

Appendix G

Anderson TIA Terrestrial Shoreline Survey Memo



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Anderson TIA Expansion NOA:
Terrestrial Shoreline Survey

Project ref:
60686634

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From:
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Date:
September 27, 2023

Memo

Subject: Anderson Tailings Impoundment Area - Terrestrial Shoreline Survey
Hudbay Minerals Inc. – Anderson Tailings Impoundment Area Expansion Notice of Alteration

Introduction

This report summarizes the results of a terrestrial shoreline survey conducted along the Anderson Tailings Impoundment Area (Anderson TIA) shoreline during the September 2023 water quality sampling program. The terrestrial shoreline survey was completed as a part of the pending Anderson TIA Expansion Notice of Alteration to be completed by AECOM on behalf of Hudbay. The following report describes the riparian shoreline environment, and terrestrial shoreline environment of six (6) types of shorelines in the Anderson TIA. Shoreline types are broadly defined by their habitat composition. Much of the Anderson TIA shoreline environment is relatively similar, with slight variations in current conditions. A map indicating the shoreline types can be found in **Appendix A**.

Survey Summary

Incidental Wildlife Observations

Although not specifically surveyed, evidence of habitat use by fauna species were documented during terrestrial and shoreline survey. Signs of black bear (*Ursus americanus*) and moose (*Alces alces*) were observed in cleared areas along the shoreline. Various migratory bird species (Canada Geese (*Branta canadensis*), Common Loon (*Gavia immer*), and several duck species), Common Ravens (*Corvus corax*), gull species (*Laridae* family), and Bald Eagles (*Haliaeetus leucocephalus*) were observed in and around Anderson TIA.

Upstream Inflow

The aquatic environment immediately downstream of the natural inflow into Anderson TIA, located in the furthest southwest portion of the Anderson TIA, is characterized by many partially submerged dead standing trees. This area is shallow with very little aquatic shoreline vegetation. A series of beaver dams are located just upstream of the inflow into Anderson TIA. At the time the survey was conducted water levels were well below the top of the existing dams, with no apparent flow into Anderson TIA. The beaver dams are highly vegetated with typical riparian vegetation (aquatic sedges and grasses, Typha sp., Equisetum sp., etc.) and exhibit a high concentration of algal growth, indicating healthy nutrient levels in the upstream waters.

In contrast, most of Anderson TIA has little to no riparian vegetation along its shoreline. The terrestrial shoreline surrounding the inflow is typical of the Anderson TIA area, with a mature forest stand of black spruce, balsam poplar, and trembling aspen, and an understory of brush, sedges, and grasses.

Figure 1 – Anderson TIA Upstream Inflow, Exposed Tailings, and Surrounding Area



Figure 2 – Anderson TIA Upstream Inflow and Nearby Tailings Pipes



Anderson Tailings Impoundment Area

Shoreline Type 1

The aquatic shoreline had little sign of riparian vegetation, with no submerged or emergent aquatic vegetation within the shallowest portions of the shoreline. Many cleared and fallen trees, along with dead standing trees in the water, were present along the shoreline, creating an irregularly sloped benthic environment. The immediate terrestrial shoreline is gradually sloped and was recently cleared of vegetation in 2021. Numerous dead trees were present, with grasses and small shrubs beginning to regreen the area. The terrestrial shoreline environment was cleared for approximately 100 m to 200 m back from waterfront, transitioning into a mature forest stand dominated by black spruce, trembling aspen, and balsam poplar, with some birch and jack pine present.

Figure 3 – Anderson TIA Shoreline Type 1 - Heavily Cleared Terrestrial Shoreline



Shoreline Type 2

The aquatic shoreline is deep relative to other more gradual shorelines found throughout Anderson TIA. The aquatic shoreline showed little-to-no riparian vegetation. The immediate terrestrial shoreline environment was mostly vegetated with small to medium sized bedrock outcrops, with shallow soil layers. Dead standing and dying trees were observed along the shoreline, likely due to the inconsistent and fluctuating water levels in Anderson TIA. A typical boreal forest stand composed of black spruce, trembling aspen, balsam poplar, and jackpine, was present along the terrestrial the shoreline. This terrestrial shoreline was typical of the Anderson TIA prior to the clearing of much of the shoreline in 2020-2021.

