

Wildfire Risk Assessment & Mitigation Plan

Northwest Territories Power Corporation Hydro Facilities

**Prepared for:
Northwest Territories Power Corporation**

**Prepared by:
Stew Walkinshaw**
MONTANE
Forest Management Ltd.
Canmore, AB.
(403)678-7054
montane@shaw.ca

February 2019

Table of Contents

Executive Summary	iii
1 Overview	1
2 Methodology and Standards	1
3 South Region	3
3.1 Taltson Hydro System	
3.2 Fort Smith Powerplant and Substation	
4 North Region	14
4.1 Snare Hydro System	
4.2 Bluefish Hydro System	
4.3 Jackfish Lake Powerplant and Substation	
5 Transmission Powerlines	31
5.1 South Region	
5.2 North Region	
6 References	40

Executive Summary

This wildfire risk assessment and mitigation plan evaluates wildfire behaviour potential and provides recommendations to reduce the threat of wildfire to the NTPC facilities at Taltson, Bluefish, Snare, Fort Smith, and Jackfish Lake, and to the main transmission powerlines from each of the hydro plants.

Wildfire threat potential is summarized below.

NTPC Facility	Wildfire Threat Potential
Taltson	High threat from long-range and short-range spotting and a Moderate threat from radiant heat ignition. The 2014 and 1998 wildfires provide good fuelbreaks surrounding most of the site facilities.
Fort Smith	Moderate threat from long-range spotting and Low threat from short-range spotting and radiant heat ignition.
Snare	Low-High threat from long-range spotting, Moderate-High threat from short-range spotting, and Low threat from radiant head ignition. The 2016 and 2008 wildfires have provided good fuelbreaks to the east and west of the site however there are still significant hazardous fuels between the fire perimeters and the sites that present wildfire threat.
Bluefish	High threat from long-range spotting, Moderate-High threat from short-range spotting, and Low threat from radiant heat ignition. The 2014 wildfire has provided a good fuelbreak to the east of the site however there are still significant hazardous fuels between the fire perimeter and the site and to the west and south of the site.
Jackfish Lk.	Moderate threat from long-range spotting and Low threat from short-range spotting and radiant heat ignition due to good clearance from wildland vegetation and use of non-combustible structure materials.
South-Region Powerlines	Sections at highest threat to wildfire are the Pine Point to Fort Resolution, Pine Point to Hay River, and Hay River to Enterprise sections due to the use of wooden poles and/or minimal right-of-way (ROW) width.
North-Region Powerlines	Sections at highest threat to wildfire are the lines within the Snare facility due to the use of wooden poles and inadequate right-of-way (ROW) brushing. The sections from Bluefish to Jackfish Lake and the southwestern portion of Behchoko line junction to Behchoko substation have metal poles and adequate ROW width however forest fuels have not burned for some time.

Specific mitigation recommendations are provided for each facility in this report based on FireSmart best-practices. Overall findings include:

- Some structures have combustible exterior features (roofing, siding, porches/decks) that put the structure at risk of ignition and require replacement.
- Many structures have wildland grass, brush, and/or trees adjacent to/underneath and/or within 10 metres that need treatment.
- Some structures have coniferous wildland fuels within 100 metres that need treatment.
- Transmission powerlines that travel through coniferous wildland fuel types are at threat to wildfire and should be considered for right-of-way brushing and or widening.

1 Overview

Northwest Territories Power Corporation requested Stew Walkinshaw, Montane Forest Management to complete a wildfire risk assessment and mitigation plan for the Taltson, Bluefish, and Snare hydro plants, the Fort Smith and Jackfish Lake facilities, and the main transmission powerlines from each of the hydro plants.

This report evaluates current wildfire behaviour potential at each site and provides recommendations to reduce the threat of wildfire to the facilities based on FireSmart recommended guidelines and best practices.

2 Methodology and Standards

Field work was conducted in September and October 2018 by ground and aerial assessments.

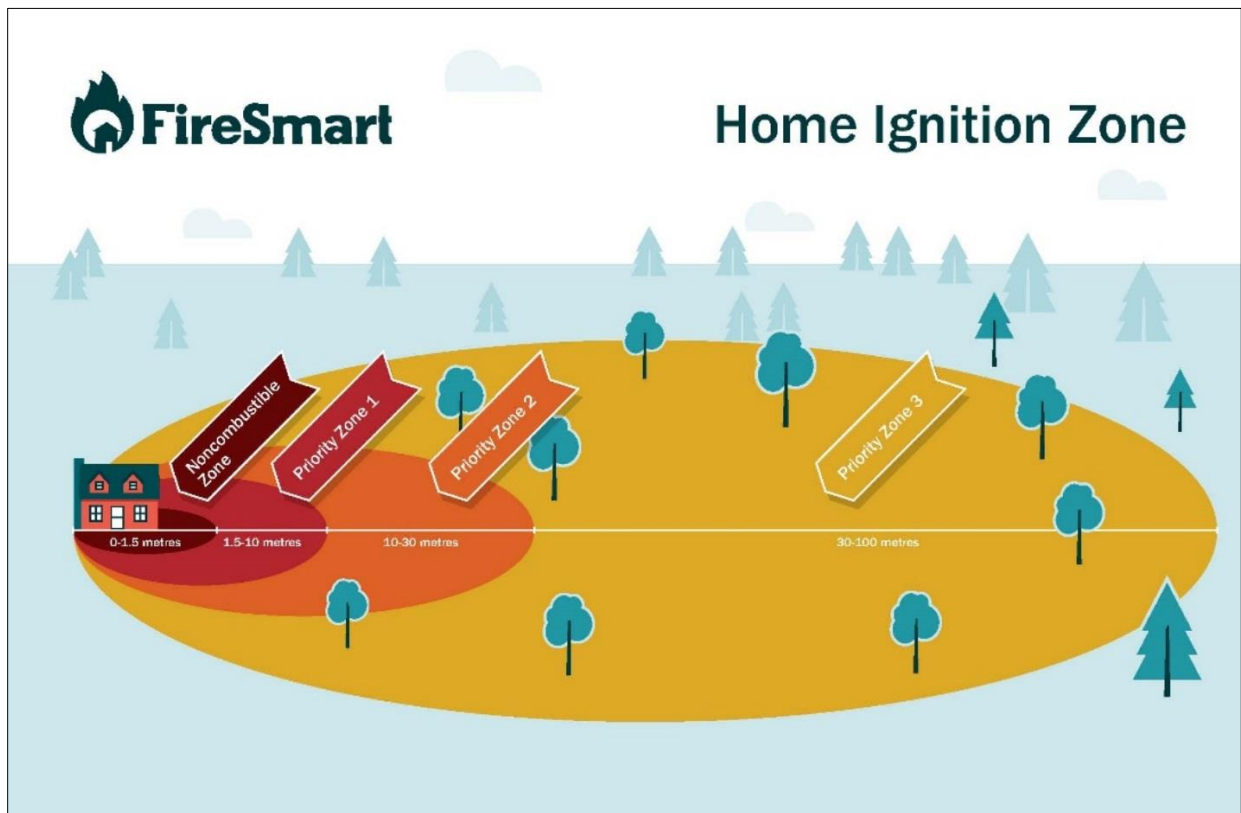
Structure ignition from wildfires occurs when combustible structures and surrounding human-built fuels are within critical ignition distance of wildland fuels.

Structure materials including roofing, siding, and decking and features such as deck/porch skirting and location of combustible materials piles were assessed to determine the structure ignition and combustibility potential (Partners in Protection, 2003).

Wildland fuel types within 500 metres of each site were assessed to determine the threat of long-range spotting (500m), short-range spotting (100m), and radiant/direct flame impingement (30m) ignition potential. Structure ignition from radiant heat/direct flame impingement may occur when hazardous wildland fuels are within 30 metres of structures, ignition from short-range spotting may occur when hazardous fuels are within 100 metres of structures, and ignition from long-range spotting may occur when hazardous fuels are within 500 metres of structures (Beverly et.al., 2010). Hazardous wildland fuel types include coniferous and mixedwood forest and surface/ground fuel accumulations, including native grasses, adjacent to and underneath structures.

Vegetation management within the Home Ignition Zone (Priority Zones 1, 2, and 3) is critical to reducing structure ignition potential.

- **Priority Zone 1 (0-10m)** begins immediately adjacent to a structure and extends outward in all directions for a minimum of 10 metres. The objective of vegetation management in this Zone is to create an environment that will not support fire of any kind. A minimum 1.5m non-combustible zone (**Zone 1A**) must surround the structure and any attachments (decks/porches).
- **Priority Zone 2 (10-30m)** begins 10 metres from the structure and extends to a minimum of 30 metres from the structure. The objective of vegetation management within this Zone is to create an environment that only supports fires of lower intensity and rate of spread.
- **Priority Zone 3 (30-100m)** begins 30 metres from the structure and extends to 100 metres or farther from the structure. Vegetation management may only be needed in this Zone when High/Extreme hazard levels result from **heavy continuous coniferous forest vegetation and/or steep topography**.



This report provides FireSmart best-practice recommendations for structure materials and features and vegetation management in Priority Zone 1A (0-1.5m), Zone 1B (1.5-10m), and Zone 2-3 (10-100m).

3 South Region

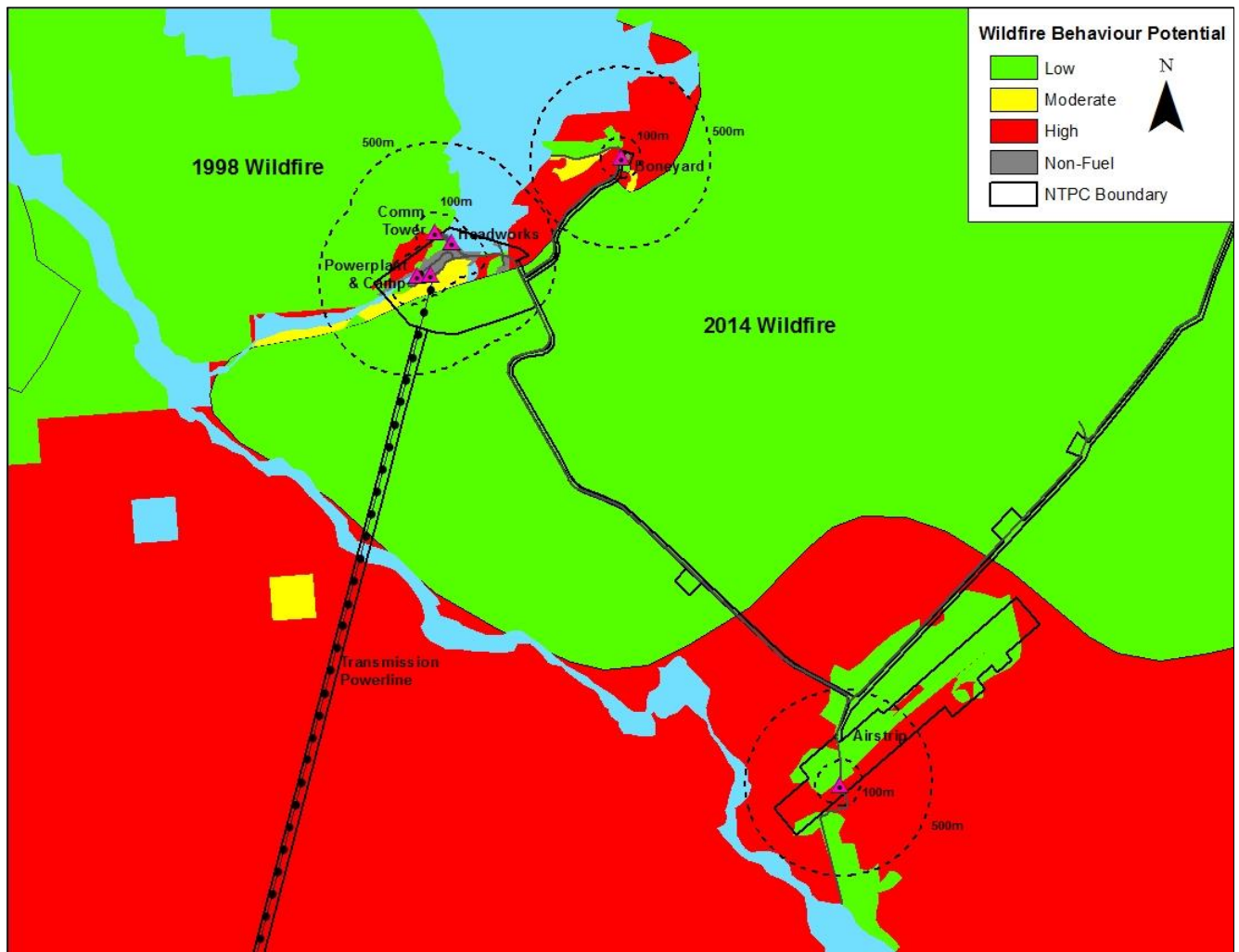
3.1 Taltson Hydro System

3.2 Fort Smith Powerplant & Substation

3.1 Taltson Hydro System

The Taltson site has a High threat from long-range and short-range spotting and a Moderate threat from radiant heat ignition. The 2014 and 1998 wildfires provide good fuelbreaks surrounding most of the site facilities.

Ignition Type	Potential	Comments
Long-Range Spotting (500 metres)	High	Highest threat to Airstrip structures from hazardous fuels surrounding.
Short-Range Spotting (100 metres)	High	Highest threat to Airstrip and Boneyard structures.
Radiant Heat (30 metres)	Moderate	Highest threat to Boneyard structures.



