

Wrigley

Community Wildfire Protection Plan



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



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Stew Walkinshaw, R.P.F.

MONTANE
Forest Management Ltd.

Canmore, AB.

Phone: (403) 678-7054 Email: montane@shaw.ca

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1 Introduction

The Wrigley 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 Wrigley.

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 Wrigley 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 Wrigley (Map 1).

Stakeholders consulted with in the planning process included:

- Daniel Allaire, Forest Officer GNWT ENR Fort Simpson
- Tim Lennie, Band Chief Pehdzeh Ki First Nation

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

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

Map 1 - Planning Area Wrigley

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 high. Fire incidence data indicates that GNWT ENR responded to 6 wildfires in the planning area (Map 2), including a 25,000 hectare wildfire on the west-side of the MacKenzie River in 2005. General cause is predominantly lightning.

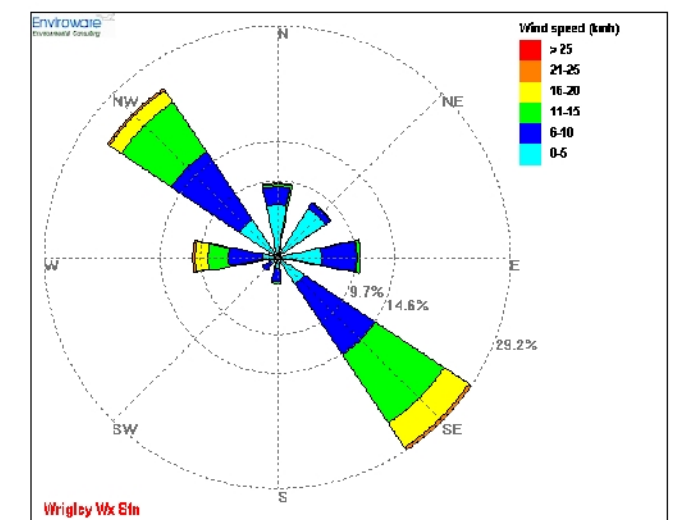
Table 1: Fire Incidence by Cause (1988 – 2009)

General Cause	Number of Fires	Percent of Total
Human-Caused	2	33
Lightning-Caused	4	77
Totals	6	100

