Faro
Community Wildfire Protection Plan 2024

Wildland Fire Management

Yukon

Adoption of the Faro Community Wildfire Protection Plan

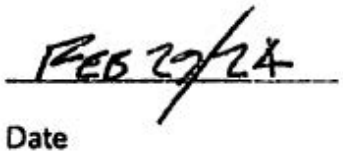
The Faro Community Wildfire Protection Plan (CWPP) was developed between June 2023 – January 2024 and represents a collaborative effort between the Town of Faro and Government of Yukon to take action to address the threat of wildland fire to the Faro community.

This plan is intended to serve as a planning tool for residents and fire and land managers. It will enable them to assess risks associated with wildland fire, identify mitigation strategies, and make and implement recommendations for reducing those risks.

Jack Bowers

Mayor

Town of Faro

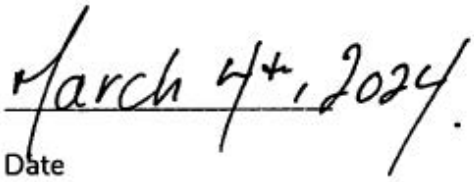


Date

Lisa Walker

Director, Wildland Fire Management Branch

Government of Yukon



Date

Faro, Yukon

February 26, 2024

Acknowledgments

We respectfully acknowledge that the land within this Community Wildfire Protection Plan is in traditional territory of the Ross River Dena Council. The Kaska Dena, or Denek'éh ("people" in Dena), is part of the larger Kaska Nation residing in the southeast Yukon and northern British Columbia. We acknowledge with respect the diverse history and culture of the Kaska Nation.

Larry Baran, Chief Administrative Officer, Town of Faro

Mark Vainio, Operations Manager, Town of Faro

Adam Minder, Faro Fire Chief, Town of Faro

Kieth Austin, Deputy Fire Chief, Town of Faro

Jennifer Brooker, Executive Assistant, Town of Faro

Jennifer Sharp, Fuels Management Forester, Wildland Fire Management

Luc Bibeau, Manager Prevention & Mitigation, Wildland Fire Management

Joanna Wand, Wildfire Risk Specialist, Forsite Consultants Ltd.

Liam Curran, Fuel Management Specialist, Forsite Consultants Ltd.

Brad Armitage, Principal Wildfire Specialist, Ember Research Services Ltd.

Suzanne Lavoie, Fire Weather Specialist, Ember Research Services Ltd.

Executive Summary

The Faro Community Wildfire Protection Plan (CWPP) was developed through a collaborative effort between the Town of Faro and the Government of Yukon Wildland Fire Management Branch. Ember Research Services Ltd and Forsite were contracted and provided significant contributions towards the technical assessments and recommendations herein, as well as the writing of the plan. The CWPP addresses the wildland-urban interface (WUI) surrounding the community of Faro. The area of interest is within the traditional territory of the Ross River Dena Council.

Using the best available spatial data and fire science research, this CWPP identifies the wildfire risks surrounding the community and the potential consequences of a wildfire to the community and recommends possible ways to reduce the risk. Although wildfire threats cannot be eliminated within the area of interest, the CWPP can significantly build on existing efforts to reduce the risk and potential impacts.

Recommendations are summarized in Table 10. The recommendations are based on a review of best practices from other jurisdictions, gaps identified through community engagement, the local wildfire risk analysis, prevention of human-caused ignitions, and integration of FireSmart program principles.

The following table summarizes *Actions* assigned *High Priority* ratings from Table 10 in this CWPP:

High Priority Risk Mitigation Actions Summary	
Action #	**Description**
1	Community Endorsement: During the draft stages the CWPP is presented to and available to the public to understand, comment and ask questions. Approval of the management tools presented in the plan is crucial to its success.
2	Ongoing awareness: Conduct an annual community meeting (or incorporate into an existing meeting) in support of the CWPP and community preparedness.
3	Promoting FireSmart Principles.
4	Private Property Hazard Reduction Strategies.
9	Organize community clean-up days for properties. Prioritize properties based upon FireSmart Home Assessments done and proximity to forest fuels.
12	Organize Wildfire Preparedness Days in identified high risk areas, collaborate with Yukon Wildfire and local fire department.
13	Design a fuel management plan to reduce fuel loads in high coniferous areas, particularly conifers in the old burn scars.
14	Support community members to clean up vegetation in their Home Ignition Zone.
20	Pursue and coordinate cross training opportunities.

Faro Community Wildfire Protection Plan

Contents

1. Purpose

Wildfire is an essential natural process in the Yukon's boreal forests. It is a key driver of ecological resilience and both plant and animal species rely on its occurrence. Wildfire also poses a threat to human life, homes, infrastructure and, when at unusually high severity or frequency, the natural environment as well. As human development expands further into natural ecosystems, more communities and industries are at risk of wildfire impacts.

The purpose of this Community Wildfire Protection Plan (CWPP) is to provide a sustainable wildfire risk management strategy with tools to increase wildfire resiliency and support the Town of Faro and interested stakeholders.

This CWPP outlines the active governance, community, social and cultural aspects of the community as well as the environment in which it inhabits.

The CWPP then identifies the wildfire risk potential within and surrounding Faro and describes the values at risk of wildfire impacts within the Area of Interest (AOI).

The plan then proposes actions to reduce wildfire risk factors identified in the risk assessment process. The goal of these actions is to manage fuels surrounding the community, allow safe and operational spaces for wildfire crews to respond to fire, and prepare community members, stakeholders, and local infrastructure to become fire resilient.

The recommendations and actions developed in this CWPP are themed around the seven FireSmart disciplines and aim to be integrated with present and future land and community management plans to be implemented with the involvement of community members and relevant stakeholders.

Town of Faro. Source: TheNarwhal.ca

2. Planning Area

2.1 Planning Area Description

Faro is situated within the traditional territory of the Ross River Dena Council, an area renowned for its prime moose hunting grounds. The Kaska Dena, or Denek'éh ("people" in Dena), is part of the larger Kaska Nation residing in the southeast Yukon and northern British Columbia. The Dena Cho Trail, a 67-kilometre multi-use trail, follows the traditional Kaska route connecting Faro and Ross River. Visit their webpage for more information about the Ross River Dena Council Peoples.

The AOI (Figure 1) is centred around the town of Faro and nearby values, which is located four hours from Whitehorse. It also includes a future planning area to the east of Faro, off Mitchell Road and south of the Pelly River. Faro is surrounded by picturesque lakes, mountain ranges, winding rivers, and lush green valleys that provide a habitat for a diverse range of wildlife. Located along the Tintina Trench, a linear valley stretching from British Columbia across the Yukon to Alaska, Faro boasts a rich mining history. In 1958 a claim was staked that would eventually become the Faro mine. The town was named "Faro" after the gambling card game of the same name. In 1969, the Cyprus Anvil Mine officially opened. Unfortunately, on Friday, June 13th, 1969, a forest fire swept through the town, destroying the newly constructed buildings. The results of the fire persist today, as seen in the surrounding deciduous forest. The town was rebuilt, and by the mid-1970s, the lead/zinc mine became the largest in Canada.

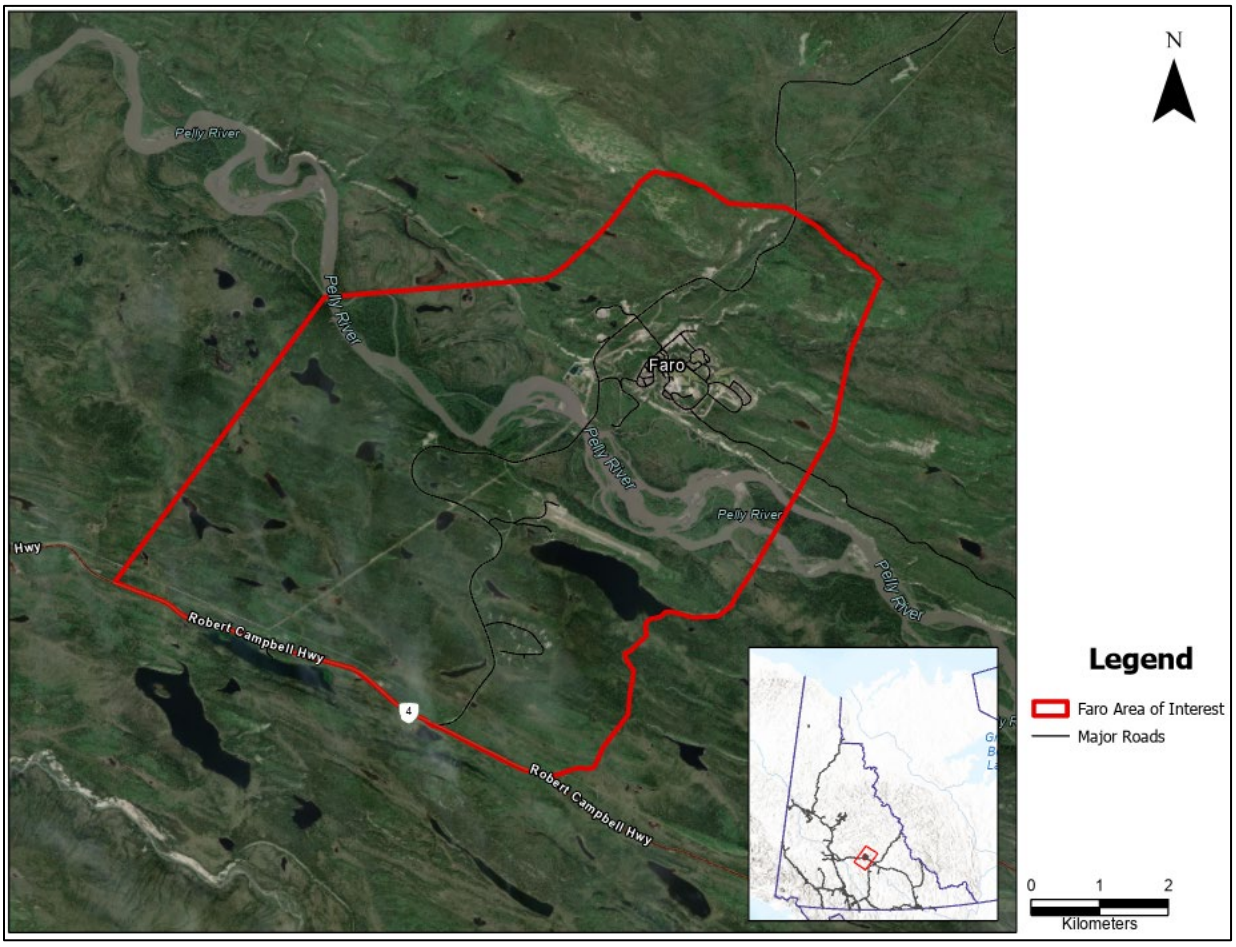


Figure 1. Faro Community Wildfire Protection Plan Area of Interest (AOI)

Since the 1960s, the population of Faro has experienced significant fluctuations due to the local economy's dependence on world ore prices. At its peak in 1981, Faro had a population of 2,800 residents. However, following the mine closure in 1997, the population declined, reaching a low of 250 residents in 2000. At the time of the mine closure in 1997 over 50% of the community's workforce was employed in mining. Today, the mine is the focus of a reclamation project, and the population of Faro stands at around 400 inhabitants[1].

Due to the presence and historical legacy of the mine, Faro benefits from a wide range of services and infrastructure. The town's power is supplied by the Yukon Energy Corporation, which provides hydroelectric power from the Whitehorse hydro facility. Additionally, Faro has backup diesel units to ensure a reliable power supply. The town also features a 1,231-meter gravel runway with lights, located adjacent to Johnson Lake and staffed seven days a week.

Faro offers various amenities, such as a recreation center, indoor ice rink, playgrounds, seasonal pool, K-12 school, Yukon College campus, health center, and a golf course that runs through the town. Faro enjoys the advantage of a relatively reliable 4G network, albeit limited to a single tower above the town. Residents can access CBC radio, and the community uses an active Facebook page (not Town operated) to communicate information.[2]

Furthermore, The Town of Faro maintains a town website as the primary source for current information, special events, and emergency updates. In a proactive move, Faro recently subscribed to the Voyent Alert service, which can send alert messages to all cell phones equipped with the app. This service would be utilized during emergency evacuation situations.

The community faces several challenges, including population size, surplus housing, and local economic development. Efforts are being made to attract new businesses, develop the town center, and expand tourism opportunities.

For more information regarding the town of Faro please visit their website.

2.2 Socio-economic Description

2.2.1 Governance

The Town of Faro is a part of the Yukon territorial government and operates under the governance system outlined in the Municipal Act of the Yukon. Incorporated as a town on June 13, 1969, Faro is led by an elected mayor and a council comprising four councillors.

Faro is situated within the traditional territory of the Ross River Dena Council. The Ross River Dena people reside in the community of Ross River, located approximately 75 kilometres east of Faro. As of 2021, 25% of Faro's population identified as Indigenous.[3]

[1] Town of Faro. 2023. History of Faro. Available: https://faro.ca/p/history-of-faro

[2] Town of Faro. 2013. Official Community Plan. Available: https://faro.ca/p/files-and-documents

[3] Yukon Bureau of Statistics. 2023. Faro. Available: https://community-statistics.service.yukon.ca/pages/faro

Faro Municipal Office (Source: Yukon News).

2.3 Ecological Description

The Ecological and Landscape Classification (ELC) system is utilized throughout the Yukon to identify and describe landscape patterns, categorizing them into ecosystem units based on climate, landscape, vegetation, and soil conditions.

Faro falls within the Yukon Plateau-North, Boreal Cordillera Ecozone, which happens to be the largest ecoregion in the Yukon. This ecozone includes the Tintina Trench, an ancient fault adjacent to Faro. The Tintina Trench is characterized by a high incidence of thunderstorms and lightning, resulting in mixed canopy forests throughout the valley due to frequent forest fires. The ecoregion primarily consists of rolling highlands with an east-west orientation. Temperature variations between seasons can be dramatic. Extreme temperatures in the lower valley floors have ranged from -62 to 36 degrees Celsius.

