Hamlet of Tulita

Community Wildfire Protection Plan

Prepared for:
Government of the Northwest Territories
Environment and Natural Resources - Forest Management Division

Northwest Territories Environment and Natural Resources

March 2011

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Table of Contents

1 Introduction

The Hamlet of Tulita Community Wildfire Protection Plan was developed to provide practical and operational wildland/urban interface risk mitigation strategies to reduce the threat of wildfire to development within Tulita.

The project objectives include:

- Assess and quantify community wildland/urban interface hazard and risk
- Based on interface hazard and risk:
  - Develop and prioritize fuel management and maintenance recommendations and prescriptions
  - Develop a summary of significant factors within the community that would enhance its exposure to wildfire and offer recommendations to reduce that threat.

The Hamlet of Tulita Community Wildfire Protection Plan was developed using standardized FireSmart hazard assessment protocols and mitigative measures were developed based on the seven disciplines of wildland/urban interface approach and current research and knowledge in interface community protection.

An implementation plan is included in this Plan to assist agencies to budget and complete projects based on the priorities identified.

This plan should be reviewed and updated at **five year intervals** to ensure it is based on current conditions.

2 Planning Area and Stakeholders

The planning area includes all lands within two kilometres of the developed areas in Tulita (Map 1).

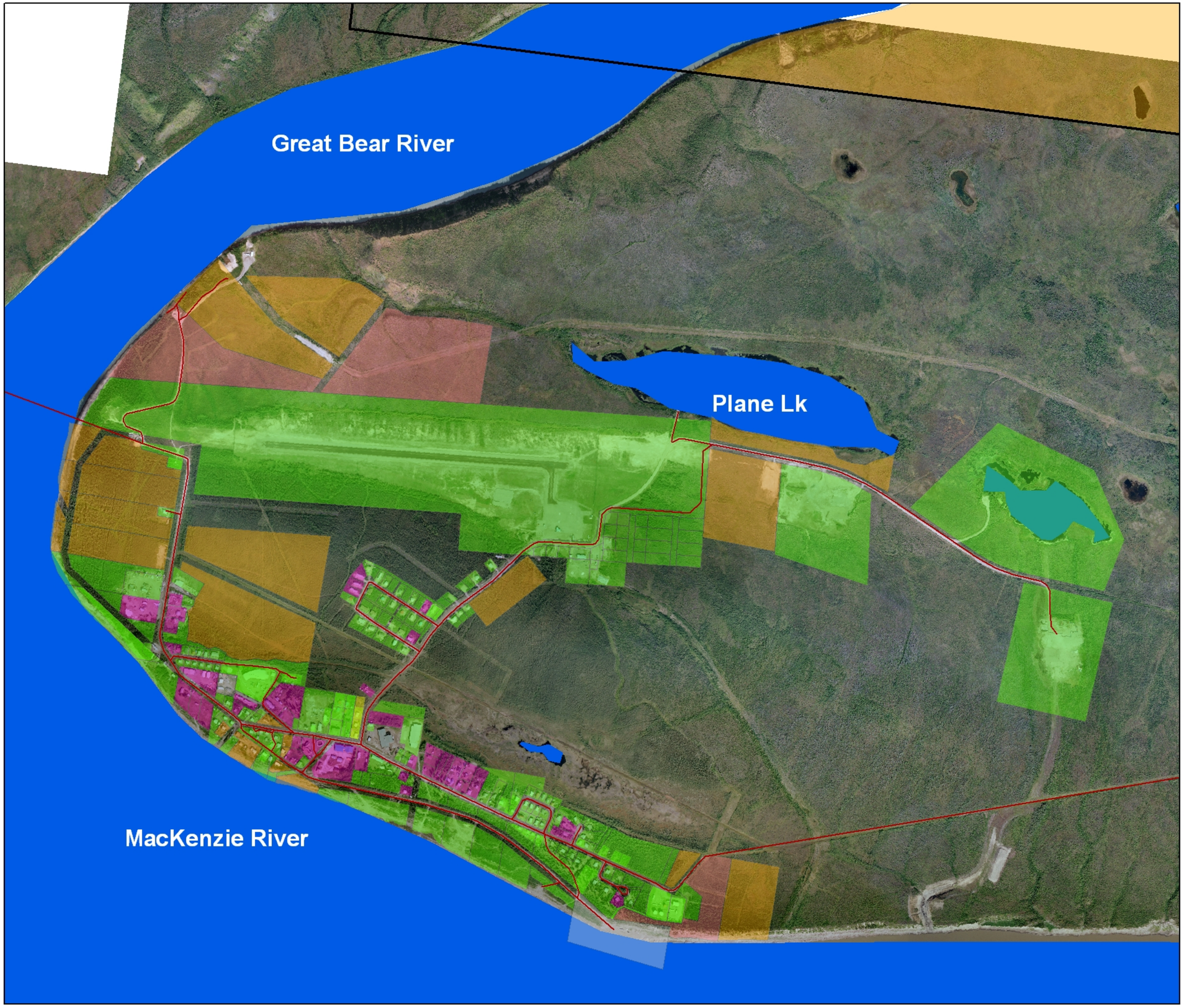
Stakeholders consulted with in the planning process included:

- Paul Rivard, Manager of Forests — GNWT ENR Sahtu Region
- Frank Andrew, Chief — Tulita Dene Band
- Chris Hopkins, Director — Sahtu Renewable Resource Board

Land status authority is varied and is represented by the following (Map 1):

- Commissioner (GNWT MACA)
- Federal
- Indian Affairs Branch
- Mixed
- Sahtu Dene
- Private
- GNWT Crown lands (GNWT ENR)

Map 1 - Planning Area
Hamlet of Tulita



Land Status Authority

- Commissioner
- Federal
- Indian Affairs Branch
- Mixed
- Sahtu Dene
- Private

Roads

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3 Hazard & Risk Assessment

The hazard and risk assessment process analyses the risk of wildfire ignition through analysis of fire incidence, the wildfire behaviour potential through analysis of fuels and weather data, and the values at risk to wildfire through FireSmart hazard assessments.

3.1 Wildfire Ignition Potential

The assessment of recent fire incidence was completed using historical fire data from GNWT Environment and Natural Resources (ENR) for the twenty two-year period from 1988 to 2009.

Data within a 10 kilometre radius of Tulita indicates that wildfire incidence is high. Fire incidence data shows a total of 27 wildfires in the planning area (Map 2). Predominant causes include fires ignited by coal seams (67%), residents, recreation, and lightning. Several large wildfires greater than 10,000 ha have occurred over the past twenty years including the 1995 coal seam fire which burned up to and around the Hamlet of Tulita.

Table 1: Fire Incidence by Cause (1988 – 2009)

General Cause	Number of Fires	Percent of Total
Human-Caused	6	22
Other-Caused	18	67
Lightning-Caused	3	11
Totals	**27**	**100**

Wildfire incidence in the planning area is high and is predominantly coal seam or human-caused.

Map 2 - Wildfire Incidence
Hamlet of Tulita

- Human-Caused Wildfire
- Lightning-Caused Wildfire
- Wildfire > 4 hectares
- Roads

VQ-009-1995
61,680 ha

EV-032-1969
10,745 ha

MacKenzie River

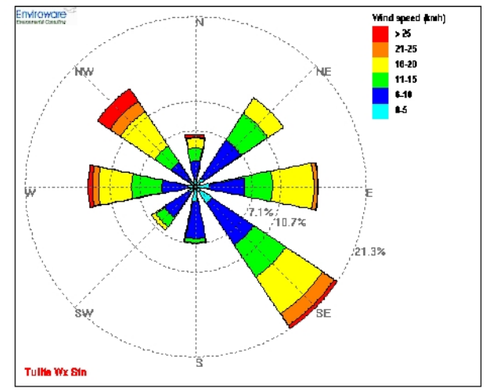
Great Bear River

Tulita

10 KM Buffer Zone

VQ-018-1998
5920 ha

VQ-057-1993
22,125 ha



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3.2 Wildfire Behaviour Potential

3.2.1 Wildland Fuel Types

Fire Behaviour Prediction (FBP) fuel types (Taylor, 1997) were used to analyze the fuel types and fire behaviour potential within and adjacent to Tulita.