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

Map 2 - Wildfire Incidence Wrigley

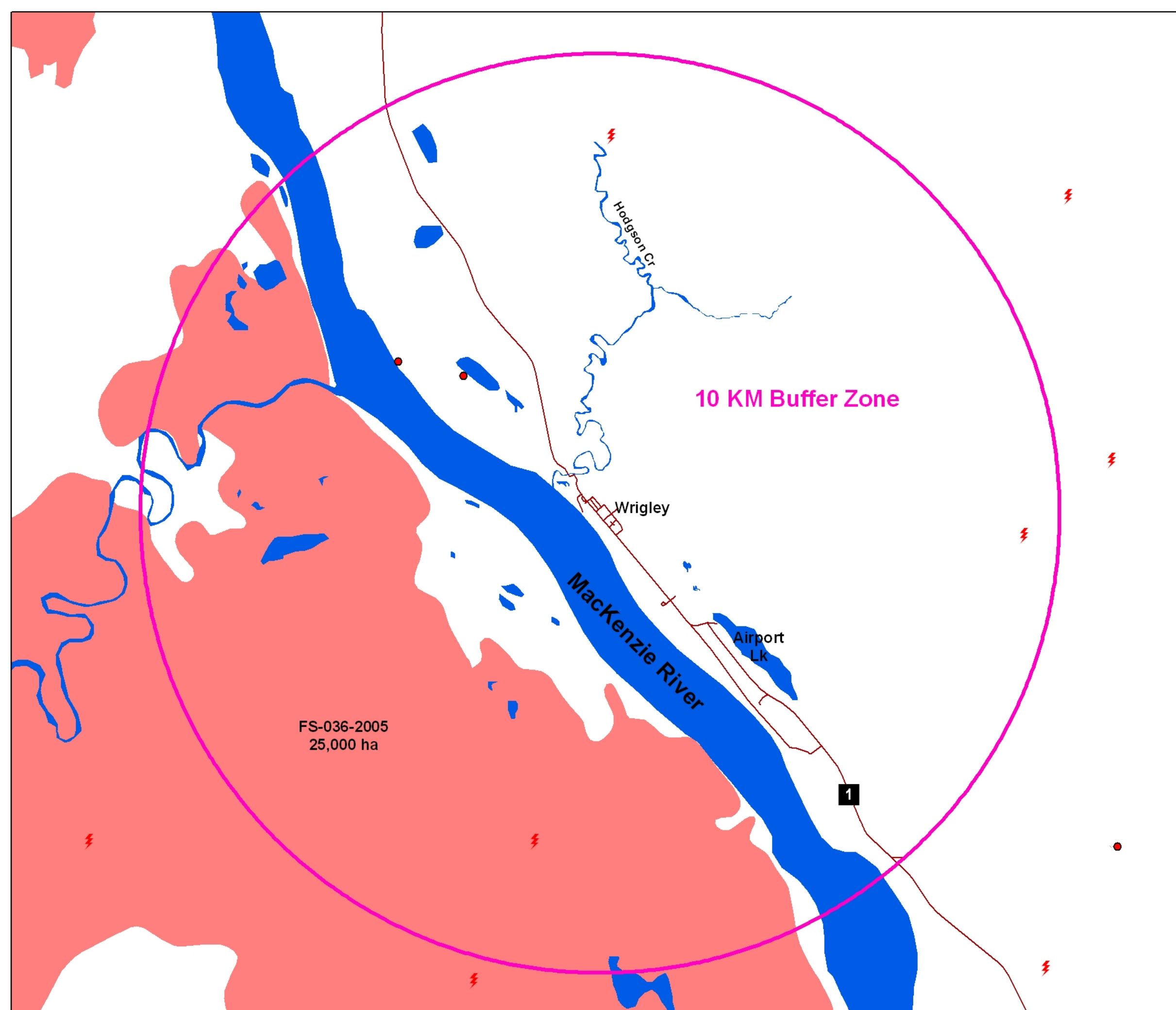
- Human-Caused Wildfire
- ⚡ Lightning-Caused Wildfire
- Wildfire > 4 hectares
- Roads



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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 Wrigley.

The planning area is dominated with boreal spruce (C-2), mature pine (C-3), and deciduous (D-1) fuel types with cured-grass fuels on the existing fuelbreaks surrounding the townsite. 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 break to wildfires on the west-side of the river.

Fuel types within the townsite area include mainly cured-grass and non-fuel on the north end and boreal spruce (C-2), mature pine (C-3), and deciduous (D-1) on the south-end.

3.2.2 Fire Weather Analysis

Fire weather data from Wrigley 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 and northwest (Figure 1).

