

Hamlet of Fort Liard

Community Wildfire Protection Plan



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



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1 Introduction

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

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 Fort Liard 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 the Hamlet of Fort Liard municipal boundary and a two-kilometre buffer surrounding the Hamlet (Map 1).

Stakeholders consulted with in the planning process included:

- | | |
|---|-----------------------------|
| ▪ Daniel Allaire, Forest Officer | GNWT ENR Fort Simpson |
| ▪ John W. McKee, CAO | Hamlet of Fort Liard |
| ▪ Robert Firth, Protective Services Officer | Hamlet of Fort Liard |
| ▪ Jennifer Newbury, Band Manager | Acho Dene Koe First Nations |

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

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

Map 1 - Planning Area Hamlet of Fort Liard

 Hamlet of Ft. Liard Boundary

 Roads

Land Status Authority

 Commissioner

 Federal

 Indian Affairs Branch

 Mixed

 Municipal

 Private



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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 the risk of wildfire is present. Fire incidence data indicates that fire agencies responded to 19 wildfires in the planning area (Map 2). 68% of wildfires were human-caused and 32% were lightning-caused and all were contained at initial attack at less than 4 hectares in size (Table 1).






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

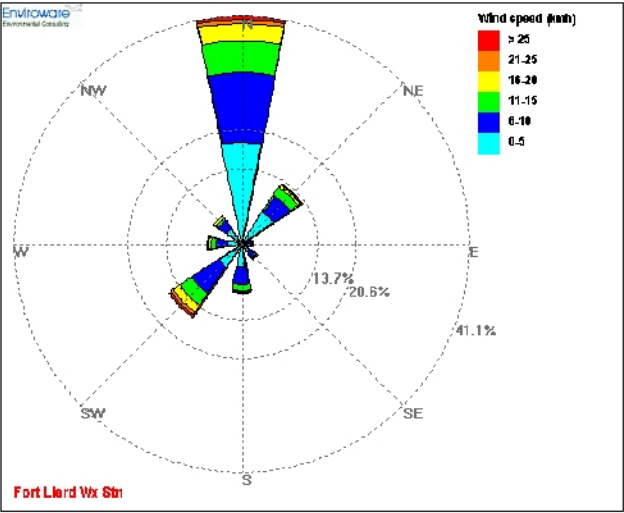
General Cause	Number of Fires	Percent of Total
Human-Caused	13	68
Lightning-Caused	6	32
Totals	19	100.0

Fort Liard Fire Chief Robert Firth reported that they respond to several spring grass fires in the unmaintained native grass areas at the airport, including one in the spring of 2010 that created significant control problems. These fires are not shown in the ENR fire history data.

The risk of wildfire in the planning area exists and most frequently occurs in areas accessible to residents and recreating public.

