PNG Legacy Site Restoration Project – RFP_RMC_2022_02

Final Report

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Contents

1. Executive Summary

The BC Oil and Gas Research and Innovation Society (BC OGRIS) provided funding to the Halfway River First Nation (Halfway) for the purposes of investigating functional restoration opportunities for legacy petroleum and natural gas (PNG) sites within Halfway member traplines.

There are nine registered traplines belonging to Halfway members. These traplines span almost 8,000 square kilometers from the Graham River in the south the Prophet River in the north and between the Rocky Mountains to the west and the Alaska Highway to the east. Throughout the Dane-Zaa people's history, trapping has played an important role for sustenance, economics and culture. When Halfway adhered to Treaty 8, trapping became a constitutional right. With the advent of colonization, decades of industrial development have caused strain on Halfway's trapping rights.

Petroleum and natural gas (PNG) development on the land has resulted in significant linear disturbance features that have become pathways for predator movement. Efficient predator access puts prey species at risk, which in turn impacts the ability to trap. Functional restoration may be a cost-effective method to reduce predator access and speed up natural regeneration along legacy seismic lines.

The objective of this project is to evaluate functional restoration opportunities on PNG Legacy Sites (i.e., seismic lines) within Halfway River First Nation (Halfway) members' traplines from the trapline owners' perspectives.

Although Halfway would like to conduct functional restoration throughout the legacy seismic lines within member traplines, there are a number of factors that must first be considered. Namely, Halfway recognises a need to understand where trapline owners would like to focus restoration efforts.

Through trapline owner interviews and a desktop study, Halfway identified priority areas for functional restoration within the almost 8,000 square kilometers of traplines. The priority areas were assessed by helicopter over a four-day period. A total of 126 seismic lines within the 9 traplines were identified as warranting functional restoration field assessments. Of these, a total of 75 legacy seismic lines met the high priority criteria set by trapline owners of proximity to cabins, intersecting high elevation habitats, and crossing major river corridors. Halfway recommends further in-depth functional restoration assessment and functional restoration activities for the 126 identified lines, with priority given to the 75 with high priority criteria set by the trapline owners.

Confounding variables to functional restoration of legacy seismic lines include current and future surface disturbance and confidence levels regarding probability that restoration will not be rendered ineffective by surface disturbances. While Halfway trapline owners would benefit from functional restoration of all legacy seismic lines, Halfway recommends beginning restoration efforts in the backcountry. This would allow time for the Province to work on coordinated land management, necessary for assuring that restoration efforts by one group or agency are not rendered ineffective by another.

The long-term success of functional restoration will depend, not only on securing funding and carrying out the on-the-ground work, but on coordinated efforts by all parties to ensure restoration efforts remain effective over the long term.

2. Background

The people of the Halfway River First Nation have occupied the basin of the Peace River, as well as the mountains to the west, since time immemorial. The Dane-zaa have been a nomadic people, moving for hunting, gathering, and fishing, a pattern that persisted long after the fur trade was introduced (Ridington 1981). Their ties to the land, meaning all their traditional lands as well as the water, air, wildlife and natural systems, are inexorably tied to who they are, how they live, and how they think. Until recently, the Dane-zaa were hunter-gatherers, with social groups consisting of family units tied to a larger nomadic tribe or band, which in turn was tied to all the Beaver Indians (and other Bands of the Peace River area) who met in large gatherings each summer. In many cases, these gatherings occurred in the Montney, Fort St. John, Taylor or Attachie areas in and around the Peace River valley. Prior to contact with non-Aboriginal people in the late 1700s, effectively all the Dane-zaa's needs were met by living from the land, not taking more than they needed, using limited tools and technology, and relying primarily on knowledge passed down from generation to generation.

The Dane-zaa first encountered Europeans between 1789 and 1793. At that time, these First Nations people were established in the Peace River valley and all over the northeast slopes of the Rocky Mountains. Change occurred rapidly thereafter. By the end of the 18th century the Northwest Company's forts were established and First Nation movements began to stabilize around them. During the fur trade era, trapping became an important economic aspect of life but has declined in economic importance in the past half-century with declining fur prices.

The opening up of the Peace River Block led to settlement pressures including uptake and clearing of large amounts of land by non-aboriginal farmers. Increased incursion by non-aboriginal trappers escaping the Great Depression of the 1930s lead to the establishment of a provincial trapline registration system, which negatively impacted both the subsistence and trade economies of the Dane-zaa, who previously did most of the hunting, trapping, and fishing in the region.

Implementation of the provincial trapline registration system resulted in many of the traditional trapping areas of the Dane-zaa families being taken over by non-aboriginal trappers (Metes, 1994). This also contributed to a decline in the fur-bearing population because traplines could easily be bought and sold. This meant there was little incentive to steward animal populations, as Dane-zaa had done previously through leaving areas "fallow" when they observed depletion of wildlife stocks. The consequence was more intense poverty for First Nations, who relied heavily on fur sales for provisions and meat and other materials from harvested animals for sustenance.

Halfway members continue to trap and some own provincial traplines. The construction of trapline cabins by Halfway has been a positive action for supporting member activities on the land. Halfway wanted to participate in this OGRIS project from a trapline perspective because of the historical importance of trapping and because it is a meaningful practice of Treaty 8 rights today. Protecting trapping as a way of life honours the treaty.

Based on an existing body of published research, linear disturbances have the potential to cause a range of ecological responses including stream sedimentation, vegetation disturbance, spread and establishment of invasive species, and a range of behavioural and population-level responses of various wildlife (Government of Alberta 2018). As such, linear corridors (including seismic lines) negatively influence treaty rights.

This project seeks to evaluate opportunities for functional restoration within Halfway members' traplines to reduce impacts on the meaningful execution of a fundamental treaty right. There are nine

identified member traplines which are located to the west and north of Reserve #168 and encompass the several major watersheds including: Graham River, Halfway River, Cameron River, Chowade River, Cypress Creek, Cameron River, Sikanni River and Prophet River. These trapline areas overlap zones of cultural significance for Halfway and are integral to the continuance of the practice of treaty rights including hunting, fishing, and trapping.

An analysis of available legacy seismic data from the Province (Geospatial 1996-2004 and Geospatial 2002-2006) indicates that there are approximately 2,315 kilometers of legacy seismic lines within the nine identified traplines.

3. Objective and Scope

The objective of this project is to evaluate functional restoration opportunities on PNG Legacy Sites (i.e., seismic lines) within Halfway River First Nation (Halfway) members' traplines from the trapline owners' perspectives.

The information gathered in this project will inform potential locations for areas of further in-depth functional restoration assessment and functional restoration activities. Functional restoration may be a cost-effective method to reduce predator access and speed up natural regeneration along legacy seismic lines.

This objective was developed within the broader objectives outlined in the BC OGRIS PNG Legacy Site Restoration Project RFP, which include:

- Address the interests of NEBC Treaty 8 First Nations, government agencies, stakeholders, the public, and funding entities in the restoration of legacy PNG disturbances;
- Support the implementation of restoration strategies and techniques that incorporate both current research and NEBC Treaty 8 First Nation traditional ecological knowledge; and
- Successfully allocate the funding provided by the federal government to support the implementation of the Legacy Sites Reclamation Program.

The scope of this project is constrained to the identification of suitable locations to conduct functional restoration assessments of legacy seismic lines. The project does not include functional restoration prescriptions or execution. It was deemed unfeasible to carry out restoration activities without first gaining a solid understanding of where functional restoration execution would be beneficial within the trapline areas.

4. Methods

This project was completed following the steps outlined below:

Step 1: Trapline Holder Interviews

Trapline owners and family representatives were invited to participate in in-person interviews at the Halfway Lands Office.

Prior to interviews, overview maps depicting each trapline were created. Map data were derived from an ARC GIS platform and consisted of imagery, roads, water features including creeks and rivers, and Halfway member trapline boundaries. Maps were plotted at 1:50,000 scale.

Interviews were conducted by a consultant (ecologist) with a member of the Halfway Lands office present. The Halfway Lands office staff member assisted in scheduling interviews and helping to translate scientific-based questions.

Interviews were approximately four hours long and focused on gathering the following information:

- historical use,
- current use, and
- areas of focus for assessment and potential functional restoration.

In all cases, printed overview maps were used to facilitate discussions.

