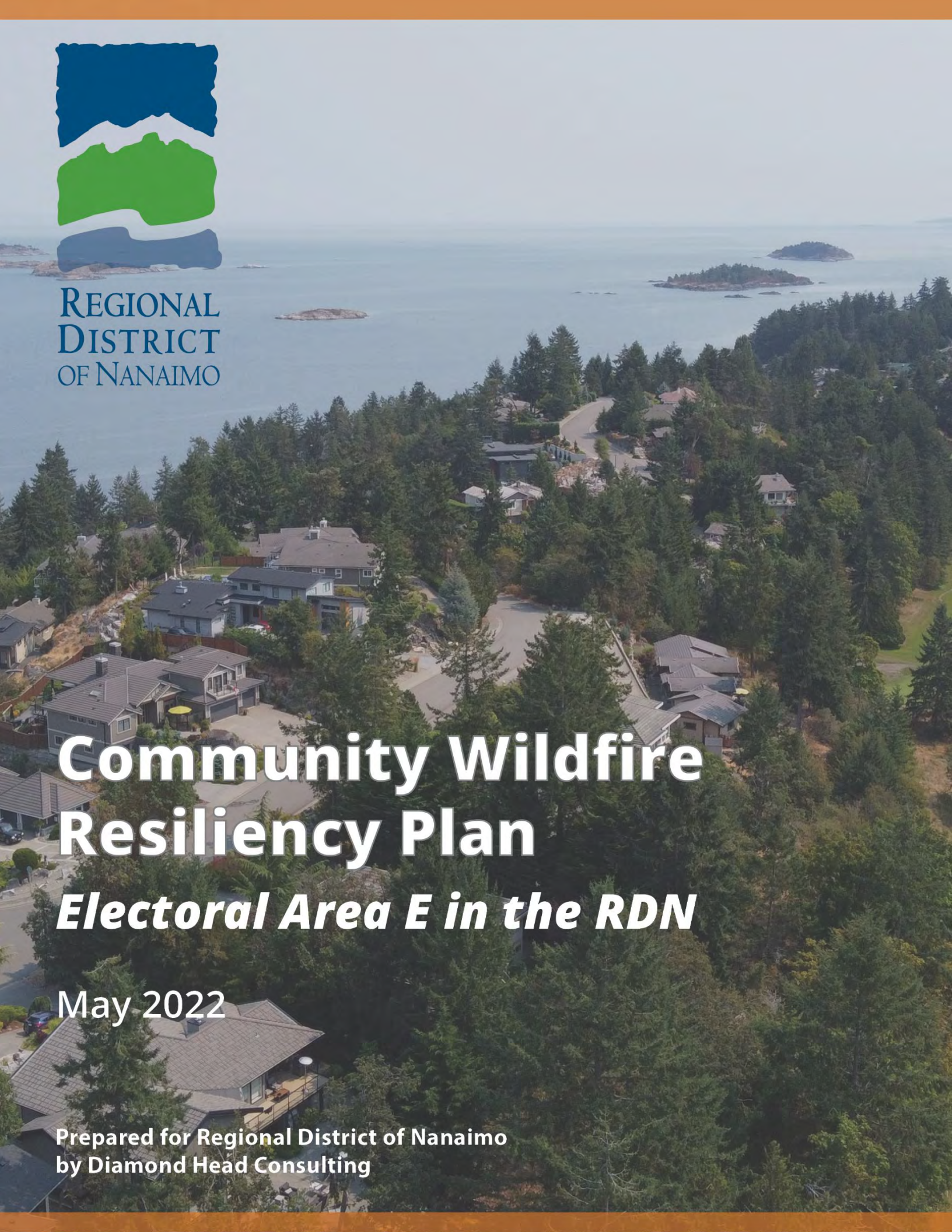

REGIONAL DISTRICT OF NANAIMO

# Community Wildfire Resiliency Plan

## *Electoral Area E in the RDN*

May 2022

**Prepared for Regional District of Nanaimo**
**by Diamond Head Consulting**

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

*May 2022*

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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.

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# Acknowledgements

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# Frequently Used Acronyms

| | |
|---|---|
| AOI | Area of Interest |
| BC | British Columbia |
| BCWS | British Columbia Wildfire Service |
| CFFDRS | Canadian Forest Fire Danger Rating System |
| CFBPS | Canadian Fire Behavior Prediction System |
| CFS | Community Funding and Supports |
| CRI | Community Resiliency Investment |
| CWPP | Community Wildfire Protection Plan |
| CWRP | Community Wildfire Resiliency Plan |
| 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 |
| HRVA | Hazard, Risk, and Vulnerability Analysis |
| LRMP | Land and Resource Management Plan |
| MOE | Ministry of Environment |
| MFLNRORD | Ministry of Forests, Lands, Natural Resource Operations and Rural Development |
| NVFD | Nanoose Volunteer Fire Department |
| 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 E (EA E) This plan examines wildfire risk in the wildland-urban interface (WUI) of EA E and makes 32 recommendations for the RDN to help build towards a FireSmart community.

The type of development and extensive forested areas that characterize EA E also contribute to its vulnerability to wildfire. Most residents live in an area called the WUI, where forests intersect with homes and businesses. In the communities, the line between forests and development is sometimes clear – like the boundary between patches of forest, farms, and conventional suburban development – and sometimes indistinct where houses are set amid the trees. These forms of development are called "interface" and "intermix" respectively and create different kinds of risk to the communities. 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. The Electoral Area's dramatic coastline and uplands have attracted much residential development, while inland areas are made up of a patchwork of farms, forests, lakes, and rural subdivisions. Because of the geography, most areas in the WUI of the community have no more than two points of public access. Neighbourhoods south of Island Highway (Hwy 19) often have only one point of access. These areas also feature a long interface with continuous private forest land. Despite this, the fragmented forest landscape makes the likelihood of a community-wide evacuation an unlikely event.

In the WUI, wildfire consultants conducted wildfire risk assessments on public land, examining the location of critical infrastructure and the characteristics of forest vegetation. These assessments and data from the Provincial Strategic Threat Analysis (PSTA) were used to map the wildfire risk throughout the WUI. The analysis shows that much of the public land base is characterized by moderate threat of wildfire. Development in these areas has placed buildings and infrastructure near forests that can sustain fires with moderate wildfire behavior. Moderate wildfire threat means that a forest is expected to readily support wildfire of low to moderate intensity during the peak fire season. Wildfire risk on private land was not modelled; however risk on private land is likely moderate, similar to public land. 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 are 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 E. 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 communities. Risk has likely increased with climate change and will continue to do so, making the cyclical and repeat nature of community wildfire planning necessary and apparent. Recommendations in the Action Plan are framed with suggested priorities and implementation timeframes. This Plan is a fundamental first step towards improving the resilience of EA E to the impacts of wildfires.

# Introduction

## Overview

To be resilient means to recover from difficulty. In the landscape, wildfire 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 the communities; instead, it means that the communities will emerge from a wildfire disaster intact and recognizable.

This Community Wildfire Resiliency Plan (CWRP) examines wildfire risk in Electoral Area E (EA E) 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 the community, focusing on actions that are within the Regional District of Nanaimo's (RDN) mandate 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, stakeholders, or long timeframes that 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. In its current form, this partnership is called the ***Community Resiliency Investment Program*** (CRI). CRI establishes the standards expected of a CWRP and provides guidance on what actions can be supported by local government to manage wildfire risk. The CWRP assesses risk within the ***wildland-urban interface (WUI)***, an area of land where natural vegetation and urban development are in proximity. The WUI is where wildfire can travel from wildland vegetation into the communities and is there is the highest concern for potential wildfire activity. To create the plan, professional foresters visited public lands in the WUI to gather information used to map 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 EA E.

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 (WUI)*** **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. (Near Dorcas Point, EA E.)**

The first three sections of the plan following this introduction consider the context of EA E and present the findings of the wildfire risk assessment. The community's 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.11). The results of wildfire threat assessments and local wildfire risk mapping are presented in *Wildfire Risk Assessment* (p.34). This section also contains information on the historic fire regime and climate change factors that may influence future wildfire risk.

The following section bridges between the *Wildfire Risk Assessment* (p.34) 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.85). 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.
- *Interagency Cooperation* (p.93). Making recommendations for the ongoing effort to engage multiple stakeholders and partner institutions is the focus of this section.
- *Cross-Training* (p.98). This section concerns opportunities and challenges in ensuring more wildfire training for relevant emergency response personnel and neighbourhood FireSmart representatives.
- *Emergency Planning* (p.101). This section considers how parallel emergency planning processes and procedures can incorporate wildfire risk and reflect wildfire preparedness.
- *Vegetation Management* (p.105). 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.112), which provides notes about potential actions discussed in the preceding sections and prioritizes recommendations for implementation. The *Action Plan* (p.112) can stand alone with the *Executive Summary* (p.x) as a guide to improving wildfire resiliency in EA E. 32 recommendations to improve wildfire resiliency in the community are provided, organized by the appropriate FireSmart discipline and suggested priority.

*Appendices* (p.120) to the plan provide additional details, including a glossary of terms and a description of how public input was received and incorporated.

## Plan Goals

Wildfire is a feature of the landscape. The patchwork of forests surrounding the homes and communities are vulnerable to wildfire whether it is of natural or human causes. 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, is protected from wildfire. |
| **Interagency Co-operation and Policy** | Wildfire management planning, preparedness, prevention, suppression, and education occurs in co-operation 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 practice. |
| **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 wildland-urban interface 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 programs 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 protection plans for EA E were prepared over ten years ago as part of an earlier generation of plans under the Province's Strategic Wildfire Prevention Initiative. The Community Resiliency Investment Program has since superseded this initiative and has created updated guidance for preparing a Community Wildfire Resiliency Plan. The RDN issued a request for proposals in 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 November 24th, 2021, and incorporated question and answer sessions during which members of the project team responded to public concerns. These meetings were held online, as adapted programming during the COVID-19 pandemic, and recordings have been made available on the RDN's Get Involved website. During the plan development phase, the Get Involved website 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 March 2022. With revisions from the community, the final plan was 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. 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 Electoral Area E (EA E) ("Nanoose Bay") and the neighbouring Nanoose First Nation and District of Lantzville in 2010. The District of Lantzville recently completed its own Community Wildfire Protection Plan. As part of its Wildfire Resiliency Initiative, the RDN is preparing new Community Wildfire Resiliency Plans for the neighbouring EAs C (Extension, Nanaimo Lakes Rd, East Wellington), F (Meadowood, Whiskey Creek, Coombs, Errington), and G (Dashwood, French Creek, San Pareil). Additionally, this plan has been developed in tandem with six other CWRPs, one for each electoral area in the RDN.

**Table 2. Linkages to existing community wildfire plans.**

| Plan | Description | Relationship to CWRP |
|---|---|---|
| Lantzville, Nanoose Bay, and Nanoose First Nation Community Wildfire Protection Plan (2010) | This is the community wildfire protection plan currently in place for EA E. This plan identified areas of moderate, high, and extreme wildfire risk using the Province's former "Interface Community Fire Hazard" analysis methodology. The plan made 45 recommendations to reduce wildfire hazard in the three communities, including supporting FireSmart education, increased bylaw enforcement of fire bans, more cooperation between local partners and the BC Ministry of Forests, and updated building standards. | The plan provides context for the present CWRP and informs current recommendations. This plan may remain relevant for actions/goals internal to the Nanoose Volunteer Fire Department or Nanoose First Nation. |
| Community Wildfire Protection Plan – Lantzville (2020) | This plan was recently prepared by the District of Lantzville, which borders EA E to the east. The plan found low to moderate wildfire threat in most areas of the District of Lantzville, including on its boundary with EA E. Recommendations in this plan include some interagency cooperation with the RDN, such as around emergency management. | The plan provides informational value on wildfire risk and response in nearby areas. |

| | | |
|---|---|---|
| Community Wildfire Resiliency Plans – Electoral Areas G and F (2022) | These plans provide risk assessment and recommendations to the RDN in adjacent communities to the west of EA E. They were prepared concurrently with this plan. | The plans provide informational value on wildfire risk and response in nearby areas. Some strategic actions by the RDN will be coordinated across the unincorporated areas and are reflected in this plan. |

## Linkages to Other Plans

The RDN acts as the primary local government for its unincorporated areas. Regional districts operate on a special service basis, typically providing only the services that are approved by their communities and using taxes and levies to support the required level of spending. Communities in unincorporated areas can also form Improvement Districts for specific taxation purposes, such as running a volunteer fire department or waterworks district. This arrangement of "overlapping" local government is quite typical and is seen in other unincorporated areas within the RDN. However, in EA E management of the fire department was transferred from the Nanoose Fire Protection Society, a non-government service organization, to the RDN in August 2021. The RDN is the sole local government providing services, including parks operations, waste removal, and bylaw enforcement, to EA E. Local government plans for these services can influence the wildfire risk environment and reflect preparedness.

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

| Plan | Description | Relationship to CWRP |
|---|---|---|
| Nanoose Bay Official Community Plan (Bylaw No. 1400, 2005) | This plan is prepared by the RDN and develops a vision for land use within the community. Under the *Local Government Act*, Official Community Plans must address how a local government area's land is to be allocated by land use. These documents can also set local government policy for a variety of social and economic issues. Bylaws adopted by the local government must be consistent with the adopted Official Community Plan. | The plan addresses planning and land use in EA E, containing policies regarding growth and development that influence wildfire risk. The urban containment boundary sets a long-term limit between urban and rural landscapes and may over time influence the pattern of interface or intermix development. Three policies address "interface fire" hazard. Policy support is expressed for "community-based programs that may prevent interface fire damage", as well as collaborating with provincial fuel management programs (see section 5.6). General recommendations are also made to support adequate fire protection and water delivery capacity.<br>The plan designates all of EA E as a "development approval information area" for the purposes of the RDN's Impact Assessment Bylaw (No. 1165, 1999). |

| Plan | Description | Relationship to CWRP |
|---|---|---|
| The Lakes District Neighbourhood Plan (Schedule B to the Official Community Plan) | This is a neighbourhood (sub-area) plan for the Lakes District adopted as a Schedule to the Official Community Plan. The Lakes District is located on the Nanoose Peninsula near Enos Lake. Neighbourhood plans contain finer-scaled detail on land use, urban design, and community servicing requirements to help shape unique identities in areas of focused development. | The plan recognizes that the forest landscape of the Nanoose peninsula comes with inherent wildfire risk and anticipates the CWPP with several policies. The neighbourhood plan responds to wildfire risk by incorporating a strategy for emergency preparedness, ensuring new development has multiple points of access and egress, and that water servicing coverage be secured where development abuts forests. It also establishes that wildfire planning best practices shall be considered, and that development within 100 m of the identified "Interface Zone" is encouraged to follow FireSmart guidelines such as the use of non-combustible building materials The plan also dictates that RDN will refer OCP amendment, zoning, subdivision, and development permit applications to the fire department for review. |
| Schooner Cove Neighbourhood Plan (Schedule C to the Official Community Plan) | This is a neighbourhood (sub-area) plan for the Lakes District adopted as a Schedule to the Official Community Plan. Schooner Cove is a small area centred on the Schooner Cove marina. Neighbourhood plans contain finer-scaled detail on land use, urban design, and community servicing requirements to help shape unique identities in areas of focused development. | The plan recognizes that wildfire hazard is a concern on the Nanoose peninsula. Prepared during the development of the 2010 Community Wildfire Protection Plan, the plan establishes that development in the area will consider wildfire planning best practices and where practicable apply FireSmart building principles alongside fuel hazard abatement. The neighbourhood plan contains similar provisions for managing wildfire risk as the Lakes District Neighbourhood Plan, including consideration of multiple access and egress routes, water servicing for fire protection, and review of plans by the fire department. |

| Plan | Description | Relationship to CWRP |
|---|---|---|
| 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. |
| RDN Hazard, Risk, and Vulnerability Analysis | 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. | 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. |
| Parks & Trails Strategy | 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, park and trail improvements, and guide core park services by the Recreation and Park Department. | Parks management is important for community wildfire planning because of its connections to vegetation management and ignitions caused by recreational activities. |
| Strategic Plan 2019-2022 | 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. | 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. |

In addition to local government plans, higher government land use plans can apply to all or specific portions of EA E. The Vancouver Island Summary Land Use Plan (2000), established by order, guides forest practices in several "special management zones." Two such areas are located in EA E and were established through Land Use Order in 2018, which prohibits disturbance in these areas. This plan does not include any recommendations that conflict with this Land Use Order.

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 E.

# 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 apply. For this plan, the area of interest is Electoral Area E (EA E) of the RDN. EA E includes the lands on the east coast of Vancouver Island west of the District of Lantzville and east of the City of Parksville. Electoral Areas G and F border the community to the west, while Electoral Area C borders it to the south. A diverse landscape hosts several communities, including the coastal areas of Beachcomber, Dolphin Drive, Schooner Cove, and Fairwinds, and inland communities like Red Gap, Matthew Road, and Sea Blush. EA E also includes the First Nation Reserve Lands of the Snaw-naw-as (Nanoose First Nation), though this area is separated from the rest of the Electoral Area by the District of Lantzville. The reserve is administered by the Snaw-naw-as and not by the RDN. The north shore of Nanoose Bay is part of the restricted Canadian Forces Maritime Experimental and Test Ranges (CFMETR), a naval facility used by the Canadian and American governments. This area is mostly forested and is managed by federal authorities as a field unit of National Defence Headquarters.

EA E contains a diverse landscape despite its small area of approximately 75 $km^2$. High areas along the shoreline are rocky and thin-soiled, supporting a cover of Douglas-fir forest that breaks open into arbutus parkland in the driest places. A mix of farmland and forest stretches across the rolling terrain between Nanoose Bay and the Englishman River. This area is deep-soiled and represents a coastal plain that was ridden over by glaciers and seawater in relatively recent geological time. In the south of EA E, privately owned forest land occupies much of the terrain, continuing into the heart of Vancouver Island's mountains. Deciduous tree species in the landscape are mainly confined to stream courses, wetlands, lakeshores, and abandoned farmland. Around streams and other riparian areas, mixed species forests of Douglas-fir, western redcedar, bigleaf maple, red alder, and other species are found.

## Wildland-Urban Interface

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 the communities are surrounded by and include large areas of forest vegetation, most of EA E can be considered as part of the interface. This plan defines the WUI as the area within one kilometre of a density of six buildings (or "structures") per square kilometre. This creates a ring around the most populated areas of EA E, where most buildings and people would be at risk if a wildfire were to occur. The distance of one kilometre 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 characterizes the communities. 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". As the name suggests, it 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. EA E contains both conditions. Interface development describes conventional residential subdivisions near Cedar and Cassidy as well as the boundary between farmland and forests, while intermix conditions are more typical in the eastern uplands where forests are more prevalent than agriculture. Figure 1 shows examples of these two conditions from EA E.

*Interface* conditions are where the boundary of urbanized and forested areas is visible at the scale of whole neighbourhoods.

*Intermix* conditions are where the boundary of urbanized and forested areas is visible at the scale of single houses or groups of houses.

Schooner Cove

Dorcas Point

**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 which are next to 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 to 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.

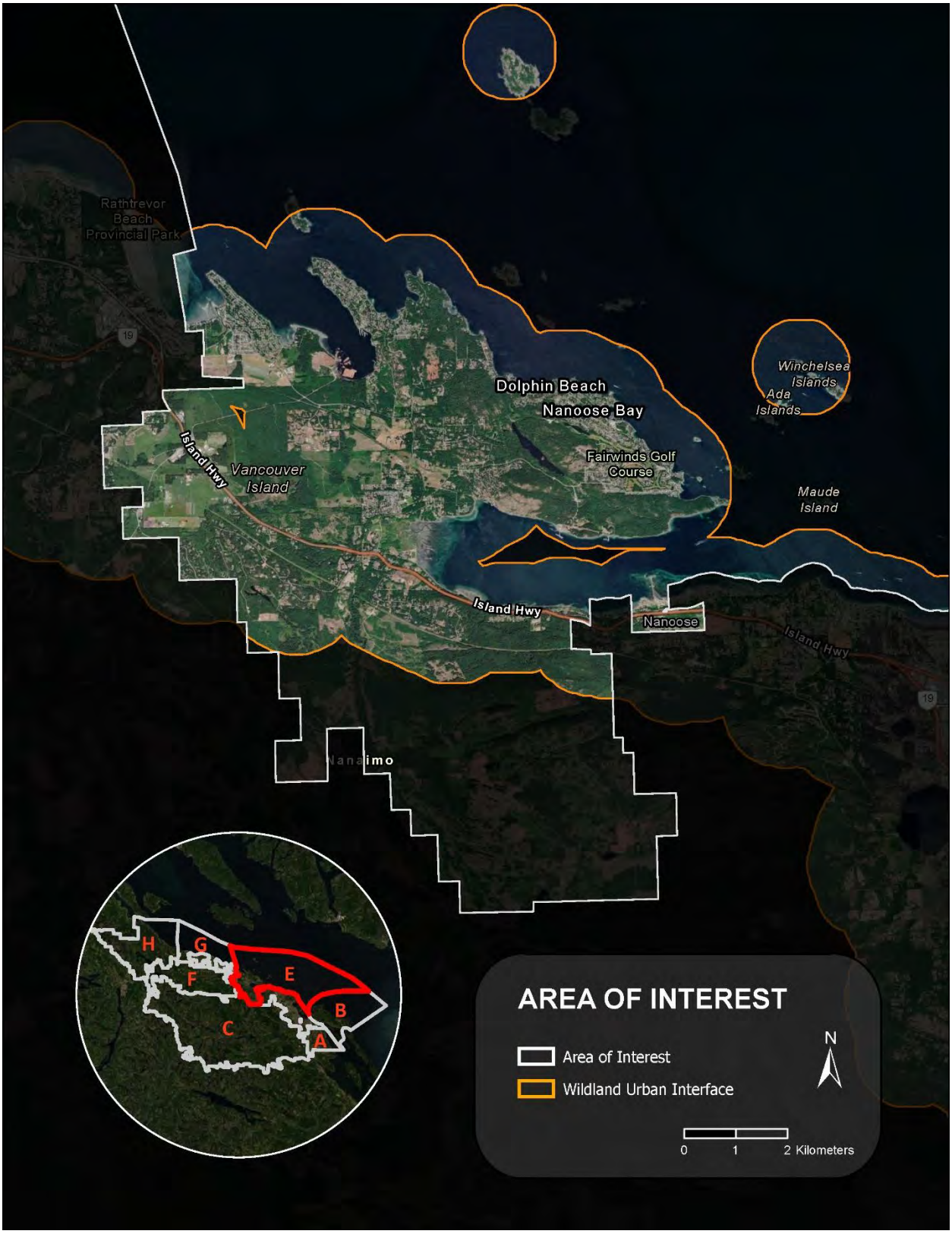


**Figure 2. Area of interest for the plan and WUI.**

## Community Information

### Demographics and Housing

The growth of the communities and how housing develops can have a large impact on the 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 the 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.

