ARTEMIS GOLD INC | Blackwater Mine

BW Gold Whitebark Pine 2023 Annual Report

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1 Background

Whitebark pine (*Pinus albicaulis*) is an ecologically important tree species that is endangered throughout its North American range. Whitebark pine plays a keystone role in high elevation ecosystems by moderating snow melt, initiating tree islands, pioneering disturbed sites, and providing an important food source to a range of wildlife species. Its importance to wildlife is perhaps its best-known attribute as it provides important winter food and has formed a mutualistic relationship with the Clark's nutcracker (*Nucifraga columbiana*).

Whitebark pine seeds have a very high fat and protein content and are readily sought out by red squirrels, black bears, and grizzly bears as a fall food source during the hyperphagic phase (Tomback and Kendall 2001). Grizzly bears commonly raid cone caches of red squirrels or rip branches from shorter trees to access cones. Although it is important to a number of wildlife species, the most significant relationship is with the Clark's nutcracker who co-evolved with the Whitebark Pine and is the primary seed disperser (Hutchins and Lanner 1982).

Whitebark pine is listed as endangered in Canada (Environment and Climate Change Canada 2017) and is Blue-Listed in British Columbia (BC Conservation Data Centre 2020). It is listed primarily due to declining populations not due to it being especially rare. It is declining due to four main causes: 1) Introduced fungus *Cronartium ribicola,* which causes white pine blister rust; 2) Mountain pine beetle (*Dendroctonus ponderosae)* which often kills large reproductive trees; 3) Changes to fire regimes including fire suppression resulting in seral replacement of whitebark pine and catastrophic landscape scale fires causing greater impacts than historical fire patterns; and, 4) Global climate change which is driving shifts in habitat distribution to higher elevations and higher latitudes, climate change is also exacerbating other threats by creating better conditions for insect survival, increased fire activity, and increased survival and expansion of blister rust.

The Blackwater Mine is permitted within whitebark pine habitat. The Federal Recovery Strategy for Whitebark Pine [Proposed] describes the threat posed by mining as negligible though it notes the localized impact as extreme (Environment and Climate Change Canada 2017). The Decision Statement issued under the Canadian Environmental Assessment Act (CEAA) provides a series of conditions to be implemented to mitigate impacts to whitebark pine during project development. These conditions were used to develop a Whitebark Pine Management Plan for the Blackwater Project; this report summarizes activities undertaken in 2023 to address these conditions.

2 Decision Statement Conditions

The Decision Statement under which the BW Gold Mine development is operating includes:

8.19 The Proponent shall conduct progressive reclamation of areas disturbed by the Designated Project. In doing so the Proponent shall identify, in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, plant species native to the Designated Project area to use for revegetation as part of progressive reclamation, including whitebark pine (Pinus albicaulis) and other conifers suitable to create habitat for southern mountain caribou (Rangifer tarandus caribou) and other species of interest to Indigenous groups.

8.20 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, a whitebark pine management plan to mitigate effects from the Designated Project on whitebark pine (Pinus albicaulis) and its critical habitat. The Proponent shall implement the plan during all phases of the Designated Project consistent

with any applicable recovery strategy related to whitebark pine (Pinus albicaulis). As part of the whitebark pine management plan, the Proponent shall:

a) establish criteria to be used to evaluate the health of whitebark pine trees and for the selection of whitebark pine (Pinus albicaulis) to be transplanted;

b) collect and preserve whitebark pine (Pinus albicaulis) rust-resistant seeds within the Designated Project area prior to vegetation clearing and use them for progressive reclamation pursuant to condition 8.19;

c) identify the locations to plant whitebark pine (Pinus albicaulis) in undisturbed areas within the Designated Project area prior to construction;

d) implement measures to support whitebark pine (Pinus albicaulis) growth and use by Clark's nutcracker (Nucifraga columbiana);

e) develop and implement a follow-up program in consultation with Indigenous groups to determine the effectiveness of the mitigation measures included in the whitebark pine management plan. The Proponent shall apply conditions 2.9 and 2.10 when implementing the follow-up program.

The follow-up program shall include:

8.20.5.1 visual monitoring of populations of whitebark pine (Pinus albicaulis), including their health, within reclaimed areas at a minimum every five years; and

8.20.5.2 monitoring of use of the reclaimed areas by Clark's nutcracker (Nucifraga columbiana) for the purpose of whitebark pine regeneration. Should the results of monitoring demonstrate that use of the reclaimed areas by Clark's nutcracker (Nucifraga columbiana) is not adequate, the Proponent shall implement additional mitigation measures.

3 2023 Workplan

The 2023 workplan was developed to build on work conducted in 2022 and to continue addressing decision statement conditions; the tasks implemented in 2023 consisted of non-field, field, and reporting components, including:

Non-Field

1 Seedling Production: Seed was put into storage to support activities described in this report.

2 Seed Storage: Seed was put into storage to in cold storage to preserve their integrity until needed.

3 Intensive Rust Screening: Individual tree and corresponding stand infection level information were sent to the Provincial White Pine Blister Rust screening program.

Field

4 Seedling Transplants: Review construction plans to determine the timeline for potential excavation of seedlings and/or saplings for transplant to identified transplant site. (Condition 8.20a)

5 Planting Trial Development: A portion of seed collected in 2022 was submitted to Sylvan Vale Nursery for seedling production with the remainder of seed stored at the Surrey Tree Seed Centre and at Moody Tree. These seedlings are scheduled to be planted across a range of trials in 2025. These trials and methods of site selection include:

5.1 Climate change trial sites on high elevation grass/sedge and mineral soil sites. Climate change trial sites were identified through a combination of reviewing Terrestrial Ecosystem Mapping (TEM) polygons, air photos, and ground truthing. (Condition 8.20 – Climate change trials are a component of the plan)

5.2 Field based rust trial locations and locations to plant whitebark pine in undisturbed locations (Condition 8.20b and c) were identified by identifying areas meeting the following criteria:

- >0.25 ha
- Submesic – mesic conditions to minimize seedling mortality due to site factors
- Soil depth >20cm and of low-moderate coarse fragment content
- Homogeneous conditions across the site
- Suitable access over time to permit establishment and remeasurement

5.3 Identification of field sites to serve as recipient sites for transplanted trees and surplus planting stock.

- Criteria for these sites was the same as for 2.2 with the inclusion of current or previous occupation by whitebark pine to confirm the suitability of the site.

