

Upper Nicola Band

Community Wildfire Protection Plan



April 2022



Prepared for:

UPPER NICOLA BAND
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April 9, 2022

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Upper Nicola

Band Council Resolution

The Council of the Upper Nicola Band	BCR Chronological No.: 2022-04-19-04
Physical: 2225 Village Road, Douglas Lake, BC Mailing: Box 3700, Merritt, British Columbia V0K 1B8	File Reference (if applicable):
Date: April 19, 2022	

Whereas: Upper Nicola Band applied for funds from Union of BC Municipalities for the 2020 Community Resiliency Investment Program to conduct the Upper Nicola Community FireSmart Planning and Wildfire Protection Plan.

The objectives of the plan were to:

- educate our members in FireSmart principles and create a wildfire resilient community by providing FireSmart education, training, policy development
- create a UNB driven Community Wildfire Protection Plan by conducting field and office work (wildfire threat assessment plots, GIS mapping, and planning) for Nicola Lake IR 1 and Douglas Lake IR 3.

Whereas: The Chief and Council, on behalf of the community of Upper Nicola Band, do hereby agree to adopt and implement the Upper Nicola Band Community Wildfire Protection Plan completed in 2022.

Therefore, be it resolved that: Chief and Council do hereby agree to support the implementation of the recommendations of the Community Wildfire Protection Plan, in effort to become a fire-resilient community and protect the safety of its residents.

Quorum for this Band consists of **(5) FIVE**






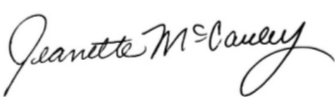


		
Chief Harvey McLeod	Councillor Mathilda Chillihitzia	Councillor Stacie Coutlee
		
Councillor Brian Holmes	Councillor Fred Holmes	Councillor David Lindley
		
Councillor Dennis MacDonald	Councillor Jeanette McCauley	Councillor Wallace Michel
		
Councillor Kevin Ned		

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Acknowledgments

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The author of this report would like to thank and acknowledge the following people for their assistance and participation in the preparation of the 2020 Upper Nicola Community Wildfire Protection Plan:

Collette Sunday – Upper Nicola Band Administrator

Upper Nicola Councillor Brian Holmes

Upper Nicola Councillor Dennis MacDonald

Dan Manuel – Director of Community Services

Ivy Gregoire – Assistant, Director of Community Services

Mahendra Paul – Fire Chief – Upper Nicola Volunteer Fire Department

Ira Tom – Former Upper Nicola Band Fire Chief

Rene Roddick and James McKendry – BC Hydro Vegetation Management

Mike Aldred – Wildfire Prevention Officer, BC Wildfire Service

Paul Emmett – Weather Forecaster, BC Wildfire Service

Acronyms

AOI	Area of Interest
AOP	Annual Operating Plan
BCWS	British Columbia Wildfire Service
CI	Critical Infrastructure
CRI	Community Resiliency Investment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resiliency Plan
EMBC	Emergency Management British Columbia
EP	Emergency Plan
ERP	Emergency Response Plan
FESBC	Forest Enhancement Society of British Columbia
FCF&S	FireSmart Community Funding and Supports
FLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
FNESS	First Nation Emergency Services Society
FRPA	Forest & Range Practices Act
GIS	Geographic Information Systems
HIZ	Home Ignition Zone
HVRA	Hazard, Risk, and Vulnerability Analysis
ISC	Indigenous Services Canada
PSTA	Provincial Strategic Threat Assessment
SARA	Species at Risk Act
HIZ	Home Ignition Zone
UBCM	Union of British Columbia Municipalities
UNB	Upper Nicola Band
VAR	Values at Risk
WRR	Wildfire Risk Reduction
WUI	Wildland-Urban Interface

Executive Summary

Fire has always been an integral part of Syilx land management and way of life, but the behavior of wildfires is changing dramatically and are now becoming more threatening to human life, safety and community values. Wildfire seasons are starting earlier in the spring and continuing later into the fall; fires are larger and more intense; and communities are seeing unprecedented impacts. The 2021 wildfire season illustrated the need for communities to increase preparedness levels in anticipation for challenging seasons ahead. BC southern interiors Kamloops Fire Centre saw 455 wildfires burn 498,000 hectares of land. Approximately 1% of the entire land base of British Columbia burned in 2021 (Wildfire season summary, n.d.). This past wildfire season was one of the most devastating on record due to the proximity of wildfires to communities and the resulting loss of human life, communities, homes and livestock.

The focus area of the Community Wildfire Protection Plan is called the Wildland-Urban Interface (WUI). The WUI is defined as the area within 2 kilometers of a community, which is the distance that a burning ember can travel into the communities from nearby wildfires. There are two WUI areas for the Upper Nicola Band: Nicola Lake (Quilchena) and Douglas Lake (Spaxomin). Within these WUI areas, the most common ecosystem and fuel type is grassland, which covers the valleys and rolling hills near the communities. Small pockets of other vegetation types flourish along the Nicola River and its tributaries, including trembling aspen and cottonwood forests and seasonal wetlands.

There are many values at risk that require consideration during a wildfire event, but first and foremost is human life and the safety of all residents living on UNB lands. Other important values that need protection include homes, community buildings, cultural values, species at risk, and critical infrastructure such as energy sources, water and sewage systems, and communication towers. The Community Wildfire Protection Plan provides recommendations pertaining to the protection of these values in the event of a wildfire, including conducting home assessments and mitigating wildfire risks around homes, creating an evacuation plan, and assessing and protecting critical infrastructure.

A wildfire risk analysis was completed for the WUI areas, resulting in 99% of the area categorized as a moderate fire threat class. This rating was developed by analyzing the natural disturbance regime, fuel types, wildfire history, topography, and weather patterns in the Wildland-Urban Interface areas for Quilchena and Spaxomin. Local wildfire threat assessments were also completed which further refined the threat class rating.

To mitigate the identified wildfire risk within and around the community, a number of recommendations have been identified which include that UNB implement a FireSmart program to mitigate wildfire risk immediately adjacent to houses and critical infrastructure. This program will include education and home assessments, as well as programming for the 7 FireSmart disciplines (education, emergency planning, vegetation management, legislation, development, interagency cooperation, and training). This also includes implementing a vegetation management program which incorporates prescribed burning and fuel reduction activities.

Wildfire response resources are available through the provincial wildfire service as well as the Upper Nicola Band Fire Department. At a community scale, there is a need for funding to upgrade and replace firefighting equipment including the fire engines, pumps, hand tools, and structure protection units. In addition, funding is needed to provide ongoing training for the fire department and Emergency Support Services facility.

Through the fulsome implementation of this plan, the Upper Nicola Band will be able to prepare its people and lands for wildfires; to be able to respond safely, quickly and effectively to wildfire emergencies, and to emerge strongly resilient from wildfires impacts.

Summary of Recommendations

Short Term (1-2 years)

<u>Recommendation #2</u>	That Upper Nicola complete home ignition zone assessments and initiate the FireSmart rebate program in the community.
<u>Recommendation #3</u>	That Upper Nicola complete a comprehensive evacuation route plan for the community, which includes maps of access/egress routes.
<u>Recommendation #4</u>	That Upper Nicola complete the remaining Critical Infrastructure (CI) assessments and source funding to address deficiencies noted in the assessment, if required.
<u>Recommendation #7</u>	That propane tanks be assessed during the CI or HIZ assessments and recommendations provided to the Upper Nicola administration to reduce surrounding vegetation, if applicable.
<u>Recommendation #9</u>	That Upper Nicola locate and map static water supplies available to the community for wildland firefighting water sources.
<u>Recommendation #10</u>	That BC Wildfire Service work collaboratively with Upper Nicola to develop acceptable processes and protocols for the protection of cultural heritage values during fire suppression activities.
<u>Recommendation #11</u>	That Upper Nicola internally identify cultural values that would require protection during a wildfire event,
<u>Recommendation #13</u>	That Upper Nicola develop policies to incorporate FireSmart principals in the current UNB Fire Department Plans and UNB Health and Safety plans.
<u>Recommendation #14</u>	That Upper Nicola develop a policy for annual controlled burns on Upper Nicola lands that includes a training component for prescribed/control burning techniques and fire suppression.
<u>Recommendation #16</u>	Revising or creating landscaping guidelines / policies to incorporate fire-resistant landscaping techniques and vegetation.

<u>Recommendation #17</u>	Establish requirements for new home builds and renovations to ensure that the exterior design and finish of buildings follows FireSmart guidelines.
<u>Recommendation #20</u>	That Upper Nicola commit to reviewing and updating the ERP and HVRA annually.
<u>Recommendation #21</u>	That Upper Nicola Fire Department provide annual refresher training in basic firefighting courses for all volunteer members of the Upper Nicola Fire Department.
<u>Recommendation #22</u>	That Upper Nicola Band source funding to complete fuel reduction treatments (hand & prescribed burning) in and around the Nicola Lake and Douglas Lake residential areas (WUI Areas).
<u>Recommendation #23</u>	That Upper Nicola Band initiate or participate in a land-based planning table that includes topics on retention planning, cumulative effects analysis, acceptable residual waste allowances and reduced stocking standards if timber harvesting is considered as a fuel reduction strategy.
<u>Recommendation #24</u>	That Upper Nicola Band continue to participate in and work in conjunction with the Nicola Fuel Management Technical Working Committee to develop and implement harvesting and landscape level fuel reduction projects.
<u>Recommendation #25</u>	That Upper Nicola source funding to supplement the wildland firefighting equipment available to the community in the event of a wildfire. Identified equipment included bladders, pumps, hoses, nozzles and accessories.
<u>Recommendation #26</u>	That Upper Nicola develop and complete a comprehensive annual training plan that includes an onboarding plan/training for new Fire Department members, annual competency training for active members and any other training that is required to comply with current structural firefighting standards.
<u>Recommendation #27</u>	That Upper Nicola communicate with BCWS to inform them of Upper Nicola's SPU capacity and status.

Mid Term (3-5 years)

<u>Recommendation #1</u>	Ensure that community FireSmart objectives and wildfire preparedness initiatives are embedded into higher level planning processes where applicable.
<u>Recommendation #5</u>	That the Upper Nicola Band develop a business continuity plan and include it as an addendum to the UNB ERP
<u>Recommendation #6</u>	That Upper Nicola assess options of purchasing and installing back up generation systems that can provide power to critical infrastructure required during periods of power outs.
<u>Recommendation #12</u>	<p>That Upper Nicola engage with organizations such as MFLNRORD to develop a monitoring program to track climate change trends on Upper Nicola lands which could include:</p> <ul style="list-style-type: none"> • Climatic factors: temperature, precipitation, snowpack, glacial melt and extreme weather events • Disturbance: fire weather index, mass earth movements, insect and disease prevalence by seral stage, and soil moisture. • Hydrology: stream flow by watershed, water temperature, channel stability, forest cover, erosion, and suspended sediment. • Biodiversity: regime shifts, seral stage, habitat supply, species health, connectivity, invasive species and distribution shifts. • Range: plant communities and condition, and drought conditions.
<u>Recommendation #19</u>	Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management staff are included.

Long Term (5-10 years)

<u>Recommendation #8</u>	That any future infrastructure or community development planning include the investigation of increasing the capacity of the existing water supply or designing water storage facilities for fire suppression activities.
<u>Recommendation #15</u>	Review and amend Strategic Plans, Comprehensive Community Plans and/or any relevant land use bylaws to incorporate FireSmart principles.
<u>Recommendation #18</u>	Include wildfire prevention and suppression considerations in the design of subdivisions (e.g. road widths, turning radius for emergency vehicles, and access and egress points).

SECTION 1: Introduction

Wildfire is an integral part of British Columbia's ecosystems and landscapes, including areas where citizens settle and communities grow. Due to an increasing population and expanding rural development, more communities in B.C. are located in areas of potentially increased wildfire risk.

This Community Wildfire Protection Plan (CWPP) will determine the level of, and steps to manage, wildfire risk within and surrounding communities of the Upper Nicola Band. It provides background information and links to supplementary information required to ensure that factors contributing to wildfire risk are well understood. The recommendations and Best Management Practices (BMP) are considered relevant for a general timeframe of 5 years unless changes and improvements to FireSmart initiatives, fuel reduction efforts, community development, community involvement and/or wildfire events alter the needs and resiliency of the local area, which may prompt updating components of this Community Wildfire Protection Plan.

The Community Wildfire Protection Plan is organized into the following major sections:

Section 1 Introduction: introduces the purpose of a CWPP, CWPP planning process and the community communication strategies

Section 2 Local Area Description: defines the Area of Interest (AOI) for the CWPP; provides a description of the community (or communities) within the AOI, a description of the Wildland Urban Interface (WUI) areas and identifies linkages to other plans that warrant consideration in this planning process

Section 3 Values at Risk: introduces the extent to which wildfire has the potential to impact values within a community

Section 4 Wildfire Risk Analysis: describes the process that was undertaken to identify and summarize the fuel hazard and other factors that contribute to the wildfire threat around a community

Section 5 Recommendations for Mitigating Wildfire Risk: outlines the strategies the community can put into practice to reduce the risk and the impact of a wildfire:

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

5.5 Forest Fuel Reduction: identifies and prioritizes forest fuel reduction treatments. This also includes other preventative measures that identifies local actions and strategies that can further reduce the threat of wildfires

Section 6 Wildfire Response Resources: provides a high-level overview of the resources that are available to local governments and communities in the event of a wildfire.

1.1 Purpose

The purpose of the Community Wildfire Protection Plan is to:

- 1) to assist the Upper Nicola community in identifying wildfire risks to the community,

2) describe potential consequences from the impacts of wildfire, and

3) provide mitigation recommendations based on current information that the community should consider implementing to reduce identified risks.

Specifically, the CWPP will:

- Delineate the communities Area of Interest (AOI) and Wildland Urban Interface (WUI) areas around habited areas on reserve at risk of wildfire, including the locations of homes and essential community infrastructure;
- Identify the threat to human life, property and critical infrastructure within a defined area;
- Determine wildfire risk throughout the WUI Area,
- Provide wildfire community resiliency recommendations and Best Management Practices (BMP) using current information and science.
- Identify measures necessary to reduce the identified threats. The CWPP planning process will provide the community with a detailed framework to guide the implementation of specific actions that will result in:
 1. Reduced likelihood of a wildfire entering the community
 2. Reduced impacts and losses to property and critical infrastructure
 3. Reduced negative economic and social impacts to the community
- Identify priority areas within the WUI for fuel reduction treatments, develop a Treatment Plan and provide recommendations to further support and enhance the community's efforts to be FireSmart. The recommendations are based on the seven (7) FireSmart disciplines to increase community resilience in the event of a wildfire.

1.2 CWPP Planning Process

Preparing a CWPP is based on the needs of the First Nation and the community members involved in its development. To properly prepare and mitigate wildfire risks, a community is required to develop a plan that involves key stakeholders, incorporates land use plans and clearly describes the wildfire risk. The CWPP should complement any policies, plans, legislation or multi-party agreements that are currently in place.

In 2020, the Upper Nicola Band acquired the services of Landscape Consulting Corporation to develop a CWPP for the Upper Nicola's Area of Responsibility (AoR), specifically focused on those areas surrounding habited reserve lands.

The following key steps were undertaken during the development of the CWPP:

Phase 1 – Initial planning, preparation and information gathering;

Phase 2 – Field and office data collection;

Phase 3 – Development of the draft Community Wildfire Protection Plan document, maps and spatial data files;

Phase 4 – Review of completed draft CWPP document by Upper Nicola, and revisions completed;

Phase 5 – Submission of completed CWPP document and supporting files

The declaration of the COVID-19 pandemic and resulting implementation of the BC Public Health orders/restrictions in efforts to manage the virus outbreak occurred in March 2020 and continued into 2022. The Public Health Orders/restrictions required specific safety protocols to be in place, including the restriction of all non-essential travel, limiting the size of groups/gatherings and increasing personal protection measures such as sanitizing all common surfaces/equipment, wearing masks and maintaining a minimum 2m/6ft distance wherever possible. Offices were closed and administrative staff were encouraged to work from home whenever possible. This created challenges for information gathering as well delaying the original completion date of field work. In addition, the 2021 wildfires and atmospheric flooding events created additional challenges and unanticipated delays.

The field work was completed between December 2020 and April 2021, with the completion of 64 wildfire threat assessment plots and associated data collection.

1.3 Community Communication Plan

As detailed in Upper Nicola's approved 2022-2023 FireSmart Community Funding & Supports (FCFS) project, Upper Nicola has committed to implementing the following community outreach and communication initiatives:

- 1) Distributing a community FireSmart newsletter two times per year,
- 2) Organize community meetings to update the community of FireSmart and wildfire preparedness initiatives that are being promoted and implemented in the community,
- 3) Distributing wildfire preparedness and FireSmart materials throughout the community and offering opportunities to review FireSmart related videos,

- 4) Using social media platforms such as TikTok, Twitter, Facebook and the Upper Nicola app to enhance the distribution of FireSmart information and events to the community
- 5) Organizing a community FireSmart Day event,
- 6) Developing an internal communication strategy for administration that details how, when and by whom annual FireSmart information will be shared and distributed within the community.

SECTION 2: Local Area Description

2.1 Local Area of Interest (AOI)

The Syilx traditional territory covers approximately 69,000 km² in the southern interior of British Columbia and the northern part of Washington State. Upper Nicola is the only Syilx (Okanagan) community in the Nicola watershed. The Upper Nicola community is affiliated with the Nicola Tribal Association/Nicola Tribal Council, which consists of seven Nlaka'pamux nation Bands and one Syilx (Upper Nicola) nation Band. Upper Nicola has identified the following area as its Area of Responsibility (AoR) within the Syilx traditional territory in which the responsibility for community wildfire preparedness falls within.

2.2 Community Description

Upper Nicola is located 45 km east of Merritt and 90 km south of Kamloops, British Columbia. Merritt is the closest populated center in proximity to the Upper Nicola community, which has many of the essential emergency services and amenities for community members that include:

- Health Services (Nicola Valley Hospital and Health Centre)
- BC Emergency ServicesRCMP
- BC Wildfire Service – Merritt Fire Zone
- Airport

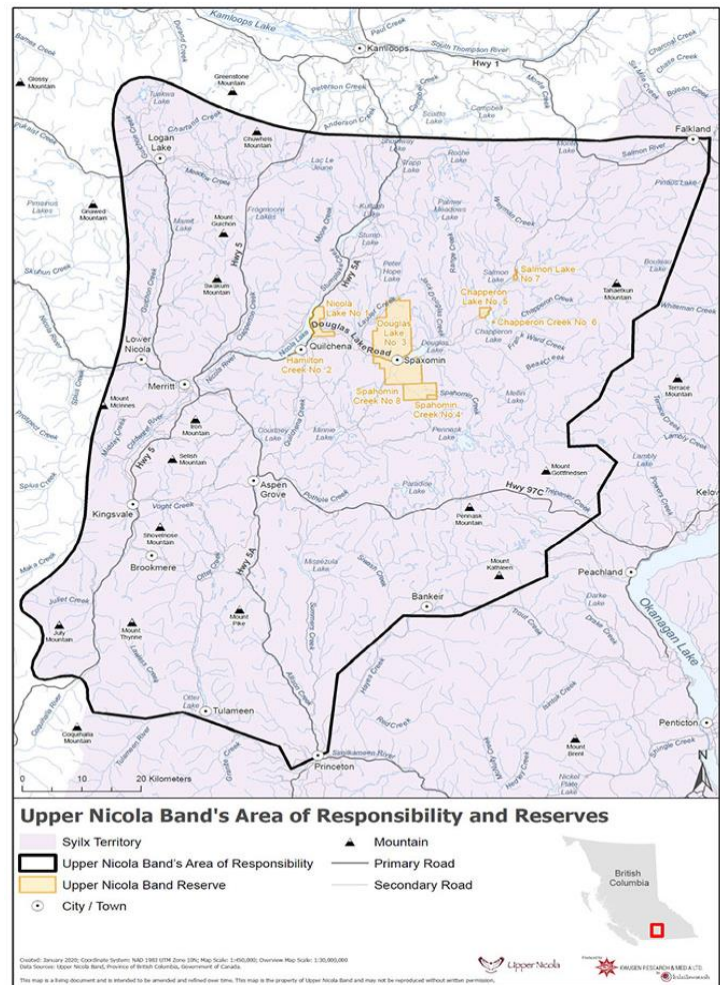


Figure 1: Upper Nicola Band's Area of Responsibility and Reserves

The City of Merritt's municipal boundaries do not immediately adjoin or overlap with Upper Nicola's reserve lands. Upper Nicola falls within the boundaries of the Thompson Nicola Regional District, Electoral Area "M" (Beautiful Nicola Valley-North). Regional health services are provided by Interior Health and First Nations Health Authority.

The Upper Nicola community currently has approximately 980 registered members. The majority of UNB members (63%) do not live on UNB reserves. UNB membership has grown by about 21% since 2001 with the annual off reserve population growing more quickly than the on-reserve (Upper Nicola Band, n.d.).

2.2.1 Upper Nicola Lands

Upper Nicola has eight reserves located near Nicola Lake and Douglas Lake with the two main residential communities located on Nicola Lake (IR #1), and at the west end of Douglas Lake (IR #3). These communities are known locally as Quilchena (Nicola Lake) and Spaxomin (Douglas Lake). The reserves comprise approximately 12,484 hectares that span a range of 50 kilometers along Highway 5A and the Douglas Lake Road (Upper Nicola Band, n.d.).