The planning area is dominated with cured–grass fuels in the 1995 fire area and boreal spruce (C-2), mixedwood (M-1) non-fuel (NF) , and deciduous (D-1) fuel types in the developed Hamlet area. Each of these fuel types can present hazard to interface structures based on fuel moisture conditions and time of year. The MacKenzie River provides a fuelbreak to wildfires on the south-side of the river.

3.2.2 Fire Weather Analysis

Fire weather data from the Tulita weather station was used to determine the predominant wind directions during the fire season. Data indicates that the predominant and strongest wind directions are from the southeast/east and northwest/west quadrants (Figure 1).

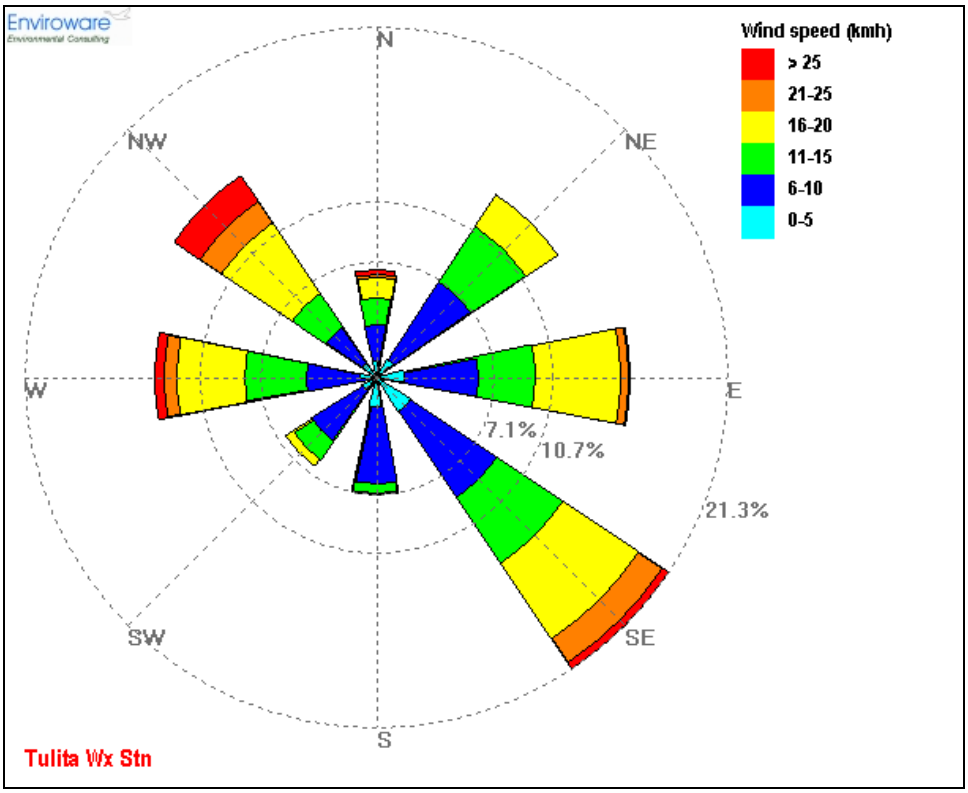


Figure 1 – Tulita Windrose

Wildland fuel types and fire weather data indicates a Low potential for intense landscape-level wildfire exists in the areas surrounding Tulita. The potential for smaller-scale wildfire within the Hamlet area exists due to the C-2 and M-1 fuel types.