6 Stand Enhancement Activities: Layout and survey of stands to design restoration work to ensure use by Clark's nutcrackers. (Condition 8.19d)

6.1 Survey of mixed species stands that are whitebark leading or co-leading to develop daylighting prescriptions to support a diversity of whitebark pine size classes and ensure continual recruitment of whitebark pine to reproductive size classes.

6.2 Identification of healthy beetle susceptible sized trees for the application of verbenone to prevent beetle attack.

7 Incidental Work: During the course of work on site, incidental observations may be made which are relevant to whitebark pine management; this incidental work will be described in this section.

Reporting

8 Management Plan Updates: Review of mine construction work to identify any needed mitigation measures.

9 Reporting: Reporting and Prescription Development. Refinement and update of whitebark pine management plan based on field tasks and other work conducted to meet the Decision Statement Objectives. (Condition 8.19).

4 2023 Non-Field Implementation

4.1 Seedling Production

Seeds from 49 individual trees were sown for seedling production. Due to the variability in the number of seeds collected from each tree, not all trees had the same number of seeds sown. Twenty-six trees had enough seed sown to produce 224 seedlings and 23 trees had enough seed sown for 112 seedlings for a total seedling production potential of 8400 seedlings. These seedlings will be deployed in the various planting trials described in this report.

4.2 Seed Storage

Seed remaining from that collected in 2022 is presently in storage. A total of 2973 g of seed is stored at the Surrey Tree Seed Centre (TSC) under seedlot number 54265. An additional 9604 g of seed collected from 27 parents is presently in freezer storage at Moody Tree. Some seed from the individual lots was sent for seedling production in 2022 and an additional amount from the original collection is included in the amount stored at the TSC. An additional 1380.5 g from the original seed collection in 2013 is also in storage at the TSC.

Table 1. Summary of individual parent tree seed remaining in storage from the 2022 collection.

Parent	Storage Weight (g)	Parent	Storage Weight (g)	Parent	Storage Weight (g)
39	330	3177	444	3186	279
1208	156	3178	474	3187	415
3167	325	3179	154	3188	387
3168	235	3180	513	3189	318
3169	407	3181	508	3190	562
3172	436	3182	278	3191	215
3174	82	3183	250	3192	208
3175	636	3184	513	3193	548
3176	360	3185	356	3199	215

4.3 Intensive Rust Screening

Seed from five trees were submitted to the provincial rust screening program at the Kalamalka Forestry Centre. These trees were healthy reproductive individuals selected from a region on Mount Davidson where only 26% of the trees were healthy with the remaining trees rust infected or dead from rust. These trees will be inoculated with blister rust spores in 2025 and monitored for rust infection over time to potentially identify individuals resistant to rust infection.

5 2023 Results

In 2023 a 4,900 ha wildfire burned much of the Mount Davidson and BW Gold permit area. This fire consumed a large number of whitebark pine of all size classes primarily on the north and east slopes of Mount Davidson (Figure 1). This fire resulted in the destruction of many potential restoration sites but conversely created many potential restoration sites, primarily planting sites. The decline and ultimate death of some trees that suffered stem scald or burned root systems is likely to continue over the next several years (Figure 2). This fire altered the dynamic of many whitebark pine mitigation tasks as some translocation areas burned in the fire eliminating the need to excavate trees from these sites and other areas that were not previously considered for mitigation work are now suitable planting locations; in 2022 identifying rust field trial locations was challenging as very few areas were of sufficient size to accommodate a trial, in 2023 the burned forest provides numerous locations to establish these trials.

