

# McMillan Creek Restoration Project (was West Milligan Creek) – PNG Legacy Site Restoration Program

## Uujɔ Aanaawudleh Eseq – McMillan Creek

From Beaver language, “They will fix it good”

October 31, 2022

Doig River First Nation & Tree Time Services Inc.

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## Executive Summary

Restoration initiatives are a high priority for the Doig River First Nation and as such encouraged the Band's Lands Department to create a strategy for protecting and restoring important habitat areas within their traditional territory. Areas targeted for restoration were identified through geospatial analysis, research using various data sources, site visits and engagement with DRFN community members.

The initial site targeted for this restoration project was 40km of 5-8m wide legacy seismic lines (40-60 years old) developed for petroleum exploration. Many of the seismic lines experienced poor regeneration of trees and other woody vegetation, negatively impacting key habitat areas of the threatened caribou species in the Chinchaga range and moose.

Multiple data sources were reviewed to identify the restoration candidates and are further discussed in Section 2: Background Information. This data determined areas that best supported the numbers and health of primarily caribou and moose while minimizing conflict with existing industrial activities and tenures, not impede access to areas where community members exercise their treaty rights, cultural practices and not be at risk of future industrial disturbance.

Typically, site prep in this type of area that is mostly made up of muskeg is completed under frozen ground conditions with tree planting completed in the Spring. However, with this project it was decided to trial amphibious excavators. With many years of experience using their amphibious equipment in this environment, we chose to collaborate with Caribou Tracks to perform all heavy equipment components of the restoration implementation. They also mentored a Ujuo Development operator on the use of amphibious excavators and restoration techniques to aid in the capacity building for DRFN.

We successfully completed the project scope of treating 40km's of PNG Legacy Seismic Lines using functional and ecological techniques which included mounding, spreading coarse woody debris, tree-bending, tree-hinging, tree-felling, and tree planting. We planted 40,140 seedlings of 3 different species. We had various challenges but are proud of the project's outcome.

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## Table of Revisions

Revision No.	Date	Reason/Type of Revision
1	November 17/22	Remove comments and adjust hours for DRFN and add hours for TTSI for Q4 to Nov 15/22

## Acronyms & Definitions

[**Optional** – include if applicable]

TTSI – Tree Time Services Inc.

DRFN – Doig River First Nation



## 1. Introduction

McMillan Creek project area was 1 of the 3 ideal candidate areas identified by Doig River First Nation for this restoration project. It included >40km of 5-8m wide legacy seismic lines (40-60 years old) developed for petroleum exploration. Many of these seismic lines experienced poor regeneration of trees and other woody vegetation, negatively impacting key habitat areas of the threatened caribou in the Chinchaga range.

Habitat quality and abundance for animal species are important ecological values for the DRFN community members. Moose and caribou habitat are especially significant as they support species important for the cultural practices of community members. Making these areas of utmost priority to restore.

We successfully restored 40Km’s using functional and ecological restoration techniques in Q3 2022. Completing this type of work in the summer and in a muskeg, area was made possible by use of amphibious excavators which has a minimal environmental footprint due to its low ground pressure and overall design.

The report will further delve into the methodology and the processes used to successfully complete this restoration project.

## 2. Background Information

The proposed project area selection is part of a community-endorsed restoration plan that has been developed as part of an ongoing caribou and moose habitat mapping project being executed by Doig River First Nation and Ursus Wildland Consulting. This is a Doig River First Nation led project funded by Environment and Climate Change Canada for restoration planning in the Chinchaga Range.