After forest fires, lodgepole pine (*Pinus contorta*) and white spruce (*Picea glauca*) frequently regenerate in burned areas. Trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) are also commonly found on disturbed sites.

Situated above the Pelly River, Faro is located at an elevation of 716m above sea level. Low rainfall periods typically occur from December through May, while wetter periods in the region are experienced in July and

August. Permafrost in the area can reach up to 24m but reports commonly indicate depths of around 10m near Faro.[4]

For a detailed description of the physiography, geology, glacial history, climate, hydrology, soils, vegetation, and wildlife within the Yukon Plateau North Ecoregion refer to the *Ecoregions of the Yukon Territory* Technical Bulletin, pages 197 – 206.

2.4 Natural Disturbance and Forest Succession

Wildfire has historically been the dominant agent of disturbance of the boreal ecosystems found in and around the AOI.[5] These wildfire events are relatively infrequent but, when they do occur, they tend to burn at a high fire intensity and result in stand-replacing effects.

While other disturbance agents like pests, pathogens, and windthrow have generally had minimal impact on forest succession in the Yukon, some insect outbreaks have caused stress and subsequent mortality in large forest areas. This can have implications for the wildfire resilience of an area, as dead-standing and fallen trees can significantly increase fire behaviour for a certain period.

The Yukon's Forest Management Branch conducts annual aerial surveys to monitor forest health in the territory, following a zonation approach where areas are surveyed once every 3-7 years.[6] The Faro area (Forest Health Zone 4) was last surveyed in 2017. Two major health concerns were reported: the western balsam bark beetle (*Dryocoetes confuses*) affecting high elevation stands, and severe defoliation of aspen due to aspen serpentine leafminer (*Phyllocnistis populiella*) from Francis Lake (located south of Mayo) to Ross River.

Balsam Health

The western balsam bark beetle is a wood-feeding insect primarily targeting subalpine fir trees. Under normal circumstances, the beetles prefer trees weakened by age or climatic stress, such as drought, wind damage, or snow damage. However, during outbreaks, even healthy trees become susceptible to attack. It is important to consider the impacts of climate change and how they may influence pest infestations moving forward. Endemic beetle populations typically result in the mortality of individual trees, while outbreak populations can cause extensive mortality at the group tree or stand-level over several years of attack. Surveys indicate that the most affected areas have been high-elevation stands with a significant presence of subalpine fir trees.

Aspen Health

The ‘aspen decline’ complex is a phenomenon found across Canada and the United States and was first detected in the Yukon in 1987. It is unclear precisely what is causing the widespread mortality of aspen

---

[4] Smith, C.A.S., Meikle, J.C., and Roots, C.F. (editors), 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, 313 p. Available: https://yukon.ca/sites/yukon.ca/files/env/env-ecoregions-yukon-territory.pdf

[5] Flooding is also a significant disturbance for low lying forests. It is most common in spring and can also occur dur to ice jams that form during spring break up or winter freeze up.

[6] Government of Yukon. 2020. *Yukon Forest Health Report*. Whitehorse. Accessible: https://yukon.ca/sites/yukon.ca/files/emr-2020-yukon-forest-health-report.pdf

stands. However, it is suspected to be induced by drought and exacerbated by several factors, including insect and fungi attack, snow and ice damage, site and stand structure, land-use history, topography, and inter- and intra-specific competition. In recent years, the Forest Management Branch has detected a steady increase in areas affected by aspen decline. A warming climate is expected only to exacerbate this problem, and widespread aspen decline could increase fuel available for wildfire on the landscape.

Trembling aspen has been known to reduce wildfire intensities in pure or nearly pure stands and it has been regarded as a 'natural fuel break' on the landscape. This is partly due to the increased levels of foliar moisture in the leaves compared to coniferous trees. If leaves have been severely defoliated or large patches are experiencing aspen decline, the result could alter the relationship between aspen and wildfire on the landscape. Aspen forests can also act as windbreaks, reducing the influence of surface winds on fire spread and the ability for fires to spread embers.

North Klondike Highway, 2022. Source: Government of Yukon

3. Wildfire Summary

3.1 Drivers of a wildfire

There are three interacting elements that drive a wildfire, commonly referred to as the 'fire triangle' (Figure 2): fuel, weather and topography. The interaction between these three factors determines how a wildfire behaves – how fast it spreads and how intensely it burns.

Fuel refers to any flammable material including vegetation (leaves, bark, trees, duff) that are burned by the fire. It can also include man-made fuels, such as buildings. The fuel type, dryness, size and arrangement can all influence the speed, size and severity of a wildfire. Fuel is the only component of a wildfire that we can control, and also the most significant (no fuel, no fire). Fuel treatment plans aim to change the arrangement, size and even type of fuel in an area around an asset or a community to change how a fire behaves. Reducing fire behaviour to allow wildfire response crews to control or extinguish a fire is a critical objective of fuel treatment plans.

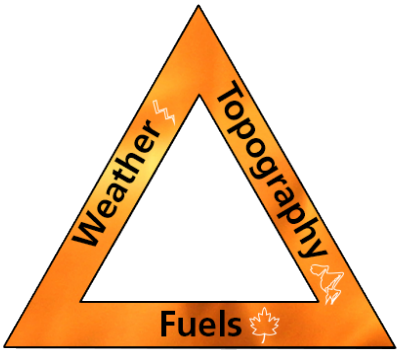


Figure 2. The fire triangle – interacting components that drive a wildfire.

Weather also influences how fast a fire moves and how intensely it burns. It also influences whether an ignition, like a lightning strike, will extinguish or develop into a large fire. Winds at ground level and at higher elevations will drive a fire forwards, enable the spread of embers and supply the fire with oxygen to increase fuel combustion. Further, atmospheric dryness, lack of rain and high air temperature will contribute to the degree and rate of fuels drying, making them more available to burn. At extreme weather conditions, weather becomes a more significant factor in fire growth than the type of fuel.

Topography describes land shape, elevation above sea level, steepness and the direction of a slope (e.g. south facing). Topography also includes land features such as canyons and valleys. All of these features can increase or slow wildfire spread. Elevation influences weather conditions (like air temperature). Slope aspect influences vegetation growth and dryness (south facing slopes have more heat from the sun and are drier). Slope also influences how fast a fire moves: faster uphill due to pre-heating of vegetation from rising hot air and flame, and slower downhill. Features such as valleys influence wildfire spread by directing wind flow.

3.2 Components of a wildfire

Wildfire can negatively impact a value, such as a home, through direct flame contact, radiant heat exposure, convective energy output (i.e. 'fire smoke column'), embers and smoke exposure (Figure 3).

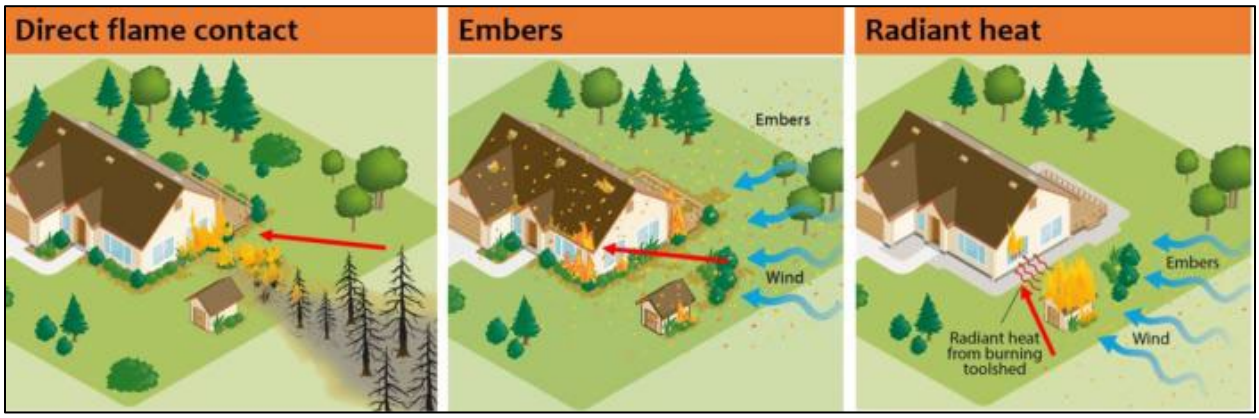


Figure 3. Example of how a wildfire can impact a home[7]

Figure 3 above illustrates how direct flame contact, embers and radiant heat from nearby fuel can impact a home. Convective energy refers to the heat energy produced by a wildfire that rises into the atmosphere (Figure 4). Visible as a fire smoke plume (or 'convection column') this energy can create strong winds that increase fire growth and damage structures. It can also generate lightning storms, sparking more fires.

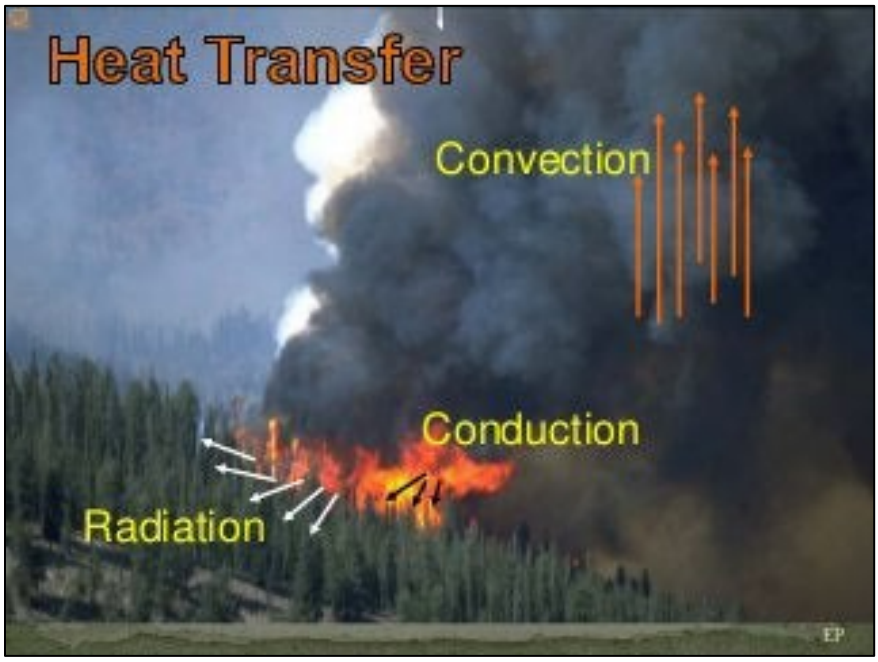


Figure 4. Example of three different types of heat and energy transfer.

[7] University of California. 2022. *Preparing Your Home*. Wildfire Preparation. Available: https://ucanr.edu/sites/fire/Prepare/Building/

3.3 What is Wildfire Risk?

Detailed wildland fire risk methods can be found in the following report, *Yukon Communities: Wildland Fire Risk Assessment Methodology Project* (WFRAM Report).[8] The WFRAM Report uses the internationally recognised risk management standard ISO 31000 "Risk Management – Principles and Guidelines" and applies it for wildland fire risk management using an adaptation of research by Al Beaver.[9,10] The following is a summary of key principles in the WFRAM Report.

Wildfire risk can be described as a function of the following risk components:

Wildfire Risk = Likelihood x Severity x Exposure x Values x Vulnerability

The following is a brief description of each of the risk components presented in the WFRAM Report:

Likelihood	The chance of a wildfire occurring, often examined by analysing past ignition trends, the frequency of destructive climatic and weather events and trends forecast under a changing climate.
Severity	Severity usually refers to how much fuel is consumed by the fire and how much heat energy is produced. A high severity fire consumes almost all vegetation, often moves quickly and produces enough energy to be difficult to suppress or control. Severity is driven by the fire triangle components: fuel, weather and terrain.
Exposure	The seasonal and diurnal time and duration a value that is vulnerable to the assessed likelihood x severity may be exposed. It is primarily determined by the proximity of the value to the likelihood, the topography, direction and rate of spread, embers, smoke dispersion and what the duration of fireline intensity will be upon arrival.
Value	A 'value' is any social, environmental or economic asset that is considered valuable by a community, land manager or industry.
Vulnerability	How predisposed to damage from a wildfire is a value if it is exposed to the assessed likelihood and severity discussed above.

It should be noted that this risk equation follows the zero properties law of multiplication that states any number multiplied by zero equals zero. In this case, if any one of the risk components can be eliminated (zero) then the wildfire risk is also eliminated (zero). For example, there is no wildfire risk if there is no vulnerability, such as the case where a structure is built with non flammable materials like concrete. Completely eliminating wildfire risk is usually extremely difficult to achieve and it is the task of land managers and communities to identify which controls or mitigations they can employ to reduce the components that make up wildfire risk to their area of interest and to their unique values. Table 1 below provides examples for each component of wildfire risk and some of their potential controls.

[8] Ember Research Services Ltd. 2017. *Yukon Communities: Wildland Fire Risk Assessment Methodology Project.* Report for Yukon Wildland Fire Management

[9] Note ISO 31000:2018 is a more recent version of the risk management standard discussed in the report.

[10] Beaver A. 2015. *Wildland Fire Risk Management and Decision Making*. Conference proceedings: 13th International Wildland Fire Safety Summit and 4th Human Dimensions of Wildland Fire Conference. April 20-24, Boise, Idaho.

