# TEKWÄNT'E MAN FOREST SUBALPINE ECOCULTURAL PLANTING PROJECT

Yukon Seed & Restoration

## Silviculture Treatment Plan

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# Executive summary

Yukon Seed & Restoration (YSR) is a delivery partner for the federal Government's Two Billion Trees program, the initiative to take a "significant step forward in Canada's approach to tackle the dual crises of climate change and biodiversity loss". YSR aims to plant 50,000 Yukon provenance tree and shrub species in 20 hectares of heavily fire impacted forest on both the First Nation of Nacho Nyäk Dun's (NND) Category A Settlement land and federal crown land in the Central Yukon. This Silvicultural Treatment Plan concerns itself with a 10ha parcel in the Subalpine Area of the  Tekwänt'e Man Forest surrounding Ethel Lake, southeast of Stewart Crossing.

The aim of this planting project is to promote and assist natural succession in an area severely burned by the 2019 North Crooked Creek Fire by reintroducing *Abies lasiocarpa* (Subalpine Fir), a fire intolerant species that has seen no natural regrowth since the fire. The site and species were identified as  particularly valuable through community consultation, both due to the site being a cultural gathering area, and as its importance as habitat for the Ethel Lake Caribou population.

Voices of the First Nation of Na-Cho Nyäk Dun (NND) community were taken into consideration in developing this planting project, building on consultation from workshops with NND Elders and an open house discussion with the community. Traditional knowledge links the increase of fire activity in the area with the decrease of *Abies lasiocarpa* (Subalpine Fir) across the landscape, leading YSR to direct 25,000 trees under its Two Billion Trees funding to this important eco-cultural restoration project.

Treatment includes planting fire-intolerant native species, linked with training and capacity building workshops for community members. Ongoing monitoring and adaptive management will ensure the successful establishment of planted species.

# Background

## Disturbance history

In 2019 the North Crooked Creek Fire burned 25,527ha of the Tekwänt'e Man Forest along Ethel Lake Road, southeast of Stewart Crossing. In 2020 YSR completed a Slope Hazard Assessment of the roadside area, identifying that several areas were at high risk for destabilisation due to wildfire impacts, and two landslides had already occurred due to destabilisation of the soils. In 2023, YSR completed soil and vegetation surveys within the fire footprint that revealed high vegetation burn severity and moderate soil burn severity with low conifer regeneration.

## Previous silviculture prescriptions

No previous silvicultural treatment has been completed in this area. Along the first 10km of Ethel Lake Road there is evidence of some roadside erosion control work that has been completed by Yukon Highways, but otherwise YSR is not aware of any other work conducted in the burn area.

# Treatment location

Location Area:
The treatment site is in the Tekwänt'e Man Forest in the heart of Na-Cho Nyäk Dun Traditional Territory in the central Yukon. Access to the site is at kilometer 19 of Ethel Lake Road, located 11km south of Stewart Crossing off the Klondike Highway. The Tekwänt'e Man Forest falls within the Yukon Plateau-North ecoregion and spans Boreal Low, Boreal High and Sub Alpine Bioclimatic zones. The landscape is characterized by middle to upper elevation coniferous and mixed wood forests with vast rolling plateaus and deep valleys (Smith et al., 2004). Permafrost is extensive and discontinuous throughout the area. The area hosts the Ethel Lake Caribou range, estimated to be a population of 520 in a 2019 survey (Yukon Government, 2024).

Site Location:
The 10ha treatment site under this Silviculture Treatment Plan is in a Subalpine pocket, approximately 4km from Ethel Lake Road accessible by a 4x4 trail (Figure 1). It is 3km from the mapped Ethel Lake Caribou Herd winter range, although YSR has recorded signs of Caribou across the area.

Access considerations:
The site is approximately 4km from Ethel Lake Road, accessible by a well-established 4x4 trail. Access for equipment, tree plugs and personnel will be by ATV, which is well-supported by current conditions of the trail and will require no further work or maintenance. Access along Ethel Lake Road is by 4x4 pick up trucks, and the trailhead hosts a large laydown area for equipment staging.

