APPENDIX H
Vegetation Monitoring Plan

REPORT

Vegetation Monitoring Plan

Coffee Gold Mine

Prepared for:

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October 1, 2024

REVISION TRACKING LOG

Revision Tracking Log			
Version	**Date**	**Section Updated**	**Description of Update**
0	November 2023	-	First submission of the Vegetation Monitoring Plan
1	October 2024	Various	Updates to the Plan to address QML IR1 and comments resulting from ongoing engagement with affected First Nations as well as consistency with other monitoring documents.
2			

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
ArcGIS	ArcGIS Mapping Program
BACI	Before-After-Control-Impact
CCME	Canadian Council for Ministers of the Environment
CDC	Conservation Data Centre
CEC	cation exchange capacity
CFIA	Canadian Food Inspection Agency
CoPCs	Chemical of Potential Concern
EDI	EDI Environmental Dynamics Inc.
GPS	Global Positioning System
ICP-MS	Collision Cell Inductively Coupled Plasma-Mass Spectrometry
IUCN	International Union for Conservation of Nature
NAR	Northern Access Route
Newmont	Goldcorp Kaminak Ltd., a wholly owned subsidiary of Newmont Corporation (Newmont)
Plan	Vegetation Monitoring Plan
Project	Coffee Gold Mine
QEP	Qualified Environmental Professional
TH	Tr'ondëk Hwëch'in
UTV	Side by Side Motor Device
VC	Valued Component
YISC	Yukon Invasive Species Council
YESAB	Yukon Environmental and Socio-economic Assessment Board

LIST OF SYMBOLS AND UNITS OF MEASURE

Symbol / Unit of Measure	Definition
ha	hectare
km	kilometre
km/hr	kilometer per hour
m	metre
mg/kg	milligrams per kilogram
%	percent

1.0 INTRODUCTION

Construction, operation, and closure of the Project have the potential to negatively impact vegetation within or near the project area which may affect the environment. This Vegetation Monitoring Plan (the Plan) outlines the predicted Project-related effects and subsequent monitoring to verify those predictions, detect change in the receiving environment, and support management actions to control adverse effects. The Vegetation Monitoring Plan is intended to work in tandem with the Vegetation Protection Plan, which includes a summary of baseline information and details the measures that will be undertaken to control adverse effects generated by Project activities.

This Plan has been written to meet the guidance provided in the *Plan Requirement Guidance for Quartz Mining Projects* (YWB and EMR 2013).

This Plan is provided in conjunction with several other plans to meet the requirements for quartz mine applications for a Quartz Mining License and a Water Use Licence under the *Quartz Mining Act* and the *Waters Act*, respectively. Other applicable regulations related to vegetation management and monitoring are detailed in Section 2.0.

Consultation during preparation of the Project Proposal (#2017-0211) identified vegetation as a valued component that should have a range of mitigation measures implemented in order to minimize change (Goldcorp 2017). Specific concerns included habitat loss, change in vegetation health due to dust deposition, and risk of introduction and spread of invasive plant species.

This draft Plan is provided for review and feedback by stakeholders and First Nations to address the above concerns. Once reviewed, any further concerns, and where they have been addressed in the revised plan will be summarized here.

2.0 VEGETATION MONITORING FRAMEWORK

This monitoring program outlines how vegetation will be monitored and how this information will be used to confirm the predictions of the environmental assessment or detect unanticipated effects.

The monitoring framework is based on the following principles:

- Monitor and verify potential effects related to the Project
- Implement monitoring efforts that can detect natural and Project-related changes to the environment
- Monitor and evaluate the effectiveness of mitigation measures
- Identify unanticipated effects
- Provide an early warning of undesirable change to vegetation
- Inform adaptive management measures.

A Qualified Environmental Professional (QEP) will oversee the monitoring activities and complete the final reporting of results. The QEP will be familiar with vegetation being monitoring and will have a working knowledge of all applicable species, status ranks, thresholds, and regulations related to the management of vegetation in Yukon.

2.1 Predicted Project-Related Effects on Vegetation

Vegetation was identified as a Valued Component for the assessment of potential Project-related effects provided in the *Coffee Gold Mine Project Proposal for Executive Committee Screening* (Goldcorp 2017). Valued Subcomponents assessed for vegetation include ecological communities, wetland habitats, traditional and medicinal plants, rare plants, and vegetation health. Invasive plants were treated as a subject of note with a potential adverse effect on ecological communities. Effects assessments were completed for each subcomponent. Based on the timing and nature of Project interactions with vegetation subcomponents the following potential Project-related effects on vegetation were considered:

- Habitat loss — potential changes to habitat includes the loss of existing areas of vegetated habitat/ecological communities, wetland communities, and areas that could provide suitable conditions for traditional, medicinal and rare plants
- Change in vegetation health due to dust deposition — potential changes related to increased emissions such as dust which could result in a change in trace metal concentrations in plants and potentially affect vegetation health
- Risk of introduction and spread of invasive plant species — potential changes from the introduction or spread of non-native plant species that could displace native vegetation.

Project interactions were assessed without mitigation and then again with mitigation (Goldcorp 2017). Project effects that were still apparent after mitigation were further assessed as Residual Effects. Project monitoring generally focuses on residual adverse effects predicted to have a high likelihood of probability; however, all Project-related residual effects on vegetation were assessed as not significant (Goldcorp 2017). Therefore, this monitoring plan will provide data that can determine if such predictions were correct and provide a means for adaptive management if required. Summaries of the residual effects (based on the Coffee Gold Mine YESAB Proposal Appendix 15-B Vegetation Valued Component Assessment Report) are provided in Table 2-1. Additional information on available baseline information is available in the Vegetation Protection Plan.

Table 2-1 Overview of Residual Effects on Vegetation[1]

Component	Subcomponent	Potential Residual Effect	Residual Change or Effect
Vegetation	Ecological Communities	Habitat loss	Not significant residual effect. The effect is adverse since vegetation will be lost due to clearing within the Project footprint. Low magnitude of change since there is less than 10% loss of mapped ecological communities within the total local study area. The loss of ecological community habitat will only occur once within the Project footprint when the clearing activity occurs. The effect is permanent because not all areas will be reclaimed and there will be permanent loss of vegetation due to permanently changed structures of the landscape. The effect is partially reversible because the majority of the Project footprint will be reclaimed or natural regeneration will occur in most areas, except in areas such as open pits or certain road sections. Effects are likely due to loss of habitat. Confidence in the predictions for habitat loss is moderate considering the uncertainty regarding the coarse-scale approach to assessing habitat for ecological communities (i.e., comparable habitat baseline is not available for the larger region) and how individual ecological communities will be affected by habitat loss. None of the communities are rare, and they are likely available and distributed throughout the Project area.
	Wetland Habitats	Habitat loss	Not significant residual effect. The effect is adverse since wetland habitat will be lost due to clearing within the Project footprint. Low magnitude of change since there is a less than 10% loss of mapped wetland communities within the total local study area. The loss of wetland habitat will only occur once within the Project footprint when the clearing activity occurs. The effect is permanent because not all areas will be reclaimed. The effect is partially reversible because the majority of the Project footprint will be reclaimed. Effects are likely due to loss of wetland habitat. Confidence in the predictions for habitat loss is moderate considering the uncertainty regarding the coarse-scale approach to assessing habitat for wetland communities (i.e., comparable habitat baseline is not available for the larger region) and how individual wetland communities will be affected by habitat loss. None of the communities are rare, and they are likely available and distributed throughout the Project area.
	Traditional and Medicinal Plants	Habitat loss	Not significant residual effect. The effect is adverse as potential habitat will be lost due to clearing occurring infrequently (once) in the Project footprint. Low magnitude of change because there is a less than 10% loss of mapped ecological communities within the total local study area. The effect is partially reversible because not all areas will be reclaimed and there will be permanent loss of vegetation due to permanently changed structures of the landscape. Effects are likely due to loss of habitat. Confidence in the predictions for habitat loss is moderate considering the uncertainty regarding the coarse-scale approach to assessing habitat for traditional and medicinal plants (i.e., comparable habitat baseline is not available for the larger region) and how individual traditional and medicinal plant communities will be affected by habitat loss. None of the assessed traditional and medicinal plants are rare, and they are likely available and distributed throughout the Project area.

Component	Subcomponent	Potential Residual Effect	Residual Change or Effect
Vegetation Cont'd	Rare Plants	Habitat Loss Mortality of individual plants	Not significant residual effect. The effect is adverse as potential rare plant habitat will be lost due to clearing occurring infrequently (once) in the Project footprint. The magnitude of the effect is low because no rare plants were identified during field surveys, and there is a proportional loss of less than 10% for mapped ecological communities where rare plants could potentially occur within the local study area. The duration of the effect will be permanent as certain sites will not be reclaimed, and habitat loss will occur once for clearing. The effect will be partially reversible over the long-term once vegetation is allowed to re-establish in areas where site conditions have not been drastically changed, but in certain areas where reclamation or natural regeneration will not occur, such as open mine pits, the loss of habitat is permanent. The loss of habitat could potentially occur, but the presence of a rare plant species within the Project footprint is unlikely. Confidence in the predictions for habitat loss is moderate considering the uncertainty how individual rare plants will be affected by habitat loss.
	Vegetation Health	Increased trace metal concentrations in plants	Not significant residual effect. The effect is adverse as potential for a negative effect to vegetation health exists in the form of possible loss in species diversity and abundance in areas adjacent to the Project footprint. The adverse effect will be limited to the local study area. Dust will travel into the regional study area but should not have measurable effects on the vegetation. The magnitude of the effect is moderate since there is the potential that vegetation health will be affected, and this effect could be manifested as a decline in species abundance and diversity in areas where high dust deposition thresholds will be reached. The duration of the effect is long-term since it is likely that existing species abundance and diversity will return but will take time once activities have stopped. The effect is partially reversible over the long-term once mitigation measures are implemented and vegetation is allowed to re-establish. The effect to vegetation health is likely due to Project dust producing activities. The context of the effect is considered moderate since the overall vegetation community has resilience to the imposed stress and should be able to adapt. Certain individual species may have a low resilience to an increase in metal uptake due to dust deposition and will not easily adapt to the effect. Confidence in the predictions for vegetation health is moderate considering the uncertainty regarding individual species difference in metal uptake.

[1] Based on the Coffee Gold Mine, YESAB Proposal Appendix 15-B Vegetation Valued Component Assessment Report

2.2 Monitoring Components

For the purposes of monitoring, wetland habitats, traditional and medicinal plants, and rare plants are considered under ecological communities because all components are largely defined by vegetation cover characteristics encompassed under ecological communities. Consequently, the Vegetation Monitoring Plan consists of three general monitoring programs:

1. **Habitat Loss/Habitat Reclaimed** — The Project will result in the loss of vegetation due to the clearing of the Project footprint; this may include changes to ecological communities, wetland habitats, traditional and medicinal plants, and rare plants. The Habitat Loss/Habitat Reclaimed monitoring program will track the extent of habitat loss within the mine area due to clearing of the Project footprint, and as areas are progressively reclaimed, will track the area revegetated.
2. **Trace Metals** — The Project has the potential to affect vegetation health by increasing trace metals levels present in vegetation adjacent to the Project footprint through dust deposition and other Project-related emissions. Trace metals monitoring will track trace metals in select plant species at various distances from the mine site.

- **Invasive Plants** — Potential Project-related effects to vegetation may include changes to plant composition and loss of native plants due to the introduction and spread of invasive plants. Invasive plant monitoring will document the presence and abundance of invasive plants in the Project area south of the Stewart River.

The indicators, monitoring components, measurable parameters and supporting monitoring data that will be used to assess potential effects on vegetation are provided in Table 2-2. Measurable parameters are components that can effectively track an effect (i.e., with confidence) and upon which adaptive management thresholds can be applied. Supportive monitoring data provides additional perspective and may help identify why an effect is found in the measurable parameter; however, it generally cannot be used on its own to make definitive conclusions regarding effects on vegetation.