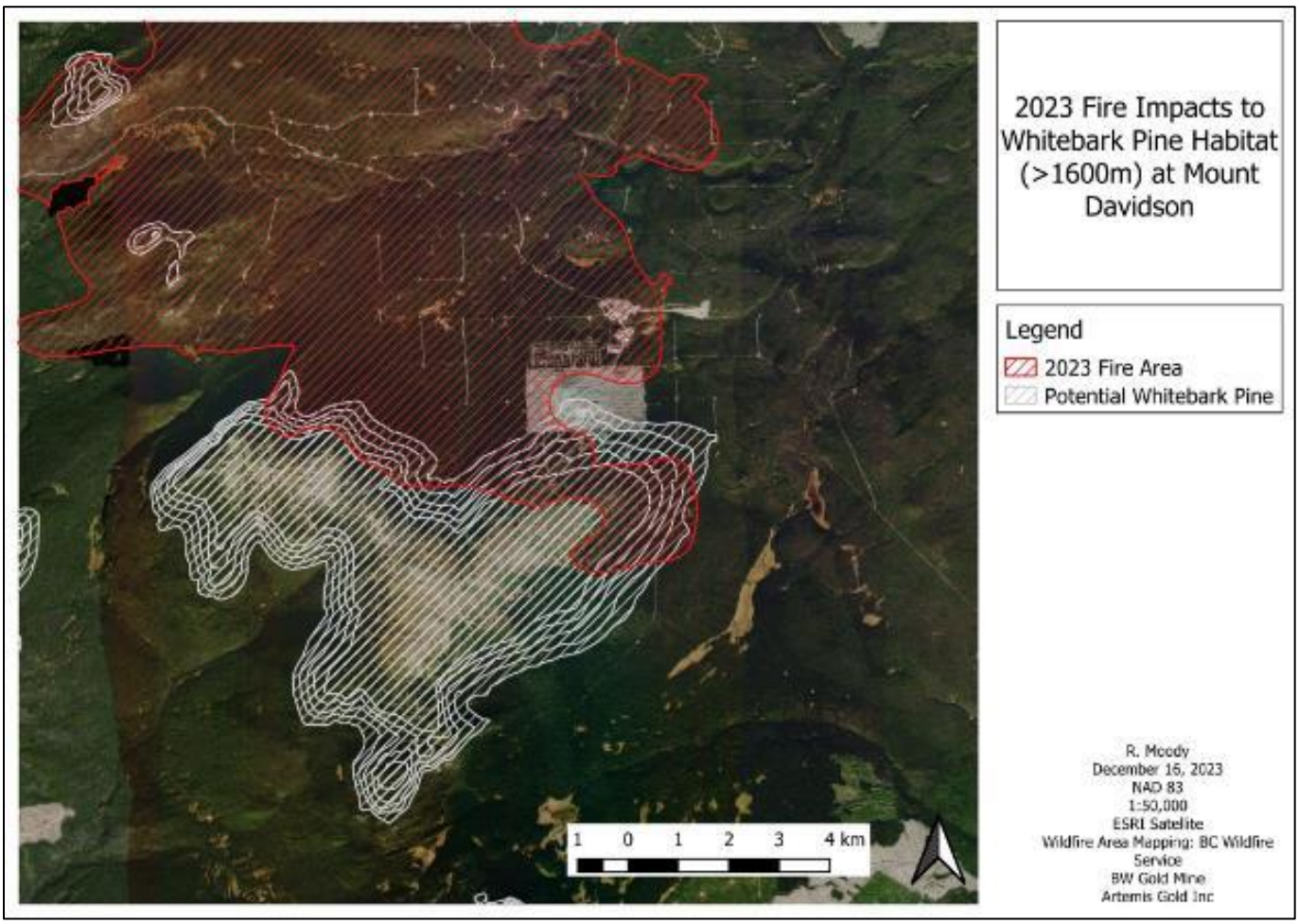

Figure 1. Location of 2023 wildfire on Mount Davidson relative to potential whitebark pine habitat.

Figure 2. Large whitebark pine growing on the southwest edge of the pit area, note burned forest surrounding tree.

5.1 Seedling Transplants

In 2023 the primary objective related to seedling transplants was to compare construction plans with excavation need to develop seedling transplant plan. The wildfire in 2023 impacted a large area of potential seedling excavation; thus, field work was re-allocated to determining the post-fire seedling excavation need. Much of the future pit area where 'transplantable' trees were observed in 2022 was burned by wildfire, killing nearly all forest cover. The southeast pit area including areas not yet cleared was not impacted by the fire thus some seedlings and saplings still remain in this region (Figure 3). The 2022 survey identified this unburned portion as having 125 seedlings/saplings per hectare; thus, transplanting work should occur in this region prior to any additional clearing or excavation. The area not shaded in Figure 3 was also surveyed in 2022 and no whitebark pine seedlings were identified. During the 2023 visit construction was exclusively on mine infrastructure and was not occurring in the open pit area. When pit excavation begins, transplant teams should work to move suitable seedlings and saplings if needed.

