# Trout Lake

# 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 Trout Lake 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 Trout Lake.

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 Trout Lake 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 Trout Lake (Map 1).

Stakeholders consulted with in the planning process included:

- Daniel Allaire, Forest Officer — GNWT ENR Fort Simpson
- Dolphus Jumbo, Band Chief — Sambaa K'e First Nation

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

- Commissioner (GNWT MACA)
- Federal
- GNWT Crown lands (GNWT ENR)


# Map 1 - Planning Area
# Trout Lake

## Land Status Authority

- Commissioner
- Federal
- Indian Affairs Branch
- Mixed
- Municipal
- 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 the planning area boundary indicates that wildfire incidence is low. Fire incidence data indicates that GNWT ENR responded to 2 lightning-caused wildfires in the planning area (Map 2). One was contained at 0.01 ha while the other was contained at 75 ha. Fire incidence data shows several lightning-caused wildfires just east of the 10 kilometre zone, including 2 large fires in 1996 totaling 22,000 ha and one large fire in 2004 totaling 14,500 ha.

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

| General Cause | Number of Fires | Percent of Total |
|---|---|---|
| Human-Caused | 0 | 0 |
| Lightning-Caused | 2 | 100 |
| **Totals** | **2** | **100** |

**Wildfire incidence in the planning area is low and is predominantly lightning-caused.**

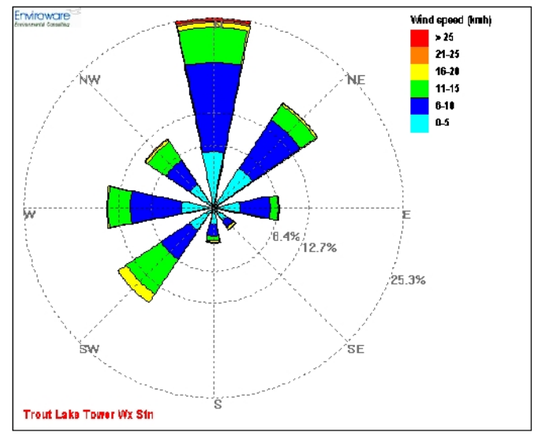
# Map 2 - Wildfire Incidence
# Trout Lake

Trout Lake

10 KM Buffer Zone

Island River

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

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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 Trout Lake.

The planning area is dominated with boreal spruce (C-2) with scattered patches of deciduous (D-1), cured grass (O1) and mixedwood (M-1) fuel types. Each of these fuel types can present hazard to interface structures based on fuel moisture conditions and time of year. The recently cleared airstrip and access road and the new and recently maintained fireguards west of the community provide good breaks from the C-2 fuel types to the south and west.

Fuel types within the developed area are primarily non-fuel, deciduous, or cured grass resulting in minimal wildfire threat to structures.

### 3.2.2 Fire Weather Analysis

Fire weather data from the Trout Lake Tower weather station was used to determine the predominant wind directions during the fire season. Data indicates that the predominant and strongest wind direction is from the north with significant representation from the west, southwest and northeast (Figure 1).

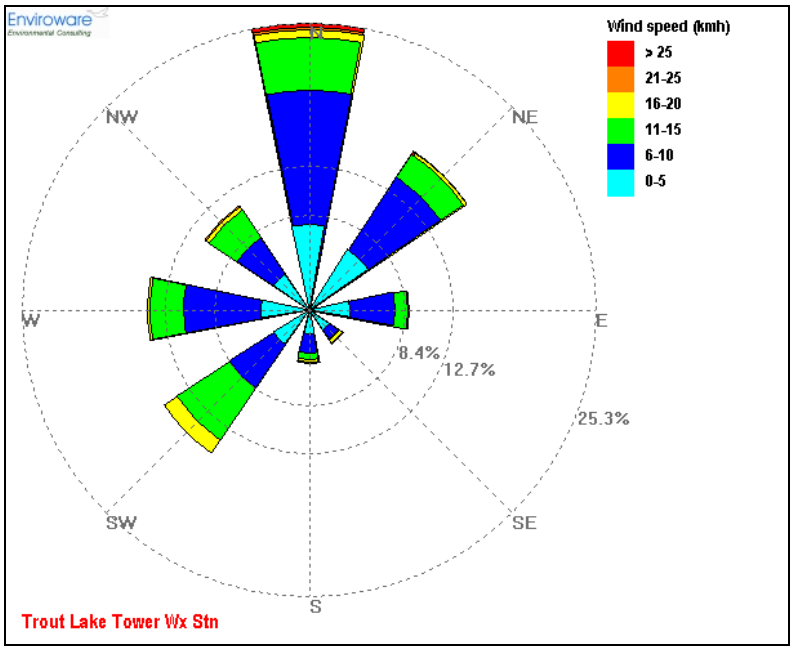



***Figure 1 – Trout Lake Tower Windrose***

**Wildland fuel types and fire weather data indicates a High potential for intense wildfire exists in C-2 fuels surrounding Trout Lake however fuels within the community are primarily non-fuel, deciduous, or cured grass resulting in minimal wildfire threat to structures.**