Taltson Hydro Wildfire Threat Factors and Recommended Mitigations

Facility	Wildfire Threat Factors	Recommended Mitigation(s)
Airstrip Buildings and Fuel Drums	<ul style="list-style-type: none"> ▪ 2 Structures – 1-Metal, 1-Asphalt shingle roof /wood siding & fuel drums ▪ Zone 1A – native surface grass adjacent to buildings. ▪ Zone 1B – native surface grass. ▪ Zone 2-3 – Hazardous coniferous pine to south and east. 	<ul style="list-style-type: none"> ▪ Clear and maintain fuel-free Zone 1A around both buildings. ▪ Clear pine fuels to south and east for a minimum of 30 metres from buildings and fuel drums. ▪ Thin/prune/clean coniferous fuels out to NTPC tenured boundary.
Boneyard	<ul style="list-style-type: none"> ▪ 2 Structures – Metal roof/Metal siding. Open eaves on cold storage building. ▪ Zone 1A – native grass/trees & combustible materials piles adjacent to buildings. ▪ Zone 1B – native grass/trees & combustible material piles. ▪ Zone 2-3 – Hazardous mixedwood fuels surrounding site. 	<ul style="list-style-type: none"> ▪ Close-in eaves on cold storage bldg. with non-combustible material. ▪ Clear and maintain fuel-free Zone 1A around both buildings including all combustible material piles. ▪ Clear mixedwood fuels to south for a minimum of 20 metres to edge of 2014 burn. ▪ Thin/prune/clean coniferous fuels for minimum 50 metres to north, east, and west.
Comm Tower	<ul style="list-style-type: none"> ▪ 1 Structure – Old Asphalt shingle roof/Wood siding with wooden walkway to building – both un-skirted. ▪ Zone 1A – native lichen/trees, debris piles adjacent to buildings. ▪ Zone 1B – native lichen/trees. ▪ Zone 2-3 – Hazardous immature pine fuels surrounding site. 	<ul style="list-style-type: none"> ▪ Replace old asphalt shingles on building with non-combustible material. ▪ Skirt undersides of building and walkway with non-combustible material. ▪ Separate wooden walkway from building by minimum 1.5m of non-combustible material. ▪ Clear and maintain fuel-free Zone 1A around building and walkway. ▪ Clear pine fuels for a minimum of 30 metres surrounding building and tower.
Headgate	<ul style="list-style-type: none"> ▪ All metal/concrete. ▪ No forest fuels within 30 metres. 	<ul style="list-style-type: none"> ▪ None.
Powerplant	<ul style="list-style-type: none"> ▪ All metal/concrete. ▪ Minimal forest fuels within 30 metres. 	<ul style="list-style-type: none"> ▪ None.
Sump Shack	<ul style="list-style-type: none"> ▪ Asphalt shingle roof/Plywood siding. ▪ Zone 1A & 1B – Deciduous and brush. 	<ul style="list-style-type: none"> ▪ Clear 3 metres surrounding building.
Camp	<ul style="list-style-type: none"> ▪ 3 Structures – Asphalt & Metal roofs/Wood and Metal siding. Wood decks, un-skirted on bunkhouses. ▪ Zone 1A & 1B – native grass/brush adjacent to buildings. ▪ Zone 2-3 – Hazardous spruce/pine fuels to south and east of buildings. 	<ul style="list-style-type: none"> ▪ Skirt all deck undersides with non-combustible material. ▪ Clear and maintain fuel-free Zone 1A around all buildings. ▪ Thin/prune/clean spruce/pine fuels south & east of buildings for a minimum of 100 metres to edge of 2014 burn.
Taltson Facility	<ul style="list-style-type: none"> ▪ There is no wildfire sprinkler protection equipment onsite. 	<ul style="list-style-type: none"> ▪ Purchase adequate wildfire protection sprinklers, pumps, and hose to protect critical values during a wildfire.



Airstrip & Buildings – Inadequate Zone 1, 2, & 3 Clearance



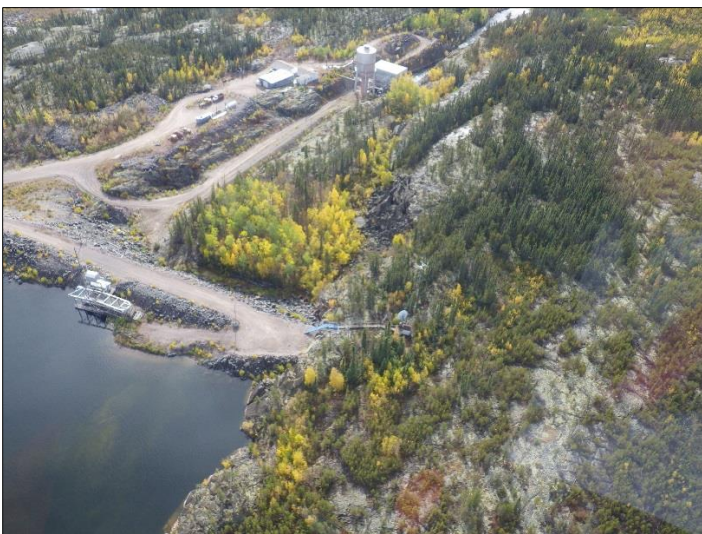
Airstrip & Buildings – Inadequate Zone 1 Clearance



Boneyard – Inadequate Zone 1, 2, & 3 Clearance



Boneyard – Combustible Debris Adjacent to Structures



Comm Tower - Inadequate Zone 1, 2, & 3 Clearance



Comm Tower – Unskirted and Combustible Walkway



Headworks – Minimal Threat



Headworks – Minimal Threat



Powerplant, Sump Shack, & Camp – Minimal Threat



Powerplant – Minimal Threat

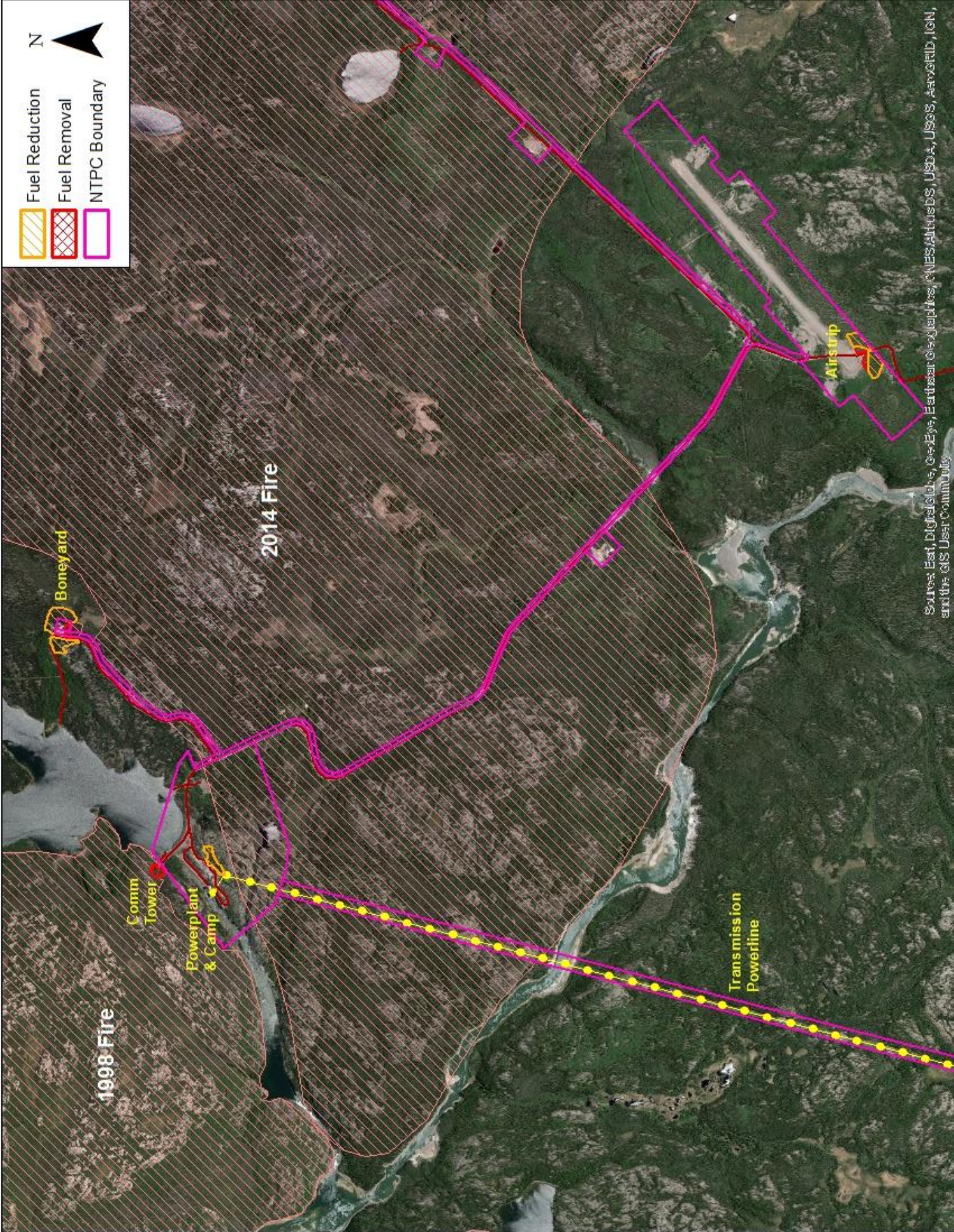


Sump Shack – Inadequate Zone 1 Clearance

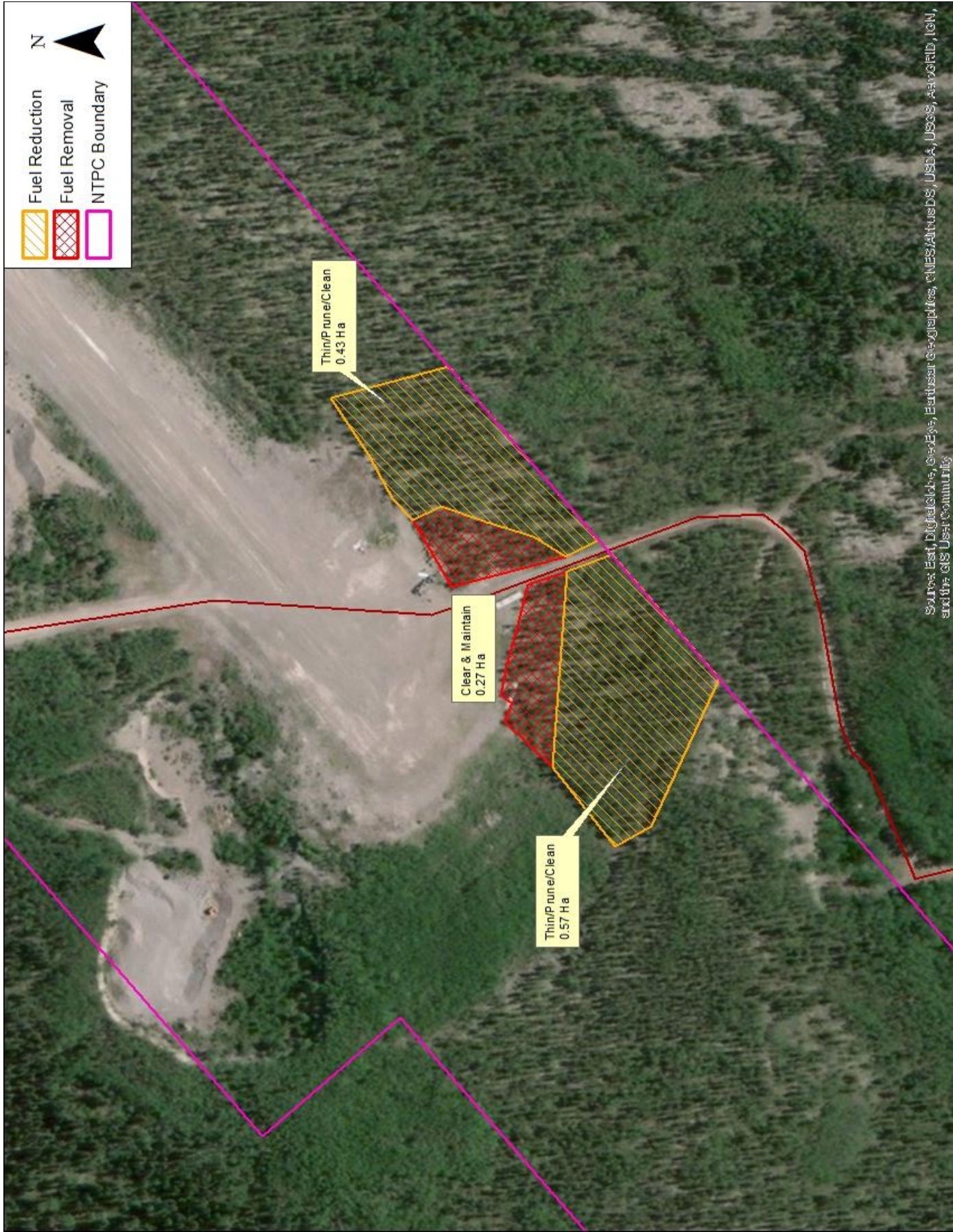


Camp – Inadequate Zone 1 Clearance from Grass/Brush

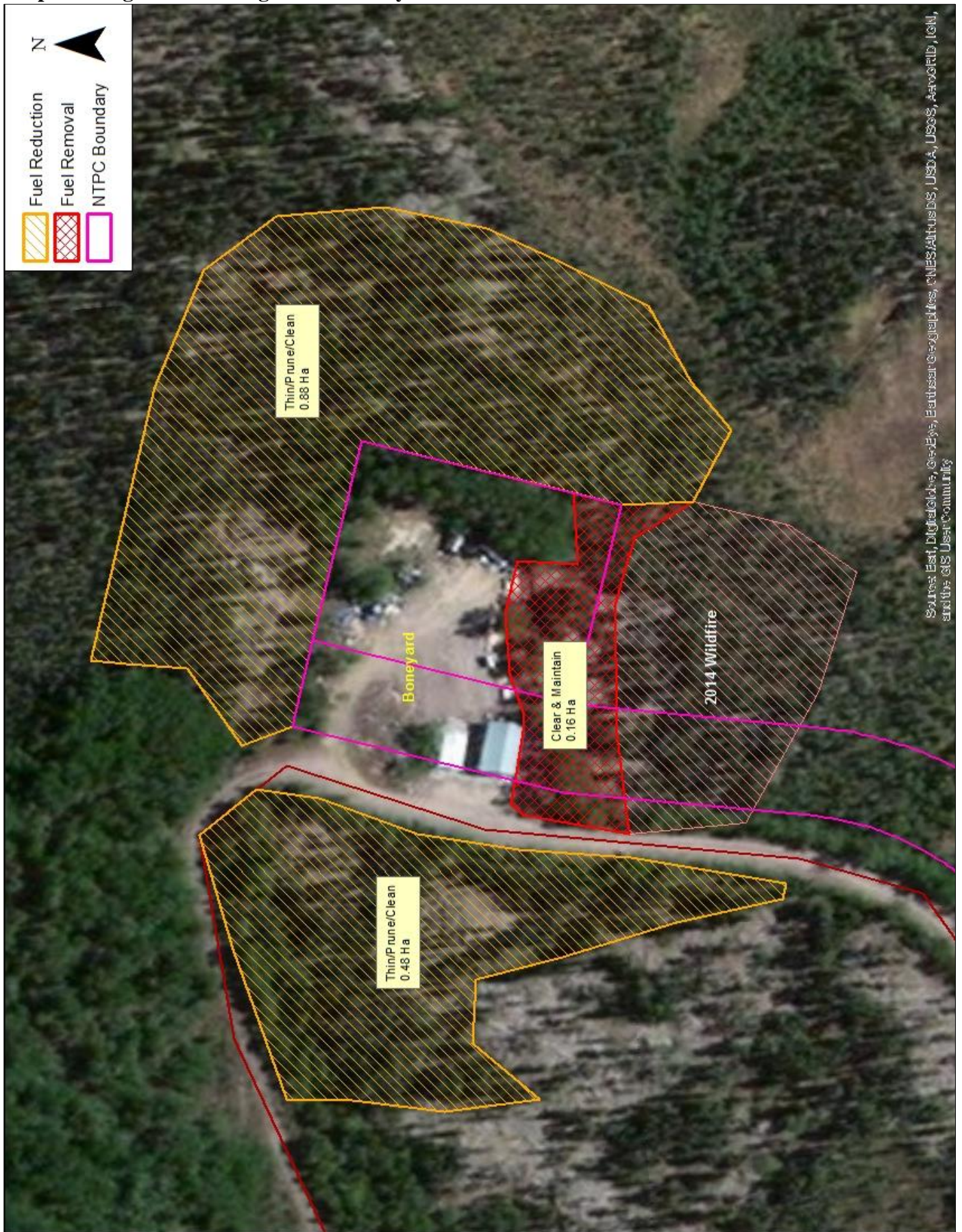
Proposed Vegetation Management – Taltson Overview