## Site details

- The site is in the Yukon Plateau-North ecoregion, in a Subalpine pocket.
- The site burned in the 2019 North Crooked Creek Fire, resulting in high vegetation burn severity and moderate soil burn severity with low conifer regeneration.
- Current regeneration is occurring through natural succession, progressing slowly due to the severity of the burn, dominated by shrub and forb species.
- The severity of the burn has reduced the aerial seedbank, slowing the expected succession rate and altering the species of natural succession. *Abies lasiocarpa* (Subalpine Fir), a fire intolerant species, has not been seen regenerating.
- Slopes vary across the landscape, changing from plateaus to deep valleys. In 2019, a slope hazard assessment was completed that identified several hazardous slopes at risk of landslide activity.
- The 10ha planting site is at the slope crest position of an area with slopes 10-30%.
- Soils are Drystic Brunisol, an acidic soil that lacks a well-developed mineral-organic surface horizon (Smith et al., 2004).
- The vegetation inventory of the area is based on an ELC map completed in 2023, using references from surrounding unburned areas. Species makeup of the site include *Abies lasiocarpa* (Subalpine Fir), *Salix spp.* (Willow), *Vaccinium spp*., *Rhododendron spp.* (Labrador Tea), *Artemisia spp.* (Sage), *Pinus contorta* (Lodgepole Pine) and others, with tree heights ranging from 2 to 4m (Photos 1-4).

# Tekwänt'e Man Forest Restoration Project Site

YUKON SEED & RESTORATION

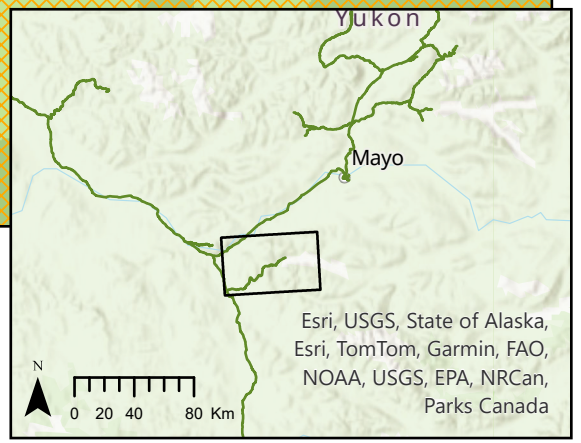
Silver Trail

Ethel Lake

Subalpine

Ethel Lake Road

Klondike Highway




Map produced by Naomi Butterfield, Yukon Seed & Restoration
Date Created: 2024-11-20
Projection: NAD 1983 Yukon Albers
Data Source: GeoYukon

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## Legend

- Roads
- Waterbodies
- Ethel Lake Caribou Range

Bioclimate Zones

- Boreal Alpine Tundra
- Boreal High
- Boreal Low
- Boreal Subalpine
- Project Site

- Post disturbance conditions identified in 2024 site survey and delineation are 40% bare ground, 25% shrub cover consisting mainly of *Salix* (willow spp.), *Pinus contorta* (Lodgepole Pine), and *Betula glandulosa* (Scrub Birch), 35% herbaceous, 25% bryophyte.
- No site preparation has been completed since the fire, and site preparation has been assessed as not required for silviculture treatments to take place.

Photos 1-4: Subalpine Planting Area post-burn conditions 2024

# Planning considerations

The Director is required to ensure consistency with approved plans and legislation. This treatment plan follows the principles set out in higher level plans and agreements. Each are described below:

## Public and First Nations consultation

YSR works closely with the NND, engaging with the Government and Community to guide the work that we do. The application to Environment and Climate Change Canada for the Two Billion Trees program arose through community consultation, where interest in reforestation projects was identified as important to the community. During consultation the subalpine area of the Tekwänt'e Man Forest was identified as a priority area, both due to the cultural value of the site as a gathering place, as well as the importance of the habitat for the local Ethel Lake Caribou Herd. Elders identified that over time, wildfire has reduced the presence of *Abies lasiocarpa* (Subalpine Fir), a medicinally important tree, across the landscape. Due to the identified importance of regenerating the fire-intolerant species, YSR allocated 25,000 of the total 50,000 trees for the Two Billion Trees program to this site. Additional consultation took place in October 2024 where YSR presented the final planting plan to the community which was met with enthusiasm.

NND is supportive of YSR's plans to conduct revegetation at this site, confirmed through a recent Two Billion Trees specific community event, discussing plans for the project.

## First Nations Final Agreements

The North side of Ethel Lake Road is category A settlement land of the NND, as determined by the Final Agreement under the Umbrella Agreement. Part of YSR's Two Billion Trees programming will occur in this area. Given community interest in the eco-cultural restoration of *Abies lasiocarpa* (Subalpine Fir) in the Subalpine areas, the project was expanded outside of settlement lands, prompting the requirement to develop this Silviculture Treatment Plan.

## Stocking Standards

The Yukon Silviculture Stocking Standards (2019) defines this site as Pure Subalpine Fir Stand, requiring it to have:

- Target stocking ; 1000 sph

- Primary minimum stocking : 800 sph.