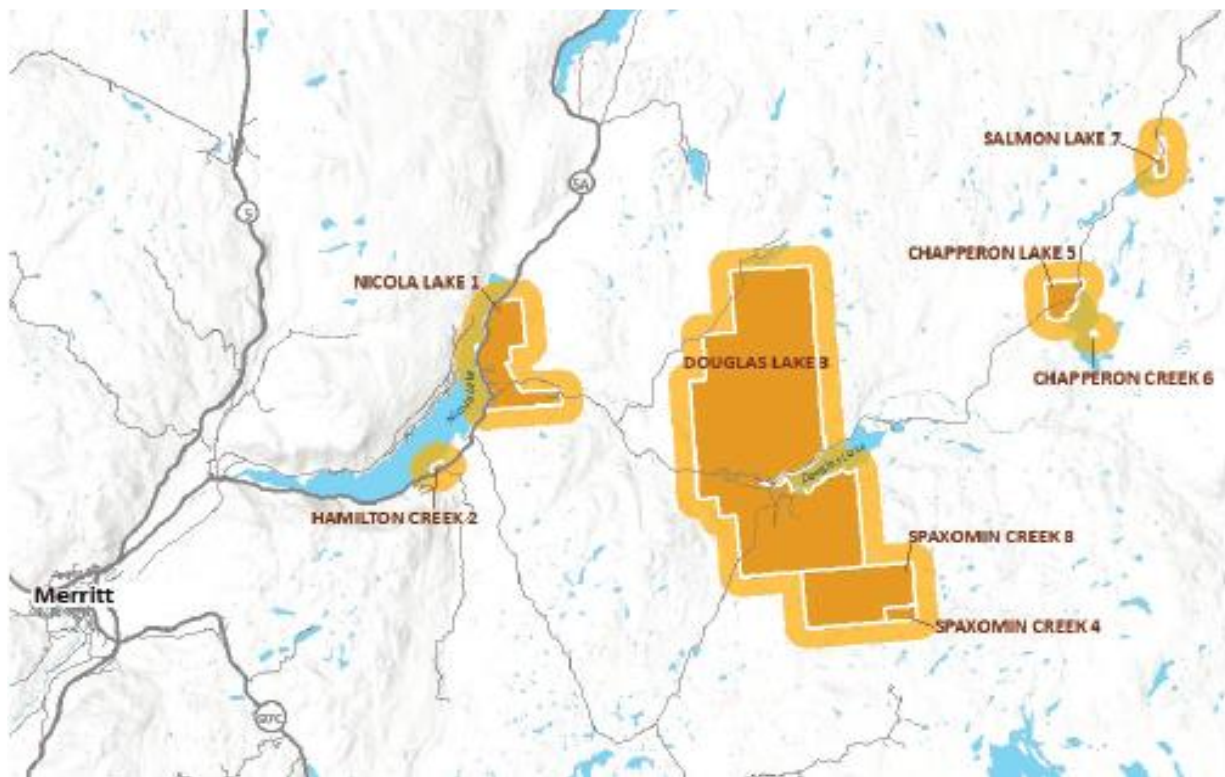


Figure 2: Map of Upper Nicola Band Reserve Lands

Table 1: Upper Nicola Reserve Lands

Reserve #	Name	Hectares (Ha)	Percent (%) total of reserve lands
IR#1	Nicola Lake	1,092	8.7
IR#2	Hamilton Creek	24	0.2
IR#3	Douglas Lake	9,367	74.7
IR#4	Spahomin Creek	129	1.0
IR#5	Chapperon Creek	293	2.3
IR#6	Chapperon Lake	6	0.1
IR#7	Salmon Lake	70	0.6
IR#8	Spahomin Creek	1,561	12.4

Upper Nicola's reserve lands are primarily categorized as Agriculture / Range (AR), Forestry (FR) and Environmentally Sensitive Area (ESA), together accounting for approximately 95% of the total land base within reserve boundaries.

2.2.2 Economic drivers

Upper Nicola currently has a number of economic initiatives, both completed and underway. These include new housing development projects, forestry operations, ranching, tourism and business ventures. Upper Nicola is also involved with other external economic initiatives and partnerships that include solar projects, carbon recovery and various natural resource initiatives.

Within the two communities of Spaxomin (Douglas Lake) and Quilchena, there are 138 residential homes, approximately 20 small businesses operating on-reserve, three RV campsites, as well as enhanced domestic water systems. There are also over 500 horses and over 250 cows owned by various families in the community (Upper Nicola Band, n.d.).

2.3 Wildland Urban Interface (WUI) Area Description

The Wildland Urban Interface (WUI) is defined in the FireSmart manual as any area where combustible forest fuel is found adjacent to homes, farm structures or other outbuildings. This may occur at the interface, where development and forest fuel (vegetation) meet at a well-defined boundary, or in the intermix, where development and forest fuel intermingle with no clearly defined boundary.

The WUI used for Upper Nicola was created by buffering the structure density class greater than 6 out to 2km to represent a reasonable distance that embers can travel from a wildfire to ignite a structure.

Table 2: Upper Nicola WUI Areas

WUI	Total WUI area (ha)	Private land (ha)	Crown land (ha)	First Nation reserve land (ha)	Water (ha)
IR #1 Nicola Lake	2,426 ha	899	214	832	481
IR #3 Douglas Lake	4,474 ha	313	0	3,704	457

WUI 1: Nicola Lake

Homes and structures on Nicola IR #1 have been built on the flat valley bottom along the Nicola River and Nicola Lake, at an elevation of approximately 650m. While most of the homes are on flat valley-bottom lots, some structures along Nicola River Road and Hillside Road have been built on the lower slopes of large hills surrounding the community, with their yards having slope steepness of 15-30%. The high hills surrounding this community, where no homes have been built, rise 500 meters above the valley bottom and have steep slopes measuring 45% to over 80%. There are sections of talus and cliff including above Highway 5 at the Nicola Bay RV Park.

The Upper Nicola community is located where two valleys meet: the east-west valley along Nicola River, and the north-south valley along Nicola Lake. As such, the slopes surrounding the community are of all aspects. Generally, the south and west aspects within the WUI receive the greatest amounts of sunlight and experience the most drying of grassland fuels; however even the grasslands with northern aspects are susceptible to low fine fuel moisture levels during the summer months as well.

Residences located on Nicola IR #1 and Hamilton Creek IR #2 are surrounded by primarily 0-1a/b open grasslands, which consists of both irrigated and non-irrigated fields that span outwards to 500 meters away from the homes (the "WUI 500"). There are some scattered conifer trees and high-flammability shrubs such as juniper intermixed in the grasslands, but do not substantially affect wildfire behaviour except where they are within 10 meters of homes and pose a direct risk to the home. Adjacent to the Nicola River, which runs centrally through IR #1 is a mixed deciduous type, which has a substantial component of dead and dying material. As detailed in the fire history mapping, human caused fire starts would most likely occur around the populated Nicola Lake area. A fire approaching the community would be expected to spread most rapidly towards the community from the southwest as the typical strongest prevailing wind direction is in a northeasterly direction up the valley. (B. Holmes, personal communication, September 9, 2021.)

Some north aspects of the gullies in the surrounding hills are forested with Douglas-fir stands. These stands have 20-40% crown closure of mature trees with up to 1,500 stems/ha in the understory. These forests are not found within the Home Ignition Zones (within 100 meters of homes).

Along the Nicola River there are small pockets of other fuel types that include:

- D-1/2 (Green/Leafless aspen). This fuel type is made up of mature aspen forests. Some of these stands have up to 5,000 understory stems/ha of trembling aspen. Others have widely spaced mature trees with grassy understories.
- M-1/2 (Mixed wood). This fuel type includes mature cottonwood stands; some of which were burned in a recent wildfire.

Wetland ecosystems along the river with dense willow vegetation. Approximately 50% of the willow is dead. These wetlands flood in spring and fall, and there are pools of standing water through the summer.

WUI 2: Douglas Lake

The topography of IR #3 is varied. Much of the community has been built around Douglas Lake, which sits at 800 m elevation. These homes and community buildings are on the flat or rolling hills near the lake. Homes also exist on the lower portion of the steep hills surrounding the lake, which rise to 1,450 m elevation. These homes have yards and properties with slopes ranging from 15-30%. From Douglas Lake, the upper Nicola River flows northwest towards Nicola Lake. Homes along the river are built on the valley bottom or in the canyon along the river.

The community of Douglas Lake IR #3 is also surrounded by open 0-1a/b grasslands, with a mosaic of irrigated and non-irrigated pastures in the valley bottom and a mixed deciduous type along the Nicola River which flows from Douglas Lake. Due to a limited number of natural fire breaks around the Douglas Lake area, it is expected that the fire would travel rapidly with continuous spread rates in this area. A fire approaching the Douglas Lake community would be expected to spread most rapidly towards the community from the east as the typical strongest prevailing wind direction is in a westerly direction (B. Holmes, personal communication, March 28, 2022.) Some grassland areas have highly flammable shrub species, including big sagebrush. The pastures have varying levels of fuel loading. The grasslands have continuous fuels with few natural fire breaks. The pastures that are grazed, irrigated or cut have the lowest fuel loading levels.

Along the Nicola River and Douglas Lake there are thickets of riparian vegetation. These riparian areas have thin duff layers and high levels of elevated fine fuels (up to 50% cover) as 25-50% of the willows are dead, creating high loading of dry standing fuels. There are small grassy openings that break up the continuity of the riparian zones. These willow ecosystems also exist in the strips between irrigated fields.

Other fuel types found in the Douglas Lake WUI area, but to a lesser extent include:

- M-1/2 (Mixed wood). These forests occur along the canyons in the Nicola River and on steep slopes leading from the river up to the flats above. Near the river, grasses and shrubs are prominent (including willow and rose species). Farther from the river, coniferous and deciduous trees are noted, with 10-40% overstory crown closure of Douglas-fir, trembling aspen, and Ponderosa pine. Ladder fuels are scattered, with 10-40% coverage, and include shrubs and young conifer saplings. There is a high volume of dead and downed woody material (10-40%) which increases the wildfire risk within these forests.
- D-1/2 (Green/Leafless aspen). These forests are made up of widely-spaced mature trembling aspen. Where grazing occurs, surface fuels and ladder fuels are sparse, with a fuel strata gap of 3-10 meters. In areas where grazing is excluded, there is 25-50% cover of fine woody debris and scattered ladder fuels of 10-40% cover

- C-7 (Ponderosa Pine-Douglas Fir). This fuel type occurs in areas with higher moisture (such as north-facing slopes) or in places that have not been burned or grazed. Overstory trees are relatively sparse, with the densest forests having 600 stems/hectare. Crown closure is 20-40%. These forests have thin duff layers (2-5 cm) and surface fuels of dead fine fuels or bunchgrass and juniper. Fine woody debris is present, with 10-25% coverage. Ladder fuels are made up of young conifer trees, generally fewer than 900 stems per hectare or 10-39% cover. Dead trees are uncommon.

2.4 Linkage to Other Plans and Policies

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

Table 3: Key Plan and Relationship to CWPP

Plan Type	Description	Relationship to CWPP	Additional Information
Upper Nicola Comprehensive Community Plan (April 2021)	The CCP is the big picture, high-level plan that lays out the guiding principles for the way our community's growth and self determination can unfold.	Provides community demographic data and growth trends. Details strategic level goals and objectives for community planning initiatives, which includes housing needs and directives.	NICOLA-CCP.pdf (uppernicola.com) Comprehensive Community Planning for First Nations in BC (CCP Handbook)
Upper Nicola Strategic Plan (updated January 2022)	Strategic plans help prioritize a community's annual goals and activities for goal setting, implementation and budgeting purposes.	Review the Strategic Plan to determine if and how wildfire planning factors into the community's priorities. Inclusion can support resource allocation for CWPP implementation.	PowerPoint Presentation (uppernicola.com)

Upper Nicola Community Safety Plan	In development.	Include pertinent sections of the CWPP in the Community Safety Plan	In draft
Upper Nicola Governance Decision Making Policy	Protocols and decision principles for implementing FireSmart and wildfire risk reduction measures in the community based on the principles of Enowkinwixw: The Law of Reason for external governments.	Provides direction and process for Upper Nicola governance decision making for Tmxw and Tmxw'ulaxw.	5.1.1-20210225-Upper-Nicola-Governance-Decision-Making-Policy.pdf (uppernicola.com)
Upper Nicola Residential Land Allocation Policy	Policies and procedures for the allocation of residential lands to community members using consistent and fair processes.	Provides policies and procedures for Upper Nicola governance decision makers for the allocation of residential lands. Review the policies and procedures for opportunities to incorporate FireSmart principals or objectives.	https://uppernicola.com/wp-content/uploads/2021/04/Land-Allocation-Policy-FINAL-March-2016.pdf

Upper Nicola Band Emergency Plan	<p>The BC <i>Emergency Program Act</i> requires local authorities to prepare a local all hazard Emergency Management Plan (EMP) that addresses the preparation for, response to and recovery from emergencies and disasters.</p>	<p>Wildfire is one of the 57 hazards identified by Emergency Management BC in the provincial all hazards plan.</p> <p>The Provincial Strategic Threat Assessment (PSTA), WUI Risk Class Assessment maps and the WUI Wildfire Threat Assessment can be used to support identifying the wildfire risk to the local area of responsibility for input into both the HRVA as part of the EMP, and the wildfire risk assessment within the CWRP.</p>	<p>Emergency Program Act (gov.bc.ca)</p> <p>Wildland Urban Interface Risk Class Maps (BC Website)</p> <p>697 Upper Nicola Band Emergency Plan – updated July 2020</p> <p>UPPER NICOLA VALLEY – STUMP LAKE – DOUGLAS PLATEAU – PENNASK LAKE EVACUATION PLAN – 2013 4985 (civicweb.net)</p>
Archaeology and Cultural Heritage	<p>Community protocols, policies and guidelines for land-based assessments and projects</p>	<p>To align community cultural heritage objectives with wildfire reduction objectives and fire suppression activities</p>	<p>15.1-UNB-Cultural-Heritage-Resources-Policy-April-27-2006.pdf (uppernicola.com)</p> <p>Suxwtxttem-Policy-Signed-2017Jun19.pdf (uppernicola.com)</p>

Neighborhood / Area Plan	Local plans such as neighborhood or area plans provide detailed planning measures for a specific area within a community to support implementation of the Community Comprehensive Plan. These are most relevant where overlap occurs with identified WUI/wildfire hazard areas.	Ensure that local guidelines and requirements for architectural design, local parks and other area features are compatible and reconciled with the CWPP wildfire risk reduction goals and actions.	JenBeverlyExposureAssessmentLayout_v5.indd (firesmartbc.ca)
Housing Needs Report	Incorporate FireSmart principles and objectives during planning, budgeting and construction of proposed housing units	Develop policies and guidance documents informing appropriate FireSmart objectives to be included in future housing needs, budgeting and assessments	NICOLA-CCP.pdf (uppernicola.com)
FireSmart Community Plans	Completed FireSmart Neighborhood Community Assessments and Plans	FireSmart plans can be included in CWPPs.	Example- FireSmart-Community- Plan.pdf Guides & Manuals FireSmart BC

B.C. Wildfire Risk Management Plan (in progress)	The Wildfire Risk Management Plans are developed by a landscape unit (i.e. Timber Supply area, Natural Resource District or Natural Resource Region) and will have protocols and strategies for managing wildfire risk in given landscape units.	This plan will offer high level strategies as the landscape units will overlap with the community AOI and WUI.	MFLNRO – Cascades District. This plan is internal to the MFLNRO and is not available for public review at this time.
Landscape Tactic Fuel Reduction Plan	A landscape unit-level plan to develop an action plan for mitigating or managing wildfire risk.	The plan takes the Wildfire Risk Management Plan strategic direction and areas of identified risk and develops an action plan to mitigate or manage wildfire risk near values at risk. In most cases this plan will border or overlap CWPP areas of concern.	This plan is still being developed by BC Wildfire Service.
Regional Land Use Plans & Legal Direction	Most areas of the province have completed regional and sub-regional land use plans. Landscape or watershed level plans have also been completed for many areas.	These plans contain resource management objectives that can provide guidance, or in some cases legal direction for CWPP implementation.	Land Use Plans & Legal Direction By Region - Province of British Columbia (gov.bc.ca) Kamloops Land & Resource Management Plan - Province of British Columbia (gov.bc.ca)

Climate Action and Sustainability Plan	Climate action, sustainability, or resiliency plans address actions to reduce greenhouse gas emissions, improve air and water quality, and implement a range of social, environmental, and economic issues that are critical to long- term health, vibrancy, and well-being of a community.	Actions of climate plans and CWPPs can be aligned to achieve multiple and mutual goals, such as increases in green infrastructure projects.	toen160222.pdf (gov.bc.ca) ClimateBC_Map (climatewna.com) Data Portal Pacific Climate Impacts Consortium cpas_2021.pdf (gov.bc.ca)
Timber Management Plans	Timber Management Plans include management plans associated with Community Forest Agreements and First Nations Woodlands Licenses and volume-based agreements.	Align harvesting, silviculture and other forest management objectives with wildfire risk reduction.	Community Forest Agreements - Province of British Columbia (gov.bc.ca) Merritt Timber Supply Area - Province of British Columbia (gov.bc.ca) Glimpse Lake logging proposal for fire mitigation
Parks, Recreation and Trail Plans	Parks and recreation plans to guide the management of their parks and open spaces. Trail planning may be incorporated into these plans or developed as stand-alone planning.	Align vegetation management objectives in the rec site area with wildfire risk reduction measures. Ensure that trail planning and development can support wildfire risk reduction strategies wherever possible (control lines, emergency access, etc.) Incorporate wildfire risk reduction into visitor use, regulations and public safety planning.	Glimpse Lake recreation area is managed by Upper Nicola, primarily for community use.

ISC/BCWS Fire Suppression MOU Agreement	The basic purpose of the MOU document is to establish the agreement between Indigenous Services Canada and BCWS which enables BCWS to provide response support to wildfires on federal land.	That there is an acknowledgment that ISC provides BCWS with annual funding to assist the community in wildfire response support	Provincial/Federal agreement
SAR/Wildlife considerations	To identify and include specific considerations for SAR or species of concerns when considering wildfire reduction measures.	Include pertinent habitat considerations for SAR species or UNB species of interest into all wildfire reduction operational treatment projects.	<p>Species at Risk Act (justice.gc.ca).</p> <p>Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia (gov.bc.ca)</p> <p>Upper Nicola has identified the following species and habitats to be addressed during operational treatment projects:</p> <ul style="list-style-type: none"> • Riparian areas • Blue Heron • Great Basin Spadefoot toads • Lewis Woodpecker • Burrowing Owl

Recommendation # 1

Ensure that community FireSmart objectives and wildfire preparedness initiatives are embedded into higher level planning processes where applicable.

SECTION 3: Values at Risk (VAR)

Wildfire has the potential to impact values within a community which includes human life, property, critical infrastructure, high environmental and cultural values, and resource values. Updating VAR data is critical for effective mitigation planning. This can be achieved through the Critical Infrastructure Assessment process or during the development or updating of the Local Authority Emergency Response Plan.

3.1 Human Life and Safety

The intent of this section is to clearly identify and understand where people and structures are located within the WUI in order to effectively determine the wildfire risk and identify mitigation activities. In the event of a wildfire approaching a community, the first priority is human life and safety, including the evacuation of at-risk areas. Wildfire can move quickly and unpredictably. It takes time for people to evacuate an area and safe egress can be blocked by the fire itself or by vehicle congestion or accidents.

3.1.1 Upper Nicola Infrastructure and Services

The structures in the community have been built in a wildland-urban interface, surrounded by canyons and valleys that encompass all aspects. Homes that are on steep slopes (15-30%) and south-west aspects have an increased risk of wildfire (for example, the homes on the northern edge of Douglas Lake). In these areas, grasses will dry quickly in the morning and wildfire is likely to travel uphill towards the homes. For these areas, it is important to focus FireSmart work around the homes by removing combustible fuels (long, dry grasses) that occur within 30 meters of the homes. Homes that are on the valley bottom also require FireSmart work, although the flat topography means they have slightly lower risk compared to homes located on steeper, south-facing slopes.

The majority of Upper Nicola's residential and commercial infrastructure is located on Nicola Lake IR#1 and Douglas Lake IR#3. Hamilton Creek IR #2 contains two houses, an RV park and two wells. The following is a tabular summary of the types of infrastructure recorded on UNB's lands:

IR #1 Nicola Lake:

- One of two main residential areas
- Upper Nicola Health Center
- Several communal gathering spaces
- RV parks
- Historic buildings
- Water and sewer infrastructure
- Future subdivision to be developed on Lot 87 near the Post and Rail site.

Table 4: Nicola IR#1 Infrastructure

Type of Infrastructure	Number of Units	Critical Infrastructure?
4-Plex	4	No
Barn	3	No
Church	1	No
Duplex	2	No
House	52	No
RV Parks	3	No
Post & Rail Mill	1	No
Post & Rail Office	1	No
Shed	14	No
Shop	1	No
Waste Management Transfer Station	1	No
Weigh Scale & Office	1	No
Communications Tower	1	Yes
Community Health Centre	1	Yes
Community Water Treatment Plant	1	Yes
Community Water Reservoir	1	Yes
Apartments	3	No

Propane Tank, Large	1	Yes
Propane Tank, Large	1	Yes
Septic Lift Station	1	Yes
Well, Community Water System	2	Yes

IR #3 Douglas Lake

- One of the two main residential areas
- Community services and associated infrastructure include band administration, health, social development, cultural heritage, lands, housing, community services, taxations, fire department, tire shop, water and sewer infrastructure, daycare and the N'Kwala School
- The Glimpse Lake communal gathering area is located at the northern tip of the reserve.
- Future subdivision to be developed on Lot 142 along Douglas Lake Road northeast of the community.

Table 5: Douglas Lake IR#3 Infrastructure

Type of Infrastructure	Number of Units	Critical Infrastructure?
Administration Office	1	Yes
Barn	12	No
Business, Tire Shop	1	No
Cabin - Glimpse Lake	4	No
Communications Tower	1	Yes
Community Hall	1	No

Community Meeting Building	1	No
Daycare Building	1	No
Duplex	2	No
Firehall	1	Yes
Fuel Station	1	Yes
Gazebo - Glimpse Lake	1	No
General Store	1	No
Historical Building	1	No
House	76	No
Land Claims Office	1	No
Old Cabin	4	No
Old Church	1	No
Depression	1	No
Portable Building	1	No
Propane Tank, Large	7	Yes
Pumphouse, Irrigation	6	Yes
Quonset Shed	2	No
School	1	Yes
Shed	22	No
Shop, large	1	No

Triplex	1	No
Water Reservoir, Domestic	1	Yes

IR#2 Hamilton Creek

- Jack Ranch RV Park
- Two houses
- Two domestic wells

Recommendation #2

That Upper Nicola complete home ignition zone assessments and initiate the FireSmart rebate program in the community.