Map 2 - Wildfire Incidence
Hamlet of Fort Liard

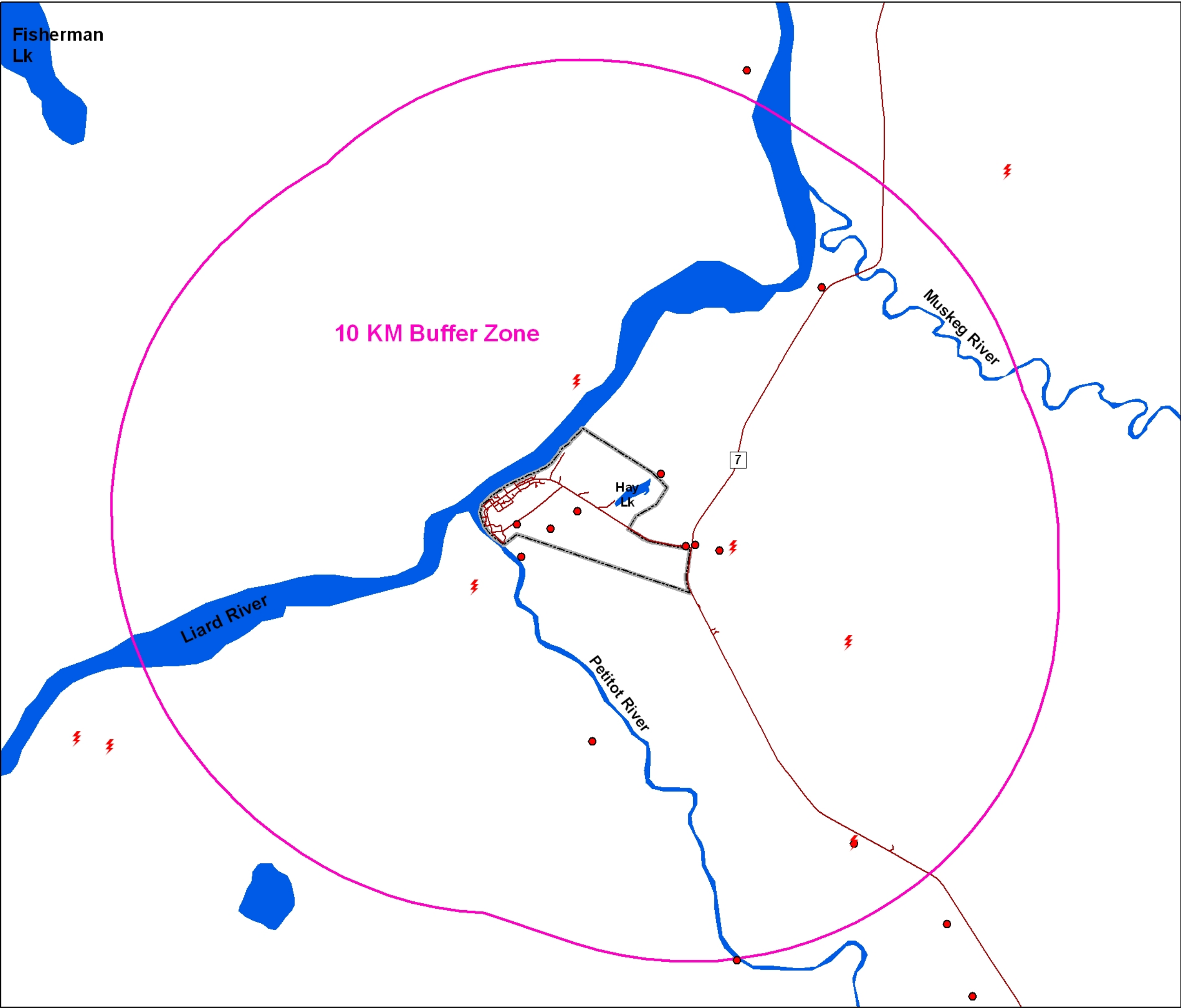
-  Hamlet of Ft. Liard Boundary
-  Roads
-  Human-Caused Wildfire
-  Lightning-Caused Wildfire
-  Wildfire > 4 hectares



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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 Fort Liard.

The planning area is dominated with deciduous (D-1) and mixedwood (M-1) with patches of boreal spruce (C-2), mature pine (C-3), and cured-grass (O1) fuel types. Each of these fuel types can present hazard to interface structures based on fuel moisture conditions and time of year. The access road into the community and the airstrip provide a good break from the fuel types to the south and east. The unmaintained native grass (O1) fuels on the airstrip present significant spring and fall hazard to structures on the edge of the airstrip.

3.2.2 Fire Weather Analysis

Fire weather data from the Fort Liard 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 (Figure 1).