Great Bear River

Plane Lk

New Resid.
Subdivision

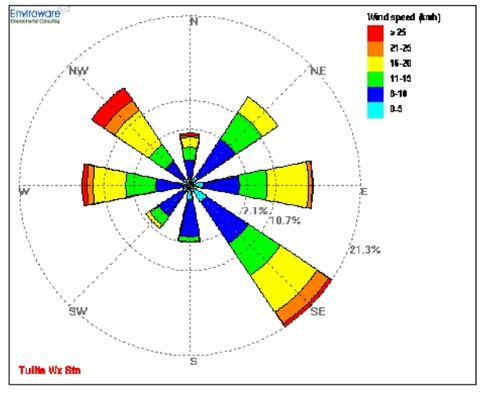
MacKenzie River

Map 3 - Fuel Types
Hamlet of Tulita

FBP Fuel Type

- Spruce-Lichen Woodland (C-1)
- Boreal Spruce (C-2)
- Mature Pine (C-3)
- Immature Pine (C-4)
- Deciduous (D-1)
- Mixedwood (M-1)
- Bog
- Non-Fuel (NF)
- Cured Grass (O1)

Roads



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3.3 FireSmart Hazard Assessments

FireSmart hazard assessments (P.I.P., 2003) were conducted on developments and adjacent wildland fuel types within the planning area. The FireSmart hazard assessment process evaluates wildland and structural fuel types, structural features, and topography within and adjacent to the development area to consistently quantify the wildland/urban interface hazards within the planning area and to help set priorities for mitigative options.

Section 3.2 identified a Low potential for intense landscape-level wildfire on the lands surrounding Tulita. FireSmart hazard is rated as High to Extreme based on the proximity of C-2 fuel types to newer development areas within the Hamlet. FireSmart hazard for each of the development areas is discussed below.

Table 2: FireSmart Hazard Assessments

Development Area	Structure/Site Hazard (0 – 30m)
Main Townsite	Low - Extreme
New Residential Subdivision	Extreme
Industrial Area/Airport	Low
NTPC Power Generation Station	Moderate

MainTownsite

FireSmart hazard for the Tulita main townsite is primarily Low with some perimeter areas at High to Extreme hazard based on proximity to C-2 and M-1 fuels. Exterior structure materials are primarily non-combustible asphalt shingle or metal roofing and wood or metal siding. Access roads are all-weather loop and dead-end. The highest wildfire threat is to structures backing onto C-2 fuels on the north and east perimeters of the townsite area.

New Residential Subdivision

FireSmart hazard for the new residential subdivision is Extreme due to C-2 fuels immediately surrounding the structures, with inadequate Zone 1 defensible space. Exterior structure materials are primarily asphalt shingle roofing and hardi-plank or vinyl siding.

Industrial Area/Airport
FireSmart hazard for the Industrial Area/Airport is Low. Fuel types surrounding the structures are primarily non-fuel and cured-grass with significant Zone 1-2 defensible space established between fuels and structures. Exterior structure materials are primarily metal roofing and metal siding.

Tulita NTPC Power Generation Stn.
FireSmart hazard for the NTPC Power Generation Station is Moderate. The site consists of a large non-fuel clearing surrounded by boreal spruce (C-2) fuel types. Exterior structure materials are metal roofing and siding.

The FireSmart hazard is High to Extreme in the new residential subdivision and on the north and east perimeter developments in the main townsite area.

Map 4 - FireSmart Hazard
Hamlet of Tulita

Great Bear River

Plane Lk

Airport

New Resid. Subdivision

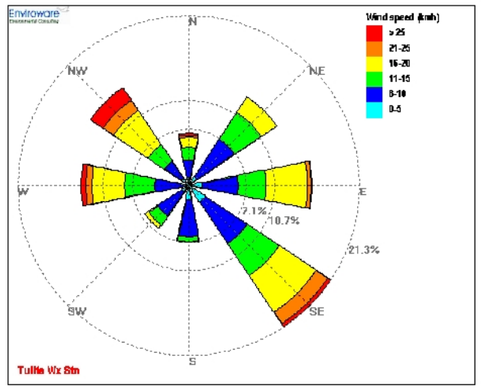
Main Townsite

MacKenzie River

FireSmart Hazard

- Low
- Moderate
- High
- Extreme

Roads



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4 Vegetation Management Options

The goal of vegetation management is to create a fuel-reduced buffer between structures and flammable wildland vegetation to reduce the intensity and rate of spread of wildfire approaching or leaving the development. Vegetation management options are proposed at the appropriate scale, based on hazard and risk, to reduce the threat of wildfire to developed areas. While fuel modification projects reduce the threat of wildfire to developments, they do not ensure structure survival under all hazard conditions.