EA E constitutes a single census subdivision for Statistics Canada. The population of EA E at the 2021 Census was 6,765[1]. 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 2016[2]. The number of private dwellings was 3,066, with just over 2,800 of these reported as being permanently occupied. The proportion of seasonal residences (8%) is higher than in the RDN as a whole (6%), reflecting Nanoose Bay's status as a desirable destination for property investment.

The RDN completed a Housing Needs Report in 2020 as part of its mandate from the Province to plan for housing affordability. The Housing Needs Report contains information about the observed rate of growth across the RDN's municipalities and Electoral Areas and uses this information to forecast the growth in housing need until 2041. Across the RDN an additional 3,500 housing units are needed to meet forecast demand by 2026. The Report does not break down forecast need by Electoral Area. Development activity in EA E is focused inside the urban containment boundary, which surrounds Fairwinds, Schooner Cove, and Red Gap. These areas have seen development of several dozen homes in recent years, and some development of multi-family housing.

The demographics of EA E reflects the area's strong attractiveness. The community has higher median and average ages, lower labour force participation, and a higher number of two-person households than the RDN as a whole. As in other unincorporated areas, homeowners (90%) greatly outnumber other residents (10%), partly due to a lack of rental housing or other forms of occupancy. Average household income is just under $110,000 per year.

[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 A, 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. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed September 23, 2021).

Community demographics will influence risk and appropriate emergency planning and response. On average, residents are older and belong to wealthier households than in other areas of the RDN. Despite this, a significant number of residents live alone (21%). In the community, these households are likely to be older retirees, some of whom are aging in place after losing a partner or loved one. Young families continue to make homes in EA E but may face additional cost or time pressure that limits their ability to participate in wildfire resiliency programs. Residents from different walks of life may need different supports to connect with emergency planning processes or receive direction from emergency responders during a wildfire. Table 4 compares key demographic attributes of the community with the RDN and the wider province.

**Table 4. Community Information for EA E.**

| Community Information | Electoral Area E | RDN | Province of British Columbia |
|---|---|---|---|
| Total Population (2021) | **6,765** | 170,367 | 5,000,879 |
| Land area ($km^2$) | **75.08** | 2,038.04 | 922,503.01 |
| Population density (persons/$km^2$) | **81.6** | 76.4 | 5.0 |
| Number of private dwellings | **3,066** | 73,622 | 2,063,417 |
| Number of dwellings occupied by usual residents | **2,814 (91.8%)** | 68,904 (93.6%) | 1,881,969 (91.2%) |
| Average household income ($) | **108,772** | 77,868 | 90,354 |
| Average household size (persons) | **2.2** | 2.2 | 2.4 |
| Households by tenure – owner | **2,540 (90.4%)** | 50,930 (74%) | 1,279,020 (68%) |
| Households by tenure – renter | **270 (9.6%)** | 17,900 (26%) | 599,360 (32%) |
| Prevalence of low-income, after tax (LICO-AT) (%) | **4.1** | 8.6 | 11.0 |
| Labour force participation rate (%) | **47.1** | 55.2 | 63.9 |
| Unemployment rate (%) | **7.1** | 7.7 | 6.7 |
| Median age (years) | **59.4** | 51.1 | 43.0 |
| *Data Sources:*<br><br>*Reported total population is from the 2021 Census.*<br><br>*All other figures are from the previous 2016 Census, which was the most recent available information at time of writing.* | *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).*<br><br>*Statistics Canada. 2017. Nanaimo E, 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 October 7, 2021)..* | | |

### Fire and Emergency Response

Fire response is provided in EA E by the Nanoose Volunteer Fire Department (NVFD). Formerly operated as a non-government society, management of the NVFD was transferred to the RDN in August of 2021. This transfer has not affected the service area or department personnel. The fire protection service area covers the entirety of EA E except for the Snaw-naw-as Nation reserve and extends into neighbouring parts of Electoral Areas F and G east of the Englishman River. The CFMETR base employs a small, dedicated team of firefighting personnel who are active on the site during workday hours and respond to incidents associated with base operations. At all times, the NVFD will respond to an emergency call on the CFMETR base and will be allowed to access the site through its 24/7 manned gate off Fairwinds Drive.

NVFD is a registered department with the Office of the Fire Commissioner, meaning they must meet standards for training set in the BC Fire Service *Playbook.* NVFD is a department of 28 (April 2022) paid-on-call firefighters, all trained to the "interior-service operations standard" under the *Playbook*. This means that the department can respond to the variety of exterior and interior fires within their declared service level that can occur in the community, including wildfires. Some members of the department have additional training relevant to wildfire, including courses for wildland response with the BCWS, leadership training, and incident command system. Fire Hall No. 1 on Nanoose Road in Red Gap stores several vehicles, including dedicated engines, tenders, command, and support vehicles. The department maintains a smaller response truck, adapted from a Dodge 3500 one-ton base, that can be used to respond to bush fires in areas with poor road access. Recently, the department achieved Superior Tanker Shuttle Accreditation from the Fire Underwriters Survey of Canada. This means that the department can provide the water delivery capacity equivalent to municipal water service in areas without fire hydrants. This applies in neighbourhoods south of Island Highway (Hwy 19) and in rural (generally inland) areas which lack water service. However, the accreditation does not guarantee response times or water availability during a widespread emergency. Some areas of the community remain further from the fire hall or available water supplies, complicating wildfire response.

Mutual aid agreements between the NVFD and neighbouring fire departments provide access to additional resources during a major event inside EA E. In recent years, automatic aid agreements have been growing in number among the RDN's fire departments and surrounding municipal and Improvement District departments. Negotiations for these agreements have helped support interagency cooperation between first responders.


**Figure 3. Fire Protection Districts of the Nanoose Volunteer Fire Department.**

**Table 5. Major resources for fire response inside EA E.**

| Organization | Major Resources for Fire Response |
|---|---|
| Nanoose Volunteer Fire Department | - ~28 volunteers trained in accordance with NFPA 1001 practice requirements and playbook guidance as interior-service firefighters.<br>- Seven response vehicles, including one modified four-wheel drive wheelbase.<br>- Several thousand feet of supply hose for drafting and attack line, generally loaded on separate vehicles and cached at the fire hall.<br>- All members train to WSPP-FF 1 and ICS-100<br>- Officers trained to ICS-200.<br>- Several members with experience on BCWS crews. |
| Canadian Force Maritime Experimental and Test Ranges | - Small team of designated staff respond to fires on base property 9-5.<br>- Two response vehicles.<br>- 1,000 L water tank and hand tools cached at waterfront campground. |

## 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 six structures per square $km^2$ 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 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 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 centre 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 rising 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 E are attracted to these communities because of the seaside views and rural atmosphere. This has resulted in intermix areas of rural estates, with homes set within and among the forest, as well as interface areas where conventional subdivision and land development has created suburban communities on the edge of forests and farms.

Development conditions and structure density affect all aspects of fire management response and can strongly influence fire behavior. 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.85.

### Human Health

In addition to the direct risks to life, large uncontrolled wildfires can cause other human health impacts. Residents 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 incomes[3]. 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 underrated. 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 emergency[4].

**Photo 2. Smoke can reduce air quality and cause health problems. (Example from outside the RDN.)**

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

[4] 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).

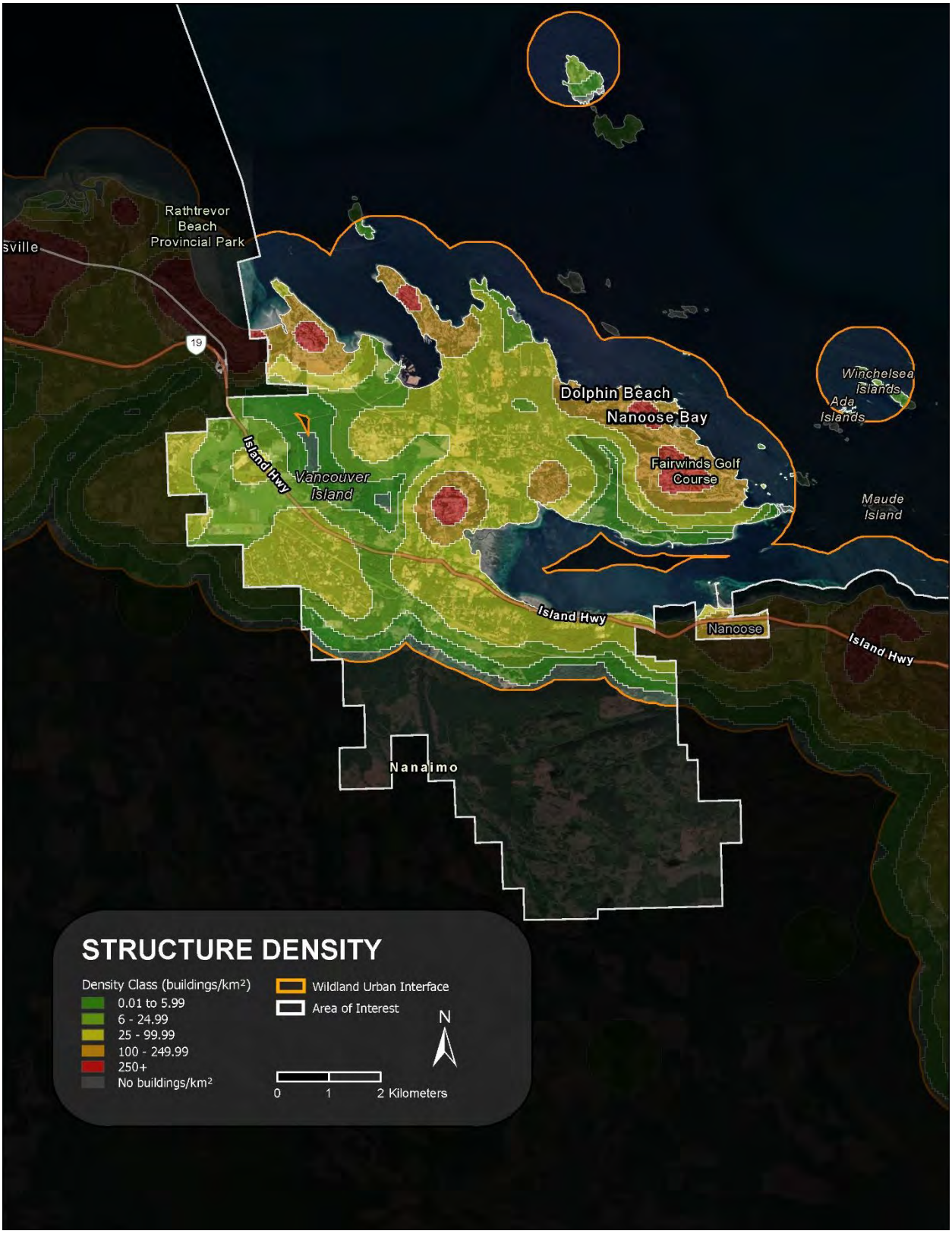


**Figure 4. Structure density within the WUI. The WUI represents a buffer of one km around areas of six structures per km$^2$ or higher and is an indication of where most people live.**

### Environment and Protected Areas

EA E hosts a variety of forest habitats in parks and protected areas. The mild climate in these regions allow animals and plants to thrive that are not found elsewhere in Canada. In addition, the Salish Sea hosts travelling and resident marine wildlife whose habitats can be impacted by what happens on shore. A variety of birds, mammals, and small animals bridge the divide between land and sea each day.

Slightly less than 2% of EA E is within parks and protected areas, which is low relative to neighbouring Electoral Areas. Other public lands and suitable private lands increase the proportion of the area that offers natural and semi-natural habitats. The low proportion of protected areas is related to Nanoose Bay's coastal location and long history of settlement.

Forested environments, regardless of their conservation status, contain vegetation that can fuel a wildfire. Renewing 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. In the case of EA E, the most extensive remaining forests are on private land managed by forestry companies. Public land contributes the minority share of EA E's forest cover. There are large contiguous areas of forested land on the base at CFMETR, and in the woodlot license tenure (W1479) located south of Moorecroft Regional Park. The RDN has acquired a variety of community and regional parks to provide people places to recreate and enjoy nature, many of which contain some forest cover. The Province has also established a handful of provincial parks. Moorecroft Regional Park (36 ha) is the largest park property in the area, followed by Arbutus Grove Provincial Park (22 ha) on the border with Lantzville.

### 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. 12 occurrences of blue-listed species and 12 occurrences of red-listed species are known within the project area. An additional two occurrences of blue-listed and 11 red-listed ecological communities are 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 |
|---|---|---|---|
| 11988<br>11989 | *Allium amplectens*<br>Slimleaf Onion | Plant | Blue |
| 591<br>4335<br>5187<br>5451 | *Dryopteris arguta*<br>Coastal wood fern | Plant | Blue |
| 6968 | *Entosthodon fascicularis*<br>Banded Cord-moss | Plant | Blue |
| 4341 | *Eumetopias jubatus*<br>Steller Sea Lion | Vertebrate | Blue |
| 1589 | *Nannopterum auritum*<br>Double-crested Cormorant | Vertebrate | Blue |
| 10774<br>10775 | *Populus trichocarpa -Alnus rubra/Rubus spectabilis*<br>Black Cottonwood – Red Alder / Salmonberry | Ecological Community | Blue |
| 7158<br>8587 | *Rana aurora*<br>Northern Red-legged frog | Vertebrate | Blue |
| 11219 | *Syntrichia laevipila*<br>Twisted Oak Moss | Plant | Blue |
| 14323 | *Abies grandis / Mahonia nervosa*<br>Grand fir / Dull Oregon-grape | Ecological Community | Red |
| 7340 | *Bartramia aprica*<br>Rigid Apple Moss | Plant | Red |
| 16024 | *Chrysemys picta (pop. 1)*<br>Painted turtle – Pacific coast population | Vertebrate | Red |
| 1336<br>1790 | *Erynnis propertius*<br>Propertius Duskywing | Invertebrate | Red |
| 867 | *Gasterosteus sp. 2*<br>Enos Lake Limnetic Stickleback | Vertebrate | Red |
| 2114 | *Gasterosteus sp. 3*<br>Enos Lake Benthic Stickleback | Vertebrate | Red |
| 2645 | *Meconella oregana*<br>White meconella | Plant | Red |
| 8387<br>8397<br>8398<br>8400 | *Pseudotsuga menziesii / Mahonia nervosa*<br>Douglas-fir / Dull Oregon-grape | Ecological Community | Red |
| 4289<br>4290 | *Pseudotsuga menziesii / Melica subulate*<br>Douglas-fir / Alaska Oniongrass | Ecological Community | Red |
| 5127<br>16812 | *Quercus garryana / Bromus carinatus*<br>Garry oak / California brome | Ecological Community | Red |
| 378 | *Ranunculus alismifolius* var. *alismifolius*<br>Water-plantain Buttercup | Plant | Red |
| 10810<br>10812 | *Thuja plicata / Symphoricarpos albus*<br>Western Redcedar / Common Snowberry | Ecological Community | Red |
| 15010<br>15011 | *Tramea lacerata*<br>Black saddlebags | Invertebrate | Red |
| 6558 | *Uropappus lindleyi*<br>Lindley's Microseris | Plant | Red |

| | | | |
|---|---|---|---|
| 408 | *Viola praemorsa* var. *praemorsa*<br>Yellow Montane Violet | Plant | Red |

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 its intensity and frequency. the landscape developed in the context of sporadic wildfire, with plants and animals that have adapted to wildfire disturbance[5,6]. In the Salish Sea lowlands, Indigenous people used prescribed wildfire pre-colonization to maintain desirable meadow forage and food plants like camas[7,8]. Wildfires can support biodiversity by re-establishing a diversity of forest ages and tree sizes 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.

[5] 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.

[6] 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.

[7] 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.

[8] 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

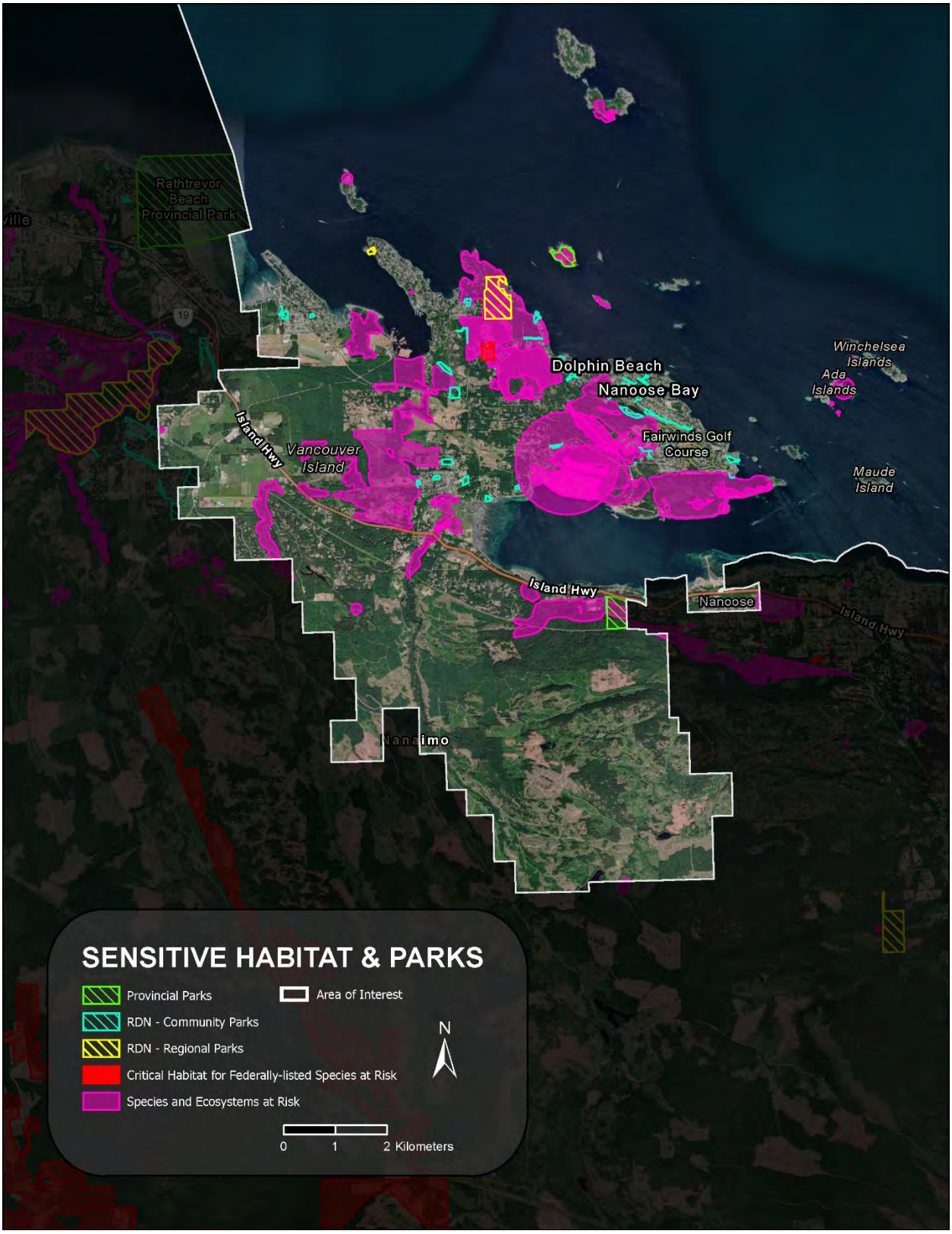


**Figure 5. Protected areas and known locations of protected species or habitat.**

### Cultural and Archaeological Values

The landscape of EA E 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 within EA E is the core territory of the *Snaw-naw-as* First Nation. Indigenous people have lived in this landscape since time immemorial and continue to advocate for the 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 human remains. Because of the sensitive nature of many of these sites, their locations cannot be published. Within EA E, 56 archaeological sites are known. Activities with physical impacts on the land 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. 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. The unique CFMETR facility is involved in tactical equipment and naval technology testing. It can be assumed that hazardous values are present at the CFMETR site during normal operations. Other than the Canadian Forces base, the most significant stores of hazardous values are likely to be fuel or other supplies located within commercial fuel stations, marinas, or on private residential property. 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 auto, trade, and other commercial development concentrated along Island Highway (Hwy 19). During a wildfire, any known or suspected location of hazardous values presents a danger to emergency responders and the public.

The most significant RDN facility within EA E is the Nanoose Bay Pollution Control Centre. This facility provides primary treatment of wastewater from properties in the Fairwinds neighbourhood and is located near forests at the west end of Dolphin Lake. The treatment plant uses chemical enhancements to support the filtration of wastewater. Some chemicals as well as the untreated wastewater present at the site may be considered a potentially hazardous value because of their impacts to human health if improperly contained.

The only major industrial facility within EA E is the Northwest Bay Log Sort. Several thousand cut logs can be stored in the open air at this facility. Operations with heavy machinery create small-diameter

debris. The site's operator, Mosaic Forest Management, has its own extensive protocols for emergency response at its facilities and maintains internal firefighting capacity for use on company properties. NVFD will respond to an emergency call within the site boundary.

### Other Resource Values

Wildfires can be large, landscape-scale events that create long-term impacts on sections of the economy which rely on forest resources or access to land, including forestry, tourism, and farming. A loss of mature forests to wildfire in the area would be felt emotionally by residents and visitors and may be measurable in reduced property values or tourism and overnight stays. Wildfire is particularly challenging for holders of small private land parcels or forest tenures, who are less resilient to landscape-scale disturbance or temporary losses of access.

## Critical Infrastructure

Critical infrastructure is 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, facilities deemed critical to the delivery of emergency services (like evacuation planning or fire protection) within the RDN's Hazard Risk and Vulnerability Assessment were considered. The nature of government in the unincorporated communities means that the RDN is directly responsible for only a few 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 in EA E is mostly provided by overhead transmission lines, with distributors following most roads on the peninsula. Two exceptions to this are the Red Gap and Fairwinds Drive areas, where electrical power is routed underground. The above-ground distribution network relies almost exclusively on wood utility poles. Wood 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. A high voltage transmission line passes from northwest to southeast through EA E, south of Island Highway (Hwy 19). High-voltage lines are somewhat less likely to become sources of ignition because wider rights-of-way reduce the chance of vegetation contacting charged lines. BC Hydro inspects and manages vegetation along its utility corridors.

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 back-up power is an important part of wildfire preparedness.

### Communications Infrastructure

Primary connections to telephone and internet service in most of the EA E are provided via the same overhead connections as are used for electrical power. Some rural residences are served by satellite telecommunications providers.

Cellular telephone service and text messaging services are frequently residents' primary means of communication. Cell service is provided by the major Canadian telecommunications companies to all parts of EA E. Smaller providers may have incomplete network coverage in the area. Cellular towers for the different carriers are found in Schooner Cove and CFMETR; parts of EA E are also served by towers in the City of Parksville and District of Lantzville.