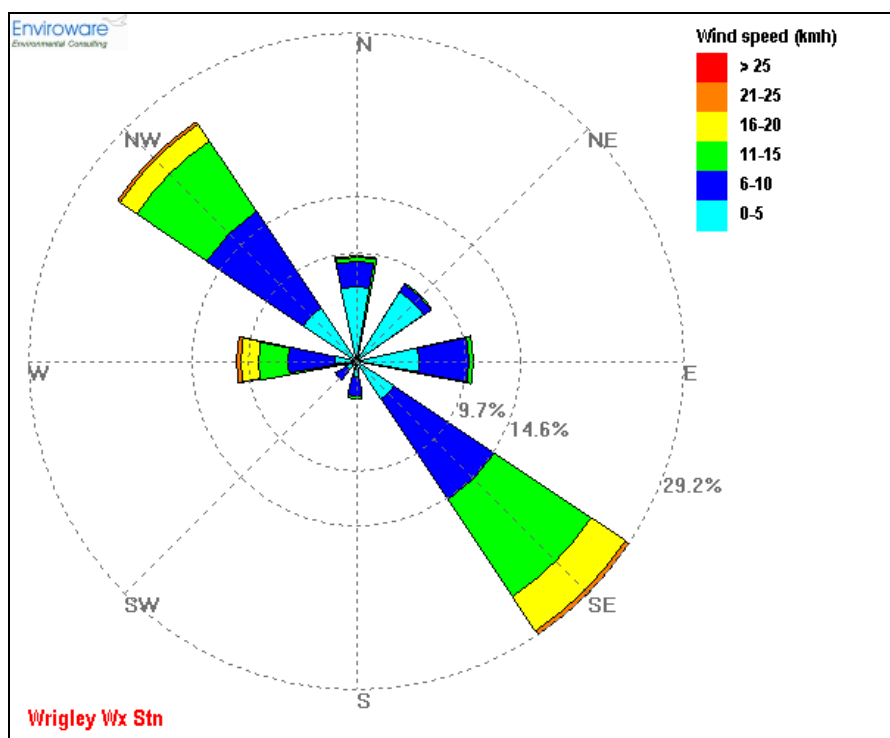












Figure 1 – Wrigley Windrose

Wildland fuel types and fire weather data indicates a High potential for intense landscape-level wildfire exists in C-2 and C-3 fuels surrounding Wrigley.

Map 3 - Fuel Types Wrigley

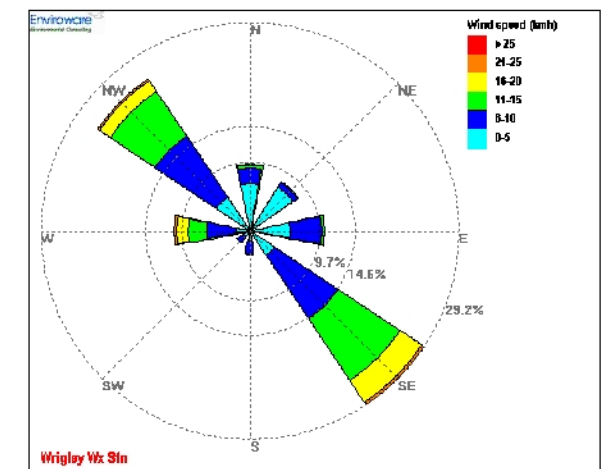
FBP Fuel Type

-  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



Rural Dwelling/Cabin Site



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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 Wrigley. FireSmart hazard is rated Low to Extreme for the townsite area based on the low hazard fuel types on the north-end and the high hazard fuel types in the newer developments on the south-end of the townsite. FireSmart hazard for each of the development areas is discussed below.

Table 2: FireSmart Hazard Assessments

Development Area	Structure/Site Hazard (0 – 30m)
Wrigley Townsite	Low - Extreme
Wrigley Airport	Low
Wrigley Firebase (ENR)	Moderate
Wrigley Highway Maint. Camp	Low

Wrigley Townsite

FireSmart hazard for the Wrigley townsite area ranges from Low to Extreme. Fuel types inside the winter road include deciduous (D-1), mature pine (C-3), boreal spruce (C-2), spruce-lichen woodland (C-1), non-fuel (NF), and cured-grass (O1). Exterior structure materials are primarily asphalt shingle or metal roofing and wood, log, or hardi-plank siding. Access roads are all-weather loop and dead-end. The highest wildfire threat is to structures in the new subdivisions on the south-end of the townsite area.





Wrigley Airport

FireSmart hazard for the Wrigley Airport is Low. Fuel types surrounding the structures are mainly cured-grass or non-fuel with spruce (C-2) and pine (C-3) fuel types surrounding the airstrip lands. Exterior structure materials are primarily asphalt shingle or metal roofing and metal and wood siding.

Wrigley ENR Firebase

FireSmart hazard for the firebase is Moderate. Fuel types surrounding the structures are primarily mixedwood (M-1) and boreal spruce (C-2) however significant fuels reduction has been completed around the structures reducing the hazard level. Exterior structure materials are asphalt shingle roofing and wood and log siding.