Vegetation management consists of one or any combination of the following options:

- Fuel removal
- Fuel reduction
- Species conversion

Complete descriptions of the methods included in each of the above options are included in *"Fire-Smart Protecting Your Community from Wildfire"* (PIP 2003).

FireSmart standards refer to three interface priority zones with vegetation management for interface structures recommended in Zones 1 and 2 at a minimum and in Zone 3 based on hazard and risk.

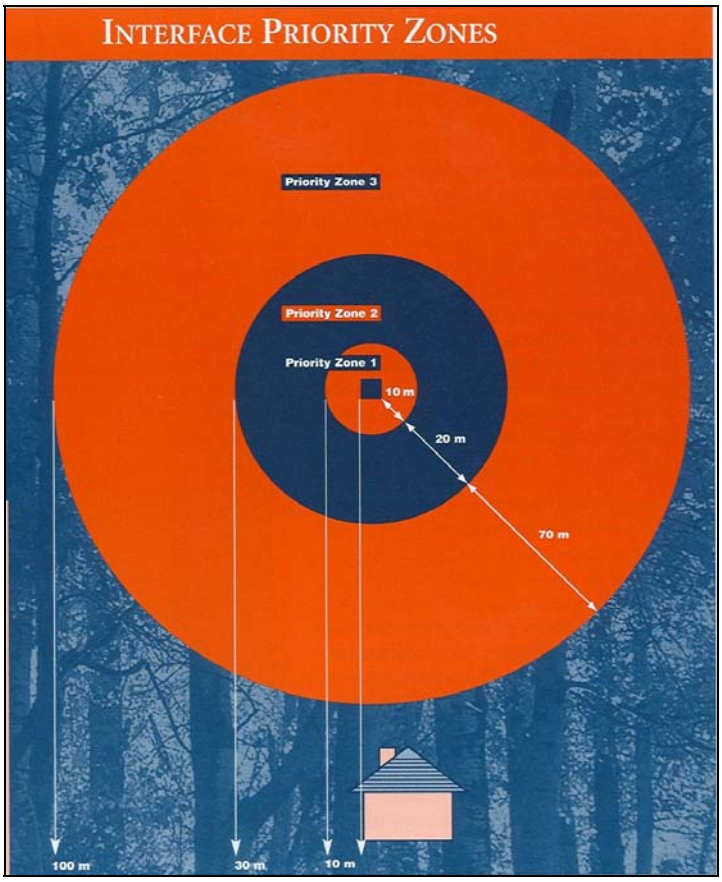


Figure 3 – Interface Priority Zones (PIP, 2003)

4.1 Existing Vegetation Management

Fireguards were completed to the east of the Hamlet in the 1990's by the GNWT ENR Department (Map 5 & Table 3). This fireguard was challenged and over-run by wildfire in 1995 but managed to slow the intensity and rate of spread enough to allow ENR to control the spread across the guard the following day.

Table 3: Existing Vegetation Management Areas

Name	Area (ha)	Year	Agency	Comments
Fireguards	4.2	1990's	GNWT ENR	Old fireguard needs maintenance and widening to ensure effectiveness

4.2 Proposed Vegetation Management

4.2.1 Zone 1

Zone 1 vegetation management is predominantly adequate throughout the area except for scattered structures with lack of adequate Zone 1 defensible space from native grass fuels (O1).