Radio communication is an important part of emergency response in EA E. The Nanoose Bay Fire Hall incorporates a radio broadcast transmitter for maintaining land-mobile communications between the department, dispatch, and crews responding to an emergency. The department also maintains a repeater for communications on top of Notch Hill.

### 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, physical emergency operations centres, fire halls, schools, hospitals, and transportation facilities. Ensuring the safety of public buildings and institutions during a wildfire is important for emergency response and community recovery after an event. During an emergency, these facilities may also be used as muster locations, evacuation reception centres, 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 E.**

| Facility or Building Name | Location | Description |
|---|---|---|
| Nanoose Bay Fire Hall<br>*Nanoose Volunteer Fire Department* | 2471 Nanoose Rd (Red Gap) | Modern fire hall with vehicles and equipment used by the Nanoose Volunteer Fire Department. |
| Nanoose Bay Elementary School<br>*School District No. 69* | 2875 Northwest Bay Road (Red Gap) | Community school enrolling students grades K-7. |

In addition to buildings identified in the RDN's Hazard Risk and Vulnerability Assessment, additional buildings in EA E serve a public function and may be important to protect during wildfire. These include the Nanoose Place Community Centre and Nanoose Library, and several privately owned properties with community functions such as the Fairwinds Recreation Center and faith-based facilities.

### Water Supply & Waste Treatment

Sources of freshwater are limited in the area. In Madrona, Beachcomber, Dolphin Beach, Fairwinds, and Red Gap, community water is supplied via a network of community wells supplemented by surface water from Englishman River – the Nanoose Peninsula water system managed by the RDN. A small area has self-organized community water service southwest of Nanoose Bay in the William Springs Waterworks District. There are also private water systems in place to serve some strata developments. Outside of these areas, most residents rely on independent wells. There are few sources of surface freshwater in lakes and streams in EA E, though nearby properties often have licenses to use these resources. In recent years EA E, along with other parts of coastal British Columbia, has experienced severe water shortages during the summer due to a combination of reduced summer precipitation, warmer temperatures, and increased water use. The ability to supplement water supply from the Englishman River to the Nanoose Peninsula water system has supported continued growth on the peninsula, though water supply, particularly on smaller systems, remains limited during fire season.

Liquid waste is handled for most properties by septic systems. Most of the Fairwinds area along with CFMETR are connected to the Nanoose Bay Pollution Control Centre. Adjacent to the City of Parksville, the Pacific Shores neighbourhood is connected by trunk sewer to the French Creek Pollution Control Centre in Electoral Area G.

**Table 8. RDN water supply and waste treatment infrastructure in EA E.**

| Facility or Building Name | Location | Description |
|---|---|---|
| Nanoose Bay Pollution Control Centre<br>*RDN* | 3260 Schooner Cove Drive (Fairwinds) | Wastewater treatment facility providing service to primarily to Fairwinds and CFMETR. |
| Nanoose Bay Peninsula Water Treatment Plant<br>*RDN* | 2480 Nanoose Road (Red Gap) | Drinking water treatment facility providing enhanced water quality to Fairwinds and Red Gap areas. |

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 so-called "splash impact" of raindrops on newly exposed mineral soils[9]. This impacts the rate of groundwater recharge, as well as affecting surface water sources with sedimentation and excess mineral nutrients downslope of burned areas.[10]. There have been cases where debris flows have damaged homes and infrastructure were attributed to wildfire damage to soils[11]. 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[12,13]. In EA E, protecting drinking water supply, septic, and sewer systems means protecting local hydrology from the potential impacts of wildfire and erosion.

[9] 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.
[10] 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.
[11] 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.
[12] 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.
[13] 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.

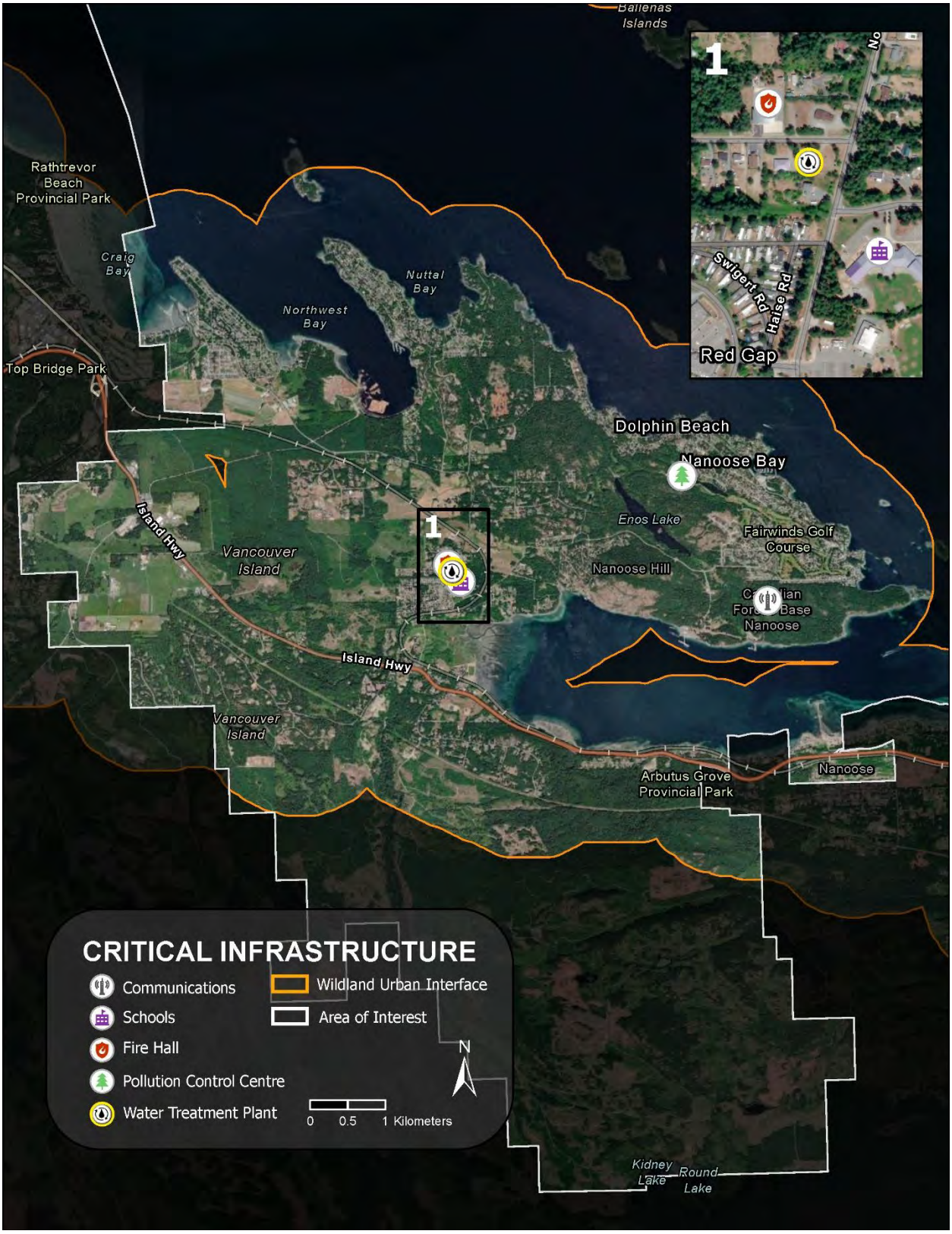


**Figure 6. Public facilities considered critical infrastructure.**

# Wildfire Risk Assessment

Crucial to building resiliency in the communities 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*** to refer to different components of the community's vulnerability to wildfire. Both threat and risk have been modelled using data collected from forests in Electoral Area E (EA E). Wildfire threat refers to the potential fire behavior 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 behavior based on fuel conditions, weather conditions, slope, aspect, and other biophysical factors. This can also be referred to as wildfire behavior 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 E. These components are topography, forest fuels (vegetation, debris and organic soil), and weather.

### Topography

Topography influences wildfire behavior 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 "warmer" 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 the latitude are more protected from direct solar exposure. Therefore, while warmer aspects burn more frequently on average, during the most extreme fire weather cooler aspects can often support more severe fire behavior. 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 behavior.

Terrain in the electoral area is variable. Short, bluffy slopes are common along the coast and inland south of Island Highway (Hwy 19), while gentle hills connect the Nanoose peninsula with inland portions of EA E. Maximum elevation in EA E is approximately 460 m above sea level in the foothills south of Nanoose Bay. The highest point on the Nanoose Peninsula is Notch Hill at about 250 m above sea level. The area between the peninsula and the foothills is between sea level and 100 m in elevation. North and south aspects dominate the terrain. The Electoral Area contains several small lakes and ponds, the largest of which is Enos Lake (18 ha) located on the Fairwinds property. Surface water is absent from many parts of EA E and may be unsuitable for use by firefighting.

### Fuels (vegetation)

Forest fuels are the dead and living vegetation, and organic soil matter within and surrounding interface communities. Fuel conditions vary with the composition of tree species, live and dead proportions, 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 because they persist in a dry, dormant state for much of the year through 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 or grassland areas.

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.

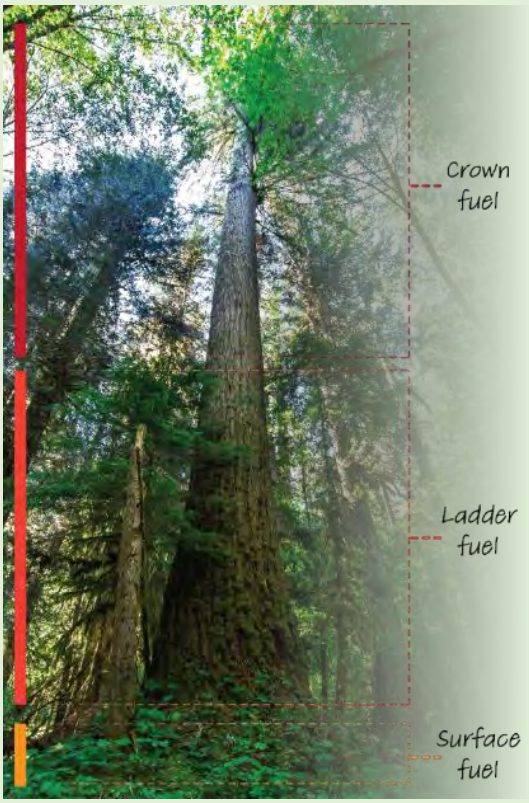


**Photo 3. Forest fuel layers.**

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 behavior between high intensity and low intensity fires is significant for preparedness planning and response. For example, BC Wildfire Service (BCWS) ground crews will action a fire burning with an intensity of more than 2,000 kilowatts per metre (kw/m). This is a measure of energy being put out by head 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 soil 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 4. A wildfire with active crown fire. (Example from outside the RDN)**

Crown fires become more likely where hazardous fuels have low ***vertical*** and ***horizontal separation***. Amid the 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 Behavior 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 the 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.

On the coast of the Salish Sea, most native coniferous forests are represented by the C-5 fuel type. This represents a coniferous forest with relatively high horizontal and vertical separation of fuels, where a high intensity of surface fire would be required under usual fire season 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 behavior). Young forests are typically denser and may have less separation between fuel layers and neighbouring tree crowns. On the south coast of BC these forests may be assigned the C-3 fuel type, which is associated with high wildfire threat. In the landscape of EA E, C-3 forests often represent areas that have were logged 10-40 years ago and are developing again as forests. Other common fuel types in the area 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 9 provides a breakdown of fuel types by total area.

**Table 9. Summary of fuel types within EA E.**

| Fuel Type Name | Area (ha) | General description |
|---|---|---|
| C-5 | 2,486 | Mature, low to moderate density stands of the native conifer Douglas-fir, generally over 40 years in age and over 15 m in height. |
| C-3 | 46 | Young conifer stands with high stem densities, generally younger than 40 years and less than 15 m in height. |
| D-1/2 | 766 | Deciduous stands with fewer than 25% coniferous composition. |
| M-1/2 | 562 | Mixedwood stands with between 25 and 75% coniferous and deciduous composition. |
| N | 92 | Non-fuel areas – pavement, rock, extensive sand. |
| O-1a/b | 1,067 | Grass fuel types, also used to represent agricultural fields and large lawns. |
| S-1 | 7 | Areas recorded as recently harvested in provincial data (typically less than five years). This fuel type is intended to represent logging slash and ignores mandatory fuel hazard abatement. |
| W | 3,378 | Bodies of water, including freshwater and the ocean. |

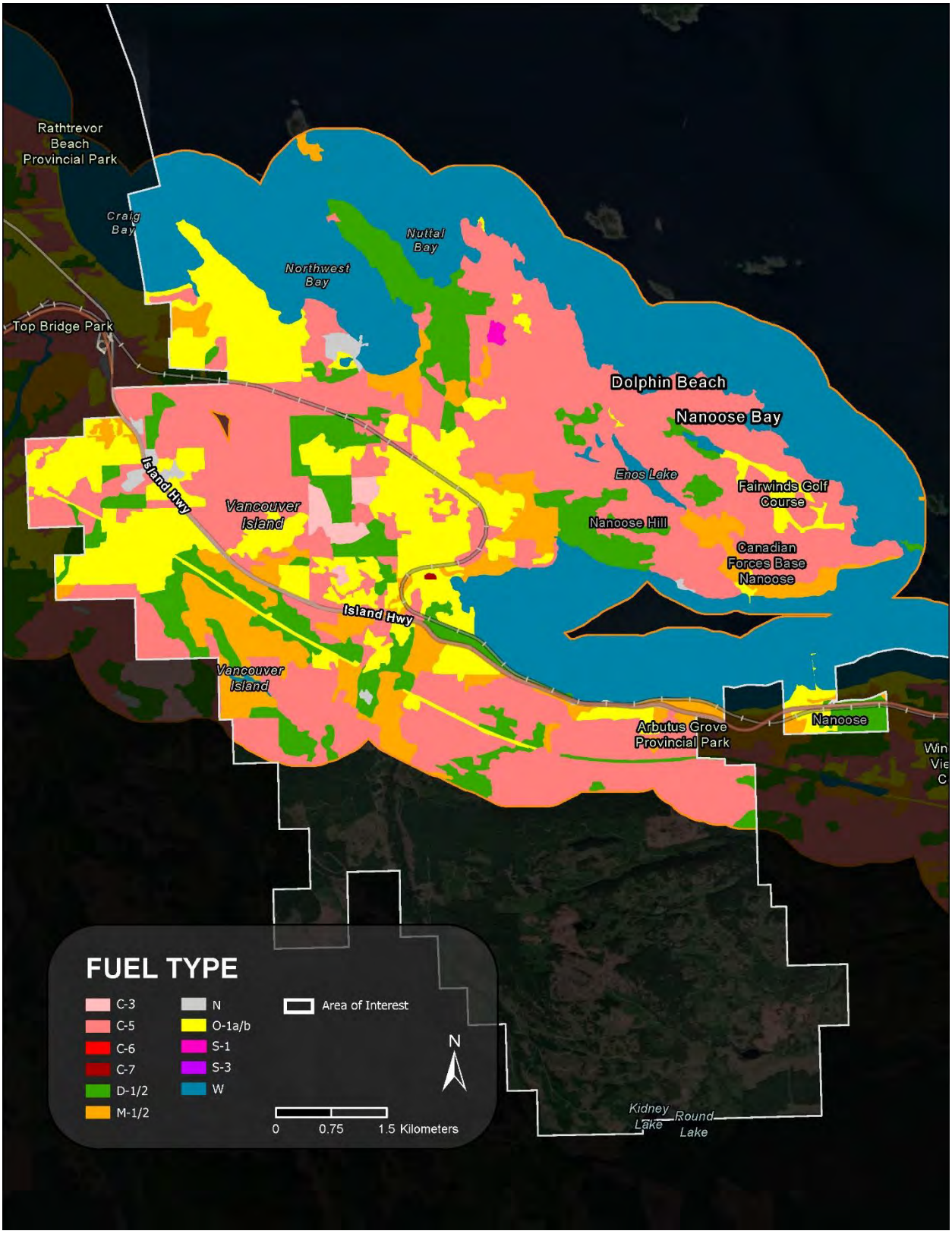


**Figure 7. Fuel types in the WUI.**

## Weather

Weather in EA E is strongly influenced by the surrounding ocean. Sea breezes cool the air during the summer and increase local humidity. In this section, weather data for Nanoose Bay is shown. Average daily highs for Nanoose Bay have ranged between 8°C (December) and 25°C (July & August). Most precipitation arrives in fall, winter, and spring, with sharply reduced precipitation in July, August, and September. Snow is rare and may fall only once or twice per year. Due to subdued elevation, isolation, and mild climate, forest ecosystems in the interface areas do not receive appreciable moisture from snowmelt.

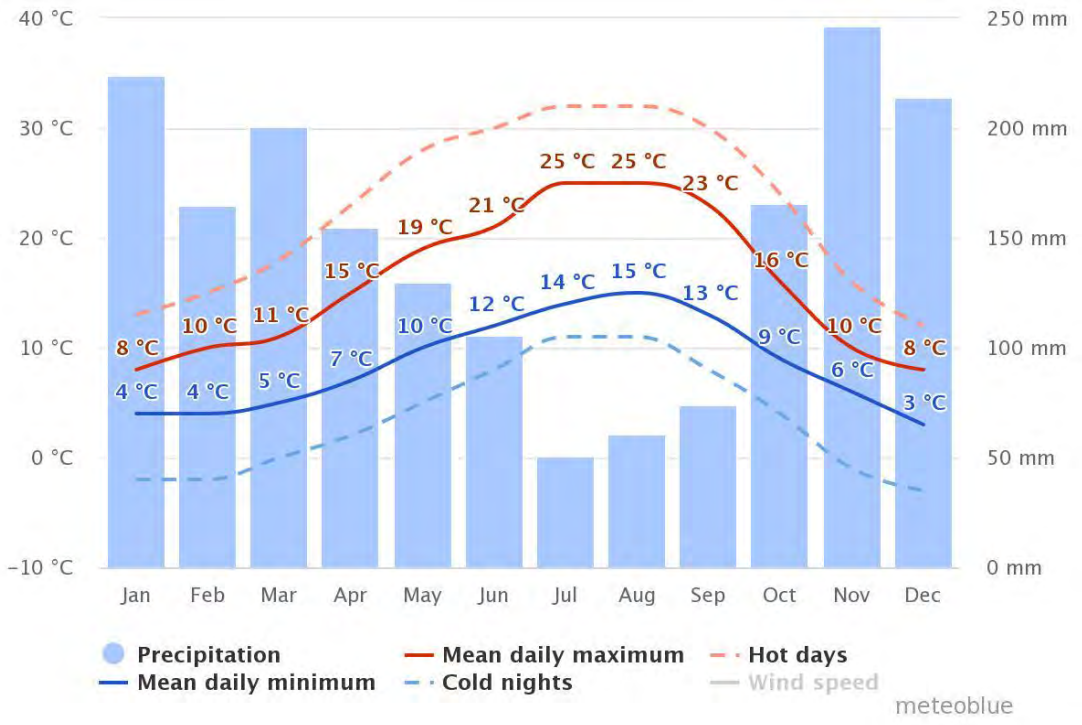


**Figure 8. 30-year modelled climate averages for Nanoose Bay (meteoblue).**

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 the area from the south. These events are often experienced as strong east or east-southeasterly winds. Storms also come from the northwest, though these tend to be weaker. Occasionally, the region receives cold easterly outflow winds that channel through the valleys of the Lower Mainland and across the Straight of Georgia. While fire risk is very low during the wet winter months, these wind events are notable because they contribute to surface fuel loading by bringing small branches and needles to the forest floor. These fine fuels then dry out to become tinder for the next fire season.

Winds are subdued in the summer months when the area experiences high air pressure and mostly stable skies. Peak fire season is characterized by many warm, blue days. Typically, the average temperatures are exceeded 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 can also bring smoke to the area. 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 hectares burned[14].

