Permit Application

Environmental Impact Assessment

White Pine North Project

Volume IIO

Appendices E-7 through H-2

White Pine Copper LLC

White Pine, Michigan

September 2026

Project I.D.: 23W200

Solving our clients' toughest science and engineering challenges.

E-7

2026 Additional Wetland Delineations

2026 Additional Wetland Delineations

White Pine North Project, Carp Lake Township, Ontonagon County, Michigan

Prepared for
White Pine Copper, LLC.

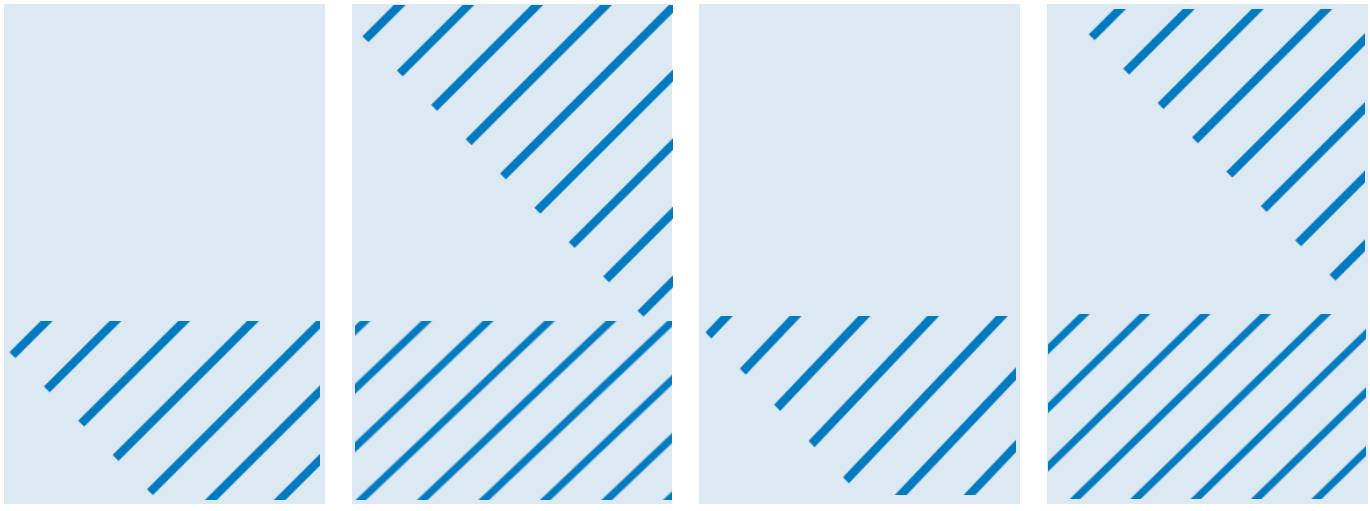
Prepared by
Barr Engineering Michigan, LLC.

July 16, 2026

22661013.01

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2026 Additional Wetland Delineations

White Pine North Project

July 17, 2026

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1 Introduction

1.1 Study Purpose

In 2024 Barr Engineering Co. (Barr) and in 2025 Barr Engineering Michigan (Barr Michigan) were retained by White Pine Copper, LLC (WPC) to delineate wetlands within a combined area of approximately 1100 acres of the White Pine North (WPN) facility located in Carp Lake Township, Ontonagon County, Michigan (Figure 1) The results of those 2024 and 2025 field efforts were reported in March 2025 and March 2026, respectively (ref (1) and ref (2)). Following these efforts, additional land was identified at WPN that was primarily outside of the 2024 and 2025 review areas but within the footprint of anticipated work by WPC. In response, Barr's operational subsidiary, Barr Engineering Michigan, LLC, was retained by WPC for additional wetland delineation work within these areas to inform WPC's planning of the WPN facility and to facilitate obtaining associated wetland impact permits. This report summarizes and documents the work completed in those additional areas.

1.2 Survey Area

The 2026 additional wetland delineation Survey Areas included three separate Work Areas (shown in Figure 2), roughly totaling 13 acres together. This included 1) a 4.42-acre area associated with facility expansion adjacent and east of the Bedell Pond passive treatment wetland 2) a 1.83-acre corridor proposed as a location for discharge into the Mineral River on the west side of the plant site (west of the Bedell Pond passive treatment wetlands, and 3) a roughly 6.86-acre corridor along the southeastern boundary of the tailings basin proposed as a location for utilities. The dominant land uses and cover types within these Survey Areas include fallow, excavated borrow areas, wetlands, open water, and upland forest. A portion of the Pine Creek is also located within the Survey Area.

2 Desktop Review

Barr conducted a desktop review to evaluate aerial imagery, topography, soil types, and mapped wetlands within the Survey Area prior to the wetland delineation. As part of this review, Barr staff accessed resources such as the Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) Soil Units (ref. (3)) shown on Figure 3a, Figure 3b, and Figure 3c, the National Wetlands Inventory (ref. (4)) shown on Figure 4a, Figure 4b, Figure 4c, and aerial photography. This reference data was utilized by field teams to identify gaps and inconsistencies that needed to be addressed as part of the field surveys. The reference data also informed field teams where potential locations and types of wetland habitat that could be encountered within the Survey Area.

3 Methodology

The wetland delineation was conducted in a manner consistent with the Corps of Engineers Wetlands Delineation Manual (ref. (5)) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (ref. (6)). The wetland delineation procedures outlined in these manuals require the evaluation of on-site vegetation, soils, and hydrologic characteristics. Site observations are described in Sections 4 and 5 below. The wetland boundaries were flagged in the field with alphanumerically labeled pink pin flags and/or pink flagging tape. Flagging was located using a Global Positioning System (GPS) unit capable of sub-meter accuracy.

4 Results

The three Survey Areas (Work Areas 1 through 3) contain 33 wetlands, totaling approximately 2.13 acres of wetland (Figure 5a, Figure 5b, Figure 5c). These wetland areas consist of ponded and non-ponded excavated borrow pits, and drainages within 500 feet of, or contiguous to, multiple streams. Wetland types include riverine (R), palustrine, or freshwater, ponded (PUB), emergent (PEM), and scrub-shrub (PSS) habitats.

4.1 Vegetation, Soil, and Hydrology

The wetland delineation was completed in accordance with standard procedures throughout most of the Survey Areas. In two locations, the Survey Areas showed evidence of having been historically disturbed at the landscape scale from combinations of impacts relating to timber harvesting, clearing, grading, and/or borrow pit excavation, in addition to past and current beaver activity. In those locations, the delineation followed procedures related to Atypical Situations within the Corps of Engineers Wetlands Delineation Manual (ref. (5)).

Dominant wetland vegetation identified within the wetlands includes species such as field horsetail (*Equisetum arvense*), fringed bindweed (*Fallopia cilinodis*), variegated scouring rush (*Equisetum variegatum*), water horsetail (*Equisetum fluviatile*), red raspberry (*Rubus ideaus subsp. strigosus*), shining willow (*Salix lucida*), Missouri willow (*Salix eriocephala*), narrow-leaf cattail (*Typha angustifolia*), field sow-thistle (*Sonchus arvensis*), boneset (*Eupatorium perfoliatum*), dark green bulrush (*Scirpus atrovirens*), soft-stemmed club rush (*Schoenoplectus tabernaemontani*), American water horehound (*Lycopus americanus*), Canada blue-joint (*Calamagrostis canadensis*), balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), kidney-leaved violet (*Viola renifolia*), northern lady fern (*Athyrium angustum*), gynandrous sedge (*Carex gynandra*), Bebb's willow (*Salix bebbiana*), black willow (*Salix nigra*), hispid buttercup (*Ranunculus hispidus*), rough bedstraw (*Galium tinctorium*), dwarf red raspberry (*Rubus pubescens*), bog rose (*Rosa palustris*), crested sedge (*Carex cristatella*), lamp rush (*Juncus effusus*), inflated bladder sedge (*Carex intumescens*), white-panicled American-aster (*Symphyotrichum lanceolatum*), pussy willow (*Salix discolor*), red-osier dogwood (*Cornus alba subsp. sericea*), and fringed loosestrife (*Lysimachia ciliata*). Primary and secondary hydrology indicators were identified throughout the wetlands areas. Due to the magnitude of previous disturbance, soils within some wetlands were not consistent with their WSS descriptions but did meet the parameters of a "man-induced wetland" as defined by the Corps of Engineers Wetlands Delineation Manual (ref. (5)).

In contrast, the adjacent upland areas included species such as hemlock (*Tsuga canadensis*), red maple, yellow birch (*Betula alleghaniensis*), white ash (*Fraxinus americana*), wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), balsam fir, shinleaf (*Pyrola elliptica*), bird's-foot trefoil (*Lotus corniculatus*), flat-top goldenrod (*Euthamia graminifolia*), variegated scouring rush, trembling aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), northern red oak (*Quercus rubra*), Canada honeysuckle (*Lonicera canadensis*), field horsetail, Canada bluejoint, white pine (*Pinus strobus*), Kentucky bluegrass (*Poa pratensis*), tall goldenrod (*Solidago altissima*), timothy (*Phleum pratense*), red clover (*Trifolium pratense*), wild carrot (*Daucus carota*), golden sedge (*Carex aurea*), black cherry (*Prunus serotina*), bigleaf wood aster (*Eurybia macrophylla*), western thimbleberry (*Rubus parviflorus*), bracken fern (*Pteridium aquilinum*), Virginia strawberry (*Fragaria virginiana*), oak fern (*Gymnocarpium dryopteris*), Alleghany blackberry (*Rubus alleghaniensis*), tall buttercup (*Ranunculus acris*), sugar maple (*Acer saccharum*), dandelion (*Taraxacum officinale*), yellow hawkweed (*Hieracium caespitosum*), bigtooth aspen (*Populus grandidentata*), beaked hazelnut (*Corylus cornuta*), common agrimony (*Agrimonia*

gryposepela), American elm (*Ulmus americana*), prickly gooseberry (*Ribes cynosbati*), red baneberry (*Actaea rubra*), dogbane (*Apocynum androsaemifolium*), balsam polar (*Populus balsamifera*), downy serviceberry (*Amelanchier arborea*), fire cherry (*Prunus pensylvanica*), northern starflower (*Trientalis borealis*), and white-panicled American-aster, with no observed evidence of wetland hydrology or soils.

Table 4-1, below, summarizes the identified wetlands within the four Survey Areas and rationale for the regulatory determination completed by Barr.

Table 4-1 Wetland and Associated Dataform Matrix

Wetland Name	Wetland Type	Size On-site (acres)	Flag Numbers	Wetland Datasheet	Upland Datasheet	Regulated by EGLE under Part 303?
A	Emergent	0.38	A1-A33open	DP1-W	DP1-U	Yes; contiguous with (within 500 feet of) a pond.
B	Emergent	0.01	B1-B3	DP3-W	DP3-U	Yes; contiguous with a pond.
C	Emergent	0.01	C1-C4open	DP2-W	DP2-U	Yes; contiguous with a pond.
D	Emergent	0.44	D1-D21	DP4-U	DP4-U. DP5-U	Yes; contiguous with a pond.
E	Emergent	0.01	E2-E5	DP6-W	DP6-U	Yes; contiguous with a pond.
F	Emergent	0.12	F1-F13open	DP7-W	DP7-U	Yes; contiguous with the Mineral River.
G	Riverine (Pine Creek)	0.01	G1-G4open	N/a	N/a	Regulated under Part 301
H	Emergent	0.06	H1-H12open	DP9-W	DP9-U	Yes; contiguous with the Pine Creek.
I	Emergent	0.03	I1-I35	DP10-W	DP10-U	Yes; contiguous with the Pine Creek.
J	Emergent	0.13	J1-J17	DP11-W	DP11-U	Yes; contiguous with the Pine Creek and a pond.

K	Scrub-shrub	0.01	K1-K10	DP12-W	DP12-U, DP13-U	Yes; contiguous with the Pine Creek and a pond.
L	Emergent	0.01	L1-L9	DP13-W	DP13-U	Yes; contiguous with the Pine Creek and a pond.
M	Emergent	0.02	M1-M9	DP13-W	DP13-U	Yes; contiguous with the Pine Creek and a pond.
N	Emergent	0.03	N1-N10	DP13-W	DP13-U	Yes; contiguous with a pond.
O	Emergent	0.01	O1-O6	DP13-W	DP13-U	Yes; contiguous with a pond.
P	Emergent	0.03	P1-P9	DP13-W	DP13-U	Yes; contiguous with a pond.
Q	Emergent	0.02	Q1-Q7	DP14-W	DP14-U	Yes; contiguous with a pond.
R	Emergent	<0.01	R1-R5open	DP13-W	DP13-U	Yes; contiguous with the Pine Creek.
S	Emergent	0.01	S1-S6	DP14-W	DP14-U	Yes; contiguous with a pond.
T	Emergent	0.06	T1-T12	DP14-W	DP14-U, DP15-U	Yes; contiguous with a pond.
U	Emergent	0.01	U1-U10	DP15-W	DP15-U	Yes; contiguous with a pond.
V	Emergent	0.01	V1-V4	DP15-W	DP15-U	Yes; contiguous with a pond.
W	Emergent	0.10	W1-W20	DP16-W	DP16-U	Yes; contiguous with a pond.
X	Emergent	0.04	X1-X12	DP16-W	DP16-U	Yes; contiguous with a pond.
Z	Emergent	<0.01	Z1-Z4	DP16-W	DP16-U	Yes; contiguous with a pond.
Aa	Emergent	0.03	Aa1-Aa14	DP17-W	DP17-U	Yes; cumulative area is greater than 5 acres in size.

Ab	Emergent	0.01	Ab1-Ab5	DP13-W	DP13-U	Yes; contiguous with a pond.
Ac	Emergent	0.01	Ac1-Ac8	DP15-W	DP15-U	Yes; contiguous with a pond.
Ad	Emergent, Ponded	0.28	Ad1-Ad23open	DP18-W	DP18-U	Yes; cumulative area is greater than 5 acres in size.
Ae	Emergent	0.02	Ae1-Ae7	DP13-W	DP13-U	Yes; contiguous with the lake(1).
Af	Emergent	0.05	Af1-Af12	DP16-W	DP16-U	Yes; contiguous with a lake(1).
Ag	Emergent	0.02	Ag1-Ag5	DP19-W	DP19-U	Yes; contiguous with a lake(1).
Ah	Emergent	0.12	Ah1-Ah9	DP19-W	DP19-U	Yes; contiguous with a lake(1).
Ai	Emergent	0.01	Ai1-Ai7open	DP19-W	DP19-U	Yes; contiguous with a lake(1).

1. "Lake" refers to impounded water in adjacent Tailings Dam with open water surface area greater than 5 acres. The actual "lake" is unlikely to be a regulated feature in that it likely meets exemption standards as a water treatment facility. Barr's understanding of past interpretation by EGLE staff is that wetlands within 500 feet of a water treatment facility meeting the definition of a "pond" or "lake" are likely to be regulated based on proximity to a regulating feature even if that regulated feature is not regulated in and of itself.

Figure 5a, Figure 5b, and Figure 5c depict an overview of the approximate location of the wetland areas encountered within each of the three Survey Areas. Additional details are provided in Appendix A: U.S. Army Corps of Engineers (USACE) Wetland Data Forms

5 Conclusions

5.1 Jurisdiction

Based on observations of topography, vegetation, soil, and indicators of hydrology, Barr has determined that 2.13 acres of regulated wetland habitat is present in the three Survey Areas. According to Part 303, Wetlands Protection, of the Michigan NREPA, 1994 PA 451, as amended (Part 303), and Michigan's assumption of Section 404 of the Clean Water Act, wetlands regulated by the State of Michigan include wetlands that are:

1. Located within 500 feet of, or having a direct surface water connection to, an inland lake, pond, river, or stream; or

2. Greater than 5 acres in size; or

3. Located within 1,000 feet of, or having a direct surface water connection to, the Great Lakes or Lake St. Clair; or

4. A water of the United States, as that term is used in section 502(7) of the Federal Water Pollution Control Act, 33 USC 1362; or

5. Known to have a documented presence of an endangered or threatened species under Part 365 of State of Michigan 1994 PA 451, as amended or the Federal Endangered Species Act of 1973, Public Law 93-205; or

6. Rare or imperiled.

For the wetlands identified herein, 33 wetlands appear to be regulated by EGLE under Part 303 as they are within 500 feet or have direct surface water connection (are contiguous with) a pond, the Pine River, or a lake. One wetland (Wetland G) is mapped as the Pine River, and contains a defined bed, banks, and evidence of flow and so is regulated by EGLE under Part 301.

5.1.1 Federal Wetland Regulations

Wetlands with a nexus to navigable waters are regulated under Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act of 1972 as Water of the United States (WOTUS). Within Michigan, navigable waters are the Great Lakes and the mouths of specific rivers where the river flows into a Great Lake. Barr's review of the navigable waters list maintained by the U.S. Army Corps of Engineers (ref. (7)) indicates that Lake Superior is the lone navigable water that is relevant to the WPN site. Therefore, Barr concluded that wetlands in the Study Area that would meet the definition of WOTUS, are those wetlands that have nexus to Lake Superior.

Current federal agency guidance (ref. (8)) limits the WOTUS designation of wetlands to "only those adjacent wetlands that have a continuous surface connection because they directly abut the requisite jurisdictional water" and provides a two-part test:

1. The adjacent body of water must be a "water of the United States," which generally means traditional navigable waters, or a relatively permanent body of water connected to a traditional navigable water; and

2. The wetland…must have a continuous surface connection to a requisite covered water making it difficult to determine where the water ends, and wetland begins.

Section 10 of the Rivers and Harbors Act of 1899 governs activities in navigable waters. It regulates construction, excavation, or filling activities in those navigable waters, including wetlands with nexus to navigable waters, and requires authorization from the U.S. Army Corps of Engineers. Given that the WPN site lies approximately 2 miles inland from Lake Superior, direct connection to Lake Superior is considered unlikely and any WOTUS within the Study Area would not be a traditional navigable water and therefore not likely to be regulated under Section 10 Rivers and Harbors Act.

Section 404 of the Clean Water Act of 1972 governs activities in all WOTUS. Therefore, Barr considered the two-part test to determine if those wetlands that have a continuous surface connection to Lake Superior, or a continuous surface connection to a relatively permanent body of water (RPW) that in turn

has a surface connection to Lake Superior. To identify potential RPW connections to Lake Superior, Barr considered the streams mapped in this study to create those connections. Therefore, wetlands within the Study Area with connection to a mapped stream are likely to be regulated by Section 404. Please also be aware that under a Memorandum of Agreement between the federal government and the State of Michigan, Section 404 permitting of wetlands would occur under Part 303 with permitting administered by Michigan EGLE.

5.2 Regulatory Authority

EGLE, and in some coastal cases USACE, have regulatory authority regarding the wetland boundary location(s) and jurisdictional status of wetlands in the State of Michigan. Barr's wetland determination was performed in general accordance with accepted procedures for conducting wetland determinations.

Barr's conclusions reflect our professional opinion based on the site conditions within the Survey Areas observed during the site visits. Discrepancies may arise between current and future wetland determinations and delineations due to changes in vegetation and/or hydrology as the result of land use practices or other environmental factors, whether on-site or on adjacent or nearby properties. Barr provides no warranty, guarantee, or other agreement in respect to the period of time for which this wetland determination will remain valid.

6 References

1. **Barr Engineering Co.** *2024 Wetland Delineation and Characterization Report, White Pine North Project, Carp Lake Township, Ontonagon County, Michigan.* Grand Rapids, Michigan : Barr Engineering Co., 2024. 22661013.00.

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4. **National Wetlands Inventory.** *Surface Waters and Wetlands.* [Online] U.S. Fish and Wildlife Service, National Standards and Support Team, Wetlands. [Cited: June 21, 2024.] https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.

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7. **United States Army Corps of Engineers.** *Navigable Waters of the United States within the Regulatory Jurisdiction of the US Army Corps of Engineers Detroit District.* July 12, 2022.

8. **United States Army Corps of Engineers and United States Environmental Protection Agency.** *Memorandum to the field between US Department of the Army, USACE, and the USEPA concerning the proper implementation of "Continuous Surface Connection" under the defintion of "Waters of the United States" under the Clean Water Act.* March 12, 2025.

9. **Michigan Department of Natural Resources and Environment.** Michigan Rapid Assessment Method for Wetlands: User's Manual. July 23, 2010. MiRAM Version 2.1.

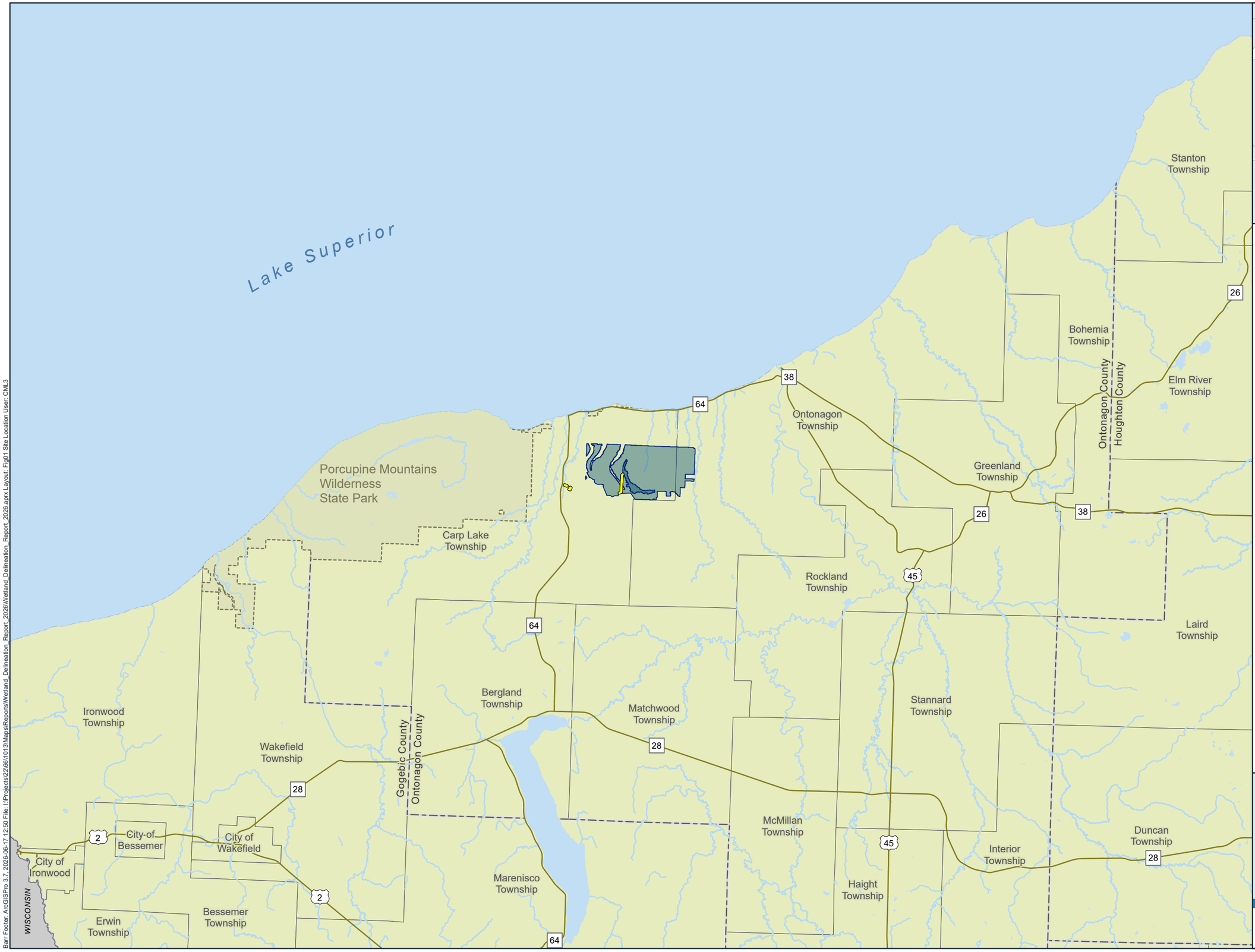
10. **Michigan Department of Natural Resources and Environment Land and Water Management Division.** Michigan Rapid Assessment Method for Wetlands (MiRAM) Rating Form. July 23, 2010. MiRAM Version 2.1.

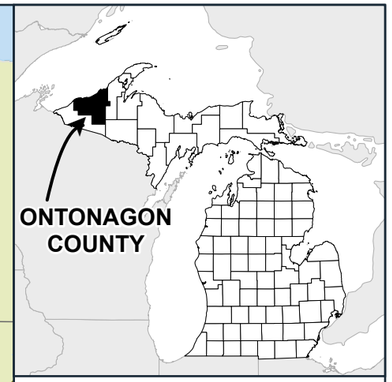
11. **Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016.** The National Wetland Plant List: 2016 Wetland Ratings (NWPL). *U.S. Army Corps of Engineers Digital Library.* [Online] April 28, 2016. [Cited: March 7, 2025.] https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/3540/.

12. **Michigan Department of Environment, Great Lakes, and Energy.** *Wetland Identification Report, MiEnviro Site Name: 66-White Pine Copper-Carp Lake Twp.* Lansing, Michigan : s.n., 2025. MiEnviro Submission No. HQ6-65JR-KA16Y.

13. **United States Army Corps of Engineers.** *Naviagable Waters of the United States within the Regulatory Jursidiction of the US Army Corps of Engineers Detroit District.* July 12, 2022.

Figures





Survey Area

Apx. Limit of Underground Mine Area

Porcupine Mountains Wilderness State Park

Municipal Boundary

County Boundary

N

0 5 10

Miles

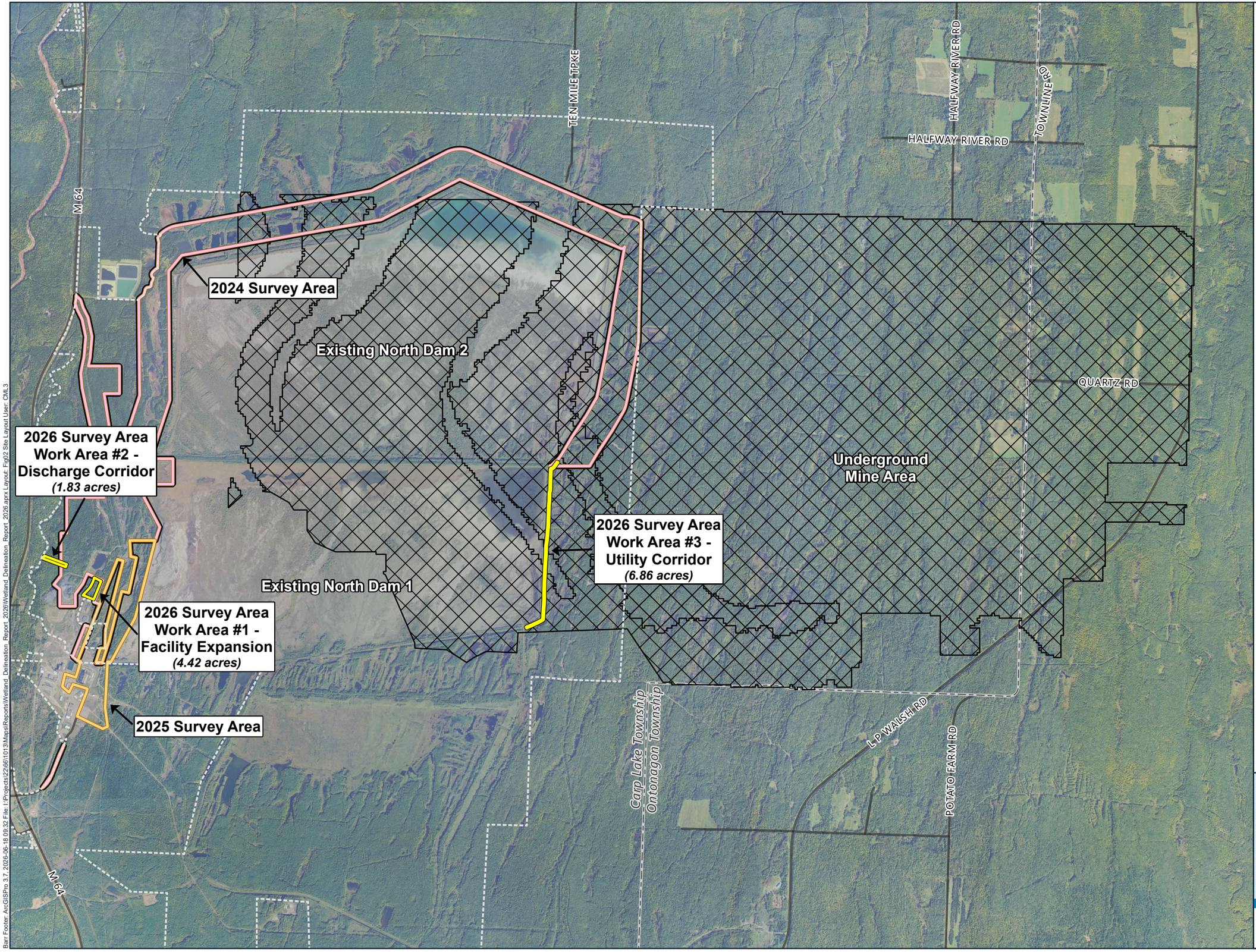
Basemap: World Street Map (Esri)

Site Location
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 1

BARR

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2026 Survey Area
2025 Survey Area
2024 Survey Area
Apx. Limit of Underground Mine Area
Township Boundary

0 3,000 6,000
Feet

Imagery: USDA NAIP 2024

Site Layout
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

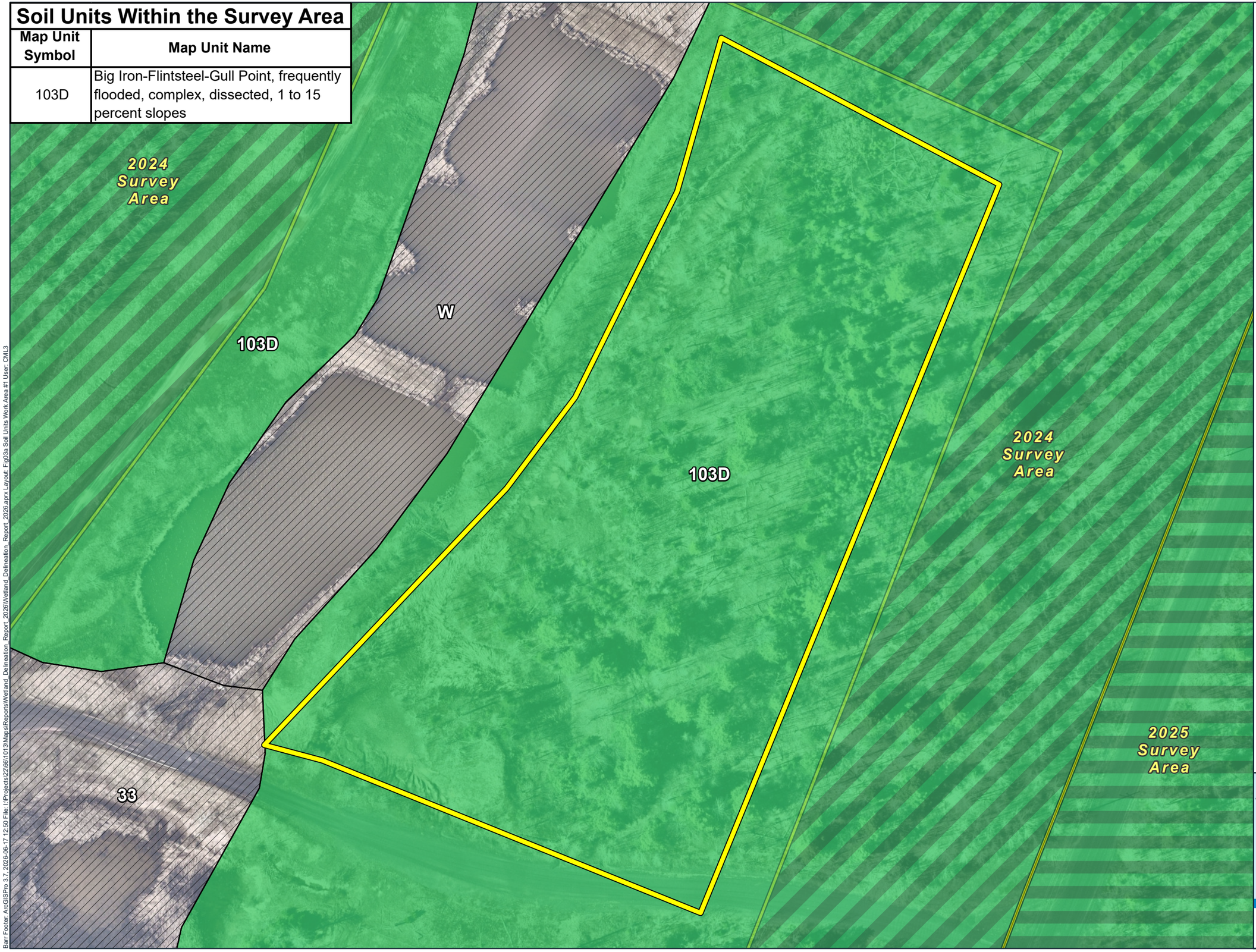
FIGURE 2

BARR

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Soil Units Within the Survey Area

Map Unit Symbol	Map Unit Name
103D	Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes



2026 Survey Area
2025 Survey Area
2024 Survey Area
Soil Unit

Soil Drainage Class

Somewhat poorly drained
NA

N

0 75 150
Feet

Imagery: Nearmap 4/30/2025

Soil Units
Work Area #1 - Facility Expansion
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

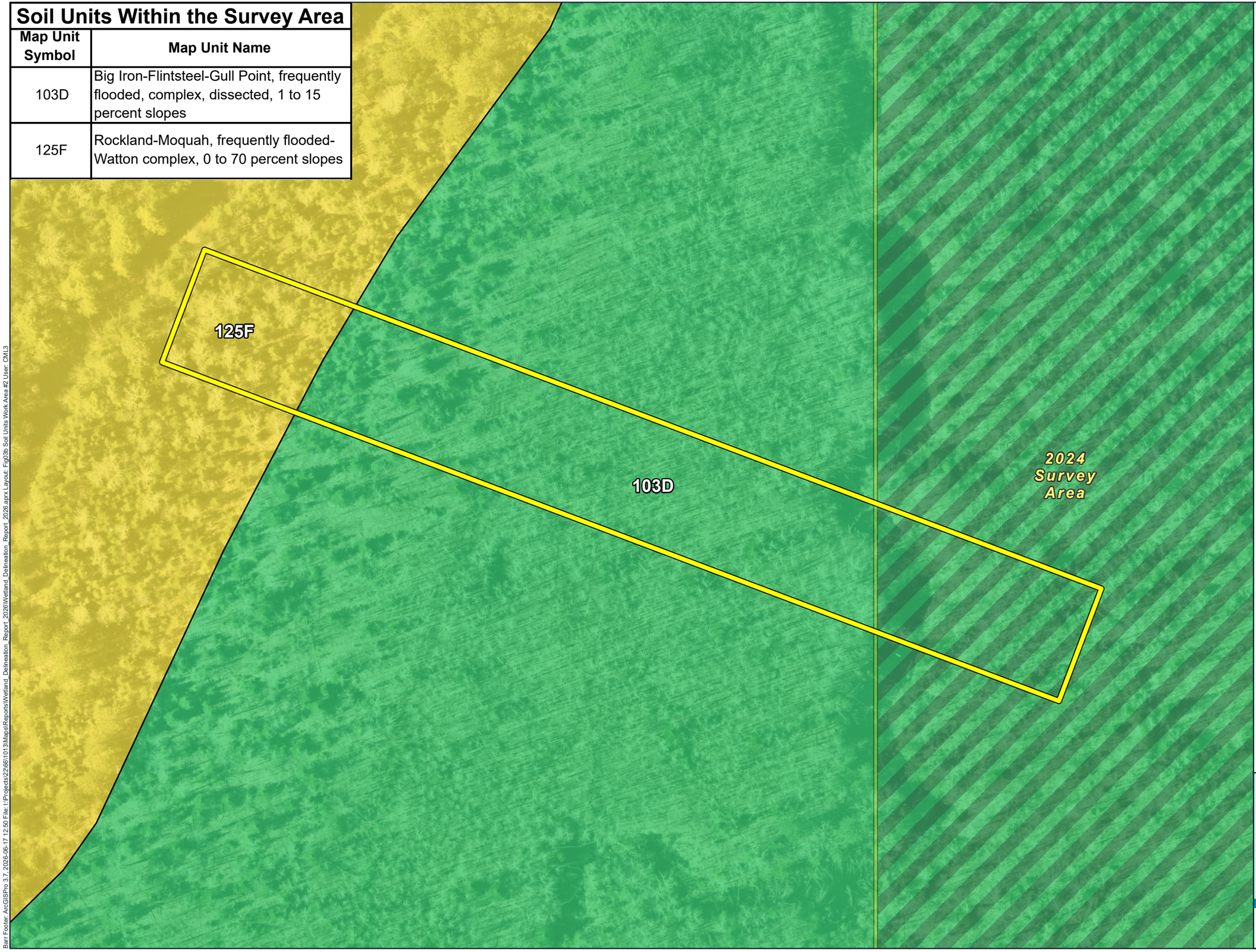
FIGURE 3a

BARR

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Soil Units Within the Survey Area

Map Unit Symbol	Map Unit Name
103D	Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes
125F	Rockland-Moquah, frequently flooded-Watton complex, 0 to 70 percent slopes



2026 Survey Area

2024 Survey Area

Soil Unit

Soil Drainage Class

Well drained

Somewhat poorly drained

N

0 75 150

Feet

Imagery: Nearmap 4/30/2025

Soil Units
Work Area #2 - Discharge Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

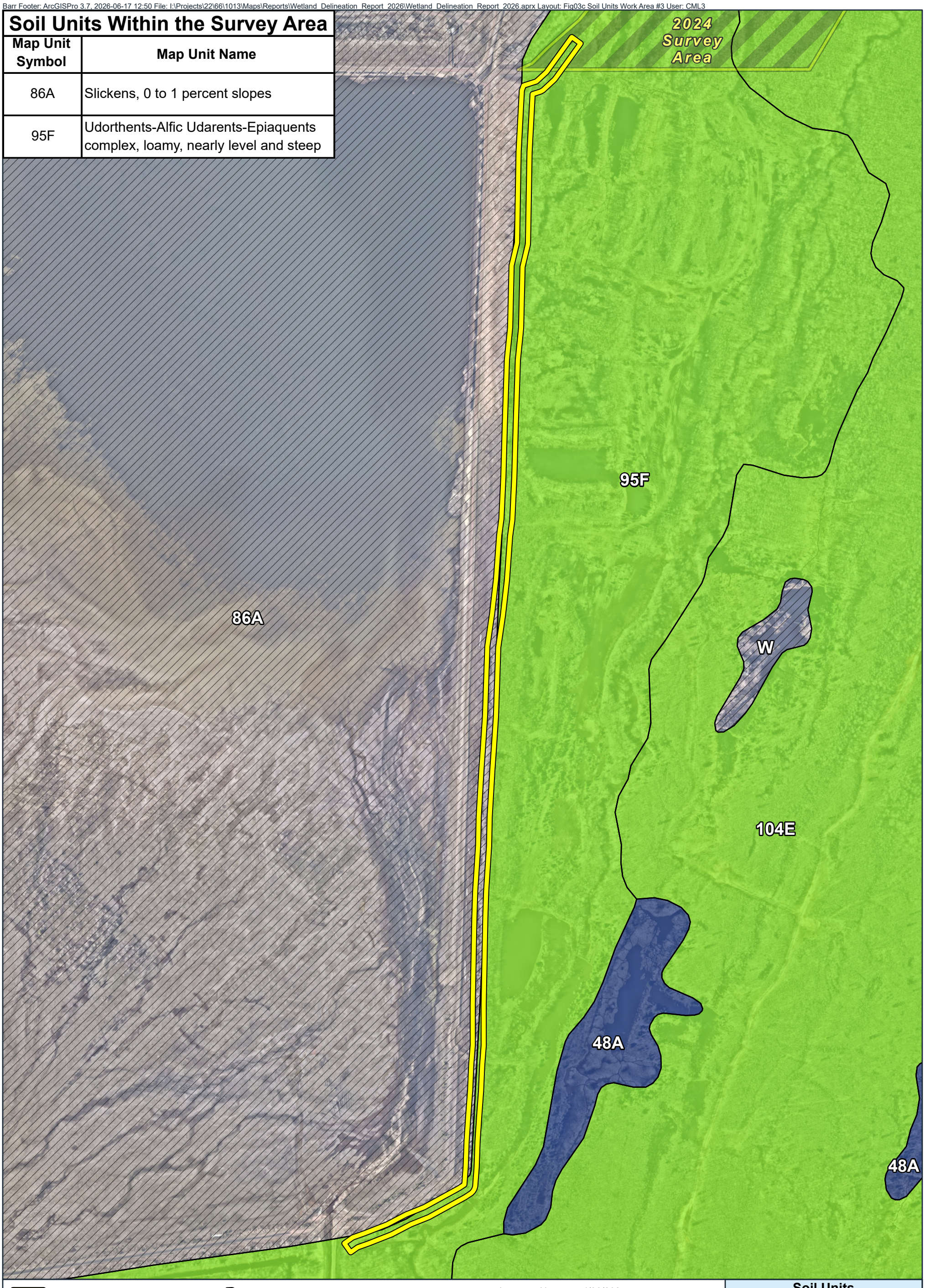
FIGURE 3b

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-17 12:50 File: I:\Projects\22\66\1013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026.aprx Layout: Fig03b Soil Units Work Area #2 User: CML3

Soil Units Within the Survey Area

Map Unit Symbol	Map Unit Name
86A	Slickens, 0 to 1 percent slopes
95F	Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep



2026 Survey Area
2024 Survey Area
Soil Unit
Soil Drainage Class
Moderately well drained
Very poorly drained
NA

Imagery: Nearmap 4/30/2025

N

0 400 800
Feet

Soil Units
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan
FIGURE 3c

BARR



2026 Survey Area

2025 Survey Area

2024 Survey Area

Wetlands (NWI)

Freshwater Pond

Riverine

N

0 75 150

Feet

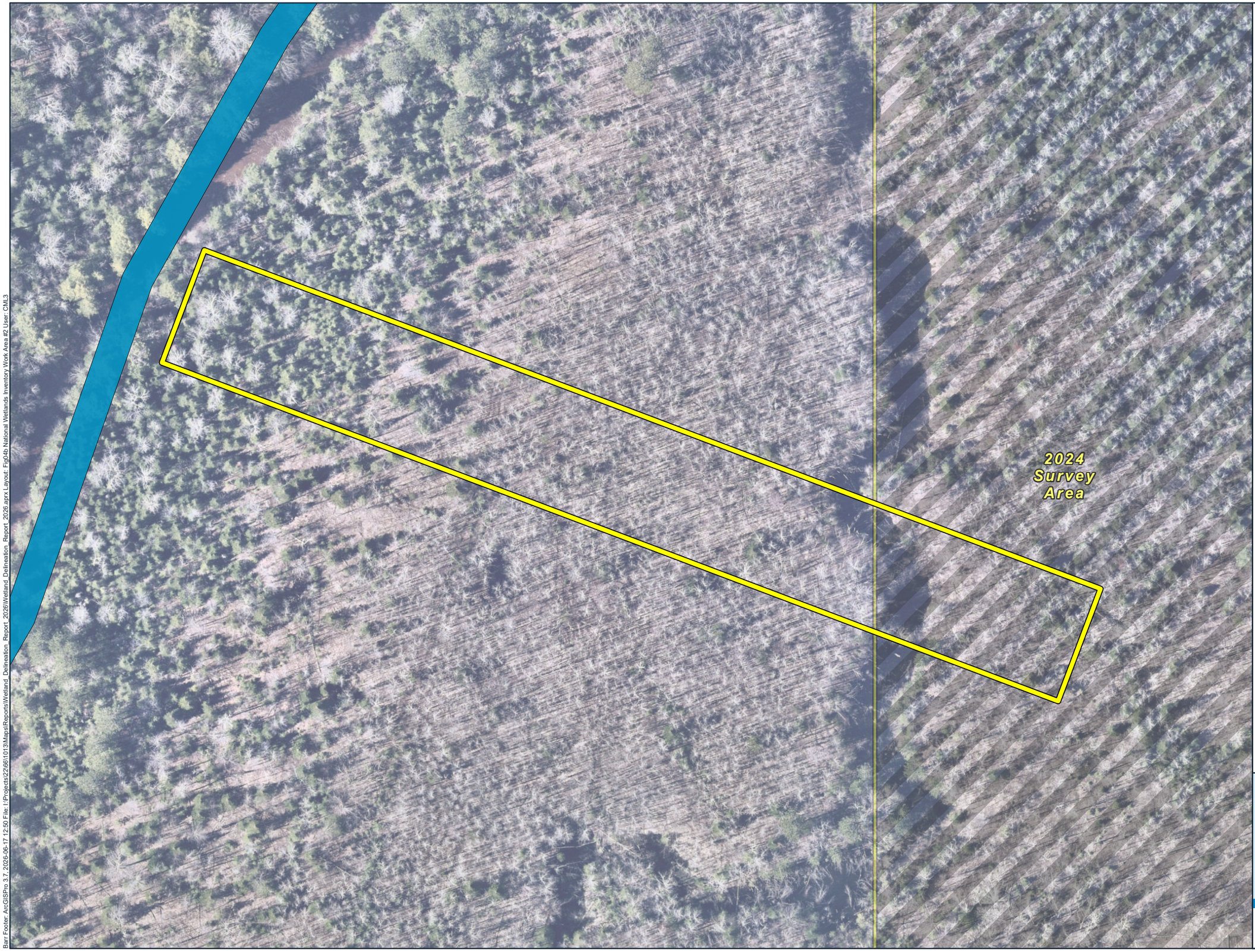
Imagery: Nearmap 4/30/2025

National Wetlands Inventory
Work Area #1 - Facility Expansion
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 4a

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-17 12:50 File: I:\Projects\22\66\1013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026.aprx Layout: Fig04a National Wetlands Inventory Work Area #1 User: CML3



2026 Survey Area

2024 Survey Area

Wetlands (NWI)

Riverine

0 75 150

Feet

Imagery: Nearmap 4/30/2025

National Wetlands Inventory
Work Area #2 - Discharge Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 4b

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-17 12:50 File: I:\Projects\23\68\1013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026 aprx Layout: Fig04b National Wetlands Inventory Work Area #2 User: CML3



2026 Survey Area

2024 Survey Area

Wetlands (NWI)

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Riverine

Imagery: Nearmap 4/30/2025

N

0 400 800

Feet

National Wetlands Inventory
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan
FIGURE 4c

BARR



2026 Survey Area

2025 Survey Area

2024 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

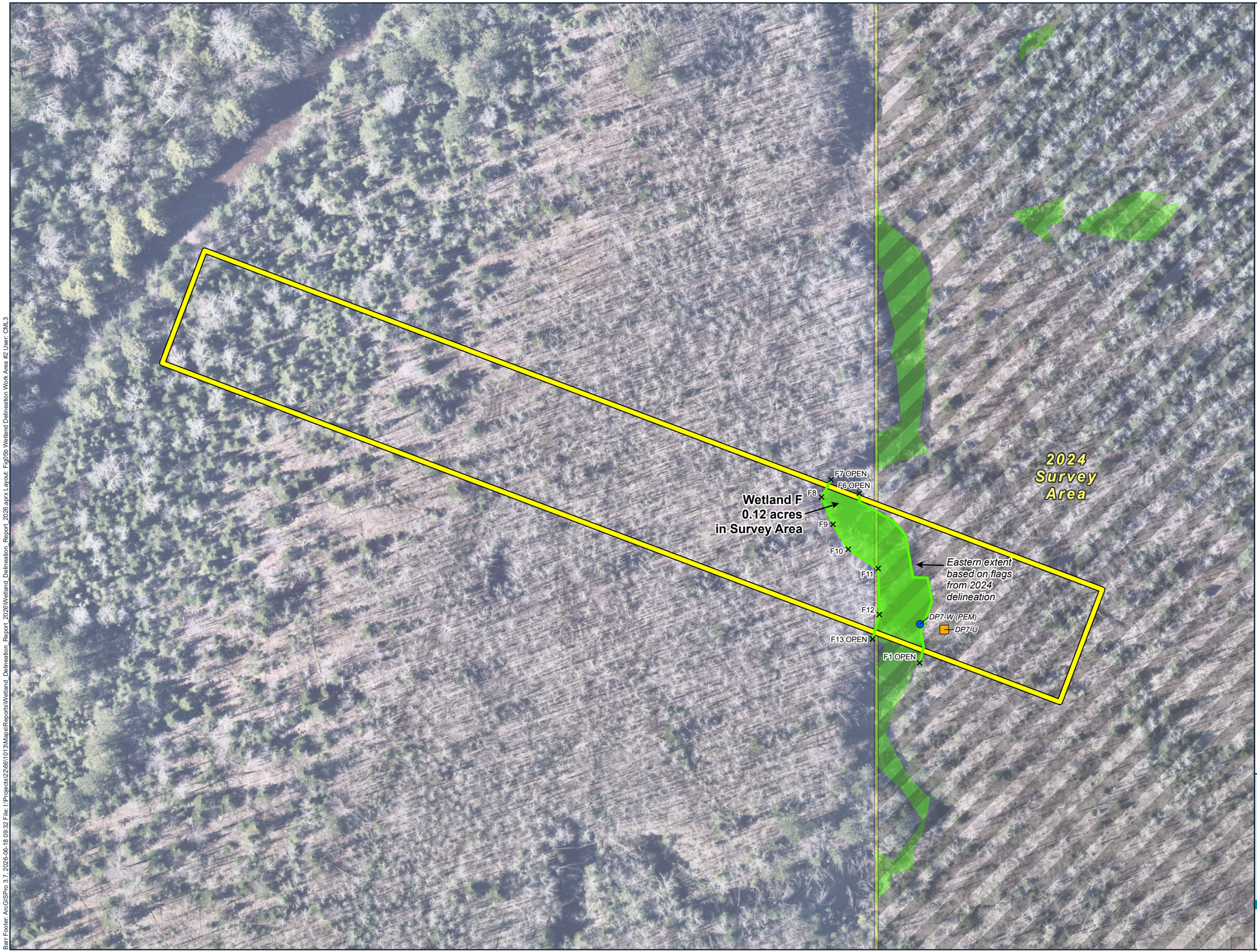
Upland Data Point

Wetland Delineation
Work Area #1 - Facility Expansion
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5a

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-18 09:32 File: I:\Projects\22\66\1013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026.aprx Layout: Fig05a Wetland Delineation Work Area #1 User: CML3



2026 Survey Area

2024 Survey Area

Field Delineated Wetland Boundary

Wetland Area

Wetland Flag

Wetland Data Point

Upland Data Point

N

0 75 150

Feet

Imagery: Nearmap 4/30/2025

Wetland Delineation
Work Area #2 - Discharge Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5b

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-18 09:32 File: I:\Projects\23\0661\013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026.aprx Layout: Fig05b Wetland Delineation Work Area #2 User: CML3



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

N

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-1

BARR



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

N

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-2

BARR



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

N

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-3

BARR



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-4

BARR



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

N

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-5

BARR



2026 Survey Area

Field Delineated Wetland Boundary

Wetland Area

× Wetland Flag

Wetland Data Point

Upland Data Point

Imagery: Nearmap 4/30/2025

N

0 60 120

Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-6

BARR



2026 Survey Area
Field Delineated Wetland Boundary
Wetland Area
× Wetland Flag
Upland Data Point

Imagery: Nearmap 4/30/2025

0 60 120
Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

FIGURE 5c-7

BARR

Barr Footer: ArcGISPro 3.7, 2026-06-17 12:50 File: I:\Projects\22\66\1013\Maps\Reports\Wetland_Delineation_Report_2026\Wetland_Delineation_Report_2026.aprx Layout: Fig05c Wetland Delineation Work Area #3 Overview User: CML3

2024 Survey Area

Wetland AI
Wetland AH
See Figure 5c-1
Wetland AG
Wetland AF
Wetland AE
Wetland AD
See Figure 5c-2
Wetland AD
Wetland AC
Wetland AB
Wetland AA
Wetland Z
Wetland X
See Figure 5c-3
Wetland W
Wetland V
Wetland U
Wetland T
See Figure 5c-4
Wetland S
Wetland R
Wetland Q
Wetland P
Wetland O
Wetland N
See Figure 5c-5
Wetland M
Wetland L
Wetland K
Wetland J
See Figure 5c-6
Wetland I
Wetland H
See Figure 5c-7
Wetland G

2026 Survey Area
2024 Survey Area
Wetland Area
Extent of Detail Pages

Imagery: Nearmap 4/30/2025

N

0 400 800
Feet

Wetland Delineation
Work Area #3 - Utility Corridor
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan
FIGURE 5c

BARR

Appendices

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP1-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): Convex Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771194 Long: -89.563516 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP1-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	80	Y	FACU
2. Acer rubrum	15	N	FAC
3. Betula alleghaniensis	5	N	FAC
4.			
5.			
6.			
7.			
	100.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer rubrum	20	Y	FAC
2. Fraxinus americana	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
	30.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Tsuga canadensis	10	Y	FACU
2. Aralia nudicaulis	5	Y	FACU
3. Maianthemum canadense	5	Y	FACU
4. Abies balsamea	2	N	FAC
5. Pyrola elliptica	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	24.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	42	x 3 =	126
FACU species	112	x 4 =	448
UPL species	0	x 5 =	0
Column Totals:	154 (A)		574.00 (B)

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP1-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	5YR 5/2	100					SIL	
1-12	5YR 5/4	100					SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

7" duff, dry soil. Plot at top of hill due to thick duff layer near wetland plot.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP1-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Toeslope Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771165 Long: -89.563543 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: A
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 6

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP1-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	50	Y	FAC
2. Fallopia cilinodis	20	Y	FACU
3. Equisetum variegatum	10	N	FACW
4. Equisetum fluviatile	5	N	OBL
5. Rubus idaeus	2	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	87.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	10	x 2 =	20
FAC species	52	x 3 =	156
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	87 (A)		261.00 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Mosses present 30%

SOIL

Sampling Point DP1-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/2	100					L	
1-15	7.5YR 4/2	80	7.5YR 5/8	15	C	M	CL	Moist
1-15			7.5YR 3/1	5	C	M	CL	
15-18	10YR 2/1	100					MUCK	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ✓ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Buried muck layer.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP2-U

Investigator(s): Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771342 Long: -89.564287 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)
Recently drained area, disturbed, slag and fill present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP2-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum variegatum	90	Y	FACW
2. Lotus corniculatus	5	N	FACU
3. Euthamia graminifolia	2	N	FAC
4. Lycopus americanus	2	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	99.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	90	x 2 =	180
FAC species	2	x 3 =	6
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	99 (A)		208.00 (B)

Prevalence Index = B/A = 2.1

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP2-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	5YR 4/4	100					CL	Dry, mostly clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Fill/slag layer at 9".

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP2-W

Investigator(s): Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771260 Long: -89.564375 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ✓, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: B
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP2-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix lucida	30	Y	FACW
2. Salix eriocephala	5	N	FACW
3.			
4.			
5.			
6.			
7.			
	35.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Typha angustifolia	40	Y	OBL
2. Sonchus arvensis	20	Y	FACU
3. Equisetum arvense	15	N	FAC
4. Eupatorium perfoliatum	10	N	FACW
5. Scirpus atrovirens	10	N	OBL
6. Schoenoplectus tabernaemontani	10	N	OBL
7. Lycopus americanus	2	N	OBL
8.			
9.			
10.			
11.			
12.			
	107.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	62	x 1 =	62
FACW species	45	x 2 =	90
FAC species	15	x 3 =	45
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	142 (A)		277.00 (B)

Prevalence Index = B/A = 1.95

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP2-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	100					CL	
6-14	2.5YR 4/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Clay at 14. Culvert outlets here. Soils disturbed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP3-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Summit Local relief (concave, convex, none): None Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772117 Long: -89.563433 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP3-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Abies balsamea	15	Y	FAC
2. Acer rubrum	15	Y	FAC
3. Betula papyrifera	10	Y	FACU
4.			
5.			
6.			
7.			
	40.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	5	Y	FAC
2. Quercus rubra	2	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	7.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	55	x 3 =	165
FACU species	12	x 4 =	48
UPL species	0	x 5 =	0
Column Totals:	67 (A)		213.00 (B)

Prevalence Index = B/A = 3.18

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP3-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/2	100					CL	Dry
7-16	5YR 4/3	70	5YR 4/6	30	C	M	CL	Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Copper - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP3-W

Investigator(s): Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772107 Long: -89.563413 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: B
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ___	Depth (inches): 0
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP3-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Calamagrostis canadensis	60	Y	OBL
2. Scirpus atrovirens	20	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		80.00 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 20%

SOIL

Sampling Point DP3-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 5/2	85	2.5YR 4/6	10	C	M	CL	Black is muck within matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Additional matrix color for line 0-15 (10YR 2/1 5% MUCK)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP4-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Footslope Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772060 Long: -89.562429 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP4-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadensis	70	Y	FACU
2. Acer rubrum	20	Y	FAC
3. Betula alleghaniensis	5	N	FAC
4.			
5.			
6.			
7.			
	95.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Abies balsamea	20	Y	FAC
2. Acer rubrum	20	Y	FAC
3. Fraxinus americana	10	Y	FACU
4.			
5.			
6.			
7.			
	50.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Abies balsamea	30	Y	FAC
2. Aralia nudicaulis	5	N	FACU
3. Lonicera canadensis	2	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	37.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	95	x 3 =	285
FACU species	87	x 4 =	348
UPL species	0	x 5 =	0
Column Totals:	182 (A)		633.00 (B)

Prevalence Index = B/A = 3.48

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground

SOIL

Sampling Point DP4-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					CL	
4-16	10YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

1 inch duff

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP4-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772044 Long: -89.562624 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: D
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	✓ Water-Stained Leaves (B9)	___ Aquatic Fauna (B13)
___ High Water Table (A2)	___ Marl Deposits (B15)	___ Hydrogen Sulfide Odor (C1)
___ Saturation (A3)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Presence of Reduced Iron (C4)
___ Water Marks (B1)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Thin Muck Surface (C7)
___ Sediment Deposits (B2)	___ Other (Explain in Remarks)	
___ Drift Deposits (B3)		
___ Algal Mat or Crust (B4)		
___ Iron Deposits (B5)		
___ Inundation Visible on Aerial Imagery (B7)		
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)	___ Dry-Season Water Table (C2)
___ Drainage Patterns (B10)	___ Crayfish Burrows (C8)
___ Moss Trim Lines (B16)	___ Saturation Visible on Aerial Imagery (C9)
	___ Stunted or Stressed Plants (D1)
	✓ Geomorphic Position (D2)
	___ Shallow Aquitard (D3)
	___ Microtopographic Relief (D4)
	___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP4-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Abies balsamea	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	60	Y	FAC
2. Abies balsamea	15	N	FAC
3. Acer rubrum	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		300.00 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP4-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 3/2	95	5YR 5/8	5	C	M	CL	Moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

4" duff

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP5-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Footslope Local relief (concave, convex, none): Convex Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772238 Long: -89.562429 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)
Plastic pipeline here, 6-8 inches

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP5-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula alleghaniensis	20	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer rubrum	20	Y	FAC
2. Abies balsamea	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
	30.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	5	Y	FAC
2. Cornus canadensis	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		180.00 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 75%

SOIL

Sampling Point DP5-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/2	100					CL	
1-9	5YR 5/3	100					SCL	
9-17	5YR 4/3	95	2.5YR 4/6	5	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

4" duff. No indicators of hydric soils observed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP6-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771598 Long: -89.562907 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: E
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP6-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	5	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer rubrum	5	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Abies balsamea	20	Y	FAC
2. Equisetum arvense	5	N	FAC
3. Calamagrostis canadensis	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	40 (A)		110.00 (B)

Prevalence Index = B/A = 2.75

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Mosses present

SOIL

Sampling Point DP6-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					CL	
2-5	5YR 4/3	100					CL	
5-13	5YR 4/4	90	2.5YR 3/4	10	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

4" duff, no hydric soil indicators.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Facility Expansion City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP6-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 31 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771670 Long: -89.562811 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: E
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP6-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	Y	FAC
2. Abies balsamea	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
	35.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Abies balsamea	60	Y	FAC
2. Acer rubrum	10	N	FAC
3.			
4.			
5.			
6.			
7.			
	70.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	15	Y	FAC
2. Acer rubrum	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	125	x 3 =	375
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		375.00 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 60%.

SOIL

Sampling Point DP6-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					MUCK	
7-12	5YR 3/2	95	5YR 5/8	5	C	M	MMI	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

4" duff.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Discharge Corridor City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP7-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 36 T051N R042W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773899 Long: -89.567380 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP7-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus rubra	20	Y	FACU
2. Pinus strobus	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
	30.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Populus tremuloides	25	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Acer rubrum	20	Y	FAC
2. Aralia nudicaulis	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	45	x 3 =	135
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	80 (A)		275.00 (B)

Prevalence Index = B/A = 3.44

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP7-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	5YR 4/4	90	5YR 4/6	10	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

6” duff.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Discharge Corridor City/County: Ontonagon County Sampling Date: 2026-06-09

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP7-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 36 T051N R042W

Landform (hillside, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773909 Long: -89.567461 Datum: WGS84

Soil Map Unit Name: Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: F
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP7-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Betula papyrifera	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum sylvaticum	15	Y	FACW
2. Viola renifolia	10	Y	FACW
3. Athyrium angustum	5	N	FAC
4. Acer rubrum	5	N	FAC
5. Carex gynandra	5	N	OBL
6. Calamagrostis canadensis	2	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	42.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	7	x 1 =	7
FACW species	25	x 2 =	50
FAC species	10	x 3 =	30
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	52 (A)		127.00 (B)

Prevalence Index = B/A = 2.44

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 60%

SOIL

Sampling Point DP7-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 3/1	100					MMI	
6-9	7.5YR 5/2	95	7.5YR 5/8	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Check indicators.
3" duff

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP8-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.769945 Long: -89.504228 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP8-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Poa pratensis	25	Y	FACU
2. Solidago altissima	15	Y	FACU
3. Lotus corniculatus	10	N	FACU
4. Trifolium pratense	5	N	FACU
5. Phleum pratense	5	N	FACU
6. Carex aurea	5	N	FACW
7. Daucus carota	5	N	UPL
8. Cirsium arvense	2	N	FACU
9.			
10.			
11.			
12.			
	72.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	62	x 4 =	248
UPL species	5	x 5 =	25
Column Totals:	72	(A)	283.00 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 25%.

SOIL

Sampling Point DP8-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 4/4	80					C	
3-14	5YR 4/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Auger refusal at 12 inches due to stiff clay - Additional matrix color line 3-14 (5YR 2.5/1 20% lc)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP9-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 34 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.770904 Long: -89.503144 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP9-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	70	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	70.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus americana	25	Y	FACU
2. Prunus serotina	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
	35.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Eurybia macrophylla	25	Y	UPL
2. Rubus parviflorus	20	Y	FACU
3. Solidago altissima	10	N	FACU
4. Pyrola elliptica	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	70	x 3 =	210
FACU species	70	x 4 =	280
UPL species	25	x 5 =	125
Column Totals:	165 (A)		615.00 (B)

Prevalence Index = B/A = 3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 40%.

SOIL

Sampling Point DP9-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix			Redox Features					
(inches)	Color (moist)		%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR	2.5/1	100					SIL	
2-6	7.5YR	2.5/1	80					SIL	
6-11	5YR	4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Auger refusal at 11 inches due to coarse fragments. Additional matrix color, line 2-6 (5YR 4/4 20%, clay)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
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OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP9-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 34 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.770930 Long: -89.503281 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: H
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP9-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix bebbiana	30	Y	FACW
2. Salix nigra	15	Y	OBL
3.			
4.			
5.			
6.			
7.			
	45.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Ranunculus hispidus	25	Y	FAC
2. Carex gynandra	5	N	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	30	x 2 =	60
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	75 (A)		155.00 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 70%.

SOIL

Sampling Point DP9-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					MUCK	
2-4	10YR 4/1	100					SI	
4-16	5YR 4/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
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OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP10-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771244 Long: -89.503369 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP10-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	50	Y	FAC
2. Fraxinus americana	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
	70.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus americana	25	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	25.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Fragaria virginiana	40	Y	FACU
2. Pteridium aquilinum	30	Y	FACU
3. Trifolium pratense	20	Y	FACU
4. Solidago altissima	5	N	FACU
5. Pyrola elliptica	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	50	x 3 =	150
FACU species	142	x 4 =	568
UPL species	0	x 5 =	0
Column Totals:	192 (A)		718.00 (B)

Prevalence Index = B/A = 3.74

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP10-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix			Redox Features					
(inches)	Color (moist)		%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR	2.5/1	100					SIL	
2-6	7.5YR	2.5/1	80					SIL	
6-11	5YR	4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Auger refusal at 11 inches due to coarse fragments. Additional matrix color for line 2-6 (5YR 4/4 20%, clay)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper - LLC State: Michigan Sampling Point: DP10-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.771284 Long: -89.503386 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ✓, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: I
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)
Near "I"1

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP10-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix lucida	20	Y	FACW
2. Salix bebbiana	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
	40.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Calamagrostis canadensis	5	Y	OBL
2. Ranunculus hispidus	5	Y	FAC
3. Viola renifolia	2	N	FACW
4. Equisetum arvense	2	N	FAC
5. Carex gynandra	2	N	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	16.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	7	x 1 =	7
FACW species	42	x 2 =	84
FAC species	7	x 3 =	21
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	56 (A)		112.00 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP10-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	100					SI	
6-12	5YR 4/4	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Base of slope, disturbed.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP11-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772288 Long: -89.503330 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP11-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	60	Y	FAC
2. Fraxinus americana	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
	80.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Pteridium aquilinum	50	Y	FACU
2. Rubus allegheniensis	25	Y	FACU
3. Gymnocarpium dryopteris	2	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	77.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	60	x 3 =	180
FACU species	97	x 4 =	388
UPL species	0	x 5 =	0
Column Totals:	157 (A)		568.00 (B)

Prevalence Index = B/A = 3.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 60%.

SOIL

Sampling Point DP11-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	100					SIC	Dry

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP11-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.772288 Long: -89.503324 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: J
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	✓ Water-Stained Leaves (B9)	___ Aquatic Fauna (B13)
___ High Water Table (A2)	___ Saturation (A3)	___ Marl Deposits (B15)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Sediment Deposits (B2)
___ Oxidized Rhizospheres on Living Roots (C3)	___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Iron Deposits (B5)
___ Thin Muck Surface (C7)	___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)	___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)	___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)	✓ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)	✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)	___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP11-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Typha angustifolia	10	Y	OBL
2. Equisetum arvense	5	Y	FAC
3. Calamagrostis canadensis	5	Y	OBL
4. Galium tinctorium	2	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	22.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	17	x 1 =	17
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	22 (A)		32.00 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Mosses present, bare ground

SOIL

Sampling Point DP11-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					SIL	
2-4	10YR 3/1	100					SI	
4-8	5YR 4/4	95	10YR 5/3	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ✓ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP12-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773008 Long: -89.503382 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: K
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)
Upland finger divides J and K

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP12-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus americana	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Solidago altissima	5	Y	FACU
2. Calamagrostis canadensis	5	Y	OBL
3. Pteridium aquilinum	5	Y	FACU
4. Trifolium pratense	5	Y	FACU
5. Ranunculus acris	5	Y	FAC
6. Rubus pubescens	5	Y	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	30.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 42.86 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	5	x 2 =	10
FAC species	5	x 3 =	15
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	40 (A)		130.00 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP12-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					SICL	
4-5	7.5YR 3/1	100					SI	
5-16	7.5YR 4/3	95	7.5YR 5/8	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP12-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773086 Long: -89.503352 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: K
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP12-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix bebbiana	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Rubus pubescens	15	Y	FACW
2. Calamagrostis canadensis	5	Y	OBL
3. Rosa palustris	5	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	45 (A)		80.00 (B)

Prevalence Index = B/A = 1.78

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Mosses present. Bare ground 60%

SOIL

Sampling Point DP12-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					MUCK	
2-4	10YR 4/1	100					SI	
4-17	5YR 5/3	90	7.5YR 5/8	10	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Clay

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP13-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773358 Long: -89.503365 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: L
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP13-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	40	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	40.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer rubrum	25	Y	FAC
2. Acer saccharum	20	Y	FACU
3. Fraxinus americana	15	Y	FACU
4.			
5.			
6.			
7.			
	60.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Rubus pubescens	35	Y	FACW
2. Solidago altissima	4	N	FACU
3. Ranunculus acris	2	N	FAC
4. Hieracium caespitosum	2	N	UPL
5. Taraxacum officinale	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	67	x 3 =	201
FACU species	41	x 4 =	164
UPL species	2	x 5 =	10
Column Totals:	145 (A)		445.00 (B)

Prevalence Index = B/A = 3.07

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 50%.

SOIL

Sampling Point DP13-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					CL	
4-14	5YR 4/3	85	5YR 3/4	15	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP13-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.773425 Long: -89.503390 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

Also for Wetlands M, N, O, P, R, Ab, and Ae

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP13-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix bebbiana	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Scirpus atrovirens	3	Y	OBL
2. Calamagrostis canadensis	2	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	25 (A)		45.00 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
90% bare ground.

SOIL

Sampling Point DP13-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					MUCK	
2-4	10YR 4/1	100					SI	
4-16	5YR 4/4	90	5YR 5/8	10	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP14-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.775427 Long: -89.503290 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP14-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus grandidentata	30	Y	FACU
2. Acer rubrum	15	Y	FAC
3. Populus tremuloides	10	N	FAC
4.			
5.			
6.			
7.			
	55.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus americana	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Fraxinus americana	5	Y	FACU
2. Acer rubrum	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	70 (A)		250.00 (B)

Prevalence Index = B/A = 3.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 80%.

SOIL

Sampling Point DP14-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					CL	
2-14	10YR 4/3	95	5YR 3/4	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-10

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP14-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.775454 Long: -89.503340 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: Q
Wetland Hydrology Present?	Yes ✓	No ___	

Also for Wetlands S and T

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	✓ Water-Stained Leaves (B9)	___ Aquatic Fauna (B13)
___ High Water Table (A2)	___ Marl Deposits (B15)	___ Hydrogen Sulfide Odor (C1)
___ Saturation (A3)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Presence of Reduced Iron (C4)
___ Water Marks (B1)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Thin Muck Surface (C7)
___ Sediment Deposits (B2)	___ Other (Explain in Remarks)	
___ Drift Deposits (B3)		
___ Algal Mat or Crust (B4)		
___ Iron Deposits (B5)		
___ Inundation Visible on Aerial Imagery (B7)		
___ Sparsely Vegetated Concave Surface (B8)		

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP14-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Calamagrostis canadensis	5	Y	OBL
2. Ranunculus hispidus	5	Y	FAC
3. Equisetum arvense	5	Y	FAC
4. Carex cristatella	5	Y	FACW
5. Carex gynandra	5	Y	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	5	x 2 =	10
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	25 (A)		50.00 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 75%.

SOIL

Sampling Point DP14-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					MUCK	
2-6	7.5YR 4/1	100					MMI	
6-16	7.5YR 4/1	70	5YR 5/8	15	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ✓ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Additional matrix color, line 6-16 (7.5YR 3/1 15% lc)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP15-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Footslope Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.776702 Long: -89.503330 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP15-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	30	Y	FAC
2. Populus grandidentata	30	Y	FACU
3.			
4.			
5.			
6.			
7.			
	60.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer saccharum	25	Y	FACU
2. Fraxinus americana	20	Y	FACU
3. Ulmus americana	5	N	FACW
4. Corylus cornuta	2	N	FACU
5.			
6.			
7.			
	52.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Aralia nudicaulis	10	Y	FACU
2. Fraxinus americana	5	Y	FACU
3. Rubus pubescens	5	Y	FACW
4. Agrimonia gryposepala	2	N	FACU
5. Actaea rubra	2	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	24.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28.57 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	30	x 3 =	90
FACU species	96	x 4 =	384
UPL species	0	x 5 =	0
Column Totals:	136 (A)		494.00 (B)

Prevalence Index = B/A = 3.63

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP15-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					CL	
3-17	5YR 4/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP15-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.776789 Long: -89.503323 Datum: WGS84

Soil Map Unit Name: Slickens, 0 to 1 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: U
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ✓ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding at north end.

VEGETATION – Use scientific names of plants.

Sampling Point: DP15-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Carex intumescens	10	Y	FACW
2. Carex gynandra	10	Y	OBL
3. Rubus pubescens	5	N	FACW
4. Juncus effusus	5	N	OBL
5. Carex vulpinoidea	5	N	OBL
6. Equisetum arvense	2	N	FAC
7. Symphyotrichum lanceolatum	2	N	FACW
8.			
9.			
10.			
11.			
12.			
	39.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	17	x 2 =	34
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	39 (A)		60.00 (B)

Prevalence Index = B/A = 1.54

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 60%.

SOIL

Sampling Point DP15-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					MUCK	
3-5	5YR 4/2	100					MMI	Saturated layer
5-15	5YR 4/2	90	10YR 5/6	10	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP16-U

Investigator(s): Christian Tibaudo, Kinnan Stauber - Barr Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Footslope Local relief (concave, convex, none): None Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.778136 Long: -89.503106 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP16-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus grandidentata	30	Y	FACU
2. Populus tremuloides	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
	50.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Fraxinus americana	15	Y	FACU
2. Prunus virginiana	10	Y	FACU
3. Acer rubrum	2	N	FAC
4.			
5.			
6.			
7.			
	27.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Aralia nudicaulis	20	Y	FACU
2. Eurybia macrophylla	10	Y	UPL
3. Actaea rubra	5	N	FACU
4. Rubus allegheniensis	5	N	FACU
5. Ribes cynosbati	5	N	FACU
6. Taraxacum officinale	2	N	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	47.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	22	x 3 =	66
FACU species	92	x 4 =	368
UPL species	10	x 5 =	50
Column Totals:	124 (A)		484.00 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 50%

SOIL

Sampling Point DP16-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	5YR 4/3	90	5YR 5/6	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Additional soil matrix color, line 0-14 (5YR 3/1 5% lc)

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP16-W

Investigator(s): Christian Tibaudo, Kinnan Stauber - Barr Section, Township, Range: Sec 33 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.778134 Long: -89.503173 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: W
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

Also for Wetlands X, Z, and Af

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP16-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix nigra	10	Y	OBL
2. Salix discolor	10	Y	FACW
3. Salix interior	5	N	FACW
4. Cornus alba	5	N	FACW
5.			
6.			
7.			
	30.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum variegatum	60	Y	FACW
2. Typha angustifolia	25	Y	OBL
3. Equisetum arvense	20	N	FAC
4. Lysimachia ciliata	20	N	FACW
5. Carex vulpinoidea	5	N	OBL
6. Symphyotrichum lanceolatum	5	N	FACW
7. Rubus pubescens	5	N	FACW
8. Lycopus uniflorus	5	N	OBL
9. Galium labradoricum	2	N	OBL
10.			
11.			
12.			
	147.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	47	x 1 =	47
FACW species	110	x 2 =	220
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	177 (A)		327.00 (B)

Prevalence Index = B/A = 1.85

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Mosses present.

SOIL

Sampling Point DP16-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					MUCK	
3-15	5YR 5/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

3 " duff.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP17-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.779670 Long: -89.503000 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area within a Wetland?** Yes ___ No ✓
Hydric Soil Present?	Yes ___	No ✓	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP17-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus grandidentata	25	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	25.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Acer saccharum	50	Y	FACU
2. Populus grandidentata	26	Y	FACU
3. Acer rubrum	10	N	FAC
4.			
5.			
6.			
7.			
	86.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Acer saccharum	20	Y	FACU
2. Pteridium aquilinum	15	Y	FACU
3. Aralia nudicaulis	10	N	FACU
4. Apocynum androsaemifolium	5	N	UPL
5. Equisetum arvense	5	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	146	x 4 =	584
UPL species	5	x 5 =	25
Column Totals:	166 (A)		654.00 (B)

Prevalence Index = B/A = 3.94

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP17-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	5YR 4/3	90	5YR 4/1	5	D	M	C	
0-14			5YR 5/8	5	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP17-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.779617 Long: -89.503049 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: AA
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)
PEM

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	✓ Water-Stained Leaves (B9)	___ Surface Soil Cracks (B6)
✓ High Water Table (A2)	___ Aquatic Fauna (B13)	___ Drainage Patterns (B10)
✓ Saturation (A3)	___ Marl Deposits (B15)	___ Moss Trim Lines (B16)
___ Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Dry-Season Water Table (C2)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Crayfish Burrows (C8)
___ Drift Deposits (B3)	___ Presence of Reduced Iron (C4)	___ Saturation Visible on Aerial Imagery (C9)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Stunted or Stressed Plants (D1)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	✓ Geomorphic Position (D2)
___ Inundation Visible on Aerial Imagery (B7)	___ Other (Explain in Remarks)	___ Shallow Aquitard (D3)
___ Sparsely Vegetated Concave Surface (B8)		___ Microtopographic Relief (D4)
		✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 6

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP17-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix bebbiana	15	Y	FACW
2. Salix discolor	10	Y	FACW
3. Acer rubrum	5	N	FAC
4.			
5.			
6.			
7.			
	30.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum arvense	90	Y	FAC
2. Symphyotrichum lanceolatum	20	N	FACW
3. Rubus pubescens	15	N	FACW
4. Salix nigra	10	N	OBL
5. Calamagrostis canadensis	5	N	OBL
6. Lysimachia ciliata	2	N	FACW
7. Ranunculus acris	2	N	FAC
8. Galium boreale	2	N	FAC
9.			
10.			
11.			
12.			
	146.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	62	x 2 =	124
FAC species	99	x 3 =	297
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	176 (A)		436.00 (B)

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP17-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					MUCK	
3-9	5YR 3/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

4" duff

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP18-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Shoulder Local relief (concave, convex, none): None Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.780955 Long: -89.503023 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	**Is the Sampled Area**
Hydric Soil Present?	Yes ___	No ✓	**within a Wetland?** **Yes** ___ **No** ✓
Wetland Hydrology Present?	Yes ___	No ✓	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP18-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	20	Y	FAC
2. Populus grandidentata	20	Y	FACU
3. Fraxinus americana	10	N	FACU
4. Populus balsamifera	10	N	FACW
5.			
6.			
7.			
	60.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Corylus cornuta	25	Y	FACU
2. Fraxinus americana	20	Y	FACU
3. Populus tremuloides	15	N	FAC
4. Quercus rubra	5	N	FACU
5. Prunus pensylvanica	5	N	FACU
6. Acer rubrum	5	N	FAC
7. Amelanchier arborea	5	N	FACU
	80.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Pyrola americana	25	Y	FAC
2. Hieracium caespitosum	5	N	UPL
3. Maianthemum canadense	5	N	FACU
4. Trientalis borealis	2	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	37.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	67	x 3 =	201
FACU species	95	x 4 =	380
UPL species	5	x 5 =	25
Column Totals:	177 (A)		626.00 (B)

Prevalence Index = B/A = 3.54

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 70%.

SOIL

Sampling Point DP18-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					CL	
2-13	5YR 4/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP18-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.780903 Long: -89.503048 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: PEM/PUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	If yes, optional Wetland Site ID: AD
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)
Also contains a ponded area, containing water-shield (Brasnia schreberi) and water greater than 1 foot deep

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 3

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP18-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix discolor	20	Y	FACW
2. Cornus alba	15	Y	FACW
3.			
4.			
5.			
6.			
7.			
	35.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Typha latifolia	15	Y	OBL
2. Carex stricta	10	Y	OBL
3. Equisetum fluviatile	5	N	OBL
4. Carex gynandra	5	N	OBL
5. Mentha arvensis	2	N	FACW
6. Solanum dulcamara	2	N	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	39.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	37	x 2 =	74
FAC species	2	x 3 =	6
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	74 (A)		115.00 (B)

Prevalence Index = B/A = 1.55

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP18-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 3/2	100					MMI	
3-17	5YR 4/4	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ✓ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP19-U

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Sideslope Local relief (concave, convex, none): None Slope %: 3-7

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.783415 Long: -89.502858 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No ✓	**within a Wetland?** **Yes** ____ **No** ✓
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP19-U

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus americana	20	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	20.0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Populus balsamifera	25	Y	FACW
2. Corylus cornuta	25	Y	FACU
3. Lonicera canadensis	10	N	FACU
4.			
5.			
6.			
7.			
	60.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Pteridium aquilinum	30	Y	FACU
2. Symphyotrichum lanceolatum	10	N	FACW
3. Hieracium caespitosum	10	N	NI
4. Equisetum arvense	2	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	52.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	2	x 3 =	6
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	122 (A)		416.00 (B)

Prevalence Index = B/A = 3.41

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)
Bare ground 50%.

SOIL

Sampling Point DP19-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					CL	
3-15	5YR 4/4	80					C	
3-15	5YR 4/6	20					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Northcentral and Northeast Region
See ERDC/EL TR-12-1; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 09/30/2027
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: White Pine Mine - Eastern Utility Corridor City/County: Ontonagon County Sampling Date: 2026-06-11

Applicant/Owner: White Pine Copper LLC State: Michigan Sampling Point: DP19-W

Investigator(s): Barr - Christian Tibaudo, Kinnan Stauber Section, Township, Range: Sec 28 T051N R041W

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope %: 0-2

Subregion (LRR or MLRA): LRR K, MLRA 92 Lat: 46.783352 Long: -89.502897 Datum: WGS84

Soil Map Unit Name: Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: AG
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)
Also for Wetlands AH, and AI

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

____ Surface Water (A1)	✓ Water-Stained Leaves (B9)	____ Surface Soil Cracks (B6)
✓ High Water Table (A2)	____ Aquatic Fauna (B13)	____ Drainage Patterns (B10)
✓ Saturation (A3)	____ Marl Deposits (B15)	____ Moss Trim Lines (B16)
____ Water Marks (B1)	____ Hydrogen Sulfide Odor (C1)	____ Dry-Season Water Table (C2)
____ Sediment Deposits (B2)	____ Oxidized Rhizospheres on Living Roots (C3)	✓ Saturation Visible on Aerial Imagery (C9)
____ Drift Deposits (B3)	____ Presence of Reduced Iron (C4)	____ Stunted or Stressed Plants (D1)
____ Algal Mat or Crust (B4)	____ Recent Iron Reduction in Tilled Soils (C6)	✓ Geomorphic Position (D2)
____ Iron Deposits (B5)	____ Thin Muck Surface (C7)	____ Shallow Aquitard (D3)
____ Inundation Visible on Aerial Imagery (B7)	____ Other (Explain in Remarks)	____ Microtopographic Relief (D4)
____ Sparsely Vegetated Concave Surface (B8)		✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP19-W

Tree Stratum (Plot size: 30' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15' radius)			
1. Salix discolor	25	Y	FACW
2. Salix nigra	20	Y	OBL
3. Cornus alba	15	Y	FACW
4.			
5.			
6.			
7.			
	60.0	=Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Equisetum pratense	25	Y	FACW
2. Carex utriculata	20	Y	OBL
3. Carex gynandra	15	Y	OBL
4. Typha angustifolia	10	N	OBL
5. Mentha arvensis	5	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75.0	=Total Cover	
Woody Vine Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
	0	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		205.00 (B)

Prevalence Index = B/A = 1.52

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP19-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	5YR 4/4	100					C	Moist to saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Iron Monosulfide (A18)
- ___ Mesic Spodic (A17) **(MLRA 144A, 145, 149B)**
- ___ Sandy Mucky Mineral (S1)
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- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
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- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)
- ___ Red Parent Material (F21) **(MLRA 145)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**) Thin
- ___ Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Red Parent Material (F21) **(outside MLRA 145)**
- ___ Very Shallow Dark Surface (F22)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

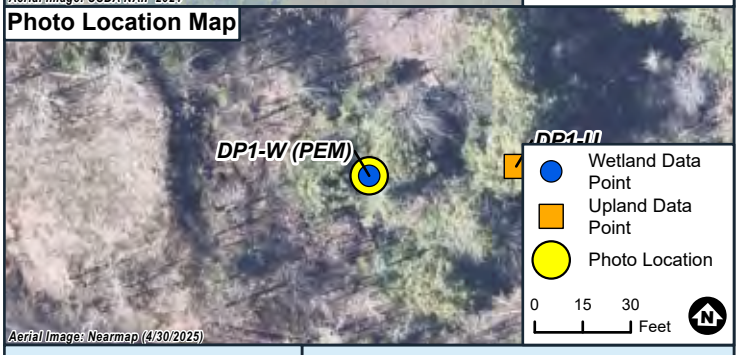
4" duff. Problem soil, no redox, no organic.