Table 2-2 Indicators, Monitoring Components, Measurable Parameters and Supporting Monitoring Data for Vegetation

Monitoring Component	Measurable Parameters	Supportive Monitoring Data
Habitat Loss/Habitat Reclaimed (Section 3.0)	• Size of footprint (comparison of proposed footprint and actual area disturbed)	• Reclamation Effectiveness Monitoring (Reclamation & Closure Plan)
Trace Metals (Section 4.0)	• Increased concentration of trace metals in soil and selected plant species	• Dust monitoring (Air Quality & Greenhouse Gas Monitoring Plan)
Invasive Plants (Section 5.0)	• Presence of invasive plants in the Project Footprint	• Records of invasive plant removal and investigations into the pathway of entry (Vegetation Protection Plan)

2.3 Monitoring Areas

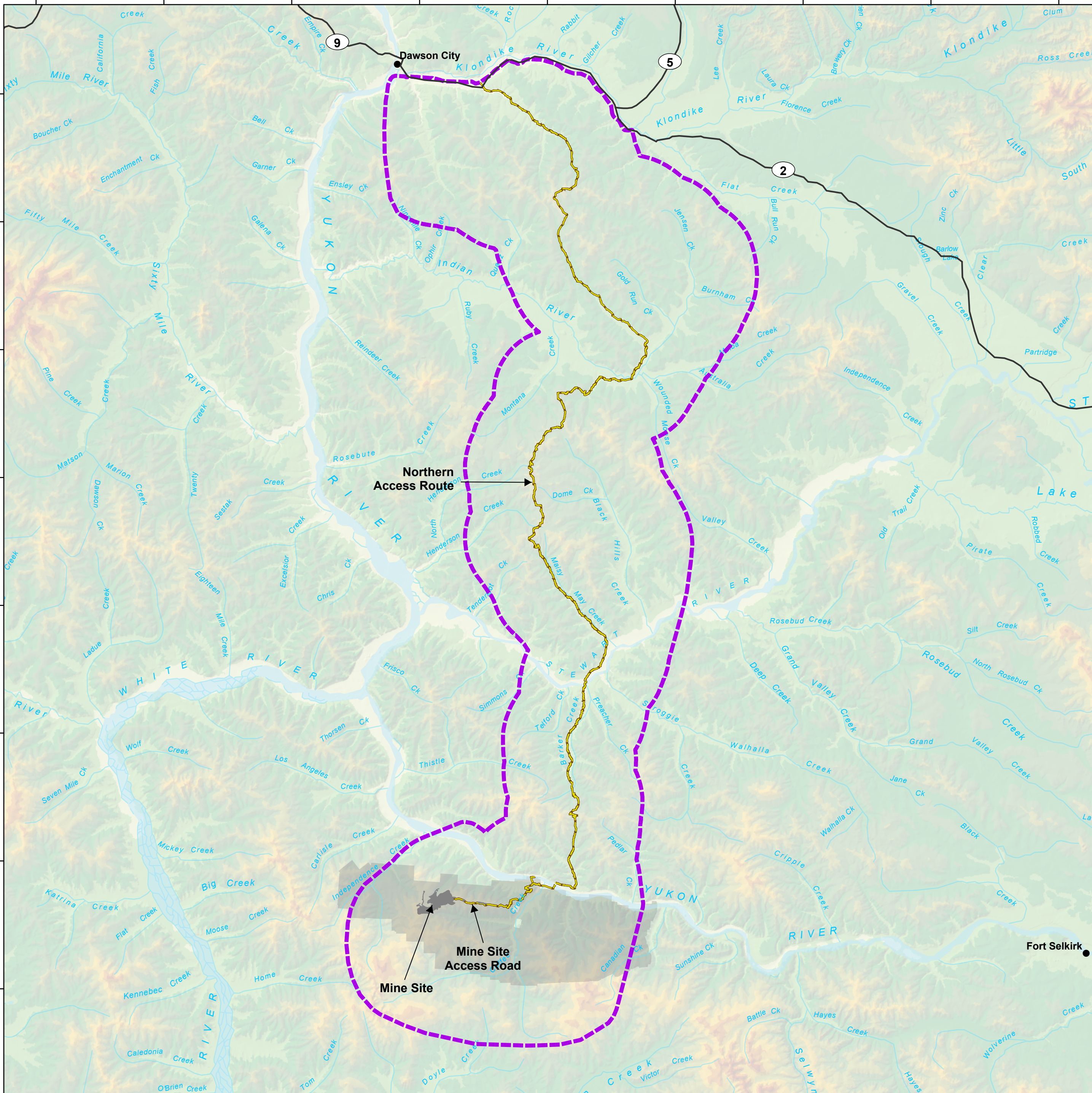
Several spatial boundaries will be used for the vegetation monitoring programs outlined in this Plan. These monitoring areas are generally described using the following terms:

Project Footprint — The area in which ground will be disturbed and Project activities will occur, may include the mine site and/or the NAR.

Mine Area Footprint — The portion of the Project footprint encompassing the mine site, mine site access route, and airstrip.

Regional Study Area (RSA) — The RSA is equivalent to the Regional Assessment Area (RAA) used in the assessment of Project-related effects on vegetation (Goldcorp 2017). North of the Yukon River, the RSA follows an approximately 10 km buffer of the NAR. South of the Yukon River, the RSA follows a less constrained boundary. The eastern boundary leaves the 10 km buffer and travels from the Yukon River southward to the Project. From that point it trends westward to encompass all of the Coffee Creek drainage and some of the upper reaches of Doyle Creek to the south. It then loosely follows the height of land (forming an arc along its southern edges) and drops down into the valley of Independence Creek. The boundary continues down the creek valley to the Yukon River where it once again assumes an approximate 10 km buffer along the proposed access road route (Figure 2-1).

All monitoring for vegetation is located within the Vegetation RSA, with the exception of the Trace Metals Monitoring Program, which includes reference sites away from the mine area footprint, outside of the RSA. However, most monitoring programs do not cover the full extent of the RSA — where pertinent, program-specific study areas are defined within the relevant sections of this Plan.



Legend

- Vegetation Regional Assessment Area
- Highway
- Northern Access Route
- Mine Site
- Coffee Property

Figure 2-1. Vegetation Regional Study Area

Data Sources

1:50,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model and 1:250,000 National Topographic Database (NTDB) provided by Geomatics Yukon - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

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Kilometres

Map Scale: 1:900,000 (printed on 8.5 x 11)
Map Projection: NAD 1983 UTM Zone 7N

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2.4 Links to other Disciplines

There is the potential for vegetation to be affected by Project-related dust, erosion and sediment, water runoff, and reclamation activities. Monitoring associated with these variables will help inform the identification of effects on vegetation. Additionally, the monitoring conducted for vegetation will help inform potential effects on wildlife and human health. This relationship is illustrated in Figure 2-2 where the direction of the arrow indicates the potential effect of one discipline on another.

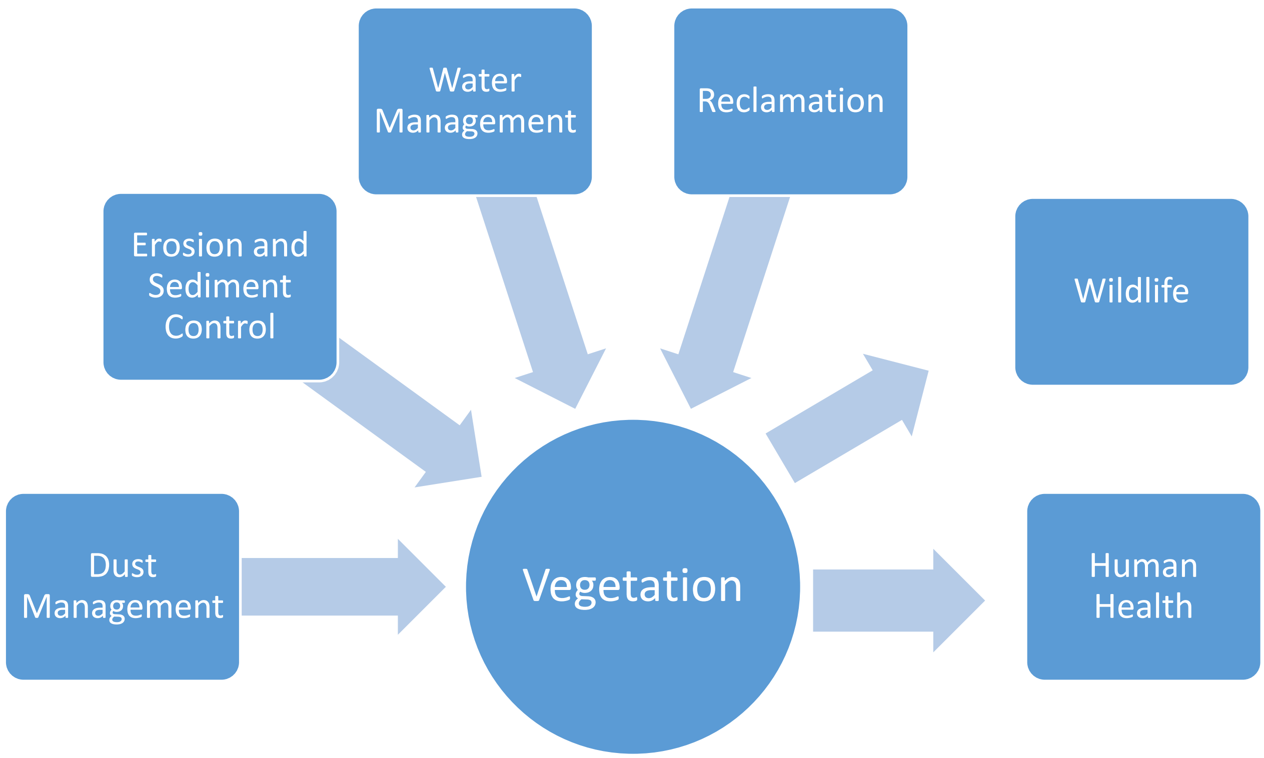


Figure 2-2 Diagram of the Relationship between Vegetation and Other Disciplines

3.0 HABITAT LOSS/HABITAT RECLAIMED MONITORING

3.1 Background and Objective

A key Project interaction for vegetation is the residual loss of plants and ecological communities via direct habitat loss. This loss may be partially reversed through successful reclamation of disturbed areas (see the Reclamation & Closure Plan for more information). The objective of the Habitat Loss/Habitat Reclaimed monitoring is to track direct habitat loss within the Project area by quantifying the amount of habitat loss and habitat reclaimed. See the Vegetation Protection Plan for information on proposed mitigations and strategies to limit habitat loss associated with the Project.

3.2 Study Design Overview

The Habitat Loss/Habitat Reclaimed monitoring will consist of an annual survey to document the extent of the mine area footprint, including both the area of surface disturbance, and the extent of progressive reclamation in the mine area. Comparisons will be made between the planned mine area footprint (i.e., the mine area footprint is expected to be approximately 1,340 ha) and the actual footprint. A similar process will apply to any new quarry/borrow sites along the NAR. The design of the habitat loss/habitat reclaimed monitoring program is summarized in Table 3-1.