**Photo 5. The Salish Sea plays a key role in the weather patterns of the area of interest.**

[14] 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):

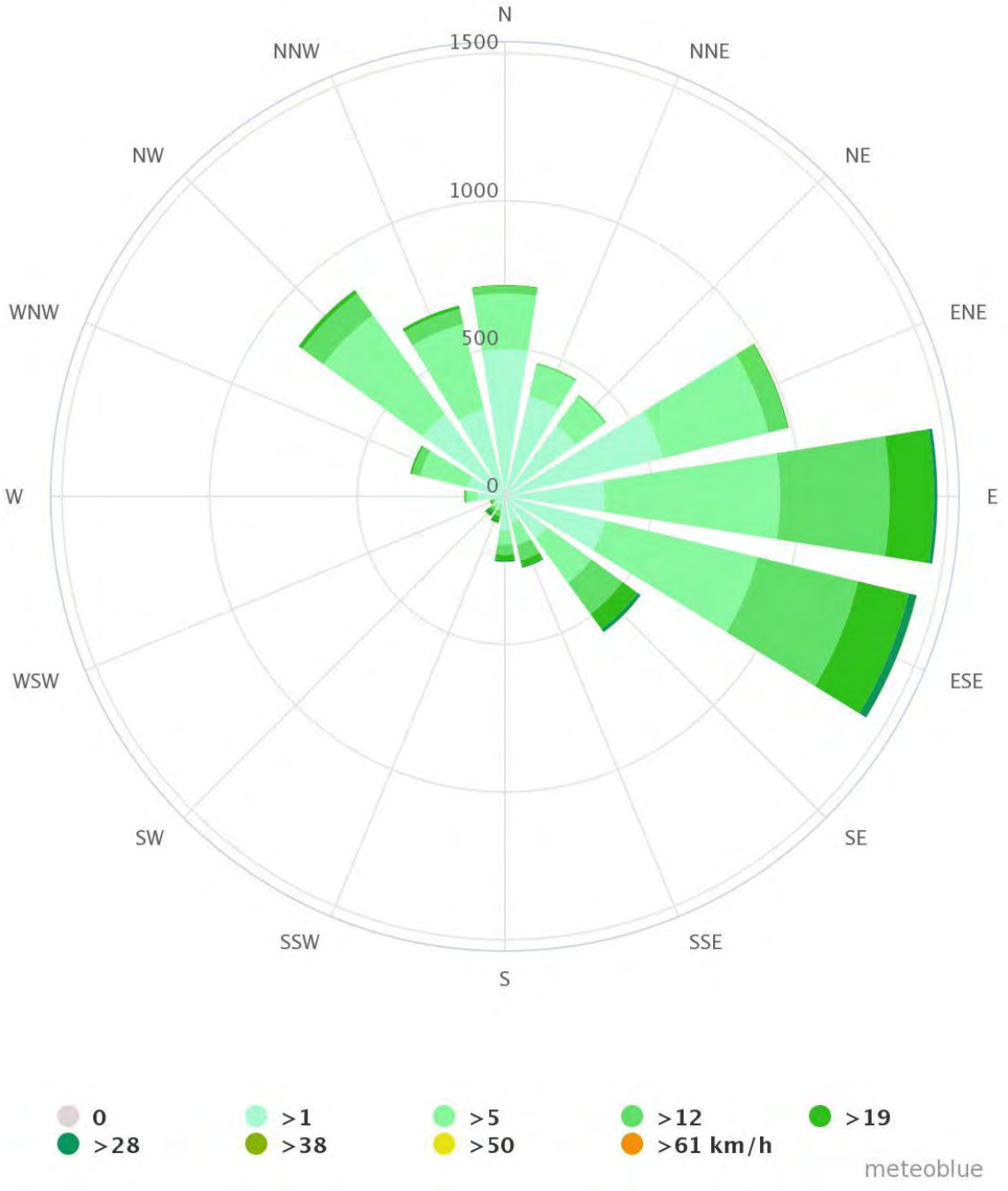


**Figure 9. Wind rose diagram for Nanoose Bay (meteoblue). The diagram shows cumulative hours (the wind rose radius) at an average windspeed from each cardinal direction during the average year (1990-2020).**

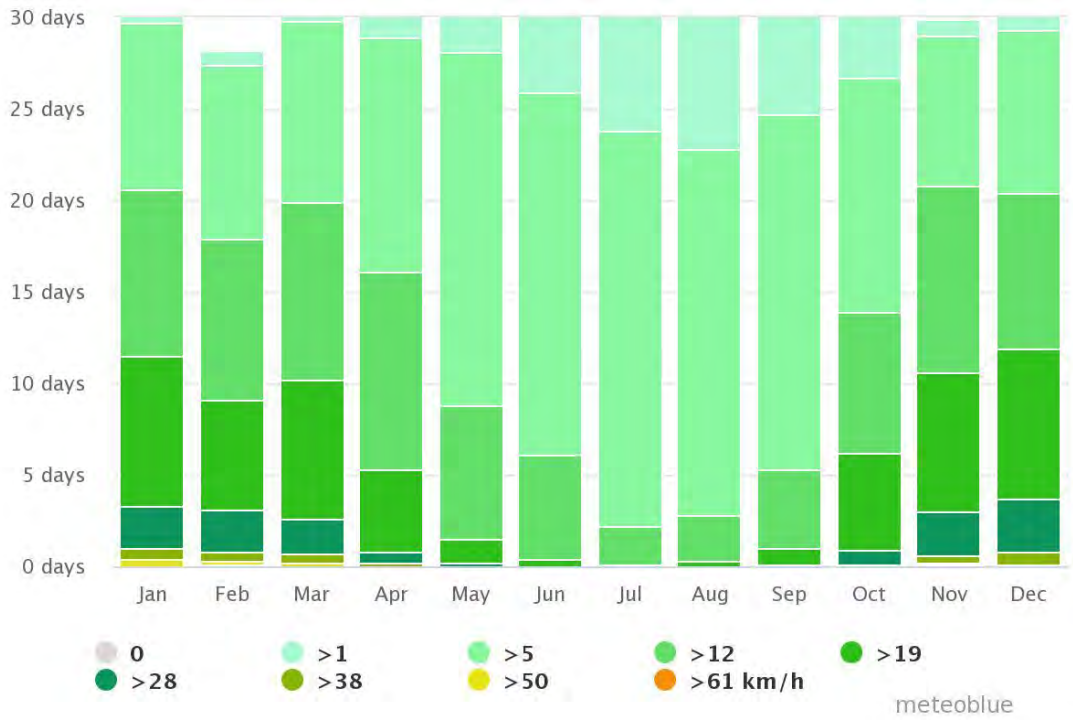


**Figure 10. Windspeeds by month experienced for Nanoose Bay (meteoblue).**

### Fire Weather Rating

Fire Weather Rating is the use of weather measurements to assess likely fire behavior 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 the 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 10 shows weather averages during the core fire season (May-September) for the two nearest BC Wildfire Management Branch weather stations, Cedar (Station # 59) and Bowser (Station #56). Data shown cover 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 the area. In 2018 and 2021, years that featured highly active wildfire seasons in the rest of the province, prolonged drought occurred throughout July and August alongside higher than average temperatures.

**Table 10. 20-year average weather (2000 -2020) from Cedar (59) and Bowser (56) BCWS weather stations.**

| | Weather Attribute | May | | Jun | | Jul | | Aug | | Sep | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Station Cedar (59) Bowser (56) | 59 | 56 | 59 | 56 | 59 | 56 | 59 | 56 | 59 | 56 |
| 2000-2020 | Maximum Daily High (°C) | 31.0 | 31.7 | 34.9 | 33.9 | 34.5 | 36.1 | 33.1 | 34.0 | 33.6 | 32.7 |
| | Daily Average High (°C) | 18.5 | 17.9 | 21.3 | 20.7 | 22.0 | 24.1 | 22.1 | 24.0 | 20.8 | 19.7 |
| | Monthly Average Rainfall (mm) | 44.1 | 49.2 | 41.2 | 43.4 | 19.4 | 23.3 | 22.3 | 31.7 | 53.1 | 82.4 |
| 2018 | Maximum Daily High (°C) | 28.4 | 28.0 | 34.2 | 33.9 | 34.4 | 34.2 | 33.8 | 32.5 | 27.8 | 25.9 |
| | Daily Average High (°C) | 21.4 | 20.9 | 20.9 | 20.2 | 27.6 | 26.7 | 25.9 | 25.6 | 19.2 | 17.9 |
| | Monthly Rainfall (mm) | 4.6 | 12.4 | 43.8 | 58.8 | 1.6 | 7.6 | 2.4 | 2.8 | 104.2 | 182.2 |
| 2021 | Maximum Daily High (°C) | 25.2 | N/A | 41.3 | N/A | 35.0 | N/A | 37.4 | N/A | 27.8 | N/A |
| | Daily Average High (°C) | 17.2 | N/A | 23.5 | N/A | 26.1 | N/A | 24.7 | N/A | 18.8 | N/A |
| | Monthly Rainfall (mm) | 18.8 | N/A | 39.0 | N/A | 0 | N/A | 4.8 | N/A | 115.0 | N/A |

*2021 data for Bowser (56) weather station was not available at time of writing.

### Climate Change and Wildfire Behavior

Climate change is causing changes to temperatures and precipitation patterns that impact forest health and wildfire risk. In 2021, the community 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 human caused climate change[15]. 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 scenario[16]. The estimates show 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

[15] 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. Tradowsky, 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. https://www.worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/

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

increase by 7% annually and by 3.9% in summer. Despite this, PCIC projects the dry season in the region 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 increase in wildfire frequency[17,18]. Warmer temperatures in spring and fall will extend the duration of the fire season, extending periods of high wildfire hazard[19].

Climate change affects forest fuels as well as fire weather ratings. Climate change affects forest health by creating mismatch between trees and the physical environment, which creates the conditions for outbreaks of insects and tree diseases[20]. More frequent or prolonged droughts reduce tree health and vigor, also increasing susceptibility to pathogens and pests[21]. Declining forest health tends to increase forest fuel loads because it increases tree mortality and morbidity s. 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 due to drought stress has been observed. This has increased fuel loads in some cedar forests, particularly the fine fuel load of small branches and dropped foliage that contribute 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, weather scientists and fire prevention officers have already observed the fire season lengthen in recent years. The moist winter climate on the coast of BC 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 result in an increase in wildfire intensity and frequency in EA E.

[17]Kirchmeier-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.
[18] Taylor, 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.
[19] Abatzoglou, J., & Williams, A. (2016). Impact of anthropogenic climate change on wildfire across western US forests. *Proc Natl Acad Sci USA* 113(42):11770–11775.

[20] Woods, 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.

[21] Sturrock, 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.

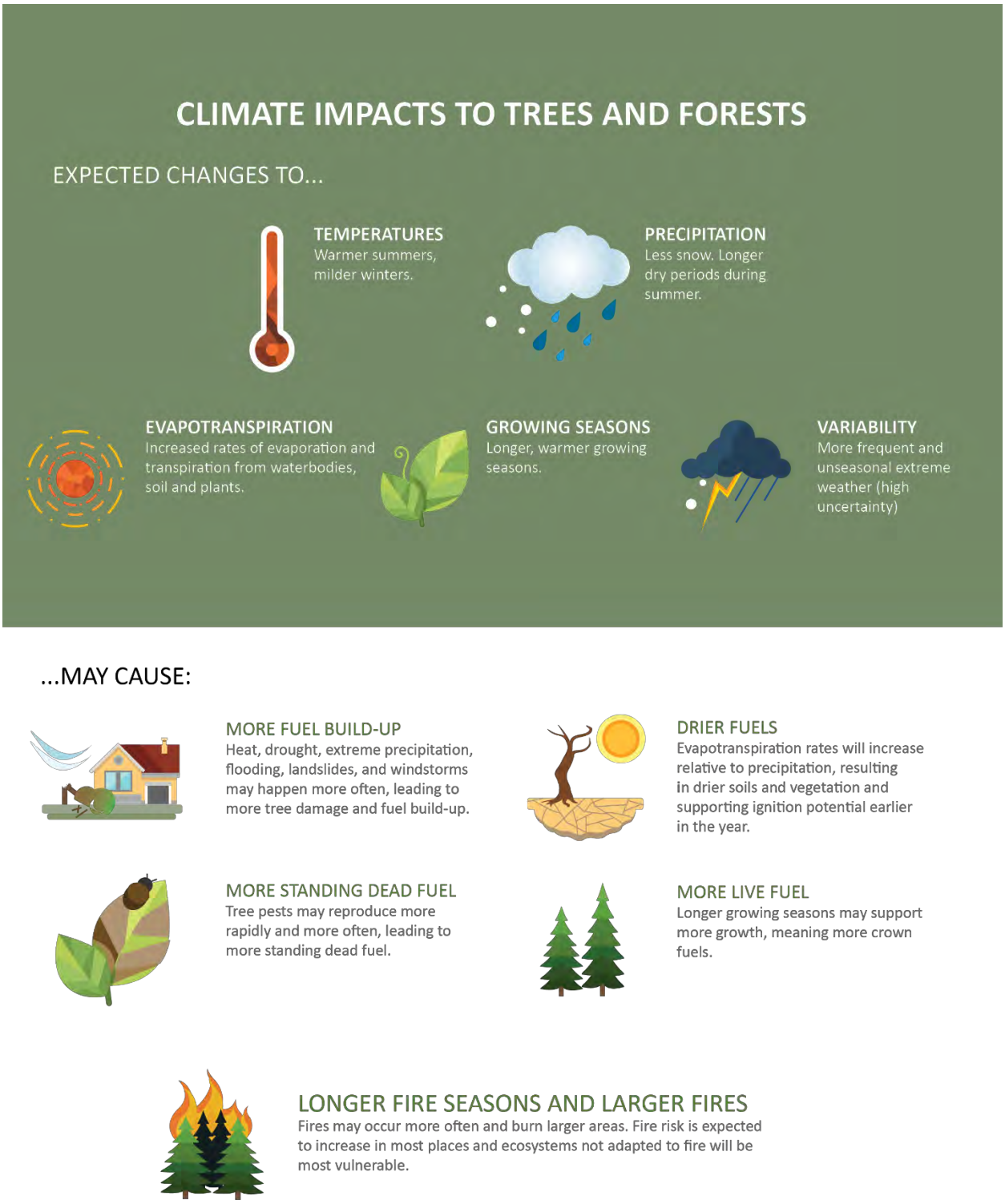


**Figure 11. Potential impacts of climate change on wildfire behavior.**

## Fire History

### *Climate and Ecosystems*

EA E is within a zone of near-Mediterranean climate characterized by cool, wet winters and warm summers with long dry periods. the 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 ecology. Observing the landscape, it is apparent that wildfire is a disturbance 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 the communities 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 E consists of two BEC zones, the Coastal Douglas-fir Zone (CDF) and the Coastal Western Hemlock (CWH) zone. The CDF is found across the Nanoose peninsula and includes almost all areas where homes are found. This BEC zone occurs in the rain shadow 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. The CWH BEC zone is located uphill and inland of the CDF in EA E and represents coastal forests where moisture has been sufficient historically for mature stands of western hemlock to develop in the absence of natural disturbance. The CWH is divided into "subzones" that tailor its description of ecosystems to a wider variety of sites. The "very dry maritime" or "xm" subzone is the only subzone in EA E, and represents the driest, mildest ecosystem within the CWH. Table 11 compares climate averages for the CDF with averages from the CWHxm.

**Table 11. Climate maximums and minimumsfor 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 |

Forests in the CDF are the driest ecosystems in BC's coastal rainforest. Aridity during the early fire season is increased by the lack of supplementary 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, the 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*). In the CWHxm, conditions are still relatively dry and mild. Mature forests of Douglas-fir are still common in this zone, though most forests will have components of western hemlock and western redcedar, even if only in the shaded understory. Because of the foothills position of these forests, CWH forests are more likely to receive supplementary moisture from snowmelt at higher elevations during the early fire season. Still, summer drought is an annual occurrence in these forests, differing only in degree from conditions on the Nanoose peninsula. During summer, these forests can experience higher temperatures and reduced relative humidity because of their greater distance from the ocean.

### *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 and the Coastal Western Hemlock Zone – Very Dry Maritime Subzone are considered to belong to NDT 2 – ecosystems with infrequent stand-initiating events. This means that, before colonization, most new forests in the 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 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 EA E needs stand-initiating fire disturbance to reset ecosystems and allow new trees to grow. Pre-colonization ***fire return intervals*** in surrounding 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 extensive old age forests with scattered patches

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

of young forest containing some veteran, fire-scarred trees[22]. Site-specific studies have shown through charcoal analysis that the fire interval was more frequent than 200 years in some coastal Douglas-fir forests[23, 24].

### *Changes in Fire Return Interval*

Ecologists believe the present landscape of predominantly Douglas-fir forests and 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 south[25]. 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 forest[26]. 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.

[22] Province of British Columbia. (1995). Biodiversity Guidebook. *Forest Practices Code of British Columbia*, p. 22.
[23] 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).
[24] 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.
[25] Hebda, R.J. (1995). British Columbia Vegetation and Climate History with Focus on 6 ka BP. *Geographie physique et Quarternaire, 49*(1), 55-79.
[26] 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.

**Photo 6. CDF forest burned by wildfire in North Cowichan, BC.**

### *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 1930s, during which land clearing, lumbering, railways, camping, and mining activities provided many sources of ignition[27].

The BCWS provides information on historic fires throughout British Columbia. Since 1950, there have been 269 wildfires recorded by the Wildfire Service in EA E. 100 of these were classified as "nuisance fires", which are fires that did not spread to surrounding vegetation but were nevertheless called in to the Wildfire Service. 162 fires did spread to vegetation and required fire suppression. The remaining seven reported fires were not located. The largest escaped fire during this period occurred in 1954 and burned over seven ha.

The Wildfire Service also keeps longer reaching information on large fires. Between 1920 and 2020, only four large fires occurred in the electoral area. Each of these fires occurred before 1940. The largest fire occurred in 1922 and burned an estimated 761 ha on near where the western border of where EA E is today. In the last 100 years, fires have burned an estimated 1,002 ha in and around EA E (accounting for several fires that burned across current Electoral Area boundaries). Almost all of this area was affected before 1954. Since 1954, the total area burned in is just under 30 ha.

Since 1950, the average size of fires is just under 0.5 ha, but this is distorted by a small number of escaped, larger fires. 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. Reports to the BCWS of nuisance fires or other incidents have outstripped the number of fires requiring suppression in recent decades.

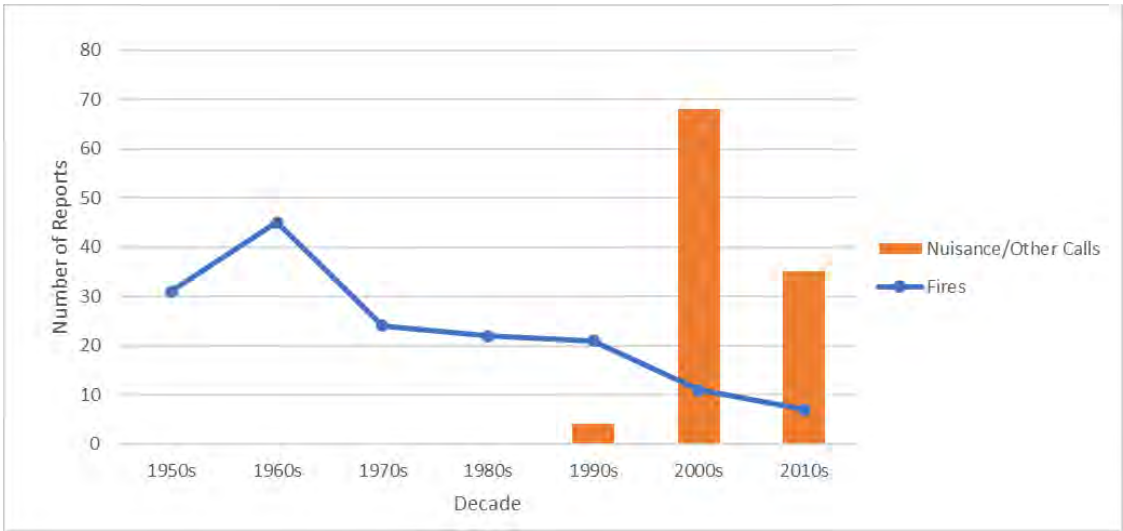


**Figure 12. Number of fires in BCWS records, 1950-2020.**

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

Human intervention in the forest, both deliberate and unintentional, has impacted the fire regime in this area. Almost every fire recorded in the BCWS data since 1920 has been caused by humans: there have been 10 fires ignited by lightning during this period and 155 recorded fires with person as the recorded or probably cause. Prohibition of indigenous cultural practices, growing opposition to slash-burning in expanding communities, and effective fire suppression have all limited fire behavior since the major fires of the early 20th century. While there are still several ignitions per year in the interface owing to campfires, recreation, and other human causes, most are immediately extinguished by firefighters, community members, or unsuitable weather conditions.

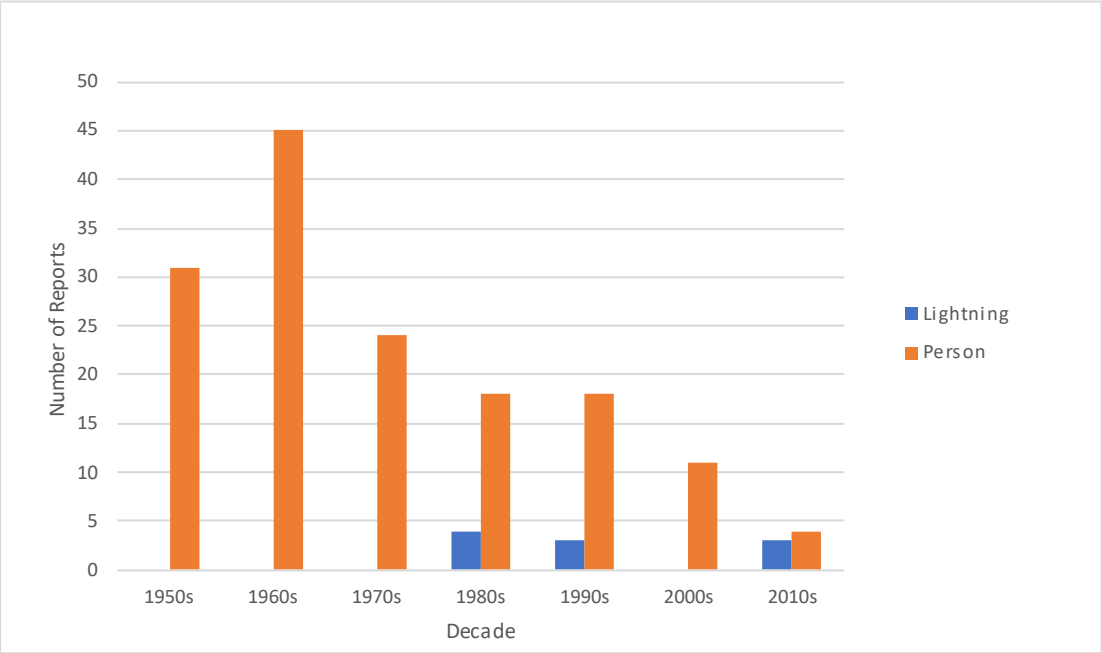


**Figure 13. Fires by recorded cause (1950-2020). Only "fires" are shown, not nuisance calls. The four large fires recorded in the 1920-2020 dataset have "person" as the assigned cause.**

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 health[28] 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 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.

[28] 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, and 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 behavior 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 moderate threat (75% of public land). The PSTA predicts that fire threat is low on an additional 22% of the public land base. Overall, 80% of EA E's land area is privately owned and cannot be rated by this analysis.

