Community Wildfire Protection Plan

Norman Wells

Government of
Northwest Territories

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1 Introduction

In 2010, a Community Wildfire Protection Plan (CWPP) was developed for the Town of Norman Wells to address the hazard and the risk to the community from wildfire. That CWPP was developed to provide practical and operational wildland /urban interface (WUI) risk mitigation strategies to reduce the threat from wildfire to the community.

The original CWPP was developed by Valhalla Consulting Inc., Diamond Head Consulting Ltd and Timberline Natural Resource Group Ltd in cooperation with the Government of the Northwest Territories (GNWT) and the Town of Norman Wells.

In 2018 the GNWT, Department of Environment and Natural Resources (ENR) updated the Town of Norman Wells' CWPP by using the most recent information, science and expertise available. This included using standardized FireSmart assessment protocols and mitigative measures were developed based on the 7 disciplines of FireSmart.

1. Vegetation Management
2. Development
3. Legislation
4. Public Education and Engagement
5. Inter-Agency Cooperation
6. Cross Training
7. Emergency Planning

The update included:

- The FireSmart mitigation efforts completed around the community
- The change in hazard around the community.
- New recommendations or modification to existing recommendations

Norman Wells, in cooperation with ENR, implemented some of the original recommendations but there is still work to do.

The update includes recommendations to assist in setting priorities to reduce the threat from wildfire. It is important to note that while implementing these recommendations will reduce the threat from wildfire to structures, it will never completely remove the threat.

This plan should be reviewed regularly to ensure that it remains a priority to the community and its residents.

2 Planning Area and Stakeholders

The planning area includes all lands within Norman Wells and a two-kilometre buffer surrounding the community (**Map 1**).

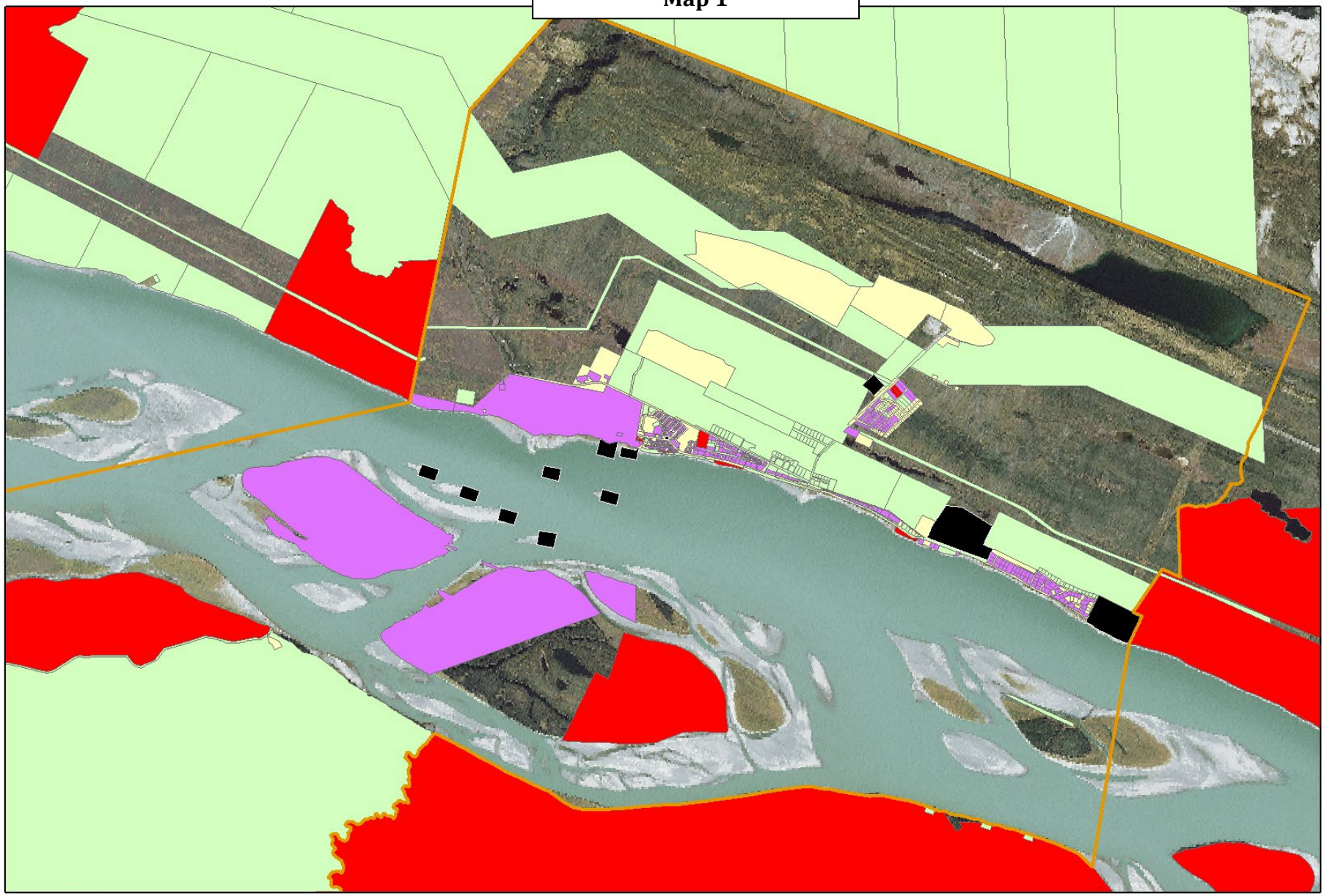
Stakeholders involved in the planning process included:

- Government of the Northwest Territories, Environment and Natural Resources
- Town of Norman Wells

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

- Commissioner
- Federal
- Municipal
- Private
- Sahtu

Map 1



Norman Wells Land Status Authority

Land Ownership

- Commissioner
- Federal
- Municipal
- Private
- Sahtu
- Planning Area

N

1:80,000

0 500 1,000 2,000

Meters

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3 Hazard & Risk Assessment

The hazard and risk assessment process analysed 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 ENR for ten year period from 2009 to 2018.

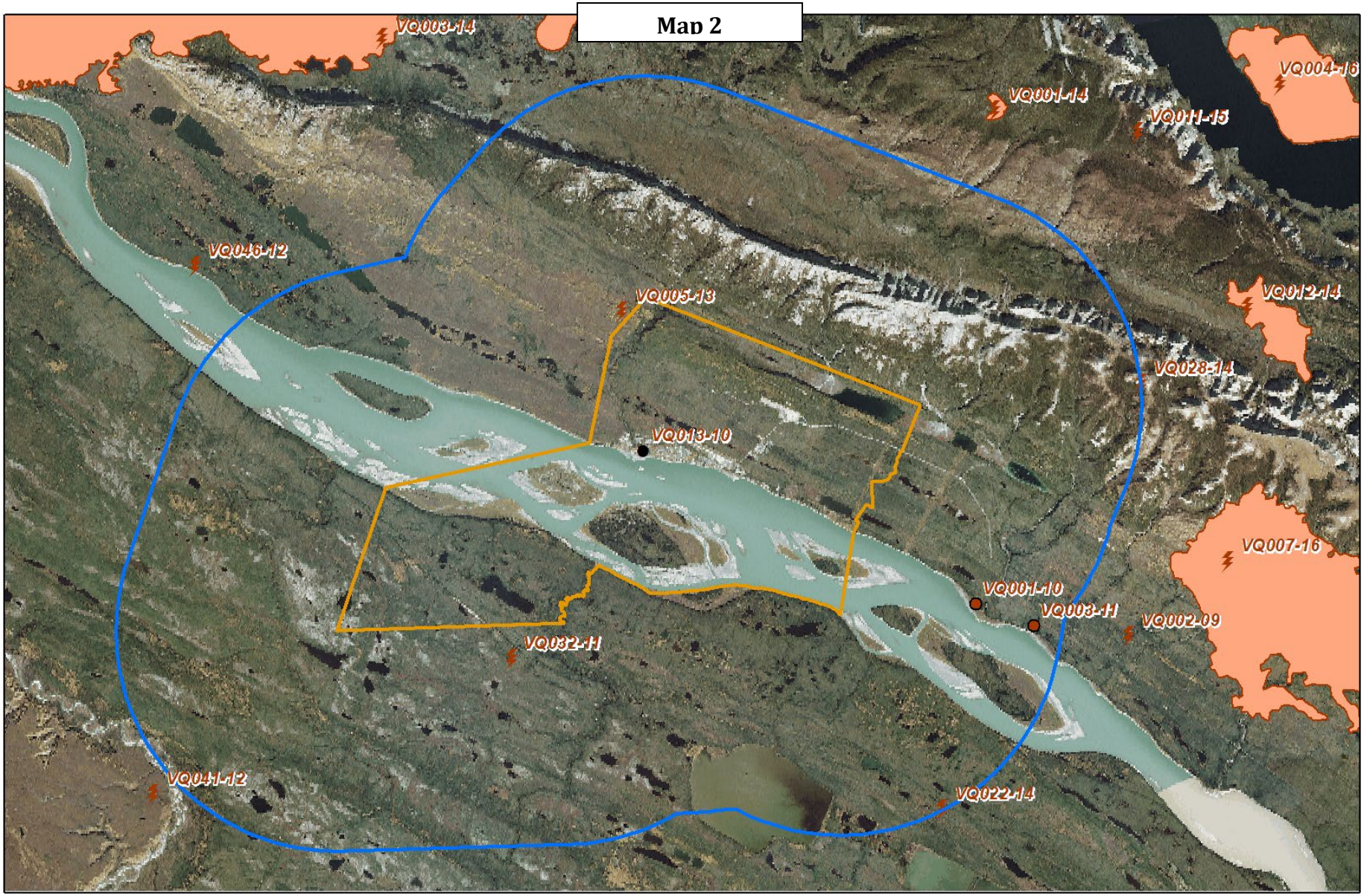
Fire incidence data indicates that of the 7 wildfires discovered within a 10 kilometre radius of the community, 4 were lightning-caused, 2 were human caused 1 was of unknown cause (Table 1). All of these reported fires were kept small in size (<10 ha) and resulted in no impact to the community of Norman Wells (Map 2).

Table 1: Fire Incidence by Cause (2009 – 2018)

General Cause	Number of Fires	Percent of Total
Human Caused	2	29
Lightning Caused	4	57
Unknown Cause	1	14
Totals	**7**	**100**

The risk of wildfire in the planning area is Low and is most frequently lightning-caused.

Map 2



Norman Wells
Ten Year Fire History

Planning Area 10km Buffer
Planning Area
Large Fire History

Human Caused