Table 3-1 Overview of Habitat Loss/Habitat Reclaimed Monitoring

Monitoring Component	Description
Indicator	Ecological Communities
Monitoring Category	Environmental Effects
Design	Project footprint survey with focus on the mine area and new quarry/borrow sites along the NAR
Measurable Parameters	Size of the footprint (comparison of proposed footprint and actual area disturbed; ha)
Key Project Interactions	Direct habitat loss (either temporary or permanent). Project activities will result in the direct loss of ecological communities including wetland habitats, and ecosystems containing traditional and medicinal plants, and potentially rare plants.
Goal	The Project will not exceed the extent of the proposed footprint; progressive reclamation will take place during operations.
Objective	Ensure that the Project footprint within area of new disturbance (i.e., the mine area and new quarry/borrow sites along the NAR) is within the proposed limit; quantify the amount of habitat lost to the Project footprint, as well as the successful reclamation of disturbed habitats.
Threshold	Exceedance of proposed footprint
Scope of Monitoring Work	Habitat loss/habitat reclaimed monitoring will be conducted along the boundary of the mine area footprint (including the proposed mine site, mine access route, and airstrip) up to the boundary of the NAR. It will also be conducted at new quarry/borrow sites along the NAR. Monitoring will be conducted using the most appropriate technology available, (which may include aerial mapping, ground-based (i.e. walking) surveys, handheld GPS or drone) to measure the extent of the mine area footprint. Similar methodology will be used to measure the extent of progressive reclamation in disturbed areas. The size of the footprint (ha) will be compared with the proposed footprint. The habitat loss/habitat reclaimed monitoring program will be conducted once annually during construction and operation.

3.3 Monitoring Areas and Frequencies

The Habitat Loss/Habitat Reclaimed monitoring will be completed within the Project footprint in the mine area (including the proposed mine site, mine access route, and airstrip) up to the boundary of the NAR (Figure 3-1). Additionally, the monitoring program will also apply to any new quarry/borrow sites along the NAR.

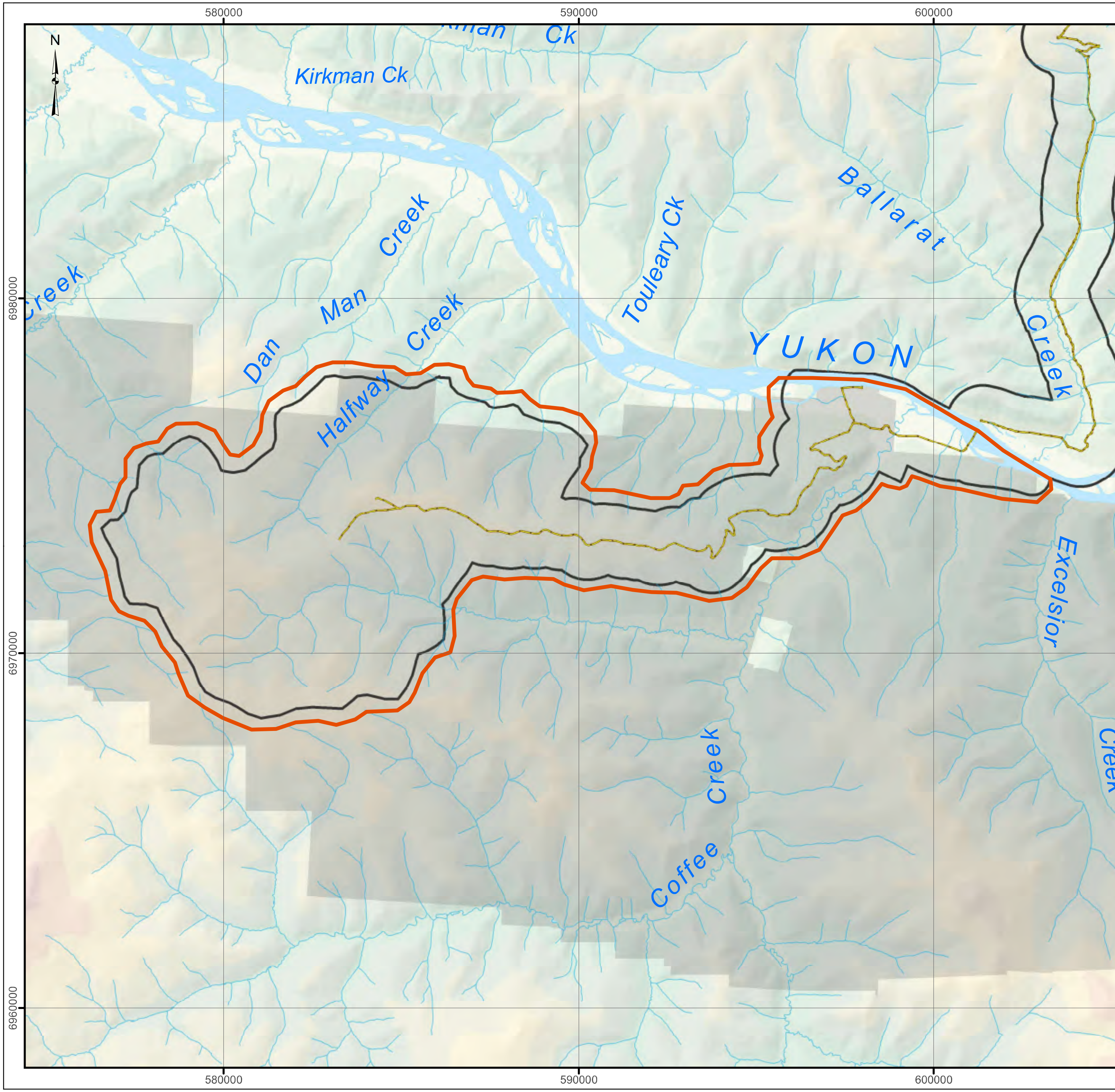
The Habitat Loss/Habitat Reclaimed monitoring will be completed during construction, operations, and reclamation and closure. During construction and operations, monitoring will be conducted once annually to capture the direct loss of vegetation from clearing activities and to track locations that are progressively reclaimed[1]. During reclamation and closure, monitoring will be conducted every three years, or as determined by reclamation efforts, to capture on going revegetation activities. To ensure comparability of the data over time, monitoring should be completed at the same time each year. Monitoring should be done early to mid-summer when most plant species are productive and growing.

3.4 Methods

The Habitat Loss/Habitat Reclaimed monitoring component will measure changes to the size (ha) of the Project footprint relative to the proposed footprint, as well as areas that are progressively reclaimed. The extent of the footprint will be measured by a qualified individual using a handheld GPS, drone, LiDAR, aerial surveys or other technology, and tracked using the datasheet provided in Appendix A, or similar. Similarly, any areas that have been reclaimed will be measured. Once an area is successfully reclaimed the field crew will define what ecosite is present for the reclaimed site. Successful reclamation will be determined as per information and guidelines outlined in the Project’s Reclamation Effectiveness Monitoring section of the Reclamation & Closure Plan. Ecosite class information gathered during field monitoring will be verified at the analysis stage. GPS information will be saved and uploaded for analysis.

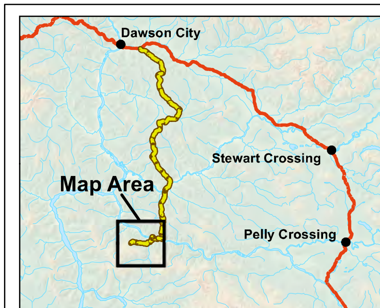
[1] Monitoring of quarry/borrow sites along the NAR may cease once activity at the site is finished and revegetation efforts are completed.

Figure 3-1. Habitat Loss/Habitat Reclaimed Monitoring Areas



Legend

- Northern Access Route
- Coffee Property
- Local Study Area
- Habitat Loss/Habitat Reclaimed Monitoring Area



0 800 1,600 2,400 3,200 4,000
Meters

Map Scale: 1:150,000 (Printed at 8.5 x 11)
Coordinate System: NAD 1983 UTM Zone 7N

Data Sources
1:50,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model and 1:250,000 National Topographic Database (NTDB) provided by Geomatics Yukon - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Disclaimer
This document is not an official land survey and the spatial data presented is subject to change. Project data displayed is site specific.

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3.5 Data Analysis, Interpretation and Reporting

The Habitat Loss/Habitat Reclaimed monitoring component will evaluate the amount of surface area disturbed by Project activities relative to the amount of surface area reclaimed for the mine area footprint and new quarry/borrow areas along the NAR on an annual and cumulative basis. Following the field component, GPS files will be uploaded using a mapping program such as ArcGIS to calculate:

1. Annual footprint.
2. Annual footprint reclaimed.
3. Annual footprint – annual footprint reclaimed.
4. Total footprint (i.e., the total footprint area disturbed to date, includes all previous year disturbances).
5. Total footprint reclaimed.
6. Total footprint – total footprint reclaimed.

The analysis will include both the total area (ha) lost/reclaimed and the area lost/reclaimed by ecosite. Additionally, the total mine area footprint will be compared to the proposed mine area footprint to ensure that the mine area footprint is within the proposed limit. Resulting annual reports, due by March 31 of the following year, will include methods, results, and an assessment of the results. The reports will also include the following:

- A summary of Project activities.
- Efforts to minimize surface disturbance in the mine area footprint.
- If warranted, a description of proposed changes to the monitoring program and/or any changes to mitigation activities to adaptively manage for unforeseen effects.

4.0 TRACE METALS MONITORING

4.1 Background and Objective

Change in vegetation health was identified as a potential Project-related effect to vegetation in the assessment for the proposed *Coffee Gold Mine Project Proposal for Executive Committee Screening* (Goldcorp 2017) where trace metals uptake via fugitive dust or other Project emissions may affect the health of vegetation and subsequently cause potential risk to humans and wildlife that consume affected plant material. Dust can also affect the health of vegetation by blocking plant respiration, transpiration, and photosynthesis; the effects of dust on vegetation may vary based on several factors, including the quantity and frequency of dust accumulation, the chemical composition of the dust, and the specific plant species affected (Walker and Everett 1987). Although trace metals are elements that occur in natural environments, they may become toxic to living organisms when concentrations become excessive such as in perturbed environments (Adriano 2001).

The assessment of Project-related effects predicted that the Project would not have a significant effect on vegetation health (Goldcorp 2017). The objective of trace metals monitoring is to monitor trace metal concentrations in soil and select vegetation species, in comparison to baseline and reference conditions, to confirm that the Project does not result in an increase in trace metal concentrations to soil and vegetation above identified thresholds. See the Vegetation Protection Plan and the Air Quality and Greenhouse Gas Management Plan for measures to limit the effects of dust and other Project emissions on vegetation health.

4.2 Study Design Overview

The trace metals monitoring program follows a statistically robust study design to detect potential changes in the concentration of trace metals in soil and select vegetation species over time. The design of the trace metals monitoring program is summarized in Table 4-1 and a design methodology summary is provided in Appendix B.

Table 4-1 Overview of Trace Metals Monitoring

Monitoring Plan Component	Description
Indicator	Soil, lichen, willow, and lowbush cranberry
Monitoring Category	Environmental Effects
Design	Before-After-Control-Impact (BACI)
Measurable Parameter	Trace metal concentrations in soil and vegetation (mg/kg)
Key Project Interactions	Dust and air emissions released into the environment have the potential to increase trace metal concentrations in soil and vegetation affecting vegetation health which may lead to a loss of native species and changes in plant composition. If metals are absorbed by plants, then they may be ingested by wildlife or humans, which may influence the health of individuals.
Goal	The Project will not result in an increase in trace metal concentrations to soil and vegetation above identified thresholds
Objective	Quantify trace metal concentrations in soil, lichen, willow, and lowbush cranberry
Threshold	Project thresholds have been established for each chemical of potential concern (CoPC)/soil or vegetation species combination. Refer to Section 4.5. Data Analysis, Interpretation, and Reporting for more details.
Scope of Monitoring Work	Trace metals monitoring will be conducted in the Project area with a focus on the mine area. Samples of soil, lichen, willow, and lowbush cranberry will be collected within the following distances categories relative to the footprint: Adjacent (<100 m), Near (100-1000 m), and Far (5.5-7.5 km). Monitoring will be completed near the end of the growing season (August). Trace metals monitoring will be completed once in construction and every three years during operations or as triggered by Project monitoring. Soil and vegetation samples will be analyzed for trace metal concentrations (mg/kg) and analyzed against Project specific thresholds for chemicals of potential concern (CoPCs). To support analysis of the trace metals data, additional passive dustfall monitoring will be conducted in the month prior to the collection of trace metals soil and vegetation samples.