Data Point:
DP1-W (PEM)

Point Type:
Wetland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

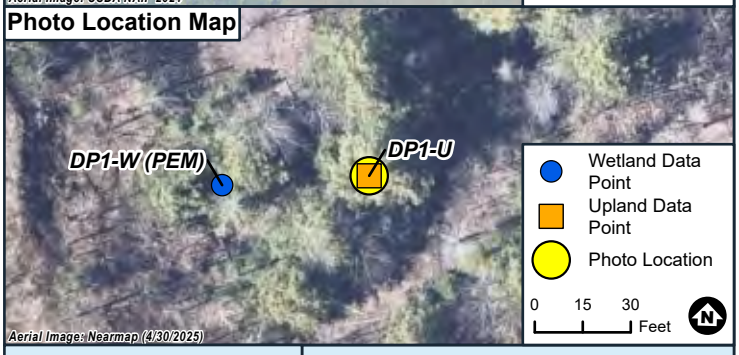
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Data Point:
DP1-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

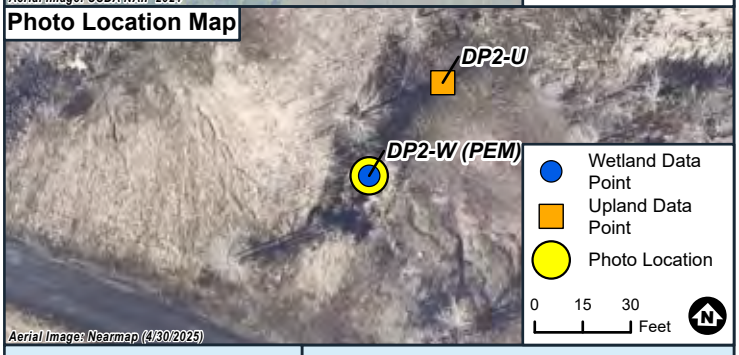
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Data Point:
DP2-W (PEM)

Point Type:
Wetland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

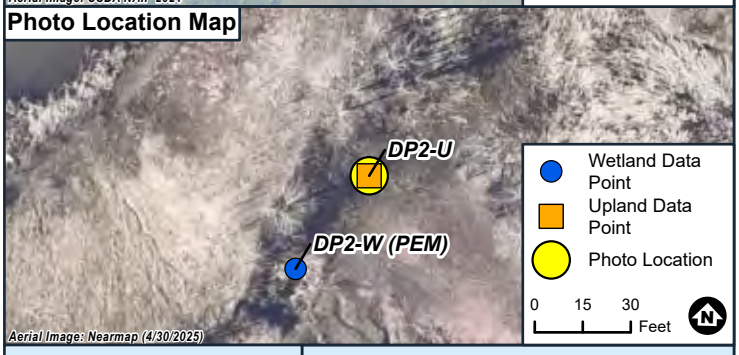
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Data Point:
DP2-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

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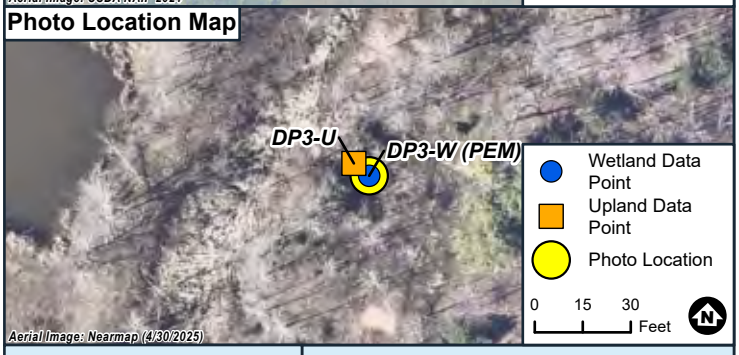




Overview Map



Photo Location Map



Data Point:
DP3-W (PEM)

Point Type:
Wetland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

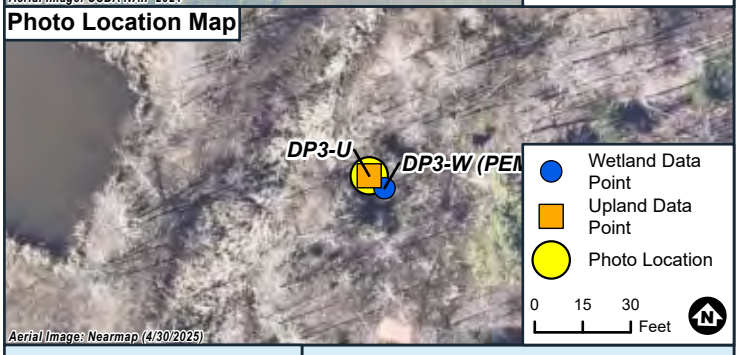
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Data Point:
DP3-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

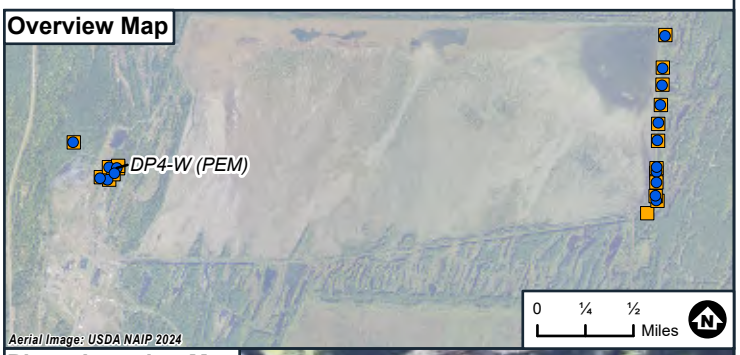
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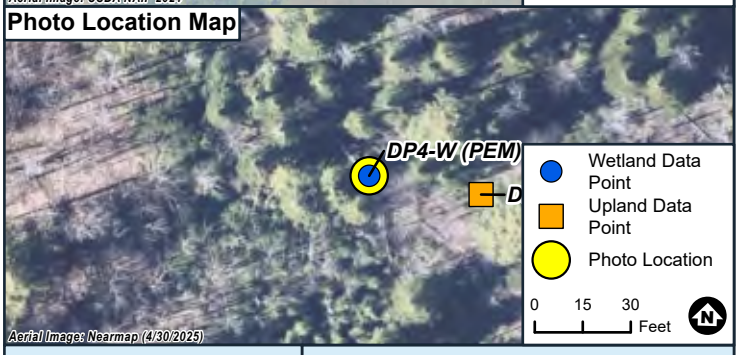
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Data Point:
DP4-W (PEM)

Point Type:
Wetland

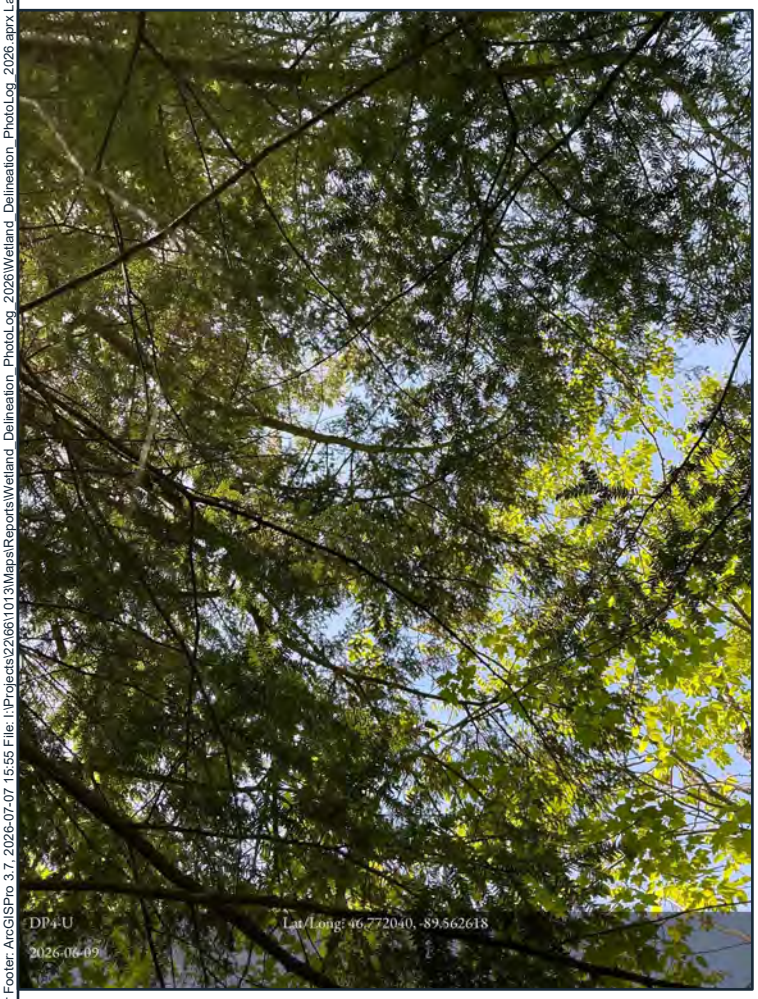
Wetland Delineation Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

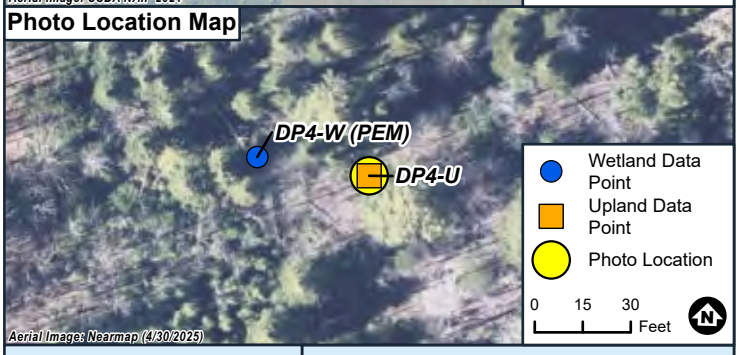
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Data Point:
DP4-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

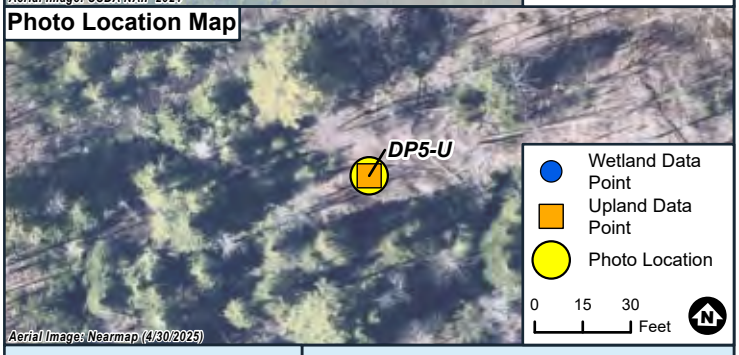
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Data Point:
DP5-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

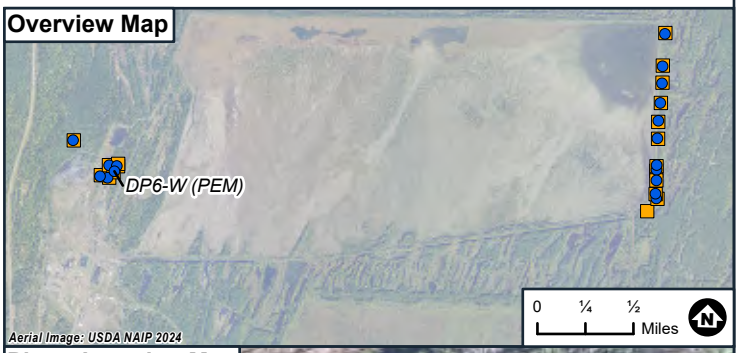
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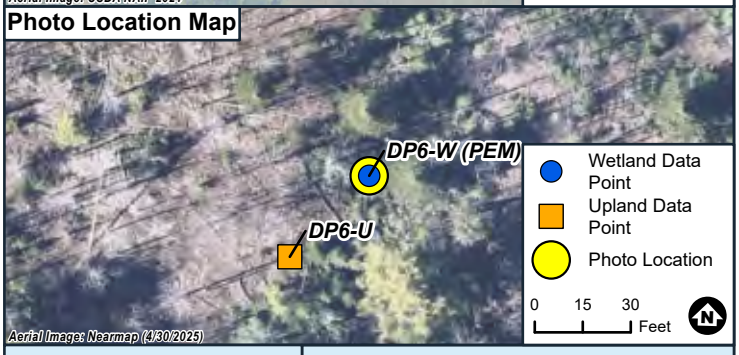
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Data Point:
DP6-W (PEM)

Point Type:
Wetland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

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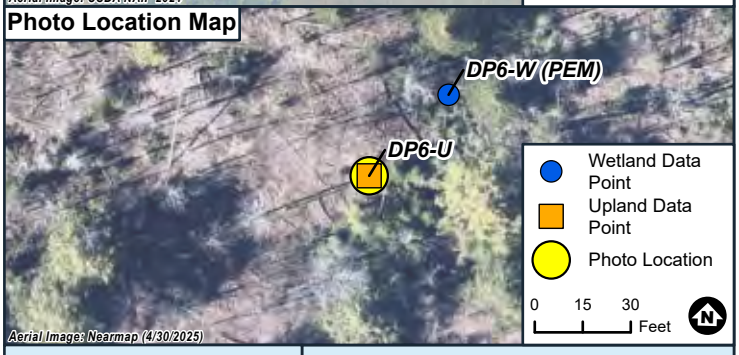




Overview Map



Photo Location Map



Data Point:
DP6-U

Point Type:
Upland

Wetland Delineation Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

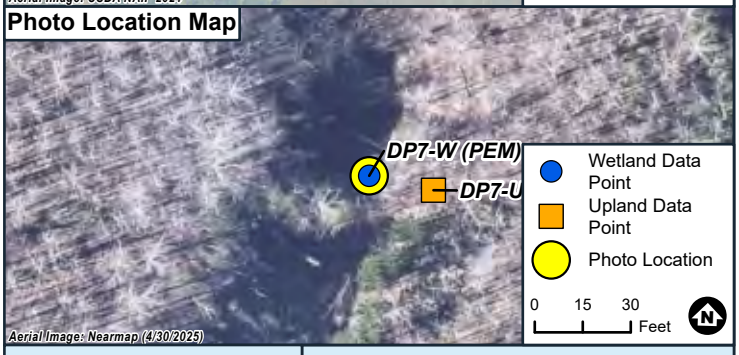
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Data Point:
DP7-W (PEM)

Point Type:
Wetland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

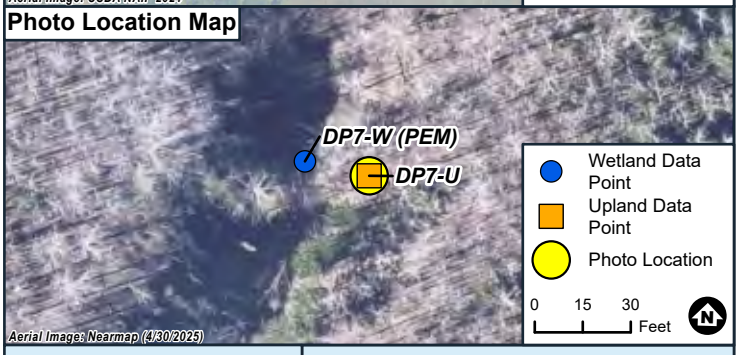
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Data Point:
DP7-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

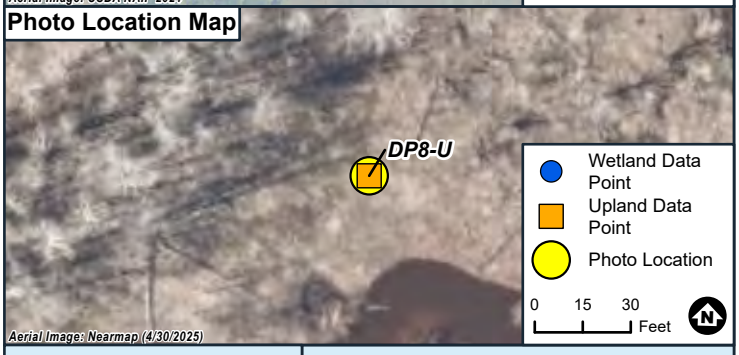
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Data Point:
DP8-U

Point Type:
Upland

Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

BARR

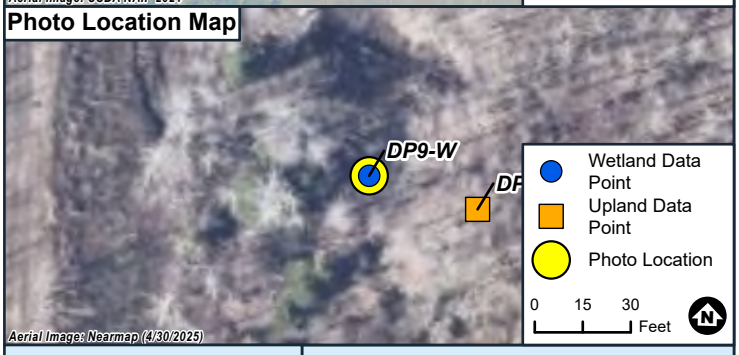
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Data Point:
DP9-W

Point Type:
Wetland

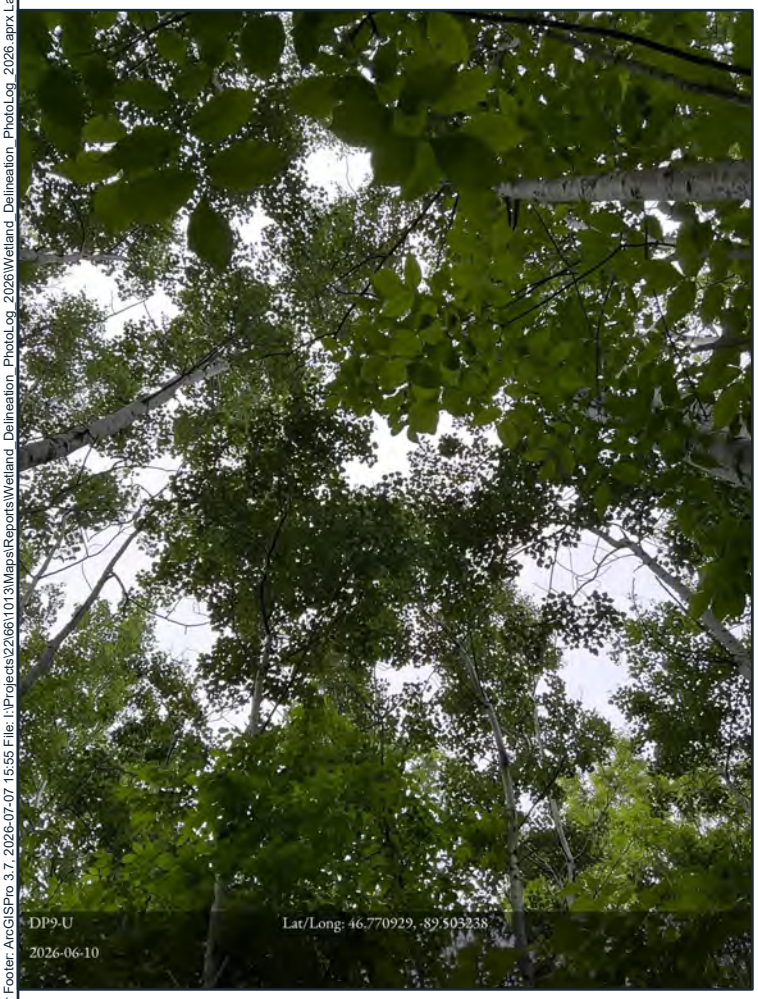
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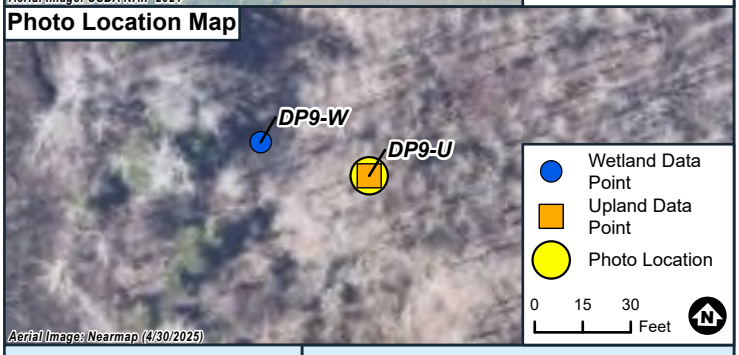
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Point Type:
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Ontonagon County, Michigan

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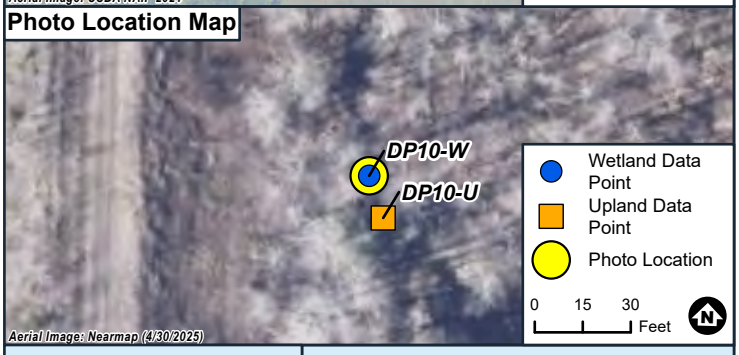




Overview Map



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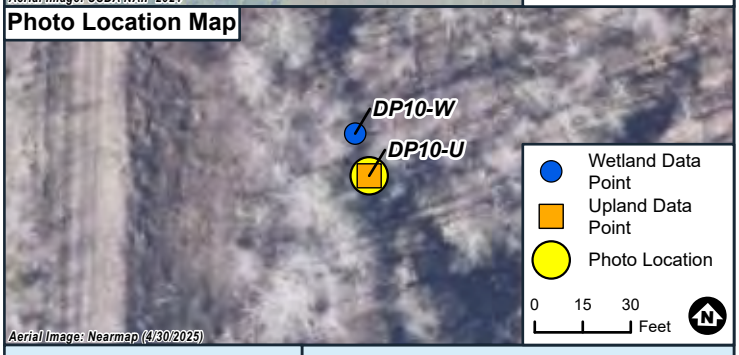
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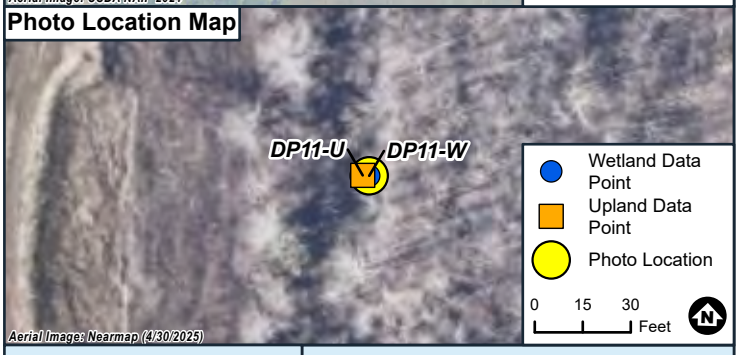




Overview Map



Photo Location Map



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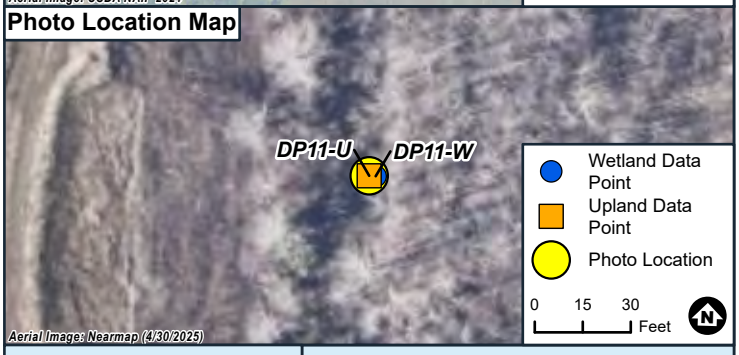
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Data Point:
DP11-U

Point Type:
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Carp Lake Township
Ontonagon County, Michigan

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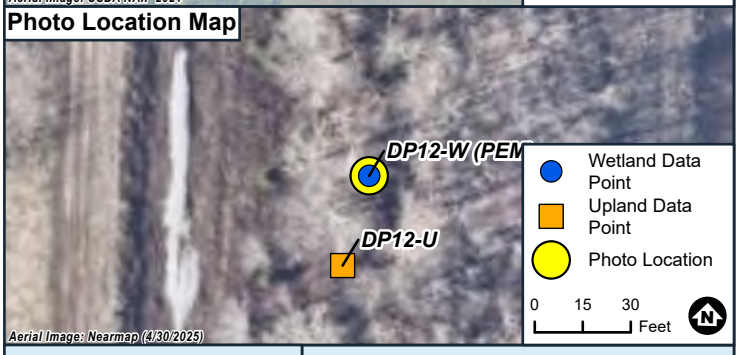
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Ontonagon County, Michigan

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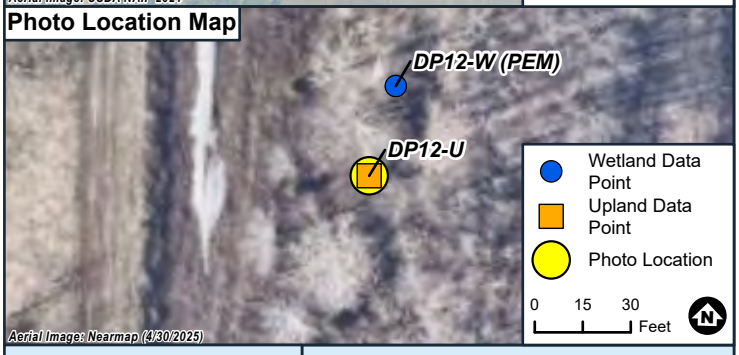
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Data Point:
DP12-U

Point Type:
Upland

Wetland Delineation
Photo Locations
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White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

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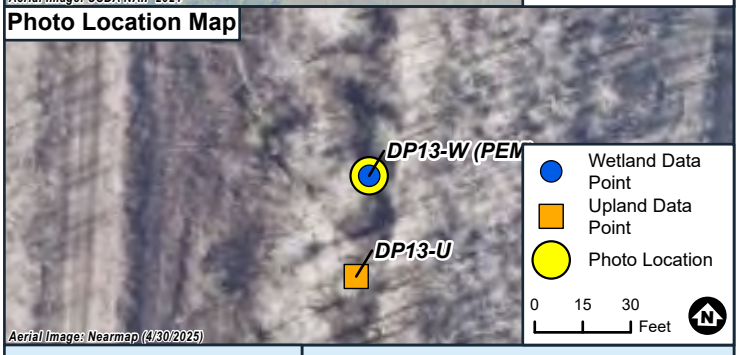




Overview Map



Photo Location Map



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Point Type:
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White Pine Copper, LLC
Carp Lake Township
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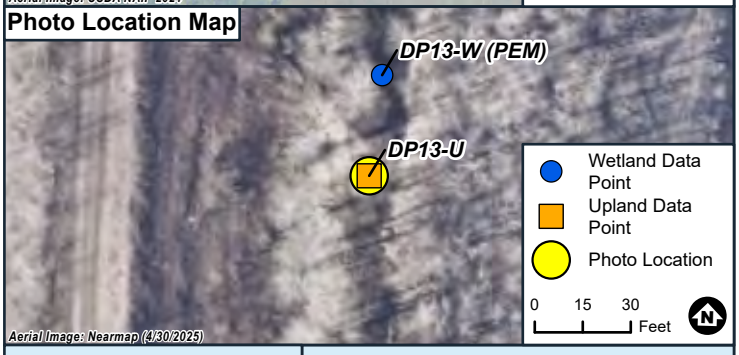
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Data Point:
DP13-U

Point Type:
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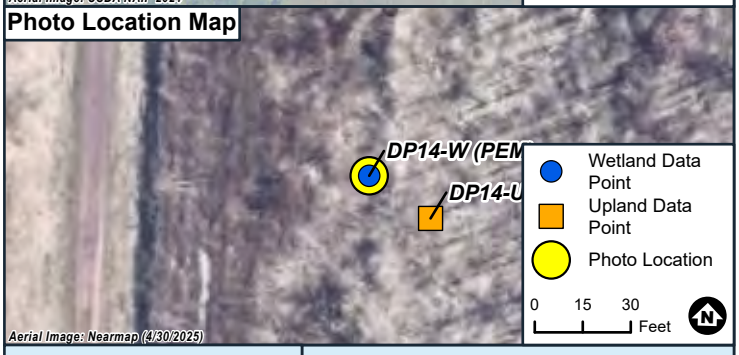




Overview Map



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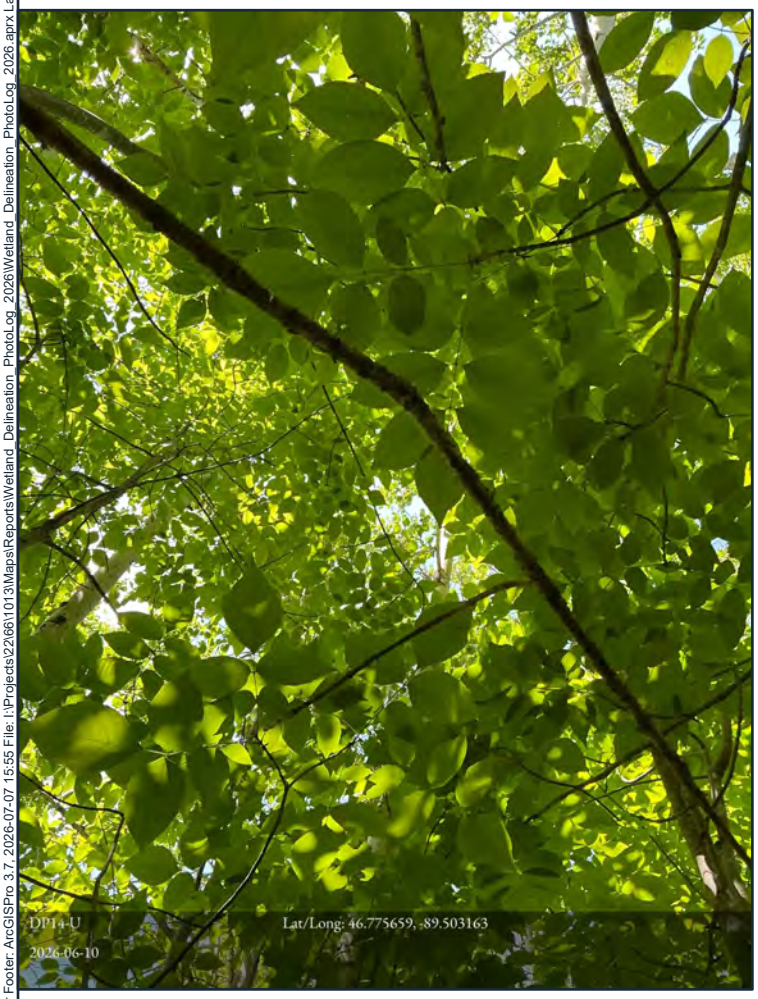
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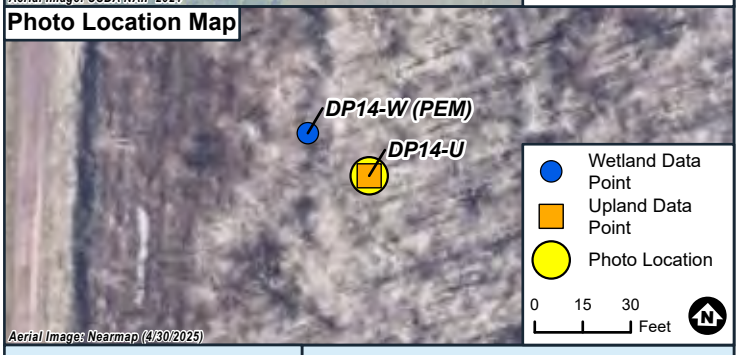
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Data Point:
DP14-U

Point Type:
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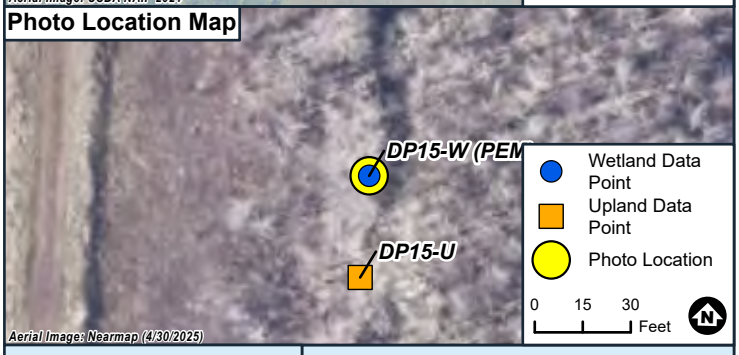
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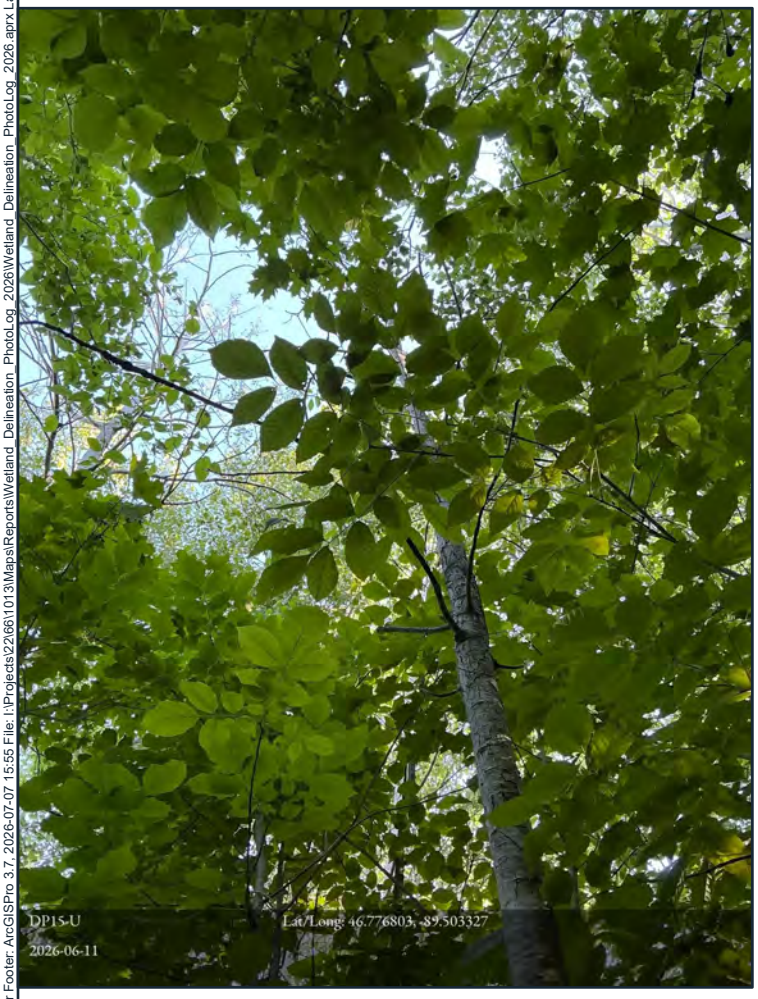
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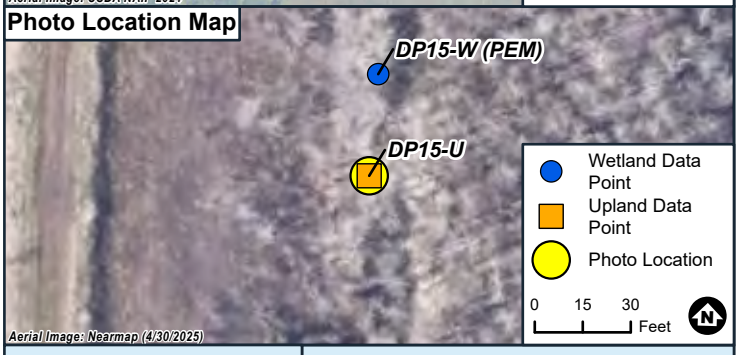
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Data Point:
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Point Type:
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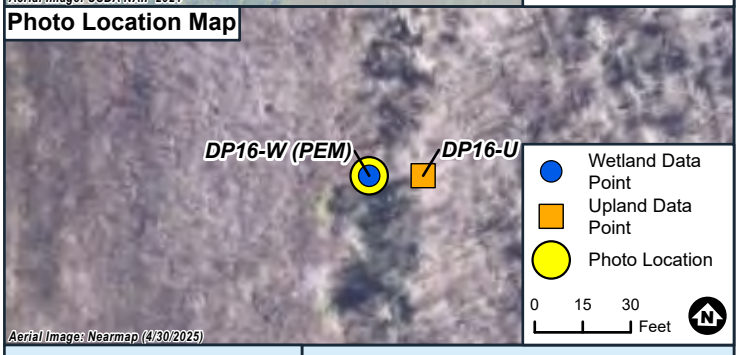
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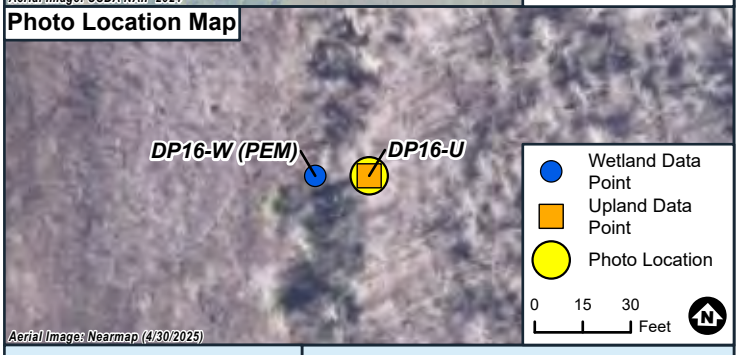
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Data Point:
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Point Type:
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Carp Lake Township
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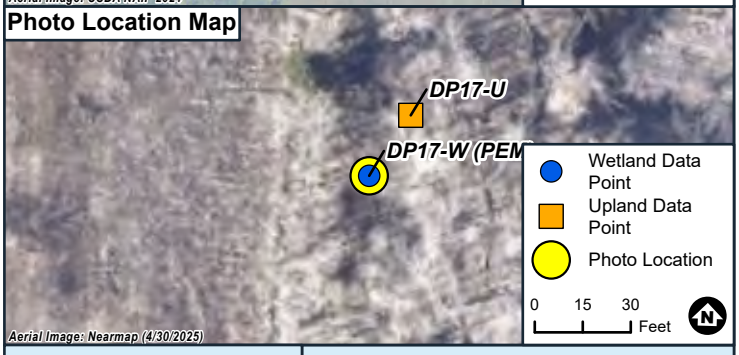
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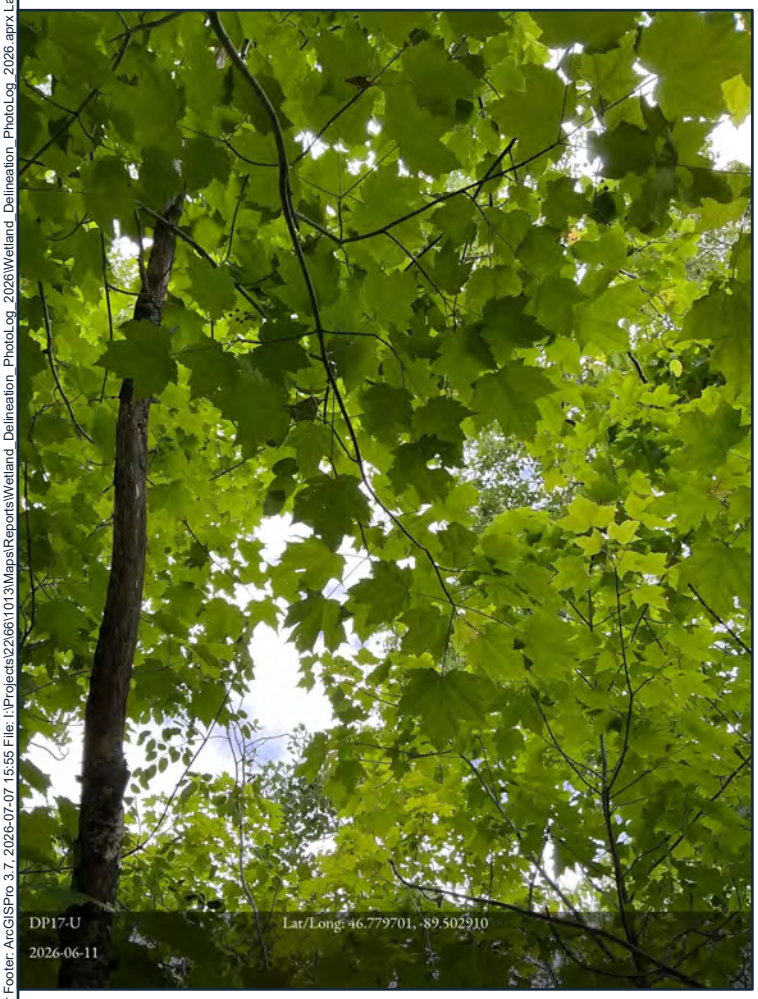
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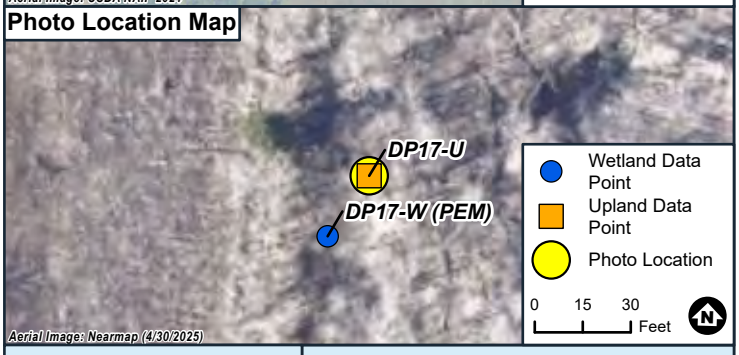
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Data Point:
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Point Type:
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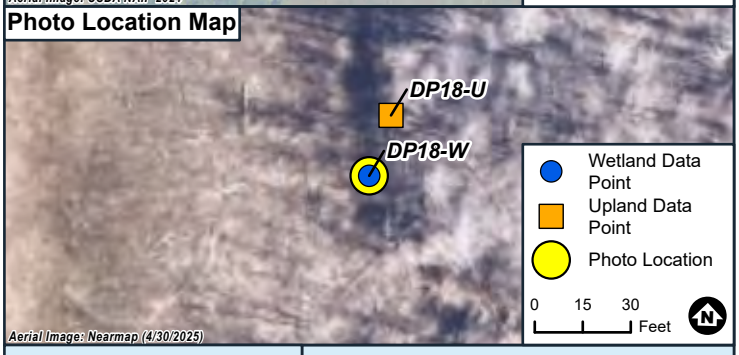




Overview Map



Photo Location Map



Data Point:
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Point Type:
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Wetland Delineation
Photo Locations
White Pine North
White Pine Copper, LLC
Carp Lake Township
Ontonagon County, Michigan

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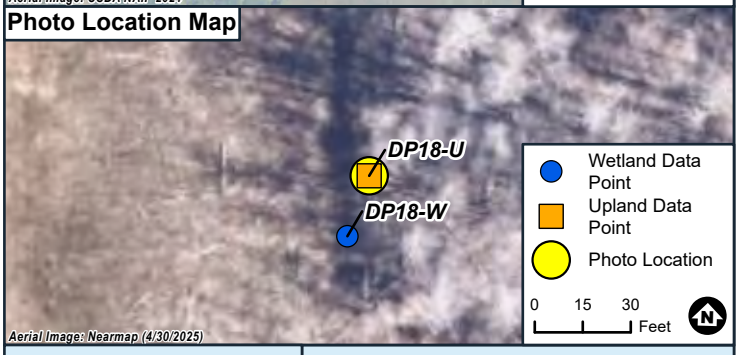
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Data Point:
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Point Type:
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Carp Lake Township
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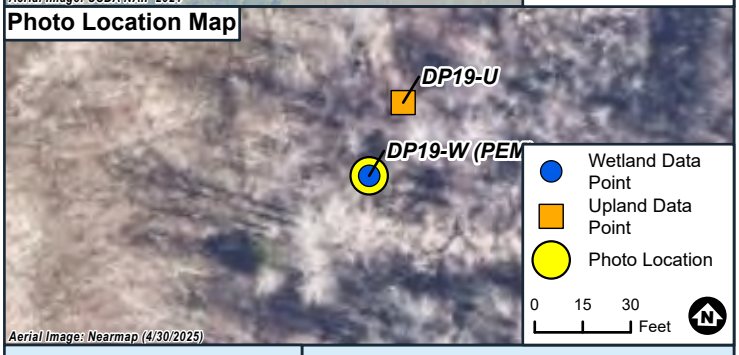
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Carp Lake Township
Ontonagon County, Michigan

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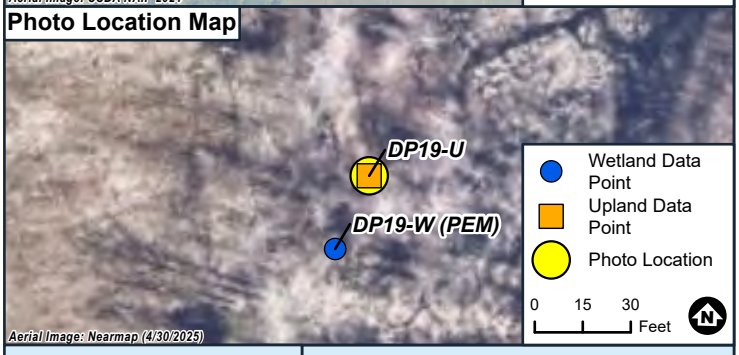
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Data Point:
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Point Type:
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White Pine Copper, LLC
Carp Lake Township
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Appendix F

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F-13 Rare Plant Species Survey and Community Mapping Results
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Baseline Aquatic Survey Report 2024

White Pine North

Baseline Aquatic

Survey Report 2024

April 8, 2025

Prepared for:

White Pine Copper, LLC

White Pine, MI

Prepared by:

ADVANCED ECOLOGICAL MANAGEMENT, LLC

ADVANCED
ECOLOGICAL
MANAGEMENT

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List of Abbreviations, Acronyms, and Symbols

AEM	Advanced Ecological Management LLC
CPUE	Catch-per-unit-effort
°C	Degrees Celsius
t	Duration of time
EGLE	Michigan Department of Environment, Great Lakes, and Energy
ft	Feet
gpm	Gallons per minute
GLEAS	Great Lakes and Environmental Assessment Section
µS/cm	Microsiemens per centimeter
mg O_2/L	Milligrams of oxygen per liter of water
ml	Milliliters
max	Maximum
min	Minimum
N	North
n.m.	Not measured
N	Number of fish caught
NPDES	National Pollutant Discharge Elimination System
pH	Measure of acidity or alkalinity of a solution
P-51	Procedure Number 51
R	Range
n	Sample size
Sec	Section
s	Standard deviation
T	Township
W	West

1.0 EXECUTIVE SUMMARY

Advanced Ecological Management, LLC (AEM), with assistance from Streamside Eco, LLC, and White Water Associates, Inc. conducted baseline aquatic surveys in 2024 at the White Pine North Project site. The White Pine North site is located in Ontonagon County in the Upper Peninsula of Michigan as shown on Figure 1-1. An aquatic baseline survey was conducted in ten stream sample stations and included fish, macroinvertebrate, and habitat community ratings according to the metrics outlined in the Surface Water Assessment Section (SWAS) Procedure Number 51 (P-51), a survey protocol for wadable streams and rivers. Additional aquatics surveys at ten ponds located within the property and North Dam 2 (tailings dam) were also conducted. Reconnaissance mussel surveys were conducted as part of the stream surveys and ponds were visually inspected for the presence of mussels. Sampling survey locations are shown in Figures 3-2 and 3-3.

A total of 720 fish were collected from the 10 stream sample stations that were surveyed as part of this assessment. Predominantly minnow species, including creek chubs (*Semotilus atromaculatus*), blacknose dace (*Rhinichthys atratulus*), and longnose dace (*Rhinichthys cataractae*), which were the most frequently collected species among all 10 sample stations. A summary of the fish, macroinvertebrate, and habitat ratings for the ten stream transects can be found in Table 1-1. Sample stations Duck 2, Mineral 1, Mineral 2, and Pine Creek were all determined to be “Acceptable” for the fish score rating. All other streams were rated “Poor” for fish, due to collecting less than a total of 50 fish in those sample stations. All stream transects, except for Duck 2 and Miles Creek, were rated “Acceptable” for the macroinvertebrate score. Duck 2 and Miles Creek were rated “Poor”. Argentine 1, Caribou, Duck 1, Mineral 1, Perch Creek, and Pine Creek were rated “Good” for the stream habitat score. Miles Creek was rated “Marginal” for the stream habitat score, and Argentine 2, Duck 2, and Mineral 2 were all rated “Excellent”.

Reconnaissance mussel surveys detected the presence of the cylindrical papershell (*Anodontoides ferussacianus*) in stream sample stations located in Duck Creek, Mineral River, Perch Creek and Pine Creek. In addition, several giant floater mussels (*Pyganodon grandis*) were found in the Duck Creek 2 sample station. Except for Perch Creek, where several dozen cylindrical papershell mussels were found, all of the mussels occurred in very low densities throughout their respective stream sample station locations. Empty shells of giant floater mussels were observed on the eastern bank of Pond 6.

A total of 5,111 fish were collected from all ponds and North Dam 2 that were surveyed as part of this assessment. The fish communities among all ponds and North Dam 2 were consistent and contained primarily minnow species (averaging between 1 and 2 inches in length) and pumpkinseed sunfish (averaging between 1 and 3 inches in length).

A total of 13 species of reptiles and amphibians were recorded during the survey, with the western painted turtle (*Chrysemys picta*), northern leopard frog (*Lithobates pipiens*), and the green frog (*Lithobates clamitans*) being the most frequently encountered species during the baseline assessment.

No state or federally threatened or endangered species were encountered during any of the surveys conducted as part of this assessment.

2.0 INTRODUCTION

White Pine Copper, LLC (WPC) is planning to commence mining operations at the White Pine North Project site. WPC is a joint venture between Kinterra Copper USA LLC (66% ownership) and Highland Copper Corporation (34% ownership). WPC is seeking to develop the brownfield site of the previous White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County, Michigan (Figure 1-1). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities, including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and South Dam. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established.

WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtrations. Tailings will be managed through re-use of one or more of the existing tailings dams.

Advanced Ecological Management, LLC (AEM) contracted with WPC to conduct baseline aquatic surveys, including reptile and amphibian surveys at the White Pine North Project site. These aquatic surveys were completed from May through July 2024, with the goal of describing existing conditions of aquatic biota

within the vicinity of the White Pine North Project area to satisfy requirements of the Mining Permit and Environmental Impact Assessment under Part 632 of Michigan's Natural Resources and Environmental Protection Act and rules specified in R 425.202. Specifically, the survey objectives were to describe the fish, macroinvertebrates (including freshwater mussels), reptile and amphibian communities, record the presence of any threatened or endangered aquatic species encountered, and to describe the aquatic habitat within the vicinity of the Project area. This report is intended to provide information to explain the methods used to conduct the aquatic surveys and to describe the results of the baseline surveys.

3.0 STUDY SITE

The White Pine North site is a former copper mine and processing facility located in White Pine, Michigan. The mine property is located east of Michigan Highway M-64 (M-64) approximately 5.4 miles south of Silver City in Ontonagon County, Michigan (Figure 1-1).

Survey locations were selected through an evaluation process that included a desktop review followed by a site reconnaissance visit on May 6 and 7, 2024 to the Project area. The subsequent site visit was used to verify that the sites selected during the desktop review were adequate for conducting the baseline aquatic surveys. Based on the site reconnaissance, some of the sites initially selected in the desktop review were found to be inadequate, where insufficient water was present, or a stream channel indicated in mapping data no longer existed in the field (Figure 3-1).

The aquatic investigations included surveys of 10 ponds within the White Pine North Project area, North Dam 2 (tailings dam), and 10 stream survey stations within the vicinity of the Project area, including two in the Mineral River, one in Pine Creek, one in Perch Creek, two in Argentine Creek, one in Caribou Creek, two in Duck Creek, and one in Miles Creek (Figures 3-2 and 3-3). The streams and ponds that were evaluated for this survey are located within the Lake Superior basin and they discharge or flow north towards Lake Superior. The study streams are primarily influenced by surface water, and some maintain an ephemeral flow regime (D. Caroffino, Michigan Department of Natural Resources, personal communication, May 24, 2024).

These stream sample locations were selected based on their proximity to the mine and the processing facility, and their ability to provide representative habitat and biological diversity information. The following is a description of individual sampling stations for the aquatics portion of the survey:

Argentine Creek: Two sample stations were surveyed on Argentine Creek, Argentine 1 (Arg 1) and Argentine 2 (Arg 2), respectively (Figure 3-2). Arg 1 was 100 feet in length and was located approximately 0.04 Miles northwest of the intersection of Halfway River Road and Halfway River Road, downstream from the mine property (Table 3-1). Arg 2 was 100 feet in length and was located 0.12 Miles south of the intersection of LP Walsh Road and Bay Road upstream from the mine property (Table 3-1). Both sample stations were dominated by riffle/run segments. Arg 1 contained sand, cobble, and larger boulders for substrate (Photographs 1 and 2). Arg 2 contained organic matter and muck for substrate (Photographs 3 and 4). Arg 2 was also much smaller in width and depth compared to Arg 1. The riparian vegetation of both stream stations included royal fern (*Osmunda regalis*), ostrich fern (*Matteucia struthiopteris*), and watercress (*Nasturtium officinale*).

Caribou Creek: One sample station that was 100 feet in length was surveyed on Caribou Creek approximately 1.94 Miles east of the intersection of LP Walsh Road and M-64 (Figure 3-2; Table 3-1), upstream of the mine property. Caribou Creek was a very small stream (approximately one-foot wide), with a braided channel just north of the sample station. The substrate was composed of muck and organic matter. Riparian vegetation included sedge species (*Carex spp.*), ostrich fern, and royal fern (Photographs 5 and 6). Speckled alder (*Alnus rugosa*) was also present along the banks.

Duck Creek: Two sample stations were surveyed on Duck Creek, Duck 1 and Duck 2 (Figure 3-2). Duck 1 was 100 feet in length and was located upstream of the mine property approximately 3.38 Miles east of the intersection of LP Walsh Road and M-64 (Table 3-1). Duck2 was 300 feet in length and was located downstream of the mine property approximately 2.1 Miles south of intersection of small gravel access road (shared entrance with Bolo Road) and M-64. Both transects were dominated by riffle/run segments. Duck 1 contained sand, cobble, and larger boulders for substrate, and Duck 2 contained bedrock and larger slabs of shale for substrate (Photographs 7 through 10). The riparian vegetation present in Duck 1 included royal fern, ostrich fern, and watercress. Speckled alder was also prominent along the banks of both sample stations, with red maples (*Acer rubrum*) along the riparian corridors.

Miles Creek: One sample station that was 100 feet in length was surveyed on Miles Creek approximately 0.56 Miles south of the intersection of a private access drive (Curlew Lane) and M-64 (Figure 3-2, Table 3-1), downstream of the mine property. The sample station substrate was dominated by sand and silt

particles. Riparian vegetation included sedge species, ostrich fern, and royal fern (Photographs 11 and 12). Speckled alder was also present along the banks.

Mineral River: Two sample stations were surveyed on the Mineral River, Mineral 1 (Min 1) and Mineral 2 (Min 2; Figure 3-2). Min 1 was 300 feet in length and was located approximately 0.15 Miles west of the mine access road along the west side of the mine, where it orients from a north-south road to a northeast oriented road (Table 3-1). Min 1 was sampled upstream of the culvert that flows under an access drive. Min 2 was 300 feet in length and was located upstream of the mine property immediately downstream (west) of where M-64 crosses the river approximately 0.24 miles south of its intersection with LP Walsh Road (Table 3-1). Both Mineral River sample stations were primarily composed of riffle/run segments and their substrate consisted of large boulders and bedrock. The predominant riparian vegetation consisted of speckled alder along the stream bank within the transect of Min 1 (Photographs 13 and 14). Min2 had speckled alder and eastern red cedar (*Juniperus virginiana*) along the banks (Photographs 15 and 16).

Perch Creek: One sample station, measuring 300 feet in length, was surveyed on Perch Creek 0.04 Miles northeast of the National Pollution Discharge Elimination System (NPDES) regulated Perch Outfall (001A; Figure 3-2; Table 3-1), which forms the headwaters of Perch Creek. The stream's flow rate and water quality characteristics, immediately downstream of the outfall, are highly influenced by the discharge. The substrate of Perch Creek included organic matter, woody debris, sand, gravel, and boulders in the upper portion of the sample station and more clay and silt in the lower portion of the sample station (Photographs 17 and 18). Royal fern and speckled alder were present along the banks.

Pine Creek: One sample station, measuring 300 feet in length, was surveyed on Pine Creek approximately 0.10 Miles east of the northeast corner of the mine access road where the road orients to a north-south direction along the east side of the mine (Figure 3-2, Table 3-1). Pine Creek was also composed of mostly riffle/run segments and the substrate consisted of boulders and bedrock (Photographs 19 and 20). There were also portions of the sample station that contained undercut banks. Vegetation included speckled alder, ostrich fern, and royal fern.

Portal Creek: A total of 16 sample stations, each measuring 100 feet in length, were surveyed on Portal Creek within approximately 2,400 feet of stream channel immediately north of the stream crossing of the southern berm that forms North Dam 1. The Portal Creek survey was conducted in June 2024 in a separate

survey from the other sites that are included in this baseline report. The Portal Creek report is included in Appendix B of this report.

Ponds: The ponds that were surveyed for this baseline survey are all located north of the North 2 Tailings Dam (Figure 3-3). Ten ponds were investigated as part of this baseline survey. The term "Pond 1" was assigned to the westerly most pond surveyed on the mine property and the pond numbering generally increased from a west to east direction, except for ponds 6 through 8, which were in the northwest portion of the pond survey area (Figure 3-3). Although Pond 1 appeared to be hydrologically isolated from all other waterbodies, it maintained similar substrate and aquatic vegetation composition to the other ponds that were investigated as part of this baseline survey (Photograph 21). Ponds 2-5 are all hydrologically connected, and part of the White Pine Copper water management system regulated under NPDES Permit MI0006114. As part of the water management system, water is discharged through the North Dam 2 spillway into the perimeter ditch that drains to the west along the northern toe of North Dam 2. The water then flows north, under the perimeter road, through a culvert and is routed through a series of five connected stilling ponds. The clarified water is discharged through Outfall 001 into Perch Creek, from Pond 2, under the NPDES Permit (Figure 3-4). Pond 6 is isolated from Ponds 7 and 8 during dry periods (typically in the late summer months), but during wet times there is a small stream channel connecting the pond systems. Ponds 7 and 8 are directly connected by several small streams and channels. Pond 9 is hydrologically connected to two other adjacent ponds and seasonally connected to wetland drainages. Pond 10 is hydrologically connected to an adjacent pond and seasonally connected to other drainages and nearby ponds.

Most of the ponds had soft substrates composed of marl, silt, and muck, and much of the substrate was covered by muskgrass (*Chara spp*.). The banks and fringes of the pond contained narrowleaf cattails (*Typha angustifolia*) and sandbar willow (*Salix interior*, Photographs 22 through 26).

North Dam 2: North Dam 2 is a large tailings dam (approximately 2,400 acres in size) located in the northern extent of the White Pine Copper property. A permanent pond covers approximately 105 acres in the northeast portion of the impoundment. The east end of the dam contains crushed concrete and rebar along the shorelines, and the material also made up most of the substrate within the ponded water of North Dam 2 (Photograph 27). The bottom of the ponded water area dropped off sharply approximately 25 yards from the shoreline. The west end of the ponded water area was much shallower, and the

shorelines were vegetated with narrowleaf cattail, various rush species (*Juncus spp.*), and sandbar willow (Photograph 28). The substrate was very soft and primarily comprised of marl and muck. The entire dam was surrounded by an access road placed upon a berm that rises approximately 10 to 40 feet high above the surface of the ponded water.

4.0 METHODS

To characterize the quality of the streams within the vicinity of the Project area, flowing and wadable water bodies were sampled according to the Michigan Department of Environment, Great Lakes, and Energy (EGLE; formerly the Michigan Department of Environmental Quality) Surface Water Quality Division *Procedure #51 Survey Protocols for Wadable Rivers* (P-51; MDEQ, 1990). The P-51 is a rapid bioassessment protocol that is used to evaluate stream quality based on fish, macroinvertebrates, and stream habitat characteristics.

Surface waters were sampled to characterize the fish communities and to provide a general description of the aquatic habitat. Fish from the streams were sampled using a backpack electroshocker, and fish from the ponds were sampled using fyke nets. Macroinvertebrates were sampled using D-framed kick nets from the edges of the ponds.

4.1 Stream Fish Collection

A backpack electroshocker was used to sample fish in each stream. A multi-pass removal was conducted in each stream sample station (Van Deventer and Platts, 1983). For each electrofishing pass, stunned fish were placed in a live well for identification and enumeration. Following collection, identification, and enumeration in each station, fish were released back within each station.

Stream fish data were analyzed according to P-51 metrics to produce a “fish score” that was used to rate the fish community as poor, neutral (acceptable), or excellent quality. There are ten metrics used to evaluate the fish community diversity, and they are listed in the P-51 methodology (MDEQ, 1990). The score for each metric can range from –1 to +1 and are described as follows:

- -1 indicates the community is performing outside of (minus) two standard deviations from the average conditions found at excellent sites;

- 0 indicates the community is performing between the average condition and (minus) two standard deviations from the average condition found at excellent sites, and;
- +1 indicates the community is performing better than the average condition found at excellent sites.

The summation of the fish scores can range from –10 to +10 using these metrics. Stations that score from +5 to +10 are considered excellent. Stations that score from –5 to –10 or have less than 50 fish are considered poor, while stations that score from –5 to +5 (including zero) are considered acceptable in fish community structure (MDEQ, 1990).

Catch-per-unit-effort (CPUE) is used as an index of fish abundance. Fish sampling efforts were standardized to units consistent with the Michigan Department of Natural Resources sampling protocol (Schneider et al., 2000). CPUE for the following gear was estimated as follows:

CPUE = $\frac{N}{t}$

Where,

N = number of fish caught

t = sample duration in minutes (boom shocker), or

t = sample duration in net nights (24-hour set of a multi-sized mesh panel gill net), or

t = sample duration in net nights (Fyke net).

In addition to the data collected for the P-51 analysis, length and weight data of fish captured were recorded. Fish were identified to species using various taxonomic references (Bailey et al., 2003; Becker, 1983; Hubbs et al. 2004). If field identification was not possible or was questionable, one representative of each species was placed in a voucher jar containing 10% formalin for later identification. Each voucher jar was labeled according to the sample location and date.

4.1.2 Stream Macroinvertebrate Collection and Mussel Surveys

Macroinvertebrate sampling was conducted within all stream transects. Subsequent to the completion of fish sampling, aquatic macroinvertebrates, including decapods (crayfish), were collected within each station using D-framed kick-nets (Merritt et al., 1996). Samples were collected from all habitat types within each station to characterize the macroinvertebrate community. Stations were sampled for 20 minutes

using two kick-nets and samples were collected in all habitat types within each station to characterize the macroinvertebrate community. In accordance with the Procedure-51 protocol, macroinvertebrate samples from each station were placed in a bucket to form a composite sample. The composite sample was subsampled to obtain approximately 300 +/- 60 organisms for later identification and enumeration. Following the subsample, the remaining composite sample was searched for additional large or rare taxa that were not included in the subsample and will be ultimately combined with the subsample. Collected specimens were stored in 250 ml plastic wide-mouth jars containing 70 percent ethanol and were identified using various taxonomic references. (Bright, 2024; Merritt et al., 2019; Cummings and Mayer, 1992; Pennak, 1990).

The wadable stream macroinvertebrate data were analyzed according to nine metrics identified in the P-51 methodology. The sum of the macroinvertebrate scores can range from –9 to +9; and like the fish community, are graded as excellent, acceptable (slightly impaired), or poor according to the summation of the metric scores. Stations that score from +5 to +9 are considered excellent. Stations that score from –6 to –9 are considered poor, while stations that score from –5 to +5 (including zero) are considered acceptable in macroinvertebrate community structure (MDEQ, 1990).

Mussel species were evaluated for each stream through “Reconnaissance” surveys (Hanshue et al. 2021). Reconnaissance surveys were conducted concurrent with the aquatic surveys (July 8 through July 13, 2024) and involved walking the streams and looking for mussels within the substrate using a bucket that contained a viewing window at the bottom. Additionally, banks were checked for shells of mussels that had been removed from the water. Live mussels were immediately identified and returned to their original position in the stream, posterior end up, half buried in sediment. Voucher photographs of all species were collected. Consistent with the communication requirement of the collector’s permit, preliminary results of the mussel survey were emailed to Dave Caroffino (MDNR Lake Superior Basin Coordinator) within 24 hours of completing the field survey (Appendix C). Final results from the survey are reported to the MDNR through the annual collector’s permit online reporting process.

4.1.3 Stream Habitat Evaluation

Riparian and instream habitats were qualitatively described for each transect. A description of stream morphology included run/riffle/pool/shallow pool configurations, substrate, substrate embeddedness, instream cover, vegetation, flow stability, and bank stability. Stream habitat was rated as excellent, good,

marginal, or poor based on P-51 scores interpreted from 10 habitat metrics. Habitat was rated according to the following P-51 habitat scores (MDEQ, 1990):

Habitat Characterization	Total Point Score
1. Excellent	> 154
2. Good	105 – 154
3. Marginal	56 – 104
4. Poor	< 56

Wetted stream width was measured at the downstream extent, upstream extent, and middle of each sample station to describe the physical dimensions of each stream sample station at the time of the survey. The average depth of the sample station was determined from stream depth measured at 20 percent of the channel width, 50 percent of the channel width, and 80 percent of the channel width at the downstream extent, upstream extent, and middle of the station. Stream flow was measured using a SonTek Flow Tracker.

Photographs were taken at each station to illustrate the conditions during the sampling period. Water temperature, pH, conductivity, and dissolved oxygen were measured as part of the stream habitat evaluation. These water quality parameters were measured using a Yellow Springs Instrument Professional Plus water quality meter. P-51 stream habitat survey cards were completed for every stream sample station that was evaluated for this baseline survey (Appendix A).

4.2 Ponds

Ponds were surveyed using a small flat-bottom rowboat. The boat was used to deploy nets for fish sampling, check for live mussels, and to collect macroinvertebrate samples from around the shoreline of the ponds.

4.2.1 Pond Fish Collection

Fyke nets were deployed perpendicular to the shoreline using a small flat-bottom rowboat. Fyke nets were constructed of 0.125-inch "Ace"-type nylon mesh coated with green latex net dip. The lead was 15 feet-long and the height of the lead was 2 feet-high. The frame and the cab were 10 feet-long when fully extended. The frame section is formed by two rectangular spring-steel frames that are 2 feet-high by 4 feet-wide. The cab is constructed of two 2-foot diameter steel hoops. The fyke nets were deployed in

Ponds 1, 2, 5, 8, 9, and 10 and North Dam 2. Pond 1 was sampled with two fyke nets over one night for approximately 24 hours and ponds 2, 5, 8, 9, and 10 each were sampled with one fyke net for one night over approximately 24 hours. North Dam 2 was sampled with three fyke nets over two nights for a total of six net nights (one net night = one net set for approximately 24 hours).

4.2.2 Pond Macroinvertebrate Collection and Mussel Surveys

Aquatic macroinvertebrate sampling was conducted along the shoreline of Ponds 1, 2, 5, 8, and 9 and North Dam 2 using a D-frame kick-net. When possible, macroinvertebrates were also collected using the D-frame kick-net from the small john boat to sample areas that could not be reached by waders. Collected specimens were stored in 500 ml plastic wide-mouth jars containing 70% ethanol, and were identified using various taxonomic references (Bright, 2024; Merritt et al., 2019; Cummings and Mayer, 1992; Pennak, 1990).

Mussels were surveyed by looking in the substrate when out in the boat, and by checking the shoreline for shells of organisms that had been removed from the water. Shells that were found on the bank were identified to the species level and recorded.

4.2.3 Water Quality Evaluation

Water temperature, pH, conductivity, and dissolved oxygen were measured as part of the pond habitat evaluation. These water quality parameters were measured using a Yellow Springs Instrument Professional Plus water quality meter. The water quality was typically sampled at the same location where the first fyke net was deployed in each pond.

4.3 Reptile and Amphibian Surveys

Reptile and amphibian surveys were conducted by White Water Associates for this baseline survey. Reptile and amphibian surveys were conducted around the streams and ponds in the vicinity of North Dam 1 and North Dam 2 from May through July 2024 to capture the peak activity periods for these organisms (Figure 3-1). The surveys included listening for calls along the survey route (around the Tailings Dams) and informed meander surveys, which involved searching appropriate habitats for species of reptiles and amphibians expected or known to be present. Auditory cues (calling frogs), animal signs (for example, turtle egg fragments, shed snake skins, and tracks) and direct visual sightings of adults, juveniles, larvae, and eggs were used to identify the presence of species. Anuran (frogs and toads) surveys were conducted

in peak breeding season and they were primarily conducted after dark to best sample during the highest breeding activities. Calling intensity was rated from a value of 1 to 3, which are described as follows:

1. Individuals can be counted and there is a detectable interval between calls.
2. Individuals can be counted and there are some overlapping calls.
3. Full chorus of calls that are continuous and overlapping.

During the same time periods, headlamps were used to look for salamanders in the same aquatic habitats. A variety of suitable aquatic habitats were sampled for amphibians. Additionally, suitable habitat was visually searched for reptiles (snakes, turtles, and lizards).

4.4 Threatened and Endangered Species

Prior to conducting the field surveys, the Ontonagon County Element List (Michigan Natural Features Inventory, 2024) was reviewed to determine if any threatened, endangered, or special concern aquatic species occurred within the vicinity of the project. Following completion of the surveys, the list was revisited to validate whether any of the species encountered during this baseline survey were threatened or endangered. The Michigan Natural Features County Element List for Ontonagon County is included in Appendix D.

5.0 RESULTS

Stream and pond surveys, including mussel reconnaissance surveys, were conducted from July 8, 2024, through July 13, 2024. A total of 10 stream transects, 10 ponds, and the ponded water in North Dam 2 were sampled during that time period. Reptile and amphibian surveys were conducted on May 6, June 10, and July 19, 2024.

5.1 Streams P-51

All streams sampled within the project vicinity are located in a region that is classified as a Northern Lakes and Forests ecoregion (Omernik and Gallant, 1988). Therefore, all P-51 scoring was based on metrics that relied on typical data from the Northern Lakes and Forest ecoregion.

A total of 25 different fish species and a total of 897 fish were captured among the eight different streams, including Portal Creek where a total of 159 fish were captured (Table 5-1). The results from Portal Creek are not included in this summary but can be found in Appendix B. Among all fish that were captured among the streams, ponds, and North Dam 2, the length of the fish ranged from 15 millimeters (0.6 inches) to 336 millimeters (13.6 inches), with an average length of 64.2 millimeters (2.5 inches; Table 5-2). Fish

weights ranged from 0.1 gram (0.004 ounces) to 220.0 grams (7.8 ounces), with an average weight of 5.8 grams (0.2 ounces) among all fish that were captured (Table 5-2).

5.1.1 Argentine Creek

A total of 42 fish representing six taxa were collected from sample station Arg 1. The dominant species included rainbow trout (*Oncorhynchus mykiss*), blacknose dace (*Rhinichthys atratulus*), and creek chubs (*Semolitus atromaculatus;* Table 5-1). The Catch Per Unit of Effort (CPUE) for Arg 1 was 1.0 fish per minute of electricity discharge. No threatened or endangered species were captured in Arg 1. The fish community of sample station Arg 1 was classified as "Poor" because less than 50 fish total were captured (Table 5-3).

A total of 100 macroinvertebrates were collected from Arg 1, where Hemipterans (true bugs) and Trichopterans (caddisflies) were the most frequently collected organisms (Table 5-4). Based on P-51 rating metrics, the macroinvertebrate community of sample station Arg 1 was rated as "Acceptable" (Table 5-5).

Arg 1 stream habitat was classified as a riffle/run habitat. The habitat was rated as "Good" in accordance with the P-51 total habitat score (Table 5-6).

The average width of sample station Arg 1 was 5.6 feet (standard deviation; s = 2.2 feet; sample size; n = 3) and the average depth was 0.3 feet (s = 0.2 feet; n = 9; Table 5-7). The discharge within Arg 1 was 42 gallons per minute (gpm). Water temperature within Arg 1 was 15.5°C, which was the lowest among all sample stations (Table 5-8). The percent dissolved oxygen was 76.2, the dissolved oxygen was 7.6 milligrams of oxygen per liter (mg O_2/L), and the pH was 7.7 (Table 5-8).

A total of 10 fish representing three taxa were collected from Arg 2. The species included brook stickleback (*Culaea inconstans*), creek chubs, and northern redbelly dace (*Chrosomus eos;* Table 5-1). The CPUE for Arg 2 was 0.5 fish per minute of electricity discharge. No threatened or endangered species were captured in Arg 2. The fish community of sample station Arg 2 was classified as "Poor" because less than 50 fish total were captured (Table 5-3).

A total of 92 macroinvertebrates were collected from Arg 2, where true bugs, Gastropods (snails), and Anisopterans (dragonflies) were the most frequently collected organisms (Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of sample station Arg 2 was rated as "Acceptable" (Table 5-5).

Arg 2 stream habitat was classified as a riffle/run habitat. The habitat was rated as "Excellent" in accordance with the P-51 total habitat score (Table 5-6).

The average width of sample station Arg 2 was 2.2 feet (standard deviation; *s* = 0.3 feet; sample size; *n* = 3) and the average depth was 0.3 feet (*s* = 0.1 feet; *n* = 9; Table 5-7). The discharge was not measured within Arg 2 due to the width of the stream being too small for the equipment to effectively operate. Water temperature within Arg 1 was 19.0°C (Table 5-8). Percent dissolved oxygen was 49.4 and dissolved oxygen was 4.6 mg O_2/L. Dissolved oxygen in Arg 2 was the second lowest among all sample stations and Arg 2 had the lowest pH among all sample stations (pH = 6.7; Table 5-8).

Freshwater mussels were not observed in any of the Argentine Creek sample stations.

5.1.2 Caribou Creek

A total of eight fish representing two taxa were collected from Caribou Creek. The two species included brook stickleback and central mudminnow (*Umbra limi;* Table 5-1). The CPUE for the Caribou Creek sample station was 0.4 fish per minute of electricity discharge. No threatened or endangered species were captured in Caribou Creek. The fish community of the Caribou Creek sample station was classified as "Poor" because less than 50 fish total were captured (Table 5-3).

A total of 117 macroinvertebrates were collected from the Caribou Creek sample station, where Dipterans (flies) and dragonflies were the most frequently collected organisms (Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of the Caribou Creek sample station was rated as "Acceptable" (Table 5-5).

Freshwater mussels were not observed in the Caribou Creek sample station.

The Caribou Creek sample station was classified as a riffle/run habitat. The habitat was rated as "Good" in accordance with the P-51 total habitat score (Table 5-6).

The average width of the Caribou Creek sample station was 2.4 feet (standard deviation; *s* = 1.4 feet; sample size; *n* = 3) and the average depth was 0.4 feet (*s* = 0.2 feet; *n* = 9; Table 5-7). The discharge was

not measured within Caribou Creek due to the width of the stream being too small for the equipment to effectively operate. Water temperature within Caribou Creek was 17.0°C, and the pH was 11.6, which was the highest pH among all sample stations surveyed (Table 5-8). Conductivity, percent dissolved oxygen, and dissolved oxygen were the lowest in Caribou Creek among all other sampled sample stations (conductivity = 73.0 µS/cm.; % dissolved oxygen = 28.2; dissolved oxygen = 2.7 mg O_2/L; Table 5-8).

5.1.3 Duck Creek

A total of 30 fish representing two taxa were collected from sample station Duck 1. The two species included blacknose dace and creek chub (Table 5-1). The CPUE for Duck 1 was 1.5 fish per minute of electricity discharge. No threatened or endangered species were captured in Duck 1. The fish community of sample station Duck 1 was classified as "Poor" because less than 50 fish total were captured (Table 5-3).

A total of 78 macroinvertebrates were collected from Duck 1, where true bugs, dragonflies, and true flies were the most frequently collected organisms (Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of sample station Duck 1 was rated as "Acceptable" (Table 5-5).

Freshwater mussels were not observed in the Duck 1 sample station.

Duck 1 stream habitat was classified as a riffle/run. The habitat was rated as "Good" in accordance with the P-51 total habitat score (Table 5-6).

The average width of sample station Duck 1 was 4.1 feet (standard deviation; *s* = 0.4 feet; sample size; *n* = 3) and the average depth was 0.1 feet (*s* = 0.1 feet; *n* = 9; Table 5-7). The discharge was not measured within Duck 1 due to the width of the stream being too small for the equipment to effectively operate. Water temperature within Duck 1 was 18.9°C. The percent dissolved oxygen was 92.3, the dissolved oxygen was 8.6 mg O_2/L, the highest readings among all stations, and the pH was 8.0 (Table 5-8).

Due to complex habitat structure at sample station Duck 2, and difficulty with adequate net blocking, two backpack electroshockers were used to simultaneously survey the sample station with only a single pass removal. A total of 155 fish representing 11 taxa were collected from sample station Duck 2. The dominant species included blacknose dace, common shiner (*Luxilis cornutus*), and creek chub (Table 5-1). The CPUE

for sample station Duck 2 was 2.6 fish per minute of electricity discharge. No threatened or endangered species were captured in Duck 2. The fish community of sample station Duck 2 was classified as "Acceptable" with a fish score rating of 0 (Table 5-3).

A total of 37 macroinvertebrates were collected from Duck 2, where true bugs, true flies, and Decapodans (crayfish) were the most frequently collected organisms (Table 5-4). Based on P-51 rating metrics, the macroinvertebrate community in sample station Duck 2 was rated as "poor" (Table 5-5).

Several giant floater (*Pyganodon grandis*) and cylindrical papershell (*Anodontoides* ferussacianus) mussels were found in Duck 2; however, they were low in density throughout the sample station (Table 5-9). Mussel habitat is less than ideal since most of the substrate is composed of large cobble, boulder, and bedrock.

Duck 2 stream habitat was classified as a riffle/run. The habitat was rated as "Excellent" in accordance with the P-51 total habitat score (Table 5-6).

The average width of sample station Duck 2 was 17.6 feet (standard deviation; s = 3.0 feet; sample size; n = 3) and the average depth was 0.4 feet (s = 0.3 feet; n = 9; Table 5-7). The discharge was not measured within Duck 2 because we were unable to identify a suitable location with a consistent flow profile to measure stream velocity. Water temperature within Duck 2 was 19.8°C, percent dissolved oxygen was 75.7, dissolved oxygen was 6.9 mg O_2/L, and pH was 7.8 (Table 5-8).

5.1.4 Miles Creek

A total of one fish representing one taxon (brook stickleback) was collected from Miles Creek (Table 5-1). The CPUE for the Miles Creek sample station was 0.1 fish per minute of electricity discharge. No threatened or endangered species were captured in Miles Creek. The fish community of the Miles Creek sample station was classified as "Poor" because less than 50 fish total were captured (Table 5-3).

A total of 40 macroinvertebrates were collected from Miles Creek, where dragonflies were the most frequently collected organisms, followed by Isopods (sowbugs) and Amphipods (scuds; Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of the Miles Creek sample station was rated as "Poor" (Table 5-5).

Freshwater mussels were not observed in the Miles Creek sample station.

Miles Creek stream habitat was classified as a riffle/run. The habitat was rated as "Marginal" in accordance with the P-51 total habitat score (Table 5-6).

The average width of Miles Creek was 2.4 feet (standard deviation; *s* = 0.2 feet; sample size; *n* = 3) and the average depth was 0.2 feet (*s* = 0.1 feet; *n* = 9; Table 5-7). The discharge was not measured within Miles Creek due to the width of the stream being too small for the equipment to effectively operate. Water temperature within Miles Creek was 20.0°C, which was the second highest among all sample stations (Table 5-8). The pH was 7.3 which was the second lowest pH among all sample stations, and the percent dissolved oxygen was 63.5 and the dissolved oxygen was 5.8 mg O_2/L (Table 5-8).

5.1.5 Mineral River

A total of 211 fish representing 12 taxa were collected from sample station Min 1. The dominant species included longnose dace (*Rhinichthys cataractae*), creek chub, and mottled sculpin (*Cottus bairdii;* Table 5-1). The CPUE for sample station Min 1 was 1.5 fish per minute of electricity discharge. No threatened or endangered species were captured in Min 1. The fish community of sample station Min 1 was classified as "Acceptable" with a fish score rating of -1 (Table 5-3).

A total of 84 macroinvertebrates were collected from Min 1, where true bugs, true flies, and dragonflies were the most frequently collected organisms (Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of sample station Min 1 was rated as "Acceptable" (Table 5-5).

Freshwater mussels were not observed in the Min 1 sample station.

Min 1 stream habitat was classified as a riffle/run habitat. The habitat was rated as "Good" in accordance with the P-51 protocol total habitat score (Table 5-6).

The average width of sample station Min 1 was 20.9 feet (standard deviation; *s* = 5.6 feet; sample size; *n* = 3) and the average depth was 0.5 feet (*s* = 0.3 feet; *n* = 9; Table 5-7). The discharge within Min 1 was 1,341 gallons per minute. Water temperature within Min 1 was 19.2°C, the percent dissolved oxygen was 89.6,

and dissolved oxygen was 8.3 mg O_2/L (Table 5-8). Min 1 and Perch Creek both recorded a pH of 8.2, which was the second highest pH reported among all sample stations (Table 5-8).

A total of 114 fish representing eight taxa were collected from sample station Min 2. The dominant species included creek chubs, longnose dace, and blacknose dace (Table 5-1). The CPUE for sample station Min 2 was 1.1 fish per minute of electricity discharge. No threatened or endangered species were captured in Min 2. The fish community of sample station Min 2 was classified as "Acceptable" with a fish score rating of 0 (Table 5-3).

A total of 229 macroinvertebrates were collected from Min2, where true flies, caddisflies, and Ephemeropterans (mayflies) were the most frequently collected organisms (Table 5-4). Based on the P-51 rating metrics, the macroinvertebrate community of sample station Min 2 was rated as "Acceptable" (Table 5-5).

Several cylindrical papershell mussels were found in low density throughout sample station Min 2 (Table 5-9). Mussel habitat is not ideal due to the dominance of bedrock in the streambed.

Min 2 was classified as a riffle/run habitat. The habitat was rated as "Excellent" in accordance with the P-51 total habitat score (Table 5-6).

The average width of sample station Min 2 was 17.6 feet (standard deviation; *s* = 5.5 feet; sample size; *n* = 3) and the average depth was 0.3 feet (*s* = 0.2 feet; *n* = 9; Table 5-7). The discharge within Min 2 was 425 gallons per minute. Water temperature within Min 2 was 17.8°C, the percent dissolved oxygen was 79.4, the dissolved oxygen was 7.6 mg O_2/L, and the pH was 7.7 (Table 5-8).

5.1.6 Perch Creek

Due to high conductivity and difficulty with adequate net blocking of the Perch Creek sample station, due to a high gradient in the sample station, two backpack electroshockers were used to simultaneously survey the sample station with only a single pass removal. A total of 47 fish representing 12 taxa were collected from the Perch Creek sample station. The dominant species included creek chub, blacknose dace, and bluntnose minnow (*Pimephales notatus;* Table 5-1). The CPUE for the Perch Creek sample station was 0.7 fish per minute of electricity discharge. No threatened or endangered species were captured in the Perch

Creek sample station. The fish community of the Perch Creek sample station was classified as “Poor” because less than 50 fish total were captured (Table 5-3).

A total of 23 macroinvertebrates were collected from Perch Creek, where caddisflies, dragonflies, and true flies were the most frequently collected organisms (Table 5-4). Based on P-51 rating metrics, the macroinvertebrate community of the Perch Creek sample station was rated as “Acceptable” (Table 5-5).

Approximately three dozen live cylindrical papershell mussels were found in the clay substrate located in the downstream extent of the sample station (Table 5-9).

The stream habitat of Perch Creek was classified as a riffle/run habitat. The habitat was rated as “Good” in accordance with the P-51 total habitat score (Table 5-6).

The average width of the Perch Creek sample station was 14.8 feet (standard deviation; s = 4.2 feet; sample size; n = 3) and the average depth was 0.8 feet (s = 0.3 feet; n = 9; Table 5-7). The discharge within Perch Creek was 4,462 gallons per minute. Water temperature within the Perch Creek sample station was 24.3°C, which was the highest among all sampled stream transects (Table 5-8). The Perch Creek sample station also had the highest conductivity at 929.0 µS/cm, the percent dissolved oxygen was 85.9, the dissolved oxygen was 7.2 mg O_2/L, and the pH was 8.2 (Table 5-8).

5.1.7 Pine Creek

A total of 102 fish representing 13 taxa were collected from the Pine Creek sample station. The dominant species included creek chub, brown bullhead (*Ameiurus nebulosus*), and mottled sculpin (Table 5-1). The CPUE for the Pine Creek sample station was 1.0 fish per minute of electricity discharge. No threatened or endangered species were captured in the Pine Creek sample station. The fish community of the Pine Creek sample station was classified as “Acceptable” with a fish score rating of -1 (Table 5-3).

A total of 58 macroinvertebrates were collected from Pine Creek, where true flies, mayflies, and true bugs were the most frequently collected organisms (Table 5-4). Based on P-51 rating metrics, the macroinvertebrate community of the Pine Creek sample station was rated as “Acceptable” (Table 5-5).

There were several cylindrical papershell mussels found in Pine Creek, but the density was very low throughout the transect (Table 5-9).

The stream habitat of Pine Creek was classified as a riffle/run. The habitat was rated as "Good" in accordance with the P-51 total habitat score (Table 5-6).

The average width of the Pine Creek sample station was 12.8 feet (standard deviation; *s* = 4.4 feet; sample size; *n* = 3) and the average depth was 0.6 feet (*s* = 0.4 feet; *n* = 9; Table 5-7). The discharge within Pine Creek was 92 gallons per minute. Water temperature within the Pine Creek sample station was 19.1°C, the percent dissolved oxygen was 80.2, dissolved oxygen was 7.4 mg O_2/L, and pH was 7.9 (Table 5-8).

5.1.8 Portal Creek

A total of 159 fish were collected, representing five species: brook stickleback, creek chub, longnose dace, northern redbelly dace, and white sucker (*Catostomus commersonii*) among all 16 Portal Creek sample stations (Appendix B). No threatened or endangered species were captured in the Portal Creek sample stations and all of the sample stations each contained fewer than 50 fish. The fish community of all the Portal Creek sample stations was classified as "Poor" (Appendix B).

Only one live macroinvertebrate, *Notonectidae*, was found in one of the 16 Portal Creek sample stations. Nine empty caddisfly cases of three taxa were found among three other portal creek sample stations, but no live specimens were located. The macroinvertebrate community was considered to be "Poor" at all 16 Portal Creek sample stations (Appendix B).

Freshwater mussels were not observed in any of the Portal Creek sample stations.

The stream habitat of Portal Creek was classified as a riffle/run and the habitat was rated as "Good" in accordance with the P-51 total habitat score among 15 of the 16 sample stations. One sample station was rated as Marginal (Appendix B).

5.2 Ponds (excluding North Dam 2)

Ponds 2 through 5 and Ponds 6 through 8 were hydrologically connected via culverts or ditches. Because fish were able to travel freely among each connected pond, nets were only placed in Ponds 1, 2, 5, 8, 9, and 10. A total of 2,816 fish were collected among all ponds that were surveyed as part of this baseline aquatic survey, with northern redbelly dace, fathead minnow (*Pimephales promelas*), and pumpkinseed sunfish (*Lepomis gibbosus*), being the most frequently observed fish (Table 5-10). Pond 1 had the most fish captured with 1,057 fish comprised of five taxa (Table 5-10). The dominant species included pumpkinseed sunfish, northern redbelly dace, and fathead minnows. Pond 2 had a total of 126 fish captured comprised of 10 taxa (Table 5-10). The dominant species included bluegill (*Lepomis* macrochirus), creek chub, and hornyhead chub (*Nocomis biguttatus;* Table 5-10). Pond 5 had a total of 429 fish captured comprised of 11 taxa. The dominant species included northern redbelly dace, hornyhead chub, and creek chub (Table 5-10). Pond 8 had a total of 552 fish captured comprised of three taxa, which included northern redbelly dace, fathead minnow, and brook stickleback (Table 5-10). Pond 9 had a total of 560 fish captured comprised of five taxa including a predominance of northern redbelly dace, fathead minnow, and Johnny darter (Table 5-10). Pond 10 had a total of 92 fish captured comprised of seven taxa, which included a predominance of northern redbelly dace, fathead minnow, the central mudminnow (Table 5-10). The CPUE of nets set in the ponds ranged from a minimum of 92 fish per net night in Pond 9 to a maximum of 561 fish per net night in Pond 1, with an average CPUE of 402 fish per net night.

A total of 546 macroinvertebrates were collected among all ponds surveyed, where Amphipods (scuds), true bugs, and dragonflies were the most frequently collected macroinvertebrates (Table 5-11). The most macroinvertebrates were collected from Pond 1 where scuds and beetles were the most frequently observed macroinvertebrates, and the fewest macroinvertebrates were collected from Pond 2 where scuds and dragonflies were the most common. Macroinvertebrate results for all pond locations are summarized in Table 5-11.

Water quality data were collected from nine of the ten ponds that were surveyed. Pond 4, which was one of the ponds that is hydrologically connected via culverts to Ponds 2, 3, and 5, inadvertently was not sampled for water quality data during the survey. Water temperature ranged from 25.1°C in Pond 5 to 29.9°C in Pond 6 (Table 5-12). Pond 1 had the highest pH at 9.4 and Pond 9 had the lowest pH at 7.6. Conductivity was highest in Pond 10 (1,677.0 µS/cm) and lowest in pond 1 (152.7 µS/cm; Table 5-12). Ponds 2, 3, and 4 were hydrologically connected through channels between each pond. Ponds 2 and 3

exhibited similarly high conductivities, which is also indicative of their connection (Table 5-12). The percent dissolved oxygen was highest in Pond 1 (149.2) and lowest in Pond 9 (88.1). Dissolved oxygen was highest in both Pond 1 and Pond 8 (11.9 mg O_2/L) and lowest in Pond 9 (6.8 mg O_2/L; Table 5-12).

Habitat remained consistent among most of the ponds. It was common for the substrate to be covered by muskgrass and other aquatic macrophytes. The substrate below the vegetation was primarily marl and muck, and often too soft to wade in. The banks and fringes of the ponds contained narrowleaf cattail and sandbar willow. Many of the ponds were utilized by beavers (*Castor canadensis*), muskrats (*Ondatra zibethicus*), painted turtles, and common snapping turtles (*Chelydra serpentina*).

North Dam 2

A total of 2,295 fish comprising a total of seven taxa were collected in North Dam 2 (Table 5-10). The dominant species included fathead minnow, blacknose shiner, and northern redbelly dace. The CPUE of nets set in North Dam 2 ranged from a minimum of 15 fish per net night to a maximum of 527 fish per net night, with an average CPUE of 383 fish per night.

A total of 39 macroinvertebrates were collected in North Dam 2 (Table 5-11). Dragonflies and true bugs were the most frequently collected macroinvertebrates.

The temperature in North Dam 2 was 28.3 °C, the pH was 9.4, which was also the highest pH, along with Pond 1, among all ponds that were surveyed (Table 5-12). Conductivity, percent dissolved oxygen, and dissolved oxygen all trended towards the median values among all ponds, in North Dam 2 (Conductivity = 391.7 µS/cm; Percent dissolved oxygen = 100.8; Dissolved oxygen = 7.9 mg O_2/L; Table 5-12).

Most of the north shore of North Dam 2 contained crushed concrete and rebar along the shoreline, notably at the east end of the basin. The concrete rubble also appeared to make up most of the substrate within the ponded water of North Dam 2. The bottom of the ponded water area dropped off sharply approximately 25 yards from the shoreline. The west end of the ponded water area was much shallower, and the shorelines were vegetated with narrowleaf cattail, various rush species (*Juncus spp.*), and sandbar willow. The substrate was very soft and was primarily composed of marl and muck. The entire basin was surrounded by an access road placed upon a high berm.

No live mussels were observed in the substrate of any ponds or North Dam 2. Empty shells of giant floater were observed on the eastern bank of Pond 6.

5.3 Reptiles and Amphibians

Although reptiles and amphibians were encountered throughout most of the area that was surveyed for this baseline assessment (Tables 5-14 and 5-15), numerous observations were recorded along the south and west boundaries of the survey transect (Figure 5-1). A total of 13 species of reptiles and amphibians were recorded during the survey (Table 5-13). The western painted turtle, northern leopard frog (*Lithobates pipiens*), and the green frog (*Lithobates clamitans*) were the most frequently encountered species during the 2024 survey. Among all calling frogs, spring peepers (*Pseudacris crucifer*) tended to call as a chorus that was indistinguishable from individual calls, indicating they are abundant where they were observed (Table 5-14). No threatened or endangered species were documented during the survey.

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Exhibit A - Report figures

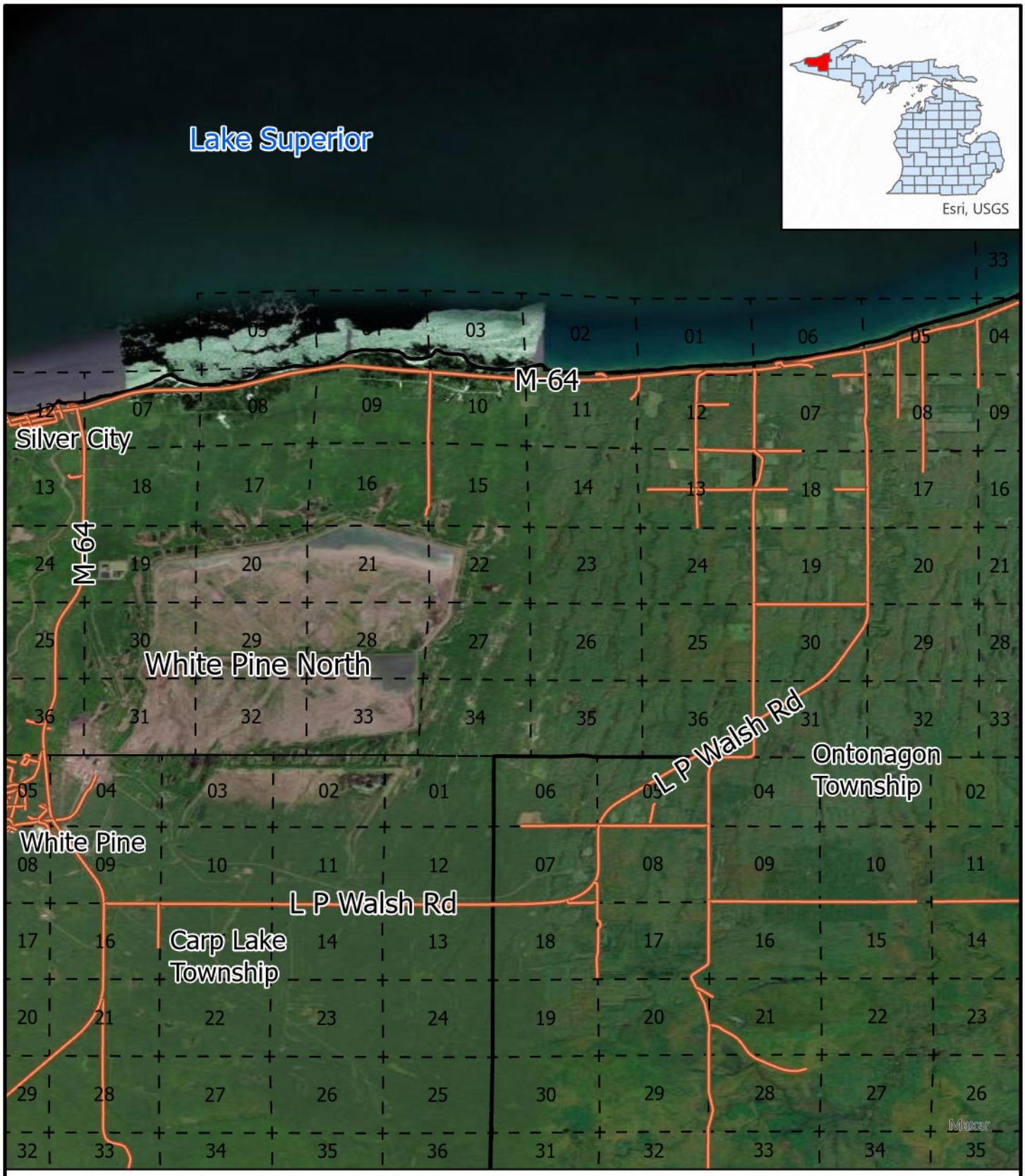


Figure 1-1. Project Location
White Pine North
White Pine Copper, LLC

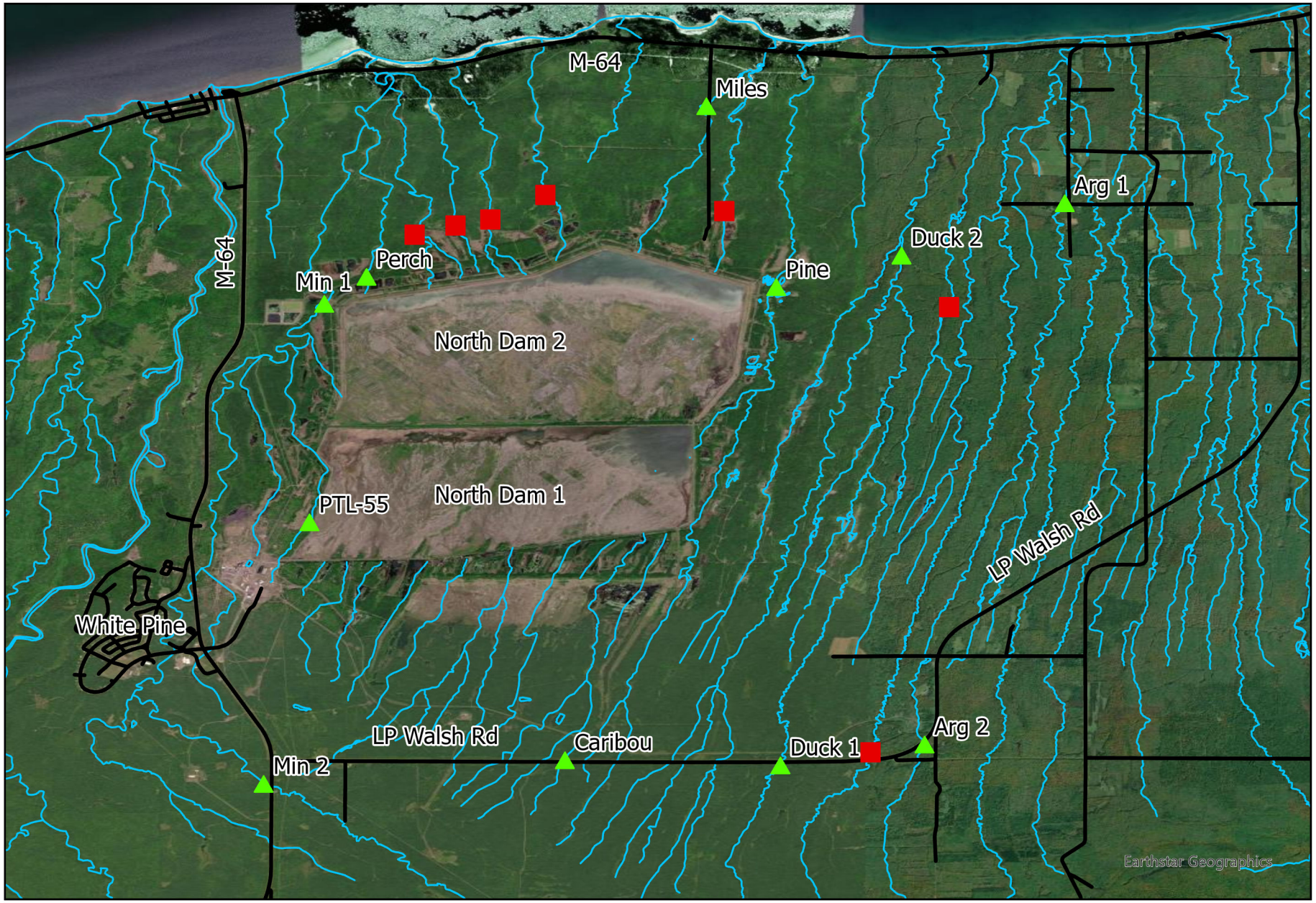


Figure 3-1. Potential Streams Considered for Surveying
White Pine North
White Pine Copper, LLC

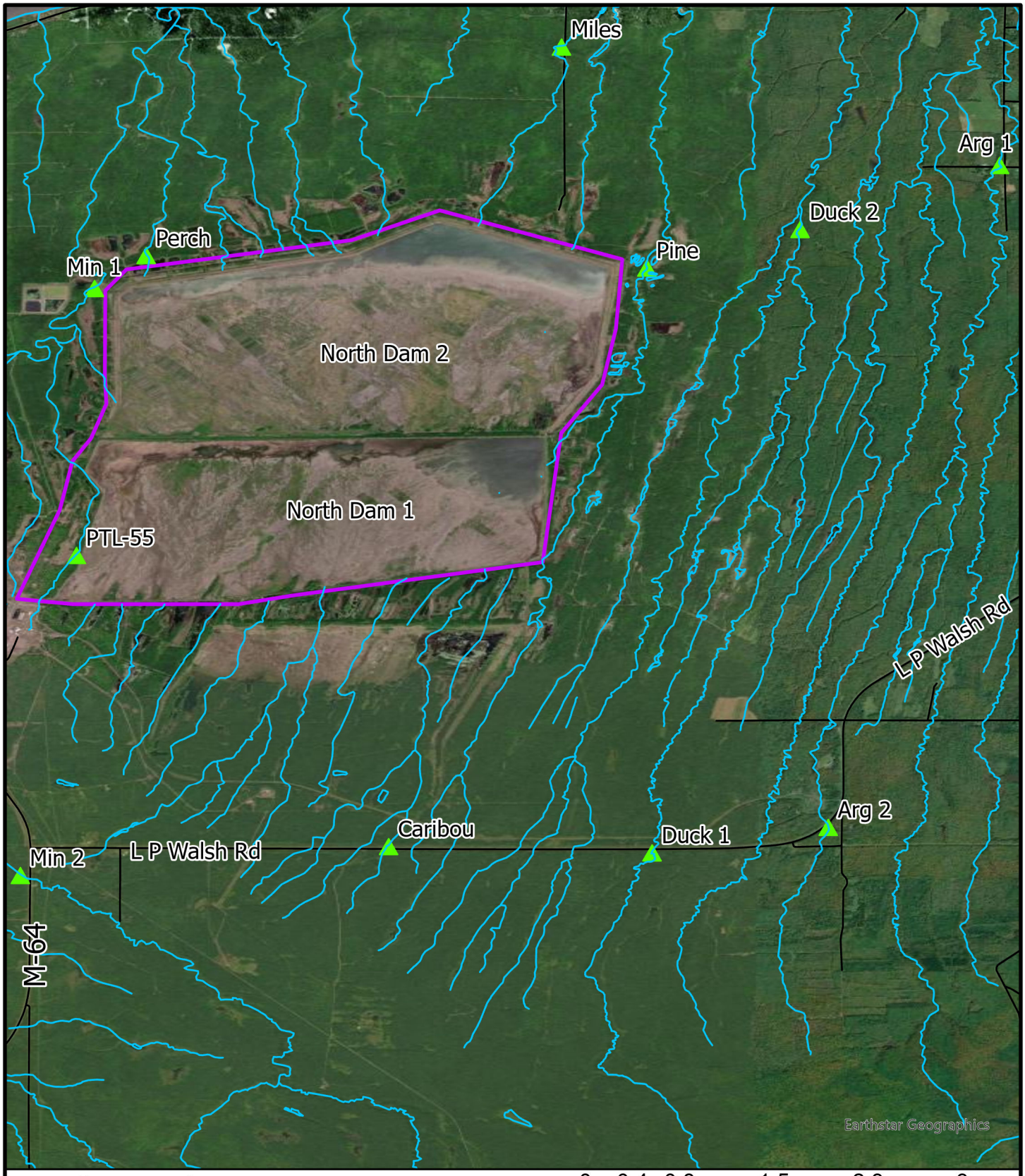


Figure 3-2. Stream, Reptile and Amphibian Survey Locations
White Pine North
White Pine Copper, LLC



Legend

- Pond Sample Locations
- Net Set Locations in North Dam 2

N

0 0.1 0.3 0.5 0.8 1 Miles

AeM ADVANCED ECOLOGICAL MANAGEMENT

Figure 3-3. Pond and North Dam 2 Survey Locations
White Pine North
White Pine Copper, LLC

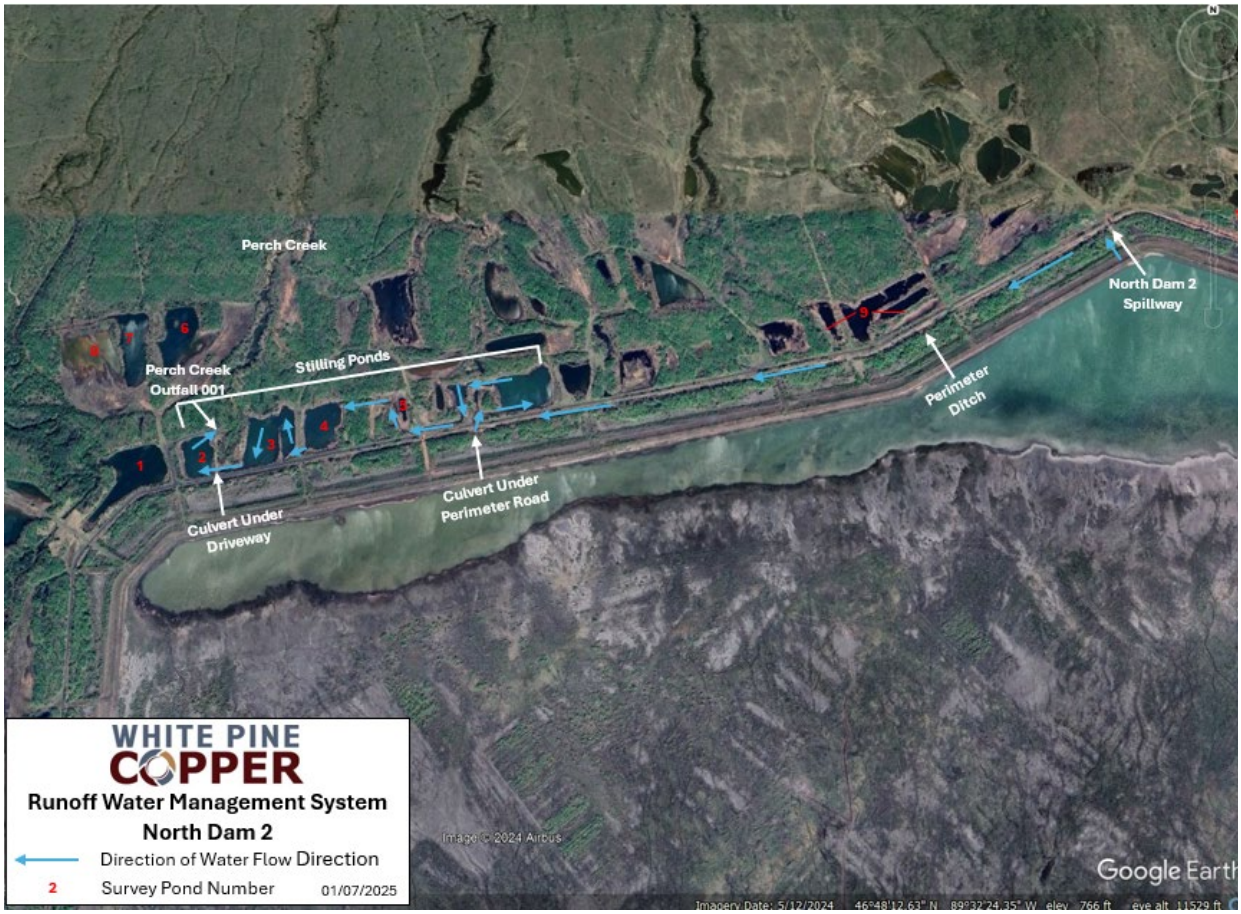


Figure 3-4. Runoff water management system of North Dam 2.

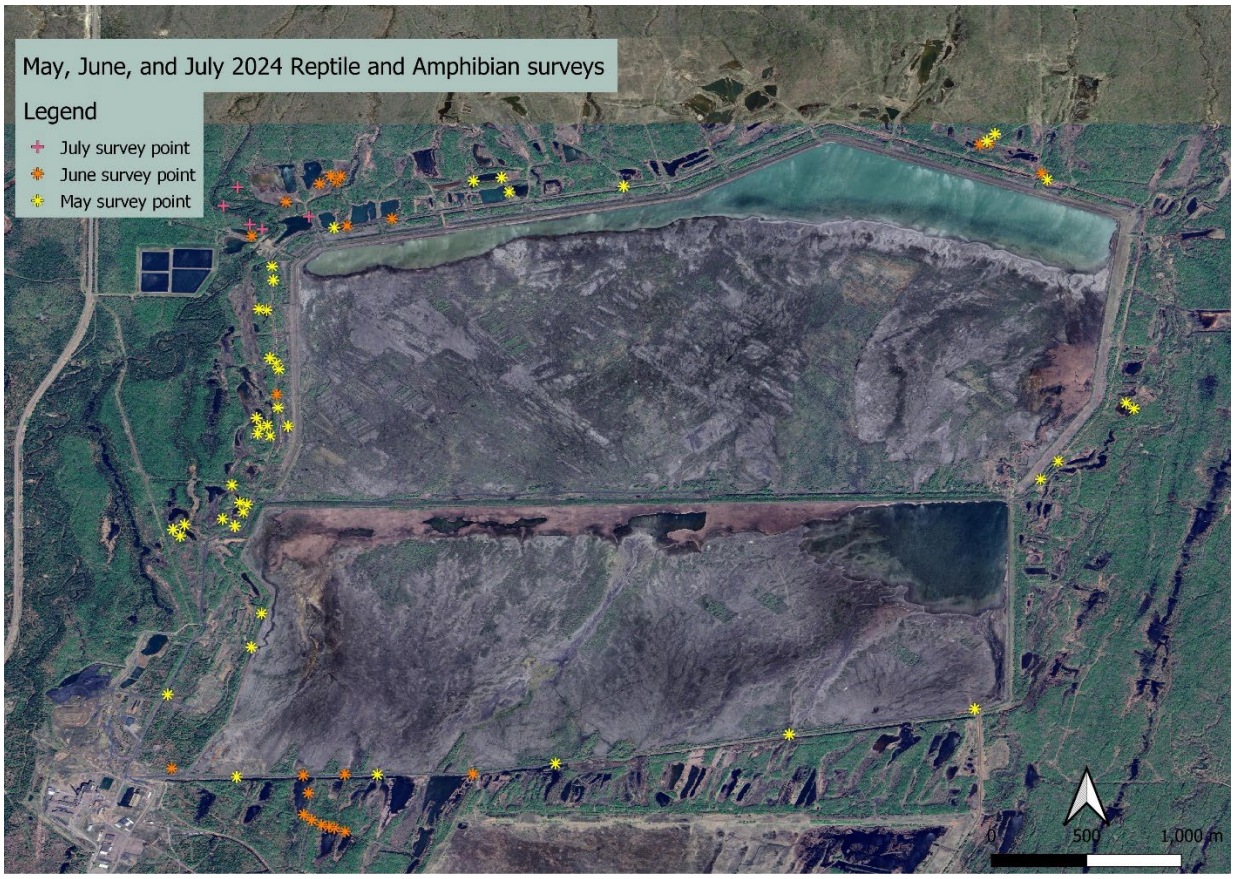


Figure 5-1. Survey locations where reptiles and/or amphibians were encountered during the 2024 survey.

Exhibit B – Report tables

Table 1-1. Summary of the Procedure 51 fish, macroinvertebrate, and aquatic habitat scores for all stream stations surveyed for the 2024 White Pine North baseline aquatic assessment.

Stream Sample Station	**Arg1**	**Arg2**	**Caribou**	**Duck1**	**Duck2**
Fish Score Rating	Poor	Poor	Poor	Poor	Acceptable
Macroinvertebrate Score Rating	Acceptable	Acceptable	Acceptable	Acceptable	Poor
Stream Habitat Score Rating	Good	Excellent	Good	Good	Excellent
Station Sample Station	**Miles**	**Min1**	**Min2**	**Perch**	**Pine**
Fish Score Rating	Poor	Acceptable	Acceptable	Poor	Acceptable
Macroinvertebrate Score Rating	Poor	Acceptable	Acceptable	Acceptable	Acceptable
Stream Habitat Score Rating	Marginal	Good	Excellent	Good	Good

Table 3-1. Stream sample station location descriptions.

Stream Name	Stream Sample Station	Latitude/Longitude (upstream extent) NAD 1983	Township/Range/ Section	Location Description
Argentine Creek	Arg 1	N 46.815781 W -89.451523	T51N/R41W/Sec 13	0.04 Miles northeast of the intersection of Halfway River Rd and Halfway River Rd
Argentine Creek	Arg 2	N 46.739225 W -89.47112	T50N/R41W/Sec 7	10 feet south of the LP Walsh Rd crossing
Caribou Creek	Caribou	N 46.737269 W -89.522071	T50N/R42W/Sec 11	75 feet north of LP Walsh Rd crossing
Duck Creek	Duck 1	N 46.736319 W -89.491591	T50N/R42W/Sec 13	100 feet south of LP Walsh Rd crossing
Duck Creek	Duck 2	N 46.80743 W -89.474668	T51N/R41W/Sec 23	2.09 Miles south of intersection of two track access road (shared entrance with Bolo Rd) and M-64
Miles Creek	Miles	N 46.82912 W -89.5017	T51N/R41W/Sec 9	0.56 Miles south of the intersection of private access drive and M-64
Mineral River	Min1	N 46.80111 W -89.55829	T51N/R41W/Sec19	0.15 Miles west of WPC mine access road
Mineral River	Min2	N 46.733342 W -89.563119	T50N/R42W/Sec 16	Crosses M-64 0.24 miles south of M-64 intersection with LP Walsh Rd
Perch Creek	Perch	N 46.804395 W -89.549353	T51N/R41W/Sec 19	0.04 Miles northeast of NPDES Perch Creek Outfall (001A)
Pine Creek	Pine	N 46.803955 W -89.492304	T51N/R41W/Sec 22	0.10 Miles east of the northeast corner of the mine access road

NAD 1983 = North American Datum of 1983
N = North
W = West
T = Township
R = Range
Sec = Section

Table 5-1. Stream Fish Collection Data – Species and number of fish collected in each sample station that was surveyed as part of the 2024 White Pine North baseline aquatic assessment.