Lightning
Unknown

N

1:225,000

0 1,2502,500 5,000
Meters

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3.2 Wildfire Behaviour Potential

3.2.1 Forest Fuel Types

Fire Behaviour Prediction (FBP) fuel types were used to analyze the fuel types and fire behaviour potential adjacent to Norman Wells.

The planning area is dominated with spruce-lichen woodland (C-1) fuels with patches of boreal spruce (C-2), cured-grass (O-1a), mixed wood (M-2), and deciduous (D-1). Two existing fuel breaks south of the community are (M-2) fuel type (with deciduous species being dominant).

Forest fuel types and fire weather data indicates that the threat of landscape-level wildfire towards Norman Wells is Low due to the predominance of surrounding C-1 fuel types.

3.3 FireSmart Hazard Assessments

FireSmart hazard assessments (P.I.P., 2017) were conducted on development areas and adjacent wildland fuel types within the planning area (Table 2).

Table 2: FireSmart Hazard Assessments

Development Area	Structure/Site Hazard (0 – 30m)
Norman Wells	Moderate - High
Residential Area (West End)	Moderate
Residential Area (East End)	Moderate - High
Residential Area DoT (East Outskirts)	High - Extreme
Airport	Low
Fuel Tank Site	Low
Imperial Oil Diesel Generator	Low
NTPC Diesel Power Generator	Low

Hazard factor's for each of the development areas are discussed below.