Step 2: Desktop Review

Due to the large geographical area of the combined traplines, and based on trapline owner and representative interviews, areas of focus for field assessment were identified.

Areas of focus for field assessment were:

- Areas in and around existing trapping cabins, as identified through interviews as containing culturally important values;
- Areas in and around proposed trapping cabin locations, as identified through interviews as containing culturally important values;
- Areas in and around high elevation habitats, as identified through interviews as being culturally important features;
- Areas in and around waterways and riparian areas, as identified through interviews as being culturally important features;

Trapline areas were spatially displayed and reviewed using an ESRI / ARC GIS platform.

The ESRI ARC / GIS platform was used to overlay the following spatial layers:

- Basemap imagery
- Roads
- Streams

- Wetlands
- Rivers
- Lakes
- Trapline boundaries (Halfway member owned)
- BC Oil and Gas Commission Geophysical Lines including:
    - Geophysical (seismic) features: 1996-2004
    - Geophysical (seismic) features: 2002-2006
    - Geophysical ancillary features
    - Geophysical lines (permitted)

Georeferenced maps with areas of focus were produced for use on iPads during field assessment, as follows:

Cabins

- Cabin locations were identified;
- A five-kilometer radius buffer was created around each cabin location;
- Geophysical features as found in the provincial database were added as a map layer; and
- Linear features not in the government layers highlighted, where possible.

High Elevation Habitats

- High elevation habitats, including mapped Ungulate Winter Ranges (UWRs) and Englemann Spruce / Subalpine Fir (ESSF) biogeoclimatic zones were identified;
- Geophysical features as found in the provincial database were added as a map layer; and
- Linear features not in the government layers highlighted, where possible.

Halfway Mapped Cultural (TUS) Data in and around Major River Corridors

- TUS data, specifically point data, were identified;
- Geophysical features as found in the provincial database were added as a map layer; and
- Linear features not in the government layers highlighted, where possible.

Overlay with Existing & Future Development

Given the amount of development in some of the traplines, particularly the areas closer to Highway 97 (front country), assessment areas were refined as follows:

- Cabin areas, regardless of development, were assessed.

- Legacy seismic lines in and around high elevation habitats were assessed outside of the more developed areas.
- Legacy seismic lines in and around major river corridors were assessed outside of the more developed areas.
- Legacy seismic lines in and around documented traditional use areas were assessed outside of the more developed areas.

Step 3: Field Assessment

The field assessment portion of this project was completed over four days using a helicopter with a crew consisting of one consultant (ecologist) and two Halfway members (trapline owner and family representative).

Helicopter flight duration was between four and five hours each day, with provisions for commute to and from the hangar to the trapline area and re-fuelling.

The helicopter pilot was provided with a mapped location of trapline cabins (either UTM or KMZ) as a guide to the general trapline area.

Using an IPad with georeferenced maps, the assessment crew directed the helicopter pilot to areas of focus within each trapline boundary.

When in the priority areas, the crew assessed existing seismic lines. Assessment criteria included:

- Record (UTM) of assessment point;
- Picture(s);
- Condition of seismic line:
    - General ecological features:
        - Forest
        - Wetland
    - Tree growth:
        - Would prevent vehicle / animal access
        - Would not prevent vehicle / animal access
    - Access signs:
        - Vehicle
        - Animal

Step 4: Analysis

Analysis consisted of evaluating field-identified legacy seismic lines in terms of benefit and feasibility of functional restoration.

Restoration benefit increases when:

- Seismic line is in proximity of cabin;
- Seismic lines allows access into alpine;
- Seismic line allow access into high elevation forest;

- Seismic line overlaps riparian area; and
- Seismic line overlaps mapped TUS.

Feasibility increases when:

- Restoration area is accessible by restoration crews / equipment; and
- Restoration area will not be rendered ineffective by current and / or future surface disturbance.

5. Results

Interviews

Interviews took place over a five-day period.

Desktop Review

Areas of focus were mapped according to cabin location, high elevation habitat, and river corridors and associated TUS data.

These areas were then overlayed with existing and known future development.

Once the overlay was complete, the results were discussed with the Halfway Lands Department.

Discussion results included:

- Existing development includes the need to maintain and re-establish access for maintenance and deactivation purposes.
- The Halfway Reserve and areas where members currently practice treaty rights, including member traplines, is within the Montney Play, a major natural gas formation. Halfway anticipates significant PNG development across the landscape. Halfway also anticipates greater forestry activity if new areas are slated for deferral or protection and the annual allowable cut for the Fort St John Timber Supply Area is not reduced.
- Given existing known future development and anticipated future development, Halfway feels that there will be greatest success in focusing functional restoration in the backcountry, where development pressures are lower.

Given the above, assessment areas were refined. Cabin areas, regardless of development, were assessed. Legacy seismic lines in and around high elevation habitats and major river corridors were assessed outside of the more developed areas. Specifically:

<u>Trapline “A”</u>

- Focus on legacy seismic lines in and around the trapline cabins;
- Focus on legacy seismic lines along the Prophet River; and
- Focus on legacy seismic leading into and within high elevation habitats.

<u>Trapline “B”</u>

- Focus on legacy seismic lines in and around the trapline cabin;
- Focus on legacy seismic lines along the Sikanni River;
- Focus on legacy seismic lines around Lily Lake; and
- Focus on legacy seismic lines leading into and within high elevation habitats.

Trapline “C”

- Focus on legacy seismic lines along the Halfway River;
- Focus on legacy seismic lines around Cypress Creek; and
- Focus on legacy seismic lines leading into and within high elevation habitats.

Trapline “D”

- Focus on legacy seismic lines around existing cabin; and
- Focus on legacy seismic lines around the Cameron River headwaters;

Trapline “E”

- Focus on legacy seismic lines around existing cabin;
- Focus on legacy seismic lines around the Halfway River and Big Creek; and
- Focus on legacy seismic lines leading into and within high elevation habitats.

Trapline “F”

- Focus on legacy seismic lines around existing cabin;
- Focus on legacy seismic lines around the Chowade River;
- Focus on legacy seismic lines between Horseshoe Creek Road and the Halfway River; and
- Focus on legacy seismic lines leading into and within high elevation habitats.

Trapline “G”

- Focus on legacy seismic lines around existing cabin;
- Focus on legacy seismic lines around the Graham River; and
- Focus on legacy seismic lines leading into and within high elevation habitats.

Aerial Assessment

From the aerial assessments, a total of 126 seismic lines within the 9 traplines were identified for conducting functional restoration field assessments.

A summary of the number of seismic lines identified for functional restoration field assessments within each trapline is provided in Table 1.

Table 1 – Seismic lines identified for field assessment within each trapline

Trapline Number	Seismic Lines Identified for Field Assessment
TR0736T004	9
TR0736T005	6
TR0742T003	26
TR0743T001	19
TR0743T002	13
TR0743T003	7
TR0743T006	13
TR0744T005	10
TR0744T006	23
Total number of seismic lines identified for field assessment	**126**

Figures 10 to 19 show the locations of the seismic lines within each Halfway members' trapline that were identified for conducting functional restoration field assessments.