**Table 12. Summary of wildfire threat from Provincial Strategic Threat Analysis**

| PSTA Threat Rating (class) | Area (ha)* | % of land area |
|---|---|---|
| Extreme (9-10) | 24 | 0.3% |
| High (7-8) | 24 | 0.3 |
| Moderate (4-6) | 1,112 | 14.8% |
| Low (1-3) | 324 | 4.3% |
| No Data (Private Land) | 6,030 | 80.3% |
| Water (incl. ocean) | 48,525 | N/A |

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

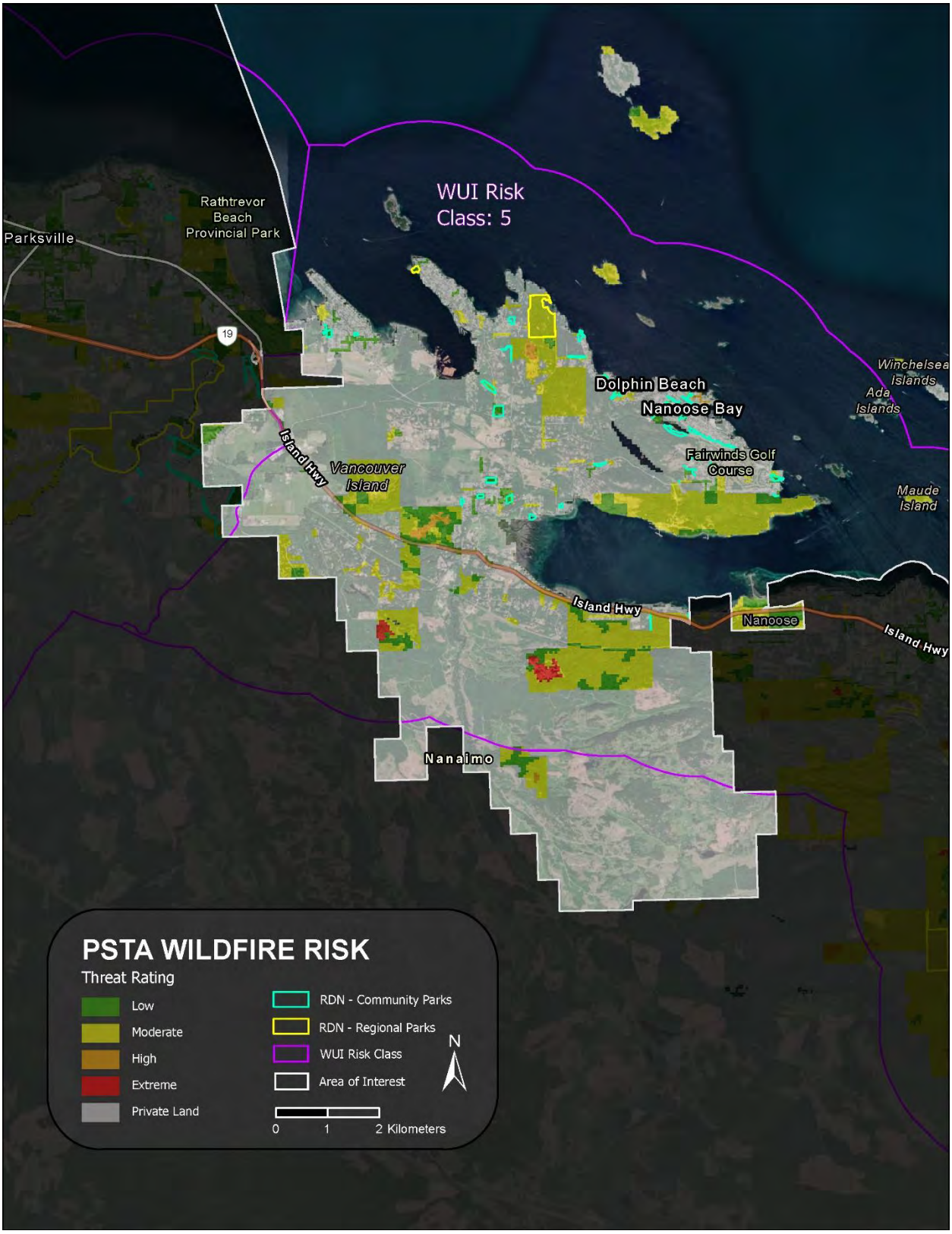


**Figure 14. Wildfire threat ratings from Provincial Strategic Threat Analysis (PSTA)**

The PSTA 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 seven wildfire threat plots and 17 walkthrough assessments were conducted within the area of interest. Figure 15 shows the wildfire threat and risk results from the local threat assessment. Appendix D provides a detailed summary of the technical process for determining this local wildfire threat score.

**Table 13. 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 | 15.1 | <1% | Extreme | 3.6 | <1% |
| High | 30.5 | <1% | High | 34.9 | <1% |
| Moderate | 1118.9 | 20% | | | |
| Low | 75.1 | 1% | | | |
| Very Low | 3368.3 | N/A | | | |
| No Data (Private Land) | 4,328 | 78% | No Data | 4,328 | 78% |

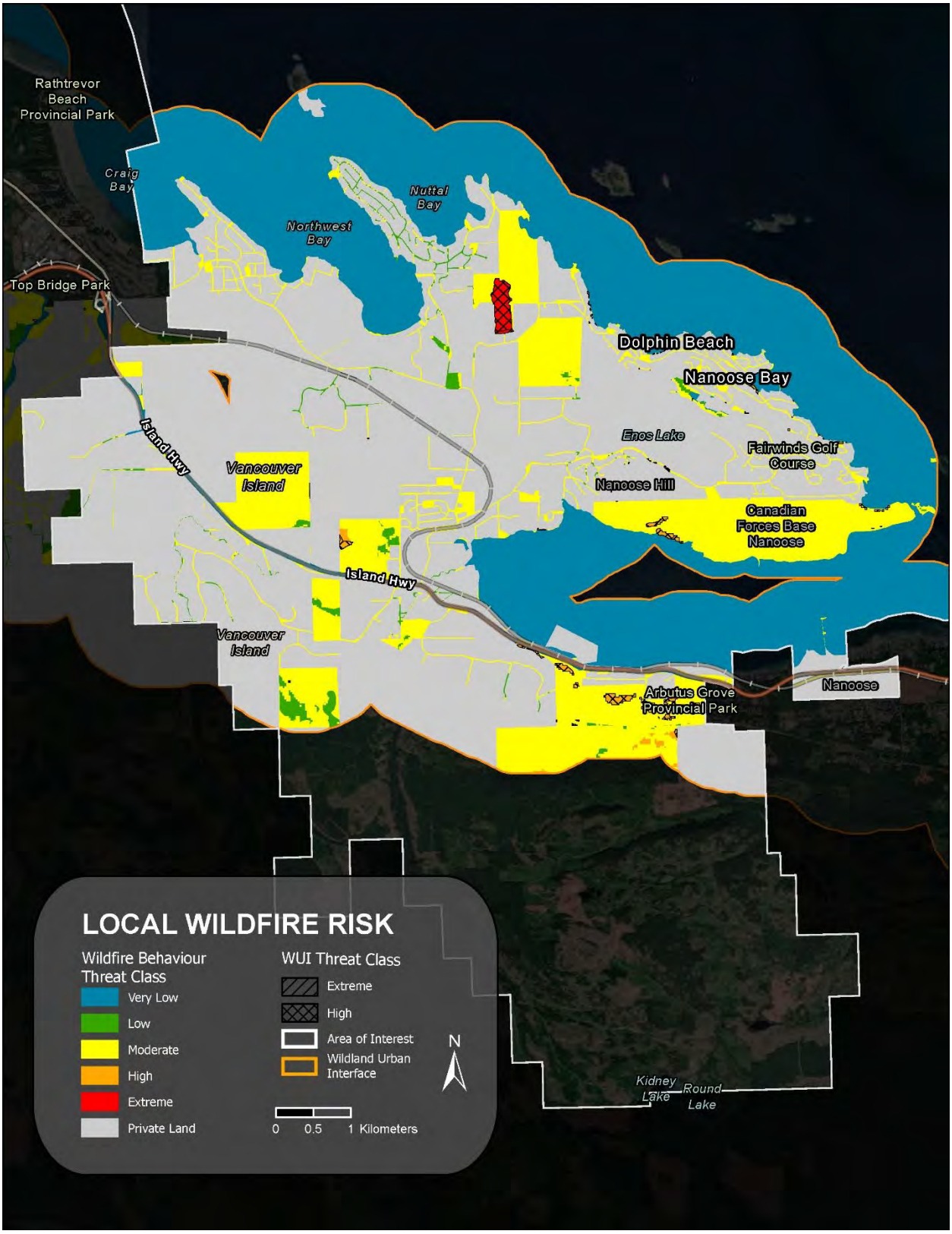


**Figure 15. Wildfire threat and risk resulting from the local threat assessment.**

## Local Wildfire Risk Summary

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

Overall, wildfire risk in EA E is moderate. The potential wildfire behavior in the landscape is generally moderate, with few forests posing a high threat of wildfire behavior. There is an extensive WUI throughout EA E, yet the area of high and extreme risk is small. Under conventional methods, only forests with high and extreme wildfire threat are factored into the wildfire risk analysis. Because of the overwhelming dominance of moderate-threat rated forests, the area of pronounced wildfire risk is low. However, much of the community is characterized by interface conditions where homes abut moderate-threat rated forests, or intermix development where there is a lack of clear boundaries between moderate-threat rated forests and homes.

Moderate threat characterizes EA E wherever mature to old-aged coniferous forests are found on gentle ground. Moderate threat also characterizes most mixed wood areas, where stands have between 25-75% deciduous composition in the overstorey or main forest canopy. Areas associated with moderate wildfire threat can support wildfire during a typical fire season but have reduced likelihood of supporting a fire of high intensity. This means that ignitions in these areas may develop into fires that can affect neighbouring homes, even though the most aggressive crown fire behavior is somewhat unlikely under historic fire weather patterns. These forests require extreme fire weather and ignition conditions before they are expected to support active crown fire. Climate change is increasing the likelihood of severe fire behavior in these areas by raising fire weather indices above historic averages. The wildfire threat in moderate rated areas is real and should not be discounted.

High threat is driven by different factors depending on location. In the few areas characterized by high threat, forests are likely to support intermittent crown fire in the hot, dry conditions brought by a typical fire season. Areas of high wildfire threat reflect locations where steep slopes are contributing to the estimated rate of fire spread. 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 behavior by preheating uphill fuels and causing more “bathing” of uphill fuels in flame due to slope geometry. High threat ratings driven by slope are found within small areas near Sea Blush Drive and Arbutus Grove Provincial Park, the south slope of Notch Hill in CFMETR, and potentially other locations with short, steep slopes. These areas are discontinuous and are broken up by changes in terrain and the fuel environment.

A limited area of C-3 fuel type in the woodlot west of Red Gap is estimated to have high wildfire threat. This is because fuel conditions in this fuel type lend themselves to increased fire severity under typical fire season weather conditions. One significant area of extreme wildfire threat was identified. This area is a recent cut block within the woodlot (W1479) south of Moorecroft Regional Park. The extreme wildfire rating is caused by the fuel type used to represent this area in the Provincial Strategic Threat Analysis (S-1). This fuel type represents slash fuels caused by clear cut harvesting and presumes that little or no fuel hazard abatement will take place (i.e. post harvesting there is no site treatment to remove leftover fuels). In this case, fuel hazard abatement has taken place as is required under the Wildfire Act for interface areas. The wildfire threat is likely overestimated for this location. Aerial observations of this area did not reveal substantial fuel loading.

Other high or extreme threat areas may be found in forests on private land that have not been included in the risk modelling. Because of the extent of private property in the project area, a precautionary approach is warranted in interpreting and applying wildfire threat information. Wildfire threat exists on private residential, industrial, and commercial lands.

### *Neighbourhoods of Higher Relative Risk*

A complete understanding of risk requires us to consider all 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.

Transportation in EA E is dependent on the public road network, particularly connections to and from Island Highway (Hwy 19) at Bonnell Creek (west end of Nanoose Bay). The highway corridor is wide enough that in some locations it potentially could function as a fuel break during a major interface wildfire, separating the Nanoose peninsula from forested inland areas. However, ignitions on the peninsula itself are a higher risk to peninsula communities than an ignition in the foothills. Subdivisions south of Island Highway (Hwy 19) are largely unable to benefit from its potential use as a fire break. Additionally, homes south of the Highway are beyond the reach of the peninsula water service, which provides hydrant connections for firefighting in most coastal communities.

Within EA E, the local transportation network offers at least two routes between most locations north of Island Highway (Hwy 19). Despite this, most neighbourhoods are designed around a single primary access from the major road network. Northwest Bay Road offers a secondary connection into the urban area of Parksville for residents of the northwest part of EA E. During an emergency the Northwest Bay Logging Road, a private road maintained by Mosaic Forest Management, may potentially be used as a secondary evacuation route between communities and Island Highway (Hwy 19).

Areas with only a single point of road access are generally limited in area. The largest such areas are in the south (Matthew Road, Sea Blush Drive) and North (Beachcomber/Dorcas Point). Developments on Matthew Road and Sea Blush Drive are south of Island Highway (Hwy 19) and lack hydrant service. While Beachcomber and Dorcas Point have more homes, these areas generally have fire hydrant service and are also less exposed to continuous forests owing to their coastal geography and higher landscape fragmentation. Development in Matthew Road, Sea Blush Drive, and Dorcas Point has intermix characteristics, where homes are generally surrounded by wildland vegetation. Beachcomber and other peninsular neighbourhoods tend to have interface characteristics where there are distinct boundaries between homes and forests, although several neighbourhoods have high urban tree cover. Though fire behavior varies, intermix development presents intrinsically higher risk because it tends to offer more pathways for wildfire between forest vegetation and homes.

The hydrant system present on most on the Nanoose peninsula can draught water from the Englishman River to supplement low groundwater during times of drought. While climate change may affect regional high and low water levels, this feature increases the system's resilience and likely reliability during suppression efforts in the interface north of Island Highway. In areas without hydrants, the Nanoose Volunteer Fire Department's Superior Tanker Shuttle Accreditation satisfies Canadian Underwriters Survey requirements for water delivery. The NVFD maintains fire water storage tanks in Seablush and Matthew Road areas to support fire suppression efforts in these areas lacking fire hydrants. However, the ability to sustain an effective shuttling operation during an interface wildfire involving multiple homes is not implied by the accreditation. During a large wildfire emergency, resource capacity will be limited and suitable road access for water delivery is not guaranteed. This potentially puts neighbourhoods without community water service or suitable surface water sources for drafting at a higher relative risk during a wildfire event.

### Hazard, Risk, and Vulnerability Analysis

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 nation-wide 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 own communities.

FireSmart is organized into seven "disciplines" or topic areas which address different aspects of wildfire preparedness:

- *Education* (p.67)
- *Legislation and Planning* (p.79)
- *Development Considerations* (p.85)
- *Interagency Cooperation* (p.93)
- *Cross-Training* (p.98)
- *Emergency Planning* (p.101)
- *Vegetation Management* (p.105)

The following sections of the Community Wildfire Resiliency Plan discuss each of these disciplines and consider recommendations the Regional District of Nanaimo (RDN) may pursue to improve wildfire resilience. 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.112) for a summary of recommendations and suggested priorities.

The Community Wildfire Resiliency Plan uses FireSmart terminology to discuss risk 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 wildland-urban interface (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 16. Pathways to home ignition in the WUI.**

FireSmart assessments divide the area around the home into four 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 homes[29]. 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.

[29] 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).

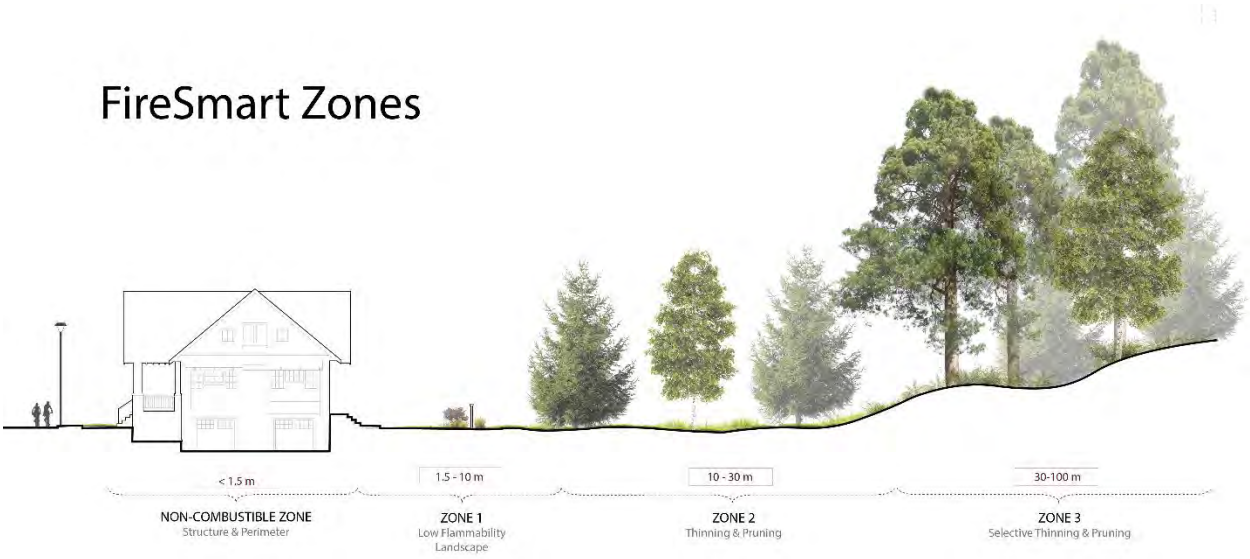


**Figure 17. The FireSmart zone system.**

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 by local governments. The Province provides this support via the Community Resiliency Investment Program. The Community Resiliency Investment Program is administered by the Union of British Columbia Municipalities. The program allows local governments to access supplementary funding for wildfire risk management and FireSmart initiatives. 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 14 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 14. FireSmart activities eligible for Community Resiliency Investment (CRI) program funding (2022).**

| FireSmart Discipline or Program Area | Activity |
|---|---|
| 1. Education | • Promotion of another eligible activity.<br>• Organize and host public information meetings relating to another eligible activity.<br>• Promote and distribute FireSmart educational materials and resources.<br>• Support the organization of a Wildfire Community Preparedness Day.<br>• Support the organization of a Neighbourhood Champion Workshop, community FireSmart day, or other related events, workshops and open houses.<br>• Support neighbourhoods to apply for the FireSmart Canada Neighbourhood Recognition Program. |
| 2. Community Planning | • Develop or amend a Community Wildfire Resiliency Plan. |

| FireSmart Discipline or Program Area | Activity |
|---|---|
| | • Develop FireSmart policies and practices for the design and maintenance of public assets and lands.<br>• Complete FireSmart assessments for publicly owned critical infrastructure. |
| 3. Development Considerations | • Amend Official Community Plans or land use, engineering, subdivision, and public works bylaws to incorporate FireSmart principles<br>• Revise landscaping requirements in zoning and development permit documents.<br>• Establish Development Permit Area for Wildfire Hazard.<br>• Include wildfire prevention and suppression considerations in the design of subdivisions<br>• Amend referral processes for new developments to ensure multiple departments, including fire services and/or emergency management personnel, are included. |
| 4. Interagency Co-operation | • Develop, coordinate, and/or participate in a Community FireSmart and Resiliency Committee<br>• Participate in multi-agency planning tables for fire and/or fuel management.<br>• Provide Indigenous cultural safety and humility training to emergency management personnel in order to more effectively partner with and assist Indigenous communities.<br>• Attend the annual FireSmart BC conference. |
| 5. Emergency Planning | • Develop and/or participate in cross-jurisdictional meetings and tabletop exercises focused on wildfire preparedness and suppression, such as seasonal wildfire readiness meetings.<br>• Assess community water delivery ability as required for suppression activities.<br>• Assess structure protection inventory.<br>• Use and/or promote Emergency Management BC Wildfire Preparedness Guide for community emergency preparedness events focused on wildfire. |
| 6. FireSmart Training and Cross-Training | • Support neighbourhood representatives or local government staff to become certified as Local FireSmart Representatives and support certified staff to become facilitators.<br>• Wildfire Mitigation Specialist training for the FireSmart Home Partners Program.<br>• Cross-train fire department members (registered departments) to include structural fire and interface fire training (subject to course/credential eligibility).<br>• Cross-train emergency management personnel to provide ICS-100 (Incident Command System and WRR Basics Course) |
| 7. FireSmart Projects for Critical Infrastructure | • 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 | • Conduct Home Ignition Zone Assessments for individual residential properties or homes.<br>• Develop a rebate program to residential property owners that complete eligible FireSmart activities (limited to 50% cost sharing up to $500 per property).<br>• Undertake Neighbourhood Wildfire Hazard Assessments and support the development of FireSmart Neighbourhood Plans for specific areas.<br>• Provide off-site green waste debris disposal for residential property owners who have undertaken FireSmart activities. |
| 9. Fuel Management | • Undertake planning and development for fuel management on public land, consistent with the BC Wildfire Service Fuel Management Prescription Guidance Document.<br>• Undertake required professional assessments to support plan development.<br>• Implement new fuel management treatments on publicly owned land, or fuel management maintenance activities supported by a prescription.<br>• Off-site debris disposal for approved fuel management or maintenance activities. |

| FireSmart Discipline or Program Area | Activity |
|---|---|
| | • Additional money 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) | • 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.<br>• Consultant/contractor costs, including professional planners and foresters.<br>• Public information costs. |

### *The Role of a FireSmart Coordinator*

Navigating all the aspects of FireSmart can be challenging for local governments and private landowners alike. Local governments often lack the capacity to implement the FireSmart programming in addition to existing responsibilities. To help with this issue, the Community Resiliency Investment Program allows 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 entire region is desirable. This position could be housed within the Emergency Services department, working under the direction of the Emergency Program Coordinator and 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 that could be assigned to this coordinator are summarised in Table 15.

**Table 15. Potential Roles of the FireSmart Coordinator**

| FireSmart Activity Category | Role of FireSmart Coordinator |
|---|---|
| Education | • Support the development of a detailed communications strategy for FireSmart<br>• Develop and conduct a public education program, including meetings or information sessions, public signage, and social media.<br>• Distribute FireSmart materials through community partners and online. |
| Community Planning | • Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition, including by supporting facilitation and FireSmart events and demonstration projects.<br>• Complete FireSmart assessments for critical infrastructure.<br>• Conduct internal education for RDN staff on wildfire risk and FireSmart principles. |
| Development considerations | • Comment on wildfire issues within a development permit process on behalf of the Emergency Services department, when development applications are received by the planning department. |
| Interagency co-operation | • Coordinate FireSmart initiatives between electoral areas and external partners as applicable, such as by representing the RDN in working groups or committees. |
| Emergency planning | • Provide comment on wildfire issues during emergency plan and response preparation. |
| FireSmart Implementation | • Coordinate retrofits and vegetation management for critical infrastructure.<br>• With homeowners' consent:<br>o Conduct Home Ignition Zone Assessments for residential properties or homes.<br>o Develop FireSmart Neighbourhood Plans.<br>• Coordinate chipping days or bin programs to facilitate vegetative debris disposal. |
| Other | • Report on program implementation, progress, and community feedback regarding FireSmart to the Emergency Program Coordinator and Manager, Emergency Services.<br>• Prepare grant applications |

Having a FireSmart Coordinator working alongside permanent staff in the Emergency Services department is particularly important in translating FireSmart language and principles into the context of the RDN's communities. This arrangement provides program continuity and long-term oversight of the RDN's FireSmart messaging. Previously, attempts at establishing FireSmart neighbourhood committees have lost momentum when homeowners became discouraged by strict interpretation of FireSmart guidance. Ensuring that permanent staff continue to carry primary responsibility for RDN'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.

## Education

Education is first among the seven FireSmart disciplines. Education enhances awareness of wildfire risk and prevention, which encourages individuals to act on private property while also building public support for initiatives by local 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 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. 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, however. It's also about representing a vision of a FireSmart community that can inspire the RDN's own operations and feature in its communications with other public authorities and First Nations.

The RDN should plan its education activities to complement existing outreach in Electoral Area E (EA E). the communities have a wealth of knowledge among dedicated individuals who are already acting to manage wildfire risk. The Nanoose Volunteer Fire Department is an active advocate for FireSmart and community wildfire preparedness in EA E and maintains successful contacts with residents through social media and community events. The RDN can support local organizations by collaborating during grant applications for FireSmart activities that further the common interests of community wildfire resiliency.