# Map 3 - Fuel Types
# Trout Lake

Trout Lake

Island River

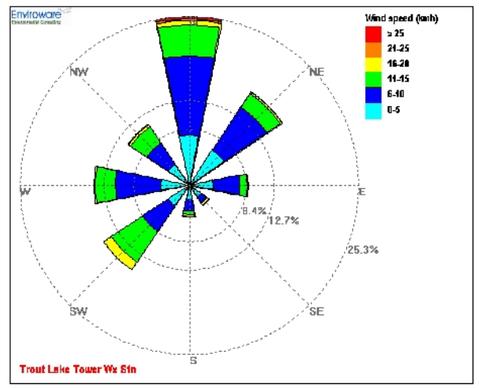
Winter Road

New Airstrip

## 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 high potential for intense landscape-level wildfire in the lands surrounding Trout Lake however FireSmart hazard is rated Low to Moderate for the developed areas of Trout Lake, due to the non-fuel, deciduous, and cured-grass fuel types, primarily non-combustible exterior structure materials (asphalt shingle roofing/wood siding), and adequate Zone 1 defensible space for the majority of structures.

**The threat of significant structure loss from wildfire in Trout Lake is predominantly Low to Moderate due to the wildland fuel types, structural materials, and Zone 1 defensible space standards within the community.**

# Map 4 - FireSmart Hazard
# Trout Lake

Trout Lake

Island River

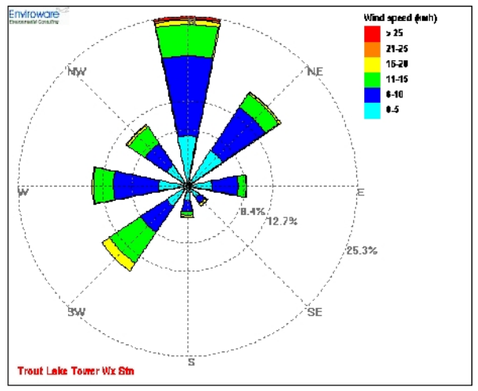
Winter Road

New Airstrip

## 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.

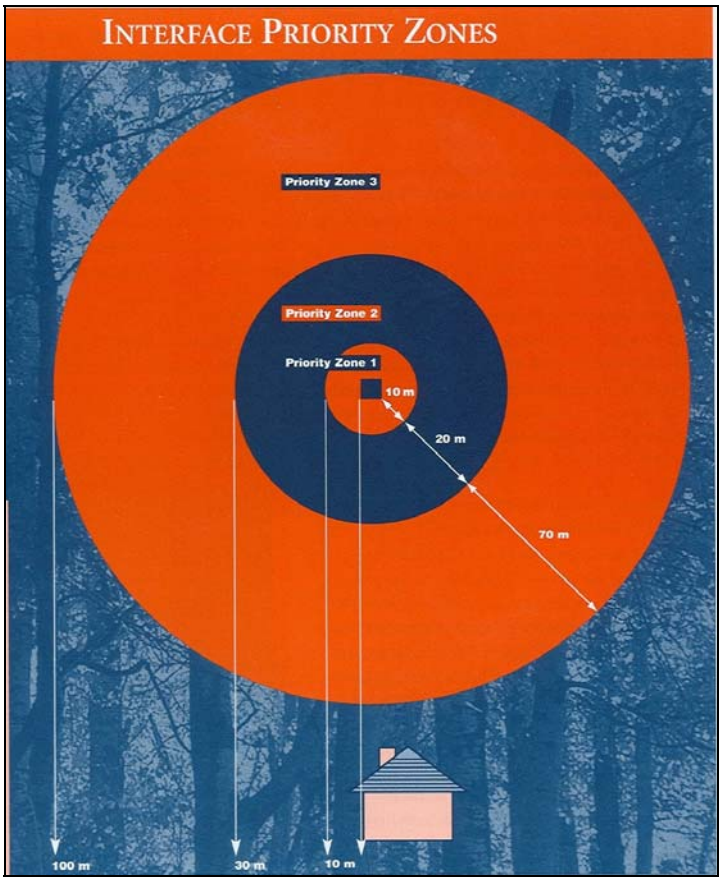



***Figure 3 – Interface Priority Zones (PIP, 2003)***

## 4.1 Existing Vegetation Management

Fuels removal and reduction projects have been completed in the planning area by the GNWT ENR Department (Map 5 & Table 3).