3.1.2 Access and Evacuation

Evacuation is the process of moving persons and/or domestic animals from an area that may pose a threat to life and limb to an area of safety. Depending on the nature and scope of the threat, an evacuation may involve a single building, a group of buildings or an entire community.

The following is an excerpt from the Upper Nicola Band Emergency Plan (Upper Nicola Band, 2020) which governs the overall evacuation process and procedure:

"An evacuation is the action by which one or more persons leave the place they are occupying to avoid a real or potential threat. There are two general categories, planned and without notice. There are three types; partial, total, and selective. An evacuation in which an emergency is occurring requires a great deal of careful planning and co-operation. Evacuations can be the result of events that threaten the safety of individuals or it is unsafe to remain in their normal residence. Examples of these events include, but not limited to; floods, earthquake, landslide, hazardous material spill, wild land fire, public safety situation and events that may isolate the Upper Nicola Band for a prolonged period.

The process to enact an evacuation (partial, total, and selective) of any First Nation community is performed by a Band Council Resolution. The Band Council will normally be working with the federal and provincial governments and advised of the specific threat or situation. The decision for a planned evacuation is made in stages, when time permits, with notice given initially as an evacuation alert and if required by an evacuation order. When the event is over and it is safe to return home, there will be an evacuation rescind". (p. 29)

As stated above, the authority to enact an evacuation order for Upper Nicola is through a BCR, and lands outside of Upper Nicola lands fall under the Thompson Nicola Regional District's (TNRD) emergency preparedness jurisdiction and evacuation plan. Additional evacuation information for the area is found on the TNRD's main web page: <https://www.tnrd.ca/> (Thompson-Nicola Regional District, n.d.).

Upper Nicola evacuations orders and alerts are posted on the community website, through social media and delivered door to door. Depending on the nature and type of emergency, the safest egress route is chosen at the time and relayed to the community through the sources listed above.

Residents on Nicola IR#1 and Hamilton IR #2 are able to evacuate north to Kamloops and south to Merritt on Highway 5A, as well as to the east on Douglas Lake Road if necessary.

Douglas Lake IR #3 has three evacuation routes:

- Douglas Lake Road - northeast to connect with Highway 97 by Westwold, and northwest to connect with Highway 5A at Quilchena
- South on Minnie Lake Road to Minnie Lake, then northwest on Pennask Lake Road to Highway 5A
- Lauder Road to Glimpse Lake, then to Peterhope Lake Road west to Highway 5A

The preferred evacuation route is the main Douglas Lake Road. The Douglas Lake Road and Highway 5A are both maintained year-round by the Ministry of Transportation. Two of the Douglas Lake IR #3 egress routes (Glimpse Lake and Minnie Lake roads) out of the community are single lane roads which may lead to congestion during an evacuation. Alternative routes also include Pennask Lake Road and Salmon River Road.

Recommendation #3

That Upper Nicola complete a comprehensive evacuation route plan for the community, which includes maps of access/egress routes.

3.2 Critical Infrastructure

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

During the structure inventory collection phase, the following infrastructure was identified as being critical to providing essential services to the community:

- Communication Towers (IR #1 and #3)
- Community Health Center (IR #1)
- Community water wells, treatment plant and reservoirs (IR #1 and #3)
- Propane tanks (IR #1 and #3)
- Septic lift station (IR #1)
- Administration Office (IR #3)
- School (IR #3)
- Fire Hall (IR #3)
- Fuel Station (IR #3)
- Irrigation pumphouses (IR #3)

It was noted that Upper Nicola has completed the formal Critical Infrastructure assessments for Nicola Lake IR #1, but has not yet completed CI assessment for infrastructure on Douglas Lake IR #3.

Recommendation #4	That Upper Nicola complete the remaining Critical Infrastructure (CI) assessments and source funding to address deficiencies noted in the assessment, if required.
Recommendation #5	That the Upper Nicola Band develop a business continuity plan and include it as an addendum to the UNB EP

3.3 Electrical Power

The Douglas Lake substation is a primary transmission station located in the interior. The substation is situated along Douglas Lake Road between the Nicola Lake and Douglas Lake residential areas. BC Hydro is responsible for wildfire reduction maintenance in and around the substation and along the transmission lines.

The residential electrical supply to both Nicola Lake IR#1 and Douglas Lake IR #3 residents is through BC Hydro distribution lines. Currently most, if not all of the distribution poles are wooden structures. There is a high likelihood that the power supply may be impacted to the community in a wildfire event if the fire is approaching the community from the south or west direction.

Overhead transmission and distribution lines are a major ignition hazard. Falling trees or branches can knock a powerline to the ground, where it will remain charged and potentially start a fire. Primary distribution lines are sometimes the most problematic as they are remote and difficult to inspect and maintain. Secondary lines contain less voltage but are more susceptible to being overgrown by vegetation, which can lead to arcing and ignition. Underground power lines are the safest.

BC Hydro has implemented a number of strategies to reduce the likelihood of wildfire impacting both the infrastructure and power supply to the communities. There is a fire services agreement between BC Hydro and BC Wildfire Service for infrastructure protection during wildfire events. BC Hydro also conducts annual inspections/patrolling of both the transmission and distribution lines and prioritizes fuel reduction treatments based on wildfire risk modelling. Fuel reduction programs along the transmission and distribution lines include mowing and mulching. BC Hydro is currently updating their internal wildfire reduction programs and guidelines.

Recommendation #6	That Upper Nicola assess options of purchasing and installing back up generation systems that can provide power to critical infrastructure required during periods of power outages.
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3.4 Communications and Pipelines

There were two cell towers noted in close proximity to the community. It is assumed that these towers service cell communication in the Upper Nicola region. The closest pipeline to the Upper Nicola community is the Trans Mountain Pipeline located on the north side of Nicola Lake. There are no municipal buildings located in close proximity to the Upper Nicola community.

3.5 Hazardous Values

Propane tanks surrounded by vegetation are potential hazards. Combustion adjacent to these tanks increases the internal pressure causing the tank to vent through a relief valve. The resulting fire is one of high-intensity and has the potential to destroy an adjacent building. Hence, when positioning tanks, the relief valves should point away from buildings. Faulty relief valves will not allow pressure to discharge resulting in an extremely dangerous boiling liquid expanding vapour (BLEVE) explosion. Propane tanks should have all vegetation cleared for at least 3 m in all directions. Tanks should be located at least 10 m from any building. Future development around the tank should respect this distance and be monitored by operation and maintenance staff.

There were nine (9) large propane tanks identified on IR #1 and 3#, as well as various types of infrastructure at the post and rail facility on Nicola IR #1. These features should be assessed under the critical infrastructure assessment, or through the home ignition zone assessments and recommendations provided to UNB administration to reduce the fire hazards around these structures, if applicable.

Recommendation #7

That propane tanks be assessed during the CI or HIZ assessments and recommendations provided to UNB administration to reduce surrounding vegetation, if applicable.

3.6 Community Water Sources and Infrastructure

The Nicola Lake IR #1 community domestic water system is sourced from two wells connected to the water treatment plant. From the plant, the treated water is stored in a 50,000-gallon reservoir above Nicola Lake for distribution through a piping system connected to the fire hydrants, residences and other structures. The Douglas Lake IR #3 community domestic water system is sourced through two wells connected to a 100,000-gallon reservoir located downstream of Douglas Lake, then through a distribution system connected to the fire hydrants, homes and other structures. The residences on Hamilton IR#2 are serviced by 2 wells; one well provides domestic water for the 2 homes and the second well provides water to the Jack Ranch RV Park. Water for irrigation purposes at Douglas Lake IR #3 is obtained from surface water intakes on the Nicola River and delivered through high-pressure pumping and piping systems. There are no irrigation water systems at Nicola Lake IR #1.

Currently there are 23 fire hydrants at Nicola Lake IR#1 and 48 fire hydrants at Douglas Lake IR#3 that are available to supply water for structure fire fighting purposes by the Upper Nicola Band fire department. The fire hydrant systems have been upgraded recently in the community.

Alternative power sources should be considered for the community domestic water systems at Nicola Lake IR #1 and Douglas Lake IR #3. During major events due to extreme wildfire activity or flooding of the adjacent streams and lakes, lengthy power outages may occur on the BC Hydro power distribution system that provides electricity to the Upper Nicola community, shutting down the pumps and water treatment processes of the community water system and cutting off the domestic water supply. Having an alternative power source for the community water systems will ensure that a domestic water supply will continue to be available to homes, and to the Upper Nicola Band fire department to respond to residential structure and other fires within the community.

As an additional water source, fire suppression crews are often required to rely on static natural water sources or the water carried onboard emergency vehicles when dealing with fires in remote wildland developments. When planning new developments in the wildlands, man-made surface water storage areas could be designed and constructed that are accessible to fire suppression vehicles in order to refill onboard tanks. These water systems should be separate from and not interfere with the community water supply.

Alternatively, underground cisterns could also be constructed to store water for fire suppression purposes. These tanks could supply water to emergency vehicles responding to a fire, or potentially run sprinkler systems during an interface fire. During the design phase of the remote developments, an experienced fire suppression specialist should be consulted to help determine appropriate locations for man-made water storage systems.

In addition to identifying and mitigating the wildfire risk to community water infrastructure, the effects of wildfire on community watersheds and/or domestic use watersheds must also be considered and integrated into planning processes. As seen from the 2021 wildfires, entire watersheds were impacted to varying degrees. Anticipated impacts would include future hydrological issues, including immediate and mid term water quantity and quality changes, terrain stability, erosion, sedimentation loading, and increased debris flows.

Recommendation #8	That any future infrastructure or community development planning include the investigation of increasing the capacity of the existing community water supply or designing additional water storage facilities for fire suppression activities.
Recommendation #9	That Upper Nicola locate and map static water supplies available to the community for wildland firefighting water sources.

3.7 Cultural Values

Approximately 1% of Upper Nicola's land base has been formally classified as culturally significant areas, but it is recognized that all areas surrounding the community hold significance to the community. Indigenous cultural heritage resources include archaeological sites, traditional use sites, historic buildings and artifacts, and heritage trails, or any other objects or places of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people.

Archaeological sites in British Columbia that date to 1846 or earlier are protected from alteration of any kind by the Heritage Conservation Act (HCA). The provisions of the HCA apply to archaeological sites located on both public and private land, known and unknown, and are binding on government.

It is extremely important that agencies involved in the implementation of fire suppression techniques during a wildfire collaborate with Indigenous communities to identify and mitigate for archaeological and cultural values, before, during and after wildfire events. This type of collaboration was initiated during the 2021 White Rock Lake Fire, where Upper Nicola staff worked with the BC Wildfire Service before and during the construction of fireguards to ensure that culturally sensitive sites were avoided and/or minimally impacted.

Recommendation #10	That BC Wildfire Service work collaboratively with Upper Nicola to develop acceptable processes and protocols for the protection of cultural heritage values during fire suppression activities.
Recommendation #11	That Upper Nicola internally identify cultural values that would require protection during a wildfire event.

3.8 Environmental Values

Upper Nicola has identified that approximately 3.7% of UNB's land base is comprised of environmentally sensitive areas, including sensitive soils and riparian areas adjacent to Nicola Lake and along Nicola River. In addition, other important ecological considerations that have been identified to be considered during planning are:

- Invasive species identification and mitigation
- Invasive fish species considerations
- Water quality impacts

3.9 Other Resource Values

In addition to the values listed above, Upper Nicola has identified the following features be given consideration for during wildfire planning activities:

- Riparian areas
- Blue Heron
- Great Basin Spadefoot toads
- Lewis Woodpecker
- Burrowing Owl

The above noted species have been identified by Upper Nicola as confirmed or potentially having a presence in the local area. There are no known mapped locations of these species identified in the Conservation Data Center (CDC) database. Upper Nicola Band currently has a Burrowing Owl program that is underway in the community. There are also numerous historical churches, cabins and other outbuildings that are present that also warrant the application of FireSmart principles to reduce fire hazard around these important historic community structures.

SECTION 4: Wildfire Risk Analysis

Current wildfire trends, both in B.C. and Canada, show increased impacts to values from unwanted wildfires and associated suppression costs; increased threats to communities and infrastructure; and increased losses of natural resources including mid-term timber supply. This is being driven by the effects of climate change, increased fuel loading and expanding urban and natural resource development on the forested land base.

A risk-based framework considers the likelihood of an unwanted wildfire event and also identifies the consequences to communities, high value resources and assets as the measure of risk;

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

Section 6.1 of Upper Nicola's Emergency Response Plan (Upper Nicola Band, 2020) Hazard/Risk/Vulnerability Assessment (HVRA) identified fire, which includes forest range, urban, wildland and urban interface as having a likely probability of occurrence.

The Upper Nicola community can be threatened by wildfires in two basic scenarios. The first is a landscape level (large) wildfire starting outside of, and moving into the community. The second is a wildfire starting within the community and quickly threatening adjacent structures. The identification of risk levels will help inform priorities for increased community resiliency efforts.

4.1 Past Natural Disturbance Events and Impacts

Due to the close proximity of IR #1 to Nicola Lake and Nicola River, the community of Upper Nicola has been impacted more substantially by flood events than by wildfire. In 2017, several neighbourhoods on Nicola Lake IR #1 were under both an evacuation alert and order due to flooding; an evacuation order issued in 2018 for selected properties on Nicola Lake IR #1 due to flooding and a state of local emergency was declared in 2020 due to both flooding and the pandemic. These flood events resulted in some foundation damage and septic flooding to several homes. The Upper Nicola community continues to be proactive with flood prevention by initiating activities such as opening flood gates, sandbagging preparation before flood season and working with local municipalities to annually plan for these events.

Recent fires, such as the 2017 Elephant Hill fire demonstrated the volatile fire behaviour that a fast-moving surface fire can exhibit in grassland ecosystems, such as rapid spread rates and increased spotting distances. The Upper Nicola communities have a similar type of vegetation complexes surrounding the community. The 2021 White Rock Lake Fire burnt in close proximity to the Upper Nicola community of Spaxomin, but fortunately did not result in a community evacuation alert or order.

4.2 Eco-cultural Fire Regimes

Low elevation grasslands and open forests were more widespread throughout the Bunchgrass, Ponderosa Pine and drier elements of the Interior Douglas-fir biogeoclimatic zone before European colonization. Some of the open forests and grasslands were maintained in a "fire-climax" state by periodic lightning-caused fires and cultural burning by the Upper Nicola community. The abolition of cultural burning and the introduction of fire suppression have altered fire regimes, fostering litter accumulation and forest encroachment in some grasslands, and changing canopy composition and density in some forested areas. An increase in fire activity in the late 19th and early 20th centuries likely increased the extent of these ecosystems, but fire suppression during the last ten decades has

had the opposite effect. This has resulted in increased fuel accumulations, increased probability of crown fires, loss of understorey plant communities, and insect and disease damage.

4.2.1 Fire Regime – Regional context

The Upper Nicola community is located in the Thompson-Okanagan region, in the southern interior of the province which includes the Thompson-Okanagan plateau as well as portions of the Coast and Cascade mountains to the southwest and the Columbia Ranges to the northeast. The region contains several large lakes including the Okanagan and Shuswap lakes, and large rivers including the Thompson, Shuswap and Fraser. Lying in the rain shadow of the Coast and Cascade Mountains, this region has some of the warmest and driest ecosystems in BC.

Vegetation communities broadly include open bunchgrass in the hot, dry valleys of the south, through transitional parkland with widely-spaced ponderosa pine and Douglas-fir, to inland temperate rainforests of western redcedar and western hemlock at low elevations in the Columbia Ranges and dense coniferous stands in the cold, wet higher elevations.



Figure 3: British Columbia Biogeoclimatic Zones

An important ecological function of fire in grasslands is to suppress the growth of forests and woody shrubs, such as big sagebrush (Gayton, 2003). As forests and shrublands encroach, grassland areas disappear and are replaced by forested ecosystems with different wildfire regimes. When fires occur less frequently than is natural, they tend to burn more destructively due to a buildup of fuels (Gayton, 2003). In forests that historically experienced frequent, low-intensity fires (such as the PP and IDF BEC Zones), changes to the fire regime have led to densification of forests and the increased likelihood of high-severity stand-replacing fires (Gedalof, 2020).

4.2.2 Fire Regime: Local Context

Natural Disturbance Types (NDTs) were developed by the Ministry of Forests as part of the Forest Practices Code and are described in the Biodiversity Guidebook (Ministry of Forests & BC Environment, 1995). NDTs categorize the province into zones based on the frequency and severity of

natural disturbances (pre-European disturbance events). The definition of natural disturbance also includes Indigenous burning activity.

The two Upper Nicola WUI areas are located in the Natural Disturbance Type (NDT) 4 zone, which means this zone experiences frequent, low intensity, stand-maintaining fires. On grasslands, these fires limit encroachment by most woody trees and shrubs. Surface fire return intervals for the PP and IDF biogeoclimatic zones historically ranged from 4 to 50 years; stand-initiating crown fires were rare in the PP and occurred at intervals ranging from at least 150 to 250 years or more in the IDF. The WUI 1 – Nicola Lake is located in the BG xw1 and PPxh2 biogeoclimatic zones and WUI 2 – Douglas Lake is located in the BGxw1 and IDF xh2 biogeoclimatic zone. There are a few scattered patches of coniferous forests seen in some gullies and north-facing slopes which contain ponderosa pine near Nicola Lake, and Douglas-fir forests near Douglas Lake.

4.3 Climate Change

As a whole, British Columbia has become warmer and wetter over the last century. The most notable changes are warmer winters, more frequent extreme rainfall events, drier conditions in the summer and decreasing snowpacks. Due to the existing effects of greenhouse gas emissions, climate scientists agree these warming trends will continue. By the end of this century, mean annual temperature in BC could be at least 1.7 to 4.6C warmer than it was in the last few decades. Winter precipitation will likely fall as rain rather than snow, resulting in lower snowpacks, earlier and more rapid snowmelt, and longer fire seasons (Ministry of Forests, Lands and Natural Resource Operations, 2016).

Table 6: Summary of climate projections for the Thompson Okanagan for the 2050's

Climate variable	Change in Thompson-Okanagan	Variation within region
Temperature		
Mean (°C)	+1.8 (1.1 to 2.7)	Slightly higher in the south
Summer (°C)	+1.9 (1.3 to 2.7)	Slightly higher in the south
Winter (°C)	+1.6 (0.8 to 3.0)	Slightly lower in the south
Precipitation (%)		
Annual	+6(-1 to 11)	Consistent over region
Summer	-9 (-19 to 1)	Biggest decrease in north
Winter	+7(-4 to 15)	Consistent over region

Snowfall (%)		
Winter	-11 (-20 to 0)	Biggest decrease in south
Spring	-55 (-75 to -12)	Consistent over region
Snowpack	Decrease	Become intermittent or disappear at lower elevations
Frost free days	+24 (14 to 35)	Greater increase at lower elevations and in south
Growing Degree Days	+319 (183 to 482)	Greater increase at lower elevations and in south
Extreme Weather	More heat waves	Particularly at lower elevations

**Based on 1961-1990 baseline. Projected changes in temperature continue to increase past 2050. Source: PCIC Plan2Adapt tool (Plan2Adapt, 2022). Median of 30 projections with range (in brackets) showing the 10th to 90th percentile of projected changes.*

Along with climatic changes, vegetation changes are also anticipated which could include the following potential outcomes:

- Increased disturbances due to insects and disease
- Shifts in vegetation. Potential ranges of species will move northward and upward in elevation
- Increased forest fire frequency
- Longer and more intense wildfire seasons
- Increased number of high and extreme fire danger days for an average year.

The most profound changes to BC's ecosystems in this century are expected to be the result of more frequent and severe natural disturbances. In the Southern Interior, the area influenced by natural disturbances could double over the next century, with forest and grassland drought, fire and insects expected to be primary disturbance agents.

The increased prevalence of disturbance will vary by climatic sub-regions, elevation and forest type, with the biggest changes projected for dry forested ecosystems at low elevations. Drought will increase in all but the coolest, wettest ecozones; drought is expected to increase mortality in many tree species, including lodgepole pine, Douglas-fir, spruce, subalpine fir and trembling aspen.

Fires are projected to be larger, more intense and more frequent with a risk of large wildfires being particularly high in dry ecozones with lodgepole pine. Fire intensity will increase with more intermittent to full crown fires and frequency will increase; in the Thompson-Okanagan, the area

experiencing fires every 50 years or less may expand from 34% to over 90% by 2085. Fire refugia (areas where organisms can survive the unfavourable conditions) are expected to decrease; in the Thompson-Okanagan, refugia may decrease from 41 to 2% of the landscape by 2085 (Ministry of Forests, Lands and Natural Resource Operations, 2016).

Natural disturbance dynamics will also likely change including increased fire and drought in southern and coastal BC, increased storms and windthrow on the coast, and more frequent and extensive mortality due to bark beetles, defoliators and diseases across BC. Invasive species will increase. Hydrological regimes will shift due to increased evaporation, altered vegetation communities, increased storm frequency and magnitude, decreased snow accumulation, seasonal changes to precipitation, and accelerated ice melt followed by diminished glacier extent (Ministry of Forests, Lands and Natural Resource Operations, 2016).

As a result, wildfires are predicted to increase in frequency, become more intense and more difficult to control which are likely to result in increased tree mortality, detrimental impacts to soils and hydrology, and increased threat to the community and interface areas.

Recommendation #12

That Upper Nicola engage with organizations such as MFLNRORD to develop a monitoring program to track climate change trends on Upper Nicola lands which could include:

- Climatic factors: temperature, precipitation, snowpack, glacial melt and extreme weather events
- Disturbance: fire weather index, mass earth movements, insect and disease prevalence by seral stage, and soil moisture.
- Hydrology: stream flow by watershed, water temperature, channel stability, forest cover, erosion, and suspended sediment.
- Biodiversity: regime shifts, seral stage, habitat supply, species health, connectivity, invasive species and distribution shifts.
- Range: plant communities and condition, and drought conditions.

4.4 Provincial Strategic Threat Analysis (PSTA)

One of the key elements contained in the BC Fuel Reduction Strategy is the province-wide analysis, through applied GIS, of the major factors that contribute to the potential threat of wildfires. These factors include ignition potential, fire occurrence history, forest fuels and fire intensity, and the potential for a fire to crown and spot a distance away from the head of the main fire. This analysis and associated mapping is known as the Provincial Strategic Threat Analysis (PSTA).