Proposed Vegetation Management – Airstrip Buildings and Fuel Drums



Proposed Vegetation Management – Boneyard



Proposed Vegetation Management – Powerplant, Comm Tower, and Camp

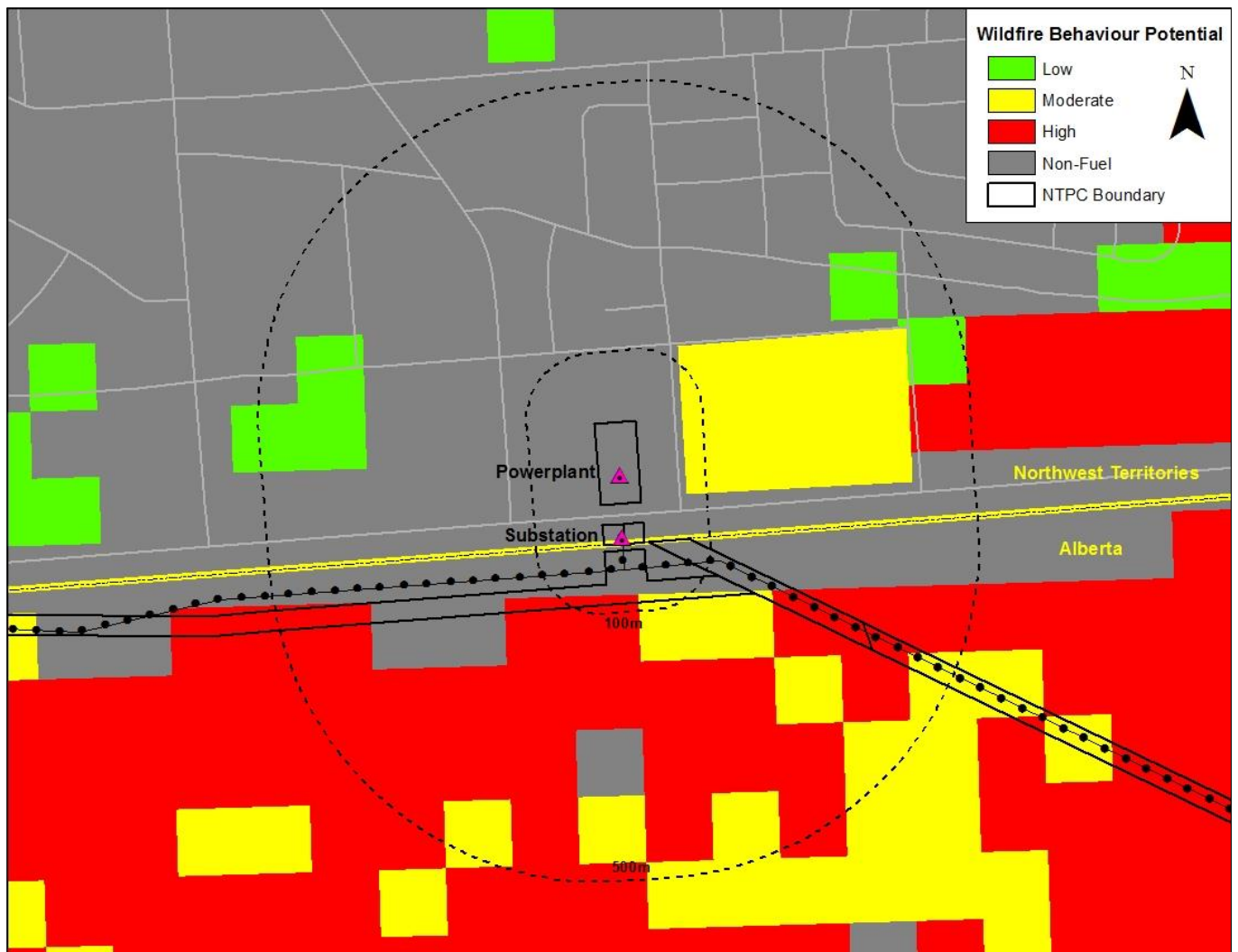


3.2 Fort Smith Powerplant & Substation

The Fort Smith site has a Moderate threat from long-range spotting and Low threat from short-range spotting and radiant heat ignition.

Ignition Type	Potential	Comments
Long-Range Spotting (500 metres)	Moderate	Hazardous fuels to the south of Fort Smith however site is resistant to spot fire ignition.
Short-Range Spotting (100 metres)	Low	Minimal threat from the south.
Radiant Heat (30 metres)	Low	Minimal threat due to vegetation clearance and non-combustible structure materials.

There is no work proposed for the Fort Smith Substation site except for regular maintenance of vegetation in-growth and combustible material piles.





Fort Smith Substation and Powerplant



Fort Smith Substation and Powerplant

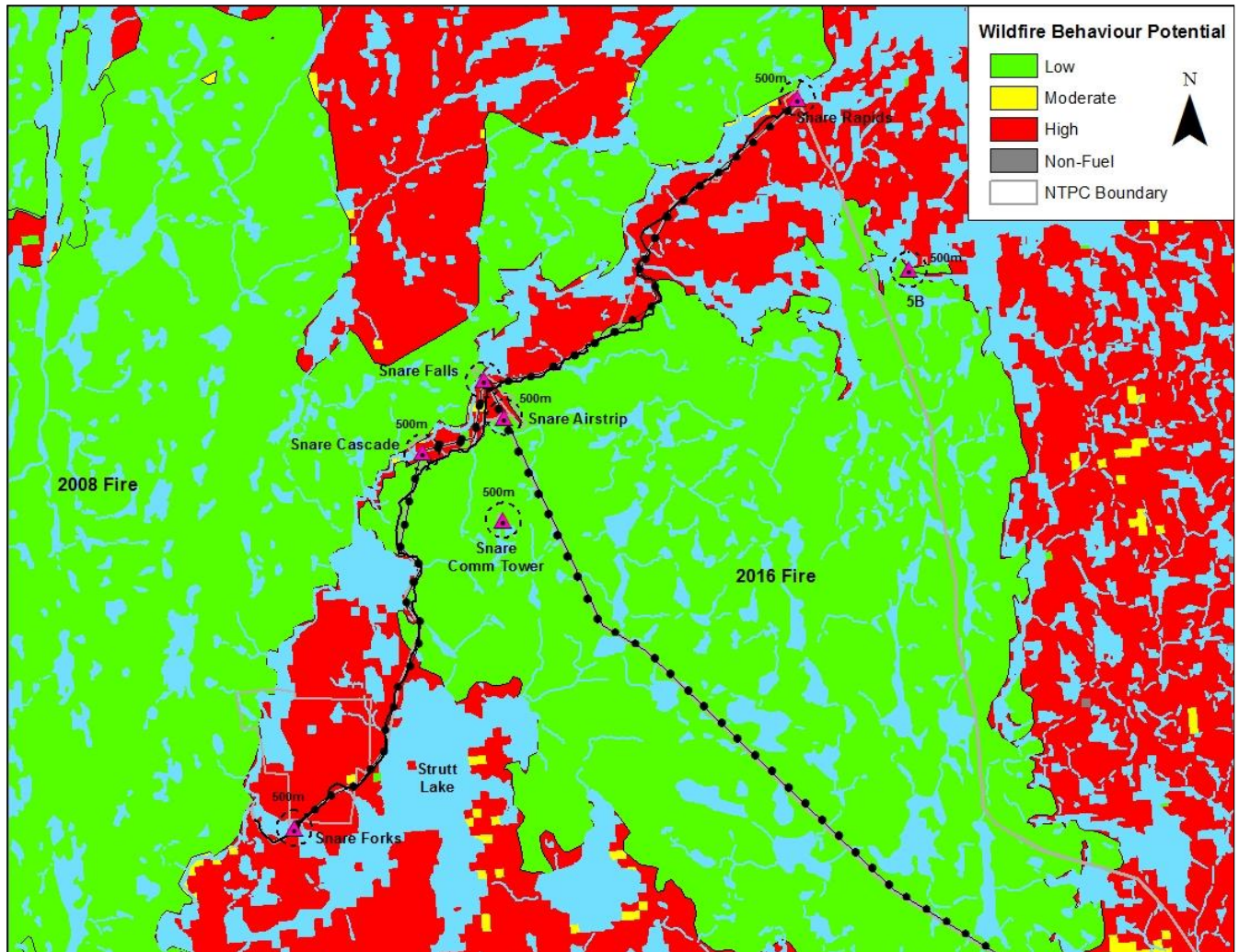
4 North Region

- 4.1 Snare Hydro System
- 4.2 Bluefish Hydro System
- 4.3 Jackfish Lake Powerplant & Substation

4.1 Snare Hydro System

The Snare site has a Low-High threat from long-range spotting, Moderate-High threat from short-range spotting, and Low threat from radiant head ignition. The 2016 and 2008 wildfires have provided good fuelbreaks to the east and west of the site however there are still significant hazardous fuels between the fire perimeters and the sites that present wildfire threat.

Ignition Type	Potential	Comments
Long-Range Spotting (500 metres)	Low-High	High threat for Snare Rapids and Snare Forks.
Short-Range Spotting (100 metres)	Moderate-High	High threat for Snare Rapids and Snare Forks Moderate threat for Snare Airstrip, Falls, and Cascade.
Radiant Heat (30 metres)	Low	Surface grass/brush fuels around and underneath buildings present threat.



Snare Hydro Wildfire Threat Factors and Recommended Mitigations

Facility	Wildfire Threat Factors	Recommended Mitigation(s)
Snare Forks Powerplant/Substn, Headgate, & Radio Shack/Comm Tower	<ul style="list-style-type: none"> ▪ Non-combustible structure materials. ▪ Zone 1A – Radio Shack – Inadequate. ▪ Zone 1B – Radio Shack – Inadequate. ▪ Zone 2-3 – Powerplant/Radio Shack – Inadequate. 	<ul style="list-style-type: none"> ▪ Clear and maintain fuel-free Zone 1A around Radio Shack. ▪ Thin/prune/clean spruce fuels to south and north of all facilities for a minimum of 100 metres from buildings.
Snare Cascade Powerplant, Substation, & Staff House	<ul style="list-style-type: none"> ▪ Combustible vinyl siding on Staff House. ▪ Zone 1A – native grass/brush underneath and surrounding Staff house. ▪ Zone 1B – native grass/brush surrounding Staff house. ▪ Zone 2-3 – Minimal threat from forest fuels. 	<ul style="list-style-type: none"> ▪ Clear and maintain grass and brush fuels underneath and surrounding Staff house.
Snare Falls Powerplant, Substation, Headgate & Tie Substation	<ul style="list-style-type: none"> ▪ Non-combustible structure materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Adequate. 	<ul style="list-style-type: none"> ▪ Minimal threat - No work required.
Snare Airstrip Maintenance Shop, Weatherhaven, and Gas Tanks	<ul style="list-style-type: none"> ▪ All non-combustible metal except for Weatherhaven structure and steps/deck on Maintenance building. ▪ Zone 1A – Adequate, gravel. ▪ Zone 1B – Adequate, some combustible debris/materials. ▪ Zone 2-3 – Zone 2 is cleared, Zone 3 presents minimal threat. 	<ul style="list-style-type: none"> ▪ Replace wooden steps/deck with metal. ▪ Ensure that combustible materials (tires, wood) are stored >10 metres from structures.
Snare Rapids Powerplant/Substn & Headgate	<ul style="list-style-type: none"> ▪ Non-combustible structure materials except wooden steps on Powerplant. ▪ Minimal forest fuels within 100 metres. 	<ul style="list-style-type: none"> ▪ Consider replacing wooden steps and walkways with non-combustible metal.
Snare Rapids Camp and Support Buildings	<ul style="list-style-type: none"> ▪ Varied combustible and non-combustible materials. ▪ Zone 1A – Inadequate for most, deciduous, brush, and grass. ▪ Zone 1B – Inadequate for most, deciduous, brush, and grass. ▪ Zone 2-3 – Inadequate for Camp & CapMon Wx Stn. 	<ul style="list-style-type: none"> ▪ Replace all wooden steps/porches with metal and skirt all open undersides with non-combustible material. ▪ Clear and maintain fuel-free Zone 1A around all buildings. ▪ Clean and clear 10 metres around Electrical Shop. ▪ Thin/prune/clean for a minimum of 30 metres behind Camp buildings.
Comm Tower	<ul style="list-style-type: none"> ▪ All fuels removed from 2016 wildfire. 	<ul style="list-style-type: none"> ▪ Minimal threat – No work required.
5B Dam	<ul style="list-style-type: none"> ▪ Most fuels removed from 2016 wildfire. 	<ul style="list-style-type: none"> ▪ Minimal threat – No work required.
Snare Facility	<ul style="list-style-type: none"> ▪ There is no wildfire sprinkler protection equipment onsite. 	<ul style="list-style-type: none"> ▪ Purchase adequate wildfire protection sprinklers, pumps, and hose to protect critical values during a wildfire.