Table 1. Wildfire Risk Matrix with examples for risk drivers (risk analysis) and mitigation examples (potential controls)[3]

	Likelihood	x Severity	x Exposure	x Value(s)	x Vulnerability
Risk Analysis	• Ignition History • *Lightning • *Human • Seasonality • Fuel Hazard • Fire Cycle • Fire Interval • Historic Weather • Climate Change	• Rate of Spread • Crown Fraction Burned • Fuel Consumption • Fire Intensity • Radiant Heat Flux • Embers • Smoke	• Proximity to value • *Direction • *Distance • *Topography • Length/Breadth Ratio • Property Density • Smoke transport • Severity Duration	• Public • Response Resources • Property (WUI) • Infrastructure • Industry • Cultural • Environment • Watersheds	• Human Physiology • Property Construction • Property Maintenance • Subdivision Design • Socio – Economics • Biodiversity • Fire Effects • Resilience
Potential Controls	• Education • Engineering • *Spark Arresters • *Power Grid Mgnt • Enforcement • *Fire Bans • *Area Closures	• Fuel Management • *Hazard Reduction • *Ecological Burning • *Mechanical	• Community Layout & Design • Defensible Space • Strategic Fuel Breaks • Area Closures • Fire Response • Warnings • Evacuations	• Education • Harvesting • Salvage	• Building Controls • Land Use • Resilience • Ecological prescribed fire

Source: adapted from Beaver 2015 conference proceedings[9]

3.4 Wildfire Regime

A wildfire regime is the pattern of fire frequency, size, intensity, type and severity in an area. Boreal forests are a fire dependent ecosystem, adapted to wildfire as the main forest disturbance and driver of ecological processes.

Boreal forests are closed canopy forests, with a moist and shaded forest floor, limiting most fires to small areas with high moisture levels and lowered wind speeds within forest stands. These conditions often result in surface and ground fires; however, the boreal forest is known for its high intensity crown fire potential (Figure 5).

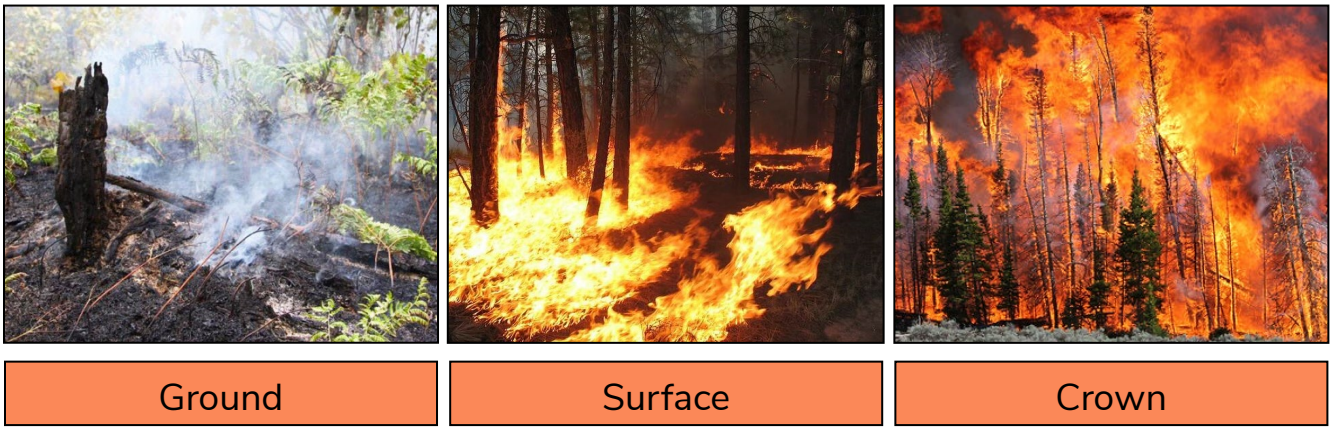


Figure 5. Types of wildfire

Ground fires burn beneath the surface (deeper duff layers, tree roots). These fires can 'overwinter', which means they can continue to smoulder underground during winter and, when the right conditions arrive, can appear above ground by burning up through drying fuels. These fires can be difficult to suppress completely and need monitoring.

Surface fires spread along the forest floor, burning fuels on the ground (leaf litter and duff layer) and woody debris. The rate of fire spread depends on many factors; however, intensity is usually at a manageable level for successful wildfire suppression.

Crown fires are those which travel through the tree canopies and most often completely burn fuel at all levels in the forest from the ground up. Crown fires are typically high intensity, large wildfires that occur during warm and dry weather patterns that remain long enough to dry out vegetation and cause extreme fire conditions.

Crown fires typically move at an extreme rate of spread and cause long-distance spotting of embers. Long-distance spotting occurs when significant embers are produced from burning material, which are lifted into the atmosphere due to strong winds and convective energy and then projected in front of the main fire. These embers can start new fires (well in front of the main fire) and rapidly increase the fire's rate of spread. These fires are the most intense type of fire and are often difficult or impossible to suppress without changes to fuel and/or weather conditions.

The fire regime also fluctuates with seasons. Spring wildfire risk can be high in between the time of snow melt, and when green-up occurs and grasses start growing. Green-up is when deciduous trees produce leaves with high moisture content making them harder to burn. When grasses begin growing they also increase their moisture content, turning green. Strong winds can dry vegetation and support wildfires in spring weather windows. Once deciduous trees reach the green-up stage, then the wildfire risk can lower for a period until warm summer conditions persist long enough to dry fuels.

While some of the Yukon's First Nations people used fire as a land management tool, the history of cultural burning practices in the Faro area is unknown.

4. Wildfire Risk Assessment

4.1 Environmental Factors

4.1.1 Weather

The Faro weather station is located at the Faro airport. The last 12 years of records have been analysed to provide a history of fire weather patterns (Table 2). Weather data was analysed every year from 1st May until the station was turned off in winter.

Table 2. Faro weather station details

Station	Agency	Latitude	Longitude	Elevation	Years with Records	Number of Years	Number of records
Faro	MSC	62.2	-133.367	716	2012 to 2023[11]	12	2071

Weather data can be summarised into percentiles.[12] This is a useful way to compare weather records against the maximum and other percentiles to gauge how high or extreme values are (Table 3).

Table 3. Summary of high percentile weather data for Faro weather station ('daily values' at noon LST)[13]

				Percentiles				
Variable	Mean	Max	Median	70th	80th	90th	95th	99th
Temperature (°C)	12.4	28.4	13.7	17.0	18.9	21.3	23.2	25.6
Relative Humidity (%)	53.6	12.0	51.0	41.0	35.0	30.0	25.0	19.0
Wind Speed (km/h)	7.4	35.0	6.0	10.0	13.0	17.0	20.0	26.0
Precipitation (mm in one day)	1.2	34.6	0.0	0.6	1.8	4.0	6.2	13.0
Fire Weather Index (FWI)	7.3	47.8	4.2	9.6	13.6	19.4	23.8	33.6

The Faro weather station also calculates Fire Weather Index (FWI) System values. The following chart (Figure 6), displays FWI values for the weather records available. The FWI is a rating of potential fire

[11] Data from 2012 onwards used for this report to mitigate quality uncertainties in older recorded data.

[12] A percentile is a measure used to indicate the value below which a given percentage of observations fall (e.g. 70th percentile is the value below which 70% of the data can be found). A 99th percentile temperature value is one where 99% of other temperature values recorded are lower than the 99th percentile value.

[13] 'Daily' weather records are used for fire weather index calculations – statistical data using all hours may vary.

intensity. It uses weather observations to calculate the dryness of the fuel and expected fire behaviour should an ignition start on that day. It does not consider fuel type or terrain.

Figure 6 illustrates that high FWI conditions occur most frequently in the spring and early summer. High FWI values gradually ease off during summer, the timing of which varies by the individual season.

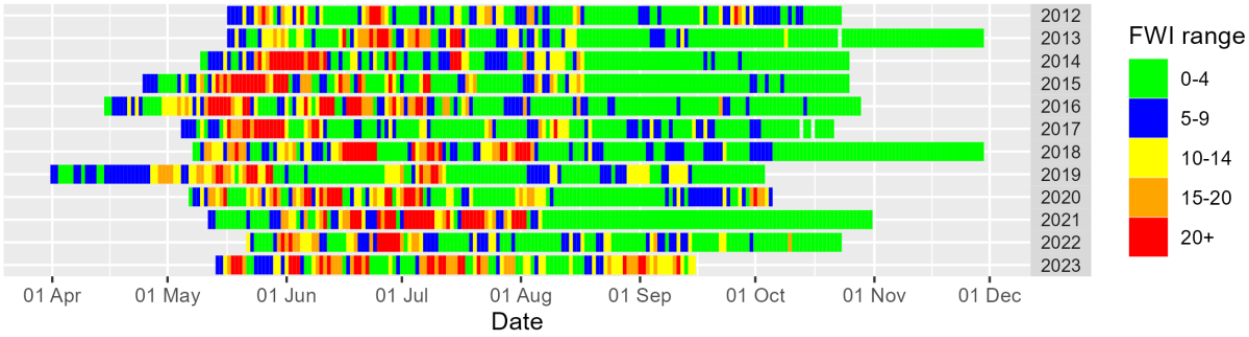


Figure 6. Recorded Fire Weather Index (FWI) values at Faro weather station since 2012.

An important component of weather data is wind speed and direction. Wind is a key driver of fire behaviour and the path in which it spreads. The terrain surrounding Faro influences wind direction, with the Pelly River valley that runs north-west to south-east through town, as well as the Margundy River valley (alongside which is the Robert Campell Highway) directly to the west of town. Mountainous terrain surrounding Faro will also have local impacts such as higher wind speeds as air flows over ridges and eddy effects on leeward slopes.

Wind records can be analysed to show the number of times a wind direction was recorded at the weather station to gain an understanding of which wind directions are most frequent. Wind records were formatted into a wind rose (Figure 7). These diagrams are informative to determine the most frequent wind direction and strength by season. The colour of the wind rose displays the frequency of wind speeds recorded in each direction. Figure 7 shows that Faro weather station predominantly recorded stronger winds mainly from the east and west in spring, and from the west and north-west in summer.

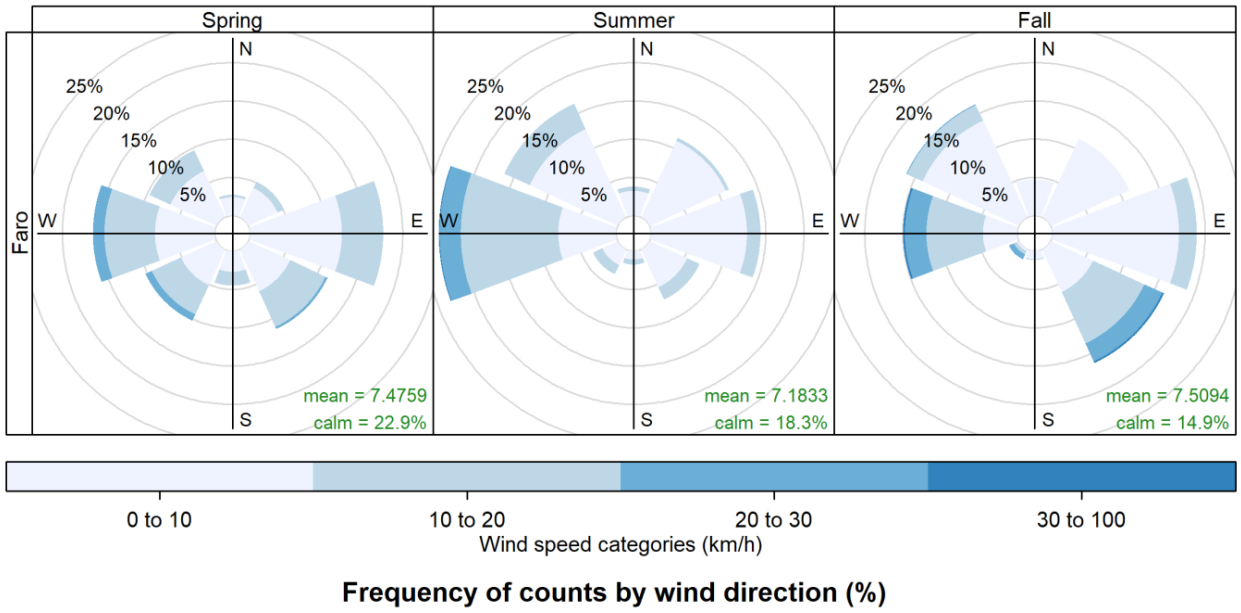


Figure 7. Wind rose showing historic wind speed frequency count by wind direction for each season (spring, summer and fall) as recorded at Faro weather station.

Applying FWI data to wind rose charts enables an overview of whether high FWI values were recorded under a predominant wind direction. Figure 8 illustrates that for Faro, high FWI days can occur under under any wind direction; however, there are dominant wind directions that occur during high FWI days, which differs across the seasons.

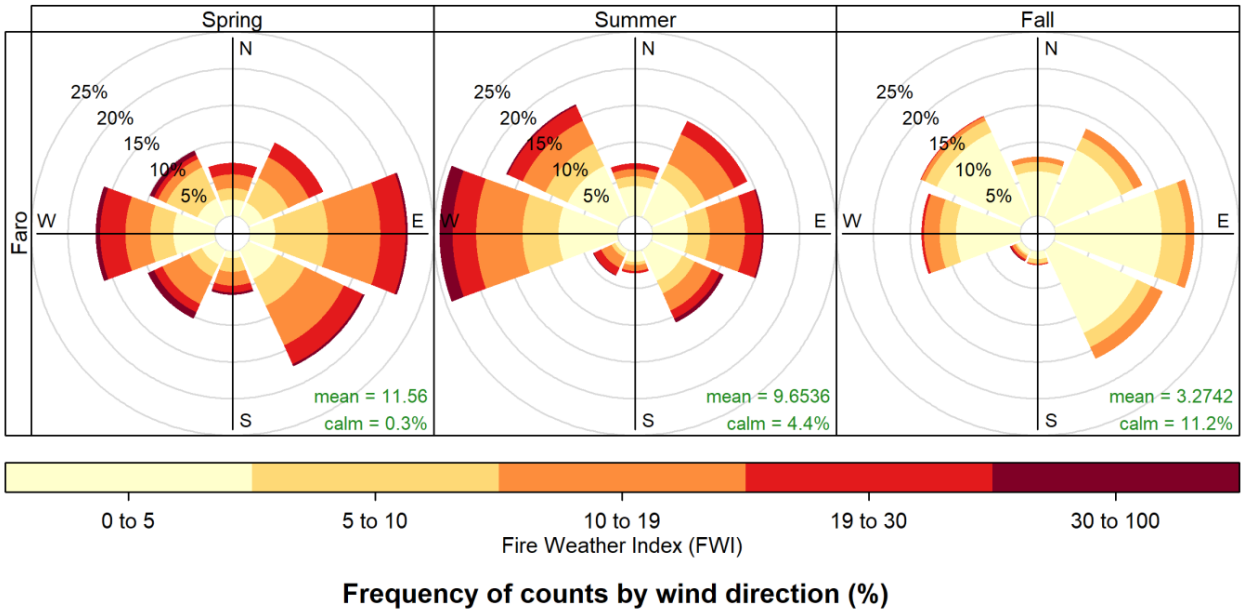


Figure 8. Fire Weather Index (FWI) rose showing frequency count by wind direction for each season (spring, summer and fall) as recorded at Faro weather station.