## Factors for Success

### Vision of a FireSmart community

Public engagement is one of the most challenging aspects of community wildfire planning. For public engagement to be effective, the RDN needs to reframe managing wildfire risk as a collective undertaking with community and individual benefits. During the development of this plan, residents and local firefighters have expressed that interest in FireSmart declines when people are confronted with what seems like an expensive and impossible task – the task of making a forested community FireSmart. The RDN needs to present a vision of FireSmart that works for the communities and still adequately represents the forest character. 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 a scoring outcome.

**Photo 7. 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 E (EA E), 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.** Although this plan found similar levels of threat around the community, risk depends on further factors like population density, social vulnerability, and demographics. Additionally, some areas share a common point of access, reliance on a particular water source, distance 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 two basic audiences within an area-based approach could be intermix and interface areas. Conventional suburban developments on lots of less than 0.1 ha tend to have interface characteristics, such as clear boundaries between forests and urban areas. Areas with larger lots tend to have more forest vegetation surrounding homes. There is often higher risk in intermix areas where more ignition pathways exist between forest vegetation and homes.
- **Age and household size.** EA E contains many one- or two-person households of older retirees while remaining an attractive community for families with young children. Both young families and older people may face cost pressures that keep them from engaging in emergency preparedness or FireSmart initiatives. Ensuring that different groups 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 not have the time to participate in community activities outside of their other commitments. Finding ways to reach people where they are is an important consideration of recognizing diversity and building resilience.
- **RDN staff.** RDN staff in various departments work to provide services for the residents of EA E. 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.
- **Other jurisdictions and agencies.** The RDN is part of a network of local governments, improvement districts, and First Nations that provide administrative services to residents of EA E. There may be value in continuing to liaise with other governments serving the community to develop a shared understanding of wildfire threat and FireSmart. This can involve ensuring other organizations have been provided with the plan. The Snaw-naw-as Nation is also eligible to receive funding for community wildfire planning through provincial programs. The RDN should work with the Snaw-naw-as to further the common interest in emergency preparedness.

### Information placement

A 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 the year in EA E, with in-person contacts and community events timed to correspond and respect the calendar of community gatherings, school sessions, and seasonal interest that make EA E a desirable place to live. Informational contacts regarding RDN projects, such as fuel management, should take place during the shoulder season, when both important stakeholders like the BCWS and members of the public 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 mass emergency notification system, Voyent Alert!

For information on how to register for Voyent Alert!, visit rdn.bc.ca/emergency-alerts.

### 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 E, including printed and digital media and during in-person or online events.

**Table 16. Potential key messages for a wildfire communications strategy**

| Potential Key Messages for Public Communications |
|---|
| • The communities of EA E are set beside and among forests, making them vulnerable to wildfires.<br>• The wildfire risk in coastal forests during the wildfire season is real, and most forests will support wildfire of moderate intensity.<br>• Predicted and observed climate change in the region are consistent with more aggressive wildfire behavior.<br>• 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.<br>• There are resources to support private landholders and neighbourhoods in becoming more FireSmart.<br>• The RDN can help reduce wildfire risk by strategically managing forest fuels on its parkland and supporting FireSmart community development. |

## 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. The RDN should consider printing the plans on request for socially vulnerable individuals or people with low digital literacy or other accessibility concerns.

The RDN's major resource in EA E is its network of community and regional parks. The largest and most heavily used regional park in EA E is Moorecroft Regional Park. Community parks typically have little developed infrastructure and see lower use, though some like Claudet Road and Dolphin Lake are a few ha in size. The RDN can initiate passive education by installing wildfire awareness signage and educational material in high-traffic locations, including trailheads, such as near the parking lot in Moorecroft Regional Park, public community trailheads in the Fairwinds neighbourhood, beach access at Beachcomber Regional and Brickyard Community Parks. The Fairwinds area contains additional trailheads on private land that may be desirable as high-traffic locations and could potentially be installed with support from the developer. This includes the primary hiking access up Notch Hill. Popular recreational areas are high-visibility locations where people are already thinking about forests– this is a good opportunity to make connections between forests and fire in familiar environments.

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 or FireSmart landscaping 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.


**Photo 8. Trailheads are excellent locations for wildfire awareness signs.**

### Expanding access to FireSmart information and services

Ability to conduct FireSmart home assessments is limited by staff capacity within the RDN and local fire departments. The Nanoose Volunteer Fire Department is the primary provider of FireSmart outreach to the community but is limited in the amount of time that can be dedicated to FireSmart programming by its other responsibilities. The RDN should investigate ways to provide FireSmart assessment services for residents of EA E. If no regional FireSmart Coordinator is hired, the RDN's Emergency Services department currently has certified Local FireSmart Representatives who could potentially undertake a limited number of assessments, perhaps in a targeted neighbourhood or on a specific day. Hiring a dedicated RDN FireSmart Coordinator would drastically improve the capacity for these engagement initiatives and administrative work related to future grant applications. This position can be funded through grants and shared among other Electoral Areas that are not currently served by a fire department FireSmart coordinator position.

### 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 residents 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, advertising and hosting the event, 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 or could potentially be offered in partnership with an interested community stewardship group. The RDN's role will also be to provide chipping or waste removal services as well as grant support and/or locations for the event as required. 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, selected areas are of marginal impact to landscape wildfire risk. Because clean up days are focused primarily on education and demonstration of FireSmart principles in a small area, they do not follow the stricter guidance 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. Linear corridors, such as the community trails in Fairwinds, are also often good locations for community clean up events because they contain easy-access areas and are frequently near homes. Other suitable areas of high visibility could include beach and water accesses on park land or trails within Moorecroft Regional Park.

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 who follow the Community Recognition Program 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 recognition process, its 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 WUI and can support the neighbourhood FireSmart planning process. Prior to and concurrent with hazard assessments, motivated neighbours should be organizing in their community to increase participation and the number of home assessments. The end goal 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 advertising a new neighbourhood initiative through its social media and online channels. There is also funding available to offer half-day FireSmart Neighbourhood Champion training for interested residents and/or distributing FireSmart material to households facing barriers to access this information. In areas where neighbourhood organization is underway, the RDN may be able to help facilitate a start up event. Criteria for providing support to neighbourhood organizers should be developed so that serious initiatives with widespread interest in their communities are prioritized for resources.


[firesmartcanada.ca/programs/neighbourhood-recognition-program/](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. Although most neighbourhoods are exposed to forests with a moderate threat of wildfire, this plan considers other factors that affect risk such as the availability of water for firefighting, access to other areas and through transportation routes, and the proximity of neighbourhoods to contiguous, landscape-scale forests. Neighbourhoods that may make suitable sub-areas on the basis of shared access, identity, and geographic profile are listed in Table 17.

**Table 17. Potential sub-areas for FireSmart planning and neighbourhood initiatives.**

| Name | Wildfire Risk Rating* | Area Description | Fire Protection | Recommended FireSmart Activities |
|---|---|---|---|---|
| Sea Blush Drive / Hillview Rd – Intermix / Interface | M/H | Varied intermix/interface conditions in two single-access subdivisions south of Island Highway. Areas are without fire hydrants, though NVFD fire water storage tank is present in Sea Blush. Areas are contiguous with long-term forest lands managed by private land forest companies. Wildfire threat in this area is influenced by short, steep slopes. | Nanoose Volunteer Fire Department | Creation of FireSmart neighbourhood plans is recommended for these areas. The RDN should liaise with representatives of the NVFD 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 supports such as coordination with the NVFD, BCWS, and other actors as applicable. The RDN may also include eligible neighbourhood FireSmart activities in its CRI grant applications. |
| Matthew / Morello Rd – Intermix | M | Intermix conditions dominate mainly large-lot rural properties with single paved point of access via Morello Rd at Island Highway. Area is without fire hydrants, though NVFD fire water storage tank is present. Area is contiguous with long-term forest lands managed by private land forest companies. | Nanoose Volunteer Fire Department | |
| Peninsula communities – Intermix | M | Several small subdivisions on the Nanoose Peninsula are at relative risk during a wildfire due to proximity between homes and vegetation and/or a lack of secondary access. This includes Notch Hill—Florence Drive and Dorcas Point/Beachcomber. Beachcomber, where residential densities are higher, has characteristics of both interface and intermix conditions. Some areas lack hydrant service. Forests are somewhat fragmented by urban development in the peninsula. | Nanoose Volunteer Fire Department | |

| Name | Wildfire Risk Rating* | Area Description | Fire Protection | Recommended FireSmart Activities |
|---|---|---|---|---|
| Red Gap – Interface | M | Interface conditions dominate small-lot residential development near NW Bay and Powder Point Rds. Red Gap contains several community buildings of importance as well as the NVFD fire hall. | Nanoose Volunteer Fire Department | These neighbourhoods are of secondary priority for developing FireSmart neighbourhood plans because they border smaller forest areas than higher priority communities or contain agricultural land that can help buffer development from forest areas. The plan would be led by neighbourhood committees with the RDN acting as a local government representative and providing supports such as coordination with the fire departments, BC Wildfire Service, and other actors as applicable. The RDN may also include eligible neighbourhood FireSmart activities in its CRI grant applications. |
| Fairwinds / Dolphin Beach – Interface | M | Interface conditions dominate small-lot residential development centered on Schooner Cove. Forests in CFMETR are closed to the public, which reduces the likelihood of uncontrolled ignitions. | Nanoose Volunteer Fire Department | |

**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 for day-to-day announcements by the RDN concerning service notices, such as solid waste rescheduling or park closures. Because it allows messages directly to user devices 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. For more information on how to register for the Voyent Alert! system, visit rdn.bc.ca/emergency-alerts.

### 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 topic 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. To visit the RDN Wildfire Resiliency Webpage, visit getinvolved.rdn.ca/rdn-wildfire-resiliency.


**rdn.bc.ca/get-involved-rdn**

# 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. However, the Government of Canada is a major forest landowner in the Fairwinds area by controlling the military installation at CFMETR. Qualitatively, the risk of a wildfire breaking out at CFMETR is lower than on other public lands. This is because of the site's 24/7 controlled access and dedicated firefighting resources during operational hours.

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 which 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.

## Role of the RDN

The RDN's role is to manage wildfire within its jurisdiction in unincorporated areas. Areas of authority in Electoral Area E (EA E) include the provision of services for waste management, including green waste or vegetation debris, community planning functions and the regulation of development, the maintenance and management of community and regional parks, the administration of bylaw enforcement, some community water systems, and other key areas identified by the *Local Government Act*. The RDN recently welcomed the Nanoose Volunteer Fire Department into its administrative structure, making the RDN invested in both wildfire prevention and response in the area. In unincorporated areas 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.

In EA E, some local government services are provided by Improvement Districts, namely community water service in the Williams Springs Waterworks District. The RDN works to coordinate its community planning with the capacity of the Improvement Districts to provide these services.

## 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 by-laws 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. The RDN operates on a special service basis within the unincorporated areas. While promoting FireSmart design is a key principle of any Community Wildfire Resiliency Plan, the RDN's role will also rely on supporting 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 adjusting policies for community planning and development review, 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, rewarding, and enforcement is unlikely. New bylaws or policies can also result in a rise in the number of nuisance calls which do not have merit but drain the resources of local government. Conducting analysis prior to 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

### Record where problematic uses of park lands occur in relation to wildfire threat.

The RDN may be able to reduce ignition likelihood on its public lands by adopting restrictions on use during periods of high fire danger. Private parkland in the Fairwinds community is already subject to periodic closure during periods of extreme fire danger. Sources of ignition in parks include cigarette butts, hot vehicles and motors, cooking fires, bonfires, firecrackers and fireworks, discarded items, and deliberate arson. Before initiating restrictions on use or access to parks, it is important to collect information about any 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.


**Photo 9. Fairwinds trails closed during extreme wildfire danger.**

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 consider that fire threat shown in this plan represents the potential fire behaviour during 90$^{th}$ 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 in most areas. The impacts of climate change have and will affect the 90$^{th}$ percentile weather values used to estimate potential fire behavior, 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 can adopt internal policies to make sure parks and RDN-owned property and facilities receive wildfire hazard assessment at an appropriate level of service.

The assessment tools for vacant 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 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 fuel environment. 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 to ensure an assessment program can access grant funding through CRI.

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 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 capital assets and emergency infrastructure. With assessments in place, the RDN could apply for implementation funding to complete re-landscaping or even exterior renovations of its facilities up to a per structure maximum of $50,000.

### Update the building policies to incorporate FireSmart design principles in RDN facilities

As part of a FireSmart program for its properties and critical infrastructure, the RDN should require that all internal 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 technique. FireSmart design principles are sometimes seen as conflicting with policies which support wood construction, such as the RDN's Wood First policy. However, FireSmart design need not restrict the use of wood for certain roles in design. 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 decorative elements in a façade with a minor impact on FireSmart hazard scoring. Similarly, large diameter wood elements such as heavy timbers or modern innovations like glued laminated lumber (glulam) can also typically be used externally with minor impacts on hazard scoring. Interior construction and use of wood as a structural material is not restricted by FireSmart. FireSmart design avoids the use of unrated wood products and extensive use of small-diameter products as facing materials. The Nanoose Bay Fire Hall on Nanoose Road is an existing example of how FireSmart construction can be both beautiful and functional, while maintaining a connection to the landscape through the use of some wood elements.


**Photo 10. The Nanoose Fire Hall uses FireSmart construction techniques.**

The RDN's Green Building Policy establishes the seven step Integrated Design Process for designated capital projects. This policy lays out how the largest projects in the RDN should address the multiple perspectives and concerns of the RDN and its communities throughout the life of the facility. The RDN's Hazard Risk and Vulnerability Analysis and this CWRP establish wildfire resiliency as one of these concerns. The RDN should consider updating the Green Building Policy so that wildfire hazard mitigation professionals are part of the core project team for facilities investments in the WUI.

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

Many local 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) and Church Road transfer station (Electoral Area F), which receive green waste for a tipping fee. It is within the RDN's authority to facilitate access to the solid waste facilities for the purpose of disposing 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 has capacity to 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 Emergency Services and Solid Waste 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

The Regional District of Nanaimo (RDN) has authority of the use of land, zoning, and official community planning in Electoral Area E (EA E). Community planning tools are important for building fire resiliency because they can be used to influence the design of interface and intermix areas on private property. This section discusses the community planning tools available to the RDN and describes how they could be employed to improve wildfire resiliency in EA E. Actions discussed in this section range from small procedural changes that the RDN can implement relatively quickly, to large public processes nested within the Official Community Plan.

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 wildland0-urban interface (WUI). The National Fire Protection Association (NFPA), a US-based international organization, has developed codes and standards for 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 BC Building Code that address wildfire hazard in the WUI.

FireSmart principles in the Non-Combustible Zone (0-1.5 m) and Zone 1 (1.5-10m) are often the focus of regulations in municipalities which 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 these zones, meaning vegetation and landscaping in this area are intended to be of low flammability and non-combustible building materials are preferred.

The Ministry of Transportation and Infrastructure is the authority responsible for subdivision approvals, referring applications for subdivision to local authorities like the RDN and Improvement Districts as part of its process. The RDN is 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.

## Zoning and Subdivision Bylaws

In EA E the RDN regulates land use and parcel size through the Land Use and Subdivision Bylaw[30]. The Bylaw is in force in Electoral Areas A, C, E, G, and H, acting as the zoning code (Part 3 – Land Use Regulations) for these areas, containing subdivision regulations (Part 4 – Subdivision Regulations) and also describing Development Permit Area (DPA) guidelines enabled by the Official Community Plan (Part 5).

### Zoning

Zoning provisions relate to allowable land uses and buildable space on each parcel in the RDN. Zoning policies can influence the fire resilience of communities by setting rules for how development on each lot relates to the street and to neighbouring parcels. Buildings are provided with minimum setbacks by zone. This effectively establishes the distance between buildings and forest vegetation on many properties. Setbacks of no less than 10 m between buildings and the outer limit of forest vegetation enable homeowners to take action within this crucial area. Currently most commercial and residential zones in the Bylaw have minimum setbacks of between 2 and 8 m. The minimum setback for residential buildings in most rural zones is 8m from property line. In areas of high wildfire threat guiding building siting away from adjacent forest vegetation can provide value to communities and support active landscape maintenance by homeowners.

Part 3 also regulates the landscaping or vegetation required within a zone. These provisions are typically used to reduce nuisance between different land uses by controlling the installation of vegetation buffers, such as between residential areas and adjacent highways or industry. The design of these buffers can influence wildfire risk, as common hedging species like cedar and yew are ignition hazards that should be kept at least 10 m away from buildings.

Using Zoning to guide fire resilient community development can sometimes be inefficient. The geography of different zones may not align with an identifiable interface and is often specified more finely than guidelines for interface development need to be. This means that properties affected by an amended zoning bylaw may not face an appreciable wildfire hazard. Even when appropriately targeted, using zoning to address community wildfire hazard can create a substantial future burden of variance for non-conforming properties. In new developments rezoning with new zones can reduce this burden but may complicate the bylaw unnecessarily.

[30] Bylaw No. 500. (1987). Land Use and Subdivision Bylaw.

### Development Permit Areas

Establishing a special Development Permit Area (DPA) can help set development patterns while reducing the impacts of poor targeting and regulatory burden of developing new zones for each land use in the interface. DPA are areas within a community where a local government can establish additional information needs or regulatory requirements on new development applications. In these areas, construction projects must receive a Development Permit showing that the project will meet guidelines established for the area before they can be issued a Building Permit to begin construction. DPAs can be used for a variety of purposes established by the *Local Government Act*. To be in effect, DPAs must be adopted as part of an Official Community Plan. The RDN has adopted several DPAs in the Official Community Plan for EA E and sets out guidelines for each in the Land and Subdivision Bylaw. DPAs exist in EA E to regulate urban design issues and the protection of farmland, sensitive ecosystems and natural habitat features. The RDN does not currently have a DPA for wildfire hazard. Considerations for such a tool are found in a following section regarding the Official Community Plan.

### Subdivision Regulations

Subdivision Regulations (Part 4) are used to affect the number, size, and shape of parcels in a new development as well as control the standard for community services like fire hydrants. For this reason, subdivision control is a highly effective tool for ensuring new neighbourhoods or developments are set up to be FireSmart. The RDN's regulations are limited in scope to the regulation of minimum parcel sizes and shapes, establishing additional requirements to the Ministry of Transportation and Infrastructure's highway standards, and the delivery of community water and sewerage services. In areas with hydrants provided as part of a community water system, the delivery of sufficient fire flows is also regulated. Amending rules around subdivision may also be more acceptable to the public than zoning changes or development permit systems (discussed below), because subdivision approvals are typically tied to new multi-lot development and not all new construction.

Subdivision review is a secondary role for the RDN. In unincorporated areas, the provincial Ministry of Transportation and Infrastructure is responsible for subdivision approvals, and reviews proposals in consultation with local governments. During this process, the RDN is able to provide comment on the suitability of subdivision applications and make recommendations for amendments to subdivision design to better meet community expectations from the Official Community Plan and legal requirements in the Land Use and Subdivision Bylaw (i.e. Zoning). Applying FireSmart principles to subdivision design requires better advocacy between the RDN Emergency Services and Planning departments. Where possible, it may make sense to request the design of more effective fuel free areas on the edges of new developments. Having good communications with the development community is an important part of this advocacy.

## 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 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"[31], 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 RDN has established all of EA E as a Development Approval Information Area, meaning that a development application may be required to provide an "impact report" containing information pertinent to the approval. Details on the contents of the impact report are provided in the Impact Assessment Bylaw (No. 1165, 1999). The RDN can request additional information relevant to any policy within the Official Community Plan or in accord with any adopted bylaw. This may enable the RDN to request information about wildfire threat or hazard on private property. This information can be extremely valuable to the RDN's administrators in strategic planning for community wildfire resiliency across departments.

### Development Permit Area Implementation

The second mechanism goes beyond development approval information and allows local government to designate DPAs within the Official Community Plan[32]. 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 "protect[ing] 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 which 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

[31] *Local Government Act* [RSBC 2015], S. 484-487

[32] *Local Government Act* [RSBC 2015], S. 488-491

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 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 11. Example of properties in 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 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 applications. 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.

## Initiatives to Consider

### Provide FireSmart information as standard issue within all DP or building permit application packages.

The RDN can ensure homeowners in the interface have the information they need to develop a fire resilient design for their properties. The permit application process is the primary means for RDN to disseminate FireSmart information and occurs at a significant time in the design process. To maximize the effect of this information the RDN could prepare a brief handout explaining the WUI and the importance of considering fire risk, with links to this report, the FireSmart homeowner's guide, and the contact information for the proposed RDN FireSmart Coordinator. Emergency Services should work with Planning staff to provide all materials needed for this initiative and could also provide basic internal training to planners and front-counter staff to promote FireSmart as an "all department" initiative.

### Ensure a FireSmart perspective is applied to development referrals and review.

The RDN reviews building, zoning, and OCP amendment applications internally to determine the suitability of new development activity in different parts of EA E. While the RDN does not have the final responsibility for subdivision approvals, subdivision applications are referred to the RDN as part of the provincial approval process led by the Ministry of Transportation and Infrastructure. It is possible to include the local fire department and FireSmart personnel on the referral approval team. Increasing communications between Fire professionals and the planning department will build awareness of wildfire resilient design and identify issues with the existing Land Development and Subdivision Bylaw, such as landscape review focused on vegetation as a land-use buffer rather than a WUI risk factor. Such an initiative could extend guidelines for development review in the Lakes District and Schooner Cove Neighbourhood Plans to other parts of EA E, with a focus on subdivision referrals. As time goes on, it may be desirable to extend the scope of review to additional application categories.

### Investigate using Development Approval Information provisions to request wildfire threat assessment on private lands.

A key message of this CWRP is that wildfire threat does not stop at the border between public and private land. To improve the RDN's understanding of wildfire risk on private land, Development Approval Information provisions of the *Local Government Act* can be used in conjunction with the RDN's Impact Assessment Bylaw to begin requesting assessments of wildfire threat as key parts of the information required to approve major developments. There are concerns with a sudden increase in the number of reports required of development. These include ensuring there is sufficient capacity to review the resulting reports internally within reasonable timeframes, setting standards for a potential "wildfire hazard information report" such as desired content, methods, and professional qualifications, and working to promote the program as a reasonable and acceptable step to the development community and the general public. Development Approval Information provisions do not immediately allow for the RDN to begin mandating FireSmart design on affected properties – this requires the creation of a DPA where additional guidelines for design and construction in the WUI apply. However, the "wildfire hazard information report" would symbolize the commitment of the RDN to increasing its understanding of wildfire risk on private land and could help build awareness of hazard mitigation for property owners in the interface.

### Consider how future introduction of a Development Permit Area for wildfire hazard could support community safety and resiliency.