Wrigley Highway Maintenance Camp

FireSmart hazard for the Highway Maintenance Camp is Low. The site consists of a large non-fuel clearing surrounded by mixedwood (M-1) and boreal spruce (C-2) fuel types. Exterior structure materials are primarily asphalt shingle or metal roofing and wood, vinyl, or metal siding. The threat of wildfire to this site is minimal due to the Zone 1-2 clearing and structural materials used.

Pellissey Residences

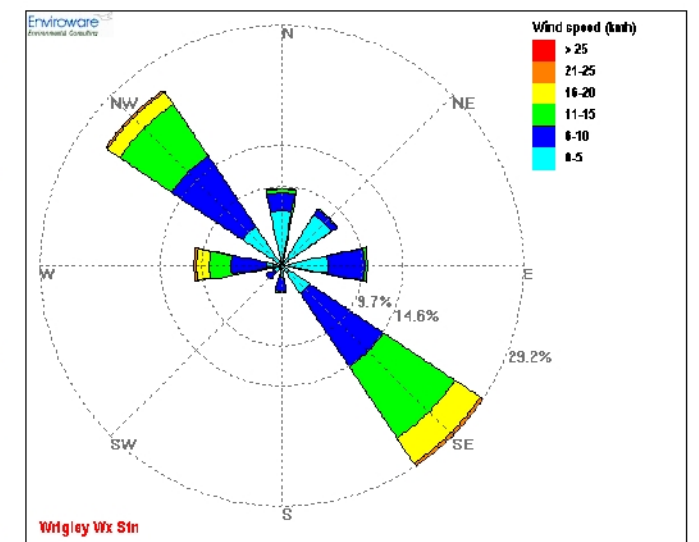
FireSmart hazard for the two Pellissey residences located southeast of Wrigley along MacKenzie River (Map 4) bank is High-Extreme. Both residences are located in C-2 fuel types with inadequate Zone 2 defensible space and poor access. Exterior structure materials are asphalt shingle roofing and wood siding.



The threat of significant structure loss from wildfire in Wrigley is High in the new subdivisions on the south-end and for scattered structures on the east perimeter of the townsite. The rural developments are at Low to Moderate threat.

Map 4 - FireSmart Hazard Wrigley

FireSmart Hazard



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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.

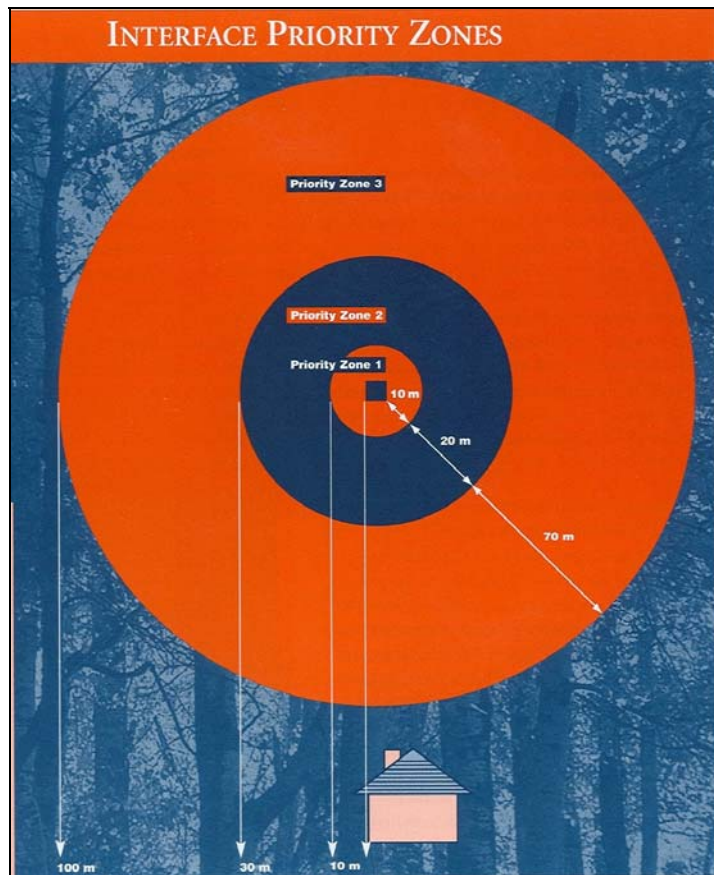


Figure 3 – Interface Priority Zones (PIP, 2003)