4.1.2 Fire History

There is significant fire history surrounding the Faro AOI (see Figure 9) due to the town's proximity to the Tintina Trench. The topography of the trench influences weather in the region and from mid-June to mid-July, frequent lightning storms occur and cause multiple wildfire ignitions. Reviewing the wildfire history demonstrates that the Faro AOI has been impacted in several ways:

1. **Direct impacts from wildfires igniting within the AOI or burning near the AOI**. In 1969 directly impacted the town of Faro and another fire in 1958 burned areas just south of town, see Figure 9.
2. **Indirect impacts by cutting off supply access to the town and evacuation from the town.** Wildfires in the 1950s, 1960s, 2000s and 2010s impacted the Robert Campbell Highway between Carmacks and Faro. The most recent fire in 2013 (2013CA008 near Carmacks), crossed the Robert Campbell Highway. The 2023 fire season saw a wildfire with high fire behaviour south of the highway (Figure 10). Ultimately this fire did not impact the highway; however, its proximity to Faro and the major road into and out of town was certainly a cause for concern and prompted evacuation discussions.
3. **Direct impacts from smoke** caused by wildfires elsewhere can impact the AOI. In 2019 the Yukon's chief medical officer issued an air quality advisory throughout the territory.[14] Exposure to wildfire smoke, particularly over long periods, can cause serious health issues.[15]

Crystal Lake fire 2022, source: CBC

[14] Azizi, J. 3 July 2019. Wildfire Smoke Leads to Air Quality Advisory Across the Yukon. Yukon News [website]. Available: https://www.yukon-news.com/news/wildfire-smoke-leads-to-air-quality-advisory-across-the-yukon/

[15] Howard C, Rose C, Dodd W, et al. 2020. SOS! Summer of Smoke: a retrospective cohort study examining the cardiorespiratory impacts of a severe and prolonged wildfire season in Canada's high subarctic. Available: https://bmjopen.bmj.com/content/bmjopen/11/2/e037029.full.pdf.

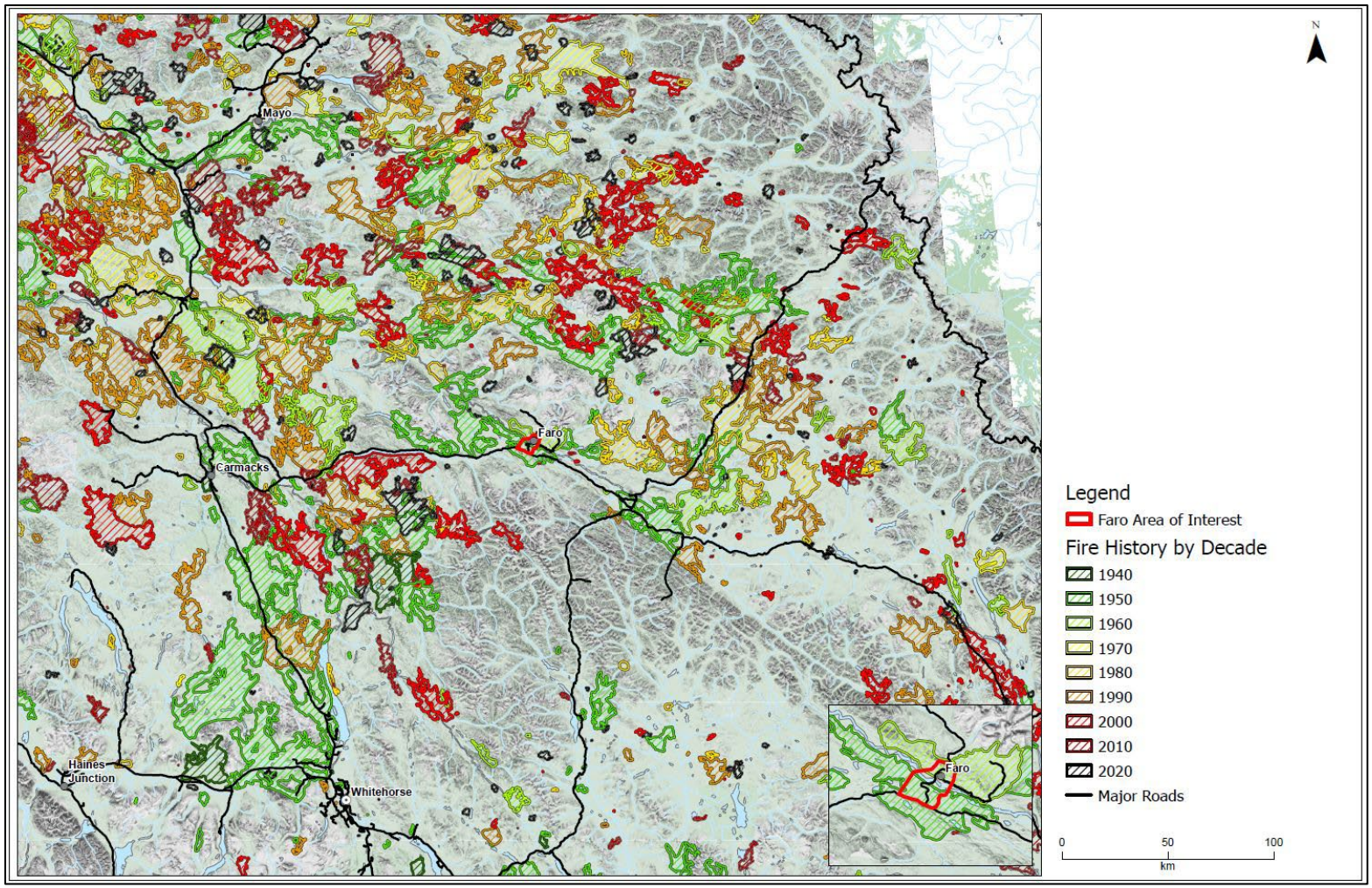


Figure 9. Fire History in the broader landscape surrounding the Faro Area of Interest. Data source: GeoYukon

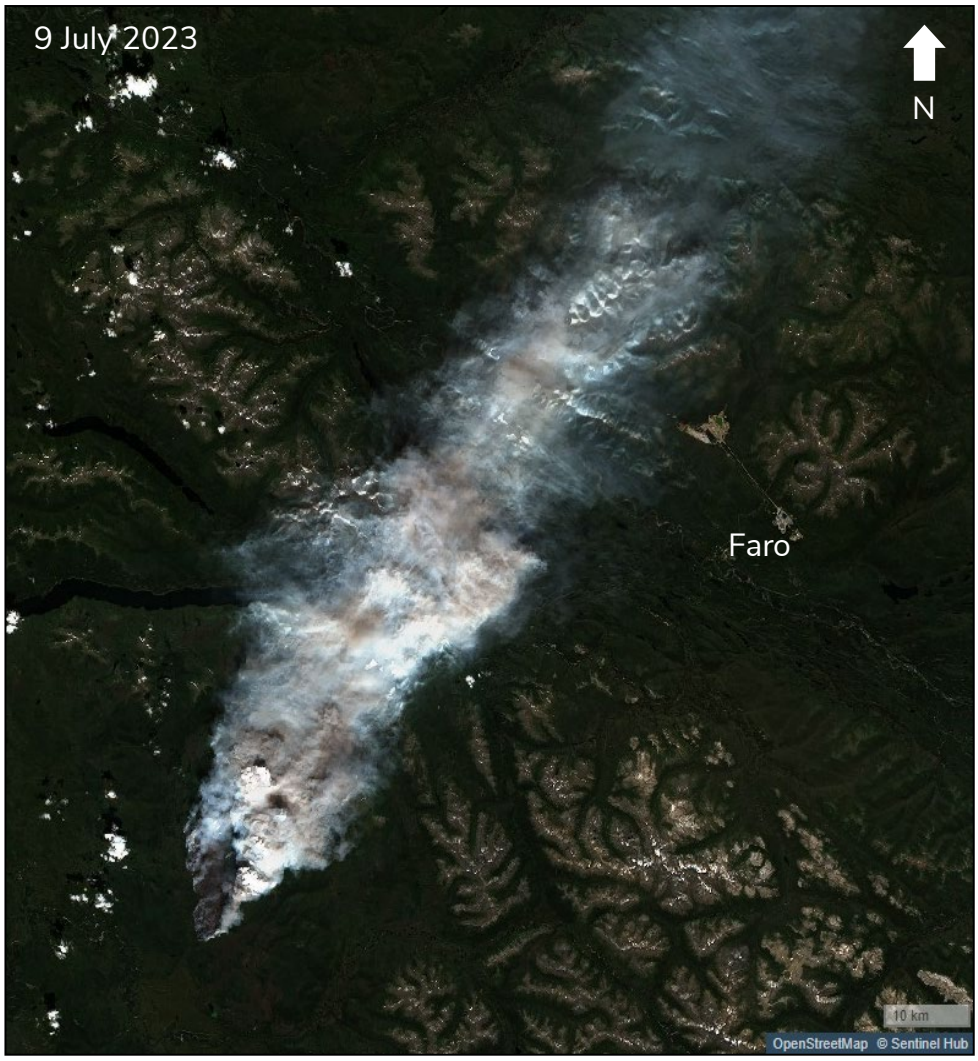


Figure 10. Sentinel-2 satellite imagery of a wildfire burning near Faro on 9 July 2023. Data Source: Sentinel Hub

4.1.3 Ignition Causes

There is almost equal prevalence of wildfires in the area that were caused by lightning verses human activity. Wildfire ignitions from human activities are most frequent along or near roadsides and within the Faro AOI, see Figure 11.

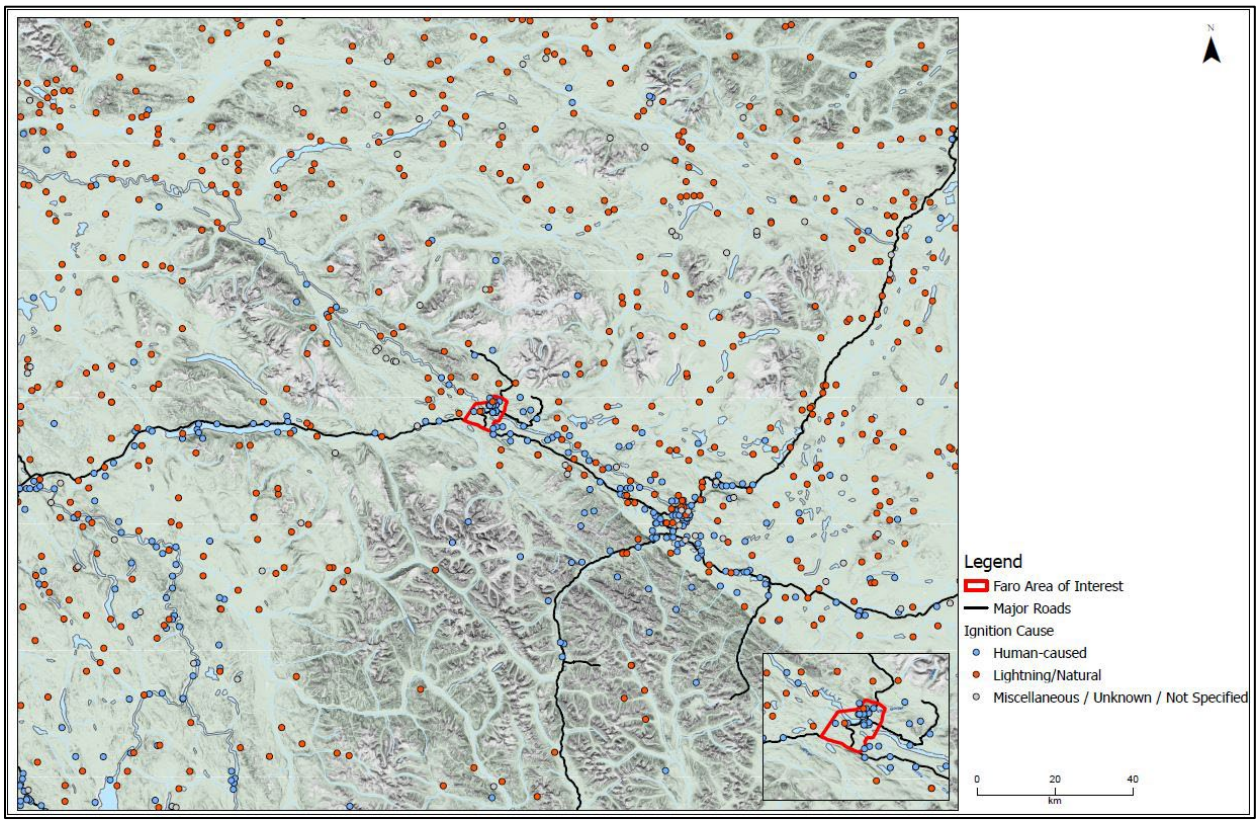


Figure 11. Wildfire ignition locations and their sources (1940 - 2023). Inset shows close up on Faro AOI. Data source: GeoYukon

In the Faro AOI, human-caused ignitions include accidental and malicious causes and make up 77% of recorded ignitions (Table 4).