Figure 4 – Anderson TIA Shoreline Type 2 - Typical Terrestrial ATIA Shoreline



Shoreline Type 3

The aquatic shoreline environment was shallow with a gradual slope leading to the cleared shoreline. Little emergent and submerged aquatic vegetation was present in the Anderson TIA near the shoreline, with little-to-no sign of riparian vegetation along the shoreline. Dead fallen trees resulting from previous forest clearing were present within the Anderson TIA, and along the terrestrial shoreline. Approximately 50 m to 100 m of terrestrial vegetation was cleared, before transitioning to a mature forest stand of black spruce, balsam poplar, and trembling aspen. The cleared terrestrial area was beginning to regrow with low brush and juvenile trees (< 1 m) interspersed throughout the area.

Figure 5 – Anderson TIA Shoreline Type 3 - Cleared Terrestrial Shoreline with Short Shrubs



Figure 6 – Anderson TIA Shoreline Type 3 – Clear Terrestrial Shoreline with Mature Forest



Shoreline Type 4

The aquatic shoreline environment was mostly bare, with no signs of emergent or submerged vegetation. Dead standing and fallen trees resulting from previous forest clearing and fluctuating water levels were present within the waters of the Anderson TIA. The terrestrial shoreline was composed of a mixture of steep grades and bedrock cliffs. Some trees and shrubs were present amongst the high grades and outcrops, growing from shallow topsoil layers. In higher areas where the slope became more gradual a mature forest composed of trembling aspen and balsam poplar was present.

Figure 7 – Anderson TIA Shoreline Type 4 - Large Rocky Outcrops Common to this Area



Shoreline Type 5

Large portions of the northern shoreline section of Anderson TIA have exposed tailings in the shallow areas, or immediately adjacent to the existing road that lead into the terrestrial shoreline environment. The aquatic shoreline has a shallow grade with little aquatic vegetation present, and no riparian vegetation present along the shoreline. The terrestrial shoreline and surrounding environment were cleared for the maintenance and expansion the road running along the north portion of Anderson TIA. Some large shrubs and small trees were left standing along road between the terrestrial shoreline and the existing treeline. The forest stand was composed mainly of trembling aspen and balsam poplar, with some black spruce throughout.

Figure 8 – Anderson TIA Shoreline Type 5 - View of Exposed Tailings from the Road



Figure 9 – Anderson TIA Shoreline Type 5 - View of Exposed Tailings and the Northern Shoreline Road



Shoreline Type 6

The aquatic shoreline has a shallow grade with little aquatic vegetation present, and no riparian vegetation present along the shoreline. Downed trees were observed throughout the aquatic shoreline as a result of previous clearing efforts. The terrestrial shoreline has been heavily cleared over the past several years to accommodate several roads, laydown areas, and the existing dam along the east portion of Anderson TIA. Sparsely vegetated areas with mature trees and brush are still present along the shoreline, however a large majority of the terrestrial shoreline environment has been altered. In the areas north and south of the existing dam of Anderson TIA, a mature forest stand of black spruce, balsam poplar, and trembling aspen exists past the cleared areas. Large portions of the ground near the Anderson TIA dam are covered in gravel or other forms of fill to accommodate the construction efforts.

