



Community-based revegetation programs at Faro

# NEWSLETTER

2021-2022

## Why is community-based revegetation important at Faro?

Revegetation represents a commitment to re-establish plants at the Faro mine as part of healing the land. It is important for revegetation to be led by Kaska people. Faro is located on unceded Kaska territory and the Kaska have acted as stewards of this land since time immemorial.

It would be hard to keep reclaimed landforms at Faro from having any vegetation—plants are very adaptable and persistent! The plants established through revegetation programs also provide important habitats for all the non-human animals that live in the area. So, taking care of these animals will include carefully designed revegetation to ensure healthy habitats in the future. Kaska stewardship objectives, protocols and expertise are central to this careful revegetation work.

This newsletter shares some of the highlights of ongoing revegetation programs at Faro led by Dena Cho Environmental and Remediation Inc. (Dena Cho), including the tree planting program and a seed collection and vegetation sampling/trace metals uptake monitoring program. This work is guided by Ross River youth and Elders and the Ross River Lands Department, with support provided by Dena Cho, Integral Ecology Group and Wildside Reforestation. Funding is provided by the Government of Canada.

*Above: Last day of the tree planting program in 2021; Right: seedlings ready for planting (left-right): choba (aspen), ts'u (spruce), and gadze (lodgepole pine)*



**Dena Cho**  
Environmental Limited Partnership  
A Dena Nezziddi Development Corp. Company



**Canada**

## What did we do?

### Kaska protocols followed for tree planting and seed collection and vegetation sampling

We began each program with an offering and prayer from an Elder, to give thanks to the plants that will provide roots for tree planting, and seeds, leaves, and stems for metals uptake monitoring and future revegetation. In doing so, the plants will help heal the land around Faro. Tobacco was offered each day at sampling locations during the seed collection and trace metals uptake monitoring programs. Care was taken to harvest only what we needed when collecting seeds and plant samples, and the land was treated with respect. To respect and revitalize the Kaska language, we continue to learn and use the Kaska names for the plants we're working with.

For the seed collection and trace metals uptake monitoring programs, Elders from different family groups were invited to take the lead in the different locations visited, based on traditional family and stewardship regions. This was based on the Ross River Dena Grandfathers' map, as per direction from the Ross River Lands Department.



## Update on the tree planting program

### Who was hired, and what did we plant?

Dena Cho hired Kaska members to support the tree planting program, including 13 youth and 6 Elders in 2021, and 9 youth and 4 Elders in 2022. Several Elders also joined for a tour of the planting areas in 2022. The community has planted thousands of seedlings at the Faro mine in the past two years—36,000 *ts'u* (white spruce) and *gadze* (lodgepole pine) seedlings in 2021, and 24,000 *ts'u* (white spruce), *gadze* (lodgepole pine), and *choba* (trembling aspen) seedlings in 2022.



*Below: Welcome gathering at Blind Creek for the tree planting program in 2021; Above: Elders Dorothy, Minnie, and Louie visit the tree planters in 2022*

## Where and how were the trees planted?

In 2021, the seedlings were planted in various small mine disturbances like gravel pits, mostly at the northwestern end of the mine. In 2022, the seedlings were planted in similar sites along the Faro/Grum haul road, and on a reconstructed portion of the North Fork Rose Creek diversion near the Faro rock dumps (Figure 1).

In 2021, some of seedlings were also planted for reclamation-research purposes. These research projects include a fertilizer trial and a trial that investigates different ways of placing soil materials on waste rock piles in order to encourage revegetation. Planting was completed using standard reforestation techniques. All trees were planted with fertilizer “teabags” in their planting hole to provide food for the plants for the first couple of years after planting.

## Seed collection and metals uptake monitoring programs

### Why are we collecting seeds and sampling vegetation?

Elders have told us that it is important to collect seeds for revegetation from local, native plant species. This will help to ensure the plants used for revegetation at Faro are adapted to the local area. It also limits the risk of invasive species. Seed collection, vegetation sampling and tree planting programs are also an ideal way to involve youth and Elders in the reclamation process, to provide on-the-land training opportunities, and to make sure that some of the benefits of the Faro Remediation Project go to the community of Ross River. To help with seed survival, seeds were collected from plants growing at the same elevation range (900-1200 m) as the Faro mine site. The seeds collected will