FireSmart Zone 1 vegetation management options include:

- Removal of flammable forest vegetation within 10 metres of structures.
- Removal of all coniferous ladder fuels (limbs) to a minimum height of 2 metres from ground level on residual overstory trees.
- Removal of all dead and down forest vegetation from the forest floor.
- Increased maintenance to ensure that all combustible needles, leaves, and native grass are removed from on and around structures.
- Establishment and maintenance of a non-combustible surface cover around the structure including the use of FireSmart landscaping species.
- Removal of all combustible material piles (firewood, lumber, etc) within 10 metres of the structure.

For more information on FireSmart Zone 1 standards refer to *FireSmart – Protecting Your Community from Wildfire* (PIP 2003).

Recommendation 1: Encourage residents to establish adequate Zone 1 defensible space around their structures.

4.2.2 Zone 2-3

Zone 2-3 fuels management is recommended for areas surrounding the new residential subdivision and on the east and west perimeters of the main townsite to reduce the threat of wildfire in C-2 and M-1 fuels to perimeter structures (Table 4 & Map 5). Proposed fuels management areas are conceptual at this time and will require detailed fuels reduction planning to identify fuels management prescription, unit boundaries, and operational constraints.

Table 4: Priority Fuel Modification Areas

Priority	Area (Ha)	Proposed Fuel Modification Standards	Land Status Authority
1	14.7	▪ Fuels reduction by spacing Spruce to 2-3 m crown spacing for a minimum 100m wide behind homes ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Retain deciduous overstory stems ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite	▪ GNWT ENR ▪ Commissioner ▪ Sahtu Dene
2	5.4	▪ Fuels reduction by spacing Spruce to 2-3 m crown spacing for a minimum 100m wide behind homes ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Retain deciduous overstory stems ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite	▪ Indian Affairs ▪ Commissioner
3	2.5	▪ Fuels reduction by spacing Spruce to 2-3 m crown spacing for a minimum 75m wide behind homes ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Retain deciduous overstory stems ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite	▪ Sahtu Dene
4	5.7	▪ Fuels removal to maintain and widen existing fireguard to minimum 40m width ▪ Dispose of debris by piling and burning onsite	▪ GNWT ENR
Total	**28.3**		

Recommendation 2: Zone 2-3 fuels reduction and maintenance is the responsibility of the Land Status Authority holder(s) and should be implemented based on the priorities identified in this plan.

4.3 Vegetation Management Maintenance

Fuel modification area maintenance schedules depend on many factors including fuel type, soil and moisture conditions, and specific weather events. It is suggested that land managers provide periodic inspections of their fuel modification project areas and complete maintenance as required. It is projected that fuel modification maintenance will be required at least each five-year period.

Recommendation 3: Ensure that all existing fuel modification projects are inspected on a regular basis and maintained as necessary to ensure effectiveness. Maintenance should be the responsibility of the land manager or landowner.

Map 5 - Fuel Modification
Hamlet of Tulita

Plane Lk

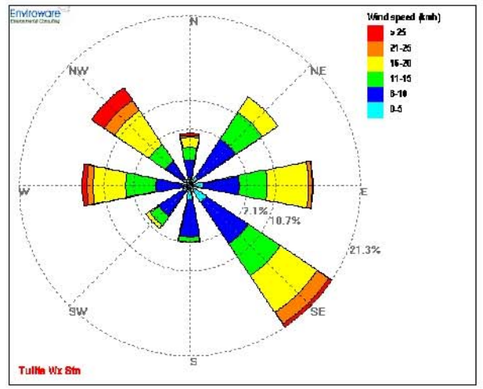
Existing Fuel Modification

Proposed Fuel Modification

Fuel Removal/Clear

Fuel Reduce/Thin

Roads



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5. Development Options

Consideration of wildfire at the planning stage of new development is encouraged to ensure that wildfire hazard and appropriate mitigation measures are developed and implemented prior to development.

New developments may overlap or conflict with existing fuel modification resulting in a reduction in fuelbreak effectiveness and an increase in wildfire threat to the new or existing development in the area.