Snare Forks Radio Shack – Inadequate Zone 1 and 2-3 Clearance



Snare Cascade Staff House – Inadequate Zone 1 Clearance



Snare Airstrip – Wooden Steps/Deck & Combustible Materials



Snare Rapids Powerplant – Combustible Wooden Steps

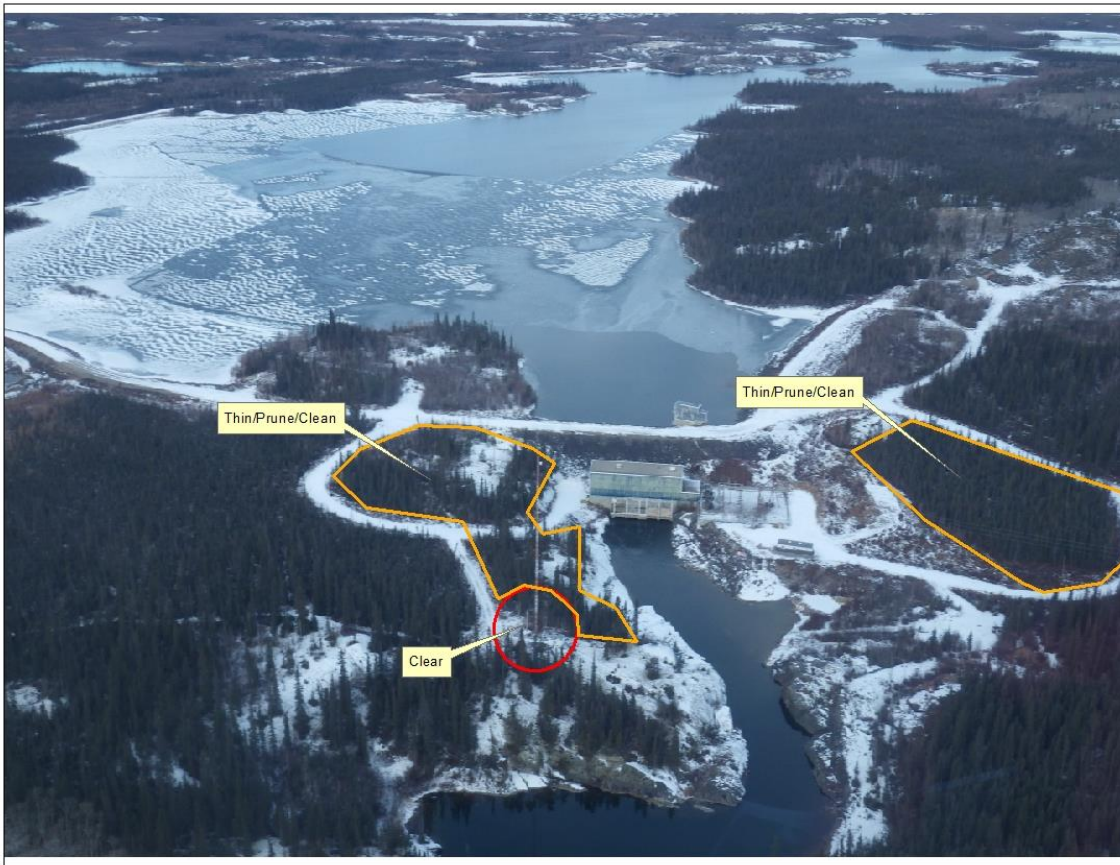


Snare Rapids Camp – Wooden Porches and Inadequate Zone 1

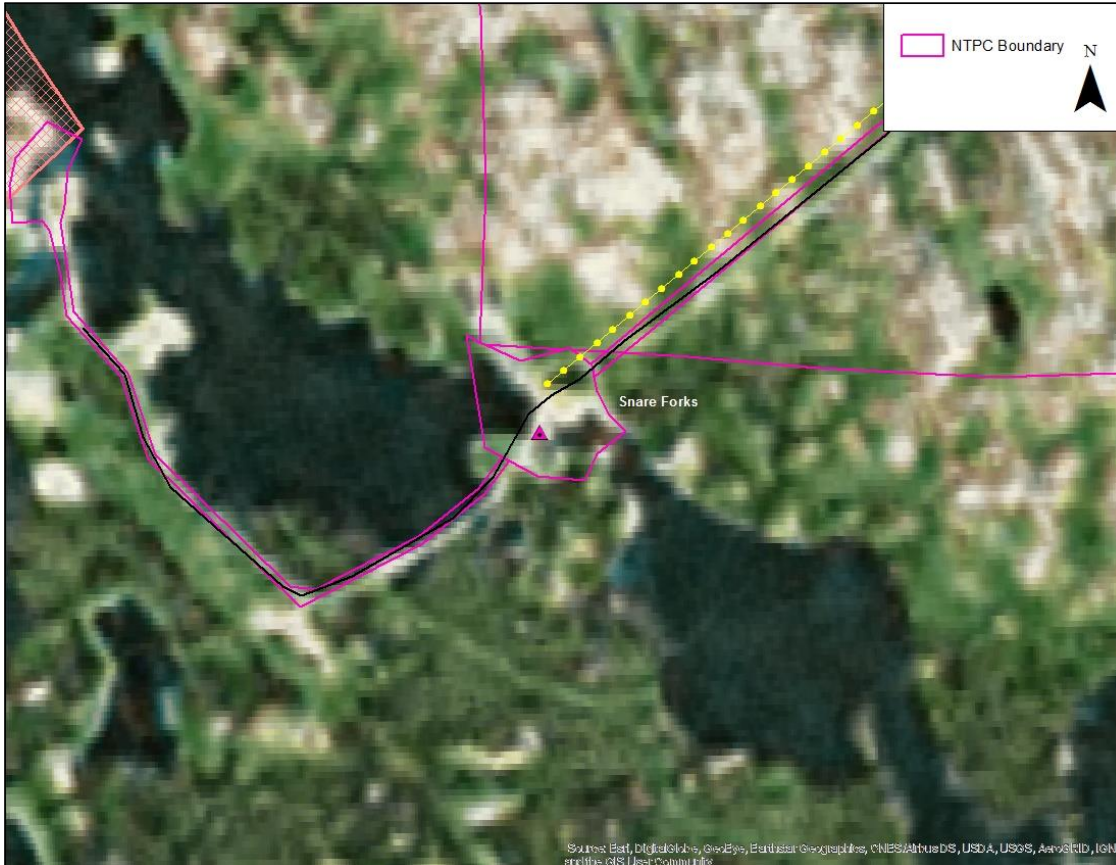


Snare Rapids Camp – Un-skirted Building and Porch Undersides

Proposed Vegetation Management – Snare Forks



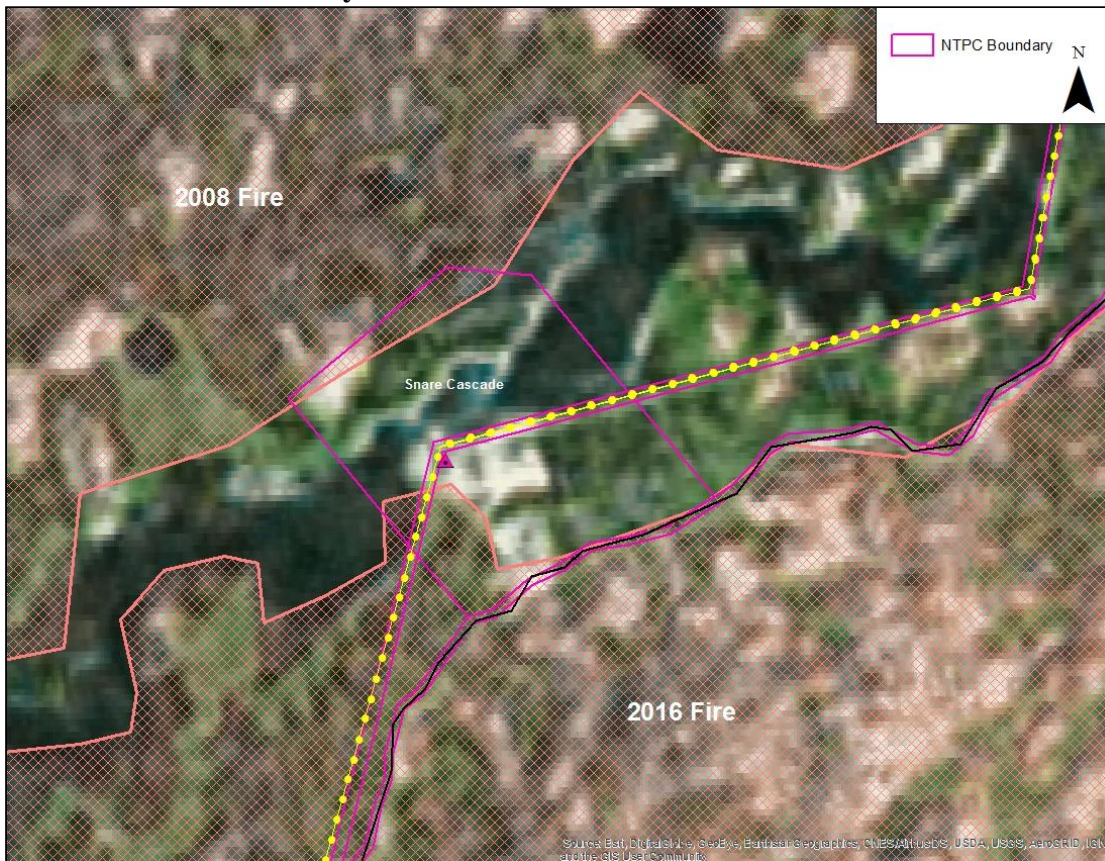
NTPC Tenured Boundary – Snare Forks



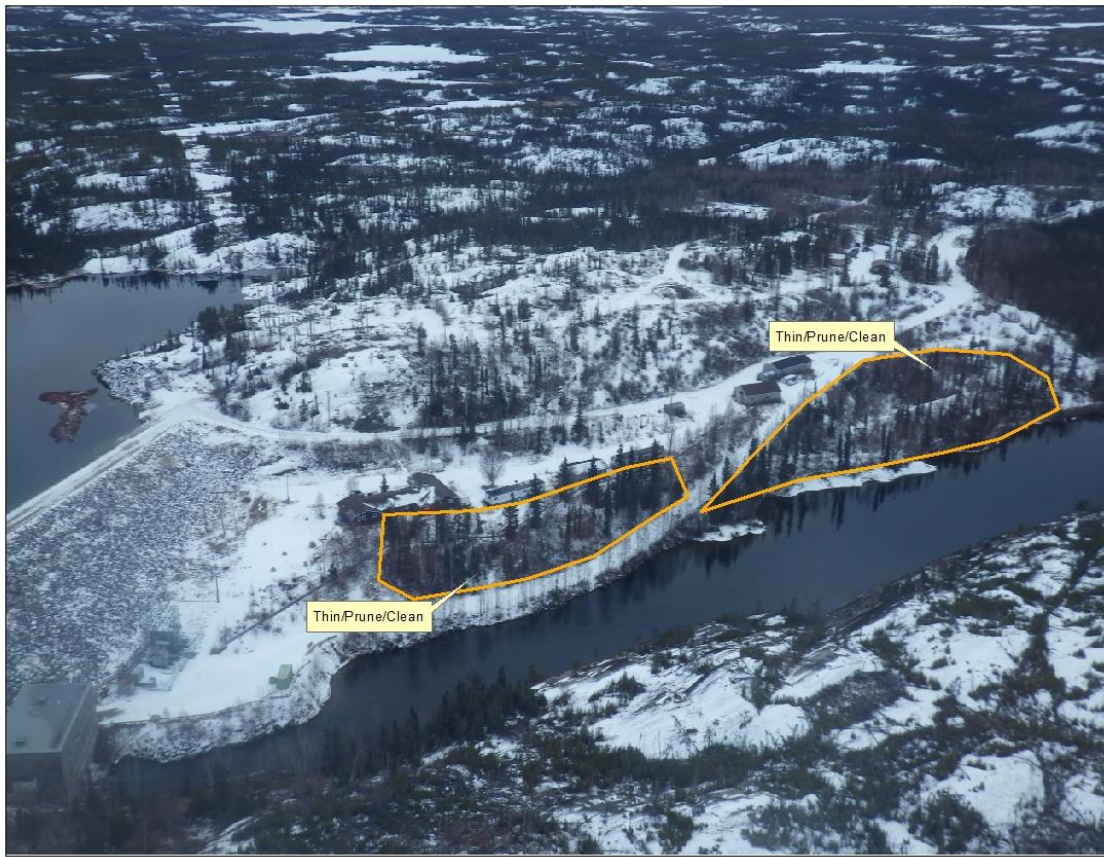
Proposed Vegetation Management – Snare Cascade



NTPC Tenured Boundary – Snare Cascade



Proposed Vegetation Management – Snare Rapids Camp



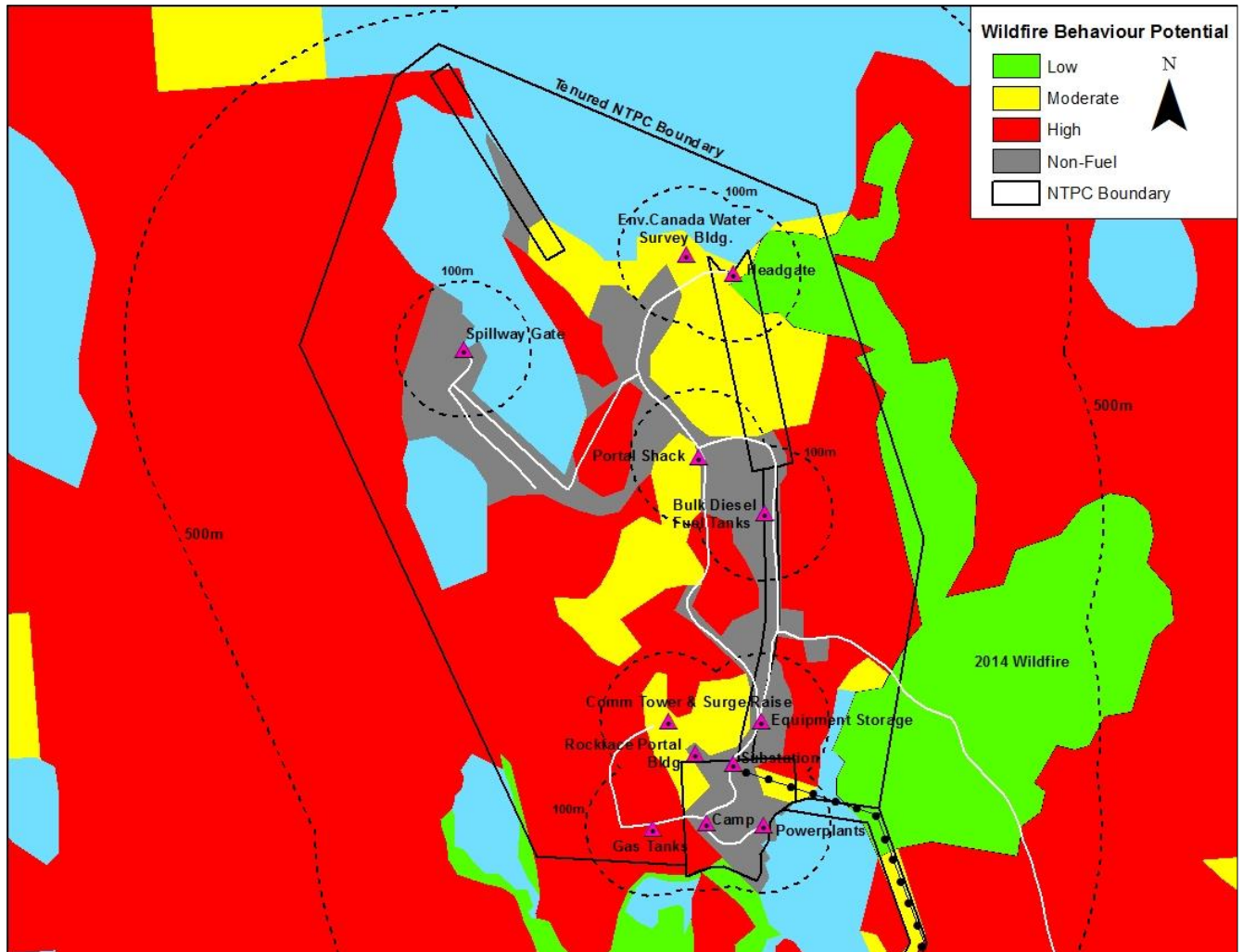
NTPC Tenured Boundary – Snare Rapids



4.2 Bluefish Hydro System

The Bluefish site has a High threat from long-range spotting, Moderate-High threat from short-range spotting, and Low threat from radiant heat ignition. The 2014 wildfire has provided a good fuelbreak to the east of the site however there are still significant hazardous fuels between the fire perimeter and the site and to the west and south of the site.

Ignition Type	Potential	Comments
Long-Range Spotting (500 metres)	High	Heavy coniferous fuels in all directions.
Short-Range Spotting (100 metres)	Moderate-High	Moderate threat for Headgate and Spillway Gate. High threat for Portal Shack/Bulk Diesel Tanks and Camp/Powerplant sites.
Radiant Heat (30 metres)	Low	Grass/brush around and under structures creates some threat.