Table 4. Ignition History Summary (1946 – 2023) – Faro Area of Interest only

Cause	Number of ignitions	Area burned
Human	17	3 ha
Lightning	2	15,517 ha

Source: GeoYukon

4.1.4 Fuel Types

For fire behaviour prediction purposes, Canadian forests and grasslands are categorised into different Fire Behaviour Prediction (FBP) System fuel types.[16] These fuel types have different vegetation species and structure (e.g. vegetation density). Because if this, fire will behave differently in each fuel type. Table 5 outlines which fuel types are present in the Faro AOI. More detailed descriptions of these fuel types can be found on the Natural Resources Canada website.[16]

Fuel types are named to reflect fire behaviour in different vegetation groups. However, since fuel types are used to describe an expected fire behaviour, they may not actually reflect the tree species that are on the ground. For example, the C1 (Boreal Spruce) fuel type does not indicate there is black spruce mixed with jack pine and white birch around Faro; rather, these fuel types correlate the forest fuel complex and how the fire behaviour that could be expected in that fuel complex. Fuel types should be regarded as a 'best fit' rather than strictly based on tree species.

Table 5. Canadian Fire Behaviour Prediction (FBP) System Fuel Types[16] present within the Faro AOI.

Fuel Type	Name	Fire Behaviour Characteristics
C1	Spruce-Lichen Woodland	Has some 'build up' time and will eventually reach a rate of spread similar to C2/C4. Moderately intensity for conifer fuel types.
C2	Boreal Spruce	A very volatile fuel type - C2 produce high intensity and fast moving fires more easily than other fuel types. Fires can easily become crown fires.
C3	Mature Jack or Lodgepole Pine	Fastest rate of spread overall, however requires high wind speeds and low fuel moistures to reach this faster rate of spread than other fuel types.
D1/D2	Deciduous (D1 leafless aspen, D2 green aspen)	Lower rates of spread, lower ember production and lower fire intensity (than conifer) when trees have leaves. Often used in urban interface areas to reduce fire behaviour around values.
Non-Fuel	Non-fuel	This category includes 'non-fuel', water and 'urban'.
M1/M2 25	Mixedwood – 25% conifer	The rate of spread and intensity of fire depends on the conifer/deciduous mix. Higher conifer mix will have faster rates of spread, higher fire intensity and more embers produced.
M1/M2 50	Mixedwood – 50% conifer	
M1/M2 75	Mixedwood – 75% conifer	
O1a/b	Grass	Fastest rate of spread potential.

[16] FBP Fuel Type Descriptions, Natural Resources Canada: https://cwfis.cfs.nrcan.gc.ca/background/fueltypes/d1

4.1.5 Climate Change

Fire regimes in boreal forests are changing. During the 1990s, 2.75 million hectares of forest was burned annually across Canada. By 2004, 3.3 million hectares of forest are burned annually. By the end of this century, the annual area burned by forest fires in Canada is predicted to increase by 74 – 118%.[17]

Research into changing weather patterns observed in recent history generally agrees that boreal forests will become more fire prone as climate change impacts become more prevalent.[18] This is due to decreased fuel moisture and an increase in extreme fire weather occurrence. While most studies do not look at whether we can expect an increase in lightning caused ignitions, human ignition sources can increase with growing populations and transportation networks. A recent study examining potential changes in fire intensity and type in Canada's boreal forests concluded that by the end of the century we can expect[18]:

- an increase in the number of days where crown fires are likely, and
- an increase in the number of days when fire intensity is greater than suppression capabilities.

Climate change impact on fire weather was also modelled for the Yukon specifically.[19] Results found that temperature, precipitation, and relative humidity annual averages will all increase.

An increase in precipitation does not mean a reduction in wildfire risk. One study proposes that the precipitation increase is not substantial enough to reduce the impact of warmer temperatures on drying fuels.[18] Warmer temperatures increase evapotranspiration, lower water tables and decrease fuel moisture and surface soil moisture content. Significant increases in precipitation would be required to balance an increase in temperature.[17] It is far more difficult to model the impact of climate change on precipitation quantities than it is for temperature.[20]

Many studies and reports agree that the Yukon should expect warmer temperatures and an increase in fire season length and wildfire frequency as the impacts of climate change progress.

More resources:

> Canadian Climate Institute. 2022. Due North: Facing the costs of climate change for northern infrastructure. Environment and Climate Change Canada.
>
> Canadian Institute for Climate Choices (CICC). 2020. Tip of the Iceberg: Navigating the known and unknown costs of climate change for Canada. Canadian Climate Institute.

[17] Flannigan MD, Logan KA, Amiro BD, Skinner WR & Stocks BJ. 2005. *Future Area Burned in Canada*. Climatic Change 72: 1-16.

[18] Wotton, M, Flannigan, M & Marshall, G. 2017. Potential climate change impacts on fire intensity and key wildfire suppression thresholds in Canada. Environmental Research Letters. 12. 095003. 10.1088/1748-9326/aa7e6e.

[19] AECOM. 2021. *Modeling Future Wildfire Risk in Yukon*. Report for Yukon Government.

[20] Wotton M, Flannigan M & Nock CA. 2010. *Forest fire occurrence and climate change in Canada*. International Journal of Wildland Fire. 19. 253-271. 10.1071/WF09002.

4.2 Socio-Economic Factors

4.2.1 Wildfire Response

The Town of Faro benefits from a local fire department at 221 McQueston Road, positioned at the northwest end of the town. This department operates under the guidance of one fire chief, one deputy fire chief, and a team of three firefighters (2023). The department's resources include two pumper trucks and one rescue truck.

As part of their foundational training, all fire department members complete a mandatory wildfire orientation course that covers the fundamental aspects of wildland firefighting. Additionally, an annual training session is typically organized during the spring in collaboration with the Yukon Wildland Fire Management Protective Services Branch.

Faro is in the Tatchun Fire Region, Ross River Fire District. Yukon Wildland Fire Management operates fire bases within this fire region, and these bases are staffed with initial attack crews during the fire season. However, it's important to emphasize that there is no Wildland Fire Management firebase located in Faro. Consequently, firefighting resources would be dispatched from Ross River or Carmacks in the event of a wildland fire. The estimated response times from these locations are detailed below.

Table 6. Estimated response time to Faro during an initial start. Please note that these times are estimates provided by Town of Faro and Wildland Fire Management. They do not account for severity of the fire season and resource allocation during a wildfire season.

Location	Resource	Response Time-Ground	Response Time -Air
Carmacks - Fire Centre	2x Initial Attack Crews	2 hours	1 hour
Ross River – Fire Base	1x Initial Attack Crews	1 hour	½ hour

4.2.2 Values at Risk

Values within the Faro AOI can be identified in the following classifications (Table 7): Human life, cultural, infrastructure, environmental, and economic. Assets can be directly impacted by wildfire (e.g. radiant heat/embers) or indirectly (e.g. loss of tourism, exposure to smoke, ash, fire fighting chemicals and soil erosion).

Table 7. Values at risk of wildfire impacts (direct or indirect) within the Faro Area of Interest.

Value	Description
Human Life	Faro population: ~478[21]
Cultural	Big Red Truck (tourist attraction)
	Campbell Region Interpretive Centre
	Dena Cho Trail[22]
	Mount Mye Sheep Centre – scenic viewing platform and cabin[22]
	Johnson Lake Campground
	John Connolly Campground & RV Park
	Faro Arboretum – walking loop trail with benches, viewing decks and interpretive panels
	Fingers Site – scenic viewing platform
Infrastructure	Pelly River Bridge
	Faro Airport
	Faro Cell Tower (62.241090°, -133.311625°)
	Faro Recreation Centre
	Town Office
	Fire Siren #1 & #2
	Water Storage Tanks
	Del Van Gorder School
	Faro Landfill
	Old Firehall
	Old PW Building
	New PW-FH Building
	Grocery Store
	Arena
	Water Reservoir, Water Wells & Pumphouse
	Seniors Extended Living Residence
Environmental	Watersheds: Lower Pelly - Yukon River Drainage Area
	Wildlife Key Areas: Van Gorder Creek (Thinhorn Sheep and Alpine Raptor)[22]
Economic	Tourism (activities): canoeing, golfing, fishing, hunting, camping, hiking, flight seeing, off-road access
	Wilderness tourism and tourism accommodation
	Campgrounds
	Forestry Cutting Permits

[21] Faro Community Statistics. 2023. Available: https://community-statistics.service.yukon.ca/pages/faro

[22] This value is outside the AOI boundary but has been included due to its importance to the community.

Campbell Region Interpretive Centre. Source: Explore North Blog

4.2.3 Key Vulnerabilities

Identifying key vulnerabilities for values identified within the Faro AOI assists in preparing mitigation and preparedness strategies. Below are the values identified in the AOI that, if impacted, can cause a significant impact on people living in or around Faro (Table 8).

With a population size of approximately 478, Faro faces limitations in the availability of services and products within the town. As a result, most Faro residents need to travel approximately 360 kilometres to Whitehorse to access the products and services they may require.[23] This reliance on a distant center for essential supplies and services highlights the potential cascading impacts of a wildfire in the local community, especially considering the area's remoteness.

It is crucial to consider the implications of the community being isolated for several days in the event of a wildfire. The remote location of Faro raises questions about whether the existing infrastructure and supplies are adequate to support the community during such a scenario. Adequate planning and preparedness measures must be put in place to ensure the well-being and safety of residents in emergency situations like wildfires.

[23] Town of Faro. Official Community Plan. 2013. Available: https://faro.ca/p/files-and-documents

Table 8. Values and their vulnerabilities in Faro Area of Interest

Value	Wildfire Hazard	Description
Homes	Direct flame contact, radiant heat and ember exposure. Increased risk of flooding after fire event.	Homes are constructed within the wildland urban interface (WUI). Homes are near continuous forests, which can support elevated fire behaviour and risk house loss (and possibly loss of life). Significant loss of forest cover upstream due to fire can impact surface water flow and increase likelihood of high flood levels.
Evacuation routes and access routes for firefighting resources	Inability to evacuate from a wildfire.	Faro has limited access/evacuation routes. Faro is located approximately 10.5 kilometres up Mitchell Rd off the Robert Campbell Highway. The Robert Campbell Highway leads east to Ross River and west to Carmacks. Access to the Robert Campbell Highway via Mitchell Rd is limited. The Pelly River bridge is a major pinch point and leaves residents dependent on the functionality of a bridge in an emergency. Mitchell Rd does lead north from Faro to the Faro Mine complex; however, this is a forest service road and is a dead end.
	Difficulty accessing a property during a wildfire.	It is important to know any specific access challenges before a fire and report to property owners, for example: long driveways and small turn around points that are difficult for a fire engine. Most properties in the Faro AOI appear to have good access. However, the Tintina Rural subdivision currently has a single access egress route and is located across the Pelly River from Faro.
Drinking water supply	Infiltration of fire by-products, sedimentation, changes in soil properties, runoff and firefighting chemicals infiltrating into water supply.	There are three water production wells in the Town of Faro. Water supply wells can be impacted by wildfire through several processes. First, contamination from particles after a wildfire seeping into wells (as a result of the fire or from fire retardant). Secondly, well infrastructure can be impacted, depending on well design.
Firefighting water supply	Access to water is from Faro, Johnson Lake and Pelly River,	Water sources for firefighting appliances may limit efficiency of firefighting. Fire hydrants exist throughout the town.

Value	Wildfire Hazard	Description
	wetlands and private wells.	
Community Health and Health Facilities	Direct fire hazard and supply chain issues from blocked roads.	If the Faro Community Health Centre were to be directly impacted by fire, or if Faro were to be temporarily disconnected from supplies/staff, the community might not be able to access health care. The nearest pharmacy and hospital are located 360 km away in Whitehorse.
	Smoke.	Smoke particulates cause significant physical and mental health impacts for both short and long-term exposures.
School facilities	Direct fire hazard and resources.	If the school were to be directly impacted by fire, or if Faro would to be temporarily disconnected from staff, the community might not be able to access school and facilities. The nearest school facilities to Faro are in Ross River or Carmacks.
Economic: tourism – wildlife viewing, historical buildings	Direct fire impact and smoke.	Loss of environmental assets and increased smoke in the area can reduce tourism. For example, the annual Faro Crane & Sheep festival and the annual golf tournament. Faro also has invested in wildlife viewing infrastructure which if damaged from a fire could impact tourism.
Infrastructure	Loss of soil integrity as a product of fire.	Chemical changes such as increased acidity from fire product run off can impact biological treatment of sewage.
	Ember attack and radiant heat threats.	Historic wooden structures and unsealed structures in Faro are particularly vulnerable.
Environmental Values	Loss of habitat from direct fire impacts, degradation of water quality from runoff.	Forests, rivers and wetlands around the AOI provide regional biodiversity values and support local community. Loss of habitat can occur not only when forests are burned at too a high severity or too frequently, but also when soil properties are altered and chemicals and sediments infiltrate nearby rivers. Large wildfires can also impact permafrost. Due to the variable depths of permafrost in and around the Faro area, it is particularly at risk of melting and impacting the species that have evolved with this feature. There are severe Aspen Leaf Miner (*Phyllocristis populiella*) impacts to aspen forests in valleys surrounding the AOI, see section 2.4 Natural

Value	Wildfire Hazard	Description
		Disturbance and Forest Succession. Wildfire behaviour in these areas can significantly increase from impacts.

4.3 FireSmart

FireSmart™ Canada is a national program that helps Canadians increase neighborhood resilience to wildfire and minimize its negative impacts. It was founded over 20 years ago to address common concerns about wildfire in the wildland urban interface (WUI).