Restoration areas were delineated, features were buffered and prioritized based on the following criteria:

<b>Habitat Quality</b>	<ul style="list-style-type: none"> <li>• Traditional Use and Traditional Ecological Knowledge Geospatial Database                         <ul style="list-style-type: none"> <li>• Wildlife Use Areas</li> <li>• Visual Sightings</li> <li>• Hunting Areas</li> <li>• Knowledge of prime habitat locations</li> </ul> </li> <li>• Caribou Habitat Modeling Suitability (Rank 1)</li> <li>• Moose Habitat Modeling Suitability (Rank 1) Overlap with Caribou Rank 1 Habitat</li> <li>• Within Core Caribou Range</li> </ul>
<b>Cultural Use</b>	<ul style="list-style-type: none"> <li>• Complex Consultation Zones (important areas identified by community members that they would like to see protected based on</li> </ul>

	interviews and community meetings) <ul style="list-style-type: none"> <li>Community member cabins</li> </ul>
<b>Cumulative Impact</b>	<ul style="list-style-type: none"> <li>A cumulative impact grid (percent area disturbed per square kilometer)                         <ul style="list-style-type: none"> <li>Oil and Gas Seismic lines</li> <li>DRA Roads</li> </ul> </li> <li>Density of dead-end roads based on DRA Road lines</li> <li>Density of COR wellsites</li> </ul>
<b>Industry/Cultural Conflict</b> (Areas removed from potential restoration footprint)	<ul style="list-style-type: none"> <li>Active Oil and Gas wellsites, facilities and pipelines</li> <li>Active Oil and Gas Roads</li> <li>Community member cabins</li> <li>Community member travel routes</li> </ul>

Data sources used to identify the restoration candidate areas included the following:

COR O&G Wellsites	Range Tenure
Active O&G Wellsites	Caribou Core Range
Oil and Gas Seismic Lines	Key cultural areas of importance to DRFN
DRFN Hunting Roads	TUS Environmental Features (Salt Licks, key habitat areas, etc.)
OGC Permitted Roads Forest Tenure Roads	TUS Habitation Features (cabin sites, camp sites, etc.)
DRA Roads	Moose/Caribou habitat areas from Ursus Wild Model

The above criteria were combined into a model to create potential restoration areas which were ranked based on the amount of disturbance and dead-end within those areas. The areas with highest impact and areas greater than 10 square kilometers were visually assessed for selection based on ease of access, proximity to streams for restoration anchor points and terrain potential for restoration (i.e., not inundated with water, no excessive streams impeding movement of restoration equipment).

From that research 3 area candidates were identified. Our project area included 40km of legacy seismic line segments that needed restoration efforts based on the criteria outlined above. It was also chosen as its position provided the greatest gain in undisturbed habitat for the lowest cost.

Ground truthing of the candidate segments to further verified the information gathered through geospatial analysis. During this phase, segments were be assessed by identifying site limiting factors (anthropogenic activity, wet areas, competing vegetation, nutrient availability etc.) and prescribed a suitable restoration technique. This work was executed at multiple times by DRFN Elders and field monitors with field support provided by Ursus Wildland Consulting, Uujo Development operators, Caribou Tracks operators and by Tree Time Services Project Managers.

### 3. First Nations Participation

Restoration initiatives are a high priority for the Doig River First Nation and as such encouraged the Band's Lands Department to create a strategy for protecting and restoring important habitat areas within their traditional territory. The first step in that strategy was to identify critical habitat areas for caribou moose through geospatial modeling, traditional use knowledge and field visits. This initial step was funded by Environment and Climate Change Canada for restoration planning in the Chinchaga Range. Once these critical habit areas were identified, they moved on to locate areas where restoration activity could take place and finally completing the functional and ecological restoration within 1 of the 3 identified areas. This work was completed with full support, leadership and participation from the Lands Manager, Elders, Community members as well as additional staff such as their GIS analyst, and field supervisor.

Field activities were also supported by Uujo Contracting, A Doig River First Nation member owned business and Uujo Developments which is DRFN's economic development corp. They assisted with field scouting, provided an operator for the field work, and managed the argo rentals/maintenance. We also used partners of Uujo Development industry partners where possible such as Bailey Helicopters, Big Creek Services, Pioneer Rentals, AFD Petroleum and Mountainview Safety Services - Medics.

It's Tree Time's full intention, as their partner, to provide DRFN with a procedural framework making future projects easier to self managed. With future funding support, these types of projects have substantial opportunity to build capacity for Doig River First Nation.