Bluefish Hydro Wildfire Threat Factors and Recommended Mitigations

Facility	Wildfire Threat Factors	Recommended Mitigation(s)
Headgate	<ul style="list-style-type: none"> ▪ Non-combustible structure materials. Hole in east-side of building that could collect airborne embers. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Minimal threat from forest fuels, 2014 burn area. 	<ul style="list-style-type: none"> ▪ Fill hole in east-side of building.
Environment Canada Water Survey Building	<ul style="list-style-type: none"> ▪ Non-combustible structure materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Minimal threat from forest fuels. 	<ul style="list-style-type: none"> ▪ Minimal threat – No work required.
Spillway Gate	<ul style="list-style-type: none"> ▪ Non-combustible structure materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Minimal threat from forest fuels, surrounded by rock. 	<ul style="list-style-type: none"> ▪ Minimal threat - No work required.
Portal Shack	<ul style="list-style-type: none"> ▪ Non-combustible structure materials – C-Can. ▪ Zone 1A – Inadequate, some deciduous, grass, and brush. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Adequate. 	<ul style="list-style-type: none"> ▪ Clear and maintain fuel-free Zone 1A around building.
Bulk Diesel Fuel Tanks	<ul style="list-style-type: none"> ▪ Non-combustible materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Inadequate – dense black spruce to east and scattered black spruce to west. 	<ul style="list-style-type: none"> ▪ Thin/prune/clean spruce to east and west of site.
Equipment Storage & Construction Accommodation	<ul style="list-style-type: none"> ▪ Construction Accommodation is non-combustible materials and Equipment Storage is Weatherhaven tent with non-combustible ends. ▪ Zone 1A – Inadequate, unmaintained grass/shrubs surrounding and underneath buildings. ▪ Zone 1B – Inadequate, unmaintained grass/shrubs. ▪ Zone 2-3 – Inadequate, dense black spruce fuels to east/downhill of site. 	<ul style="list-style-type: none"> ▪ Clear and maintain fuel-free Zone 1A around and underneath all buildings. ▪ Maintain grass/brush in Zone 1B around all buildings. ▪ Thin/prune/clean black spruce stand to east/downhill of site.
Substation	<ul style="list-style-type: none"> ▪ All non-combustible materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Adequate. 	<ul style="list-style-type: none"> ▪ Minimal threat – No work required.

Facility	Wildfire Threat Factors	Recommended Mitigation(s)
Penstock & Rockface Portal Bldg	<ul style="list-style-type: none"> ▪ All non-combustible materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Adequate. ▪ Zone 2-3 – Adequate. 	<ul style="list-style-type: none"> ▪ Minimal threat – No work required.
Communication Tower and Surge Raise	<ul style="list-style-type: none"> ▪ All non-combustible materials. ▪ Zone 1A – Adequate. ▪ Zone 1B – Inadequate, scattered black spruce. ▪ Zone 2-3 – Inadequate, scattered black spruce. 	<ul style="list-style-type: none"> ▪ Clear for minimum 10 metres surrounding site fence line. ▪ Remove black spruce for minimum 20 metres surrounding site fence line.
Gas Tanks	<ul style="list-style-type: none"> ▪ All non-combustible materials. ▪ Zone 1A – Inadequate, grass/shrubs inside fence line. ▪ Zone 1B – Inadequate, grass/shrubs inside fence line. ▪ Zone 2-3 – Inadequate, scattered black spruce in stand below site. 	<ul style="list-style-type: none"> ▪ Clear and maintain grass/brush in Zone 1A & 1B inside fence line. ▪ Thin/prune/clean black spruce stand to south/downhill of site.
Camp	<ul style="list-style-type: none"> ▪ Varied combustible & non-combustible materials. Wood deck with open underside on Operator accommodation. ▪ Zone 1A – Inadequate, grass/shrubs. ▪ Zone 1B – Inadequate, grass/shrubs. ▪ Zone 2-3 – Inadequate, scattered black spruce in stand below site. ▪ 	<ul style="list-style-type: none"> ▪ Skirt exposed undersides of Operator Accommodation deck & Storage Building back walkway and front storage deck. ▪ Clear and maintain grass/brush/trees in Zone 1A & 1B around all structures. ▪ Thin/prune/clean black spruce stand to southwest of site.
Powerplants and Butterfly Valve Shacks	<ul style="list-style-type: none"> ▪ All non-combustible materials. ▪ Zone 1A – Inadequate, grass/shrubs. ▪ Zone 1B – Inadequate, grass/shrubs and scattered black spruce. ▪ Zone 2-3 – Inadequate, scattered black spruce to north of G1 Powerplant. 	<ul style="list-style-type: none"> ▪ Clear and maintain grass/brush in Zone 1A and 1B around all buildings. ▪ Remove black spruce in stand to north of G1 Powerplant.
South-Boundary Territorial Lands	<ul style="list-style-type: none"> ▪ Coniferous fuels within 500 metres of south-boundary present a risk of short and long-range ember transport into the facility. 	<ul style="list-style-type: none"> ▪ Thin/prune/clean coniferous stands on south-boundary of facility to reduce ember transport potential.
Bluefish Facility	<ul style="list-style-type: none"> ▪ There is no wildfire sprinkler protection equipment onsite. 	<ul style="list-style-type: none"> ▪ Purchase adequate wildfire protection sprinklers, pumps, and hose to protect critical values during a wildfire.



Headgate – Patch Hole in East-Side of Building



Portal Shack – Inadequate Zone 1A Clearance



Bulk Diesel Tank Site – Zone 2-3 Vegetation Management Areas



Equipment Storage & Camp – Inadequate Zone 1



Comm Tower & Surge Raise – Inadequate Zone 1 and 2-3



Gas Tanks – Inadequate Zone 1



Camp – Clear/Maintain Zone 1



Camp – Clear/Maintain Zone 1



Powerplant G1 – Clear Zone 1 Brush and Black Spruce

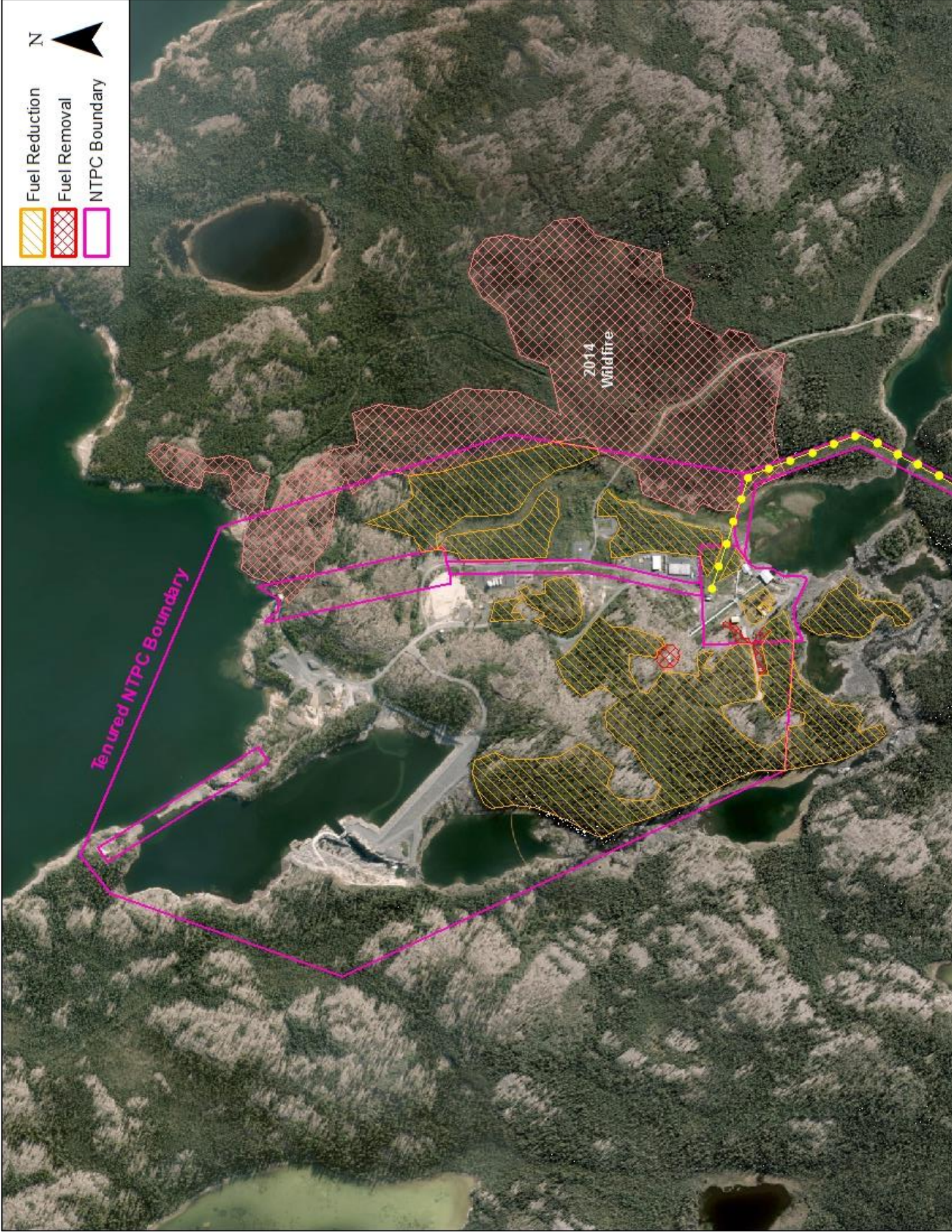


Butterfly Valve Shacks – Clear Zone 1 Brush

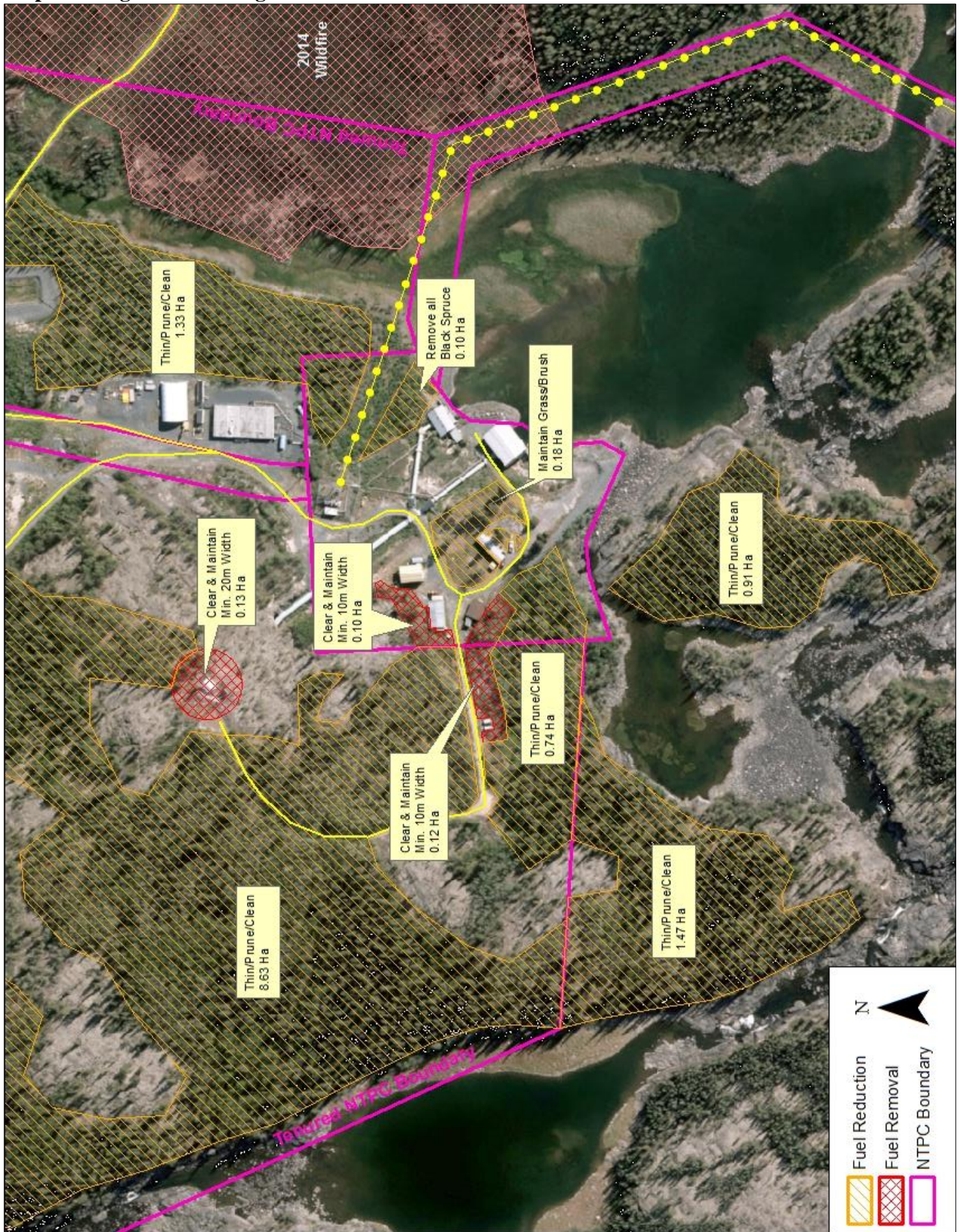


South-Boundary Territorial Lands – Thin/Prune/Clan to Reduce Ember Transport Potential

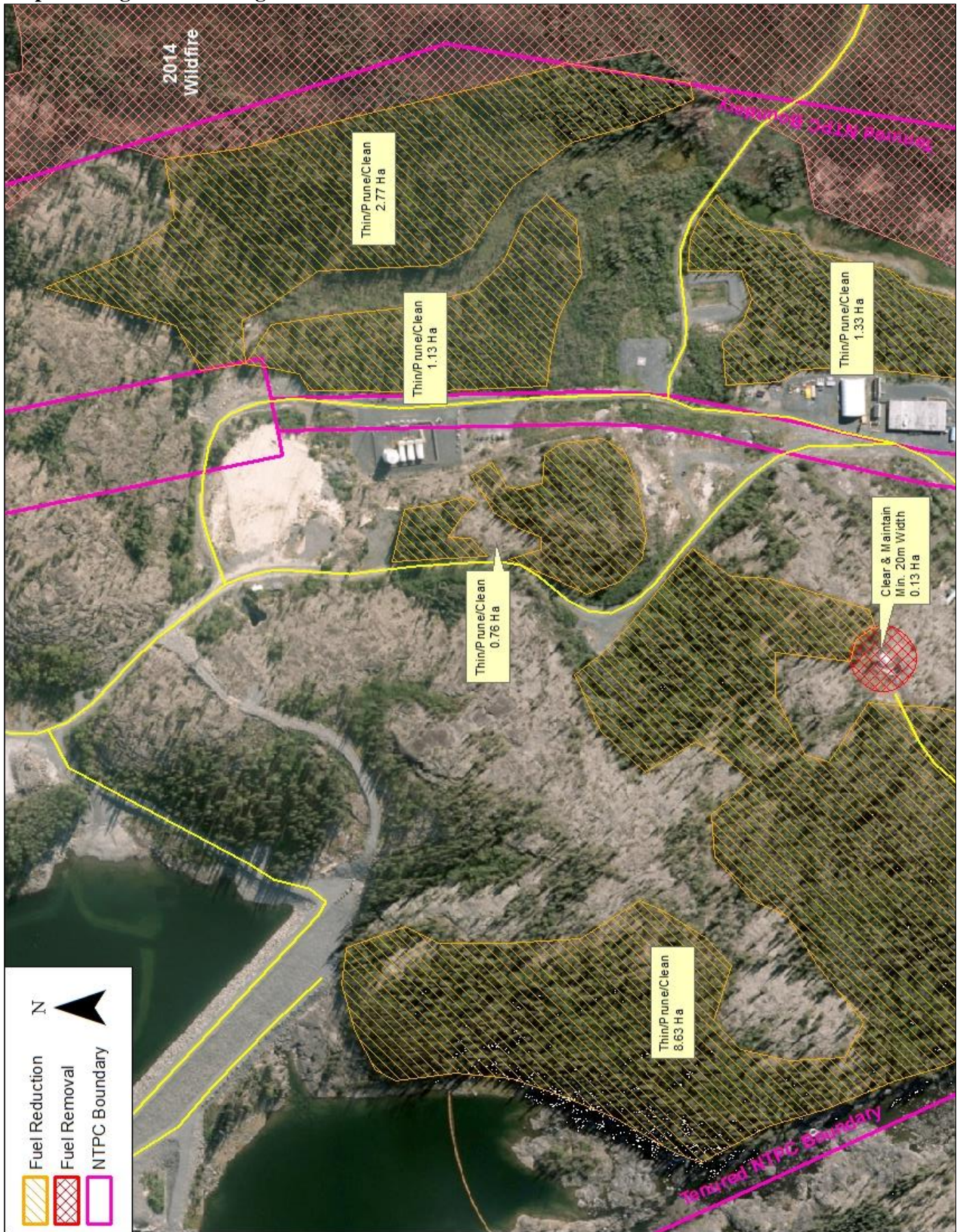
Proposed Vegetation Management – Bluefish Overview