Recommendation 4: If a new development removes or reduces the effectiveness of any existing or proposed FireSmart mitigation measures or introduces new wildfire hazards, the area must be assessed and measures implemented to maintain the community protection standards.

5.1 Structural Options

Structural characteristics that contribute to a structure's ability to withstand wildfire ignition include type of roofing and siding material, structure siting with respect to steeper forested slopes, and proper construction and maintenance of eaves, vents, and openings that can accumulate flammable debris and allow wildfire to gain entry to the structure.

The most common roofing materials in the planning area are asphalt shingle and metal and the most common siding materials are wood, metal, or hardi-plank.

Structures are typically elevated above-ground on pilings and many are not skirted allowing wildfire access to the underside of structures with cured grass or combustible materials underneath the structure.

5.2 Infrastructure Options

Infrastructure options include provision of adequate access standards to ensure quick and safe ingress and egress for residents and emergency responders during a wildfire, adequate and accessible water supply for structure protection and suppression, and utility installation standards that do not increase risk to emergency responders during a wildfire emergency.

5.2.1 Access

Access road standards throughout the planning area are mainly adequate for an interface community with primarily all-weather loop road and dead-end access. There is no summer access road to Tulita.

5.2.2 Water Supply

Tulita does not have municipal hydrant water-supply. All development areas rely on water-tender supply from the local fire department for structure protection activities.

5.2.3 Franchised Utilities

Franchised utilities affected by an interface fire include electrical power and gas. Proper installation and maintenance of these services can minimize the risk to residents and emergency services personnel.

Electrical Power

Power distribution and residential service is provided through a NTPC diesel-powered generator station with above-ground distribution lines.

Gas

Heating fuel is provided by heating oil.

6. Public Education Options

Public education is a large part of the solution to success. Residents, landowners, municipal administration, and elected officials all need to be aware of the issues related to *FireSmart* development and the solutions to minimizing the risk and need to become a partner in implementation of the solutions in their communities. If stakeholders understand the issues relating to wildland/urban interface hazard they will be more likely to take action on their own property or to support actions taken by other authorities.

Residents and stakeholders can refer to the GNWT ENR, Forest Management Division website at www.nwtfire.com for further information on the GNWT FireSmart program, current wildfire updates, and other wildfire management related information.

Key Messages

FireSmart hazard assessments identified the need for the following key messages to target audiences in the planning area.

- Development and maintenance of FireSmart Zone 1 defensible space surrounding the home, including:
  - Grass maintenance
  - Firewood and combustibles storage
- Removal of all combustible materials and vegetation from around and underneath homes
- Skirting of structure open-undersides to minimize the threat of wildfire entry underneath structures.

Recommendation 5: Public education on acceptable FireSmart Zone 1 standards is recommended for all Tulita residents. Priority items include:

- Development and maintenance of FireSmart defensible space surrounding the home
- Removal of all combustible materials and vegetation from around and underneath homes
- Skirting of structure open-undersides

7. Inter-Agency Cooperation and Cross-Training Options

Interagency cooperation and cross-training between all stakeholders is necessary to ensure cooperative and effective implementation of wildland/urban interface mitigation options and to coordinate an effective response to a wildland/urban interface fire.

Interagency stakeholders within the planning area include:

- Sahtu Dene and Metis
- GNWT Environment and Natural Resources (ENR)
- GNWT Municipal and Community Affairs (MACA)

Recommendation 6: Develop a FireSmart Committee, consisting of all relevant stakeholders, to coordinate and lead the FireSmart program for the area.

Cross-training for Tulita Fire Department members and ENR wildfire suppression personnel should include basic wildfire, wildland/urban interface fire, and incident command system training courses.

The following cross-training courses are available.