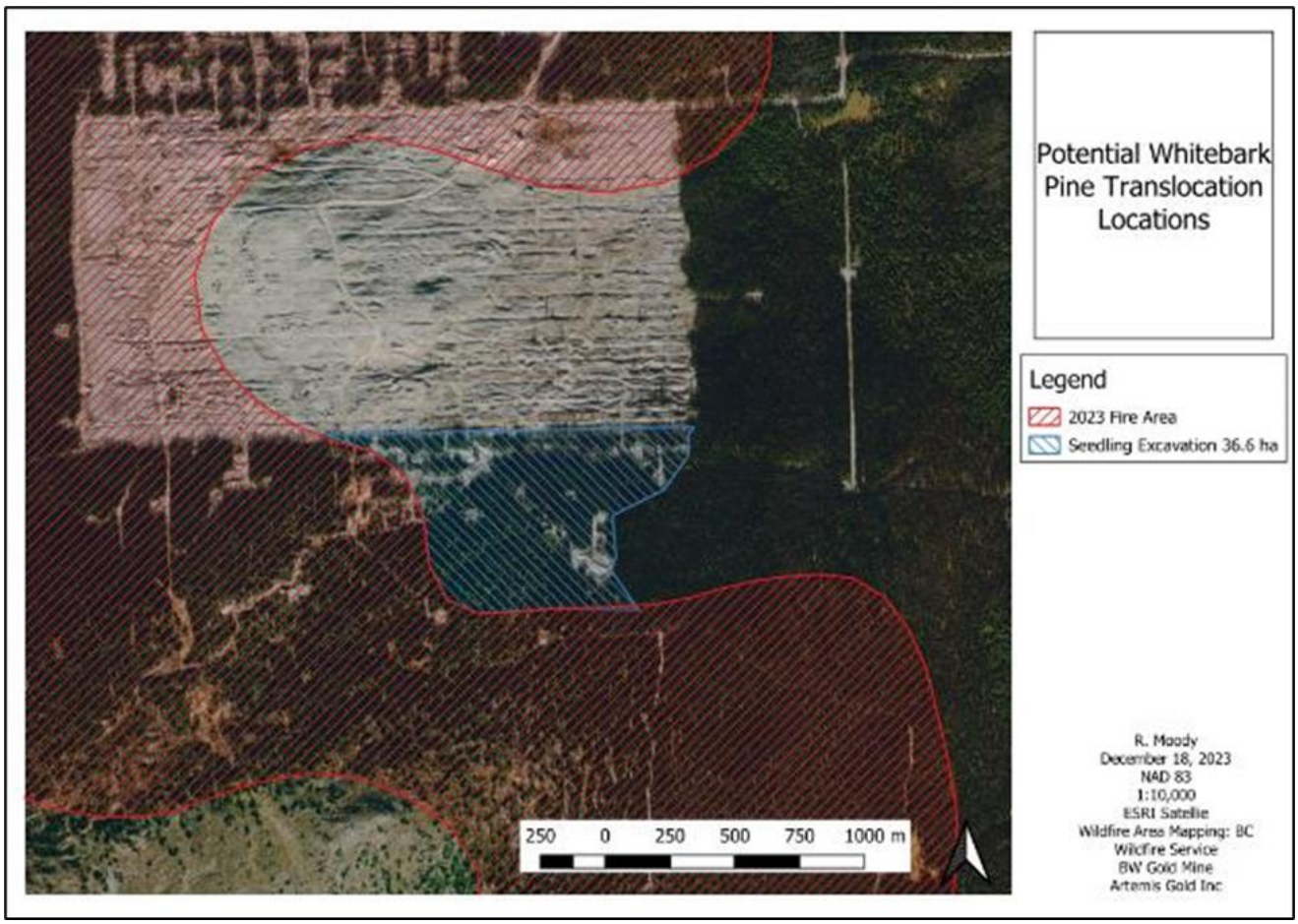

Figure 3. Mine area not impacted by fire where whitebark pine seedling/sapling excavation may occur.

Implementation

Excavating seedling for transplant should only occur once site impacts are confirmed as translocating seedings tends to have mixed results; further, moving smaller seedlings is easier and more successful than moving larger seedlings, if impacts are confirmed several years in the future it may be prudent to move the trees before they grow larger. To transplant seedlings the following guidelines should be followed:

- Crews should sweep ahead of any clearing or earthworks and excavate any whitebark pine by adhering to these protocols.
- Seedlings should be moved while dormant, excavating seedlings in the fall is preferred.
- Avoid storing seedlings, a dormant seedling can be moved and replanted safely; moving them to a lower elevation may break dormancy.
- If seedlings must be stored, use containers that protect the roots from damage and desiccation such as large pots and burlap wraps.
- If excavating by hand limit work to seedlings less than 1 m tall; if a machine is assisting, saplings up to 2.5 m may be excavated.
- Excavation should begin as wide as possible (use 1.5x tree height radius) and work inwards until roots are encountered.
- Any action that may stretch or rip roots should be avoided, roots may be pruned to limit damage and size of root mass; root pruning should occur at the widest area feasible but should not be less than the dripline of the tree. Pruning roots will stimulate the production of new feeder roots at the pruning site.

- When replanting the tree, the hole should be as deep as the root ball to avoid any settling and should be 2-3x as wide as the root ball to encourage root spread.
- The transplant recipient sites selected should have suitable moisture levels, so no watering is required.
- Do not fertilize transplants.

5.2 Planting Site Identification

Planting locations were identified for four main planting types: 1) Climate change trials, 2) Field based blister rust trials, 3) Progressive reclamation, and 4) Undisturbed recipient sites for translocation and seedling planting. The priority planting for the seedlings currently in production is for field-based rust trials with surplus seedlings allocated to the other trials.

Climate change trials are primarily to determine if whitebark pine can move to unoccupied habitat where it may currently be climate limited. These sites were identified as alpine tundra (Figure 4), alpine grasslands (Figure 5), and grass sites on cooler aspects where tree establishment has been limited by cool conditions and late snow-lie. A total of seven potential climate change trial planting locations were identified including: one warm control site, four tundra sites, one grass site, and one grass cool site. Sites were prioritized for trial deployment based on access and size (Figure 6).

Figure 4. Example of tundra trial site.

Figure 5. Example of grassland trial site.