We were also grateful to have received letters of support from Blueberry First Nation, West Moberly First Nation, and Halfway River First Nation.

### 4. Methods

#### *Equipment Advantages*

Caribou Tracks amphibious excavators were integral to the success of this project at this time of year. Why?

- Equipment can float and does not have the same level as risk as working in winter conditions
- Equipment is remote controlled and can be utilized for crossing streams, creeks, rivers, and fens to reduce the potential risk to loss of life in an upset condition
- Equipment has a small carbon footprint, consuming only 5-10 Gallons of fuel a day
- Equipment has a minimal environmental footprint due to its low ground pressure and overall design. See last photo on Appendix A showing the Caribou Footprint vs the Excavator Footprint – almost unnoticeable.

#### *Permits Required*

- A Special Use Permit (SUP) was obtained for this project. According to S. 7(1)(n) of the Provincial Forest Use Regulation (PFUR) this is the appropriate type of permit to undertake ecological restoration activities on Crown Land. Section 9 of the PFUR stipulates that a management plan must be submitted along with the SUP which details how the land will be used. A special use permit with accompanying management plan was provided to the Ministry of Forests, Lands, and Natural Resource Operations, which was approved.
- Section 52 – Application to Cut, Damage, or Destroy Incidental Volume of Crown Timber (50m<sup>3</sup> or Less)
- Section 92 – General Wildlife Measure – Exemption Request
- Section 11 - Change Approval and Notification (Changes In and About a Stream)

#### *Third Party Engagement*

Several third parties were engaged in the planning and execution of this project.

#### Strathcona Resources Limited

Agreements were obtained from Strathcona Resources Limited for our activities which included a camp rental agreement, a road use agreement, multiple staging location agreements, and a facility crossing agreement.

#### Canadian Natural Resources Limited

Canadian Natural Resources Limited was engaged for road use permission on an access road.

#### BC One Call

BC One Call was contacted prior to the commencement of work in the designated area, and it was determined through this engagement that Strathcona Resources was the only facility owner pertinent to this project area.

#### WorkSafe BC

WorkSafe BC was notified in advance of our intent to conduct operations in the area and was provided detailed instruction on how to locate us.

### Shock Trauma Air Rescue Service (STARS)

STARS was contacted prior to the onset of field operations, and they were provided with coordinates for an emergency evacuation, if required.

## 5. Results

The project was able to deliver 40kms of linear restoration, with several treatment types utilized and deploying 40,140 seedlings within the project area. The vast majority (36.20kms) received full functional treatment as proposed in the original plan, while selected areas received only partial treatment or only ecological restoration for site-specific reasons which will be explored in greater detail in the following sections.

### 5.1 Location & Timing of the Completed Activities

The field operations and treatment phase of the project took place between August 21 and September 16, 2022. Most of the work was staged off an access road located at 57.018104, -120.755278. The project involved site preparation (mounding), tree bending and hinging with an amphibious excavator operated by Caribou Tracks. Once site preparation was completed, the mounds on the line segments were planted with ecologically appropriate species for the area by TTSI Field Assistants. The 40,140 seedlings were made up of a variety of species including White Spruce (*Picea glauca*), Black Spruce (*Picea mariana*) and Tamarack (*Larix laricina*). Finally, slashers from Big Creek Services would pass along a line segment to fell trees, both impeding future access and creating a more hospitable environment for seedling re-establishment.

#### *Phase 1: Pre-treatment Inventory and Planning*

Pre-treatment photographs are in Appendix A.

Doig River First Nation biologist and a community member completed an on the ground review of the project area. Game cameras were installed and data collected was reviewed. DRFN and Tree Time completed a fly-over tour of all the candidate areas to review the best access routes. Once the McMillan project area was chosen, TTSI project management worked closely with DRFN's Land's Manager/RPF to decide upon specific treatment areas within the polygon. Decisions about which areas would receive treatment vs which area would be left untreated were largely based on the degree of ecological recovery taking place at the time of inspection. For example, if sizeable and widespread black spruce and tamarack were found on a specific line segment, then this segment would be considered for non-treatment. Special attention was paid on treating areas that were most in need of treatment (i.e., no re-establishment). Furthermore, some specific line segments were too narrow to allow amphibious excavator access, so they received slashing treatment alone. In some of the wider seismic lines, regrowth was relatively strong, but the forester requested tree bending for both functional and ecological purposes; In these specific circumstances that was the administered treatment.