		Sample Station									
Common Name	**Scientific Name**	**Arg 1**	**Arg 2**	**Caribou**	**Duck 1**	**Duck 2**	**Miles**	**Min 1**	**Min 2**	**Perch**	**Pine**
Blacknose dace	*Rhinichthys atratulus*	**6**			**20**	**45**		**24**	**18**	**5**	**9**
Blacknose shiner	*Notropis heterolepis*					**6**					**3**
Blackside darter	*Percina maculata*										**1**
Bluegill	*Lepomis macrochirus*									**1**	
Bluntnose Minnow	*Pimephales notatus*							**3**		**5**	
Brook stickleback	*Culaea inconstans*	**1**	**7**	**7**		**3**	**1**	**1**			**1**
Brown bullhead	*Ameiurus nebulosus*										**13**
Central mudminnow	*Umbra limi*			**1**						**2**	**9**
Common shiner	*Luxilis cornutus*					**31**		**4**	**1**	**2**	
Creek chub	*Semolitus atromaculatus*	**5**	**2**		**10**	**29**		**51**	**36**	**21**	**24**
Fathead minnow	*Pimephales promelas*								**1**	**1**	
Golden shiner	*Notemigonus crysoleucas*					**1**					
Hornyhead chub	*Nocomis biguttatus*							**1**		**2**	
Iowa darter	*Etheostoma exile*					**10**					**1**
Johnny darter	*Etheostoma nigrum*					**7**				**4**	**7**
Longnose dace	*Rhinichthys cataractae*							**57**	**36**	**1**	**8**
Mimic shiner	*Notropis volucellus*								**3**		
Mottled sculpin	*Cottus bairdii*	**1**				**14**		**27**	**17**		**11**
Northern redbelly dace	*Chrosomus eos*		**1**					**1**			**10**
Pumpkinseed sunfish	*Lepomis gibbosus*							**4**			
Rainbow darter	*Etheostoma caeruleum*					**6**					
Rainbow trout	*Oncorhynchus mykiss*	**26**									
Sand shiner	*Notropis stramineus*									**2**	
Slimy sculpin	*Cottus cognatus*	**3**						**24**			**5**
White sucker	*Catostomus commersonii*					**3**		**14**	**2**	**1**	
	Total	**42**	**10**	**8**	**30**	**155**	**1**	**211**	**114**	**47**	**102**

Arg 1, Arg 2 – Sample stations located in Argentine Creek
Min 1, Min 2 – Sample stations located in Mineral River
Duck 1, Duck 2 – Sample stations located in Duck Creek

Table 5-2. Length and Weight of Fish Collected in Stream Stations, Ponds, and North Dam 2 during 2024.

Common Name	Min. Length (mm)	Max. Length (mm)	Avg. Length (mm)	Min Weight (gm)	Max. Weight (gm)	Avg. Weight (gm)
Blacknose dace	15.0	97.0	53.3	0.1	10.0	2.0
Blacknose shiner	36.0	64.0	44.0	0.2	1.8	0.6
Blackside darter	55.0	55.0	55.0	1.7	1.7	1.7
Bluegill	31.0	81.0	38.6	0.4	8.9	0.9
Bluntnose minnow	32.0	64.0	51.3	0.3	2.8	1.5
Brook stickleback	17.0	58.0	38.0	0.1	2.0	0.7
Brown bullhead	80.0	145.0	113.7	6.4	44.8	20.5
Central mudminnow	35.0	89.0	62.4	0.2	7.0	3.1
Common shiner	18.0	175.0	57.7	0.1	58.0	3.1
Creek chub	20.0	191.0	68.6	0.1	78.8	5.0
Emerald shiner	44.0	65.0	54.9	0.5	2.5	1.4
Fathead minnow	35.0	76.0	58.6	0.2	4.5	2.2
Golden shiner	63.0	63.0	63.0	2.0	2.0	2.0
Hornyhead chub	40.0	130.0	66.9	0.8	25.8	3.8
Iowa darter	48.0	63.0	57.8	1.0	2.5	1.9
Johnny darter	21.0	63.0	36.1	0.1	1.8	1.0
Longnose dace	39.0	100.0	66.6	0.4	8.2	2.9
Mimic shiner	37.0	70.0	55.4	0.3	2.7	1.4
Mottled sculpin	20.0	100.0	57.3	0.1	53.0	4.0
Northern redbelly dace	34.0	66.0	49.0	0.4	35.0	1.5
Pumpkinseed	35.0	200.0	70.2	0.6	199.0	11.1
Rainbow darter	48.0	56.0	50.5	1.0	1.8	1.3
Rainbow trout	31.0	58.0	45.5	0.3	1.7	0.9
Sand Shiner	40.0	57.0	48.5	0.4	1.4	0.9
Slimy sculpin	17.0	92.0	59.5	0.1	8.6	2.9
White Sucker	33.0	336.0	146.3	1.0	220.0	35.9

Min – Minimum
Max – Maximum
Avg – Average
mm – millimeters
gm – grams

Table 5-3. P-51 sample station fish score summaries for the 2024 White Pine North baseline aquatic assessment.

	Sample Station									
	Arg 1		Arg 2		Caribou		Duck 1		Duck 2	
Metric	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**
Total number of taxa	6	-1	3	0	2	0	2	-1	9	2
Number of darter, sculpin, madtom taxa	2	0	0	-1	0	-1	0	-1	3	0
Number of sunfish taxa	0	0	0	0	0	-1	0	0	0	0
Number of sucker taxa	0	-1	0	-1	0	-1	0	-1	1	0
Number of intolerant taxa	3	0	0	0	0	-1	0	0	3	0
Percent tolerant	26.19	0	20	0	12.5	1	100	0	56.76	100
Percent omnivorous taxa	26.19	0	20	0	12.5	1	100	0	52.03	100
Percent insectivorous taxa	11.90	0	70	0	87.5	1	0	0	47.97	0
Percent piscivorous taxa	0	0	0	0	0	-1	0	0	0	0
Percent simple lithophilic spawner taxa	14.29	0	0	0	0	-1	66.67	0	53.38	66.67
Total Score		**-2**		**-2**		**-3**		**-3**		**0**
Fish Score		**Poor**		**Poor**		**Poor**		**Poor**		**Acceptable**

	Sample Station									
	Miles		Min 1		Min 2		Perch		Pine	
Metric	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**
Total number of taxa	1	-1	11	0	7	0	12	0	13	1
Number of darter, sculpin, madtom taxa	0	-1	1	-1	1	0	1	-1	5	1
Number of sunfish taxa	0	0	1	1	0	0	1	1	0	-1
Number of sucker taxa	0	-1	1	-1	1	0	1	-1	0	-1
Number of intolerant taxa	0	0	2	-1	2	0	1	-1	5	1
Percent tolerant	0	0	43.60	0	51.35	0	82.98	0	48.04	0
Percent omnivorous taxa	0	0	43.60	0	51.35	0	74.47	-1	53.92	-1
Percent insectivorous taxa	100	0	55.92	1	48.65	0	25.53	-1	36.27	0
Percent piscivorous taxa	0	0	0	-1	0	0	0	-1	0	-1
Percent simple lithophilic spawner taxa	0	0	46.92	1	51.35	0	19.15	0	17.65	0
Total Score		**-3**		**-1**		**0**		**-5**		**-1**
Fish Score		**Poor**		**Acceptable**		**Acceptable**		**Poor**		**Acceptable**

Arg 1, Arg 2 – Sample stations located in Argentine Creek
Min 1, Min 2 – Sample stations located in Mineral River
Duck 1, Duck 2 – Sample stations located in Duck Creek

Table 5-4. Stream sample station macroinvertebrate data from July 2024 for the White Pine North baseline aquatic assessment.

	Sample Station									
Taxa	**Arg 1**	**Arg 2**	**Caribou**	**Duck 1**	**Duck 2**	**Miles**	**Min 1**	**Min 2**	**Perch**	**Pine**
ANNELIDA (segmented worms)										
Hirudinea (leeches)		2		1	2				1	
Lumbriculida	3		1	6						
ARTHROPODA										
Crustacea										
Amphipoda (scuds)		2				6				
Decapoda (crayfish)	2	2			4		4	5		1
Isopoda (sowbugs)				1		8				
Insecta										
Ephemeroptera (mayflies)										
Baetidae		1		2	3		6	28		11
Heptageniidae								1		2
Caenidae		1								
Leptophlebiidae	8			1						
Odonata										
Anisoptera (dragonflies)										
Aeshnidae	3						2	1	1	1
Calopterygidae								1	4	
Cordulegasteridae	2	11	32	19		20	4	1	1	1
Corduliidae	4	4					2			
Gomphidae										
Plecoptera (stoneflies)										
Leuctridae								1		
Perlodidae										1
Hemiptera (true bugs)										
Gerridae	30	30	4	27	21		3	9		10
Veliidae	1				1		47			
Megaloptera										
Corydalidae (dobson flies)									1	2

Table 5-4 continued. Stream sample station macroinvertebrate data from July 2024 for the White Pine North baseline aquatic assessment.

	Sample Station									
Taxa	**Arg 1**	**Arg 2**	**Caribou**	**Duck 1**	**Duck 2**	**Miles**	**Min 1**	**Min 2**	**Perch**	**Pine**
Trichoptera (caddisflies)										
Brachycentridae	1			2						
Hydropsychidae								43	8	
Limnephilidae			1				1		1	5
Philopotamidae								2	1	
Thremmatidae	30									
Coleoptera (beetles)										
Dytiscidae (total)	1	4	7							
Elmidae	2			4	1		2	13		2
Gyrinidae							1			
Hydrophilidae	1	3	1							
Diptera (flies)										
Ceratopogonidae				1						
Chironomidae	6	4	40	5	3		7	49	3	8
Dixidae	2									
Psychodidae								1		
Simuliidae			25	3	1	1	4	66	2	13
Tipulidae	1			5			1	5		1
Arachnida										
Trombidiformes										
Hydrachnidiae				1						
MOLLUSCA										
Gastropoda (snails)										
Planorbidae		2	4							
Physidae	3	25			1					
Pelecypoda (bivalves)										
Pisidiidae		1	2			5				
Sphaeriidae								3		
Total Collected	**100**	**92**	**117**	**78**	**37**	**40**	**84**	**229**	**23**	**58**

Table 5-5. P-51 stream macroinvertebrate scores and community ratings from July 2024 for the White Pine North baseline aquatic assessment.

	Sample Station									
	Arg 1		Arg 2		Caribou		Duck 1		Duck 2	
Metric	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**
Total number of taxa	16	0	14	1	10	1	14	1	9	-1
Number of mayfly taxa	1	-1	2	1	0	-1	2	1	1	-1
Number of caddisfly taxa	2	-1	0	-1	1	-1	2	-1	0	-1
Number of stonefly taxa	0	-1	0	-1	0	-1	0	-1	0	-1
Percent mayfly taxa	8.00	0	2.17	0	0	-1	3.85	0	8.11	0
Percent caddisfly taxa	31.00	1	0.00	-1	0.85	-1	3.85	0	0.00	-1
Percent contr. dom. taxon	31.00	-1	32.61	-1	34.19	-1	34.62	-1	56.76	-1
Percent isopod, snail, leech	3.00	1	31.52	-1	3.419	1	2.56	1	8.11	0
Percent surf. air breathers	33.00	-1	40.22	-1	10.26	0	34.62	-1	59.46	-1
Total Score		-3		-4		-4		-1		-7
Community Rating	**Acceptable**		**Acceptable**		**Acceptable**		**Acceptable**		**Poor**	

	Sample Station									
	Miles		Min 1		Min 2		Perch		Pine	
Metric	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**	**Score**
Total number of taxa	5	0	13	0	16	0	10	-1	13	0
Number of mayfly taxa	0	-1	1	-1	2	-1	0	-1	2	-1
Number of caddisfly taxa	0	-1	1	-1	2	-1	3	0	1	-1
Number of stonefly taxa	0	-1	0	-1	1	0	0	-1	1	0
Percent mayfly taxa	0.00	-1	7.143	0	12.66	0	0	-1	22.41	1
Percent caddisfly taxa	0.00	-1	1.190	0	19.65	0	43.48	1	8.62	0
Percent contr. dom. taxon	50.00	-1	55.95	-1	28.82	-1	34.78	-1	22.41	0
Percent isopod, snail, leech	20.00	-1	0	1	0.00	1	4.348	0	0	1
Percent surf. air breathers	0.00	1	60.71	-1	3.93	1	0	1	17.24	-1
Total Score		-6		-4		-1		-3		-4
Community Rating	**Poor**		**Acceptable**		**Acceptable**		**Acceptable**		**Acceptable**	

Table 5-6. P-51 stream habitat scores and ratings from July 2024 for the White Pine North baseline aquatic assessment.

	Sample Station									
Habitat Metric	**Arg 1** Riffle/Run	**Arg 1** Riffle/Run	**Caribou** Riffle/Run	**Duck 1** Riffle/Run	**Duck 2** Riffle/Run	**Miles** Riffle/Run	**Min 1** Riffle/Run	**Min 2** Riffle/Run	**Perch** Riffle/Run	**Pine** Riffle/Run
Substrate and Instream Cover										
Epifaunal Substrate/Avail. Cover	14	16	13	12	16	6	19	15	13	13
Embeddedness	18	15	3	9	17	5	17	18	15	16
Velocity/Depth Regime	11	16	3	8	16	4	16	14	17	17
Channel Morphology										
Sediment Deposition	17	15	4	10	17	7	18	19	16	16
Maintained Flow Volume	2	2	9	4	8	3	8	7	8	7
Flashiness	2	2	10	2	5	5	2	7	1	1
Channel Alteration	17	19	19	18	17	16	11	19	13	13
Frequency of Riffles (or Bends)	17	18	18	16	17	14	18	19	16	15
Riparian and Bank Structure										
Bank Stability (L)	7	9	10	8	9	9	5	8	3	4
Bank Stability (R)	7	9	10	8	9	9	4	9	3	5
Vegetative Protection (L)	5	9	10	6	8	7	4	8	4	4
Vegetative Protection (R)	5	8	10	6	9	7	4	8	4	4
Riparian Veg. Zone Width (L)	7	10	10	10	10	4	5	10	9	10
Riparian Veg. Zone Width (R)	7	7	10	10	8	10	4	10	9	10
Total Score	136	155	139	127	166	103	132	171	131	135
Habitat Rating	**Good**	**Excellent**	**Good**	**Good**	**Excellent**	**Marginal**	**Good**	**Excellent**	**Good**	**Good**

L – left bank facing downstream

R - right bank facing downstream

Table 5-7. Stream sample station dimensions.

Station	Length	Width (ft)		Depth (ft)	
		Average*	*s*	Average *	*s*
Arg 1	100	5.6 (3)	2.2	0.3 (9)	0.2
Arg 2	100	2.2 (3)	0.3	0.3 (9)	0.1
Caribou	100	2.4 (3)	1.4	0.4 (9)	0.2
Duck 1	100	4.1 (3)	0.4	0.1 (9)	0.1
Duck 2	300	17.6 (3)	3.0	0.4 (9)	0.3
Miles	100	2.4 (3)	0.2	0.2 (9)	0.1
Min 1	300	20.9 (3)	5.6	0.5 (9)	0.3
Min 2	300	17.6 (3)	5.5	0.3 (9)	0.2
Perch	300	14.8 (3)	4.2	0.8 (9)	0.3
Pine	300	12.8 (3)	4.4	0.6 (9)	0.4

***sample size is indicated within ()**

***s* = standard deviation**

ft = feet

Table 5-8. Average water quality parameters – stream sample stations.

Sample Station	Date	Time	Temperature °C	pH	Conductivity µS/cm	Percent Dissolved Oxygen	Dissolved Oxygen mg O_2/L	Discharge gpm
Arg 1	7/11/2024	9:38	15.5 (0.0)	7.7 (0.03)	140.0 (0.9)	76.23 (3.4)	7.64 (0.3)	42
Arg 2	7/12/2024	17:19	19.0 (1.0)	6.7 (0.2)	136.0 (3.8)	49.4 (2.7)	4.6 (0.2)	n.m.
Caribou	7/10/2024	13:57	17.0 (0.1)	11.6 (0.4)	73.0 (2.0)	28.2 (5.3)	2.7 (0.5)	n.m.
Duck 1	7/12/2024	16:06	18.9 (0.3)	8.0 (0.1)	141.0 (1.6)	92.3 (1.6)	8.6 (0.05)	n.m.
Duck 2	7/13/2024	12:22	19.8 (0.4)	7.8 (0.1)	127.0 (1.1)	75.7 (6.2)	6.9 (0.6)	n.m.
Miles	7/13/2024	14:01	20.0 (0.2)	7.3 (0.1)	241.0 (3.5)	63.5 (6.8)	5.8 (0.5)	n.m.
Min 1	7/8/2024	14:18	19.2 (0.2)	8.2 (0.04)	160.0 (0.8)	89.6 (0.8)	8.3 (0.1)	1341
Min 2	7/10/2024	10:03	17.8 (0.1)	7.7 (0.03)	117.0 (0.3)	79.4 (4.5)	7.6 (0.4)	425
Perch	7/8/2024	18:57	24.3 (0.1)	8.2 (0.02)	929.0 (1.2)	85.9 (1.6)	7.2 (0.1)	4462
Pine	7/9/2024	11:04	19.1 (0.2)	7.9 (0.01)	221.0 (1.7)	80.2 (2.0)	7.4 (0.2)	92

°C = degrees Celsius
µS/cm = micro Siemens per centimeter
mg O_2/L = milligrams of oxygen per liter
gpm = gallons per minute
n.m = not measured
standard deviation is indicated within ()

Table 5-9. Freshwater mussels (Uneonidae) observed in stream sample stations during the 2024 reconnaissance surveys.

		Sample Station									
Common Name	**Scientific Name**	**Arg 1**	**Arg 2**	**Caribou**	**Duck 1**	**Duck 2**	**Miles**	**Min 1**	**Min 2**	**Perch**	**Pine**
Cylindrical papershell	*Anodontoides ferussacianus*	0	0	0	0	X	0	0	X	X	X
Giant floater	*Pyganodon grandis*	0	0	0	0	X	0	0	0	0	0

X – Indicates freshwater mussels were observed during reconnaissance survey

0 – Indicates no freshwater mussels were observed

Table 5-10. Fish collection data from White Pine North ponds during July 2024 – Ponds 1, 2, 5, 8, 9, 10 and North Dam 2.

		Pond Number						
Scientific Name	**Common Name**	**1**	**2**	**5**	**8**	**9**	**10**	**North Dam 2**
Catostomus commersonii	White sucker		3	7				73
Chrosomus eos	Northern redbelly dace	265	8	117	444	395	57	404
Culaea inconstans	Brook stickleback	18		11	12	4		81
Etheostoma exile	Iowa darter						3	
Etheostoma nigrum	Johnny darter					42		
Lepomis gibbosus	Pumpkinseed sunfish	607	3	19				57
Lepomis macrochirus	Bluegill		48					
Luxilus cornutus	Common shiner		11	1			1	6
Nocomis biguttatus	Hornyhead chub		18	112				
Notropis heterolepis	Blacknose shiner		4	35			6	632
Pimephales notatus	Bluntnose minnow		1			5	2	
Pimephales promelas	Fathead minnow	151	2	31	96	114	15	1,042
Semolitus atromaculatus	Creek chub	16	28	77				
Rhinichthys atratulus	Blacknose dace			17				
Umbra limi	Central mudminnow			2			8	
	Total	**1,057**	**126**	**429**	**552**	**560**	**92**	**2,295**

Table 5-11. Pond and North Dam 2 macroinvertebrate collection data at White Pine North during July 2024.

	Pond						
Taxa	**1**	**2**	**5**	**8**	**9**	**10**	**North Dam 2**
ANNELIDA (segmented worms)							
Hirudinea (leeches)	4	1	4	7	8	2	2
ARTHROPODA							
Crustacea							
Amphipoda (scuds)	56	21	56	15	15	3	
Decapoda (crayfish)		2	5		1		
Insecta							
Ephemeroptera (mayflies)							
Caenidae	1		5				
Siphlonuridae				2			
Odonata							
Anisoptera (dragonflies)							
Aeshnidae	3	2		3	2	6	2
Coenagrionidae		7	4	2	4		9
Corduliidae		2	1	4	4	2	
Gomphidae			1		1		
Libellulidae	6	4	4	22	5	10	3
Hemiptera (true bugs)							
Corixidae			3	49	9	5	6
Gerridae		2	6				
Mesoveliidae							1
Nepidae				1	4		1
Notonectidae				4	1	3	6
Bellostomatidae	4			1	6	2	
Pleidae				1			
Coleoptera (beetles)							
Dytiscidae (total)	9		1	1	8		
Gyrinidae	1						
Haliplidae			3			2	
Hydrophilidae	4				1		
Scirtidae	29						
Diptera (flies)							
Chironomidae	6	1	4	1	5	1	8
Dixidae			1				
Stratiomyidae	2						
Tabanidae				2		1	1
MOLLUSCA							
Gastropoda (snails)							
Planorbidae	7			15	2	11	
Physidae	5			1			
Pelecypoda (bivalves)							
Pisidiidae	2			2	8	2	
Total	**139**	**42**	**98**	**133**	**84**	**50**	**39**

Table 5-12. Water quality parameters from the White Pine North ponds and North Dam 2 that were surveyed in July 2024.

Station	Date	Time	Temperature °C	pH	Conductivity µS/cm	Percent Dissolved Oxygen	Dissolved Oxygen mg O_2/L
Pond 1	7/9/2024	16:22	27.4	9.4	152.7	149.2	11.9
Pond 2	7/9/2024	16:36	26.4	8.2	975.0	102.6	8.3
Pond 3	7/9/2024	14:53	26.4	8.0	985.0	99.3	7.8
Pond 4	7/9/2024	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.
Pond 5	7/9/2024	17:10	25.1	7.8	1,050.0	102.4	8.4
Pond 6	7/11/2024	16:42	29.9	9.3	178.9	124.8	10.0
Pond 7	7/11/2024	16:37	27.4	8.7	173.3	118.8	9.1
Pond 8	7/12/2024	15:58	29.3	8.8	176.3	146.6	11.9
Pond 9	7/12/2024	17:15	28.7	7.6	323.4	88.1	6.8
Pond 10	7/12/2024	17:34	29.0	7.8	1677	122.1	9.2
Nort Dam 2	7/13/2024	17:29	28.3	9.4	391.7	100.8	7.9

°C = degrees Celsius
µS/cm = micro Siemens per centimeter
mg O_2/L = milligrams of oxygen per liter
n.m. = not measured

Table 5-13. Reptile and amphibian species recorded during 2024 within White Pine North project area.

Common Name	Species Name
American toad	*Anaxyrus americanus*
Gray treefrog	*Dryophytes versicolor*
Green frog	*Lithobates clamitans*
Northern leopard frog	*Lithobates pipiens*
Northern red-bellied snake	*Storeria occipitomaculata occipitomaculata*
Mink frog	*Lithobates septentrionalis*
Wood frog	*Lithobates sylvaticus*
Spring peeper	*Pseudacris crucifer*
Spotted salamander	*Ambystoma maculatum*
Ring-necked snake	*Diadophis punctatus*
Eastern Garter snake	*Thamnophis sirtali*
Snapping turtle	*Chelydra serpentina*
Western painted turtle	*Chrysemys picta*

Table 5-14. Amphibian calls recorded during 2024 within White Pine North project area.

Date	Latitude	Longitude	American toad	Gray treefrog	Green frog	Northern leopard frog	Mink frog	Wood frog	Spring peeper
5/6/2024	46.803023	-89.550271	ncd	ncd	1	1	ncd	ncd	ncd
5/6/2024	46.769929	-89.506154	ncd	ncd	1	ncd	ncd	ncd	ncd
5/6/2024	46.782606	-89.56057	ncd	ncd	ncd	1	ncd	ncd	ncd
5/6/2024	46.781828	-89.560878	ncd	ncd	ncd	ncd	ncd	ncd	3
5/6/2024	46.78399	-89.556275	ncd	ncd	ncd	1	ncd	ncd	ncd
5/6/2024	46.782507	-89.557099	ncd	ncd	1	ncd	ncd	ncd	ncd
5/6/2024	46.78936	-89.555337	ncd	ncd	ncd	ncd	ncd	ncd	3
5/6/2024	46.797356	-89.554914	ncd	ncd	1	1	ncd	ncd	3
5/6/2024	46.805479	-89.538219	1	ncd	1	ncd	ncd	ncd	ncd
5/6/2024	46.800371	-89.554544	ncd	ncd	1	1	ncd	ncd	ncd
5/6/2024	46.808988	-89.505318	1	ncd	1	1	ncd	ncd	3
5/6/2024	46.790977	-89.495729	ncd	ncd	1	1	ncd	ncd	3
5/6/2024	46.786974	-89.500411	ncd	ncd	ncd	ncd	ncd	ncd	ncd
5/6/2024	46.768181	-89.518928	ncd	ncd	ncd	ncd	ncd	ncd	ncd
5/6/2024	46.790657	-89.554133	ncd	ncd	ncd	ncd	ncd	ncd	ncd
5/6/2024	46.793677	-89.554247	ncd	ncd	1	ncd	ncd	ncd	ncd
5/6/2024	46.805867	-89.530335	ncd	ncd	ncd	ncd	ncd	ncd	3
5/6/2024	46.806326	-89.501159	ncd	ncd	ncd	ncd	ncd	ncd	3
5/6/2024	46.789425	-89.55486	ncd	1	ncd	ncd	ncd	1	3
6/10/2024	46.765848	-89.561458	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.765374	-89.552399	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.764163	-89.552035	ncd	ncd	ncd	ncd	1	ncd	ncd
6/10/2024	46.762675	-89.552364	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.762298	-89.551825	ncd	ncd	ncd	1	ncd	ncd	ncd
6/10/2024	46.761973	-89.551146	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.76186	-89.550631	ncd	ncd	ncd	ncd	1	ncd	ncd

1 – Individuals can be counted and there is a detectable interval between calls.

2 – Individuals can be counted and there are some overlapping calls.

3 – Full chorus of calls that are continuous and overlapping

ncd – no calls detected

Table 5-14 continued. Amphibian calls recorded during 2024 within White Pine North project area.

Date	Latitude	Longitude	American toad	Gray treefrog	Green frog	Northern leopard frog	Mink frog	Wood frog	Spring peeper
6/10/2024	46.761757	-89.55025	ncd	ncd	ncd	ncd	1	ncd	ncd
6/10/2024	46.761514	-89.549523	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.765443	-89.549528	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.765472	-89.540713	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.791564	-89.554221	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.802448	-89.555938	ncd	ncd	1	1	ncd	ncd	ncd
6/10/2024	46.804805	-89.55358	ncd	ncd	1	1	ncd	ncd	ncd
6/10/2024	46.806051	-89.551266	ncd	ncd	ncd	1	ncd	ncd	ncd
6/10/2024	46.806596	-89.550501	ncd	ncd	1	1	ncd	ncd	ncd
6/10/2024	46.803147	-89.549387	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.803649	-89.546285	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.806761	-89.501527	ncd	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.808822	-89.505147	1	ncd	ncd	ncd	ncd	ncd	ncd
6/10/2024	46.808761	-89.505803	ncd	ncd	ncd	1	1	ncd	ncd
7/19/2024	46.802917	-89.555218	ncd	ncd	1	ncd	ncd	ncd	ncd
7/19/2024	46.80453	-89.55789	ncd	ncd	1	1	ncd	ncd	ncd
7/19/2024	46.806831	-89.56054	ncd	ncd	ncd	1	ncd	ncd	ncd
7/19/2024	46.805814	-89.556918	ncd	ncd	ncd	ncd	ncd	ncd	ncd

1 – Individuals can be counted and there is a detectable interval between calls.

2 – Individuals can be counted and there are some overlapping calls.

3 – Full chorus of calls that are continuous and overlapping

ncd – no calls detected

Table 5-15. Reptile locations recorded during 2024 within White Pine North project area.

Date	Latitude	Longitude	Northern redbellied snake	Ring-necked snake	Eastern garter snake	Snapping turtle	Western painted turtle	Spotted salamander	Species richness
5/6/2024	46.803023	-89.550271					X		1
5/6/2024	46.781828	-89.560878				X	X		2
5/6/2024	46.78399	-89.556275			X				1
5/6/2024	46.78936	-89.555337					X	X	2
5/6/2024	46.805479	-89.538219				X			1
5/6/2024	46.786974	-89.500411				X	X		2
5/6/2024	46.768181	-89.518928					X		1
5/6/2024	46.790657	-89.554133					X		1
6/10/2024	46.765848	-89.561458					X		1
6/10/2024	46.765374	-89.552399					X		1
6/10/2024	46.764163	-89.552035					X		1
6/10/2024	46.762675	-89.552364			X				1
6/10/2024	46.761973	-89.551146					X		1
6/10/2024	46.76186	-89.550631					X		1
6/10/2024	46.761514	-89.549523					X		1
6/10/2024	46.765443	-89.549528					X		1
6/10/2024	46.765472	-89.540713					X		1
6/10/2024	46.791564	-89.554221					X		1
6/10/2024	46.804805	-89.55358					X		1
6/10/2024	46.803147	-89.549387				X			1
6/10/2024	46.803649	-89.546285				X			1
6/10/2024	46.806761	-89.501527		X					1
6/10/2024	46.808761	-89.505803	X						1
7/19/2024	46.805814	-89.556918					X		1

Exhibit C – Site Photographs



Photograph 1. Upstream view of Argentine 1 facing north.



Photograph 2. Downstream view of Argentine 1 facing south.



Photo 3. Upstream view of Argentine 2 facing northwest.



Photo 4. Downstream view of Argentine 2 facing southeast.



Photo 5. Upstream view of Caribou Creek facing north.



Photo 6. Downstream view of Caribou Creek facing south.



Photo 7. Upstream view of Duck 1 facing north.



Photo 8. Downstream view of Duck 1 facing south.

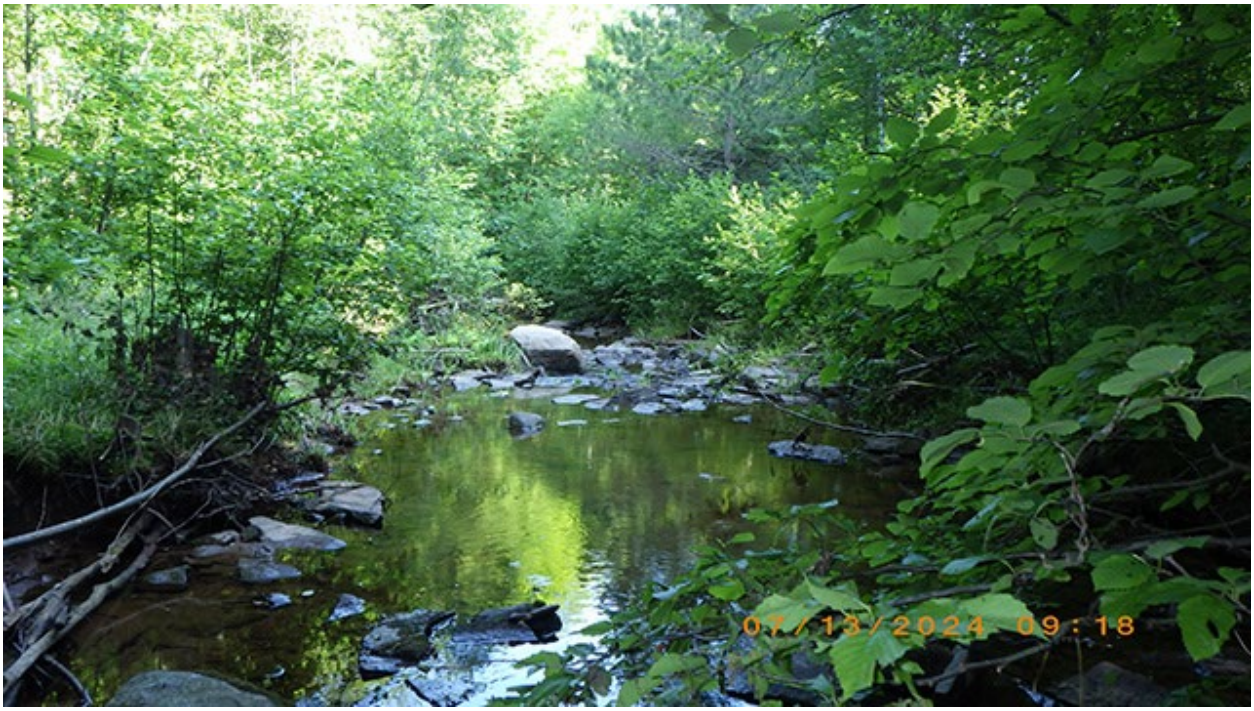


Photo 9. Upstream view of Duck 2 facing north.

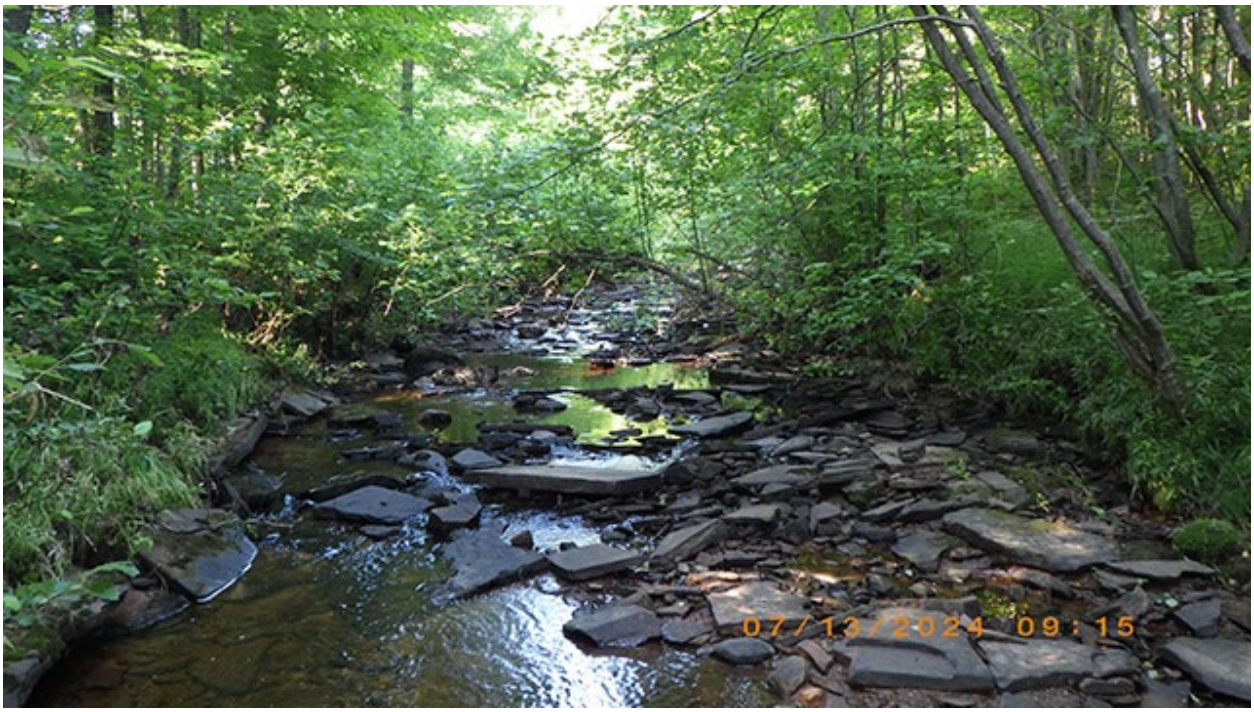


Photo 10. Downstream view of Duck 2 facing south.



Photo 11. Upstream view of Miles Creek facing east.



Photo 12. Downstream view of Miles Creek facing west.



Photo 13. Upstream view of Mineral 1 facing east.



Photo 14. Downstream view of Mineral 1 facing west.



Photo 15. Upstream view of Mineral 2 facing east.



Photo 16. Downstream view of Mineral 2 facing west.



Photo 17. Upstream view of Perch Creek facing north.



Photo 18. Downstream view of Perch Creek facing south.



Photo 19. Upstream view of Pine Creek facing north.



Photo 20. Downstream view of Pine Creek facing south.



Photo 21. Pond 1. View facing west.



Photo 22. Pond 2. View facing northeast.



Photo 23. Pond 3. View facing north.



Photo 24. Pond 5. View facing north.



Photo 25. Pond 7. View facing northwest.



Photo 26. Pond 9. View facing north.



Photo 27. Northeast corner of North Dam 2. View facing southwest.



Photo 28. Northwest corner of North Dam 2. View facing southwest.

Appendix A – P-51 Stream Habitat Survey Cards

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Argentine Creek (Class 1)	LOCATION (road crossing): Halfway River Rd +
COUNTY/TOWNSHIP: DOUGLAS/CARL LAKE TWP	T 51N R 4W S 13
LAT(dd): 46.815781 LONG (dd): -89.451523	RIVER BASIN: Duck Creek - Frontal Lake Superior
STORET #:	HUC CODE: ECOREGION: NLF
INVESTIGATOR(S): AJS, ACS, RW, MS DATE: TIME 9:20 (AM) PM	REASON FOR SURVEY: [x] Targeted: comment Baseline [ ] Randomized: VSEC # [ ] VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: [x] Sunny [ ] Partly Cloudy [ ] Cloudy [ ] Rainy

Has there been a significant rain in the last 7 days? [ ] Yes [ ] No [x] Don't Know

Air Temperature 68 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: [x] Forest [ ] Commercial [ ] Field/Pasture [ ] Industrial [ ] Agricultural [ ] Residential [ ] Other _____

Local Watershed NPS Pollution: [x] No evidence [ ] Some potential sources [ ] Obvious Sources

Local Watershed Erosion: [x] None [ ] Moderate [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

[x] Trees [x] Shrubs [x] Grasses [x] Herbaceous Species:

Estimate buffer width (left) _____ ft (right) _____ ft

STREAM CHARACTERIZATION

Stream Subsystem: [x] Perennial Likely [ ] Intermittent [ ] Lake Outlet Influenced [ ] Dam Influenced

Stream Origin: [x] Spring Fed [ ] Lake/Pond [x] Swamp, Marsh, Bog [ ] Mixture of origins [ ] Other _____

Stream Modifications: [x] None [ ] Dredged [ ] Canopy Removal [ ] Snagging [ ] Impounded [ ] Relocated [ ] Bank Stabilization [ ] Habitat Improvement

Stream Type: [x] Coldwater [ ] Warmwater

INSTREAM FEATURES

Avg. Stream Width 5.6 ft Avg. Stream Depth 0.3 ft

Surface Velocity _____ ft/sec (at thalweg) Est. Flow 42 cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 560 ft² High Water Mark _____ ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION

[ ] Rooted emergent [x] Rooted submergent [ ] Rooted floating [ ] Free Floating [ ] Floating algae [ ] Attached algae

Portion of the reach with aquatic vegetation 2 %

Nuisance aquatic plants or slimes present? Yes [ ] No [x]

Dominant species present _____

WATER QUALITY

Temperature 59.9 °F

Water Samples Taken: [x] None [ ] Other _____ [ ] GA [ ] GN [ ] MA [ ] MN [ ] VOA [ ] ON

Solids, Turbidity: [x] Clear [ ] Slightly turbid [ ] Turbid [ ] Floating solids [ ] Suspended solids [ ] Settleable solids [ ] Foams

Color: [x] Clear [ ] Stained [ ] Opaque [ ] Colored _____ [ ] Other _____

Surface Oils: [x] None [ ] Sheen [ ] Globs [ ] Flecks [ ] Slick [ ] Other _____

Water Odors: [x] Normal/None [ ] Sewage [ ] Petroleum [ ] Chemical [ ] Fishy [ ] Other _____

SEDIMENT

Sediment Samples Taken: [x] None [ ] Other _____ [ ] MS [ ] GS [ ] VOA [ ] OS/BNA

Oils: [x] Absent [ ] Slight [ ] Moderate [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [x] No

Sediment Odors: [x] Normal/None [ ] Sewage [ ] Petroleum [ ] Chemical [ ] Anaerobic [ ] Other _____

Deposits: [x] None [ ] Sludge [ ] Sawdust [ ] Paper fiber [ ] Sand [ ] Relict shells [ ] Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	
Boulder	>10"	5			
Cobble	2.5"-10"	50	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	30			
Sand	Gritty (course)	5	Other		
Silt	Gritty (fine)				
Clay	slick	10			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 60 %
- ☐ Run 20 %
- ☐ Pool 20 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☒	☐
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: ACCENTINE #2	LOCATION (road crossing): US Stream of LP Walsh (South)
COUNTY/TOWNSHIP: CATHLACON/CARP LAKE TWP	T 50N R 41W S 7
LAT(dd) 46.73925 LONG (dd) -89.47112	RIVER BASIN: DUCK CREEK - FRONTAL L. SUPERIOR
STORET #	HUC CODE / ECOREGION: NLAF
INVESTIGATOR(S): AS, DW, RW; ACS, MS	DATE / TIME: 5:15 AM (PM)
	REASON FOR SURVEY: [X] Targeted: comment Baseline; [ ] Randomized: VSEC #; VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: [ ] Sunny; [X] Partly Cloudy; [ ] Cloudy; [ ] Rainy

Has there been a significant rain in the last 7 days? [ ] Yes [X] No [ ] Don't Know

Air Temperature 83 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: [X] Forest; [ ] Commercial; [ ] Field/Pasture; [ ] Industrial; [ ] Agricultural; [ ] Residential; [ ] Other

Local Watershed NPS Pollution: [X] No evidence; [ ] Some potential sources; [ ] Obvious Sources

Local Watershed Erosion: [ ] None; [ ] Moderate; [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

[X] Trees [ ] Shrubs Species:

[X] Grasses [ ] Herbaceous

Estimate buffer width (left) >150 ft (right) >150 ft

STREAM CHARACTERIZATION

Stream Subsystem: [ ] Perennial; [X] Intermittent; [ ] Lake Outlet Influenced; [ ] Dam Influenced

Stream Origin: [ ] Spring Fed; [ ] Lake/Pond; [ ] Swamp, Marsh, Bog; [X] Mixture of origins; [ ] Other Muddy Surface

Stream Modifications: [X] None; [ ] Dredged; [ ] Canopy Removal; [ ] Snagging; [ ] Impounded; [ ] Relocated; [ ] Bank Stabilization; [ ] Habitat Improvement

Stream Type: [ ] Coldwater; [X] Warmwater

INSTREAM FEATURES

Avg. Stream Width 1.2 ft; Avg. Stream Depth .03 ft

Surface Velocity 0.01 ft/sec (at thalweg); Est. Flow cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 220 ft²; High Water Mark 1.5 ft

Canopy Cover: 70 % Shaded

AQUATIC VEGETATION

[ ] Rooted emergent; [ ] Rooted submergent; [ ] Rooted floating

[ ] Free Floating; [ ] Floating algae; [X] Attached algae

Portion of the reach with aquatic vegetation %

Nuisance aquatic plants or slimes present? Yes [ ] No [X]

Dominant species present

WATER QUALITY

Temperature 18°C 65 °F

Water Samples Taken: [X] None [ ] Other; [ ] GA [ ] GN; [ ] MA [ ] MN; [ ] VOA [ ] ON

Solids, Turbidity: [X] Clear; [ ] Slightly turbid; [ ] Turbid; [ ] Floating solids; [ ] Suspended solids; [ ] Settleable solids; [ ] Foams

Color: [X] Clear; [ ] Stained; [ ] Opaque; [ ] Colored; [ ] Other

Surface Oils: [X] None; [ ] Sheen; [ ] Globs; [ ] Flecks; [ ] Slick; [ ] Other

Water Odors: [X] Normal/None; [ ] Sewage; [ ] Petroleum; [ ] Chemical; [ ] Fishy; [ ] Other

SEDIMENT

Sediment Samples Taken: [X] None [ ] Other; [ ] MS [ ] GS; [ ] VOA [ ] OS/BNA

Oils: [X] Absent; [ ] Slight; [ ] Moderate; [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [X] No

Sediment Odors: [X] Normal/None; [ ] Sewage; [ ] Petroleum; [ ] Chemical; [ ] Anaerobic; [ ] Other

Deposits: [X] None; [ ] Sludge; [ ] Sawdust; [ ] Paper fiber; [ ] Sand; [ ] Relict shells; [ ] Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	70
Boulder	>10"				
Cobble	2.5"-10"	10	Muck-Mud	black, very fine organic (FPOM)	20
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	60	Other		
Silt	Gritty (fine)				
Clay	slick	20			

Proportion of Reach Represented by Stream Morphology Types

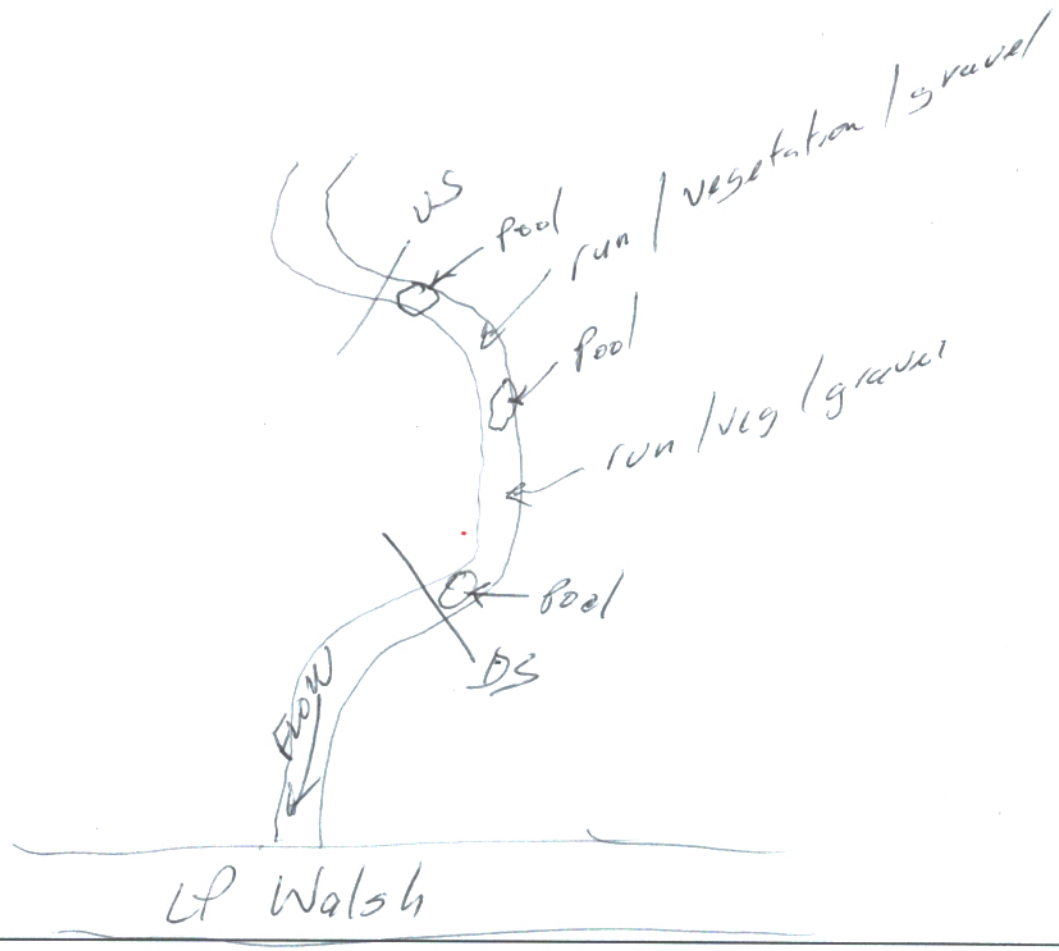
- ☐ Riffle 5 %
- ☐ Run 20 %
- ☐ Pool 70 %
- ☐ Depositional 5 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☒	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☒	☐
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: CARIBOU CREEK
LOCATION (road crossing): DOWNSTREAM OF RL Walsh
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP
T 50N R 42W S 11
LAT(dd): 46.737269 LONG (dd): -89.522071
RIVER BASIN: PINE CREEK-FRONTAL L. SUPERIOR
STORET #
HUC CODE
ECOREGION: NLAF
INVESTIGATOR(S): AJS, ALS, MS, RW
DATE: 07/10/24
TIME: 1:57 AM (PM)
REASON FOR SURVEY
☒ Targeted: comment Baseline
☐ Randomized: VSEC #
VSEC description (eg. cold small)

WEATHER CONDITIONS
Current
☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Rainy
Has there been a significant rain in the last 7 days?
☐ Yes ☐ No
☒ Don't Know
Air Temperature 73 °F

WATERSHED FEATURES
Predominant Surrounding Land Use
☒ Forest
☐ Commercial
☐ Field/Pasture
☐ Industrial
☐ Agricultural
☐ Residential
☐ Other
Local Watershed NPS Pollution
☒ No evidence
☐ Some potential sources
☐ Obvious Sources
Local Watershed Erosion
☒ None
☐ Moderate
☐ Heavy

RIPARIAN VEGETATION
Indicate the dominant type and record the dominant species
☒ Trees ☒ Shrubs Species:
☒ Grasses ☒ Herbaceous
Estimate buffer width (left) 1000+ ft (right) 1000+ ft

STREAM CHARACTERIZATION
Stream Subsystem
☐ Perennial
☒ Intermittent Likely
☐ Lake Outlet Influenced
☐ Dam Influenced
Stream Origin
☐ Spring Fed
☐ Lake/Pond
☒ Swamp, Marsh, Bog
☐ Mixture of origins
☐ Other
Stream Modifications
☒ None
☐ Dredged
☐ Canopy Removal
☐ Snagging
☐ Impounded
☐ Relocated
☐ Bank Stabilization
☐ Habitat Improvement
Stream Type
☒ Coldwater
☐ Warmwater

INSTREAM FEATURES
Avg. Stream Width 2.4 ft
Avg. Stream Depth 0.4 ft
Surface Velocity ft/sec (at thalweg)
Est. Flow cfs
Est. Survey Reach Length 100 ft
Survey Reach Area 240 ft²
High Water Mark 0.5 ft
Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
☒ Rooted emergent
☒ Rooted submergent
☐ Rooted floating
☐ Free Floating
☐ Floating algae
☒ Attached algae
Portion of the reach with aquatic vegetation 90 %
Nuisance aquatic plants or slimes present? Yes ☐ No ☒
Dominant species present

WATER QUALITY
Temperature 62.8 °F
DO: 3.2 mg/L
Water Samples Taken
☒ None ☐ Other
☐ GA ☐ GN
☐ MA ☐ MN
☐ VOA ☐ ON
Solids, Turbidity
☒ Clear
☐ Slightly turbid
☐ Turbid
☐ Floating solids
☐ Suspended solids
☐ Settleable solids
☐ Foams
Color
☒ Clear
☐ Stained
☐ Opaque
☐ Colored
☐ Other
Surface Oils
☒ None
☐ Sheen
☐ Globs
☐ Flecks
☐ Slick
☐ Other
Water Odors
☒ Normal/None
☐ Sewage
☐ Petroleum
☐ Chemical
☐ Fishy
☐ Other

SEDIMENT
Sediment Samples Taken
☒ None ☐ Other
☐ MS ☐ GS
☐ VOA ☐ OS/BNA
Oils
☒ Absent
☐ Slight
☐ Moderate
☐ Profuse
Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☐ No No Stones
Sediment Odors
☒ Normal/None
☐ Sewage
☐ Petroleum
☐ Chemical
☐ Anaerobic
☐ Other
Deposits
☒ None
☐ Sludge
☐ Sawdust
☐ Paper fiber
☐ Sand
☐ Relict shells
☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	90
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	90
Gravel	0.1"-2.5"				
Sand	Gritty (course)		Other		
Silt	Gritty (fine)	90			
Clay	slick	10			

Proportion of Reach Represented by Stream Morphology Types

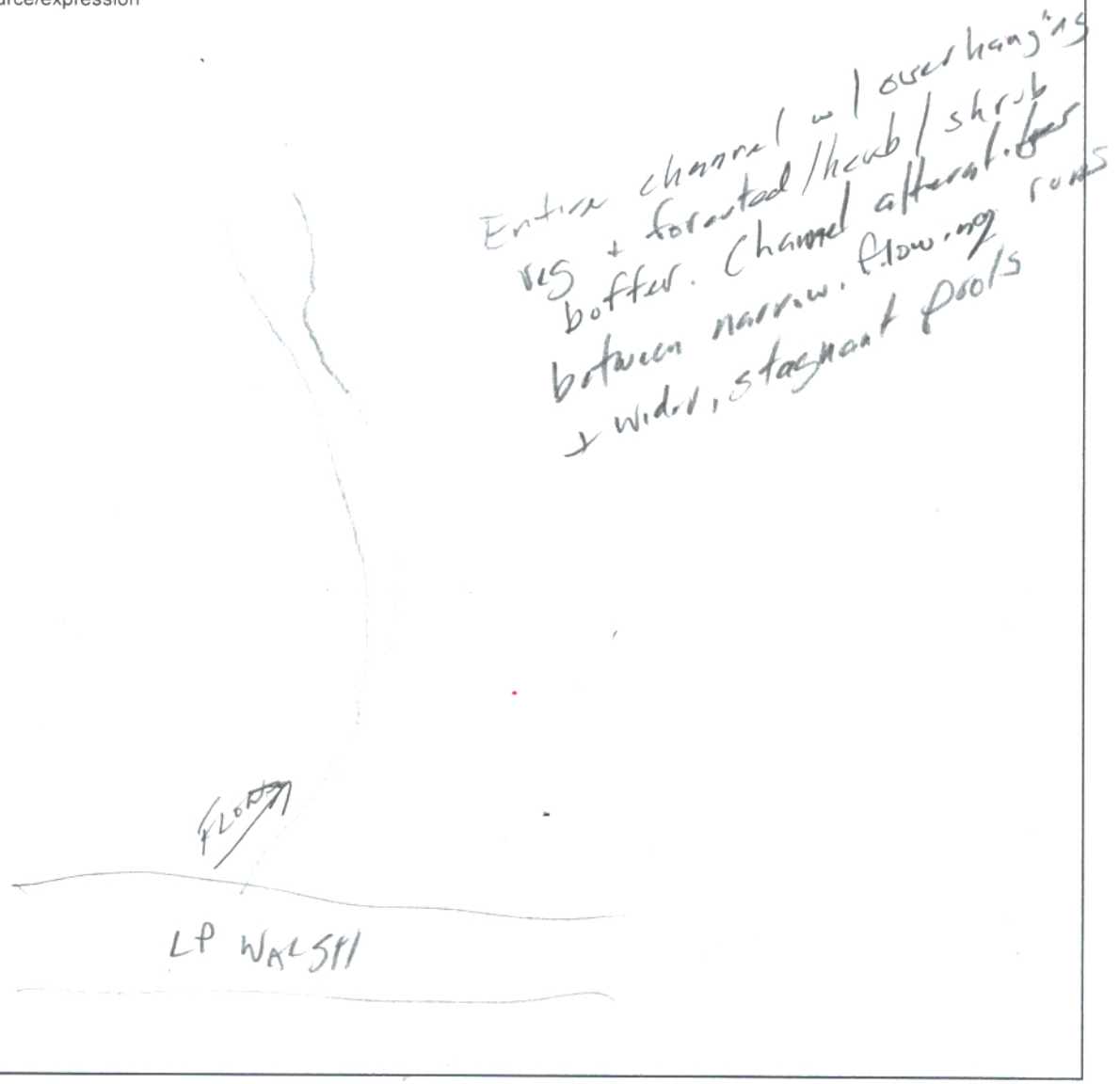
- ☐ Riffle_____%
- ☐ Run 60 %
- ☐ Pool 40 %
- ☐ Depositional_____%

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☒	☐	☐	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☒	☐	☐	☐
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Duck Creek (E Branch)	LOCATION (road crossing): DOWNSTREAM (South) of LP Walsh Duck
COUNTY/TOWNSHIP: DOUGLAS / CARP LAKE TWP	T 50N R 42W S 13
LAT(dd) 46.736319 LONG (dd) -89.491591	RIVER BASIN: DUCK CREEK-FRONTAL L. SUPERIOR
STORET #	HUC CODE / ECOREGION: NLAF
INVESTIGATOR(S): DW, KJS, ACS, MS, RW	DATE 07/12/24 TIME 3:47 AM (PM)
	REASON FOR SURVEY: ☒ Targeted: comment Baseline ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☒ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☒ No ☐ Don't Know

Air Temperature 82 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☐ Other _____

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☐ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 1000+ ft (right) 1000+ ft

STREAM CHARACTERIZATION

Stream Subsystem: ☒ Perennial Likely ☐ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☒ None ☐ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☐ Warmwater

INSTREAM FEATURES

Avg. Stream Width 41 ft Avg. Stream Depth 0.1 ft

Surface Velocity ~~X~~ ft/sec (at thalweg) Est. Flow ~~X~~ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 410 ft² High Water Mark 2 ft

Canopy Cover: 85 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☒ Rooted submergent ☐ Rooted floating

☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 5 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature _____ °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☒ Clear ☐ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	
Boulder	>10"	5			
Cobble	2.5"-10"	15	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	25			
Sand	Gritty (course)	50	Other		
Silt	Gritty (fine)				
Clay	slick	5			

Proportion of Reach Represented by Stream Morphology Types

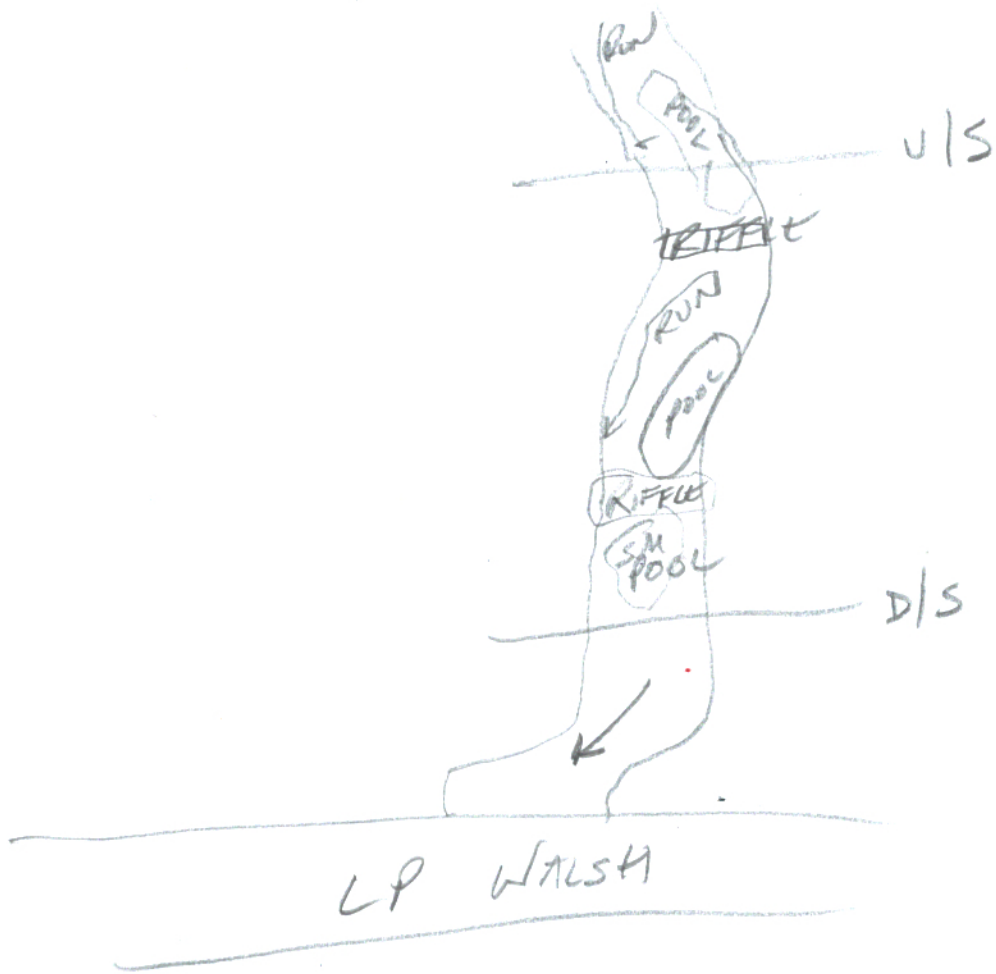
- ☐ Riffle 25 %
- ☐ Run 25 %
- ☐ Pool 25 %
- ☐ Depositional 25 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☒	☐
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: DUCK CREEK Duck2

LOCATION (road crossing): West of A TRAIL FROM Bold Rd

COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP

T 51N R 41W S 23

LAT(dd): 46.80743 LONG (dd): -89.47466B

RIVER BASIN: DUCK CREEK - FRONTAL L. SUPERIOR

STORET #:

HUC CODE:

ECOREGION: NLAI

INVESTIGATOR(S): AS, DW, MS

DATE: 07/13/24

TIME: 9:30 (AM) PM

REASON FOR SURVEY
- [x] Targeted: comment Baseline
- [ ] Randomized: VSEC #
- VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- [x] Sunny
- [ ] Partly Cloudy
- [ ] Cloudy
- [ ] Rainy

Has there been a significant rain in the last 7 days?
- [ ] Yes
- [x] No
- [ ] Don't Know

Air Temperature 66 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- [x] Forest
- [ ] Commercial
- [ ] Field/Pasture
- [ ] Industrial
- [ ] Agricultural
- [ ] Residential
- [ ] Other

Local Watershed NPS Pollution
- [x] No evidence
- [ ] Some potential sources
- [ ] Obvious Sources

Local Watershed Erosion
- [x] None
- [ ] Moderate
- [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- [x] Trees
- [x] Shrubs
- [x] Grasses
- [x] Herbaceous

Species:

Estimate buffer width (left) 1000 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem
- [x] Perennial
- [ ] Intermittent
- [ ] Lake Outlet Influenced
- [ ] Dam Influenced

Stream Origin
- [ ] Spring Fed
- [ ] Lake/Pond
- [ ] Swamp, Marsh, Bog
- [x] Mixture of origins
- [ ] Other

Stream Modifications
- [x] None
- [ ] Dredged
- [ ] Canopy Removal
- [ ] Snagging
- [ ] Impounded
- [ ] Relocated
- [ ] Bank Stabilization
- [ ] Habitat Improvement

Stream Type
- [ ] Coldwater
- [x] Warmwater

INSTREAM FEATURES

Avg. Stream Width 17.6 ft

Avg. Stream Depth 0.4 ft

Surface Velocity 0.06 ft/sec (at thalweg)

Est. Flow cfs

Est. Survey Reach Length 300 ft

Survey Reach Area 5,280 ft²

High Water Mark 2 ft

Canopy Cover: 40 % Shaded

AQUATIC VEGETATION
- [ ] Rooted emergent
- [ ] Rooted submergent
- [ ] Rooted floating
- [ ] Free Floating
- [ ] Floating algae
- [ ] Attached algae

Portion of the reach with aquatic vegetation %

Nuisance aquatic plants or slimes present? Yes [ ] No [x]

Dominant species present

WATER QUALITY

Temperature 70 °F

Water Samples Taken
- [x] None
- [ ] Other
- [ ] GA
- [ ] GN
- [ ] MA
- [ ] MN
- [ ] VOA
- [ ] ON

Solids, Turbidity
- [x] Clear
- [ ] Slightly turbid
- [ ] Turbid
- [ ] Floating solids
- [ ] Suspended solids
- [ ] Settleable solids
- [ ] Foams

Color
- [x] Clear
- [ ] Stained
- [ ] Opaque
- [ ] Colored
- [ ] Other

Surface Oils
- [x] None
- [ ] Sheen
- [ ] Globs
- [ ] Flecks
- [ ] Slick
- [ ] Other

Water Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Fishy
- [ ] Other

SEDIMENT

Sediment Samples Taken
- [x] None
- [ ] Other
- [ ] MS
- [ ] GS
- [ ] VOA
- [ ] OS/BNA

Oils
- [x] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [x] No

Sediment Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] Other

Deposits
- [x] None
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper fiber
- [ ] Sand
- [ ] Relict shells
- [ ] Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		40%	Detritus	Sticks, wood, coarse plant material (CPOM)	15%
Boulder	>10"				
Cobble	2.5"-10"	30%	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	15%			
Sand	Gritty (course)	10%	Other		
Silt	Gritty (fine)	5%			
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 40 %
- ☐ Run 40 %
- ☐ Pool 20 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: MILES CREEK	LOCATION (road crossing): CURLEW RD
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 9
LAT(dd): 46.828948 LONG (dd): -89.492304	RIVER BASIN: PINE CREEK / FRONTAL L. SUPERIOR
STORET #:	HUC CODE: ECOREGION: NLF
INVESTIGATOR(S): AS, DW, MS DATE: 07/13/24 TIME: 1:45 AM (PM)	REASON FOR SURVEY: ☒ Targeted: comment Baseline ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☒ Sunny ☐ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☒ No ☐ Don't Know

Air Temperature 84 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☐ Other _____

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☒ None ☐ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☐ Grasses ☐ Herbaceous Species:

Estimate buffer width (left) 1000+ ft (right) 1000+ ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent LIKELY ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☒ None ☐ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 2.4 ft Avg. Stream Depth 0.2 ft

Surface Velocity _____ ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 240 ft² High Water Mark 2+ ft

Canopy Cover: 80 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☒ Rooted submergent ☐ Rooted floating

☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 2 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature _____ °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☒ Clear ☐ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☒ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	15
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	10	Other		
Silt	Gritty (fine)	45			
Clay	slick	40			

Proportion of Reach Represented by Stream Morphology Types

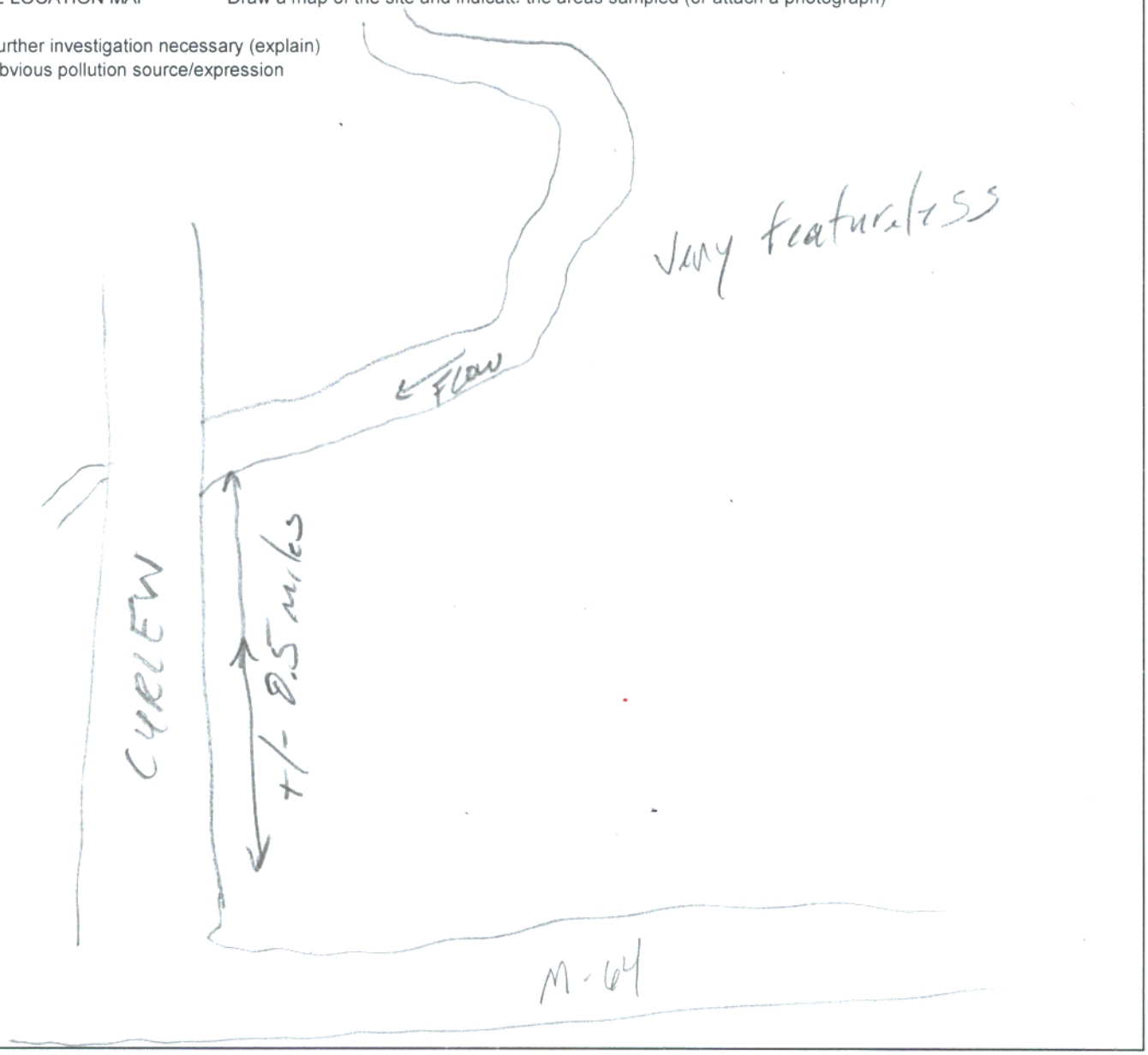
- ☐ Riffle 5 %
- ☐ Run 75 %
- ☐ Pool 10 %
- ☐ Depositional 10 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☒	☐
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J STREAM CARD

Shaded fields are entered into database

STREAM NAME: MINERAL RIVER 1	LOCATION (road crossing)
COUNTY/TOWNSHIP: SWIFT DAGON / CARP LAKE TWP	T 51N R 41W S 19
LAT(dd): 46.80111 LONG (dd): -89.55829	RIVER BASIN: MINERAL RIVER
STORET #	HUC CODE / ECOREGION: NLF
INVESTIGATOR(S): DW, RW, AS, MS, AS DATE: 7-8-24 TIME: 1200 AM (PM)	REASON FOR SURVEY: ☑ Targeted: comment BASELINE SURVEY ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☐ Partly Cloudy ☑ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☑ No ☐ Don't Know

Air Temperature 80 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☐ Forest ☐ Commercial ☐ Field/Pasture ☑ Industrial ☐ Agricultural ☐ Residential ☐ Other _____

Local Watershed NPS Pollution: ☐ No evidence ☐ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☐ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☑ Trees ☑ Shrubs ☐ Grasses ☐ Herbaceous

Species: Alder, Cedar, Spruce

Estimate buffer width (left) >150 ft (right) >150 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☑ Perennial ☐ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☑ Mixture of origins ☐ Other _____

Stream Modifications: ☐ None ☑ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☑ Coldwater ☐ Warmwater

INSTREAM FEATURES

Avg. Stream Width 26.9 ft — Avg. Stream Depth 0.5 ft

Surface Velocity 0.51 ft/sec (at thalweg) — Est. Flow 2.46 cfs

Est. Survey Reach Length 300 ft

Survey Reach Area 6,270 ft² — High Water Mark 5 ft

Canopy Cover 50 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating

☐ Free Floating ☐ Floating algae ☑ Attached algae

Portion of the reach with aquatic vegetation 15 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature 66.6 °F

Water Samples Taken: ☑ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☑ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☑ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☑ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☑ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Oils: ☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors: ☑ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	15%
Boulder	>10"	30			
Cobble	2.5"-10"	30	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	20	Other		
Silt	Gritty (fine)	10			
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 30 %
- ☐ Run 30 %
- ☐ Pool 20 %
- ☐ Depositional 20 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☒	☐
Rootwads	☐	☒	☐	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: MINERAL RIVER	LOCATION (road crossing): UPSTREAM of M-64 CROSSING MN7
COUNTY/TOWNSHIP: ANTONAGON / CARP LAKE TWP	T 50N R 42W S 16
LAT(dd): 46.733342 LONG (dd): -89.563119	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAF
INVESTIGATOR(S): AJS, KES, MS, RW DATE: 07/10/24 TIME: 9:50 AM PM	REASON FOR SURVEY: ☒ Targeted: comment baseline ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☒ Sunny ☐ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☐ No ☒ Don't Know

Air Temperature 70 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other M-64 crossing

Local Watershed NPS Pollution: ☒ No evidence ☐ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☒ None ☐ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☐ Grasses ☐ Herbaceous Species:

Estimate buffer width (left) 1000+ ft (right) 1000+ ft

STREAM CHARACTERIZATION

Stream Subsystem: ☒ Perennial ☐ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☒ None ☐ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☐ Warmwater

INSTREAM FEATURES

Avg. Stream Width 17.6 ft Avg. Stream Depth 0.3 ft

Surface Velocity 0.40 ft/sec (at thalweg) Est. Flow 0.95 cfs

Est. Survey Reach Length 300 ft

Survey Reach Area 5,280 ft² High Water Mark 2.5 ft

Canopy Cover: 90 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☒ Attached algae

Portion of the reach with aquatic vegetation 5 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☐

Dominant species present _____

WATER QUALITY

Temperature 64 °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☒ Clear ☐ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☐ No

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock		30	Detritus	Sticks, wood, coarse plant material (CPOM)	
Boulder	>10"	30			
Cobble	2.5"-10"	25	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	5	Other		
Silt	Gritty (fine)				
Clay	slick	5			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 65 %
- ☐ Run 10 %
- ☐ Pool 20 %
- ☐ Depositional 5 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

☐ Further investigation necessary (explain)
☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Perch Creek	LOCATION (road crossing): Downstream of Pond Impoundment
COUNTY/TOWNSHIP: Ontonagon / Carp Lake Twp	T 51N R 41W S 19
LAT(dd): 46.804395 LONG (dd): -89.54953	RIVER BASIN: Mineral River
STORET #:	HUC CODE: ECOREGION: NLF
INVESTIGATOR(S): AS DW DATE: 07/08/24 TIME: 6:14 AM PM	REASON FOR SURVEY: ☒ Targeted: comment Baseline Survey ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☒ Sunny ☐ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☐ No ☐ Don't Know

Air Temperature 73 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other Mine historic activity

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☐ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous Species:

Estimate buffer width (left) _____ ft (right) _____ ft

STREAM CHARACTERIZATION

Stream Subsystem: ☒ Perennial ☐ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☐ None ☐ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☒ Relocated Possibly? ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 14.8 ft Avg. Stream Depth 0.8 ft

Surface Velocity 0.63 ft/sec (at thalweg) Est. Flow 9.44 cfs

Est. Survey Reach Length 300 ft

Survey Reach Area 4,440 ft² High Water Mark 3.0 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☒ Attached algae

Portion of the reach with aquatic vegetation 5 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature _____ °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☒ Clear ☐ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	10
Boulder	>10"	5			
Cobble	2.5"-10"	15	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	20			
Sand	Gritty (course)	5	Other		
Silt	Gritty (fine)				
Clay	slick	55			

Proportion of Reach Represented by Stream Morphology Types

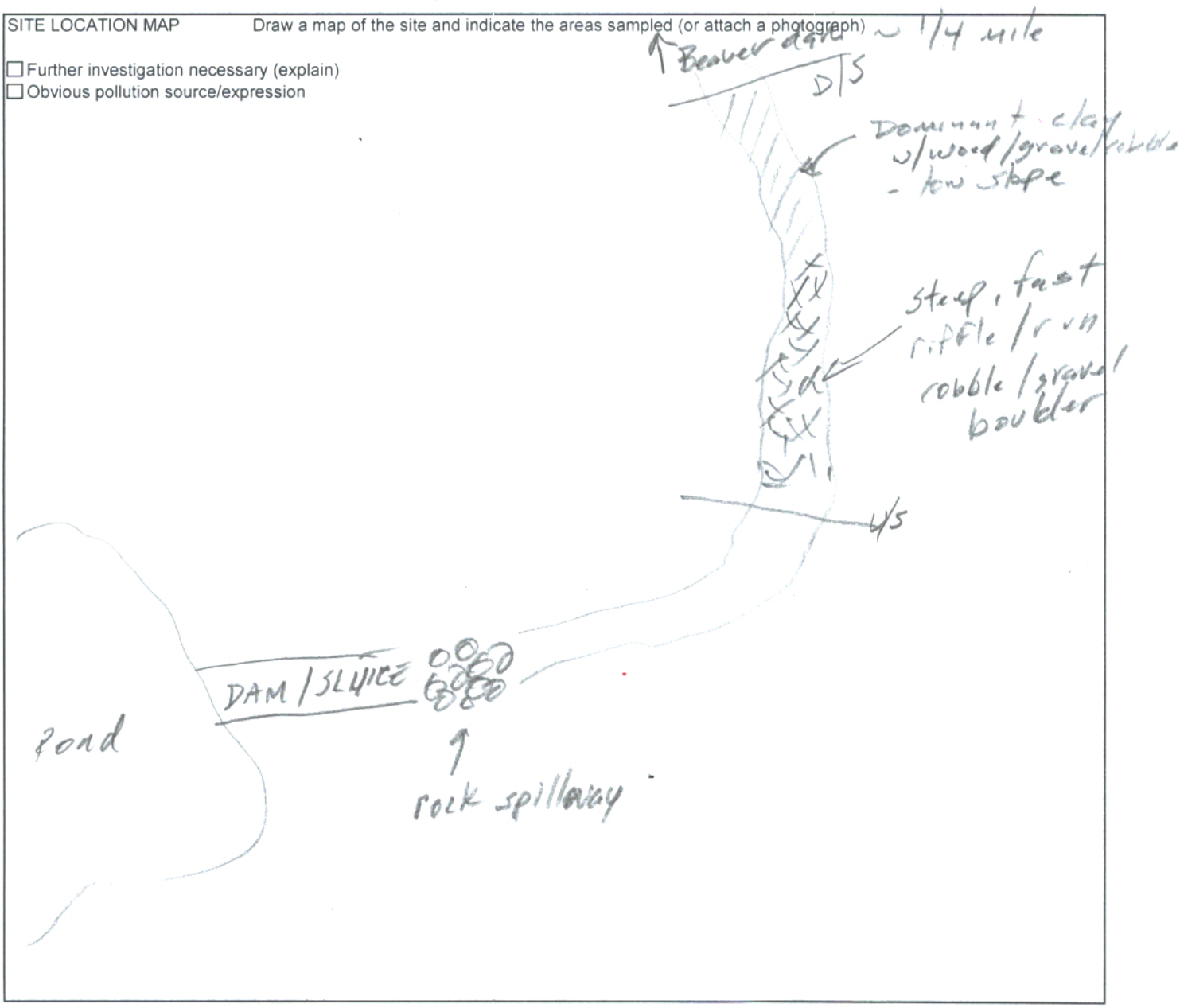
- ☐ Riffle 30 %
- ☐ Run 45 %
- ☐ Pool 20 %
- ☐ Depositional 5 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Pine Creek	LOCATION (road crossing): EAST OF TAILINGS BASIN
COUNTY/TOWNSHIP: DOUGLAS/CARP LAKE TWP	T 51N R 4W S 22
LAT(dd) 46.603955 LONG (dd) -89.492304	RIVER BASIN: PINE CREEK/FRONTAL L. SUPERIOR
STORET #	HUC CODE / ECOREGION: NLAP
INVESTIGATOR(S): AS/AS/MS RW	DATE 07/09/24 TIME 11:00 (AM) PM
	REASON FOR SURVEY: ☒ Targeted: comment Baseline ☐ Randomized: VSEC # ☐ VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☒ Sunny ☐ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☐ Yes ☐ No ☒ Don't Know

Air Temperature 76 °F

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 1000 ft (right) 1000 ft

WATERSHED FEATURES

Predominant Surrounding Land Use: ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other historic mining

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

STREAM CHARACTERIZATION

Stream Subsystem: ☒ Perennial ☐ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☐ None ☐ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☒ Relocated maybe ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 12.8 ft Avg. Stream Depth 0.5 ft

Surface Velocity 0.19 ft/sec (at thalweg) Est. Flow 0.21 cfs

Est. Survey Reach Length 300 ft

Survey Reach Area 3,840 ft² High Water Mark 2 ft

Canopy Cover: 75 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature 66.3 °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☒ Clear ☐ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"	15			
Cobble	2.5"-10"	35	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	20			
Sand	Gritty (course)	5	Other		
Silt	Gritty (fine)				
Clay	slick	25			

Proportion of Reach Represented by Stream Morphology Types

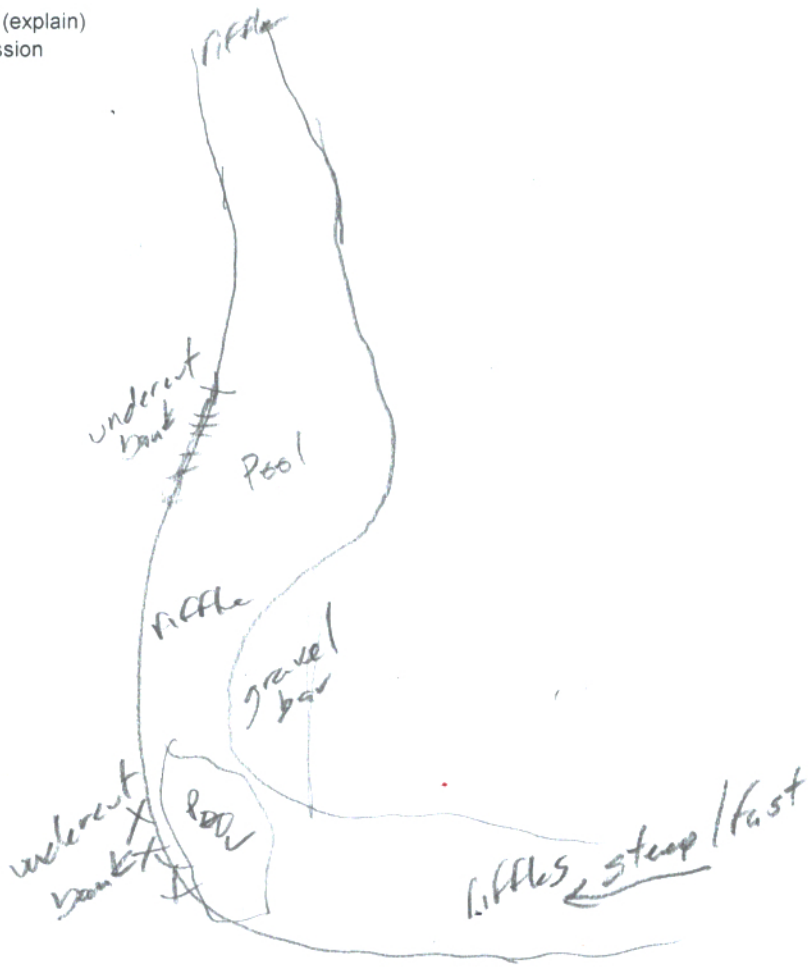
- ☐ Riffle 25 %
- ☐ Run 45 %
- ☐ Pool 25 %
- ☐ Depositional 5 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☒	☐	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



Appendix B – Procedure 51 Biological and Habitat Assessment of Portal Creek

Procedure 51 Biological and Habitat Assessment of Portal Creek, White Pine, Michigan

August 2024

Prepared For:

White Pine Copper, LLC.

Prepared By:

1.0 INTRODUCTION

White Pine Copper, LLC (WPC) is obligated under a Consent Decree with the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) to remediate contamination that resulted from historical operations of the former White Pine Copper Mine, which ceased operations in 1997. Portal Creek is a tributary to the Mineral River and is located within the mine property approximately 100 meters west of Tailings Dam North #1 (Figure 1-1). Portal creek flows to the north and was identified as a location that had elevated levels of copper from the historical mining operations. Portal Creek was subsequently included in a Site Remedial Action Plan (RAP) as part of the State of Michigan Consent Decree, which resulted in sediment removal activities in 2008 to reduce the copper concentration within the creek.

The biological and physical integrity of the stream were required to be qualitatively monitored as part of the RAP to evaluate the recovery of the stream following the sediment removal activities. Portal Creek was evaluated in 2014 in accordance with the Great Lakes and Environmental Assessment Section (GLEAS) Procedure 51 (P-51). The 2014 P-51 findings did not conclusively satisfy the State of Michigan monitoring requirements under the Consent Decree and subsequent monitoring was required. Streamside Eco, LLC (SECO) has contracted with WPC to conduct a P-51 survey of the stream segments that were last monitored in 2014. SECO personnel conducted a P-51 survey of Portal Creek during June 2024. This report describes the methods that were used and the results of the survey of Portal Creek.

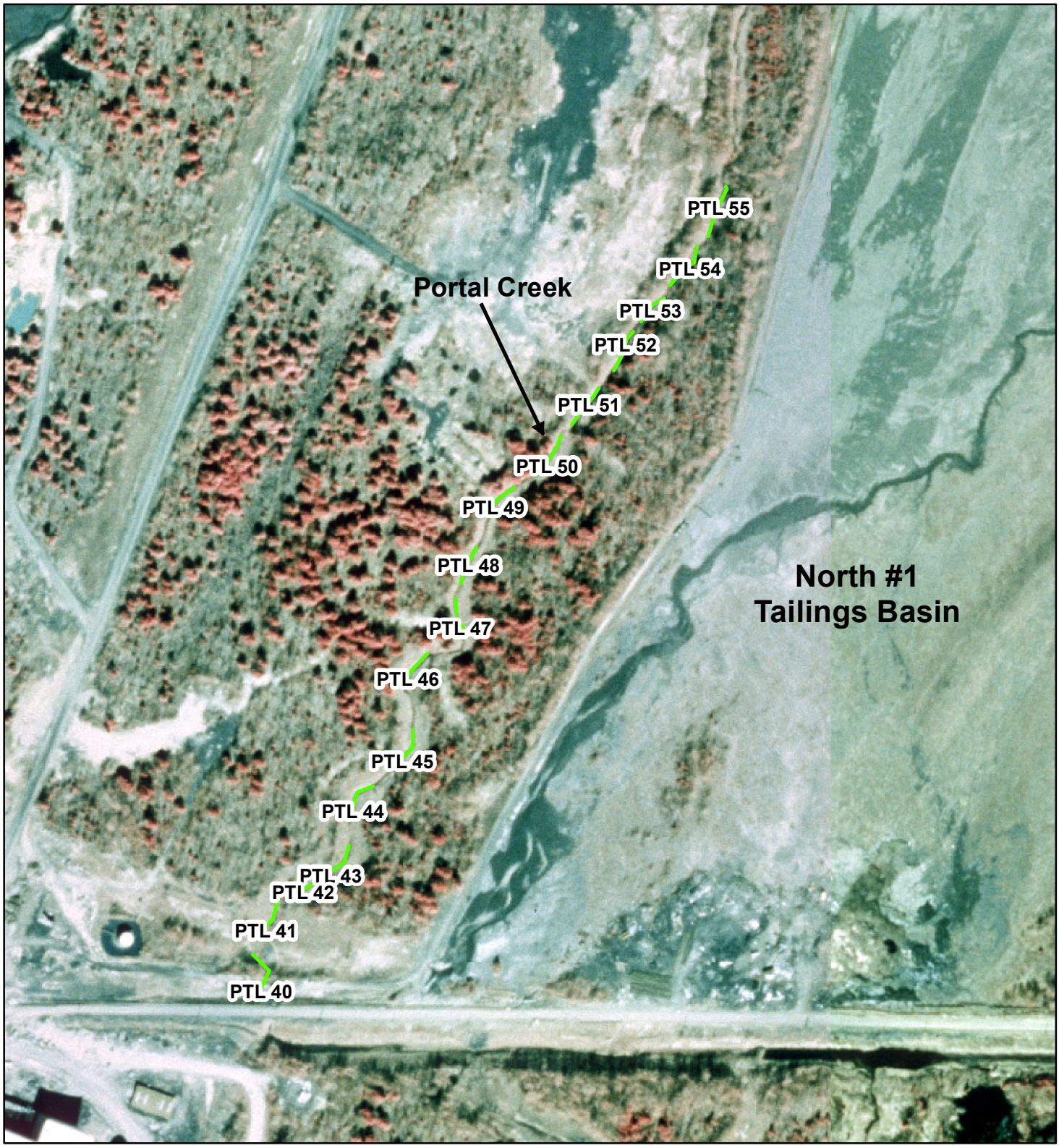
2.0 METHODS

The 2024 P-51 survey was conducted according to the Michigan Department of Environmental Quality's (now referred to as EGLE) Surface Water Quality Division *Procedure #51 Survey Protocols for Wadable Rivers* (MDEQ, 1990). SECO attempted to sample in the same general locations that were surveyed in 2014. However, the stations were no longer marked in the field and the GPS coordinates from the 2014 survey were not available.

SECO established 16 sample stations (100 feet in length) within approximately 2,400 feet of stream channel (Figure 1-1). Sample stations were identified based upon the original numbering system established during the 2014 survey, with station numbers ranging from "PTL-40" to "PTL-55". The coordinates of the upstream and downstream extents of each sample station were recorded using a Global Positioning System (Table 2-1). Photographs were collected at the downstream and upstream extent of each sample station to illustrate the prevailing site conditions at the time of the survey (Appendix A). However, the downstream photos were inadvertently not collected for stations PTL-50 through PTL-55.

The P-51 protocol was used at each sample station to assess the fish community, the macroinvertebrate community, and physical habitat. The P-51 survey was initiated at sample station PTL-40 and then was subsequently conducted from the downstream-most sample station (PTL-55), working upstream to sample station PTL-41. The fish community was surveyed first within each sample station using a Smith-Root LR-24 backpack electrofisher, with all sample stations being thoroughly surveyed throughout their

entirety. Fish species composition and relative abundance was noted at each sample station. All fish were returned alive back into each sample station following identification and enumeration.



Legend

P-51 Sample Locations

0 125 250 500 750 1,000 Feet

N

StreamsideEco

PROJECT	White Pine Copper
TITLE	Portal Creek P-51
FIGURE	1-1

The macroinvertebrate survey was conducted immediately following the fish survey in each sample station. Two biologists sampled all habitat types within each sample station for 20 minutes each using D-framed kick nets. Samples were placed in a large white enameled sample tray for subsequent sorting and later identification. Aquatic macroinvertebrate samples were identified to the Family taxonomic level.

SECO biologists completed P-51 stream survey forms (Appendix B) for each sample station following fish and macroinvertebrate sampling. Stream width and depth data were also collected as part of the habitat assessment. Physical habitat was scored using the Riffle/Run habitat field forms.

3.0 RESULTS

The P-51 survey of each sample station was conducted on June 6, 2024. Weather conditions at the time of the survey included a cloudy sky with air temperatures ranging from 55°F to 60°F. Although a rain event had occurred on June 5, the creek was only slightly turbid, and the substrate was visible throughout each sample station. Water levels were observed to be declining throughout the day during sampling. To gain a better understanding of stream hydrology, SECO biologists revisited Portal Creek during July 2024.

A total of 159 fish were collected, representing five species: brook stickleback (*Culaea inconstans*), creek chub (*Semotilus atromaculatus*), longnose dace (*Rhinichthys cataractae*), northern redbelly dace (*Chrosomus eos*), and white sucker (*Catostomus commersonii*; Table 3-1). The highest number of fish (sample size = 45) was observed in Station PTL-41, while no fish were collected at Stations PTL-43 and PTL-44.

The P-51 protocol indicates that if fewer than 50 fish are collected at a station, the station will not be scored using the metrics, but will be considered to be below acceptable quality and would be rated as "poor". None of the sample stations contained 50 fish.

Only one live macroinvertebrate, *Notonectidae*, was found at Station PTL-41 (Table 3-2). Nine empty caddisfly cases of three taxa were found among Stations PTL-52 (4), PTL-53 (4) and PTL-55 (1), but no live specimens were located. The macroinvertebrate community is considered to be "Poor" at all stations.

Portal Creek primarily consists of an incised, steep, clay-lined channel surrounded by a wide, vegetated riparian area. Additionally, the stream discharge appears to vary greatly on a seasonal basis (i.e., flashy flow regime) and is known to dry up, or nearly dry up, during dry periods of summer. The observed water levels during the July 2024 site visit were much lower than the water levels that were observed in each station in June. Physical habitat was rated as "Good" at all stations except for PTL-55, which was rated as "Marginal" (Table 3-3). Scores ranged from 103 at Station PTL-55 (two points shy of "Good") to 138 at Station PTL-40. However, Stations PTL-40 and PTL-41 differ from the rest, in that they are located between a series of perched culverts on the upstream end and a significant grade control (+/- 3 feet) on the downstream end. Station PTL-40 contains a deep pool and a length of narrow channel with floodplain bench and Station PTL-41 contains a narrow channel flowing through a vegetated floodplain bench. Stations PTL-40 and PTL-41 are effectively disconnected from the rest of the stream.

Although the Portal Creek physical habitat is rated as "Good" according to the P-51 metric scoring, the score is inflated by the riparian and bank structure scores. The riparian areas are generally wide and well vegetated, despite channel incision and the flashy nature of the hydrology. The instream habitat, which fish and macroinvertebrates depend on foremost, is poor. The streambed is dominated by clay with

sparse gravel and cobble. The predominance of clay is unsuitable for most macroinvertebrates. The channel incision and steepness of slope results in very fast and high-energy flow during high water events. It is probable that most of the gravel, cobble, woody, and organic debris in the channel are mobile during high flows. Further, the low volume of flow during dry periods leaves much, or all, of the streambed exposed. It is obvious that the water level of Portal Creek gets low enough to negatively impact aquatic organisms.

4.0 SUMMARY

In June 2024, Portal Creek contained a "Poor" fish community, a "Poor" macroinvertebrate community and "Good" physical habitat. Poor instream habitat and variability of flow (extreme highs and lows) negatively impact macroinvertebrates. The lack of stable, quality habitats in Portal Creek was documented during this assessment.

5.0 REFERENCES

MDEQ (Michigan Department of Environmental Quality). 1990. SWAS Procedure 51 Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers, April 24, 1990. Revised June 1991, August 1996, January 1997, May 2002, and December 2008.

6.0 Tables

Table 2-1. Survey Station Locations for Portal Creek (Upstream and Downstream Coordinates).

Station Identification Number	Sample Station Extent	Northing	Easting
PTL 40	Upstream	46.765426	-89.561708
	Downstream	46.765642	-89.561815
PTL 41	Upstream	46.765746	-89.561771
	Downstream	46.766002	-89.561597
PTL 42	Upstream	46.766060	-89.561550
	Downstream	46.766016	-89.561276
PTL 43	Upstream	46.766095	-89.561197
	Downstream	46.766379	-89.560991
PTL 44	Upstream	46.766561	-89.560962
	Downstream	46.766379	-89.560991
PTL 45	Upstream	46.766942	-89.560581
	Downstream	46.767149	-89.560420
PTL 46	Upstream	46.767464	-89.560459
	Downstream	46.767671	-89.560287
PTL 47	Upstream	46.767791	-89.560006
	Downstream	46.768009	-89.559980
PTL 48	Upstream	46.768137	-89.560000
	Downstream	46.768383	-89.559842
PTL 49	Upstream	46.768601	-89.559673
	Downstream	46.768821	-89.559506
PTL 50	Upstream	46.768852	-89.559286
	Downstream	46.769155	-89.559077
PTL 51	Upstream	46.769226	-89.558968
	Downstream	46.769464	-89.558727
PTL 52	Upstream	46.769580	-89.558571
	Downstream	46.769836	-89.558381
PTL 53	Upstream	46.769944	-89.558410
	Downstream	46.770075	-89.558116
PTL 54	Upstream	46.770193	-89.558129
	Downstream	46.770440	-89.557808
PTL 55	Upstream	46.770484	-89.557716
	Downstream	46.770812	-89.557644

Table 3-1. Fish collected by station in Portal Creek on June 6, 2024.

Common Name	PTL-40	PTL-41	PTL-42	PTL-43	PTL-44	PTL-45	PTL-46	PTL-47	PTL-48	PTL-49	PTL-50	PTL-51	PTL-52	PTL-53	PTL-54	PTL-55
Brook stickleback	1	1					1									
Creek chub	3	14	33				9	5	3	2	4	3	2	4	9	11
Longnose dace		2	2			1	5	1			1			1		1
Northern redbelly dace	1	27					2								5	1
White sucker		1					1	1							1	
Total	5	45	35	0	0	1	18	7	3	2	5	3	2	5	15	13
Electrofishing time (sec)	1,356	1,5457	1,216	936	1,002	1,476	1,056	937	1,208	1,037	1,024	1,000	1,044	1,084	1,512	1,308

Table 3-2. Aquatic macroinvertebrates collected by station in Portal Creek on June 6, 2024.

Order	Family	PTL-40	PTL-41	PTL-42	PTL-43	PTL-44	PTL-45	PTL-46	PTL-47	PTL-48	PTL-49	PTL-50	PTL-51	PTL-52	PTL-53	PTL-54	PTL-55
Hemiptera	Notonectidae	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3-3. Physical Habitat Scoring (P51) for Portal Creek.