4.3 Monitoring Areas and Frequencies

Trace metals monitoring will be completed outside of the mine area footprint within three distance classes relative to the footprint: Adjacent (<100 m), Near (100-1000 m), Far (5.5-7.5 km), and, when needed, measurements will be taken from Reference Sites (Figure 4-1). Samples of soil, lichen, willow, and lowbush cranberry will be collected at eight sites within each distance class. The total number of samples across the three distance classes will be 96 where there are 32 samples for each soil, lichen, willow, and lowbush cranberry. Trace metals monitoring will be completed once in construction (before operations are initiated) and every three years during operations starting one year after operations have been initiated. The amount of trace metals in leaf tissues varies throughout the growing season; therefore, monitoring is to be completed around the same time every monitoring period (Ernst 1994). For the Coffee Project, monitoring will be completed near the end of the growing season (August). Pending results from early analyses, monitoring frequency may change during operations as determined by changes in trace metal concentrations.

4.4 Methods

4.4.1 Field Methods

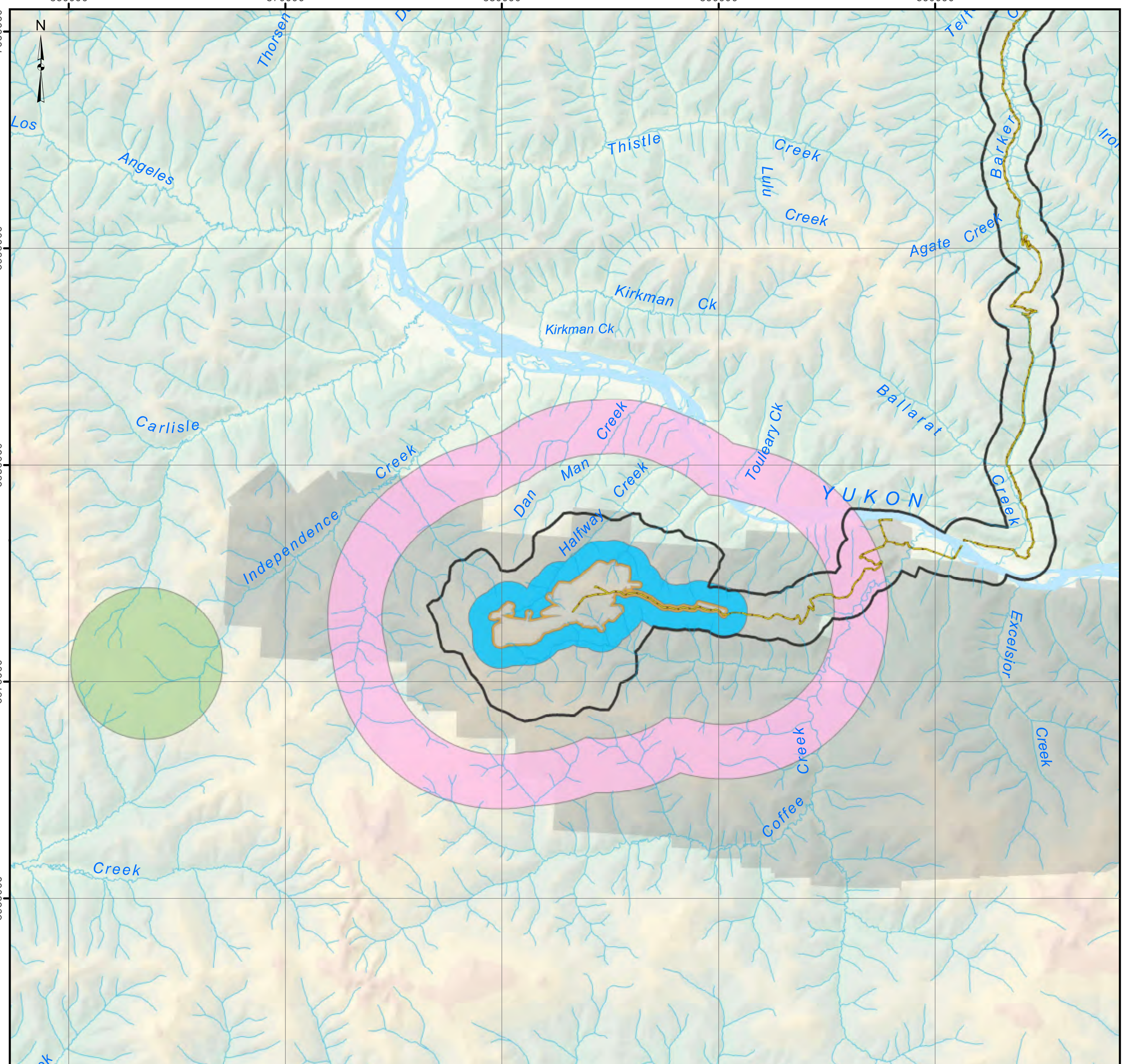
One month prior to the collection of soil and vegetation samples for trace metals analysis, a minimum of two dustfall canisters will be deployed within each of the Adjacent (<100 m) and Near (100-1000 m) distance categories. The precise location of these canisters will be determined in consultation with the QEP to target areas close to where the trace metals sampling will be conducted; however, each canister will be located at least 1 km from the other canister(s) within the same distance category. Dustfall canisters will be left out for one month and collected during the trace metals sampling program. Methods for the field sampling and dust fall analysis will follow those described in the Air Quality and Greenhouse Gas Monitoring Plan for passive dustfall monitoring and dustfall metals analysis.

Trace metals sampling will include soils, reindeer lichen (*Cladina* spp.), willow (*Salix* spp.), and lowbush cranberry (*Vaccinium vitis-idaea*). The aforementioned plant species were selected for trace metals analyses because of their dietary importance for wildlife and humans and their widespread availability across the site[2] (EDI 2017). Samples will be collected using the following procedures:

- Each sample will be collected using a new pair of nitrile gloves
- Samples will be collected using a stainless-steel tablespoon or trowel for soil and snips for vegetation. Spoon/trowel and snips will be cleaned with alcohol wipes before and after each site
- Vegetation samples will be collected within a 10 m radius of plot centre at each site. For each of the focal species the following plant parts will be collected:
    - Lichen — entire specimen
    - Willow — current year's growth (leaves and new stems) from at least three different plants
    - Lowbush cranberry — above ground portions and berries where available.
- Vegetation samples should only be taken from healthy, mature leaves or berries; old, dead or damaged leaves will be avoided
- During sampling, the amount to be collected will be:
    - Approximately 20 grams (roughly two handfuls but should be confirmed by accredited laboratory doing the analysis) of each vegetation sample
    - 100 to 200 grams (should be confirmed by accredited laboratory doing the analysis) of soil at a depth of less than or equal to 30 cm from the surface of the soil (within the rooting zone of plants to be sampled and whenever possible taken from Ae or B soil horizon unless the majority of the plant roots are found in the Ah soil horizon).
- Replicate samples will be taken randomly at 10% of the monitoring sites
- Samples will be placed in new individual resealable plastic bags (i.e., Ziploc freezer bags), labelled, and frozen until being sent to an accredited laboratory for analyses. If a freezer is not available, samples will be kept in a cool place such as a cooler with ice packs
- Data will be collected using the datasheet provided in Appendix C.

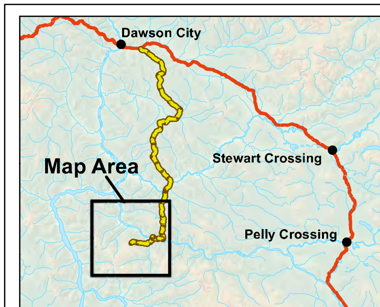
[2] Horsetail (*Equisetum* sp.) was initially included in baseline sampling for trace metals but was dropped from the program due to limited distribution within the defined distance classes.

Figure 4-1. Trace Metals Monitoring Areas



Legend

- Northern Access Route
- Coffee Property
- Local Study Area
- Moose Mountain (Control Zone)
- Adjacent Zone (100 m)
- Near Zone (100 m - 1000 m)
- Far Zone (5 km - 7.5 km)



0 2 4 6 8 10
KM

Map Reference Scale: 1:250,000 (Printed at 8.5 x 11)
Coordinate System: NAD 1983 UTM Zone 7N

Data Sources
1:50,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model and 1:250,000 National Topographic Database (NTDB) provided by Geomatics Yukon - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Disclaimer
This document is not an official land survey and the spatial data presented is subject to change. Project data displayed is site specific.

Drawn: OL	Checked: AA	Date: 2022-05-12

Newmont EDI

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4.4.2 Sample Handling and Laboratory Methods

All samples will be sent to an accredited laboratory following up-to-date hold times for the Project-specific chemicals of potential concern (CoPCs). Refer to Section 4.5 Data Analysis, Interpretation, and Reporting for a list of the Project CoPCs. Samples should be transported to the laboratory in a cooler with ice packs including laboratory-specific chain of custody forms.

Trace metals analysis will evaluate metals uptake in plant tissues and metals accumulated on the surface of the plant from dust dispersal. These analyses have different preparation protocols in the laboratory; therefore, it is important to communicate with the laboratory prior to analysis. To evaluate both trace metals uptake in plant tissues and metals accumulated on the surface of the plant, the laboratory must divide vegetation samples including leaves and berries (excluding roots) in two. One half of each sample will be washed prior to analysis while the other half of the sample will not be washed. All samples will be analyzed using inductively coupled plasma mass spectrometry (ICP-MS). The analysis for washed samples will provide the concentration of trace metals in plant tissues (mg/kg) whereas the analysis for unwashed samples will provide both trace metals in plant tissues and trace metals deposited on plant tissues. The difference between these two results provides the actual concentration of trace metals deposited on the plant via dust deposition.

Soil samples will be prepared as usual by the laboratory prior to trace metals analysis using ICP-MS methods. Additional parameters that will be requested as part of this analysis include soil pH, texture, and cation exchange capacity (CEC).

4.5 Data Analysis, Interpretation, and Reporting

Data will be analysed for trace metals concentrations (mg/kg) in soil, lichen, willow, and lowbush cranberry for nine CoPCs, as well as soil pH, texture, and CEC for soil samples. The following CoPCs were selected for the Coffee Project:

- Arsenic
- Cadmium
- Chromium
- Copper
- Mercury
- Lead
- Selenium
- Uranium
- Zinc.

CoPCs were chosen based on the consideration of several factors including the level of risk associated with each element, baseline metal concentrations in soils and plants, and other Project baseline studies (EDI 2017). Data management and analysis will be carried out by a qualified person with experience in ArcGIS database management and analysis. Trace metal concentrations will be analyzed in soil and vegetation in relation to Project thresholds. Should analysis find that the threshold for a particular CoPC has been exceeded within one or more distance classes, further investigation will be undertaken. This may include an examination into the potential consequences of the exceedance (i.e. specific to the CoPC and soil/plant species involved), investigation into potential sources of the CoPC, review of data from the associated dustfall monitoring, and/or additional sampling (including sampling at Reference sites if deemed appropriate). Threshold levels for CoPCs were determined based on a literature review of current guidelines and assessment of baseline data variability:

- **Soils** — Thresholds for trace metal concentrations in soils were identified using CCME agricultural soil quality guidelines and an assessment of baseline data. With the exception of arsenic and chromium, baseline trace metals concentrations were well below CCME agricultural soil quality guidelines[3]; therefore, these guidelines will be used for soil trace metal thresholds. For arsenic and chromium, a Project threshold was derived from a statistical standpoint as a two standard deviation change from baseline concentrations; refer to Appendix B for details (Table 4-2).