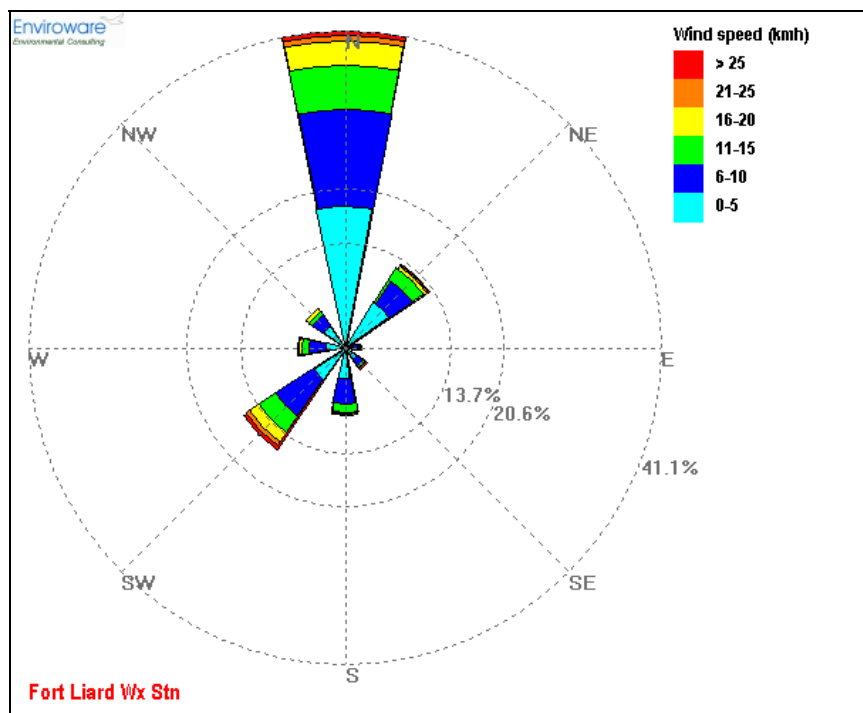
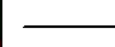


Figure 1 – Fort Liard Windrose










Wildland fuel types and fire weather data indicates that the predominant potential for wildfire exists in M-1 and C-2/C-3 fuel types to the northeast of Ft. Liard or in M-1 fuel types immediately adjacent to developed areas.

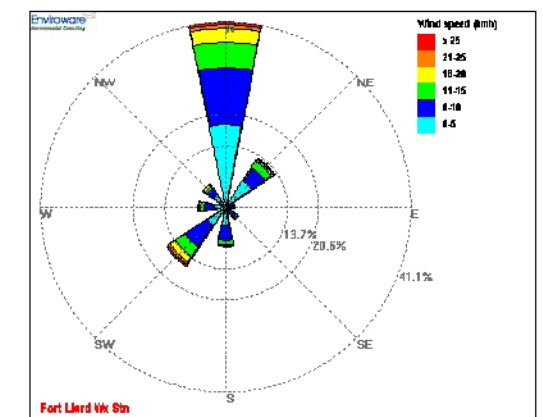
Map 3 - Fuel Types Village of Fort Liard

 Village of Ft. Liard Boundary

 Roads

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)



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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.

The development at the highest risk to wildfire is the new sub-division on the east-side of the main hamlet (Table 2). All other developments are at Low to Moderate hazard.

Hazard factor's for each of the development zones is discussed below.

Table 2: FireSmart Hazard Assessments

Development Zone	Structure/Site Hazard (0 – 30m)
Ft. Liard Hamlet	Moderate
New Subdivision	Moderate - High
Beaver Camp	Moderate
Bertrend/Deneron Cabins – Hwy 7	Moderate
Beaver Enterprises – Hwy 7	High
Lomen Cabins – Hwy 7	Moderate

Ft. Liard Hamlet

The hamlet area consists of the main townsite and the airport. It primarily consists of non-fuel, deciduous, and cured-grass fuel types. Exterior structure materials are primarily asphalt shingle or metal roofing and hardi-plank or wood siding. Access roads are primarily all-weather loop-roads with some dead-end cul-de-sac roads. FireSmart hazard is rated as Moderate for the hamlet area due to the spring cured-grass threat to perimeter structures and the mixedwood fuel types to the northeast of the Hamlet.





New Subdivision

The new subdivision is currently under development. Structures presently onsite are constructed with asphalt shingle roofing and hardiplank or vinyl siding materials. Surrounding fuel types are primarily mixedwood with a 20 metre wide fuels reduction strip around the perimeter. FireSmart hazard is presently rated as Moderate-High due to the mixedwood fuel type but significant clearing around the present dwellings and the existing 20 metre wide fuel modification.

Beaver Camp

Beaver Camp consists of an Atco trailer open camp, small millsite, and an industrial storage yard. All structures consist of metal roofing and siding materials. Surrounding fuel types are primarily mixedwood and deciduous. FireSmart hazard is rated as Moderate based on the M-1 fuel type and flammable material piles scattered throughout the site.



Bertrand/Deneron Cabins

These two cabin sites, located on the west-side of Hwy 7, south of Ft. Liard access, are located within or adjacent to D-1 fuels with native grass surrounding. FireSmart hazard is rated as Moderate due to the spring cured-grass hazard.