Wildland Fire

- Wildland Firefighter (NFPA 1051 Level I, S-100, or equivalent)

Wildland/Urban Interface Fire

- Structure and Site Preparation Workshop (S-115)
- Fire Operations in the Wildland/Urban Interface (S-215)

Incident Command System

- ICS Orientation (I-100)
- Basic ICS (I-200)
- Intermediate ICS (I-300)
- Advanced ICS (I-400)

Recommendation 7: Tulita Fire Department and GNWT MACA & ENR should partner on cross-training initiatives to ensure emergency responders are cross-trained to the following minimum standards:

- Wildland Firefighter
- Structure and Site Preparation Workshop (S-115)
- Fire Operations in the Wildland/Urban Interface (S-215)
- Incident Command System (I-100 to I-400) as applicable

8. Emergency Planning Options

Emergency preparedness is an important part of any disaster planning. The need for organization, clear chain of command, and an understanding of job responsibilities during an interface fire are of paramount importance.

At present Tulita does not have a wildfire pre-plan to provide emergency responders with detailed tactical information with respect to values at risk and operational strategies and tactics to minimize losses during a wildland/urban interface fire. A suggested outline is as follows:

- Planning Area Jurisdictional Authority
- Values at risk (life, structures, infrastructure)
- Fire operations plan (strategies/tactics, water sources, equipment, communications plan)

Recommendation 8: Develop a Community Wildfire Pre-Plan for Tulita to provide greater operational detail to emergency responders during a wildland/urban interface incident.

9 Implementation Plan

The goal of the implementation plan is to identify the responsible stakeholders for each of the recommendations and set timelines for commencement and completion based on priorities and funding availability.

Vegetation Management

Issue	Recommendation	Responsible Agency
Zone 1	**Recommendation 1:** Encourage residents to establish adequate Zone 1 defensible space around their structures.	GNWT MACA Hamlet of Tulita
Zone 2-3	**Recommendation 2:** Zone 2-3 fuels reduction and maintenance is the responsibility of the Land Status Authority holder(s) and should be implemented based on the priorities identified in this plan.	GNWT ENR & MACA Sahtu Dene Indian Affairs
Maintenance	**Recommendation 3:** Ensure that all existing fuel modification projects are inspected on a regular basis and maintained as necessary to ensure effectiveness. Maintenance should be the responsibility of the land manager or landowner.	GNWT ENR & MACA Sahtu Dene Indian Affairs

Development

Issue	Recommendation	Responsible Agency
FireSmart Development Planning	**Recommendation 4:** If a new development removes or reduces the effectiveness of any existing or proposed FireSmart mitigation measures or introduces new wildfire hazards, the area must be assessed and measures implemented to maintain the community protection standards.	GNWT MACA Hamlet of Tulita

Public Education

Issue	Recommendation	Responsible Agency
Public Education Priorities	**Recommendation 5:** Public education on acceptable FireSmart Zone 1 standards is recommended for all Tulita residents. Priority items include: ▪ Development and maintenance of FireSmart defensible space surrounding the home ▪ Removal of all combustible materials and vegetation from around and underneath homes ▪ Skirting of structure open-undersides	GNWT ENR & Hamlet of Tulita

Interagency Cooperation & Cross-Training

Issue	Recommendation	Responsible Agency
FireSmart Committee	**Recommendation 6:** Develop a FireSmart Committee, consisting of all relevant stakeholders, to coordinate and lead the FireSmart program for the area.	GNWT MACA & ENR Hamlet of Tulita Sahtu Dene and Metis Metis Association Sahtu Renewable Resource Board
Cross-Training	**Recommendation 7:** Tulita Fire Department members and GNWT MACA & ENR should partner on cross-training initiatives to ensure emergency responders are cross-trained to the following minimum standards: ▪ Wildland Firefighter ▪ Structure and Site Preparation Workshop (S-115) ▪ Fire Operations in the Wildland/Urban Interface (S-215) ▪ Incident Command System (I-100 to I-400) as applicable	GNWT MACA & ENR Hamlet of Tulita

Emergency Planning

Issue	Recommendation	Responsible Agency
Community Wildfire Pre- Planning	**Recommendation 8:** Develop a Community Wildfire Pre-Plan for Tulita to provide greater operational detail to emergency responders during a wildland/urban interface incident.	GNWT ENR & MACA Tulita Fire Dept