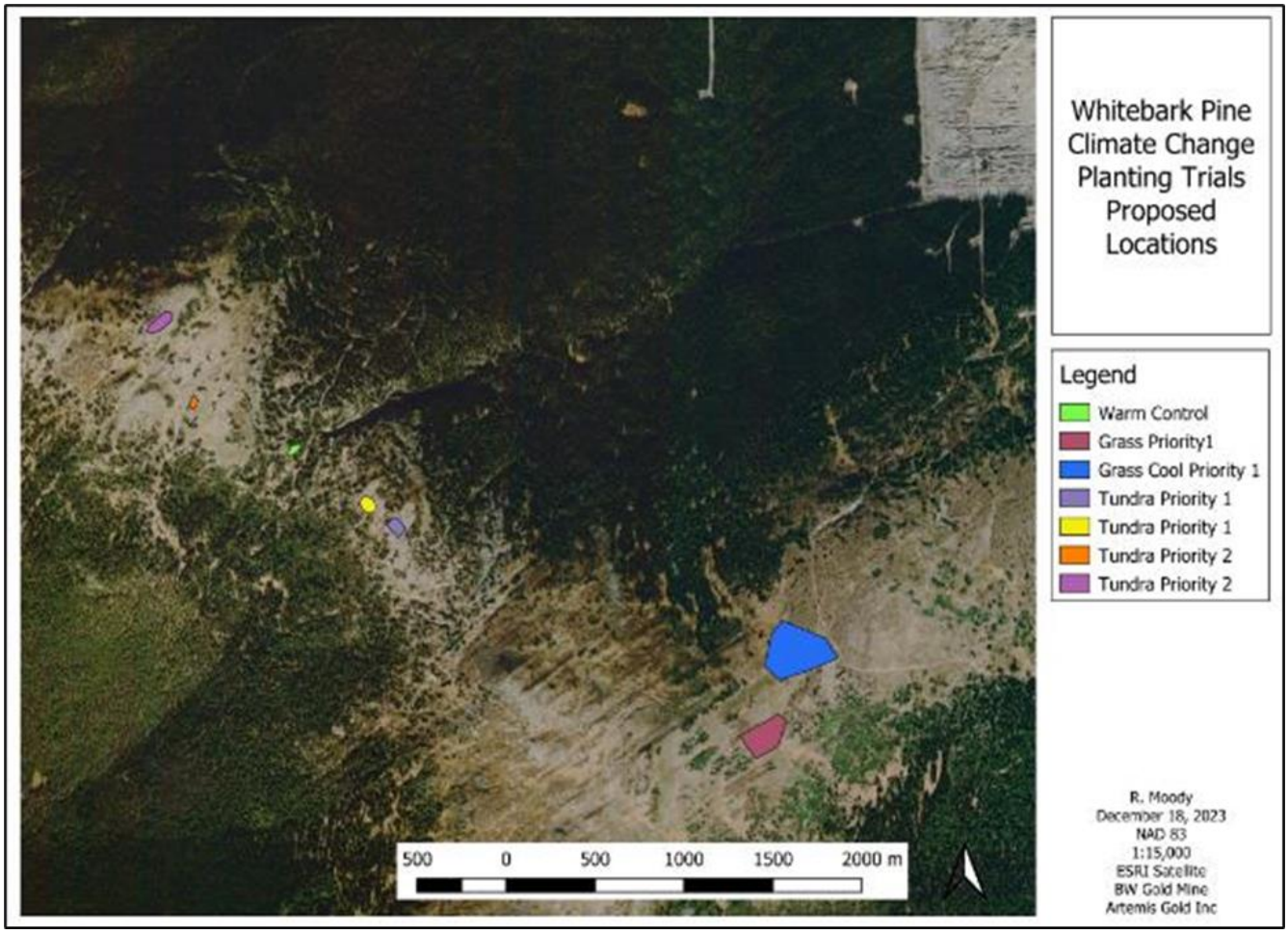

Figure 6. Climate change trial planting locations selected on Mount Davidson.

Dedicated field-based blister rust sites were primarily identified at lower elevations to select for sites that are more conducive to rust infection and growth. Sites were selected among existing infrastructure and outside of the mine area where the trials would be secure for many year to monitor trends. Rust infection responses may take several years thus secure locations are crucial. These sites were identified in conjunction with the local Canfor Forester to ensure trial establishment does not interfere with other forest management objectives.

A total of seven potential field-based blister rust trial sites were identified including five at lower elevations north of the mine development and two at whitebark pine elevation on the east side of mount Davidson within the recently burned forest (Figure 7). At least one site from sites C-G Figure 7 should be selected as a trial site and at least one of A or B. Site requirements are somewhat contingent on the nursery sowing/production report confirming seedling projections; this report is anticipated from the nursery in January 2024.

Recipient sites for planting surplus stock and transplanting seedlings/saplings were also identified as Sites A and B in Figure 7 and along with the previous sites identified in 2022 surveys. Site B in particular is large enough to establish rust trials and receive surplus stock. The fire created many new hectares of suitable habitat for planting stock; however, suitable habitat was observed to occur in a matrix with suitable habitat intermixed with poor habitat. Many areas on mountain were identified as too rocky for planting and should be left for nutcrackers to plant.

An additional site at the Lake 15/16 restoration area was identified but has not been ground surveyed. This site may be suitable for progressive reclamation or as a rust trial.

Due to the fire events in 2023, it was recommended by the regional entomologist and the Canfor Forester, it was recommended that planting be delayed by a year as post-fire environments are commonly infested by black army cutworm (*Actebia fennica*) who may feed on young seedlings; thus, planting of all sites in the region will be delayed until 2025.