Research investigating recent WUI disasters presents the case that catastrophic loss of homes due to wildfires is often due to structure ignition from ember showers which can ignite fuels surrounding, or in contact with, the structure.[24,25] Once a home or other infrastructure is ignited, the fire can spread through the built environment and quickly overwhelm suppression resources.

The findings from the 2021 Lytton disaster (British Columbia) cannot be understated. The wildfire passed over the community in less than one hour. After which, the fire was perpetuated throughout the Village and Indian Reserves along four different spread paths from structure to structure. Most structures destroyed in the Lytton fire were ignited by other structures and urban fuels, not from the influence of the wildfire (Figure 12).[24]

Figure 12. Image of Lytton, BC, after the 2021 wildfire showing unburned vegetation surrounding destroyed homes and structures. Source: CBC

[24] Cohen JD, Westhaver A. 2022. An Examination of the Lytton, British Columbia wildland-urban fire destruction. Summary Report to the British Columbia FireSmart Committee. Available: https://firesmartbc.ca/wp-content/uploads/2022/05/An-examination-of-the-Lytton-BC-wildland-urban-fire-destruction.pdf

[25] Knapp, E.E., Valachovic, Y.S., Quarles, S.L. et al. 2021. Housing arrangement and vegetation factors associated with single-family home survival in the 2018 Camp Fire, California. fire ecol 17, 25. Available: https://doi.org/10.1186/s42408-021-00117-0

Disastrous fires in the WUI can overwhelm fire suppression efforts due to large numbers of near simultaneous structural ignitions - this is called the 'WUI fire disaster sequence'.[26,27] We cannot rely on suppression efforts to reduce large scale structure loss, instead creating ignition-resistant structures and properties is the most likely means of preventing WUI disasters.

The best strategy to prevent loss of values is to mitigate the hazard on the property. The Home Ignition Zone (HIZ) is the area within 30m of your home and structures. Figure 13 illustrates the Immediate Zone, Intermediate Zone and Extended Zone.

Homeowners can minimise home and property vulnerability to wildfire by addressing threats in each of these zones. Start with the most vulnerable zone, the Immediate Zone, and work outwards away from the value at risk.

Figure 13. FireSmart Home Ignition Zones. Source: FireSmart.ca.

For information on each Home Ignition Zone, training, tips and checklists on how to protect your home and further resources such as project funding opportunities, see FireSmart Canada and FireSmart Yukon websites.[28]

Aside from encouraging residents to follow FireSmart Homeowner practices there are other factors that can be planned for and regulated. Some factors that influence the susceptibility of WUI structures, effectiveness of response, and level of public safety during a wildfire include:

- Location of development, including hazardous or vulnerable land uses, in relation to the higher hazard forested vegetation types, steep slopes, and other geographical features that contribute to extreme fire behavior,
- Access to and within the community and circulation/travel patterns,
- Availability and adequacy of water supply,
- Design guidelines and architectural standards,
- Residential addressing and street signage,
- Type of construction materials used to build structures and attachments,
- Lot size and structure density,
- Landscaping, screening, and buffering.

[26] Cohen, J.D. (2010). The wildland/urban interface problem. Fremontia. 38:2/38:3. 8p.
[27] Calkin, D.E, Cohen, J.D., Finney, M.A. and Thompson, M.P. (2014). How risk management can prevent future wildfire disasters in the wildland-urban interface. Proc. Natl. Acad. of Science. U.S.A. 111: 746–751.
[28] FireSmart Canada website: https://firesmartcanada.ca/ and FireSmart Yukon website: https://yukon.ca/en/emergencies-and-safety/wildfires/keep-your-property-safe-wildfires

5. Plan Implementation

The CWPP is designed to comprehensively plan for all aspects of community wildfire planning by structuring strategies based on the seven FireSmart disciplines:

- Education,
- Emergency Planning,
- Vegetation Management,
- Legislation and Planning,
- Development Considerations,
- Interagency Cooperation, and
- Cross Training.

Each FireSmart discipline and their role in resiliency planning for the Faro community within the AOI is outlined below.[29]

A summary of all actions is available in *Appendix 3: Summary of Risk Mitigation Actions and Responsibilities*, along with assigned responsibilities and information on resources required.

Additional resources and information sources are in *Appendix 4: Additional Resources and Information*.

5.1 Education

Public education and outreach efforts help community members learn about wildfire and its potential impacts to their communities. In addition, these efforts should be designed to help individuals understand their role in taking action to reduce risk. Education and outreach activities are designed for all groups to benefit, including elected officials, community planners, residents, visitors, businesses, land managers, first responders, and more.

Goal: The Community Wildfire Protection Plan (CWPP) is only successful if community members and stakeholders are engaged in taking action to reduce wildfire risk. This CWPP aims to establish effective communication and develop educational activities so that each member of the community understands the potential for interface wildfire in Faro and can play their role to reduce the risk.

Context: Due to the 1969 fire that devastated the town, it is possible that some community members assume that the surrounding area has minimal fuel loading and, consequently, reduced risk of wildfires.

However local representatives have noted a shifting narrative, particularly following the destructive 2023 wildfire season, which significantly damaged and impacted communities across Canada. This shift underscores the importance of ensuring that Faro residents comprehensively understand the real threat posed by wildfires and support efforts to enhance their community's resiliency.

The initial step towards garnering community support involves education and outreach initiatives aimed at helping residents learn about wildfires and their potential to impact the Town of Faro.

[29] For more information on the national FireSmart program, visit: https://firesmartcanada.ca

Actions:

- Community Endorsement: During the draft stages, the CWPP is presented and available to the public to understand, comment and ask questions. Approval of the Plan Implementation actions presented in the plan is crucial to its success.
- Ongoing awareness: Conduct an annual community meeting (or incorporate into an existing meeting) in support of the CWPP and community preparedness.
- Promoting FireSmart Principles:
    - Relevant parties will work with community associations and other local groups to coordinate FireSmart projects. Additionally, Yukon Wildland Fire Management in collaboration with other stakeholders will seek to educate the community on FireSmart principles, such as organizing community school visits to inform students about fire resiliency and FireSmart practices.
    - Identify trusted locals as community FireSmart champions who will be available to assist with FireSmart activities as required.
    - Participate in an annual FireSmart Community Preparedness Day.[30] Increase advertising to attract higher attendance each year.
- Private Property Hazard Reduction Strategies: In addition to supporting FireSmart and fuel abatement activities on public land, implementation of the CWPP includes educating community members on reducing wildfire hazards on their own properties.
    - Undertake a community survey to find out the greatest barriers to FireSmart (education, physical means, financial means, etc).
    - If physical barriers (equipment, time, labour) are a key barrier for not undertaking FireSmart measures around the community, assemble and train a youth crew to conduct works such as hauling away flammable debris, keeping grass mowed, etc.
    - Disseminate information about the free FireSmart Begins at Home mobile app.[31] This is a free Apple or Android app that "guides homeowners through a series of questions about their property to help residents identify specific actions they can take on their property to reduce wildfire risks."

[30] See https://firesmartcanada.ca/programs/wildfire-community-preparedness-day/ for more information.
[31] Available through App Store and Google Play.

5.2 Emergency Planning

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 in the future.

Goal: The goal of emergency planning is to prepare the community to respond safely and effectively, in partnership with local first response agencies and local and regional authorities to wildfire events. This CWPP aims to increase the number of community members who:

1. Understand the risk associated with wildfire in their community,
2. Know what to do to be safe and mitigate damage,
3. Take action to increase individual preparedness, and
4. Participate in community resilience planning.

Context: The Town of Faro is supported by a local volunteer fire department with five local staff members (2023). Given the remote location of Faro, preparations for a wildfire emergency are important. This necessitates adopting a multi-pronged approach, as the nearest Yukon Wildfire crews are stationed in Carmacks and Whitehorse.

Actions:

- Completing an evacuation plan and practicing evacuations ahead of time can significantly improve efficiency during an emergency and increase the likelihood of a positive outcome.
- Increased communication of existing evacuation planning efforts to the public include identification of:
    - A range of possible scenarios and how evacuation might proceed in each,
    - Primary routes, their quality, and strategies for improvement (if necessary),
    - Areas for residents to shelter in place in the event their evacuation route is compromised.
- Incorporate wildfire response into new Municipal Civil Emergency Management Plan – currently in development.
- Host annual tactical exercises to practice evacuations and identify vulnerabilities, such as:
    - 'Tabletop Exercises' to address larger-scale issues and scenarios,
    - Neighbourhood level mock evacuations to address local considerations,
    - Neighbourhoods identified as being most exposed would represent the best pilots and priorities for these exercises and provide opportunities for local feedback,
    - Implement and trial the Voyent Alert multipurpose notification service.[32]

[32] Town of Faro have implemented the Voyent Alert notification service.

5.3 Vegetation Management

The general goal of vegetation management is to reduce the potential wildfire intensity and ember exposure to people, infrastructure, structures and other values through manipulation of both the natural and cultivated vegetation that is within or adjacent to a community. A well-planned vegetation management strategy that is coordinated with development, planning, legislation and emergency response wildfire risk reduction objectives can greatly increase fire suppression effectiveness and reduce damage and losses to structure and infrastructure.

Goal: Proactively manage vegetation at multiple scales to reduce the potential wildfire intensity and ember exposure to people, infrastructure, and other values.

Context: The change in fuels from the 1969 fire cannot be relied on to provide protection against severe wildfire behaviour for two reasons:

- 54 years since the fire is enough time for a conifer or spruce understory to regrow in the fire scar area. Even in areas of predominantly deciduous vegetation overstory (such as aspen or birch), grass, conifer and spruce re-growth underneath can enable higher than expected fire behaviour.
- The frequency of severe fire weather days is increasing. Under these conditions, wildfires transition from being predominantly driven by types of vegetation to being driven by weather conditions and almost all vegetation types can carry fast moving, destructive wildfires.

Also, most homes and structures in Faro are surrounded by continuous forest. Heavily forested areas adjacent to structures not only increase wildfire hazard exposure such as radiant heat and embers, they also create a challenging environment for wildfire suppression operations. Alteration of vegetation to reduce fire behaviour using fuel treatments enables crews to action wildfires more directly or indirectly through fire suppression tactics such as back burning.

Actions:

- Organize community clean-up days for properties. Prioritize properties based upon FireSmart Home Assessments and proximity to forest fuels.
- Develop plans to reduce wildfire risk to critical infrastructure and viewing platforms identified as important for tourism.
- Territorial fuel maps are produced according to a mix of territorial datasets. The result is a close representation of vegetation on the ground; however, for a small Area of Interest like Faro it is recommended to review the territorial fuel type layer and confirm mapping accuracy.
- Monitor aspen health in the Faro area and develop a contingency plan in the event of significant aspen dieback.
- Organize Wildfire Preparedness Days in identified high risk areas, collaborate with Yukon Wildfire and local fire department.
- Design a fuel management plan to reduce fuel loads in high coniferous areas, particularly conifers in the old burn scars. See Appendix 5: Types of Fuel Management.
- Support community members to clean up vegetation in their Home Ignition Zone (refer to FireSmart and Appendix 4: Additional Resources and Information).

5.4 Legislation

Legislation and Regulation can be a very effective tool for reducing wildfire risk on provincial crown lands and within the administrative boundaries of a local government or First Nation communities. Provincial acts and regulations provide the means for local governments and First Nation communities to implement wildfire risk reduction actions through by-laws.

Goal: To facilitate an understanding of how local, territorial, and federal legislation can either support or restrict the ability to implement local policies and bylaws, and other wildfire risk reduction activities.

Actions:

- Adopt FireSmart building and landscaping requirements to be addressed in the development and leasing approvals process.
- Update 2008-04 *Property Maintenance Bylaw* to adopt FireSmart building and landscaping requirements to be addressed in the development and leasing approvals process.
- Assess and determine how future planning and development activities can support post fire recovery, such as preparing information and permits for debris removal and rebuilding that will be ready in the event of structure losses during a wildfire.

Additional Information:

Territory Policy: The Yukon and Canadian governments both have Acts, Regulations and guidance documents are relevant to wildfire protection planning in the Faro area – see *Appendix 2: Relevant Acts and Regulations.*

Bylaws and zoning: Communities can have a significant impact on reducing fire risk by considering a suite of options available through regulations such as zoning and/or bylaws. New infrastructure, such as future subdivisions should consider fire hazards prior to development. Established infrastructure should consider fire risk whenever upgrades are required. The Canadian Standards Association (CSA) has developed a *National Standard CSA S504:19 Fire Resilient Planning for Northern Communities*.[33] This standard helps guide community developments and building standards with considerations for communities living in fire prone ecosystems such as those in Yukon.

Town of Faro Community Plan is currently being updated from the former version, wildfire risk reduction and FireSmart disciplines should be considered and incorporated when developing the plan.

Management plans: *Appendix 1* identifies key local management plans for the planning area. These existing plans include information that guides the contents of the community wildfire protection plan and may include policies and recommendations that touch on reducing risk of oncoming wildfire for the community. Additionally, future management plans or amendments to existing plans should consider the contents of the Community Wildfire Protection Plan and consider incorporating to increasing fire resiliency.

[33] For more information, see ChangingClimate.ca: https://changingclimate.ca/case-study/csa-s50419-fire-resilient-planning-for-northern-communities/

5.5 Development

Development decisions, such as land use types, structure density, road patterns, and other considerations, shape the built and natural environments. These decisions can bring lasting impacts to the WUI and wildfire risk by affecting public and first responder safety and survivability of homes, critical infrastructure, and other community features. Considering these factors early in the development process can reduce wildfire risk to life, safety, and property.

Goal: To implement a strategy for decreasing the chance of structural losses within the AOI due to wildfire, by utilizing regulatory and administrative tools to reduce wildfire hazard and increase the number of homes and other infrastructure compliant with FireSmart guidelines (with low ignition potential).