HABITAT METRIC	PTL-40	PTL-41	PTL-42	PTL-43	PTL-44	PTL-45	PTL-46	PTL-47
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	14	7	7	5	5	6	12	6
Embeddedness (20)	16	16	16	11	13	8	7	12
Velocity/Depth Regime (20)	16	11	11	10	6	10	15	9
Channel Morphology								
Sediment Deposition (20)	17	16	16	16	18	11	13	12
Flow Status - Maint. Flow Volume (10)	5	7	3	3	3	3	3	3
Flow Status - Flashiness (10)	2	2	2	2	2	2	2	2
Channel Alteration (20)	13	10	12	9	8	10	14	14
Frequency of Riffles/Bends (20)	15	10	12	11	6	12	13	15
Riparian and Bank Structure								
Bank Stability (L) (10)	8	6	7	7	8	7	5	6
Bank Stability (R) (10)	8	5	5	6	7	7	6	7
Vegetative Protection (L) (10)	8	5	6	7	6	8	7	5
Vegetative Protection (R) (10)	8	5	6	6	7	7	7	6
Riparian Veg. Zone Width (L) (10)	4	8	10	10	10	10	10	10
Riparian Veg. Zone Width (R) (10)	4	6	6	6	6	6	6	6
TOTAL SCORE (200):	138	114	119	109	105	107	120	113
HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

HABITAT METRIC	PTL-48	PTL-49	PTL-50	PTL-51	PTL-52	PTL-53	PTL-54	PTL-55
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	7	6	8	12	9	11	4	7
Embeddedness (20)	10	13	14	14	16	8	11	16
Velocity/Depth Regime (20)	10	13	11	16	15	9	11	8
Channel Morphology								
Sediment Deposition (20)	12	12	15	16	16	10	12	16
Flow Status - Maint. Flow Volume (10)	3	3	3	3	3	3	3	3
Flow Status - Flashiness (10)	2	2	2	2	2	2	2	2
Channel Alteration (20)	14	14	14	12	12	12	11	12
Frequency of Riffles/Bends (20)	6	8	8	14	12	10	7	7
Riparian and Bank Structure								
Bank Stability (L) (10)	8	8	6	7	8	8	7	5
Bank Stability (R) (10)	8	7	7	5	6	6	7	6
Vegetative Protection (L) (10)	8	7	5	6	7	8	7	2
Vegetative Protection (R) (10)	8	7	6	6	4	6	7	2
Riparian Veg. Zone Width (L) (10)	10	10	10	10	8	6	7	7
Riparian Veg. Zone Width (R) (10)	10	10	8	7	10	10	10	10
TOTAL SCORE (200):	116	120	117	130	128	109	106	103
HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)

7.0 APPENDIX A – Photographs



Site PTL-40, looking downstream in July 2024



Site PTL-40, looking upstream in July 2024



Site PTL-41, looking downstream in July 2024



Site PTL-41, looking upstream in July 2024



Site PTL-42, looking downstream in July 2024



Site PTL-42, looking upstream in June 2024



Site PTL-42, looking upstream in July 2024



Site PTL-42, looking upstream in June 2024



Site PTL-43, looking downstream in July 2024



Site PTL-43 looking upstream in June 2024



Site PTL-43, looking upstream in July 2024



Site PTL-44, looking downstream in July 2024



Site PTL-44, looking upstream in July 2024



Site PTL-44, looking upstream in June 2024



Site PTL-45, looking downstream in July 2024



Site PTL-45, looking upstream in July 2024



Site PTL-46, looking downstream in July 2024



Site PTL-46 looking upstream in June 2024



Site PTL-46, looking upstream in July 2024



Site PTL-47, looking downstream in July 2024



Site PTL-47 looking upstream in June 2024



Site PTL-47, looking upstream in July 2024



Site PTL-48, looking downstream in July 2024



Site PTL-48 looking upstream in June 2024



Site PTL-48, looking upstream in July 2024



Site PTL-49 looking downstream in July 2024



Site PTL-49 looking upstream in June 2024



Site PTL-49 looking upstream in July 2024



Site PTL-50, looking upstream in June 2024



Site PTL-51 looking upstream in June 2024



Site PTL-52 looking upstream in June 2024



Site PTL-53 looking upstream in June 2024



Site PTL-54 looking upstream in June 2024



Site PTL-55 looking upstream in June 2024

8.0 APPENDIX B – Stream Survey Forms

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME Portal Creek	LOCATION (road crossing) PTL 4D
COUNTY/TOWNSHIP (ONTONAGON) / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd) 46.765642 LONG (dd) -89.561615	RIVER BASIN MINERAL R. NLR
STORET #	HUC CODE ECOREGION NLAF
INVESTIGATOR(S) AS, JG	DATE 6-6-24 TIME 630 (AM) PM
	REASON FOR SURVEY ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 54 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other M, N, WG

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs
- ☐ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 75 ft (right) 75 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☐ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Perched Culvert

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 15 ft Avg. Stream Depth 2 ft

Surface Velocity 0.5 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 1120 ft

Survey Reach Area 1,500 ft² High Water Mark 2 ft

Canopy Cover: 20 % Shaded

AQUATIC VEGETATION
- ☒ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 40 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☐ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	Trace
Boulder	>10"				
Cobble	2.5"-10"	10	Muck-Mud	black, very fine organic (FPOM)	Trace
Gravel	0.1"-2.5"	25			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	65			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 15 %
- ☐ Run 70 %
- ☑ Pool 15 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☐	☒
Aquatic macrophytes	☐	☒	☐	☐
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 40 (cont.)

SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Portal Creek	LOCATION (road crossing): DTL 41
COUNTY/TOWNSHIP: ONTONAGON / CARP	T 51N R 41W S 31
LAT(dd) 46.766602 LONG (dd) -89.561597	RIVER BASIN: MINERAL RIVER
STORET #	HUC CODE / ECOREGION: NLAE
INVESTIGATOR(S): AS JG	DATE 6-6-24 TIME 1930 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☐ Partly Cloudy ☒ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 54 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other MINING

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 500 ft (right) 300 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 7 ft Avg. Stream Depth 0.4 ft

Surface Velocity 1 ft/sec (at thalweg) Est. Flow cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 700 ft² High Water Mark 2 ft

Canopy Cover: 60 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 12 %

Nuisance aquatic plants or slimes present? ☐ Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken: ☒ None ☐ Other ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored ☐ Other

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	20
Boulder	>10"				
Cobble	2.5"-10"	5	Muck-Mud	black, very fine organic (FPOM)	15
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	85			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 20 %
- ☑ Run 75 %
- ☑ Pool 5 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 41 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME Postal Creek	LOCATION (road crossing) PTL 42
COUNTY/TOWNSHIP ONTONAGON / CARP	T 51N R 41W S 31
LAT(dd) 46.766060 LONG (dd) -89.561276	RIVER BASIN MINERAL RIVER
STORET #	HUC CODE ECOREGION NLAF
INVESTIGATOR(S) AS JG DATE 06-6-24 TIME 830 AM (PM)	REASON FOR SURVEY ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 55 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs
- ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 500 ft (right) 300 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.4 ft

Surface Velocity 2 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 80 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"	5	Muck-Mud	black, very fine organic (FPOM)	—
Gravel	0.1"-2.5"	15			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	80			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 20 %
- ☐ Run 70 %
- ☐ Pool 10 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 42 (Cont.)
SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: POSTAL CREEK	LOCATION (road crossing): PTL 43
COUNTY/TOWNSHIP: ONONAGON / CARP LAKE	T 51N R 41W S 31
LAT(dd): 46.766379 LONG (dd): -89.560991	RIVER BASIN: MINERAL RIVER
STORET #	HUC CODE / ECOREGION: NLDF
INVESTIGATOR(S): AS, JG	DATE: 6-6-21 TIME: 7:30 AM PM
	REASON FOR SURVEY: ☑ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 57 °F

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs
- ☐ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 500 ft (right) 300 ft

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.3 ft

Surface Velocity 1.5 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	- trace
Boulder	>10"	1			
Cobble	2.5"-10"	3	Muck-Mud	black, very fine organic (FPOM)	- trace
Gravel	0.1"-2.5"	26			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	70			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 25 %
- ☑ Run 75 %
- ☑ Pool 5 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☐	☒
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 43 (Cont.)

SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: POSTAL CREEK	LOCATION (road crossing): PTL 44
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd): 46.766379 LONG (dd): -89.560991	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAF
INVESTIGATOR(S): AS JG	DATE: 6-6-24 TIME: 6 30 AM (PM)
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 57 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 4 ft Avg. Stream Depth 0.3 ft

Surface Velocity 2 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 400 ft² High Water Mark 2 ft

Canopy Cover: 100 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	90			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 20 %
- ☐ Run 80 %
- ☐ Pool _____ %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☐	☒
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 44 (Cont.)

SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL 45
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd): 46.766942 LONG (dd): -89.560581	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAF
INVESTIGATOR(S): ASJG	DATE: 6-6-24 TIME: 5:28 AM (PM)
	REASON FOR SURVEY: ☑ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☐ Partly Cloudy ☒ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 58 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☑ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☑ Other MINING

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 4 ft Avg. Stream Depth 0.5 ft

Surface Velocity 2 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 400 ft² High Water Mark 2 ft

Canopy Cover: 90 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.8 °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	– trace
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	– trace
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	90			

Proportion of Reach Represented by Stream Morphology Types

- ☒ Riffle 45 %
- ☒ Run 50 %
- ☒ Pool 5 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 45 (Cont.)

SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME PORTAL CREEK	LOCATION (road crossing) PTL 46
COUNTY/TOWNSHIP CHIPPEWA / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd) 46.767464 LONG (dd) -89.560287	RIVER BASIN MINERAL RIVER
STORET #	HUC CODE ECOREGION NLAF
INVESTIGATOR(S) AS JG	DATE 6-6-24 TIME 430 AM (PM)
	REASON FOR SURVEY ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 60 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs
- ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.5 ft

Surface Velocity 1.5 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 170 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 90 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"				
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 20 %
- ☑ Run 60 %
- ☑ Pool 20 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☒	☐	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 46 (CONT.)

~~See~~ SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL 47
COUNTY/TOWNSHIP: CANONASIDON / CARP LAKE TWP	T: 51N R: 41W S: 31
LAT(dd): 46.768009 LONG (dd): -89.559980	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLF
INVESTIGATOR(S): AS, JG DATE: 6-6-24 TIME: 335 AM PM	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 60 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☐ Forest
- ☐ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☐ Other _____

Local Watershed NPS Pollution
- ☐ No evidence
- ☐ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☐ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs Species:
- ☐ Grasses ☒ Herbaceous

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.5 ft

Surface Velocity 2 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? ☐ Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"	1			
Cobble	2.5"-10"	3	Muck-Mud	black, very fine organic (FPOM)	trace
Gravel	0.1"-2.5"	35			
Sand	Gritty (course)	30	Other		
Silt	Gritty (fine)				
Clay	slick	36			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 50 %
- ☑ Run 50 %
- ☐ Pool _____ %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 47 (Cont)

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Portal Creek	LOCATION (road crossing): PTL 48
COUNTY/TOWNSHIP: Cattonagon/Cass Lake TWP	T 51 N R 41 W S 31
LAT(dd) 46.768383 LONG (dd) -89.559842	RIVER BASIN: Mineral River
STORET #	HUC CODE / ECOREGION: NLF
INVESTIGATOR(S): AS, JG	DATE 6-6-24 TIME 2:30 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☐ Partly Cloudy ☒ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 58 °F

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 500 ft (right) 500 ft

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other Mining

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other _____

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.8 ft

Surface Velocity 1 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 1170 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 85 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? ☐ Yes ☒ No

Dominant species present

WATER QUALITY

Temperature 19.8 °F

Water Samples Taken: ☒ None ☐ Other _____ ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored _____ ☐ Other _____

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other _____

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other _____ ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other _____

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	trace
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	trace
Gravel	0.1"-2.5"	20			
Sand	Gritty (course)	30	Other		
Silt	Gritty (fine)				
Clay	slick	50			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 20 %
- ☑ Run 65 %
- ☑ Pool 15 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☑	☐
Overhanging vegetation	☐	☐	☑	☐
Large woody debris	☐	☐	☑	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☑	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 48 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL 4/9
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd):	LONG (dd):
	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAP
INVESTIGATOR(S): AS, JG	DATE: 6-6-24 TIME: 1 30 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☒ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 57 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☐ Other

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.8 ft

Surface Velocity 1.5 ft/sec (at thalweg) Est. Flow cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 90 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken: ☒ None ☐ Other ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored ☐ Other

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	trace
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	trace
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	25	Other		
Silt	Gritty (fine)				
Clay	slick	70			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 10 %
- ☑ Run 80 %
- ☑ Pool 10 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 49 (Cont.)

SEE Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL SD
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T: 51N R: 41W S: 31
LAT(dd): 46.749155 LONG (dd): -89.559077	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLF
INVESTIGATOR(S): AS, JG	DATE: 6-6-24 TIME: 1230 AM (PM)
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☒ Partly Cloudy ☐ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 56 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☒ Other MINE

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☒ Grasses ☒ Herbaceous Species:

Estimate buffer width (left) 500 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.7 ft

Surface Velocity 1.5 ft/sec (at thalweg) Est. Flow cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 90 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.8 °F

Water Samples Taken: ☒ None ☐ Other ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored ☐ Other

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"	5	Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	20			
Sand	Gritty (course)	20	Other		
Silt	Gritty (fine)				
Clay	slick	55			

Proportion of Reach Represented by Stream Morphology Types

- ☒ Riffle 10 %
- ☒ Run 80 %
- ☒ Pool 10 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

P.T.L 50 (Cont.)

SEE SITE Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL 51
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd) 46.769461 LONG (dd) -89.558727	RIVER BASIN: MINERAL RIVER
STORET #	HUC CODE / ECOREGION: NLAT
INVESTIGATOR(S): AS, JG	DATE: 6-6-24 TIME: 1130 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current: ☐ Sunny ☐ Partly Cloudy ☒ Cloudy ☐ Rainy

Has there been a significant rain in the last 7 days? ☒ Yes ☐ No ☐ Don't Know

Air Temperature 57 °F

WATERSHED FEATURES

Predominant Surrounding Land Use: ☒ Forest ☐ Commercial ☒ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential ☑ Other MINING

Local Watershed NPS Pollution: ☐ No evidence ☒ Some potential sources ☐ Obvious Sources

Local Watershed Erosion: ☐ None ☒ Moderate ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

☒ Trees ☒ Shrubs ☐ Grasses ☑ Herbaceous Species:

Estimate buffer width (left) 100 ft (right) 500 ft

STREAM CHARACTERIZATION

Stream Subsystem: ☐ Perennial ☒ Intermittent ☐ Lake Outlet Influenced ☐ Dam Influenced

Stream Origin: ☐ Spring Fed ☐ Lake/Pond ☐ Swamp, Marsh, Bog ☒ Mixture of origins ☐ Other

Stream Modifications: ☐ None ☒ Dredged ☐ Canopy Removal ☐ Snagging ☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement

Stream Type: ☐ Coldwater ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.7 ft

Surface Velocity 1 ft/sec (at thalweg) Est. Flow cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION

☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating algae ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken: ☒ None ☐ Other ☐ GA ☐ GN ☐ MA ☐ MN ☐ VOA ☐ ON

Solids, Turbidity: ☐ Clear ☒ Slightly turbid ☐ Turbid ☐ Floating solids ☐ Suspended solids ☐ Settleable solids ☐ Foams

Color: ☐ Clear ☒ Stained ☐ Opaque ☐ Colored ☐ Other

Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Flecks ☐ Slick ☐ Other

Water Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other

SEDIMENT

Sediment Samples Taken: ☒ None ☐ Other ☐ MS ☐ GS ☐ VOA ☐ OS/BNA

Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors: ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other

Deposits: ☒ None ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	20	Other		
Silt	Gritty (fine)				
Clay	slick	70			

Proportion of Reach Represented by Stream Morphology Types

- ☒ Riffle 30 %
- ☒ Run 60 %
- ☒ Pool 10 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 51 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: TORSAL CREEK	LOCATION (road crossing): PTL 52
COUNTY/TOWNSHIP: ONTONAGON / CARP LAKE TWP	T 51N R 41W S 31
LAT(dd): 46.76983 LONG (dd): -89.55838	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAF
INVESTIGATOR(S): AS JG	DATE: 6-6-24 TIME: 10:30 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 56 °F

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☐ Shrubs
- ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 500 ft (right) 100 ft

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☒ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 0.9 ft

Surface Velocity 1 ft/sec Est. Flow _____ cfs (at thalweg)

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☑

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☑ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"	3	Muck-Mud	black, very fine organic (FPOM)	trace
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	20	Other		
Silt	Gritty (fine)				
Clay	slick	67			

Proportion of Reach Represented by Stream Morphology Types

- ☒ Riffle 10 %
- ☒ Run 80 %
- ☒ Pool 10 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☐	☒
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 52 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: Portal Creek	LOCATION (road crossing): PTL53
COUNTY/TOWNSHIP: [illegible]/CARP LAKE Twp	T 51N R 41W S 31
LAT(dd): 46.770875 LONG (dd): -89.558116	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLDF
INVESTIGATOR(S): AS, JG DATE: 6-6-24 TIME: 9:30 AM PM	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 56 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☒ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINING

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☐ Shrubs
- ☒ Grasses ☒ Herbaceous

Species:

Estimate buffer width (left) 250 ft (right) 100 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 6 ft Avg. Stream Depth 1.5 ft

Surface Velocity 1 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 600 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present _____

WATER QUALITY

Temperature 19.8 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	10
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	Trace
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	15	Other		
Silt	Gritty (fine)				
Clay	slick	80			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 10 %
- ☑ Run 70 %
- ☑ Pool 20 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 53 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL SH
COUNTY/TOWNSHIP: DOUGLAS/CARLAKE THP	T 51N R 41W S 31
LAT(dd): 46.771440 LONG (dd): -89.557808	RIVER BASIN: MINERAL RIVER
STORET #:	HUC CODE: ECOREGION: NLAF
INVESTIGATOR(S): AS, JG DATE: 6-6-24 TIME: 8 30 (AM) PM	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☑ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 54 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☒ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other NONE

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs ☐ Grasses ☐ Herbaceous

Species:

Estimate buffer width (left) 250 ft (right) 75 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other _____

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 7 ft Avg. Stream Depth .5 ft

Surface Velocity 0.75 ft/sec (at thalweg) Est. Flow _____ cfs

Est. Survey Reach Length 100 ft

Survey Reach Area 700 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other _____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored _____
- ☐ Other _____

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other _____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other _____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other _____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☒ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other _____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other _____

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	10	Other		
Silt	Gritty (fine)				
Clay	slick	85			

Proportion of Reach Represented by Stream Morphology Types

- ☑ Riffle 5 %
- ☑ Run 20 %
- ☑ Pool 75 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 54 (Cont.)

See Site Photos

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: PORTAL CREEK	LOCATION (road crossing): PTL 55
COUNTY/TOWNSHIP: DOUGLAS / CARR LAKE THP.	T 51N R 41W S 31
LAT(dd) 46.770812 LONG (dd) -89.557644	RIVER BASIN: MINERAL RIVER
STORET #	HUC CODE / ECOREGION: NLAF
INVESTIGATOR(S): AS, JG	DATE: 6-6-24 TIME: 7:30 AM PM
	REASON FOR SURVEY: ☒ Targeted: comment ☐ Randomized: VSEC # VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☐ Sunny
- ☐ Partly Cloudy
- ☒ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 58 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☒ Forest
- ☐ Commercial
- ☒ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☐ Residential
- ☒ Other MINE

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☐ Trees ☐ Shrubs
- ☐ Grasses ☐ Herbaceous

Species:

Estimate buffer width (left) 170 ft (right) 200 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☐ Perennial
- ☒ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other

Stream Modifications
- ☐ None
- ☒ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☒ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 8 ft Avg. Stream Depth 1.5 ft

Surface Velocity 1 ft/sec (at thalweg) Est. Flow cfs

Est. Survey Reach Length 170 ft

Survey Reach Area 800 ft² High Water Mark 2 ft

Canopy Cover: 95 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 19.7 °F

Water Samples Taken
- ☒ None ☐ Other
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☒ Slightly turbid
- ☐ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☒ Stained
- ☐ Opaque
- ☐ Colored
- ☐ Other

Surface Oils
- ☒ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☐ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	ID
Boulder	>10"				
Cobble	2.5"-10"	5	Muck-Mud	black, very fine organic (FPOM)	Trace
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)		Other		
Silt	Gritty (fine)				
Clay	slick	90			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle_____%
- ☒ Run 100 %
- ☐ Pool_____%
- ☐ Depositional_____%

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☐	☒	☐
Large woody debris	☐	☒	☐	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PTL 55 (Cont.)

See Site Photos

Appendix C – Email Communication Record with MDNR Fisheries Biologist

From: Aaron Snell
To: Caroffino, David (DNR)
Cc: Doug Workman
Subject: Re: Mussel survey, White Pine Copper

Hi Dave,
Just wanted to update you on our field work. I ended up finding live mussels in four streams in and around the White Copper site; Mineral River (M-64 site upstream of WPC); Perch Creek (WPC site); Pine Creek (WPC) and; Duck Creek (NE of WPC). I found both cylindrical papershell and giant floater, which you probably know are very common species. Very low mussel densities in Mineral, Pine and Duck and the habitat is not ideal since there is so much bedrock, boulder and cobble - a few mussels were tucked into "softer" substrates in a few nooks and crannies. In Perch Creek though, density was a bit higher. Mussels occupied the clay banks in the stream and beaver ponds. No evidence of mussels in any of the lakes/ponds.

I will be preparing a final report in the next 90 days. If you have any questions or would like additional detail in the meantime, please let me know.

Aaron

Aaron Snell
StreamsideEco
(616) 238-7372
www.streamsideeco.com

From: Caroffino, David (DNR) <CAROFFINOD@michigan.gov>
Sent: Wednesday, May 8, 2024 4:47 PM
To: Aaron Snell <snell@streamsideeco.com>
Cc: Doug Workman <workman@streamsideeco.com>
Subject: RE: Mussel survey, White Pine Copper

Hi Aaron,

Thanks for the notification. All sounds good, and I look forward to hearing your results. Reach out if you need anything.

Dave

Dave Caroffino

Michigan Department of Natural Resources
Lake Superior Basin Coordinator
Fisheries Division Tribal Liaison
(231) 350-8654 – Cell
caroffinod@michigan.gov

From: Aaron Snell <snell@streamsideeco.com>
Sent: Wednesday, May 8, 2024 3:23 PM
To: Caroffino, David (DNR) <CAROFFINOD@michigan.gov>
Cc: Doug Workman <workman@streamsideeco.com>
Subject: Mussel survey, White Pine Copper

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Hi Dave,
Our firm has been hired to complete baseline aquatic surveys at the White Pine Copper site in Ontonagon County. As part of that work, we will be looking for any evidence of native mussels. I have received my 2024 Scientific Collector's Permit for the site. I am looking to get your approval on a mussel survey plan, which I attached here. Based upon our initial site surveys, I don't think we will find any mussels but we do need to complete the "Reconnaissance" survey as part of our contract. The map I attached for the project area is very vague but our search will be driven by accessibility, presence of water, property ownership, beaver dams, etc. and it is difficult to pin down exact locations where we will be working. Most of the work will be done on White Pine Copper property, but also possibly, with permission, on private property.
Thanks,
Aaron

Aaron Snell
StreamsideEco
(616) 238-7372
www.streamsideeco.com

Appendix D – Michigan Natural Features Ontonagon County Element Occurrence Data

Michigan Natural Features Ontonagon County 2024 Element Data

Scientific Name	Common Name	Federal Status	State Status	Occurrences in County	Last Observed in County
Coregonus artedi	Lake herring or Cisco		T	5	2017
Coregonus kiyi	Kiyi		SC	2	2000
Coregonus zenithicus	Shortjaw cisco		E	1	1999
Cottus ricei	Spoonhead sculpin		SC	1	2001
Glyptemys insculpta	Wood turtle		T	25	2024
Lasmigona compressa	Creek heelsplitter		SC	1	2018
Necturus maculosus	Mudpuppy		SC	2	2013
Notropis dorsalis	Bigmouth shiner		T	1	2007

F-2

2025 Additional Pond Surveys Memorandum

Memo

AEM | ADVANCED ECOLOGICAL MANAGEMENT

To: White Pine Copper, LLC
From: Doug Workman, PhD
Date: December 15, 2025
Re: 2025 Additional Pond Surveys

Advanced Ecological Management, LLC (AEM) conducted an aquatic survey of each pond within the northern vicinity of the White Pine Copper, LLC (WPC) White Pine North Project site on July 18, 2025 (Figure 1). In July 2024, AEM completed a baseline aquatic survey that included fish and macroinvertebrate surveys, water quality, and general characteristics of seven streams and ten ponds within the greater Project area. The ten pond locations assessed in 2024 were selected based on spatial distribution and similar physical characteristics which were representative of the other ponds within the northern vicinity of the Project area. Data and information from all ponds located within this area were not included in the 2024 report; therefore, the purpose of this survey was to document baseline water quality information and general characteristics of all pond locations within the northern extent of the White Pine North Project site.

AEM identified and navigated to ponds using aerial imagery and GPS. At each pond, spatial coordinates for the sample point were logged using a handheld GPS (Table 1). A photo was also taken at each sample point, and the direction of the photo was recorded. General pond observations such as surrounding vegetation, substrate composition, and connectivity to other nearby pond systems were also noted for each sample location. Water temperature, dissolved oxygen, pH, and conductivity were measured at the sample point of each pond using a Yellow Springs Instrument Model YSI Professional Series water quality meter.

Many of the ponds contained similar vegetation (Table 1) including narrow leaf cattails (*Typha angustifolia*), sandbar willow (*Salix interior*), American pussy willow (*Salix discolor*), common rush (*Juncus effusus*), reed canary grass (*Phalaris arundinacea*), water shield (*Brasenia schreberi*), fowl manna grass (*Glyceria striata*), green bulrush (*Scirpus atrovirens*), and Eleocharis species (*Eleocharis spp.*). Common vegetation within the substrate of the ponds included Eurasian milfoil (*Myriophyllum spicatum*), sago pondweed (*Stuckenia pectinata*), coontail (*Ceratophyllum demersum*), and Illinois pond weed (*Potamogeton illinoensis*). Water quality varied among ponds. The water temperature ranged from 18.2°C to 21.9°C, conductivity ranged from 40.4 µSiemens/cm to 1,261.0 µSiemens/cm, and dissolved oxygen ranged from 2.66 mg O_2/L to 10.39 mg O_2/L. The percent dissolved oxygen ranged from 30.4 to 115.1 and the pH ranged from 6.95 to 9.12 (Table 2). Although no fish were surveyed as part of this assessment, brook stickleback (*Culaea inconstans*), northern redbelly dace (*Chrosomus eos*), and fathead minnows (*Pimephales promelas*) were observed in water along the shoreline of some of the ponds. The fish species found in these ponds were consistent with some of the species found in the ponds that were surveyed by AEM in 2024. There were also various waterfowl species observed within the pond including duck and heron species. Additionally, there was evidence of deer, bear, and coyote traffic surrounding the ponds and areas directly adjacent to the ponds.

Ponds 2-5 and 11 are all hydrologically connected, and part of the White Pine Copper water management system regulated under NPDES Permit MI0006114. As part of the water management system, water is discharged through the North Dam 2 spillway into the perimeter ditch that drains to the west along the northern toe of North Dam 2. The water then flows north, under the perimeter road, through a culvert

and is routed through a series of five connected stilling ponds. The clarified water is discharged through Outfall 001 into Perch Creek, from Pond 2, under the NPDES Permit (Figure 2). The average water temperature among these ponds was 20.0°C, the average conductivity was 641 µSiemens/cm, the average dissolved oxygen was 6.8 mg O_2/L, the average percent dissolved oxygen was 76.3, and the average pH was 7.6 (Table 2).

The average of the water quality parameters was calculated for the water quality data among all ponds, excluding Ponds 2-5 and 11, which are part of the water management system, and Pond 10, which had the highest conductivity reading among all ponds surveyed. The average water temperature was 20.8°C, the average conductivity was 268.1 µSiemens/cm, the average dissolved oxygen was 7.6 mg O_2/L, the average percent dissolved oxygen was 84.9, and the average pH was 7.9 (Table 2). Excluding the conductivity of Pond 10, all other water quality parameters for that pond were consistent with the other ponds not connected to the White Pine Copper water management system.

The results of the 2025 pond survey show that the water quality varies between the ponds that are part of the water management system and those that are outside the system with the average conductivity being higher and average dissolved oxygen lower in the ponds that are part of the water management system. This survey also documents that the ponds selected in 2024 for fish and macroinvertebrate assessments encompassed the full range of water quality observed across all ponds within the northern vicinity of the Project area and provide a good representation of the fish and macroinvertebrate species found in the ponds in this area.

Table 1. Pond locations, general observation notes, and indication of the ponds being part of the runoff management system.

Pond ID	Part of the Runoff Management System? (Yes/No)	Latitude/Longitude	Notes
1	No	46.803652, -89.552026	• Cattail fringe surrounding the pond • Substrate included chara, sago pond weed, coon tail
2	Yes	46.804132, -89.550285	• Cattail fringe surrounding the pond
3	Yes	46.803266, -89.549122	• Cattail fringe surrounding the pond
4	Yes	46.803653, -89.547158	• Vegetation surrounding the pond included sandbar willow, narrow leaf cattail, reed canary grass, and common rush (*Juncus effusus*) • Substrate included sago pond weed and Eurasian milfoil
5	Yes	46.804191, -89.543406	• Cattail fringe surrounding the pond
6	No	46.806033, -89.551455	• Pond surrounded by a bulrush fringe and contained some cattails • Appears to be connected to Pond 7 and Pond 8 through a ditch/channel during high water events
7	No	46.805523, -89.553574	• Fringe of pond contained a mix of cattails and some shrubby/wooded shoreline

Table 1. Pond locations, general observation notes, and indication of the ponds being part of the runoff management system (continued).

Pond ID	Part of the Runoff Management System? (Yes/No)	Latitude/Longitude	Notes
8	No	46.80596, -89.5544	• Pond surrounded by a bulrush fringe and contained some cattails
9	No	46.806545, -89.52698	• Pond was surrounded by a cattail fringe that also contained water shield and *Eleocharis spp.*
10	No	46.809724, -89.512121	• Cattail fringe surrounding the pond
11	Yes	46.804683, -89.539721	• Cattail fringe surrounding the pond • The substrate was heavily vegetated with sago pond weed • Appears to be connected to the Pond 5 system in the northwestern corner of Pond 11
12	No	46.805199, -89.537741	• Pond was surrounded with a fringe composed of cattails and Illinois pond weed
13	No	46.806524, -89.538659	• Pond was surrounded with a fringe composed of cattails and water shield
14	No	46.807345, -89.539351	• Pond was shallow and had a cattail fringe
15	No	46.806107, -89.541671	• Pond was shallow

Table 1. Pond locations, general observation notes, and indication of the ponds being part of the runoff management system (continued).

Pond ID	Part of the Runoff Management System? (Yes/No)	Latitude/Longitude	Notes
16	No	46.806784, -89.544212	• Cattail fringe surrounding the pond with some islands of cattails present in the middle of the pond
17	No	46.806965, -89.536703	• Pond was shallow and had a fringe composed of cattails and water shield
18	No	46.808675, -89.534116	• Pond was surrounded by a fringe containing *Eleocharis spp.,* cattails, and American pussy willow (*Salix discolor*)
19	No	46.806707, -89.530649	• Shallow pond surrounded by a cattail fringe that also contained fowl manna grass, water shield, and green bulrush (*Scirpus atrovirens*)
20	No	46.809988, -89.524726	• Large pond containing multiple basins that was surrounded by a cattail fringe
21	No	46.812028, -89.520479	• Pond surrounded by cattail fringe • The east pond is also connected to the pond located just west
22	No	46.812836, -89.522057	• Shallow pond surrounded by a fringe containing water shield and cattails

Table 1. Pond locations, general observation notes, and indication of the ponds being part of the runoff management system (continued).

Pond ID	Part of the Runoff Management System? (Yes/No)	Latitude/Longitude	Notes
23	No	46.810574, -89.511643	• Pond was surrounded by a fringe containing water shield, cattails, *Eleocharis spp.,* and green bulrush
24	No	46.812932, -89.509924	• Pond was surrounded by a cattail fringe • Substrate contained Eurasian milfoil
25	No	46.81066, -89.513972	• Pond was surrounded by a cattail fringe
26	No	46.813905, -89.52227	• The northern bank has no cattail fringe, but the rest of the pond is surrounded by a cattail fringe
27	No	46.80777, -89.501766	• Shallow pond surrounded by a cattail fringe
28	No	46.802328, -89.556034	• Pond is surrounded by a bulrush fringe containing some cattails
29	No	46.802084, -89.556441	• Pond is surrounded by a bulrush fringe containing some cattails

Table 2. Pond water quality data.

Pond ID	Time	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg O_2/L)	% Dissolved Oxygen	pH
1	10:25	21.3	140.2	7.3	83.0	8.4
2	10:30	21.3	656.0	8.7	98.7	7.8
3	10:39	20.7	694.0	7.2	80.7	7.7
4	10:40	19.5	654.0	8.8	96.2	7.6
5	10:54	19.1	579.0	6.5	73.8	7.7
6	9:56	20.5	166.4	8.3	92.8	8.2
7	10:11	21.2	146.2	7.2	81.5	7.8
8	10:16	18.7	171.1	6.0	64.1	7.6
9	13:06	20.6	224.2	6.4	71.5	7.0
10	14:14	20.0	1,261.0	10.4	115.1	7.4
11	11:08	19.2	622.0	2.9	32.0	7.0
12	11:14	21.6	134.8	7.6	86.4	7.9
13	11:21	21.6	158.8	8.5	96.2	7.7
14	11:28	21.9	254.6	7.8	91.5	8.1
15	11:49	21.9	113.5	8.8	99.0	8.7
16	11:50	21.5	286.7	7.3	82.2	7.9
17	12:07	17.5	258.9	9.7	99.6	7.3
18	12:19	21.9	58.5	6.1	73.7	7.7
19	12:58	18.2	40.4	5.6	59.3	7.0
20	13:18	21.7	249.8	8.6	98.0	7.5
21	13:43	21.1	402.8	6.7	73.8	7.6
22	13:50	21.2	275.6	2.7	30.4	7.4
23	14:19	21.4	791.0	9.3	107.3	8.1
24	14:27	21.6	299.5	9.3	107.4	8.1
25	14:45	20.5	719.0	7.0	78.2	7.6
26	15:00	21.4	551.0	4.5	52.0	7.7
27	15:10	18.2	456.0	10.8	114.1	7.8
28	15:34	21.6	128.3	9.6	110.5	9.1
29	15:38	21.7	139.0	9.0	100.0	8.8

°C = degrees Celsius
µS/cm = micro Siemens per centimeter
mg O_2/L = milligrams of oxygen per liter

Pond Photos



Pond 1. View to the west.



Pond 2. View to the southwest.



Pond 3. View to the north.



Pond 4. View to the northeast.



Pond 5. View to the north. Photo was taken from the channel and not the actual pond basin due to the pond being inaccessible.



Pond 6. View to the north.



Pond 7. View to the north.



Pond 8. View to the north.



Pond 9. View to the north.



Pond 10. View to the north.



Pond 11. View to the north.



Pond 12. View to the northeast.



Pond 13. View to the northwest.



Pond 14. View to the west.



Pond 15. View to the west.



Pond 16. View to the northeast.



Pond 17. View to the south.



Pond 18. View to the southwest.



Pond 19. View to the southeast.



Pond 20. View to the east. Photo also shows the connection between the basins.



Pond 21. View to the west.



Pond 22. View to the northwest.



Pond 23. View to the northwest.



Pond 24. View to the north.



Pond 25. View to the north.



Pond 26. View to the northwest.



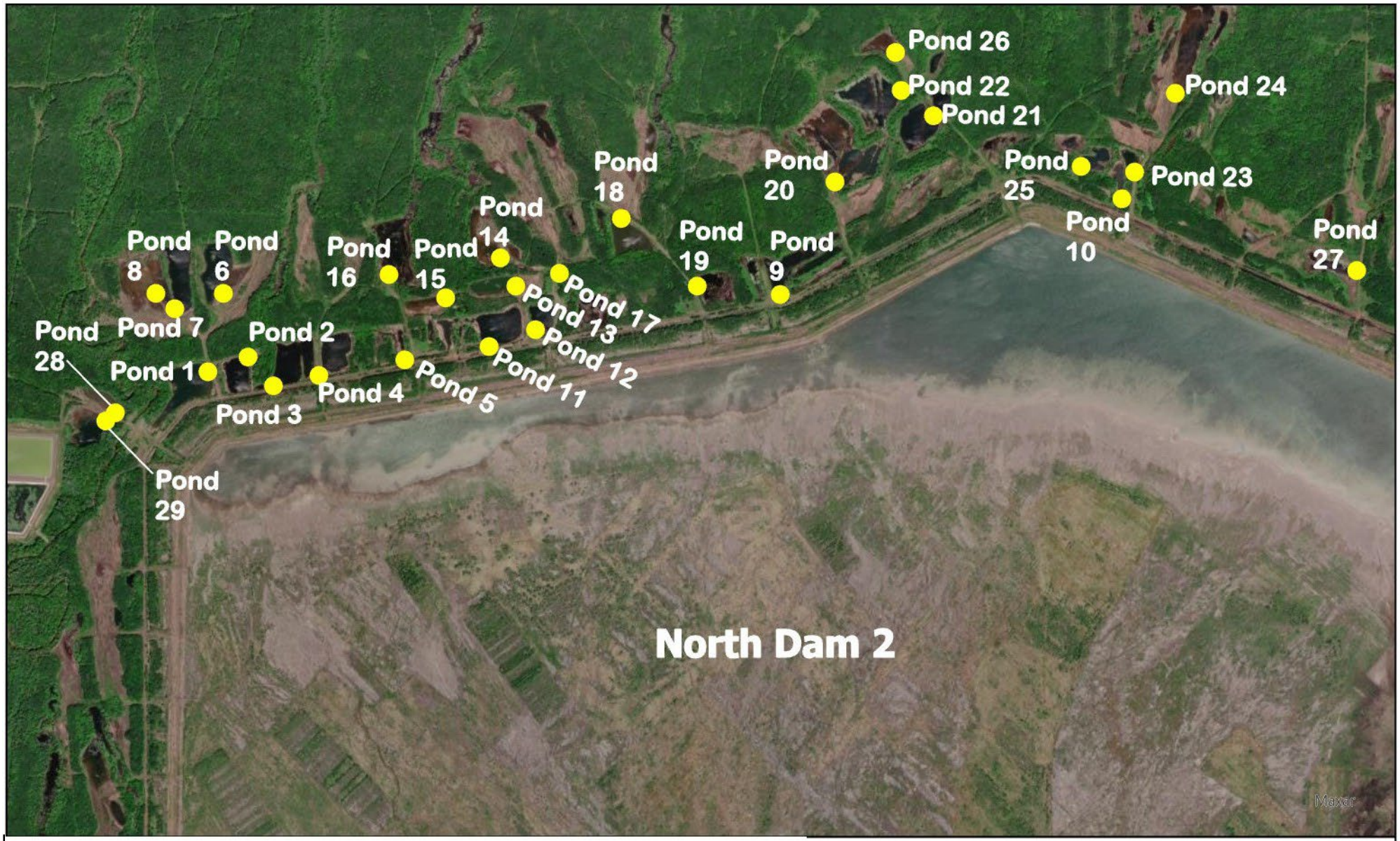
Pond 27. View to the west.



Pond 28. View to the west.



Pond 29. View to the southwest.



Legend

Pond Sample Locations

N

A

0 0.13 0.25 0.5 0.75 1 Miles

AeM ADVANCED ECOLOGICAL MANAGEMENT

Figure 1. Pond Sample Locations
White Pine North
White Pine Copper, LLC

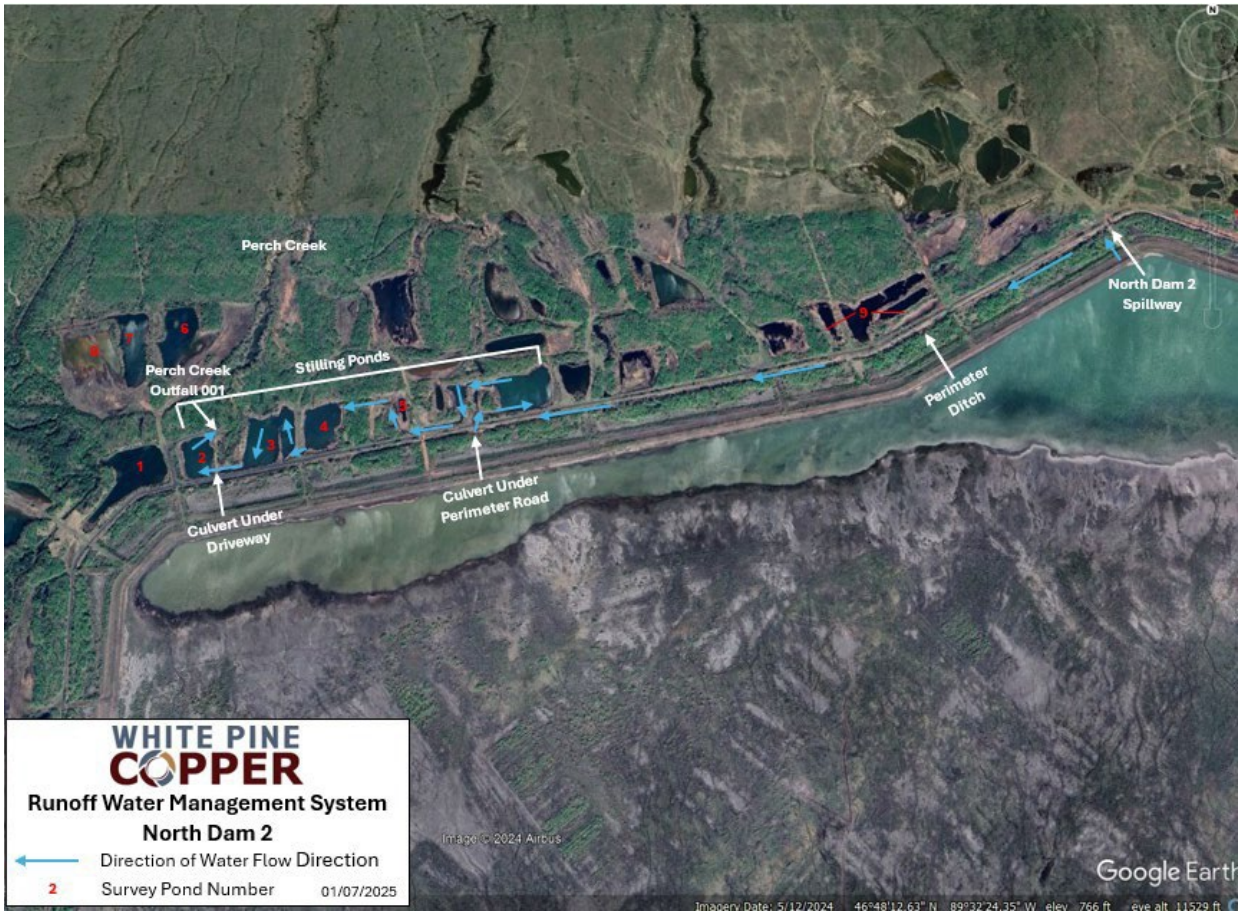


Figure 2. White Pine Copper, LLC Water Management System.

F-3

Mussels Found in Perch Creek and Mineral River Memorandum

AeM | ADVANCED ECOLOGICAL MANAGEMENT

To: Amanda Zeidler

From: Doug Workman, PhD

Date: April 29, 2026

RE: Mussels found in Perch Creek and Mineral River

Ms. Zeidler:

Per our conversation, you indicated the White Pine North project is working through NPDES permitting for your water treatment plant discharge, which includes developing specific chloride limits that are based on the absence of chloride sensitive mussel species in Perch Creek and the Mineral River.

In accordance with the permitting process, the Michigan Department of Environment, Great Lakes & Energy (EGLE) has requested information about aquatic surveys of Perch Creek and the Mineral River that would inform their review process. In addition, Kathy Hall (LimnoTech) has provided the following list of mussel species that represents the most sensitive species in the toxicity data set that EGLE used to develop the chloride criteria:

Scientific Name	**Common Name**
Epioblasma torulosa rangiana	Northern riffleshell
Sphaerium tenue	Arctic fingernail clam
Sphaerium simile	Grooved fingernail clam
Lampsilis siliquoidea	Fatmucket
Lampsilis fasciola	Wavy-rayed lampmussel
Lampsilis cardium	Plain pocketbook
Ligumia recta	Black sandshell
Amblema plicata	Three ridge

The purpose of this memorandum is to describe the mussel communities that were surveyed by Advanced Ecological Management, LLC (AEM) and Streamside Eco, LLC during a 2024 aquatic survey of Perch Creek and the Mineral River, which included “Reconnaissance” surveys (Hanshue et al. 2021) that were conducted in two 300-foot-long reaches in the Mineral River and one 300-foot-long reach in Perch Creek (Figure 1).

The reconnaissance surveys were conducted in the Mineral River and Perch Creek on the White Pine North Project site on July 8, 2024 (Min 1 and Perch on Figure 1) and another reconnaissance survey was conducted in the Mineral River upstream of the White Pine North Project site on July 10, 2024 (Min 2 on Figure 1). The cylindrical papershell (*Anodontoides ferussacianus*) was identified within the Perch Creek sample station on the White Pine North Project site and in the Mineral River sample station located upstream of the White Pine North Project site. No freshwater mussels were observed in the Mineral River sample station located on the White Pine North Project site. Three *Sphaerium* sp. were also collected at the Min 2 location but were not identified to species. No other freshwater mussels were observed in these sample stations.

Perch Creek

Approximately three dozen live cylindrical papershell mussels were found in the clay substrate at the downstream extent of the Perch Creek sample station. The downstream extent of the sample station was comprised of a mix of clay and silt, and a mix of gravel, cobble, and small boulders. No mussels were observed in the upstream extent of the sample station, where the substate was predominantly comprised of mostly gravel, cobble, and some sand.



Perch Creek. Downstream extent view facing upstream (south)



Perch Creek. Upstream extent facing downstream (north)

Mineral River (Min 1)

The substrate of the Min1 sample station located in the Mineral River was predominantly bedrock and large boulders, with a mix of some sand and gravel in the downstream extent. The upstream extent and was predominantly bedrock, with more sand and gravel compared to the downstream extent and also had boulders present.



Mineral River (Min1). Downstream extent facing upstream (west).


Mineral River (Min1). Upstream extent facing downstream (east).

Mineral River (Min 2)

Several cylindrical papershell mussels were found in low density throughout the sample station Min2, which is situated upstream of the White Pine North project site. The substrate of the sample station was largely bedrock with a mix of cobble, small boulders, and some sand. Soft sediment where the mussels could successfully embed within the substrate was limited within the Min2 sample station.



Mineral River (Min 2). Downstream extent facing upstream (east)



Mineral River (Min 2) Upstream extent facing downstream (west)

The Michigan Natural Features Inventory's Michigan Mussels App was also reviewed as part of this memo preparation. Consistent with our survey findings, the Michigan Mussels App indicated no rare mussels have been reported within the Mineral River-Frontal Lake Superior watershed boundary (HUC10), which includes both the Mineral River and Perch Creek. The common mussel that has been reported within this area is the giant floater (*Pyganodon grandis*), which was not observed in the Mineral River or Perch Creek sample stations.

None of the most sensitive species in the toxicity data set that EGLE used to develop the chloride criteria were observed in the Mineral River or Perch Creek on the White Pine North project site. Three Sphaerium mussels were observed in the Mineral River upstream of the project site but were not identified to the species level.

According to the Michigan Natural Features Inventory (MNFI) Michigan Listed Mussels database, the northern riffleshell has not been observed in the Upper Peninsula and the northern-most recorded observation was in Bay County, Michigan. The northern riffleshell requires swiftly moving, well oxygenated water and prefers riffle and run areas with fine to coarse gravel (Carman and Goforth 2000). The riffle and run areas in the Mineral River are predominantly comprised of bedrock and boulders, with little potential habitat for the northern riffleshell. Similarly, the riffle areas on Perch Creek did not offer abundant areas of fine to coarse gravel.

According to the MNFI Michigan Mussels App, fatmucket mussels (*Lampsilis siliquoidea*) are considered common in the nearby Ontonagon River. However, none were found in the Mineral River or Perch Creek.

According to the MNFI Michigan Listed Mussels database, the wavyrayed lampmussel (*Lampsilis fasciola*) has not been observed in the Upper Peninsula and the northern-most recorded observation was in Leelanau County, Michigan. The wavyrayed lampmussel occurs in small-medium sized shallow streams, in and near riffles, with a substrate preference for sand and/or gravel. The riffles of the Mineral River are predominantly comprised of bedrock and boulders, with little potential habitat for the wavyrayed lampmussel.

According to the MNFI Michigan Mussels App, the plain pocketbook (*Lampsilis cardium*) has been observed in Upper Peninsula rivers. However, there does not appear to be any observations of this mussel near streams near the Mineral River or Perch Creek. In addition, none were observed in the Mineral River or Perch Creek.

According to the MNFI Michigan Listed Mussels database, the black sandshell (*Ligumia recta*) has not been observed in Ontonagon County but has been observed in numerous locations throughout the Upper and Lower Peninsulas of Michigan. The Mineral River is unlikely to provide adequate habitat for the black sandshell, as most of the strong current areas that the black sandshell prefers for habitat contain a predominance of boulders and bedrock, which is not listed as suitable for this species (Branch 2025).

According to the MNFI Michigan Mussels App, the threeridge (*Amblema plicata*) has been observed in Upper Peninsula rivers. However, there does not appear to be any observations of this mussel near streams near the Mineral River or Perch Creek. In addition, none were observed in the Mineral River or Perch Creek.

References

Branch, E.C. 2025. Special animal abstract for *Ligumia recta* (black sandshell). Michigan Natural Features Inventory, Lansing, MI.

Carman, S. and R. R. Goforth. 2000. Special animal abstract for *Epioblasma torulosa rangiana* (northern riffleshell mussel). Michigan Natural Features Inventory, Lansing, MI.

Hanshue, S., J. Rathbun, P. Badra., J. Battaso, B . H osler, J . P ruden, J . G rabarkiewicz. 2021. Michigan Freshwater Mussel Survey Protocols and Relocation procedures for Rivers and Streams, Version 3. Michigan Mussel Committee, Lansing, Michigan.

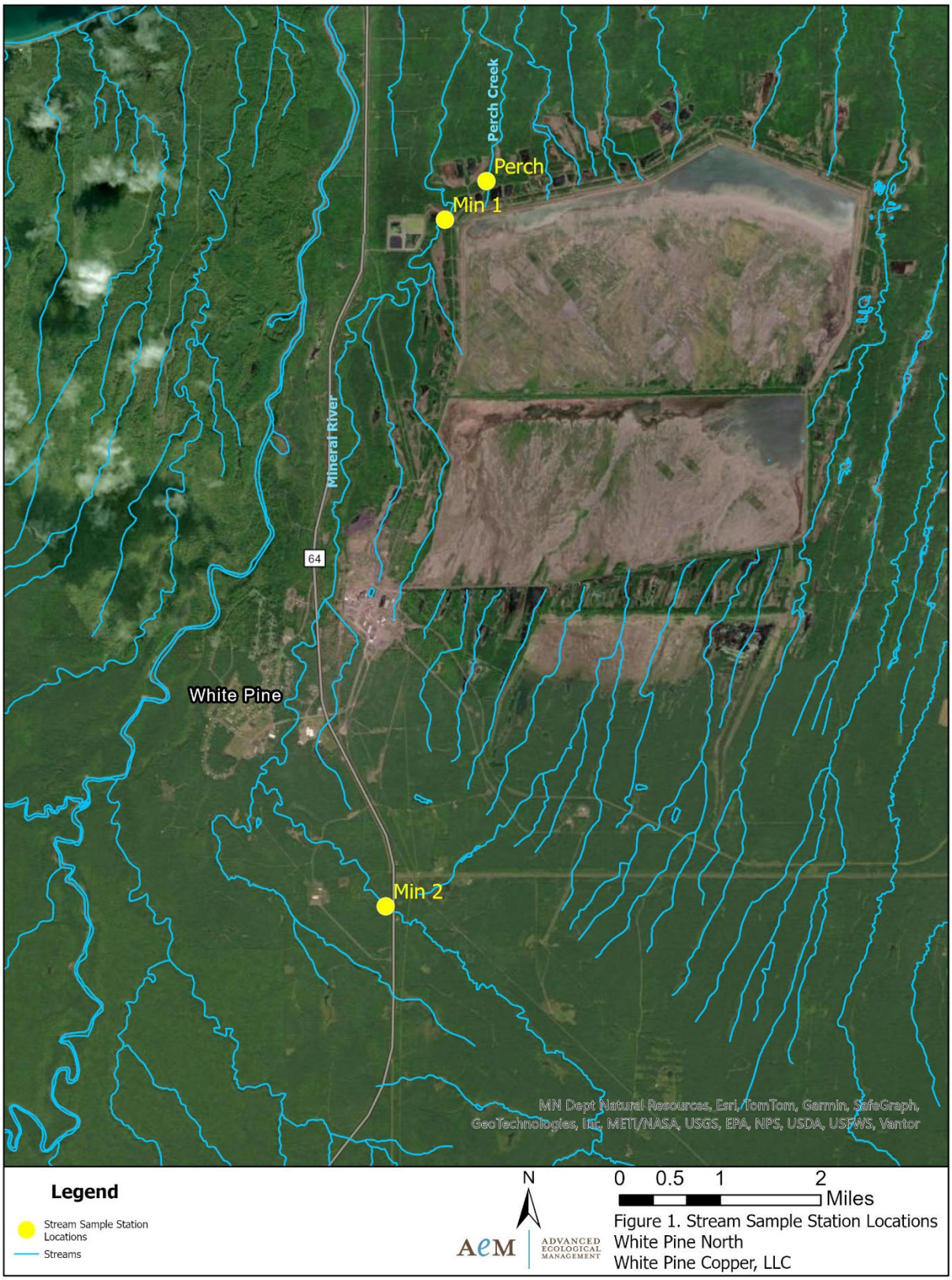


Figure 1. Stream Sample Station Locations
White Pine North
White Pine Copper, LLC

F-4

Rare Plant Species Surveys, Natural Community and Land Cover Mapping Report

Rare Plant Species Surveys, Natural Community and Land Cover Mapping Report

White Pine North Project
Carp Lake Township
Ontonagon County, Michigan

Prepared for:

White Pine Copper LLC.
P.O Box 338
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Prepared by:

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Stantec Project #:193710518

March 19, 2025

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1.0 INTRODUCTION

White Pine Copper LLC (WPC) retained Stantec Consulting Services Inc. (Stantec) to conduct a baseline study to evaluate the existing land cover types, natural communities, and probable presence/absence of federally or State-listed threatened, endangered, and special concern (TES) species within the proposed above ground facilities of the White Pine North Project (WPN Proposed Project).

WPC is a joint venture between Kinterra Copper USA LLC (66 percent ownership) and Highland Copper Corporation (34 percent ownership). WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Figure 1, Appendix A). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam (Figure 2, Appendix A). Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

2.0 VEGETATION ASSESSMENTS

The scope for Stantec's investigation included both desktop review and field surveys. The desktop review scope included the Proposed Surface Footprint, Proposed Transmission Line Corridor, Proposed Railroad Corridor, and Potential Tailings Dam Expansion Area (together, the Study Area); and the existing North Dam 2 (ND2) (Figure 2, Appendix A). The field survey was completed within the portions of the Study Area as defined above, where WPC has surface rights. The extent of the Proposed Underground Mine Area outside of the WPN Proposed Project's surface extent was not included within the scope for Stantec's investigation.

2.1 DESKTOP REVIEW METHODS

2.1.1 Natural Communities and Land Cover

Available information on existing and historical conditions, natural communities and land cover was obtained and reviewed to evaluate current conditions, site history, and environmental resources within the Study Area, and ND2. This information was utilized to develop desktop-based preliminary mapping of land cover and native plant communities.

Those resources included the following:

- 1978 Environmental Assessment (Michael Baker Jr. Inc. 1978)
- 2014 Ecological Survey (MDEQ 2015)
- Field delineated wetland GIS data (Barr 2024)
- U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) Soil Survey data (USDA NRCS 2024)
- National Wetland Inventory (USFWS 2024a; Figure 3, Appendix A)
- USGS Geological Maps (USGS 2024)
- Quaternary Geology of Michigan (Farrand et. al 1998)
- GLO Vegetation circa 1800 (Comer and Albert 1997)
- LiDAR, Digital Elevation Model (DEM) mapping (USGS 2022)
- USGS 24k National Hydrography Data (NHD), watershed mapping (USGS 2024)
- Aerial photography (USDA-FSA 2022; Figure 4, Appendix A)
- 2015 Timber Stand Mapping (WPC supplied data)

2.1.2 Rare Plant Species

The Michigan Department of Natural Resources (MDNR) typically requires a Rare Species Review (RSR) to determine the potential presence of rare plant species within and in close proximity to the WPN Proposed Project. Michigan Natural Features Inventory (MNFI) Element Occurrence township-level database records indicate the potential for rare plant species to occur on the site; including several Michigan Threatened and Special Concern plant species recorded in the vicinity of the WPN Proposed Project.

Prior to conducting the field surveys for rare species, Stantec obtained and reviewed available mapping, field reports and other pertinent information for the Study Area as noted below:

- Michigan Flora and other regional floras, herbarium records, and the MNFI rare plants web page (MNFI 2023);
- A review of U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) resource list, of federally listed, proposed, and candidate species for listing under the Endangered Species Act (ESA), for the WPN Proposed Project (USFWS 2024b);
- Results of previous floristic, biological, wetland, and natural resource surveys
- The current list of Michigan Threatened and Endangered plants, per the ESA of the State of Michigan, effective March 20, 2023, and Special Concern species, available on the MNFI website.

2.2 DESKTOP REVIEW RESULTS

Desktop review of available resources was conducted to assess current conditions across the Study Area and ND2 (Figure 2, Appendix A). Portions of the Study Area where WPN has not obtained surface access rights were mapped via desktop methods. Land cover and natural community mapping for the Desktop Mapped Area portions of the Study Area is depicted on Figure 5 (Appendix A).

2.2.1 Landscape, Geology, Soils, and Historical Context

The Study Area is comprised of inactive mine facilities, access roads, and historic borrow pits and excavations associated with historical tailings basins, North Dam 1 (ND1) and ND2. A substantial component of the Study Area is forested, primarily with small to moderate sized hardwoods which have been and continue to be actively utilized for timber harvest. Areas of mature hardwood and conifer timber exist onsite, especially along the banks of the Mineral River. The WPN Proposed Project was almost entirely Sugar Maple-Hemlock Forest at the time of the U.S. General Land Office surveys in the early 1800's (Comer and Albert 1997). Copper mining and lumbering have been ongoing in Ontonagon County, since the 1840s and 1880s, respectively (Michael Baker Jr. Inc 1978). The current White Pine Mine facilities were in operation from 1955 until it shut down in 1997.

Bedrock geology of the WPN Proposed Project consists of Freda Sandstone and Nonesuch Formation, of the Middle Proterozoic Oronto Group. The Nonesuch Formation contains siltstone, shale, and sandstone, and includes copper deposits (USGS 1995). Quaternary geology of the WPN Proposed Project is characterized by lacustrine clay and silt deposits (MNFI 1998). In the post-glacial period, this section of northern Ontonagon County was inundated by an earlier stage of Lake Superior. The soils of the Site are derived from these glacial clays and silts. NRCS soil mapping indicates that the major soil series present in the Study Area include Udorthents-Alfic Udarents-Epiaquents complex, loamy, nearly level and steep. This series is predominantly composed of mixtures of soil types typically found in heavily disturbed landscapes where the original soils have been altered by grading, filling, or construction. Other mapped soils include Big Iron-Flintsteel-Gull Point, frequently flooded, complex, dissected, 1 to 15 percent slopes; Rockland-Moquah, frequently flooded-Watton complex, 0 to 70 percent slopes; Greenstone silt loam, 0 to 3 percent slopes; Histosols and Aquents, 0 to 1 percent slopes, ponded; and Water. Numerous wetland

areas are mapped for the Study Area by NWI (Figure 3, Appendix A). Many of these correspond to borrow pit excavations that surround the perimeter of ND2 and are perennially inundated pond features (PUBGx). The full extent of ND2 is mapped by NWI as wetland. The topography of the WPN Proposed Project and surrounding landscape slopes consistently from higher elevations, along the higher ridges of the Copper Range, south of the WPN Proposed Project; descending northward toward Lake Superior. Numerous perennial and intermittent streams descend northward in narrow, parallel ravines which dissect the landscape. Within the Study Area, the largest of these is the Mineral River, which clips the northwest corner of the Study Area. Pine Creek bisects the eastern section of the Study Area, east of ND2. Elevations within the Study Area range from a high point of approximately 896 feet (ft) above mean sea level (msl) at the southwest end of the Study Area (Proposed Railroad Corridor); to a low elevation of 704 ft along the Mineral River in the northwest edge of the Study Area (Figure 4, Appendix A). The majority of the Study Area is comprised of a highly modified landscape, altered from its natural condition as a result of logging, mining, excavation, and other activities that have occurred over the past 150 years.

ND2 was evaluated via desktop analysis. ND2 consists of approximately 2,664 acres of existing tailings. The ND2 surface is relatively flat, sloping gradually from a high elevation of approximately 804 ft along its south boundary, to approximately 790 ft at its north edge. Subsequent to the mine closure in 1997, this area has reverted to natural vegetation. The full extent of ND2 is mapped in NWI as wetland. Open water ponds extend along the northern portion (Figure 4, Appendix A).

2.2.2 Natural Communities and Land Cover

Much of the Study Area has reverted to natural succession following historic excavation and other disturbances. Similarly, ND2 has reverted to natural vegetation growth following the cessation of mining activities over 25 years ago. Experimental plantings of various woody species have occurred in plots within the central and western portions of ND2. Overall vegetation cover on ND2 appears to comprise a mix of herbaceous meadow and sparse woody cover. There appear to be some extensive areas of bare substrate, that may be seasonally inundated.

Recent aerial imagery indicates that the majority of the Study Area is forested, with substantial smaller areas consisting of developed infrastructure, including roads, industrial facilities, material stockpiles, and paved or graveled areas (Figure 4, Appendix A). There are also extensive areas of non-forested, open land with sparse vegetation coverage and exposed soils. These meadow areas have established on clayey soils exposed by past excavation and grading activities.

2.2.3 Rare Plant Species

On April 24, 2024, Stantec obtained an IPaC resource list of species and other resources such as critical habitat that are federally protected under USFWS jurisdiction, that are known or expected to occur on or near the WPN Proposed Project (USFWS 2024b). Known resources identified for the area included four species of mammals, one species of bird, and one species of insect that are protected under or are proposed for protection under the federal ESA. There are no federally protected plants known or expected for the WPN Proposed Project.

On April 30, 2024, Stantec conducted a township level search of records of the MNFI Web Database, under Stantec's license for access, for known occurrences of rare species in the townships in which the WPN Proposed Project is located. Specifically, the search included the following townships:

- T50N R41W
- T50N R42W
- T51N R40W
- T51N R41W
- T51N R42W

This search conservatively included up to a six-mile buffer from the WPN Proposed Project. The search queried the database for known records of TES species. The results of the MNFI database search included 11 plant species: three Michigan Threatened species, and eight Michigan Special Concern species. Special Concern species are not legally protected under State law, but are tracked by MNFI in order to learn more about their distribution and conservation in the state. The 11 rare plant species identified in the MNFI database search constitute the target species for the rare plant survey of the Study Area. The target species, their state and federal status, habitat descriptions, and survey periods are provided in Appendix B.

2.3 FIELD SURVEY METHODS

A team of four Stantec botanists conducted pedestrian meander surveys across all portions of the Study Area where WPC has surface rights (the Field Survey Area), during two seasonal mobilizations in 2024. The Field Survey Area (Figure 2, Appendix A) was divided into roughly 40-acre survey blocks for land cover mapping and rare plant survey purposes. Each survey block was investigated by a botanist working independently.

Meander paths were determined in the field by the botanist surveying each survey block, as efficient and feasible (i.e. avoiding hazards such as deep water) routes to thoroughly investigate the extent and variation in terrain, land cover, vegetation, and hydrology within each area. Meander paths were informed by desktop data loaded on field tablets, including NWI, NHD, NRCS soil mapping, aerial imagery, elevation contours, and by conditions observed in the field. This intuitive meander approach typically involves a zigzag or meandering route across a survey area. During the meander, the botanist can choose to deviate from any planned route to investigate newly observed land, water, and habitat features as well as the most likely habitats for target TES species. Since the meander path is dependent upon the landscape encountered and frequently modified en route, meanders are somewhat unpredictable. Meander surveys incorporated flexibility, and prioritized more intensive searches in areas with observed high-quality and suitable habitats more likely to support target TES species.

During field surveys, all personnel remained in communication with two-way radios, with botanists working in adjacent blocks. The full extent of the Field Survey Area was surveyed during each mobilization (June and August 2024), to map and characterize native plant communities and other significant vegetation features and to search for TES species during each target species' survey period as defined by MNFI (Appendix B).

Locations of features identified/recorded in the field were mapped using the Environmental Systems Research Institute (ESRI) ArcGIS Collector application for iPad and a Bluetooth-connected EOS Positioning Systems, Inc. Arrow 100 Global Positioning System (GPS) receiver, capable of sub-meter accuracy. The scientific names for plant species encountered during the field surveys, or otherwise discussed in this report, follow the nomenclature used by Michigan Flora (Voss and Reznicek 2012). Quality control measures were applied during all stages of methods development and field implementation.

2.3.1 Natural Communities and Land Cover

Field identification of vegetative communities was conducted in the field using Michigan Natural Features Inventory's natural community classification (MNFI, 2024). Many communities and land cover types within the Study Area have been significantly influenced and altered by past land use activities, including mining, grading, excavation, industrial development, and recent and historic timber harvest. These activities have resulted in land cover types and vegetation that have established following disturbance. Where disturbance has been severe or recent, the vegetation may be absent, sparse, or composed of disturbance-driven, weedy, and/or non-native plant species. In cases where vegetation was not consistent with any of the MNFI natural communities, anthropogenic land cover designations (e.g., Upland Meadow, Developed) were used.

The field investigators recorded these vegetation attributes to aid in identification and differentiation of vegetative community types:

- Dominant species, by stratum (tree, shrub/sapling, herbaceous)
- Canopy size class range based on diameter at breast height (dbh)
- Disturbances (historical mining/grading, windthrow, logging, roads/trails, beaver, etc.)

Within a single MNFI community type, where significant differences in structure and/or composition were observed, investigators could differentiate between distinct sub-types, based on substantially different canopy size class, dominant species, and/or ecological functions. Where applicable, such sub-types were mapped as distinct units in the field.

For each distinct land cover type, a land cover/natural community point was recorded using GPS, with the following associated data fields:

- Community/Land Cover Type
- Description
- Dominant Species – Canopy
- Estimated dbh
- Dominant Species – Subcanopy
- Dominant Species – Shrub
- Dominant Species – Herbaceous
- Estimated Canopy Cover (by stratum)
- Notes

Communities and land cover types were delineated using land cover boundaries recorded in the field or based on aerial imagery. Stantec generally utilized delineated wetland boundaries collected by Barr

Engineering (2024), to map boundaries between natural community types that are typically comprised largely or entirely of wetland, from predominantly upland natural communities or land cover types. In some areas, predominantly wetland or upland natural communities were mapped according to the vegetation and other surficial characteristics observed in the field. The natural community and land cover characterization and mapping effort did not include a full evaluation of soils and hydrology that would be required to make a wetland determination; nor does Stantec's community mapping provide a delineation of wetland and upland areas. Indeed, some Michigan natural communities can contain both upland and wetland elements (Cohen et al. 2015). In most cases, communities/land cover units under one acre in size were not mapped, unless they represented an exceptional, rare, or unique feature, or had significant potential to provide specialized habitat for TES species.

Species lists were collected during field surveys for each natural community/land cover type. Lists of observed species of vascular plants were compiled from all investigators across both mobilizations. Estimated areal cover percentages were assigned to each species within each natural community and vegetated land cover type. Floristic quality metrics for natural communities and land cover types were evaluated based on a floristic quality assessment (FQA) of meander survey data, using the Michigan FQA database (Reznicek et al. 2014), as implemented in the Universal FQA Calculator (Freyman et al. 2016). FQA methodology (Swink and Wilhelm 1994) assesses floristic quality using an average Coefficient of Conservatism (Mean C) and a Floristic Quality Index (FQI) for each distinct community. Each native species is assigned a C value on a regional basis, which ranges from 0 to 10 and represents an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition. A C value of 0 is applied to a species that demonstrates little fidelity to any remnant natural community, and to all non-native plant species. A C value of 10 is applied to plants that are almost always restricted to high quality natural communities. Values lower than 4 generally represent species with low fidelity to natural communities, and values closer to 10 represent more "conservative" species that are intolerant of ecosystem degradation.

FQI is calculated using the following formula:

FQI = Mean C($\sqrt{N}$)

C= Coefficient of Conservatism

N= Species Richness (Native & Non-native)

Generally, a higher FQI value is an indicator of a higher quality, intact natural community. However, FQI results must be carefully interpreted, especially in small assessment areas that have inherently lower species richness. In Michigan, it has been proposed that sites with an FQI of 35 or greater are "floristically important from a statewide perspective," but FQI is sensitive to area, landscape patterns and other factors, limiting its usefulness in assessing relative conservation value of different sites (Slaughter et al. 2015). While difficult to generalize, lower quality, disturbed, and/or small sites typically have an FQI of less than 35; FQI for sites of moderate quality/size may range between 35–45, and areas of large extent/exceptionally high quality may have an FQI exceeding 45 (Wilhelm & Masters 1995).

The cover weighted Mean C is a metric that is relatively independent of assessment area size, and takes into account the relative coverage of species across the assessment area. Cover weighted mean C provides a useful quantitative metric for evaluating the ecological condition and integrity of sites along a

gradient of human disturbance, more so than other metrics such as FQI. Cover weighted mean C is the preferred metric for evaluating community condition in Wisconsin (Marti and Bernthal 2019). Cover weighted Mean C is calculated as the sum of each species' C value multiplied by its cover, divided by the total cover for all species. While no mean C, FQI, or weighted Mean C floristic quality benchmarks have been established for categorizing the floristic quality of Michigan natural communities, they are in use in other nearby areas, such as Wisconsin wetlands (regional benchmarks for mean C and weighted mean C, for four regions of the state), Minnesota wetlands (MPCA 2015), and the Chicago Region (utilizing mean C and FQI; Wilhelm & Masters 1995).

2.3.2 Rare Plant Species

Information on the eleven target State Threatened or State Special Concern species for the survey was obtained from agency guidance and botanical reference sources in preparation for the survey. The species' characteristics, habitat, and optimal identification periods are summarized in Table B-1 (Appendix B). Reference materials used in preparation include Michigan's Rare Plants (MNFI 2023), Michigan Flora Online (Reznicek et. al 2025), and Field Manual of Michigan Flora (Voss and Reznicek 2012). Meander surveys were conducted across the full extent of the accessible Field Survey Area, during the appropriate survey period for each target species, per MNFI guidance. An intuitive meander survey approach was applied, to broadly sample across the variation of habitat types, with an emphasis on identification and survey of high-quality habitats, and habitats with the highest suitability for the target TES species.

If observed, any federally- or State-listed TES plant species occurrences were to be documented with an estimate of population size, GPS-mapped location, notes on phenology and evidence of reproduction (flowering, fruiting, or vegetative), habitat, associated species, evidence of disturbance and/or threats to the population, photographs, and voucher specimens (if needed for identification). Collection of voucher specimens of Michigan Special Concern and Threatened species was authorized under Joshua Sulman's Michigan Threatened and Endangered Species Permit #311 (which does not authorize collection of Michigan Endangered species, or of federally listed Threatened or Endangered species). If collected, voucher specimens were to be deposited at the University of Michigan Herbarium (MICH) in Ann Arbor, MI. As a condition of the T/E Permit, all Michigan TES species occurrences found during surveys are required to be reported to Michigan Department of Natural Resources and MNFI in an annual report.

2.4 FIELD SURVEY RESULTS

Land cover and natural community mapping and rare species surveys were completed during two mobilizations timed to coincide with target rare species survey windows. Josh Sulman, Stantec's Lead Botanist on the project, holds a Michigan Threatened and Endangered species permit for plants under the Consultant category, and was the field survey lead for both mobilizations. During the first mobilization, June 3–6, 2024, surveys were conducted by Stantec botanists Josh Sulman, Melissa Curran, Scott Krych, and Matt Knickelbine. The second mobilization occurred August 12–14, 2024, with surveys conducted by Josh Sulman, Scott Krych, Matt Knickelbine, and Eliza Suchan, of Stantec. Survey results are discussed in the following sections for plant communities and TES species. Land cover and natural community mapping for the Field Survey Area is depicted on Figure 5 (Appendix A). Plant species lists

compiled for each land cover and natural community type are provided in Appendix C. Photographs of natural communities, land cover types, and uncommon plant observations are included in Appendix D, and photo locations are shown on Figure 5 (Appendix A).

Mass grading has occurred over most of the Study Area. Most grading occurred decades ago, associated with the construction of the historical tailings dams. As a result, most of the vegetation and plant communities are relatively recent in origin, and have established on highly modified landscapes and substrates. The vegetation composition is often quite distinct from that of typical natural communities as described for Michigan by Cohen et al. (2015, 2020), having developed on exposed clayey substrates following significant disturbance. Soil development is limited. Vegetation contains a high proportion of coverage by native and non-native, disturbance tolerant and early-successional species. Overall, topography ranges from nearly level to very steep, and includes numerous borrow pit excavations, steep embankments, and steep slopes. Substrates are predominantly reddish clayey, loamy, and gravelly soils. Some areas, particularly access roads, consist of gravelly fill or of cobble-sized, glass-like reddish slag material. Many of the excavations and borrow pits are seasonally to perennially inundated. Due to the high clay content, surface water is ponded and retained in many concave areas. In addition, there is a high level of beaver activity, and numerous beaver dams are present on most of the waterways through the Study Area, which have flooded extensive areas of low-lying terrain. There are fairly extensive areas of sparse, meadow vegetation and exposed reddish clayey soils present within the Study Area.

Areas of ungraded, natural topography comprise a smaller component of the Study Area, predominantly found along the larger waterways, particularly the Mineral River and Pine Creek, and in areas more distant from the existing tailings dams and mine facilities. These areas have greater soil development, and sometimes a pronounced duff layer. Vegetation is mostly forest, characterized by a larger size class of canopy trees, higher coverage by coniferous species, and presence of more late-successional species typical of mature forests of the western Upper Peninsula of Michigan.

A summary of natural communities and land cover types mapped for the Study Area, key floristic quality metrics, and acreage is presented in Table 1.

Table 1. Summary of Natural Community and Land Cover Types, Key Vegetation Metrics

Desktop / Field Survey	Natural Community / Land Cover Type	Acreage	Total Species Richness	Native Species Richness	Cover-Weighted Mean C
Field	Developed	49.72	n/a	n/a	n/a
	Emergent Marsh	73.72	52	47	2.4
	Mesic Northern Forest - Early Successional	513.96	170	150	3.3
	Mesic Northern Forest - Mature	58.26	64	60	4.5
	Northern Hardwood Swamp	40.31	59	57	2.8
	Northern Shrub Thicket	14.15	35	30	3.4
	Northern Wet Meadow	49.11	93	82	2.9
	Submergent Marsh	112.86	17	17	5.9
	Upland Meadow	126.76	77	42	1.6
	Total Field Survey Areas	**1,038.85**	**354**	**301**	**n/a**
Desktop	Developed	6.30			
	Emergent Marsh	1.82			
	Mesic Northern Forest - Early Successional	18.42			
	Mesic Northern Forest - Mature	11.51			
	Northern Hardwood Swamp	7.17			
	Northern Shrub Thicket	0.25			
	Northern Wet Meadow	3.14			
	Submergent Marsh	9.18			
	Upland Meadow	14.30			
	Desktop Review Only Portion of Study Area	**72.09**			
	Total Study Area	**1,110.94**			
Desktop	**North Dam 2**	**2,664.57**			

2.4.1 Wetland Natural Communities and Land Cover

Predominantly wetland natural communities mapped in the Study Area include Northern Hardwood Swamp, Northern Shrub Thicket, Northern Wet Meadow, Emergent Marsh, and Submergent Marsh systems (Figure 5, Appendix A). These natural communities together comprise 290.15 acres of the Field Survey Area, and are further described below.

2.4.1.1 Northern Hardwood Swamp

Northern Hardwood Swamp occurs across 40.31 acres of the Field Survey Area. Northern Hardwood Swamp is described by MNFI as a seasonally inundated wetland forest dominated by deciduous trees, particularly black ash (*Fraxinus nigra)*. Northern Hardwood Swamps typically occur on neutral to slightly acidic hydric mineral soils or shallow muck over mineral soils. They are primarily found in depressions on level to hummocky glacial lakeplains, fine and medium-textured glacial tills, and broad flat outwash plains,

as well as shallow basins, groundwater seeps, and low-level terrain near rivers, lakes or edges of peatlands (Cohen et al. 2020).

The dominant tree species observed in Northern Hardwood Swamps within the Study Area included red maple (*Acer rubrum*) and quaking aspen (*Populus tremuloides*), with black ash present but uncommon. Prevalent herbaceous species included nodding sedge (*Carex gynandra*), common horsetail (*Equisetum arvense*), spotted touch-me-not (*Impatiens capensis*), northern bugle weed (*Lycopus uniflorus*), wool-grass (*Scirpus cyperinus*), mad-dog skullcap (*Scutellaria lateriflora*), and late goldenrod (*Solidago gigantea*). Locally, ferns including ostrich fern (*Matteuccia struthiopteris),* cinnamon fern (*Osmunda cinnamomea)* and royal fern (*O. regalis)* achieve high coverage. Northern Hardwood Swamps in the Study Area have microtopography including small basins, hummocks, and hollows, which are often seasonally inundated. Most stands are early successional, with recent logging history, and are dominated by 4–10 inch dbh quaking aspen and red maple. Older stands found along streams and in depressions within surrounding upland forests have larger-sized canopy red maple, with greater than 10 inch dbh, and yellow birch (*Betula alleghaniensis*) as an associate. Shrubs, including speckled alder (*Alnus incana*), are sparse in this community.

2.4.1.2 Northern Wet Meadow

Northern Wet Meadow occurs across 49.11 acres of the Field Survey Area. They are described by MNFI as open, groundwater-influenced, sedge/grass-dominated wetlands that occur on glacial lakebeds, in channels of glacial outwash, and in depressions on glacial outwash and moraines and typically border stream, ponds, or lake margins, as well as above beaver dams. Soils are nearly always sapric peat and range from strongly acidic to neutral in pH. Open conditions are maintained by seasonal flooding, beaver-induced flooding, and fire (Cohen et al. 2020).

Within the Study Area, the Northern Wet Meadow community is widespread and occurs on open ground, especially where past excavation has resulted in flat to concave surfaces with exposed clayey substrates, landscape positions that support seasonal inundation and/or a high-water table. The clayey substrates impede infiltration, and are in notable contrast to the typical organic substrate described for this community by MNFI. The Northern Wet Meadow community is intermediate on a moisture gradient between Upland Meadow and Emergent Marsh, and a single open meadow is often comprised of a mosaic of all three of these herbaceous-dominant communities. The Northern Wet Meadow generally lacks a canopy stratum. Dominant shrub species observed within the Northern Wet Meadow included bebb's willow (*Salix bebbiana*) and diamond willow (*Salix eriocephala*). Dominant herbaceous species with high coverage included redtop (*Agrostis gigantea*) and variegated scouring rush (*Equisetum variegatum*), with other common species including common horsetail, northern green rush (*Juncus alpinoarticulatus*), golden-fruited sedge (*Carex aurea)*, grass-leaved goldenrod (*Euthamia graminifolia)* and wild strawberry (*Fragaria virginiana).* The composition of this community within the Study Area is rather distinct from the typical natural community as described by MNFI, with generally short-statured, sparser vegetation, high coverage by horsetails, a significant component of non-native species, and low coverage by the usual native sedge and grass species that are characteristic dominants. The differences likely arise from the history of grading and excavation, and lack of organic peat or muck soils.

2.4.1.3 Emergent Marsh

Emergent Marsh occurs across 73.72 acres of the Field Survey Area. Emergent Marsh communities are widespread across Michigan, and are shallow water wetlands along the shores of lakes and streams characterized by emergent narrow and broad-leaved herbs and grass-like plants as well as floating-leaved herbs (Cohen et al. 2020).

With the Study Area, Emergent Marsh is typically found within excavated basins, around the perimeter of perennial open water (Submergent Marsh) communities. It is also found within impounded basins associated with beaver ponds. Hydrology in this community is characterized by seasonal to perennial inundation of 1 foot or more, resulting in a predominance of emergent aquatic vegetation. Emergent Marshes within the Study Area characteristically were dominated by hybrid cattail (*Typha x glauca*), a non-native species which grows in extensive, dense colonies of plants often more than six ft tall. Other prevalent species included variegated scouring rush, softstem bulrush (*Schoenoplectus tabernaemontani*), and wool-grass (*Scirpus cyperinus*). With its high coverage by non-native species, this community had the lowest cover-weighted mean C (2.4) of all the wetland communities within the Study Area. Substrates observed in this community ranged from clay to muck.

2.4.1.4 Submergent Marsh

Submergent Marsh occurs across 112.86 acres of the Field Survey Area. Submergent Marsh is a fully aquatic plant community that occurs in deep to sometimes shallow water in lakes and streams throughout Michigan. Soils are typically characterized as loosely consolidated organic material of variable depth and pH that accumulate over any mineral soil or bedrock (Cohen et al. 2020).

Submergent Marsh has a greater extent than any wetland community within the Field Survey Area. Submergent Marsh is widespread across the Study Area, in perennially inundated portions of excavated basins, borrow pits, and beaver ponds, in water too deep for emergent vegetation. Vegetation is comprised of floating and submerged plants. Dominant species included the floating-leaved species, water-shield (*Brasenia schreberi*), common duckweed (*Lemna minor*), various-leaved pondweed (*Potamogeton gramineus*), and broad-leaved pondweed (*Potamogeton natans*); and the submersed species, spiked water-milfoil (*Myriophyllum sibiricum*), sago pondweed (*Stuckenia pectinata*), and common bladderwort (*Utricularia vulgaris*). The stoneworts (Characeae), which are submersed, plant-like macro-algae, were also common, and achieved high levels of dominance in some basins. Floating vegetation cover was mostly sparse, though submergent vegetation and algae was quite dense in some areas. All 17 plant species recorded in the Submergent Marsh were native; despite having the fewest species of any community or land cover type, Submergent Marsh had the highest cover-weighted Mean C (5.9) recorded for any community in the Field Survey Area.

2.4.1.5 Northern Shrub Thicket

Northern Shrub Thicket communities occur across 14.15 acres of the Field Survey Area. Northern Shrub Thicket is a shrub-dominated wetland of northern Michigan, typically occurring along streams and adjacent to lakes and beaver ponds. In these areas, succession to closed-canopy swamp forest is slowed by fluctuating water tables, beaver flooding, and windthrow (Cohen et al. 2020).

In the Field Survey Area, this community is limited in extent, mostly within wet basins in surrounding wooded areas, particularly along Pine Creek. Dominant shrubs observed in this community included speckled alder and several willow species (*Salix bebbiana, S. eriocephala, S. lucida*, and *S. petiolaris*). Prevalent species in the herbaceous layer included fringed sedge (*Carex crinita*), common horsetail, water horsetail (*Equisetum fluviatile),* and interrupted fern (*Osmunda claytoniana*).

2.4.2 Upland Natural Communities and Land Cover

Predominantly upland natural communities and land cover types mapped in the Study Area include Mesic Northern Forest, Upland Meadow, and Developed/Unvegetated Areas (Figure 5, Appendix A). These cover types together comprise 748.69 acres of the Field Survey Area and are further described below.

2.4.2.1 Mesic Northern Forest

Mesic Northern Forest was mapped across 572.22 acres, comprising more than half of the Field Survey Area. This is the most extensive natural community or land cover type across the extent of the Study Area. It is described by MNFI as a forest type of moist to dry-mesic sites of northern Michigan, characterized by the dominance of northern hardwoods, with conifers including hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus)* as frequent canopy associates. Mesic Northern Forest consists of two broad classes: northern hardwood forest and hemlock-hardwood forest. Mesic Northern Forests historically dominated vast areas of mesic uplands in the Great Lakes Region (Cohen et al. 2020). The full extent of the Study Area was historically Sugar Maple-Hemlock Forest (i.e., hemlock-hardwood forest) at the time of the U.S. General Land Office surveys in the early 1800's (Comer and Albert 1997).

Within the Study Area, two components of Mesic Northern Forest were observed, which are fairly well differentiated as two distinct subtypes, by seral/successional stage, canopy size class, stand age, or time since last timber harvest. These subtypes were distinguished by differences in structure, species composition, habitat and ecological functions, factors that largely correlated with stand age. Therefore, we categorized Mesic Northern Forest into two subtypes:

- Mesic Northern Forest – Early Successional
- Mesic Northern Forest – Mature

Mesic Northern Forest – Early Successional is the dominant natural community type within the Field Survey Area, by far, encompassing 513.96 acres. These early successional Mesic Northern Forests have a more recent history of disturbance than the mature subtype, generally have younger, smaller canopy trees ranging from approximately 4–10 inches dbh, abundant quaking aspen in the canopy, and low canopy coverage by conifers. Generally, the canopy trees have established following a disturbance event, either logging or grading, that likely occurred within the last 50 years; and the canopy trees have not yet reached maturity. The youngest stands appear to be in the range of 10–20 years old (based on visual estimates) and have regenerated following timber harvest.

Dominant tree species within the early successional Mesic Northern Forest subtype included quaking aspen, red maple, sugar maple (*Acer saccharum*), paper birch (*Betula papyrifera*), and white ash (*Fraxinus americana*). Prevalent shrubs included beaked hazelnut (*Corylus cornuta),* thimbleberry (*Rubus parviflorus*), and wild red raspberry (*Rubus strigosus*). Dominant herbaceous vegetation included wild sarsaparilla (*Aralia nudicaulis*), yellow trout lily (*Erythronium americanum*), large-leaved aster (*Eurybia macrophylla*), and bracken fern (*Pteridium aquilinum*). The total and native species richness (170 and 150 respectively) are the highest recorded for any community or land cover type, indicative of a moderately diverse community encompassing multiple habitat niches, a range of soil types, disturbance regimes, and with a very large extent. The cover-weighted mean C is 3.3, which is moderate compared to the other land cover types assessed.

Mesic Northern Forest - Mature has an extent of 58.26 acres within the Field Survey Area, or approximately 10 percent of the total area of Mesic Northern Forest. This subtype of the Mesic Northern Forest community is characterized by larger sized and older canopy trees, consisting of later successional species, and a higher percentage of cover by conifers. A prominent feature of this subtype is the presence of larger-sized eastern hemlock, sugar maple, and yellow birch (*Betula alleghaniensis)*, indicators of older stands that have not been logged or significantly disturbed for a long period, likely over 80 years.

Dominant trees within the mature Mesic Northern Forest subtype included red maple, sugar maple, yellow birch, and eastern hemlock. Occasional large individuals of white-cedar (*Thuja occidentalis)* were also present. Subcanopy species frequently included hop-hornbeam (*Ostrya virginiana*), balsam fir (*Abies balsamea)*, and mountain maple (*Acer spicatum).* Common shrubs included beaked hazelnut, witch hazel (*Hamamelis virginiana),* leatherwood (*Dirca palustris),* and Canadian fly honeysuckle (*Lonicera canadensis)*. Typical and characteristic herbaceous plants included wild sarsaparilla, Canada mayflower (*Maianthemum canadense*), partridge-berry (*Mitchella repens),* northern wood-sorrel (*Oxalis acetosella),* zigzag goldenrod (*Solidago flexicaulis),* rose twisted stalk (*Streptopus lanceolatus),* nodding trillium (*Trillium cernuum),* lady fern (*Athyrium filix-femina*), oak fern (*Gymnocarpium dryopteris*), and ostrich fern. The mature subtype had a native species richness of 60, and a cover-weighted mean C of 4.5, the highest for any of the terrestrial land cover types. The Mesic Northern Forest – Mature subtype retains characteristics of the historic natural vegetation, including structure and composition, that were likely prevalent across the Study Area in the early 1800's.

2.4.2.2 Upland Meadow

Upland Meadow occurs across 126.76 acres of the Field Survey Area. This land cover type is not representative of any MNFI natural community. Upland Meadow is comprised of herbaceous pioneer species and occurs on moderately well-drained, heavily altered, clayey or gravelly substrates. Upland Meadow is distributed mainly in relatively flat areas where mass grading has occurred, in the vicinity of the historic White Pine Mine plant, on areas of gravel fill, and compacted soils. Vegetation is mostly comprised of disturbance-tolerant, weedy species, with a larger proportion of non-native plant species than any other land cover type. Total species richness was 77, of which 42 species were native. Cover weighted Mean C was 1.6, the lowest of any land cover type.

Dominant species observed within the Upland Meadow included spotted knapweed (*Centaurea stoebe*), orchard grass (*Dactylus glomerata*), poverty oatgrass (*Danthonia spicata*), Queen Anne's lace (*Daucus carota*), common horsetail, wild strawberry (*Fragaria virginiana*), birdfoot trefoil (*Lotus corniculatus*), and Canada goldenrod (*Solidago canadensis*).

2.4.2.3 Developed Areas

Developed Areas occur across 49.72 acres of the Field Survey Area. Developed Areas do not comprise any MNFI natural community, rather, this land cover type comprises areas that have been subject to modification and routine maintenance such that little or no natural vegetation development has occurred. They include maintained roads, railroads, buildings, parking areas, graded, unvegetated areas, material stockpiles, and slag piles. Developed Areas would likely succeed toward Upland Meadow over time, in the absence of ongoing maintenance.

2.4.3 Rare Plant Species

No federally or state-listed TES plant species were observed during the 2024 surveys of the Field Survey Area. Presence/absence surveys for each target species were conducted during the MNFI recommended survey period for each species, with an emphasis on potentially suitable habitats. Target species, their status, and their habitats are described in Table B-1 (Appendix B). Representative photographs of natural communities and land cover types observed within the Field Survey Area are provided in Appendix D. Generally, the results of the surveys indicated a lack or scarcity of potentially suitable habitat conditions, typical associated species, and a low likelihood for the target species to occur onsite.

While field surveys were not conducted for TES plant species in the desktop-only portions of the Study Area or ND2, the desktop review indicates that these areas are largely disturbed and degraded by past land use activities and have similar vegetation composition and habitat characteristics to the areas evaluated in the field. The results of the desktop and field investigations do not indicate a high likelihood of suitable habitat or presence of TES plant species within these areas.

Three target species are listed as Michigan-Threatened, and are legally protected in the State of Michigan: their characteristics and survey results are described in more detail below.

Climbing Fumitory (*Adlumia fungosa)*

Climbing fumitory is an herbaceous vine found in gravelly or rocky Great Lakes shores, woods, and thickets, and in rich, diverse mesic forests inland. This species was last reported from Ontonagon County in 1939 (MNFI 2023). This species likely historically occurred on or along the Lake Superior shore, but suitable habitat conditions for this species are unlikely to exist within the Study Area. Potentially suitable habitats for this species may occur in Mesic Northern Forest. This species was not detected in presence/absence surveys across the Field Survey Area.

Showy Orchis (*Galearis spectabilis)*

Showy orchis is a small orchid of rich woods, which has been documented in Ontonagon County as recently as 2021 (MNFI 2023). This species typically grows in rich deciduous woods, in shady rich soils

with spring ephemerals. Potentially suitable habitats for this species may occur in Mesic Northern Forest, especially along streams. This species was not detected in presence/absence surveys across the Field Survey Area.

Vasey's Pondweed (*Potamogeton vaseyi)*

Vasey's Pondweed is an annual, floating-leaved aquatic plant (Gleason & Cronquist 1991). In Michigan, this is a species occurring in small lakes typically found at water depths of 6 ft and greater and has been documented in Ontonagon County as recently as 2021 (MNFI 2023). Potentially suitable habitats for Vasey's Pondweed may occur in Submergent Marsh communities. In addition to presence/absence surveys throughout the Survey Area, targeted aquatic plant sampling of higher quality Submergent Marsh communities, including natural basins and beaver ponds with diverse aquatic plants, was conducted for this species. This species was not detected within the Field Survey Area.

Special Concern Species

Eight species listed as Special Concern in Michigan, and tracked by MNFI, were sought in presence/absence surveys across the extent of the Field Survey Area, during the appropriate survey period. Five of these species are found on rock outcrops, or along Lake Superior shorelines. Suitable shoreline and bedrock habitats for these species were lacking within the Study Area. Canadian Milk Vetch (*Astragalus canadensis)* occurs on rocky slopes along Lake Superior; small blue-eyed Mary (*Collinsia parviflora),* occurs on bedrock outcrops and cliffs. Douglas's hawthorn (*Crataegus douglasii)* is known from rocky shorelines along Lake Superior. Male fern (*Dryopteris filix-mas)* is found in rocky cliffs and ravines in mixed northern hardwood forests; and northern gooseberry (*Ribes oxyacanthoides)* is found on bedrock outcrops (MNFI 2023). None of these species, or their preferred habitats, were detected within the Study Area.

Two Special Concern species are found in rich forests and swamps. While natural community types with potentially suitable habitats exist onsite, most are degraded and early successional communities. Northern bluebell (*Mertensia paniculata)* is found in Hardwood-Conifer swamp, Mesic Northern Forest, and Rich Conifer Swamp; Large Toothwort (*Cardamine maxima)* is found in rich deciduous forests and floodplains (MNFI 2023). Neither species was detected in the Field Survey Area.

One Special Concern species, western monkeyflower (*Mimulus guttatus)* is only documented in Michigan from a springy ditch and calcareous forested seeps in Ontonagon County; it is a disjunct occurrence from its main range is in the western U.S. (MNFI 2023; Reznicek et al. 2025). Suitable habitats were not present, and this species was not detected within the Field Survey Area.

3.0 CONCLUSIONS

Stantec conducted a baseline study to evaluate the existing land cover types, natural communities (Table 1; Figure 5, Appendix A), and probable presence/absence of federally or state-listed threatened, endangered and special concern (TES) plant species within the proposed above-ground facilities (Study Area) and ND2 for the White Pine North Project (WPN Proposed Project). This report documents the

methods and results of desktop review and field investigations for the Study Area and ND2 conducted by Stantec during 2024.

Land cover types and natural communities were identified and mapped using a combination of desktop review and field meander surveys. A site history of mass grading and timber harvest has contributed to disturbance across the majority of the Study Area resulting in vegetation and natural communities that are relatively recent in origin and have established on highly modified landscapes and substrates. Desktop review was conducted for the Study Area and ND2. Field surveys were conducted across the portions of the Study Area where WPC has obtained surface rights (the Field Survey Area), during two mobilizations: June 3–6 and August 12–14. A total of nine land cover/natural community types were mapped in the 1,035.85-acre Field Survey Area. Predominantly wetland natural communities comprise 290.15 acres in the mapped Field Survey Area and include Northern Hardwood Swamp, Northern Shrub Thicket, Northern Wet Meadow, Emergent Marsh, and Submergent Marsh (Figure 5, Appendix A).

Predominantly upland natural communities and landcover types mapped in the Field Survey Area comprise 748.69 acres, and include Mesic Northern Forest (Early Successional and Mature subtypes), Upland Meadow, and Developed/Unvegetated Areas (Figure 5, Appendix A). Plant species lists were recorded for each land cover/natural community type, with a total of 354 plant species recorded for the Field Survey Area. The Mesic Northern Forest (Early Successional subtype) had the highest plant species richness at 170, while Submergent Marsh had the lowest, at 17. The Submergent Marsh had the highest Cover-Weighted Mean Coefficient of Conservatism, a measure of floristic quality, at 5.9, while Upland Meadow had the lowest, at 1.6 (Appendix C).

Presence/absence surveys were completed for 11 target state-listed plant species, including three Michigan Threatened species (climbing fumitory, showy orchis, and Vasey’s pondweed) and eight Michigan Special Concern species (Canadian milk vetch, small blue-eyed Mary, Douglas’s hawthorn, male fern, northern gooseberry, northern bluebell, large toothwort and western monkeyflower), during each species’ optimal identification period (Table B-1, Appendix B). Potentially suitable habitats for target TES species were evaluated and searches for TES plant species were conducted across the Field Survey Area. No state- or federally-listed TES plant species were detected during the onsite investigation.

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Appendix A Figures

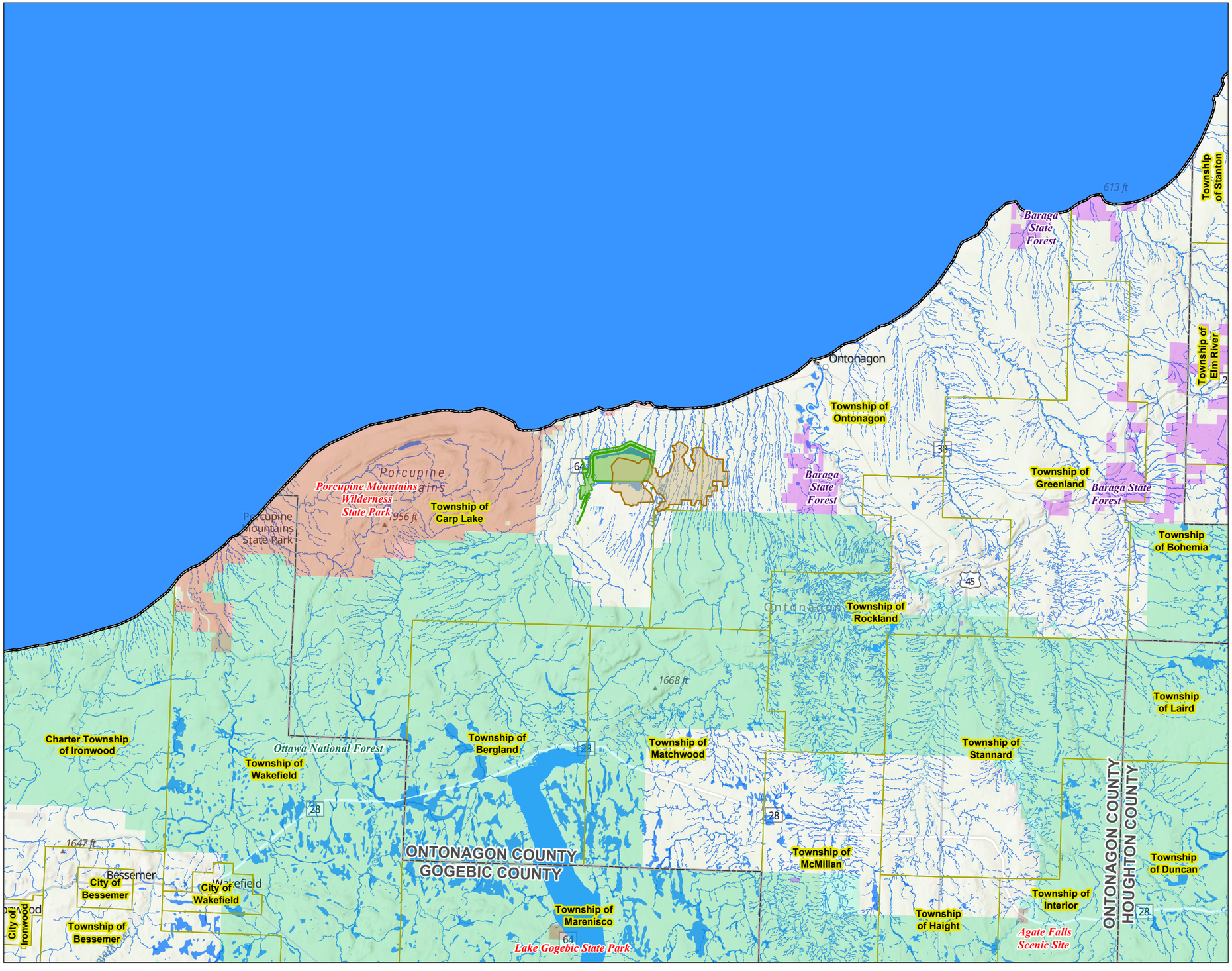


Figure No.