The PSTA and the Wildland-Urban Interface (WUI) Risk Class framework are high level analyses that provide a starting point to assess the local wildfire threat. The PSTA utilizes and interprets provincial fuel type mapping, historical fire occurrence data, topography, and historical weather station data and is designed to consistently assess and map potential wildfire threats to values across the landscape (including communities, infrastructure and natural resources) and to integrate different aspects of wildfire hazard and risk.

Since the PSTA is conducted at the provincial level, it has a number of limitations when applied at a local scale. As a result, the PSTA information is complemented with a local wildfire threat analysis that considers local factors to improve the wildfire threat assessments at a community level (see Section 4.5). Wildfire threat exposure to the community varies throughout the fire season based on the fuels present, the moisture content of fuels, and fire weather conditions. Consequences of a threat may be realized when an ignition occurs during high or extreme wildfire conditions, as represented by Fire Danger Rating.

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

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

The PSTA data for 2019 was provided by BC Wildfire Service prior to the development of this CWPP, and upon review was considered the best available information at the time for the purpose of preparing the CWPP.

As part of the CWPP local wildfire threat analysis, ground-truth data was gathered through field reconnaissance and wildfire threat/fuel assessment work completed at 25 plot locations within the Nicola Lake WUI Area and at 38 plot locations within the Douglas Lake WUI Area. The collected data was evaluated against the PSTA Fuel Type and Wildfire Threat data for the same area. The final Fuel Type and Wildfire Threat data incorporated into the CWPP included any updates to the data within the two WUI Areas as a result of the evaluation, ensuring consistency with what was observed on the ground. The updated Fuel Type and Wildfire Threat data is provided to the BC Wildfire Service as part of the CWPP geospatial data submission.

Fuel is forest vegetation, viewed from the standpoint of how it affects fire behaviour. The burning of fuel generates energy and contributes to the intensity of a fire. For the purposes of fire behaviour prediction, the Fire Behaviour Prediction (FBP) system categorizes fuel into 17 distinct types. Since fuel is the only fire behaviour driver that can be modified by people and is a critical input of the PSTA Fire Threat Analysis, considerable time has gone into classifying British Columbia's ecosystems according to FBP fuel types. These fuel types are listed below:

- C-1 spruce-lichen woodland
- C-2 boreal spruce
- C-3 mature jack or lodgepole pine
- C-4 immature jack or lodgepole pine
- C-5 red and white pine
- C-6 coniferous plantation
- C-7 Ponderosa pine/Douglas-fir

- D-1 leafless aspen
- D-2 green aspen
- M-1 boreal mixed wood – leafless
- M-2 boreal mixed wood – green
- M-3 dead balsam fir mixed wood – leafless
- M-4 dead balsam fir mixed wood – green
- S-1 jack or lodgepole pine slash
- S-2 white spruce-balsam slash
- S-3 coastal cedar/hemlock/Douglas-fir slash
- O-1a matted grass
- O-1b standing grass

From the updated CWPP fuel type data, the majority of the land base within the Upper Nicola WUI Areas with “combustible” surface material (vegetation) falls within the O-1a/b Fuel Type (91%), C-7 Fuel Type (5%), D-1/2 Fuel Type (3%) and M-1/2 Fuel Type (1%) overall. By individual WUI Area; within the O-1a/b Fuel Type (93%), C-7 Fuel Type (2%) and D-1/2 Fuel Type (5%) for the Nicola Lake WUI and within the O-1a/b (90%), C-7 Fuel Type (5.5%), D-1/2 Fuel Type (3%) and M-1/2 Fuel Type (1.5%) for the Douglas Lake WUI.

The 2019 Wildfire Threat Analysis integrated three distinct elements of fire threat or risk: fire occurrence (fire density), suppression difficulty and fire impacts (head fire intensity), and spotting impact. Areas rated in the High-Extreme fire threat class are locations where the fire intensity, frequency and spotting risks can be severe enough to potentially cause catastrophic losses to values at risk. From the updated CWPP wildfire threat data, the vast majority (99%) of the land base in the Upper Nicola WUI Areas falls within the Moderate fire threat class, where the combustible land base will support primarily surface fires only. It is the areas within the CWPP WUI Area that are adjacent to homes and other critical infrastructure that are of priority for consideration in fuel reduction activities.

4.5 Upper Nicola Local Wildland Urban Interface (WUI) Threat Assessments

Plots to determine the wildfire threat ratings within the wildland-urban interface surrounding the Upper Nicola Indian Band community were established in the field on December 4 & 5, 2020 and April 20, 22 & 23, 2021 to assess the local wildfire threat, including field reviewing fuel characteristics, proximity of fuel to the community, local fire spread patterns, topographical considerations and local factors.

The following information was collected at each plot in accordance with the guidelines outlined in the document “Wildland Urban Interface Wildfire Threat Assessments in B.C.” (Morrow, Johnston, &

Davies, 2013) to determine a low, moderate, high or extreme wildfire behaviour threat class and WUI wildfire threat class rating:

- Duff and litter depth
- Flammable surface fuels continuity
- Vegetation fuel composition
- Fine woody debris continuity
- Large woody debris continuity
- Live and Dead Coniferous and Deciduous crown closure
- Live and Dead Conifer crown base height
- Suppressed and understory conifers
- Continuous forest land and slash cover
- Forest health
- Biogeoclimatic zone
- Historical wildfire occurrence
- Aspect
- Slope
- Terrain
- Landscape/Topography
- Position of structure / community to rating area
- Type of development
- Position of assessment area

Each of these categories on the WUI wildfire threat assessment worksheets were assigned a numerical value and summed to produce a wildfire behaviour and WUI wildfire threat class rating for each established plot (refer to Appendix 1 for individual wildfire threat plot results). The plot ratings were then incorporated into the evaluation of areas for potential recommended forest fuel modification treatments.

4.6 Fire History

For millennia, Indigenous people have tended landscapes with fire – a careful art and complex management system that creates a mosaic of ecosystems across the landscape (Turner, 2014). The combination of cultural burning and naturally-occurring fires are the factors that define the natural fire regime – defined as the frequency and intensity of fires in a given landscape. The Upper Nicola Band Area of Responsibility has historically experienced frequent, low intensity fires (both wildfire and cultural burning), but this fire regime has changed dramatically in the past century.

Colonial laws that banned cultural burning and introduced fire suppression have greatly changed the natural disturbance regime in the Southern Interior of BC, including the WUI areas in this plan. When Europeans colonized North America, they brought with them a mindset that fire is unnatural; this ideology was further bolstered by catastrophic wildfires set by European settlers (Thomas & McAlpine, 2010). In BC, Indigenous burning was largely banned around the year 1880, and by the 1940s the BC Forest Service had become extremely successful in suppressing the size and intensity of wildfires (Gayton, 2003).

Because the area surrounding the Upper Nicola communities is primarily grassland, historic fire suppression efforts, cultural and community fire applications and small-scale agricultural burns have

been relatively successful in mitigating catastrophic fires in the area. Recorded spatial historical fire data provides the following fire history within the Upper Nicola WUI areas:

Nicola Lake IR #1 WUI

Fire starts from 1962 to 2019 (fires under 1 ha):

- 7 lightning starts
- 17 person starts
- 4 unknown starts

Fire starts from 1940 to 2019 (fires over 1 ha in size):

- 4 polygons ranging in size from 2.6 ha to 2,050 ha (1940 fire on west side of Nicola Lake)
- 2 person starts
- 2 unknown starts
- Closest fires to structures were 2 unknown start fires in 2019, 2.6 and 6.0 ha in size

Douglas Lake IR #3 WUI

Fire starts from 1963 to 2019 (fires under 1 ha):

- 3 lightning starts
- 8 person starts
- 3 unknown starts

Fire starts from 1938 to 2019 (fires over 1 ha in size):

- 6 polygons ranging in size from 5.7 ha to 361 ha
- 2 person starts
- 2 unknown starts
- The closest fire to structures was a 1940, 89 ha, person started fire directly north of the community.

4.7 Wildfire Behaviour

Fire weather information such as temperature, relative humidity, precipitation, wind speed and wind direction are used in making fire prevention, preparedness and suppression decisions, as well as other general fire management decisions. There are three major factors that influence wildfire behaviour: fuel, weather and topography. These factors are known as the Fire Behaviour Triangle which is shown in Figure 4 (Kelly, n.d.). The amount, type and continuity of fuel and its moisture content directly influence fire behaviour. The fuel load determines the potential amount of heat that can be released during a burn, whereas the type and distribution of fuel elements affects their combustibility. Fine fuels (diameter <6 mm) burn more readily than coarse ones. The moisture content of fuel affects the completeness of combustion. Living tissues have a higher moisture content than dead matter and therefore burn less readily. Fuel characteristics differ among ecosystems, resulting in differences in fire behaviour and hence in damage to plants. To manage fire, it is therefore important to understand the variability in fire behaviour in different ecosystems (Gambiza, Campbell, Moe, & Frost, 2005).

Wind speed affects the rate of spread of fire and flame height. For example, strong winds increase the rate of spread and reduce flame height. Air temperature and relative humidity affect fuel moisture. High relative humidity increases the moisture content of cured fuel whereas high temperatures reduce it through enhanced evaporative losses. To understand the potential impacts of fire on plants, it is necessary to study how weather conditions at the time of burning and fuel characteristics influence fire behaviour in different ecosystems (Gambiza, Campbell, Moe, & Frost, 2005)

The BC Wildfire Service operates about 260 weather stations that generates weather reports for indices such as wind speed, precipitation, wind direction, FFMC and BUI on an hourly basis. The reports generated for wind speeds and direction are termed ISI-Rose. The closest BC Wildfire Service weather station to the Upper Nicola Band WUI areas is the Glimpse Lake station 291. Five-year monthly averages were calculated from the daily data for the years 2017 – 2021.:

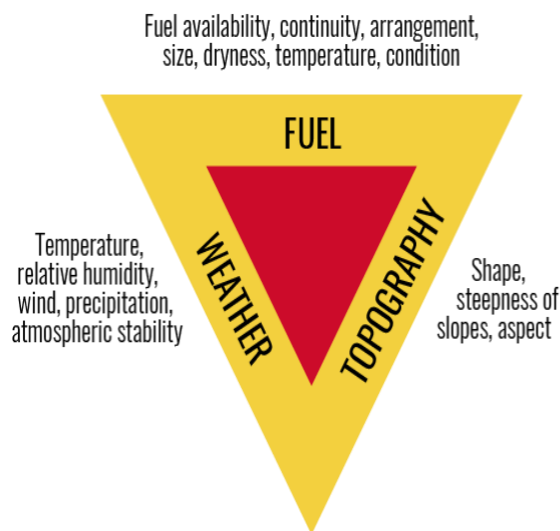
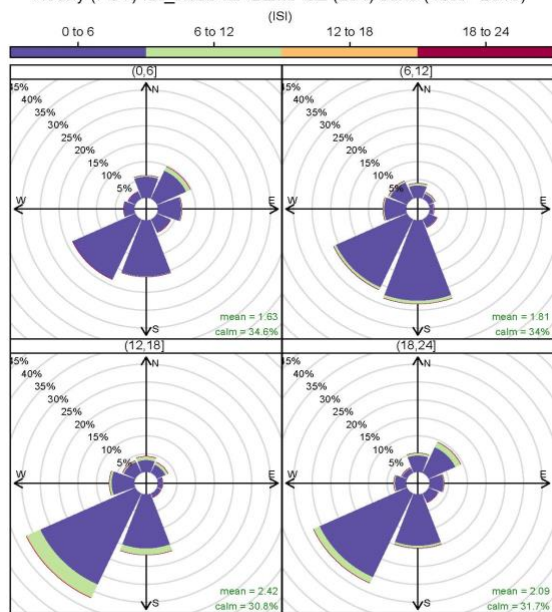


Figure 4: Wildfire Behaviour Factors

4.7.1 Wind Speed and Direction

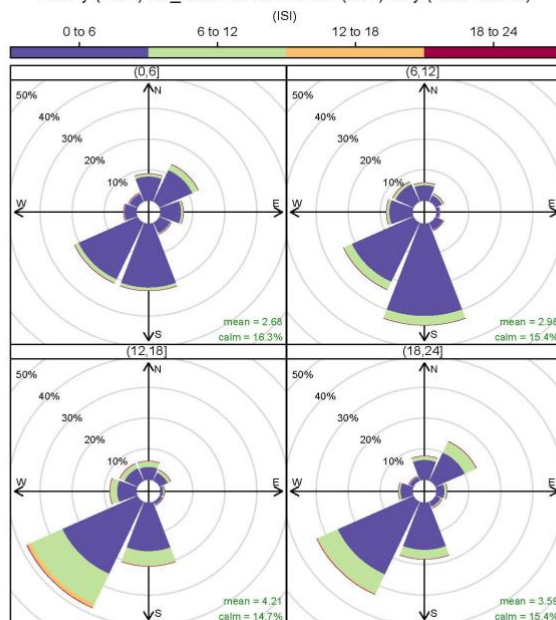
The ISI Rose for Glimpse Lake weather station 291 shows that during the peak fire season months (June-Aug), prevailing wind direction in general proximity to the Upper Nicola community is from a north east direction. Wind speeds and direction are influenced from both Nicola and Douglas Lakes. Peak winds speeds are recorded between the hours of 1200 and 1800 hours, and typically reach peak speeds around 1600. Wind speeds remain relatively gusty until 2400 hours and generally then decrease between the hours of 2400 and 1200.

Hourly (PST) ISI_Rose for GLIMPSE (291) June (1997–2016)



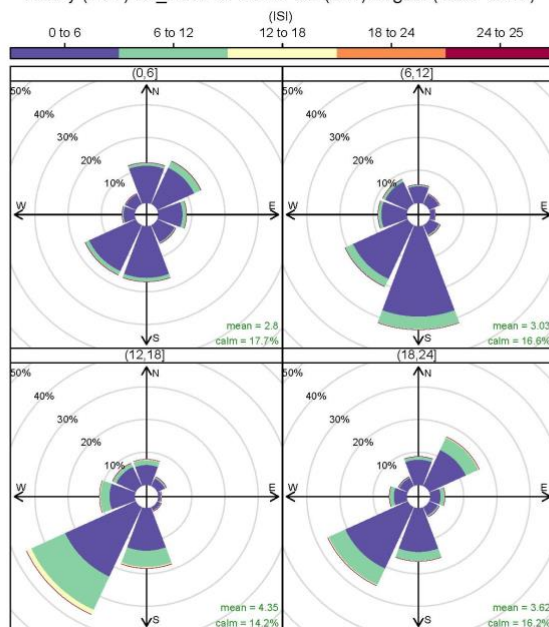
Frequency of counts by wind direction (%)

Hourly (PST) ISI_Rose for GLIMPSE (291) July (1997–2016)



Frequency of counts by wind direction (%)

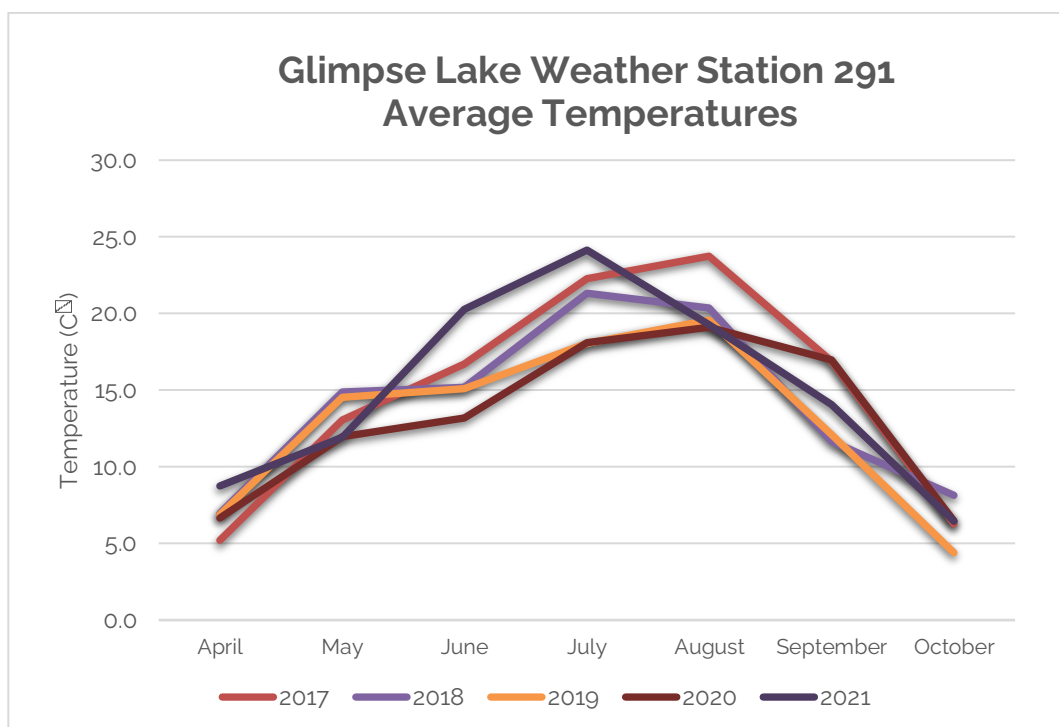
Hourly (PST) ISI_Rose for GLIMPSE (291) August (1997–2016)



Frequency of counts by wind direction (%)

4.7.2 Temperature

Average monthly temperatures June through August from 2017 - 2021 for the Glimpse Lake weather station 291 range between 17 and 25 degrees Celsius. It is noted that the years with the highest recorded monthly temperatures (2017, 2018 and 2021) directly correlate with notable wildfire seasons. 2021 experienced the highest average temperature of 24.1 degrees in July. 2017 experienced a similar average high temperatures of 23.7 degrees in August.

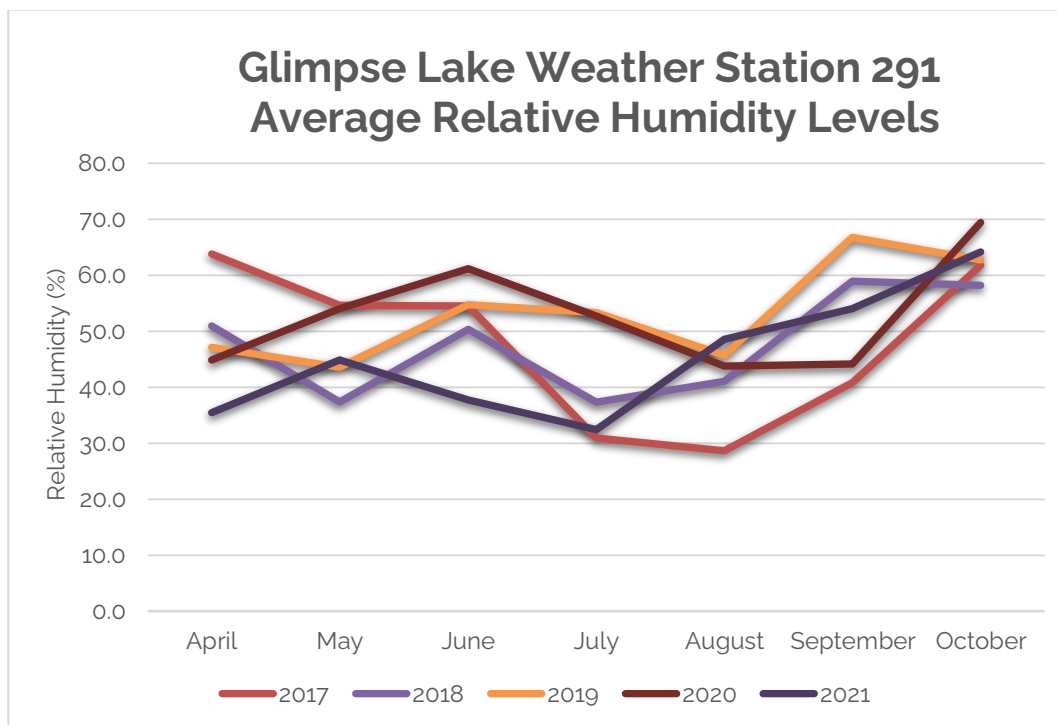


Glimpse Lake Weather Station 291 Average Temperatures (2017-2021)

Year	April	May	June	July	August	September	October
2017	5.2	13.1	16.7	22.3	23.7	16.9	6.3
2018	7.0	14.9	15.2	21.3	20.4	11.6	8.1
2019	6.9	14.5	15.1	18.0	19.6	12.1	4.4
2020	6.7	11.9	13.2	18.1	19.1	17.0	6.5
2021	8.7	11.9	20.3	24.1	19.3	14.0	6.4

4.7.3 Relative Humidity

Average relative humidity levels for the Glimpse Lake weather station ranged between 30.9% and 61.2% during the peak fire season months of June through August. There is a direct correlation noted between years with drastically reduced relative humidity levels and notable wildfire seasons (2017, 2018 and 2021). 2017 experienced the longest sustained lowest relative humidity levels in the months of July and August at 30.9% and 28.6% respectively. 2021 also experienced low levels of relative humidity in the month of July at 32.4%

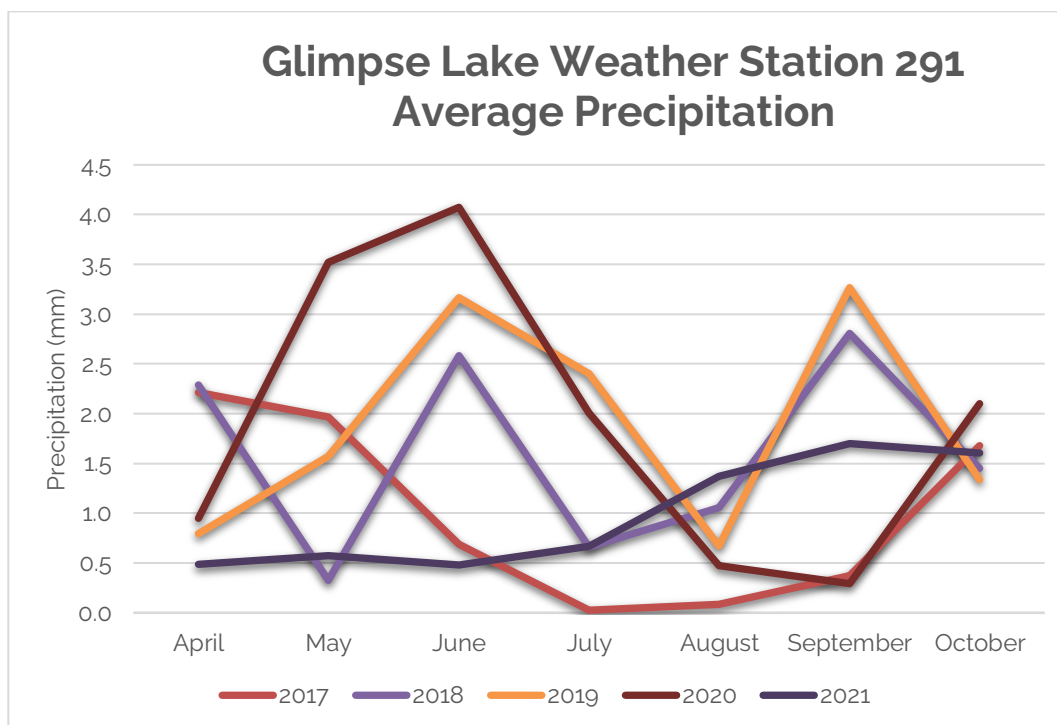


Glimpse Lake Weather Station 291 Average Relative Humidity (2017-2021)

Year	April	May	June	July	August	September	October
2017	63.8	54.7	54.5	30.9	28.6	40.8	61.8
2018	50.9	37.4	50.4	37.3	41.1	58.9	58.2
2019	47.1	43.6	54.7	53.3	45.7	66.8	62.8
2020	44.8	54.1	61.2	52.7	43.8	44.2	69.4
2021	35.5	44.8	37.7	32.4	48.5	54.0	64.2

4.7.4 Precipitation

Average precipitation for the Glimpse Lake weather station ranged between 0.5mm and 4.1mm during the peak fire season months of June through August. In all years, the month with the lowest precipitation levels was August. There is a direct correlation noted between years with drastically reduced precipitation levels and notable wildfire seasons (2017, 2018 and 2021). 2017 experienced the lowest precipitation recorded with July and August recording no, or trace amounts of precipitation (0.0 and 0.1 respectively). The year 2021 experienced sustained low levels of precipitation for four months until some reprieve was noted starting in August, and finally normalizing with previous years in October.