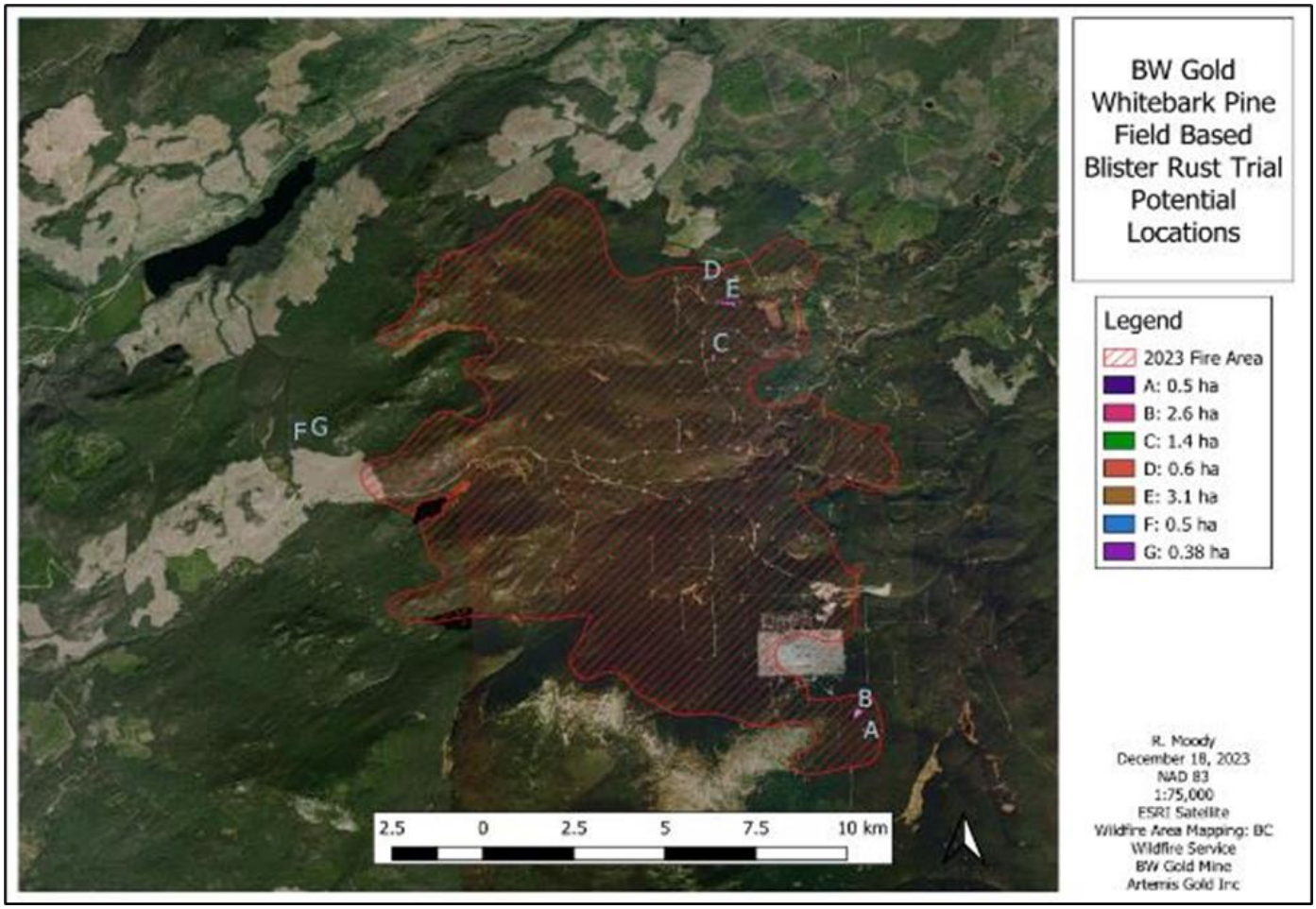

Figure 7. Field locations visited to identify field screening and surplus planting sites.

Figure 8. Example of burned area too rocky to plant; note tree cover that existed previously.

Implementation

The nursery sowing report from mid-January 2024 and forthcoming updates over the seedling production period will be used to develop a more specific planting plan prior to planting in 2025. The priority planting trials for seedling allocation are the field-based blister rust trials as rust may take several years to infect trees thus the longer these trials are deployed, the better. Trials for rust will be embedded in the climate change trials to monitor for rust impacts along with site productivity. Surplus stock will be planted at prescription densities (620/ha) in area A or B in Figure 7, or at the Lake mitigation site discussed in the Incidental Work section.

Prior to establishing any planting trial outside of the mine footprint, permits must be secured from the Ministry of Forests including: 1) Provincial Forest Use Regulation (PFUR) Section 9 - Special Use Permit (SUP); and 2) FRPA 52(1)(b) for silviculture treatments. When selecting lower elevation sites (Figure 7, C-G), working with local forest licensees may be required if the site is not Free-Growing. At time of writing, the preferred planting of rust trials would occur in sites B, C, and D.

For each rust trial 30 seedlings from each of the 49 parents are required within each planting site; deficient parents may be replanted in the future. Seedlings will be planted in six reps at each site with five seedlings from each parent in each rep. A baseline will be laid out with each parent's planting line established at 1m intervals; seedlings from each parent will be planted perpendicular to the baseline at 50 cm intervals (Table 2). Each seedling will have height measured. Only healthy vigorous seedlings will be included in the trials as survival is the key outcome and trees already displaying stress may succumb to factors not related to the sites or blister rust; on follow-up visits recording tree health and vigour will be conducted. Whitebark pine seedings are typically planted in mid-September once moisture levels have increased through fall rains or heavy dews.

For the climate change planting trials, seedlings will be planted as per the layout of the rust screening trial; however, it is probable that the 23 parent trees with 112 seedling produced will not have sufficient seedlings to plant in climate change trials. Further, it may be challenging to deploy six replicates of each of the remaining 26 parents at each trial site, particularly the alpine tundra site(s) which are of limited area. The climate change trials will primarily measure seedling survival and height growth against the planting in better suited habitats including paired trials planted at site B and the warm control site. To determine the difference in climatic conditions between sites, a series of iButtons should be deployed to monitor growing season temperature and humidity conditions[1].

Table 2. Planting layout design and monitoring table; within each yellow shaded cell seedling height and health codes are recorded.

Distance Along Transect (m)	Parent	Distance Perpendicular from Transect (m)				
		0	0.5	1	1.5	2
1	A					
2	B					
3	C					
4	D					

[1] https://www.ibuttonlink.com/collections/ibuttons

5.3 Stand Enhancement Activities

The primary means to enhance and support stands to ensure use by Clark's nutcracker is to support whitebark pine in larger size classes to ensure cone crops are available on-site until planted seedlings are producing cones, which may take over 40-years. To protect existing juvenile-mature stands the primary modes of protection are competition removal via thinning and verbenone application to protect mature trees from mountain pine beetle.

In general nearly all stands were dominated to some extent by subalpine fir, a condition that will continue to lead to future high competition levels for whitebark pine. Of the 26 VRI polygons reviewed in the 2022 report, 23 were subalpine fir leading. Due to its shade tolerance and ability to layer, subalpine fir is an extremely competitive species. During the field surveys of Mount Davidson, stands where whitebark pine growth of larger trees (>2m) was being impeded by competition were noted (Figure 9). Stands were identified for thinning on the southeast side and on the ridge directly west of the pit area (Figure 10).

Figure 9. Whitebark pine tree growing among heavy competition.

Figure 10. Stand enhancement sites identified on Mount Davidson.

Another means to protect mature trees through the application of the anti-aggregation pheromone verbenone to protect mature trees from mountain pine beetle attack. Mountain pine beetle typically attack larger trees with attacks increasing with increasing diameter. Attacks generally begin at trees greater than 10 cm in diameter. In 2022 a stand occurring southeast of the open pit area at 1650 m ASL was observed to have 89% of whitebark pine in it killed by mountain pine beetle; thus the protection of the remaining mature trees on-site is warranted for future attacks. Trees were visually surveyed for size suitability for mountain pine beetle attack and most of the larger trees occurred in the lower elevation ranges of whitebark pine (Figure 11).