Beaver Enterprises – Hwy 7

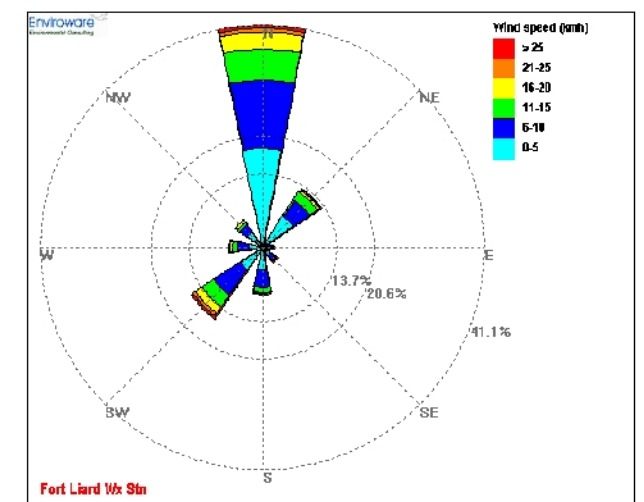
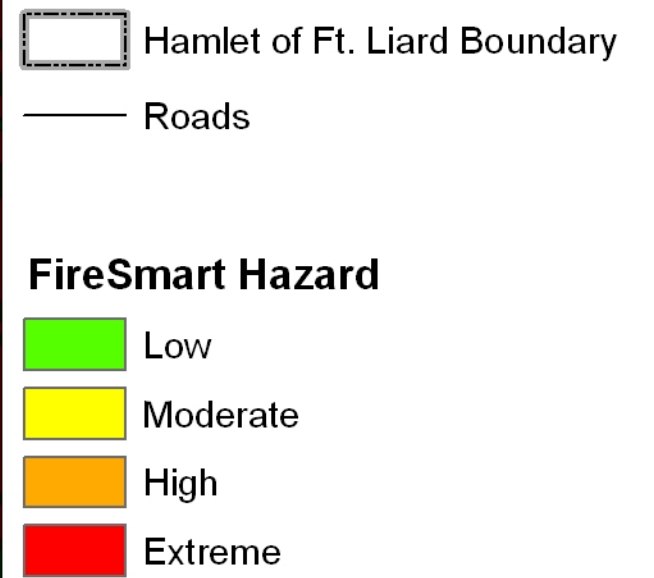
The Beaver Enterprises yard on Hwy 7 is an industrial storage yard with several above-ground fuel tanks. Surrounding fuel types are primarily deciduous and mixedwood and structures have significant clearance from the fuels while the fuel tanks are relatively close. FireSmart hazard is rated as Low for the structures and High for the fuel tanks.

**Lomen Cabins – Hwy 7**

This site contains several cabins/outbuildings with adequate Zone 1 defensible space and surrounded by mixedwood fuels. FireSmart hazard is rated is Moderate due to the adjacent M-1 fuels.

The threat of significant structure loss from wildfire in Fort Liard is predominantly Low to Moderate. FireSmart hazard is Moderate-High for the new subdivision development and High for the Beaver Enterprises Hwy 7 bulk fuel-tank site .

Map 4 - FireSmart Hazard Hamlet of Fort Liard



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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.