Glimpse Lake Weather Station 291 Average Precipitation (2017-2021)

Year	April	May	June	July	August	September	October
2017	2.2	2.0	0.7	0.0	0.1	0.4	1.7
2018	2.3	0.3	2.6	0.7	1.1	2.8	1.5
2019	0.8	1.6	3.2	2.4	0.7	3.3	1.3
2020	0.9	3.5	4.1	2.0	0.5	0.3	2.1
2021	0.5	0.6	0.5	0.7	1.4	1.7	1.6

4.7.5 Slope

Slope percentage influences a fire's trajectory and rate of spread. The steepness of the slope effects the spread rate and fire generally moves faster uphill than downhill with fire spreading faster on steeper slopes.

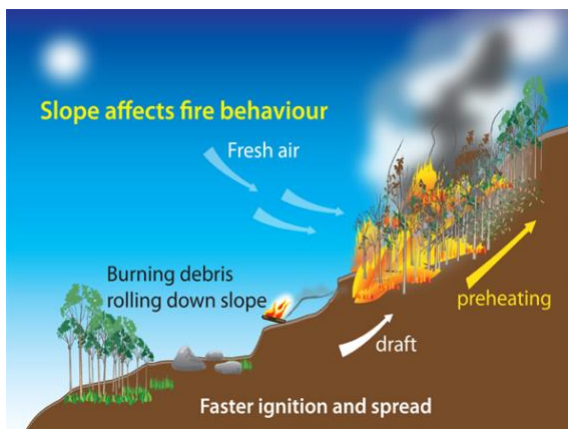


Figure 5: Slope affects on Fire Behaviour

Table 7: 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.

Slope Position of the Value

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

Table 8: 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.

4.7.6 Aspect

The aspect affects the amount of sunshine the slope receives. In the northern hemisphere, south facing slopes receive more solar radiation than north facing slope. This directly influences the types and moisture content of the vegetation. Fire behaviour typically changes drastically as it spreads into different aspects.

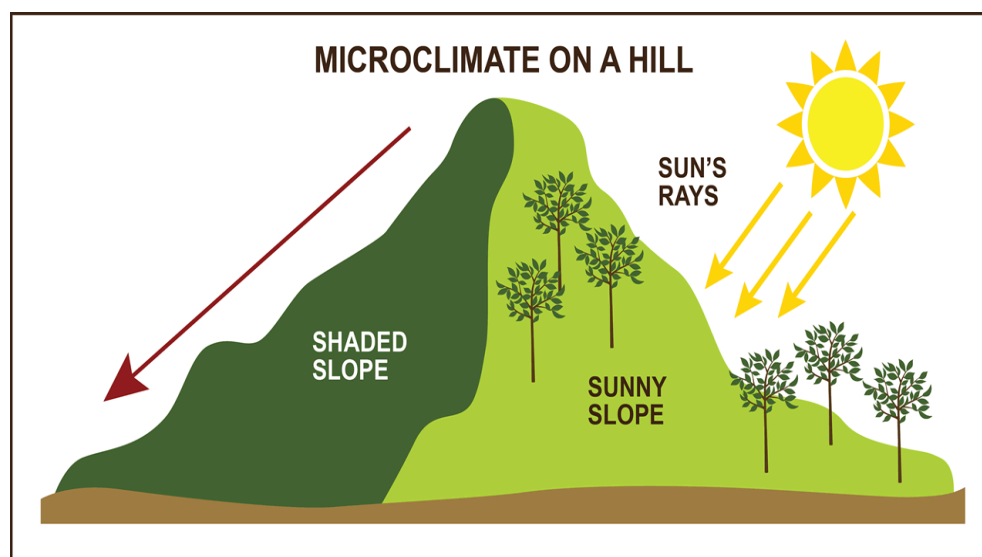


Figure 6: Solar Radiation and Aspect

4.7.7 Terrain

Terrain also affects fire behaviour in that terrain influences wind patterns and air flows across different topographic features. Mountain and valleys channel local wind direction, or as wind is forced through narrow valleys or canyons, velocities will typically increase.

4.7.8 Spotting Potential

The following table outlines the general fuel type categories found in BC along with an associated crown fire/spotting potential rating. The general fuel types found within and around the UNB communities are O-1a/b and D-1/2 and M-1/M2 (26-49% conifer):

Table 9: Fuel Type Categories and Crown Fire Potential

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

SECTION 5: Recommendations for Mitigating Wildfire Risk

Mitigating wildfire risk is a proactive approach to reducing potential impacts and subsequent losses from devastating wildfires. Understanding and assessing all of the risks that apply to a given community is a key consideration when determining actions that organizations can undertake to mitigate and manage the wildfire risk within and adjacent to their respective jurisdictions.

As identified through the Wildfire Risk Analysis, the Upper Nicola community could be impacted by fire in the following ways;

- a) from a fire start within the community itself; and
- b) from a landscape fire moving into the community

Comprehensive community wildfire resiliency planning involves evaluating the risks and implementing a robust program that incorporates a variety of different mitigation options to reduce the identified risks. Programs that can assist in reducing those are fuel reduction programming within and surrounding the community, as well as communicating, educating and promoting FireSmart activities that homeowners can implement collectively as further wildfire resiliency efforts for individual households and properties.

5.1 Overview of the FireSmart Program

FireSmart BC is a provincial program that was created to increase wildfire resilience among homeowners, communities, emergency responders, and all levels of government (FireSmart BC, n.d.). It is a holistic approach that encourages efforts from grassroots to high-level organizations. At the grassroots level, FireSmart is based on the actions of residents and neighborhoods helping each other protect their homes from wildfire. At higher levels, it may include direction such as developing legislation or improving emergency response during a wildfire. FireSmart is based on scientific research which has studied past wildfire disasters, wildfire dynamics and emergency response.

The wildfire risk reduction recommendations that this CWPP will detail are focused on the disciplines outlined in the provincial FireSmart program: ([Disciplines | FireSmart BC](#)):

- 1) Education
- 2) Legislation and Planning
- 3) Development Considerations
- 4) Interagency Cooperation
- 5) Cross Training
- 6) Emergency Planning
- 7) Vegetation Management and Fuel Reduction Activities

The FireSmart Canada Neighbourhood Recognition Program is a way that communities can be recognized and acknowledged for the important FireSmart work they have completed in their community. Neighborhoods that have achieved FireSmart recognition become eligible for a \$500 annual grant to host a FireSmart day.

5.2 Community Engagement and Initiatives

The Upper Nicola community has recently become more engaged in wildfire planning initiatives and FireSmart programming. The community has not yet achieved FireSmart recognition through FireSmart Canada, but is currently taking steps to achieve this. As a governing body, the Upper Nicola Band administration plays a key role in establishing and promoting wildfire resiliency within the community. While FireSmart focuses on individual residents taking charge of wildfire resiliency, it's important that UNB inspires and supports the residents in FireSmart work. The following is a summary of Upper Nicola's FireSmart and wildfire preparedness planning initiatives to date:

- UNB community members conduct annual controlled burns of grasslands surrounding the community to reduce fuels near homes.
- FireSmart BC educational materials have been distributed to the community through newsletters and information displays at office buildings.
- Wildfire updates and information were provided at community meetings throughout 2021, including at the UNB Annual General Meeting.
- UNB facilitated cross training programs for the volunteer fire department members, which included basic firefighting training courses in 2020/2021.
- UNB is working to receiving FireSmart Canada Neighborhood Recognition for the community and plans to apply for neighbourhood recognition in 2022.

- Completed the Community Wildfire Protection Plan for Upper Nicola.
- Completed a portion of the critical infrastructure assessments for infrastructure on Nicola Lake IR #1.
- Applied for continued FireSmart programming through the 2022 UBCM CRI FireSmart Community Funding Support grant program.

5.3 Upper Nicola FireSmart Neighbourhoods

This section uses the information gathered from the local wildfire threat, risk assessments fuel typing and structural data to best understand the priority areas for FireSmart planning and activities within the community. Based on the information analyzed above, there were four (4) draft neighbourhoods delineated for Upper Nicola as the priority areas for FireSmart activities. These neighbourhoods would form the structure and grouping for the upcoming FireSmart neighbourhood recognition. The following table and maps summarize the proposed neighbourhood particulars and recommendations:

Table 10: Upper Nicola Priority FireSmart Neighbourhood Areas

Area ID	Wildfire Risk Rating (E/H/M/L)	FireSmart Y/N	FireSmart Canada Recognition Received Y/N	Recommended FireSmart Activities
Priority Area 1: Douglas Lake North 71 structures	M	N	N	<ul style="list-style-type: none"> • Complete neighborhood assessment • Complete home ignition zone assessments • Complete critical infrastructure assessments (if present) • Implement prescribed fire • Implement fuel reduction programs
Priority Area 2: Nicola Lake 88 structures	M	N	N	<ul style="list-style-type: none"> • Complete neighborhood assessment • Complete home ignition zone assessments • Complete critical infrastructure assessments (if present) • Implement prescribed fire • Implement fuel reduction programs

Priority Area 3: Douglas Lake South 79 structures	M	N	N	<ul style="list-style-type: none"> • Complete neighborhood assessment • Complete home ignition zone assessments • Complete critical infrastructure assessments (if present) • Implement prescribed fire • Implement fuel reduction programs
Priority Area 4: Post and Rail 4 structures	M	N	N	<ul style="list-style-type: none"> • Complete neighborhood assessment • Complete home ignition zone assessments • Complete critical infrastructure assessments (if present)

Maps of the Upper Nicola proposed FireSmart neighbourhoods are found in Appendix 2

5.4 FireSmart Programming

In addition to the FireSmart activities already completed in Upper Nicola communities, there have been a number of additional initiatives that Upper Nicola has identified within each of the seven FireSmart programming disciplines that they would like to engage in and champion in upcoming year(s). Some of these initiatives have already been included in an application to the Provincial Community FireSmart Funding Supports application for 2022/2023.

5.4.1 Communication and Education

[Education | FireSmart BC](#)

Public education is the critical foundation of FireSmart. In order for a community to become resilient in the face of wildfire, all members of the community need to understand the wildfire risks and their role in reducing those risks. As people learn the importance of taking initiatives in protecting their homes from wildfire, they start to inspire their neighbours, which creates a ripple effect of wildfire resiliency. Education can happen on many levels, from one-on-one training to social media campaigns. UNB should tailor education programs to the needs of its community.

Some of the key education pieces of the FireSmart program include:

- 1) FireSmart Home Assessments/Structural zone assessments
- 2) Research
- 3) Guide and Manuals
- 4) Knowing your local LFR
- 5) Landscaping
- 6) Videos and brochures

The following education initiatives are being proposed for implementation in the Upper Nicola community:

Proposed Education Activities – 2022/2023	Proposed Outcomes – 2022/2023
Research, develop and distribute a digital or paper community FireSmart information newsletter twice per year.	Increased FireSmart awareness within community throughout the year through various forms of media
UNB will host multiple community information meeting(s) to update the community on FireSmart and wildfire preparedness initiatives that are being promoted and implemented within the community.	UNB community members will gain information and knowledge that will help them prepare their homes and yards in the fall and spring in advance of the fire season, as well as initiatives that are being implemented across the community as a whole.
Promoting FireSmart awareness and wildfire preparedness within the UNB community by distributing materials and videos including the FireSmart Begins at Home Manual, Guide to Landscaping and Last-minute Wildfire Checklist.	UNB community members will gain FireSmart and fire preparedness knowledge which will benefit the community as a whole.
UNB will host a FireSmart Day event to gather the community members together in the late summer or early fall to have an outdoor event focussed on implementing FireSmart activities around the home(s), as part of the community effort to be a Wildfire Resilient Community.	UNB community members will continue to FireSmart their homes and yards by completing outdoor activities such as removing flammable debris from around the home, stacking firewood away from the home, cleaning leaves and debris from gutters, decks and porches, vegetation trimming and pruning, etc.
Apply for UNB FireSmart Canada Neighborhood Recognition for 2022. The required documentation will be compiled for the FireSmart Board by the qualified LFR and submitted to FireSmart Canada.	Engaging the UNB community, selecting a Community Champion and assembling the FireSmart Committee will be a top priority at the commencement of the project.
UNB communication strategy	Develop a comprehensive communication strategy detailing how and when FireSmart information will be distributed within the community.

Complete 165 Home Ignition Zone Assessments	Housing staff, tenants and homeowners will learn about the principles of FireSmart through the process of doing the home assessments with the LFR. This will increase awareness of how to reduce wildfire risk, and empower tenants to undertake treatments to protect their homes from wildfire. The task list that is generated from the home assessments will provide a guideline for prioritizing treatments.
Complete 4 Neighborhood Wildfire Assessments	The UNB community will have Neighborhood Wildfire Hazard Assessment Forms completed by a qualified LFR for the Nicola Lake and Douglas Lake residential areas. This will help Band Administration to incorporate FireSmart principles into community plans and operations (ex: housing renovations). Additionally, the Neighborhood Wildfire Hazard Assessment Form is required to apply for FireSmart Canada Community Recognition Program.
Complete 4 Neighborhood FireSmart Plans	The FireSmart Neighborhood Plans will provide action items for UNB to work on in the coming year. The plans are critical to ensure that UNB has an organized approach to improving the wildfire resiliency of the community. The plans are also required to apply for FireSmart Canada Neighborhood Recognition Program. A goal for UNB is to apply for their recognition with FSCNRP.
Complete Critical Infrastructure Assessments on 17 structures in the community	17 critical infrastructure assessments will be completed by a qualified LFR to identify the degree that they are FireSmart.

5.4.2 Legislation and Planning

([Legislation & Planning | FireSmart BC](#))

Legislation and planning is an effective way for First Nations governance to improve the wildfire resiliency of their community. Many of the services offered by a First Nations band administration have impacts to wildfire resiliency, including housing, emergency response, and land and resource management. By incorporating wildfire resiliency into its plans and laws, a community can influence their membership and provide better services. For example, FireSmart policies can be developed for the design and maintenance of new housing developments.

Upper Nicola has identified the following legislation and planning initiatives that will be undertaken within the community in 2022:

Proposed Legislation and Planning Activities – 2022/2023	Proposed Outcomes – 2022/2023
Complete a Community Wildfire Protection Plan (CWPP) to guide and inform community wildfire resiliency efforts for the Upper Nicola Band.	Have a completed CWPP and submit spatial data and reporting requirements to the funder.

Other initiatives that were identified by Upper Nicola staff as important were the development of policies and practices for FireSmart First Nation Land or publicly owned land: develop policies and practices that can supplement the UNB Fire Department plans and UNB Health and Safety plans. These policy development topics were not included for implementation in 2022/2023.

Recommendation #13	That Upper Nicola develop policies to incorporate FireSmart principals in the current UNB Fire Department Plans and UNB Health and Safety plans.
Recommendation #14	That Upper Nicola develop a policy for annual controlled burns on Upper Nicola lands that includes a training component for prescribed/control burning techniques and fire suppression.

5.4.3 Development Considerations

([Development Considerations | FireSmart BC](#))

Land use planning and development standards provide the opportunity to protect homes and communities from wildfires. Through good planning, communities can improve the chances that new or existing developments will survive wildfires. Considering factors such as land use types, structure density and road locations early in a development process can greatly improve the survivability of structures and neighborhoods, and facilitate better emergency response such as evacuations and first responder safety.

In 2021, the Natural Research Council Canada published a guide called "National Guide for Wildland-Urban Interface Fires" (Bénichou, et al., 2021). This guide draws from recent research to provide information about hazard and risk assessment, vegetation management, construction measures, community planning, and emergency planning. It can be found at <https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/construction-innovation/new-national-guide-wildland-urban-interface-fires>

Development initiatives that were not included in the 2022 UNB FCFS application, but are recommended are:

Recommendation #15	Review and amend Strategic Plans, Comprehensive Community Plans and/or any relevant land use bylaws to incorporate FireSmart principles.
Recommendation #16	Revising or creating landscaping guidelines / policies to incorporate fire-resistant landscaping and vegetation.
Recommendation #17	Establish requirements for new home builds and renovations to ensure that the exterior design and finish of buildings follows FireSmart guidelines.
Recommendation #18	Include wildfire prevention and suppression considerations in the design of subdivisions (e.g. road widths, turning radius for emergency vehicles, and access and egress points).
Recommendation #19	Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management staff are included.

5.4.4 Interagency Cooperation

([Interagency Cooperation | FireSmart BC](#))

Achieving a FireSmart community requires collaboration at all levels, from individual homeowners to Band administration and elected officials, local fire departments, and provincial government representatives. The collaboration of these groups is critical in both the prevention, response and recovery from wildfires.

Upper Nicola Band already has relationships with many of the stakeholders involved in wildfire response for their communities, but strengthening these relationships will further enhance the preparedness and the resilience of the community in the face of wildfire.

Proposed Interagency Cooperation Activities – 2022/2023	Proposed Outcomes – 2022/2023
UNB will host 3 CFRC interagency meetings with local governments, regional districts, government ministries and organizations including the TNRD, BCWS, EMBC, MoTI, MFLNRO, Firekeepers and the 5-Nations Fuel Management Working Group to promote wildfire prevention, resiliency and FireSmart Principles within and surrounding the UNB community.	The meetings will facilitate the sharing of information, ideas, and support for wildfire resiliency and FireSmart initiatives within the UNB community, as well as surrounding areas
UNB CFRC members will attend the annual FireSmart Symposium in Kamloops BC.	The attendees will learn about new ideas and approaches to FireSmart and have an opportunity to network with experts in the field, and upon their return implement FireSmart principles within the UNB community.

5.4.5 Emergency Planning

[\(Emergency Planning | FireSmart BC\)](#)

Community preparations for a wildfire emergency requires a multi-pronged approach. Individuals and agencies need to be ready to react by developing plans, mutual-aid agreements, resource inventories, training and emergency communication systems. All of these make it possible for a community to respond effectively to the threat of wildfires as a whole. It takes everyone from firefighters to government representatives to homeowners to have the best-laid plans in a worst-case scenario. Encouraging emergency planning by combining local knowledge with expertise in wildfire management helps communities become better prepared in responding to and recovering from wildfire.

Proposed Emergency Planning Activities – 2022/2023	Proposed Outcomes – 2022/2023
Hold four meetings with applicable emergency organizations (UNB EOC, BCWS, MFLNRO, EMBC, TNRD etc.) focused on community egress planning and overall wildfire readiness.	To establish a working group to discuss and plan for community readiness prior to the annual wildfire season.

Recommendation #20	That Upper Nicola commit to reviewing and updating the ERP and HVRA annually.
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5.4.6 Cross Training

([Cross-training | FireSmart BC](#))

There are two kinds of firefighters: wildfire and structural. Many other local resources may also be involved in managing a wildfire incident. When firefighters are cross-trained, response capabilities are improved, and communities are safer. Wildland-Urban Interface resiliency planning and incident response draw on many different professions who do not typically work in wildfire environment. Cross-training of fire fighters, public works staff, utility workers, local government and First Nations administration, planning and logistics staff, and other key positions will help support the development of comprehensive and effective wildfire risk reduction planning and activities, as well as a safe and effective response. Training initiatives can include cross-training fire departments to include structural fire and interface wildfire training (e.g. S-100), attending training for Local FireSmart Representatives and community champions and supporting professional development to increase capacity for FireSmart activities in the community.