Table 4-2 Project Thresholds for Trace Metals Monitoring in Soils

CoPC	Source	Threshold (mg/kg dry weight)
Arsenic	Statistically derived	Adjacent: 22.062; Near: 22.260; Far: 11.530
Cadmium	CCME Soil Quality Guidelines[1]	1.4
Chromium	Statistically derived	Adjacent: 36.903; Near: 47.347; Far: 46.188
Copper	CCME Soil Quality Guidelines[1]	63
Lead	CCME Soil Quality Guidelines[1]	70
Mercury	CCME Soil Quality Guidelines[1]	6.6
Selenium	CCME Soil Quality Guidelines[1]	1
Uranium	CCME Soil Quality Guidelines[1]	23
Zinc	CCME Soil Quality Guidelines[1]	200

[1]Thresholds based on CCME Agricultural Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME 1997, 1999a, 1999b, 1999c, 1999d, 1999e, 2007, 2009, 2018

- **Vegetation** — There are no standard thresholds available to assess vegetation health. In the absence of guidelines, baseline trace metals data were assessed for variability and thresholds were derived from a statistical standpoint. Thresholds for CoPCs were developed for each distance category and plant species, based on a two (2) standard deviation (SD) change relative to (mean) baseline conditions. A 2 SD change (or critical effect size) is a common indicator of mining-related- effects on biota (Environment Canada 2012). The CoPC thresholds are provided as concentration values (e.g., XX mg/kg) (Table 4-3 to Table 4-5). The calculated thresholds were then compared to guidelines for trace metals levels in cattle forage (as a surrogate for wild ungulates) — all calculated thresholds were well below maximum tolerable levels for trace metals in cattle forage and were consequently accepted. Refer to Appendix B for more information.

Note that the list of CoPCs for vegetation differs from list of CoPCs identified in the Human Health Risk Assessment Technical Report and the Addendum Report (Hemmera Envirochem Inc. 2017, 2018) because the focus and priorities of the two programs are different. The CoPCs selected for the evaluation of human

[3] Note that the Vegetation Baseline Report (EDI 2017) presented the soils trace metals results in relation to CCME Industrial Soil Quality Guidelines. Based on comments received from the Selkirk First Nation, Newmont committed to adapting the soils thresholds to reflect the more conservative CCME Agricultural Soil Quality Guidelines, which are now reflected in this report.

health risks included criterion air contaminants that are routinely assessed as priority contaminants in fuel combustion by-products; see Hemmera Envirochem Inc. (2017, 2018) for more details.

Table 4-3 Project Thresholds for CoPCs in Vegetation for Sites Adjacent (≤100 m) to the Project Footprint

CoPC	Thresholds (mg/kg dry weight)		
	Lichen	Willow	Lowbush Cranberry
Arsenic	0.273	0.050	0.050
Cadmium	0.049	1.388	0.021
Chromium	0.482	0.200	0.200
Copper	1.654	4.685	4.871
Lead	0.235	0.056	0.049
Mercury	0.028	0.012	0.024
Selenium	0.050	0.050	0.050
Uranium	0.010	0.002	0.002
Zinc	15.190	130.806	32.362

Table 4-4 Project Thresholds for CoPCs in Vegetation for Sites Near (100-1,000 m) the Project Footprint

CoPC	Thresholds (mg/kg dry weight)		
	Lichen	Willow	Lowbush Cranberry
Arsenic	0.196	0.050	0.050
Cadmium	0.035	1.387	0.026
Chromium	0.457	0.200	0.207
Copper	1.441	4.986	5.047
Lead	0.208	0.036	0.041
Mercury	0.026	0.010	0.017
Selenium	0.050	0.050	0.050
Uranium	0.012	0.002	0.002
Zinc	11.284	214.624	31.174

Table 4-5 Project Thresholds for CoPCs in Vegetation for Sites Far (5.5-7.5 km) from the Project Footprint

CoPC	Thresholds (mg/kg dry weight)		
	Lichen	Willow	Lowbush Cranberry
Arsenic	0.232	0.050	0.050
Cadmium	0.068	9.668	0.080
Chromium	0.549	0.200	0.200
Copper	1.649	5.347	4.859
Lead	0.252	0.032	0.040
Mercury	0.035	0.010	0.014
Selenium	0.050	0.081	0.050
Uranium	0.015	0.002	0.003
Zinc	17.904	166.526	31.066

Reporting on trace metals monitoring (to be completed by March 31 of the year following each sampling program) will include methods, results, and a data analysis/assessment of the results. The report will also include the following:

- Total number of sites monitored including the number of soil and vegetation indicator species sampled at each site
- Total number and location where replicate samples were collected
- Laboratory results
- Results of the threshold analysis
- If warranted, description of proposed changes to mitigation practices and/or the trace metals monitoring program in response to monitoring results and/or any investigations into threshold exceedances[4].

[4] Exceedance of a trace metals threshold will not necessarily result in changes to mitigation practices, rather observation of an exceedance within a specific distance category will trigger an investigation into the potential cause and consequences of that exceedance. Changes to mitigation will only be proposed if warranted based on the findings of the investigation.

5.0 INVASIVE PLANT MONITORING

5.1 Background and Objective

The potential introduction and/or spread of invasive plants was identified as a potential Project-related effect to vegetation in the assessment for the proposed *Coffee Gold Mine Project Proposal for Executive Committee Screening* (Goldcorp 2017). Invasive plants are those that are introduced by humans to areas outside of their natural range of distribution, where they become established and disperse, generating a negative impact on the economy, environment, and social realms (IUCN 2011). Potential Project-related effects include changes to plant composition and possible loss of native plant species, due to the introduction and spread of invasive plants in the Project area. Physical disturbance due to construction activities creates suitable conditions for the introduction and spread of invasive plants (Polster 2005). Vehicle transport (e.g., heavy machinery to all-terrain vehicles) travelling along Project roads could also inadvertently transport plant propagules in tires, the undercarriage, or in mud on the vehicle to previously unaffected areas. The effects of invasive species on native diversity is well documented and is recognized by some as the second greatest threat to listed species after habitat loss (Wilcove et al. 1998, Enserink 1999). Invasive plant species can influence ecosystem diversity, structure, and function through invasion and hybridization which can ultimately change the way in which a site is used by wildlife, insects, and micro-organisms. Changes in nutrient cycling, hydrology, erosion, and fire regimes may also occur (CFIA 2008).

During baseline surveys for the Project in 2015 and 2016, invasive plant surveys were completed along existing sections of the NAR and along existing disturbance within the Coffee Property (i.e., the exploration property located south of the Yukon River). These surveys identified five invasive plant species with an invasiveness rank of 1 that are considered a priority for management. Distribution of invasive plants varied by species, but in general, invasive plant species were much more prevalent along the northern sections of the NAR than in the southern parts of the Project area. South of the Yukon River, baseline surveys documented three invasive species within the Coffee Property: Smooth Brome (*Bromus inermis*), Narrow-leaved Hawksbeard (*Crepis tectorum*), and Perennial Sow-thistle (*Sonchus arvensis* ssp. *uliginosus*). Smooth Brome and Narrow-leaved Hawksbeard were along identified along the NAR, along with two additional invasive species: White Sweetclover (*Melilotus albus*) located at several locations along the NAR (including areas south of the Stewart River) and Yellow Sweetclover (*Melilotus officinalis*) found only along the northern-most sections of the NAR near Dawson. Since the discovery of invasive plants on site in 2015, the Environmental Department has been working to eliminate populations within the Coffee Property[5]. For more information on baseline conditions, refer to the Vegetation Protection Plan.

For this Project, Newmont will implement mitigation measures for invasive plant species across the Project area to prevent the introduction and/or spread of invasive species within the Project area. In addition, Newmont will actively manage for invasive plants to prevent invasive species spread south of the Yukon River (see the Vegetation Protection Plan for more details).

To guide the targeted removal of invasive plants within the Coffee Property (i.e., south of the Yukon River), annual invasive plant surveys will be carried out within the Project footprint. Additionally, at the request of WRFN, Newmont has agreed to extend the annual invasive plant surveys along the southern sections of the NAR (i.e., south of the Stewart River). Consequently, the objective of invasive plant monitoring is to

[5] Since the completion of baseline studies, invasive plant management activities associated with the exploration program have detected both White Sweetclover and Yellow Sweetclover within the Coffee Property; the Environmental Department is working to eliminate these populations.

quantify the presence and abundance of invasive plant species within and adjacent to the Project footprint south of the Stewart River. The results of invasive plant monitoring will be used to:

1. Guide the targeted removal of any Rank 1 invasive species identified in the Coffee Property (i.e., south of the Yukon River) (refer to the Vegetation Protection Plan for further details on the methods for invasive plant removal).
2. Monitor and document any spread of invasive plant species along the southern sections of the NAR (i.e., between the Stewart and Yukon Rivers).
3. Document the effectiveness of Project mitigation measures for invasive plants and, if necessary, inform adjustments to mitigation practices.

Newmont will also consider participating in regional efforts to manage invasive species along the NAR north of the Yukon River in collaboration with other road users or with regulatory agencies.

5.2 Study Design Overview

Invasive plant monitoring is designed to meet the objective stated above through presence and abundance sampling within the Project footprint. The design of the invasive plant monitoring program is summarized in Table 5-1.

Table 5-1 Overview of Invasive Plant Monitoring

Monitoring Component	Description
Indicator	Invasive plant species
Monitoring Category	Environmental Effects
Design	Project footprint survey; presence and absence sampling
Measurable Parameter	Occurrence of invasive plants in the Project footprint south of the Stewart River; density distribution class
Key Project Interactions	Introduction of invasive plant species causing habitat loss for native plant species and possible change of plant composition
Goal	The Project minimizes the potential introduction and spread of invasive plant species
Objective	1) To quantify the presence and abundance of invasive plant species within and adjacent to the Project footprint south of the Yukon River to aid in the management of invasive plants 2) To document any spread of invasive plant species along the southern sections of the NAR between the Stewart River and the Yukon River.
Threshold	No introduction of invasive plant species within and adjacent to the Project footprint south of the Yukon River as a result of Project activities
Scope of Monitoring Work	Invasive plant monitoring will be conducted in the Project footprint south of the Stewart River. Monitoring will be conducted using presence and absence sampling methods to determine abundance and density distribution of invasive species. A combination of roadside driving at slow speeds in a vehicle or UTV averaging 20 km/hr and walking surveys will be used to monitor linear and non-linear (localized) features. Invasive plant monitoring will be completed annually during construction and operation.

5.3 Monitoring Areas and Frequencies

Invasive plant monitoring will focus on the Project footprint south of the Stewart River, including the mine area, the mine access road, and the NAR (Figure 5-1). Invasive plant monitoring will be completed each year during construction and operation. South of the Yukon River, two surveys per year will be conducted during the snow-free period to ensure that both early and late blooming plants are captured. Between the Yukon River and the Stewart River, a single survey will be conducted during the summer months. Surveys will be timed to facilitate plant species identification and allow for removal of invasive plants prior to seed set, wherever possible. Survey frequency may be altered during operations based on the results of previous monitoring activities, consideration of adaptive management, or incidental observations.

5.4 Methods

Prior to invasive plant monitoring, the CDC and Yukon Invasive Species Centre (YISC) will be contacted to determine if there are updates to the list of invasive plant species in Yukon. Using this list, with a focus on Rank 1 species for management purposes, presence and absence sampling methods will be used to survey areas where invasive plants are most likely to be found (Oldham 2007; ANPC 2012). Sample site selection will consider potential entry points and locations where there is a high volume of humans, vehicles, and equipment entering or leaving the Project footprint, including mine infrastructure, laydown areas, access roads, airstrip, and camp facilities. As the Project develops, the survey area will expand as necessary to include disturbed areas with exposed soil.