*Phase 2: Treatment Implementation*

Post-treatment photographs are in Appendix A.

Phase two results were very closely completed to what was originally included in the proposal. The only key difference is that some segments received tailored treatments based on site specific conditions, as described above.

**Table 1:** Site Restoration Summary for the Reporting Period

Site Location	Number of Sites (e.g., number of unique seismic lines)	Treatment Method(s)	Total Area Restored (linear kilometers)
McMillian Creek Polygon	43	Full Treatment	36.20
McMillian Creek Polygon	3	Slashing Only	1.77
McMillian Creek Polygon	4	Planting Only	0.87
McMillian Creek Polygon	6	Bending Only	1.86

\*Full Treatment defined as Tree Bending & Hinging, Mounding, Tree planting, and Slashing.

*Phase 3: Restoration Activity Performance Monitoring*

The Phase 3 component of our project was focused on designing a monitoring plan for subsequent years to track progress towards our project objectives and securing funding and developing budgets to ensure the plan can be executed. Monitoring locations were set up in areas with relatively easier access to monitor the establishment of seedlings annually. More thorough project area monitoring will occur according to the monitoring plan outlined in the site plan and proposal.

**Objective of long-term Monitoring:** Determine if restoration treatments are meeting pre-determined recommended targets for ecological suitable species growth, access control, and line of sight.

The following response metrics will be assessed up to 5 years post treatment contingent on funding: access management, line of sight, CWD, drainage and surface water, vegetation composition, seedling survival, density, and vigor.

Table 2 summarizes the results of the monitoring during project implementation

**Table 2:** Monitoring Activities & Findings

Activity Monitored	Summary of Findings-implementation
Planting-density (stems/Ha.) (vigor and survival are n/a at planting)	1720
Access management	n/a
Line of sight	247

CWD (m <sup>3</sup> /Ha.)	30
Drainage and surface water	n/a
Vegetation composition	n/a

### 5.2 Project Training Initiatives

Several key training initiatives were incorporated into the PNG Legacy Site Restoration Program, with a clear focus on capacity-building for Doig River First Nation. DRFN Land’s Manager and TTSI Project Manager worked closely throughout the project to ensure appropriate permits were obtained. They also worked with FLNRORD for guidance throughout Phase 1 & 2. The Field Operations Supervisor from Tree Time Services spent a great deal of time advising a DRFN Field Supervisor on specific aspects of linear restoration project management. Instruction was also provided to another DRFN member on correct tree-planting technique and associated quality inspection. Finally, Caribou Tracks provided instruction on amphibious excavator operation to two members of DRFN/Uujo to help the nation with capacity-building.

**Table 3:** Training Summary

Training Received	Total Number of Members/Staff Trained	Issued Certifications (if applicable)
Project Management	1	N/A
Tree Planter	1	N/A
Amphibious Excavator	2	N/A

### 5.3 Employment Information

TTSI as prime contractor was set up well to support the project management and execution of this extremely meaningful project with partner Doig River First Nation. It was an important focus for TTSI to hire any DRFN/Uujo partner companies where possible ensuring maximum capacity building for the nation.