Wildfire hazard is  increasing as climate change progresses. The widespread interface and intermix conditions in EA E place the community at an inherent risk of wildfire damage or loss. It would be valuable to adopt guidance for development in the WUI so that only resilient designs are permitted via the structure of a DPA for natural hazards. Moving to require new building materials, landscaping, and site servicing standards to address the natural hazard of wildfire is a multi-year process that should involve comprehensive community engagement and be started before it is needed. Introducing wildfire hazard provisions into a new or existing DPA requires public confidence and widespread awareness of the condition and sources of that hazard. This is why education and voluntary FireSmart initiatives are prioritized by this CWRP, along with initiatives to improve the RDN's understanding of wildfire risk on private property.

Some residents are motivated to live in unincorporated areas because they are attracted to a limited local government with fewer "rules" around development. However, most residents are motivated simply by beautiful landscapes and vibrant communities; they may be more open to arguments for changing planning processes and approvals. A DPA for natural hazard should be seen as a tool that conserves a community's character by protecting it from catastrophic loss, rather than as an example of local government overreach. Attitudes toward new regulations may rapidly change as wildfire events alter the public perception of risk.

# Interagency Cooperation

The Regional District of Nanaimo (RDN) is not the only actor in wildfire management within the project area; several agencies and authorities influence wildfire in the community and work to protect Electoral Area E (EA E) 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 the Canadian military. 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 E means that it can act as an intermediary between different agencies and groups that together prepare EA E for wildfire.

## 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 for and responding to wildfire in EA E:

- **The RDN** – conducts emergency and evacuation planning, initiates and staffs Emergency Operations Centre during a wildfire, declares local states of emergency and exercises local emergency powers to direct residents out of a fire zone (under the Emergency Program Act). The RDN also manages properties in the community and regional parks system and provides most community planning functions under the *Local Government Act*, influencing loss prevention.
- **BC Wildfire Service** – before a wildfire, supports wildfire risk reduction through projects on provincial crown land and joint training; collaborates with local fire departments and local governments on FireSmart projects; and issues fire bans in its regions during periods of elevated fire danger. During a wildfire, acts as official first suppression response to a wildfire in parts of EA E without local fire protection districts.
- **Nanoose Volunteer Fire Department** – provides first suppression response within its fire protection areas (all of EA E and portions of neighbouring Electoral Areas C, F, and G). Conduct outreach within their communities to promote responsible fire use and control.
- **Snaw-naw-as Nation** – Electoral Area is within their traditional territory and have members living both on- and off-reserve in the area. 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.
- **Emergency Management BC** – before, during, and after a wildfire supports local government response
- **Ministry of Forests, Lands, Natural Resource Operations and Rural Development** – provides review and issues tenures to fuel management projects located on crown land.
- **Ministry of Transportation and Infrastructure** – maintain public roads in unincorporated areas, including maintenance of flammable vegetation found roadside, responsible for subdivision application approval.

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 can be part of any communications plan for FireSmart initiatives led by the RDN.

### Regular Communications Through an Annual or Semi-Annual Meeting

While most of these organizations communicate with each other, there is not currently a schedule to 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 that 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 contract between partners to build trust and promote coordination of emergency planning functions.

## Initiatives to Consider

### 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 between the fire departments in the RDN, it may be valuable for the RDN to bring together departments with the BCWS and 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. 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. 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 when CRI funding announcements are generally made (March). 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 E and bring together emergency planners, first responders, and 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 the RDN with support from the BCWS and local fire departments. It may be valuable to have some or all representatives from the authorities identified in the *Factors for Success* (p.80), 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 review of the RDN's CRI funding applications
- Suggest initiatives for inclusion in the funding applications.
- 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 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, NVFD, and one member of the community at large may provide sufficient representation and distribution of effort. The scheduling of an annual meeting would logically occur in August before 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. 4.0% of the population of Electoral Area self-identified as indigenous ("aboriginal identity") on the 2016 Census[33]. While this rate falls below the average rate of individuals expressing indigenous heritage in the RDN as a whole or the rest of British Columbia, this represents several hundred members of the community. The Snaw-naw-as Nation has a core interest in these lands and waters, which are part of their traditional territory and includes their Nanoose Bay reserve. As a discipline involving land management, wildfire prevention can affect indigenous cultural values, and Snaw-naw-as Nation should be involved in the planning of vegetation management. EA E contains 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, CRI supports providing cultural safety and humility training to emergency management personnel involved in both wildfire prevention and suppression. The RDN could provide staff members in its Emergency Operations Centre with 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 E, 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. https://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 E (EA E) 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 FireSmart programming and interagency cooperation. 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 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 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 . 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, EA E's communities have an existing base of knowledge and training in wildfire preparedness and response. Nanoose Volunteer Fire Department has a robust training program to meet provincial requirements for registered departments. The Department has also taken steps to train members to respond to wildfire interface events. Having additional members access training and experience can help build resilience in EA E.

### Identify Funding Eligibility

The local fire department can refer to this document and the annual updated CRI program information to understand which courses or opportunities are covered by grant funding. Currently, direct funding opportunities for training within CRI 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 Nanoose 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. This training is only available to members of volunteer fire departments or emergency management personnel.

NVFD strives to train new volunteers with SPP-WFF1 and ICS-100 within two years of joining the force. Having both firefighters and RDN staff complete ICS-100 ensures that emergency responders and staff participating in an Emergency Operations Centre have 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

Through CRI, community members have access to preparedness training within the FireSmart frame. Residents throughout EA E can access training as Neighbourhood Champions, which provides them the knowledge to engage with their communities on preparedness issues and potentially take a leading role in establishing a neighbourhood FireSmart committee for developing a FireSmart neighbourhood plan (discussed under *Education*). To offer support to 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. Staff in the RDN's Emergency Services Department currently include two certified Local FireSmart representatives, though staff have a limited capacity to run new programming. Internally, the RDN can also ensure its parks and planning departments receive basic training in FireSmart so that they are able to support resiliency initiatives.

### Initiatives to Consider

#### Collaborate with the Nanoose 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 in EA E, have the same knowledge of wildland suppression and enable all members to participate in structural protection deployments with the BCWS if desired. 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 E.

#### 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 RDN to use in-house talent to build up FireSmart awareness and capacity in its unincorporated 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 E 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 is a suitable alternative to neighbourhood level programming where there is widely distributed interest in FireSmart across the community. The assessments and impacts of the Home Partners Program are not dissimilar from the scope of a wildfire hazard assessment for the property under a Development Permit Area (DPA) regime. Investing in a multi-year Home Partners Program could provide valuable preparatory experience or a voluntary alternative to establishing new regulations.

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 RDN's 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 emergency 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 behavior 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), issues evacuation alerts, orders and rescinds, and coordinates an Emergency Operations Centre during periods of need, bound by the requirements of the Emergency Program Act. Emergency planning, including evacuation planning, by the RDN focuses on an all-hazards approach, rather than prescriptive plans that may quickly be overcome by situational uncertainty. For example, the RDN's evacuation planning relies on remote sensing data and field assessments to understand all possible routes, rather than focusing on a single preferred route which may be non-functional in a large emergency. During a wildfire emergency, multiple routes and resources may quickly become unpassable, 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 emergency planning by the RDN, pre-incident planning by local firefighters, 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 preparedness 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 has not been undertaken as part 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' guidance.

**Table 18. Sample Guide to Wildfire Response Condition Level.**

| Preparedness Level/ Fire Danger Rating | Action Guidelines |
|---|---|
| I Low | • Staff monitor fire danger rating weekly |
| II Moderate | • Staff monitor fire danger rating daily |
| III High | • Staff on normal shifts<br>• Notify proposed Community FireSmart and Resiliency Committee of preparedness level.<br>• Establish weekly communications with local fire responders regarding preparedness concerns.<br>• Promote wildfire awareness and reporting mechanisms on social media channels.<br>• Publish fire danger rating on RDN website.<br>• Consult with RDN Parks on potential area closures in zones of high and extreme wildfire threat. |
| IV Extreme | • EOC and parks staff on standby.<br>• Notify proposed Community FireSmart and Resiliency Committee of preparedness level.<br>• Weekly communications with local fire responders regarding preparedness concerns.<br>• Weekly communications with parks department staff over internal preparedness.<br>• Promote wildfire awareness and reporting mechanisms on social media channels.<br>• Publish fire danger rating on RDN website.<br>• Consider area closure notices in park zones of high and extreme wildfire threat. Prepare area closure notices. |
| V Ongoing fire(s) | • Issue area closures in all parks and publicize with media release and RDN website.<br>• Mobilize EOC if evacuation is needed, or if fire requires additional support from Emergency Management BC.<br>• Issue Evacuation Alerts and Orders based on fire behavior prediction as appropriate in consultation with BCWS and publicize with media release and RDN website.<br>• Assist evacuated residents with support access and emergency lodging.<br>• Daily communications with local fire responders, BCWS, and parks department.<br>• Daily public updates via social media and public release. |

## 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 NVFD and neighbouring local fire departments, RDN Emergency Services 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 Emergency Services department can work closely with the NVFD to coordinate this exercise, which should include details about the scenario's location, time, and context. This working group is an opportunity for the primary fire responders, the local fire departments, to share their knowledge and suppression capacity with emergency planners.

### Conduct a community info session about emergency preparedness during 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 18), tied to fire danger reporting updated daily by the Province. Table 18 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 Electoral Area E (EA E) community.

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

While the focus of the Community Wildfire Resiliency Plan is on preparing for a wildfire within the boundaries of EA E, wildfire smoke impacts can range far and wide and have affected the community during past fire seasons. 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 E, such as commercial centres, faith-based facilities, or community buildings with suitable HVAC systems that are open to the public. Identifying community partners for such a program and alerting them to expected smoke conditions could be incorporated into the wildfire emergency preparedness condition guide, along with guidelines for monitoring expected smoke weather.

### Pre-Incident Planning

The pre-incident plan is a body of knowledge prepared by local fire departments that details the suppression resources and challenges to fire scenarios throughout the protection area. During a wildfire, local fire departments will provide the suppression response and incident control to an ignition inside the fire protection areas while the RDN declares a state of emergency as necessary and directs communities to evacuate. This section is mainly provided as guidance for local fire departments who lead the first response to a wildfire and provide incident control at the scene. The following issues should be addressed by a pre-incident plan:

**Command**

- First responder
- Incident command and delegation
- Management constraints
- Area closure procedures
- Interagency agreements

**Logistics**

- Alert/Order publication and notification
- Location of utilities and de-energization
- Communications protocols
- Roads, trails, and access
- Emergency Operation Centre location

**Operations**

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

**Planning**

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

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 the RDN, BCWS, and local fire departments. 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* (p.93).

# Vegetation Management

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 (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 the 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 division reflects the difference in goals and methods 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 which 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 Regional District of Nanaimo (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. Development of other FireSmart initiatives for private land are discussed in the *Education* (p.67) and *Legislation and Planning* (p.79) sections.

### 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. This is available only for structures critical to wildfire response (such as a reception centre, water infrastructure, communications towers, electrical infrastructure, etc.) having a completed FireSmart

assessment score card at the time of application. Reassessment with the appropriate score card following the mitigation works is also a covered cost for publicly owned critical infrastructure. The RDN can prepare a FireSmart assessment program in consultation between Emergency Services and the Engineering and Utilities Department to assess key community water and wastewater infrastructure or other facilities. Pump stations for the Nanoose Peninsula water service, the water treatment plant on Nanoose Road, and the Nanoose Pollution Control Centre are all key pieces of infrastructure that should be assessed under this program. Developing this program is discussed in *Legislation and Planning.*

### Fuel Management for Forest Landscapes

Fuel management in the wider landscape is not 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 improve the effectiveness of fire suppression techniques and thereby reducing 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 remote areas 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-verified. The areas shown on the map in this section form a discussion piece to be used in pursuing a fuel management program and do not imply fuel management will occur. The process from initial identification of a treatment area to implementation on the ground typically takes multiple years.

**Photo 12. Example of a forest prior to fuel management. (Example from outside the RDN)**

**Photo 13. In the same area as in the previous photo, post fuel treatment. (Example from outside the RDN)**

### Methods for identifying potential fuel treatment areas

Areas on public lands that were identified as having potentially high wildfire risk within 100m of densely populated areas or critical infrastructure were visited in the field. Fuel plots were established in representative areas of the forest stands to determine wildfire threat. Assessments of the fuel condition were completed following the Provincial assessment system using the 2020 Wildfire Threat Assessment Guide. 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 prioritise the areas for fuel hazard mitigation funding under the Community Resiliency 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, and thereby reducing the wildfire risk. This involves reducing the overall fuel load and disrupting both the vertical and horizontal continuity to create gaps between the fuel layers. The overall objective of the fuel treatment prescriptions is to change the fire behavior potential of forests from a crown fire to a surface fire under the most dangerous weather conditions (the 90$^{th}$ percentile fire weather indices). Successful fuel management allows suppression resources to be able to act on the wildfire and defend the adjacent values. The detailed strategies for reducing fire behavior 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.

*Surface fire* is where only fuels in contact with ground are involved in a wildfire.

*Crown fire* is where tree crowns, including foliage and branches, are involved in a wildfire. Crown fire can be *passive*, meaning only single tree crowns or groups of trees are involved, or *active*, meaning fire is readily spreading between tree crowns.

**Figure 18. Comparison of surface and crown fire behavior.**

### Potential Treatment Areas

The opportunities for forest fuel management on public land in Electoral Area E (EA E) are extremely limited. This is because of several factors, including:

- The small amount of public land in EA E.
- The limited area of contiguous forests with high or extreme wildfire threat.

- High environmental values of remaining forest cover, such as in provincial and regional parks.
- Low feasibility, primarily due to public land fragmentation, restricted access to private or controlled land, or distance from available land base to values of concern.

The RDN is a minor landowner in EA E. While all forms of public land ownership within the WUI are potential fuel treatment areas in this Community Wildfire Resiliency Plan, the RDN only has authority to advance treatments that occur on its own property. Fuel management on other forms of public land ownership must be advanced through partnership with the agency having authority and the BCWS.

Only one area was identified as being a suitable candidate for fuel management. This area is located in the western portion of Moorecroft Regional Park and adjacent crown land. The treatment area is designated a low priority for implementation due to the current moderate threat/risk rating. The treatment area is generally over 100 m from values due to a buffer of forested private land that is not accessible to fuel treatment. A second area in Dublin Gulch, between Sea Blush Drive and Arbutus Grove Provincial Park, was considered as a potential treatment area but preliminary field review indicated treatment low treatment feasibility due to poor access, steep slopes, and a wide separation between likely treatment area boundaries and values of concern.

Figure 19 shows the location of the potential treatment area identified by this CWRP. The areas are described in more detail in Table 19.

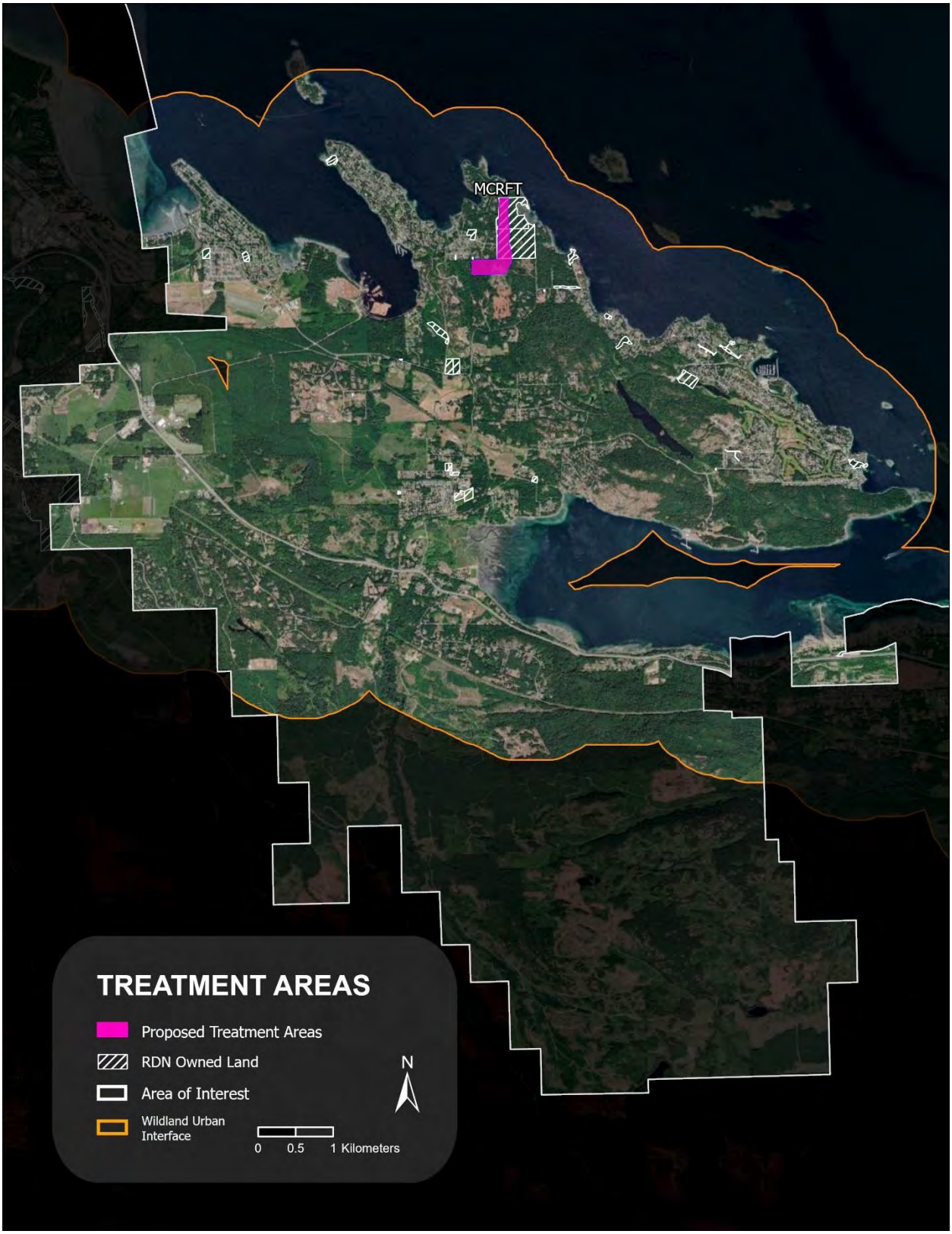


**Figure 19. Map of potential fuel management areas in EA E.**

**Table 19. Areas with the highest potential for fuel management in Electoral Area E.**

| Treatment Polygon ID | General Location | Jurisdiction | Local Fuel Threat (Ha) | | | Total Area (ha) | Priority | Treatment Rationale / Constraints |
|---|---|---|---|---|---|---|---|---|
| | | | Moderate | High | Extreme | | | |
| MCRFT | Moorecroft Regional Park & Woodlot 1479 | RDN/Crown Provincial | 18.4 | 0 | 1.8 | 20.2 | Low | This area is characterized by moderate wildfire threat. This area is located within 100 m of suburban residential development in the Dorcas Point neighbourhood, but is adjacent to few homes. C-5 stands at moderate densities are typical of these forests, with limited areas of M-2 fuel type around stand edges and in low lying areas.<br><br>Preliminary constraints: A restrictive covenant applies to much of the Moorecroft Park property that may potentially limit alterations to forest structure or other vegetation. Area is within a popular recreational area and contains trails that would need to be conserved or rehabilitated. Public access management during future implementation would be required. The area borders a small number of residential properties and provides limited benefit, though it may discourage the fire on the peninsula from moving towards the populated Beachcomber neighbourhood. A fuel management prescription must consult with First Nations on cultural feature identification. Consultation must also consider the active woodlot license if crown provincial land is included in the treatment. |

# 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 E (EA E). A formal review after five years is recommended, with 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.

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, provides a sample tracking and reporting tool.