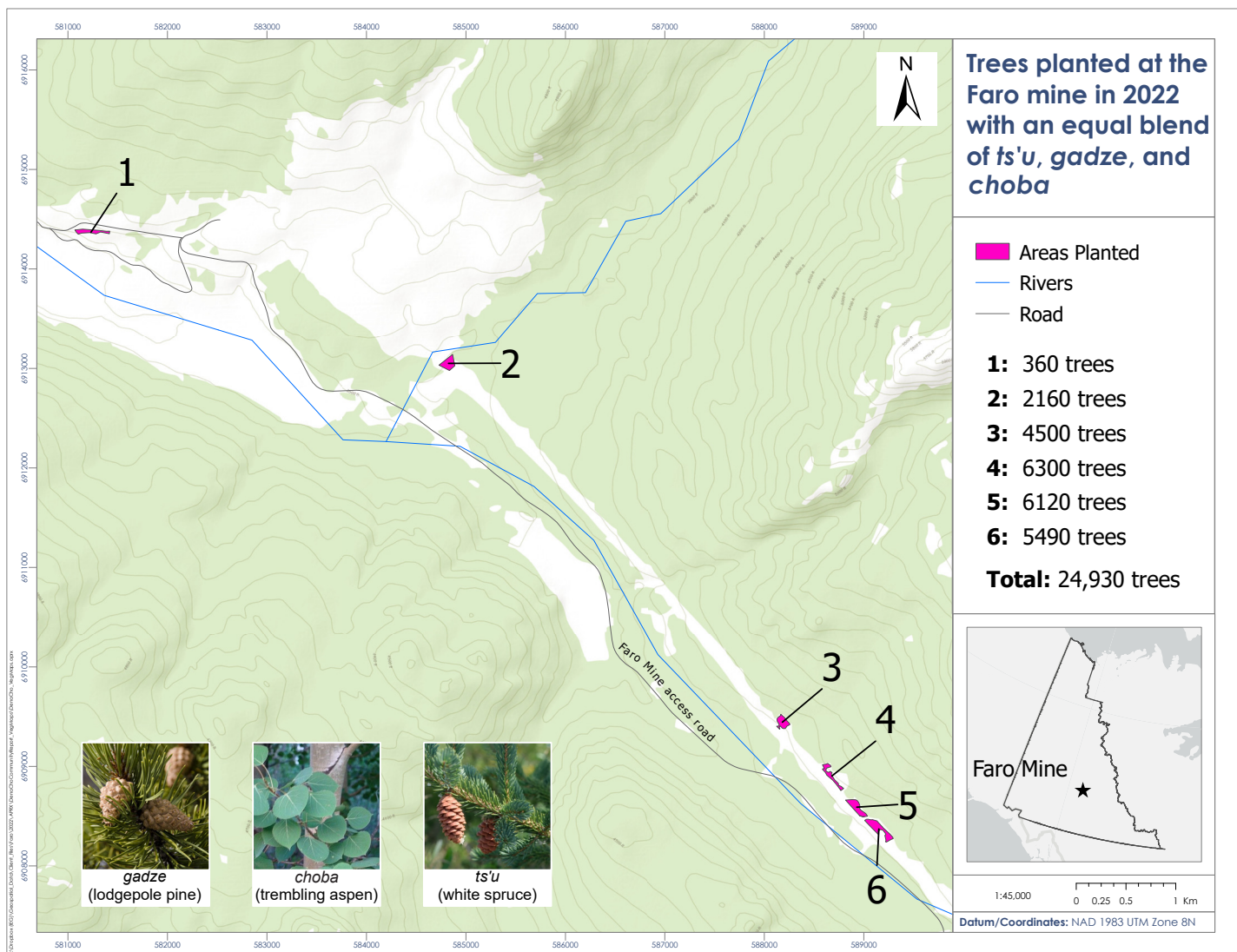


Figure 1. Trees planted at Faro mine in 2022 with an equal blend of *ts'u*, *gadze*, and *choba*

be grown into plugs at NATS Nursery, in Langley B.C., and used for future revegetation programs at Faro.

Concerns from Elders about heavy metal contamination in plants was a key reason for starting the trace metals uptake monitoring program. There is a worry that wildlife in the region are being harmed by eating contaminated vegetation. There are many potential sources of contamination for wildlife around Faro, all of which cannot be understood through a vegetation sampling program alone. For example, wildlife could be exposed to contamination through water or rock dust, rather than vegetation. The current program focuses on collecting vegetation samples and analyzing the metals content in different plant tissues.



*Elder Mary Maje planting the first tree during the planting program in June 2021*

from this initial discussion and research were cross-referenced with previously published resources on Kaska land use and plant-specific knowledge. The final species list was reviewed by several Elders and the Ross River Lands Department.