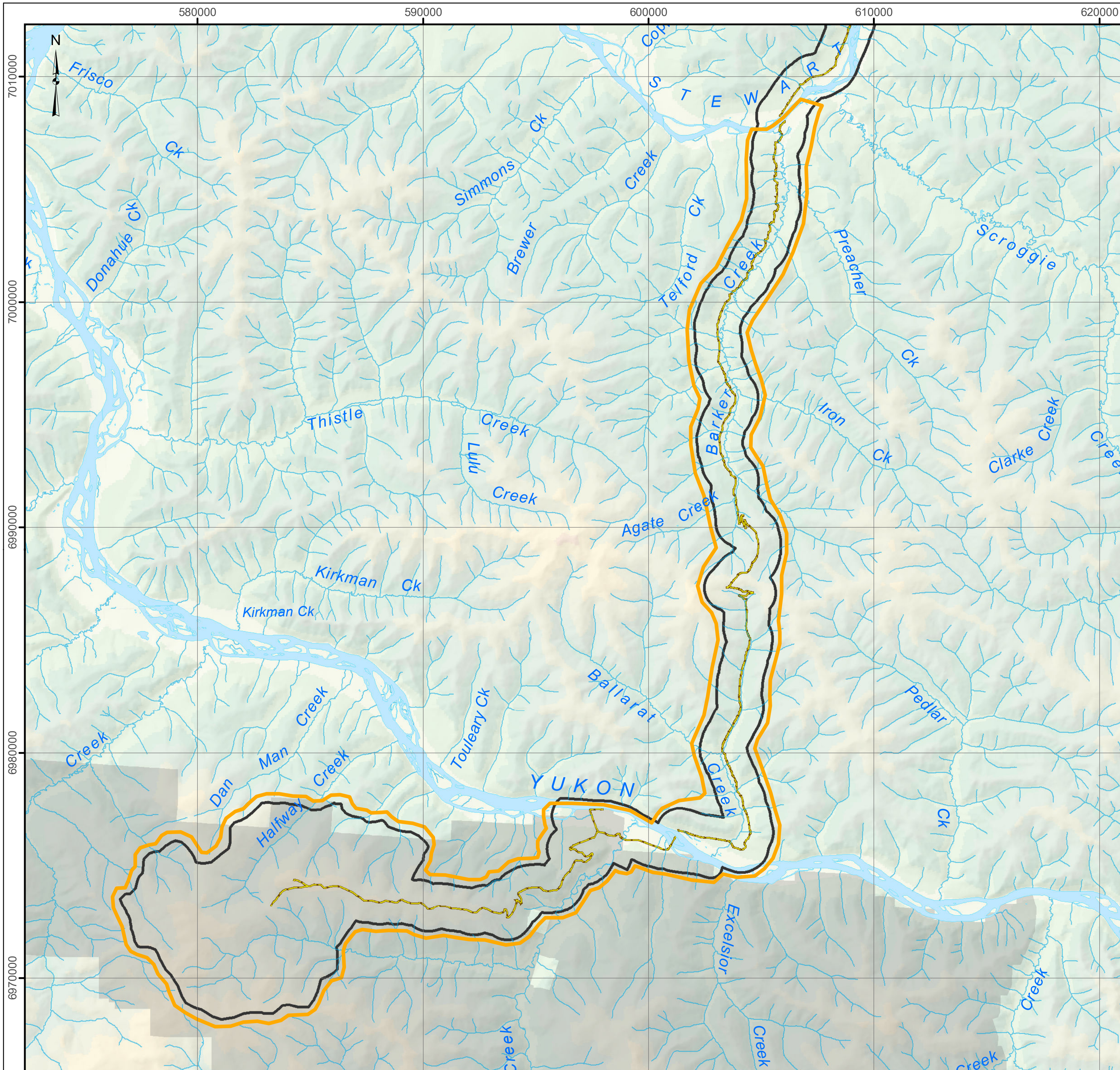
Invasive plant monitoring will be conducted using a combination of roadside driving and walking surveys. Sample sites that are localized, such as laydown areas or camps, will be surveyed on foot and marked with a GPS as a point location. Linear features, such roads, will be surveyed in a vehicle or UTV at slow speeds averaging 20 km/hr allowing surveyors to assess either side of the road. Within each 2 km segment, invasive plants will be identified, and a density distribution class will be recorded for each species from 1–8, adapted from the BC Ministry of Forests Weed Density Distribution Classes. If an invasive plant species is positively identified, the following steps will be taken to document the species occurrence:

- Species name (common and scientific with reference to the Flora of North America available online)
- Yukon invasiveness rank from 1 (high priority) to 7 (least concern; Environment Yukon 2012)
- Location (with a handheld GPS)
- Site information (roadside, pullout, clearing etc.) and area of extent.
- Density distribution adapted from the BC Ministry of Forests Weed Density Distribution Classes (Luttmerding et al. 1990; Appendix D)
- Phenology (i.e., leafing, flowering, fruiting etc.); health and size of the plant(s).
- Pictures (with reference point so that the location can be easily found in the future)
- If necessary, collect a sample for verification including the roots, flowers and/or fruits
- Data will be collected using the datasheet provided in Appendix E.

Identification of invasive plants may also be conducted incidentally during other environmental monitoring programs and during routine monitoring tasks in the footprint.

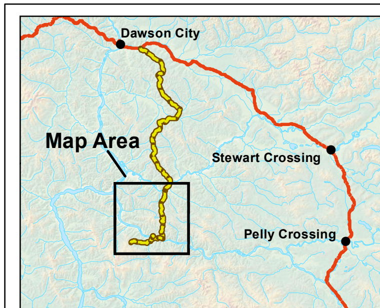
Following invasive plant surveys, targeted removal of any Rank 1 invasive species identified in the Project footprint south of the Yukon River will be carried out. Refer to the Vegetation Protection Plan for details on the methods of invasive plant removal.

Figure 5-1. Invasive Plant Monitoring Areas



Legend

- Northern Access Route
- Coffee Property
- Local Study Area
- Invasive Plant Monitoring Areas



0 2,000 4,000 6,000 8,000 10,000
Meters

Map Scale: 1:150,000 (Printed at 8.5 x 11)
Coordinate System: NAD 1983 UTM Zone 7N

Data Sources
1:50,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model and 1:250,000 National Topographic Database (NTDB) provided by Geomatics Yukon - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Disclaimer
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Drawn: OL/AR	Checked: AA	Date: 2023-08-09

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5.5 Data Analysis, Interpretation, and Reporting

Changes to invasive plant populations in the Project area will be evaluated by analysis of abundance and density distribution. Following the field component, GPS files will be uploaded using a mapping program such as ArcGIS to map the abundance and density distribution of Rank 1 species. The annual abundance and distribution of Rank 1 species will be compared to baseline surveys and previous years' monitoring results to determine whether there has been an increase in the number of Rank 1 species present, the distribution of Rank 1 species, and the abundance of Rank 1 species. If the annual monitoring identifies new populations of invasive species south of the Yukon River, an investigation will be carried out to, if possible, determine the pathway of entry. If warranted based on the findings of the investigation, changes to mitigation practices will be proposed to reduce the possibility of further introduction.

The monitoring report, completed annually by March 31 of the following year, will include methods, results, and a data analysis/assessment of the results of the invasive plant monitoring. The report will also include the following:

- Areas surveyed
- Rank 1 invasive plant species found, including abundance and density distribution
- Review of annual monitoring results relative to baseline conditions
- If warranted, description of proposed changes to mitigation practices and/or the invasive plant monitoring program in response to monitoring results.

6.0 ADAPTIVE MANAGEMENT

Newmont will work towards continual improvement to meet the objectives of the Plan using adaptive management. The Environmental Manager or their delegate will investigate improvements in any trend and assess whether the practices responsible for the improvements can be applied to other areas. Reviews of mitigation and monitoring programs for the Project will determine if the Coffee Gold Mine is meeting performance targets of the Plan and any deficiencies will be addressed. Deteriorating trends will be studied to determine the root cause and may include:

- Environmental incidents and non-conformances
- Non-compliance with authorizations and/or permits
- Disturbance occurring outside designated boundaries
- Encroachment into riparian buffers
- Unauthorized disturbance to rare plants, lichens or ecosystems or culturally important species
- Introduction and/or spread of invasive plant species
- Ineffective invasive plant species control.

When the cause is identified, the Environmental Manager or their delegate will implement a suitable corrective action. Examples of corrective actions may include:

- Additional training of employees and contractors
- Enhancement of invasive plant inventory and monitoring
- Implementation of additional mitigation measures or changes to existing mitigation measures
- Incorporation of new information to improve management and site-specific risk
- Additional supervisory oversight.

7.0 REPORTING AND ANNUAL REVIEW

This Plan is expected to be revised as new information becomes available, methods of monitoring are developed, or management issues arise that need to be addressed. Newmont will also continue to maintain a dialogue with regulators, governments, and Project stakeholders to further develop the details of this Plan. These parties may include, but will not be limited to: Yukon Government, First Nations, and various other land users.

Reporting on the monitoring activities described in this Plan will be completed annually. The annual monitoring report will present the methodologies used for the monitoring, a summary of the information collected, and, where relevant, any mitigation measures or adaptive management practices that were implemented to address effects detected during monitoring. Where applicable, the report will also include a summary of any engagement with regulators, First Nations, or Project stakeholders regarding the status of monitoring programs, and a description of any proposed changes to mitigation and monitoring plans. The annual report will be available to regulators, governments, and Project stakeholders upon request.

Retrospective analysis of potential effects of the Project will be completed every four years and will be more comprehensive than the annual monitoring reports. These reports will make comparisons between pre- and post-Project data collected over the life of the Project while attempting to discern Project-related effects from natural variation. The findings will be compared to predicted effects and any unanticipated effects will be identified. These analyses will not be carried out for every sampling year due to the presumed inability to inform effects on an annual basis, particularly if effects are small and incremental.

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APPENDIX A

Habitat Loss/Habitat Reclaimed Monitoring Datasheet

Habitat Loss/Habitat Reclaimed Monitoring Datasheet

Date	Surveyors	Habitat Type[1]	Start Location (Latitude)[2]	End Location (Longitude)[2]	Start Time (24 hr)	End Time (24 hr)	Ecosite_Class[3]	Photos	Comments

[1] Habitat Type = Loss or Reclaimed
[2] Provide latitude/longitude as decimal degrees
[3] Once area is deemed successfully reclaimed include what ecosite class is present

APPENDIX B
Trace Metals Design Summary

Trace Metal Design Summary

Evolution of the Trace Metals Program

The vegetation and soils trace metals program has undergone several revisions since baseline sampling was initiated in 2014. Changes in the program design throughout its development have been the result of several factors including: changes in the Project footprint/Project design, comments received from regulators and First Nations reviewers both during and after the Project review by YESAB, statistical analyses and logistical considerations. The following bullets summarize key steps in the development of this program:

- 2014 & 2015 — Collection of baseline data on vegetation and soil metal concentrations was initiated around the proposed mine site and existing Coffee Camp (2014) and along the NAR (2015). Site selection generally coincided with the Ecosystem Mapping Program (EDI 2017) and sample sites were located within three distance categories based on a preliminary estimation of the Project footprint: Adjacent (0–25 m), Near (75–250 m), and Far (1.5–2.5 km).
- 2016 — The study design was revised to incorporate available data from the 2016 dust isopleth modelling and additional sampling was conducted to improve extent and coverage around the proposed mine site. New distance categories were developed to better represent dust isopleth modelling and prevailing winds (South, Northeast, and Northwest): Adjacent (≤100 m), Near (100–1000 m), Far (5.5–7.5 km), and Control (≥15 km). Also in 2016, a power analysis was conducted using simulations to determine if samples size and study design were sufficient to detect a change in metal concentrations in soil and vegetation relative to recommended threshold values (details below). For more information on the 2014–2016 baseline sampling, refer to the Vegetation Baseline Report (EDI 2017).
- 2017 — The Coffee Project was submitted for review by YESAB; the Vegetation Valued Component Assessment Report (Appendix 15-B) committed to a trace metals monitoring program and included a basic introduction to the proposed program based on the 2016 analysis (Goldcorp 2017).
- 2018 — Information request received from the Selkirk First Nation asked that the thresholds for soil metal concentrations be based on the CCME Agricultural Soil Quality Guidelines, which are more conservative than the CCME Industrial Soil Quality Guidelines used in the Vegetation Baseline Report. The proponent agreed to update the thresholds to use the more conservative guidelines. Also in 2018, the trace metal monitoring power analysis was updated to include samples collected in 2016.
- 2019 — An updated Project description was submitted to YESAB which included changes to the footprint of the proposed mine site and an increased rate of production. Supplemental sampling was conducted in response to concerns raised regarding some of the proposed control sites. Baseline data from 2014–2019 were reanalyzed in relation to updated distance categories — categories were still defined as Adjacent (≤100 m), Near (100-1000 m), Far (5.5–7.5 km), and Control (≥15 km) but were revised to reflect the updated 2019 Project footprint. The results of this analysis were reported in the Coffee Gold Project: 2019 Terrestrial Studies report (EDI 2020).
- 2022 — YESAB completed its review and recommended that the Project be allowed to proceed subject to the terms and conditions specified in the Referral Report and Recommendation. The Draft Vegetation Monitoring Plan was finalized and sent to the affected First Nations for review and comment in preparation for Project licensing. The proposed trace metals monitoring program was

based on the 2019 analysis; it included four distance categories (Adjacent, Near, Far and Reference) based on the 2019 Project footprint and proposed thresholds based on CCME Agricultural Soil Quality Guidelines and statistically derived thresholds based on percent change from baseline concentration where the standard deviation was divided by the average for each CoPC and multiplied by 100 to get a percent.