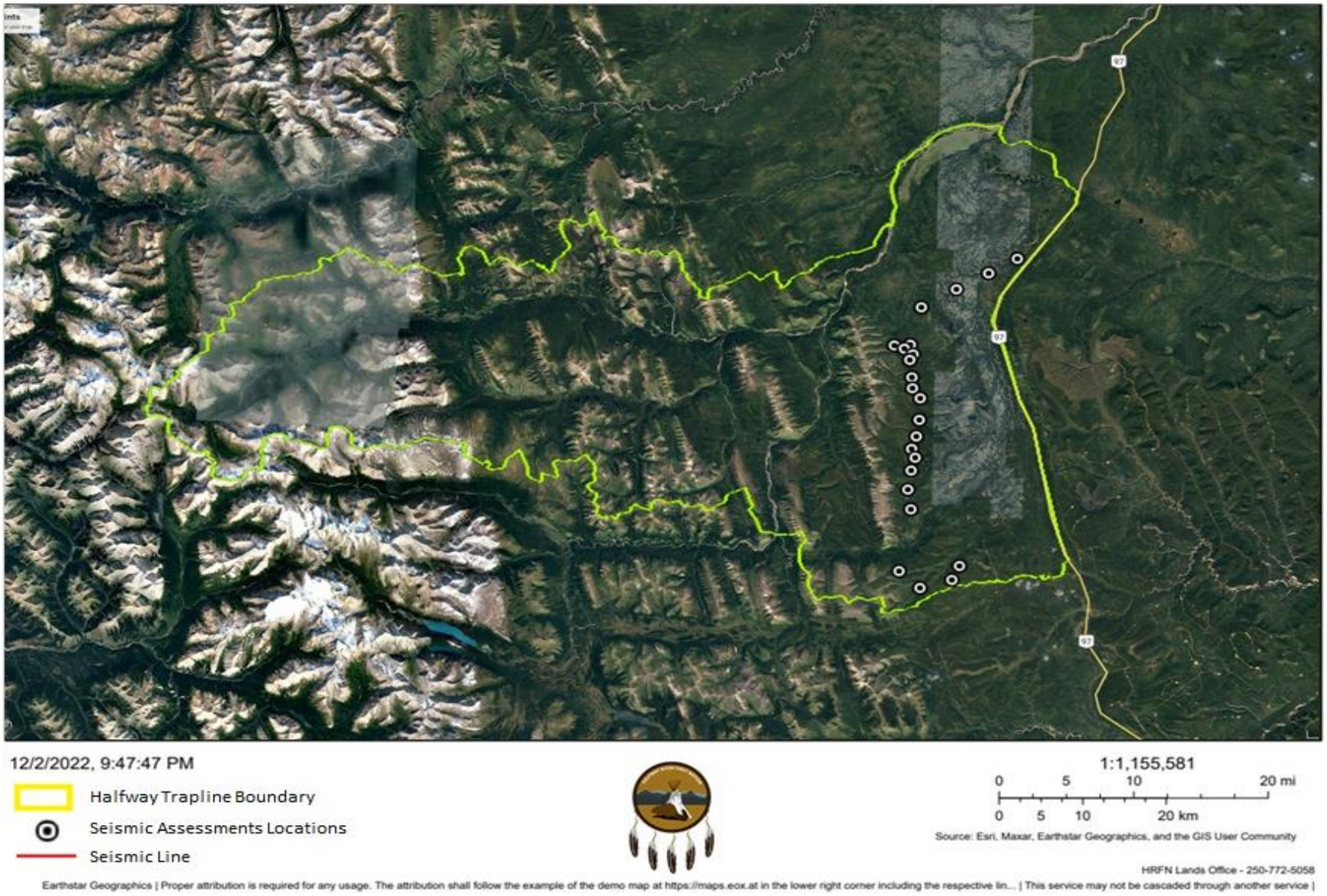

Figure 10. Trapline “A” Seismic Assessment Locations

Figure 11. Trapline “B” Seismic Assessment Locations

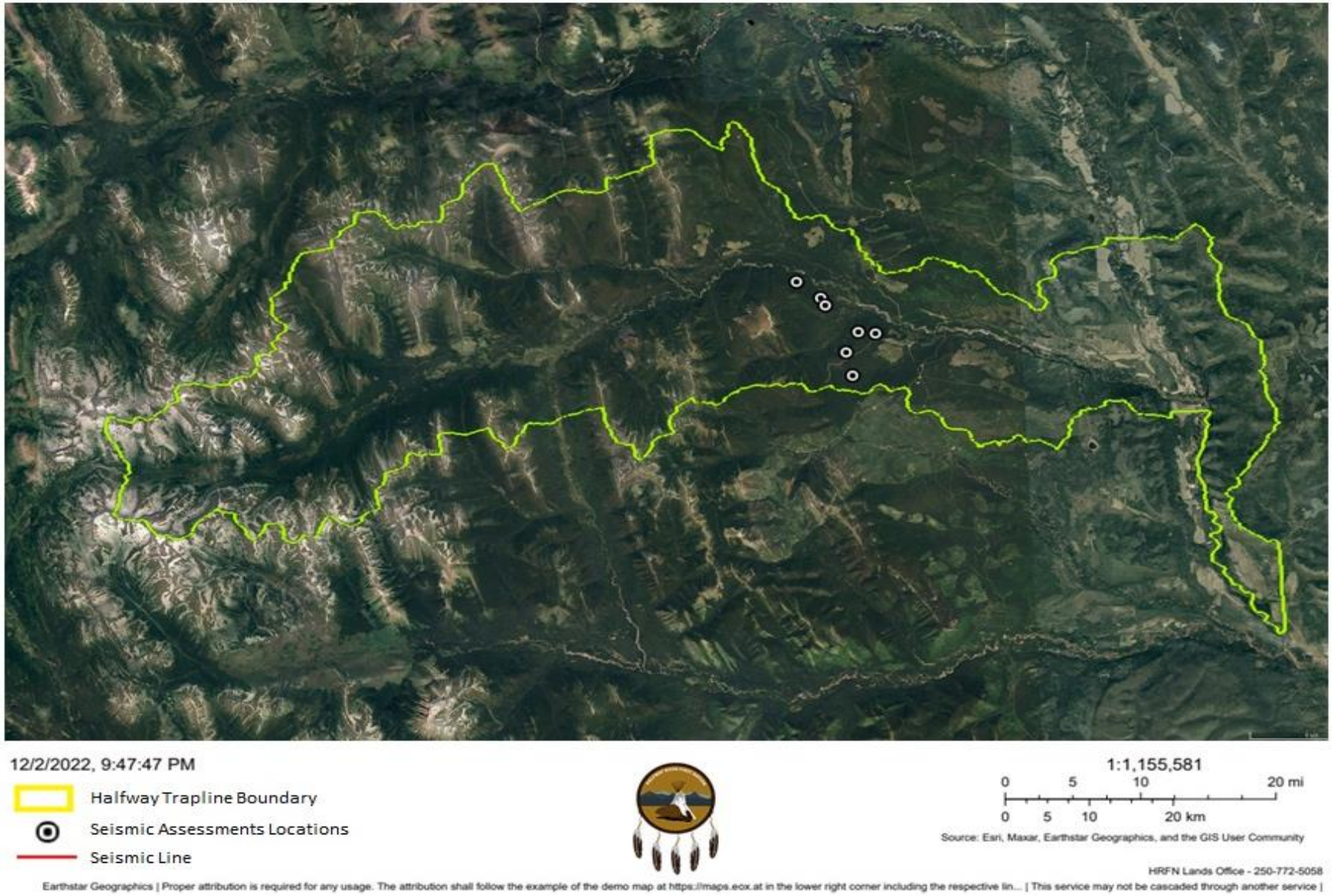

Figure 12. Trapline "H" Seismic Assessment Locations

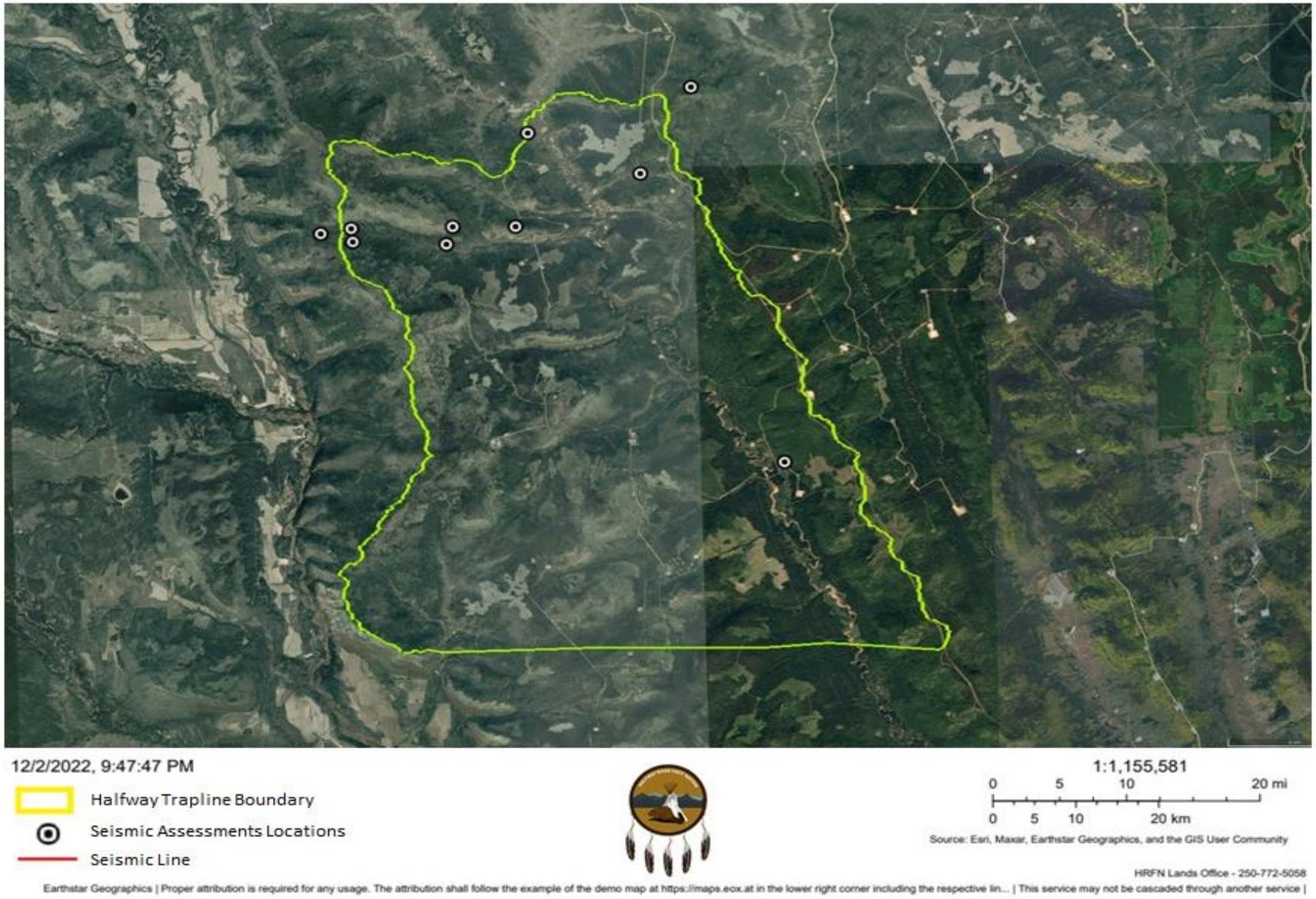

Figure 13. Trapline “D” Seismic Assessment Locations

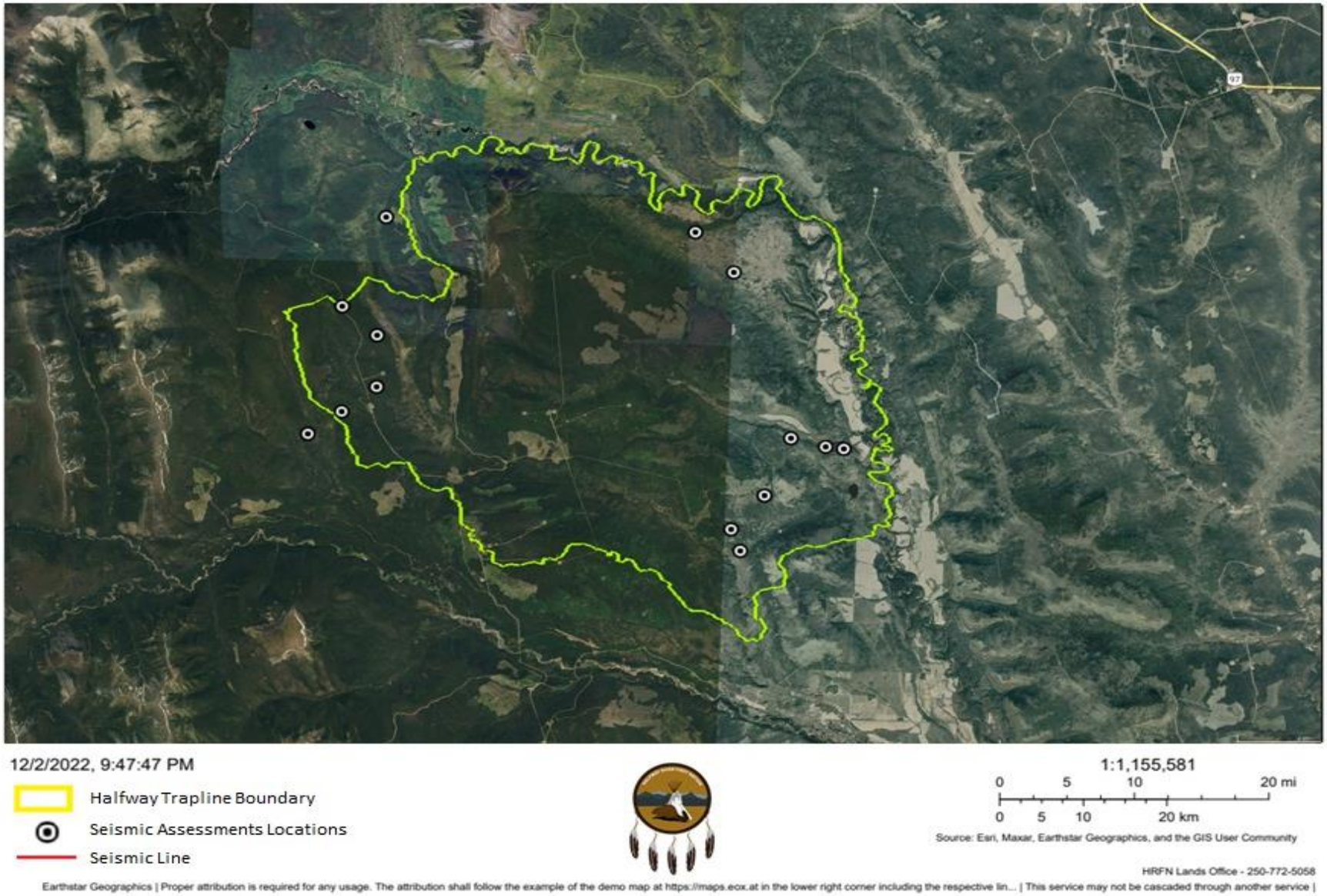

Figure 14. Trapline "C" Seismic Assessment Locations

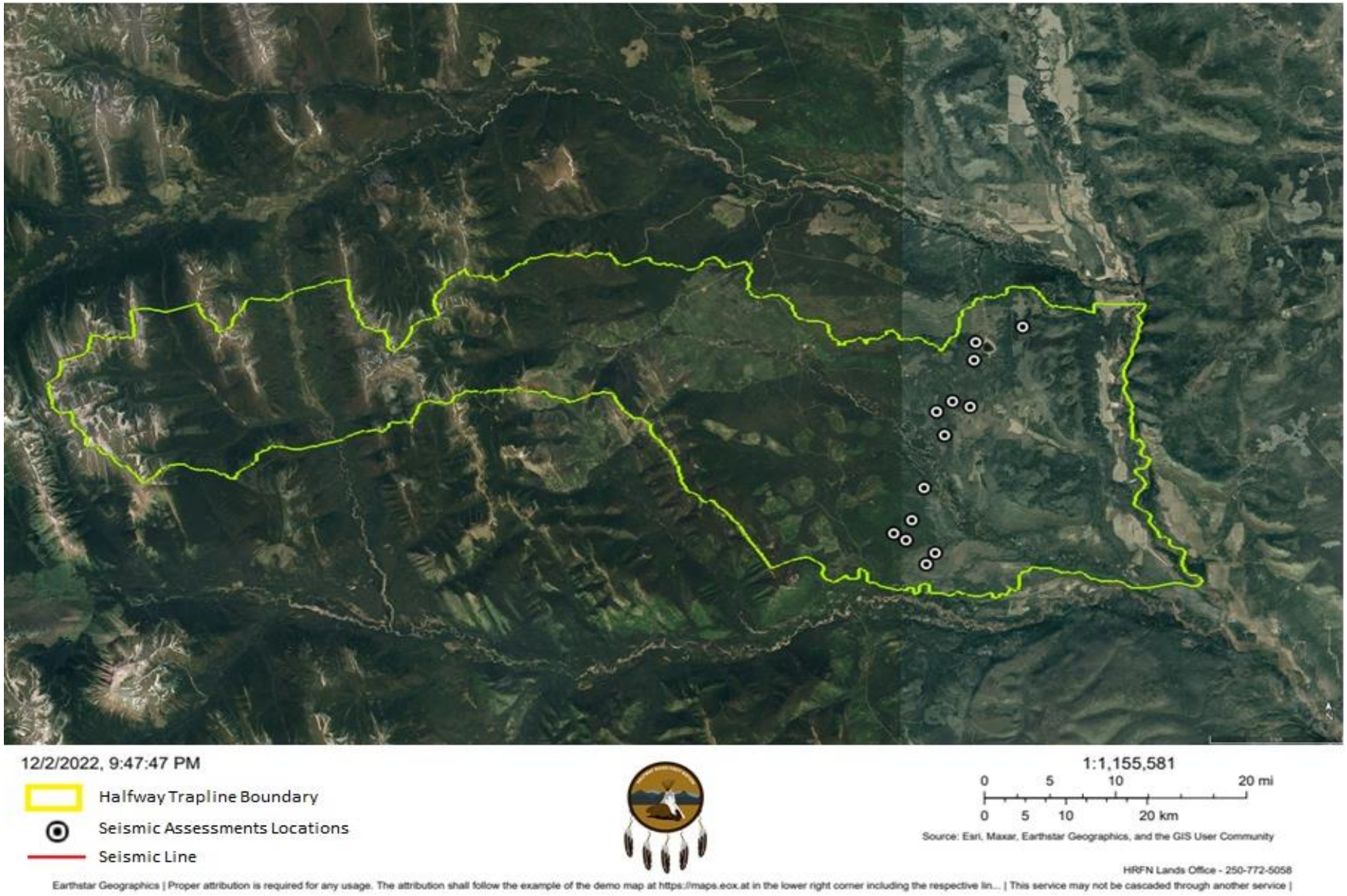

Figure 15. Trapline “E” Seismic Assessment Locations

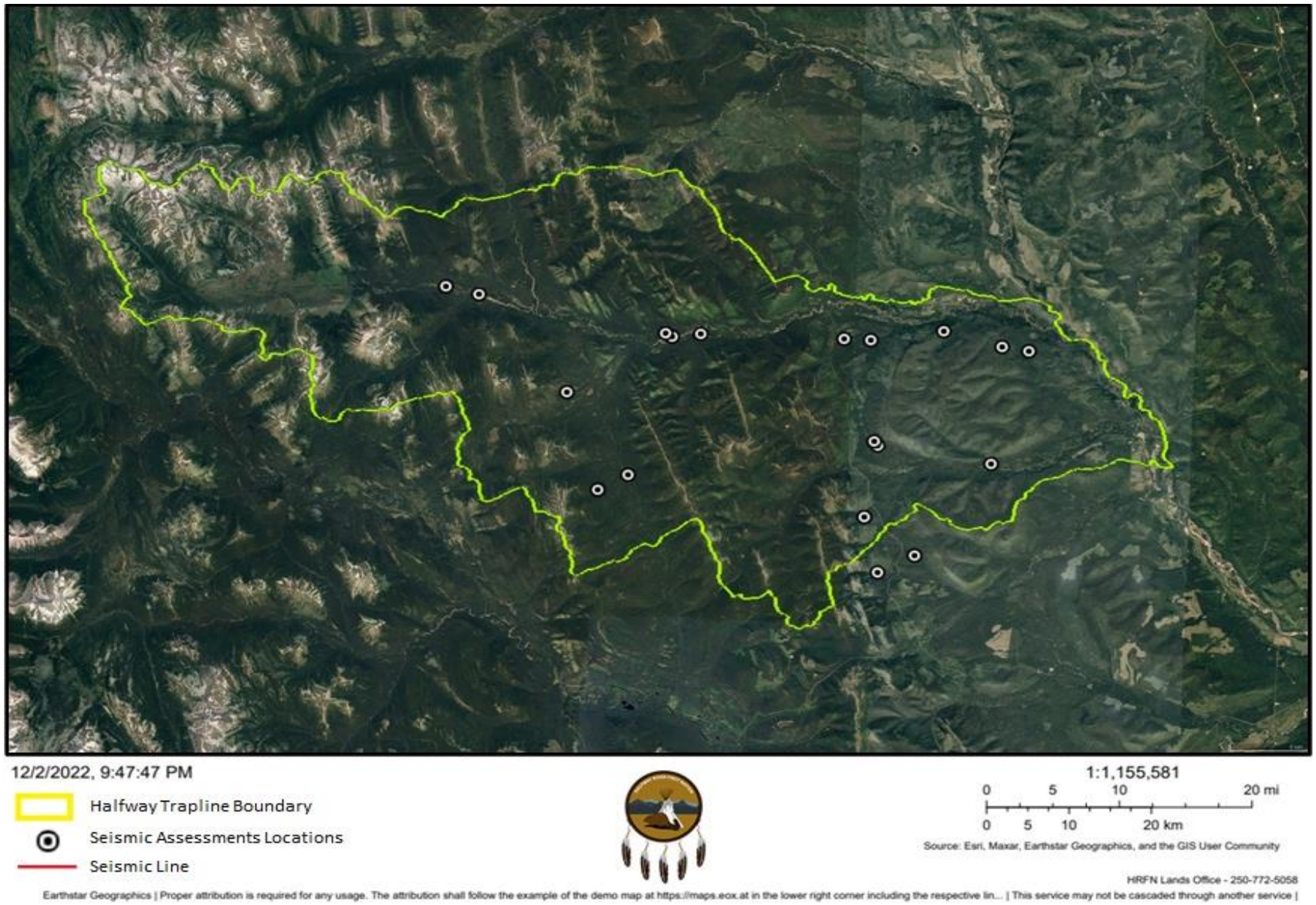