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	3.7 2.0	1990's 2010	GNWT ENR	Old fireguard needs maintenance, new fireguard needs debris disposal
Fuels Reduction	7.9	1995	GNWT ENR	
ENR Firebase		Ongoing	GNWT ENR	

Fireguards have been constructed in the 1990's and in 2010 by ENR around the north and east perimeter of the townsite. The new 2010 fireguard requires debris disposal and the old 1990's guard requires maintenance to ensure their effectiveness.



Fuels reduction has been completed in C-2 fuels on the northeast side of the townsite between the old fireguard and the developed area to space the black spruce. Additional fuels reduction is recommended in patches between this area and the developed areas.



GNWT ENR has completed fuels reduction around their firebase and continues to improve and maintain this area.



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 east perimeters of the community to reduce the threat of wildfire in C-2 and C-3 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	8.0	<ul style="list-style-type: none">Fuels removal to maintain and widen existing fireguard to a minimum of 40 metres in width around East, North, and South sides of developmentFinish cleanup of debris from 2010 fireguard constructionDispose of debris by piling and burning onsite	<ul style="list-style-type: none">CommissionerGNWT ENRFederal
2	0.7	<ul style="list-style-type: none">Fuels removal to create minimum 40 metre wide firebreak from SW of main road to breaks of bankDispose of debris by piling and burning onsite	<ul style="list-style-type: none">Commissioner
3	15.4	<ul style="list-style-type: none">Fuels reduction by spacing spruce to 2-3 m crown spacing in C-2 and M-1 fuel types inside the firebreak and adjacent to developmentsRemove all dead standing and dead & down coniferous and deciduousRetain deciduous overstory stemsPrune limbs to 2 metres<ul style="list-style-type: none">Dispose of debris by piling and burning onsite	<ul style="list-style-type: none">CommissionerGNWT ENRFederal
Total	24.1		

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.