- 2023 — The trace metals monitoring program was updated based on comments received from First Nations reviewers and an updated statistical analysis. Specific updates included: 1) evaluation of the distance categories and sampling locations against the updated dust isopleth modelling (based on the 2019 Project updates); and 2) updates to statistically derived thresholds using a 2 standard deviation change relative to mean baseline values for Adjacent, Near, and Far distance categories.

Selection of Species and CoPCs

The selection of vegetation species for sampling and chemicals potential concern (CoPCs) on which to focus the analysis were both made during baseline sampling. Since the trace metals monitoring program is based on a before-after control-impact (BACI) study design, these same vegetation species and CoPCs will be used moving forward. The following summarizes the rationale for the selection of vegetation species and CoPCs from the Vegetation Baseline Report (EDI 2017).

Vegetation species selected for the trace metals monitoring program were chosen based on value as wildlife forage, importance to First Nations, comparability to other studies and availability within the Project area. Initial sampling included four species/species groups: willow (*Salix* spp.), fruticose lichen (*Cladina* spp.), horsetail (*Equisetum arvense, Equisetum pratense*, and *Equisetum sylvaticum*), and lowbush cranberry (*Vaccinium vitis-idaea*); however, horsetail was subsequently dropped due to limited availability within and nearby the Project Footprint (i.e., within the Adjacent and Near zones). The following bullets outline the rationale behind each remaining three species:

- Willow is an important forage species for moose and other wildlife which consume the leaves, twigs, branches, and catkins (high in vitamin C) for sustenance. As a medicinal plant, the inner bark can be used to relieve headaches, fever, cold, flu, or pain related to urinary tract, sciatic nerve pain, tendonitis, osteoarthritis, back pain, muscle aches, sprains, or menstrual cramping. (Gray 2011; Schofield 1998). Willow has also been used by local First Nations for basket making, making snares, tanning hides, and is a source for natural dyes (Schofield 1998; Leary 2009).
- Lichen is an important food source for caribou, particularly during the winter. Lichen lacks an outer cuticle; therefore, it absorbs nutrients from the atmosphere and has been used in previous studies to monitor air quality.
- Lowbush cranberry is harvested by First Nations (Mishler and Simeone 2004; InterGroup Consultants Ltd. 2009; Bates and DeRoy 2014) and local First Nations have reported previously harvesting it in the Coffee Creek area (Tr’ondëk Hwëch’in 2012). The berries are reported to reduce the development of kidney stones and urinary tract infections, lower blood sugar, benefit the cardiovascular and immune system, stimulate digestion, prevent bacteria build up in the mouth, and improve eyesight (Gray 2011; Schofield 1998). Many bird and wildlife species also forage on lowbush cranberry for sustenance.

The selection of CoPCs on which to focus data analysis was based on several considerations:

- Site conditions as determined by baseline metal concentrations in vegetation and soil (i.e., several metals were not present at detectable levels in vegetation and soil samples and were therefore not selected as CoPCs);
- Potential as a source of contamination in soil and vegetation:
  - Arsenic is a minor constituent often associated with gold ores (CCME 1997) and preliminary review of the baseline results showed soil samples with arsenic concentrations above CCME soil quality guidelines; and
  - The baseline water quality report found several total metals in surface water samples at varying amounts above reportable detection limits with the most notable being uranium (Lorax 2016).
- The level of risk associated with each element. Several sources were consulted including Canadian Environmental Quality Guidelines (provided by the CCME), and relevant literature on the presence, effects and other aspects of metals in northern terrestrial biota (e.g. Gamberg 2000 & 2008; CACAR 2003). In the study, Contaminants in Arctic Moose and Caribou, cadmium, copper, lead, and zinc were identified as trace metals of potential concern in northern biota (Gamberg 2008). Similarly, Contaminants in Yukon Country Foods identified arsenic and mercury as trace metals of potential concern (Gamberg 2000).

Based on this review, nine CoPC were selected including:

- Arsenic
- Cadmium
- Chromium
- Copper
- Mercury
- Lead
- Selenium
- Uranium
- Zinc.

Note that the list of CoPCs selected for vegetation and soils trace metals monitoring differs from list of CoPCs identified in the Human Health Risk Assessment Technical Report and the Addendum Report (HHRA; Hemmera Envirochem Inc. 2017, 2018) because the focus and priorities of the two programs are different. The CoPCs selected for the evaluation of human health risks were primarily focussed on airborne contaminants (e.g., air contaminants that are routinely assessed as priority contaminants in fuel combustion by-products causing potential health concerns relating to breathing). However, Chapter 5 of HHRA (i.e., the traditional and non-traditional food gathering risk assessment) assessed the impact of dust deposition on plants that are ingested by humans and animals and in that analysis, arsenic was selected as the only CoPC of concern. See Hemmera Envirochem Inc. (2017, 2018) for more details.

Distance Categories

The distance categories for the trace metals program are based on proximity to the proposed Project footprint (as per the 2019 Project description): Adjacent (≤100 m), Near (100–1000 m), Far (5.5–7.5 km), and Control (≥15 km).

In 2023, the proposed distance categories and sampling sites were re-evaluated based on the updated 2019 dust isopleth modelling. However, no changes were ultimately made to the distance categories based on the predicted dustfall dispersion in each distance category. Specifically, the analysis looked at the maximum 30-day averaged dust deposition rate predicted during Year 4 of Operations (Tetra Tech 2019); the 2019 predicted dustfall was classified into 10 decile bins (i.e., 10-percentile intervals in dustfall values) and mapped (Appendix Map 1). Appendix Table 2 shows the number of monitoring sites in each decile bin of dustfall predictions. Sites that were Adjacent or Near had the highest amounts of predicted dustfall (9th and 10th decile bins; Appendix Table 2). Dustfall predictions in the Far category spanned several decile bins (5th to 10th;Appendix Table 2) and the team considered splitting the Far distance category into two sub-categories based on the level of predicted dustfall: (a) Far-Low (5th and 6th quantile) and (b) Far-High (7th to 10th quantile). However, a test of CoPC concentrations at Far-Low versus Far-High sites did not identify significant differences at baseline levels, so the Far distance category was kept as a single group. With increased dustfall through the life of the Project, it is possible that CoPC uptake in vegetation and soil may differ across the Far distance category based on expected dustfall dispersion. If and when thresholds are exceeded in the Far distance category, an investigation will be triggered that evaluates CoPC concentrations relative to dustfall predictions.

Appendix Table 2: Number of Trace Metal Monitoring Sites at each Dustfall-distance Category across Decile Bins of Predicted Dustfall Deposition

Dustfall-Distance Category	Predicted Dustfall Deposition, Decile Bins ¹					Total # of Sites
	6 (0.032–0.044)	7 (0.044–0.062)	8 (0.062–0.100)	9 (0.100–0.200)	10 (0.200–100.67)	
Adjacent (≤100 m)	–	–	–	–	10	**10**
Near (100–1,000 m)	–	–	–	1	10	**11**
Far (5.57.5 km)	5	1	3	2	1	**12**

¹Units of dustfall in mg/m²/month.
*Note: dustfall deposition quantities are predicted and do not represent actual baseline conditions.

Power Analyses

In 2016, a power analysis was conducted using simulations to determine if samples size and study design were sufficient to detect a change in metal concentrations in soil and vegetation relative to recommended threshold values. The power analysis focused on changes in trace metal concentrations to soil and focal plants (willow, lichen, and lowbush cranberry) for nine CoPC using R version 3.3.1 (R Core Team 2016). Power simulations were not performed for metals and substrates where more than 50% of baseline samples were below the detection limit. CoPC included in the power analysis were arsenic, cadmium, chromium, copper, lead, mercury, selenium, uranium, and zinc.

Simulations were used to determine the effect size for a variety of sampling designs (Bolker 2007). Ultimately, eight samples per distance category (i.e., Adjacent [100 m], Near [1000 m], Far [>4000 m], and Control [≥15 km]) was identified as a minimum requirement. Note that these distance categories were associated with the 2014/2015 field program, prior to the 2016 update. Metal concentrations in three groups were simulated from a normal distribution, based on the mean and standard deviation of 2014 baseline sampling data following a log-transformation. Data for the fourth group were simulated assuming an increase in median metal concentrations for that group. For every 10% increase in metal concentrations, 1000 data sets were simulated.

A one-way ANOVA was run on each simulated data set and power was calculated as the proportion of tests with a significant difference among groups (p-value of less than 0.1). The level at which increased metal concentrations could be detected with statistical power of 0.8 (i.e. in at least 80% of simulations) was compared to proposed thresholds to determine if a statistically significant change could be detected before exceeding the threshold.

The 2016 power analysis determined that eight samples per distance category (i.e., Adjacent [100 m], Near [1000 m], Far [>4000 m], and Control [≥15 km]) would be sufficient to detect a change in median metal concentrations before exceeding the recommended threshold for most CoPC in soil and vegetation.

In 2018, the power analysis was revisited based on revised distance categories and with data collected from the 2016 sampling period. Five distance categories were used: 0-200 m, 200–1,000 m, 1,000–2,000 m, >4,000 m, and a reference category (Moose Mountain sites). The analysis determined how much metal concentrations would have to increase in the closest distance category (0–200 m) to detect a significant project effect with 80% power at a significance level of p-value less than 0.05. The results of the 2018 power analysis demonstrated that the current sampling scheme (8 samples per distance category) could detect a change of 2 standard deviations from baseline mean CoPC concentrations. Therefore, even with different distance classes and a more stringent significance level ($p < 0.05$ in 2018 versus $p < 0.1$ in2016), the results of the 2018 power analysis were consistent with the 2016 power analysis. Overall, this suggests that eight samples per distance class is sufficient for ongoing trace metals monitoring.

Threshold Calculations

Threshold levels for CoPCs were determined based on a literature review of current guidelines and an assessment of baseline data variability. Trace metal thresholds are meant to serve as indicators of Project effects, which are best measured using a BACI study design in areas relevant to project activities. The trace metals monitoring program will focus on monitoring within the Adjacent, Near, and Far areas only. Reference sites may not be visited every year and will primarily be reviewed if/when unexplained exceedances are detected within the other distance categories (i.e., to assist scientists in determining whether broader environmental changes may be contributing to the observed changes). Consequently, reference locations were not included in the development of thresholds.