Figure 16. Trapline "F" Seismic Assessment Locations

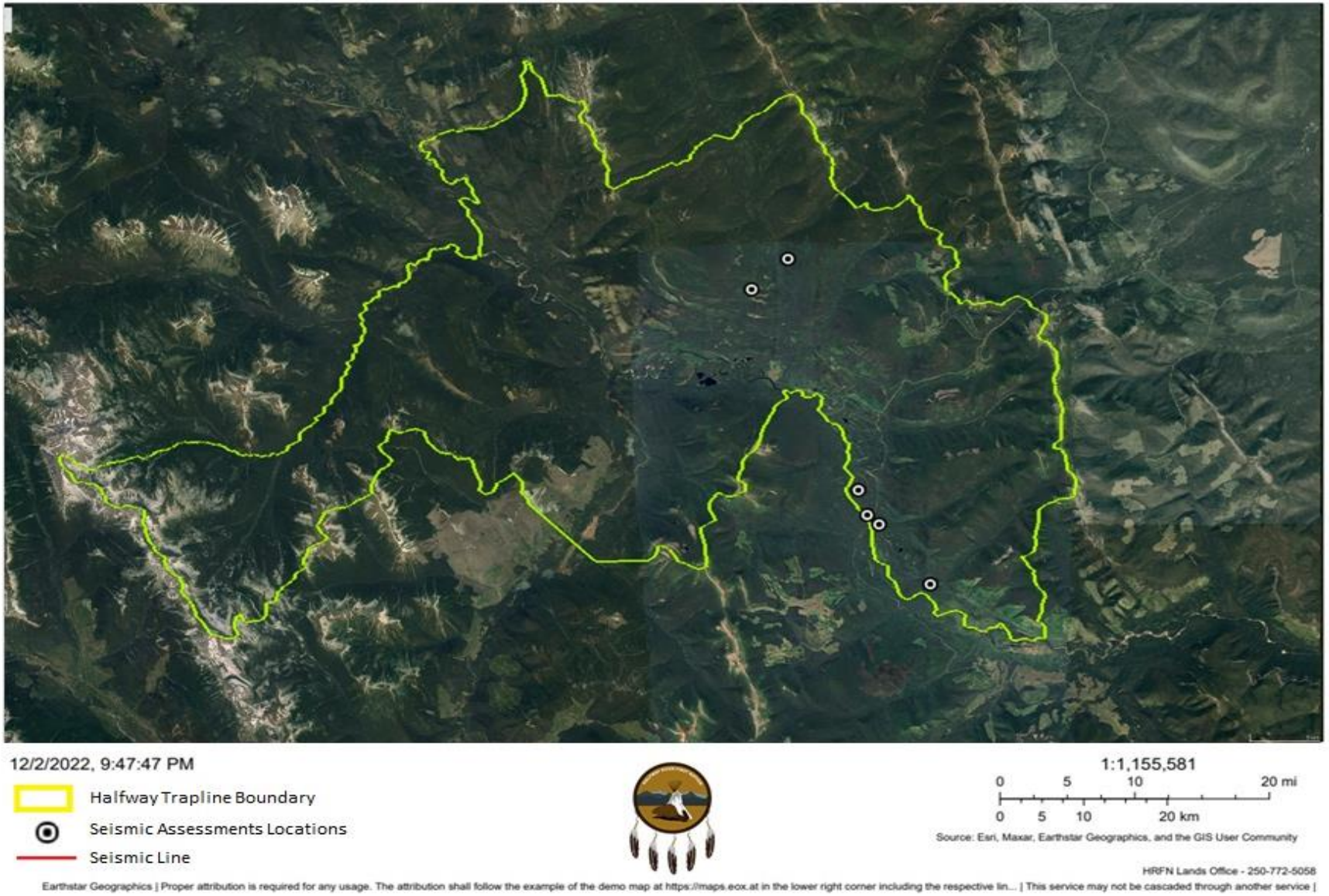

Figure 17. Trapline "G" Trapline Seismic Assessment Locations

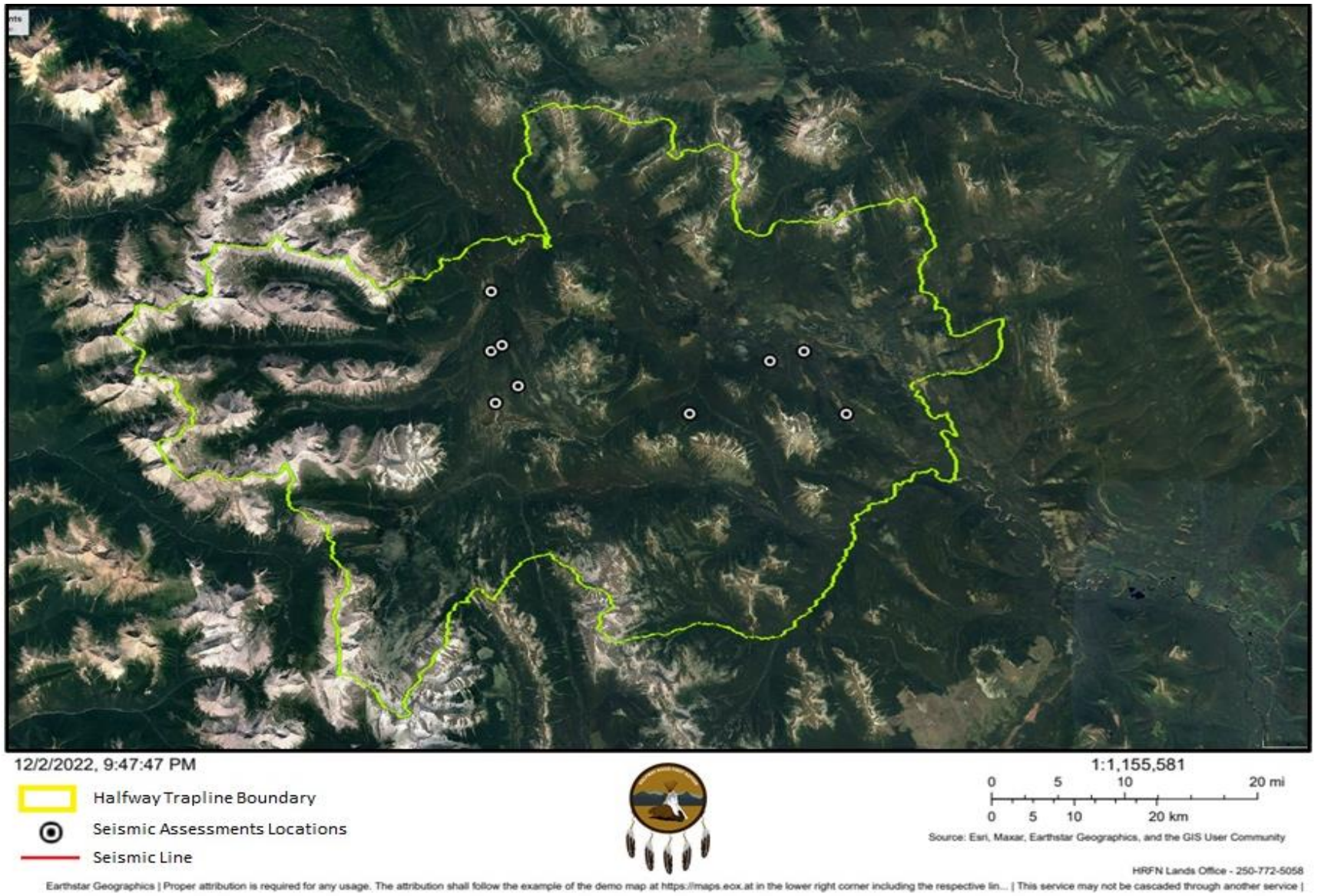

Figure 18. Trapline "I" Trapline Seismic Assessment Locations

Analysis

Of the 126 seismic locations identified for conducting functional restoration field assessments 77 were located in or intersected high priority area for Halfway member trapline owners (Table 2). This includes:

- 29 intersected high elevation habitats;
- 35 crossed waterways/riparian areas;
- 7 in proximity to sensitive traditional use areas; and
- 4 were in the vicinity of existing or proposed Halfway member trapping cabins.

Table 2 – Seismic lines identified for field assessment within each trapline

Trapline Number	High Priority Seismic Lines Identified for Field Assessment
TR0736T004	9
TR0736T005	6
TR0742T003	17
TR0743T001	19
TR0743T002	3
TR0743T003	4
TR0743T006	4
TR0744T005	3
TR0744T006	12
Total number of high priority seismic lines identified for field assessment	**77**

Figures 20 and 21 show examples of locations intersecting high elevation habitats (assessment points “A”-21 and “G”-6).

Figures 22 and 23 show examples of locations crossing waterways (assessment points “B”-23 and “B”-14).

A kmz of the 126 seismic assessment locations by trapline is provided in Appendix A.

A kmz of the 75 high priority seismic assessment locations by trapline are provided in Appendix B.

Photos of seismic assessment points are provided in Appendix C.

Figure 20. Assessment point “A”-1c, intersecting high elevation habitat (specifically an UWR)

Figure 21. Assessment point “G”-6, intersecting high elevation habitat (specifically an UWR)