1

Title

Project Location

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
TR by SR on 2025-03-04
IR by JS on 2025-03-03

N

0 2.5 5 Miles

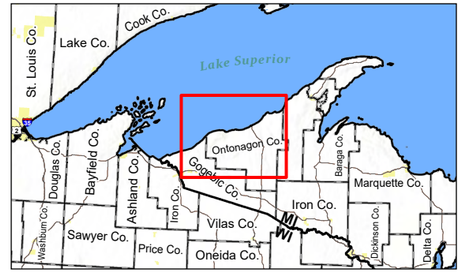
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Legend

- Proposed Surface Facilities
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- State Forest
- National Forest

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: World Topographic Map

Stantec

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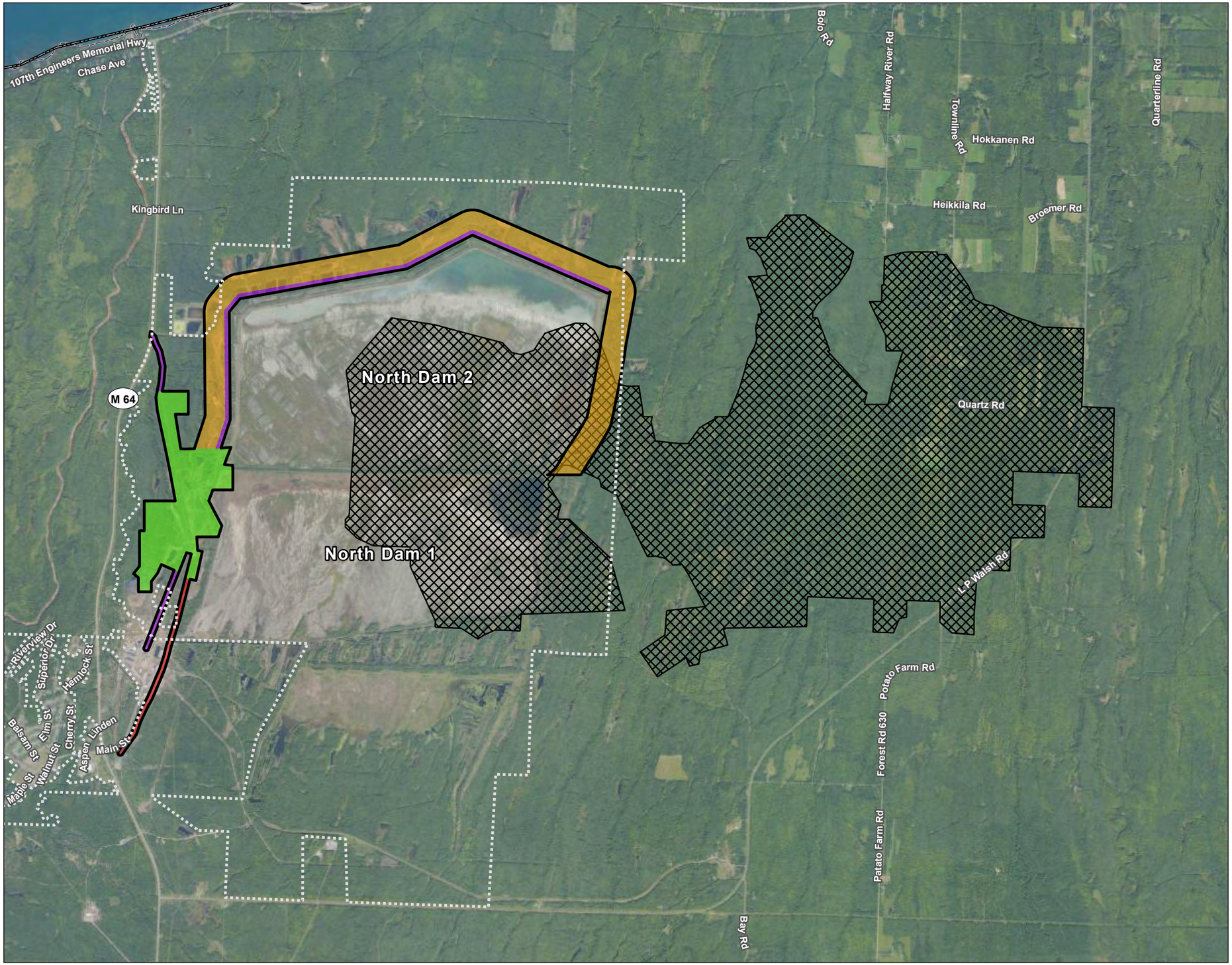


Figure No.
2

Title
Site Layout

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
TR by SR on 2025-03-04
IR by JS on 2025-03-03

N

0 2,000 4,000 Feet
(At original document size of 11x17)
1:48,000

Legend
- Study Area
- Surface Rights Boundary
- Proposed Underground Mine Area
- Proposed Surface Footprint
- Proposed Railroad Corridor
- Proposed Transmission Line Corridor
- Potential Tailings Dam Expansion Area



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: 2022 NAIP

Stantec

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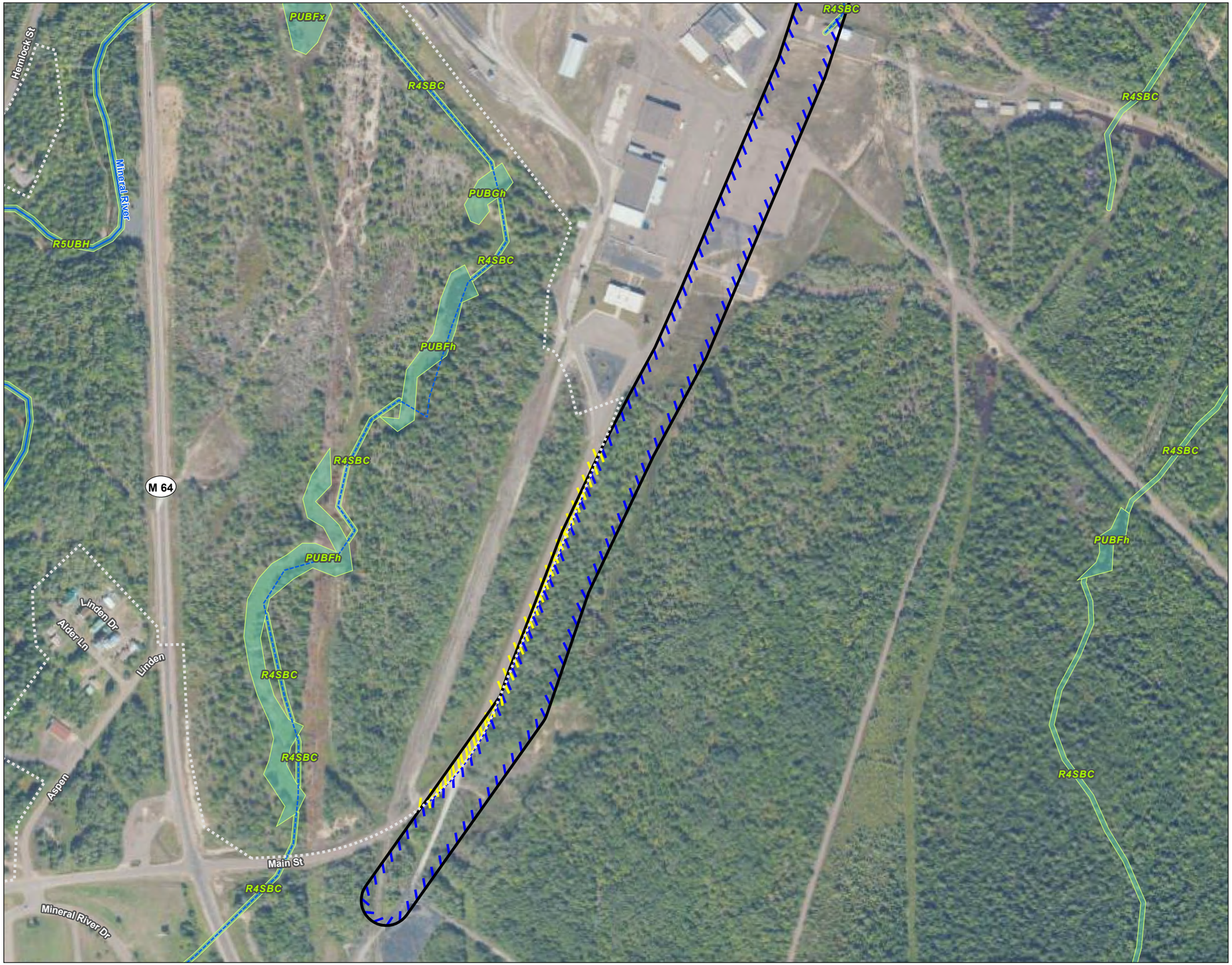


Figure No.
3

Title
National Wetlands Inventory

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

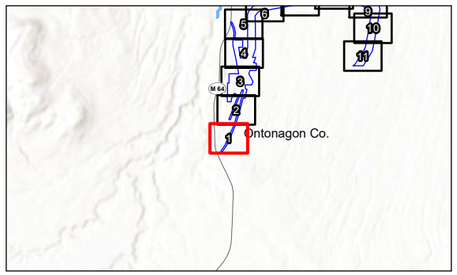
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TR by SR on 2025-03-04
IR by JS on 2025-03-03

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1:4,800

Legend
- Study Area
- Surface Rights Boundary
- Desktop Mapped Area
- Field Mapped Area
- National Wetlands Inventory

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, USFWS
3. Background: 2022 NAIP

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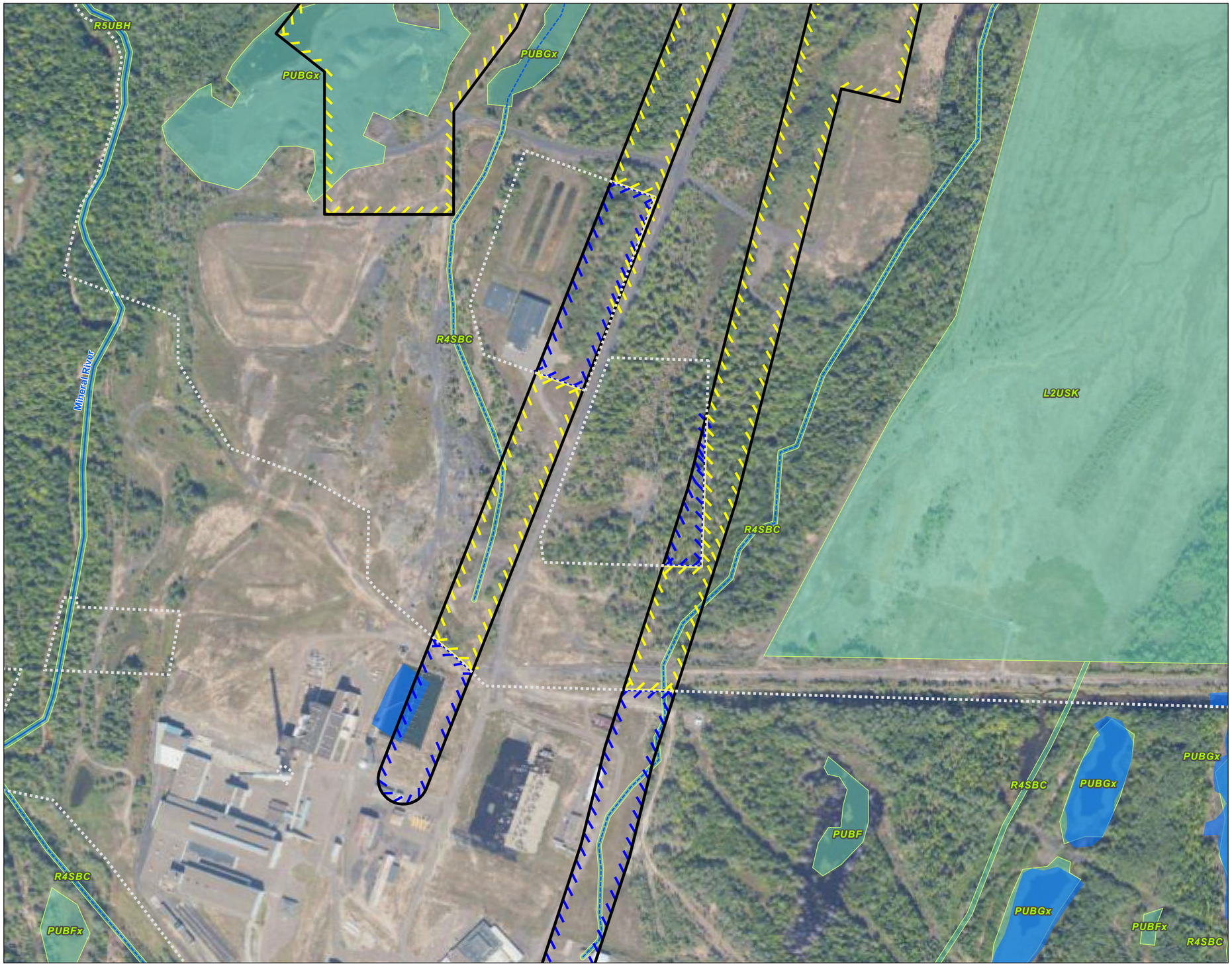


Figure No.

3

Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
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N

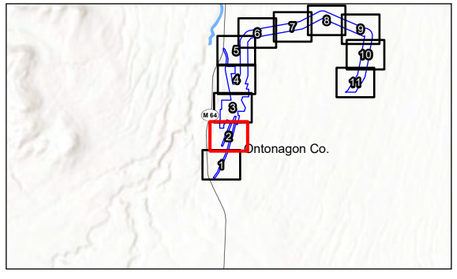
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Legend

- Study Area
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- National Wetlands Inventory

National Hydrography Dataset

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Notes
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3. Background: 2022 NAIP

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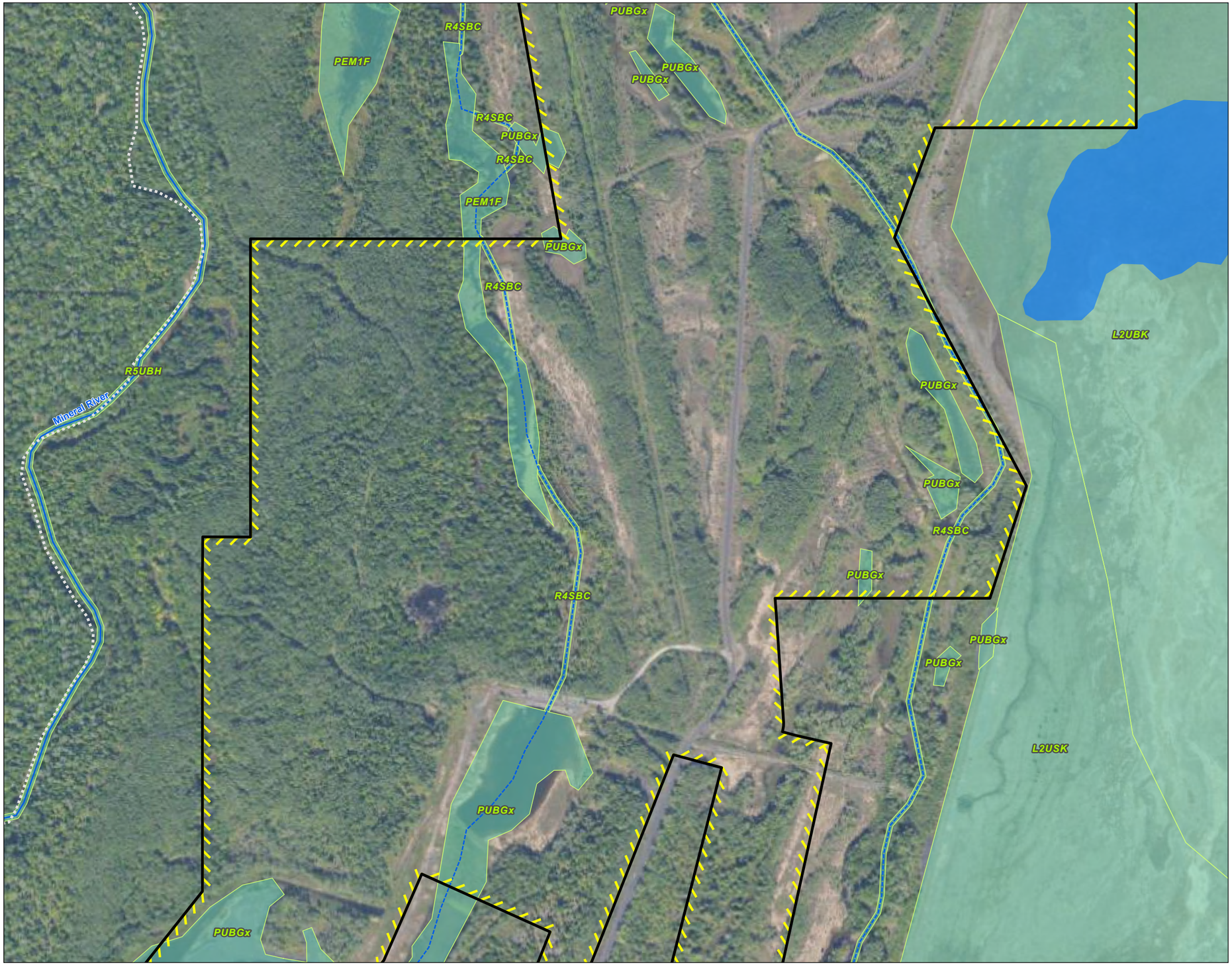


Figure No.

3

Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
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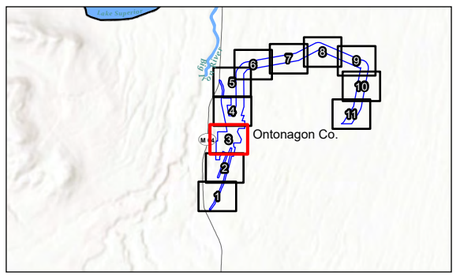
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Legend

- Study Area
- Surface Rights Boundary
- Field Mapped Area
- National Wetlands Inventory

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
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Notes
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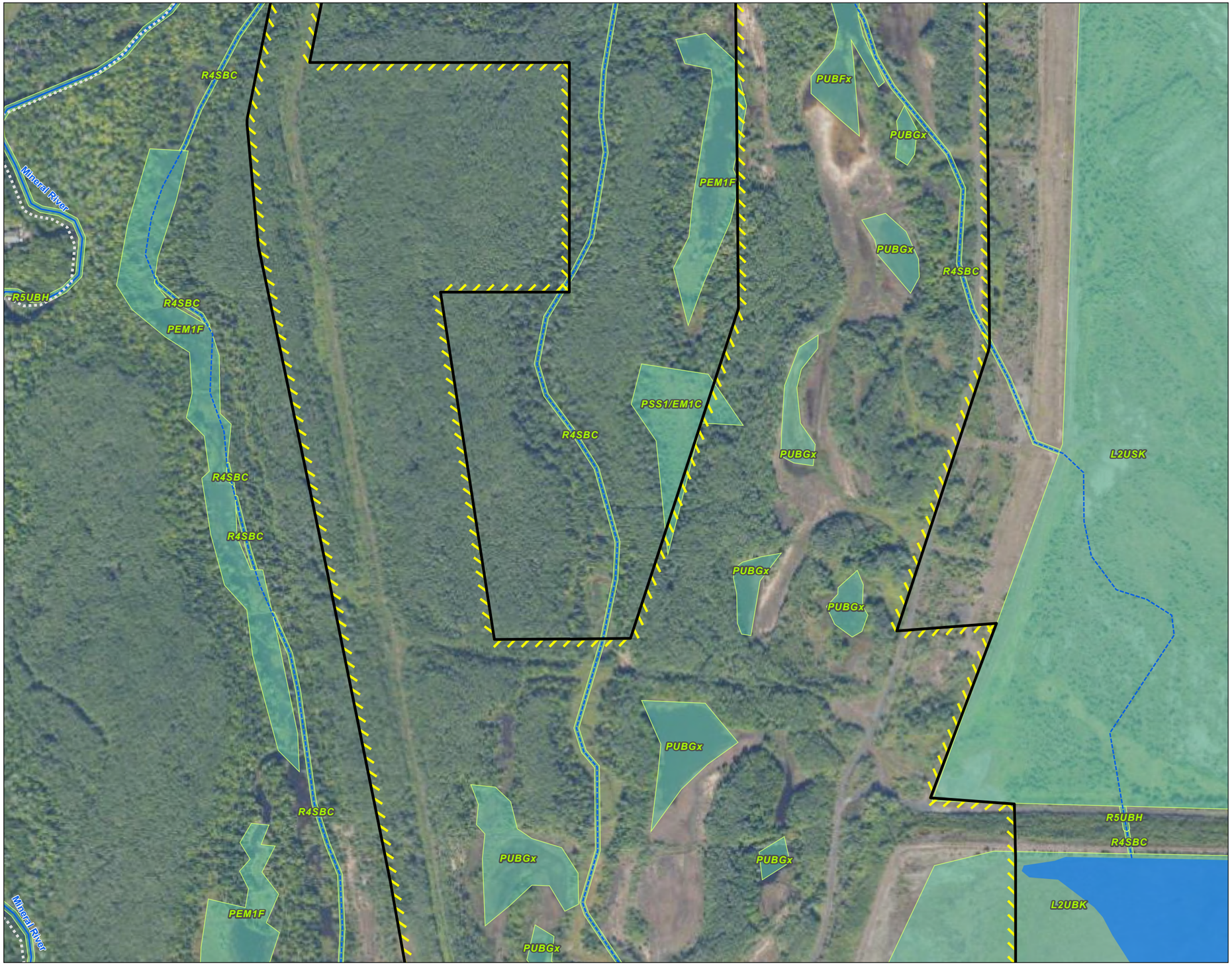


Figure No.

3

Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
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N

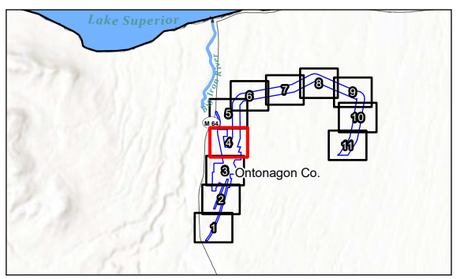
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Legend

- Study Area
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- Field Mapped Area
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National Hydrography Dataset

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Notes

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3. Background: 2022 NAIP

Stantec

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Figure No.

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Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
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N

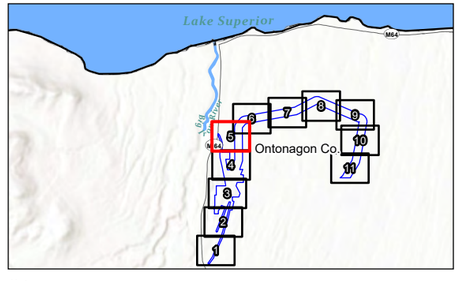
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Legend

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Notes

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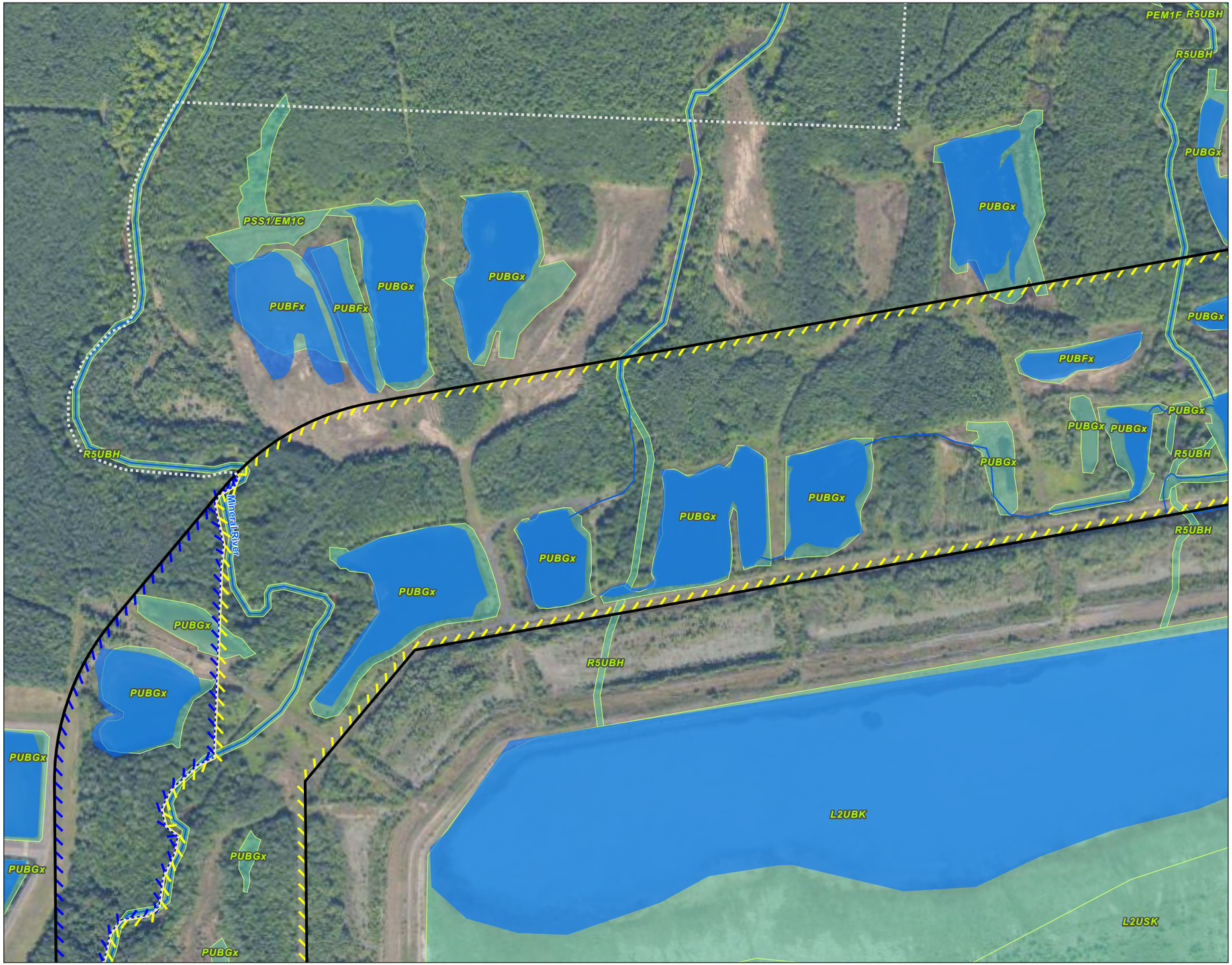


Figure No.
3

Title
National Wetlands Inventory

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

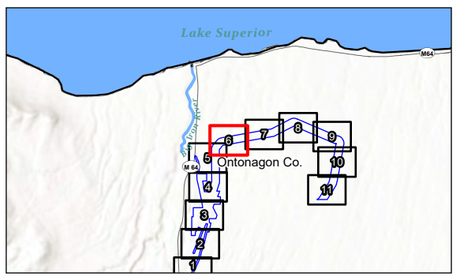
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IR by JS on 2025-03-03

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Legend
- Study Area
- Surface Rights Boundary
- Desktop Mapped Area
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- National Wetlands Inventory

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
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3. Background: 2022 NAIP

Stantec

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Figure No.

3

Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
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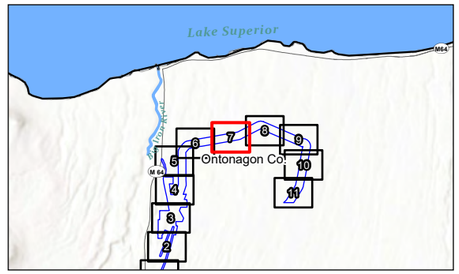
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Legend

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National Hydrography Dataset

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Notes

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Figure No.
3

Title
National Wetlands Inventory

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

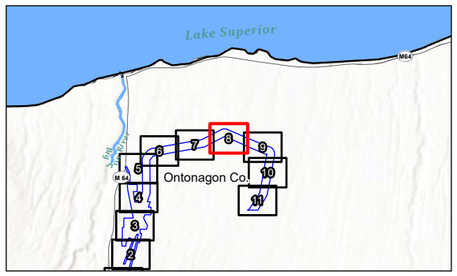
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Legend
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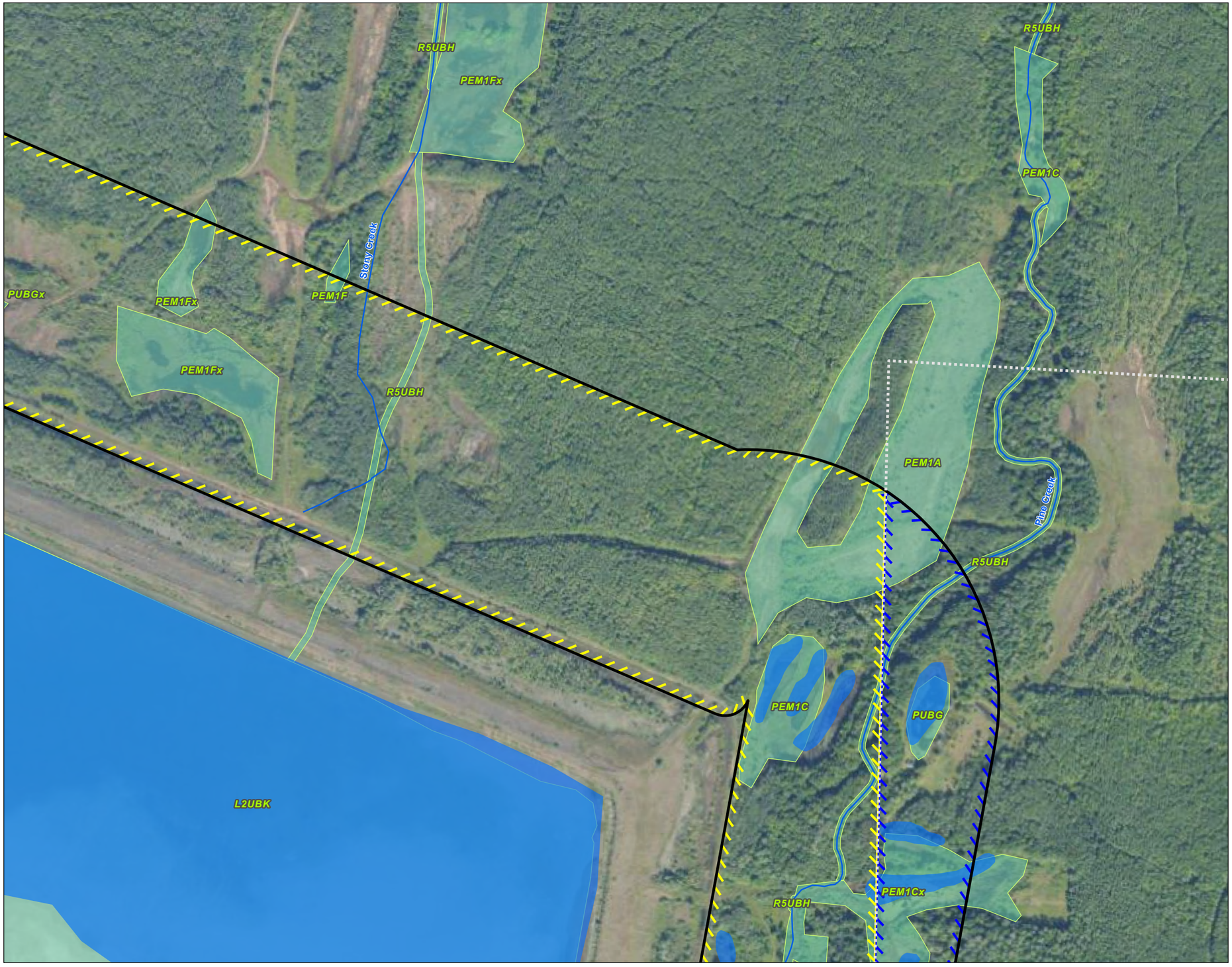


Figure No.
3

Title
National Wetlands Inventory

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

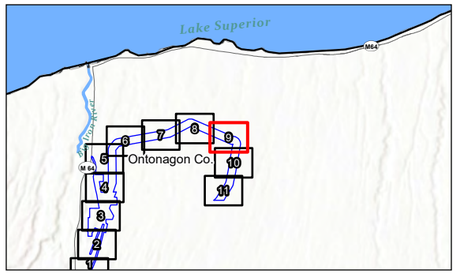
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IR by JS on 2025-03-03

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Legend
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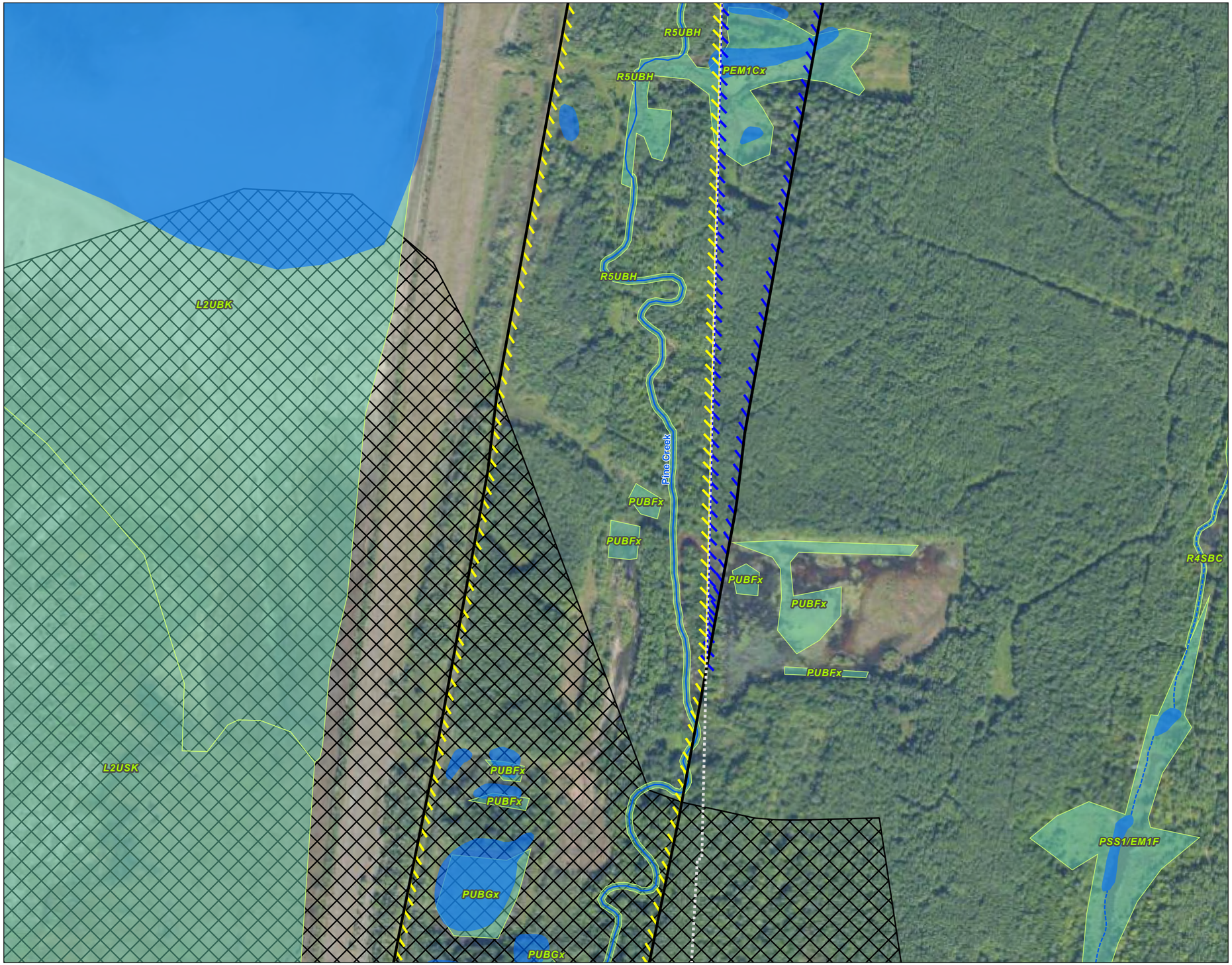


Figure No.

3

Title

National Wetlands Inventory

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
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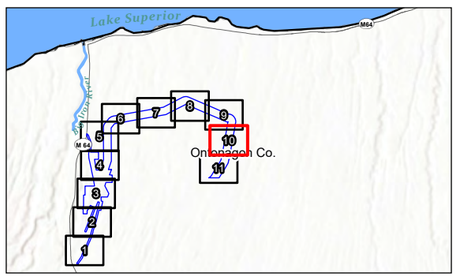
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Legend

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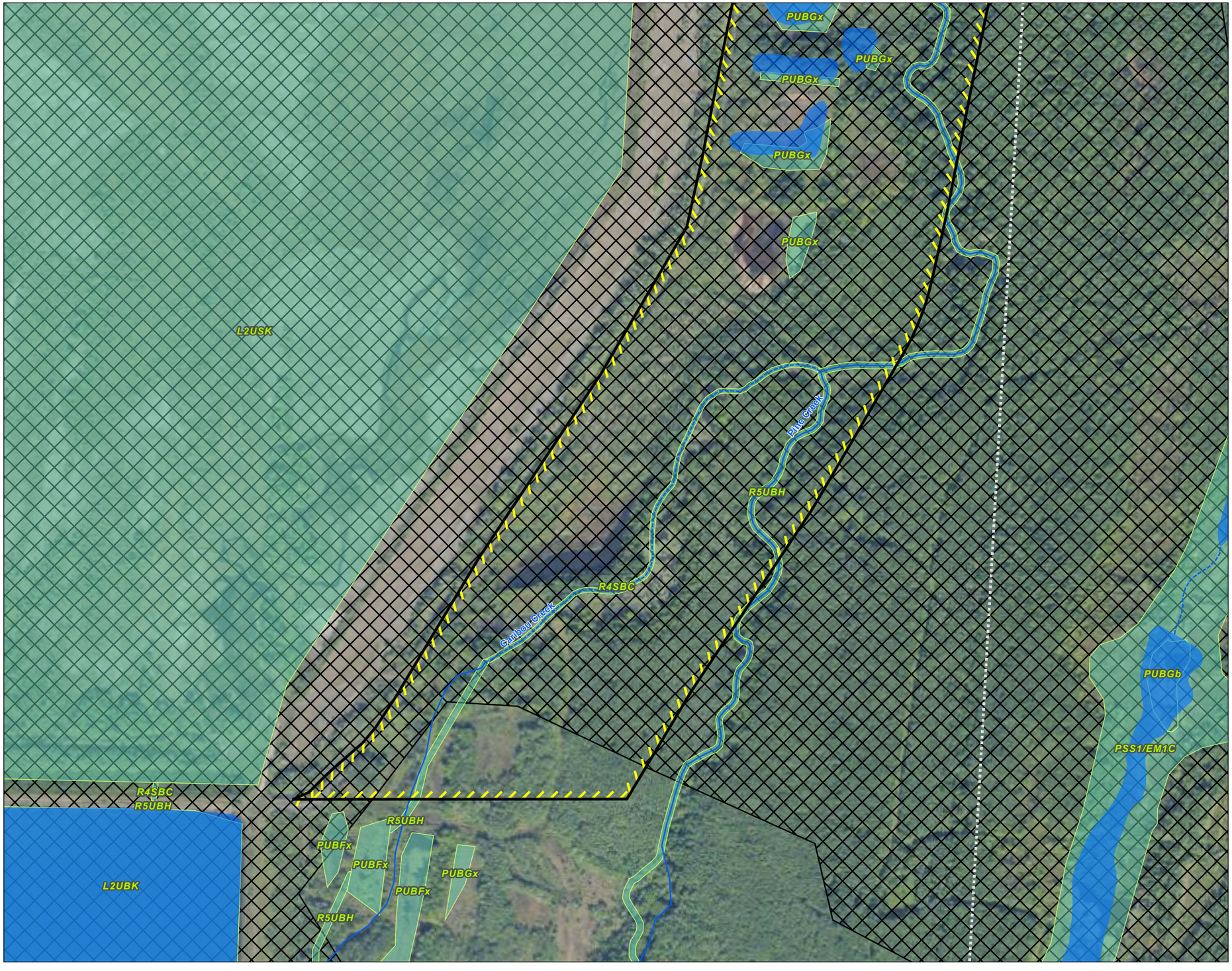


Figure No.

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IR by JS on 2025-03-03

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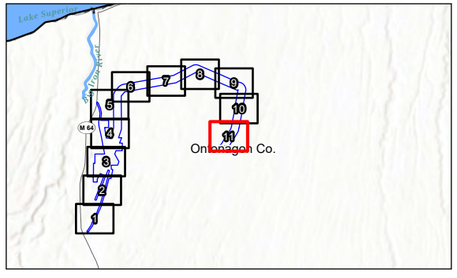
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Legend

- Study Area
- Surface Rights Boundary
- Proposed Underground Mine Area
- Field Mapped Area
- National Wetlands Inventory

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, USFWS
3. Background: 2022 NAIP

Stantec

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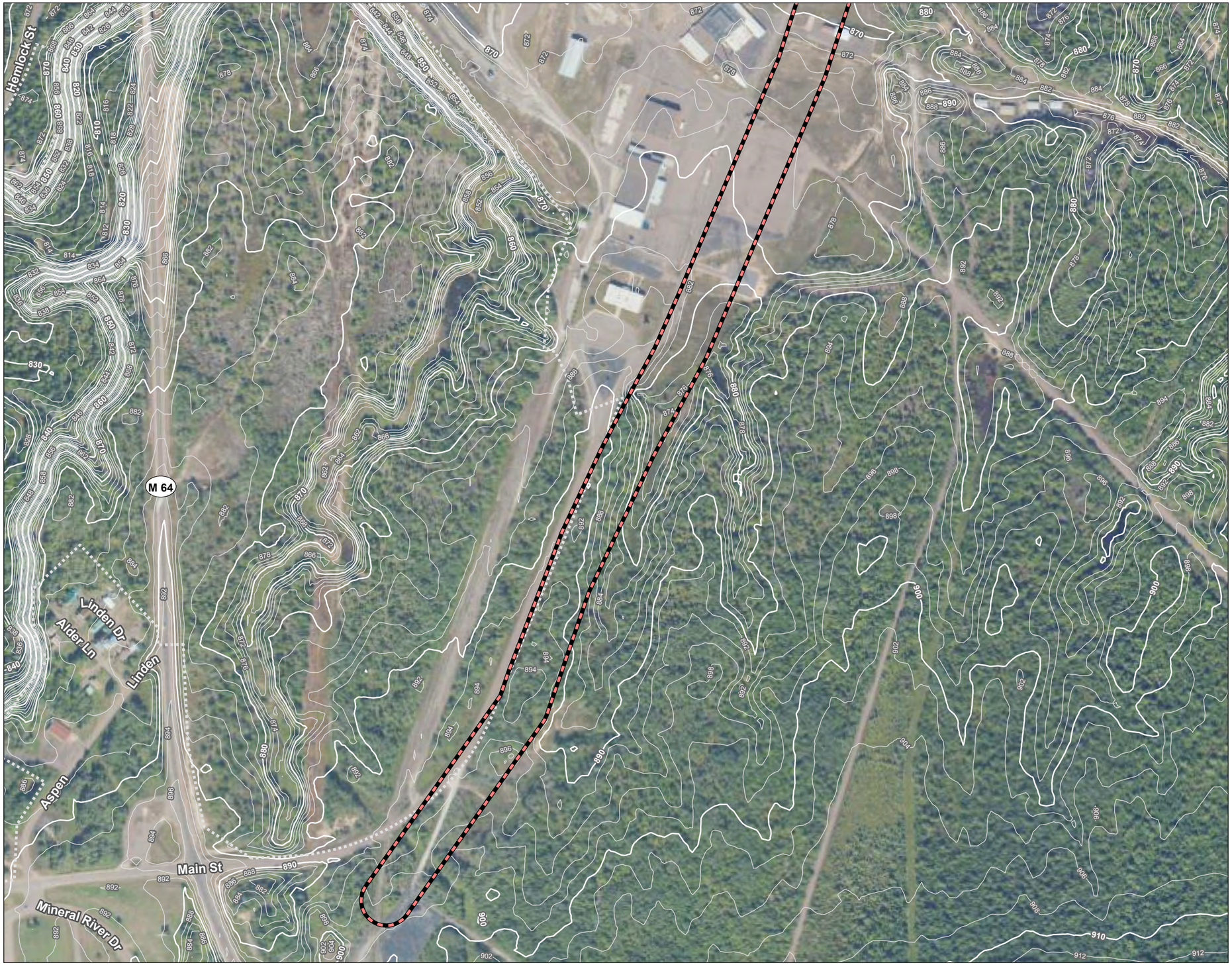


Figure No.

4

Title

Project Area Orthophotography & Contours

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

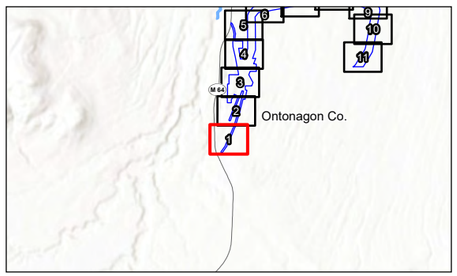
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TR by MK on 2025-01-06
IR by JS on 2025-03-03

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Legend

- Study Area
- Surface Rights Boundary
- Proposed Railroad Corridor
- 2ft Elevation Contour



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Project Area Orthophotography & Contours

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

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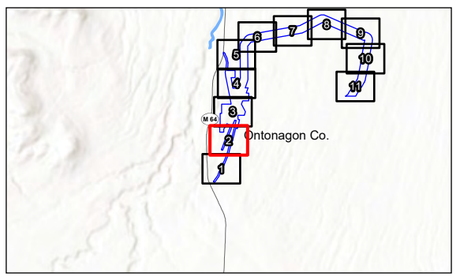
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Legend

- Study Area
- Surface Rights Boundary
- Proposed Surface Footprint
- Proposed Railroad Corridor
- Proposed Transmission Line Corridor
- 2ft Elevation Contour



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Project Area Orthophotography & Contours

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

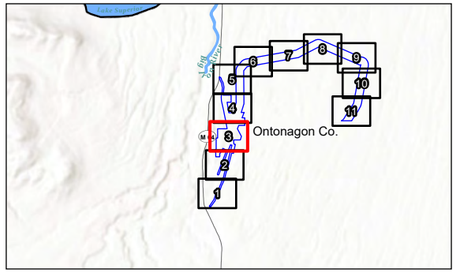
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Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
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Figure No.

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Title

Project Area Orthophotography & Contours

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-01-03
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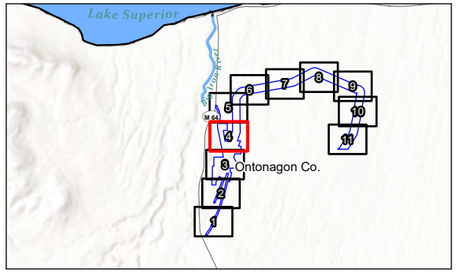
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- Potential Tailings Dam Expansion Area
- 2ft Elevation Contour



Notes

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Figure No.

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Project Area Orthophotography & Contours

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

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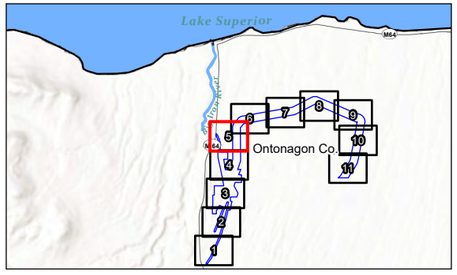
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Project Area Orthophotography & Contours

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
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Ontonagon Co., MI

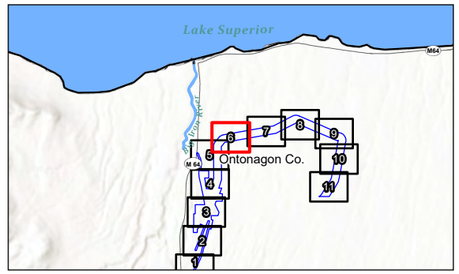
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Project Area Orthophotography & Contours

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

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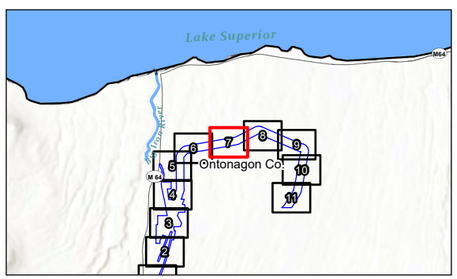
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Project Area Orthophotography & Contours

Client/Project

193710518

White Pine Copper LLC
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Project Location

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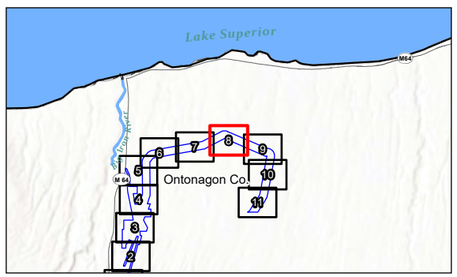
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Project Area Orthophotography & Contours

Client/Project 193710518

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White Pine North Project

Project Location
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Ontonagon Co., MI

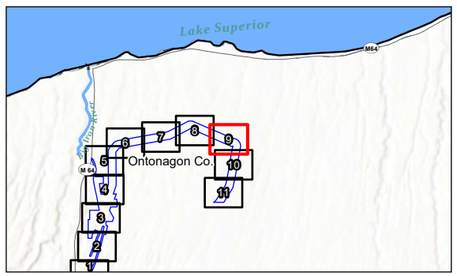
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Project Area Orthophotography & Contours

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

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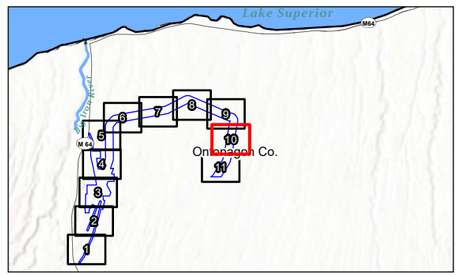
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Project Area Orthophotography & Contours

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
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Ontonagon Co., MI

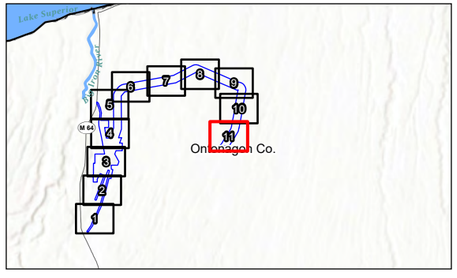
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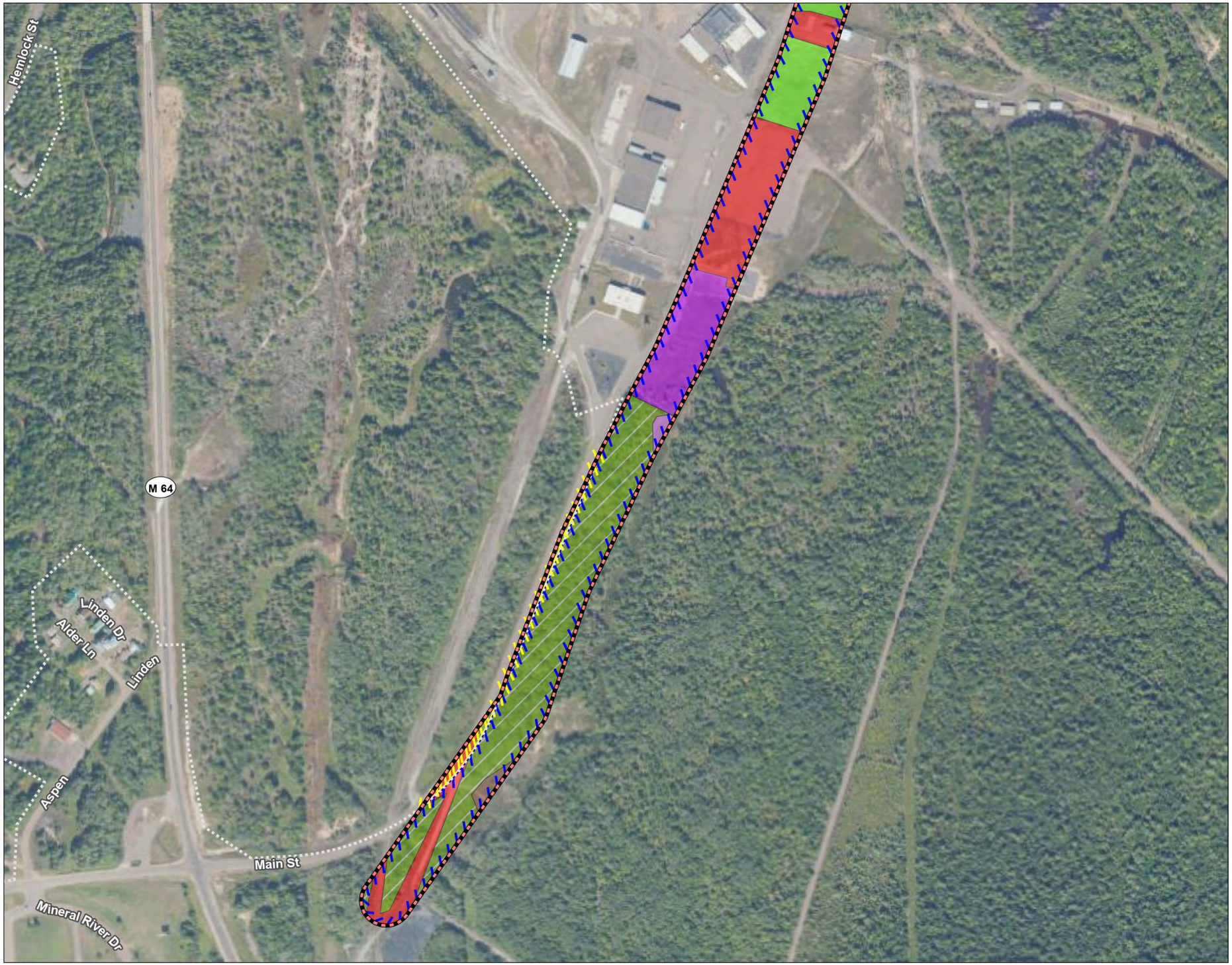


Figure No.
5

Title
Community Overview

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

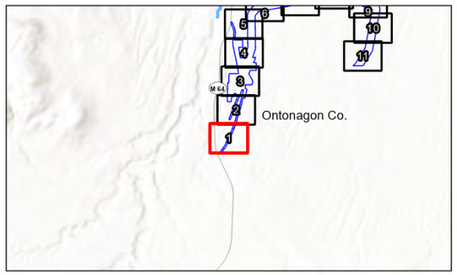
Project Location
Twp. of Carp Lake,
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Legend
- Study Area
- Surface Rights Boundary
- Proposed Railroad Corridor
- Photo Location
- Desktop Mapped Area
- Field Mapped Area
- Delineated Wetland (Barr, 2024)
- Developed
- Emergent Marsh
- Mesic Northern Forest - Early Successional
- Mesic Northern Forest - Mature
- Northern Hardwood Swamp
- Northern Shrub Thicket
- Northern Wet Meadow
- Open Water
- Submergent Marsh
- Upland Meadow



Notes
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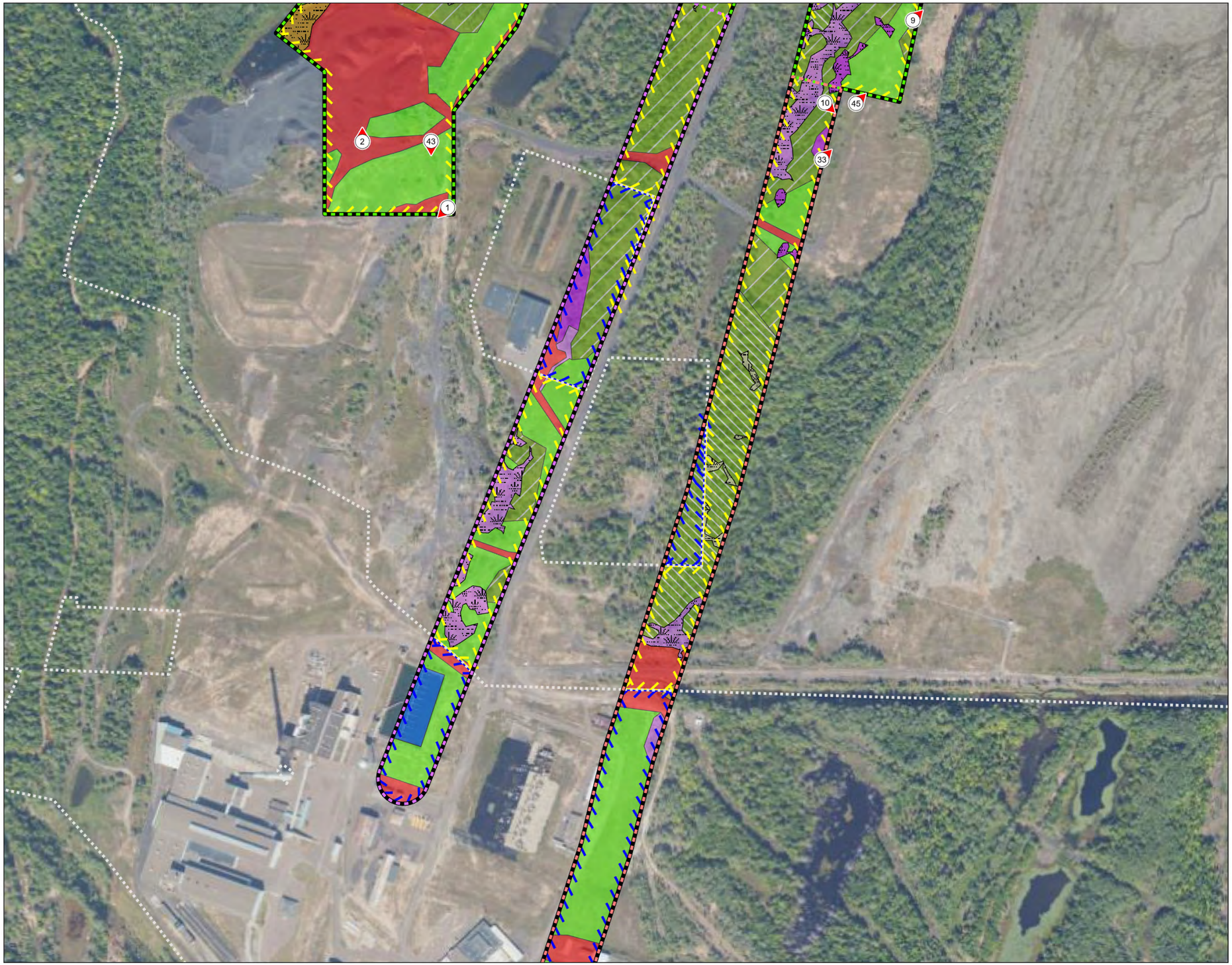


Figure No.
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Title
Community Overview

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

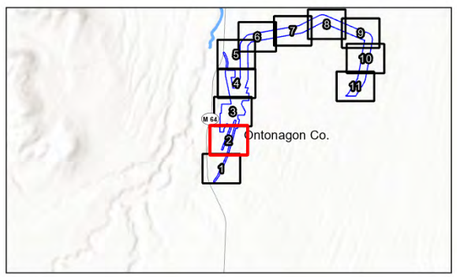
Project Location
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Figure No.

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Community Overview

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White Pine North Project

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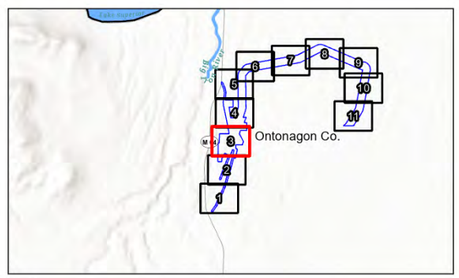
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- Submergent Marsh
- Upland Meadow



Notes
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2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

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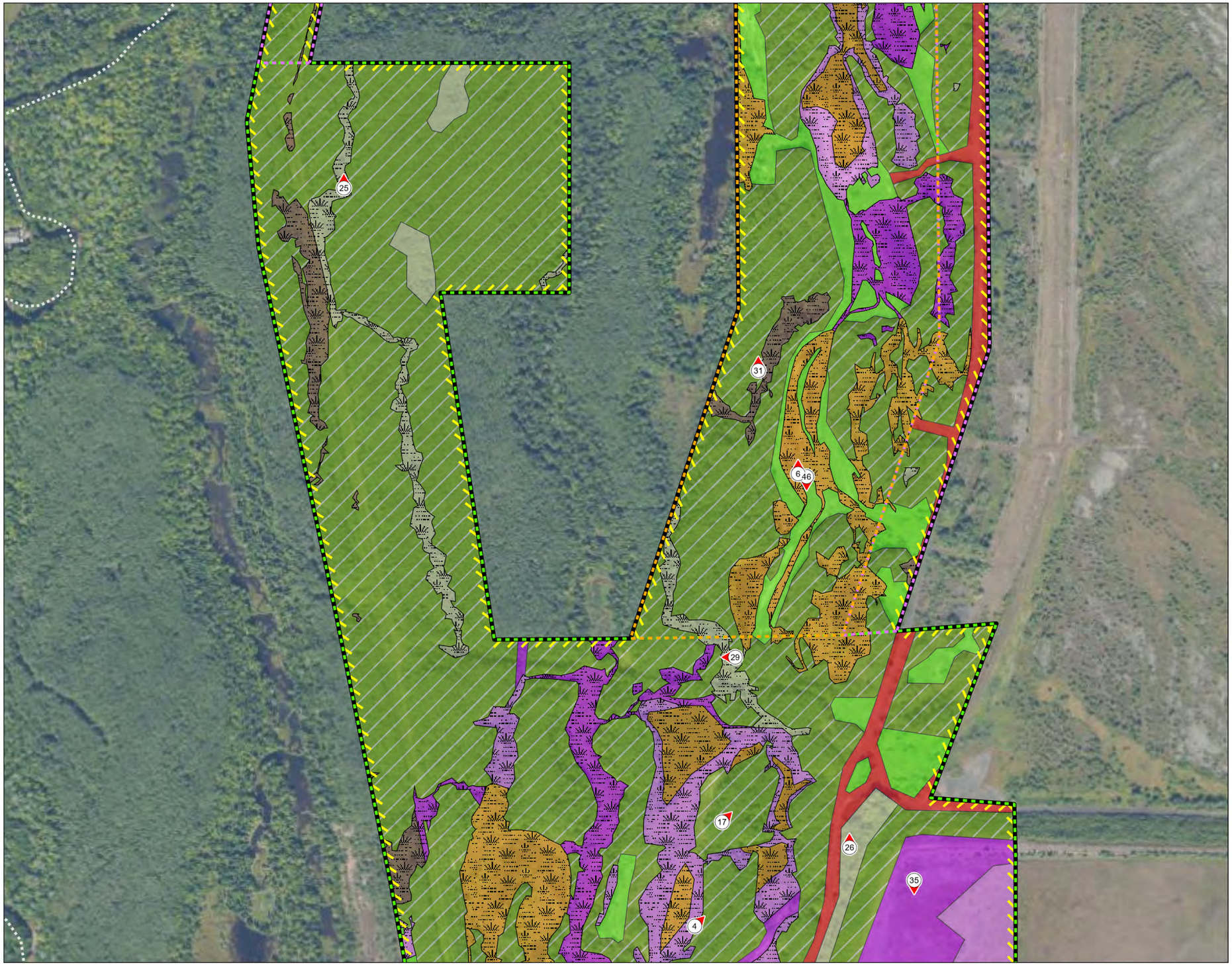


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5

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White Pine Copper LLC
White Pine North Project

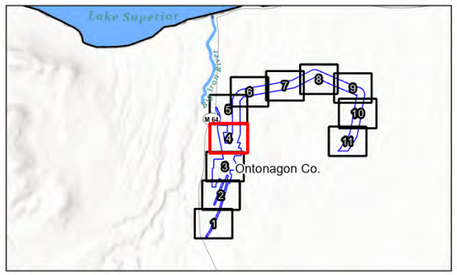
Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-01-03
TR by MK on 2025-01-06
IR by JS on 2025-03-03

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- Proposed Surface Footprint
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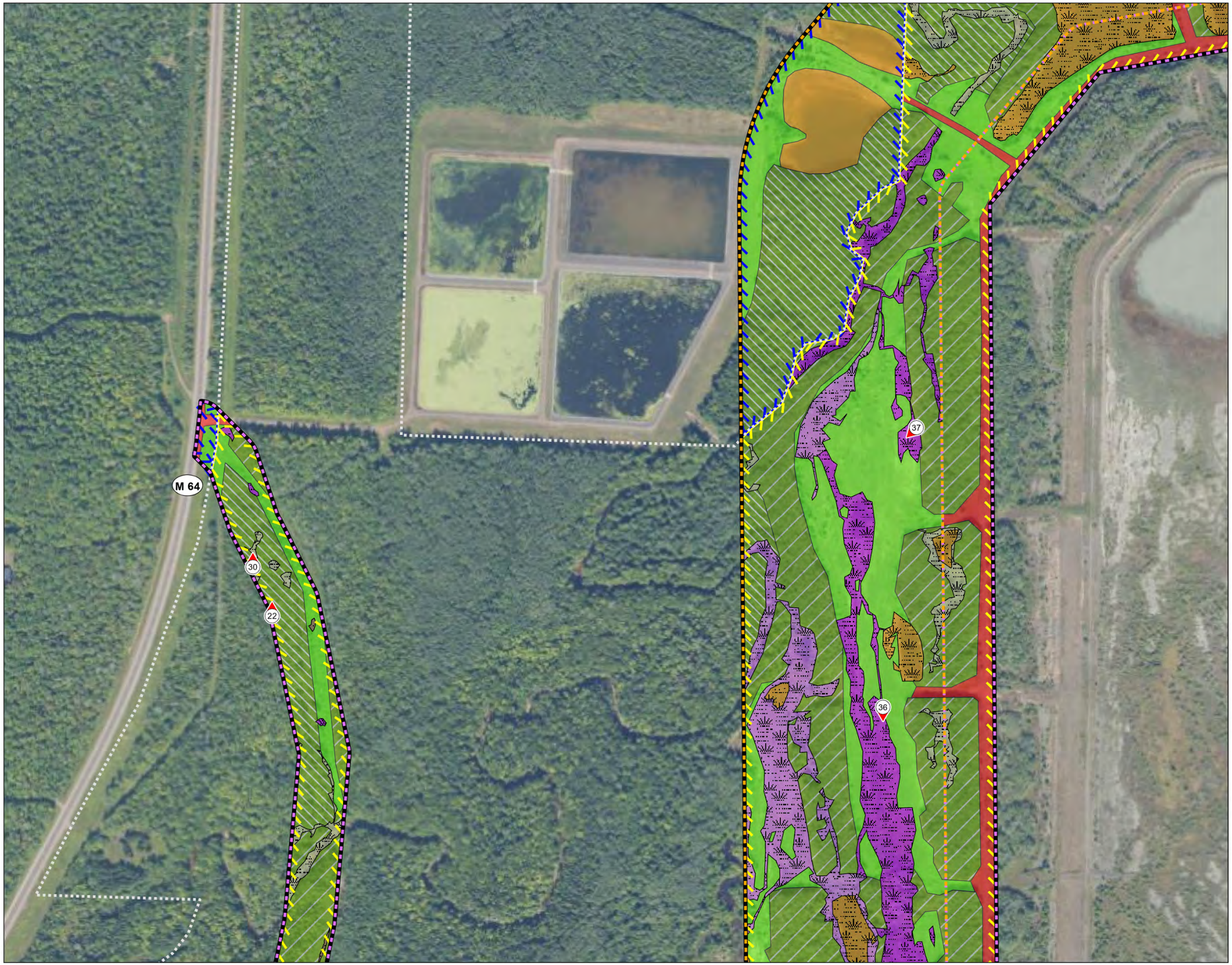


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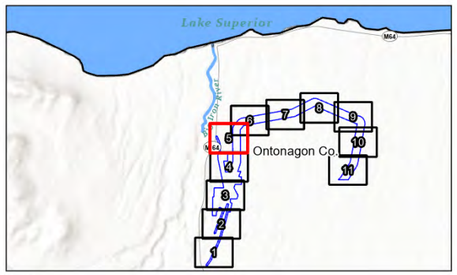
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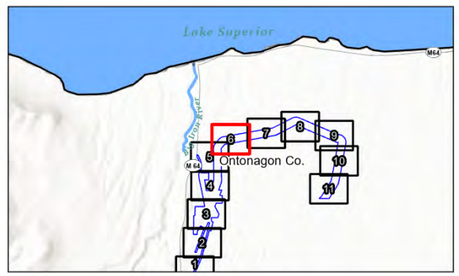
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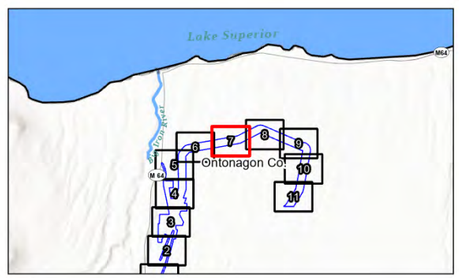
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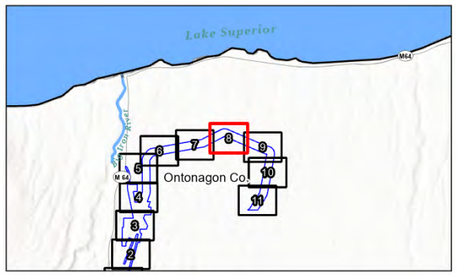
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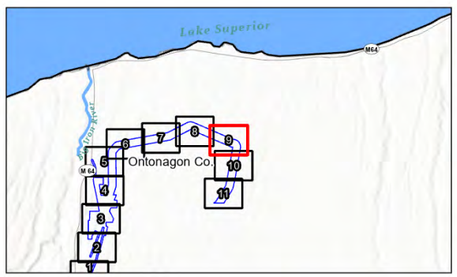
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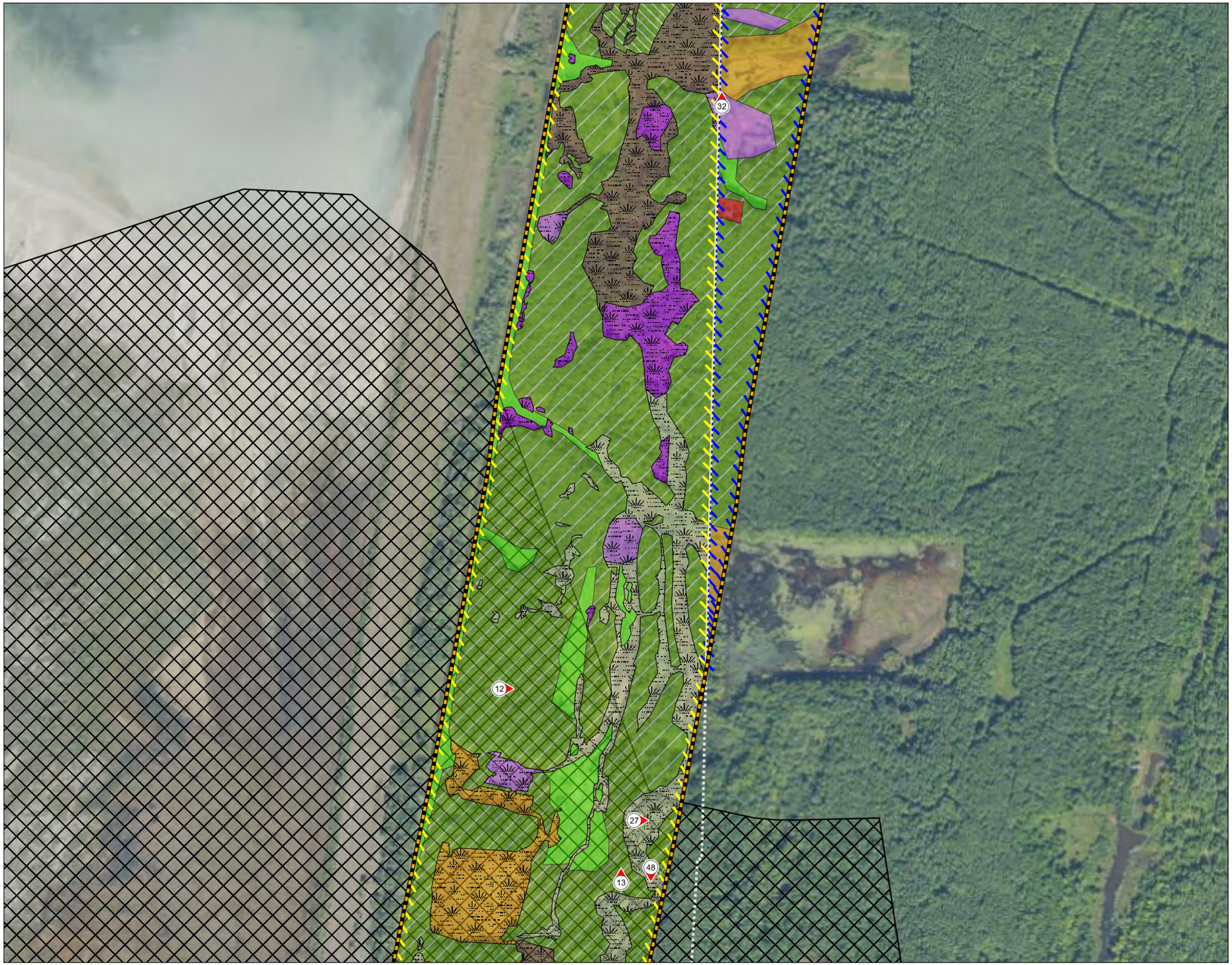


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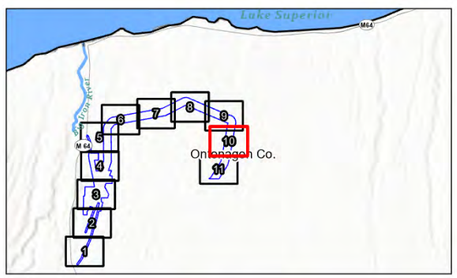
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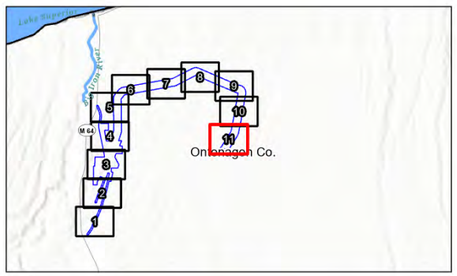
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Appendix B Table B-1. Rare Plant Species and Survey Periods

Table B-1. Rare Plant Species and Survey Periods

Species	Common Name	Taxon Group	MI State Status	US Status	Source	Habitat Description (MNFI)	Suitable Habitat in Survey Area?	Optimal Survey Period
								January / February / March / April / May / June / July / August / September / October / November / December
Adlumia fungosa	Climbing Fumitory	Plant	Threatened	--	MNFI	Gravelly or rocky Great Lakes shores, woods, thickets, glades, mesic southern forests and in dune complexes. Last observed in Ontonagon County in 1939.	potential	June, July, August, September
Astragalus canadensis	Canadian Milk Vetch	Plant	Special Concern	--	MNFI	Occurs in a variety of habitats including oak barrens, open areas in rich, moist soil over limestone, moist openings, wet ground, and sandy lake shores. Natural communities include boreal forest, mesic northern forest, northern shrub thicket.	yes	July, August
Cardamine maxima	Large Toothwort	Plant	Special Concern	--	MNFI	Found in rich deciduous hardwoods and locally in floodplains. Natural community types include mesic northern forest, floodplain forest.	yes	May, June, July
Collinsia parviflora	Small Blue-eyed Mary	Plant	Special Concern	--	MNFI	Bedrock outcrops in western Upper Peninsula, where it occurs on open, rocky ridge tops and cliff summits on thin, bare soil formed by eroding bedrock, and sometimes around the edges of low shrubs.	potential - only if rock outcrops are present	May, June, July
Crataegus douglasii	Douglas's Hawthorn	Plant	Special Concern	--	MNFI	Found on rocky and bedrock outcrop shorelines in northern Michigan (conglomerate or basalt substrates). Also known from thin-soiled bedrock glades and balds in near-shore areas and hilltops, often in shrubby thickets. This species often persists in disturbed areas. Natural communities include boreal forest, mesic northern forest. Known from Bonanza Falls, approx. 1 mile NW of Study Area.	potential	June, July, August, September
Dryopteris filix-mas	Male Fern	Plant	Special Concern	--	MNFI	Rocky, sheltered sites (cliffs, sinkholes, ravines, crevices) in mixed northern hardwood forests in the northern Lower Peninsula and Upper Peninsula. It often occurs on limestone bedrock, but is not restricted to calcareous substrates. Natural communities include boreal forest, mesic northern forest, cliff, glade, and sinkholes.	potential	July, August
Galearis spectabilis	Showy Orchis	Plant	Threatened	--	MNFI	rich deciduous woods, often near temporary spring ponds in sandy clay or rich loam soils, or in shady, rich microhabitats alongside common spring ephemerals. Vigorous colonies can spread into more open habitat. Natural communities include mesic northern forest, floodplain forest.	yes	May, June
Mertensia paniculata	Northern Bluebell	Plant	Special Concern	--	MNFI	This species is limited to the northwestern Upper Peninsula, where it is primarily found in conifer and hardwood-conifer swamps and rich upland forests and occasionally occurs in hardwood stands. In swamps, it may often be found on drier, sphagnum hummocks, while in upland forests it is generally found in cool, moist microhabitats, including drainages, shaded moist depressions, wet seepage areas, near or along rivers, and areas of filtered light. Natural communities include Hardwood-conifer swamp, mesic northern forest, and rich conifer swamp.	yes	May, June, July
Mimulus guttatus	Western Monkeyflower	Plant	Special Concern	--	MNFI	In and along cold, calcium-rich springs, seeps, and streams.	potential - coordination with Aquatic Survey team is required	June, July, August
Potamogeton vaseyi	Vasey's Pondweed	Plant	Threatened	--	MNFI	Small lakes, recorded water depths of 6 and 12-15 feet, occurring in moderately alkaline or soft waters.	potential - if small lakes are present (coordination with Aquatic Survey team)	June, July, August
Ribes oxyacanthoides	Northern Gooseberry	Plant	Special Concern	--	MNFI	igneous bedrock outcrops in the western Upper Peninsula - natural communities include glade, bald, lakeshore, and cliff	unlikely - last recorded in Ontonagon Co. in 1950, in the Porcupine Mts.	June, July

Appendix C 2024 MEANDER SURVEY SPECIES LISTS

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Emergent Marsh

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Agrostis gigantea	redtop	non-native	grass	0	2
Alisma triviale	northern water-plantain	native	forb	1	2
Barbarea vulgaris	yellow rocket	non-native	forb	0	1
Callitriche palustris	water-starwort	native	forb	6	1
Campanula aparinoides	marsh bellflower	native	forb	7	1
Carex bebbii	sedge	native	sedge	4	2
Carex comosa	sedge	native	sedge	5	1
Carex gynandra	sedge	native	sedge	3	2
Carex oligosperma	sedge	native	sedge	10	2
Carex pseudo-cyperus	sedge	native	sedge	5	2
Carex retrorsa	sedge	native	sedge	3	2
Cicuta bulbifera	water hemlock	native	forb	5	2
Cicuta maculata	water hemlock	native	forb	4	1
Cladium mariscoides	twig-rush	native	sedge	10	1
Dulichium arundinaceum	three-way sedge	native	sedge	8	1
Eleocharis acicularis	spike-rush	native	sedge	7	1
Eleocharis erythropoda	spike-rush	native	sedge	4	2
Eleocharis obtusa	spike-rush	native	sedge	3	1
Eleocharis palustris	spike-rush	native	sedge	5	2
Epilobium ciliatum	willow-herb	native	forb	3	1
Epilobium coloratum	cinnamon willow-herb	native	forb	3	1
Epilobium leptophyllum	fen willow-herb	native	forb	6	1
Equisetum arvense	common horsetail	native	fern	0	2
Equisetum fluviatile	water horsetail	native	fern	7	1
Equisetum variegatum	variegated scouring rush	native	fern	6	10
Eupatorium perfoliatum	boneset	native	forb	4	2
Galium tinctorium	stiff bedstraw	native	forb	5	1
Glyceria grandis	reed manna grass	native	grass	6	1
Iris versicolor	wild blue flag	native	forb	5	1
Juncus canadensis	canadian rush	native	rush	6	1
Juncus effusus	soft-stemmed rush	native	rush	3	1
Leersia oryzoides	cut grass	native	grass	3	1
Ludwigia palustris	water-purslane	native	forb	4	1
Lycopus americanus	common water horehound	native	forb	2	2
Mentha canadensis	wild mint	native	forb	3	1
Mimulus ringens	monkey-flower	native	forb	5	1
Phalaris arundinacea	reed canary grass	native	grass	0	2
Plantago rugelii	red-stalked plantain	native	forb	0	1
Polygonum aviculare	knotweed	non-native	forb	0	1
Ranunculus pensylvanicus	bristly crowfoot	native	forb	6	1
Rorippa palustris	yellow cress	native	forb	1	1
Rumex obtusifolius	bitter dock	non-native	forb	0	1
Sagittaria latifolia	common arrowhead	native	forb	4	1
Salix lucida	shining willow	native	shrub	3	2
Schoenoplectus tabernaemontani	softstem bulrush	native	sedge	4	4
Scirpus cyperinus	wool-grass	native	sedge	5	4
Scutellaria lateriflora	mad-dog skullcap	native	forb	5	1
Sium suave	water-parsnip	native	forb	5	1
Sparganium americanum	american bur-reed	native	forb	6	2
Symphyotrichum lateriflorum	calico aster	native	forb	2	1

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Emergent Marsh

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Typha x glauca	hybrid cat-tail	non-native	forb	0	60
Verbena hastata	blue vervain	native	forb	4	1

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	47	4.4	30.2	
All Species	52	4.0	28.8	2.4

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Mesic Northern Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Abies balsamea	balsam fir	native	tree	3	2
Acer negundo	box-elder	native	tree	0	2
Acer rubrum	red maple	native	tree	1	15
Acer saccharum	sugar maple	native	tree	5	15
Achillea millefolium	yarrow	native	forb	1	1
Actaea pachypoda	dolls-eyes	native	forb	7	1
Actaea rubra	red baneberry	native	forb	7	1
Agrimonia gryposepala	tall agrimony	native	forb	2	1
Agrostis gigantea	redtop	non-native	grass	0	2
Allium tricoccum	wild leek	native	forb	5	1
Amelanchier laevis	smooth shadbush	native	tree	4	1
Anaphalis margaritacea	pearly everlasting	native	forb	3	1
Anemone canadensis	canada anemone	native	forb	4	1
Anemone quinquefolia	wood anemone	native	forb	5	1
Apocynum androsaemifolium	spreading dogbane	native	forb	3	2
Aralia nudicaulis	wild sarsaparilla	native	forb	5	25
Aralia racemosa	spikenard	native	forb	8	1
Arctium minus	common burdock	non-native	forb	0	2
Arisaema triphyllum	jack-in-the-pulpit	native	forb	5	2
Asarum canadense	wild-ginger	native	forb	5	1
Asclepias syriaca	common milkweed	native	forb	1	1
Athyrium filix-femina	lady fern	native	fern	4	5
Betula alleghaniensis	yellow birch	native	tree	7	1
Betula papyrifera	paper birch	native	tree	2	10
Botrychium matricariifolium	daisy-leaved moonwort	native	fern	5	1
Botrypus virginianus	rattlesnake fern	native	fern	5	1
Brachyelytrum aristosum	northern shorthusk	native	grass	7	1
Carex arctata	sedge	native	sedge	3	1
Carex bromoides	sedge	native	sedge	6	1
Carex communis	sedge	native	sedge	2	1
Carex deflexa	sedge	native	sedge	5	1
Carex deweyana	sedge	native	sedge	3	1
Carex gracillima	sedge	native	sedge	4	2
Carex gynandra	sedge	native	sedge	3	1
Carex hirtifolia	sedge	native	sedge	5	1
Carex intumescens	sedge	native	sedge	3	1
Carex leptonervia	sedge	native	sedge	3	2
Carex ormostachya	sedge	native	sedge	5	1
Carex peckii	sedge	native	sedge	3	1
Carex pedunculata	sedge	native	sedge	5	1
Carpinus caroliniana	blue-beech	native	tree	6	1
Chamerion angustifolium	fireweed	native	forb	3	1
Circaea canadensis	enchanters-nightshade	native	forb	2	1
Cirsium arvense	canada thistle	non-native	forb	0	1
Clematis virginiana	virgins bower	native	vine	4	1
Clinopodium vulgare	wild-basil	native	forb	3	1
Clintonia borealis	bluebead-lily; corn-lily	native	forb	5	1
Coptis trifolia	goldthread	native	forb	5	1
Corallorhiza maculata	spotted coral-root	native	forb	5	1
Cornus alternifolia	alternate-leaved dogwood	native	tree	5	1

2024 Meander Survey Species List - Mesic Northern Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Cornus canadensis	bunchberry	native	shrub	6	1
Corylus cornuta	beaked hazelnut	native	shrub	5	5
Cryptotaenia canadensis	honewort	native	forb	2	1
Cystopteris fragilis	fragile fern	native	fern	4	1
Daucus carota	queen-annes-lace	non-native	forb	0	1
Dendrolycopodium dendroideum	tree clubmoss	native	fern	5	1
Dendrolycopodium hickeyi	pennsylvania clubmoss	native	fern	5	1
Dianthus armeria	deptford pink	non-native	forb	0	1
Diervilla lonicera	bush-honeysuckle	native	shrub	4	1
Dirca palustris	leatherwood	native	shrub	8	1
Dryopteris carthusiana	spinulose woodfern	native	fern	5	1
Dryopteris intermedia	evergreen woodfern	native	fern	5	1
Elymus hystrix	bottlebrush grass	native	grass	5	1
Epilobium ciliatum	willow-herb	native	forb	3	1
Epipactis helleborine	helleborine	non-native	forb	0	1
Equisetum arvense	common horsetail	native	fern	0	1
Equisetum hyemale	scouring rush	native	fern	2	1
Equisetum scirpoides	dwarf scouring rush	native	fern	7	1
Erythronium americanum	yellow trout lily	native	forb	5	15
Eurybia macrophylla	big-leaved aster	native	forb	4	10
Fallopia cilinodis	fringed false buckwheat	native	vine	3	1
Festuca subverticillata	nodding fescue	native	grass	5	1
Fragaria virginiana	wild strawberry	native	forb	2	2
Fraxinus americana	white ash	native	tree	5	10
Galeopsis tetrahit	hemp-nettle	non-native	forb	0	1
Galium aparine	annual bedstraw	native	forb	0	1
Galium boreale	northern bedstraw	native	forb	3	1
Galium triflorum	fragrant bedstraw	native	forb	4	2
Geum canadense	white avens	native	forb	1	2
Geum fragarioides	barren-strawberry	native	forb	6	1
Geum laciniatum	rough avens	native	forb	2	1
Goodyera oblongifolia	menzies rattlesnake plantain	native	forb	8	1
Halenia deflexa	spurred gentian	native	forb	7	1
Hepatica americana	round-lobed hepatica	native	forb	6	1
Hieracium piloselloides	king devil	non-native	forb	0	2
Hypopitys monotropa	pinesap	native	forb	6	1
Juncus compressus	rush	non-native	rush	0	1
Juniperus communis	common or ground juniper	native	shrub	4	1
Lapsana communis	nipplewort	non-native	forb	0	1
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0	1
Lilium michiganense	michigan lily	native	forb	5	1
Lobelia inflata	indian-tobacco	native	forb	0	1
Lonicera canadensis	canadian fly honeysuckle	native	shrub	5	1
Lonicera tatarica	tartarian honeysuckle	non-native	shrub	0	1
Lotus corniculatus	birdfoot trefoil	non-native	forb	0	1
Luzula acuminata	hairy wood rush	native	rush	5	1
Lysimachia ciliata	fringed loosestrife	native	forb	4	1
Maianthemum canadense	canada mayflower	native	forb	4	5
Maianthemum racemosum	false spikenard	native	forb	5	1
Malaxis unifolia	green adders-mouth	native	forb	8	1

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2024 Meander Survey Species List - Mesic Northern Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Matteuccia struthiopteris	ostrich fern	native	fern	3	1
Melampyrum lineare	cow-wheat	native	forb	6	1
Milium effusum	wood millet	native	grass	8	1
Mitchella repens	partridge-berry	native	forb	5	1
Mitella nuda	naked miterwort	native	forb	8	1
Onoclea sensibilis	sensitive fern	native	fern	2	1
Oryzopsis asperifolia	rough-leaved rice-grass	native	grass	6	2
Osmorhiza berteroi	sweet-cicely	native	forb	5	1
Osmorhiza claytonii	hairy sweet-cicely	native	forb	4	1
Osmunda claytoniana	interrupted fern	native	fern	6	1
Ostrya virginiana	ironwood; hop-hornbeam	native	tree	5	1
Packera aurea	golden ragwort	native	forb	5	1
Parthenocissus quinquefolia	virginia creeper	native	vine	5	1
Petasites frigidus	sweet-coltsfoot	native	forb	10	1
Phegopteris connectilis	northern beech-fern	native	fern	5	1
Picea glauca	white spruce	native	tree	3	1
Pinus strobus	white pine	native	tree	3	1
Poa alsodes	bluegrass	native	grass	9	1
Poa saltuensis	bluegrass	native	grass	5	1
Polygala paucifolia	gay-wings	native	forb	7	1
Polygonatum pubescens	downy solomon seal	native	forb	5	1
Populus balsamifera	balsam poplar	native	tree	2	1
Populus grandidentata	big-tooth aspen	native	tree	4	1
Populus tremuloides	quaking aspen	native	tree	1	60
Prunus pensylvanica	pin cherry	native	tree	3	1
Prunus serotina	wild black cherry	native	tree	2	2
Prunus virginiana	choke cherry	native	shrub	2	1
Pteridium aquilinum	bracken fern	native	fern	0	8
Pyrola elliptica	large-leaved shinleaf	native	forb	6	1
Quercus rubra	red oak	native	tree	5	2
Ranunculus abortivus	small-flowered buttercup	native	forb	0	1
Ranunculus acris	tall or common buttercup	non-native	forb	0	1
Ranunculus recurvatus	hooked crowfoot	native	forb	5	1
Ribes cynosbati	prickly or wild gooseberry	native	shrub	4	1
Ribes hirtellum	swamp gooseberry	native	shrub	6	1
Ribes triste	swamp red currant	native	shrub	6	1
Rubus allegheniensis	common blackberry	native	shrub	1	2
Rubus parviflorus	thimbleberry	native	shrub	6	4
Rubus pubescens	dwarf raspberry	native	shrub	4	1
Rubus strigosus	wild red raspberry	native	shrub	2	5
Rumex obtusifolius	bitter dock	non-native	forb	0	1
Salix humilis	prairie willow	native	shrub	4	1
Sambucus racemosa	red-berried elder	native	shrub	3	1
Sanguinaria canadensis	bloodroot	native	forb	5	1
Saponaria officinalis	bouncing bet	non-native	forb	0	1
Solidago canadensis	canada goldenrod	native	forb	1	1
Solidago flexicaulis	zigzag goldenrod	native	forb	6	1
Solidago gigantea	late goldenrod	native	forb	3	1
Spinulum annotinum	stiff clubmoss	native	fern	5	1
Spiranthes casei	cases ladies-tresses	native	forb	8	1

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2024 Meander Survey Species List - Mesic Northern Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Symphyotrichum lateriflorum	calico aster	native	forb	2	1
Taraxacum officinale	common dandelion	non-native	forb	0	1
Thalictrum dasycarpum	purple meadow-rue	native	forb	3	1
Tilia americana	basswood	native	tree	5	1
Toxicodendron radicans	poison-ivy	native	vine	2	1
Trientalis borealis	star-flower	native	forb	5	1
Trifolium pratense	red clover	non-native	forb	0	1
Trillium cernuum	nodding trillium	native	forb	5	1
Trillium grandiflorum	common trillium	native	forb	5	1
Triosteum aurantiacum	horse-gentian	native	forb	5	1
Tsuga canadensis	hemlock	native	tree	5	1
Ulmus americana	american elm	native	tree	1	1
Uvularia grandiflora	bellwort	native	forb	5	1
Uvularia sessilifolia	merrybells	native	forb	5	1
Veronica officinalis	common speedwell	non-native	forb	0	1
Vicia villosa	hairy vetch	non-native	vine	0	1
Viola blanda	sweet white violet	native	forb	5	1
Viola canadensis	canada violet	native	forb	5	1
Viola labradorica	dog violet	native	forb	3	1
Viola pubescens	yellow violet	native	forb	4	1

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	150	3.8	52.7	
All Species	170	4.3	49.5	3.3

2024 Meander Survey Species List - Mesic Northern Forest - Mature

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Abies balsamea	balsam fir	native	tree	3	5
Acer rubrum	red maple	native	tree	1	10
Acer saccharum	sugar maple	native	tree	5	10
Acer spicatum	mountain maple	native	tree	5	1
Actaea rubra	red baneberry	native	forb	7	1
Amphicarpaea bracteata	hog-peanut	native	vine	5	2
Anemone canadensis	canada anemone	native	forb	4	1
Anemone quinquefolia	wood anemone	native	forb	5	1
Aquilegia canadensis	wild columbine	native	forb	5	1
Aralia nudicaulis	wild sarsaparilla	native	forb	5	8
Arctium minus	common burdock	non-native	forb	0	1
Arisaema triphyllum	jack-in-the-pulpit	native	forb	5	1
Athyrium filix-femina	lady fern	native	fern	4	5
Berberis thunbergii	japanese barberry	non-native	shrub	0	1
Betula alleghaniensis	yellow birch	native	tree	7	5
Brachyelytrum aristosum	northern shorthusk	native	grass	7	2
Circaea alpina	small enchanters-nightshade	native	forb	4	1
Clintonia borealis	bluebead-lily; corn-lily	native	forb	5	2
Corylus cornuta	beaked hazelnut	native	shrub	5	8
Dirca palustris	leatherwood	native	shrub	8	1
Dryopteris carthusiana	spinulose woodfern	native	fern	5	2
Dryopteris intermedia	evergreen woodfern	native	fern	5	3
Elymus hystrix	bottlebrush grass	native	grass	5	1
Epipactis helleborine	helleborine	non-native	forb	0	1
Equisetum arvense	common horsetail	native	fern	0	1
Equisetum scirpoides	dwarf scouring rush	native	fern	7	1
Equisetum sylvaticum	woodland horsetail	native	fern	5	1
Eurybia macrophylla	big-leaved aster	native	forb	4	1
Galium asprellum	rough bedstraw	native	vine	5	1
Gaultheria procumbens	wintergreen	native	shrub	5	1
Gymnocarpium dryopteris	oak fern	native	fern	5	10
Hamamelis virginiana	witch-hazel	native	shrub	5	1
Laportea canadensis	wood nettle	native	forb	4	1
Lathyrus ochroleucus	pale vetchling	native	vine	8	1
Lonicera canadensis	canadian fly honeysuckle	native	shrub	5	2
Maianthemum canadense	canada mayflower	native	forb	4	10
Maianthemum racemosum	false spikenard	native	forb	5	1
Matteuccia struthiopteris	ostrich fern	native	fern	3	5
Mitchella repens	partridge-berry	native	forb	5	1
Oryzopsis asperifolia	rough-leaved rice-grass	native	grass	6	2
Osmunda claytoniana	interrupted fern	native	fern	6	1
Ostrya virginiana	ironwood; hop-hornbeam	native	tree	5	5
Oxalis acetosella	northern wood-sorrel	native	forb	7	1
Parthenocissus quinquefolia	virginia creeper	native	vine	5	1
Phegopteris connectilis	northern beech-fern	native	fern	5	1
Polygonatum pubescens	downy solomon seal	native	forb	5	1
Prenanthes alba	white lettuce	native	forb	5	1
Prunus virginiana	choke cherry	native	shrub	2	1
Pteridium aquilinum	bracken fern	native	fern	0	3
Ribes cynosbati	prickly or wild gooseberry	native	shrub	4	1

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2024 Meander Survey Species List - Mesic Northern Forest - Mature

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Ribes triste	swamp red currant	native	shrub	6	1
Rubus parviflorus	thimbleberry	native	shrub	6	1
Sambucus racemosa	red-berried elder	native	shrub	3	1
Sanicula marilandica	black snakeroot	native	forb	4	1
Schizachne purpurascens	false melic	native	grass	5	1
Solanum dulcamara	bittersweet nightshade	non-native	vine	0	1
Solidago flexicaulis	zigzag goldenrod	native	forb	6	1
Streptopus lanceolatus	rose twisted-stalk	native	forb	5	1
Taxus canadensis	yew	native	shrub	5	1
Thalictrum dasycarpum	purple meadow-rue	native	forb	3	1
Thelypteris palustris	marsh fern	native	fern	2	1
Thuja occidentalis	arbor vitae	native	tree	4	1
Trillium cernuum	nodding trillium	native	forb	5	1
Tsuga canadensis	hemlock	native	tree	5	40

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	60	4.7	36.4	
All Species	64	4.4	35.2	4.5

White Pine North Project
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2024 Meander Survey Species List - Northern Hardwood Swamp

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Abies balsamea	balsam fir	native	tree	3	2
Acer rubrum	red maple	native	tree	1	30
Alisma triviale	northern water-plantain	native	forb	1	1
Alnus incana	speckled alder	native	shrub	5	2
Anemone canadensis	canada anemone	native	forb	4	1
Athyrium filix-femina	lady fern	native	fern	4	1
Betula alleghaniensis	yellow birch	native	tree	7	1
Bidens comosa	swamp tickseed	native	forb	5	1
Bidens frondosa	common beggar-ticks	native	forb	1	1
Brachyelytrum aristosum	northern shorthusk	native	grass	7	1
Bromus ciliatus	fringed brome	native	grass	6	1
Caltha palustris	marsh-marigold	native	forb	6	1
Carex crinita	sedge	native	sedge	4	1
Carex gynandra	sedge	native	sedge	3	8
Carex intumescens	sedge	native	sedge	3	2
Carex lupulina	sedge	native	sedge	4	1
Carex stipata	sedge	native	sedge	1	1
Carex trisperma	sedge	native	sedge	9	1
Carex tuckermanii	sedge	native	sedge	8	1
Chelone glabra	turtlehead	native	forb	7	1
Circaea alpina	small enchanters-nightshade	native	forb	4	1
Cornus sericea	red-osier	native	shrub	2	1
Dryopteris intermedia	evergreen woodfern	native	fern	5	1
Eleocharis acicularis	spike-rush	native	sedge	7	1
Epilobium ciliatum	willow-herb	native	forb	3	1
Epilobium coloratum	cinnamon willow-herb	native	forb	3	1
Equisetum arvense	common horsetail	native	fern	0	5
Equisetum hyemale	scouring rush	native	fern	2	1
Erigeron philadelphicus	philadelphia fleabane	native	forb	2	1
Fraxinus nigra	black ash	native	tree	6	2
Glyceria striata	fowl manna grass	native	grass	4	1
Gymnocarpium dryopteris	oak fern	native	fern	5	1
Impatiens capensis	spotted touch-me-not	native	forb	2	4
Juncus effusus	soft-stemmed rush	native	rush	3	1
Lycopus uniflorus	northern bugle weed	native	forb	2	5
Lysimachia thyrsiflora	tufted loosestrife	native	forb	6	1
Matteuccia struthiopteris	ostrich fern	native	fern	3	1
Mentha canadensis	wild mint	native	forb	3	1
Monotropa uniflora	indian-pipe	native	forb	5	1
Onoclea sensibilis	sensitive fern	native	fern	2	2
Osmunda cinnamomea	cinnamon fern	native	fern	5	1
Osmunda regalis	royal fern	native	fern	5	1
Parthenocissus inserta	thicket creeper	native	vine	4	1
Poa palustris	fowl meadow grass	native	grass	3	1
Populus tremuloides	quaking aspen	native	tree	1	10
Ranunculus hispidus	swamp buttercup	native	forb	5	1
Rubus pubescens	dwarf raspberry	native	shrub	4	1
Salix discolor	pussy willow	native	shrub	1	1
Salix petiolaris	slender willow	native	shrub	1	1
Scirpus cyperinus	wool-grass	native	sedge	5	5

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2024 Meander Survey Species List - Northern Hardwood Swamp