Residential Area (West)
FireSmart hazard for Residential Area (West End) is rated as **Moderate** with fuels primarily consisting of small to very large pockets of spruce (C-2), mixed wood (M-2) and non-fuel. Exterior structure materials are primarily asphalt shingle/metal roofing and wood, log, and hardiplank siding. Access roads are all-weather loop and dead-end design.

Residential Area (East)
FireSmart hazard for Residential Area (East) is rated as **Moderate - High.** Fuels consist of moderate density spruce (C-2) and mixed wood (M-2). Increased risk level due to encroachment of (C-2) toward some structures, primarily homes. Exterior structure materials are primarily asphalt shingle/metal roofing and wood, log, and hardiplank siding. Access roads are all-weather loop and dead-end design.

Residential Area (DoT)
FireSmart hazard for the Residential Area (DOT) is rated as **High - Extreme**. Fuels consist of moderate to high density spruce (C-2), directly adjacent to most structures. Exterior structure materials are primarily asphalt shingle/metal roofing and wood, log, and hardiplank siding. Access roads are all-weather loop and dead-end design.

Diesel Power Generator (Imperial Oil)
FireSmart hazard for the diesel power generator site is rated as **LOW**. Fuels consist of open to moderate density spruce (C-1/C-2) and mixed wood (M-1) with adequate mineral soil defensible space between the generator and wildland fuels. The site is located on the Imperial Oil lease and has good all-around accessibility.

Back-up Diesel Power Generator (NTPC)
FireSmart hazard for the back-up diesel power generator site is rated as **LOW**. Fuels directly adjacent to the site are sparse and consist of open density spruce (C-2) and deciduous (D-1/D-2) species with adequate mineral soil defensible space between the generator and wildland fuels. The site has good all-around accessibility.

Fuel Tank Site
FireSmart hazard for the fuel tank site is rated as **LOW**. Fuels consist of open to moderate density spruce (C-1/C-2) with adequate mineral soil defensible space between the tanks and wildland fuels. Tanks are all metal construction.

Airport
FireSmart hazard for the Airport is rated as **LOW**. Fuels primarily consist of non-fuel, cured grass (O-1/O-2), mixed wood (M-2) and deciduous (D-1/D-2) with significant defensible space between the terminal and wildland fuels. Exterior structure materials are metal roofing and siding. The access road is all-weather loop design.

The highest wildfire threat for Norman Wells exists in the Residential Area DoT (East Outskirts) of the existing community. These areas are mostly high to extreme.

4 Vegetation Management Options

The goal of vegetation management is to create a clear space between the community and the forest to reduce the intensity and rate of spread of wildfire approaching or leaving the community. 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 (remove trees);
- Fuel reduction (thin and prune trees);
- Species conversion (plant less flammable trees).

Complete descriptions of the methods included in each of the above options are included in the link:
https://www.firesmartcanada.ca/mdocs-posts/firesmart-priority-zones-2017/