## Treatment objectives

This treatment plan aims to complete the following objectives:

1. Re-introduce *Abies lasiocarpa* (Subalpine Fir), a culturally important yet fire-intolerant species which is not regenerating naturally post 2019 wildfire.
2. Increase natural regeneration by providing a jumpstart through planting of *Abies lasiocarpa* (Subalpine Fir) trees, and *Shepherdia canadensis* (Soapberry), and *Rosa acicularis* (Prickly Rose) shrubs, in grouped spacing, that will increase soil, ground and site conditions alongside a seed bank, to promote natural succession.
3. Ensure survival of planted and naturally occurring species to regenerate the burned landscape, rehabilitating the area for the Ethel Lake Caribou Herd's winter range, and providing culturally meaningful spaces to community members of Mayo and the NND.

## Planned treatments and schedule

Planned treatments include:

- Site preparation will not be required for this program.
- Planting will occur over two periods:
    - In spring 2025 (June) 12,500 *Abies lasiocarpa* (Subalpine Fir) will be planted across 5ha of the identified area at a density of 2,500 sph to account for mortality and to comply with best practices for winter range caribou habitat restoration (Waters and Delong, 2001). Trees are sourced from Woodmere nursery and originate from the Stikine region in northern British Columbia: Subalpine Fir Stikine seedlot 43678.
    - High density planting will include cluster planting to promote protection and moisture capture.
    - Trees will be planted with teabag fertiliser to ensure adequate nutrient availability for establishment and growth.
    - Seedlings will be covered with browse protection (Freegro TreeShelters) to avoid wildlife damage during early development. These will be sourced from Khowutzun Forestry, an Indigenous Forestry company.

    - In spring 2026 (June) another planting program of 12,500 *Abies lasiocarpa* (Subalpine Fir) will proceed across the remaining 5ha of the site at a density of 2,500 sph to account for mortality. These trees will be grown at Woodmere nursery, but are sourced from Yukon provenance seed, from seedlots YU-TA-01-FA 1998 and YU-WL-01-FA 1999.
    - Trees will be planted with teabag fertiliser and covered with Freegro TreeShelters for browse protection, as with the first planting program.
    - *Shepherdia canadensis* (Soapberry), and *Rosa acicularis* (Prickly Rose) shrubs will be planted in spring 2026 to enhance diversity and support natural regeneration.
    - High density planting will include cluster planting to promote protection and moisture capture.
- Tree planting is the primary reforestation method, to be completed by YSR.
- Natural regeneration is the secondary reforestation method, which YSR expects will be promoted by initial tree planting, seed capture, moisture capture, and the establishment of a healthy seed source.
- Fill planting is the tertiary reforestation method, which will be determined following annual monitoring and surveys of the initial silviculture treatment.
- Preferred species:
    - Priority species for this project will be *Abies lasiocarpa* (Subalpine Fir), a tree species that was previously prevalent across the space but which is fire intolerant and therefore has no preserved seedbank since the 2019 fire. NND elders have identified a loss of *Abies lasiocarpa* (Subalpine Fir) following severe fires and have expressed a desire for it to be planted, given medicinal properties and cultural value.
    - Additional species will be planted to enhance diversity including *Shepherdia canadensis* (Soapberry) and *Rosa acicularis* (Prickly Rose). This species mix is ecologically appropriate to the area and can be compared to reference sites at similar altitudes, as well as regeneration in burned areas.
- Acceptable species:
    - Preferred species include *Abies lasiocarpa* (Subalpine Fir), *Picea glauca* (White Spruce) and *Pinus contorta* (Lodgepole Pine).
    - Acceptable species include all Yukon Trees.
- Following the planting program the site will require ongoing monitoring. This will be completed through annual surveys, completing 10 3.99m plots per ha. Success will be

determined by meeting the minimum stocking standard of 800 sph. If mortality is high and this is not maintained within 5 years of the initial program, fill planting will be completed.

- Monitoring will be completed until seedlings are considered free to grow at seven years post planting. Additional measurements will be taken on survivability as a percentage, tree heights, and vegetation health, including chlorosis and browse.
    - Monitoring will be split between the two different planting seasons, identifying differences between seedlots, origin and propagation.