Proposed Cross Training Activities – 2022/2023	Proposed Outcomes – 2022/2023
UNB community members will attend a Local FireSmart Representative Workshop	UNB will have community members trained and certified as an LFR

Recommendation #21	That Upper Nicola Fire Department provide annual refresher training in basic firefighting courses for all volunteer members of the Upper Nicola Fire Department.
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5.4.7 Additional FireSmart Initiatives

Additional FireSmart initiatives Upper Nicola may want to consider for future implementation are:

- Undertake FireSmart Demonstration Projects for publicly owned buildings or publicly and provincially owned critical infrastructure. This may include:
 - Replacing building materials (i.e. siding or roofing) with fire-resistant materials
 - Replacing landscaping with fire-resistant plants as outlined in the FireSmart Guide to Landscaping
- Planning for private land (only with private property owners' consent)
 - Develop FireSmart Community Plans for specific areas
 - Conduct FireSmart home and property assessments

- Offer local rebate programs to home owners on private land and First Nations land that complete eligible FireSmart activities on their own properties
- Provide off-site debris disposal for private land owners who have undertaken their own vegetation management, including:
 - Provide a dumpster, chipper or other collection method
 - Waive tipping fees
 - Provide curbside debris pick-up

5.5 Vegetation Management and Fuel Reduction

[\(Vegetation Management | FireSmart BC\)](#)

The impacts of an extreme wildfire on a community can further be mitigated through the implementation of vegetation management and fuel reduction programming at multiple scales. The wildfire management objectives within each WUI zone are varied given site-specific fire behaviour factors and other resource value considerations, however, the basic management approach is to implement more aggressive fuel reduction treatments in closer proximity to the communities and any values at risk.

Fuel reduction for wildfire mitigation at the scale of private land and property ("WUI 100m") can occur through the implementation of FireSmart Principles around homes and other critical infrastructure; at the community interface level ("WUI 500m") wildfire management occurs through Community Wildfire Protection Planning designed for larger scale fuel reduction programs and beyond the community interface ("WUI 2000m"), the impact of a severe wildfire can be further reduced through fire management planning at a broader landscape level. The objective of landscape-level fire management is to minimize the development of extreme or "mega" fires by creating fuel breaks through targeted vegetation management activities, reducing fuels in key areas, and utilizing alternative silviculture practices such as realigning cut block boundaries, widening road right-of-ways, or through the use of prescribed fire.

5.5.1 FireSmart Structure Ignition Zone (WUI100) Fuel Reduction:

Work in the Structure Ignition Zone is focused on the areas closest to the home, then working outwards. The Structure Ignition Zone is divided into four sub-zones.

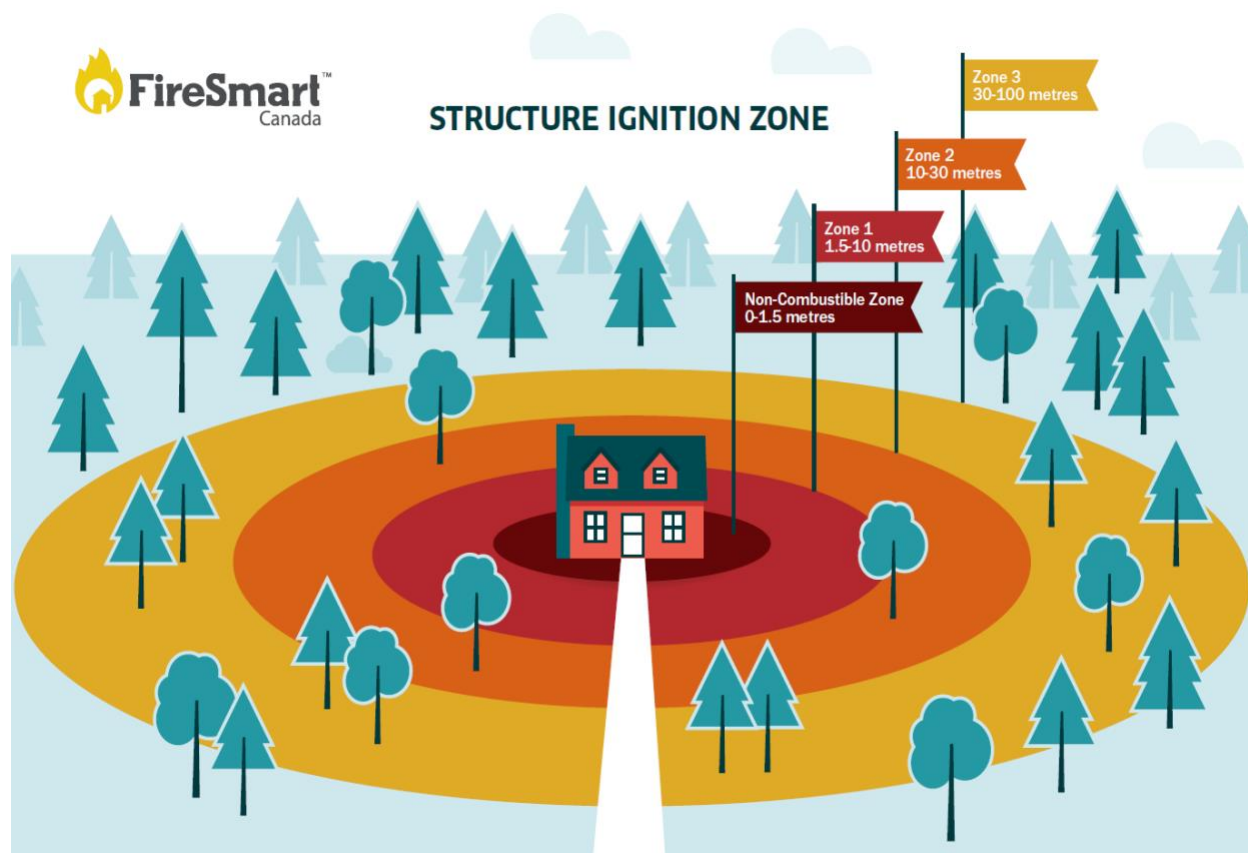


Figure 7: FireSmart Structure Ignition Zones

- **Non-combustible Zone (0 – 1.5m from home).** This zone focuses on reducing the risk of wind-blown embers from igniting materials near the home. It is essential that all combustible items and vegetation are removed from this zone. Homeowners should create a 1.5 meter wide zone of concrete, gravel, dirt or short lawn immediately next to the house, and avoid storing combustible items on or under decks (for example, firewood, tires, recycling, and furniture).
- **Zone 1 (1.5 – 10 meters from home):** All coniferous trees and high flammability shrubs should be removed from this zone. Grasses should be regularly mown, and any dead vegetation removed. Deciduous tree may be planted if tree cover is desired. The following plants are examples of high-flammability plants that should be removed:
 - Douglas-fir
 - Ponderosa pine
 - Cedar hedges
 - Juniper
 - Spruce
 - Long, dry grasses, including decorative grasses
- **Zone 2 (10 – 30 meters from home):** Grasslands and fields should be regularly mown or trimmed in this zone. If there are conifer trees in this zone, selectively remove trees to ensure that there is 3 meters of space between the branches of each tree. Remove branches from

the lower 2 meters of the trunks. Trees can be pruned up to 5 meters, taking care not to remove more than 30% of the live branches. Clear out any dead wood on the ground and rake up twigs and needles.

- Zone 3 (30 – 100 m from home). Work in this zone helps reduce the intensity of wildfires that are approaching from a distance. Homeowners should selectively remove trees so that there is a 3-meter gap between the crowns of each tree. Lower branches of conifer trees should be removed from the lower 3.5 meters of the tree (or 4 meters on the uphill side), and dead vegetation and needle buildups should be removed from the forest floor. Grasslands and fields in this zone can be burned regularly (every 1-5 years) to remove buildup of dead grasses. Fields should be kept irrigated and short through mowing or grazing.

5.5.2 Landscape Level Fuel Reduction Methods and Activities

The following sections detail fuel reduction strategies that can be implemented within the FireSmart Structure Ignition Zone WUI100 areas, and can also be expanded into the surrounding forests or grasslands in the WUI500 and WUI2000 zones to further reduce fuels on a broader landscape level around the community. Hand treatments are the generally preferred method to reduce fuels in close proximity to community cores, but timber harvesting may also be considered for larger landscape level fuel reduction initiatives or for the establishment of fuel breaks. The following details the operational stages and processes commonly associated with the development of a larger scale fuel reduction program within the WUI 100 – WUI 2000 zones surrounding communities. These types of projects can be funded through both provincial and federal funding mechanisms.

5.5.2.1 Layout of Treatment Areas and Development of a Fuel Reduction Prescription

The layout of each treatment area (polygon) will be completed by marking the boundaries with flagging tape for the Fuel Reduction work crew to follow, and GPS mapped to produce an accurate polygon map. Treatment area boundaries will be established where possible along existing openings (natural features or man-made such as roads or other land-clearings), along slope breaks, ecosystem type changes, ridge crests, riparian ecosystems, or other natural features. All danger trees will be identified and mapped, and those assessed to be hazardous will be felled or a no work zone established if they are to be retained as a wildlife tree. An assessment for potential sites of cultural/spiritual significance will be completed with the community and protected through the establishment of no work zones. Riparian areas will be assessed for potential reserve / retention prescriptions if significant water courses are located or other values exist. An evaluation will be completed that identifies potential SARA species and /or habitats (along with their respective COSEWIC status) that may be located in, or near, proposed treatment areas. The evaluation will also identify the bird nesting and breeding season for the area. Specific detailed protective measures to be implemented will be included in the prescription to prevent potential impacts of proposed fuel reduction treatments on SARA species and/or habitats.

Safe locations for pile and burn sites will be identified (e.g. away from power lines, and overhanging branches) for debris removal in all polygons. Other areas that may require exclusion include slope stability concerns, slopes that are unsafe for crews to work on, or any other features found that may require protection from proposed treatments. A Fuel Reduction Prescription (and/or Prescribed Burn Plan) will be completed by a Registered Professional Forester that outlines the forest management activities to be undertaken and provides measurable objectives and targets to be achieved on a site-specific basis. Discussions with all other First Nations, local governments, agencies, ministries and stakeholders potentially impacted by the proposed forest Fuel Reduction activities will be done

to solicit feedback. Lastly, all necessary approval permits and exemptions from the appropriate designating bodies will be applied for.

5.5.2.2 Danger Tree Assessment and Wildlife Tree Retention

Danger tree assessing and wildlife tree designation (for wildlife tree retention) is an important component of any Fuel Reduction program. Dead and dying trees with high wildlife value should be assessed by a qualified/certified Silviculture Danger Tree Assessor as a candidate wildlife tree.

- Suitable trees with high wildlife value will have at least two of the following characteristics:
- Internal decay (heart rot or cavities present)
- A sound, firm outer stem shell
- Crevices present (loose bark or cracks suitable for bats)
- Large brooms present
- Active or recent wildlife use (feeding, nesting, denning)
- Tree structure suitable for wildlife use (e.g., large nest, hunting perch, bear den)
- Large tree relative to other trees in the ecosystem, or veteran trees
- Favourably located for use by wildlife

Any tree that is assessed as "Dangerous" or unsafe that is also designated as a Wildlife Tree will be flagged accordingly and will also include a flagged No Work Zone (Wildlife Tree Reserve) for the safety of crews working in the area. A wildlife tree that is assessed as safe will not require a flagged No Work Zone. All dangerous/unsafe trees that are not retained as wildlife trees will be safely felled by a certified Danger Tree faller (or Certified Utility Arborist if near power lines) using the appropriate safety equipment and falling techniques required to bring the tree down without endangering crew safety or causing damage to nearby structures. The tree may be limbed, bucked and disposed of through chipping and/or burning or alternatively can be left as a contributor to coarse woody debris and/or as firewood to the local community.

5.5.2.3 Thinning and Brushing

Thinning of trees within the treatment areas will be done to reduce inter-tree competition and crown connectivity. Trees targeted for thinning include suppressed trees, intermediate trees and in certain forest types, codominant trees, to achieve the desired stand density and crown reduction. Dense thickets of suppressed and intermediate trees will be thinned, unless retained as a cluster or clump for biodiversity considerations. Retained trees being left on the site will promote species and genetic diversity. All brush and debris will be removed from under the crown of leave trees. All other dead/dying vegetation that contributes to fuel loading will be removed and disposed of, with the exception of some large boles that will remain on site as coarse woody debris for soil nutrients, soil moisture, wildlife habitat and other ecosystem functions

WUI 100

Within the WUI 100m, thinning and brushing activities should be consistent with current FireSmart recommendations by aggressively thinning out trees and removing understory brush to a distance of 100m from structures. The objective is to create conditions that make it difficult for a high-intensity wildfire to spread. In the WUI 100 area, ladder fuels will be eliminated (brush, young conifers and low-hanging branches) and the forest canopy will be opened up if needed (thinning trees to a minimum crown gap spacing of 3m). This work will reduce the ability of wildfire to spread to the crowns of the trees, helping it to remain a low intensity ground fire and be more easily extinguished through direct suppression action by fire crews.

WUI 500

Within the WUI 500m, thinning should continue to be aggressive by focusing on all trees <22.5cm dbh and crown gap spacing to a distance of a minimum of 3m (10ft) to 5m (15ft) or more to achieve the target stand-dependent density, ladder fuel removal and crown closure reduction as specified in the Fuel Reduction Prescription. Thinning of mature trees >22.5cm may also be prescribed depending upon stand structure and site characteristics.

WUI 2000

Within the WUI 2000m, the focus of thinning activities would be to reinforce or strengthen existing fuel breaks or create logical fuel breaks at a landscape level. This could be accomplished through timber harvesting operations, where cut block shape is specifically designed (both spatially and temporally) to tie the fuel break to natural openings and topographic features (water bodies, rock bluffs/cliffs, etc.) in effort to minimize the spread of a wildfire across the larger landscape.

5.5.2.4 Pruning

The objective of pruning actions will be to increase the base-to-crown height of mature and immature trees remaining after thinning by removing all dead and live branches from the ground to the target lift height. Any trees under 1.3 metres in height should not be pruned. Trees 1.3m to 3.0m in height should be pruned to 50% of the tree height. Trees 3.0 to 5.0 metres in height should be pruned to leave a minimum of 30% live crown remaining or 3 whorls. Trees 5.0 metres in height or greater should be pruned to a minimum of 3.5 metres; 5.0 metres or more is ideal for mature overstory trees. If the trees are located on steep slopes, the uphill side of the tree is pruned higher so that the target minimum pruning height is achieved on all sides of the tree. Pruning cuts are to be at the branch collar and done in such a fashion as to not damage (wound) the tree, or promote adventitious branching at the pruning cut.

WUI 100

Within the WUI 100m, pruning activities should be consistent with current FireSmart recommendations by aggressively pruning all retained trees within a distance of 100m from structures to the target height stated in the first paragraph given the size of each tree. This prevents a ground fire from spreading up into the crown of the tree by laddering up the branches.

WUI 500

Within the WUI 500m, pruning should continue to be aggressive by removing branches to the target lift height stated in the first paragraph given the overall height of each tree to maximize the base-to-

crown height distance and reduce the risk of a ground fire spreading up into the crowns of the trees. For those areas with a naturally-occurring shrub, grass and/or surface layer, pruning of mature overstory trees should be to a minimum of 5m (15ft) or more given the expected higher flame height and intensity of a ground fire.

WUI 2000

Within the WUI 2000m, the hand pruning of trees would not be expected as the focus of fuel reduction would be through alternative vegetation management activities to create fuel breaks across the larger landscape.

5.5.2.5 Debris Management

The debris resulting from operational treatment activities will be managed through one or more of the following techniques: hand piling and burning, chipping and/or hauling, and removal as posts, rails or firewood.

In most areas debris removal will be by piling and burning. The debris piles are located in areas safe to do so, well away from out from closed tree canopies and on flat areas where possible to avoid having the burning debris rolling down the hill. Unless otherwise approved and permitted, all burn piles are to be kept to a maximum size of 2m X 3m (Category 2 Open Fires) and must be well away from any structure or property line. If burning of debris piles is being done with no snow on the ground, a hand guard must be established around each burn pile down to mineral soil. Residents in close proximity of burning activities are to be notified of activities prior to ignition, and the venting conditions must be such that the smoke dissipates. Burning activities must be in compliance with the *Environmental Management Act - Open Burning Smoke Control Regulation* (https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/152_2019/).

In areas where piling and burning is not recommended (such as in very close proximity to residential areas, health care facilities and other critical structures), the debris can be hauled away by truck or trailer to another location for disposal. If the site is readily accessible for a chipper, debris can be chipped prior to being hauled away.

In areas that are accessible to members of the community, the option of leaving larger debris for firewood or cut tree lengths for posts and rails is available if this material can clearly be accessed, removed from the area and utilized by the community. The firewood, posts and/or rails are to be in excess of the coarse woody debris requirements stated in the Prescription for the treatment area(s).

5.5.2.6 Prescribed Fire

Traditional Indigenous laws and knowledge recognize the need to burn to minimize the impacts of wildfires and are distinguished from other fire management policies in the context of traditional law, objectives, outcomes and the right to burn. Each member of an Indigenous society has some connection to fire; from the first fire story, which many Indigenous societies recount, it is an inevitable process of life. It has been handed down as a responsibility through generations (Clark, Sara A. et al. 2021).

Indigenous people have used fire for thousands of years to create and maintain hunting grounds, cleansing the land of insect and disease, maintenance of wildlife habitat and to promote herb and berry production. Cultural burning practices are Indigenous-led and utilize low intensity burning that is planned, controlled, and involve comprehensive engagement and guidance from Elders and/or Fire Knowledge Holders often in partnership with interagency collaborators. Since time immemorial,

cultural burning practices have been carried out by Indigenous communities to enhance the health of the land and its peoples from cleaning trails, reducing fuels, maintaining ecosystem stewardship, including advancing cultural objectives for traditional diet/nutrition, medicinal and livelihood (Caverley, Cardinal Christianson, & Eustache).

Prescribed fire is the planned and controlled application of fire to a specific land area and is one of the most ecologically appropriate means for achieving a variety of land management objectives and has a long history in British Columbia. The regular burning of grasslands plays a vital role in maintaining the health of "fire-maintained" ecosystems by encouraging the proliferation of the important native plant species while hindering the spread of invasive species, or introduction and encroachment of shrubs and tree species from other ecosystems (such as Ponderosa Pine, Douglas-fir and other deciduous shrubs and trees).

Low-intensity controlled prescribed burns should be considered as a proposed treatment to reduce the fine fuel content after the coarse fuels have been removed following the treatments as described in the previous sections. Care must be taken to ensure that the fire remains purely as a ground fire and is conducted at the appropriate time of year. Large scale prescribed fire should be conducted by qualified experts in the field of preparing and executing Prescribed Burn Plans.

Nearly all of the immediate (<500m) wildland-urban interface surrounding the Upper Nicola community is grassland (Fuel Type O-1a/b). While the Upper Nicola Indian Band currently takes its own initiative to conduct annual burning of localized grassland areas adjacent to homes and structures to reduce the accumulation (loading) of the very combustible dead, dry grass material, it is recommended that the community pursue funding opportunities to conduct more extensive prescribed burning of grasslands surrounding the entire community within the 2km WUI Areas. The community should contact FNESS and BC Wildfire Service representatives to coordinate and promote the inclusion of grassland maintenance as an eligible treatment activity under the Wildfire Prevention Initiatives for both on-reserve and provincial crown lands. This would not only benefit the Upper Nicola community but many other communities throughout the province with a component of grassland surrounding and within the residential areas. The community can also contact the BC Wildfire Service to discuss the possibility of working with the Lillooet, Merritt and Kamloops Fire Zone suppression staff to conduct spring burning on a larger scale. Historically, the spring burning of grassland areas was an activity the BC Forest Service – Merritt Forest District staff successfully conducted in the Nicola Valley each year.

5.5.2.7 Maintenance Treatments

Once an area is successfully treated through the various operational activities outlined in the previous sections, it is equally important to monitor that area on a regular basis (every 3-4 years) to ensure that forest fuels do not build back up, resulting in an increase in wildfire threat once again. For example, the establishment of new trees (seedlings to juveniles) and increased crown closure of existing trees may warrant a maintenance thinning treatment; the return and/or spread of brush (ladder fuels) may warrant a maintenance brushing treatment; deadfall and windthrown trees may need to be bucked, piled and burned if the amount fuel loading is excessive and the amount exceeds coarse woody debris targets for the area; and the accumulation of surface and ladder fuels from the growth of seedlings, shrubs and brush, branch and needle fall and dead grass may warrant a controlled, low-intensity prescribed burn. A re-assessment of the post-treatment wildfire threat plots in a given treatment area will confirm whether the wildfire threat has increased, and which component of forest fuels is contributing to that increase. The activities listed in sections 5.5.1 to 5.5.9 are all applicable and are to be considered as part of the maintenance program to address any increase in wildfire threat in previously-treated areas.

5.5.2.8 Project Implementation, Monitoring and Quality-Assurance Reporting

Project implementation, monitoring/quality-assurance and reporting of fuel treatment activities by experienced professionals and field technicians ensures that all work will be implemented and undertaken (planning, set-up, prework, completion of operational activities and treatments, monitoring and reporting) using safe-work practices and completed to the standards detailed in the Fuel Reduction Prescription and/or Prescribed Burn Plan prepared by a Registered Professional Forester, and to applicable project Agreements.

5.5.2.9 Project Administration

Administration activities by the Upper Nicola Indian Band project manager and office staff would include overall project management, communications and correspondence, paperwork and filing, financial tracking, reporting and payroll, acquiring consultants and contractors, coordinating activities between project participants, and monitoring and reporting on the overall project progress with the applicable partners and funding agencies.

5.5.2.10 Community Support, Capacity and Resources

The Upper Nicola Indian Band supports the Community Wildfire Protection Plan program and the opportunity to conduct forest and grassland Fuel Reduction work within and surrounding the community to reduce the wildfire threat, become fire-resilient, and protect the safety of its residents. A Band Council Resolution adopting the CWPP and supporting its implementation is included on the second page of this document. While the Upper Nicola Indian Band has not undertaken any forest Fuel Reduction activities to date, the community successfully conducts on-reserve burning of grassland areas immediately adjacent to homes and structures, on an annual basis. The community has access to a trained, skilled, experienced and certified/qualified workforce that can be applied to forest Fuel Reduction activities. The community also will assemble the necessary equipment and resources to properly and safely conduct the operational ground treatment activities proposed in this CWPP.