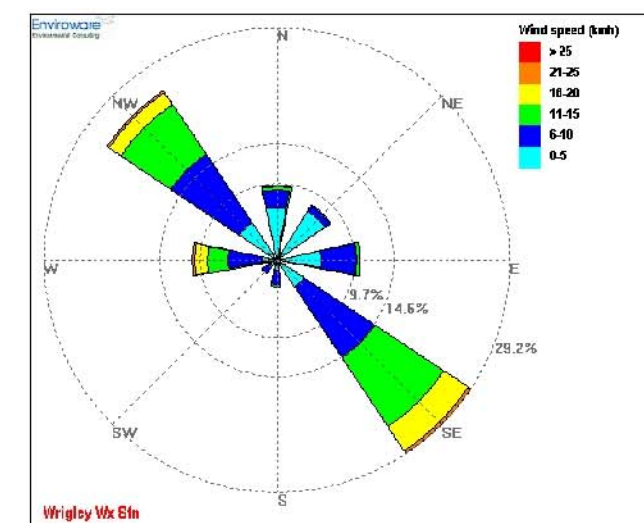
4.3 Vegetation Management Maintenance

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 Wrigley

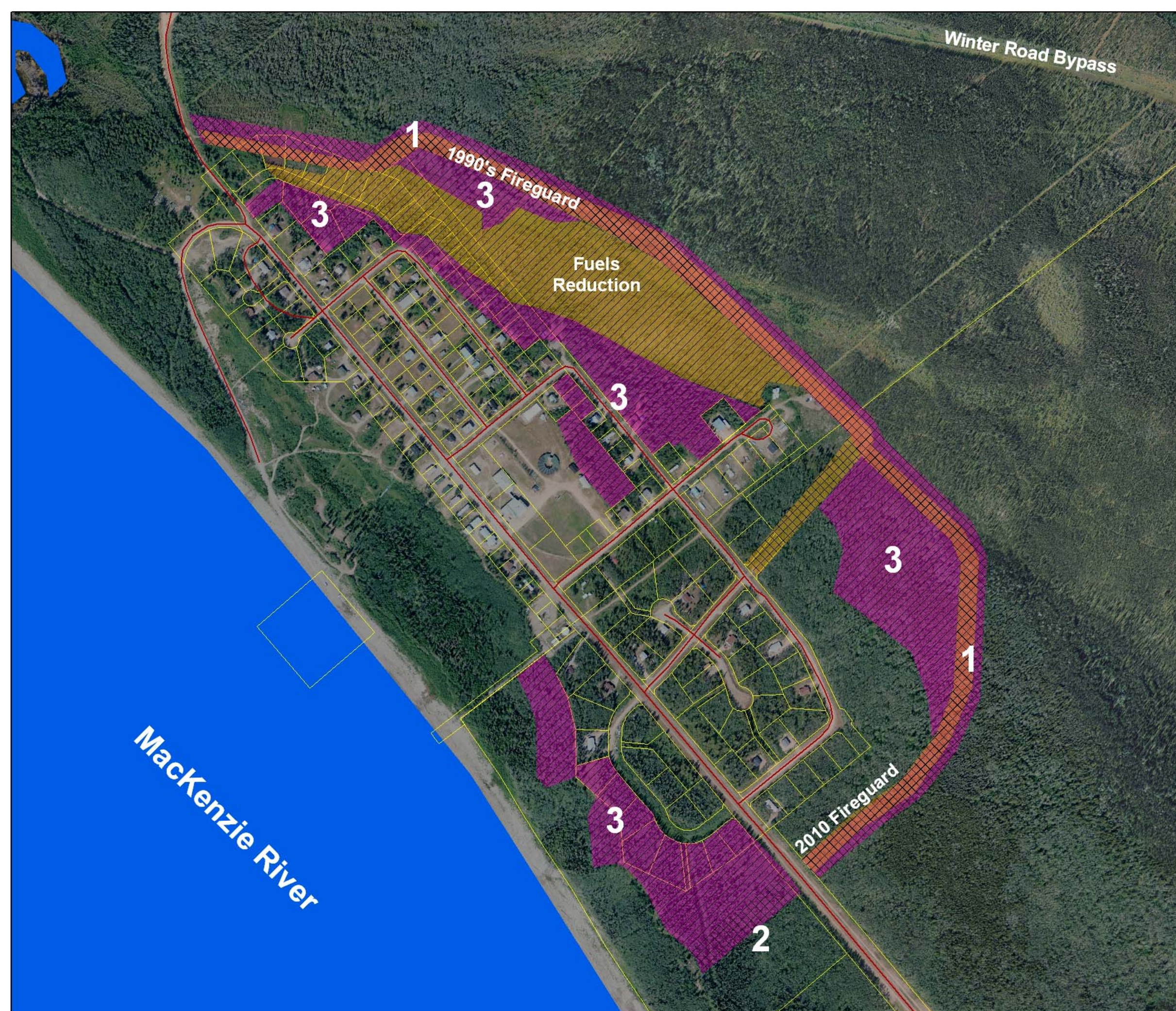
- Existing Fuel Modification
- Proposed Fuel Modification
- Fuel Removal/Clear
- Fuel Reduce/Thin
- Roads



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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 the most common siding materials are wood or hardi-plank.



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 access.

5.2.2 Water Supply

Wrigley 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 (3100 – 5400 litres).

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 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

Recommendation 5: Public education on acceptable FireSmart Zone 1 standards is recommended for all Wrigley 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:

- Pehdzeh Ki 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 Wrigley 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: Wrigley 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 Wrigley 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 Wrigley 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 Pehdzeh Ki 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 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 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 Pehdzeh Ki 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 Wrigley residents. Priority items include: <ul style="list-style-type: none"> Development and maintenance of FireSmart defensible space surrounding the home 	GNWT ENR & Pehdzeh Ki 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 Pehdzeh Ki First Nation
Cross-Training	Recommendation 7: Wrigley 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: <ul style="list-style-type: none"> ▪ 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 Pehdzeh Ki First Nation

Emergency Planning

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