Figure 22. Assessment point “B”, a location crossing the Cameron River

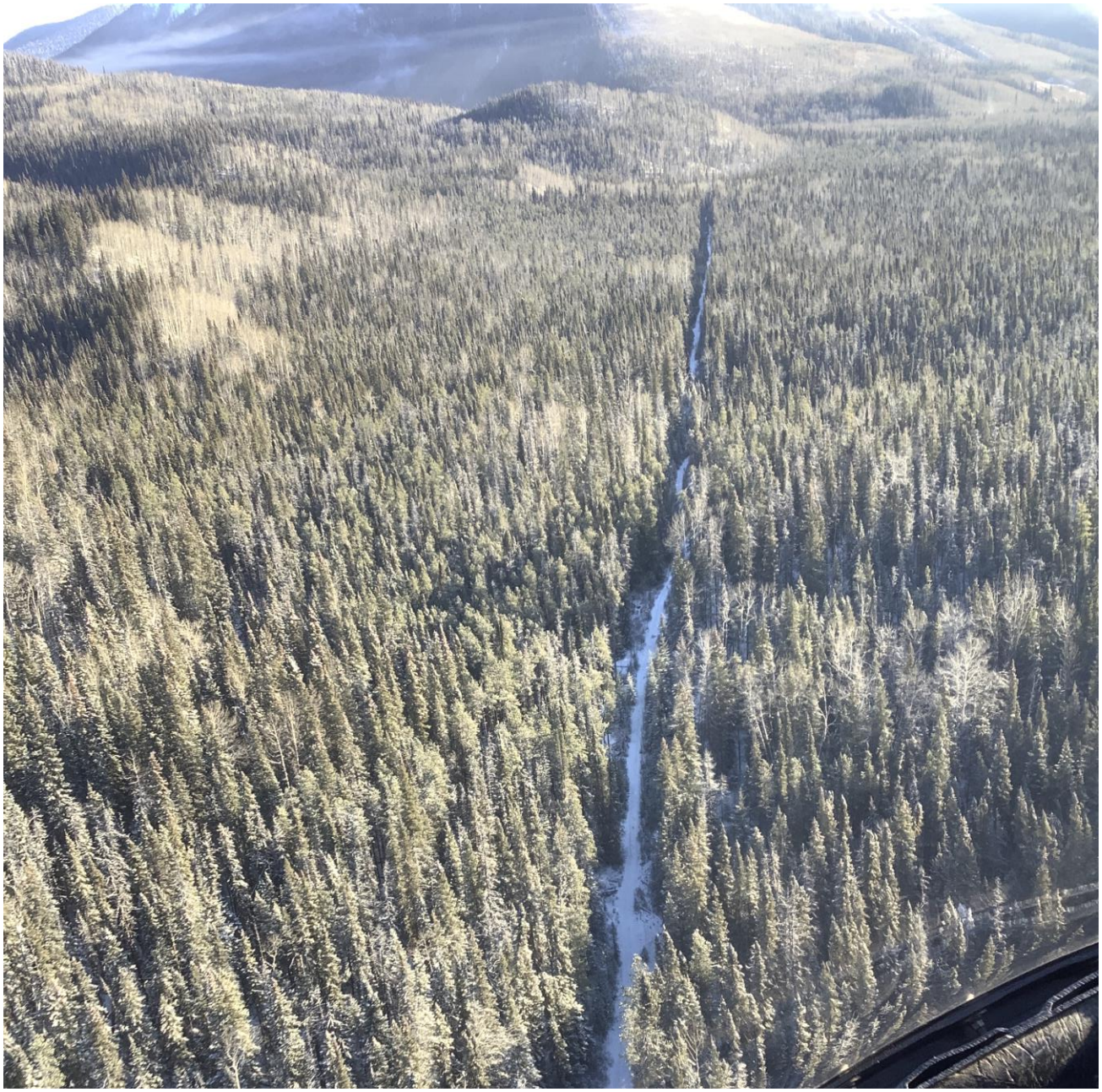

Figure 23. Assessment point “G”-1

Seismic lines identified for functional restoration field assessments had a wide variety of natural regeneration success, ranging from poor regeneration (Figure 24) to good regeneration (Figure 25).

Seismic lines also intersected a variety of habitats, ranging from wetlands (Figure 26) to dense forests (Figure 27).

In addition, seismic lines identified had a range of observable use, including recreational (Figure 28) and wildlife use (Figure 29).

Figure 24. Assessment point “C”-14, a location with poor natural regeneration success

Figure 25. Assessment point “A”, a location with good natural regeneration success