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

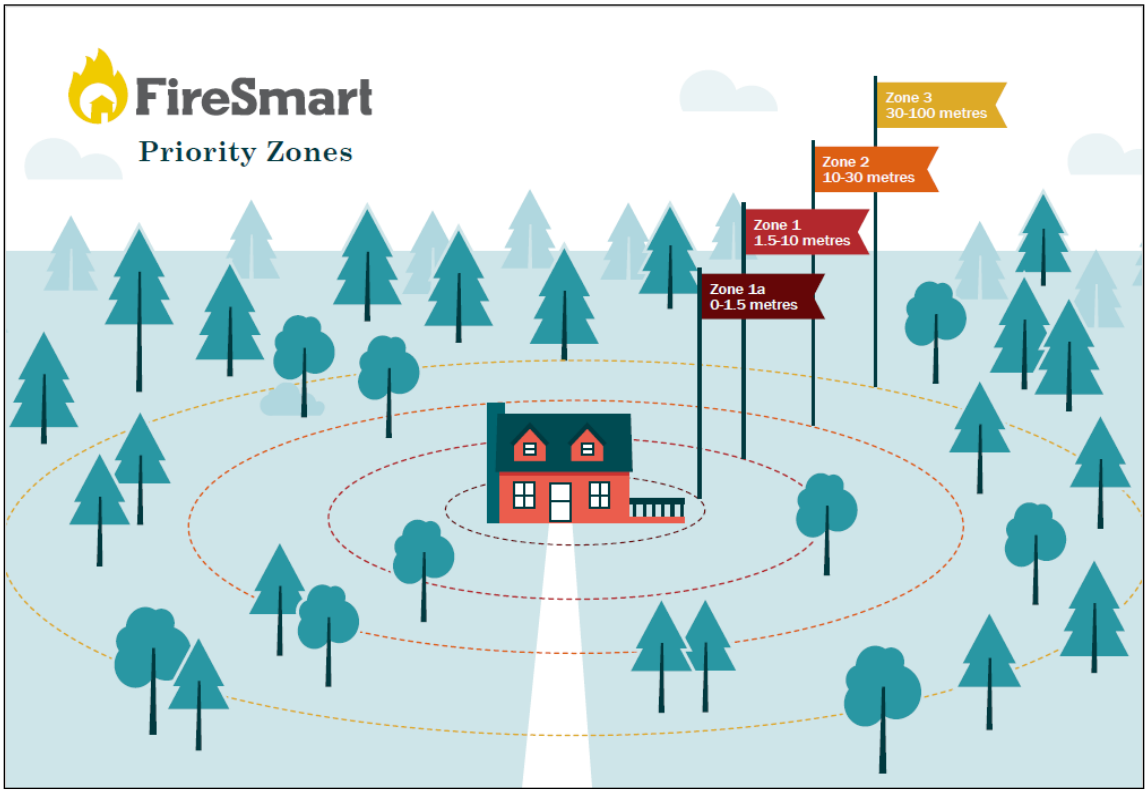

Figure 1– Interface Priority Zones (PIP, 2017)

4.1 Existing Vegetation Management

Two large fire guards, approximately three kilometres apart, were created at the south end of Norman Wells in 1995 in response to a wildfire event. Since that time both fire guards have experienced significant vegetation regrowth. However, the regrowth is predominantly deciduous in nature and should still be effective in reducing the intensity of an approaching wildland fire to a state where it is actionable by ground crews/air tankers or for use as an ignition line (Table 3).

Table 3: Existing Vegetation Management Areas

Name	Area (ha)	Year Started/Completed	Agency	Comments
South Fireguard 1	75.3	1995	GNWT	Cleared to mineral soil with heavy equipment
South Fireguard 2	116.4	1995	GNWT	Cleared to mineral soil with heavy equipment

4.2 Proposed Vegetation Management (Individual Structures)

4.2.1 Zone 1a (0-1.5 metres)

Zone 1a vegetation management is **inadequate** for many structures due to encroachment of native grass and other light fuels.

FireSmart Zone 1a vegetation management options include:

- Creating a noncombustible zone around structures by clearing vegetation and combustible material down to mineral soil within 1.5 metres of structures.
- Use noncombustible materials in this critical zone of 1.5 metres directly adjacent to your home such as gravel, bricks or concrete.
- Woody shrubs, trees or tree branches should be avoided in this area and any that are present should be properly mitigated.

4.2.2 Zone 1 (1.5-10 metres)

Zone 1 vegetation management is **adequate** for the majority of structures in the west end of the community. Zone 1 vegetation management in the east end and east outskirts (DoT) of the community is mostly **inadequate** due to significant encroachment of mature black spruce (C-2) to many structures.

FireSmart Zone 1 vegetation management options include:

- Removal of flammable forest vegetation (shrubs) 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, jerry cans, propane tanks, etc.) within 10 metres of the structure.**

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

For more information on FireSmart Zones 1a and 1 standard refer to: https://www.firesmartcanada.ca/.

4.2.3 Zone 2-3 (10-30 metres and 30-100 metres)

Priority areas are recommended for Zone 2-3 fuels management based on hazard and risk (Table 4 & Maps 3, 4 and 5). Proposed fuels management areas will require detailed fuels reduction planning to identify fuels management prescription, unit boundaries, and operational constraints as development continues.