Proposed Vegetation Management – Bluefish South



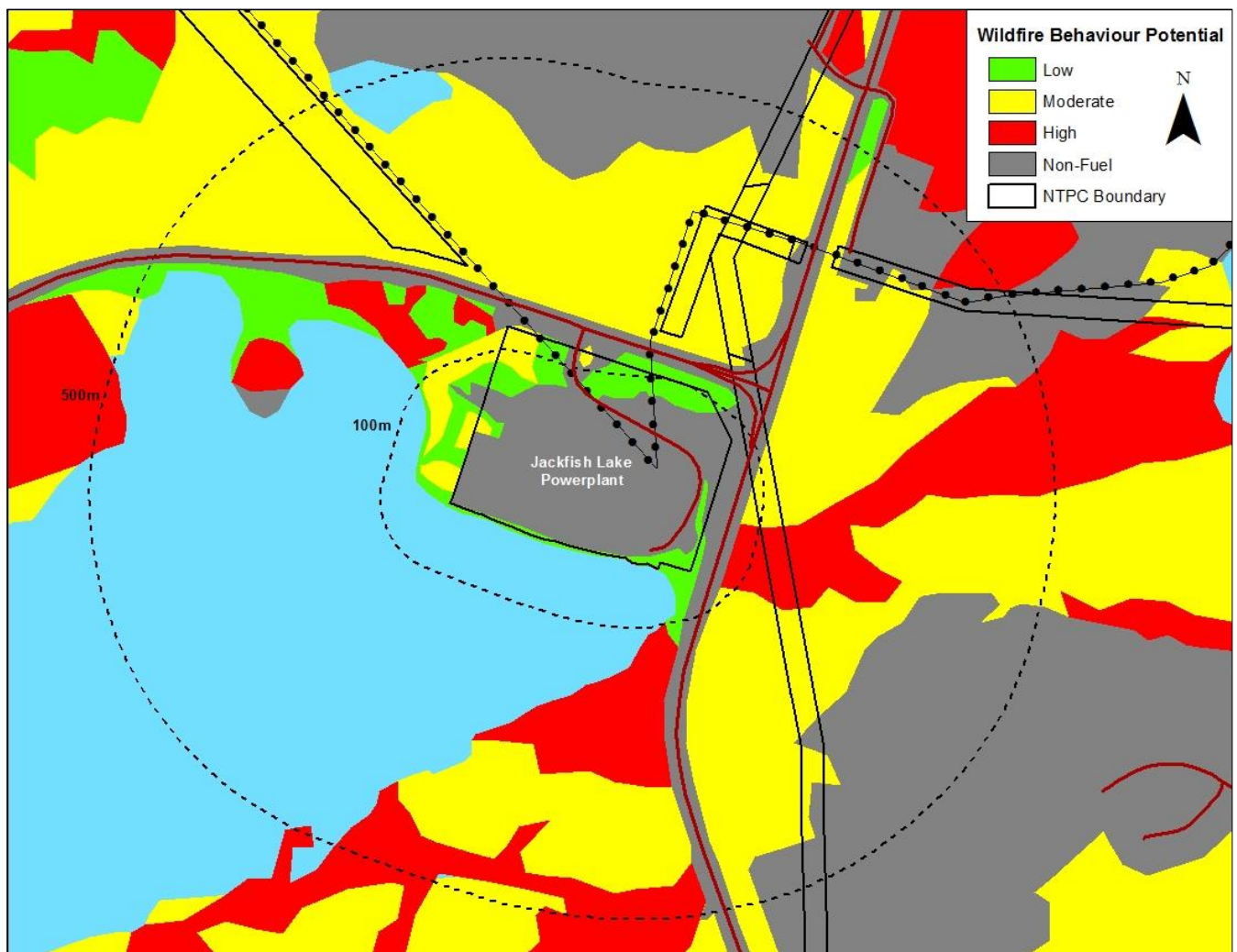
Proposed Vegetation Management – Bluefish North



4.3 Jackfish Lake Powerplant & Substation

The Jackfish Lake site has a Moderate threat from long-range spotting and Low threat from short-range spotting and radiant heat ignition due to good clearance from wildland vegetation and use of non-combustible structure materials.

Ignition Type	Potential	Comments
Long-Range Spotting (500 metres)	Moderate	Isolated patches of Black spruce (C-2) within 500 metres of site.
Short-Range Spotting (100 metres)	Low	Minimal threat.
Radiant Heat (30 metres)	Low	Minimal threat.





Adequate Zone 1-2 Clearance



Adequate Zone 1-2 Clearance

Continued maintenance of grass and brush re-growth on the site is encouraged to ensure that airborne ember transport onto the site does not result in structure ignition.

5 Transmission Powerlines

Aerial reconnaissance and discussions with NTPC and GNWT Environment & Natural Resources staff revealed that wildfires have spread near and over NTPC transmission powerlines many times with minimal disruptions and infrastructure losses. Staff noted that it is typically the wooden power poles and/or the large bird nests in the metal poles that create the power disruptions and infrastructure losses.

Aerial reconnaissance was used to identify powerline sections with wooden poles and/or are within hazardous wildland fuel types. It is those sections that NTPC should focus on for future line brushing and/or right-of-way (ROW) widening.



Wooden Poles – Pine Point to Hay River



Metal Poles – Taltson to Fort Smith



Bird Nest in Metal Pole



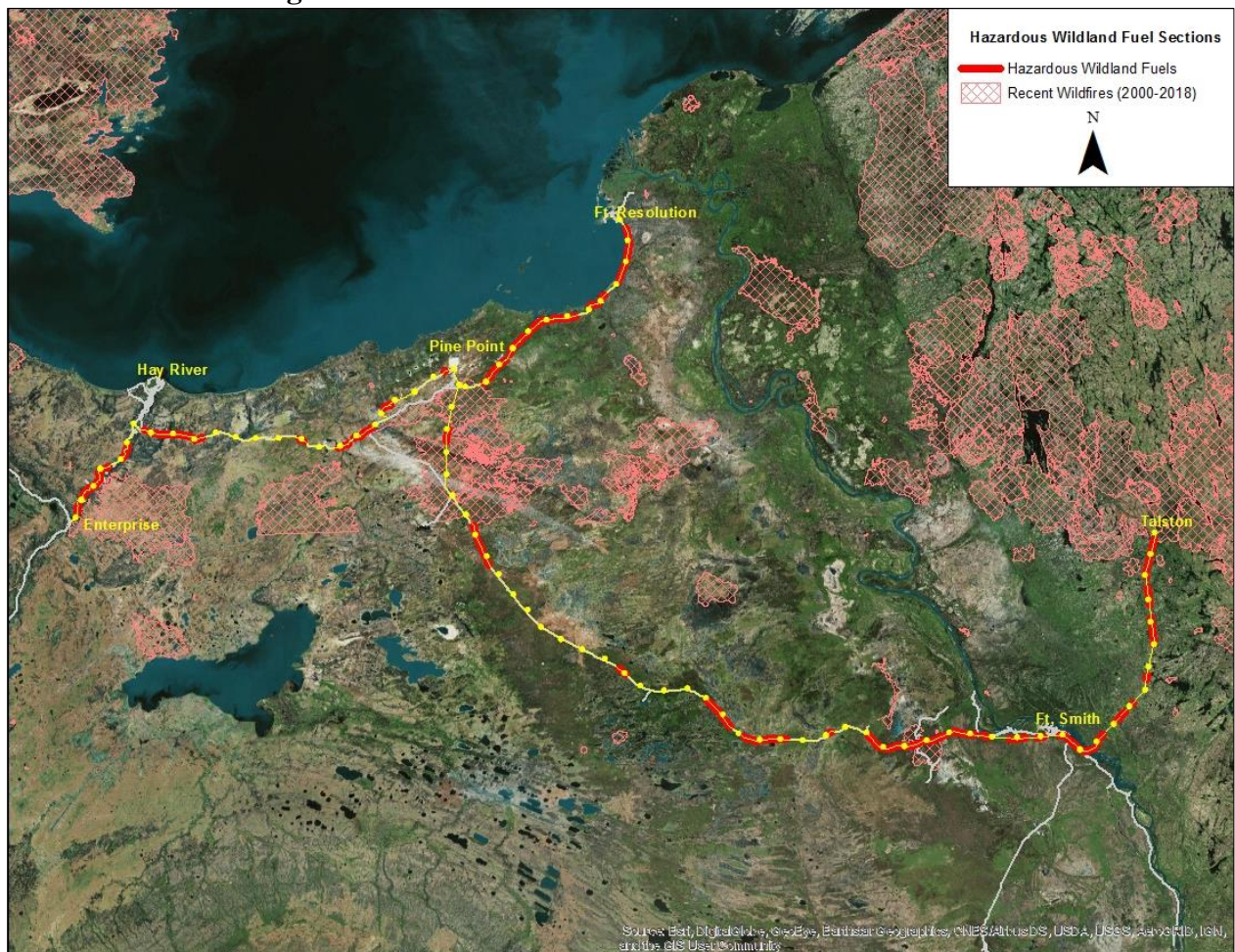
Wooden Poles with Inadequate ROW Brushing - Snare

5.1 South Region

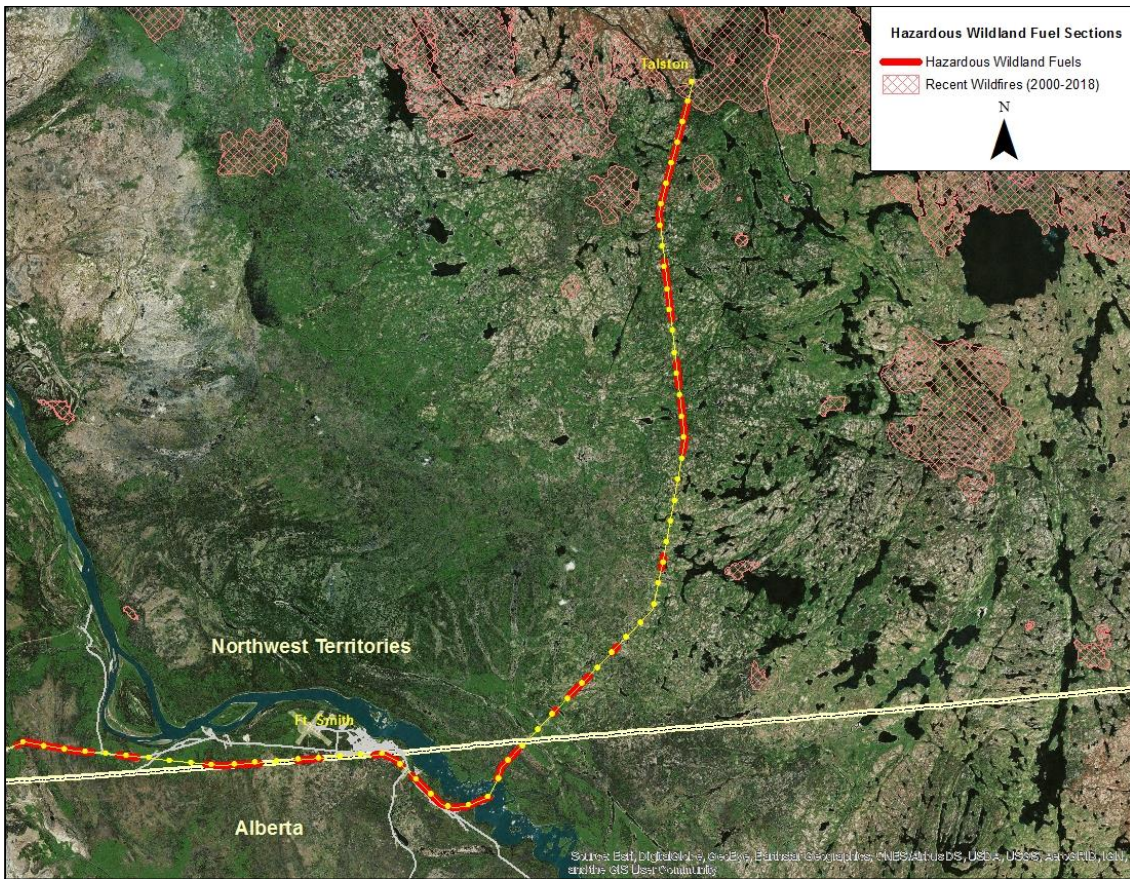
The sections at highest threat to wildfire are the Pine Point to Fort Resolution, Pine Point to Hay River, and Hay River to Enterprise sections due to the use of wooden poles and/or minimal right-of-way (ROW) width.

Section	Pole Type	Comments
Taltson to Ft. Smith	Metal	ROW has significant re-growth east of Slave River, adequately brushed west of Slave River.
Ft. Smith to Pine Point	Metal	ROW adequately brushed along Hwy 5, significant re-growth on section from Hwy 5 to Hwy 6.
Pine Point to Ft. Resolution	Wood	ROW is adequately brushed along Hwy 6 but powerline is close to forest edge.
Pine Point to Hay River	Wood	ROW is adequately brushed along Hwy 5 but powerline is close to forest edge.
Hay River to Enterprise	Wood	Some areas require brushing and powerline is close to forest edge.