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Scutellaria lateriflora	mad-dog skullcap	native	forb	5	5
Sium suave	water-parsnip	native	forb	5	2
Solanum dulcamara	bittersweet nightshade	non-native	vine	0	1
Solidago gigantea	late goldenrod	native	forb	3	8
Thalictrum dasycarpum	purple meadow-rue	native	forb	3	1
Thuja occidentalis	arbor vitae	native	tree	4	1
Torreyochloa fernaldii	fernalds false mannagrass	native	grass	6	1
Trientalis borealis	star-flower	native	forb	5	1
Typha x glauca	hybrid cat-tail	non-native	forb	0	1

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	57	3.9	29.4	
All Species	59	3.8	29.2	2.8

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2024 Meander Survey Species List - Northern Shrub Thicket

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Acer rubrum	red maple	native	tree	1	2
Alnus incana	speckled alder	native	shrub	5	50
Anemone canadensis	canada anemone	native	forb	4	2
Calamagrostis canadensis	blue-joint	native	grass	3	1
Caltha palustris	marsh-marigold	native	forb	6	1
Carex aurea	sedge	native	sedge	3	1
Carex crinita	sedge	native	sedge	4	3
Carex pellita	sedge	native	sedge	2	1
Carex stricta	sedge	native	sedge	4	1
Clematis virginiana	virgins bower	native	vine	4	1
Cornus sericea	red-osier	native	shrub	2	2
Daucus carota	queen-annes-lace	non-native	forb	0	1
Epilobium coloratum	cinnamon willow-herb	native	forb	3	1
Equisetum arvense	common horsetail	native	fern	0	10
Equisetum fluviatile	water horsetail	native	fern	7	5
Equisetum variegatum	variegated scouring rush	native	fern	6	10
Eutrochium maculatum	joe-pye-weed	native	forb	4	1
Fragaria virginiana	wild strawberry	native	forb	2	2
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0	1
Lotus corniculatus	birdfoot trefoil	non-native	forb	0	1
Onoclea sensibilis	sensitive fern	native	fern	2	2
Osmunda claytoniana	interrupted fern	native	fern	6	3
Poa palustris	fowl meadow grass	native	grass	3	2
Prunella vulgaris	self-heal	native	forb	0	2
Ribes triste	swamp red currant	native	shrub	6	1
Rumex crispus	curly dock	non-native	forb	0	1
Salix bebbiana	bebbs willow	native	shrub	1	10
Salix eriocephala	willow	native	shrub	2	20
Salix lucida	shining willow	native	shrub	3	5
Salix petiolaris	slender willow	native	shrub	1	5
Scirpus atrovirens	bulrush	native	sedge	3	2
Scirpus cyperinus	wool-grass	native	sedge	5	2
Scutellaria lateriflora	mad-dog skullcap	native	forb	5	1
Symphyotrichum lanceolatum	panicled aster	native	forb	2	2
Typha x glauca	hybrid cat-tail	non-native	forb	0	2

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	30	3.4	18.1	
All Species	35	2.8	16.6	3.4

White Pine North Project
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2024 Meander Survey Species List - Northern Wet Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Abies balsamea	balsam fir	native	tree	3	1
Acer negundo	box-elder	native	tree	0	1
Agalinis purpurea	purple false foxglove	native	forb	7	1
Agrostis gigantea	redtop	non-native	grass	0	30
Alisma triviale	northern water-plantain	native	forb	1	1
Alnus incana	speckled alder	native	shrub	5	1
Anemone canadensis	canada anemone	native	forb	4	2
Asclepias incarnata	swamp milkweed	native	forb	6	1
Asclepias syriaca	common milkweed	native	forb	1	1
Betula alleghaniensis	yellow birch	native	tree	7	1
Calamagrostis canadensis	blue-joint	native	grass	3	1
Carex aurea	sedge	native	sedge	3	4
Carex bebbii	sedge	native	sedge	4	2
Carex crinita	sedge	native	sedge	4	1
Carex granularis	sedge	native	sedge	2	2
Carex hystericina	sedge	native	sedge	2	1
Carex intumescens	sedge	native	sedge	3	1
Carex pellita	sedge	native	sedge	2	1
Carex projecta	sedge	native	sedge	3	1
Carex pseudo-cyperus	sedge	native	sedge	5	1
Carex retrorsa	sedge	native	sedge	3	1
Carex scoparia	sedge	native	sedge	4	1
Carex stipata	sedge	native	sedge	1	1
Carex stricta	sedge	native	sedge	4	1
Carex viridula	sedge	native	sedge	4	2
Carex vulpinoidea	sedge	native	sedge	1	1
Cirsium arvense	canada thistle	non-native	forb	0	2
Clematis virginiana	virgins bower	native	vine	4	1
Cornus sericea	red-osier	native	shrub	2	1
Daucus carota	queen-annes-lace	non-native	forb	0	2
Epilobium ciliatum	willow-herb	native	forb	3	1
Epilobium coloratum	cinnamon willow-herb	native	forb	3	1
Equisetum arvense	common horsetail	native	fern	0	4
Equisetum hyemale	scouring rush	native	fern	2	2
Equisetum sylvaticum	woodland horsetail	native	fern	5	1
Equisetum variegatum	variegated scouring rush	native	fern	6	30
Eriophorum angustifolium	narrow-leaved cotton-grass	native	sedge	10	1
Eupatorium perfoliatum	boneset	native	forb	4	2
Euphorbia maculata	spotted spurge	native	forb	0	1
Euthamia graminifolia	grass-leaved goldenrod	native	forb	3	2
Eutrochium maculatum	joe-pye-weed	native	forb	4	1
Fragaria virginiana	wild strawberry	native	forb	2	3
Geum laciniatum	rough avens	native	forb	2	1
Glyceria canadensis	rattlesnake grass	native	grass	8	1
Glyceria striata	fowl manna grass	native	grass	4	1
Impatiens capensis	spotted touch-me-not	native	forb	2	1
Juncus alpinoarticulatus	rush	native	rush	5	10
Juncus balticus	rush	native	rush	4	1
Juncus bufonius	toad rush	native	rush	2	1
Juncus dudleyi	dudleys rush	native	rush	1	1
Juncus effusus	soft-stemmed rush	native	rush	3	1

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Northern Wet Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Leersia oryzoides	cut grass	native	grass	3	1
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0	1
Lilium michiganense	michigan lily	native	forb	5	1
Liparis loeselii	loesels twayblade	native	forb	5	1
Lobelia siphilitica	great blue lobelia	native	forb	4	1
Lotus corniculatus	birdfoot trefoil	non-native	forb	0	2
Lycopus americanus	common water horehound	native	forb	2	1
Lycopus uniflorus	northern bugle weed	native	forb	2	1
Muhlenbergia mexicana	leafy satin grass	native	grass	3	1
Onoclea sensibilis	sensitive fern	native	fern	2	1
Persicaria amphibia	water smartweed	native	forb	6	1
Persicaria maculosa	ladys-thumb	non-native	forb	0	1
Phalaris arundinacea	reed canary grass	native	grass	0	1
Phleum pratense	timothy	non-native	grass	0	1
Poa palustris	fowl meadow grass	native	grass	3	1
Prunella vulgaris	self-heal	native	forb	0	1
Ranunculus acris	tall or common buttercup	non-native	forb	0	1
Ranunculus recurvatus	hooked crowfoot	native	forb	5	1
Rubus strigosus	wild red raspberry	native	shrub	2	1
Rumex crispus	curly dock	non-native	forb	0	1
Salix bebbiana	bebbs willow	native	shrub	1	4
Salix eriocephala	willow	native	shrub	2	8
Salix exigua	sandbar willow	native	shrub	1	1
Salix lucida	shining willow	native	shrub	3	2
Salix petiolaris	slender willow	native	shrub	1	2
Scirpus atrovirens	bulrush	native	sedge	3	1
Scirpus cyperinus	wool-grass	native	sedge	5	1
Scirpus microcarpus	bulrush	native	sedge	5	1
Scutellaria lateriflora	mad-dog skullcap	native	forb	5	1
Setaria pumila	yellow foxtail	non-native	grass	0	1
Sisyrinchium montanum	mountain blue-eyed-grass	native	forb	4	1
Solidago canadensis	canada goldenrod	native	forb	1	1
Sparganium americanum	american bur-reed	native	forb	6	1
Sparganium emersum	green-fruited bur-reed	native	forb	6	1
Spiranthes cernua	nodding ladies-tresses	native	forb	4	1
Stellaria longifolia	long-leaved chickweed	native	forb	5	1
Symphyotrichum lanceolatum	panicled aster	native	forb	2	1
Torreyochloa fernaldii	fernalds false mannagrass	native	grass	6	1
Toxicodendron radicans	poison-ivy	native	vine	2	1
Tsuga canadensis	hemlock	native	tree	5	1
Typha x glauca	hybrid cat-tail	non-native	forb	0	2
Urtica dioica	stinging nettle	native	forb	1	1

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	82	3.3	29.9	
All Species	93	2.9	28.0	2.9

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Submergent Marsh

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Brasenia schreberi	water-shield	native	forb	6	35
Ceratophyllum demersum	coontail	native	forb	1	2
Eleocharis acicularis	spike-rush	native	sedge	7	1
Eleocharis palustris	spike-rush	native	sedge	5	1
Equisetum fluviatile	water horsetail	native	fern	7	1
Lemna minor	common duckweed	native	forb	5	4
Myriophyllum sibiricum	spiked water-milfoil	native	forb	10	10
Najas flexilis	slender naiad	native	forb	5	2
Potamogeton amplifolius	large-leaved pondweed	native	forb	6	2
Potamogeton foliosus	leafy pondweed	native	forb	4	2
Potamogeton gramineus	pondweed	native	forb	5	4
Potamogeton natans	pondweed	native	forb	5	10
Sium suave	water-parsnip	native	forb	5	1
Sparganium americanum	american bur-reed	native	forb	6	1
Spirodela polyrhiza	greater duckweed	native	forb	6	2
Stuckenia pectinata	sago pondweed	native	forb	3	4
Utricularia vulgaris	common bladderwort	native	forb	6	4

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	17	5.4	22.3	
All Species	17	5.4	22.3	5.9

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Upland Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Achillea millefolium	yarrow	native	forb	1	1
Agrimonia gryposepala	tall agrimony	native	forb	2	1
Agrostis gigantea	redtop	non-native	grass	0	1
Ambrosia artemisiifolia	common ragweed	native	forb	0	1
Anaphalis margaritacea	pearly everlasting	native	forb	3	1
Anthoxanthum odoratum	sweet vernal grass	non-native	grass	0	1
Asclepias syriaca	common milkweed	native	forb	1	1
Botrychium simplex	least moonwort	native	fern	5	1
Bromus inermis	smooth brome	non-native	grass	0	1
Carex aurea	sedge	native	sedge	3	1
Carex granularis	sedge	native	sedge	2	1
Carex pallescens	pale sedge	native	sedge	5	1
Centaurea stoebe	spotted knapweed	non-native	forb	0	8
Chamerion angustifolium	fireweed	native	forb	3	1
Chenopodium album	lambs-quarters	non-native	forb	0	1
Clinopodium vulgare	wild-basil	native	forb	3	1
Conyza canadensis	horseweed	native	forb	0	1
Dactylis glomerata	orchard grass	non-native	grass	0	5
Danthonia spicata	poverty grass; oatgrass	native	grass	4	30
Daucus carota	queen-annes-lace	non-native	forb	0	5
Dianthus armeria	deptford pink	non-native	forb	0	1
Dichanthelium implicatum	panic grass	native	grass	3	1
Dysphania botrys	jerusalem-oak	non-native	forb	0	1
Elymus repens	quack grass	non-native	grass	0	1
Equisetum arvense	common horsetail	native	fern	0	5
Equisetum hyemale	scouring rush	native	fern	2	1
Euphrasia stricta	european eyebright	non-native	forb	0	1
Eurybia macrophylla	big-leaved aster	native	forb	4	1
Euthamia graminifolia	grass-leaved goldenrod	native	forb	3	1
Festuca rubra	red fescue	non-native	grass	0	1
Fragaria virginiana	wild strawberry	native	forb	2	30
Galium album	white bedstraw	non-native	forb	0	1
Hieracium piloselloides	king devil	non-native	forb	0	2
Hieracium umbellatum	northern hawkweed	native	forb	7	1
Hypericum perforatum	common st. johns-wort	non-native	forb	0	1
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0	2
Linaria vulgaris	butter-and-eggs	non-native	forb	0	1
Lotus corniculatus	birdfoot trefoil	non-native	forb	0	8
Medicago lupulina	black medick	non-native	forb	0	1
Medicago sativa	alfalfa	non-native	forb	0	1
Melilotus albus	white sweet-clover	non-native	forb	0	2
Melilotus officinalis	yellow sweet-clover	non-native	forb	0	1
Oenothera biennis	common evening-primrose	native	forb	2	1
Phalaris arundinacea	reed canary grass	native	grass	0	1
Phleum pratense	timothy	non-native	grass	0	2
Picea glauca	white spruce	native	tree	3	1
Plantago lanceolata	english plantain	non-native	forb	0	1
Poa compressa	canada bluegrass	non-native	grass	0	1
Poa pratensis	kentucky bluegrass	non-native	grass	0	2
Polygonum aviculare	knotweed	non-native	forb	0	1

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Upland Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value	Cover (%)
Populus balsamifera	balsam poplar	native	tree	2	1
Populus tremuloides	quaking aspen	native	tree	1	1
Potentilla recta	rough-fruited cinquefoil	non-native	forb	0	1
Prunella vulgaris	self-heal	native	forb	0	2
Prunus virginiana	choke cherry	native	shrub	2	1
Pteridium aquilinum	bracken fern	native	fern	0	1
Rubus allegheniensis	common blackberry	native	shrub	1	1
Rubus strigosus	wild red raspberry	native	shrub	2	1
Rudbeckia hirta	black-eyed susan	native	forb	1	2
Rumex obtusifolius	bitter dock	non-native	forb	0	1
Salix eriocephala	willow	native	shrub	2	1
Salix exigua	sandbar willow	native	shrub	1	1
Salix humilis	prairie willow	native	shrub	4	1
Schedonorus arundinaceus	tall fescue	non-native	grass	0	1
Scirpus atrovirens	bulrush	native	sedge	3	1
Solidago canadensis	canada goldenrod	native	forb	1	10
Solidago juncea	early goldenrod	native	forb	3	1
Solidago nemoralis	old-field goldenrod	native	forb	2	1
Symphyotrichum ciliolatum	northern heart-leaved aster	native	forb	4	1
Symphyotrichum lateriflorum	calico aster	native	forb	2	1
Symphyotrichum pilosum	hairy aster	native	forb	1	1
Taraxacum officinale	common dandelion	non-native	forb	0	1
Thlaspi arvense	penny cress	non-native	forb	0	1
Tragopogon pratensis	common goats beard	non-native	forb	0	1
Trifolium arvense	rabbitfoot clover	non-native	forb	0	1
Trifolium pratense	red clover	non-native	forb	0	1
Viola labradorica	dog violet	native	forb	3	1

FQA Metrics	Species Richness	Mean C Value	FQI	weighted Mean C
Native	42	1.6	14.3	
All Species	77	1.2	10.5	1.6

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Abies balsamea	balsam fir	native	tree	3
Acer negundo	box-elder	native	tree	0
Acer rubrum	red maple	native	tree	1
Acer saccharum	sugar maple	native	tree	5
Acer spicatum	mountain maple	native	tree	5
Achillea millefolium	yarrow	native	forb	1
Actaea pachypoda	dolls-eyes	native	forb	7
Actaea rubra	red baneberry	native	forb	7
Agalinis purpurea	purple false foxglove	native	forb	7
Agrimonia gryposepala	tall agrimony	native	forb	2
Agrostis gigantea	redtop	non-native	grass	0
Alisma triviale	northern water-plantain	native	forb	1
Allium tricoccum	wild leek	native	forb	5
Alnus incana	speckled alder	native	shrub	5
Ambrosia artemisiifolia	common ragweed	native	forb	0
Amelanchier laevis	smooth shadbush	native	tree	4
Amphicarpaea bracteata	hog-peanut	native	vine	5
Anaphalis margaritacea	pearly everlasting	native	forb	3
Anemone canadensis	canada anemone	native	forb	4
Anemone quinquefolia	wood anemone	native	forb	5
Anthoxanthum odoratum	sweet vernal grass	non-native	grass	0
Apocynum androsaemifolium	spreading dogbane	native	forb	3
Aquilegia canadensis	wild columbine	native	forb	5
Aralia nudicaulis	wild sarsaparilla	native	forb	5
Aralia racemosa	spikenard	native	forb	8
Arctium minus	common burdock	non-native	forb	0
Arisaema triphyllum	jack-in-the-pulpit	native	forb	5
Asarum canadense	wild-ginger	native	forb	5
Asclepias incarnata	swamp milkweed	native	forb	6
Asclepias syriaca	common milkweed	native	forb	1
Athyrium filix-femina	lady fern	native	fern	4
Barbarea vulgaris	yellow rocket	non-native	forb	0
Berberis thunbergii	japanese barberry	non-native	shrub	0
Betula alleghaniensis	yellow birch	native	tree	7
Betula papyrifera	paper birch	native	tree	2
Bidens comosa	swamp tickseed	native	forb	5
Bidens frondosa	common beggar-ticks	native	forb	1
Botrychium matricariifolium	daisy-leaved moonwort	native	fern	5
Botrychium simplex	least moonwort	native	fern	5
Botrypus virginianus	rattlesnake fern	native	fern	5
Brachyelytrum aristosum	northern shorthusk	native	grass	7
Brasenia schreberi	water-shield	native	forb	6
Bromus ciliatus	fringed brome	native	grass	6
Bromus inermis	smooth brome	non-native	grass	0
Calamagrostis canadensis	blue-joint	native	grass	3
Callitriche palustris	water-starwort	native	forb	6

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Caltha palustris	marsh-marigold	native	forb	6
Campanula aparinoides	marsh bellflower	native	forb	7
Carex arctata	sedge	native	sedge	3
Carex aurea	sedge	native	sedge	3
Carex bebbii	sedge	native	sedge	4
Carex bromoides	sedge	native	sedge	6
Carex communis	sedge	native	sedge	2
Carex comosa	sedge	native	sedge	5
Carex crinita	sedge	native	sedge	4
Carex deflexa	sedge	native	sedge	5
Carex deweyana	sedge	native	sedge	3
Carex gracillima	sedge	native	sedge	4
Carex granularis	sedge	native	sedge	2
Carex gynandra	sedge	native	sedge	3
Carex hirtifolia	sedge	native	sedge	5
Carex hystericina	sedge	native	sedge	2
Carex intumescens	sedge	native	sedge	3
Carex leptonervia	sedge	native	sedge	3
Carex lupulina	sedge	native	sedge	4
Carex oligosperma	sedge	native	sedge	10
Carex ormostachya	sedge	native	sedge	5
Carex pallescens	pale sedge	native	sedge	5
Carex peckii	sedge	native	sedge	3
Carex pedunculata	sedge	native	sedge	5
Carex pellita	sedge	native	sedge	2
Carex projecta	sedge	native	sedge	3
Carex pseudo-cyperus	sedge	native	sedge	5
Carex retrorsa	sedge	native	sedge	3
Carex scoparia	sedge	native	sedge	4
Carex stipata	sedge	native	sedge	1
Carex stricta	sedge	native	sedge	4
Carex trisperma	sedge	native	sedge	9
Carex tuckermanii	sedge	native	sedge	8
Carex viridula	sedge	native	sedge	4
Carex vulpinoidea	sedge	native	sedge	1
Carpinus caroliniana	blue-beech	native	tree	6
Centaurea stoebe	spotted knapweed	non-native	forb	0
Ceratophyllum demersum	coontail	native	forb	1
Chamerion angustifolium	fireweed	native	forb	3
Chelone glabra	turtlehead	native	forb	7
Chenopodium album	lambs-quarters	non-native	forb	0
Cicuta bulbifera	water hemlock	native	forb	5
Cicuta maculata	water hemlock	native	forb	4
Circaea alpina	small enchanters-nightshade	native	forb	4
Circaea canadensis	enchanters-nightshade	native	forb	2
Cirsium arvense	canada thistle	non-native	forb	0

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Cladium mariscoides	twig-rush	native	sedge	10
Clematis virginiana	virgins bower	native	vine	4
Clinopodium vulgare	wild-basil	native	forb	3
Clintonia borealis	bluebead-lily; corn-lily	native	forb	5
Conyza canadensis	horseweed	native	forb	0
Coptis trifolia	goldthread	native	forb	5
Corallorhiza maculata	spotted coral-root	native	forb	5
Cornus alternifolia	alternate-leaved dogwood	native	tree	5
Cornus canadensis	bunchberry	native	shrub	6
Cornus sericea	red-osier	native	shrub	2
Corylus cornuta	beaked hazelnut	native	shrub	5
Cryptotaenia canadensis	honewort	native	forb	2
Cystopteris fragilis	fragile fern	native	fern	4
Dactylis glomerata	orchard grass	non-native	grass	0
Danthonia spicata	poverty grass; oatgrass	native	grass	4
Daucus carota	queen-annes-lace	non-native	forb	0
Dendrolycopodium dendroideum	tree clubmoss	native	fern	5
Dendrolycopodium hickeyi	pennsylvania clubmoss	native	fern	5
Dianthus armeria	deptford pink	non-native	forb	0
Dichanthelium implicatum	panic grass	native	grass	3
Diervilla lonicera	bush-honeysuckle	native	shrub	4
Dirca palustris	leatherwood	native	shrub	8
Dryopteris carthusiana	spinulose woodfern	native	fern	5
Dryopteris intermedia	evergreen woodfern	native	fern	5
Dulichium arundinaceum	three-way sedge	native	sedge	8
Dysphania botrys	jerusalem-oak	non-native	forb	0
Eleocharis acicularis	spike-rush	native	sedge	7
Eleocharis erythropoda	spike-rush	native	sedge	4
Eleocharis obtusa	spike-rush	native	sedge	3
Eleocharis palustris	spike-rush	native	sedge	5
Elymus hystrix	bottlebrush grass	native	grass	5
Elymus repens	quack grass	non-native	grass	0
Epilobium ciliatum	willow-herb	native	forb	3
Epilobium coloratum	cinnamon willow-herb	native	forb	3
Epilobium leptophyllum	fen willow-herb	native	forb	6
Epipactis helleborine	helleborine	non-native	forb	0
Equisetum arvense	common horsetail	native	fern	0
Equisetum fluviatile	water horsetail	native	fern	7
Equisetum hyemale	scouring rush	native	fern	2
Equisetum scirpoides	dwarf scouring rush	native	fern	7
Equisetum sylvaticum	woodland horsetail	native	fern	5
Equisetum variegatum	variegated scouring rush	native	fern	6
Erigeron philadelphicus	philadelphia fleabane	native	forb	2
Eriophorum angustifolium	narrow-leaved cotton-grass	native	sedge	10
Erythronium americanum	yellow trout lily	native	forb	5
Eupatorium perfoliatum	boneset	native	forb	4

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Euphorbia maculata	spotted spurge	native	forb	0
Euphrasia stricta	european eyebright	non-native	forb	0
Eurybia macrophylla	big-leaved aster	native	forb	4
Euthamia graminifolia	grass-leaved goldenrod	native	forb	3
Eutrochium maculatum	joe-pye-weed	native	forb	4
Fallopia cilinodis	fringed false buckwheat	native	vine	3
Festuca rubra	red fescue	non-native	grass	0
Festuca subverticillata	nodding fescue	native	grass	5
Fragaria virginiana	wild strawberry	native	forb	2
Fraxinus americana	white ash	native	tree	5
Fraxinus nigra	black ash	native	tree	6
Galeopsis tetrahit	hemp-nettle	non-native	forb	0
Galium album	white bedstraw	non-native	forb	0
Galium aparine	annual bedstraw	native	forb	0
Galium asprellum	rough bedstraw	native	vine	5
Galium boreale	northern bedstraw	native	forb	3
Galium tinctorium	stiff bedstraw	native	forb	5
Galium triflorum	fragrant bedstraw	native	forb	4
Gaultheria procumbens	wintergreen	native	shrub	5
Geum canadense	white avens	native	forb	1
Geum fragarioides	barren-strawberry	native	forb	6
Geum laciniatum	rough avens	native	forb	2
Glyceria canadensis	rattlesnake grass	native	grass	8
Glyceria grandis	reed manna grass	native	grass	6
Glyceria striata	fowl manna grass	native	grass	4
Goodyera oblongifolia	menzies rattlesnake plantain	native	forb	8
Gymnocarpium dryopteris	oak fern	native	fern	5
Halenia deflexa	spurred gentian	native	forb	7
Hamamelis virginiana	witch-hazel	native	shrub	5
Hepatica americana	round-lobed hepatica	native	forb	6
Hieracium piloselloides	king devil	non-native	forb	0
Hieracium umbellatum	northern hawkweed	native	forb	7
Hypericum perforatum	common st. johns-wort	non-native	forb	0
Hypopitys monotropa	pinesap	native	forb	6
Impatiens capensis	spotted touch-me-not	native	forb	2
Iris versicolor	wild blue flag	native	forb	5
Juncus alpinoarticulatus	rush	native	rush	5
Juncus balticus	rush	native	rush	4
Juncus bufonius	toad rush	native	rush	2
Juncus canadensis	canadian rush	native	rush	6
Juncus compressus	rush	non-native	rush	0
Juncus dudleyi	dudleys rush	native	rush	1
Juncus effusus	soft-stemmed rush	native	rush	3
Juniperus communis	common or ground juniper	native	shrub	4
Laportea canadensis	wood nettle	native	forb	4
Lapsana communis	nipplewort	non-native	forb	0

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Lathyrus ochroleucus	pale vetchling	native	vine	8
Leersia oryzoides	cut grass	native	grass	3
Lemna minor	common duckweed	native	forb	5
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0
Lilium michiganense	michigan lily	native	forb	5
Linaria vulgaris	butter-and-eggs	non-native	forb	0
Liparis loeselii	loesels twayblade	native	forb	5
Lobelia inflata	indian-tobacco	native	forb	0
Lobelia siphilitica	great blue lobelia	native	forb	4
Lonicera canadensis	canadian fly honeysuckle	native	shrub	5
Lonicera tatarica	tartarian honeysuckle	non-native	shrub	0
Lotus corniculatus	birdfoot trefoil	non-native	forb	0
Ludwigia palustris	water-purslane	native	forb	4
Luzula acuminata	hairy wood rush	native	rush	5
Lycopus americanus	common water horehound	native	forb	2
Lycopus uniflorus	northern bugle weed	native	forb	2
Lysimachia ciliata	fringed loosestrife	native	forb	4
Lysimachia thyrsiflora	tufted loosestrife	native	forb	6
Maianthemum canadense	canada mayflower	native	forb	4
Maianthemum racemosum	false spikenard	native	forb	5
Malaxis unifolia	green adders-mouth	native	forb	8
Matteuccia struthiopteris	ostrich fern	native	fern	3
Medicago lupulina	black medick	non-native	forb	0
Medicago sativa	alfalfa	non-native	forb	0
Melampyrum lineare	cow-wheat	native	forb	6
Melilotus albus	white sweet-clover	non-native	forb	0
Melilotus officinalis	yellow sweet-clover	non-native	forb	0
Mentha canadensis	wild mint	native	forb	3
Milium effusum	wood millet	native	grass	8
Mimulus ringens	monkey-flower	native	forb	5
Mitchella repens	partridge-berry	native	forb	5
Mitella nuda	naked miterwort	native	forb	8
Monotropa uniflora	indian-pipe	native	forb	5
Muhlenbergia mexicana	leafy satin grass	native	grass	3
Myriophyllum sibiricum	spiked water-milfoil	native	forb	10
Najas flexilis	slender naiad	native	forb	5
Oenothera biennis	common evening-primrose	native	forb	2
Onoclea sensibilis	sensitive fern	native	fern	2
Oryzopsis asperifolia	rough-leaved rice-grass	native	grass	6
Osmorhiza berteroi	sweet-cicely	native	forb	5
Osmorhiza claytonii	hairy sweet-cicely	native	forb	4
Osmunda cinnamomea	cinnamon fern	native	fern	5
Osmunda claytoniana	interrupted fern	native	fern	6
Osmunda regalis	royal fern	native	fern	5
Ostrya virginiana	ironwood; hop-hornbeam	native	tree	5
Oxalis acetosella	northern wood-sorrel	native	forb	7

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Packera aurea	golden ragwort	native	forb	5
Parthenocissus inserta	thicket creeper	native	vine	4
Parthenocissus quinquefolia	virginia creeper	native	vine	5
Persicaria amphibia	water smartweed	native	forb	6
Persicaria maculosa	ladys-thumb	non-native	forb	0
Petasites frigidus	sweet-coltsfoot	native	forb	10
Phalaris arundinacea	reed canary grass	native	grass	0
Phegopteris connectilis	northern beech-fern	native	fern	5
Phleum pratense	timothy	non-native	grass	0
Picea glauca	white spruce	native	tree	3
Pinus strobus	white pine	native	tree	3
Plantago lanceolata	english plantain	non-native	forb	0
Plantago rugelii	red-stalked plantain	native	forb	0
Poa alsodes	bluegrass	native	grass	9
Poa compressa	canada bluegrass	non-native	grass	0
Poa palustris	fowl meadow grass	native	grass	3
Poa pratensis	kentucky bluegrass	non-native	grass	0
Poa saltuensis	bluegrass	native	grass	5
Polygala paucifolia	gay-wings	native	forb	7
Polygonatum pubescens	downy solomon seal	native	forb	5
Polygonum aviculare	knotweed	non-native	forb	0
Populus balsamifera	balsam poplar	native	tree	2
Populus grandidentata	big-tooth aspen	native	tree	4
Populus tremuloides	quaking aspen	native	tree	1
Potamogeton amplifolius	large-leaved pondweed	native	forb	6
Potamogeton foliosus	leafy pondweed	native	forb	4
Potamogeton gramineus	pondweed	native	forb	5
Potamogeton natans	pondweed	native	forb	5
Potentilla recta	rough-fruited cinquefoil	non-native	forb	0
Prenanthes alba	white lettuce	native	forb	5
Prunella vulgaris	self-heal	native	forb	0
Prunus pensylvanica	pin cherry	native	tree	3
Prunus serotina	wild black cherry	native	tree	2
Prunus virginiana	choke cherry	native	shrub	2
Pteridium aquilinum	bracken fern	native	fern	0
Pyrola elliptica	large-leaved shinleaf	native	forb	6
Quercus rubra	red oak	native	tree	5
Ranunculus abortivus	small-flowered buttercup	native	forb	0
Ranunculus acris	tall or common buttercup	non-native	forb	0
Ranunculus hispidus	swamp buttercup	native	forb	5
Ranunculus pensylvanicus	bristly crowfoot	native	forb	6
Ranunculus recurvatus	hooked crowfoot	native	forb	5
Ribes cynosbati	prickly or wild gooseberry	native	shrub	4
Ribes hirtellum	swamp gooseberry	native	shrub	6
Ribes triste	swamp red currant	native	shrub	6
Rorippa palustris	yellow cress	native	forb	1

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Rubus allegheniensis	common blackberry	native	shrub	1
Rubus parviflorus	thimbleberry	native	shrub	6
Rubus pubescens	dwarf raspberry	native	shrub	4
Rubus strigosus	wild red raspberry	native	shrub	2
Rudbeckia hirta	black-eyed susan	native	forb	1
Rumex crispus	curly dock	non-native	forb	0
Rumex obtusifolius	bitter dock	non-native	forb	0
Sagittaria latifolia	common arrowhead	native	forb	4
Salix bebbiana	bebbs willow	native	shrub	1
Salix discolor	pussy willow	native	shrub	1
Salix eriocephala	willow	native	shrub	2
Salix exigua	sandbar willow	native	shrub	1
Salix humilis	prairie willow	native	shrub	4
Salix lucida	shining willow	native	shrub	3
Salix petiolaris	slender willow	native	shrub	1
Sambucus racemosa	red-berried elder	native	shrub	3
Sanguinaria canadensis	bloodroot	native	forb	5
Sanicula marilandica	black snakeroot	native	forb	4
Saponaria officinalis	bouncing bet	non-native	forb	0
Schedonorus arundinaceus	tall fescue	non-native	grass	0
Schizachne purpurascens	false melic	native	grass	5
Schoenoplectus tabernaemontani	softstem bulrush	native	sedge	4
Scirpus atrovirens	bulrush	native	sedge	3
Scirpus cyperinus	wool-grass	native	sedge	5
Scirpus microcarpus	bulrush	native	sedge	5
Scutellaria lateriflora	mad-dog skullcap	native	forb	5
Setaria pumila	yellow foxtail	non-native	grass	0
Sisyrinchium montanum	mountain blue-eyed-grass	native	forb	4
Sium suave	water-parsnip	native	forb	5
Solanum dulcamara	bittersweet nightshade	non-native	vine	0
Solidago canadensis	canada goldenrod	native	forb	1
Solidago flexicaulis	zigzag goldenrod	native	forb	6
Solidago gigantea	late goldenrod	native	forb	3
Solidago juncea	early goldenrod	native	forb	3
Solidago nemoralis	old-field goldenrod	native	forb	2
Sparganium americanum	american bur-reed	native	forb	6
Sparganium emersum	green-fruited bur-reed	native	forb	6
Spinulum annotinum	stiff clubmoss	native	fern	5
Spiranthes casei	cases ladies-tresses	native	forb	8
Spiranthes cernua	nodding ladies-tresses	native	forb	4
Spirodela polyrhiza	greater duckweed	native	forb	6
Stellaria longifolia	long-leaved chickweed	native	forb	5
Streptopus lanceolatus	rose twisted-stalk	native	forb	5
Stuckenia pectinata	sago pondweed	native	forb	3
Symphyotrichum ciliolatum	northern heart-leaved aster	native	forb	4
Symphyotrichum lanceolatum	panicled aster	native	forb	2

White Pine North Project
Ontonagon County, Michigan

2024 Meander Survey Species List - Total Field Survey Area

Scientific Name	Common Name	Native	Physiognomy	C Value
Symphyotrichum lateriflorum	calico aster	native	forb	2
Symphyotrichum pilosum	hairy aster	native	forb	1
Taraxacum officinale	common dandelion	non-native	forb	0
Taxus canadensis	yew	native	shrub	5
Thalictrum dasycarpum	purple meadow-rue	native	forb	3
Thelypteris palustris	marsh fern	native	fern	2
Thlaspi arvense	penny cress	non-native	forb	0
Thuja occidentalis	arbor vitae	native	tree	4
Tilia americana	basswood	native	tree	5
Torreyochloa fernaldii	fernalds false mannagrass	native	grass	6
Toxicodendron radicans	poison-ivy	native	vine	2
Tragopogon pratensis	common goats beard	non-native	forb	0
Trientalis borealis	star-flower	native	forb	5
Trifolium arvense	rabbitfoot clover	non-native	forb	0
Trifolium pratense	red clover	non-native	forb	0
Trillium cernuum	nodding trillium	native	forb	5
Trillium grandiflorum	common trillium	native	forb	5
Triosteum aurantiacum	horse-gentian	native	forb	5
Tsuga canadensis	hemlock	native	tree	5
Typha x glauca	hybrid cat-tail	non-native	forb	0
Ulmus americana	american elm	native	tree	1
Urtica dioica	stinging nettle	native	forb	1
Utricularia vulgaris	common bladderwort	native	forb	6
Uvularia grandiflora	bellwort	native	forb	5
Uvularia sessilifolia	merrybells	native	forb	5
Verbena hastata	blue vervain	native	forb	4
Veronica officinalis	common speedwell	non-native	forb	0
Vicia villosa	hairy vetch	non-native	vine	0
Viola blanda	sweet white violet	native	forb	5
Viola canadensis	canada violet	native	forb	5
Viola labradorica	dog violet	native	forb	3
Viola pubescens	yellow violet	native	forb	4

FQA Metrics	Species Richness	Mean C Value	FQI
Native	301	4.2	72.9
All Species	354	3.6	67.7

Appendix D PHOTOGRAPHS

Stantec

Client: White Pine Copper LLC
Project: White Pine North

Project Number: 193710518
Location: Ontonagon Co., MI



Photo 1: Developed/unvegetated, access road. View: SW



Photo 2: Developed/unvegetated, material stockpile. View: N



Photo 3: Emergent marsh, View: SE



Photo 4: Emergent marsh, View: NE



Photo 5: Emergent marsh, View: S



Photo 7: Emergent marsh, View: NW



Photo 6: Emergent marsh, View: N



Photo 8: Mesic northern forest - early successional, View: E



Photo 9: Mesic northern forest - early successional, View: NE



Photo 11: Mesic northern forest - early successional, View: NE



Photo 10: Mesic northern forest - early successional, View: SE



Photo 12: Mesic northern forest - early successional, View: E



Photo 13: Mesic northern forest - early successional, View: N



Photo 15: Mesic northern forest - early successional, View: NW



Photo 14: Mesic northern forest - early successional, View: S



Photo 16: Mesic northern forest - early successional, View: W



Photo 17: Mesic northern forest - early successional, View: NE



Photo 19: Mesic northern forest - mature, View: N

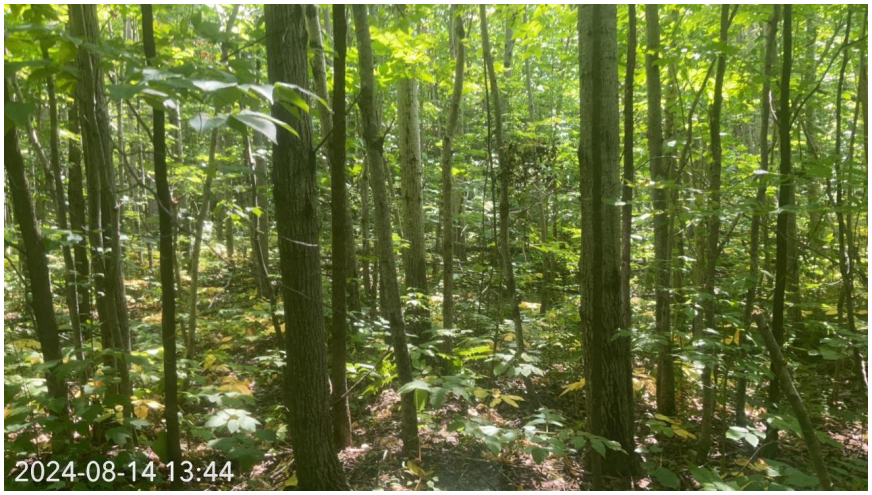


Photo 18: Mesic Northern forest - early successional, View: NW

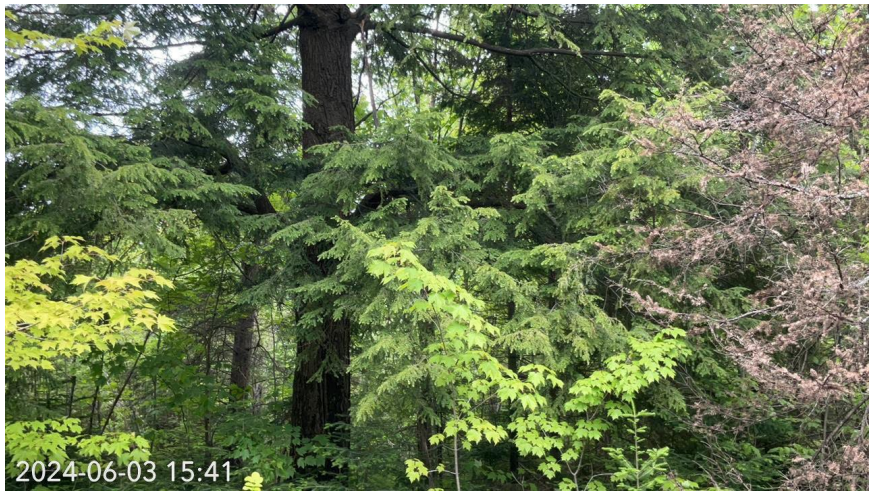


Photo 20: Mesic northern forest- mature, View: NE



Photo 21: Mesic northern forest - mature, View: W



Photo 23: Mesic northern forest - mature, View: S



Photo 22: Mesic northern forest - mature, View: NW



Photo 24: Mesic northern forest - mature, View: W



Photo 25: Northern hardwood swamp, View: N



Photo 27: Northern hardwood swamp, View: E



Photo 26: Northern hardwood swamp, View: N



Photo 28: Northern hardwood swamp, View: N



Photo 29: Northern hardwood swamp, View: W



Photo 31: Northern shrub thicket, View: N



Photo 30: Northern hardwood swamp, View: S



Photo 32: Beaver pond (submergent marsh) with northern shrub thicket beyond, View: N



Photo 33: Northern wet meadow, View: NE



Photo 35: Overview of historical tailings basin, North Dam 1. Northern wet meadow, View: S



Photo 34: Northern wet meadow, View: S



Photo 36: Northern wet meadow, View: S



Photo 37: Northern wet meadow, View: SW



Photo 38: Submergent marsh, View: E



Photo 39: Submergent marsh, View: W

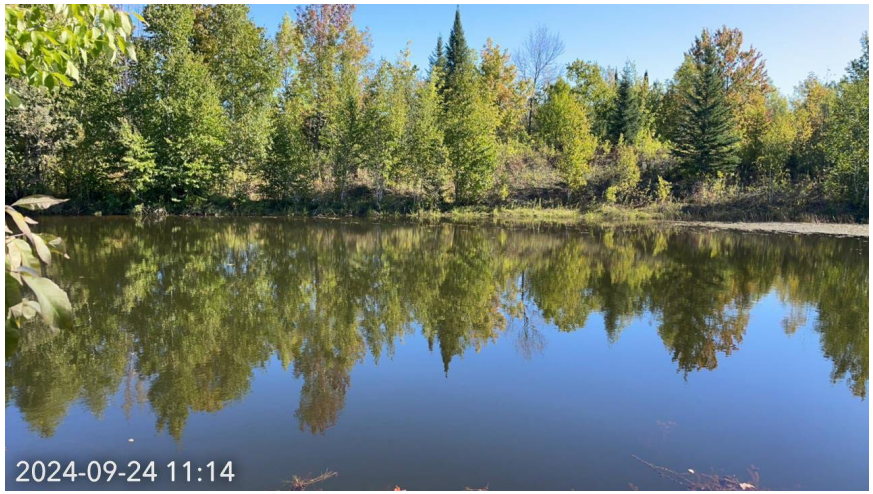


Photo 41: Submergent marsh, View: E



Photo 40: Submergent marsh, View: W



Photo 42: Upland meadow, View: S



Photo 43: Upland meadow, View: S



Photo 45: Upland meadow, View: NE



Photo 44: Upland meadow, View: SW



Photo 46: Upland meadow, View: S



Photo 47: Upland meadow, View: NE



Photo 48: Pine Creek, View: S



Photo 49: *Botrychium simplex* – least moonwort, in upland meadow, thin soil over rock.



Photo 50: *Spiranthes cernua* – nodding ladies-tresses, at edge of emergent marsh.



Photo 51: *Cladium mariscoides* – twig-rush, at edge of submergent marsh. View: E

F-5

Species Inventory: Small Mammals, Reptiles, and Amphibians Report

White Pine North Species Inventory: Small Mammals, Reptiles, and Amphibians

Stantec

Prepared for:
White Pine Copper, LLC

Prepared by:
Stantec Consulting Services, Inc

Date:
February 20, 2026

Project/File:
193710518

Stantec Consulting Services Inc.

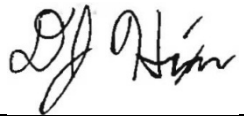
Disclaimer

The conclusions in the Report titled White Pine Copper Mine Species Inventory: Small Mammals, Reptiles, and Amphibians are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Prepared by:

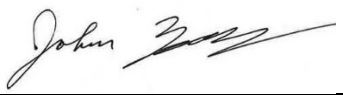


Signature

D.J. Hixon

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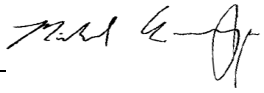


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Appendix A: Figures
Figure 1: Project Location
Figure 2: Trap Locations
Figure 3: Visual Encounter Surveys

Appendix B: Tables
Table 1. Species of small mammals observed during surveys conducted from June to September, 2025, at the White Pine Copper Project area
Table 2. Species of amphibians and reptiles observed during surveys conducted from June to September, 2025, at the White Pine Copper Project area

Appendix C: Photo Log

1 Introduction

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed a wildlife inventory within or immediately adjacent to the Project area in Ontonagon County, Michigan. As part of this inventory Stantec conducted surveys specifically for small mammals, amphibians, and reptiles (herptile).

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Appendix A; Figure 1). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project area description, purpose and objectives, methods, and results of small mammal and herptile surveys. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 Project Area Description

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan (Appendix A; Figure 1). The Project area consists of hardwood swamps, mesic forests, shrub thickets, emergent marshes, forested floodplains, and wet meadows.

1.2 Purpose and Objectives

The purpose of these surveys was to identify small mammal and herptile species within the Project area. The small mammal and herptile surveys are part of a large-scale comprehensive wildlife inventory of the Project area. Specific objectives of these surveys were to:

1. Locate suitable habitat for small mammal, amphibian, and reptile species; and
2. Identify occupying wildlife species through inventory survey techniques.

2 Methods

Obtaining wildlife inventories for the Project area entailed implementation of a comprehensive suite of survey methods for small mammals, amphibians, and reptiles. Specific inventory survey methods are described below.

2.1 Survey Site Selection

Survey site selection and installation of survey equipment was conducted by Stantec biologists with expertise in herpetology and wildlife ecology. The locations selected for surveys depended on a variety of factors. These included: locations most likely to yield a diverse assemblage of species (i.e. areas where project-related activities would be limited or non-existent thus limiting); sites most likely to yield results that were representative of habitats present on-site (i.e. surveys within community types that were representative of the Project); sites that were distributed evenly throughout the project area; sites that were accessible with survey equipment.

2.2 Terrestrial Small Mammal Surveys

2.2.1 Drift Fences

Drift fences are an established and effective technique to survey for small (average maximum weight < 2 lbs) vertebrates, including small mammals, amphibians, and reptiles (Christiansen and VanDeWalle 2000; Heye et al. 1994). This technique was implemented by installing five 100-foot drift fences throughout the Project area (Appendix A; Figure 2). Each fence consisted of 36-inch silt fence with approximately six inches buried beneath the ground and stapled upright to wood posts hammered into the soil. Fences were fitted with two types of standard live traps: pitfall traps and funnel traps (Appendix B; Photo 3, Photo 4). Four pitfalls, consisting of buried 5-gallon buckets, were placed with two at each end of the fence (four buckets per fence). Funnel traps, in the form of Gee Exotic Minnow traps (1/8 inch galvanized mesh; Memphis Net and Twine Company) were also employed to capture small mammals. Alongside the drift fence funnel traps were deployed on either side of the fence at staggered intervals (four traps per fence). Fences were installed in early May and included one survey period each month from June to September 2025. For all survey periods funnel and pitfall traps were engaged for 5 days (4 nights), or roughly four 24-hour time blocks, per month. Drift fences and associated traps were installed in May, then activated in June. Once activated, traps were checked each morning to limit mortality of captured individuals. Drift fences were assumed to have an equal likelihood of catching all small vertebrate species on-site. It was also assumed that all traps on a given fence were equally as likely to capture individuals in the vicinity regardless of trap type and approach direction because they were not baited. Therefore, neither individual fences nor individual traps on the same drift fence were treated independently. Relative abundance of species caught were calculated as catch per unit effort: the number of a given species caught in all drift fences divided by the sum of all 24-hour trapping periods. Drift fence traps were engaged for a total of 80 trap periods (average of 16 days per drift fence). Funnel taps were engaged for a total of 320 trap periods (average of 16 days per funnel trap). Between survey periods, traps were deactivated by placing lids over pitfalls and inserting PVC plugs into funnels.

2.2.2 Sherman Live Traps

In conjunction with the drift fences, an array of Sherman live traps baited with a seed mix were used to specifically target small mammals. A total of 30 Sherman traps were deployed in four group arrays at locations with suitable habitat features. Each survey period consisted of four 24-hour time blocks, per month, from June through September. Sherman traps were checked every 24 hours and captured

individuals were removed and identified. Because each Sherman trap was baited, they operated independently of other traps in the array and had to be treated independently for analyses. The locations of the trap placement were independent of where certain species may be present (i.e., sites were not selected to increase the likelihood of catching a given species). Therefore, all small mammal species on-site were equally as likely to be captured in a given Sherman trap. Relative abundance was measured as catch per unit effort; number of a given species captured in Sherman traps, divided by the total number of 24-hour trapping periods for all traps in all arrays. Sherman traps were engaged for a total of 480 trap periods (average of 16 days per Sherman trap).

Representative specimens of each species collected in traps were photographed and released immediately (Appendix C, Photo Log). All surveyors that handled small mammals wore gloves to avoid injury or contraction of zoonotic illness. Identification of captured individuals was accomplished by initial identification in the field prior to release of the animal. This involved scrutinizing morphological data, such as color patterns, or review reference to identification guides (Whitaker 2001).

2.3 Amphibian and Reptile Surveys

2.3.1 Drift Fences

Amphibian and reptile surveys were conducted monthly from June through September 2025 in conjunction with the methods used for small mammals. Five drift fences with pitfall and funnel traps (see section 2.2 Small Mammal Surveys) were employed throughout the Project area. As with small mammals, relative abundance of species caught were calculated as catch per unit effort: the number of a given species caught in all drift fences divided by the sum of all 24-hour trapping periods. Drift fence traps were engaged for a total of 80 trap periods (average of 16 days per drift fence). Funnel taps were engaged for a total of 320 trap periods (average of 16 days per funnel trap).

2.3.2 Cover Boards

Cover boards in the form of plywood were deployed as another survey method (Appendix B; Photo 1). In May 2025 a total of 26 cover boards were placed in the Project area (Appendix A, Figure 2). Cover boards were assumed to have an equal likelihood of catching all small vertebrate species on-site. It was also assumed that all boards were equally as likely to capture individuals. Therefore, each cover board was treated independently. Relative abundance of species caught were calculated as catch per unit effort: the number of a given species caught in all cover boards divided by the sum of all 24-hour trapping periods. Cover boards were engaged for a total of 416 trap periods (average of 16 days per board).

2.3.3 Visual Encounter

In addition, timed visual encounter surveys were conducted at areas that appeared to be suitable for numerous amphibian and reptile species (Appendix A, Figure 3). The primary focus of these efforts included riparian zones along and between permanent water features, as well as dominant community types. Visual encounter surveys were conducted from June to August. These surveys lasted approximately one to two hours, included two surveyors, and involved over-turning of ground debris (such as rotten logs

and leaf litter). Each month five timed visual encounter surveys were completed. Opportunistic visual encounter surveys also occurred during daily survey activities and any individuals found were documented. Identification was made by physically handling and observing individuals. It was assumed that each surveyor had independent likelihoods of encountering species, and individual surveyors must be treated separately. Therefore, relative abundance was measured as the number of individuals captured per person hours surveyed. Since two surveyors were always present during timed surveys, the amount of time spent was multiplied by two. A total of 60 person hours were committed to timed visual encounter surveys on-site.

Representative specimens of each species captured were photographed and released immediately (Appendix C). Identification of captured individuals was accomplished by initial identification in the field prior to release of the animal. This involved scrutinizing morphological data, such as color patterns, or review reference to identification guides (Sheldon 2022),

3 Results

A total of 26 species were identified within the Project area. This included eight species of amphibians, five species of reptiles, and 13 species of mammals (Table 1; Table 2). Throughout the surveys a total of 975 individuals were observed, with 616 being amphibians, 281 mammals, and 78 reptiles. Generally, the diversity of species encountered varied depending on the survey method (Table 1; Table 2).

3.1 Terrestrial Small Mammal Surveys

A total of 13 small mammal species were documented within the Project area (Table 1). The most abundant species encountered across all survey locations was the deer mouse (*Peromyscus maniculatus*; N=78). This was followed by the meadow jumping mouse (*Sapus hudsonius*; N=75), masked shrew (*Sorex cinereus*; N=61);a variety of other species were encountered (Table 1). Of the total 281 small mammals identified, Sherman traps captured 130 individuals, with pitfalls and funnel traps along drift fences capturing 126 individuals. Incidental catches at cover boards totaled 25 individuals. No state or federally threatened or endangered small mammals were captured during the survey effort. One special concern species, the northern flying squirrel (*Glaucomys sabrinus)*, was captured in a Sherman trap.

3.2 Amphibian and Reptile Surveys

A variety of amphibian and reptile species were captured during surveys, totaling 13 species representing eight amphibians and five reptiles (Table 2). Of the species encountered, the green frog (*Lithobates clamitans*) was the most frequent (N=401). Of the total 694 amphibians and reptiles identified, visual encounter surveys captured a total of 352 individual amphibians and reptiles, while drift fence pitfalls and funnel traps captured 323 individual amphibians and reptiles. Cover boards captured 19 individual reptiles. No state or federally threatened or endangered small mammals were captured during the survey effort. One special concern species, the mink frog (*Lithobates septentrionalis)*, was captured during the surveys.

4 Summary

4.1 Terrestrial Small Mammals

The small mammal species encountered were not unexpected. The activity of small mammals appeared to be greatest in August with 12 species identified over 134 individuals. Sherman traps were the most effective at targeting and capturing small mammals. No state or federally listed threatened or endangered species were encountered during the survey effort.

4.2 Amphibians and Reptiles

The species encountered during the surveys were not unexpected. The activity of amphibians and reptiles appeared to be greatest in July, with ten species identified over 300 individuals. Visual encounter surveys identified the most amphibians and reptiles with 352 individuals observed and drift fences and funnel traps captured 323 individuals. The highest abundance of amphibians and reptiles on-site was associated with wetlands and waterbodies. Visual encounter surveys focused efforts around permanent and ephemeral wetlands. No state or federally listed threatened or endangered species were encountered during the survey effort.

5 References

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Appendix A Figures

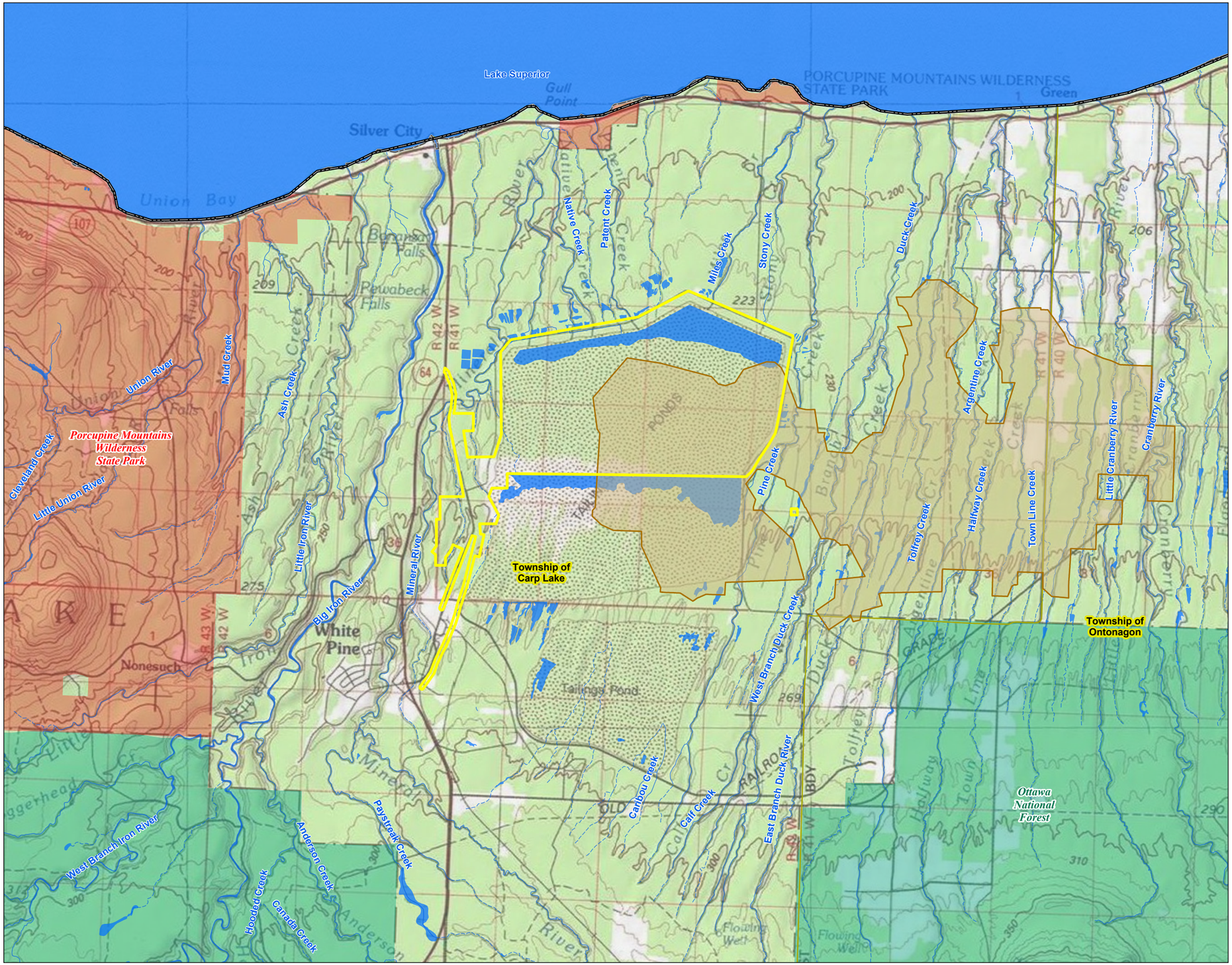


Figure No.
1

Title
Project Location

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles
(At original document size of 11x17)
1:63,360

Legend
- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2026-02-03 By: jmarty

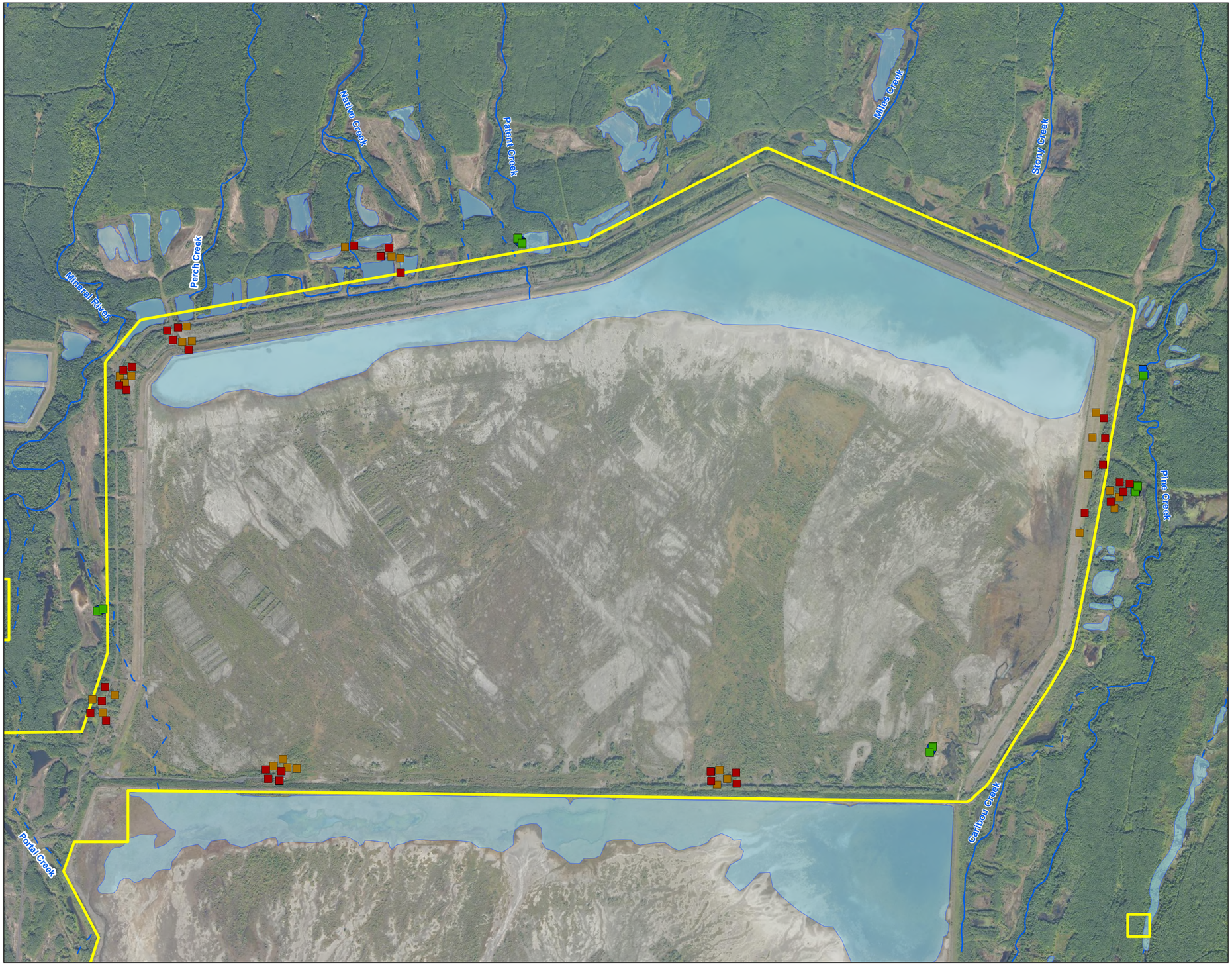


Figure No.
2

Title
Trap Locations

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 750 1,500 Feet
(At original document size of 11x17)
1:18,000

Legend
- Proposed Project Extent
- Cover Board
- Funnel Trap
- Pitfall / Drift Fence
- Sherman Trap

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2026-03-20 By: jmarty

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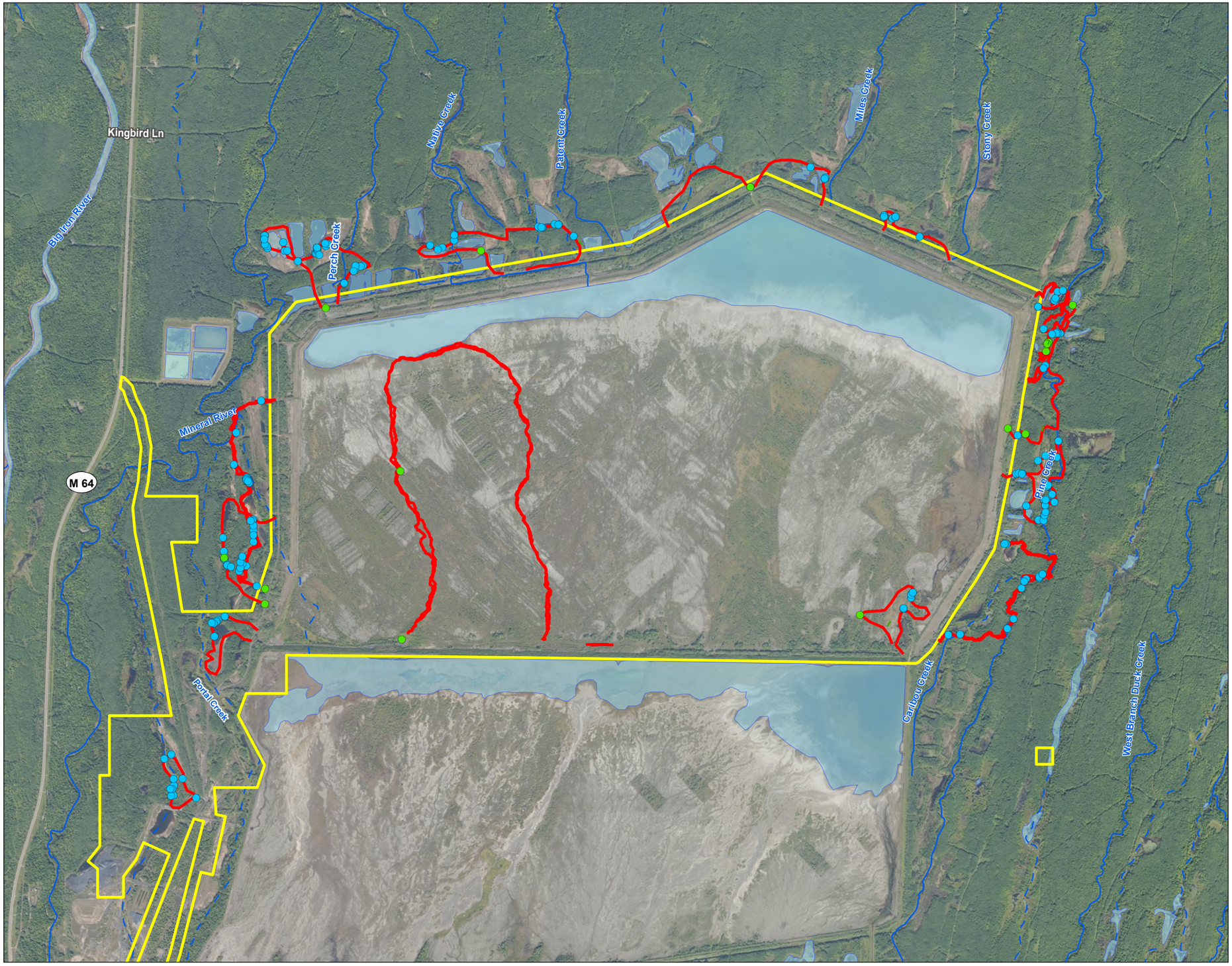


Figure No.
3

Title
Visual Encounter Survey Map

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 1,000 2,000 Feet
(At original document size of 11x17)
1:24,000

Legend
- Proposed Project Extent
- Survey Route
- Snake Observation
- Frog Observation

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Appendix B Tables

Table 1. Species of small mammals observed during surveys conducted from June to September, 2025, at the White Pine Copper Project Area. Numbers represent total individuals captured via survey technique in each month.

Class Order	State Status[1]	Survey Method	June	July	August	September	Survey Total	Catch Per Unit Effort[2]
Mammalia								
Insectivora: Shrews & Moles								
Masked Shrew (*Sorex cinereus*)	Common	Cover Board	0	0	0	21	21	0.042
		Drift Fence/ Pitfall	4	13	9	3	29	0.363
		Funnel	0	2	1	0	3	0.009
		Sherman Trap	0	1	6	1	8	0.017
Northern Short-tailed Shrew (*Blarina brewicauda*)	Common	Drift Fence/ Pitfall	1	1	1	1	4	0.050
		Funnel	1	1	1	0	3	0.009
		Sherman Trap	0	1	20	11	32	0.067
Star-nosed Mole (*Condylura cristata*)	Common	Drift Fence/ Pitfall	0	0	1	1	2	0.025
Water Shrew (*Sorex palustris*)	Common	Drift Fence/ Pitfall	1	2	1	0	4	0.050
Rodentia: Mice & Voles								
Deer Mouse (*Peromyscus maniculatus*)	Common	Cover Board	0	4	0	0	4	0.010
		Drift Fence/ Pitfall	0	0	1	0	1	0.013
		Funnel	0	0	1	0	1	0.003
		Sherman Trap	5	15	35	17	72	0.150
Eastern Chipmunk (*Tamias striatus*)	Common	Drift Fence/ Pitfall	0	1	0	0	1	0.013
		Sherman Trap	2	1	4	0	7	0.015
Meadow Jumping Mouse (*Sapus hudsonius*)	Common	Drift Fence/ Pitfall	2	4	26	1	33	0.413
		Funnel	10	9	14	2	35	0.109
		Sherman Trap	1	1	5	0	7	0.015
Meadow Vole (*Microtus pennsylvanicus*)	Common	Drift Fence/ Pitfall	0	0	3	1	4	0.050
		Funnel	0	1	0	0	1	0.003
Northern Flying Squirrel (*Glaucomys sabrinus*)	SC	Sherman Trap	0	0	0	1	1	0.002
Red Squirrel (*Tamiasciurus hudsonicus*)	Common	Sherman Trap	0	0	1	0	1	0.002

Class Order	State Status[1]	Survey Method	June	July	August	September	Survey Total	Catch Per Unit Effort[2]
Southern Red-Backed Vole (*Clethrionomys gapperi*)	Common	Drift Fence/ Pitfall	1	0	1	0	2	0.025
Woodland Jumping Mouse (*Napaeozapus insignis*)	Common	Drift Fence/ Pitfall	0	0	2	0	2	0.025
Mustelidae: Weasels								
Least Weasel (*Mustela nivalis*)	Common	Funnel	0	0	0	1	1	0.003
		Sherman Trap	0	0	1	1	2	0.004
Total Number of Small Mammal Species			7	7	12	8	13	N/A
Total Number of Individuals			28	57	134	62	281	N/A

[1]State of Michigan Status: Michigan Department of Natural Resources and Michigan Natural Features Inventory

[2]Calculated as number caught in trap type/ trap day and per person hour for visual encounter surveys.

Table 2. Species of amphibians and reptiles observed during surveys conducted from June to September, 2025, at the White Pine Copper Project Area. Numbers represent total individuals captured via survey technique in each month.

Class Order	State Status[1]	Survey Method	June	July	August	September	Survey Total	Catch Per Unit Effort[2]
Amphibia **Anura: frogs & toads**								
American Toad (*Anaxyrus americanus*)	Common	Drift Fence/ Pitfall	0	0	1	0	1	0.01
		Visual Encounter	1	0	0	-	1	0.02
Green Frog (*Lithobates clamitans*)	Common	Drift Fence/ Pitfall	15	40	46	5	106	1.33
		Funnel	8	67	15	1	91	0.28
		Visual Encounter	62	110	32	-	204	3.40
Mink Frog (*Lithobates septentrionalis*)	SC	Drift Fence/ Pitfall	0	16	3	0	19	0.24
		Funnel	0	10	1	1	12	0.04
		Visual Encounter	6	7	6	-	19	0.32
Northern Leopard Frog (*Rana pipines*)	Common	Drift Fence/ Pitfall	1	7	17	3	28	0.35
		Funnel	2	6	11	2	21	0.07
		Visual Encounter	10	3	73	-	86	1.43
Spring Peeper (*Pseudacris crucifer*)	Common	Drift Fence/ Pitfall	0	1	0	0	1	0.01
		Funnel	0	10	0	0	10	0.03
		Visual Encounter	0	1	9	-	10	0.17
Wood Frog (*Lithobates sylvaticus*)	Common	Visual Encounter	0	1	0	-	1	0.02
Caudata: salamanders								
Central Newt (*Notophthalmus viridescens louisianensis*)	Common	Funnel	0	0	4	0	4	0.01
		Drift Fence/ Pitfall	0	0	1	0	1	0.01
Spotted Salamander (*Ambystoma maculatum*)	Common	Funnel	0	1	0	0	1	0.00
Reptilia **Sepentes: snakes**								
Common Garter Snake (*Thamnophis sirtalis*)	Common	Cover Board	4	2	3	0	9	0.02
		Drift Fence/ Pitfall	0	0	1	0	1	0.01
		Funnel	6	3	6	1	16	0.05

Class Order	State Status[1]	Survey Method	June	July	August	September	Survey Total	Catch Per Unit Effort[2]
		Visual Encounter	9	1	1	-	11	0.18
Northern Red-bellied Snake (*Storeria occipitomaculata*)	Common	Cover Board	1	3	2	0	6	0.01
		Funnel	3	0	2	0	5	0.02
		Visual Encounter	1	0	0	-	1	0.02
Northern Ring-neck Snake (*Diadophis punctatus edwardsii*)	Common	Cover Board	3	0	1	0	4	0.01
		Visual Encounter	1	1	0	-	2	0.03
Testudines: turtles								
Common Snapping Turtle (*Chelydra serpentina*)	Common	Visual Encounter	3	0	0	-	3	0.05
Painted Turtle (*Chrysemys picta*)	Common	Funnel	1	0	0	0	1	0.00
		Drift Fence/ Pitfall	1	0	0	4	5	0.06
		Visual Encounter	4	10	0	-	14	0.23
Total Number of Amphibian and Reptile Species			9	10	9	5	13	
Total Number of Individuals			142	300	235	17	694	

[1]State of Michigan Status: Michigan Department of Natural Resources and Michigan Natural Features Inventory

[2]Calculated as number caught in trap type/ trap day and per person hour for visual encounter surveys.

Appendix C Photo Log



Photo 1. Representative photo of cover board



Photo 2. Representative photo of Sherman trap placement



Photo 3. Representative photo of drift fence and pitfall traps



Photo 4. Representative photo of funnel trap placement along drift fence



Photo 5. Photo of American toad captured during visual encounter surveys



Photo 6. Photo of garter snake observed under a cover board



Photo 7. Representative photo of a common snapping turtle



Photo 8. Representative photo of red-bellied snake



Photo 9. Representative photo of painted turtles captured in a pitfall trap



Photo 10. Representative photo of a northern leopard frog



Photo 11. Representative photo of spring peeper



Photo 12. Representative photo of central newt, eft stage



Photo 13. Representative photo of spotted salamander



Photo 14. Representative photo of a northern ring-necked snake



Photo 15. Representative photo of a mink frog



Photo 16. Representative photo of a green frog



Photo 17. Representative photo of a wood frog



Photo 18. Representative photo of species diversity within a pitfall trap. Pictured left to right; meadow jumping mouse, green frog, northern leopard frog, and masked shrew



Photo 19. Representative photo of a deer mouse



Photo 20. Representative photo of a meadow jumping mouse



Photo 21. Representative photo of a meadow vole



Photo 22. Representative photo of a southern red-backed vole



Photo 23. Photo of a least weasel captured in a funnel trap



Photo 24. Representative photo of a star-nosed mole



Photo 25. Representative photo of a northern short-tailed shrew



Photo 26. Representative photo of a masked shrew



Photo 27. Representative photo of a water shrew



Photo 28. Representative photo of an eastern chipmunk, captured in Sherman trap



Photo 29. Masked shrew nest encountered under a cover board



Photo 30. Deer mouse nest encountered under a cover board



Photo 31. Photo of a woodland jumping mouse, left, and a meadow jumping mouse, right, encountered dead in pitfall trap after rain event



Photo 32. Photo of the northern flying squirrel encountered deceased in Sherman trap

With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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203 S Paterson Street, Suite 500
Madison WI 53703-3689
stantec.com

F-6

Wood Turtle Survey

Wood Turtle Survey

White Pine North Project
Ontonagon County, Michigan

Prepared for:

White Pine Copper, LLC
P.O. Box 338
White Pine, MI 49971

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Date: 03/18/2026

Project # 193710518

Table of Contents

1.0 INTRODUCTION 1
1.1 PROJECT AREA DESCRIPTION 1
1.2 PURPOSE AND OBJECTIVES 1
2.0 METHODS 2
3.0 RESULTS 2
4.0 SUMMARY 3

APPENDIX A – FIGURES
Figure 1. Project Location and Topography
Figure 2. Survey Point Locations

APPENDIX B – PHOTO LOG

1.0 INTRODUCTION

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed a desktop and field survey for the presence/potential absence of wood turtle (*Glyptemys insculpta*) within or immediately adjacent to the Project area in Ontonagon County, Michigan.

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Appendix A, Figure 1). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam (Appendix A, Figure 1). Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project area description, purpose and objectives, methods, and results of the wood turtle desktop and field survey. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 PROJECT AREA DESCRIPTION

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan (Appendix A, Figure 1). The Project area and habitat search consisted of primarily forested landscapes, including northern hardwood swamp and mesic northern forest, but also included northern shrub thicket and emergent marsh associated with waterways that presented suitable overwintering or foraging habitat for wood turtle.

1.2 PURPOSE AND OBJECTIVES

The purpose of the survey was to determine the presence/likely absence of wood turtles within or immediately adjacent to the Project area. Specific objectives of the survey were to:

1. Locate suitable habitat for wood turtle within the Project area; and
2. Complete visual encounter field surveys for wood turtles within documented suitable habitat.

2.0 METHODS

A desktop review was performed to evaluate the physical attributes of the Project area, as well as sensitive environmental areas within or near the Project that may have influenced the presence/likely absence of wood turtles (Appendix A, Figure 2). The desktop review included aerial photograph interpretation via a Geographical Information System (GIS), which was used to evaluate land features within the Project area. This evaluation included landscape-level assessments and included data collected during the natural community and land cover mapping effort completed by Stantec for the Project in 2024 (Stantec, 2025); MNFI early vegetation maps (Comer et al., 1995), and National Wetland Inventory (NWI) maps (USFWS, 2024).

For the purpose of the desktop review and to determine where visual encounter surveys and trap placement would occur, suitable wood turtle habitat was defined as the following: clear, medium-sized (range 7-100 ft / 2.1-30.5 m), hard-bottomed streams and rivers with sand and/or gravel substrates and moderate flow. Vegetation requirements include partially shaded, wet-mesic herbaceous vegetation such as raspberries, strawberries, grasses, willows, and alders along or near the river for foraging. Forested floodplains (deciduous and coniferous) with numerous sunlit openings and a dense mixture of low herbs and shrubs seem to provide ideal habitat for this species. Examples of nesting habitat include sand bars, sand points, and cutbanks (Lee, Y., 1999).

The desktop review identified five mapped waterways where a field reconnaissance was necessary to confirm the presence of suitable wood turtle habitat. The waterways were inspected in order to confirm the need for visual encounter surveys and deploy hoop net traps for wood turtles if conditions were favorable. The mapped waterways included the Mineral River, Pine Creek, Patent Creek, Native Creek, Caribou Creek, Portal Creek, and Perch Creek.

Per the Michigan Natural Features Inventory wood turtle abstract, the best time to complete visual encounter surveys for wood turtles are spring and early fall because turtles are active and concentrated near streams (Lee, Y., 1999). Visual encounter surveys consist of walking through suitable habitat (e.g., in riparian or floodplain habitats along the stream or river) and searching for turtles basking or foraging in the water or on land.

Implementing the above methods, Stantec completed two site visits in fall of 2024 and one in spring of 2025 to confirm the presence of suitable habitat identified during the desktop survey and complete visual encounter surveys for wood turtles. Each site visit consisted of three full field days of visual encounter surveys. Where overwintering conditions were favorable for wood turtles in permanent waterbodies, Stantec also deployed hoop nets. This included multiple locations along the Mineral River and one location on Pine Creek. The commercial turtle traps were fitted with nylon mesh (0.5” square to 1” square) and supported by galvanized hoops (two-to-three-foot diameter) and baited with sardines. They were deployed for two 24 hr time blocks during each survey period (Appendix A, Figure 2). After deployment, turtle traps were checked at approximately 24 hr intervals.

3.0 RESULTS

Stantec completed a desktop analysis and follow-up visual encounter survey to document the presence or likely absence of wood turtle within and immediately adjacent to the Project area. The desktop analysis identified seven waterways (Mineral River, Pine Creek, Patent Creek, Native Creek, Caribou Creek, Portal Creek, and Perch Creek with the potential to provide suitable overwintering or foraging conditions for wood turtles.

Stantec biologists visited the Project the week of September 23 and October 7, 2024, and the week of May 5, 2025 to complete visual encounter surveys of wood turtle habitat identified during the desktop review (Appendix A, Figure 2). Of the five identified waterways, only the Mineral River and Pine Creek presented suitable overwintering and foraging conditions for wood turtles. The length of Patent Creek, Native Creek, Portal and Perch Creek, as well as a segment of Caribou Creek were walked by the biologists, and each were determined to have unsuitable conditions for wood turtles. This included areas of dry bed and bank, or segments with no consistent flow as well as segments where water was stagnant or too shallow to provide overwintering conditions. After documenting suitable conditions at the Mineral River and Pine Creek, the remainder of the survey effort focused on searching for wood turtles along these waterways. In addition to the visual encounter survey, Stantec biologists placed hoop nets at two different locations presenting over-wintering conditions along the Mineral River and two locations on the Pine Creek (Appendix A, Figure 2, Photo Log). These hoop net traps were checked after 24 hours of placement.

No wood turtles were documented within suitable habitat during the visual encounter surveys or by use of the hoop nets.

4.0 SUMMARY

Stantec biologists completed a desktop review and subsequent field survey for wood turtles within and immediately adjacent to the Project area. The desktop review identified five potential waterways where suitable wood turtle habitat may be present. Stantec then completed three separate field visits (weeks of September 27 and October 7, 2024 and May 5, 2025) to confirm the suitability of the mapped waterways and survey for wood turtles. Two waterways, the Mineral River and Pine Creek were confirmed to have suitable foraging and overwintering habitat for wood turtles. These waterways were surveyed during all three site visits. In addition, Stantec deployed two hoop nets along the Mineral River and two hoop nets along the Pine Creek. Neither the implementation of a visual encounter survey or use of hoop nets documented the presence of wood turtles. The wood turtle surveys provide a good baseline inventory of wood turtle use within and in close proximity to the Project Area and based on the results, we do not anticipate impacts to wood turtles as a result of the Project.

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APPENDIX A – FIGURES

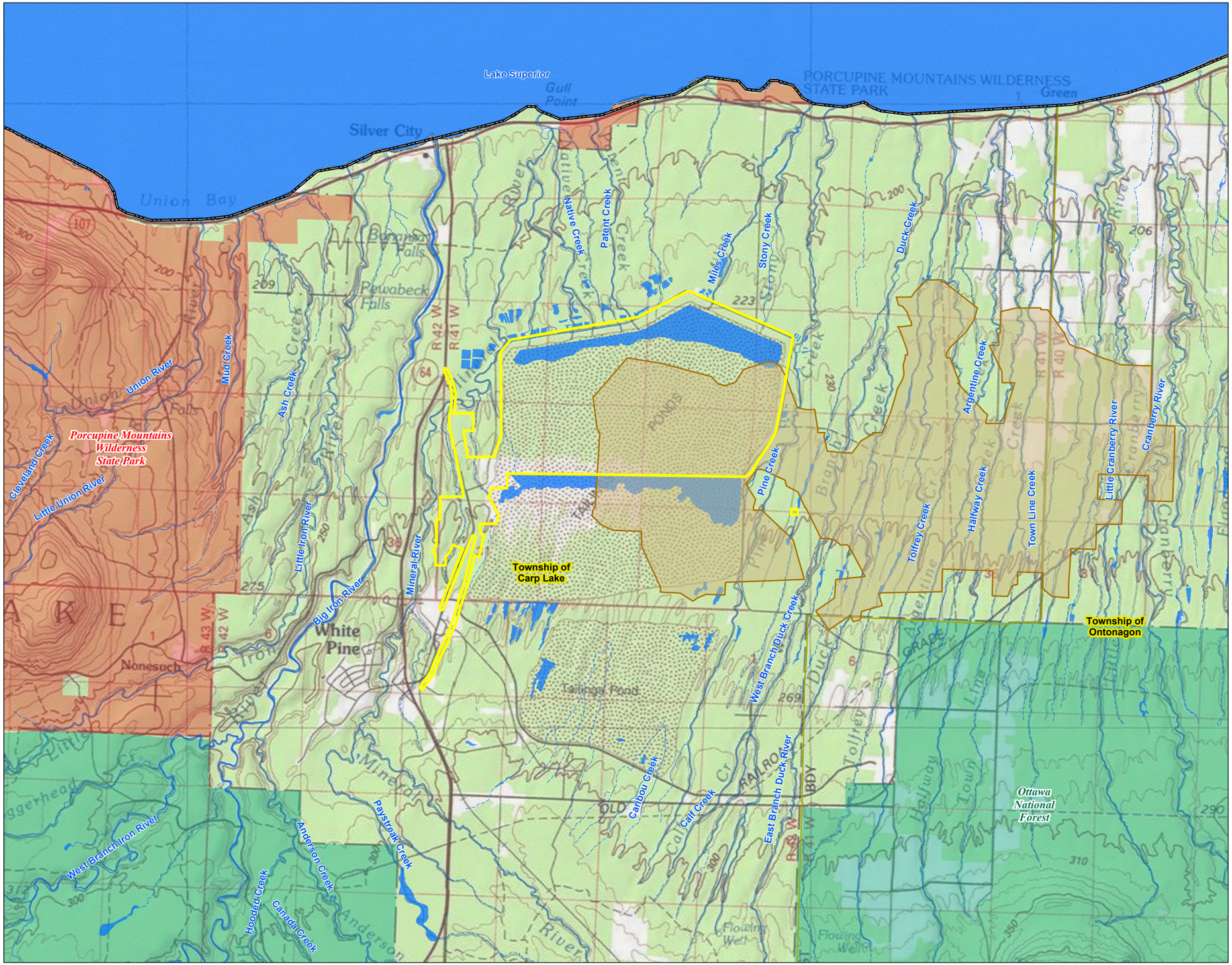


Figure No.

1

Title

Project Location

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles

(At original document size of 11x17)
1:63,360

Legend

- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

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U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2026-02-03 By: jmarty

Figure No.

2

Title

Wood Turtle Survey

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by XX on 2026-XX-XX

N

0 1,500 3,000 Feet

(At original document size of 11x17)
1:36,000

Legend

- Proposed Project Extent
- Hoop Net Location
- Pedestrian Survey Line

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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APPENDIX B – PHOTO LOG



Photo 1. Representative photo of hoop net location along the Mineral River.



Photo 2. Representative photo of hoop net location along the Mineral River.



Photo 3. Representative photo of hoop net location along Pine Creek.



Photo 4. Representative photo of hoop net location along Pine Creek.

F-7

Aerial Eagle and Raptor Nest Survey

Aerial Eagle and Raptor Nest Survey

White Pine North Project

Ontonagon County, Michigan

Prepared for:

White Pine Copper, LLC
P.O. Box 338
White Pine, MI 49971

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Date: 2/06/2026

Project # 193710518

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2.0 METHODS 2
3.0 RESULTS 3
4.0 SUMMARY 3

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Figure 1. Project Location and Topography
Figure 2. Nest Locations and Flight Tracks

1.0 INTRODUCTION

In support of the White Pine North Project (WPN) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed an eagle and raptor nest survey, utilizing aerial methods, for bald eagle (*Haliaeetus leucocephalus*) and other raptor species within the Project area, and a one-half mile nest search buffer surrounding the Project boundary, and including the proposed underground mine area east of the Project area. (hereafter referred to as the nest search area), in Ontonagon County, Michigan.

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Figure 1, Appendix A). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam (Appendix A, Figure 1). Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

On July 9, 2007, the U.S. Fish and Wildlife Service (USFWS) announced that the bald eagle would be removed from the Federal List of Endangered and Threatened Wildlife in the lower 48 U.S. states (72 Fed. Reg. 37346-37372). The rule became effective on August 8, 2007. The bald eagle remains protected under the federal Bald and Golden Eagle Protection Act (BGEPA). Tree clearing for development can affect eagles indirectly via disturbance to suitable nest or concentration sites. Disturbance at concentration sites may result in loss of productivity at nearby nests, and serious disturbance or mortality effects could result in the permanent loss of nesting territory. The State doesn't have any additional protections for the bald eagle in Michigan.

Due to the high percentage of the proposed project area and surrounding land cover type being heavily forested, a windshield or pedestrian survey could not be effectively used to locate the presence of bald eagle or other raptor nests. This report presents the Project description, purpose and objectives, methods, and results of the aerial eagle and raptor nest survey. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 PROJECT AREA DESCRIPTION

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan. (Appendix A, Figure 1). With the inclusion of the nest search buffers, the nest search area totals

approximately 19,300 acres. The Project area and nest search buffer area consists of wetlands, waterways, and forested areas.

1.2 PURPOSE AND OBJECTIVES

The purpose of the survey was to determine the locations of bald eagle and other raptor nests within the nest search area. Specific objectives of the survey were to:

1. Locate bald eagle and other raptor nests within the nest search area; and
2. Determine species and occupancy of documented nests.

2.0 METHODS

Given the large size of the nest search area, interior woodlots, and riparian areas that were not visible from public roadways, an aerial survey was necessary to accurately determine nest presence and occupancy. The timing of the survey coincided with the primary nesting period for bald eagles in Michigan (mid-March through the end of June. MNFI, 2024) and was scheduled prior to leaf out in Michigan's Upper Peninsula, to improve visibility from the air.

The aerial survey was conducted during daylight hours by one Stantec wildlife biologist with experience conducting aerial surveys and detecting and identifying raptor species and nests. The biologist was positioned in the helicopter to maximize visibility of the ground. The surveyor recorded any nest locations and nest activity status information on an iPad with internal Global Positioning System (GPS) and the ArcGIS application Field Maps.

The aircraft flew between 55 to 70 miles-per-hour at an altitude of 150-300 feet above ground level. Flight paths followed north/south transects spanning the length of the Project area including the raptor and bald eagle nest search buffer (Appendix A, Figure 2). The survey started on the west side progressing east.

In the event a bald eagle or other raptor nest is located, surveyors would attempt to identify the activity status of the nest, the species using the nest, and the number of eggs or chicks present. Nests would be considered "occupied/active" if they appeared maintained and if breeding activity was detected at the nest (eggs, young, or incubating/brooding adults were present). Nests are considered "occupied/inactive" if they appeared recently maintained (fresh lining, feathers, food remains, whitewash) and/or adult(s) are detected nearby indicating an occupied territory, but no eggs or chicks were present. If a nest is in good enough condition to be occupied (structurally sound or would require minimal maintenance to be usable in a given year) but no adults, eggs, or young were present at the time of survey it's to be considered "unoccupied/inactive." Where necessary to confirm nest status, observations were made from the ground during a follow-up site visit. A unique nest identification number was to be assigned for each nest documented during the survey.

3.0 RESULTS

The aerial nest survey was completed on March 31, 2025 during favorable weather and flight conditions. A total of 21 transects were surveyed within the proposed project extent, but also within the proposed underground mine area located east of the proposed project extent (Appendix A, Figure 2). A one-half mile buffer was included on each surveyed transect. The surveyor and helicopter pilot flew each transect a total of one pass each, working north to south, and flew additional non mapped routes within the project area and buffer as time allowed. No bald eagle nests or potential raptor nests were observed during the aerial nest survey.

Two bald eagles were observed actively hunting waterfowl within open water ponds outside of the Project area along the northwest Project boundary. Additional survey efforts were allocated to supercanopy white pines identified along the west side of the Project, adjacent to the pond, as well as suitable nesting habitat along the Big Iron River. However, no bald eagle or raptor nests were documented.

4.0 SUMMARY

A Stantec biologist and nest survey helicopter pilot completed an aerial nest survey for bald eagles and other raptors in support of the proposed Project on May 31, 2025. No bald eagle or raptor nests were observed during the survey. Given no nests were documented during the aerial nest survey we anticipate no impacts to nesting bald eagles as a result of the Project at this time.

References

Ford, J. (2020, April 21). *Eagle surveys* [Memorandum]. Department of the Interior. https://www.fws.gov/sites/default/files/documents/R6_EagleSurveys_Memo_2mile_20200421.pdf

USFWS. 2020. Updated Eagle Nest Survey Protocol. U.S. Fish and Wildlife Service. https://www.fws.gov/sites/default/files/documents/eagle-nest-survey-guidance-updated-protocol.pdf

APPENDIX A – FIGURES

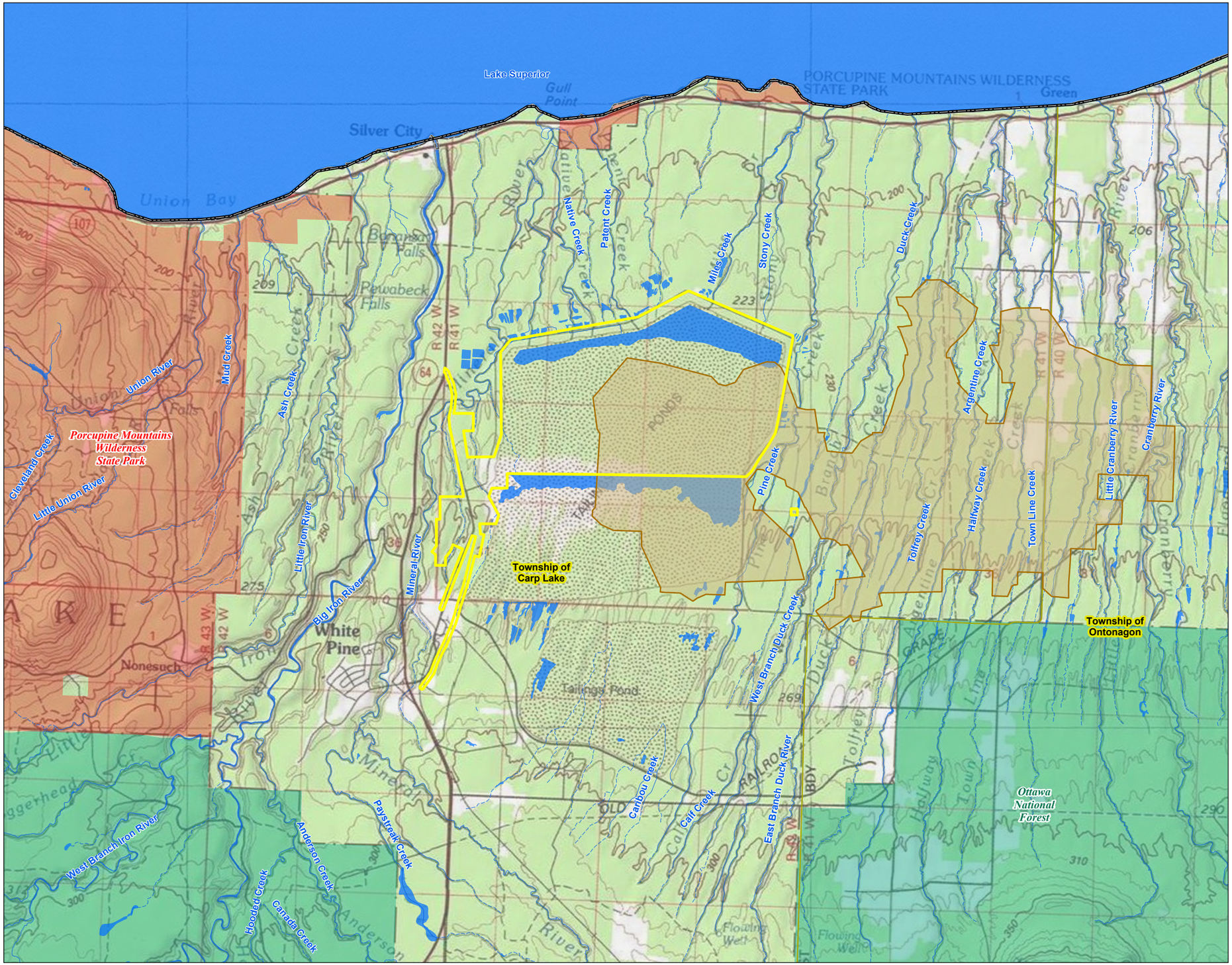


Figure No.

1

Title

Project Location

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles

(At original document size of 11x17)
1:63,360

Legend

- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

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Figure No.

2

Title

Aerial Eagle & Raptor Nest Survey

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 2,000 4,000 Feet

(At original document size of 11x17)
1:48,000

Legend

- Proposed Project Extent
- Two Observed Bald Eagles
- Survey Area
- Survey Transect
- Half-Mile Buffer

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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F-8

Northern Goshawk Broadcast Call Survey Report

Northern Goshawk Broadcast Call Survey Report

White Pine North Project

Ontonagon County, Michigan

Prepared for:

White Pine Copper, LLC
P.O. Box 338
White Pine, MI 49971

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Date: 02/03/2026

Project # 193710518

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APPENDIX A – FIGURES
Figure 1. Project Location and Topography
Figure 2. Survey Point Locations

APPENDIX B – TABLE
Table 1. Northern Goshawk Data Summary

1.0 INTRODUCTION

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed a northern goshawk (*Accipiter gentilis*) broadcast call survey, utilizing standardized methods for detecting responses for northern goshawk within and immediately adjacent to the Project area boundary within suitable nesting habitat in Ontonagon County, Michigan.

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Figure 1, Appendix A). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam (Appendix A, Figure 1). Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project area description, purpose and objectives, methods, and results of the aerial eagle and raptor nest survey. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 PROJECT AREA DESCRIPTION

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan. (Appendix A, Figure 1). The Project area and nest search area consists of forested landscapes with high canopy cover and mature trees. Including a mix of forest structural stages, that include mature and closed-canopy forests, favorable to nesting pairs of northern goshawk.

1.2 PURPOSE AND OBJECTIVES

The purpose of the survey was to determine the presence or probable absence of nesting pairs of northern goshawks in suitable habitat within the Project area. Specific objectives of the survey were to:

1. Locate northern goshawk and other raptor nests within the nest search area; and
2. Determine species and occupancy of documented nests.

2.0 METHODS

To determine the presence or probable absence of northern goshawk (*Accipiter gentilis*) Stantec completed broadcast call surveys within the Project area at previously established surveys points. Broadcast call surveys were completed to document the presence/absence of northern goshawk and document nests at previously established survey points. Sites exhibiting suitable nesting habitat (i.e., old growth and mature forest stands) identified during plant community mapping efforts completed by Stantec in 2024 were surveyed (Stantec 2025). The best time to survey for northern goshawk is from late March/early April to early May. The reason this survey window is optimal is because nests are more easily observed prior to leaf emergence and pairs become vocal during this period of the species' active season, April 1 – July 30 (Cooper, J.L. 1999).

Survey routes were established by using existing roads and trails and survey points were placed at least every 200 meters along transects predetermined through desktop review of potential suitable habitat for northern goshawk (Mosher et al. 1990). At each point northern goshawk calls were played for 10 seconds followed by 30 seconds of listening. During the listening period, the broadcast caller was rotated 120 degrees and repeated for a total of six calling sequences. The series of calling and listening sequences equaled approximately four minutes of survey time per station (Mosher et al. 1990). At each survey point biologists recorded observational details (Appendix B, Table 1).

The surveys were led by biologists experienced conducting broadcast call surveys using U.S. Forest Service protocols and were limited to suitable habitat within the Project area (Bruggemann et al. 2011). Two separate field visits were necessary to complete this survey effort. The first visit was a comprehensive survey of the mapped broadcast call locations within suitable habitat. The second field visit was to resurvey locations with confirmed northern goshawk documentations identified during the first site visit.

3.0 RESULTS

Stantec completed a broadcast call survey to document the presence or likely absence of northern goshawk within and immediately adjacent to the Project area on April 29 and May 4, 2025. A total of 84 survey points were mapped within previously identified suitable habitat within the Project boundary (Appendix A, Figure 2). The survey points were placed in a transect pattern and followed the road system around the northern tailings site and included suitable habitat near the existing mine facilities east of Highway 64. The surveys were completed during favorable weather conditions, which included sustained winds less than 15 mph and little to no precipitation.

The first site visit documented visual responses from northern goshawks at survey points 21, 38, and 83. Audible responses were documented at survey points 30, 32, 36, and 42. Following each documented response, Stantec biologists attempted to locate potential nests on foot. No nests were identified during the site visit.

During the second site visit, Stantec biologists conducted broadcast call surveys at the point locations where visual or audible responses were documented during the first site visit. No audible responses or visual observations were documented during the second site visit.

4.0 SUMMARY

Stantec biologists completed broadcast call surveys to determine the presence/probable absence of northern goshawk in support of the proposed White Pine North Project on April 29 and May 4, 2025. The first site visit documented visual responses from northern goshawk at survey points 21, 38, and 83. Audible responses were documented at survey points 30, 32, 36, and 42. Attempts to document active nests at these locations were completed by the biologists during both site visits. No nests were documented during these searches. Although suitable habitat was identified and responses were recorded during the first site visit, the lack of documented nests and the absence of responses during site visit two lead us to anticipate impacts to northern goshawks are unlikely within and in close proximity to the Project area.

References:

Bruggeman, Jason E., David E. Andersen, and James E. Woodford. "Northern Goshawk Monitoring in the Western Great Lakes Bioregion." *Journal of Raptor Research* 45, no. 4 (2011): 290–303.