Table 11: Fuel Reduction Treatment Area Summary

CWPP WUI Area	TU#	Area (ha)	Local Wildfire Threat	WUI Threat	Treatment Type
Nicola Lake	NL1	15.2	Moderate	High-Extreme	dead tree removal brush/pile & burn
Nicola Lake	NL2	12.8	Moderate	Moderate	dead tree removal brush/pile & burn
Nicola Lake	NL3	12.8	Moderate	High-Extreme	dead tree removal brush/pile & burn
Nicola Lake	NL4	3.7	Moderate	Moderate	dead tree removal brush/pile & burn

Nicola Lake	NL5	6.3	Moderate	High-Extreme	dead tree removal brush/pile & burn
Nicola Lake	NL-PBA1	111.4	Moderate	Moderate- Extreme	prescribed burn
Nicola Lake	NL-PBA2	9.8	Moderate	High-Extreme	prescribed burn
Nicola Lake	NL-PBA3	17.8	Moderate	Moderate- Extreme	prescribed burn
Nicola Lake	NL-PBA4	54	Moderate	Moderate- Extreme	prescribed burn
Nicola Lake	NL-PBA5	88.3	Moderate	Moderate- Extreme	prescribed burn
Douglas Lake	DL1	18.8	Moderate	High-Extreme	dead tree removal thin/brush/prune/pile & burn
Douglas Lake	DL2	10.3	Moderate	High-Extreme	dead tree removal thin/brush/prune/pile & burn
Douglas Lake	DL3	5.3	Moderate	Moderate	dead tree removal thin/brush/prune/pile & burn
Douglas Lake	DL4	10.7	Moderate	Moderate	dead tree removal brush/pile & burn
Douglas Lake	DL5	35.8	Moderate	High-Extreme	dead tree removal brush/pile & burn
Douglas Lake	DL6	3.2	Moderate	High-Extreme	dead tree removal brush/pile & burn
Douglas Lake	DL-PBA6	64.0	Moderate	Moderate- Extreme	prescribed burn

Douglas Lake	DL-PBA7	10.4	Moderate	High-Extreme	prescribed burn
Douglas Lake	DL-PBA8	145.9	Moderate	Moderate-Extreme	prescribed burn
Douglas Lake	DL-PBA9	19.1	Moderate	High-Extreme	prescribed burn
Douglas Lake	DL-PBA10	47.1	Moderate	Moderate-Extreme	prescribed burn
Douglas Lake	DL-PBA11	349.7	Moderate	Moderate-Extreme	prescribed burn
Douglas Lake	DL-PBA12	167.9	Moderate	Moderate-Extreme	prescribed burn
Douglas Lake	DL-PBA13	40.4	Moderate	Moderate-Extreme	prescribed burn
Douglas Lake	DL-PBA14	37.2	Moderate	Moderate-Extreme	prescribed burn

Recommendation #22

That Upper Nicola Band source funding to complete fuel reduction treatments (hand & prescribed burning) in and around the Nicola Lake and Douglas Lake residential areas (WUI Areas).

5.5.2.11 Timber Harvesting

The harvesting of mature timber is an optional treatment approach that may be considered as part of the overall fuel reduction objectives for a given area if it is operationally feasible and within a suitable forest type. The community may wish to discuss the option of timber harvesting with a forest management company to determine whether it is a viable approach in a recommended treatment area. Generally these discussions with the forest company would occur prior to the layout and prescription development phase to ensure that the treatment area(s) are not included in an approved or proposed cutting permit, or are being considered for development. If timber harvesting is considered, a qualified and experienced Professional Forester with a forest management company will work with the community to prepare and execute a Site Plan specific to this treatment approach. Due to the severe cumulating impacts of wildfire on BC's forested land base, retention planning for other values such as riparian, cultural and wildlife considerations, as well as a cumulative effects analysis is also strongly recommended to complete if timber harvesting is being considered for fuel reduction purposes. Other considerations should include that residual waste levels from harvesting

operations do not increase fuel loading around the community and consideration given to incorporating reduced stocking levels within the WUI area if silviculture obligations exist.

Upper Nicola is currently participating on a fuel management committee that includes local First Nation communities, WRR, MFLNROD and forest licencees. Fuel reduction projects are being developed on crown land for the Glimpse Lake area.

Recommendation #23	That Upper Nicola Band initiate or participate in land base planning tables that includes topics on retention planning, cumulative effects analysis, acceptable residual waste allowances and reduced stocking standards if timber harvesting is considered as a fuel reduction strategy.
Recommendation #24	That Upper Nicola Band continue to participate in and work in conjunction with the Nicola Fuel Management Technical Working Committee to develop and implement harvesting and landscape level fuel reduction projects.

SECTION 6: Wildfire Response Resources

6.1 Provincial and First Nation Firefighting Resources

The current funding and response structure for Provincial fire suppression aid on Federal reserve lands in BC is through a Memorandum of Understanding (MOU) between Indigenous Services Canada and the BC Wildfire Service. The MOU provides a flat rate annual funding for response efforts and is not calculated from actual response costs.

6.1.1 Provincial Wildfire Response

The Kamloops Fire Centre coordinates the wildfire response across south central B.C.; from Blue River in the north to the U.S. border in the south and from Bridge River in the west to Monashee Mountains in the east. The community of Upper Nicola is located in the K6 Merritt Fire Zone coverage area.

6.1.2 Local Fire Departments and Equipment

The Upper Nicola Band Fire Department, which was first founded in the early 1990's provides fire protection and public safety services to the Upper Nicola Band. The Upper Nicola Fire Department is the responsible organization for first response to an emergency on Upper Nicola lands. Their response duties include fire prevention, fire safety inspections and education, fire control and/or suppression and first aid as required. The primary response priority is the structural protection of band infrastructure and community residential, which includes chimney fires and residential grass fires. The Upper Nicola Band Fire Department's members ranges from approximately 4-11 members in any given year. The Fire Department members are trained to the NFPA standards, promote fire

safety education and fire safe behaviours and are very active in community functions such as potlucks and fundraising.

The Upper Nicola Band current owns the following structural fire fighting equipment that is located on IR#3:

- One active fire truck, the truck has capacity for 2 people in front, 4 people in the back, 1000-gallon tank, monitors, and 500 feet of hose that are non-weeping and forestry hose.
- Structural Protection Units (SPU's)

Upper Nicola Fire Department has access to the following equipment in the community for wildland firefighting capability:

- Access to a flatbed trailer with a 500-gallon tank (no pump or accessories)
- 3 wayjax pumps – only one is functional
- A mix of types and sizes of hoses – some 1 ½ hose and some forestry hose
- 4 backpack pumps
- 4 drip torches
- 4 shovels
- No pulaski's

Recommendation #25

That Upper Nicola source funding to supplement the wildland firefighting equipment available to the community in the event of a wildfire. Identified priority equipment included bladders, pumps, hoses, nozzles and accessories, and tools.

6.2 ESS Facilities

The Upper Nicola Band Office, N'Kwala School and the UNB Health Center have been delegated as EOC/ESS facilities for the community. The community has a trained and functional EOC/ESS, but there may be times with limited capacity in the community to support logistical operations. During these times, assistance could be sourced externally from agencies such as the Okanagan Nation Alliance and other Provincial agencies. In the event of a large-scale community evacuation, Merritt and Kamloops ESS centers are the closest supports.

6.3 Training

The Upper Nicola Fire Department has previously completed training with their members to align current competencies with the National Fire Protection Association standards as well as incorporating the updated BC Fire Service Minimum Training Standards: Structural Firefighters and

Training Playbook standards into current activities. This training has been provided to members through the use of power point presentations and training modules taken directly from the playbook.

Upper Nicola members were also provided the following Wildland Firefighting training module in 2021, which included the following courses:

- S 100 Basic Fire Suppression & Safety Day 1
- S 100 Basic Fire Suppression & Safety Day 2
- S 185 Fire Entrapment Avoidance
- ICS 100 Incident Command System
- S 212 Fire Line Communications, S 213 Use of Bulldozers
- S 230 Introduction to Supervision (Crew Boss)
- S 235 Burn Off and Backfiring
- S 211 The Fire Environment for Fire Fighters & Dispatchers
- S 211 The Fire Environment for Fire Fighters & Dispatchers / S 290 Principles of Fire Behaviour
- Basic Power Saw Safety, Based on BC Forest Safety Council

Recommendation #26

That Upper Nicola develop and implement a comprehensive annual training plan that includes an onboarding plan/training for new Fire Department members, annual competency training for active members and any other training that is required to comply with current NFPA structural firefighting standards.

6.4 Structural Protection Units

A structure protection unit (SPU) is a cache of equipment stored in a trailer that is used by trained structure protection specialists to set up sprinklers on and around a structure. SPUs can be effective in reducing wildfire threats to some types of buildings, such as houses, cabins, barns or other outbuildings. Upper Nicola has recently purchased SPU units for establishment and use within the community during fire season if necessary.

The BC Wildfire Service owns and operates six Type 1 SPUs (each unit is capable of helping to protect about 70-80 structures), one Type 2 SPU (capable of helping to protect about 30-40 structures) and owns and operates one Urban Structure Protection Unit (capable of helping to protect up to 150 structures).

Complementing the SPUs owned by the BC Wildfire Service, an estimated 43 additional SPUs are available during the wildfire season in B.C. These units are operated by contractors or local fire departments under standing agreements with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRO). The closest SPU deployment is from Kamloops.

As demonstrated during the 2021 wildfire season, structural protection units were pivotal pieces of equipment used for the protection of homes during the wildfire events. Upper Nicola has recently acquired structure protection trailer to be established in the community for wildfire emergencies. The community could also rely on BC Wildfire Services structural protection units and specialists to augment the number of functional SPU's required in the community during a wildfire.

Recommendation #27

That Upper Nicola communicate with BCWS to inform them of Upper Nicola's SPU capacity and status.

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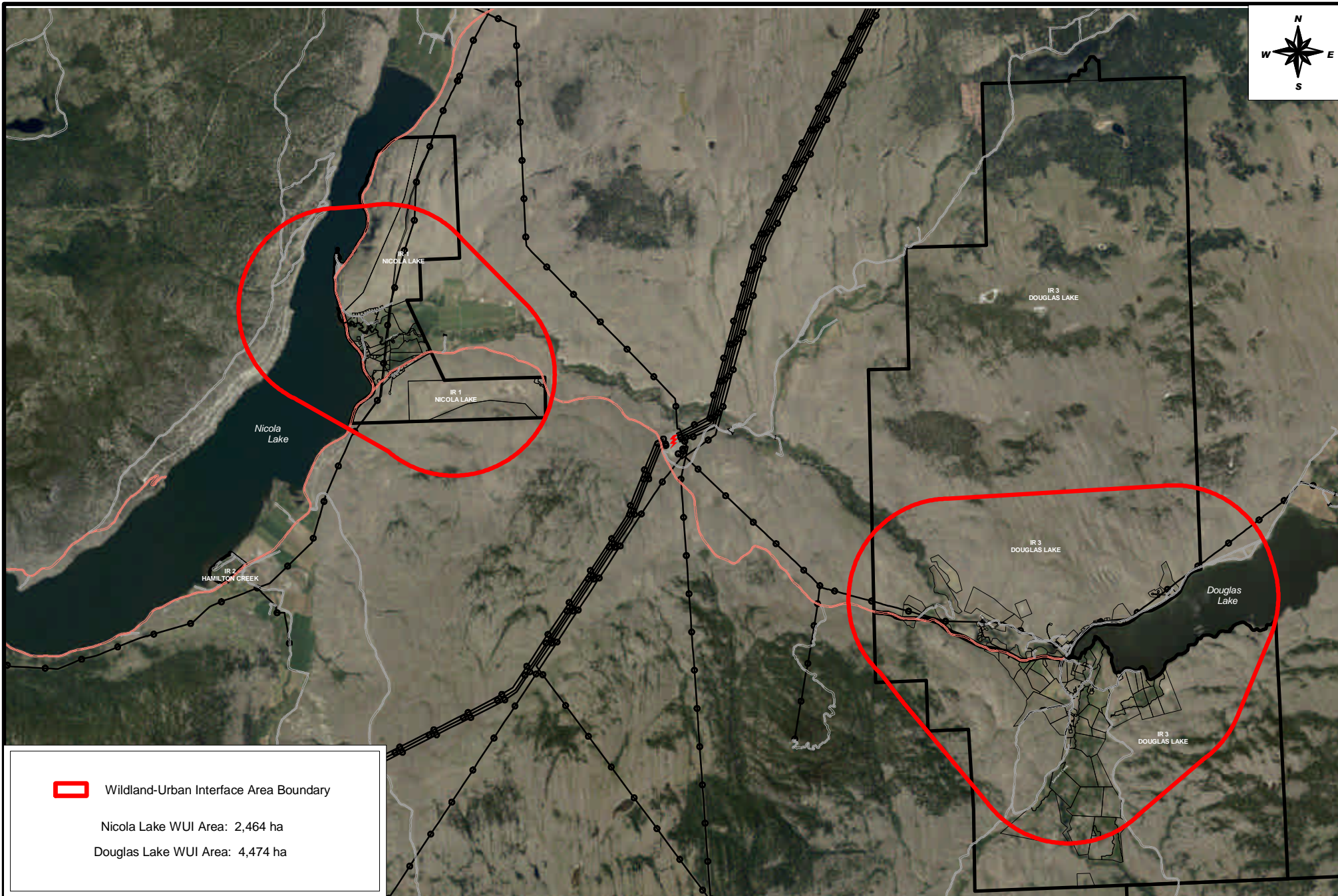
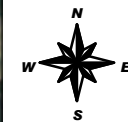
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Appendices







Appendix 1: Wildland-Urban Interface (WUI) Maps



 Wildland-Urban Interface Area Boundary

Nicola Lake WUI Area: 2,464 ha

Douglas Lake WUI Area: 4,474 ha

-  Land Parcel Boundary
-  Indian Reserve Boundary
-  Primary Roads
-  Secondary Roads
-  BC Hydro Transmission Line
-  BC Hydro Power Substation

WILDLAND-URBAN INTERFACE MAP

Overview

Upper Nicola Indian Band

1:100,000








1 0 1 2 3 4 5 Kilometers



Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: March 11, 2022






-  Land Parcel Boundary
-  Indian Reserve Boundary
-  Wildland-Urban Interface Area Boundary
-  Primary Roads
-  Secondary Roads
-  BC Hydro Transmission Line
-  Structure

WILDLAND-URBAN INTERFACE MAP
Nicola Lake (Quilchena) WUI Area
Upper Nicola Indian Band

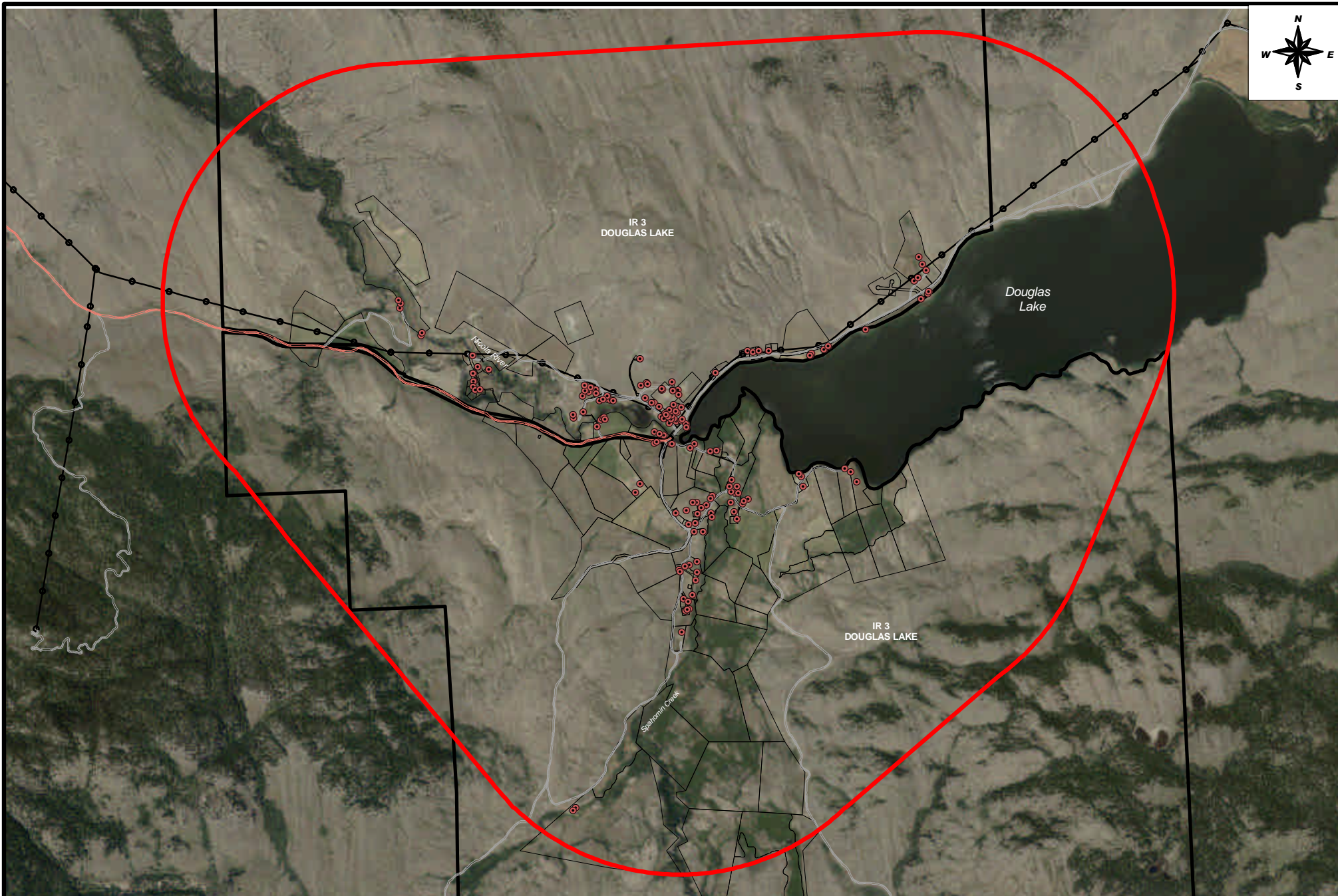
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Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: March 11, 2022





- Land Parcel Boundary
- Indian Reserve Boundary
- Wildland-Urban Interface Area Boundary
- Primary Roads
- Secondary Roads
- BC Hydro Transmission Line
- Structure

WILDLAND-URBAN INTERFACE MAP
Douglas Lake (Spaxomin) WUI Area
Upper Nicola Indian Band

1:42,500

500 0 500 1000 Meters

Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: March 11, 2022



Appendix 2: Wildfire Threat Assessment Plot Summary

Wildfire Threat Component		Threat Plot Numbers									
		1	2	3	4	5	6	7	8	9	10
1	Duff depth and moisture regime	3	3	3	3	3	3	3	3	3	3
2	Surface fuels continuity	5	5	2	0	2	5	0	5	5	5
3	Vegetation fuel composition	5	2	5	5	5	2	5	2	5	5
4	Fine woody debris continuity (<=7cm)	1	5	1	1	1	1	1	1	1	1
5	Large woody debris continuity (>7cm)	1	2	1	1	1	2	1	1	1	1
6	Live and dead coniferous crown closure	2	2	2	2	2	2	2	2	2	2
7	Live deciduous crown closure	0	0	0	0	0	0	0	0	0	0
8	Live and dead coniferous crown base height	0	0	0	0	0	0	0	0	0	0
9	Live and dead suppressed & understory conifers	2	2	2	2	2	2	2	2	2	2
10	Forest Health (% of dom and co-dom)	0	10	0	0	0	5	0	0	0	0
11	Continuous forest/slash cover within 2km	0	0	0	0	0	0	0	0	0	0
	Sub Total Fuel	19	31	16	14	16	22	14	16	19	19
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	15
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	10
	Sub Total Weather	25	25	25	25	25	25	25	25	25	25
14	Aspect	10	10	12	0	0	10	10	10	10	10
15	Slope	1	1	5	5	5	1	1	1	1	1
16	Terrain	1	1	5	5	5	1	1	1	1	1
17	Landscape/topographic limitations to wildfire spread	15	10	15	15	15	15	15	15	15	15
	Sub Total Topography	27	22	37	25	25	27	27	27	27	27
	Wildfire Behavior Threat Score	71	78	78	64	66	74	66	68	71	71
	Wildfire Behaviour Threat Class	M	M	M	M	M	M	M	M	M	M
18	Position of Structure/Community on slope	5	12	5	5	5	5	5	5	5	5
19	Type of Development	8	8	8	8	10	10	10	10	8	8
20	Position of assessment area relative to values	25	25	20	20	20	25	12	12	25	25
	Wildland Urban Interface Threat Score	38	45	33	33	35	40	27	27	38	38
	Wildland Urban Interface Threat Class	H	E	H	H	H	E	H	H	H	H
	Total Wildfire Threat Score	109	123	111	97	101	114	93	95	109	109
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low		0-40				Low		0-13			
Moderate		41-95				Moderate		14-26			
High		96-149				High		27-39			
Extreme		>149				Extreme		>39			

Wildfire Threat Component		Threat Plot Numbers									
		11	12	13	14	15	16	17	18	19	20
1	Duff depth and moisture regime	1	3	3	3	3	3	3	6	3	3
2	Surface fuels continuity	5	5	5	4	5	5	5	5	5	5
3	Vegetation fuel composition	2	1	5	2	2	2	5	5	5	2
4	Fine woody debris continuity (<=7cm)	5	7	1	5	1	5	1	1	1	7
5	Large woody debris continuity (>7cm)	2	1	1	1	1	1	1	1	1	1
6	Live and dead coniferous crown closure	2	2	2	2	2	2	2	2	2	2
7	Live deciduous crown closure	0	0	0	0	0	0	0	3	0	0
8	Live and dead coniferous crown base height	0	0	0	0	0	0	0	0	0	0
9	Live and dead suppressed & understory conifers	2	2	2	2	2	2	2	2	2	2
10	Forest Health (% of dom and co-dom)	0	0	0	0	0	0	0	0	0	0
11	Continuous forest/slash cover within 2km	0	0	0	0	0	0	0	0	0	0
	Sub Total Fuel	19	21	19	19	16	20	19	25	19	22
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	15
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	10
	Sub Total Weather	25	25	25	25	25	25	25	25	25	25
14	Aspect	10	10	10	10	10	10	10	10	10	10
15	Slope	1	1	1	1	1	1	1	1	1	1
16	Terrain	1	1	1	1	1	1	1	1	1	1
17	Landscape/topographic limitations to wildfire spread	10	10	15	10	10	10	15	15	15	10
	Sub Total Topography	22	22	27	22	22	22	27	27	27	22
	Wildfire Behavior Threat Score	66	68	71	66	63	67	71	77	71	69
	Wildfire Behaviour Threat Class	M	M	M	M	M	M	M	M	M	M
18	Position of Structure/Community on slope	5	5	5	5	5	5	5	5	5	5
19	Type of Development	8	10	8	10	10	8	8	10	10	10
20	Position of assessment area relative to values	25	25	25	12	25	25	25	25	12	1
	Wildland Urban Interface Threat Score	38	40	38	27	40	38	38	40	27	16
	Wildland Urban Interface Threat Class	H	E	H	H	E	H	H	E	H	M
	Total Wildfire Threat Score	104	108	109	93	103	105	109	117	98	85
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low 0-40						Low 0-13					
Moderate 41-95						Moderate 14-26					
High 96-149						High 27-39					
Extreme >149						Extreme >39					