For the seed collection species list, we focused on plants that Elders considered appropriate to collect seed from and to grow for future revegetation work. For the trace metals uptake monitoring program, we chose plant species that are abundant on the Faro mine site and in the surrounding area and that were identified as potentially important indicators for metal contamination (i.e., either because they are important food plants for humans or animals, or because they have particular importance to Kaska people).

For example, food for moose, such as willows were not collected for the seed collection program because there is a worry about moose eating contaminated willows. Instead, willows were sampled to better understand the heavy metal loads that moose and other ungulates could be potentially ingesting through plants.

The species selected are not considered a list of preferred species for revegetation at the Faro mine site, but were specifically chosen for seed collection and trace metals uptake monitoring (see Table 1). The list may change as the program develops and (*continued on page 6*)...



### How were plant species selected?

Species lists for both seed collection and metals uptake monitoring were developed based on guidance from Ross River Elders, the Ross River Lands Department, and reclamation ecologists from Integral Ecology Group. Dena Cho staff also reviewed research on revegetation and seed collection across Northern Canada. The species lists created

*Above: Gadze (lodgepole pine) seedling with fertilizer tea bag; Below: Collecting vegetation samples at the Faro mine*



**Table 1. Plants harvested for the Ross River seed collection and metal uptake monitoring programs in 2022.**

## Seed collection

English name	Kaska name	Latin name
field locoweed nodding locoweed fireweed bunchberry/beaver berry buckbrush mountain avens common juniper/crowberry* alder white spruce lodgepole pine	<b>gūs</b> <b>nosda zadi</b> or <b>gah dzídzé'</b> <b>kusaze</b>  <b>kuhsāze</b> <b>ts'u</b> <b>gadze</b>	<i>Oxytropis campestris</i> <i>Oxytropis deflexa</i> <i>Chamaenerion angustifolium</i> <i>Cornus canadensis</i> <i>Betula nana</i> <i>Dryas spp.</i> <i>Juniperus communis</i> <i>Alnus spp.</i> <i>Picea glauca</i> <i>Pinus contorta</i>

## Seed collection and metal uptake monitoring

English name	Kaska name	Latin name
red bearberry stoneberry blackberry/crowberry* red raspberry soapberry alpine blueberry low-bush cranberry yarrow	<b>ts'usk'ā dzâdzé</b> or <b>ts'osk'ā dzâdzé'</b> <b>tseslone</b> or <b>dzídzeslone</b> <b>dzídzest'edze</b>  <b>esgoshe</b> or <b>dzídze ashgoshe</b> <b>dahba</b> or <b>nénesdza</b> <b>itl'et</b> <b>nón cho'</b> or <b>tl'otsan</b>	<i>Arctous rubra</i> <i>Arctostaphylos uva-ursi</i> <i>Empetrum nigrum</i> <i>rubus idaeus</i> <i>Shepherdia canadensis</i> <i>Vaccinium uliginosum</i> <i>Vaccinium vitis-idaea</i> <i>Achillea millefolium</i>

## Metals uptake monitoring

English name	Kaska name	Latin name
altai fescue creeping red fescue bear-root/alpine sweetvetch black currant red currant Labrador tea/ Hudson's Bay tea prickly rose willow high-bush cranberry balsam fir balsam poplar snow lichen caribou lichen caribou horn	<b>tsas</b>  <b>kehse</b> or <b>ti mēsgé'</b>  <b>gula</b>  <b>ts'ustşę</b> <b>shoba</b> or <b>t'is</b>  <b>Eju'</b>	<i>Festuca altaica</i> <i>Festuca rubra</i> <i>Hedysarum alpinum</i> <i>Ribes spp.</i> <i>Ribes spp.</i> <i>Rhododendron groenlandicum</i> <i>Rosa acicularis</i> <i>Salix spp.</i> <i>Viburnum edule</i> <i>Abies lasiocarpa</i> <i>Populus balsamifera</i> <i>Stereocaulon spp.</i> <i>Cladonia spp.</i> <i>Cetraria islandica</i>

community involvement progresses. Until further conversations with Ross River Elders and members can occur, ceremonial plants will not be gathered for seed collection or metals uptake monitoring, since the protocols for collection of these plants are sacred.

### Who was hired, and where were the seeds and vegetation samples collected?

Dena Cho hired 3 Kaska youth and 10 Elders for the seed collection and metals uptake monitoring programs. Plants were collected along the South Canol Road, North Canol Road, Ketzá River Mine Road, the Faro Mine Complex, and along Blind Creek Road (Figure 2).