Table 4: Priority Fuel Modification Areas

Priority	Area (Ha)	Proposed Fuel Modification Standards	Land Status Authority
Fireguard (west of Imperial Oil lease site: Map 3)	2.7	▪ Mulched and cleared of all vegetation ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells
Fuel Modification Zones (west residential area: Map 3)	1.8 1.3 0.7	▪ Fuels Reduction by spacing spruce to 3 metre crown spacing ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells
Fuel Modification Zone (west residential: Map 3) (Optional)	13.4	▪ Fuels Reduction by spacing spruce to 3 metre crown spacing ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells
Fireguard (east residential:	6.8 1.7	▪ Mulched and cleared of all vegetation ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells

airport to DoT: Map 4)			
Fuel Modification Zone (east residential: behind residential and commercial structures: Map 4)	1.7 1.0	▪ Fuels Reduction by spacing spruce to 3 metre crown spacing ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells
Fuel Modification Zone (east outskirts DoT: Map 5	2.2	▪ Fuels Reduction by spacing spruce to 3 metre crown spacing ▪ Remove all dead standing and dead & down coniferous and deciduous ▪ Prune limbs to 2 metres ▪ Dispose of debris by piling and burning onsite or use as biomass or other product	▪ Town of Norman Wells
Total	**33.3**		

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 areas 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. FireSmart Zone 1a and Zone 1 fuel modification maintenance is a process requiring continued maintenance. Residents should be educated and encouraged to maintain their properties regularly to reduce the threat of wildfire to their structures.

Recommendation 3: Residents should be educated and encouraged to maintain their properties regularly to reduce the threat of wildfire to their structures.

Map 3

Norman Wells (West)
Fuel Modifications

Completed and Proposed

Fuel Modifications

- Completed
- In Progress
- Proposed

N

1:15,000

0 75 150 300

Meters

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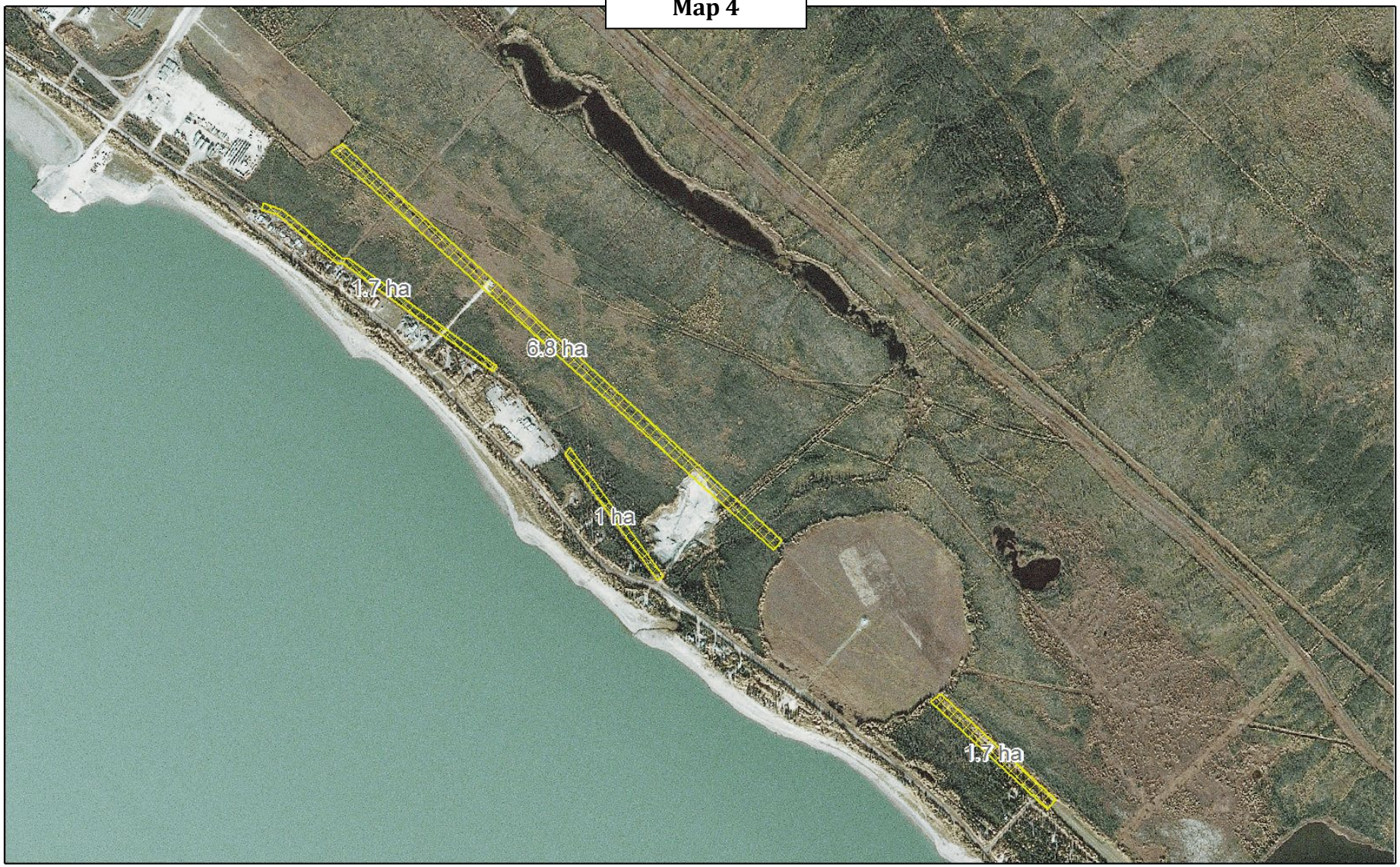
Map 4