Wildfire Threat Component		Threat Plot Numbers									
		21	22	23	24	25	27	28	29	30	
1	Duff depth and moisture regime	3	3	3	3	3	1	3	5	6	
2	Surface fuels continuity	2	2	3	4	4	4	4	5	5	
3	Vegetation fuel composition	5	5	5	5	5	5	5	5	2	
4	Fine woody debris continuity (<=7cm)	5	1	1	5	7	7	7	7	10	
5	Large woody debris continuity (>7cm)	1	1	1	1	1	1	2	1	10	
6	Live and dead coniferous crown closure	2	2	2	2	5	2	2	2	2	
7	Live deciduous crown closure	0	0	0	0	0	0	0	0	4	
8	Live and dead coniferous crown base height	0	0	0	0	15	0	0	0	0	
9	Live and dead suppressed & understory conifers	2	2	2	2	2	2	2	2	2	
10	Forest Health (% of dom and co-dom)	0	0	0	0	0	0	5	0	20	
11	Continuous forest/slash cover within 2km	0	0	0	0	0	0	0	0	3	
	Sub Total Fuel	20	16	17	22	42	22	30	27	64	
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	
	Sub Total Weather	25	25	25	25	25	25	25	25	25	
14	Aspect	10	10	0	12	12	15	15	10	10	
15	Slope	1	1	5	15	12	10	15	1	1	
16	Terrain	5	5	7	7	7	10	10	5	1	
17	Landscape/topographic limitations to wildfire spread	15	15	15	15	10	15	15	10	10	
	Sub Total Topography	31	31	27	49	41	50	55	26	22	
	Wildfire Behavior Threat Score	76	72	69	96	108	97	110	78	111	
	Wildfire Behaviour Threat Class	M	M	M	H	H	H	H	M	H	
18	Position of Structure/Community on slope	5	5	5	5	5	12	5	5	5	
19	Type of Development	8	8	5	5	5	5	10	10	10	
20	Position of assessment area relative to values	20	10	20	10	1	20	10	25	25	
	Wildland Urban Interface Threat Score	33	23	30	20	11	37	25	40	40	
	Wildland Urban Interface Threat Class	H	M	H	M	L	H	M	E	E	
	Total Wildfire Threat Score	109	95	99	116	119	134	135	118	151	
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low 0-40						Low 0-13					
Moderate 41-95						Moderate 14-26					
High 96-149						High 27-39					
Extreme >149						Extreme >39					

Wildfire Threat Component		Threat Plot Numbers									
		31	32	33	34	35	36	37	38	39	40
1	Duff depth and moisture regime	3	3	6	5	6	5	3	3	5	3
2	Surface fuels continuity	5	5	5	5	5	5	5	5	5	5
3	Vegetation fuel composition	5	1	2	1	2	5	1	1	5	2
4	Fine woody debris continuity (<=7cm)	5	5	15	5	10	7	7	5	10	7
5	Large woody debris continuity (>7cm)	2	1	2	1	5	1	1	2	2	5
6	Live and dead coniferous crown closure	2	2	2	2	2	2	2	2	2	5
7	Live deciduous crown closure	5	0	0	0	0	0	0	0	4	0
8	Live and dead coniferous crown base height	0	0	0	0	0	0	0	0	10	7
9	Live and dead suppressed & understory conifers	2	2	2	2	2	2	2	2	2	5
10	Forest Health (% of dom and co-dom)	5	0	0	0	0	0	0	0	5	5
11	Continuous forest/slash cover within 2km	0	0	5	0	0	0	0	0	3	5
	Sub Total Fuel	34	19	39	21	32	27	21	20	53	49
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	15
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	10
	Sub Total Weather	25	25	25	25	25	25	25	25	25	25
14	Aspect	10	10	10	10	10	10	10	10	10	0
15	Slope	1	1	1	1	1	1	1	1	1	12
16	Terrain	1	1	3	1	1	1	1	3	1	7
17	Landscape/topographic limitations to wildfire spread	10	10	10	10	10	10	10	10	10	10
	Sub Total Topography	22	22	24	22	22	22	22	24	22	29
	Wildfire Behavior Threat Score	81	66	88	68	79	74	68	69	100	103
	Wildfire Behaviour Threat Class	M	M	M	M	M	M	M	M	H	H
18	Position of Structure/Community on slope	5	5	5	5	5	5	5	10	5	5
19	Type of Development	10	10	5	5	5	10	10	8	5	8
20	Position of assessment area relative to values	25	25	15	12	12	25	25	12	15	25
	Wildland Urban Interface Threat Score	40	40	25	22	22	40	40	30	25	38
	Wildland Urban Interface Threat Class	E	E	M	M	M	E	E	H	M	H
	Total Wildfire Threat Score	121	106	113	90	101	114	108	99	125	141
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low		0-40				Low		0-13			
Moderate		41-95				Moderate		14-26			
High		96-149				High		27-39			
Extreme		>149				Extreme		>39			

Wildfire Threat Component		Threat Plot Numbers									
		41	42	43	44	45	46	47	48	49	50
1	Duff depth and moisture regime	3	5	5	5	3	10	3	5	5	5
2	Surface fuels continuity	5	5	5	5	5	5	5	4	5	5
3	Vegetation fuel composition	5	5	1	5	2	5	5	5	5	5
4	Fine woody debris continuity (<=7cm)	5	5	5	7	10	10	5	7	7	10
5	Large woody debris continuity (>7cm)	1	1	1	1	5	1	1	1	1	1
6	Live and dead coniferous crown closure	2	2	2	2	2	2	2	2	2	2
7	Live deciduous crown closure	0	0	0	0	4	0	0	0	0	0
8	Live and dead coniferous crown base height	0	0	0	0	0	0	0	0	0	0
9	Live and dead suppressed & understory conifers	2	2	2	2	10	2	2	2	2	2
10	Forest Health (% of dom and co-dom)	0	0	0	0	20	0	0	0	0	0
11	Continuous forest/slash cover within 2km	0	0	0	0	3	0	0	0	0	0
	Sub Total Fuel	23	25	21	27	64	35	23	26	27	30
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	15
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	10
	Sub Total Weather	25	25	25	25	25	25	25	25	25	25
14	Aspect	15	0	10	10	10	10	10	15	10	10
15	Slope	5	10	1	5	1	1	1	5	1	1
16	Terrain	5	5	1	3	1	5	1	5	1	1
17	Landscape/topographic limitations to wildfire spread	15	15	10	10	10	10	10	10	10	10
	Sub Total Topography	40	30	22	28	22	26	22	35	22	22
	Wildfire Behavior Threat Score	88	80	68	80	111	86	70	86	74	77
	Wildfire Behaviour Threat Class	M	M	M	M	H	M	M	M	M	M
18	Position of Structure/Community on slope	5	10	5	5	5	5	5	5	5	5
19	Type of Development	3	3	3	3	5	5	10	10	8	5
20	Position of assessment area relative to values	10	1	12	10	12	30	25	25	25	12
	Wildland Urban Interface Threat Score	18	14	20	18	22	40	40	40	38	22
	Wildland Urban Interface Threat Class	M	M	M	M	M	E	E	E	H	M
	Total Wildfire Threat Score	106	94	88	98	133	126	110	126	112	99
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low 0-40						Low 0-13					
Moderate 41-95						Moderate 14-26					
High 96-149						High 27-39					
Extreme >149						Extreme >39					

Wildfire Threat Component		Threat Plot Numbers									
		51	52	53	54	55	56	57	58	59	60
1	Duff depth and moisture regime	5	3	3	3	3	3	5	3	3	3
2	Surface fuels continuity	5	5	5	4	5	4	5	5	5	5
3	Vegetation fuel composition	1	5	5	2	5	2	5	5	1	1
4	Fine woody debris continuity (<=7cm)	5	1	5	10	5	10	5	5	7	5
5	Large woody debris continuity (>7cm)	1	1	1	2	1	2	1	1	1	1
6	Live and dead coniferous crown closure	2	2	2	2	2	2	2	2	2	2
7	Live deciduous crown closure	0	0	0	4	0	5	0	0	0	0
8	Live and dead coniferous crown base height	0	0	0	0	0	0	0	0	0	0
9	Live and dead suppressed & understory conifers	2	2	2	2	2	2	2	2	2	2
10	Forest Health (% of dom and co-dom)	0	0	0	5	0	10	0	0	0	0
11	Continuous forest/slash cover within 2km	0	0	0	3	0	0	0	0	0	0
	Sub Total Fuel	21	19	23	37	23	40	25	23	21	19
12	Biogeoclimatic Zone	15	15	15	15	15	15	15	15	15	15
13	Historical Wildfire Occurance	10	10	10	10	10	10	10	10	10	10
	Sub Total Weather	25	25	25	25	25	25	25	25	25	25
14	Aspect	10	10	10	15	15	10	15	10	10	10
15	Slope	1	1	1	5	5	1	5	1	1	1
16	Terrain	3	3	3	3	3	3	7	7	1	1
17	Landscape/topographic limitations to wildfire spread	10	10	10	10	10	10	10	10	10	10
	Sub Total Topography	24	24	24	33	33	24	37	28	22	22
	Wildfire Behavior Threat Score	70	68	72	95	81	89	87	76	68	66
	Wildfire Behaviour Threat Class	M	M	M	M	M	M	M	M	M	M
18	Position of Structure/Community on slope	5	5	5	5	5	5	10	5	5	5
19	Type of Development	10	10	10	10	10	10	10	10	8	10
20	Position of assessment area relative to values	25	25	25	25	30	25	25	20	25	25
	Wildland Urban Interface Threat Score	40	40	40	40	45	40	45	35	38	40
	Wildland Urban Interface Threat Class	E	E	E	E	E	E	E	H	H	E
	Total Wildfire Threat Score	110	108	112	135	126	129	132	111	106	106
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low 0-40						Low 0-13					
Moderate 41-95						Moderate 14-26					
High 96-149						High 27-39					
Extreme >149						Extreme >39					

Wildfire Threat Component		Threat Plot Numbers									
		61	62	63	64						
1	Duff depth and moisture regime	3	5	3	3						
2	Surface fuels continuity	5	5	5	5						
3	Vegetation fuel composition	2	5	2	5						
4	Fine woody debris continuity (<=7cm)	10	5	7	5						
5	Large woody debris continuity (>7cm)	10	1	5	2						
6	Live and dead coniferous crown closure	2	2	2	2						
7	Live deciduous crown closure	0	0	0	0						
8	Live and dead coniferous crown base height	0	0	0	0						
9	Live and dead suppressed & understory conifers	2	2	2	2						
10	Forest Health (% of dom and co-dom)	20	0	0	0						
11	Continuous forest/slash cover within 2km	3	0	3	0						
	Sub Total Fuel	57	25	29	24						
12	Biogeoclimatic Zone	15	15	15	15						
13	Historical Wildfire Occurance	10	10	10	10						
	Sub Total Weather	25	25	25	25						
14	Aspect	10	10	10	5						
15	Slope	1	1	1	5						
16	Terrain	3	3	3	3						
17	Landscape/topographic limitations to wildfire spread	10	10	10	10						
	Sub Total Topography	24	24	24	23						
	Wildfire Behavior Threat Score	106	74	78	72						
	Wildfire Behaviour Threat Class	H	M	M	M						
18	Position of Structure/Community on slope	10	10	5	5						
19	Type of Development	8	5	3	10						
20	Position of assessment area relative to values	25	20	10	30						
	Wildland Urban Interface Threat Score	43	35	18	45						
	Wildland Urban Interface Threat Class	E	H	M	E						
	Total Wildfire Threat Score	149	109	96	117						
Wildfire Behaviour Threat Class						Wildland Urban Interface Threat Class					
Low 0-40						Low 0-13					
Moderate 41-95						Moderate 14-26					
High 96-149						High 27-39					
Extreme >149						Extreme >39					

Appendix 3: FireSmart Neighbourhood Maps



- Land Parcel Boundary
- Indian Reserve Boundary
- FireSmart Neighbourhood Boundary
- BC Hydro Transmission Line
- Structure

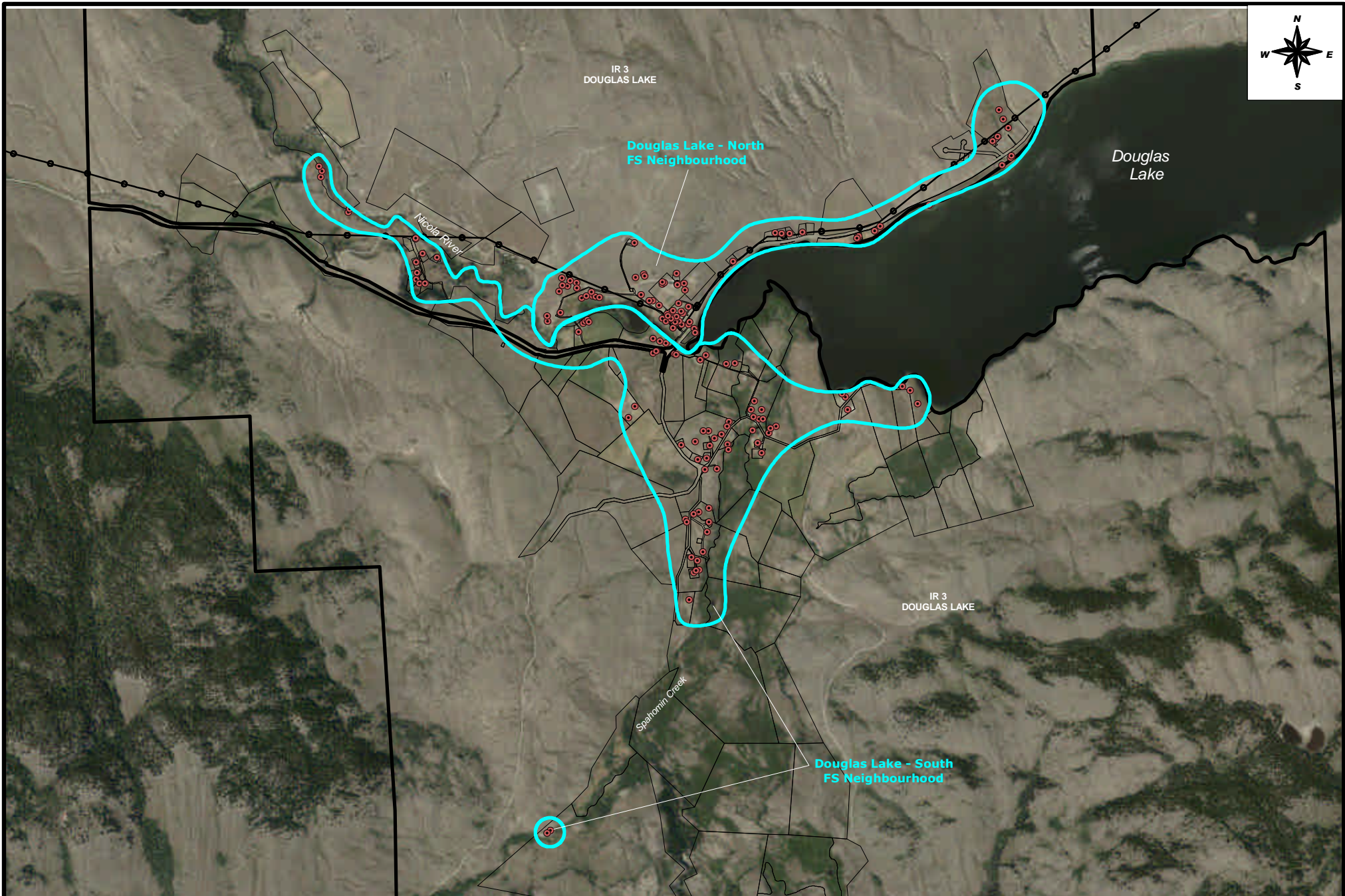
FIRESMART NEIGHBOURHOOD MAP
Nicola Lake (Quilchena) Residential Area
Upper Nicola Indian Band

1:25,000

250 0 250 500 750 1000 Meters

Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: April 5, 2022





FIRESMART NEIGHBOURHOOD MAP
Douglas Lake (Spaxomin) Residential Area
Upper Nicola Indian Band

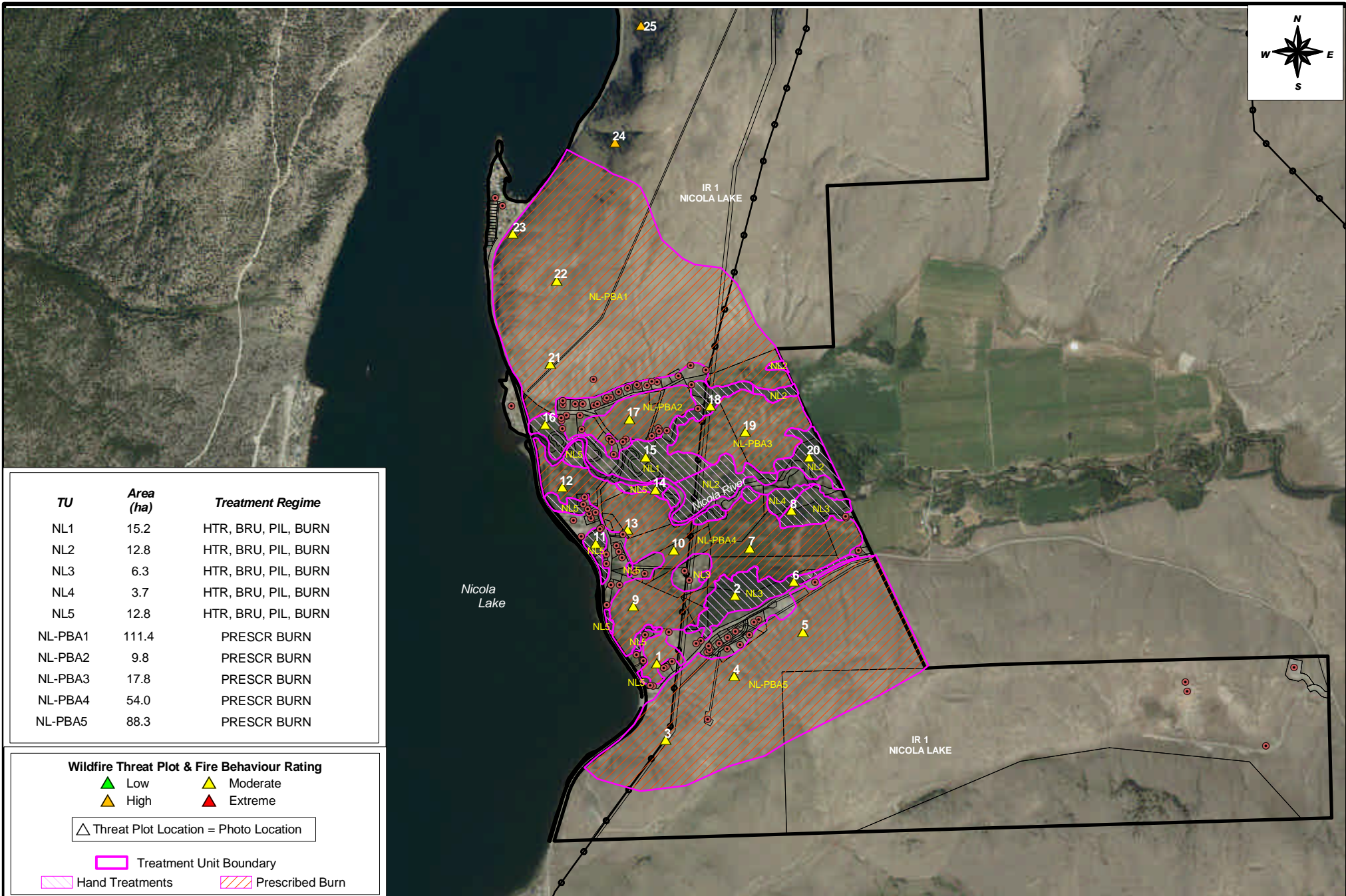
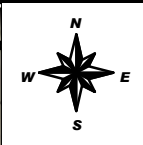
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250 0 250 500 750 1000 Meters

Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: February 28, 2022



Appendix 4: Fuel Reduction Treatment Area Map



TU	Area (ha)	Treatment Regime
NL1	15.2	HTR, BRU, PIL, BURN
NL2	12.8	HTR, BRU, PIL, BURN
NL3	6.3	HTR, BRU, PIL, BURN
NL4	3.7	HTR, BRU, PIL, BURN
NL5	12.8	HTR, BRU, PIL, BURN
NL-PBA1	111.4	PRESCR BURN
NL-PBA2	9.8	PRESCR BURN
NL-PBA3	17.8	PRESCR BURN
NL-PBA4	54.0	PRESCR BURN
NL-PBA5	88.3	PRESCR BURN

Wildfire Threat Plot & Fire Behaviour Rating

▲ Low ▲ Moderate
▲ High ▲ Extreme

△ Threat Plot Location = Photo Location

▭ Treatment Unit Boundary
▨ Hand Treatments ▨ Prescribed Burn


▭ Land Parcel Boundary
▭ Indian Reserve Boundary
●-●-●- BC Hydro Transmission Line
○ Structure

TREATMENT UNIT MAP
Nicola Lake (Quilchena) Residential Area
Upper Nicola Indian Band

1:25,000

250 0 250 500 750 1000 Meters

Mapping Project: UNB_CRI-196
Datum: NAD83
Map Projection: UTM Zone 10
Drawn By: E.Senger
Production Date: March 5, 2022

 **Landscape**
Consulting Corporation