Context: The CWPP is quoted in the new Faro Official Community Plan, which can be referenced when designing and implementing new by-laws. However, it is essential to note that Faro faced a decrease in population in the 1990s due to the closure of the mine, resulting in numerous abandoned and uninhabited buildings. These structures are challenging to maintain and represent a significant fire hazard to the community.

Actions:

- Once assessments are complete create a database for keeping track of community needs. Assign priority ranking, associated cost and support needs (financial or physical) for each structure assessed.

Faro abandoned building (2022). Source:CBC

5.6 Interagency Cooperation

It takes the collaborative efforts of multiple stakeholders working together to achieve a fire resilient community. These people include the local fire departments, local government staff, elected officials, First Nations representatives, industry representatives, territorial government, and residents in your area. Individually they are responsible to their own organizations and are dependent upon each other to develop an effective Community Wildfire Resiliency Plan and undertake a successful wildfire response.

Goal: To encourage and establish collaborative relationships among the Ross River Dena Council, Faro Volunteer Fire Department, Town of Faro Council, Yukon Wildland Fire Management, and other stakeholder groups to achieve a wildfire resilient community.

Context: Regarding wildfire and emergency planning, the leadership groups in Faro have a good relationship with the Yukon Wildland Fire Management. Effort should be made to continue to build this relationship and continue to engage with Ross River Dena Council.

Actions:

- Continue to coordinate relationship building opportunities with staff from identified stakeholder groups. This could include organizing tabletop exercises, organize a neighborhood walk day with Wildland Fire and Protective Services staff providing a demonstration with a fire truck while assessing firefighting challenges at different residences in the area, and/or participating in cross-training activities.
- Consider establishing a wildfire resiliency task force or committee comprising representatives from the Faro town council, local fire department, and Yukon Wildland Fire. This task force would oversee wildfire risk management efforts in the Faro area, with FireSmart as a guiding principle.

5.7 Cross Training

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.

Goal: Develop a diverse skill set within community members, local Fire Department and Yukon Wildland Fire Management and facilitate understanding across participants engaged in risk reduction activities and wildfire planning/response. This will allow for skilled workers to support the development of comprehensive and effective CWPP activities, including a safe and effective wildfire response.

Context: Faro has no local Yukon Wildland Fire Management base, with the nearest bases in Carmacks and Whitehorse. Given the remoteness of Faro, this underscores the importance of equipping residents

with the knowledge and ability to react safely and effectively to a wildfire threat. Yukon Wildland Fire has expressed interest increasing cross training opportunities pending operations and scheduling conflicts.

Cross-training initiatives can also prove invaluable experience, enabling policy-making staff to understand wildfire dynamics and FireSmart principles better. This understanding, in turn, facilitates incorporating FireSmart goals into various aspects of community planning.

Actions:

- Prioritize and coordinate training opportunities. These can vary, but the following training is recommended for interested community members:
    - Incident Command System (Emergency Operations Center and Training Program),[34]
    - FireSmart 101,[35]
    - FireSmart Ambassador,
    - Neighbourhood Recognition Program Specialist,
    - FireSmart Home Ignition Zone Specialist,
    - Post wildfire reclamation and recovery,
    - Post wildfire structure damage assessment.
- Offer cross training opportunities to members of the Faro Volunteer Fire Department, and Yukon Wildland Fire Management.
- Opportunity exists for cross training between local mine operators, community members and local volunteer fire department. This will strengthen coordination and response to wildfire event.

[34] Available: https://www.icscanada.ca/en/home.html. Yukon contact: emo.yukon@gov.yk.ca
[35] Available: https://firesmartcanada.ca/programs/firesmart-101/

6. Monitoring and Reporting

An annual Faro CWPP meeting will be established with stakeholders to update progress from the previous year and on current and future projects. This meeting will allow consultation and input into these projects. *Appendix 3: Summary of Risk Mitigation Actions and Responsibilities* can be used to track roles, responsibilities and milestones for monitoring and reporting purposes.

The CWPP is a living document that is developed using the best understanding of fire hazards and behaviour and wildfire community protection that is known at the time of writing. The knowledge base is anticipated to evolve as will the community of Faro's requirements for protection and risk reduction against wildfire. The CWPP will have a review cycle of 3 years.

Aerial view of Faro (Source: Reddit r/Yukon)

Appendix 1: Key Local Management Plans

Wildfire can affect many aspects of a community and there are several existing planning documents that relate to this CWPP. While this CWPP will inform subsequent community planning, existing community plans will inform the development of this CWPP by providing helpful information that guides overall plan development. The tables below outline existing plans and their relationship to this CWPP. In the digital version of this CWPP, plan titles are hyperlinks if links to documents are available.

Table 9. Key local plans and relationship to CWPP.

Plan Title	Description	Relationship to CWPP	Additional Information
Town of Faro Official Community Plan (2023)	*In Progress*		
Faro Landscape Hazards (2015)	• Geoscience mapping for climate change adaptation planning. • Hazard maps that delineate or highlight areas on the land that are affected by, or are vulnerable to, a particular hazard.	• Provides valuable insights into the Faro region physiography, vegetation, contemporary climate, past climate trends and environmental disturbance history. • Plan includes climate projects for the region using global climate models and climate change scenarios.	
Yukon Community Wildfire Risk Reduction Assessment (Ember Research Services Ltd. et al 2000)	• Assessment evaluates wildfire risk to Yukon communities and recommended risk mitigation measures.	• Former assessment from 2000 can be used to gauge change in last two decades. Compare historical to current day threats and look at what has been done since the 2000 assessment to increase wildfire resiliency.	
Summary of Land Management Authorities within Yukon Municipalities (2012)	• Identifies the four jurisdictions (Government of Canada, YTG, First Nation Governments and municipal governments) that	• Provides direction to the development of policy and law governing forest resources.	

Plan Title	Description	Relationship to CWPP	Additional Information
	plan, manage and authorize activities on land in Yukon. • Outlines the roles and responsibilities that fall to the above jurisdictions.		
A Policy for the Stewardship of Yukon's Wetlands (2022)	• A high level principle based document intended to support the Government of Yukon's decision-making process to ensure the benefits of Yukon's wetlands are sustained. • Contains three main goals: improving knowledge and understand of wetlands, manage human impacts on wetlands, identify and protect "Wetlands of Special Importance". • Commits the Government of Yukon to developing territory-wide inventory over the next five years.	• CWPP AOI (and closely surrounding area) contains wetlands that may meet criteria of "Wetlands of Special Importance" – subsequent CWPP's may need to account for these areas. • Contains three Guiding Principles that were consistently brought forth by Indigenous governments and groups that should also be considered when doing fuel management treatments: 1. Holistic approach that considers wetlands as an integral part of an interconnected system 2. Importance of respecting the land 3. Concept of reciprocity -must give back to the land when we take from the land.	Only applies to wetlands where the Government of Yukon has decision-making authority. Peatlands are being recognized as an important carbon store - protecting them from wildfire could become a growing priority globally.

Appendix 2: Relevant Acts and Regulations

The following high-level Acts, Regulations, bylaws and guidance documents are also relevant to wildfire protection planning in the Faro area:

Local

- Bylaw 2024-01 OCP (2024)
- Faro Personal Use Fuelwood Map (2023)
- Bylaw 2008-04 Property Maintenance (2008)
- Bylaw 2018-07 Faro Volunteer Fire Department (2018)
- Bylaw 2022-02 Municipal Civil Emergency Plan (2022)

Territorial

- Forest Protection Act (2002)
- Yukon Historic Resources Act (2002)
- Yukon Wildlife Act (2002)
- Territorial Lands (Yukon) Act (2003)
- Waters Act (2003)
- Yukon Environmental and Socio-economic Assessment Act (2003)
- Forest Resources Act (2008)
- Forest Resources Regulation (2010)
- Forest Resources Act: Standards and Guidelines (2015)

Federal

- Forestry Act (1985)
- Migratory Birds Convention Act (1994)
- Canadian Environmental Protection Act (1999)
- Species At Risk Act (2002)
- Fisheries Act (2019)

It is important to note that while every attempt must be made to work within the confines of the above legislation and best management guidelines, at times the qualified professional may need to decide to pursue a course of action that prioritizes wildfire risk mitigation over other values. It is important in this scenario to communicate and consult with all effected stakeholders and government authorities.

Additional regulations notes:

- All operations must follow the Forest Management Branch's Historic and Archaeological Resources Standards and Guidelines.

Appendix 3: Summary of Risk Mitigation Actions and Responsibilities

Table 10. Risk mitigation actions and responsibilities

Action	Lead/Collaborators	Priority	Resources Required	Metric for Success	Notes
Education					
1. Community Endorsement: During the draft stages the CWPP is presented to and available to the public to understand, comment and ask questions. Approval of the management tools presented in the plan is crucial to its success.	YG, Consultant, CAO, Ops Mgr, & Fire Chief	High	Website, Newsletter, Regular Council Meeting	Signed endorsement of CWPP & clear understanding of actions required to enhance community wildfire resiliency	N/A
2. Ongoing awareness: Conduct an annual community meeting (or incorporate into an existing meeting) in support of the CWPP and community preparedness.	CAO, Fire Chief, Ops Mgr	High	Website & Newsletter	Hosting annual meeting with update to the community	Timing of meeting is important, consider early spring prior to fire season
3. Promoting FireSmart Principles.	Fire Chief	High	Website & Newsletter	Survey measuring awareness in community	N/A
4. Private Property Hazard Reduction Strategies.	YG & CAO	High	Newsletter	Survey measuring awareness in community	Need to review & update Property Mtce Bylaw
Emergency Planning					
5. Completing an evacuation plan and practicing evacuations ahead of time.	Council, CAO, & Fire Chief	Moderate	Community Emergency Management Plan	Annual - 60% or greater community	Test Voyent Alert notification system

Action	Lead/Collaborators	Priority	Resources Required	Metric for Success	Notes
				participation in evacuation exercise	
6. Increased communication of existing and future evacuation planning efforts to the public.	Council, CAO, Fire Chief	Moderate	Newsletter	Accessible evacuation plan documents online, improved awareness of the plan and where to find it	In place, annual review
7. Incorporate wildfire response into new Municipal Civil Emergency Management Plan – currently in development.	CAO & Fire Chief	Moderate	N/A	Annual review occurs	In place
8. Host annual tactical exercises to practice evacuations and identify vulnerabilities.	Council, CAO, Fire Chief	Moderate	Community Emergency Management Plan	Annual tabletop exercises occur	N/A
Vegetation Management					
9. Organize community clean-up days for properties. Prioritize properties based upon FireSmart Home Assessments done and proximity to forest fuels.	Recreation Centre, Public Works, Fire Department	High	Website & Newsletter	Annual -60% or greater community participation	Host annual community clean up event
10. Develop plans to reduce wildfire risk to critical infrastructure and viewing platforms identified as important for tourism.	Fire Chief, YG	Low	N/A	Summary report of identified critical infrastructure completed by end of 2025	Will impact O&M budgets.
11. Fuel maps are produced according to a mix of territorial datasets. The result is a close	YG & Town of Faro	Moderate	Funding and external technical expertise	Improved fuels layer	This exceeds the capacity of the Town. Need assistance from

Action	Lead/Collaborators	Priority	Resources Required	Metric for Success	Notes
representation of vegetation on the ground; however, for a small Area of Interest like Faro, it is recommended to review the territorial fuel type layer and confirm mapping accuracy.					YG to review and update regularly.
12. Organize Wildfire Preparedness Days in identified high risk areas, collaborate with Yukon Wildfire and local fire department.	YG, CAO, & Fire Chief	High	Newsletter and Fire Department to promote.	Host a Community Wildfire Preparedness Day event annually in spring. 60% or greater community participation	Collaborate with Yukon Wildfire Management
13. Design a fuel management plan to reduce fuel loads in high coniferous areas, particularly conifers in the old burn scars.	FireSmart, Fire Department, with help from YG	High	Funding	Endorsement of the CWPP and implementation of fuel management projects annually	Collaborate with Yukon Wildfire Management
14. Support community members to clean up vegetation in their Home Ignition Zone.	Council, and Community Members	High	Newsletter	Distribution of home-owner education materials, implementing a chip and haul project, survey of homeowners.	Need to review & update Property Mtce Bylaw
Legislation					
15. Adopt FireSmart building and landscaping requirements to be addressed in the	YG & Town of Faro	Low	N/A	Updated Property and Mtce Bylaw	N/A

Action	Lead/Collaborators	Priority	Resources Required	Metric for Success	Notes
development and leasing approvals process.					
16. Assess and determine how future planning and development activities can support post fire recovery.	YG, Council, CAO, and Fire Chief	Low	N/A	Kickoff meeting between leads/collaborators in 2025	Need assistance from YG
Development					
17. Once above assessments are complete create a database for keeping track of community needs. Assign priority ranking.	CAO & Fire Chief	Moderate	Excel spreadsheet	Review annually at community preparedness meeting and reevaluate priorities	N/A
Interagency Cooperation					
18. Continue to coordinate relationship building opportunities with staff from identified stakeholder groups.	Council, CAO, Fire Chief & YG	Moderate	Invite all lead/collaborators to Wildfire Preparedness Day	Attendance from all identified lead/collaborators at Wildfire Preparedness Day	N/A
19. Consider establishing a wildfire resiliency task force or committee comprising representatives from the Faro town council, local fire department, and Yukon Wildland Fire.	YG to coordinate with Town of Faro	Moderate	N/A	Annual meeting pre and post fire season to review ongoing wildfire related issues	N/A
Cross Training					
20. Pursue and coordinate cross training opportunities.	YG to coordinate with Town of Faro	High	Facility to hold training, basic	Make initial contact with Yukon Wildfire and	Prioritize and encourage training opportunities for interested

Action	Lead/Collaborators	Priority	Resources Required	Metric for Success	Notes
			suppression equipment	establish cross training dates	community members. Consider timing cross training around a Wildfire Preparedness Day

Appendix 4: Additional Resources and Information

The following list of resources and information has been compiled according to the seven FireSmart Disciplines to aid in the implementation of CWPP actions in Faro.