Norman Wells (East) Fuel Modifications

Completed and Proposed

Fuel Modifications

- Completed
- In Progress
- Proposed

N

1:15,000

0 75 150 300

Meters

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Map 5

Norman Wells (East Outskirts) Fuel Modifications

Completed and Proposed

Fuel Modifications

- Completed
- In Progress
- Proposed

N

1:35,000

0 175 350 700

Meters

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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 fuel break 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, 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.

Siding materials vary between hardiplank and vinyl siding on newer structures and wood and log on older structures.

Many structures have combustible debris piles (firewood, lumber, etc.) immediately adjacent to the structure, increasing the threat of wildfire to the structure. Open decks and undersides are common. In addition, most structures that use skirting employ a mesh that is too open spaced in design to block embers. It is applied primarily as a wildlife deterrent.

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 adequate for an interface community. Access roads are all-weather loop and dead-end design. There is no summer road access to the community.

5.2.2 Water Supply

The majority of structures on the west side of Norman Wells operate on an above ground utilidor system while some small sections rely on water tender supply. This area of the community has a municipal hydrant water supply in the form of standard hydrants and access points on the utilidor system. Structures on the east side and east outskirts (DoT) rely on water-tender supply for structure protection activities. Each home in these two areas is equipped with an in-house water tank.

5.2.3 Franchised Utilities

Franchised utilities affected by an interface fire include electrical power and heating fuel. 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 above-ground powerlines from the diesel generator plant located on the Imperial Oil lease. This generator is used to power the oil refinery adjacent to it and excess power is sold to NTPC, who in turn sell this power to the residents of Norman Wells. NTPC also maintains a back-up diesel generator within the community.

Heating Fuel

Heating fuel is provided by truck delivery and stored in bulk at a tank farm.

6 Public Education Options

Public education plays a key role in promoting and implementing FireSmart principles and projects. Residents, landowners, municipal administration, and elected officials all need to be aware of the risk of wildfires 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: https://www.enr.gov.nt.ca/en/services/be-firesmart 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.