Figure 10 – Anderson TIA Shoreline Type 6 - View of Cleared Storage Areas

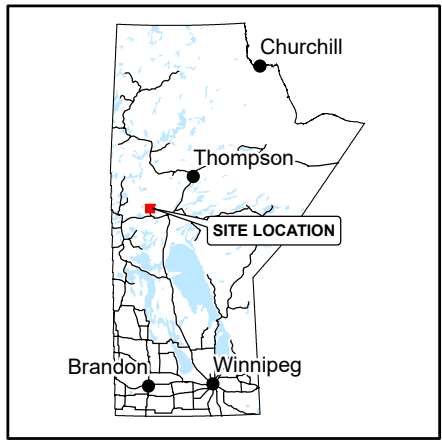
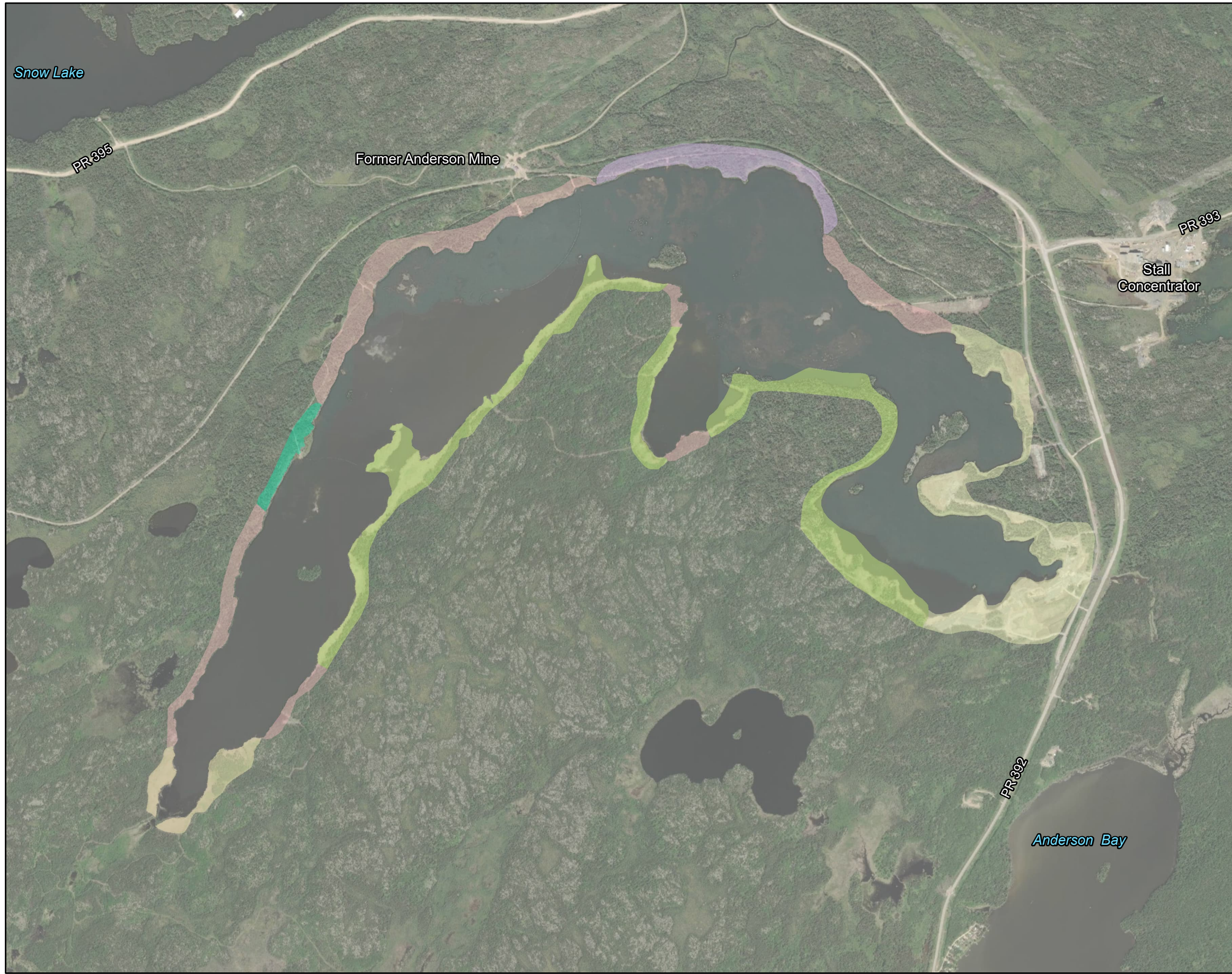


Figure 11 – Anderson TIA Shoreline Type 6 - View of the Existing Outflow Dam Structure



Appendix A – Terrestrial Shoreline Survey Map

Project Management Initials: Designer: Approved: ANS/B 279.4mm x 431.8mm
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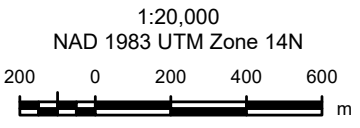
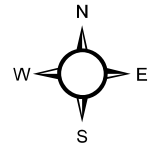


Key Map

Legend

Terrestrial Shoreline

- Type 1
- Type 2
- Type 3
- Type 4
- Type 5
- Type 6



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