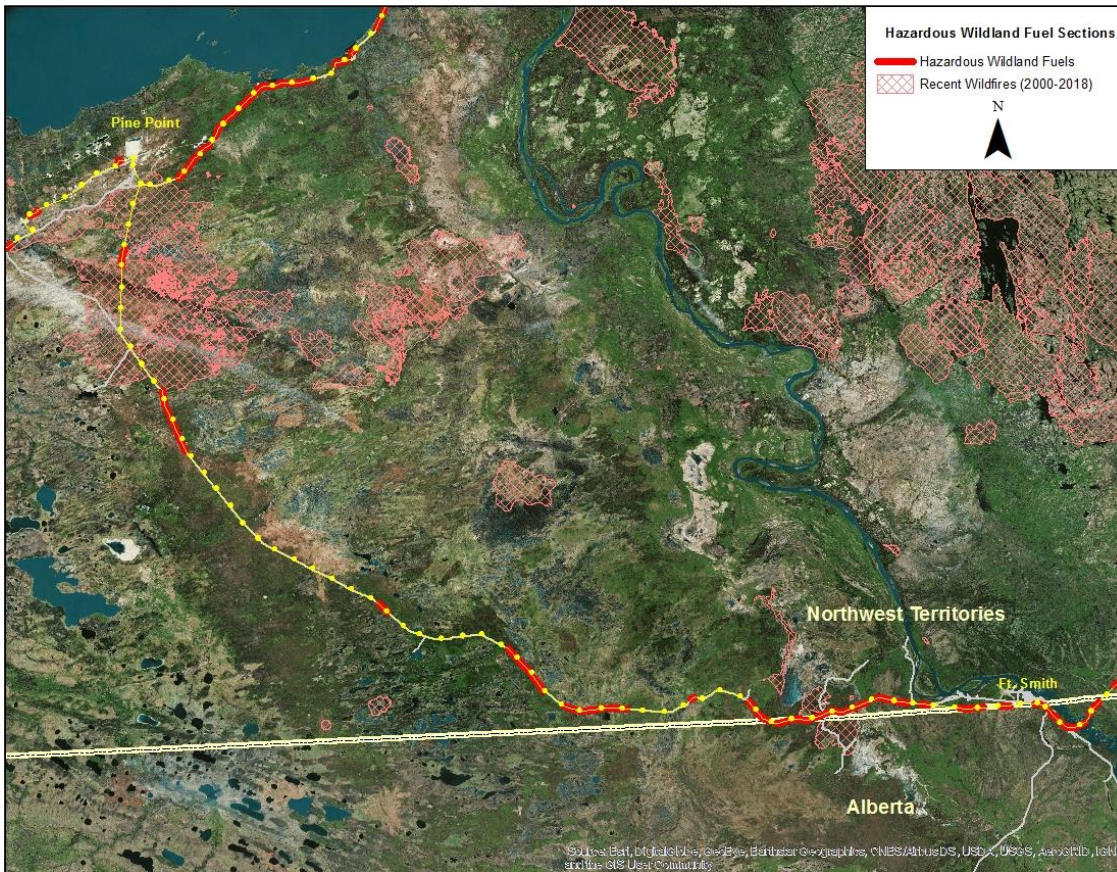
Overview – South Region Transmission Powerlines



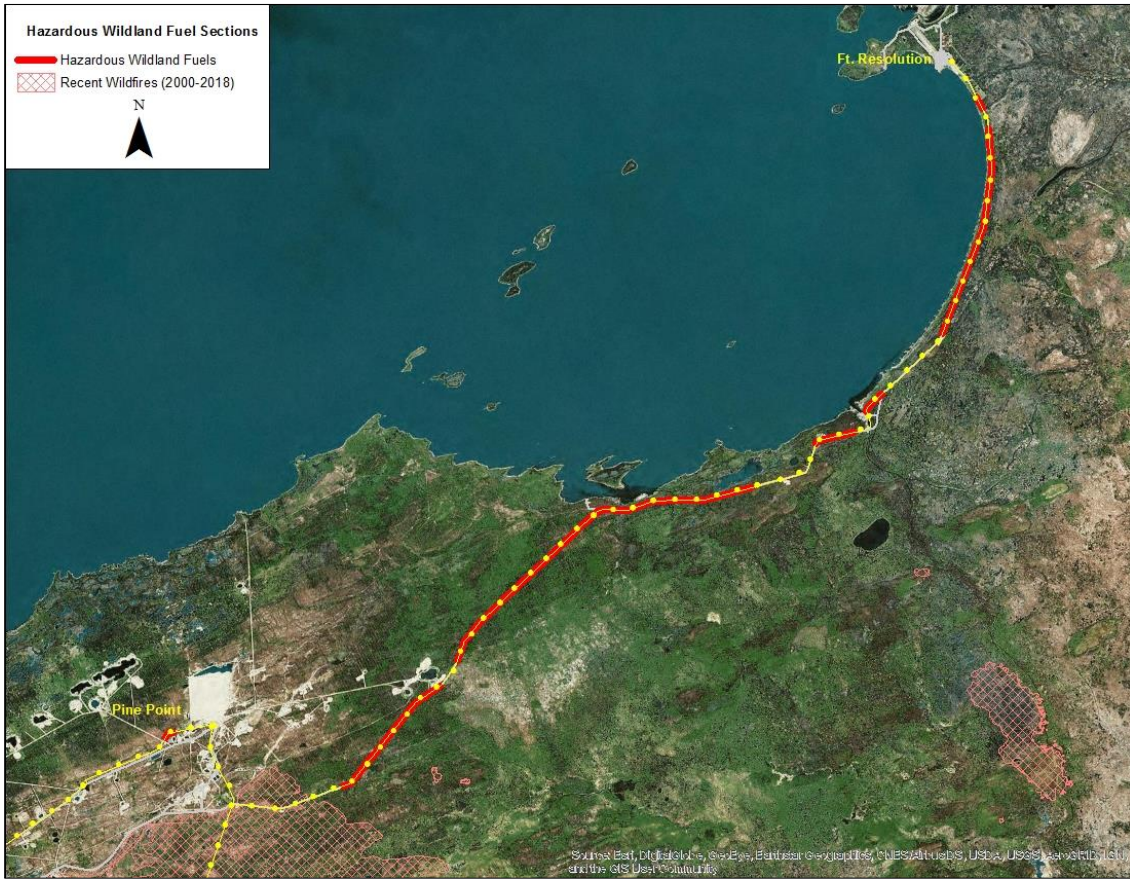
Taltson to Fort Smith



Fort Smith to Pine Point



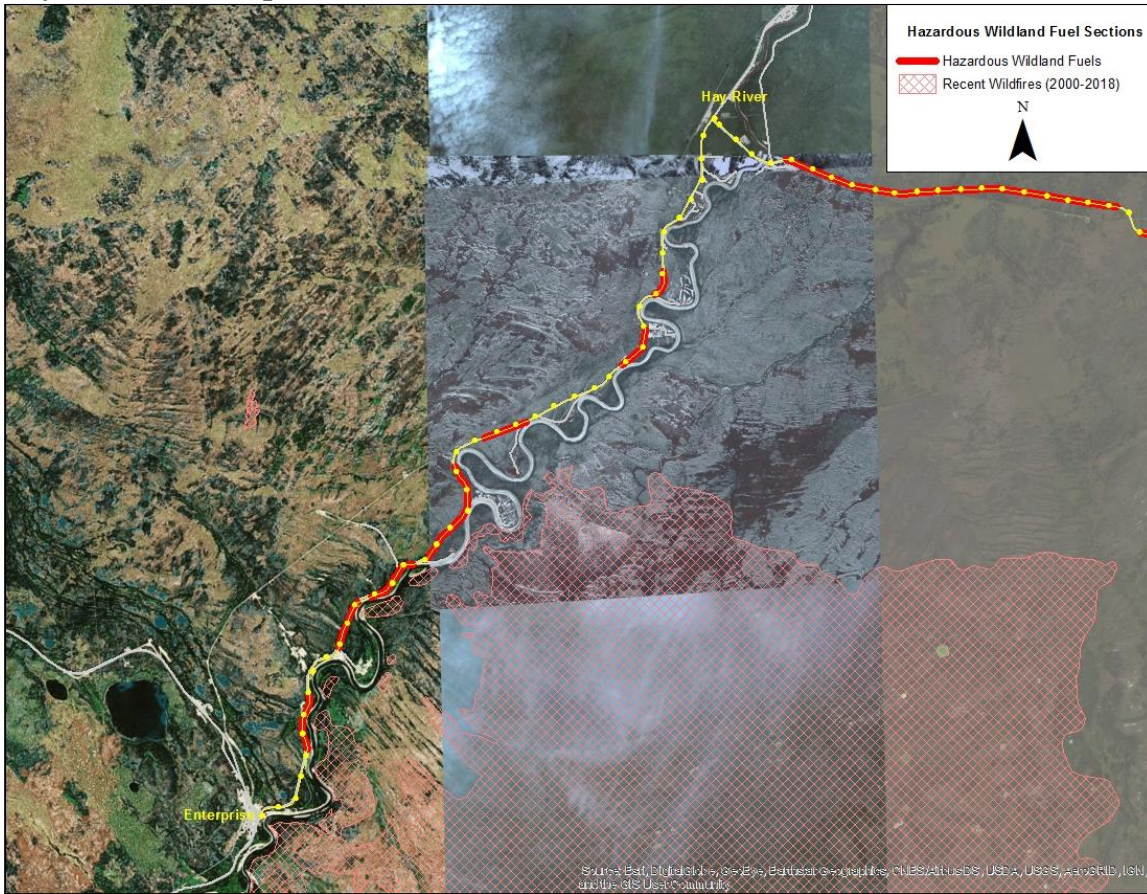
Pine Point to Fort Resolution



Pine Point to Hay River



Hay River to Enterprise

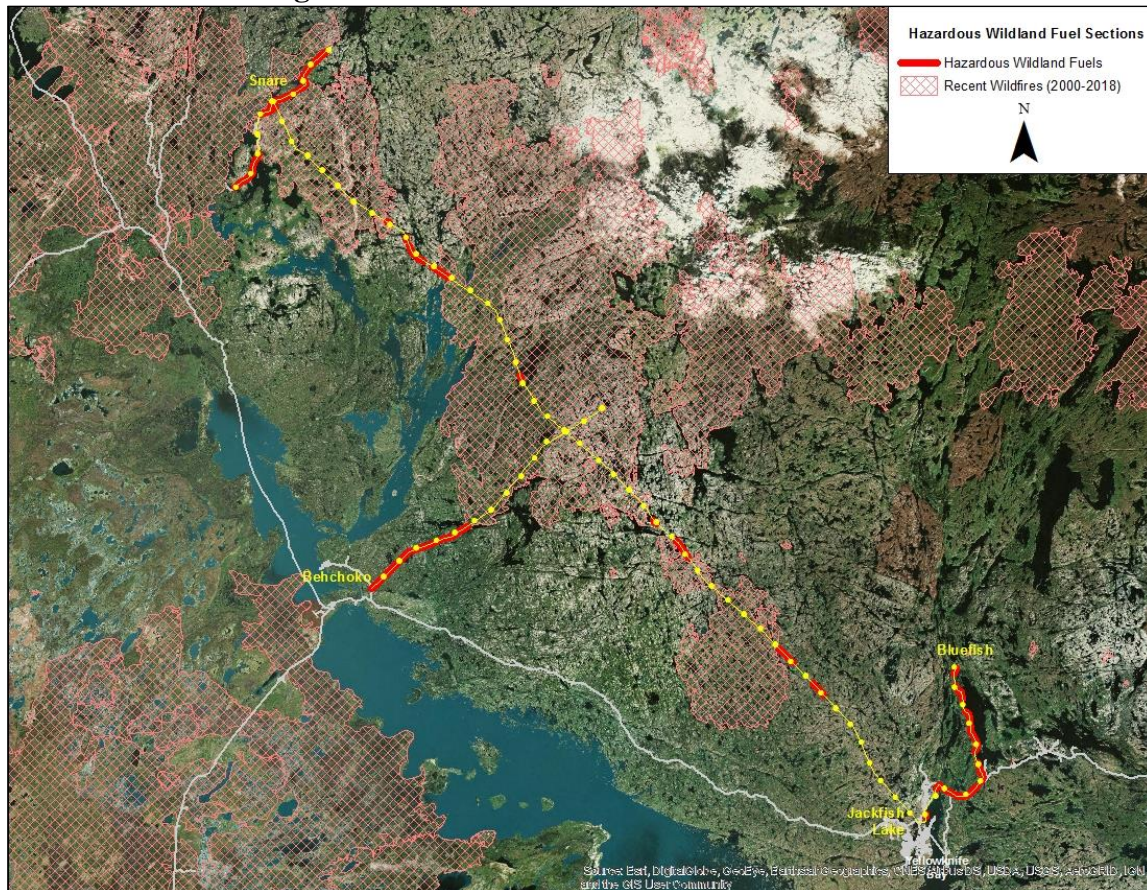


5.2 North Region

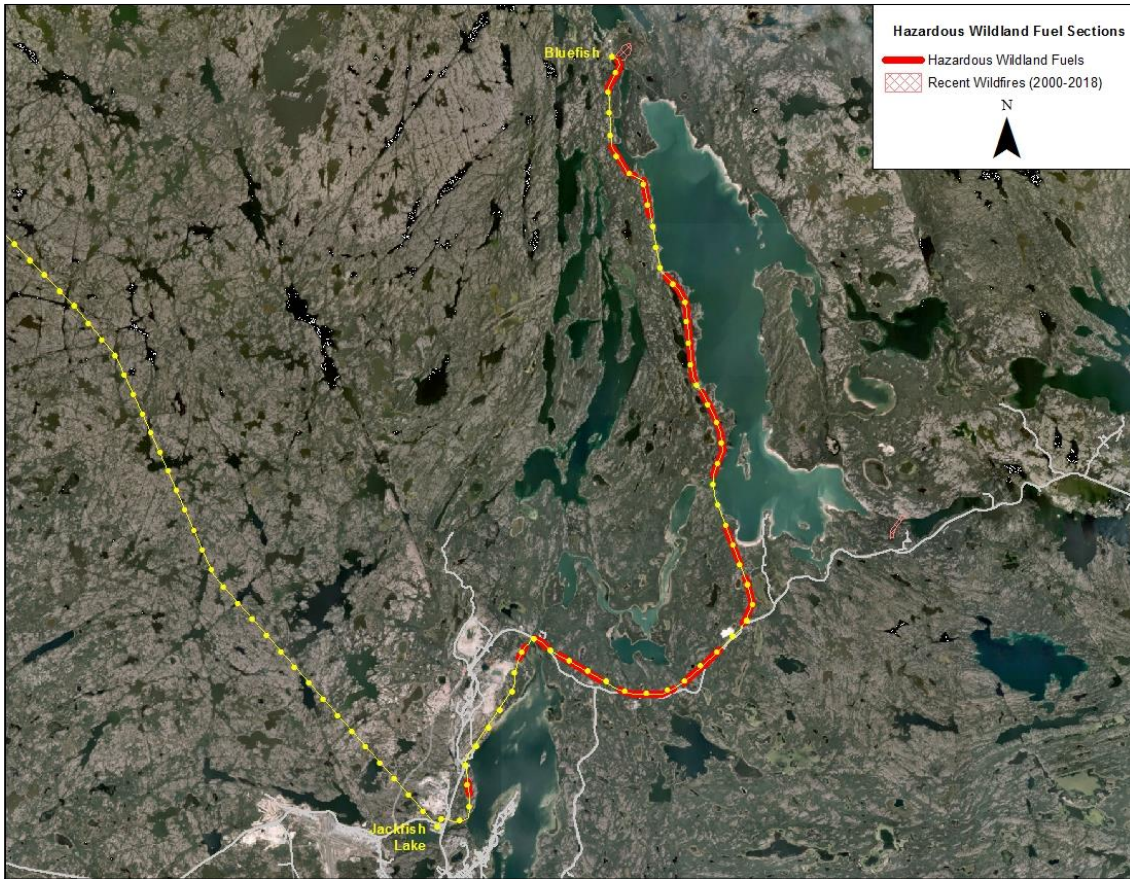
The sections at highest threat to wildfire are the lines within the Snare facility due to the use of wooden poles and inadequate right-of-way (ROW) brushing. The sections from Bluefish to Jackfish Lake and the southwestern portion of Behchoko line junction to Behchoko substation have metal poles and adequate ROW width however forest fuels have not burned for some time.