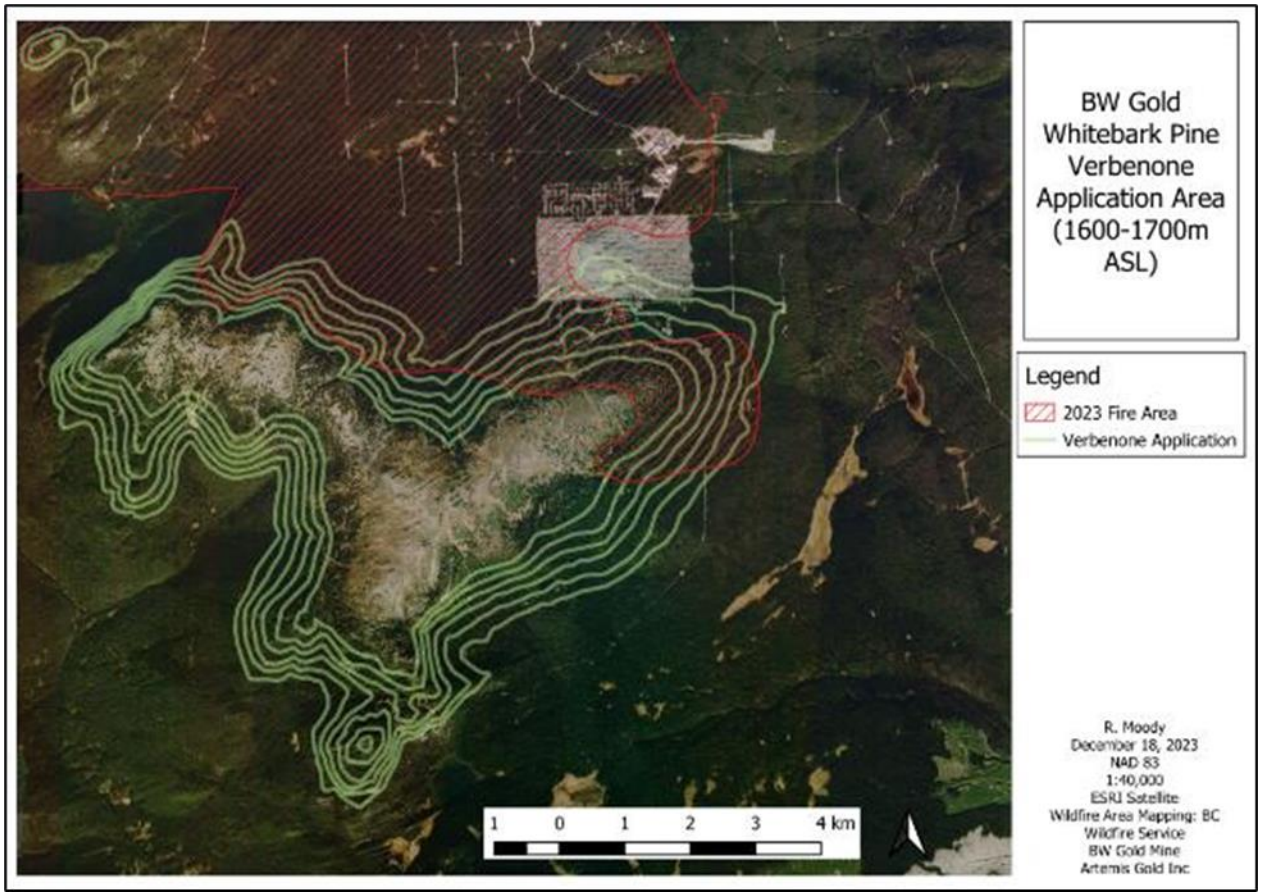

Figure 11. Area of Mount Davidson where Verbenone should be annually deployed on whitebark pine.

Implementation

Thinning

Thinning application is not designed to create new habitat as may occur following wildfire or logging, rather thinning is designed to reduce competition from around established whitebark pine trees. In general thinning is done to one tree length around each whitebark pine tree but this prescription is flexible depending on tree height relative to the height of competition, slope of the site, and orientation of competition (competition not creating shade may be better tolerated).

Prior to thinning treatments a Provincial Forest Use Regulation (PFUR) Section 9 - Special Use Permit (SUP) and FRPA 52(1)(b) may be required.

At each thinning site, five 400 m^2 plots (11.28 m radius) site should be established and the field card in Table 3 completed. Operational thinning can be implemented outside of these plots but it is important to document the shift in forest composition following the treatment.

Work should be conducted using a combination of handsaws, brush saws, and chainsaws. Hiring and training a crew from the local First Nations is the preferred implementation approach.

Table 3. Thinning field card to document shift in forest composition attributed to thinning activities; note height classes should be extended to the tallest tree in the stand.

Plot Number			Date				Crew	
Latitude								
Longitude								
Height Class (cm)	Lodgepole Pine		Subalpine fir		Engelmann Spruce		Whitebark Pine	
	Retained	Cut	Retained	Cut	Retained	Cut	Kept	
<20								
21-40								
41-60								
61-80								
81-100								

Verbenone Application

To protect larger trees from mountain pine beetle, verbenone should be applied annually to a number of target trees across Mount Davidson. These trees should be plus trees (healthy) and mapped at time of verbenone deployment. Since it is not pragmatic to apply this treatment to all trees; it should initially be applied to 200 trees annually and modified based on tree coverage. If beetle numbers are increasing on provincial inventories[2], increase the application accordingly or consult with the Regional Entomologist. Verbenone can be purchased from WestGreen Global Technologies [www.westgreenglobaltechnologies.com].

5.4 Incidental Work

During the 2023 field surveys for low elevation planting sites, the lake drainage and salvage area was visited. At this site fire had burned much of forest and the remainder of the site was being disturbed to create a channel to drain the smaller eastern lake into the western lake. The disturbed areas may be suitable for planting as progressive reclamation. These areas are lower than whitebark pine typically occurs; however, nearby whitebark pine populations in the nearby Morice and the Chilcotin both occur at elevations 500 m lower than this on suitable habitats.

Planting at the lake mitigation site may be feasible and contribute to progressive reclamation. This site should first be surveyed for planting suitability and if feasible may be planted with surplus seedlings in 2024 or 2025.

Prior to the 2023 field visit, a small cluster of six trees (tallest ~2.1 m) were identified on site. These trees were damaged during clearing activities and further destroyed during the wildfire in the area. These trees were growing outside of their typical habitat thus it is notable that field crews identified and marked them prior to clearing work.