### How did we collect seeds?

Seeds were collected from a variety of different herbs, shrubs and trees, including dry seedheads, berries, fruits, and seed cones. Seeds were collected into paper bags and labeled with the plant name, location, date, and name of collector, and kept in a cooler with ice packs during transportation. Dry seeds were stored in paper bags and kept in a well-ventilated area, while wet seeds were kept in coolers or a refrigerator until they could be sent to the plant nursery.

### How did we collect samples of plants?

Different parts of plants (i.e., plant tissues) were collected as samples, including leaves, flowers, berries, rosehips, the pitch, bark, and cones from trees, and lichen (see Table 1). One sample of soil and of mushrooms were also collected at the request of Elders while in the field. Given the interest expressed by Elders, soil and mushroom samples will be considered under this program or different monitoring programs in the future. All tissue samples were collected while wearing nitrile gloves and placed into laboratory-grade plastic bags to minimize possible cross-contamination. The sample bags were labeled with the plant name, location, date, and name of collector and kept in a cooler with ice packs during transportation. The tissue samples were stored in the freezer until they could be sent to the laboratory for analysis.

On the last day of the program, IEG and Dena Cho staff and participating youth came together to organize all of the bags of seeds and tissue samples. Everyone

helped pack the seeds and samples into coolers for transportation to the plant nursery and laboratory.

## What's on the horizon?

### Plans for tree planting in 2023

Approximately 8,000 gadze (pine), t'su (spruce), and choba (trembling aspen) will arrive for planting in June 2023, as well as about 1,350 plants from seeds collected by Kaska students at Faro in August 2020, including mountain avens, dzídzest'edze (blackberry), tsas (bear-root), esgoshe or dzídze ashgoshe (soapberry), and itl'et (low-bush cranberry).