Soils — Thresholds for trace metal concentrations in soils were identified using CCME Soil Quality Guidelines and an assessment of baseline data. The Vegetation Baseline Report (EDI 2017) initially presented the soils trace metals results in relation to CCME Industrial Soil Quality Guidelines; however, based on comments received from the Selkirk First Nation, Newmont agreed to adapt the soils thresholds to reflect the more conservative CCME Agricultural Soil Quality Guidelines. Review of the baseline trace metals data against the CCME Agricultural Soil Quality Guidelines found that with the exception of arsenic and chromium, baseline trace metals concentrations were well below CCME guidelines; therefore, these guidelines were appropriate for soil trace metal thresholds. For arsenic and chromium, a Project threshold was derived from a statistical standpoint as a two standard deviation change from baseline concentrations (refer to further details on the statistical approach under vegetation). The soils thresholds are shown in Table 4-2 in the main body of this VMP.

Vegetation — No standard thresholds exist to assess vegetation health due to the accumulation of trace metal CoPCs. However, there is a need to identify thresholds of trace metal concentrations in indicator plant species to determine changes from Project baseline conditions. In the absence of guidelines, a statistical approach was taken to develop thresholds. These thresholds were initially developed in 2019 but have since been refined.

Thresholds for CoPCs were developed for each distance category and plant species, defined as a (two) 2 standard deviation (SD) change relative to (mean) baseline conditions. A 2 SD change (or critical effect size) is a common indicator of mining-related- effects on biota (Environment Canada 2012). It is also consistent with power analyses completed in 2016 (and updated in 2018). Those power analyses assessed the magnitude of change in trace metal concentrations that could be detected with 80% power (i.e., in 800/1,000 simulations). For nearly all substrates and CoPCs, the detectable changes were approximately 2 SDs. The CoPC thresholds are provided as concentration values (e.g., XX mg/kg) and are shown in Table 4-3, Table 4-4, and Table 4-5 in the main body of this Plan.

Note that thresholds are relative to baseline conditions and may indicate larger, more variable CoPC concentrations at sites farther from the Project footprint. For example, mean concentrations of cadium (Cd) in lichen at monitoring sites, and the subsequent thresholds of Cd developed for lichen, progressively increase from the Adjacent (0.049 mg/kg) to the Far (0.066 mg/kg) dustfall-distance category. Threshold values are also dependent on the natural variation in CoPC concentrations within a dustfall-distance category. If the standard deviation of CoPC values is relatively large, then the expected threshold value also increases (recall that threshold equals two SDs greater than the baseline mean).

To assess the calculated thresholds for vegetation, trace metal concentrations in vegetation used for ungulate forage were compared to the statistically derived thresholds. The dietary tolerances of wild ungulates, such as caribou or moose, are not known due to challenges sampling populations of large mammals; however, maximum tolerable levels of trace metals in cattle forage are available and can be used as a surrogate for wild ungulates (BANR 2005; Puls 1994). These maximum tolerable levels of trace metals in cattle forage provide an overarching guideline in consideration of animal health (Appendix Table 3). All calculated thresholds (Table 4-3 through Table 4-5) were well below maximum tolerable levels of trace metals in cattle forage for all CoPCs and were consequently deemed suitable for use.

Appendix Table 3 Comparison Thresholds for CoPCs: Maximum Levels of Trace Metals in Cattle Forage

Trace Metals (CoPC)	Maximum Tolerable Levels in Cattle Forage[1] (mg/kg dry weight)
Arsenic	30
Cadmium	10
Chromium	100
Copper	40
Lead	100
Mercury	2
Selenium	5
Uranium	30[2]
Zinc	500

[1] Maximum tolerable levels of trace metals in cattle forage (BANR 2005). [2] Maximum tolerable levels of trace metals in cattle forage not available for BANR 2005. Values used are from Puls 1994.

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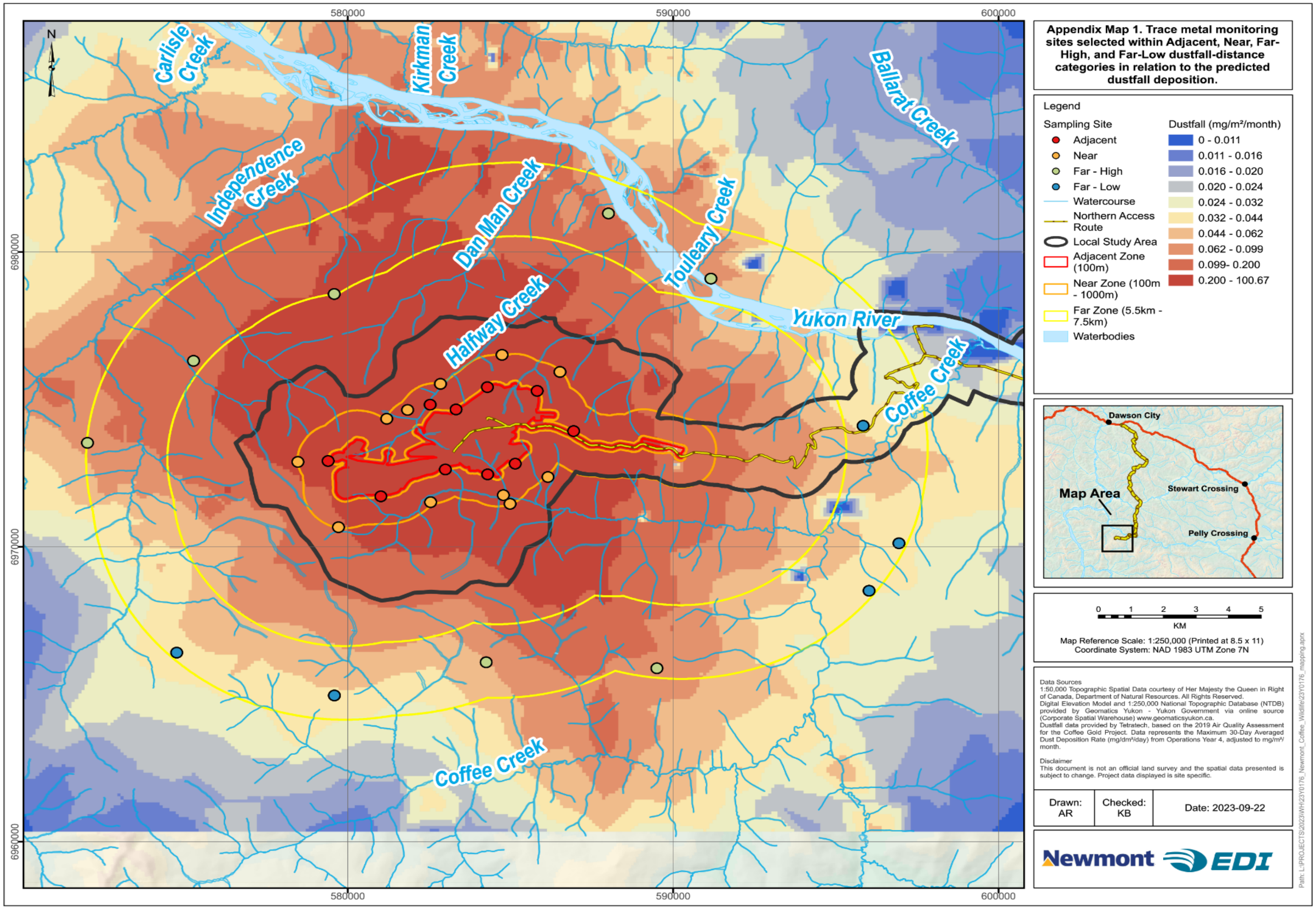


Appendix Map 1: **Trace Metal Monitoring Sites Selected within Adjacent, Near, Far-High, and Far-Low Dustfall-distance**

APPENDIX C
Trace Metals Monitoring Datasheet

Trace Metals Monitoring Datasheet

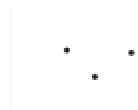
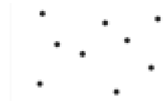
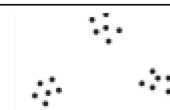
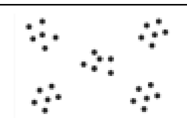
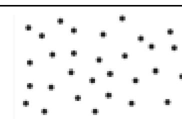
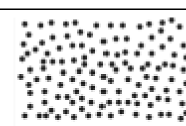
Site	Date	Observers	Waypoint #	Latitude[1]	Longitude[1]	Distance Class (m)[2]	Soil[3]	Lichen[3]	Willow[3]	Lowbush Cranberry[3]	Photo

[1] Provide latitude/longitude as decimal degrees
[2] Distance Class = Adjacent (100 m); Near (1000 m); Far (>4000 m); Reference (≥15 km)
[3] Include check mark after collection

APPENDIX D
Density Distribution Classes for Invasive Plant Monitoring[6]

[6] Adapted from Luttmerding et al. 1990

Density Distribution Classes for Invasive Plant Monitoring

Class	Density Distribution	No. of plants in 20 m x 20 m area	No. of plants/ha 100 m x 100 m	Diagram	Approximate % Cover Range
1	rare individual, a single occurrence	1	≤5		1–5
2	a few sporadically occurring individuals	2–5	5–50		1–5
3	a single patch or clump of species	1 patch (occupying an area smaller than one quadrant of the plot)	variable (3 patches)		1–10
4	several sporadically occurring individuals	≥6	≥50		5–10
5	a few patches or clumps of species	2–5 patches (each occupying an area smaller than one quadrant of the plot)	variable (3–10 patches)		10–30
6	several well-spaced patches or clumps	≥6 patches (each occupying less than one quadrant of the plot)	variable (10–many disjunct patches)		10–30
7	continuous occurrence of a species with a few gaps in the distribution	many	many (some openings)		30–60
8	continuous dense occurrence of a species	many	many		>60

Notes: The density distribution class is determined over a sufficiently large area to account for normal variation in distribution pattern.

APPENDIX E
Invasive Plant Monitoring Datasheet

ROAD SURVEY

Date:	
Start Time:	
End Time:	
Surveyors:	
Weather:	

Segment[1]	KM	Waypoint #[2]	Latitude	Longitude[3]	Invasive Plant Species[4]								Photos
					MELIALB	MELIOFF	CREPTEC	TARAOFF	TRYFHYB	BROMINE	POAPRA	Other sp.	
1	0–2	KM0	62.907262	-139.078509									
2	2–4	KM2	62.898466	-139.097146									
3	4–6	KM4	62.893653	-139.097643									
4	6–8	KM6	62.882392	-139.123942									
5	8–10	KM8	62.87896	-139.14728									
6	10–12	KM10	62.874359	-139.168471									
7	12–14	KM12	62.876419	-139.205339									
8	14–16	KM14	62.878906	-139.239602									
9	16–18	KM16	62.880417	-139.277966									
10	18–20	KM18	62.886277	-139.313268									
11	20–22	KM20	62.879841	-139.362745									

Notes:

[1] Segment 1 begins at the junction of the northern access route at southern edge of old airstrip and includes the mine site access route up to the boundary of the mine site

[2] Waypoint # marks the start of each kilometre (KM) segment.

[3] Latitude/Longitude are in decimal degrees

[4] Invasive plant species are top Rank 1 invasive plants provided as 7 letter scientific name where the first 4 letters of the genus and the first 3 letters of the species is used. The value recorded in each cell is a density distribution number sources from Luttmerding et al. 1990 available in Appendix C

WALKING SURVEY

Date	Start Time (24 hr)	End Time (24 hr)	Surveyors	Species[1]	Waypoint #	Latitude[2]	Longitude[2]	Site Info[3]	Density Distribution[4]	Notes	Photos

[1] Species names are to be recorded with reference to the Flora of North American available online
[2] Latitude/Longitude are in decimal degrees
[3] Site Info: clearing, pullout, Coffee Camp, airstrip, roadside
[4] Density distribution follows Luttmerding et al. 1990 available in Appendix C