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,

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# References:

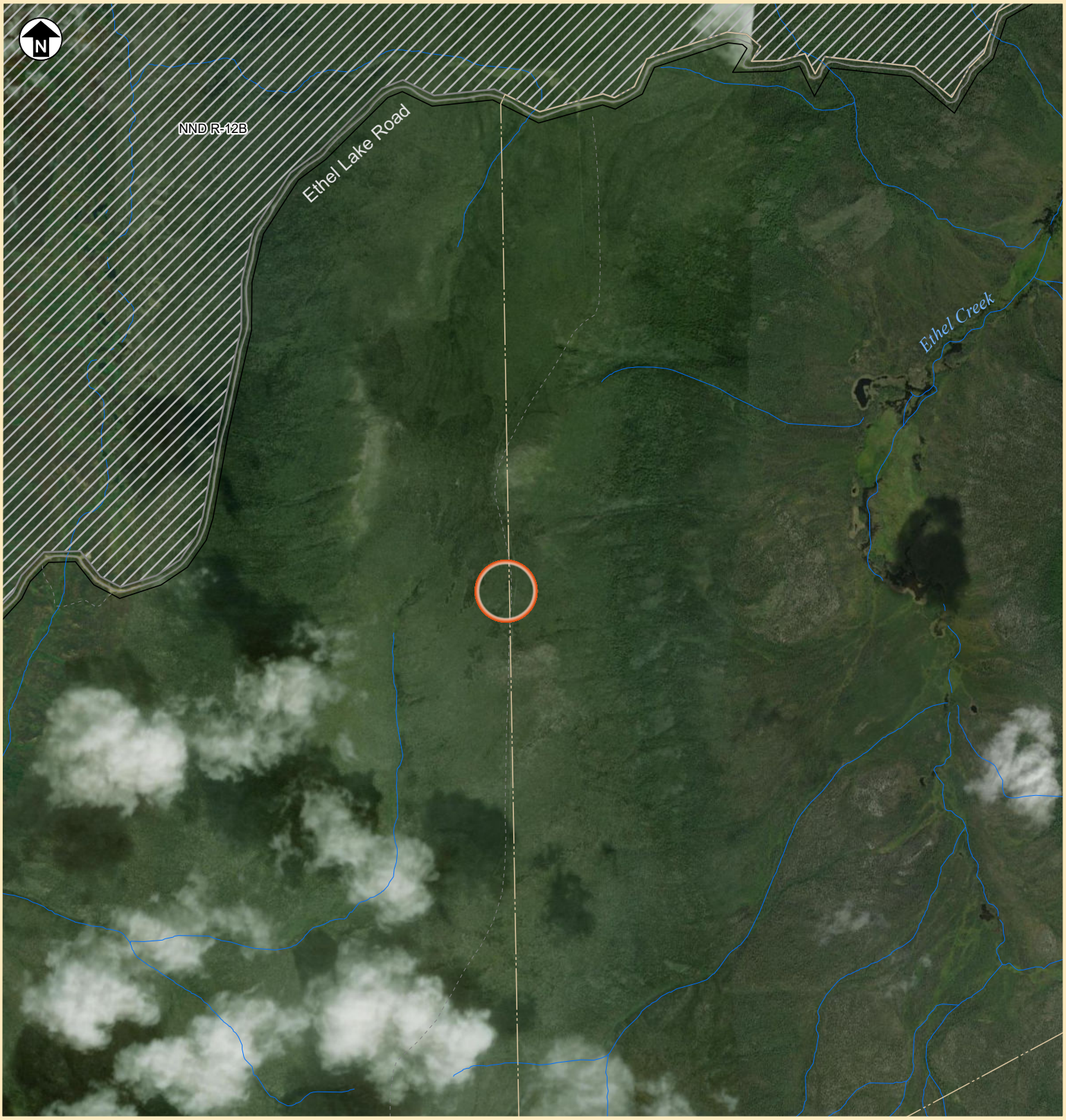
Smith, C.A.S., Meikle, J.C., and Roots, C.F. (editors), 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, 313 p.

Waters, L., Delong, R., 2001. Recruiting Caribou Habitat Using Silviculture Treatments. BC Ministry of Environment, Lands and Parks.

Yukon Environment, 2024. Yukon Caribou Herd Ranges 2024. https://yukon.ca/sites/default/files/2024-12/env-yukon-caribou-herd-ranges-2024.pdf

Government of Yukon, 2019. Silviculture Stocking Standards.

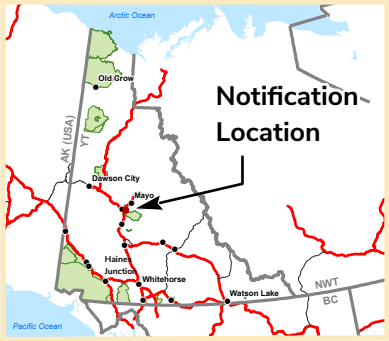
# Notification of Silviculture Treatment




## Tekwänt'e Man Forest

Notification Area

**Notification Location:**
**Tekwänt'e Man Forest**
**South of Ethel Lake Road**




Yukon

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February 28, 2025

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ALR: Mayo
North American Datum 1983
Yukon Albers

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