**Table 20. 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 5 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 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 contract) | 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 within one year after receipt by the Board of Directors | |
| **5. Create a voluntary FireSmart assessment program for private property in EA E.** | Local FireSmart Representative / FireSmart Coordinator | High | See Item 3. Incidental expenses beyond FS Coordinator salary. | Coordination with NVFD recommended. Trained LFR within RDN | Offer an annual opportunity to residents 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 population. | |
| **7. Promote FireSmart Neighbourhood Planning in neighbourhoods at relative risk.** | Local FireSmart Representative / FireSmart Coordinator | Medium | $3,000-$5,000 | Coordination with NVFD recommended. NVFD has 5 LFRs (April 2022). Trained LFR within RDN. | Number of households represented, participating Offer neighbourhood champion workshop to regional residents. | CRI funding eligible |

| Recommendation/Action | Lead(s) | Priority | Cost (Est.) | Resources Required | Metric for Success | Notes |
|---|---|---|---|---|---|---|
| **8. Host a Community Clean Up Day in Moorecroft Park as a demonstration of FireSmart principles.** | Local FireSmart Representative / FireSmart Coordinator<br>RDN Parks | Medium | $5,000 | Coordination with RDN Parks to designate clean-up areas, desired outcomes | Number of participants<br>Weight of vegetation/debris removed<br>Reduce surface fuel loading near homes. | 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<br>Coordination with social media | Number of questions asked<br>Number of contacts with residents<br>Number of survey responses (Get Involved) | |
| ***Legislation and Planning*** | | | | | | |
| ***Objective: Ensure RDN by-laws 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<br>RDN Emergency Services | High | Cost to be estimated by further study | Coordination between departments<br>Baseline studies<br>Operational capacity and training | Green waste by weight associated with a completed FireSmart assessment<br>Fees deferred | Tipping fees: CRI funding eligible. |
| **11. Conduct FireSmart Assessments of existing RDN critical infrastructure.** | RDN Emergency Services<br>RDN Engineering and Utilities | High | $25,000-$30,000 | Coordination between departments | Completed FireSmart Assessment Score Cards for all RDN-owned critical infrastructure. | CRI funding eligible. |
| **12. Support authorities having jurisdiction to conduct FireSmart Assessments of non-RDN critical public infrastructure, such as by completing joint CRI application for this purpose** | RDN Emergency Services<br>Improvement Districts<br>School District<br>Snuneymuxw First Nation | Medium | Incidental | Coordination between RDN ES and authorities having jurisdiction. | Completed FireSmart Assessment Score Cards for all critical infrastructure identified by HRVA in EA E. | CRI funding eligible. |
| **13. Harmonize the existing Wood First and Green Building policies with FireSmart principles, such as supporting fire-rated wood products.** | RDN Engineering and Utilities<br>RDN Planning and Development<br>RDN Emergency Services | 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. |

| Recommendation/Action | Lead(s) | Priority | Cost (Est.) | Resources Required | Metric for Success | Notes |
|---|---|---|---|---|---|---|
| **14. Adopt a target level of service for wildfire hazard assessment in regional and community parks** | RDN Parks | Medium | Staff time | Coordination between Parks and Emergency Services Operational capacity (qualified individual) | Level of service for wildfire hazard assessment of park lands established in new Parks and Trails Strategy | |
| **15. Begin recording wildfire threat information on park service request records and calls.** | RDN Parks | Medium | Staff time | Emergency Services to provide wildfire threat mapping. Parks to orient staff to mapping. | >90% of relevant service requests on park land attached to a wildfire threat rating for the area. | |
| ***Development Considerations*** | | | | | | |
| ***Objective: Consider FireSmart design principles in planning and development bylaws.*** | | | | | | |
| **16. Provide FireSmart information (bulletins, brochures, web resources) with development application materials** | RDN Planning | High | Staff time | Coordination between Emergency Services and Planning Department | FireSmart information is provided with all development permit application templates. | CRI funding eligible, to a pre-determined maximum (physical materials); web resources free |
| **17. Work with RDN Planning Department to consider FireSmart principles during development review and referral** | RDN Emergency Services<br>RDN Planning | High | Staff time | Coordination between Emergency Services and Planning Department | Host an interdepartmental workshop to go over FireSmart principles and design elements respecting land subdivision, including fuel setbacks and potential vegetation management. Develop a working protocol for FS Coordinator or NVFD rep involvement in development review. | Protocol: potentially CRI funding eligible depending on scope. |
| **18. Investigate use of the Development Approval Information Area (EA E) to request and collect information on wildfire hazard on private property, particularly during land subdivision.** | RDN Planning<br>RDN Legal<br>RDN Emergency Services | Medium | Staff time | Research capacity in the responsible RDN departments. | Bring a workable pathway to request wildfire hazard assessment reports for development applications on private land to the RDN Electoral Area Services Committee. | CRI funding eligible, subject to scope limitations around the bylaw review. |

| Recommendation/Action | Lead(s) | Priority | Cost (Est.) | Resources Required | Metric for Success | Notes |
|---|---|---|---|---|---|---|
| | | | | | | Pursuing wildfire hazard information on private land through the DAI mechanism helps establish wildfire risk on private land in EA E. This information need not be requested from every application. Designating a DAI zone for wildfire hazard can be part of the investigation process. Currently, the Official Community Plan for EA E identifies "forest fire" as a natural hazard within the community but contains no policy to direct development regarding this hazard. |
| **19. Consider preparing mapping of a designated wildfire hazard area for a future OCP update.** | RDN Planning | High | $10,000-15,000 | Potentially significant investment in methodology, mapping, and community engagement if DPA pursued. | Map community-supported zones for wildfire interface hazard.<br>Incorporate mapping at next OCP renewal. | CRI funding eligible, subject to scope limitations.<br><br>If incorporated into Map 1 of the OCP, mapping can be used either for DAI or future DPA mechanisms to gather information on wildfire hazard on private land and/or guide development toward FireSmart principles. |
| ***Interagency Cooperation*** | | | | | | |
| ***Objective: Ensuring wildfire response is effective*** | | | | | | |
| **20. Initiate a region-wide Interagency Fire Response and Preparedness Working Group** | RDN Emergency Services<br>BC Wildfire Service (BCWS) | High | $2,000 per meeting | Participation of local fire depts, BCWS, regional emergency responders | Host initial meeting<br>Host tabletop exercise for incident planning | CRI funding eligible |

| Recommendation/Action | Lead(s) | Priority | Cost (Est.) | Resources Required | Metric for Success | Notes |
|---|---|---|---|---|---|---|
| **21. Develop an EA E-specific Community FireSmart and Resiliency Committee** | FireSmart Coordinator | High | $2,000 per meeting | Develop terms of reference, network participants, support participation | Host initial meeting<br>Approve draft terms of reference | CRI funding eligible |
| **22. Provide cultural sensitivity training to Emergency Services staff to support positive partnerships with indigenous people and communities** | RDN Emergency Services | Medium | Staff time & facilitation fee | | 1 on duty or on call EOC staffer with cultural sensitivity training at all times during emergency | CRI funding eligible |
| ***Cross Training*** | | | | | | |
| ***Objective: Ensuring emergency responders have a variety of training and experience*** | | | | | | |
| **23. Support NVFD departments to access additional training on future CRI funding applications.** | FireSmart Coordinator | Medium | Incidental | Identify training needs for new recruits, transfers<br>NVFD to identify candidates for training and desired courses. | Full participation in training by members who want it | CRI funding eligible |
| **24. Support additional RDN staff to become Local FireSmart Representatives** | RDN Emergency Services | Medium | Staff time | | At least 2 persons in RDN Emergency Services to have active LFR certification. | CRI funding eligible. Support this training for new FireSmart Coordinator or hire with credential |
| **25. 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 | 2 new neighbourhood champions trained in priority identified areas. | CRI funding eligible |
| **26. Train RDN staff or Local FireSmart Representatives to be Wildfire Mitigation Specialists** | RDN Emergency Services | Low | $8,500 - $10,000 | Expression of interest in WMS programming from NVFD or sufficient public interest. | Certification of a WMS within the RDN ES department. | CRI funding eligible |
| ***Emergency Planning*** | | | | | | |
| ***Objective: Enhance emergency response capacity*** | | | | | | |
| **27. Establish a guide for Emergency Services EOC preparedness levels during wildfire season** | RDN Emergency Services | High | Staff time | Administrative capacity in ES. | Adopt as policy a Guide to Wildfire Preparedness Condition Levels | Sample for development provided in Emergency Planning section |
| **28. Work towards a pre-incident plan for wildfire events with local suppression experts** | Regional Fire Response and Preparedness Working Group | High | Staff time. | Participation of emergency responders and suppression authorities<br>Coordination with NVFD officers leading existing efforts. | Complete annual pre-incident plan and discuss with regional working group for fire response in pre-season meeting | CRI funding eligible when developed as part of a working group of Community FireSmart and Resiliency committee |

| Recommendation/Action | Lead(s) | Priority | Cost (Est.) | Resources Required | Metric for Success | Notes |
|---|---|---|---|---|---|---|
| **29. Conduct a community information session about emergency preparedness and evacuation during a wildfire** | RDN Emergency Services | Medium | $5,000 per event | Administrative capacity in RDN Emergency Services | Host event<br>Number of attendees | CRI funding eligible |
| **30. Identify "Clean Air Refuges" for use by the public during smoke events** | RDN Emergency Services | Low | Staff time | Partnership with community businesses and facilities.<br>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*** | | | | | | |
| **31. Work to implement FireSmart Assessment recommendations for critical infrastructure, such as by supporting joint applications to CRI for infrastructure designated in the HRVA.** | RDN Emergency Services | High | TBD based on assessment outcomes. | Administrative capacity in ES.<br>Partnership with Engineering to allocate and prioritize assets for implementation | Completed FireSmart activities and updated score cards | CRI funding eligible, when initial FireSmart assessment has been completed. Up to $50,000 per structure. |
| **32. Consider potential fuel treatment in Moorecroft Regional Park** | RDN Emergency Services<br>RDN Parks<br>BCWS | Low | Staff time | Coordination with BCWS | Maintain options to pursue fuel treatment in identified areas. | |

**Table 21. Sample tracking and reporting tool.**

| Recommendation/Action | Lead | Date Completed | Cost | Successes, challenges, and lessons learned | Follow up – provide description |
|---|---|---|---|---|---|
| **Action** | Who leads this implementation? | When was the implementation completed? Or is this an annual project? | What was the cost? Include Tribe manpower hours here | Was the metric for success achieved? If not, why? Was the metric unrealistic? What unexpected challenges were encountered? | How does implementation or failure to implement impact other actions? Did implementation of this action lead to new required actions? |
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# 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 in the 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 affects 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 | A classification of potential fire behavior 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. |

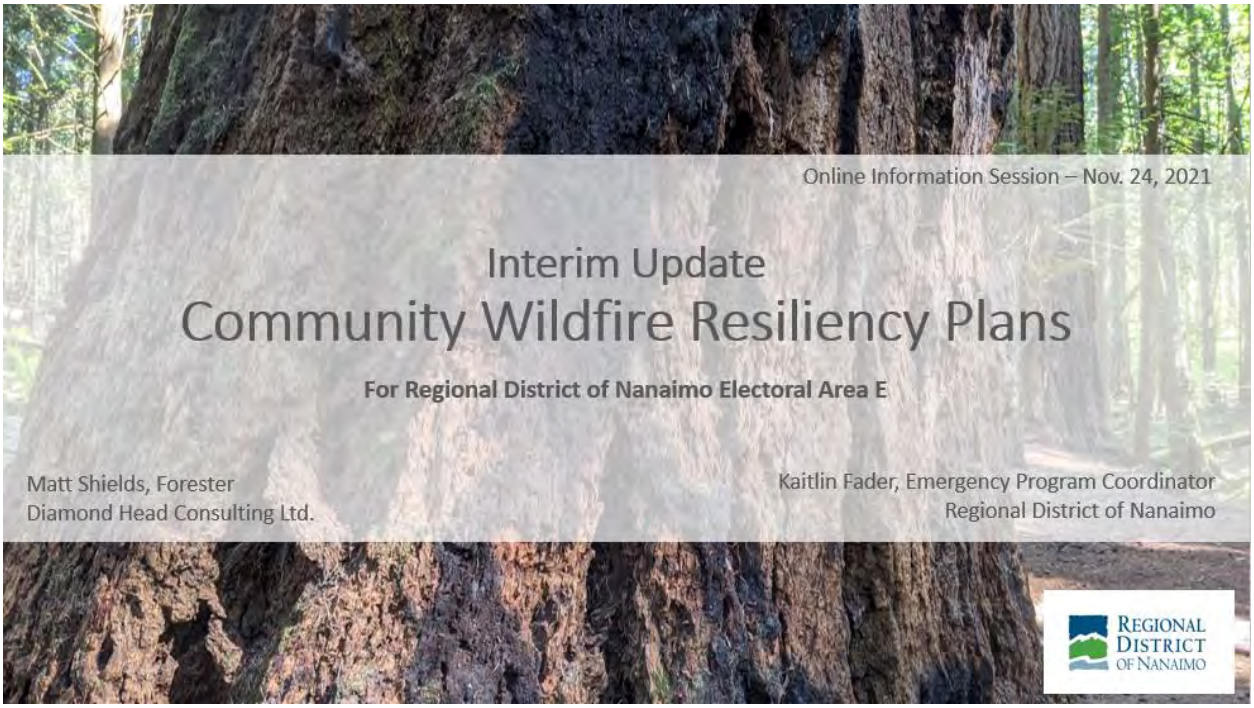
## Appendix B: Public Engagement

Public engagement for the plan consisted of information and feedback solicited via the Regional District of Nanaimo's (RDN) Wildfire Resiliency Initiative Get Involved webpage, as well as two community events hosted online via Zoom on August 26th 2021 and November 24th 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.

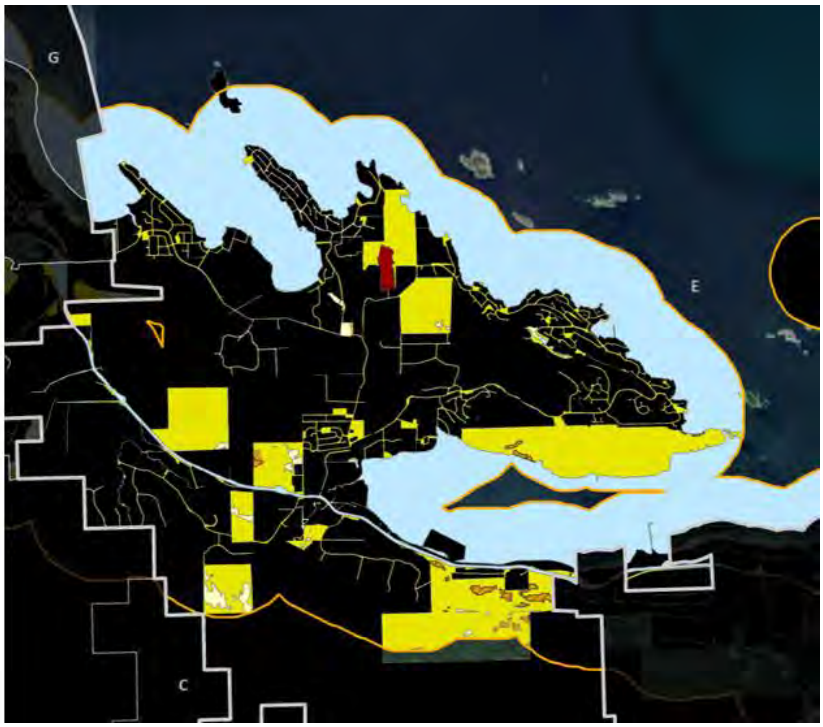
Engagement with the public revealed several common concerns across the RDN's electoral areas, particularly regarding the implementation of FireSmart landscaping. Several recommendations regarding the development of FireSmart programming for neighbourhoods of higher relative risk, reducing barriers to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

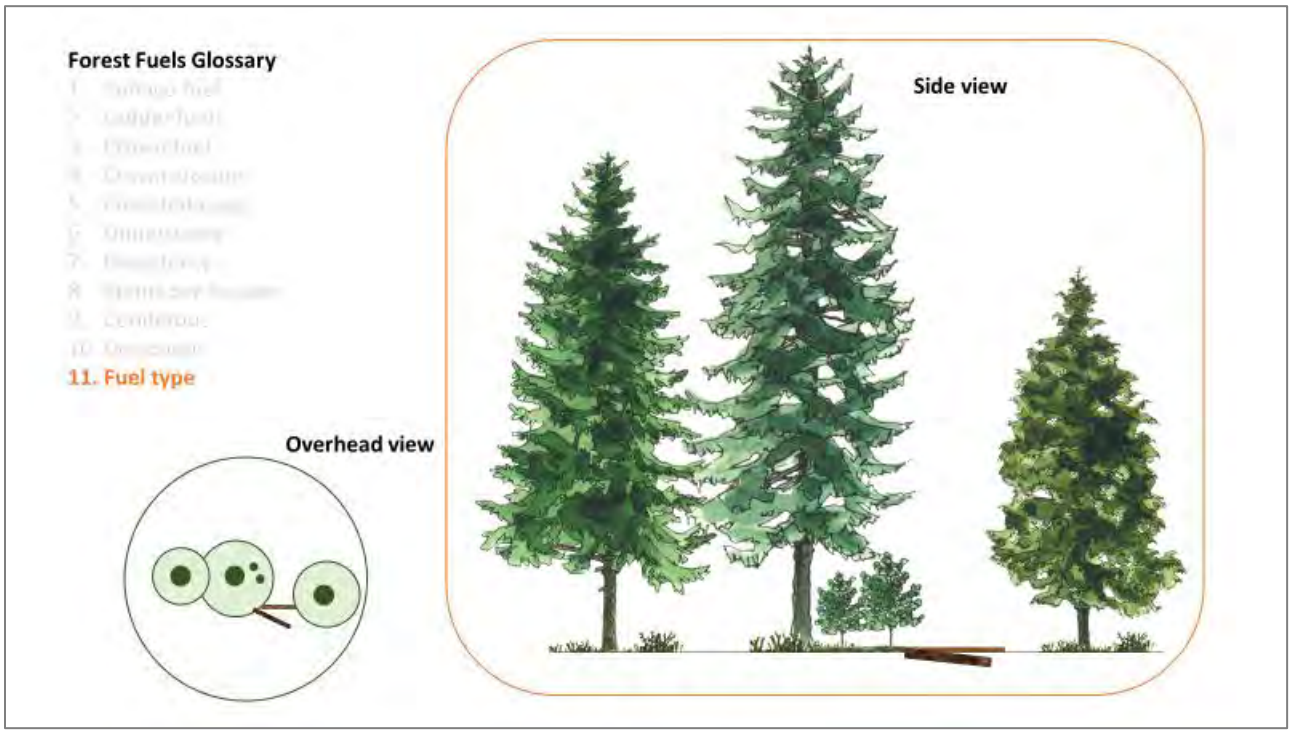
The following images are sample presentation slides from the web event of November 4, 2021, which provided an "interim update" to the community on findings of the local wildfire threat assessment.



**Wildfire Threat and Risk in Electoral Area E**
Light blue = Very low
Light yellow = Low
Yellow = Moderate
Orange = High
Red = Extreme
Hash = High risk area (high threat in proximity to homes)

- Most areas of public land in these communities have moderate wildfire risk.
- Significant areas of high risk are driven by conifer fuel types on steep slopes
- The area of extreme wildfire threat is likely overestimated.



## 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 System (Canada, 2018). 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 Behavior Prediction (FBP) System does not include coastal forests in their fuel type descriptions (Perrakis & Eade, 2015), 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.

*C-3 and C-5 - Conifer Fuel Types*

There are seven possible conifer dominated fuel types (Figure 20), 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.

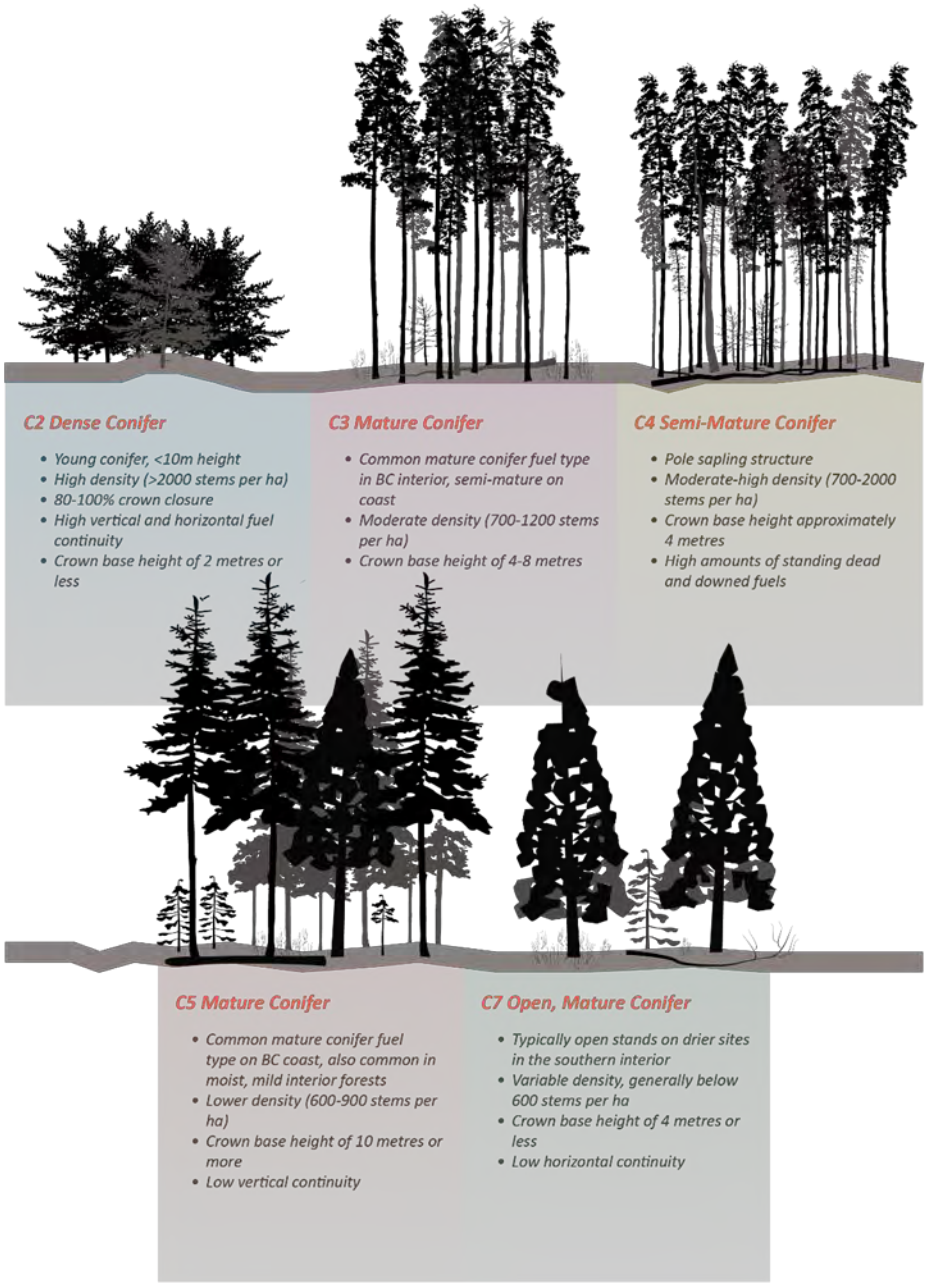



**Figure 20. Characteristics of the five most common conifer fuel types in BC. C-3 and C-5 are prevalent within the AOI.**

**Photo 14. Example of a stand classified as C-3 fuel type.**

**Photo 15. 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 16. 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 amount 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 behavior potential.

**Photo 17. 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 18. O-1a/b fuels in foreground. Note the contrast with irrigated, maintained grass in 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 disturbance, 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 BC Wildfire Service (BCWS) fuels specialist (Dana Hicks, pers communication):

1. DHC reviewed the fuel type layer with 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 values and communities as priorities.

3. Field work was conducted to ground truth the fuels layers. Polygons adjacent to values were visited by forester and the accuracy of fuel typing layer 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 a 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 increased rate of spread and wildfire intensity and are therefore reviewed together. Data for FFMC and ISI is recorded at local 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 22. 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, increase rate of spread. |
| **31-45%** | Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread. |
| **46-60%** | Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread. |
| **>60%** | Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread. |

**Table 23. Slope position of value and fire behaviour implications.**

| Slope Position of Value | Fire Behaviour Implications |
|---|---|
| Bottom of Slope/ Valley Bottom | Impacted by normal rates of spread. |
| Mid Slope - Bench | Impacted by increase rates of spread. Position on a bench may reduce the preheating near the value. (Value is offset from the slope). |
| Mid slope – continuous | Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the fire. |
| Upper 1/3 of slope | Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel. |

### 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 90$^{th}$ 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 3 areas (Table 24):

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 24. 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 15. 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 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 wildland urban 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. Area 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 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 E

## Map 1: CWRP Area of Interest (AOI)

**Legend**

- CWRP AOI
- ElectoralAreas

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
- FireProtectionAreas
- 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

N

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

# ELECTORAL AREA E

## 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**

N

0.55 Kilometers

| Wildfire Threat Rating | Area (ha) | Wildfire Risk Rating | Area (ha) |
|---|---|---|---|
| Extreme | 15.1 | Extreme | 3.6 |
| High | 30.5 | High | 34.9 |
| Moderate | 1118.9 | | |
| Low | 75.1 | | |
| Very Low | 3368.3 | | |
| No Data | 4328 | No Data | 4328 |

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

# ELECTORAL AREA E

## Map 3: Proposed Fuel Treatment Units

**Legend**

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

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

| PROPOSED_TREATMENT_ID | AREAHA |
|---|---|
| MCRFT | 20.2 |

**Coordinate System: NAD83**
**Projection: BC Environmental Albers**

**Date: April 11, 2022**

N

0.5 Kilometers

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