The six identified saplings were scheduled to be transplanted; however, damage during clearing compromised the success of this activity. Although they were destroyed in the fire, mitigation planting

[2] https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health/aerial-overview-surveys

should still be conducted. Based on the proposed replacement ratios from the 2022 Updated Whitebark Pine Management Plan, the six damaged saplings should have 60 seedlings planted as compensation.

6 2024 Workplan

Based on work conducted in 2022 and 2023, the following workplan is proposed for 2024:

- First Quarter
    - Confirm construction schedule for transplant work at southeast section of pit area, if required.
    - Confirm low elevation trial sites for planting via desktop review of tenures and construction plans.
    - Apply for permits to plant if required.
    - Review sowing/production report from nursery and finalize planting layout.
    - Determine if stand enhancement tasks will be implemented in 2024.
- Second Quarter
    - Determine capacity needs transplants and stand enhancement.
        - If needed develop capacity with local First Nations or in-house technicians.
- Third Quarter
    - Conduct stand enhancement thinning trial plots.
    - Train local environment staff on transplant protocols.
    - Field confirm planting sites, primarily those at Lake 15/16 and within Canfor area.
    - Conduct seed stratification for planting in future years if warranted.
    - Re-measure transplant survival.

- Fourth Quarter
    - Reports and maps of work.
    - Development of planting plan.
    - Review of forest health surveys for verbenone planning in 2025.
    - Development of future workplans.

7 Condition Summary

Condition	2023 Findings	Future Recommendations
8.19 The Proponent shall conduct progressive reclamation of areas disturbed by the Designated Project. In doing so the Proponent shall identify, in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, plant species native to the Designated Project area to use for revegetation as part of progressive reclamation, including whitebark pine (Pinus albicaulis) and other conifers suitable to create habitat for southern mountain caribou (Rangifer tarandus caribou) and other species of interest to Indigenous groups.	- Trial locations were identified for rust monitoring, climate change adaptation, and translocation recipient sites. - The lake mitigation site may be planted as progressive reclamation.	- Confirm lower elevation trial sites with Ministry of Forests or Licensees as required. - Secure appropriate planting permits as required. - Confirm trial locations against mine construction plans. - Confirm planting trial layout once seedling sowing and production reports are produced. - Confirm the suitability of lake area for progressive reclamation. -
8.20 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Environment and Climate Change Canada and other relevant authorities, a whitebark pine management plan to mitigate effects from the Designated Project on whitebark pine (Pinus albicaulis) and its critical habitat. The Proponent shall implement the plan during all phases of the Designated Project consistent with any applicable recovery strategy related to whitebark pine (Pinus albicaulis). <u>As part of the whitebark pine management plan, the Proponent shall:</u>	- The Whitebark Pine Management Plan is being implemented to complement the Decision Statement Conditions; for example, climate change planting trials are not within the Decision Statement but are within the Management Plan.	- Update plan if warranted.
a) establish criteria to be used to evaluate the health of whitebark pine trees and for the selection of whitebark pine *(Pinus albicaulis*) to be transplanted.	- In 2023 much of the forested habitat with trees suited to transplant were burned in a local wildfire. A small area to the southeast may contain some seedlings suited to transplant. - The wildfire created additional habitat that may be suitable for transplanting. - Guidelines for transplanting were developed. - The existing trial of transplants was not re-measured in 2023.	- Transplant whitebark only within confirmed development areas. - Follow transplant methods. - Transplant recipient location identified on south side of mountain and/or within burned stands identified for planting surplus stock. - Re-measure transplant survival in 2024.
b) collect and preserve whitebark pine (*Pinus albicaulis*) rust-resistant seeds within the Designated Project area prior to vegetation clearing and use them for progressive reclamation pursuant to condition 8.19;	- No cone collections were conducted in 2023 - Seed was sent to the Surrey Tree Seed Centre for storage. - Seedlings are in production from 49 parents for the production of 8400 seedlings to be planted in fall 2024. - A number of field planting sites for rust screening, climate change trials, and potential progressive reclamation were identified.	- Plant, map, and collect data from white pine blister rust field trials. - Report on any updated provided by government program (none anticipated for several years) - Identify additional trees to collect seed from to increase the study size from 49 parents. - Confirm field trial design, area required, and prepare field sites for trials.

Condition	2023 Findings	Future Recommendations
	- Five trees are in the provincial rust screening program.	
c) identify the locations to plant whitebark pine (Pinus albicaulis) in undisturbed areas within the Designated Project area prior to construction;	- The wildfire in 2023 created numerous new planting areas within the burned forest; - Replanting in the burned forest may be a priority above planting seedlings in occupied habitat; - Surveys confirmed climate change, rust monitoring and transplant donor sites for planting on undisturbed areas.	- Establish planting trials for climate change and blister rust on undisturbed sites and disturbed sites where consistent within the study design.
d) implement measures to support whitebark pine (Pinus albicaulis) growth and use by Clark's nutcracker (Nucifraga columbiana);	- Stands suited to thinning and brushing work were identified. - Thinning sampling plots should be completed across both treatment polygons to better understand restoration gains and labour requirements. - Verbenone should be deployed on size appropriate trees between 1600-1700 m ASL - Verbenone application should be responsive to beetle population surveys.	- Apply verbenone to plus trees to minimize losses of reproductive trees to mountain pine beetle, following First Nation consultation to deploy the treatment. - Develop restoration prescriptions. - Daylight whitebark pine to reduce competition levels and support current and future cone production.
e) develop and implement a follow-up program in consultation with Indigenous groups to determine the effectiveness of the mitigation measures included in the whitebark pine management plan. The Proponent shall apply conditions 2.9 and 2.10 when implementing the follow-up program.	- Findings will be shared with local First Nations	- Ideally a First Nations crew will assist with planting and stand improvement tasks.

8 Literature Cited

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