Homeowners

Homeowners can increase resiliency of homes and make them less vulnerable to wildfire by development and maintenance of the FireSmart Non-Combustible Zone 1a (0-1.5 metres) and Zone 1 (1.5-10 metres) defensible space surrounding the home, by:

- Clearing vegetation and combustible material down to mineral soil within 1.5 metres of structures.
- Using noncombustible materials in this critical zone of 1.5 metres directly adjacent to your home such as gravel, bricks or concrete.
- Woody shrubs, trees or tree branches should be avoided in this area and any that are present should be properly mitigated.
- Storing firewood and other combustible materials more than 10 metres away from the home.
- Keeping roof and eaves clear of leaves and other combustible debris.
- Creating propane and fuel-tank FireSmart defensible space.
- Creating a non-combustible zone for underneath and around any trailers/vehicles and mitigate sheds and other structures to the same standards as those of your home.
- If possible and/or applicable maintain Zone 2 (10-30 metres) and Zone 3 (30-100 metres) recommendations, and work with neighbors in any overlapping Priority Zones.

Communities

Communities can reduce wildfire risk and adopting FireSmart principles by:

- Holding a FireSmart Wildfire Community Preparedness Day or workshop.
- Using local government websites, social media and newsletters to promote FireSmart principles.
- Asking ENR staff what educational and/or promotional resources they have available, such as: wildfire information pamphlets, posters, educational resources, videos etc.
- Applying for the FireSmart Community Recognition Program. For more information visit: https://www.firesmartcanada.ca/firesmart-communities/firesmart-canada-community-recognition-program/.

Recommendation 6: Public education on acceptable FireSmart Zone 1a and Zone 1 standards is recommended for all residents.

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:

- Town of Norman Wells
- GNWT

Recommendation 6: Coordinate with the established emergency management committee to determine what will be required during a wildfire emergency. All relevant stakeholders should understand the FireSmart program and help to promote mitigation.

Norman Wells has an active fire department, one Type I engine and access to multiple local water tenders. Some members have been trained in Basic Wildfire (S-131) and Incident Command System (I-100 and I-200). Recommended cross-training for 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-131, or equivalent)

Wildland/Urban Interface Fire

- Structure and Site Preparation Workshop (S-115)

Incident Command System

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

Recommendation 7: Norman Wells Fire Department, the Emergency Management Team and the GNWT 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)
- Incident Command System (I-100 to I-300) 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. The Norman Wells Emergency Measures Plan is used to provide authority and direction during an emergency.

While the Town of Norman Wells does have an Emergency Measures Plan in place the community continues to work with Municipal and Community Affairs (MACA) to develop 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. MACA has developed a template for community use in creating an EMP.

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

9 Recommendations Summary

Vegetation Management

Issue	Recommendation	Responsible Agency
Zone 1a and Zone 1	**Recommendation 1:** Encourage residents to establish adequate Zone 1a and Zone 1 defensible space around their structures.	▪ Town of Norman Wells
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.	▪ Town of Norman Wells
Maintenance	**Recommendation 3:** Residents should be educated and encouraged to maintain their properties regularly to reduce the threat of wildfire to their structures.	▪ Town of Norman Wells

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 ENR ▪ Town of Norman Wells

Public Education

Issue	Recommendation	Responsible Agency
Public Education Priorities	**Recommendation 5:** Public education on acceptable FireSmart Zone 1a and Zone 1 standards is recommended for all Norman Wells residents.	▪ GNWT ENR ▪ Town of Norman Wells

Interagency Cooperation & Cross-Training

Issue	Recommendation	Responsible Agency
Interagency Cooperation	**Recommendation 6:** Coordinate with the established emergency management committee to determine what will be required during a wildfire emergency. All relevant stakeholders should understand the FireSmart program and help to promote mitigation.	▪ GNWT ENR ▪ Town of Norman Wells
Cross-Training	**Recommendation 7:** The Norman Wells Fire Department and Emergency Management Team and the GNWT should partner on cross-training initiatives to ensure emergency responders are cross-trained to include the following: ▪ Wildland Firefighter ▪ Structure and Site Preparation Workshop (S-115) ▪ Incident Command System (I-100 to I-300) as applicable	▪ GNWT ENR ▪ Town of Norman Wells

Emergency Planning

Issue	Recommendation	Responsible Agency
Community Wildfire Pre- Planning	**Recommendation 8:** Develop a Community Wildfire Pre-Plan for the community to provide greater operational detail to emergency responders during a wildland/urban interface incident.	▪ GNWT ENR ▪ Town of Norman Wells