Cooper, J.L. 1999. Special animal abstract for Accipiter gentilis (northern goshawk). Michigan Natural Features Inventory, Lansing, MI. 3 pp.

Mosher, J.A., M.R. Fuller, and M. Kopeny. 1990. Surveying woodland raptors by broadcast of con-specific vocalizations. J. Field Omith. 6 1:45346 1

Stantec. (2025) Rare Plant Species Surveys, Natural Community and Land Cover Mapping Report [Field Report]. Internal database.

APPENDIX A – FIGURES

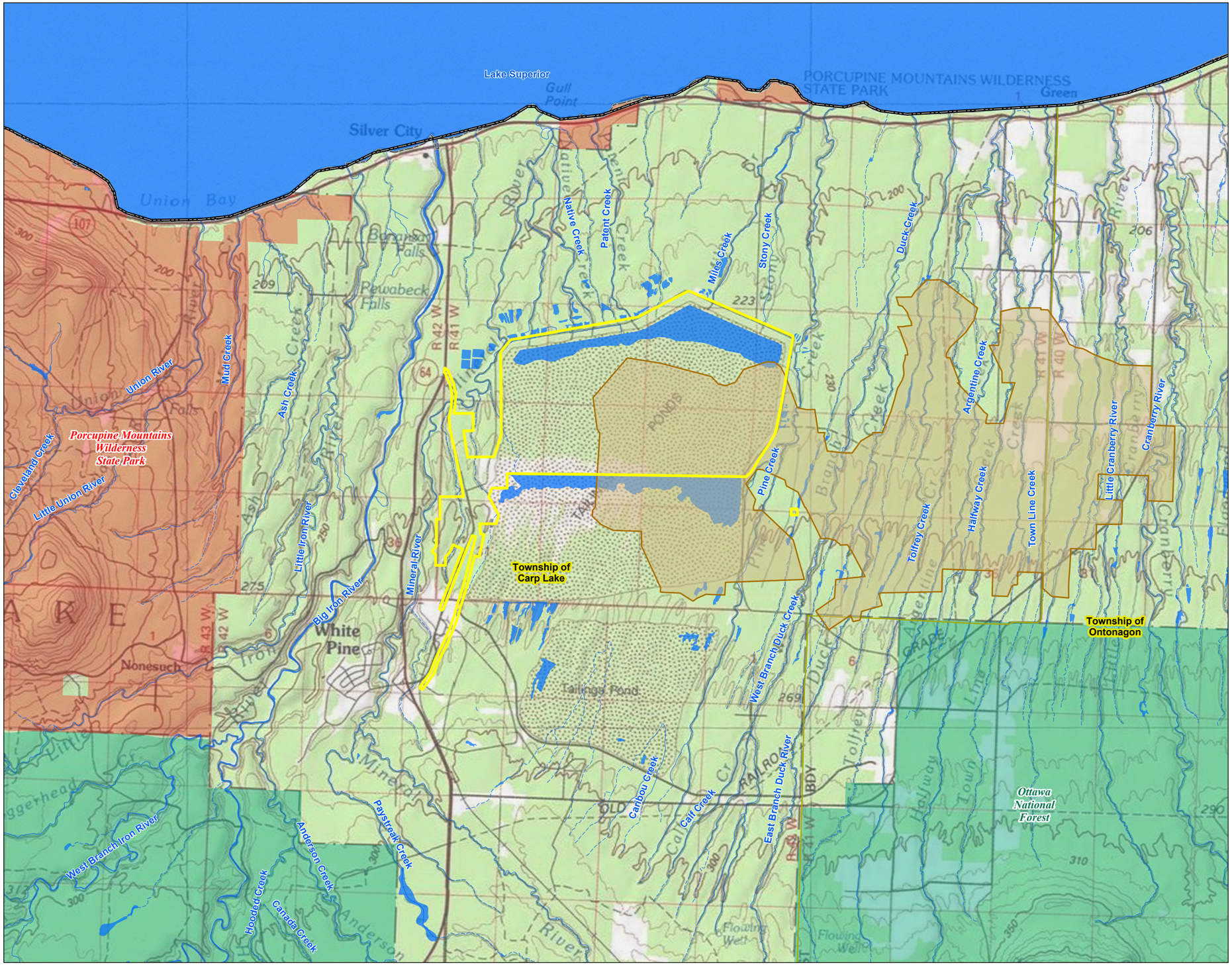


Figure No.
1

Title
Project Location

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles
(At original document size of 11x17)
1:63,360

Legend
- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

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Figure No.

2

Title

Northern Goshawk Survey Locations

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 1,500 3,000 Feet

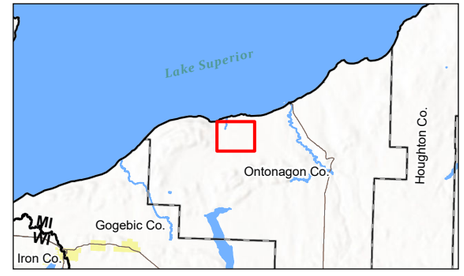
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1:36,000

Legend

- Proposed Project Extent
- Northern Goshawk Survey Point
- Northern Goshwark 100-Meter Buffer
- Audible Response
- Visual Response

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

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APPENDIX B – TABLE

Table 1. White Pine North Northern Goshawk Data Summary

Survey Point ID#	Object ID	Species_ID	Response Type	Date	Response Time Documentation	Observation Notes
13	49	Other Raptor	Visual Response	4/29/2025	11:37am	Merlin - 50m flyover
21	41	Northern Goshawk	Visual Response	4/29/2025	10:09am	100m northwest
30	2	Northern Goshawk	Audible Response	4/29/2025	8:25am	100m to the north
32	31	Northern Goshawk	Audible Response	4/29/2025	12:31pm	
36	28	Northern Goshawk	Audible Response	4/29/2025	12:02pm	
37	27	Northern Goshawk	Audible Response	4/29/2025	11:53am	Additional unidentified large raptor seen
38	26	Northern Goshawk	Visual Response	4/29/2025	11:40am	
42	22	Northern Goshawk	Audible Response	4/29/2025	10:47am	
83	65	Northern Goshawk	Visual Response	4/29/2025	2:49pm	50m flyover
84	35	Other Raptor	Visual Response	4/29/2025	2:58pm	Bald Eagle - 150m

F-9

Owl and Nightjar Survey Report

Owl and Nightjar Survey

White Pine North Project

Ontonagon County, Michigan

Prepared for:

White Pine Copper, LLC
P.O. Box 338
White Pine, MI 49971

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Date: 02/06/2026

Project # 193710518

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APPENDIX B – OWL SURVEY DATASHEETS

APPENDIX C – TABLES
Table 1. Nightjar Survey Data Summary
Table 2. Nightjar Survey Weather Summary

1.0 INTRODUCTION

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed owl and night jar surveys within the Project area in Ontonagon County, Michigan. The surveys were conducted to better understand the baseline conditions and usage of owls and night jars at the Project location.

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Figure 1, Appendix A). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam (Figure 2, Appendix A). Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project area description, purpose and objectives, methods, and results of the owl and night jar survey. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 PROJECT AREA DESCRIPTION

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan (Appendix A, Figure 1). The Project area consists of forested landscapes with high canopy cover and mature trees, including a mix of forest structural stages, that include mature and closed-canopy forests. Wetland complexes are dominated by emergent marsh, forested floodplain, and wet meadow.

1.2 PURPOSE AND OBJECTIVES

As part of a large scale, comprehensive investigation to document bird use, standardized nocturnal owl and night jar monitoring protocols were used to determine owl use within and immediately adjacent to the Project area.

2.0 METHODS

Owls

Because owls and night jars are primarily nocturnal, conventional bird survey methods (e.g., point count surveys) are not appropriate for inventorying owls or night jars. For this project, owl survey methods were adapted from standardized nocturnal owl monitoring protocols used to monitor owl populations in North American (Takats et al. 2001) and the Western Great Lakes Region (Grosshuesch and Brady, 2009). Because these protocols are designed to monitor owls at stations along roadside routes, the methods were adjusted to inventory owl along the existing road system of the Project area. Seven owl survey stations were equally spaced approximately one mile from each other along the existing roads and trail systems of the Project area. An owl survey event is defined as a full round of surveys completed within the Project Area (i.e. all seven points surveyed). Two owl survey events were conducted during the month of April 2025. Each survey event was separated by approximately seven days. Each survey event was conducted between 30 minutes after sunset and 30 minutes before sunrise. A combination of passive listening and species-specific broadcast calls was used to detect owls at each station. A preliminary desktop habitat assessment of the Project area, which included geographic location and land-cover type, suggested the site is most suitable for the northern saw-whet owl (*Aegolius acadicus*) and barred owl (*Strix varia*). The owl survey incorporated the use of a FoxPro Model FX3 Digital Game Caller to broadcast the calls of these two species to improve detection probability by invoking a response or increasing their call rates. All owls detected were recorded by species in each one-minute period they were heard calling.

Incidental detections of other nocturnal bird species (e.g., nightjars) were also recorded, although no nightjars were documented during the owl survey. Data on survey time, temperature, wind speed, cloud cover, snow cover, snow depth, and ambient noise was also recorded. See Appendix B for copies of the survey field data sheets.

Nightjars

Two nightjar species, the Eastern Whip-poor-will (*Antrostomus vociferusa*) and Common Nighthawk (*Chordeiles minor*), have the potential to occur within the Project area (Cornell 2025), but neither species is easily detected using conventional bird survey methods (e.g., point count and line-transect surveys). Specific nightjar survey methodology adapted from the United States Nightjar Survey Network protocol and used to inventory the Project for these species (Center for Conservation Biology 2010). Nightjars are most active during periods when the face of the moon is at least 50% illuminated and visible above the horizon. For this reason, nightjars were surveyed during one survey event completed one night during the appropriate lunar conditions in early June. The previously established owl survey stations were used by Stantec biologists to survey nightjars. In place of minimum six-minute listening intervals, biologists conducted 10-minute listening intervals and traveled between stations by vehicle at a slow speed to detect potential incidental individuals. Tables summarizing the Nightjar survey results are found in Appendix C.

3.0 RESULTS

Owls

Survey Event 1

Survey Event 1 was conducted between 8:52 pm April 3 and 11:09 pm April 3, 2025. The temperature ranged between 38ºF and 35ºF during the survey period. The wind was light, there was no precipitation, and the cloud cover ranged from mostly to partly cloudy during the survey period. Patchy snow cover between one to six inches was present throughout the Project Area during the survey. Ambient noise was documented at each surveyed station and remained absent or light at each survey station. All seven owl monitoring stations were surveyed during the night of April 3. One northern saw-whet owl was documented calling at Survey Station 1 during the playback portion of the survey (Appendix A, Figure 2). The owl was documented calling in the six- and seven-minute period of the playback portion of the survey. One incidental snowy owl (*Bubo scandiacus*) was documented at 8:50 pm approximately 100 meters southeast from Station 7.

Survey Event 2

Survey Event 2 was conducted between 8:55 pm and 10:58 pm on April 22, 2025. The temperature remained at 47ºF during the survey period. The wind was calm to light, there were no periods of precipitation, and the cloud cover was clear to light during the survey period. Snow was not present during the survey event. Ambient noise was documented at most of the surveyed stations, primarily the result of mating calls from multiple frog species. One barred owl and one northern saw-whet owl was detected calling at Survey Station 1 during minute one and minute two of the passive listening portions of the survey (Appendix A, Figure 2). The northern saw-whet owl called throughout the 10 minutes survey period and was documented calling closer to the survey team during minute eight. No other owls were detected during surveys at the remaining monitoring stations.

Nightjars

The single nightjar survey was completed by Stantec biologists on the night of June 11, 2025. Survey conditions were favorable and included light winds and clear to partly cloudy skies. The moon was visible during individual stops at survey stations 1, 4, 5, and 7, however, it was not visible at Survey Stations 2,3, and 6. Audible responses for eastern whip-poor-will were documented at Survey Stations 2, 3, 4, 5, 6, and 7 (Appendix A, Figure 2). Two individuals were documented calling at Survey Stations 2, 4, and 5. Three individuals were documented calling at Survey Stations 3 and 7. And one individual was documented at Survey Station 6.

4.0 SUMMARY

This report summarizes the methods and results of an owl and nightjar survey completed by Stantec within the proposed White Pine North Project Area. Seven owl monitoring stations, spaced equally at one mile apart, were surveyed during two survey events on April 3, and 23, 2025. One northern saw-whet was detected at one survey station (1) during the first survey event and at the same monitoring station during the second survey event. A single barred owl was also documented at Survey Station 1 during the second survey event.

Stantec also completed a nightjar survey within the proposed Project area on June 11, 2025. The seven survey stations used during the owl survey were surveyed for nightjars under favorable weather conditions. Eastern whip-poor-wills were documented at Survey Stations 2, 3, 4, 5, 6, and 7. The owl and nightjar surveys provide a good baseline inventory of owl and nightjar use within and in close proximity the Project Area and can be used to plan avoidance and minimization measures if necessary.

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Takats, L., D. Duncan, M.L. Hundertmark, D.J. Deutschman, & G.J. Niemi. (2001). Guidelines for Nocturnal Owl Monitoring in North America. Beaverhill Bird Observatory/Alberta Natural Heritage Information Centre, Edmonton, AB.

APPENDIX A – FIGURES

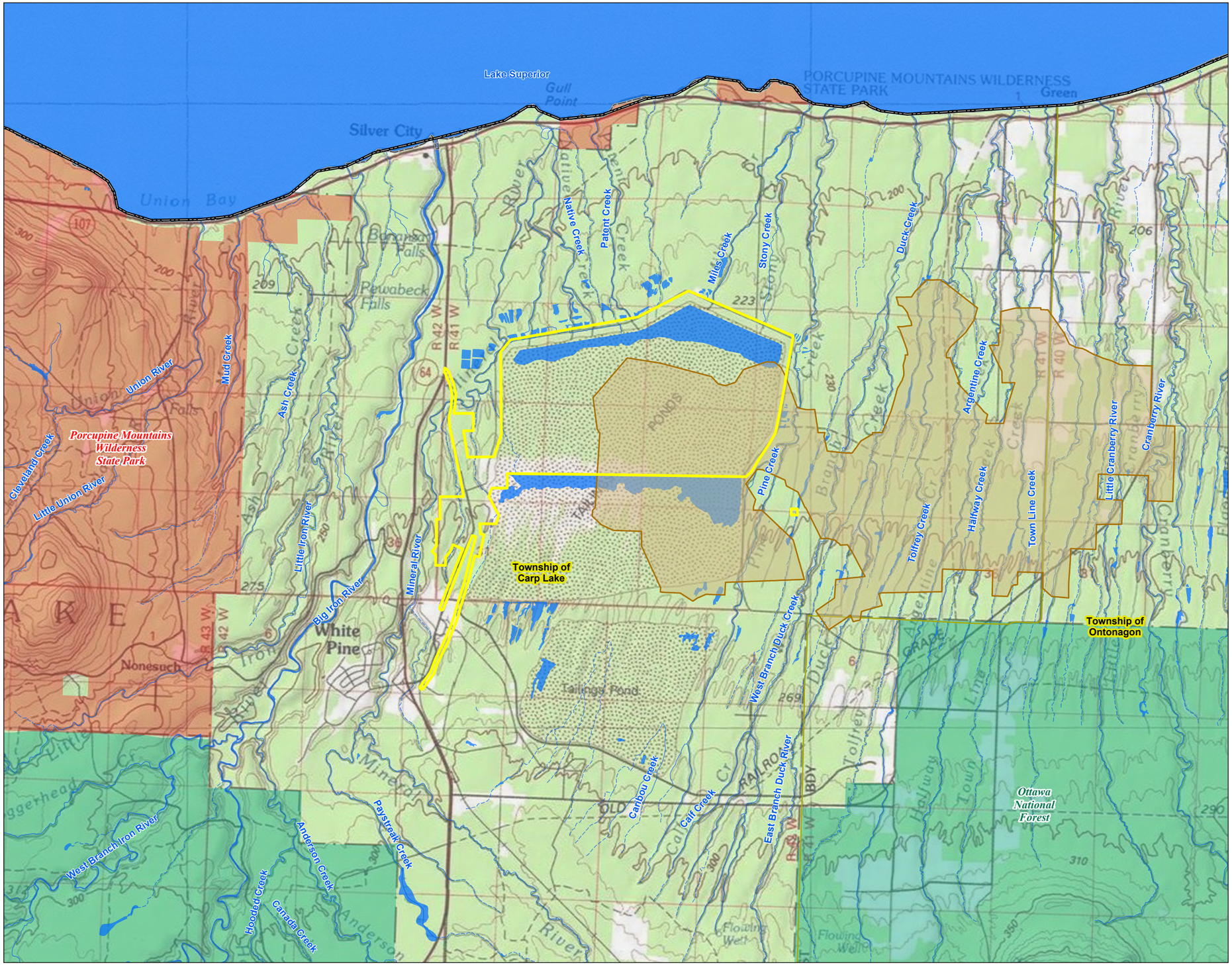


Figure No.
1

Title
Project Location

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles
(At original document size of 11x17)
1:63,360

Legend
- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

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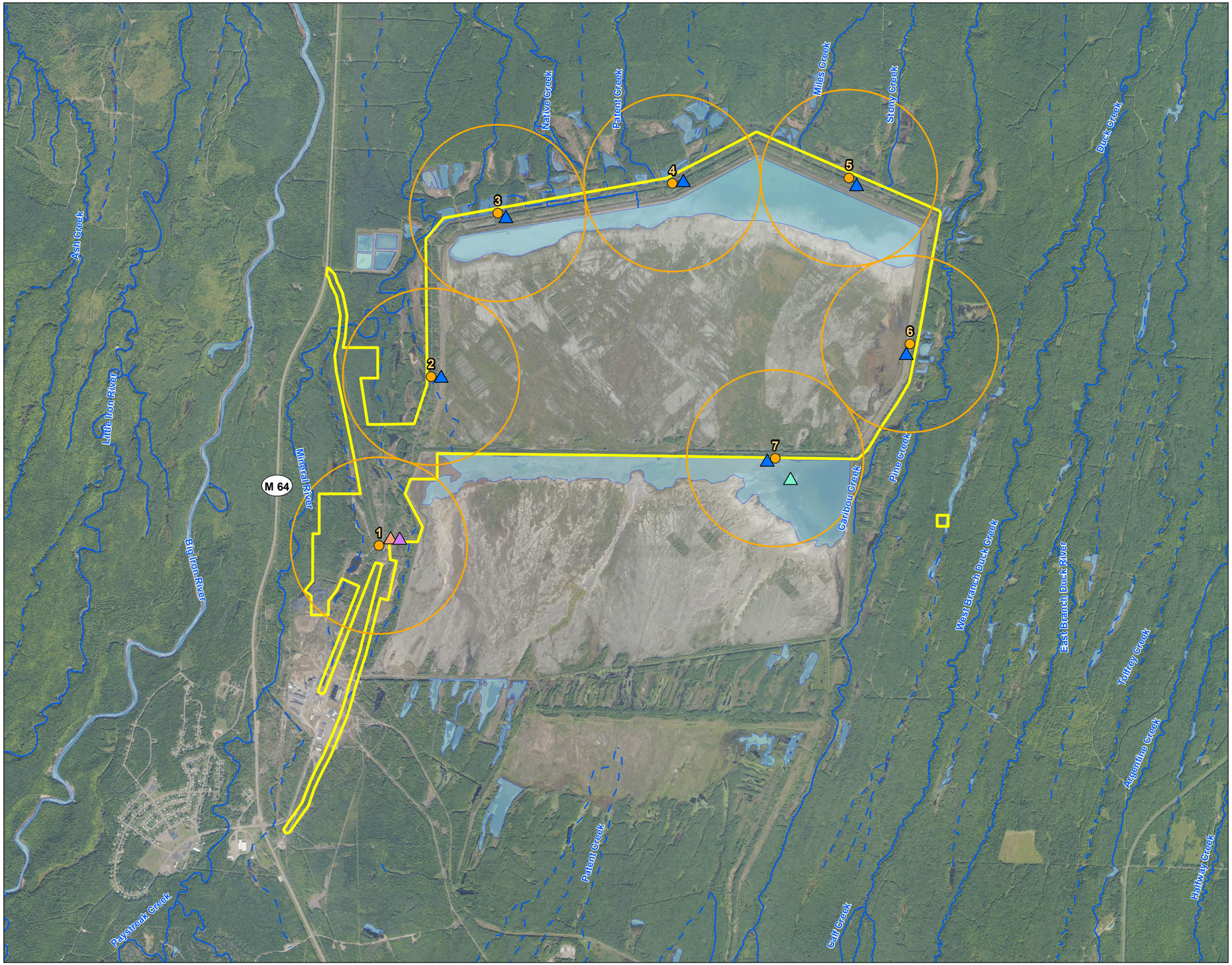


Figure No.

2

Title

Owl / Nightjar Survey Locations

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 1,500 3,000 Feet

(At original document size of 11x17)
1:36,000

Legend

- Proposed Project Extent
- Owl / Nightjar Survey Point
- Owl / Nightjar Half-Mile Buffer
- Barred Owl
- Northern Saw-Whet Owl
- Snowy Owl
- Eastern Whip-poor Will

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

APPENDIX B – OWL SURVEY DATASHEETS

Owl Survey Form

Route Number: White Pine Owl	
Observer: D. Hixon, R. Glasford	
Date: 4/3/25	
Start time: 8:52	**End time:** 11:09
Start temp(°F): 38	**End temp(°F):** 35
Precip type: 0	**Precip level:** 0
Snow cover: 2	**Snow depth(in):** 6

Weather Data at Points:

Point:	1	2	3	4	5	6	7	8	9	10
Wind	1	1	2	2	2	2	2			
Sky	2	2	2	2	3	3	3			
Noise	1	1	2	2	1	2	2			
Cars	0	0	0	0	0	0	0			

Notes: snowy owl seen at 8:50 ~100 meters SE of point 7
point 7 misc. species: AMWO
point 6 misc species: AMWO

Precip Type	Precip Level	Wind Codes	Sky Codes
0 = None	0 = Low	0 = < 1 mph	0 = 0 – 25%
1 = Snow	1=Medium	1 = 1 to 3	1 = 26 – 50%
2 = Rain	2 = High	2 = 4 to 7	2 = 51 – 75%
Snow Cover		3 = 8 to 12	3 = 76 – 100%
0 = None		4 = 13 to 18	**Noise Codes (incl. wind)**
1 = Patchy		5 = 19 to 24	1 = None
2 = Continuous			2 = Slight
			3 = Medium
			4 = Excessive

START

Point	Species	Passive Listening			Northern Saw-whet Owl (30 sec playback / 30 sec passive)				Barred Owl (30 sec playback / 30 sec passive)				END
		Min 1	Min 2	Min 3	Min 4.	Min 5.	Min 6.	Min 7.	Min 8	Min 9	Min 10	Min 11	
7													9:03
6													9:38
5													10:03
4													10:20
3													10:37
2													10:53
1	N. saw-whet						NW	NW					11:09

8:52
9:27
9:52
10:09
10:26
10:42
10:58

Owl Survey Form

Route Number:	White Pine, MI
Observer:	D Hixon R. Glasford
Date:	4/22/25
Start time:	20:55 **End time:** 22:58
Start temp(°F):	47 **End temp(°F):**
Precip type:	0 **Precip level:** 0
Snow cover:	0 **Snow depth(in):** 0

Weather Data at Points:

Point:	1	2	3	4	5	6	7	8	9	10
Wind	0	0	0	0	0	0	1			
Sky	0	0	0	1	1	1	1			
Noise	1	1	1	1	1	1	1			
Cars	0	0	0	0	0	0	0			

Notes: Pt 1 – ~~1 Al Sandhill~~ 1 min 2. called for duration and moved closer after 1st BAOW call.

Precip Type	Precip Level	Wind Codes	Sky Codes
0 = None	0 = Low	0 = < 1 mph	0 = 0 – 25%
1 = Snow	1=Medium	1 = 1 to 3	1 = 26 – 50%
2 = Rain	2 = High	2 = 4 to 7	2 = 51 – 75%
Snow Cover		3 = 8 to 12	3 = 76 – 100%
0 = None		4 = 13 to 18	**Noise Codes (incl. wind)**
1 = Patchy		5 = 19 to 24	1 = None
2 = Continuous			2 = Slight
			3 = Medium
			4 = Excessive

Spring Peepers - Pts 7, 6, 5, 4, 3, 2, 1
Wood Frog - Pts 6, 2

Point	Species	Passive Listening			Northern Saw-whet Owl (30 sec playback / 30 sec passive)				Barred Owl (30 sec playback / 30 sec passive)				
		Min 1	Min 2	Min 3	Min 4.	Min 5.	Min 6.	Min 7.	Min 8	Min 9	Min 10	Min 11	
20:55 7	—	—	—	—	—	—	—	—	—	—	—	—	21:06
21:20 6	—	—	—	—	—	—	—	—	—	—	—	—	21:32
21:38 5	—	—	—	—	—	—	—	—	—	—	—	—	21:50
21:55 4		—	—	—	—	—	—	—	—	—	—	—	22:06
22:10 3	—	—	—	—	—	—	—	—	—	—	—	—	22:22
22:31 2	—	—	—	—	—	—	—	—	—	—	—	—	22:42
22:46 1	NSWO	—	1-270°	→	→	→	→	→	→	→	→	→	22:58

call got close.

APPENDIX C – TABLES

Table 1 - White Pine North Nightjar Survey Data Summary

Survey Point ID#	Easter Whip-poor-will	Response Type	Common Nighthawk	Response Type
1	0	None	0	None
2	2	Audible Response	0	None
3	3	Audible Response	0	None
4	2	Audible Response	0	None
5	2	Audible Response	0	None
6	1	Audible Response	0	None
7	3	Audible Response	0	None

Table 2 - White Pine North Nightjar Survey Weather Summary

Season	Survey Event	Date	Observer	Point Count Station Number		Time		Wind Speed Code [1]		Sky Code [2]		Noise Code		Survey Comments
				Start	End	Start	End	Start	End	Start	End	Start	End	
Nightjar	1	11-Jun-25	Jesse Tucker	7	5	23:17	23:55	2	0	1	0	1	1	Moon not visible at stop 6
Nightjar	1	11-Jun-25	Sparrow Niman	4	1	23:05	23:51	0	0	0	0	0	0	Moon not visible at stops 2 and 3

[1] Beaufort Wind Code Categories and Definitions

Code	Speed	Definition
0	none	calm, smoke rises vertically
1	1-3 mph	wind direction shown by smoke drift
2	4-7 mph	wind felt on face, leaves rustle
3	8-12 mph	leaves, small twigs in constant motion
4	13-18 mph	raises dust/loose paper, small branches move
5	19-24 mph	small trees in leaf sway

[2] Sky Code Categories and Definitions

Code	Category
0	clear (<15% cloud cover)
1	partly cloudy (16-50% cloud cover)
2	mostly cloudy (51-75 % cloud cover)
3	overcast (76-100% cloud cover)
5	fog or haze
6	drizzle
7	rain
9	thunderstorm, w or w/out precip.

F-10

Breeding Bird and Migratory Bird Survey Report

Breeding Bird and Migratory Bird Survey Report

White Pine North Project

Ontonagon County, Michigan

Prepared for:

White Pine Copper, LLC
P.O. Box 338
White Pine, MI 49971

Prepared by:

Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere, WI 54115

Date: April 10, 2026

Project # 193710518

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1.0 INTRODUCTION 1
1.1 PROJECT AREA DESCRIPTION 1
1.2 PURPOSE AND OBJECTIVES 1
2.0 METHODS 2
2.1 STANDARDIZED BREEDING BIRD POINT COUNT SURVEYS 2
2.2 AVIAN MIGRATION TRANSECT SURVEYS 2
3.0 RESULTS 2
3.1 BREEDING SONGBIRD POINT COUNT SURVEY 2
3.2 AVIAN MIGRATION TRANSECT SURVEYS 3
4.0 SUMMARY 4

APPENDIX A – FIGURES

Figure 1. Project Location

Figure 2. Breeding Bird Survey Locations

Figure 3. Migratory Bird Transects

APPENDIX B – Tables

Table 1. Breeding bird point count survey dates, survey times, and weather conditions at White Pine Copper Mine Project in Ontonagon County, Michigan.

Table 2. Breeding bird point count survey summary at White Pine Copper Mine Project in Ontonagon, Michigan.

Table 3. Migratory bird line transect survey dates, survey times, and weather conditions at White Pine Copper Mine Project in Ontonagon County Michigan.

Table 4. Migratory bird line transect survey summary at White Pine Copper Mine Project in Ontonagon, Michigan.

1.0 INTRODUCTION

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed avian breeding and migration surveys within the Project area in Ontonagon County, Michigan. The surveys were conducted as part of the pre-construction and planning phase of the Project.

WPC is a joint venture between Kinterra Copper USA LLC (66 percent ownership) and Highland Copper Corporation (34 percent ownership). WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Figure 1, Appendix A). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project description, purpose and objectives, methods, and results of the breeding bird and migration surveys. The surveys were conducted as part of the pre-construction and planning phase of the Project.

1.1 PROJECT AREA DESCRIPTION

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan (Appendix A, Figure 1). The Project area consists of forested landscapes with high canopy cover and mature trees, including a mix of forest structural stages, that include mature and closed-canopy forests. Wetland complexes are dominated by emergent marsh, forested floodplain, and wet meadow.

1.2 PURPOSE AND OBJECTIVES

As part of a large scale, comprehensive investigation to document bird use at the Project area, standardized breeding bird and migration monitoring protocols were used to determine avian use within and immediately adjacent to the Project area.

2.0 METHODS

2.1 STANDARDIZED BREEDING BIRD POINT COUNT SURVEYS

Stantec implemented standardized point count surveys within the Project area following methods outlined by Ralph et al. (1993). Surveys were conducted over two separate survey events during the peak songbird breeding season.

In general, the survey methods involved ten-minute point counts completed at each station during optimal survey conditions from one-half hour before sunrise to approximately 10:00 AM on days with no significant precipitation and with winds less than 12 mph (Category 3 on the Beaufort Wind Scale).

Point count stations were spaced over 250 meters apart to ensure independence between bird detections at each location. A total of 43-point count stations were surveyed over two different events (three days each) in June 2025 (Appendix A, Figure 2). All bird detections by sight or sound within 100 meters were identified to species and tallied at each point count station.

2.2 AVIAN MIGRATION TRANSECT SURVEYS

Diurnal migrant land-birds were surveyed within the Project area using standardized line transect methods adapted from Ralph et al. (1995) and Biddy et al. (1992). Seven line transects were established throughout the Project area, including the access roads, which provides representative coverage of different habitat types (Appendix A, Figure 3). Transects vary in length and have predetermined start and stop locations and were subdivided into 250-meter segments. Surveys were conducted during four events: two in fall 2024 and two in spring 2025. Fall surveys occurred during the month of September and spring surveys occurred during the month of May.

Each transect was quietly walked at a steady pace by an observer that recorded all birds detected by sight or sound (singing/ calling) along each transect. To target daily peak activity periods, surveys began at or just before sunrise and continued until two line transects were completed, typically by 10:00 AM. Weather conditions (temperature, cloud cover, wind) were recorded at the beginning of each line transect. Surveys were not completed during rain or excessive wind conditions. Surveys were completed when the winds were less than 12 mph (Category 3 on the Beaufort Wind Scale). Bird detections were detected within distance categories of 25, 50, and >50 meters (Appendix B).

3.0 RESULTS

3.1 BREEDING SONGBIRD POINT COUNT SURVEY

Standardized breeding songbird point count surveys were completed at a total of 43 survey stations over two survey events – one from June 10–12, 2025 and the second from June 24–26, 2025. The survey conditions were acceptable during each breeding bird survey event (Table 1).

During the first breeding season event 703 individuals of 61 species were detected during the point count surveys (Table 2). Over half of the 703 individuals detected were comprised of twelve species including red-eyed vireo *(Vireo olivaceus*) (8%), trumpeter swan (*Cygnus buccinator*) (6%), American crow (*Corvus brachyrhynchos*) (5%), American redstart (*Setophaga ruticilla*) (5%), American robin (*Turdus migratorius*) (5%), Canada goose (*Branta canadensis*) (5%), ovenbird (*Seiurus aurocapilla*) (5%), song sparrow (*Melospiza melodia*) (5%), veery (*Catharus fuscescens*) (4%), yellow warbler (*Setophaga petechia*) (4%), clay-colored sparrow (*Spizella pallida*) (4%), and common yellowthroat (*Geothlypis trichas*) (4%). State-listed threatened species documented during breeding bird point counts included common loon (*Gavia immer,* one individual). Species carrying both Special Concern (SC) and Species of Greatest Conservation Need (SGCN) designations that were documented included trumpeter swan, American bittern (*Botaurus lentiginosus*), and grasshopper sparrow (*Ammodramus savannarum*). Species with SC designation included wood thrush (*Hylocichla mustelina*). No federally listed species were observed during the first breeding survey event (Table 2).

During the second breeding season event 728 individuals of 59 species were detected during point count surveys (Table 2). Over half of the 728 individuals detected were comprised of eleven species including song sparrow (8%), red-eyed vireo (7%), American crow (5%), clay-colored sparrow (5%), red-winged blackbird (*Agelaius phoeniceus*) (5%), veery (5%), American redstart (4%), American robin (4%), ovenbird (4%), sandhill crane (*Grus canadensis*) (4%), and yellow warbler (4%). State-listed threatened species documented during breeding bird point counts included common loon (one individual) and golden-winged warbler (*Vermivora chrysoptera,* one individual). Species carrying both SC and SGCN designations that were detected included trumpeter swan. Species with SC designation included wood thrush. No federally listed species were observed during the second breeding survey event (Table 2).

3.2 AVIAN MIGRATION TRANSECT SURVEYS

Standardized migratory bird transect surveys were conducted across seven established transects during four survey events - two in fall 2024 and two in spring 2025. Fall survey efforts were completed on September 9–12 and September 27–30, 2024. Spring surveys were conducted on May 1 and 3–4, 2025, and subsequently on May 19–22, 2025. The survey conditions were acceptable during each breeding bird survey event (Table 3).

Fall 2024 Migration Period

A total of 2,697 individuals representing 88 different species were detected during migratory transect surveys (Table 4). Because the primary objective of the surveys was to provide a baseline inventory, no effort was made to distinguish between newly-arrived migrants, stopover migrants that arrived on earlier days, or resident individuals. Of the total individuals, more than half of the detections were comprised of eight species including Canada goose (9%), American pipit (8%), trumpeter swan (8%), mallard (*Anas platyrhynchos*) (6%), palm warbler (*Setophaga palmarum*) (6%), blue jay (*Cyanocitta cristata*) (5%), yellow-rumped warbler (Setophaga coronata) (4%), and black-capped chickadee (4%). State-listed threatened species documented during transect surveys included least bittern (*Ixobrychus exilis,* one individual), peregrine falcon (*Falco peregrinus,* one individual), and northern goshawk (*Accipiter gentilis,* two individuals). Species carrying both SC and SGCN designations that were detected included trumpeter

swan, northern harrier (*Circus hudsonius*), American bittern. No federally listed species were observed during the fall migration transect surveys (Table 4).

Spring 2025 Migration Period

A total of 2,764 individuals representing 100 species were detected during migratory transect surveys (Table 4). Because the primary objective of the surveys was to provide a baseline inventory, no effort was made to distinguish among newly arrived migrants, stopover migrants that had arrived on earlier days, or resident individuals. Nearly half of all detections were comprised of eleven species: red-winged blackbird (10%), American robin (10%), song sparrow (6%), Canada goose (4%), yellow-rumped warbler (4%), American redstart (3%), clay-colored sparrow (3%), ovenbird (3%), red-eyed vireo (3%), savannah sparrow (*Passerculus sandwichensis*) (3%), and yellow warbler (3%). State-listed threatened species documented during transect surveys included spruce grouse (*Canachites canadensis,* one individual), common loon (one individual), and northern goshawk (one individual). Species carrying both SC and SGCN designations that were detected included trumpeter swan and American bittern. Species with SC designation included osprey (*Pandion haliaetus*) and wood thrush (*Hylocichla mustelina*). No federally listed species were observed during the spring migration transect surveys (Table 4).

4.0 SUMMARY

The survey methods used to inventory avian breeding bird and migratory use at White Pine North Project area provided a baseline of species diversity throughout the site. The completion of both breeding bird point counts and migratory transect surveys detected 5,461 individuals representing 129 avian species. No federally listed species were detected during any of the surveys; however, state-listed species were documented. During the breeding bird survey common loon (one individual) and golden-winged warbler (one individual) were documented. During the migration survey common loon (one individual), least bittern (one individual), peregrine falcon (one individual), northern goshawk (three individuals), and spruce grouse (one individual) were documented. In addition, five species of Special Concern or Greatest Conservation Need were documented across the survey efforts.

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Ralph, C. J., G. R. Guepel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of Field Methods for Monitoring Landbirds. General Technical Report PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 41 p.

APPENDIX A – FIGURES

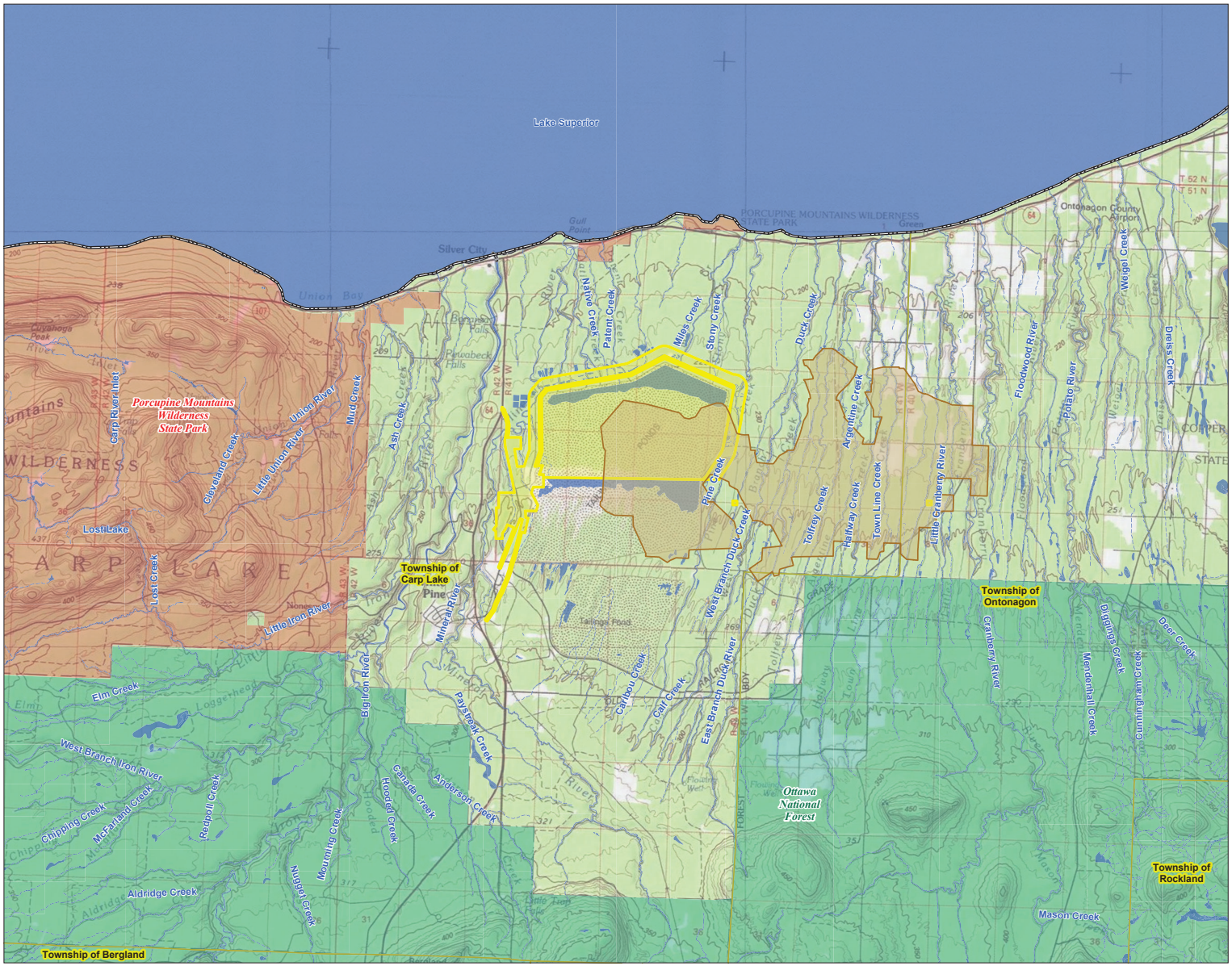


Figure No.
1

Title
Project Location

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
TR by SR on 2025-03-04
IR by JS on 2025-03-03

N

0 0.75 1.5 Miles
(At original document size of 11x17)
1:95,040

Legend
- Proposed Surface Facilities
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

\\193710\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper\193710518_WhitePineCopper.aprx Revised: 2025-12-19 By: jmarty

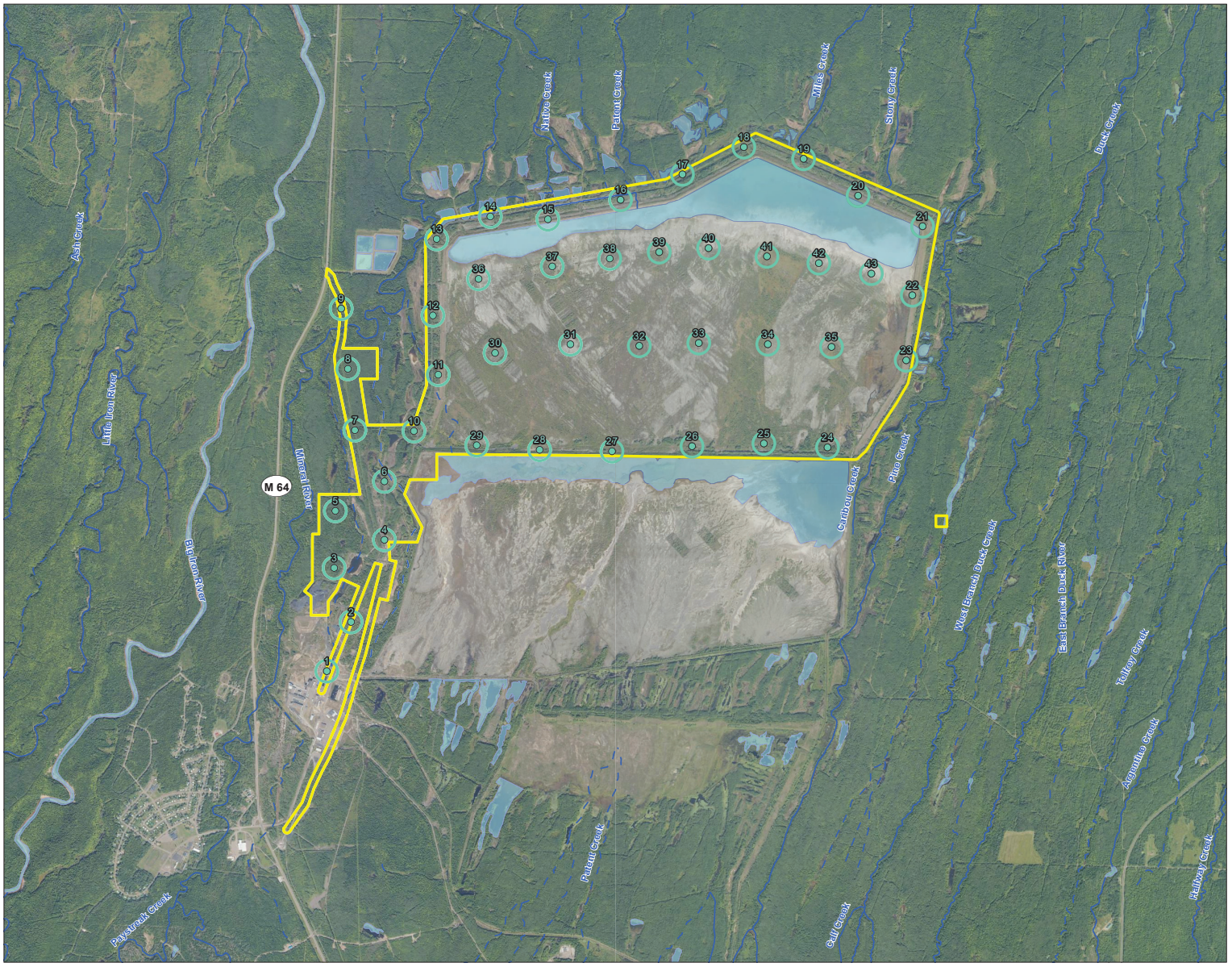


Figure No.
2

Title
Breeding Bird Survey Locations

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 1,500 3,000 Feet
(At original document size of 11x17)
1:36,000

Legend
- Proposed Project Extent
- Breeding Bird Survey Point
- Breeding Bird 100-Meter Buffer

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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I:\193710\03\05\18\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2025-12-19 By: jmurby

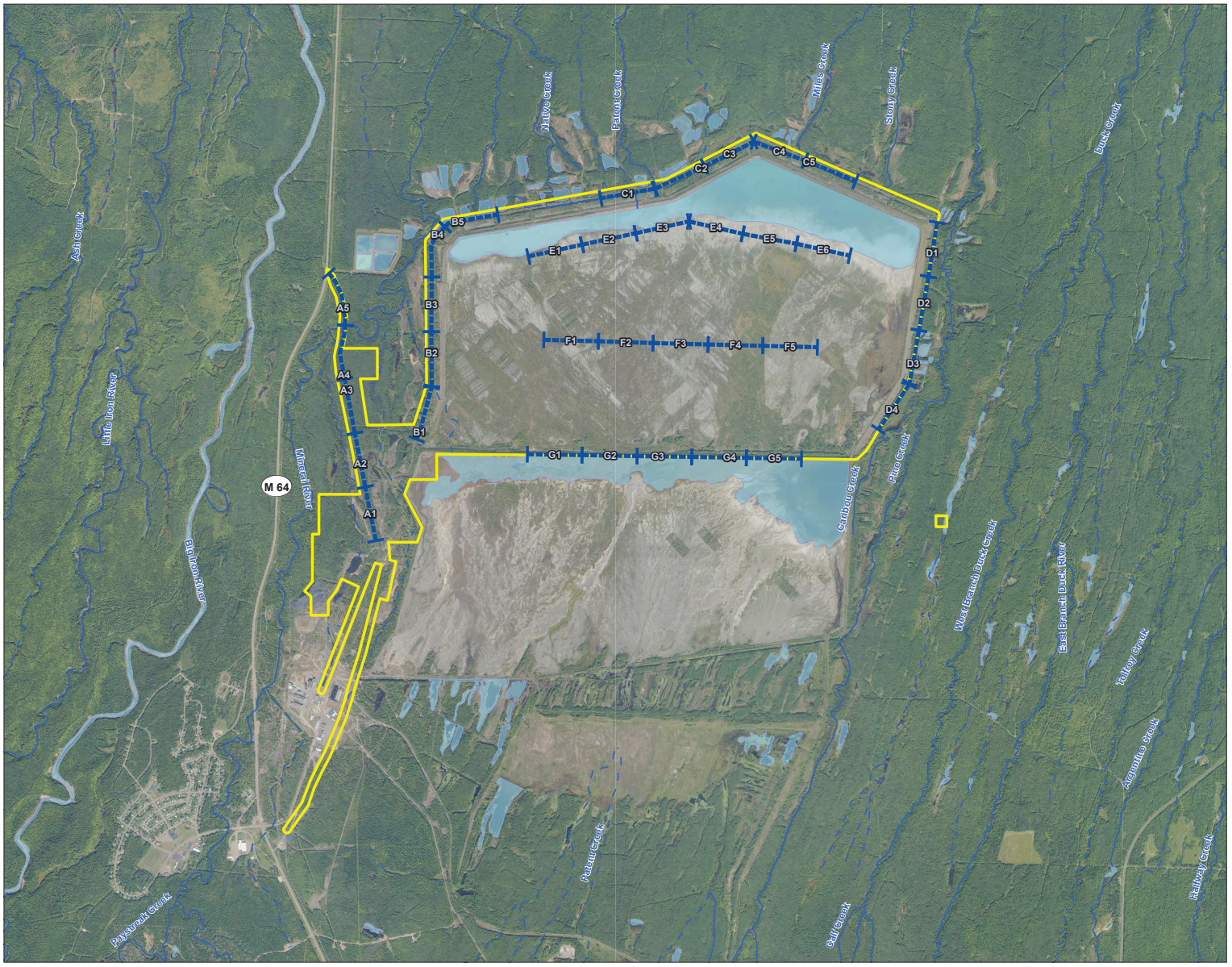


Figure No.
3

Title
Migratory Bird Transects

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 1,500 3,000 Feet
(At original document size of 11x17)
1:36,000

Legend
- Proposed Project Extent
- Survey Transect

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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I:\193710\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2026-01-28 By jmurry

APPENDIX B – TABLES

Table 1: Breeding bird point count survey dates, survey times, and weather conditions at White Pine Copper Mine Project in Ontonagon County, Michigan.

Season	Survey Event	Date	Point Count Station Number		Time		Wind Speed Code [1]		Sky Code [2]		Temperature (F)	
			Start	End	Start	End	Start	End	Start	End	Start	End
Breeding	1	10-Jun-25	16	10	6:08	8:33	2	3	3	3	51	53
Breeding	1	10-Jun-25	23	17	6:24	8:37	2	3	3	3	51	53
Breeding	1	11-Jun-25	36	43	6:10	8:23	0	2	2	1	55	57
Breeding	1	11-Jun-25	30	35	6:29	8:27	0	3	1	1	55	55
Breeding	1	12-Jun-25	1	9	5:54	8:13	0	2	0	0	48	49
Breeding	1	12-Jun-25	29	24	5:57	7:42	0	0	0	0	50	48
Breeding	2	24-Jun-25	15	10	6:00	8:03	1	2	0	0	58	61
Breeding	2	24-Jun-25	23	16	6:05	8:10	2	2	0	0	56	56
Breeding	2	25-Jun-25	36	43	6:00	8:27	2	3	0	1	48	56
Breeding	2	25-Jun-25	30	35	6:10	8:10	2	1	0	1	52	54
Breeding	2	26-Jun-25	29	24	5:57	7:41	0	1	3	3	57	58
Breeding	2	26-Jun-25	1	9	5:49	7:55	2	1	3	3	56	56

[1] Beaufort Wind Code Categories and Definitions

Code	Speed	Definition
0	none	calm, smoke rises vertically
1	1-3 mph	wind direction shown by smoke drift
2	4-7 mph	wind felt on face, leaves rustle
3	8-12 mph	leaves, small twigs in constant motion
4	13-18 mph	raises dust/loose paper, small branches move
5	19-24 mph	small trees in leaf sway

[2] Sky Code Categories and Definitions

Code	Category
0	clear (<15% cloud cover)
1	partly cloudy (16-50% cloud cover)
2	mostly cloudy (51-75 % cloud cover)
3	overcast (76-100% cloud cover)
5	fog or haze
6	drizzle
7	rain
9	thunderstorm, w or w/out precip.

Table 2: Breeding bird point count survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Breeding Bird Point Counts Survey Event 1 10-Jun 11-Jun 12-Jun	 Survey Event 2 24-Jun 25-Jun 26-Jun	 Total
ORDER: Anseriformes					
FAMILY: Anatidae - Ducks/Geese/Swans					
American Wigeon (*Mareca americana*)	AMWI			2	**2**
Canada Goose (*Branta canadensis*)	CANG		33	12	**45**
Common Merganser (*Mergus merganser*)	COME		1	1	**2**
Mallard (*Anas platyrhynchos*)	MALL		2		**2**
Trumpeter Swan (*Cygnus buccinator*)	TRUS	(SC), SGCN	42	19	**61**
ORDER: Galliformes					
FAMILY: Phasianidae - Partridges/Grouse/Turkeys/Quail					
Ruffed Grouse (*Bonasa umbellus*)	RUGR		3		**3**
Wild Turkey (*Meleagris galloparvo)*	WITU		5	1	**6**
ORDER: Podicipediformes					
FAMILY: Podicipedidae - Grebes					
Pied-billed Grebe (*Podilymbus podiceps*)	PBGR			1	**1**
ORDER: Gaviiformes					
FAMILY: Gaviidae - Loons					
Common Loon (*Gavia immer*)	COLO	THR	1	1	**2**
ORDER: Ciconiiformes					
FAMILY: Ardeidae - Herons/Bitterns/Allies					
American Bittern (*Botaurus lentiginosus*)	AMBI	(SC), SGCN	6		**6**
ORDER: Gruiformes					
FAMILY: Gruidae - Cranes					
Sandhill Crane (*Grus canadensis*)	SACR		18	29	**47**
ORDER: Charadriiformes					
FAMILY: Charadriidae - Lapwings/Plovers					
Killdeer (*Charadrius vociferus*)	KILL		5	4	**9**
FAMILY: Scolopacidae - Sandpipers/Phalaropes/Allies					
Greater Yellowlegs (*Tringa melanoleuca*)	GRYE		2		**2**
Spotted Sandpiper (*Actitis macularius*)	SPSA		1		**1**
Wilson's Snipe (*Gallinago delicata*)	WISN			5	**5**
FAMILY: Laridae - Gulls/Terns					
Ring-billed Gull (*Larus delawarensis*)	RBGU		2	18	**20**
ORDER: Coraciiformes					

Table 2: Breeding bird point count survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Breeding Bird Point Counts Survey Event 1 10-Jun 11-Jun 12-Jun	 Survey Event 2 24-Jun 25-Jun 26-Jun	 Total
FAMILY: Alcedinidae - Kingfishers					
Belted Kingfisher (*Megaceryle alcyon*)	BEKI			2	**2**
ORDER: Columbiformes					
FAMILY: Columbidae - Pigeons/Doves					
Mourning Dove (*Zenaida macroura*)	MODO			1	**1**
ORDER: Cuculiformes					
FAMILY: Cuculidae - Cuckoos/Roadrunners/Anis					
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	BBCU		3	11	**14**
ORDER: Piciformes					
FAMILY: Picidae - Woodpeckers/Allies					
Downy Woodpecker (*Picoides pubescens*)	DOWO			2	**2**
Hairy Woodpecker (*Picoides villosus*)	HAWO		1		**1**
Northern Flicker (*Colaptes auratus*)	NOFL		2	9	**11**
ORDER: Passeriformes					
FAMILY: Tyrannidae - Tyrant Flycatchers					
Alder Flycatcher (*Empidonax alnorum*)	ALFL		11	3	**14**
Eastern Kingbird (*Tyrannus tyrannus*)	EAKI		2	2	**4**
Eastern Phoebe (*Sayornis phoebe*)	EAPH		5	8	**13**
Eastern Wood-Pewee (*Contopus virens*)	EAWP		2		**2**
Great Crested Flycatcher (*Myiarchus crinitus*)	GCFL		5	7	**12**
Least Flycatcher (*Empidonax minimus*)	LEFL		15	18	**33**
FAMILY: Vireonidae - Vireos					
Red-eyed Vireo (*Vireo olivaceus*)	REVI		54	52	**106**
Warbling Vireo (*Vireo gilvus*)	WAVI		5	7	**12**
FAMILY: Corvidae - Jays/Crows					
American Crow (*Corvus brachyrhynchos*)	AMCR		37	38	**75**
Blue Jay (*Cyanocitta cristata*)	BLJA		10	16	**26**
Common Raven (*Corvus corax*)	CORA		9	6	**15**
FAMILY: Hirundinidae - Swallows					
Barn Swallow (*Hirundo rustica*)	BARS			1	**1**
FAMILY: Paridae - Chickadees/Titmice					
Black-capped Chickadee (*Poecile atricapillus*)	BCCH		3	10	**13**
FAMILY: Sittidae - Nuthatches					

Table 2: Breeding bird point count survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Breeding Bird Point Counts Survey Event 1 10-Jun 11-Jun 12-Jun	 Survey Event 2 24-Jun 25-Jun 26-Jun	 Total
Red-breasted Nuthatch (*Sitta canadensis*)	RBNU			1	**1**
FAMILY: Turdidae - Thrushes					
American Robin (*Turdus migratorius*)	AMRO		37	32	**69**
Hermit Thrush (*Catharus guttatus*)	HETH		3	1	**4**
Veery (*Catharus fuscescens*)	VEER		31	39	**70**
Wood Thrush (*Hylocichla mustelina*)	WOTH	(SC)	3	6	**9**
FAMILY: Mimidae - Mockingbirds/Thrashers					
Brown Thrasher (*Toxostoma rufum*)	BRTH		11	9	**20**
Gray Catbird (*Dumetella carolinensis*)	GRCA		2	3	**5**
FAMILY: Bombycillidae - Waxwings					
Cedar Waxwing (*Bombycilla cedrorum*)	CEDW		10	20	**30**
FAMILY: Parulidae - Wood-Warblers					
American Redstart (*Setophaga ruticilla*)	AMRE		32	30	**62**
Black-and-white Warbler (*Mniotilta varia*)	BAWW		15	13	**28**
Black-throated Green Warbler (*Setophaga virens*)	BTNW		3	1	**4**
Chestnut-sided Warbler (*Setophaga pensylvanica*)	CSWA		4	2	**6**
Common Yellowthroat (*Geothlypis trichas*)	COYE		29	25	**54**
Golden-Winged Warbler (*Vermivora chrysoptera*)	GWWA	THR		1	**1**
Magnolia Warbler (*Setophaga magnolia*)	MAWA		2		**2**
Mourning Warbler (*Geothlypis philadelphia*)	MOWA		4	2	**6**
Nashville Warbler (*Oreothlypis ruficapilla*)	NAWA		12	5	**17**
Ovenbird (*Seiurus aurocapilla*)	OVEN		34	26	**60**
Palm Warbler (*Setophaga palmarum*)	PAWA		2		**2**
Yellow Warbler (*Dendroica petechia*)	YEWA		27	28	**55**
Yellow-rumped Warbler (*Setophaga coronata*)	YRWA		2		**2**
FAMILY: Emberizidae - Emberizids					
Song Sparrow (*Melospiza melodia*)	SOSP		32	55	**87**
FAMILY: Passerellidae - New World Sparrows/Towhees					
Chipping Sparrow (*Spizella passerina*)	CHSP		6	7	**13**
Clay-colored Sparrow (*Spizella pallida*)	CCSP		25	37	**62**
Grasshopper Sparrow (*Mammodramus savannarum*)	GRSP	(SC), SGCN	1		**1**
Savannah Sparrow (*Passerculus sandwichensis*)	SAVS		15	13	**28**
Swamp Sparrow (*Melospiza georgiana*)	SWSP			3	**3**

Table 2: Breeding bird point count survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Breeding Bird Point Counts Survey Event 1 10-Jun 11-Jun 12-Jun	Survey Event 2 24-Jun 25-Jun 26-Jun	Total
Vesper Sparrow (*Pooecetes gramineus*)	VESP		2	1	**3**
White-throated Sparrow (*Zonotrichia albicollis*)	WTSP		1		**1**
FAMILY: Cardinalidae - Cardinals/Saltators/Allies					
Indigo Bunting (*Passerina cyanea*)	INBU		10	7	**17**
Rose-breasted Grosbeak (*Pheucticus ludovicianus*)	RBGR		11	10	**21**
FAMILY: Icteridae - Blackbirds					
Baltimore Oriole (*Icterus galbula*)	BAOR		6	4	**10**
Brown-headed Cowbird (*Molothrus ater*)	BHCO		4	6	**10**
Common Grackle (*Quiscalus quiscula*)	COGR		10	5	**15**
Red-winged Blackbird (*Agelaius phoeniceus*)	RWBL		20	39	**59**
FAMILY: Fringillidae - Fringilline/Cardueline Finches					
American Goldfinch (*Carduelis tristis*)	AMGO		12	11	**23**
Total Number of Species			61	59	**71**
Total Number of Individuals			703	728	**1431**

[1] Nomenclature follows the American Ornithological Society's (AOS) Check-list of North American Birds. 7th Edition, 63rd Supplement (2022).

[2] Species codes correspond to the codes used on the bird survey field forms.

[3] Status: END = Endangered or THR = Threatened Species protectected by the Michigan Natural Resources and Environmental Protection Act (Mich. Comp. Laws § 324.36501; Mich. Admin. Code R. 299.1026); SC = Special Concern Species tracked by the Michigan Department of Natural Resources Natural Features Inventory working list (2023). No federally listed bird species were detected during the surveys.

Table 3: Migratory bird line transect survey dates, survey times, and weather conditions at White Pine Copper Mine Project in Ontonagon County, Michigan.

Transect	Survey Event	Date	Time	Temperature (F)	Wind Speed Code [1]	Sky Code [2]
A	1	12-Sep-24	7:48	63	1	0
	2	30-Sep-24	8:01	51	1	1
	3	4-May-25	6:40	43	0	0
	4	21-May-25	6:51	45	1	1
B	1	12-Sep-24	7:41	62	2	0
	2	30-Sep-24	7:53	52	1	1
	3	1-May-25	8:50	50	0	3
	4	21-May-25	6:41	43	1	2
C	1	9-Sep-24	18:00	72	1	0
	2	28-Sep-24	7:55	59	1	0
	3	1-May-25	7:33	49	1	3
	4	19-May-25	7:10	34	1	0
D	1	9-Sep-24	18:10	72	1	0
	2	28-Sep-24	7:59	57	1	0
	3	1-May-25	7:18	48	0	3
	4	19-May-25	6:56	34	1	0
E	1	11-Sep-24	7:45	64	2	1
	2	29-Sep-24	8:27	62	3	1
	3	3-May-25	8:14	38	0	0
	4	20-May-25	6:49	34	3	2
F	1	10-Sep-24	9:40	70	2	1
	2	29-Sep-24	8:17	63	2	1
	3	3-May-25	8:03	38	0	0
	4	20-May-25	7:08	42	1	1
G	1	10-Sep-24	7:49	62	2	1
	2	27-Sep-24	8:03	66	3	1
	3	3-May-25	6:59	35	0	0
	4	22-May-25	6:31	30	1	0

Table 3: Migratory bird line transect survey dates, survey times, and weather conditions at White Pine Copper Mine Project in Ontonagon County, Michigan.

[1] Beaufort Wind Code Categories and Definitions

Code	Speed	Definition
0	none	calm, smoke rises vertically
1	1-3 mph	wind direction shown by smoke drift
2	4-7 mph	wind felt on face, leaves rustle
3	8-12 mph	leaves, small twigs in constant motion
4	13-18 mph	raises dust/loose paper, small branches move
5	19-24 mph	small trees in leaf sway

[2] Sky Code Categories and Definitions

Code	Category
0	clear (<15% cloud cover)
1	partly cloudy (16-50% cloud cover)
2	mostly cloudy (51-75 % cloud cover)
3	overcast (76-100% cloud cover)
5	fog or haze
6	drizzle
7	rain
9	thunderstorm, w or w/out precip.

Table 4: Migration transect survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Migration Transects Survey Event 1 9-Sep 10-Sep 11-Sep 12-Sep	Migration Transects Survey Event 2 27-Sep 28-Sep 29-Sep 30-Sep	Subtotal	Migration Transects Survey Event 1 1-May 3-May 4-May	Migration Transects Survey Event 2 19-May 20-May 21-May	Subtotal	Total
ORDER: Anseriformes									
FAMILY: Anatidae - Ducks/Geese/Swans									
American Wigeon (*Mareca americana*)	AMWI		14		**14**				**14**
Blue-winged Teal (*Spatula discors*)	BWTE		57	7	**64**	13		**13**	**77**
Bufflehead (*Bucephala albeola*)	BUFF		3		**3**	10		**10**	**13**
Canada Goose (*Branta canadensis*)	CANG		166	86	**252**	57	47	**104**	**356**
Common Merganser (*Mergus merganser*)	COME		9	17	**26**				**26**
Green-winged Teal (*Anas crecca)*	GWTE		15	50	**65**				**65**
Mallard (*Anas platyrhynchos*)	MALL		41	120	**161**	15	9	**24**	**185**
Northern Pintail (*Anas acuta*)	NOPI		69		**69**				**69**
Northern Shoveler (*Spatula clypeata*)	NSHO		17		**17**	5	2	**7**	**24**
Readhead (*Aythya americana*)	REDH		51		**51**				**51**
Ring-necked Duck (*Aythya collaris*)	RNDU		29		**29**	31		**31**	**60**
Trumpeter Swan (*Cygnus buccinator*)	TRUS	(SC), SGCN	127	76	**203**	16	23	**39**	**242**
Wood Duck (*Aix sponsa*)	WODU		9	11	**20**	1		**1**	**21**
ORDER: Galliformes									
FAMILY: Phasianidae - Partridges/Grouse/Turkeys/Quail									
Ruffed Grouse (*Bonasa umbellus*)	RUGR		1	2	**3**	13	22	**35**	**38**
Spruce Grouse (*Falcipennis canadensis)*	SPGR	THR				1		**1**	**1**
Wild Turkey (*Meleagris galloparvo)*	WITU		12	15	**27**	5		**5**	**32**
ORDER: Suliformes									
FAMILY: Phalacrocoracidae - Cormorants									
Double-crested Cormorant	DCCO			7	**7**				**7**
ORDER: Podicipediformes									
FAMILY: Podicipedidae - Grebes									
Pied-billed Grebe (*Podilymbus podiceps*)	PBGR					4	1	**5**	**5**
ORDER: Gaviiformes									
FAMILY: Gaviidae - Loons									
Common Loon (*Gavia immer*)	COLO	THR					1	**1**	**1**
ORDER: Ciconiiformes									
FAMILY: Ardeidae - Herons/Bitterns/Allies									
American Bittern (*Botaurus lentiginosus*)	AMBI	(SC), SGCN				15	8	**23**	**23**
Great Blue Heron (*Ardea herodias)*	GBHE		2	6	**8**				**8**
Great Egret (*Ardea alba*)	GREG		1	1	**2**				**2**
Least Bittern (*Ixobrychus exilis*)	LEBI	THR	1		**1**				**1**
ORDER: Falconiformes									
FAMILY: Accipitridae - Hawks/Kites/Eagles/Allies									
American Goshawk (*Astur atricapillus*)	AGOS	THR		2	**2**	1		**1**	**3**
Northern Harrier (*Circus hubsonius*)	NOHA	(SC), SGCN		1	**1**				**1**
Red-tailed Hawk (*Buteo jamaicensis*)	RTHA			1	**1**				**1**
Sharp-shinned Hawk (*Accipiter striatus*)	SSHA					2		**2**	**2**
FAMILY: Falconidae - Caracaras/Falcons									
Peregrine Falcon (Falco peregrinus)	PEFA	THR	1	1	**2**				**2**

Table 4: Migration transect survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Migration Transects Survey Event 1 9-Sep 10-Sep 11-Sep 12-Sep	Migration Transects Survey Event 2 27-Sep 28-Sep 29-Sep 30-Sep	Subtotal	Migration Transects Survey Event 1 1-May 3-May 4-May	Migration Transects Survey Event 2 19-May 20-May 21-May	Subtotal	Total
FAMILY: Pandionidae - Osprey									
Osprey (*Pandion haliaetus*)	OSPR	(SC)				1	1	**2**	**2**
ORDER: Gruiformes									
FAMILY: Gruidae - Cranes									
Sandhill Crane (*Grus canadensis*)	SACR		32	3	**35**	14	18	**32**	**67**
ORDER: Charadriiformes									
FAMILY: Charadriidae - Lapwings/Plovers									
Black-bellied Plover (*Pluvialis squatarola)*	BBPL			6	**6**		1	**1**	**7**
Killdeer (*Charadrius vociferus*)	KILL					23	7	**30**	**30**
Semipalmated Plover (*Charadrius semipalmatus)*	SEPL						9	**9**	**9**
FAMILY: Scolopacidae - Sandpipers/Phalaropes/Allies									
American Woodcock (*Scolopax minor*)	AMWO		2		**2**				**2**
Dunlin (*Calidris alpina*)	DUNL						16	**16**	**16**
Greater Yellowlegs (*Tringa melanoleuca*)	GRYE		13		**13**	11		**11**	**24**
Least Sandpiper (*Calidris minutilla*)	LESA		2	4	**6**				**6**
Lesser Yellowlegs (*Tringa flavipes*)	LEYE		3		**3**				**3**
Sanderling (*Calidris alba*)	SAND		9		**9**				**9**
Semipalmated Sandpiper (*Calidris pusilla*)	SESA		10		**10**				**10**
Spotted Sandpiper (*Actitis macularius*)	SPSA								
Wilson's Snipe (*Gallinago delicata*)	WISN					11	7	**18**	**18**
FAMILY: Laridae - Gulls/Terns									
Herring Gull (*Larus argentatus*)	HEGU		5		**5**		5	**5**	**10**
Ring-billed Gull (*Larus delawarensis*)	RBGU		15	1	**16**	3	6	**9**	**25**
ORDER: Coraciiformes									
FAMILY: Alcedinidae - Kingfishers									
Belted Kingfisher (*Megaceryle alcyon*)	BEKI					7	5	**12**	**12**
ORDER: Columbiformes									
FAMILY: Columbidae - Pigeons/Doves									
Mourning Dove (*Zenaida macroura*)	MODO		1		**1**				**1**
ORDER: Piciformes									
FAMILY: Picidae - Woodpeckers/Allies									
Downy Woodpecker (*Picoides pubescens*)	DOWO		7	4	**11**	8	8	**16**	**27**
Hairy Woodpecker (*Picoides villosus*)	HAWO		20	14	**34**	12	5	**17**	**51**
Northern Flicker (*Colaptes auratus*)	NOFL		31	22	**53**	32	3	**35**	**88**
Pileated Woodpecker (*Dryocopus pileatus*)	PIWO		3	7	**10**				**10**
ORDER: Apodiformes									
FAMILY: Apodidae - Swifts									
Chimney Swift (*Chaetura pelagica*)	CHSW						2	**2**	**2**
ORDER: Passeriformes									
FAMILY: Tyrannidae - Tyrant Flycatchers									
Eastern Phoebe (*Sayornis phoebe*)	EAPH		7		**7**	3		**3**	**10**
Great Crested Flycatcher (*Myiarchus crinitus*)	GCFL						12	**12**	**12**
Least Flycatcher (*Empidonax minimus*)	LEFL						36	**36**	**36**

Table 4: Migration transect survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Migration Transects Survey Event 1 9-Sep 10-Sep 11-Sep 12-Sep	Migration Transects Survey Event 2 27-Sep 28-Sep 29-Sep 30-Sep	Subtotal	Migration Transects Survey Event 1 1-May 3-May 4-May	Migration Transects Survey Event 2 19-May 20-May 21-May	Subtotal	Total
Willow Flycatcher (*Empidonax traillii*)	WIFL		2		**2**				**2**
FAMILY: Vireonidae - Vireos									
Blue-headed Vireo (*Vireo solitarius*)	BHVI						12	**12**	**12**
Warbling Vireo (*Vireo gilvus*)	WAVI						8	**8**	**8**
Red-eyed Vireo (*Vireo olivaceus*)	REVI		4		**4**		74	**74**	**78**
FAMILY: Corvidae - Jays/Crows									
American Crow (*Corvus brachyrhynchos*)	AMCR		32	24	**56**	12	25	**37**	**93**
Blue Jay (*Cyanocitta cristata*)	BLJA		108	29	**137**	17	12	**29**	**166**
Common Raven (*Corvus corax*)	CORA		20	7	**27**	10	27	**37**	**64**
FAMILY: Alaudidae - Larks									
Horned Lark (*Eremophila alpestris*)	HOLA		22	21	**43**		8	**8**	**51**
FAMILY: Motacillidae - Wagtails/Pipits									
American Pipit (*Anthus rubescens*)	AMPI		8	216	**224**		14	**14**	**238**
FAMILY: Hirundinidae - Swallows									
Tree Swallow (*Tachycineta bicolor*)	TRES		1		**1**				**1**
FAMILY: Paridae - Chickadees/Titmice									
Black-capped Chickadee (*Poecile atricapillus*)	BCCH		58	51	**109**	48	16	**64**	**173**
Tufted Titmouse (*Baeolophus bicolor*)	TUTI						2	**2**	**2**
FAMILY: Sittidae - Nuthatches									
Red-breasted Nuthatch (*Sitta canadensis*)	RBNU		6	3	**9**	1		**1**	**10**
White-breasted Nuthatch (*Sitta carolinensis*)	WBNU		6		**6**	5		**5**	**11**
FAMILY: Certhiidae - Creepers									
Brown Creeper (*Certhia americana*)	BRCR		1	1	**2**	1		**1**	**3**
FAMILY: Troglodytidae - Wrens									
House Wren (*Troglodytes aedon*)	HOWR		1		**1**				**1**
Winter Wren (*Troglodytes hiemalis*)	WIWR			4	**4**	1		**1**	**5**
FAMILY: Calcariidae - Longspurs and Snow Buntings									
Lapland Longspur (*Calcarius lapponicus*)	LALO			31	**31**		12	**12**	**43**
FAMILY: Turdidae - Thrushes									
American Robin (*Turdus migratorius*)	AMRO		8	16	**24**	116	75	**191**	**215**
Eastern Bluebird (*Sialia sialis*)	EABL						3	**3**	**3**
Hermit Thrush (*Catharus guttatus*)	HETH		3	1	**4**	3	4	**7**	**11**
Swainson's Thrush (*Catharus ustulatus*)	SWTH		6		**6**				**6**
Veery (*Catharus fuscescens*)	VEER					1	17	**18**	**18**
Wood Thrush (*Hylocichla mustelina*)	WOTH	(SC)					8	**8**	**8**
FAMILY: Mimidae - Mockingbirds/Thrashers									
Brown Thrasher (*Toxostoma rufum*)	BRTH					18	20	**38**	**38**
Gray Catbird (*Dumetella carolinensis*)	GRCA		7	2	**9**		17	**17**	**26**
Northern Mockingbird (*Mimus polyglottos*)	NOMO						2	**2**	**2**
FAMILY: Bombycillidae - Waxwings									
Cedar Waxwing (*Bombycilla cedrorum*)	CEDW		9		**9**				**9**
FAMILY: Parulidae - Wood-Warblers									
American Redstart (*Setophaga ruticilla*)	AMRE		2	1	**3**		86	**86**	**89**

Table 4: Migration transect survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Migration Transects Survey Event 1 9-Sep 10-Sep 11-Sep 12-Sep	Migration Transects Survey Event 2 27-Sep 28-Sep 29-Sep 30-Sep	Subtotal	Migration Transects Survey Event 1 1-May 3-May 4-May	Migration Transects Survey Event 2 19-May 20-May 21-May	Subtotal	Total
Bay-breasted Warbler (*Setophaga castanea)*	BBWA						1	**1**	**1**
Black-and-white Warbler (*Mniotilta varia*)	BAWW		5		**5**	1	27	**28**	**33**
Black-throated Blue Warbler (*Setophaga caerulescens)*	BTBW						3	**3**	**3**
Black-throated Green Warbler (*Setophaga virens*)	BTNW						10	**10**	**10**
Canada Warbler (*Cardellina canadensis*)	CAWA		2		**2**				**2**
Cape May Warbler (*Setophaga tigrina)*	CMWA		2		**2**		1	**1**	**3**
Chestnut-sided Warbler (*Setophaga pensylvanica*)	CSWA						19	**19**	**19**
Common Yellowthroat (*Geothlypis trichas*)	COYE		18	2	**20**		64	**64**	**84**
Magnolia Warbler (*Setophaga magnolia*)	MAWA						8	**8**	**8**
Mourning Warbler (*Geothlypis philadelphia*)	MOWA						3	**3**	**3**
Nashville Warbler (*Oreothlypis ruficapilla*)	NAWA			2	**2**		46	**46**	**48**
Northern Parula (*Setophaga americana)*	NOPA						1	**1**	**1**
Northern Waterthrush (*Parkesia noveboracensis)*	NOWA					1	2	**3**	**3**
Ovenbird (*Seiurus aurocapilla*)	OVEN					1	83	**84**	**84**
Palm Warbler (*Setophaga palmarum*)	PAWA		100	60	**160**	39	6	**45**	**205**
Tennessee Warbler (*Oreothlypis peregrina*)	TEWA			1	**1**		26	**26**	**27**
Wilson's Warbler (*Cardellina pusilla)*	WIWA						2	**2**	**2**
Yellow Warbler (*Dendroica petechia*)	YEWA		2		**2**		95	**95**	**97**
Yellow-rumped Warbler (*Setophaga coronata*)	YRWA		18	94	**112**	107	14	**121**	**233**
FAMILY: Icteriidae - Yellow-breasted Chat									
Yellow-breasted Chat (*Icteria virens*)	YBCH						1	**1**	**1**
FAMILY: Emberizidae - Emberizids									
Song Sparrow (*Melospiza melodia*)	SOSP		10	5	**15**	105	61	**166**	**181**
FAMILY: Passerellidae - New World Sparrows/Towhees									
American Tree Sparrow (*Spizelloides arborea*)	ATSP					2		**2**	**2**
Chipping Sparrow (*Spizella passerina*)	CHSP		11	8	**19**		5	**5**	**24**
Clay-colored Sparrow (*Spizella pallida*)	CCSP						96	**96**	**96**
Dark-eyed Junco (*Junco hyemalis*)	DEJU		1	9	**10**				**10**
Eastern Towhee (*Pipilo erythrophthalmus*)	EATO					1		**1**	**1**
Fox Sparrow (*Passerella iliaca)*	FOSP			1	**1**				**1**
Harris's Sparrow (*Zonotrichia querula*)	HASP			1	**1**				**1**
Lincoln's Sparrow (*Melospiza lincolnii*)	LISP			4	**4**	1		**1**	**5**
Savannah Sparrow (*Passerculus sandwichensis*)	SAVS		42	11	**53**	53	42	**95**	**148**
Swamp Sparrow (*Melospiza georgiana*)	SWSP			14	**14**	16		**16**	**30**
Vesper Sparrow (*Pooecetes gramineus*)	VESP					14	6	**20**	**20**
White-crowned Sparrow (*Zonotrichia leucophrys*)	WCSP			18	**18**		11	**11**	**29**
White-throated Sparrow (*Zonotrichia albicollis*)	WTSP		26	80	**106**	30	7	**37**	**143**
FAMILY: Cardinalidae - Cardinals/Saltators/Allies									
Indigo Bunting (*Passerina cyanea*)	INBU						1	**1**	**1**
Northern Cardinal (*Cardinalis cardinalis*)	NOCA						3	**3**	**3**
Rose-breasted Grosbeak (*Pheucticus ludovicianus*)	RBGR		1		**1**		27	**27**	**28**
FAMILY: Icteridae - Blackbirds									
Baltimore Oriole (*Icterus galbula*)	BAOR		5		**5**		14	**14**	**19**

Table 4: Migration transect survey summary at White Pine Copper Mine Project in Ontonagon County, Michigan.

ORDER FAMILY Species Common Name (Scientific Name)[1]	Code[2]	Status[3]	Migration Transects Survey Event 1 9-Sep 10-Sep 11-Sep 12-Sep	Migration Transects Survey Event 2 27-Sep 28-Sep 29-Sep 30-Sep	Subtotal	Migration Transects Survey Event 1 1-May 3-May 4-May	Migration Transects Survey Event 2 19-May 20-May 21-May	Subtotal	Total
Brown-headed Cowbird (*Molothrus ater*)	BHCO					29	16	**45**	**45**
Common Grackle (*Quiscalus quiscula*)	COGR			27	**27**	7	10	**17**	**44**
Red-winged Blackbird (*Agelaius phoeniceus*)	RWBL		1		**1**	180	92	**272**	**273**
Rusty Blackbird (*Euphagus carolinus*)	RUBL					8	57	**65**	**65**
FAMILY: Regulidae - Kinglets									
Golden-crowned Kinglet (*Regulus satrapa*)	GCKI		28	45	**73**	3		**3**	**76**
Ruby-crowned Kinglet (*Regulus calendula*)	RCKI			6	**6**	12		**12**	**18**
FAMILY: Fringillidae - Fringilline/Cardueline Finches									
American Goldfinch (*Carduelis tristis*)	AMGO		25	9	**34**	17	16	**33**	**67**
Pine Siskin *(Spinus pinus)*	PISI			41	**41**				**41**
Purple Finch (*Haemorhous purpureus*)	PUFI			2	**2**	16	2	**18**	**20**
Total Number of Species			70	59	**88**	59	80	**100**	**129**
Total Number of Individuals			1386	1311	**2697**	1190	1574	**2764**	**5461**

[1] Nomenclature follows the American Ornithological Society's (AOS) Check-list of North American Birds. 7th Edition, 63rd Supplement (2022).

[2] Species codes correspond to the codes used on the bird survey field forms.

[3] Status: END = Endangered or THR = Threatened Species protectected by the Michigan Natural Resources and Environmental Protection Act (Mich. Comp. Laws § 324.36501; Mich. Admin. Code R. 299.1026); SC = Special Concern Species tracked by the Michigan Department of Natural Resources Natural Features Inventory working list (2023). No federally listed bird species were detected during the surveys.

F-11

Species Inventory: Medium and Large Mammals Report

White Pine North Species Inventory: Medium and Large Mammals

Stantec

Prepared for:
White Pine Copper, LLC

Prepared by:
Stantec Consulting Services, Inc

Date:
May 08, 2026

Project/File:
193710518

Stantec Consulting Services Inc.

Disclaimer

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Prepared by:

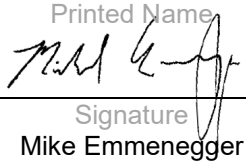


Signature

Jesse Tucker

Printed Name

Reviewed and Approved by:



Signature

Mike Emmenegger

Printed Name

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Appendix C: Photo Log

1 Introduction

In support of the White Pine North Project (WPN, Project) proposed by White Pine Copper, LLC (WPC), Stantec Consulting Services Inc. (Stantec) completed a wildlife inventory within or immediately adjacent to the Project area in Ontonagon County, Michigan. As part of this inventory Stantec conducted surveys specifically for medium and large terrestrial mammals.

WPC is wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan (Appendix A; Figure 1). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

This report presents the Project area description, purpose and objectives, methods, and results of medium and large mammal surveys. The survey was conducted as part of the pre-construction and planning phase of the Project.

1.1 Project Area Description

The proposed Project area is approximately 3,150 acres and is generally located east of White Pine, Michigan (Appendix A; Figure 1). The Project area consists of hardwood swamps, mesic forests, shrub thickets, emergent marshes, forested floodplains, and wet meadows.

1.2 Purpose and Objectives

The purpose of these surveys was to identify presence of medium and large mammal species within and adjacent to the Project area. The surveys are part of a large-scale comprehensive wildlife inventory of the Project area. Specific objectives of these surveys were to:

1. Locate suitable habitat for medium and large mammal species; and
2. Identify occupying wildlife species through inventory survey techniques.

2 Methods

Obtaining wildlife inventories for the Project area entailed implementation of surveys targeted at the detection of medium-and large-sized mammals. Specific inventory survey methods are described below.

2.1 Survey Site Selection

The locations selected for surveys depended on a variety of factors. These included: locations most likely to yield a diverse assemblage of species; sites most likely to yield results that were representative of habitats present on-site; sites that were distributed evenly throughout the project area; sites that were accessible with survey equipment. Survey site selection and installation of survey equipment was conducted by Stantec biologists with expertise in wildlife ecology.

2.2 Terrestrial Large Mammal Surveys

Camera traps are widely recognized as an effective method for surveying elusive wildlife species due to their non-invasive operation, field efficiency, and ability to function reliably over extended deployment periods (Dreibelbis 2009). To document medium- and large-sized mammals within the Study Area, Stantec deployed 15 cellular Cuddeback camera traps (CuddeLink K Dual Cell, Model k-5796 and CuddeLink G Color 20, Model G-5086; cuddeback.com, 2020). Each unit was mounted to a tree or stump approximately 2–3 feet above ground level and secured within a steel housing to minimize the risk of damage or theft (Appendix A, Figure 2).

The camera traps operated continuously from September 1, 2024, through August 31, 2025. During this time, field staff serviced each unit on a bimonthly schedule to replace batteries and exchange memory cards. An attractant scent was periodically applied at camera stations to increase the likelihood of detecting target species. Dunlap's War Paint Lure and Wawbaker's Coyote and Wolf Gland Lure were utilized to target furbearer species. Each scent lure was applied to wicking sticks or similar material and hung from vegetation within visible proximity to each camera trap. Scent was reapplied periodically when biologists visited the Project area throughout the survey window.

Camera locations were selected without bias toward specific habitats or species; thus, each camera was assumed to have an equal probability of detecting any mammal species present. Relative abundance values were calculated as catch per unit effort, defined as the number of individuals of a given species recorded divided by the total number of trap-days. When multiple images clearly depicted the same individual within a brief time window (i.e., several minutes), these were treated as a single observation. However, because individuals could not be reliably distinguished across longer intervals (days to months), it is possible that some animals were photographed more than once, limiting the ability to derive population estimates. Smaller species, such as lagomorphs and mustelids, may also be underrepresented due to their size and reduced likelihood of triggering motion sensors. In total, cameras were deployed for 5,475 trap-days (average = 365 days per camera).

Opportunistic observations of medium and large mammals—including tracks, scat, foraging sign, skeletal material, vocalizations (e.g., howls), and direct sightings—were also recorded. These incidental visual surveys occurred during general reconnaissance and while servicing the camera arrays. Because such

observations were haphazard and not time-standardized, the resulting data were used solely to document species presence or absence.

3 Results

A total of 1,739 individual mammals representing 14 species were documented within the Project area. Detected species consisted of 11 medium-sized mammal species and three large-sized mammal species (Appendix B; Table 1). White-tailed deer, coyote, and gray wolf were the most frequently observed species, with gray wolf representing the only federally listed species and the sole species of special concern recorded during the survey.

3.1 Terrestrial Large Mammal Surveys

Data was collected from 15 cellular camera traps deployed from September 1, 2024 through August 31, 2025. Across all units, approximately 1,739 individual mammals representing 14 species were documented through camera detections.

White-tailed deer (Odocoileus virginianus; N = 1,280; catch per unit effort = 0.234) were the most frequently detected species throughout the Study Area and the only ungulate recorded. Large carnivore detections included American black bear (Ursus americanus; N = 24; catch per unit effort = 0.004) and gray wolf (Canis lupus; N = 72; catch per unit effort = 0.013). Medium-sized mammal detections included coyote (Canis latrans; N = 274; catch per unit effort = 0.050), red fox (Vulpes vulpes; N = 6; catch per unit effort = 0.001), bobcat (Lynx rufus; N = 3; catch per unit effort = 0.001), beaver (Castor canadensis; N = 6; catch per unit effort = 0.001), snowshoe hare (Lepus americanus; N = 9; catch per unit effort = 0.002), raccoon (Procyon lotor; N = 38; catch per unit effort = 0.007), striped skunk (Mephitis mephitis; N = 7; catch per unit effort = 0.001), fisher (Pekania pennanti; N = 7; catch per unit effort = 0.001), American marten (Martes americana; N = 6; catch per unit effort = 0.001), North American river otter (Lontra canadensis; N = 4; catch per unit effort = 0.001), and eastern cottontail (Sylvilagus floridanus; N = 2; catch per unit effort = 0.001).

The highest species richness for medium and large mammals was documented at camera trap locations 3 and 9, each recording detections of eleven species. In contrast, the lowest richness occurred at camera trap locations 5, 11, 12, 13, and 14 (Appendix B; Table 2).This distribution pattern likely reflects habitat differences across the survey area, as the traps with the greatest richness were positioned along habitat transition zones—specifically corridors between forested areas and open water—where wildlife activity tends to be concentrated (Harris 1988). Conversely, the traps with the lowest richness were located within the tailings area, where habitat quality and structural diversity are reduced, resulting in fewer species detections (Appendix A; Figure 2).

White-tailed deer were detected across all 15 camera trap locations, with the highest number of observations (N = 231) recorded at location 10. Coyote represented the second most frequently detected species, occurring at 14 of the 15 camera trap stations. The greatest number of coyote detections (N = 46) was documented at camera trap location 9.

Incidental observations, which consisted of visual interactions with mammals, their tracks, or scat, did not include additional species that were not tallied by use of the camera traps and scent stations.

4 Summary

4.1 Terrestrial Medium and Large Mammals

In support of the White Pine North Project, Stantec completed camera and scent trap surveys for medium and large mammals between September 2024 and August 2025. Activity levels of medium and large mammals were highest in May and February, with 11 species recorded in May and nine species recorded in February. The highest number of documented individuals were 251 in November and 262 in June. Gray wolf was the only federally listed species and the sole species of special concern recorded during this timeframe. The medium and large mammal surveys provide a good baseline inventory of species present within and in close proximity to the Project Area.

4.2 Species With Legal Status

The gray wolf (*Canis lupus*) is currently designated as endangered by the U.S. Fish and Wildlife Service and listed as threatened by the Michigan Department of Natural Resources. Camera-trap detections documented the species' presence throughout the Project Area. Although comprehensive population analyses were not conducted, camera-trap data indicate that gray wolves are present at relatively low densities on-site, as reflected by a catch-per-unit-effort value of 0.013.

5 References

Dreibelbis, J., S. Locke, J. Cathey, B. Collier, and J. Hardin. 2009. Potential Uses for Trail Cameras in Wildlife Management. Texas A&M Natural Resources Institute.

Harris, L. D. 1988. Edge Effects and Conservation of Biotic Diversity. Conservation Biology 2(4): 330–332.

Michigan Department of Natural Resources and Michigan Natural Features Inventory. (March 20, 2023). Michigan's Rare Animals. Michigan State University. https://mnfi.anr.msu.edu/species/animals

Appendix A Figures

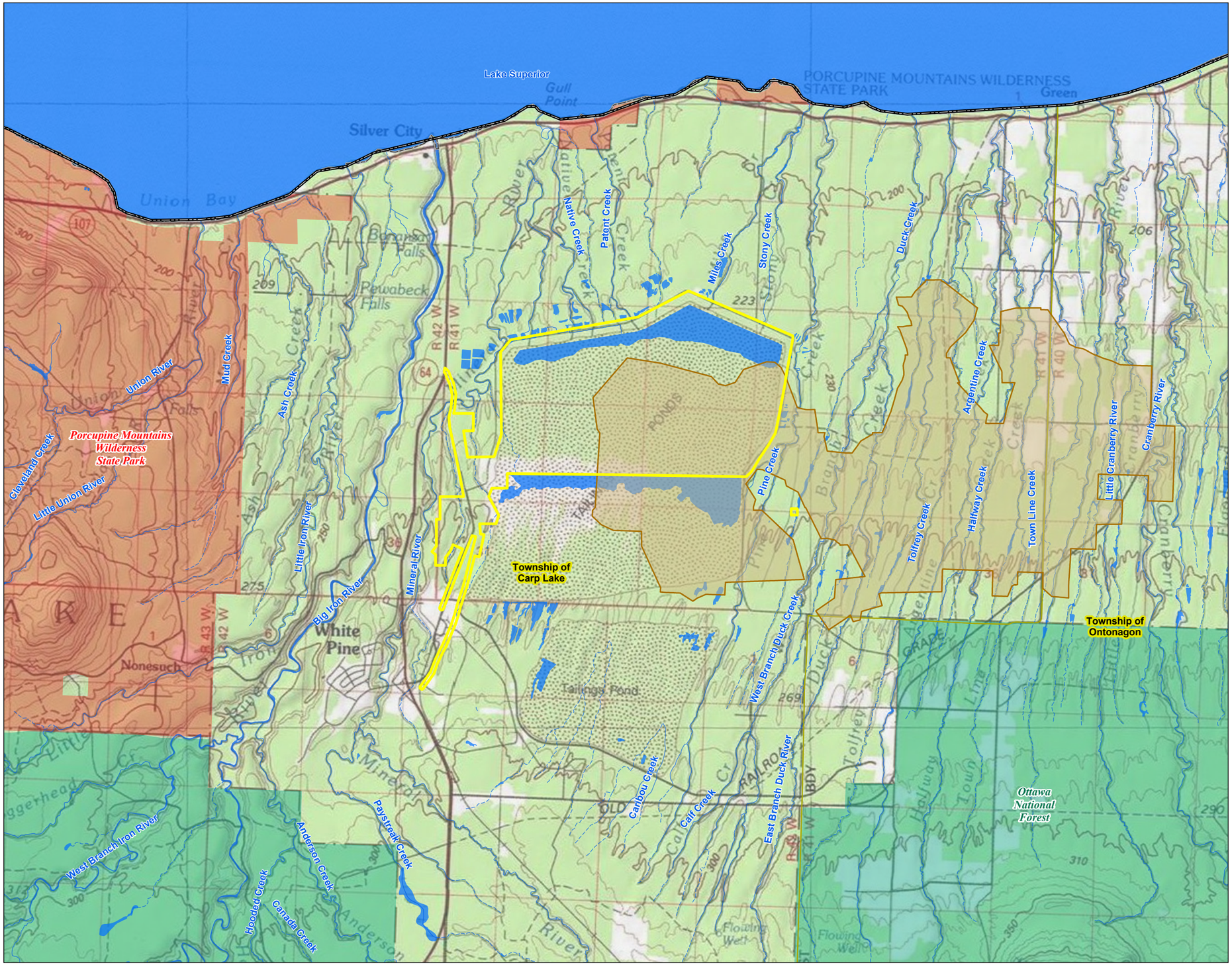


Figure No.
1

Title
Project Location

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-01-09
TR by ME on 2026-01-09
IR by DH on 2026-01-23

N

0 0.5 1 Miles
(At original document size of 11x17)
1:63,360

Legend
- Proposed Project Extent
- Proposed Underground Mine Area
- Municipal Boundary
- State Park
- National Forest

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: USGS 7.5' Topographic Quadrangles

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper_Wildlife\193710518_WhitePineCopper_Wildlife.aprx Revised: 2026-02-03 By: jmarty

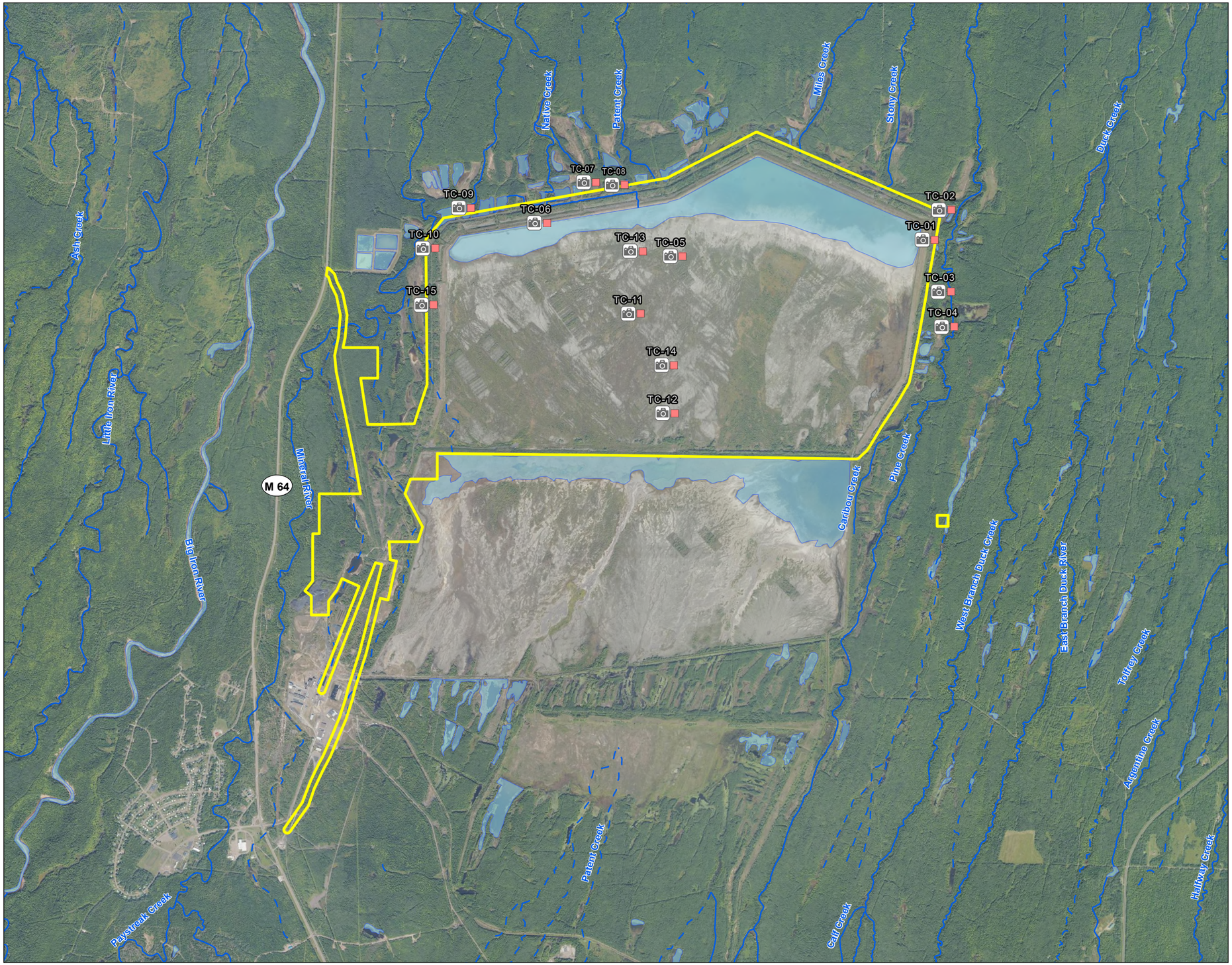


Figure No.
2

Title
Trail Camera Locations

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-09-02
TR by RC on 2025-10-02
IR by ME on 2025-12-19

N

0 1,500 3,000 Feet
(At original document size of 11x17)
1:36,000

Legend
- Proposed Project Extent
- Cent Station
- Trail Camera

National Hydrography Dataset
- Perennial Stream
- Intermittent Stream
- Waterbody



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Appendix B Tables

Table 1. Species of medium and large mammals observed during surveys conducted from September 2024 to August 2025, at the White Pine Copper Project Area. Numbers represent total individuals detected via survey technique in each month.

	State Status[1]	Survey Method	September	October	November	December	January	February	March	April	May	June	July	August	Total	Catch Per Unit Effort[2]
Medium Mammals (Average Maximum Weight 2-49 lbs)																
Beaver (*Castor canadensis*)	Common	Camera Trap	0	0	0	0	0	0	0	2	2	2	0	0	6	0.001
Snowshoe Hare (*Lepus americanus*)	Common	Camera Trap	0	0	0	1	0	2	2	3	1	0	0	0	9	0.002
Bobcat (*Lynx rufus*)	Common	Camera Trap	0	0	1	0	0	1	0	0	1	0	0	0	3	0.001
Coyote (*Canis latrans*)	Common	Camera Trap	38	44	14	18	5	5	35	29	25	14	8	39	274	0.050
Red Fox (*Vulpes vulpes*)	Common	Camera Trap	0	0	0	0	3	3	0	0	0	0	0	0	6	0.001
Raccoon (*Procyon lotor*)	Common	Camera Trap	8	0	1	1	0	2	0	1	4	16	3	2	38	0.007
Striped Skunk (*Mephitis mephitis*)	Common	Camera Trap	0	1	0	0	0	0	3	0	1	2	0	0	7	0.001
Fisher (*Pekania pennanti*)	Common	Camera Trap	0	2	0	1	1	2	1	0	0	0	0	0	7	0.001
American Marten (*Martes americana*)	Common	Camera Trap	0	0	0	1	1	1	2	1	0	0	0	0	6	0.001
North American River Otter (*Lontra canadensis*)	Common	Camera Trap	0	0	0	0	3	0	0	0	1	0	0	0	4	0.001
Eastern Cottontail (*Sylvilagus floridanus*)	Common	Camera Trap	0	0	0	0	0	0	0	0	3	0	0	0	3	0.001
Large Mammals (Average Maximum Weight >50lbs)																
Black Bear (*Ursus americanus*)	Common	Camera Trap	3	0	0	0	0	0	0	0	1	3	13	4	24	0.004
Gray Wolf (*Canis lupus)*	SC	Camera Trap	6	10	11	0	2	2	21	0	8	1	3	8	72	0.013
White-tailed Deer (Odocoileus virginianus)	Common	Camera Trap	124	184	224	27	0	19	0	39	131	224	174	134	1280	0.234
Total Number of Mammal Species			5	5	5	6	6	9	6	6	11	7	5	5	14	
Total Number of Inividuals			179	241	251	49	15	37	64	75	178	262	201	187	1739	

[1]State of Michigan Status: Michigan Department of Natural Resources and Michigan Natural Features Inventory

[2]Calculated as number captured by trap / trap day.