**Table 4:** Employment Summary

Category	Actuals
Number of Team Staff Employed in Project Execution (including any personnel who received an honorarium for participation or whose work was provided in-kind)	<p><b>Q1:</b>                      Tree Time = 7                      Doig River / Uujo = 10                      Great Excavations = 0</p> <p><b>Q2:</b>                      Tree Time = 9                      Doig River / Uujo = 7                      Caribou Tracks (was Great Excavations) = 3</p> <p><b>Q3:</b>                      Tree Time = 13                      Doig River FN = 8</p>
Number of Contractors Employed in Project Execution (including any personnel who received an honorarium for participation or whose work was provided in-kind)	<p><b>Q1:</b>                      N/A</p> <p><b>Q2:</b>                      AIM Land = 2</p> <p><b>Q3:</b>                      Uujo = 2                      Caribou Tracks (was Great Excavations) = 5                      Big Creek = 2                      Mountain View Medic = 3                      AFD Petroleum (and sub contractor) = 3                      AIM Land = 2                      Strathcona Resources = 5 camp workers</p>
Total hours of work created for all staff, including contractors and time covered through honorarium and/or in-kind donation	<p><b>Q1:</b>                      Tree Time = 178.50 Hours                      Doig River / Uujo = 383                      Great Excavations = 0</p> <p><b>Q2:</b>                      Tree Time = 179 hrs                      Doig River / Uujo = 122.75 hrs                      Caribou Tracks (was Great Excavations) = 60 hrs</p> <p><b>Q3:</b>                      Tree Time = 1589 hrs (includes the 4 tree planter hrs)                      Doig River = 245 hrs (includes elders visit)                      Uujo = 262.50 hrs                      Caribou Tracks (was Great Excavations) = 616 hrs                      Big Creek = 276 hrs                      Mountain View Medic = 23 days (day rates)                      AIM Land = 44 hrs                      AFD Petroleum = Unknown – fuel provider                      Strathcona Resources = Unknown hrs for camp staff</p> <p><b>Q4 to Nov 15/22:</b>                      Tree Time = 36.5 hrs                      Doig River = N/A</p>



## 6. Discussion & Conclusion

Although all key deliverables were achieved, challenges needed to be overcome and lessons were learned in the planning and execution of this project. One unexpected delay encountered was the timing of the Special Use Permit (SUP). Now knowing what's all involved and that all tertiary permits approvals are also linked to the Special Use Permit we would endeavor to submit the SUP at least 6 months prior to intended start date. Allowing time for proper review by the Ministry of Forestry, Lands and Natural Resource Operations prior to future projects. An inefficiency encountered was the lack of overall certified ARGO drivers that were allocated to the project through TTSI and our partners. Even though during pre-planning we had confirmed the appropriate number of argo drivers unfortunately those contractor resources were allocated to a different project. This led to a worker occasionally needing to temporarily stop their task to transport other workers who were unable to transport themselves because of a lack of certification. A recommendation for future linear disturbance reclamation projects would be to consider the timeline of work in greater detail. For example, the tree fellers could complete their work and cover ground at a much higher rate than the excavator and tree planters. Having a staggered start date for these two respective groups could have helped to reduce the downtime encountered by the fellers. We also realized right before project kick off that we would need to abide by Wildfire prevention restrictions due to our high-risk activities being slashing and excavator work extend our project timeline.



Having learned so much through this project's journey we know how we can clearly find efficiencies in all phases of any future projects. This would lead to more accurate budgeting and planning. For example, during the ground-truthing phase where multiple data sources can be selected such as stream crossing data, riparian management plan, access plan, treatment plan etc. This piece alone could save a lot of time and money in the execution phase. We look forward to seeing these learnings bring many future efficiencies on projects similar to this one.

Ultimately, we are still so please to have restored 40Km's of Moose and Caribou habitat in an area that has been damaged for over 60 years. To ensure a legacy of repair and healing in an area so important to Doig River First Nation is an incredible feeling.

## Appendix A Project Photographs

*Pre-Treatment*







2022.08.28 07:28  
57.04411, -120.78039  
Prespatou, BC V0C 2S0









2022.08.28 10:28  
57.04408, -120.78043  
Prespatou, BC V0C 2S0



*Post-Treatment*











2022.08.27 11:51  
57.04411, -120.78322  
Prespatou, BC V0C 2S0





*Photo Courtesy of Caribou Tracks – Tom Skierka*



## Appendix B Supporting Mapping

A higher-resolution copy of this map will accompany the report. The map delineates treatment areas by specific treatment type.