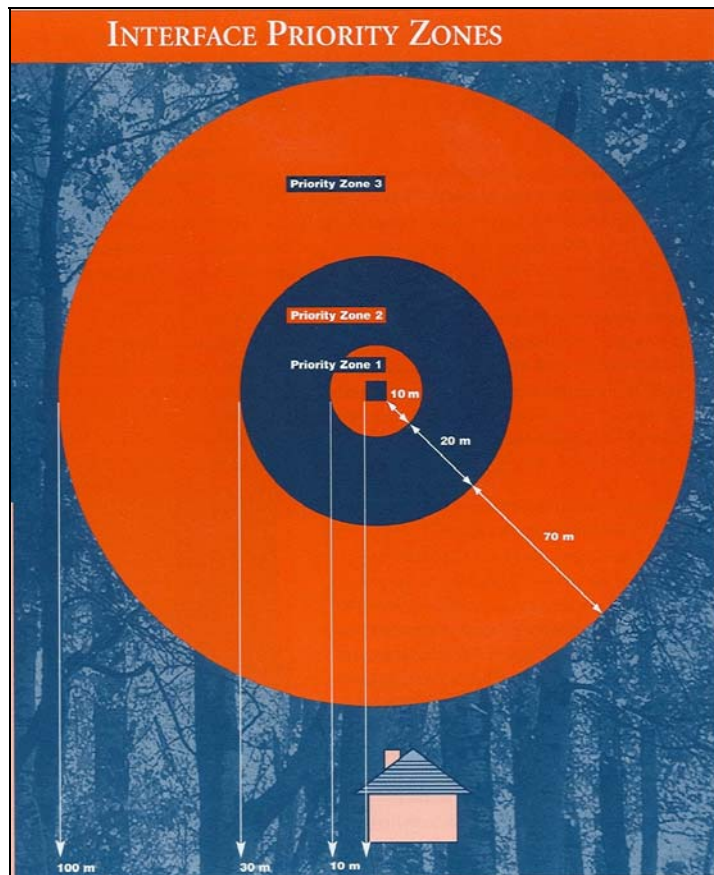


Figure 3 – Interface Priority Zones (PIP, 2003)

4.1 Existing Vegetation Management

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

Table 3: Existing Vegetation Management Areas

Name	Area (ha)	Year	Agency	Comments
New Subdivision	4.6	2010	GNWT ENR	Widen to 75–100m width

The new subdivision fuel modification was commenced in 2010 by ENR and consisted of hand-crew fuels reduction work around the perimeter of the development for approximately 25 metres in width. The project area should be widened to a minimum of 75-100 metres in width for the entire area surrounding the development.



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

Five priority areas are recommended for Zone 2-3 fuels management based on hazard and risk and the need to progressively complete areas (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 New Subdivision	3.9	<ul style="list-style-type: none"> ▪ Fuels reduction to widen existing fuel mod area by spacing spruce to 2-3 m crown spacing for a minimum 75m wide fuel modification 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 	<ul style="list-style-type: none"> ▪ GNWT ENR
2 Petitot River	3.4	<ul style="list-style-type: none"> ▪ Fuels reduction by spacing spruce to 2-3 m crown spacing immediately adjacent to 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 	<ul style="list-style-type: none"> ▪ GNWT ENR ▪ Commissioner
3 NorthEast	11.4	<ul style="list-style-type: none"> ▪ Fuels reduction to space spruce to 2-3 m crown spacing for a minimum 75m wide fuel modification behind ENR office ▪ 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 	<ul style="list-style-type: none"> ▪ GNWT ENR ▪ Commissioner
4 Airport	20.8	<ul style="list-style-type: none"> ▪ Dispose of old debris piles (buried on tall grass) from Airport construction by burning ▪ Annually mow grass on north-side of airport to reduce potential of spring/fall cured-grass fires adjacent to community 	<ul style="list-style-type: none"> ▪ Commissioner ▪ GNWT ENR
5 Log Decks	24.5	<ul style="list-style-type: none"> ▪ Dispose of old log decks by piling and burning to reduce fuel loads adjacent to community 	<ul style="list-style-type: none"> ▪ GNWT ENR
Total	64.0		

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.



Fuel Modification Priority 4 – Airport Debris Piles and Unmaintained Grass Fuels



Fuel Modification Priority 5 – Log Decks

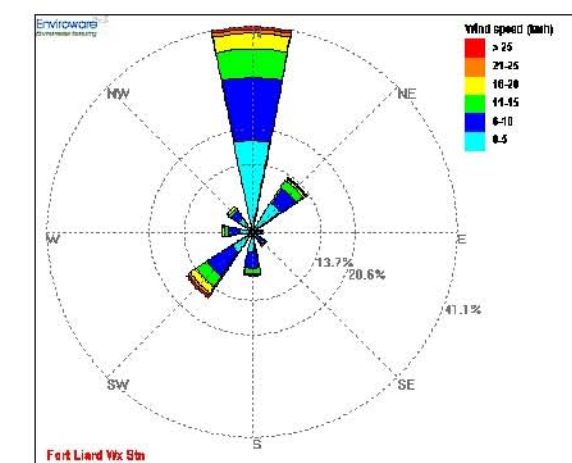
4.3 Vegetation Management Maintenance

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 fuel modification effectiveness. Maintenance should be the responsibility of the land manager or landowner.