Section	Pole Type	Comments
Bluefish to Jackfish Lake	Metal	Wide ROW, adequate brushing, some debris on line from previous brushing.
Jackfish Lake to Snare	Metal	Significant burned areas from 2014 and 2016 wildfires. ROW width is adequate, brushing needed on unburnt sections.
Snare	Wood	Narrow and unbrushed ROW's.
Behchoko Line Junction to Behchoko	Metal	Significant burned area from 2014 wildfire. ROW width is adequate, brushing needed on unburnt sections.

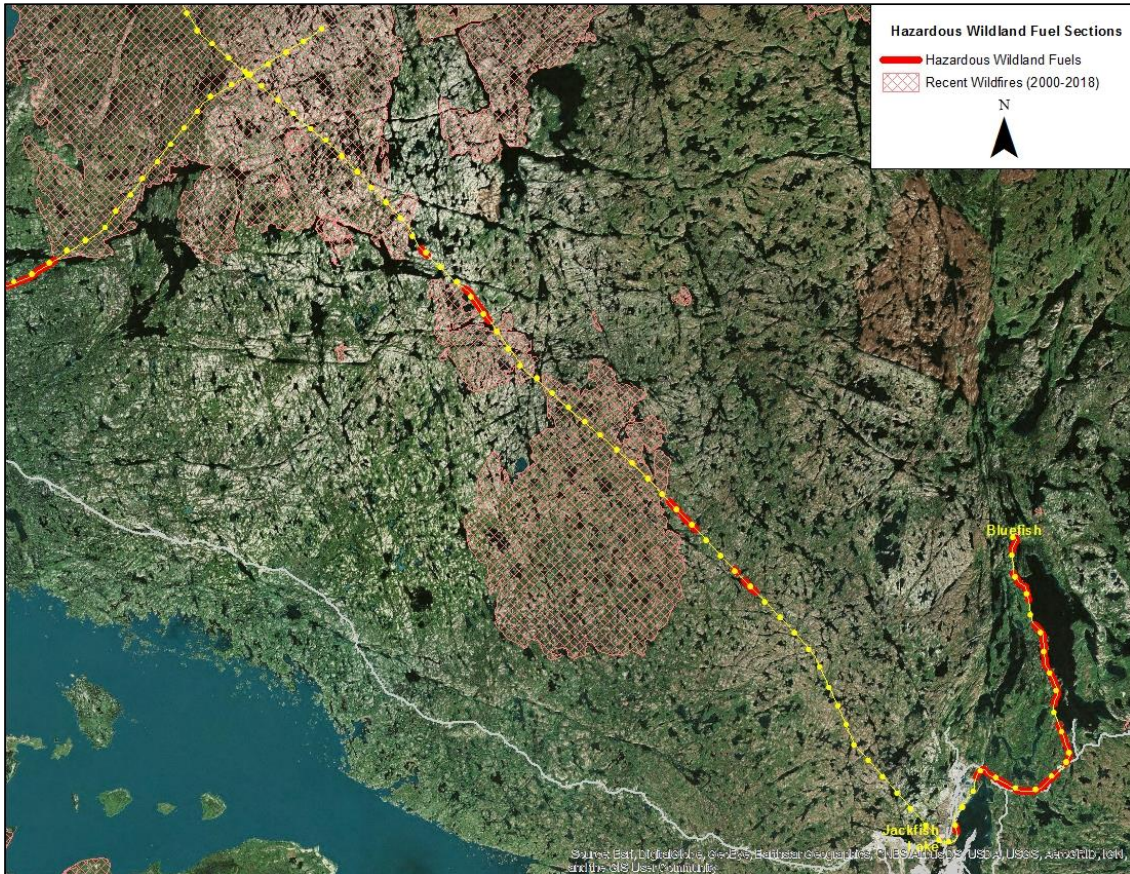
Overview – North Region Transmission Powerlines



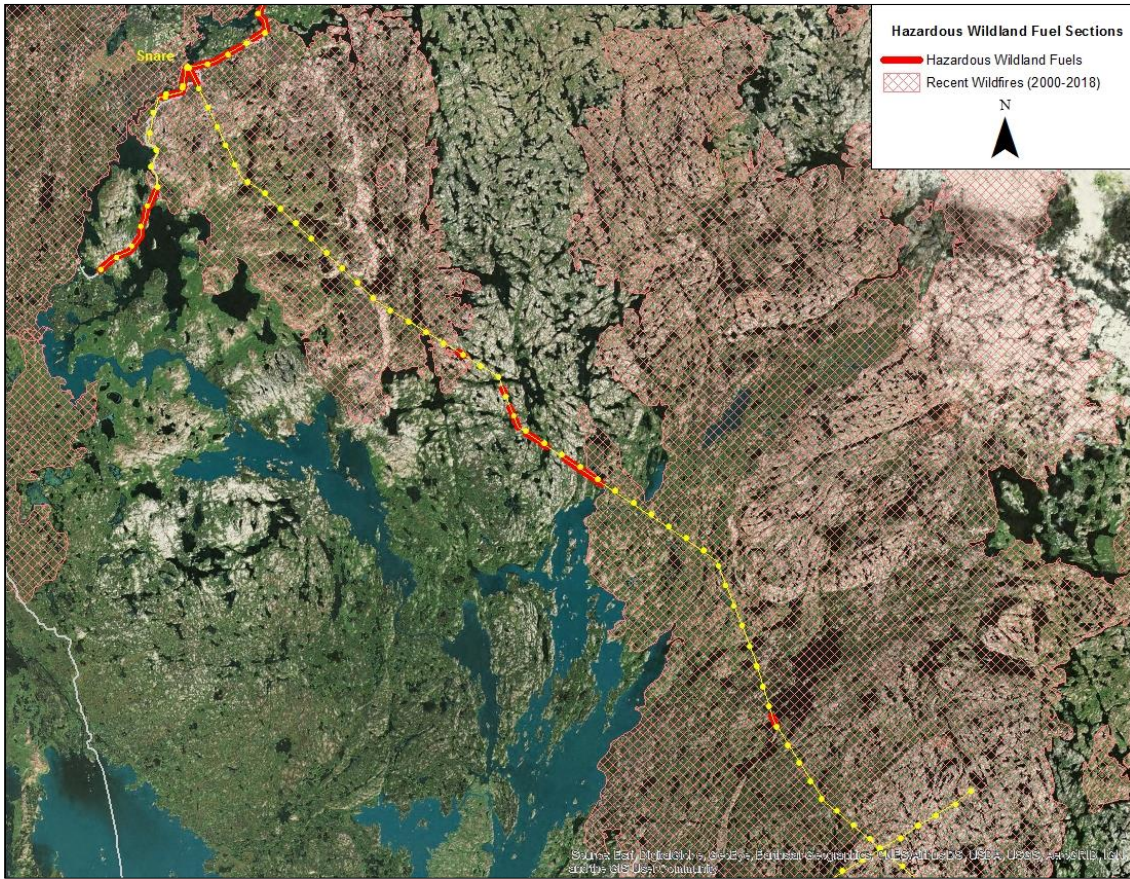
Bluefish to Jackfish Lake



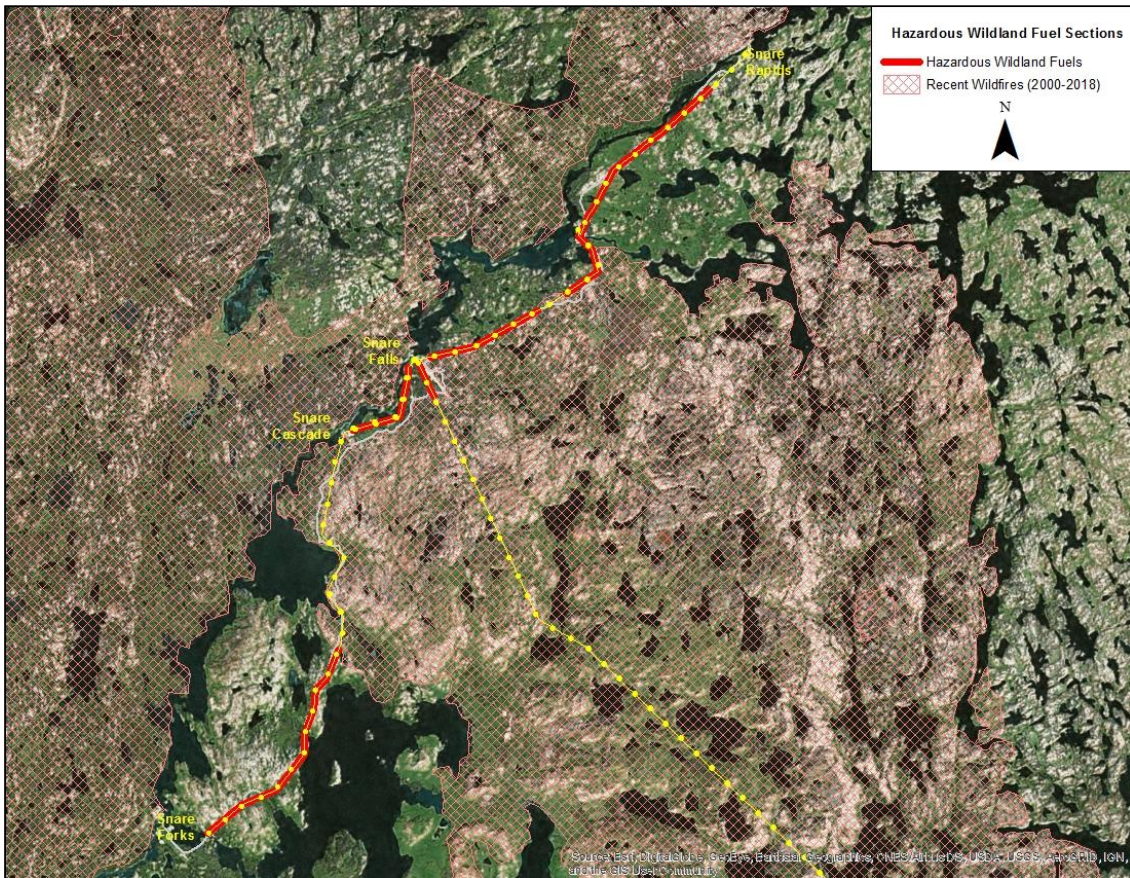
Jackfish Lake to Behchoko Line Junction



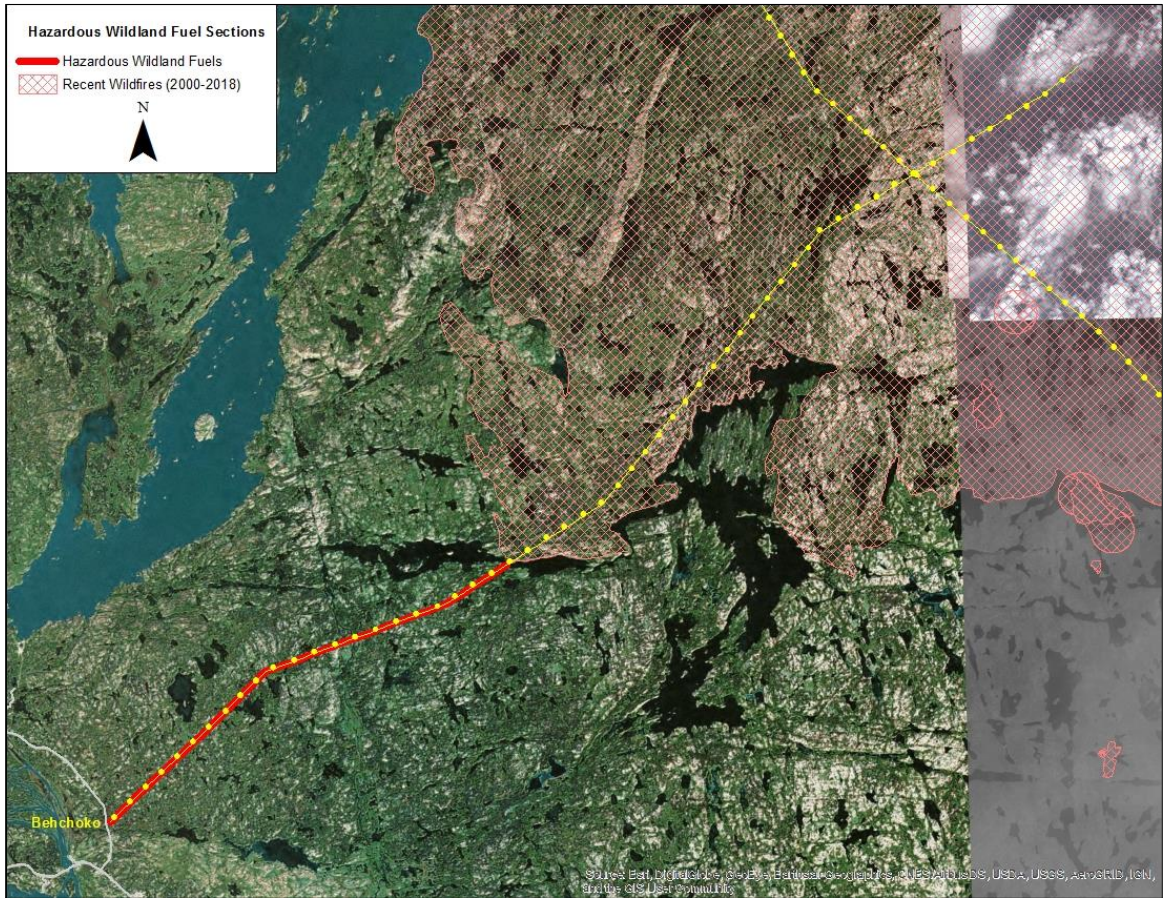
Behchoko Line Junction to Snare



Snare



Behchoko Line Junction to Behchoko



6 References

Beverly, J.L. et.al., 2010. Assessing Exposure of the Built Environment to Potential Ignition Sources Generated from Vegetative Fuel. *International Journal of Wildland Fire*. Vol. 19, Issue 3, pp 299-313.

Partners in Protection. 2017. *FireSmart Home Development Guide*. Partners in Protection and the Cooperators, Edmonton, AB.

Partners in Protection. 2003. *FireSmart – Protecting Your Community from Wildfire*. Partners in Protection, Edmonton, AB.