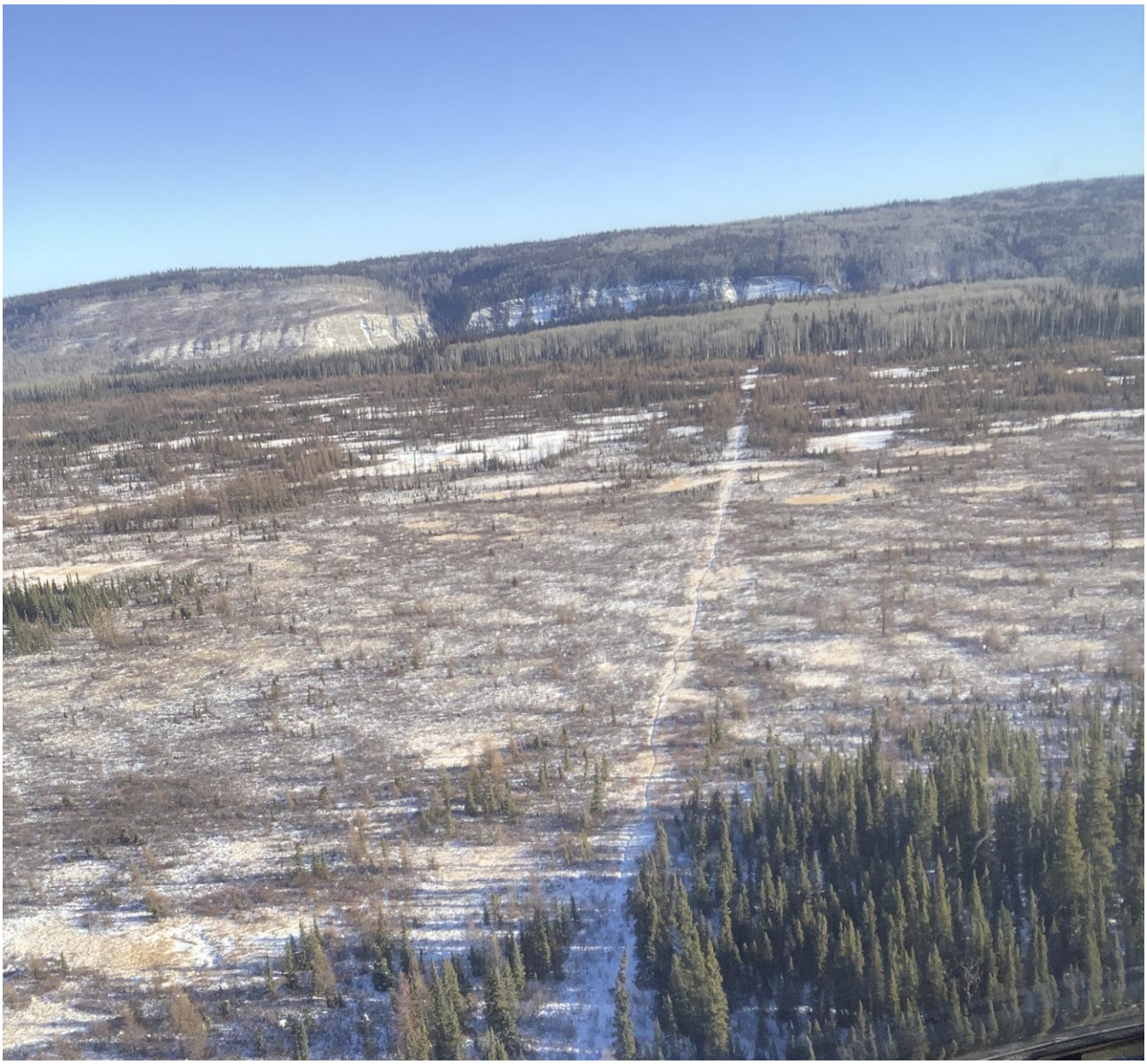

Figure 26. Assessment point “C”-8, a location in a wetland

Figure 27. Assessment point “F”-1, a location in dense forest

Figure 28. Assessment point “C”-4, a location with heavy recreational use

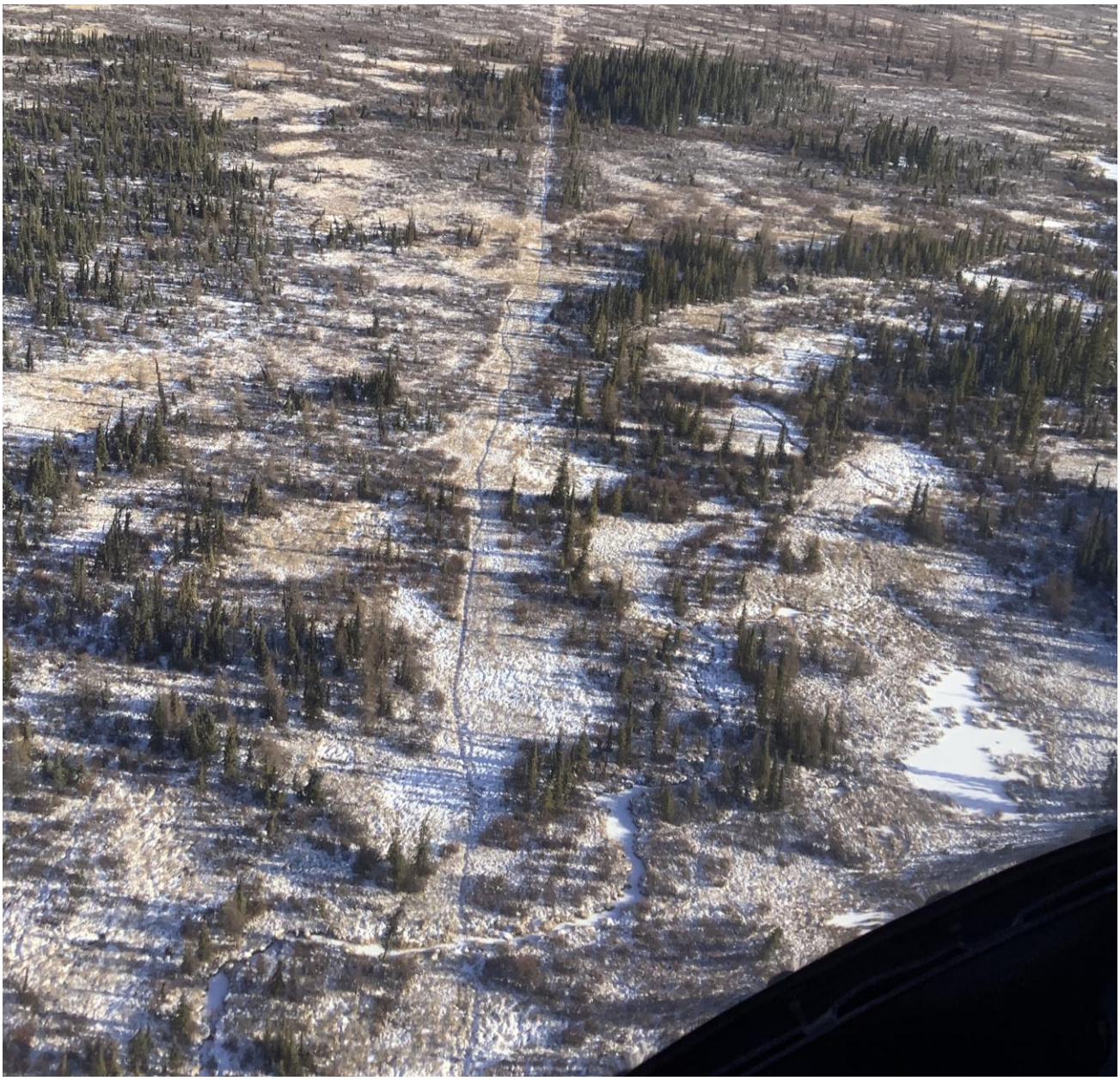

Figure 29. Assessment point “C”-8, a location with high wildlife use

6. Recommendations

Field Assessments

This project identified areas of focus within the nine Halfway members' traplines based on several factors including:

- Trapline owner priorities and values;
- Existing and known future development, and
- Available linear disturbances for restoration.

By narrowing down the areas of focus and identifying specific seismic lines for functional restoration field assessments, the field time and effort will be much more productive.

Functional restoration field assessments (like those conducted under RFP_RMC_2022_01 for Tsaa Nuna) provide valuable information on a site's current status. The field assessments also provide inputs for the restoration prescription to ensure functional restoration needs are addressed, Halfway's and the trapline holders' values are protected, and contribution to functional restoration success.

Priority Locations

Halfway recommends functional restoration field assessments be completed during the next field season (2023 snow free season) on the identified 123 seismic lines.

Given there could be potential time and budgetary constraints to this approach, Halfway has identified 75 priority seismic locations.

The 75 priority sites have been selected because:

- they are within and/or intersect important habitat areas and corridors (i.e. high elevation habitats, UWR's, riparian areas);
- they are within areas with the lowest amount of permanent development (i.e. where there are fewer roads, pipelines, well sites and cutblocks);
- they are areas in proximity to traditional use areas.

7. Discussion

Halfway member trapline owners recognise both benefits and pitfalls of legacy seismic lines. Seismic lines create easier and faster access within the trapline. The more seismic lines there are, the better the access. However, better access comes at a cost. While some access may be beneficial to a trapper, access benefits decrease as the following increase:

- Seismic line density;
- Seismic lines that create access through creek and river corridors; and
- Seismic lines that create access into high elevation habitats.

Halfway member trapline owners agree that, even as they may lose easy access, priority functional restoration of legacy seismic lines would improve their ability to trap. Function restoration of legacy seismic lines that reduces linear density and access into key cultural and biologically sensitive areas is the ultimate objective of this project. However, there are many obstacles.

A major obstacle to the implementation of functional restoration is the sheer amount of legacy seismic lines within trapline boundaries. Amount can be measured both by the number of kilometers and the density. Observing the “D”, “B”, and “C” Traplines, one is struck by the overwhelming density of seismic lines. When observing traplines such as the “G” and “I” Traplines, the lines are remote and traverse high elevation forests ‘for miles and miles’. The “A”, “H”, “E”, and “F” traplines have both density and length to contend with in portions of their traplines. The first question on restoration implementation is, “Where to begin?” Other questions that quickly follow are, “How much will this cost?” and, “Where will the money come from?” Halfway believes these questions are answerable. However, the Lands Department at Halfway knows there are confounding variables that must be addressed before the money is spent.

Confounding variables to functional restoration of legacy seismic lines include current and future surface disturbance and confidence levels regarding probability that restoration will not be rendered ineffective by surface disturbances. Using the “D” Trapline as an example, there are roads, pipelines, wellsites, and forestry cutblocks throughout the entire trapline area. Not visible are the proposed roads, pipelines, wellsites, forestry cutblocks, and other future disturbances such as aggregate development, Crown land leases, licences of occupation, and dispositions.

Initially proposed functional restoration locations have been met by Halfway’s Lands Department with questions such as, “How will this proposed PNG development, including the road, the pipeline and wellsite, interact with the functional restoration proposed in this location?” The response has been that the proposed development will eradicate the proposed restoration. It is not possible to predict all of the upcoming development and guarantee the long term success of legacy seismic restoration without a concerted and coordinated effort by the Province. Provincial agencies need to work together to plan where and when development will occur with consideration for restoration efforts. Proposed restoration sites in frontcountry areas where future development is imminent have therefore been dropped until concerted and coordinated land management across provincial agencies occurs.

Frontcountry seismic restoration in riparian areas would also be of great benefit. However, in addition to the confounding variable of future development uncertainty with respect to restoration success over the long term, this project notes that frontcountry floodplain areas have been overwhelmingly transferred to fee simple. This project initially recommended function restoration in floodplain areas

with overlapping Traditional Use (TUS) data, such as marked and mapped grave sites. However, the graves sites are on private land. Again, because of land conversions, in conjunction with proposed future development, proposed restoration sites in frontcountry areas where future development is imminent have been dropped.

This project's recommended functional restoration locations are therefore concentrated in the backcountry, remote areas where future development is less likely to have a negative impact on restoration efforts and where the Province has not rendered cultural spaces ineffectual or eradicated them altogether.

Focusing functional restoration efforts in remote, backcountry areas will have benefits for trapline owners. Backcountry seismic lines tend to be older, 2D lines, in high elevation forests. The combination of bladed trails and slower growing high elevation forest ecosystems means that these seismic lines are not regenerating quickly. Much has been said of how this access is used by wolves and how wolf access is detrimental to the caribou. It is also true that the predators have access to other prey along the way. Wolves with easy access to squirrels eradicate a food source essential to marten. Trapline owners note that marten is scarce these days.

Backcountry restoration along creek and river corridors benefits Halfway member trapline owners and the Dane-zaa in general. Creek and river corridors are where animals travel and thus where Dane-zaa have travelled with the animals in the seasonal round. This is where mapped cultural data is densest. Restoration of riparian areas restores important animal habitats and improves trapping success; it also restores disturbances to cultural values in a holistic way.

Functional restoration can occur everywhere and it will take concerted and coordinated efforts. Halfway intends to take the results and learnings from this project and connect them to ongoing efforts by the Lands Department and by Chief and Council. Halfway encourages OGRIS to do the same by taking the results and learnings to the Oil and Gas Commission and to governing provincial ministries. At the writing of this report, Halfway and the Province are negotiating a coordinated land management Pilot Project to begin to address cumulative impacts to the land and Treaty 8 rights. The Pilot Project table may a good place for all parties to begin discussing how to implement seismic restoration as part of holistic land management.

Appendix A – Seismic Assessment Points

Appendix B – High Priority Seismic Assessment Points

Appendix C –Seismic Assessment Point Photos