FireSmart Discipline	Resource
Education	• FireSmart Canada programs • Yukon Wildfire Management • Canadian Mental Health Association - Coping with Natural Disaster Stress • Educational Messaging Advisory Committee – Desk Reference • Red Cross – Coping with Crisis
Emergency Planning	• National guide for wildland-urban-interface fires - provides guidance to Canadian local governments and First Nations on WUI land use planning and regulation implementation, as well as guidance on wildfire response preparedness planning. • Evacuation Operational Guide for First Nations and Local Authorities in British Columbia • 2022 Wildfire Resources – Before, During and After a Wildfire – a list gathered by FNESS containing links for resources to support communities through all stages of a wildfire. • National Indigenous Fire Safety Council Project and the Aboriginal Firefighters Association of Canada - provides programs and research through an Indigenous led framework designed to support Indigenous communities in the development of their internal capacity to improve community safety and resiliency.
Vegetation Management	• Funding resources for fuel management treatments can vary from year to year. Information on Yukon Government funding opportunities can be found here. • FireSmart has a Cultural Burning & Prescribed Fire page with information on burn planning, current and past Cultural Burning initiatives, and funding supports. • Prescribedfire.ca also has information and resources including how to plan a burn. • Review a video case study of Shackan Indian Band (British Columbia) cultural burning planning and operational process. • Review research paper "Centering Indigenous Voices: The Role of Fire in the Boreal Forest of North America"[36]

[36] Christianson, A.C., Sutherland, C.R., Moola, F. *et al.* 2002. Centering Indigenous Voices: The Role of Fire in the Boreal Forest of North America. *Curr Forestry Rep* **8**, 257–276. https://doi.org/10.1007/s40725-022-00168-9

	• The We Are Fire Toolkit is an online knowledge product that invites you to learn about and explore uses of fire on the land. It is based in Saskatchewan; however, it is an excellent resource for how to develop Indigenous-led Fire Prescriptions.
Legislation	See *Appendix 2: Relevant Acts and Regulations*
Development	• Additional guidance on land use planning tools and strategies for the Wildland-Urban Interface include the American Planning Association's PAS Report 594 Planning the Wildland-Urban Interface (2019), which available at no charge through the association's website. • The National Research Council (NRC) Wildland-Urban Interface Technical Committee has also published National Guide for Wildland-Urban Interface (WUI) Fires (2021); this guide provides guidance to Canadian local governments and First Nations on WUI land use planning and regulation implementation.

Interagency Cooperation and Cross Training	Agencies that may play a role in interagency cooperation include:
	• Yukon Wildfire Management
	• Town of Faro Council
	• Kaska Dena Council
	• Faro Volunteer Fire Department
	• Indigenous Services Canada
	  ○ Emergency Management Assistance Program (EMAP), which supports communities in accessing emergency assistance services. Will provide funding for communities to build resiliency, and prepare and respond to natural hazards
	• First Nation Health Authority
	  ○ Emergency Management Branch – ensures FN communities are effectively incorporated into emergency preparedness, prevention, response and recovery initiatives.

Appendix 5: Types of Fuel Management

Types of Vegetation Management

Fuel Abatement

Fuel abatement is a term to describe larger-scale landscape level forest fuels treatments that extend past the wildland urban interface zone and into the landscape zone. Fuel abatement projects tend to be larger in size than FireSmart projects with greater amounts of forest fuel removal.

Larger fuel treatments can slow or completely stop wildfire spread by removing and/or reducing forest fuels (surface, ladder and crown fuels). Fuel treatments can achieve goals to reduce the rate of spread, fire intensity and the likelihood of a transition from a manageable surface fire to an aggressive crown fire.

These larger treated areas also provide strategic locations for firefighting operations. They enable safer access and escape for firefighters to suppress a wildfire. They also enable a strategic location for attack strategies such as back burning.

The following describes the fuel abatement tools proposed under this plan:
A **fire guard** is an area where all vegetation and organic matter is removed down to mineral soil. The purpose to remove combustible materials on the surface, create an access for firefighters to suppress wildfire and provide an egress route for firefighters and members of the public in the event of advancing wildfire.

A **fuel break** is a strip of land on which the forest fuels and ground vegetation has been reduced or modified to reduce the fire's ability to spread rapidly. A fuel break may include:

- **Thinning** the forest through hand falling and/or mechanical cutting. A shelterwood thinning treatment includes an increased spacing (5-8 metres) between stems of trees to reduce the potential for sustained crown fire and reduce the spread rate of fires that travel through the forest canopy.

- **Variable retention** includes clearing to create a landscape-scale fragmentation in forest fuels through removal of all coniferous stems and retention of healthy deciduous stems.

- **Mastication and mulching** using machinery to remove and/or reduce surface fuels to reduce the potential for fire to reach critical surface intensity as well as spread to a crown fire.

Prescribed Fire

Prescribed fire involves the introduction of a planned and controlled fire to an area under ideal (i.e. safe) conditions. Prescribed fire offers an efficient and cost-effective method following fuel abatement to reduce slash loading and thick duff layers (i.e. surface fuels). It may also be used as a removal treatment in a mixed wood to eliminate more flammable conifers and stimulate deciduous growth (i.e. forest fuels). Individual prescribed fire prescriptions will be developed based on site requirements and include an operational plan that considers safety and fire weather conditions. Prescribed fire is also a strong tool to enrich and prepare the ground for stand conversion (see below).

Cultural Burning

"*Cultural Burning is the controlled application of fire on the landscape to achieve specific cultural objectives. These burns are typically implemented at a low intensity, with guidance from an Elder or Fire Knowledge Keeper, often in collaboration with inter-ministry partners.*"[37]

Since time immemorial many Indigenous groups in Canada have cared for the land by putting low intensity fire on the landscape. This was a sacred practice that had many practical outcomes such as increased forage for ungulates, increased berry crop production and reduced wildfire hazards. Colonial government's ban of the Cultural Burn in the late 1800's and subsequent forest "protection" legislation implemented federally and across provinces and territories has had many ramifications on Indigenous people and the forests around them. However, there is a burgeoning interest from academics, government officials, general public, and most importantly First Nations in renewing Cultural Burn programs.

The Cultural Burning process can achieve many objectives:

- reduces overall wildfire hazard,
- empower First Nations to take back their culture and continue to increase their role as stewards of the land,
- builds interagency coordination and cooperation as multiple jurisdictions work together,
- builds on existing knowledge base of wildfire and suppression techniques,
- builds fire management capacity within the Nation and external agencies (Wildland Fire Management and other Fire Departments), and
- supports ecosystem biodiversity and habitat heterogeneity.[38]

Cultural Burning programs are gaining momentum. There are national programs available to provide hands-on guidance to build a cultural burn program with the Nation – starting with existing capacity and building upon that at the Nation's pace. Review *Appendix 4: Additional Resources and Information*.

Stand Conversion

Stand conversion has also been supported by research as a strategy to reduce the risk of a catastrophic wildfire. Stand conversion is defined as the removal of flammable species (e.g. coniferous) and replacing with less flammable species (e.g. deciduous), whether through tree planting or allowing deciduous to regenerate naturally.

Native deciduous trees (aspen or birch) may be damaged from fire but seldom contribute as a fuel to the wildfire unless under extreme fire weather conditions. This is due to their inner moisture content (trunks and thick branches) as well as the green leaves retain much more moisture than pine/spruce needles. Additionally, naturally there is very rarely any 'ladder fuels' (i.e. branches/leaves) on the lower two thirds of a mature native deciduous species. Ladder fuels contribute to fire severity by allowing a fire on the

[37] Excerpt from "What is Cultural Burning" on Prescribed Fire website. Available at: https://prescribedfire.ca/cultural-burning/

[38] UBC News. 2021. 'Cultural burning' important for biodiversity: UBC expert'. Available: https://news.ubc.ca/2021/08/03/cultural-burning-important-for-biodiversity-ubc-expert/#:~:text=Cultural%20burning%20is%20used%20for,to%20each%20community%20and%20culture

surface to spread to the crown of the tree. A fire in the crown of the trees spreads at a much more accelerated rate and higher intensity and is therefore more difficult to suppress than a surface fire.

Therefore, stand conversion from spruce/pine to native deciduous species has the benefits of:

- Having the potential to slow or completely stop a wildfire in certain conditions,
- Buying wildland firefighters more time to conduct a response to an approaching wildfire,
- Increasing safety for the wildland firefighters initiating a response by reducing the intensity of approaching wildfire.

Yukon Wildland Fire Management may assist in stand conversion strategies through planting native fire resilient deciduous species.

Appendix 6: References

The following is a summary of footnote references. Plans outlined in *Appendix 2: Relevant Acts and Regulations* and *Appendix 4: Additional Resources and Information* are accessible through hyperlinks in the digital copy of this document and are not referenced again below.

AECOM. 2021. *Modeling Future Wildfire Risk in Yukon*. Report for Yukon Government.

Azizi, J. 3 July 2019. Wildfire Smoke Leads to Air Quality Advisory Across the Yukon. Yukon News [website]. Available: https://www.yukon-news.com/news/wildfire-smoke-leads-to-air-quality-advisory-across-the-yukon/

Beaver A. 2015. *Wildland Fire Risk Management and Decision Making*. Conference proceedings: 13th International Wildland Fire Safety Summit and 4th Human Dimensions of Wildland Fire Conference. April 20-24, Boise, Idaho.

Calkin, D.E, Cohen, J.D., Finney, M.A. and Thompson, M.P. 2014. How risk management can prevent future wildfire disasters in the wildland-urban interface. Proc. Natl. Acad. of Science. U.S.A. 111: 746–751.

Canadian Climate Institute. 2022. Due North: Facing the costs of climate change for northern infrastructure. Environment and Climate Change Canada. Available: https://climateinstitute.ca/wp-content/uploads/2022/06/Due-North.pdf

Canadian Institute for Climate Choices (CICC). 2020. Tip of the Iceberg: Navigating the known and unknown costs of climate change for Canada. Canadian Climate Institute. Available: https://climateinstitute.ca/reports/tip-of-the-iceberg/

Christianson, A.C., Sutherland, C.R., Moola, F. *et al.* 2002. Centering Indigenous Voices: The Role of Fire in the Boreal Forest of North America. *Curr Forestry Rep* **8**, 257–276. https://doi.org/10.1007/s40725-022-00168-9

Cohen, J.D. 2010. The wildland/urban interface problem. Fremontia. 38:2/38:3. 8p.

Cohen JD, Westhaver A. 2022. An Examination of the Lytton, British Columbia wildland-urban fire destruction. Summary Report to the British Columbia FireSmart Committee. Available: https://firesmartbc.ca/wp-content/uploads/2022/05/An-examination-of-the-Lytton-BC-wildland-urban-fire-destruction.pdf

Ember Research Services Ltd. 2017. *Yukon Communities: Wildland Fire Risk Assessment Methodology Project*. Report for Yukon Wildland Fire Management.

Ember Research Servicees Ltd., Applied Ecosystem Management Ltd, and TransNorthern Management Consulting. 2000. *Yukon Community Wildfire Risk and Reduction Assessment – volumes 1 and 2*. Report for Government of Yukon and Indian and Northern Affairs Canada Fire Management Program.

Flannigan MD, Logan KA, Amiro BD, Skinner WR & Stocks BJ. 2005. *Future Area Burned in Canada*. Climatic Change 72: 1-16.

Government of Yukon. 2019. *Yukon Forest Health Report*. Whitehorse. Available: https://yukon.ca/sites/yukon.ca/files/emr/emr-2019-yukon-forest-health-report.pdf

Government of Yukon. 2020. *Yukon Forest Health Report*. Whitehorse. Available: https://yukon.ca/sites/yukon.ca/files/emr-2020-yukon-forest-health-report.pdf

Government of Yukon. 2021. *Yukon Forest Health Report*. Whitehorse. Available: https://yukon.ca/sites/yukon.ca/files/emr/emr-2021-forest-health-report.pdf

Howard C, Rose C, Dodd W, et al. 2020. SOS! Summer of Smoke: a retrospective cohort study examining the cardiorespiratory impacts of a severe and prolonged wildfire season in Canada's high subarctic. Available: https://bmjopen.bmj.com/content/bmjopen/11/2/e037029.full.pdf.

Knapp, E.E., Valachovic, Y.S., Quarles, S.L. *et al.* 2021. Housing arrangement and vegetation factors associated with single-family home survival in the 2018 Camp Fire, California. fire ecol 17, 25. Available: https://doi.org/10.1186/s42408-021-00117-0

Smith, C.A.S., Meikle, J.C., and Roots, C.F. (editors), 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, p.313. Available: https://yukon.ca/sites/yukon.ca/files/env/env-ecoregions-yukon-territory.pdf

Town of Faro. 2023. History of Faro. Available: https://faro.ca/p/history-of-faro

Town of Faro. 2013. Official Community Plan. Available: https://faro.ca/p/files-and-documents

UBC News. 2021. 'Cultural burning' important for biodiversity: UBC expert. Available: https://news.ubc.ca/2021/08/03/cultural-burning-important-for-biodiversity-ubc-expert/#:~:text=Cultural%20burning%20is%20used%20for,to%20each%20community%20and%20culture

University of California. 2022. *Preparing Your Home*. Wildfire Preparation. Available: https://ucanr.edu/sites/fire/Prepare/Building/

Wotton M, Flannigan M & Nock CA. 2010. *Forest fire occurrence and climate change in Canada*. International Journal of Wildland Fire. 19. 253-271. 10.1071/WF09002.

Wotton, M, Flannigan, M & Marshall, G. 2017. Potential climate change impacts on fire intensity and key wildfire suppression thresholds in Canada. Environmental Research Letters. 12. 095003. 10.1088/1748-9326/aa7e6e.

Yukon Bureau of Statistics. 2023. Faro. Available: https://community-statistics.service.yukon.ca/pages/faro