Map 5 - Fuel Modification Hamlet of Fort Liard

-  Existing Fuel Modification
-  Proposed Fuel Modification
-  Fuel Removal/Clear
-  Fuel Reduce/Thin
-  Roads
-  Hamlet of Ft. Liard Boundary



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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 with dwellings in the Hamlet with combustible wood-shake roofing materials, putting these structures at higher threat to airborne firebrand ignition.

Siding materials vary between non-combustible hardi-plank and metal to combustible vinyl, wood, and log.

Many structures have combustible debris piles (firewood, lumber, etc) immediately adjacent to the structure, increasing the threat of wildfire to 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. Most access roads are all-weather loop-road design and cul-de-sacs have adequate turnaround dimensions for fire apparatus.

5.2.2 Water Supply

Fort Liard area does not have municipal hydrant water-supply. All development areas rely on water-tender supply 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 above-ground distribution lines. Some overhead distribution and service lines in the area are at risk to hazard trees which could result in wildfire ignition or downed lines during a wildfire.

Gas

Gas distribution is provided by heating oil or propane. Several propane and fuel tanks have inadequate defensible space from wildland fuels including the fuel tanks at the Beaver Enterprises yard on Hwy 7.

Satellite Television

The Hamlet of Fort Liard had several areas cleared for satellite dish installation. Debris from the clearing was piled but not disposed of resulting in numerous flammable debris piles within the Hamlet. These debris piles require disposal by burning or chipping.



Recommendation 5: Dispose of all debris piles from satellite dish installation and other reasons by burning or chipping.

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
- Propane and fuel-tank FireSmart defensible space

Recommendation 6: Public education on acceptable FireSmart Zone 1 standards is recommended for all Fort Liard residents. Priority items include:

- Development and maintenance of FireSmart defensible space surrounding the home
- Propane and fuel-tank FireSmart defensible space

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:

- Hamlet of Fort Liard
- Acho Dene Koe First Nations
- GNWT Environment and Natural Resources (ENR)
- GNWT Municipal and Community Affairs (MACA)

Recommendation 7: Develop a FireSmart Committee, consisting of all relevant stakeholders, to coordinate and lead the FireSmart program for the area.

Cross-training for Fort Liard 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 8: Hamlet of Fort Liard 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.

The Fort Liard Emergency Response Plan is used to provide authority and direction during an emergency. At present Fort Liard 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 9: Develop a Community Wildfire Pre-Plan for the Hamlet of Fort Liard 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.	Hamlet of Fort Liard GNWT MACA
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
Maintenance	Recommendation 3: Ensure that all existing fuel modification projects are inspected on a regular basis and maintained as necessary to ensure fuel modification effectiveness. Maintenance should be the responsibility of the land manager or landowner.	GNWT ENR & MACA

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 Fort Liard
Infrastructure Debris Piles	Recommendation 5: Dispose of all debris piles from satellite dish installation and other reasons by burning or chipping.	Hamlet of Ft. Liard

Public Education

Issue	Recommendation	Responsible Agency
Public Education Priorities	Recommendation 6: Public education on acceptable FireSmart Zone 1 standards is recommended for all Fort Liard residents. Priority items include: <ul style="list-style-type: none"> ▪ Development and maintenance of FireSmart defensible space surrounding the home ▪ Propane and fuel-tank FireSmart defensible space 	GNWT ENR & Hamlet of Ft. Liard

Interagency Cooperation & Cross-Training

Issue	Recommendation	Responsible Agency
FireSmart Committee	Recommendation 7: Develop a FireSmart Committee, consisting of all relevant stakeholders, to coordinate and lead the FireSmart program for the area.	GNWT ENR & MACA Hamlet of Fort Liard Acho Dene Koe First Nations
Cross-Training	Recommendation 8: Hamlet of Fort Liard Fire Department 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 Hamlet of Fort Liard

Emergency Planning

Issue	Recommendation	Responsible Agency
Community Wildfire Pre- Planning	Recommendation 9: Develop a Community Wildfire Pre-Plan for the Hamlet of Fort Liard to provide greater operational detail to emergency responders during a wildland/urban interface incident.	GNWT ENR & MACA Hamlet of Fort Liard