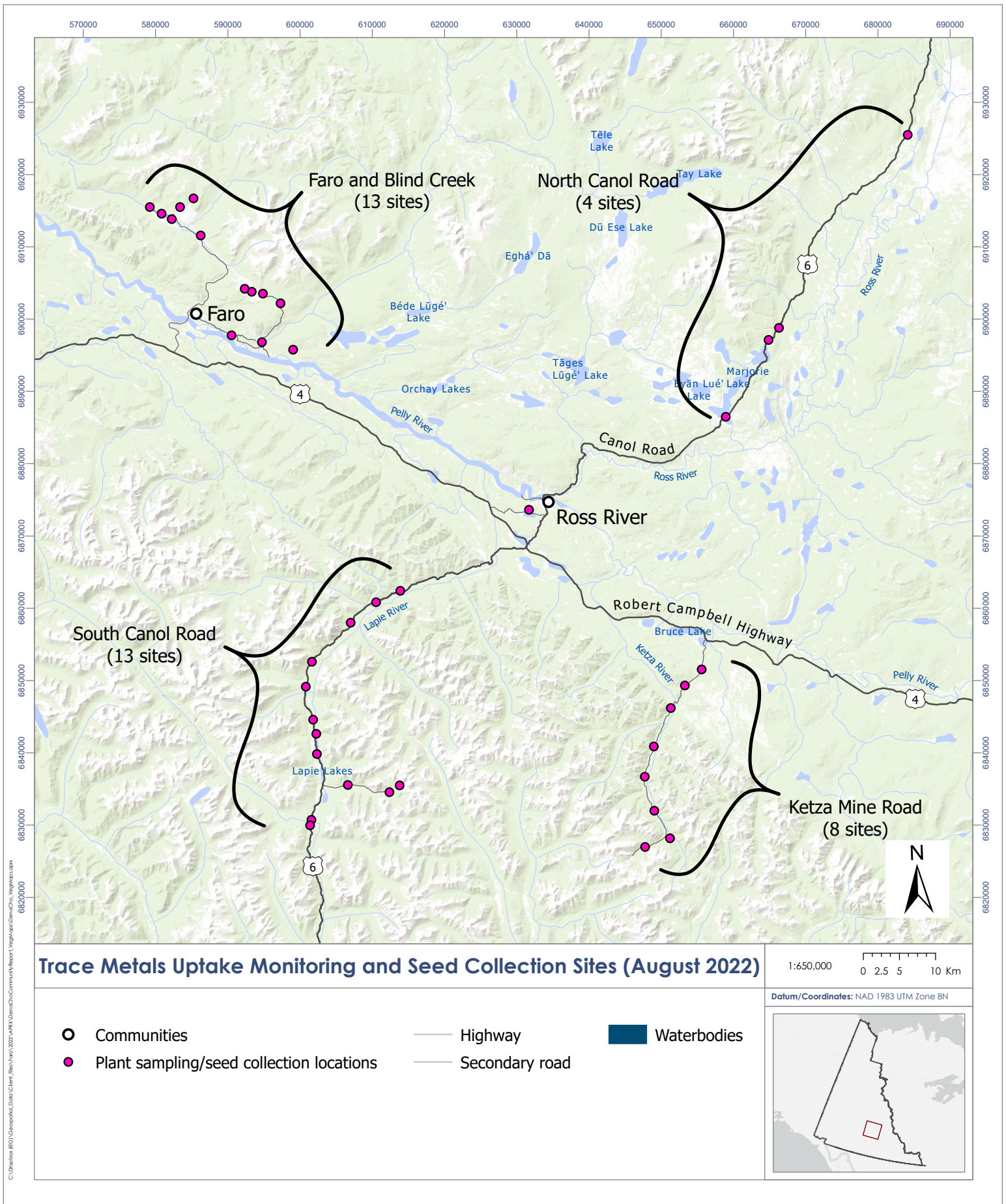


*Guts'eni, by Dennis Shorty*

These seedlings will be the first ones planted at Faro from seed collected by Kaska people! Most of these plants will be planted in the new, large-scale reclamation pilot area (called the Landform, Cover and Revegetation Pilot) on the Northwest Dump. We may establish special trial areas for the Kaska-collected seed so we can monitor survival of these plants more closely. Planting is expected to occur in June 2023 and involve a similar number of people as in 2022.

### Next steps for the seed collection program

In August 2022, the seeds were shipped to NATS Nursery Ltd. in Langley, BC. Nursery where staff will clean the seeds and remove any non-seed material (e.g., moss, twigs) and sort them by species. Once the seeds are cleaned, they will be tested for germination and viability. In the 2022 seed collection program, we collected enough seed to grow about 26,000 plants. Viable seed will be grown into seedlings (plugs) for



**Figure 2. Trace Metals Uptake Monitoring and Seed Collection Sites (August 2022)**

planting at the Faro mine site in 2024/2025, and a portion of the seeds will be stored for planting in future years. These plants will be available for planting in 2024, or in 2025—some seedlings grow slower than others and take longer to prepare for planting. The seeds collected in 2022 will produce seedlings for about the same number of plants as needed for planting at Faro on an annual basis, so the seed collection program in 2023 will have a similar goal.

### Next steps for the trace metals uptake monitoring program

The plant tissue samples collected during the program were sent for analysis to the Analytical Chemistry Laboratory in Victoria, BC. The lab is operated by the BC Ministry of Environment and Climate Change Strategy and has been operating for over 30 years. The lab works for people in government, universities, and for natural resource consultants. The samples will be tested for approximately 30 trace metals and elements. Based on guidance from Ross River Elders about traditional preparation methods, laboratory staff will run some of the tests using dried plant material (e.g., berries, lichen), while others will be boiled into tea (e.g., leaves, rosehips). Some of the individual plant samples will be split prior to analysis, with half of the sample washed with water, and the other half unwashed. This will allow for comparison of the levels of trace metals between washed and unwashed samples.



*Labrador tea samples boiled into tea in the lab.*

Results of the laboratory analyses will be reported directly back to Dena Cho analyzed with support from Integral Ecology Group. The results will be used to inform the program's questions about plant and animal health, and how to direct any vegetation sampling that we might do in 2023.



**8** *Above: Organizing vegetation samples for shipment to the lab. Right: Collecting juniper berries.*

Having plant samples tested for levels of trace metals and elements will help us address important questions, including:

- 1) Are plants up-taking metals – if so, which metals?
- 2) If plants are up-taking metals, what is the likely 'avenue' of uptake (i.e., through water/roots, through dust in the air?)
- 3) What are the potential impacts on animals and humans from eating or using these plants?
- 4) Do reclamation techniques (such as waste/tailings covers and water treatment) help to reduce the likelihood that plants will uptake metals? How? What mitigations for plant metal uptake are ideal in the short term, since covers will take a decade or more to be put in place?



*Raspberries collected with nitrile gloves and laboratory grade bags (August 2022)*

### Plans for seed collection/metals uptake monitoring in 2023

We learned a lot about the timing of seed collection in 2022. For example, we were too early for effective collection of kusaze (buckbrush) and kuhsāze (alder). In 2023, we may adjust the timing and target species for collection, based on guidance from Ross River Elders and reclamation ecologists with Integral Ecology Group.