***Table 3: Existing Vegetation Management Areas***

| Name | Area (ha) | Year | Agency | Comments |
|---|---|---|---|---|
| Fireguards – New & Existing | 6.67 | 2010 | GNWT ENR | |
| ENR Firebase | 0.2 | 2010 | GNWT ENR | |

Old fireguards constructed in 1995 and new fireguards constructed in 2010 provide excellent containment lines for wildfire advancing from the south or west. All guards are approximately 30 metres wide.

GNWT ENR constructed a new firebase west of the community and has been completing fuels reduction as time permits.

## 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 on the south and west perimeters of the community to reduce the threat of wildfire in C-2 and M-1 fuels inside the fireguard 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 | 5.5 | ▪ Fuels reduction by spacing spruce to 2-3 m crown spacing in C-2 and M-1 fuel types on south perimeter of town adjacent to developments<br>▪ Remove all dead standing and dead & down coniferous and deciduous<br>▪ Retain deciduous overstory stems<br>▪ Prune limbs to 2 metres<br>▪ Dispose of debris by piling and burning onsite | ▪ GNWT ENR |
| 2 | 1.1 | ▪ Fuels removal to widen existing fireguard an additional 10 metres to 40 metres in width<br>▪ Dispose of debris by piling and burning onsite | ▪ GNWT ENR<br>▪ Commissioner |
| **Total** | **6.6** | | |

**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
# Trout Lake

- Existing Fuel Modification
- Proposed Fuel Modification
- Fuel Removal/Clear
- Fuel Reduce/Thin
- Roads

Trout Lake

ENR Firebase

Island River

1

2

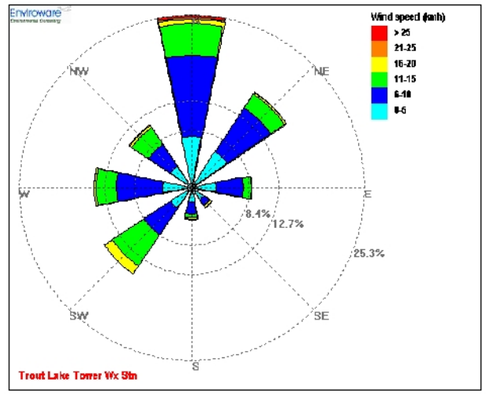
Proposed 10m Fireguard Widening

1995 Fireguard

2010
Fireguard

2010
Fireguard

New Airstrip Clearing

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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 the most common siding materials are wood.

## 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 however emergency evacuation using road access during the fire season is not possible due to winter access only to the community.

### 5.2.2 Water Supply

Trout Lake does not have municipal hydrant water-supply. All development areas rely on water-tender supply from the local fire department for structure protection activities. Each home is equipped with an in-house water tank (3,100-5,400 litres) in addition to unlimited fire suppression water supply from Trout Lake and the Island River using portable pumps.

### 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 diesel-powered generator with above-ground distribution lines.

**Gas**

Heating fuel is predominantly heating oil or firewood.

# 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

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

- Development and maintenance of FireSmart defensible space surrounding the home

# 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:

- Sambaa K'e First Nation
- 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 Trout Lake Fire Department 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:** Trout Lake 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 Trout Lake 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 Trout Lake 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<br>Sambaa K'e First Nation |
| **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<br>Federal |
| **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<br>Federal |

## 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<br>Sambaa K'e First Nation |

## Public Education

| Issue | Recommendation | Responsible Agency |
|---|---|---|
| **Public Education Priorities** | **Recommendation 5:** Public education on acceptable FireSmart Zone 1 standards is recommended for all Trout Lake residents. Priority items include:<br>▪ Development and maintenance of FireSmart defensible space surrounding the home | GNWT MACA & ENR<br>Sambaa K'e First Nation |

## 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<br>Sambaa K'e First Nation |
| **Cross-Training** | **Recommendation 7:** Trout Lake Fire Department and GNWT MACA & ENR should partner on cross-training initiatives to ensure emergency responders are cross-trained to the following minimum standards:<br>▪ Wildland Firefighter<br>▪ Structure and Site Preparation Workshop (S-115)<br>▪ Fire Operations in the Wildland/Urban Interface (S-215)<br>▪ Incident Command System (I-100 to I-400) as applicable | GNWT MACA & ENR<br>Sambaa K'e First Nation |

## Emergency Planning

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