Table 2. Species of medium and large mammals observed during surveys conducted from September 2024 to August 2025, at the White Pine Copper Project Area. Numbers represent total individuals detected at each camera trap location.

	State Status[1]	CT-1	CT-2	CT-3	CT-4	CT-5	CT-6	CT-7	CT-8	CT-9	CT-10	CT-11	CT-12	CT-13	CT-14	CT-15
Medium Mammals (Average Maximum Weight 2-49 lbs)																
Beaver (*Castor canadensis*)	Common	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
Snowshoe Hare (*Lepus americanus*)	Common	0	0	2	0	0	0	3	2	1	1	0	0	0	0	0
Bobcat (*Lynx rufus*)	Common	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0
Coyote (*Canis latrans*)	Common	33	29	27	33	1	26	9	0	46	39	3	2	1	4	21
Red Fox (*Vulpes vulpes*)	Common	0	1	2	1	0	1	0	0	0	1	0	0	0	0	0
Raccoon (*Procyon lotor*)	Common	0	0	1	23	0	5	4	0	4	0	0	0	0	0	1
Striped Skunk (*Mephitis mephitis*)	Common	0	1	1	0	0	2	2	0	0	0	0	0	0	0	1
Fisher (*Pekania pennanti*)	Common	0	1	2	0	0	0	0	0	3	1	0	0	0	0	0
American Marten (*Martes americana*)	Common	0	0	0	1	0	0	0	2	2	1	0	0	0	0	0
North American River Otter (*Lontra canadensis*)	Common	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0
Eastern Cottontail (*Sylvilagus floridanus*)	Common	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Large Mammals (Average Maximum Weight >50lbs)																
Black Bear (*Ursus americanus*)	Common	1	1	5	6	0	1	1	3	4	2	0	0	0	0	0
Gray Wolf (*Canis lupus)*	SC	1	13	13	2	0	18	1	0	8	9	5	0	0	0	2
White-tailed Deer (*Odocoileus virginianus*)	Common	50	213	222	121	4	85	108	103	55	231	13	37	2	24	12
Species Richness[2]		4	7	11	7	2	7	7	5	11	8	3	2	2	2	5
Total Number of Inividuals[3]		85	259	280	187	5	138	128	113	131	285	21	39	3	28	37

[1]State of Michigan Status: Michigan Department of Natural Resources and Michigan Natural Features Inventory

[2]Calculated as number of unique species detected per camera trap location

[3]Calculated as the sum of individuals observed across all detection events; individuals may have been recorded more than once across the sampling period.

Appendix C Photo Log



Photo 1. Representative photo of an American black bear *(Ursus americanus)*



Photo 2. Representative photo of a bobcat *(Lynx rufus)*



Photo 3. Representative photo of a red fox *(Vulpes vulpes)*



Photo 4. Representative photo of a gray wolf (*Canis lupus)*



Photo 5. Representative photo of a beaver *(Castor canadensis)*



Photo 6. Representative photo of a snowshoe hare *(Lepus americanus)*



Photo 7. Representative photo of an American marten *(Martes americana)*



Photo 8. Representative photo of a coyote *(Canis latrans)*



Photo 9. Representative photo of a raccoon *(Procyon lotor)*



Photo 10. Representative photo of a striped skunk *(Mephitis mephitis)*



Photo 11. Representative photo of a fisher *(Pekania lotor)*



Photo 12. Representative photo of North American river otter *(Lontra canadensis)*



Photo 13. Representative photo of an eastern cottontail *(Sylvilagus floridanus)*



Photo 14. Representative photo of white-tailed deer *(Odocoileus virginianus)*

With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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F-12

Bat Presence or Probable Absence Survey

Bat Presence or Probable Absence Survey

White Pine Copper Mine Project

Ontonagon County, Michigan

September 30, 2024

Prepared for:

White Pine Copper, LLC
P.O. Box 338
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Prepared by:

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Project # 193710518

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Appendix A: Quantitative Analysis of Calls Using Kaleidoscope Pro

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding. A-1

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec), on behalf of White Pine Copper, LLC, conducted a presence or probable absence acoustic survey for the federally endangered and state-threatened northern long-eared bat (*Myotis septentrionalis*) and the federally proposed endangered and state-threatened tricolored bat (*Perimyotis subflavus*) (collectively referred to as "Target Species") which is under review for federal listing. The survey was conducted for the proposed White Pine Copper Mine Project located in Ontonagon County, Michigan (Figure 1).

1.1 PURPOSE OF THE PROJECT

The purpose of this investigation was to determine presence or probable absence of the northern long-eared bat and tricolored bat within the proposed project area (survey area) of the White Pine Copper Project.

This report presents the methods, results, and conclusions of the presence or probable absence survey.

2.0 METHODS

An acoustic survey was conducted to determine presence or probable absence of the Target Species in the survey area. The U.S. Fish and Wildlife Service (USFWS) 2024 Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines (USFWS 2024) state that a presence/absence mist-net or acoustic survey should be conducted after suitable summer habitat is determined present at a site. The survey guidelines are as follows:

USFWS 2024 Acoustic Survey Guidelines

1. **Acoustic Survey Season**: 15 May to 15 August, when northern long-eared bats occupy summer habitat.
2. **Equipment**:
   - Full-spectrum and/or zero-crossing detectors
   - Directional, hemispherical, or omnidirectional microphones
3. **Acoustic Detector Placement**:
   - At least 10 feet away from vegetation or other obstructions
   - In areas without vegetation or with minimal vegetation within 100 feet of high directional microphone or 33 feet in front of other microphones
   - Parallel to woodland edges
   - At least 49 feet from known or suitable roosts (e.g., trees/snags, buildings, bridges, bat houses, caves, or mine portals)
   - Within forest canopy openings
   - Near water sources

- Along wooded fence lines, adjacent to large openings or connecting two larger blocks of suitable habitat
- Blocks of recently logged forest where some potential roost trees remain
- Along road or stream corridors with open tree canopies or canopy height more than 33 feet

4. **Acoustic Detector Spacing**: Acoustic sites should be a minimum of 656 feet apart.
5. **Minimum Level of Effort**:
   - A minimum of 14 detector nights per 123 acres of suitable northern long-eared bat summer habitat and a minimum of 10 detector nights per 123 acres of suitable Indiana bat summer habitat;
   - At least 2 detector locations for at least 2 calendar nights; and
   - Acoustic sampling period begins at sunset and ends at sunrise
6. **Weather Conditions**: (first 5 hours after sunset):
   - No precipitation including rain and/or fog for $\geq$ 30 minutes (continuous or intermittent)
   - Temperature $\geq$ 50°F
   - No strong winds exceeding 9 miles per hour for $\geq$ 30 minutes (continuous or intermittent)
   - Nightly weather observations, addressing precipitation, temperature, and wind, must be recorded from the nearest NOAA Weather Service Station, and summarized in report
7. **Orientation of Acoustic Detector**: Directional microphones should be oriented towards the majority of the flight path, while omnidirectional microphones should be oriented horizontally, and hemispherical microphones should be oriented vertically.
8. **Weatherproofing Acoustic Detector**: Wildlife Acoustics SM4BAT acoustic detector and SMM-U1 or SMM-U2 acoustic microphone are both weatherproof, requiring no after-market alterations.

At each of 20 sites within the survey area, two Wildlife Acoustics Song Meter SM4BAT acoustic detectors with one SMM-U2 omnidirectional microphone each (Wildlife Acoustics, Inc.) were deployed. All detectors were calibrated and tested before deployment using an Ultrasonic Calibrator (Wildlife Acoustics, Inc.) and programmed to begin monitoring 30 minutes prior to sunset and conclude monitoring 30 minutes after sunrise. The detectors were powered by internal alkaline batteries. The cardioid SMM-U2 microphones were oriented horizontally and directed towards a flight zone to ensure bat call detection while remaining waterproof. Temperature, rainfall, and wind conditions on the nights when acoustic sampling was conducted were monitored to ensure USFWS guidelines for weather conditions (i.e., no persistent rain [>30 minutes], strong winds [9 miles per hour] for >30 minutes, or persistent cold temperatures [below 50°F] for >30 minutes) were met.

All acoustic data were processed using the USFWS-approved acoustic bat identification program Kaleidoscope Pro 5.4.9 and Bats of North America 5.4.0 with sensitivity of 0 (Wildlife Acoustics, Inc.). Analysis was conducted only for species with ranges known to occur within the survey area, including:

- Big brown bat (*Eptesicus fuscus*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Little brown bat (*Myotis lucifugus*)
- Northern long-eared bat
- Tricolored bat

Kaleidoscope Pro converts full spectrum calls to zero crossing, allows the filtering out of background noise (e.g., insects, leaves, wind), and identifies bat calls to the species level when possible. The program evaluates the various components of all collected calls and determines whether they may represent a northern long-eared bat or tricolored bat. The automated program was set to the balanced setting (0) and attempts to identify each call file to the species level. The program outputs a Maximum Likelihood Estimation (MLE-value) for the null hypothesis to quantify the likelihood that a species is falsely identified at a given site on a given night, given the error rates for identification. Therefore, a low MLE-value (<0.05) indicates the identified species is likely present at a site.

As per the USFWS guidelines, if possible Target Species calls from the detector locations were identified by Kaleidoscope Pro, the acoustic data were qualitatively analyzed by qualified Stantec biologists using AnalookW software (Version 4.2n) for any detector night which had an MLE-value of <0.05 for the northern long-eared bat or tricolored bat indicating presence, or any nights with at least 10 tricolored bat calls. Calls recorded at that detector were visually analyzed, beginning with the first call of the night. Analysis continued until a confirmed northern long-eared bat or tricolored bat call was identified or until all calls recorded at that detector for that night had been analyzed. A presence determination was made as soon as a northern long-eared bat and/or tricolored bat call was identified, and no further analysis of calls at that site was conducted. Probable absence was assumed for any species not identified as likely present (MLE-value ≥0.05), or if qualitative analysis determined that the automated identification was inaccurate.

3.0 RESULTS

Woodland habitat is primarily located in the western portion of the survey area with scattered woodland habitat located throughout the survey area. A total of 2,461 acres of the survey area are identified as suitable bat habitat (Figure 1). Based on 2,461 acres of suitable habitat in the survey area, the site required a total of 280 detector nights according to the 2024 Guidelines.

Stantec deployed detectors at 20 sites (Figure 1). Each site had two detectors (40 detectors total at the Project) deployed for 2 to 7 calendar nights (minimum 14 detector nights per site). However, data cards were removed during deployment from two detectors; therefore, there were 38 possible detectors (hereafter referred to as “functioning detectors”) to pull data from. Additionally, there were three nights for the first ten sites and four nights for the last ten sites that did not meet the USFWS weather guidelines and therefore were removed from analysis. This resulted in a total of 277 detector nights (refer to Appendix B for details regarding detector nights by detector). Detectors were placed in areas free of clutter and positioned to maximize the number of bat calls recorded. Weather data associated with this survey effort are shown in Table 3-1.

Table 3-1. Weather conditions during acoustic surveys. Weather condition data were retrieved from the Gogebic Iron County Airport Weather Station, Ontonagon County, Michigan. Cells highlighted in gray do not meet the USFWS Guidelines.

Date	Low Temperature (°F)	Maximum Wind Speed (miles per hour)	Precipitation (yes/no)	Met USFWS Guidelines
7/23/2024	50	0	no	yes
7/24/2024	45	0	no	no
7/25/2024	53	5	no	yes
7/26/2024	68	12	no	no
7/27/2024	73	12	no	no
7/28/2024	72	9	no	yes
7/29/2024	63	5	no	yes
7/30/2024	55	0	no	yes
7/31/2024	64	5	no	yes
8/1/2024	59	3	no	yes
8/2/2024	55	5	no	yes
8/3/2024	61	8	no	yes
8/4/2024	51	6	no	yes
8/5/2024	51	0	no	yes
8/6/2024	46	5	no	no
8/7/2024	57	0	no	yes
8/8/2024	54	15	no	no
8/9/2024	52	16	yes	no
8/10/2024	49	8	no	no
8/11/2024	54	5	no	yes
8/12/2024	52	3	no	yes
8/13/2024	55	3	no	yes

Six of the seven possible bat species were identified by the program as having an MLE-value of <0.05. Two detectors had data cards stolen while deployed and therefore no data was recovered (detectors 2A and 12A). Three of the identified species were identified at all 38 of the detectors –eastern red bat, silver-haired bat, and little brown bat (Table 3-2). No detectors had all seven species; however, seven detectors (1B, 2B, 3A, 3B, 6A, 6B, and 8B) had six species. The full results of the quantitative analysis based on the Kaleidoscope Pro acoustic program are included in Appendix A.

Table 3-2. Bat species identified by Kaleidoscope Pro (MLE <0.05) at each detector at the White Pine Copper Mine Project, Ontonagon County, Michigan. Columns highlighted in grey indicate Target Species. The * indicates a species that did not have an MLE <0.05 at any detector.

Detector	Bat Species Identified by Kaleidoscope Pro as Present (MLE value <0.05)						
	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Bat	Northern Long-eared Bat*	Tricolored Bat
1A		X	X	X	X		X
1B	X	X	X	X	X		X
2A[1]	--	--	--	--	--	--	--
2B	X	X	X	X	X		X
3A	X	X	X	X	X		X
3B	X	X	X	X	X		X
4A		X	X	X	X		X
4B		X	X	X	X		X
5A		X	X	X	X		
5B		X	X	X	X		
6A	X	X	X	X	X		X
6B	X	X	X	X	X		X
7A		X	X	X	X		
7B		X	X	X	X		X
8A		X	X	X	X		X
8B	X	X	X	X	X		X
9A		X	X	X	X		
9B	X	X	X	X	X		
10A		X	X	X	X		
10B		X	X	X	X		X
11A		X	X	X	X		
11B		X	X	X	X		X
12A[1]	--	--	--	--	--	--	--
12B		X	X	X	X		
13A		X	X	X	X		
13B		X		X	X		
14A		X	X	X	X		
14B		X	X	X	X		
15A		X	X	X	X		
15B		X	X	X	X		
16A		X		X	X		
16B		X		X	X		
17A		X	X	X	X		
17B		X	X	X	X		X
18A		X	X	X	X		
18B		X	X	X	X		
19A		X		X	X		

Detector	Bat Species Identified by Kaleidoscope Pro as Present (MLE value <0.05)						
	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Bat	Northern Long-eared Bat*	Tricolored Bat
19B		X		X	X		
20A		X	X	X	X		
20B		X	X	X	X		
[1]Data cards were stolen from detectors; therefore, no data was available to analyze							

No detectors had an MLE-value of <0.05 for the northern long-eared bat on any night. However, qualitative review was completed on all calls Kaleidoscope Pro auto-identified as a northern long-eared bat call (a total of 10 calls). All 10 of the calls lacked characteristics of northern long-eared bat calls and were determined to be consistent with little brown bat calls. Therefore, based on evidence collected (i.e., no MLE values <0.05) and the qualitative review of calls auto-identified as northern long-eared bat by Kaleidoscope Pro, it is presumed **probable absence of northern long-eared bat**.

A total of 15 detectors had an MLE-value of <0.05 for the tricolored bat on at least one night. However, qualitative review of calls on these nights did not show characteristics for tricolored bat calls, indicating **probable absence of tricolored bat** at these locations.

4.0 SUMMARY AND CONCLUSIONS

Of seven possible bat species, Kaleidoscope Pro identified a total of six bat species as present at the White Pine Copper Mine Project survey area. Three species were identified at all 38 functioning detectors – eastern red bat, silver-haired bat, and little brown bat. No detectors recorded all seven possible species; however, seven detectors recorded six species.

Conclusions

- No detectors had northern long-eared bat calls with MLE values of <0.05. However, 10 calls were auto-identified by Kaleidoscope Pro as northern long-eared bat. Qualitative review of these 10 calls determined the calls were consistent with little brown bat calls. Therefore, **probable absence of northern long-eared bats** is determined during the summer maternity season.

- Fifteen detectors had tricolored bat calls with an MLE value of <0.05. However, qualitative review of these calls determined calls did not show characteristics of tricolored bat calls. Therefore, **probable absence of tricolored bats** was determined during the summer maternity season.

5.0 REFERENCES

United States Fish and Wildlife Service (USFWS). 2024. Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines. March 2024. https://www.fws.gov/sites/default/files/documents/2024-04/final_usfws_rangewide_ibat-nleb_survey_guidelines_508-compliant_.pdf.

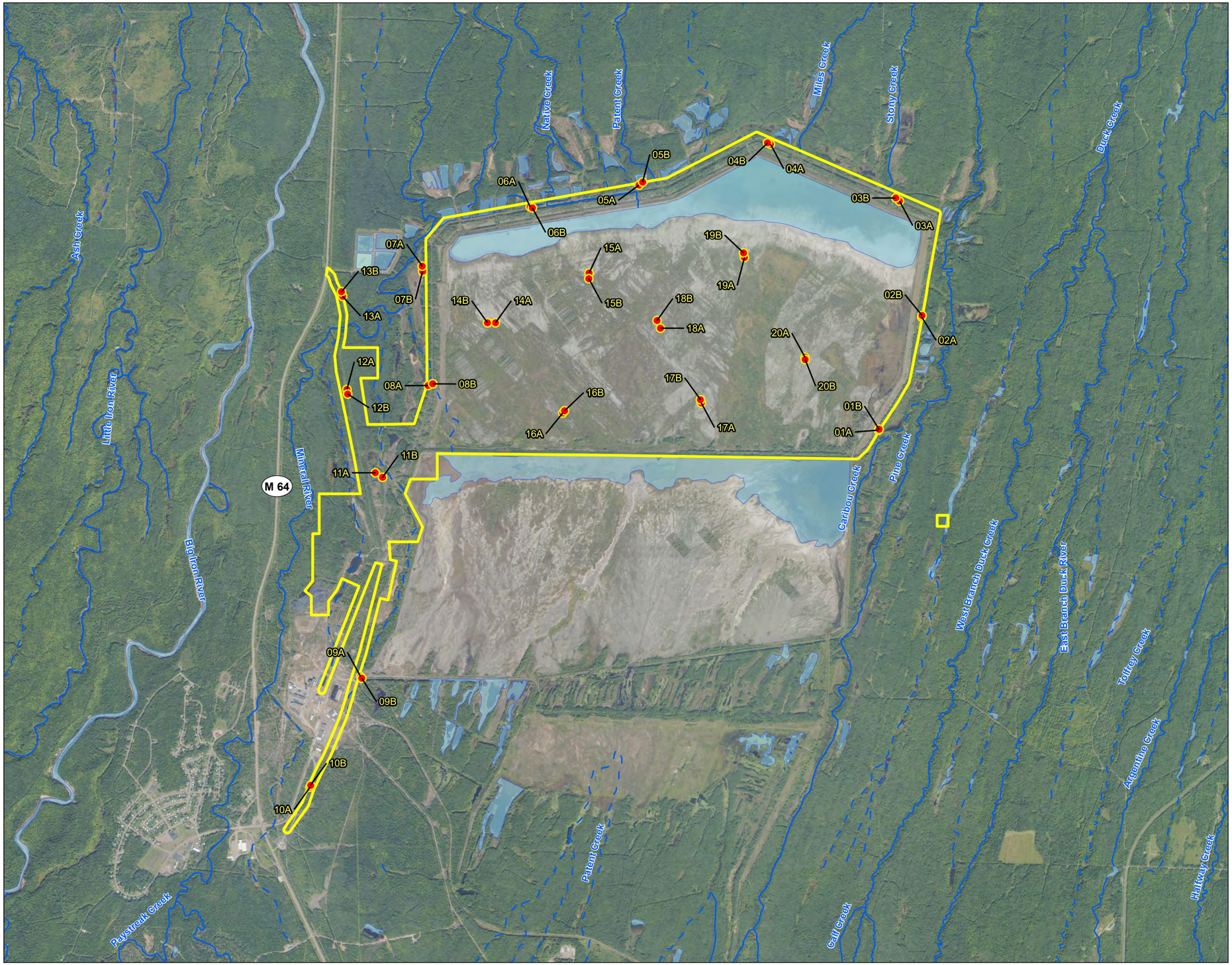


Figure No.

1

Title

Bat Acoustic Detector Locations

Client/Project 193710518

White Pine Copper LLC
White Pine Copper Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2024-09-03
TR by ME on 2024-09-03
IR by BS on 2024-09-26

N

0 1,500 3,000 Feet

(At original document size of 11x17)
1:36,000

Legend

- Proposed Project Extent
- Acoustic Monitoring Location

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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Appendix A Quantitative Analysis of Calls Using Kaleidoscope Pro

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
1A	7/23/2024	1	0.98	3	0.06	1	0.56	6	0.00	16	0.00	0	1.00	1	0.78	32	26
	7/25/2024	8	0.82	7	0.00	2	1.00	50	0.00	6	0.01	0	1.00	3	0.27	39	60
	7/28/2024	11	0.21	45	0.00	15	0.00	42	0.00	32	0.00	0	1.00	0	1.00	49	55
	7/29/2024	8	0.98	7	0.00	13	0.00	56	0.00	31	0.00	0	1.00	5	0.03	37	53
	7/30/2024	1	1.00	5	0.01	3	0.04	10	0.00	28	0.00	0	1.00	2	0.51	19	38
	7/31/2024	11	1.00	4	0.08	10	0.06	100	0.00	32	0.00	0	1.00	5	0.01	58	76
	8/1/2024	4	1.00	8	0.00	22	0.00	41	0.00	27	0.00	0	1.00	2	0.76	40	48
	8/2/2024	2	1.00	4	0.07	3	0.54	36	0.00	30	0.00	1	0.99	1	0.90	24	15
1B	7/23/2024	0	1.00	20	0.00	2	0.15	8	0.00	25	0.00	0	1.00	9	0.02	27	11
	7/25/2024	12	0.51	31	0.00	7	0.12	64	0.00	12	0.01	0	1.00	12	0.01	59	18
	7/28/2024	49	0.00	47	0.00	27	0.00	60	0.00	42	0.00	0	1.00	5	1.00	57	27
	7/29/2024	24	0.00	22	0.00	16	0.00	55	0.00	40	0.00	0	1.00	13	0.00	53	25
	7/30/2024	2	1.00	14	0.00	4	0.06	21	0.00	41	0.00	0	1.00	8	0.01	46	20
	7/31/2024	27	0.10	43	0.00	16	0.00	131	0.00	36	0.00	0	1.00	10	0.26	76	48
	8/1/2024	16	0.10	34	0.00	42	0.00	53	0.00	42	0.00	0	1.00	7	0.54	56	43
	8/2/2024	9	0.22	25	0.00	4	0.31	35	0.00	35	0.00	0	1.00	6	0.43	29	15
2B	7/23/2024	0	1.00	21	0.00	9	0.00	4	0.57	69	0.00	0	1.00	9	0.03	51	10
	7/25/2024	7	1.00	21	0.00	6	0.50	87	0.00	51	0.00	0	1.00	5	0.52	72	24
	7/28/2024	29	0.00	62	0.00	40	0.00	85	0.00	91	0.00	0	1.00	11	0.63	117	56
	7/29/2024	65	0.00	101	0.00	37	0.00	79	0.00	85	0.00	0	1.00	8	1.00	117	36
	7/30/2024	13	0.00	43	0.00	14	0.00	20	0.00	76	0.00	0	1.00	5	1.00	79	26
	7/31/2024	58	0.00	38	0.00	37	0.00	114	0.00	99	0.00	0	1.00	5	1.00	115	46
	8/1/2024	68	0.00	29	0.00	36	0.00	57	0.00	106	0.00	0	1.00	1	1.00	103	27
	8/2/2024	39	0.00	23	0.00	22	0.00	65	0.00	69	0.00	0	1.00	1	1.00	60	27

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
3A	7/23/2024	1	0.96	19	0.00	8	0.00	3	0.74	16	0.00	0	1.00	2	1.00	27	9
	7/25/2024	6	1.00	22	0.00	9	0.18	112	0.00	50	0.00	0	1.00	5	0.57	53	22
	7/28/2024	18	1.00	76	0.00	270	0.00	123	0.00	43	0.00	0	1.00	13	0.60	115	71
	7/29/2024	37	0.21	43	0.00	133	0.00	168	0.00	25	0.00	0	1.00	12	0.08	81	35
	7/30/2024	4	1.00	70	0.00	71	0.00	16	0.98	40	0.00	0	1.00	37	0.00	117	36
	7/31/2024	45	0.40	70	0.00	279	0.00	189	0.00	35	0.00	0	1.00	12	0.62	147	59
	8/1/2024	38	0.00	86	0.00	190	0.00	43	1.00	36	0.00	0	1.00	13	0.82	103	72
	8/2/2024	14	0.27	33	0.00	19	0.00	62	0.00	53	0.00	0	1.00	9	0.17	103	38
3B	7/23/2024	1	1.00	15	0.00	16	0.00	20	0.00	12	0.00	0	1.00	2	1.00	23	32
	7/25/2024	10	1.00	31	0.00	33	0.00	123	0.00	51	0.00	0	1.00	9	0.14	96	63
	7/28/2024	18	1.00	83	0.00	272	0.00	165	0.00	56	0.00	0	1.00	7	1.00	125	93
	7/29/2024	33	1.00	45	0.00	153	0.00	238	0.00	38	0.00	0	1.00	7	0.88	102	57
	7/30/2024	9	1.00	88	0.00	99	0.00	35	0.05	48	0.00	0	1.00	32	0.00	132	62
	7/31/2024	54	0.47	96	0.00	294	0.00	256	0.00	45	0.00	0	1.00	9	1.00	196	84
	8/1/2024	52	0.00	73	0.00	161	0.00	108	0.00	51	0.00	0	1.00	8	1.00	148	73
	8/2/2024	24	0.14	34	0.00	41	0.00	107	0.00	67	0.00	1	1.00	13	0.01	119	51
4A	7/23/2024	2	0.24	21	0.00	3	0.01	2	0.66	26	0.00	0	1.00	26	0.00	77	6
	7/25/2024	5	1.00	152	0.00	18	0.00	71	0.00	36	0.03	0	1.00	186	0.00	244	9
	7/28/2024	5	1.00	191	0.00	156	0.00	103	0.00	80	0.00	0	1.00	114	0.00	235	53
	7/29/2024	14	1.00	142	0.00	55	0.00	128	0.00	30	0.08	0	1.00	55	0.00	168	51
	7/30/2024	4	1.00	98	0.00	74	0.00	24	0.25	51	0.00	0	1.00	33	0.00	107	41
	7/31/2024	18	1.00	86	0.00	120	0.00	255	0.00	43	0.00	0	1.00	51	0.00	152	61
	8/1/2024	8	1.00	214	0.00	51	0.00	73	0.00	55	0.00	0	1.00	136	0.00	291	60
	8/2/2024	11	0.23	51	0.00	12	0.00	44	0.00	74	0.00	0	1.00	37	0.00	137	21
	8/3/2024	0	1.00	0	1.00	1	0.05	0	1.00	0	1.00	0	1.00	1	0.10	3	36

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
4B	7/23/2024	2	0.77	35	0.00	5	0.00	7	0.01	23	0.00	0	1.00	32	0.00	57	16
	7/25/2024	2	1.00	159	0.00	19	0.00	75	0.00	36	0.05	0	1.00	193	0.00	254	25
	7/28/2024	1	1.00	187	0.00	194	0.00	116	0.00	75	0.00	0	1.00	133	0.00	244	52
	7/29/2024	9	1.00	137	0.00	79	0.00	124	0.00	25	0.33	0	1.00	43	0.00	150	96
	7/30/2024	3	1.00	113	0.00	96	0.00	25	0.76	47	0.00	0	1.00	35	0.00	128	30
	7/31/2024	18	1.00	104	0.00	151	0.00	256	0.00	47	0.00	0	1.00	42	0.00	177	59
	8/1/2024	5	1.00	252	0.00	84	0.00	69	0.00	69	0.00	0	1.00	125	0.00	276	49
	8/2/2024	7	0.82	65	0.00	10	0.00	40	0.00	77	0.00	0	1.00	19	0.01	124	50
	8/3/2024	0	1.00	0	1.00	0	1.00	3	0.01	0	1.00	0	1.00	0	1.00	2	131
5A	7/23/2024	2	0.79	11	0.00	6	0.00	7	0.02	3	0.57	0	1.00	2	0.89	2	2
	7/25/2024	1	1.00	10	0.00	68	0.00	79	0.00	8	0.00	0	1.00	5	0.07	38	14
	7/28/2024	3	1.00	35	0.00	142	0.00	240	0.00	4	1.00	0	1.00	1	1.00	33	35
	7/29/2024	6	1.00	23	0.00	102	0.00	180	0.00	7	0.09	1	0.43	4	0.75	31	26
	7/30/2024	5	1.00	78	0.00	18	0.00	36	0.00	13	0.70	0	1.00	11	0.93	54	9
	7/31/2024	6	1.00	36	0.00	119	0.00	153	0.00	12	0.02	0	1.00	2	1.00	42	28
	8/1/2024	3	1.00	34	0.00	86	0.00	48	0.00	9	0.19	0	1.00	4	1.00	25	19
	8/2/2024	1	1.00	14	0.00	7	0.00	20	0.00	13	0.00	0	1.00	5	0.19	8	5
	8/3/2024	0	1.00	1	0.06	1	0.05	0	1.00	0	1.00	0	1.00	2	0.06	1	63
5B	7/23/2024	0	1.00	3	0.00	3	0.00	1	0.95	1	0.76	0	1.00	1	0.74	1	4
	7/25/2024	2	1.00	5	0.00	68	0.00	65	0.00	5	0.01	1	0.36	1	0.92	15	7
	7/28/2024	5	1.00	11	0.00	86	0.00	147	0.00	5	0.07	0	1.00	0	1.00	29	281
	7/29/2024	4	1.00	9	0.00	75	0.00	176	0.00	11	0.00	0	1.00	1	1.00	28	60
	7/30/2024	0	1.00	24	0.00	21	0.00	33	0.00	7	0.16	0	1.00	1	1.00	12	31
	7/31/2024	7	1.00	20	0.00	102	0.00	89	0.00	7	0.09	0	1.00	1	1.00	16	266
	8/1/2024	4	1.00	9	0.00	78	0.00	45	0.00	4	0.16	0	1.00	1	1.00	7	11

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
5B	8/2/2024	1	1.00	22	0.00	31	0.00	21	0.00	11	0.00	0	1.00	1	1.00	14	8
	8/3/2024	0	1.00	2	0.00	1	0.05	0	1.00	0	1.00	0	1.00	0	1.00	1	26
6A	7/23/2024	1	1.00	4	0.03	14	0.00	2	1.00	22	0.00	0	1.00	5	0.01	10	8
	7/25/2024	5	1.00	11	0.00	15	0.00	75	0.00	24	0.00	0	1.00	3	0.57	22	23
	7/28/2024	3	1.00	49	0.00	114	0.00	156	0.00	40	0.00	0	1.00	3	1.00	80	182
	7/29/2024	25	1.00	16	0.00	285	0.00	204	0.00	29	0.00	0	1.00	5	0.28	102	52
	7/30/2024	15	0.00	23	0.00	14	0.00	29	0.00	28	0.00	0	1.00	5	0.59	34	40
	7/31/2024	148	0.00	19	0.00	185	0.00	168	0.00	24	0.00	0	1.00	6	0.20	110	70
	8/1/2024	71	0.00	20	0.00	115	0.00	113	0.00	35	0.00	0	1.00	9	0.02	84	48
	8/2/2024	17	0.00	20	0.00	14	0.00	29	0.00	57	0.00	0	1.00	7	0.12	71	34
6B	7/23/2024	1	0.94	8	0.02	4	0.00	4	0.13	77	0.00	0	1.00	5	0.06	48	6
	7/25/2024	9	0.93	22	0.00	18	0.00	57	0.00	77	0.00	0	1.00	5	0.60	96	28
	7/28/2024	8	1.00	77	0.00	132	0.00	142	0.00	81	0.00	0	1.00	5	1.00	108	114
	7/29/2024	36	0.67	43	0.00	89	0.00	216	0.00	126	0.00	1	1.00	10	0.31	146	57
	7/30/2024	16	0.01	64	0.00	22	0.00	40	0.00	58	0.00	0	1.00	12	0.48	76	48
	7/31/2024	124	0.00	35	0.00	126	0.00	160	0.00	59	0.00	0	1.00	21	0.00	194	67
	8/1/2024	62	0.00	105	0.00	71	0.00	117	0.00	98	0.00	0	1.00	49	0.00	279	69
	8/2/2024	12	0.01	44	0.00	17	0.00	24	0.00	87	0.00	0	1.00	8	0.69	93	40
	8/3/2024	0	1.00	1	0.04	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	1	18
7A	7/23/2024	0	1.00	17	0.00	4	0.00	4	0.13	11	0.00	0	1.00	0	1.00	14	1
	7/25/2024	1	1.00	14	0.00	40	0.00	55	0.00	9	0.00	0	1.00	0	1.00	8	3
	7/28/2024	2	1.00	28	0.00	103	0.00	138	0.00	10	0.04	0	1.00	5	0.78	25	15
	7/29/2024	4	1.00	38	0.00	40	0.00	146	0.00	7	0.55	0	1.00	0	1.00	23	17
	7/30/2024	1	1.00	23	0.00	14	0.00	18	0.00	13	0.00	0	1.00	1	1.00	11	6
	7/31/2024	1	1.00	29	0.00	46	0.00	116	0.00	10	0.04	0	1.00	3	1.00	24	7

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
7A	8/1/2024	3	1.00	15	0.00	30	0.00	55	0.00	9	0.00	0	1.00	2	1.00	18	28
	8/2/2024	2	1.00	24	0.00	11	0.00	81	0.00	31	0.00	0	1.00	2	1.00	35	8
7B	7/23/2024	1	0.98	13	0.00	7	0.00	4	0.35	9	0.00	0	1.00	1	1.00	10	4
	7/25/2024	2	1.00	14	0.00	28	0.00	66	0.00	9	0.00	0	1.00	0	1.00	4	9
	7/28/2024	6	1.00	15	0.00	86	0.00	111	0.00	14	0.00	0	1.00	7	0.03	22	18
	7/29/2024	6	1.00	33	0.00	40	0.00	131	0.00	10	0.08	0	1.00	3	1.00	26	25
	7/30/2024	3	0.97	12	0.00	18	0.00	14	0.00	17	0.00	0	1.00	1	1.00	15	8
	7/31/2024	3	1.00	20	0.00	39	0.00	83	0.00	19	0.00	1	0.91	2	1.00	24	14
	8/1/2024	6	0.97	11	0.00	29	0.00	33	0.00	17	0.00	0	1.00	3	0.56	22	8
	8/2/2024	4	1.00	23	0.00	10	0.00	53	0.00	17	0.00	0	1.00	1	1.00	26	5
	8/3/2024	0	1.00	1	0.04	3	0.00	0	1.00	0	1.00	0	1.00	0	1.00	2	64
8A	7/23/2024	0	1.00	11	0.00	7	0.00	1	1.00	9	0.00	0	1.00	22	0.00	31	13
	7/25/2024	4	0.87	5	0.00	1	1.00	24	0.00	2	0.52	0	1.00	7	0.00	9	5
	7/28/2024	3	1.00	26	0.00	13	0.00	59	0.00	7	0.30	0	1.00	13	0.00	18	22
	7/29/2024	12	1.00	8	0.00	1	1.00	117	0.00	3	0.41	0	1.00	11	0.00	28	24
	7/30/2024	2	0.96	7	0.00	13	0.00	8	0.09	4	0.10	0	1.00	4	0.09	9	12
	7/31/2024	12	0.30	15	0.00	24	0.00	49	0.00	5	0.26	0	1.00	9	0.00	27	20
	8/1/2024	2	1.00	9	0.00	4	0.25	37	0.00	7	0.01	0	1.00	15	0.00	18	15
	8/2/2024	0	1.00	4	0.00	14	0.00	11	0.01	7	0.00	0	1.00	5	0.01	8	9
8B	7/23/2024	1	0.46	36	0.00	1	0.23	1	0.72	30	0.00	0	1.00	80	0.00	97	12
	7/25/2024	9	0.91	13	0.00	4	0.72	61	0.00	22	0.00	0	1.00	11	0.00	40	14
	7/28/2024	14	1.00	26	0.00	27	0.00	171	0.00	36	0.00	0	1.00	95	0.00	128	43
	7/29/2024	21	1.00	16	0.00	3	1.00	169	0.00	48	0.00	0	1.00	34	0.00	95	30
	7/30/2024	10	0.01	17	0.00	1	1.00	23	0.00	44	0.00	0	1.00	20	0.00	52	21
	7/31/2024	14	0.95	44	0.00	3	1.00	102	0.00	60	0.00	0	1.00	46	0.00	132	35

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
8B	8/1/2024	7	1.00	40	0.00	8	0.14	88	0.00	65	0.00	0	1.00	30	0.00	128	33
	8/2/2024	5	0.97	19	0.00	2	0.92	35	0.00	59	0.00	0	1.00	19	0.00	83	20
9A	7/25/2024	5	1.00	15	0.00	11	1.00	286	0.00	8	0.01	0	1.00	1	1.00	65	70
	7/28/2024	6	1.00	21	0.00	202	0.00	474	0.00	21	0.00	0	1.00	4	0.77	87	153
	7/29/2024	20	1.00	24	0.00	20	1.00	780	0.00	19	0.00	0	1.00	4	0.88	99	145
	7/30/2024	5	1.00	13	0.00	20	0.89	462	0.00	12	0.00	0	1.00	3	0.68	58	174
	7/31/2024	14	1.00	10	0.00	34	0.10	584	0.00	29	0.00	0	1.00	1	1.00	88	165
	8/1/2024	5	1.00	5	0.01	20	0.32	357	0.00	30	0.00	0	1.00	2	0.51	45	163
	8/2/2024	9	1.00	33	0.00	253	0.00	774	0.00	12	0.01	0	1.00	2	1.00	127	121
	8/3/2024	0	1.00	1	0.12	1	0.05	0	1.00	1	0.37	0	1.00	0	1.00	1	32
9B	7/25/2024	56	0.04	64	0.00	2	1.00	306	0.00	737	0.00	1	1.00	5	1.00	131	16
	7/28/2024	57	1.00	20	0.83	112	0.00	607	0.00	525	0.00	0	1.00	0	1.00	282	16
	7/29/2024	52	1.00	7	1.00	33	0.60	682	0.00	500	0.00	0	1.00	3	1.00	254	16
	7/30/2024	13	1.00	74	0.00	16	0.07	208	0.00	800	0.00	1	1.00	2	1.00	200	15
	7/31/2024	27	1.00	73	0.00	2	1.00	647	0.00	668	0.00	0	1.00	7	1.00	284	8
	8/1/2024	15	1.00	26	1.00	7	1.00	358	0.00	937	0.00	0	1.00	3	1.00	230	19
	8/2/2024	15	1.00	15	1.00	27	0.02	365	0.00	827	0.00	0	1.00	2	1.00	334	8
	8/3/2024	0	1.00	2	0.00	1	0.05	0	1.00	0	1.00	0	1.00	0	1.00	0	21
10A	7/25/2024	2	1.00	7	0.00	6	0.15	59	0.00	9	0.00	0	1.00	0	1.00	29	7
	7/28/2024	4	1.00	14	0.00	71	0.00	44	0.00	8	0.01	0	1.00	5	0.19	17	22
	7/29/2024	3	1.00	14	0.00	13	0.01	119	0.00	13	0.00	0	1.00	4	0.41	39	14
	7/30/2024	4	1.00	10	0.00	24	0.00	27	0.00	15	0.00	0	1.00	2	0.86	14	9
	7/31/2024	8	1.00	32	0.00	49	0.00	138	0.00	19	0.00	0	1.00	7	0.45	39	21
	8/1/2024	4	1.00	28	0.00	32	0.00	69	0.00	6	0.57	0	1.00	6	0.52	44	15
	8/2/2024	4	1.00	6	0.00	8	0.01	46	0.00	8	0.00	0	1.00	2	0.56	18	6

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
10B	7/25/2024	2	1.00	7	0.00	8	0.06	76	0.00	12	0.00	0	1.00	2	0.65	13	6
	7/28/2024	5	1.00	25	0.00	72	0.00	63	0.00	13	0.00	0	1.00	5	0.66	10	17
	7/29/2024	4	1.00	13	0.00	17	0.00	145	0.00	11	0.00	0	1.00	4	0.36	23	13
	7/30/2024	2	1.00	12	0.00	22	0.00	28	0.00	14	0.00	0	1.00	0	1.00	8	11
	7/31/2024	5	1.00	32	0.00	49	0.00	135	0.00	17	0.00	0	1.00	8	0.26	36	10
	8/1/2024	3	1.00	39	0.00	32	0.00	72	0.00	7	0.71	0	1.00	4	1.00	23	15
	8/2/2024	6	1.00	11	0.00	17	0.00	43	0.00	8	0.00	0	1.00	7	0.01	12	7
11A	8/3/2024	0	1.00	11	0.00	8	0.00	45	0.00	22	0.00	0	1.00	2	0.91	24	10
	8/4/2024	0	1.00	7	0.00	1	0.72	10	0.00	11	0.00	0	1.00	1	0.99	15	8
	8/5/2024	0	1.00	4	0.01	1	0.91	16	0.00	17	0.00	0	1.00	1	0.88	11	6
	8/7/2024	1	0.87	4	0.01	1	0.45	4	0.02	16	0.00	0	1.00	0	1.00	20	2
	8/11/2024	3	1.00	9	0.00	5	0.30	56	0.00	12	0.00	0	1.00	1	1.00	30	14
	8/12/2024	1	1.00	16	0.00	4	0.07	23	0.00	16	0.00	0	1.00	6	0.12	24	7
	8/13/2024	1	1.00	19	0.00	15	0.00	19	0.00	21	0.00	0	1.00	4	0.68	31	8
11B	8/3/2024	0	1.00	9	0.00	8	0.00	47	0.00	10	0.00	0	1.00	3	0.41	20	20
	8/4/2024	0	1.00	8	0.00	3	0.01	6	0.01	11	0.00	0	1.00	5	0.04	22	5
	8/5/2024	1	1.00	10	0.00	5	0.00	13	0.00	24	0.00	0	1.00	4	0.22	14	10
	8/7/2024	1	0.64	5	0.00	1	0.31	2	0.25	11	0.00	0	1.00	2	0.47	4	15
	8/11/2024	9	0.72	19	0.00	1	1.00	53	0.00	17	0.00	0	1.00	6	0.20	39	20
	8/12/2024	2	1.00	11	0.00	3	0.38	29	0.00	18	0.00	0	1.00	1	1.00	16	15
	8/13/2024	7	0.13	20	0.00	10	0.00	18	0.00	21	0.00	0	1.00	4	0.73	16	9
12B	8/3/2024	1	1.00	2	0.24	6	0.00	8	0.00	13	0.00	0	1.00	0	1.00	16	26
	8/4/2024	0	1.00	7	0.00	4	0.00	6	0.01	27	0.00	0	1.00	0	1.00	27	4
	8/5/2024	3	0.60	3	0.46	3	0.08	11	0.00	39	0.00	0	1.00	0	1.00	27	5
	8/7/2024	1	0.59	1	0.83	0	1.00	2	0.10	15	0.00	0	1.00	0	1.00	14	10

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
12B	8/11/2024	2	1.00	19	0.00	1	1.00	31	0.00	205	0.00	0	1.00	0	1.00	86	32
	8/12/2024	0	1.00	7	0.00	4	0.01	11	0.00	40	0.00	0	1.00	1	1.00	73	21
	8/13/2024	3	1.00	6	0.00	5	0.02	22	0.00	32	0.00	0	1.00	1	0.99	32	47
13A	8/3/2024	0	1.00	0	1.00	0	1.00	4	0.00	7	0.00	1	0.46	0	1.00	14	21
	8/4/2024	2	0.86	9	0.00	9	0.00	7	0.07	31	0.00	0	1.00	1	1.00	11	9
	8/5/2024	3	1.00	3	0.16	9	0.00	26	0.00	25	0.00	0	1.00	1	0.80	12	10
	8/7/2024	1	0.97	0	1.00	0	1.00	6	0.00	14	0.00	0	1.00	0	1.00	9	11
	8/11/2024	2	1.00	12	0.00	10	0.02	89	0.00	33	0.00	0	1.00	0	1.00	26	16
	8/12/2024	5	1.00	79	0.00	6	0.03	37	0.00	26	0.00	0	1.00	3	1.00	18	20
	8/13/2024	6	1.00	5	0.01	13	0.00	51	0.00	30	0.00	0	1.00	1	0.95	37	38
13B	8/4/2024	2	0.28	12	0.00	1	0.45	3	0.11	22	0.00	0	1.00	1	1.00	16	10
	8/5/2024	0	1.00	12	0.00	1	0.96	19	0.00	32	0.00	0	1.00	0	1.00	20	12
	8/7/2024	2	0.72	11	0.00	0	1.00	8	0.00	39	0.00	0	1.00	0	1.00	25	20
	8/11/2024	2	1.00	25	0.00	8	0.16	94	0.00	41	0.00	0	1.00	3	1.00	34	20
	8/12/2024	3	1.00	67	0.00	3	0.79	49	0.00	34	0.00	0	1.00	3	1.00	30	21
	8/13/2024	4	1.00	22	0.00	1	1.00	52	0.00	48	0.00	0	1.00	7	0.16	40	23
	8/14/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1
	8/15/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1
14A	8/4/2024	0	1.00	1	0.96	2	0.04	3	0.12	24	0.00	0	1.00	2	0.10	389	490
	8/5/2024	0	1.00	4	0.00	63	0.00	4	1.00	3	0.08	0	1.00	0	1.00	76	1126
	8/7/2024	0	1.00	3	0.00	3	0.00	0	1.00	3	0.07	0	1.00	2	0.25	134	543
	8/11/2024	0	1.00	1	0.33	1	1.00	28	0.00	4	0.00	0	1.00	1	0.41	10	156
	8/12/2024	0	1.00	5	0.00	10	0.00	30	0.00	8	0.00	0	1.00	0	1.00	6	192
	8/13/2024	0	1.00	0	1.00	72	0.00	23	0.38	4	0.00	0	1.00	0	1.00	20	1678
14B	8/4/2024	2	0.79	1	0.41	0	1.00	9	0.00	5	0.00	0	1.00	0	1.00	4	2

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
14B	8/5/2024	0	1.00	4	0.00	1	0.72	10	0.00	3	0.11	0	1.00	1	0.85	2	4
	8/7/2024	0	1.00	2	0.00	0	1.00	1	0.19	0	1.00	0	1.00	0	1.00	4	3
	8/11/2024	0	1.00	4	0.00	2	0.98	45	0.00	6	0.00	0	1.00	0	1.00	11	42
	8/12/2024	0	1.00	5	0.00	10	0.00	27	0.00	9	0.00	0	1.00	1	0.93	3	4
	8/13/2024	1	1.00	2	0.06	13	0.00	18	0.00	5	0.00	0	1.00	0	1.00	5	110
15A	8/4/2024	0	1.00	2	0.05	2	0.12	7	0.00	5	0.00	0	1.00	1	0.61	7	4
	8/5/2024	0	1.00	4	0.00	2	0.21	10	0.00	4	0.02	0	1.00	0	1.00	7	1
	8/7/2024	0	1.00	0	1.00	0	1.00	1	0.19	0	1.00	0	1.00	0	1.00	0	1
	8/11/2024	0	1.00	7	0.00	4	0.29	41	0.00	6	0.01	0	1.00	1	0.99	9	2
	8/12/2024	2	1.00	5	0.00	9	0.00	30	0.00	6	0.00	0	1.00	0	1.00	14	2
	8/13/2024	1	1.00	5	0.00	9	0.05	88	0.00	6	0.00	0	1.00	3	0.15	5	5
15B	8/4/2024	0	1.00	2	0.02	1	0.68	9	0.00	2	0.14	0	1.00	0	1.00	5	2
	8/5/2024	0	1.00	2	0.08	2	0.21	10	0.00	6	0.00	0	1.00	0	1.00	6	0
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1
	8/11/2024	3	1.00	1	0.28	2	0.89	34	0.00	3	0.01	0	1.00	0	1.00	7	7
	8/12/2024	1	1.00	6	0.00	9	0.00	26	0.00	2	0.50	0	1.00	0	1.00	5	5
	8/13/2024	0	1.00	8	0.00	14	0.00	81	0.00	12	0.00	0	1.00	0	1.00	6	13
16A	8/4/2024	0	1.00	3	0.00	0	1.00	3	0.01	4	0.01	0	1.00	0	1.00	4	62
	8/5/2024	0	1.00	1	0.12	0	1.00	17	0.00	1	0.37	0	1.00	0	1.00	1	58
	8/7/2024	0	1.00	1	0.35	0	1.00	0	1.00	4	0.00	1	0.30	0	1.00	5	74
	8/11/2024	1	1.00	2	0.05	0	1.00	29	0.00	5	0.00	0	1.00	1	0.61	6	204
	8/12/2024	4	0.72	11	0.00	1	0.99	20	0.00	7	0.01	0	1.00	2	0.90	8	198
	8/13/2024	1	1.00	1	0.52	1	1.00	42	0.00	7	0.00	0	1.00	0	1.00	6	155
16B	8/4/2024	0	1.00	1	0.20	0	1.00	4	0.00	2	0.06	0	1.00	0	1.00	6	369
	8/5/2024	0	1.00	0	1.00	1	0.63	8	0.00	1	0.11	0	1.00	0	1.00	5	367

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
16B	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	1	0.11	0	1.00	0	1.00	1	59
	8/11/2024	1	1.00	4	0.00	3	0.59	39	0.00	2	0.37	0	1.00	1	0.85	8	236
	8/12/2024	1	1.00	2	0.10	1	0.90	15	0.00	8	0.00	0	1.00	1	0.62	6	288
	8/13/2024	1	1.00	2	0.03	4	0.15	31	0.00	3	0.03	0	1.00	0	1.00	15	405
17A	8/4/2024	0	1.00	4	0.00	0	1.00	13	0.00	4	0.03	0	1.00	2	0.35	1	8
	8/5/2024	0	1.00	3	0.00	2	0.02	2	0.36	2	0.22	0	1.00	0	1.00	1	2
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	9
	8/11/2024	1	1.00	2	0.02	4	0.33	43	0.00	2	0.14	0	1.00	0	1.00	5	110
	8/12/2024	1	1.00	5	0.00	5	0.06	33	0.00	3	0.17	0	1.00	3	0.15	3	66
	8/13/2024	2	1.00	1	0.20	3	0.41	30	0.00	2	0.06	0	1.00	0	1.00	10	46
17B	8/3/2024	2	0.21	3	0.10	2	0.05	2	0.52	18	0.00	0	1.00	0	1.00	25	17
	8/4/2024	0	1.00	4	0.13	1	0.63	8	0.00	38	0.00	0	1.00	2	0.43	25	11
	8/5/2024	2	0.88	2	0.87	5	0.00	9	0.00	45	0.00	0	1.00	1	0.74	29	15
	8/7/2024	0	1.00	8	0.00	0	1.00	1	0.19	19	0.00	0	1.00	13	0.00	50	7
	8/11/2024	1	1.00	23	0.00	0	1.00	42	0.00	202	0.00	0	1.00	3	1.00	85	35
	8/12/2024	0	1.00	16	0.00	4	0.04	20	0.00	41	0.00	0	1.00	7	0.05	65	27
	8/13/2024	3	1.00	12	0.00	18	0.00	27	0.00	35	0.00	0	1.00	1	1.00	24	31
18A	8/4/2024	0	1.00	0	1.00	2	0.05	4	0.04	6	0.00	0	1.00	0	1.00	1	50
	8/5/2024	0	1.00	1	0.34	8	0.00	9	0.01	4	0.00	0	1.00	0	1.00	1	2
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	2	14
	8/11/2024	1	1.00	3	0.01	0	1.00	72	0.00	6	0.00	0	1.00	1	0.75	6	4
	8/12/2024	1	1.00	4	0.00	9	0.00	37	0.00	4	0.02	0	1.00	0	1.00	10	1
	8/13/2024	0	1.00	1	0.52	8	0.03	66	0.00	7	0.00	0	1.00	0	1.00	4	18
18B	8/4/2024	1	1.00	2	0.10	1	0.61	7	0.00	7	0.00	0	1.00	0	1.00	1	2
	8/5/2024	0	1.00	2	0.01	4	0.02	16	0.00	1	0.56	0	1.00	0	1.00	3	131

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		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
18B	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	10
	8/11/2024	1	1.00	5	0.00	1	1.00	52	0.00	5	0.01	0	1.00	0	1.00	2	158
	8/12/2024	1	1.00	3	0.00	6	0.05	45	0.00	4	0.01	0	1.00	2	0.25	5	26
	8/13/2024	0	1.00	2	0.06	2	1.00	69	0.00	5	0.00	0	1.00	0	1.00	4	73
19A	8/4/2024	0	1.00	4	0.00	0	1.00	8	0.00	3	0.11	0	1.00	1	0.85	4	1
	8/5/2024	0	1.00	4	0.00	3	0.08	14	0.00	4	0.02	0	1.00	0	1.00	4	2
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	1	0
	8/11/2024	0	1.00	54	0.00	7	0.08	65	0.00	5	1.00	0	1.00	4	1.00	10	4
	8/12/2024	4	1.00	5	0.00	5	0.37	61	0.00	8	0.00	0	1.00	3	0.16	8	5
	8/13/2024	0	1.00	8	0.00	1	1.00	83	0.00	6	0.01	0	1.00	3	0.34	5	5
19B	8/4/2024	0	1.00	4	0.00	0	1.00	8	0.00	2	0.31	0	1.00	0	1.00	2	0
	8/5/2024	0	1.00	3	0.01	1	0.46	5	0.00	5	0.00	0	1.00	0	1.00	0	1
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	1	0
	8/11/2024	1	1.00	49	0.00	1	1.00	63	0.00	3	1.00	0	1.00	1	1.00	9	7
	8/12/2024	2	1.00	3	0.01	1	1.00	65	0.00	5	0.00	0	1.00	0	1.00	5	14
	8/13/2024	1	1.00	2	0.03	9	0.13	106	0.00	3	0.03	0	1.00	0	1.00	12	85
20A	8/4/2024	0	1.00	1	0.54	1	0.72	10	0.00	8	0.00	0	1.00	1	0.43	5	1
	8/5/2024	0	1.00	3	0.00	1	0.52	6	0.00	5	0.00	0	1.00	1	0.75	3	0
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	3
	8/11/2024	1	1.00	2	0.04	37	0.00	37	0.00	4	0.01	0	1.00	2	0.16	5	48
	8/12/2024	0	1.00	5	0.00	14	0.00	26	0.00	6	0.00	0	1.00	1	0.93	4	11
	8/13/2024	1	1.00	4	0.00	18	0.00	14	0.00	7	0.00	0	1.00	2	0.36	9	18
20B	8/4/2024	0	1.00	2	0.02	1	0.46	5	0.00	2	0.14	0	1.00	0	1.00	6	56
	8/5/2024	0	1.00	2	0.02	0	1.00	3	0.01	3	0.03	0	1.00	1	0.60	2	6
	8/7/2024	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	9

Table A-1. Quantitative Analysis of Calls Using Kaleidoscope Pro from White Pine Copper Mine Project, Ontonagon County, Michigan. Cells shaded in gray either have MLE values <0.05 indicating likely presence of that species on that night or is a night with greater than 10 tricolored bat calls. Note that values shown as 0.05 and shaded are <0.05 but are written as 0.05 due to rounding.

Detector	Date	Big Brown Bat (EPFU)		Eastern Red Bat (LABO)		Hoary Bat (LACI)		Silver-haired Bat (LANO)		Little Brown Bat (MYLU)		Northern Long-eared Bat (MYSE)		Tricolored Bat (PESU)		No species ID	Noise
		# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	MLE	# of calls	# of calls
20B	8/11/2024	1	1.00	4	0.00	7	0.01	44	0.00	6	0.00	0	1.00	0	1.00	6	6
	8/12/2024	0	1.00	7	0.00	4	0.06	22	0.00	3	0.23	0	1.00	0	1.00	4	5
	8/13/2024	1	1.00	6	0.00	4	0.00	8	0.00	8	0.00	0	1.00	0	1.00	1	14
Total		**2,177**		**6,569**		**8,260**		**20,236**		**11,236**		**10**		**2,467**		**13,788**	**14,784**
Percent of Total Activity		**3.4%**		**10.1%**		**12.8%**		**31.3%**		**17.4%**		**<0.1%**		**3.8%**		**21.3%**	**--**

Stantec Ground-Based Acoustic Bat Detector Datasheet

Site ID: Location 1 [Detectors1A/1B]	**Project Number:** 193710518	**Project Name:** White Pine Copper Mine	
	State: MI	**County:** Ontonagon	**Acoustic Survey Type:** Summer - Presence/Absence
Lat: -46.786791 °N	**Long:** 89.500662 °W		
Deployer: RS	**Date Deployed:** July 23, 2024		**Detector #:** 23645

Detector Setup

Detector Make:	Wildlife Acoustics	**Detector Model:**	SM4BAT FS	**Dist to Obstruct (m):**	30
Microphone Model: SMM-U2 **Microphone #:**		**Directionality:**	Omnidirectional	**Mic Height (AGL; m):**	3
Weatherproofing:	None	**Mic Angle:**	0 (parallel w/ ground)	**Call Data Type:**	Full Spectrum
Mic Direction (deg):	180	**In-Field Calibration:**	PASS	**Notes:**	

HABITAT DESCRIPTION

VEGETATION CHARACTERISTICS

Habitat Type: Linear shaped shallow marsh wetland positioned between existing access road to the east and toe slope of tailings/perimeter of previously mined area.

Canopy Closure (%): 70

Habitat Description: Conditions surrounding the wetland area consists of upland deciduous woodland mixed with moderately dense shrub/herbaceous vegetation communities. The linear shape of the wetland alongside of access roads provide effective corridors for bat movement/activity.

Habitat Use: Roosting, Foraging

Habitat Notes:

STREAM CHARACTERISTICS

Est. Distance to Water Source (m):	10
Type of Water:	Wetland

Detector Startup Notes:

Detector Startup:

Card In A:	32
Card In B:	32
Memory A:	0/32GB
Memory B:	0/32GB
Battery:	5.6
Temperature:	35
Mic 0:	U2
Cal Ch 0:	PASS
Going to Sleep Until:	July 23, 2024 8:20 PM

Additional Site Notes:

USFWS accepted answers:
Mic Angle: 0 = parallel to ground, 45 = angled up, 90 = straight up, 315 = angled down, 270 = pointed down
Habitat Type: creek/riparian, pond, mine portal, field edge, bottomland forest, cave entrance, bridge, open field, upland forest, structure, other

If collecting data on paper, please add site diagram to back.

Unit 1 View Northwest

Unit 2 View North

F-13

Rare Plant Species Survey and Community Mapping Results

Stantec Consulting Services, Inc.
203 S Paterson Street Suite 500
Madison WI 53703-3689, United States

July 20, 2026
File: 193710518

Attention: White Pine Copper LLC
White Pine Copper LLC.
P.O. Box 338
White Pine, MI 49971

Dear Amanda,

Reference: Rare Plant Species Survey and Community Mapping Results
White Pine North Project, Ontonagon County, MI

INTRODUCTION

White Pine Copper LLC (WPC) retained Stantec Consulting Services Inc. (Stantec) to conduct a baseline study to evaluate the existing land cover types, natural communities, and probable presence/absence of federally or state-listed threatened, endangered, and special concern (TES) species within the proposed above ground facilities of the White Pine North Project (WPN Proposed Project).

PROJECT DESCRIPTION

WPC wholly owned by Kinterra Copper USA LLC. WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County, Michigan (Figure 1). White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established. WPC is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through reuse of one or more of the existing tailings dams. This report summarizes the community mapping and rare plant surveys completed within areas of proposed construction that were added in 2025 (Survey Area).

METHODS

A team of two Stantec botanists conducted pedestrian meander surveys across all portions of the Survey Area where WPC has surface rights during one seasonal mobilization in 2025 and another in 2026. Land cover types and natural communities were mapped based on species composition and landform features and species lists were recorded for each one. Presence/absence surveys for each target species were conducted during the MNFI (Michigan Natural Features Inventory) recommended survey period for each species, with an emphasis on potentially suitable habitats. Representative photographs of habitats were taken, and notes on the vegetation were recorded. If found, the target species were photographed and mapped with an iPad and an Arrow® GPS unit capable of sub-meter accuracy.

Land cover and natural community mapping and rare species surveys were completed during two mobilizations timed to coincide with target rare species survey windows. John Zaborsky, Stantec's Lead Botanist on these surveys, holds a Michigan Threatened and Endangered species permit for plants under the Consultant category, and was the field survey lead for both mobilizations. During the first mobilization, August 4–6, 2025, surveys were conducted by Stantec botanists John Zaborsky and Matt Knickelbine. The second mobilization occurred June 15, 2026, with surveys again conducted by John Zaborsky and Matt Knickelbine. Survey results are discussed in the following sections for plant communities and TES species. Land cover and natural community mapping for the Survey Area is depicted in Figure 2. Plant species lists compiled for each land cover and natural community type are provided in Appendix A. Photographs of natural communities, land cover types, and uncommon plant observations are included in Appendix B, and photo locations are shown in Figure 2. Target TES species, their status, and their habitats are described in Table B-1 (Appendix B).

RESULTS

A summary of natural communities and land cover types mapped for the Survey Area, species richness metrics, and acreage is presented in Table 1.

Table 1. Summary of Natural Community and Land Cover Types, Species Richness Metrics

Desktop / Field Survey	Natural Community / Land Cover Type	Acreage	Total Species Richness	Native Species Richness
Field	Developed Land	17.39	--	--
	Upland Meadow	29.27	66	34
	Wetlands	10.60	36	32
	Mesic Northern Forest - Early Successional	64.62	75	56
	Total Survey Areas	**121.88**	**177**	**122**

Developed Lands

Developed Land occurs across 17.39 acres of the Survey Area. Developed Lands do not comprise any MNFI natural community, rather, this land cover type comprises areas that have been subject to modification and routine maintenance such that little or no natural vegetation development has occurred. They include maintained roads, railroads, buildings, parking areas, graded, unvegetated areas, material stockpiles, and slag piles. Developed Land would likely succeed toward Upland Meadow over time, in the absence of ongoing maintenance.

Upland Meadow

This community was present in open spaces located around buildings and old concrete structures in the Survey Area and totaled 29.27 acres in size. The vegetation was mostly dominated by non-native species and early-successional native species such as redtop (*Agrostis gigantea*), spotted knapweed (*Centaurea stoebe*), tall fescue (*Lolium arundinaceum*), bird's foot trefoil (*Lotus corniculatus*), horsetails (*Equisetum* spp.), wild strawberry (*Fragaria virginiana*), and evening-primrose (*Oenothera biennis*). Woody vegetation was scattered throughout this community and was sometimes abundant depending on the area. Common

woody plants included numerous willow species (*Salix* spp.) and their hybrids, trembling aspen (*Populus tremuloides*), white cedar (*Thuja occidentalis*), and paper birch (*Betula papyrifera*).**Wetlands**

Wetlands in the Survey Area consisted of disturbed wet meadows or shallow marshes and combined, totaling 10.60 acres. An open wetland was also observed along the periphery of a pond that had formed on top of an old concrete foundation. The vegetation in wetlands was mostly herbaceous with numerous sedges (*Carex* spp.), rushes (*Juncus* spp.), and bulrushes (*Schoenoplectus* spp.) being dominant. Other associate species included balsam poplar (*Populus balsamifera*), willows (*Salix* spp.), narrowleaf cattail (*Typha angustifolia*), boneset (*Eupatorium perfoliatum*), jewelweed (*Impatiens capensis*), and wild mint (*Mentha canadensis*).

Mesic Northern Forest – Early Successional

This was the dominant natural community type within the Survey Area, encompassing 64.62 acres. These early successional Mesic Northern Forests have a more recent history of disturbance than the mature subtype, generally have younger, smaller canopy trees ranging from approximately 4–10 inches dbh, abundant trembling aspen in the canopy, and low canopy coverage by conifers.

Dominant tree species within the early successional Mesic Northern Forest included trembling aspen, red maple (*Acer rubrum*) sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and white ash (*Fraxinus americana*). Prevalent shrubs included beaked hazelnut (*Corylus cornuta),* thimbleberry (*Rubus parviflorus*), and wild red raspberry (*Rubus strigosus*). Dominant herbaceous vegetation included wild sarsaparilla (*Aralia nudicaulis*), large-leaved aster (*Eurybia macrophylla*), and bracken fern (*Pteridium aquilinum*). Many areas of this community contained little or no herbaceous cover under the tree canopy.

Rare Species

Three target species are listed as Michigan-Threatened, and are legally protected in the State of Michigan: their characteristics and survey results are described in more detail below.

Climbing Fumitory (*Adlumia fungosa*)
Climbing fumitory is an herbaceous vine found in gravelly or rocky Great Lakes shores, woods, and thickets, and in rich, diverse mesic forests inland. This species was last reported from Ontonagon County in 1939 (MNFI 2026). This species likely historically occurred on or along the Lake Superior shore, but suitable habitat conditions for this species are unlikely to exist within the Study Area. This species was not detected in presence/absence surveys across the Survey Area.

Showy Orchis (*Galearis spectabilis*)
Showy orchis is a small orchid of rich woods, which has been documented in Ontonagon County as recently as 2021 (MNFI 2026). This species typically grows in rich deciduous woods, in shady rich soils with spring ephemerals. This species was not detected in presence/absence surveys across the Survey Area.

Vasey's Pondweed (*Potamogeton vaseyi*)
Vasey's Pondweed is an annual, floating-leaved aquatic plant. In Michigan, this is a species occurring in small lakes typically found at water depths of 6 ft and greater and has been documented in Ontonagon County as recently as 2021 (MNFI 2026). Potentially suitable habitats for Vasey's Pondweed may occur in Wetland communities. This species was not detected within the Survey Area.

Special Concern Species

Eight species listed as Special Concern in Michigan and tracked by MNFI (Michigan Natural Features Inventory), were targeted in the presence/absence surveys across the extent of the Survey Area, during the appropriate survey periods. Five of these species are found on rock outcrops, or along Lake Superior shorelines. Suitable shoreline and bedrock habitats for these species were lacking within the Study Area. Canadian Milk Vetch (*Astragalus canadensis*) occurs on rocky slopes along Lake Superior; small blue-eyed Mary (*Collinsia parviflora*), occurs on bedrock outcrops and cliffs. Douglas's hawthorn (*Crataegus douglasii*) is known from rocky shorelines along Lake Superior. Male fern (*Dryopteris filix-mas*) is found in rocky cliffs and ravines in mixed northern hardwood forests; and northern gooseberry (*Ribes oxyacanthoides*) is found on bedrock outcrops (MNFI 2026). None of these species, or their preferred habitats, were detected within the Study Area.

Two Special Concern species are found in rich forests and swamps. While natural community types with potentially suitable habitats exist onsite, most are degraded and early successional communities. Northern bluebell (*Mertensia paniculata*) is found in Hardwood-Conifer Swamp, Mesic Northern Forest, and Rich Conifer Swamp; Large Toothwort (*Cardamine maxima*) is found in rich deciduous forests and floodplains (MNFI 2023). Neither species were detected in the Field Survey Area.

One Special Concern species, western monkeyflower (*Mimulus guttatus*) is only documented in Michigan from a springy ditch and calcareous forested seeps in Ontonagon County; it is a disjunct occurrence from its main range is in the western U.S. (MNFI 2026). Suitable habitats were not present, and this species was not detected within the Survey Area.

DISCUSSION

Natural Community and Land Cover Types

Three land cover types were identified in the Survey Area: Disturbed Grassland, Wetlands, and early successional Mesic Northern Forest. Disturbed Grassland communities occurred in open spaces, particularly around buildings and old concrete structures and on old mine tailings. They were dominated by weedy or early-successional species. Wetlands in the Survey Area were variously dominated by graminoids or willows and occurred in basins, around ponds, and along streams flooded by beaver activity. Early successional Mesic Northern Forest was extensive in the Survey Area and was mostly dominated by hardwoods, with conifers being locally common. The understory of this natural community ranged from open and barren to densely brushy. Species recorded in these communities were generally early-successional or weedy and no highly conservative species were observed.

Rare Species

No federally or state-listed TES plant species were observed during the 2025 or 2026 surveys. Generally, the results of the surveys indicated a lack or scarcity of potentially suitable habitat conditions, typical associated species, and a low likelihood for the target species to occur onsite. The Survey Area has undergone historic disturbance that has altered any natural communities where these species may have occurred.

Reference: **Rare Plant Species Survey and Community Mapping Results White Pine North Project, Ontonagon County, MI**

CONCLUSION

Natural Community characterization was performed in newly added areas within the WPN Proposed Project. Three land types were identified and mapped, and their species composition was recorded. TES plant surveys were required for three Michigan Threatened Species within the Survey Area. Stantec completed presence/absence surveys for the listed plant species, and no individuals of any TES species were observed within the Survey Area.

Regards,



John Zaborsky PhD
Environmental Scientist
Phone: (608) 839-2001
John.Zaborsky@stantec.com

Attachments:
Figure 1: Project Overview
Figure 2: Community Overview
Appendix A
Appendix B

REFERENCES

MNFI 2026. Michigan's Rare Plants. https://mnfi.anr.msu.edu/species/plants

Reference: **Rare Plant Species Survey and Community Mapping Results White Pine North Project, Ontonagon County, MI**

FIGURE 1

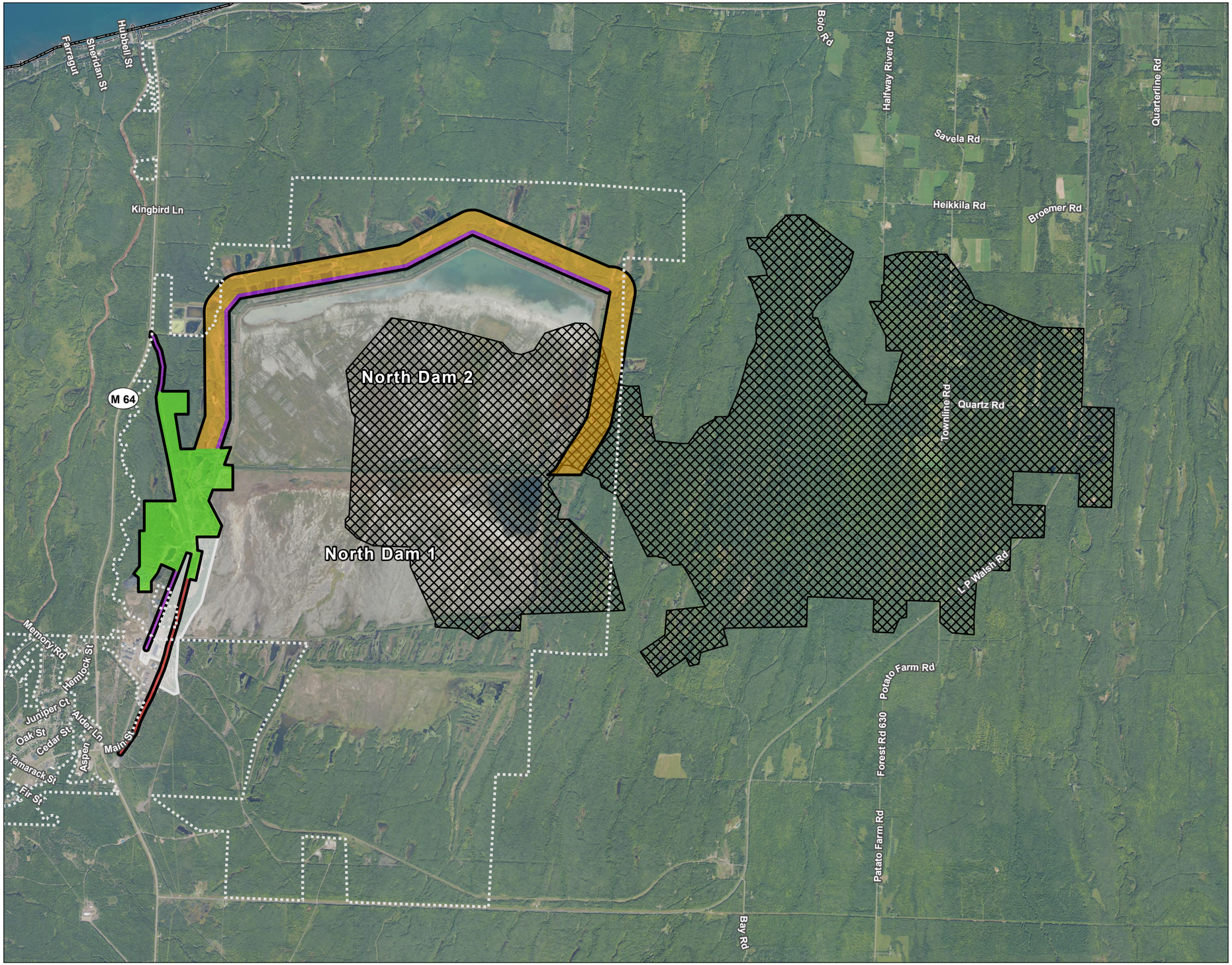


Figure No.
1

Title
Site Layout

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2025-02-24
TR by SR on 2025-03-04
IR by JS on 2026-07-21

N

0 2,000 4,000 Feet
(At original document size of 11x17)
1:48,000

Legend
- Study Area
- 2025-2026 Additional Community Mapping & Rare Plant Survey Area
- Surface Rights Boundary
- Proposed Underground Mine Area
- Proposed Surface Footprint
- Proposed Railroad Corridor
- Proposed Transmission Line Corridor
- Potential Tailings Dam Expansion Area



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS, Michigan DNR
3. Background: 2022 NAIP

Stantec

U:\193710518\10518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper\193710518_WhitePineCopper.aprx Revised: 2026-07-21 By: jmarty

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Reference: **Rare Plant Species Survey and Community Mapping Results White Pine North Project, Ontonagon County, MI**

FIGURE 2

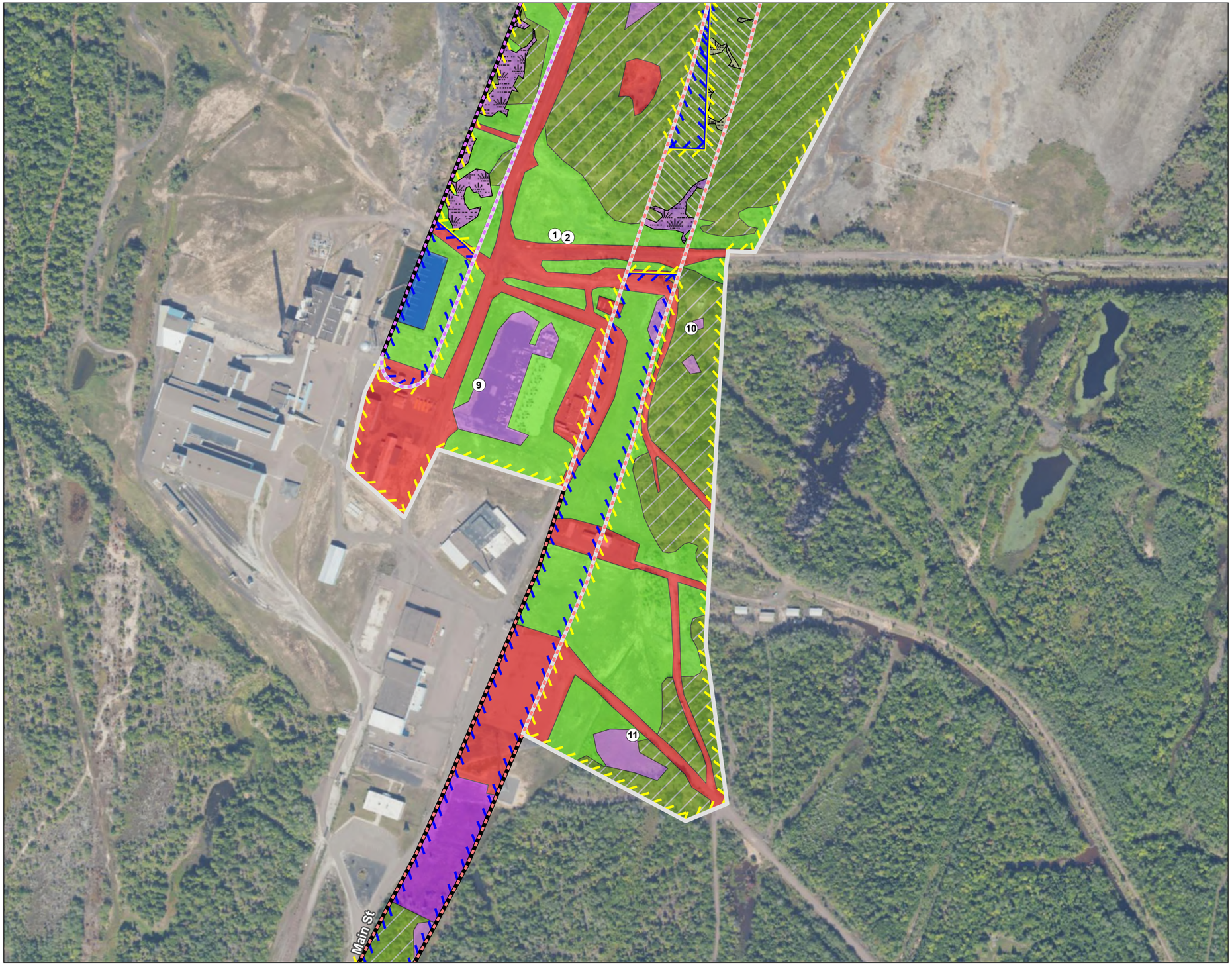


Figure No.
2

Title
Community Overview

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

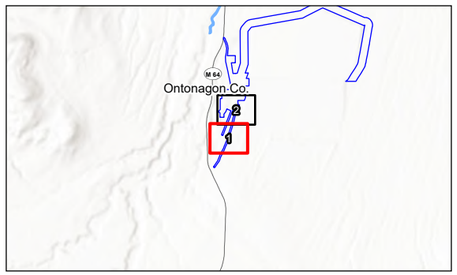
Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-07-20
TR by MK on 2026-07-21
IR by XX on 2026-XX-XX

N

0 200 400 Feet
(At original document size of 11x17)
1:4,800

Legend
- Study Area
- 2025-2026 Additional Community Mapping & Rare Plant Survey Area
- Photo Location
- Proposed Railroad Corridor
- Proposed Transmission Line Corridor
- Desktop Mapped Area
- Field Mapped Area
- Delineated Wetland (Barr, 2024)
- Developed
- Emergent Marsh
- Mesic Northern Forest - Early Successional
- Mesic Northern Forest - Mature
- Northern Hardwood Swamp
- Northern Wet Meadow
- Open Water
- Submergent Marsh
- Upland Meadow



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper\193710518_WhitePineCopper.aprx Revised: 2026-07-28 By: jmarty

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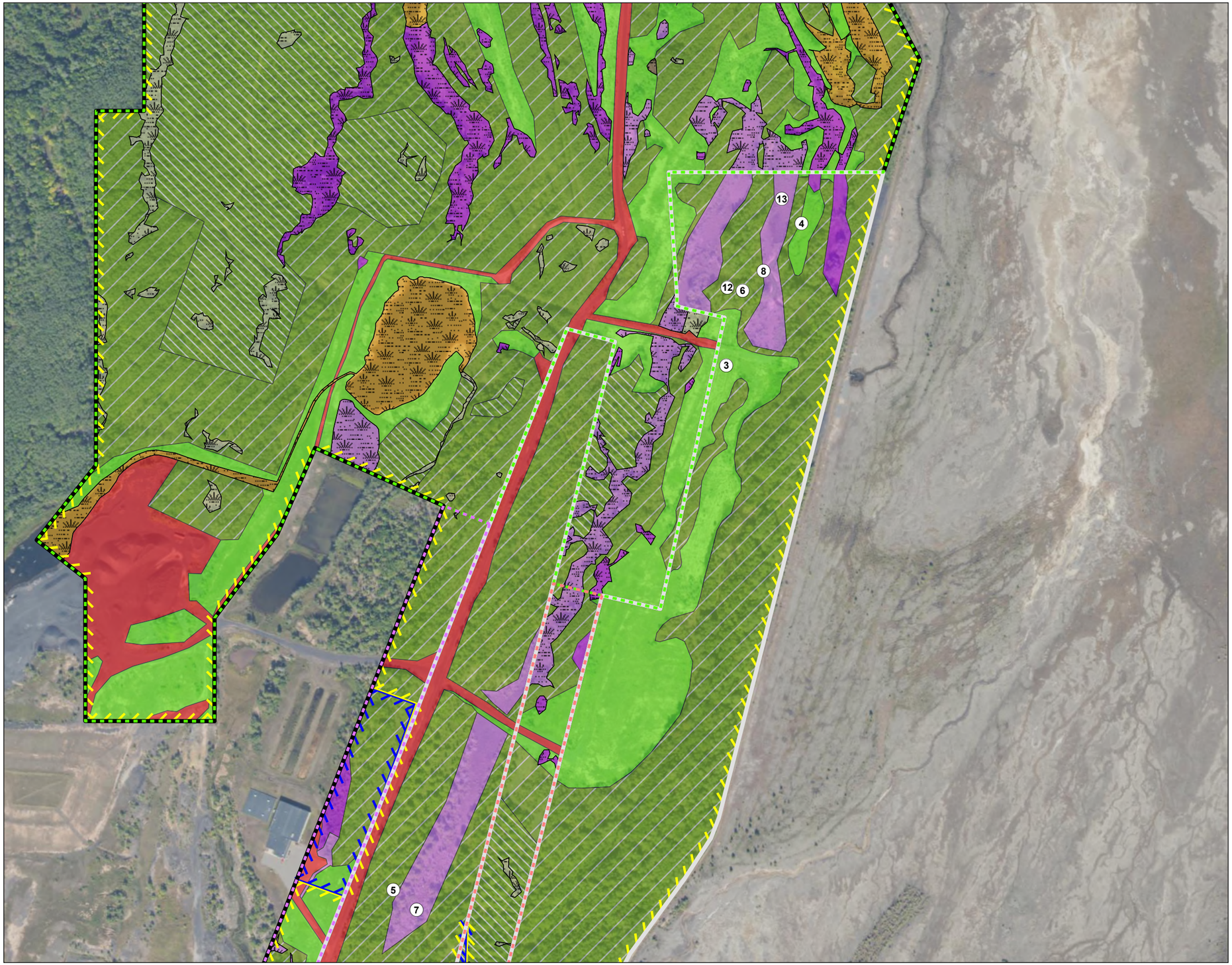


Figure No.
2

Title
Community Overview

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

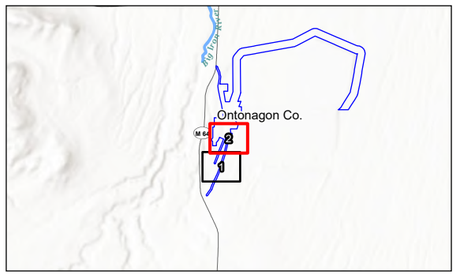
Prepared by JM on 2026-07-20
TR by MK on 2026-07-21
IR by XX on 2026-XX-XX

N

0 200 400 Feet
(At original document size of 11x17)
1:4,800

Legend

- Study Area
- 2025-2026 Additional Community Mapping & Rare Plant Survey Area
- Photo Location
- Proposed Surface Footprint
- Proposed Railroad Corridor
- Proposed Transmission Line Corridor
- Desktop Mapped Area
- Field Mapped Area
- Delineated Wetland (Barr, 2024)
- Developed
- Emergent Marsh
- Mesic Northern Forest - Early Successional
- Mesic Northern Forest - Mature
- Northern Hardwood Swamp
- Northern Shrub Thicket
- Northern Wet Meadow
- Submergent Marsh
- Upland Meadow



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Barr, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2022 NAIP

Stantec

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U:\193710518\03_data\gis_cad\gis\ArcPro\193710518_WhitePineCopper\193710518_WhitePineCopper.aprx Revised: 2026-07-28 By: jmarty

Reference: **Rare Plant Species Survey and Community Mapping Results White Pine North Project, Ontonagon County, MI**

APPENDIX A

White Pine Copper
Ontonagon County, MI

2025/2026 Meander Survey Species List - Upland Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value
Abies balsamea	balsam fir	native	tree	3
Acer rubrum	red maple	native	tree	1
Achillea millefolium	yarrow	native	forb	1
Agrostis gigantea	redtop	non-native	grass	0
Amelanchier laevis	smooth shadbush	native	tree	4
Apocynum androsaemifolium	spreading dogbane	native	forb	3
Asclepias syriaca	common milkweed	native	forb	1
Barbarea vulgaris	yellow rocket	non-native	forb	0
Betula alleghaniensis	yellow birch	native	tree	7
Betula papyrifera	paper birch	native	tree	2
Bromus inermis	smooth brome	non-native	grass	0
Carex aurea	sedge	native	sedge	3
Carex gracillima	sedge	native	sedge	4
Carex granularis	sedge	native	sedge	2
Centaurea stoebe	spotted knapweed	non-native	forb	0
Cerastium fontanum	mouse-ear chickweed	non-native	forb	0
Chenopodium album	lambs-quarters	non-native	forb	0
Dactylis glomerata	orchard grass	non-native	grass	0
Danthonia spicata	poverty grass; oatgrass	native	grass	4
Daucus carota	queen-annes-lace	non-native	forb	0
Dianthus armeria	deptford pink	non-native	forb	0
Dysphania botrys	jerusalem-oak	non-native	forb	0
Equisetum arvense	common horsetail	native	fern	0
Equisetum variegatum	variegated scouring rush	native	fern	6
Eurybia macrophylla	big-leaved aster	native	forb	4
Euthamia graminifolia	grass-leaved goldenrod	native	forb	3
Fallopia convolvulus	false buckwheat	non-native	vine	0
Fragaria virginiana	wild strawberry	native	forb	2
Fraxinus americana	white ash	native	tree	5
Hieracium piloselloides	king devil	non-native	forb	0
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0
Lotus corniculatus	birdfoot trefoil	non-native	forb	0
Malus sieboldii	siebold crab; toringo crab	non-native	tree	0
Medicago sativa	alfalfa	non-native	forb	0
Melilotus officinalis	yellow sweet-clover	non-native	forb	0
Oenothera biennis	common evening-primrose	native	forb	2
Phalaris arundinacea	reed canary grass	non-native	grass	0
Plantago lanceolata	english plantain	non-native	forb	0
Poa pratensis	kentucky bluegrass	non-native	grass	0
Populus balsamifera	balsam poplar	native	tree	2
Populus tremuloides	quaking aspen	native	tree	1
Potentilla recta	rough-fruited cinquefoil	non-native	forb	0
Prunella vulgaris	self-heal	native	forb	0
Rubus strigosus	wild red raspberry	native	shrub	2
Rumex acetosella	sheep sorrel	non-native	forb	0
Rumex crispus	curly dock	non-native	forb	0
Rumex obtusifolius	bitter dock	non-native	forb	0
Salix bebbiana	bebbs willow	native	shrub	1

White Pine Copper
Ontonagon County, MI

2025/2026 Meander Survey Species List - Upland Meadow

Scientific Name	Common Name	Native	Physiognomy	C Value
Salix discolor	pussy willow	native	shrub	1
Salix eriocephala	willow	native	shrub	2
Salix petiolaris	slender willow	native	shrub	1
Sambucus racemosa	red-berried elder	native	shrub	3
Schedonorus arundinaceus	tall fescue	non-native	grass	0
Schedonorus pratensis	meadow fescue	non-native	grass	0
Silene vulgaris	bladder campion	non-native	forb	0
Sisyrinchium montanum	mountain blue-eyed-grass	native	forb	4
Solidago altissima	tall goldenrod	native	forb	1
Sonchus arvensis	perennial sow-thistle	non-native	forb	0
Stellaria graminea	starwort	non-native	forb	0
Symphyotrichum ciliolatum	northern heart-leaved aster	native	forb	4
Thuja occidentalis	arbor vitae	native	tree	4
Trifolium pratense	red clover	non-native	forb	0
Tsuga canadensis	hemlock	native	tree	5
Ulmus americana	american elm	native	tree	1
Verbascum thapsus	common mullein	non-native	forb	0
Vicia villosa	hairy vetch	non-native	vine	0

FQA Metrics	Species Richness	Mean C Value	FQI
Native	34	2.6	15.2
All Species	66	1.3	10.6

White Pine Copper
Ontonagon County, MI

2025/2026 Meander Survey Species List - Wetlands

Scientific Name	Common Name	Native	Physiognomy	C Value
Acer negundo	box-elder	native	tree	0
Alisma triviale	northern water-plantain	native	forb	1
Alopecurus pratensis	meadow foxtail	non-native	grass	0
Carex aurea	sedge	native	sedge	3
Carex gynandra	sedge	native	sedge	3
Carex projecta	sedge	native	sedge	3
Carex scoparia	sedge	native	sedge	4
Carex stipata	sedge	native	sedge	1
Eleocharis palustris	spike-rush	native	sedge	5
Equisetum arvense	common horsetail	native	fern	0
Eupatorium perfoliatum	boneset	native	forb	4
Impatiens capensis	spotted touch-me-not	native	forb	2
Juncus articulatus	jointed rush	native	rush	3
Juncus tenuis	path rush	native	rush	1
Liparis loeselii	loesels twayblade	native	forb	5
Lycopus americanus	common water horehound	native	forb	2
Mentha canadensis	wild mint	native	forb	3
Pinus strobus	white pine	native	tree	3
Populus balsamifera	balsam poplar	native	tree	2
Populus tremuloides	quaking aspen	native	tree	1
Prunella vulgaris	self-heal	native	forb	0
Rumex crispus	curly dock	non-native	forb	0
Salix amygdaloides	peach-leaved willow	native	tree	3
Salix bebbiana	bebbs willow	native	shrub	1
Salix eriocephala	willow	native	shrub	2
Salix exigua	sandbar willow	native	shrub	1
Salix lucida	shining willow	native	shrub	3
Schedonorus arundinaceus	tall fescue	non-native	grass	0
Schoenoplectus acutus	hardstem bulrush	native	sedge	5
Schoenoplectus tabernaemontani	softstem bulrush	native	sedge	4
Scirpus atrovirens	bulrush	native	sedge	3
Scutellaria lateriflora	mad-dog skullcap	native	forb	5
Solidago gigantea	late goldenrod	native	forb	3
Symphyotrichum lateriflorum	calico aster	native	forb	2
Typha angustifolia	narrow-leaved cat-tail	non-native	forb	0
Utricularia vulgaris	common bladderwort	native	forb	6

FQA Metrics	Species Richness	Mean C Value	FQI
Native	32	2.6	14.7
All Species	36	2.3	13.8

White Pine Copper
Ontonagon County, MI

2025/2026 Meander Survey Species List - Northern Mesic Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value
Abies balsamea	balsam fir	native	tree	3
Acer rubrum	red maple	native	tree	1
Acer saccharum	sugar maple	native	tree	5
Achillea millefolium	yarrow	native	forb	1
Agrostis gigantea	redtop	non-native	grass	0
Amelanchier laevis	smooth shadbush	native	tree	4
Anaphalis margaritacea	pearly everlasting	native	forb	3
Apocynum androsaemifolium	spreading dogbane	native	forb	3
Aralia nudicaulis	wild sarsaparilla	native	forb	5
Asclepias syriaca	common milkweed	native	forb	1
Athyrium filix-femina	lady fern	native	fern	4
Betula alleghaniensis	yellow birch	native	tree	7
Botrypus virginianus	rattlesnake fern	native	fern	5
Bromus inermis	smooth brome	non-native	grass	0
Carpinus caroliniana	blue-beech	native	tree	6
Centaurea stoebe	spotted knapweed	non-native	forb	0
Chimaphila umbellata	pipsissewa	native	shrub	8
Cirsium arvense	canada thistle	non-native	forb	0
Corylus cornuta	beaked hazelnut	native	shrub	5
Daucus carota	queen-annes-lace	non-native	forb	0
Diervilla lonicera	bush-honeysuckle	native	shrub	4
Dryopteris carthusiana	spinulose woodfern	native	fern	5
Epilobium coloratum	cinnamon willow-herb	native	forb	3
Epipactis helleborine	helleborine	non-native	forb	0
Equisetum arvense	common horsetail	native	fern	0
Equisetum fluviatile	water horsetail	native	fern	7
Equisetum hyemale	scouring rush	native	fern	2
Eurybia macrophylla	big-leaved aster	native	forb	4
Euthamia graminifolia	grass-leaved goldenrod	native	forb	3
Fallopia cilinodis	fringed false buckwheat	native	vine	3
Fragaria virginiana	wild strawberry	native	forb	2
Fraxinus americana	white ash	native	tree	5
Galium triflorum	fragrant bedstraw	native	forb	4
Gymnocarpium robertianum	limestone oak fern	native	fern	10
Hieracium piloselloides	king devil	non-native	forb	0
Leucanthemum vulgare	ox-eye daisy	non-native	forb	0
Lonicera canadensis	canadian fly honeysuckle	native	shrub	5
Lonicera tatarica	tartarian honeysuckle	non-native	shrub	0
Lotus corniculatus	birdfoot trefoil	non-native	forb	0
Maianthemum canadense	canada mayflower	native	forb	4
Matteuccia struthiopteris	ostrich fern	native	fern	3
Medicago lupulina	black medick	non-native	forb	0
Melilotus officinalis	yellow sweet-clover	non-native	forb	0
Osmorhiza berteroi	sweet-cicely	native	forb	5
Ostrya virginiana	ironwood; hop-hornbeam	native	tree	5
Picea glauca	white spruce	native	tree	3
Poa compressa	canada bluegrass	non-native	grass	0
Polygonatum pubescens	downy solomon seal	native	forb	5
Populus balsamifera	balsam poplar	native	tree	2
Populus grandidentata	big-tooth aspen	native	tree	4
Populus tremuloides	quaking aspen	native	tree	1

White Pine Copper
Ontonagon County, MI

2025/2026 Meander Survey Species List - Northern Mesic Forest - Early Successional

Scientific Name	Common Name	Native	Physiognomy	C Value
Prunus pensylvanica	pin cherry	native	tree	3
Pteridium aquilinum	bracken fern	native	fern	0
Pyrola elliptica	large-leaved shinleaf	native	forb	6
Quercus rubra	red oak	native	tree	5
Rubus parviflorus	thimbleberry	native	shrub	6
Rubus pubescens	dwarf raspberry	native	shrub	4
Rubus strigosus	wild red raspberry	native	shrub	2
Rumex acetosella	sheep sorrel	non-native	forb	0
Salix bebbiana	bebbs willow	native	shrub	1
Salix discolor	pussy willow	native	shrub	1
Scirpus microcarpus	bulrush	native	sedge	5
Silene latifolia	white campion	non-native	forb	0
Solidago altissima	tall goldenrod	native	forb	1
Solidago canadensis	canada goldenrod	native	forb	1
Spinulum annotinum	stiff clubmoss	native	fern	5
Taraxacum officinale	common dandelion	non-native	forb	0
Thuja occidentalis	arbor vitae	native	tree	4
Tilia americana	basswood	native	tree	5
Trifolium pratense	red clover	non-native	forb	0
Trifolium repens	white clover	non-native	forb	0
Tsuga canadensis	hemlock	native	tree	5
Ulmus americana	american elm	native	tree	1
Vicia villosa	hairy vetch	non-native	vine	0
Viola labradorica	dog violet	native	forb	3

FQA Metrics	Species Richness	Mean C Value	FQI
Native	56	3.7	27.7
All Species	75	2.8	24.2

APPENDIX B

Table B-1. Rare Plant Species and Survey Periods

Species	Common Name	Taxon Group	MI State Status	US Status	Source	Habitat Description (MNFI)	Suitable Habitat in Survey Area?	Optimal Survey Period
								January / February / March / April / May / June / July / August / September / October / November / December
Adlumia fungosa	Climbing Fumitory	Plant	Threatened	--	MNFI	Gravelly or rocky Great Lakes shores, woods, thickets, glades, mesic southern forests and in dune complexes. Last observed in Ontonagon County in 1939.	potential	June, July, August, September
Astragalus canadensis	Canadian Milk Vetch	Plant	Special Concern	--	MNFI	Occurs in a variety of habitats including oak barrens, open areas in rich, moist soil over limestone, moist openings, wet ground, and sandy lake shores. Natural communities include boreal forest, mesic northern forest, northern shrub thicket.	yes	July, August
Cardamine maxima	Large Toothwort	Plant	Special Concern	--	MNFI	Found in rich deciduous hardwoods and locally in floodplains. Natural community types include mesic northern forest, floodplain forest.	yes	May, June, July
Collinsia parviflora	Small Blue-eyed Mary	Plant	Special Concern	--	MNFI	Bedrock outcrops in western Upper Peninsula, where it occurs on open, rocky ridge tops and cliff summits on thin, bare soil formed by eroding bedrock, and sometimes around the edges of low shrubs.	potential - only if rock outcrops are present	May, June, July
Crataegus douglasii	Douglas's Hawthorn	Plant	Special Concern	--	MNFI	Found on rocky and bedrock outcrop shorelines in northern Michigan (conglomerate or basalt substrates). Also known from thin-soiled bedrock glades and balds in near-shore areas and hilltops, often in shrubby thickets. This species often persists in disturbed areas. Natural communities include boreal forest, mesic northern forest. Known from Bonanza Falls, approx. 1 mile NW of Study Area.	potential	June, July, August, September
Dryopteris filix-mas	Male Fern	Plant	Special Concern	--	MNFI	Rocky, sheltered sites (cliffs, sinkholes, ravines, crevices) in mixed northern hardwood forests in the northern Lower Peninsula and Upper Peninsula. It often occurs on limestone bedrock, but is not restricted to calcareous substrates. Natural communities include boreal forest, mesic northern forest, cliff, glade, and sinkholes.	potential	July, August
Galearis spectabilis	Showy Orchis	Plant	Threatened	--	MNFI	rich deciduous woods, often near temporary spring ponds in sandy clay or rich loam soils, or in shady, rich microhabitats alongside common spring ephemerals. Vigorous colonies can spread into more open habitat. Natural communities include mesic northern forest, floodplain forest.	yes	May, June
Mertensia paniculata	Northern Bluebell	Plant	Special Concern	--	MNFI	This species is limited to the northwestern Upper Peninsula, where it is primarily found in conifer and hardwood-conifer swamps and rich upland forests and occasionally occurs in hardwood stands. In swamps, it may often be found on drier, sphagnum hummocks, while in upland forests it is generally found in cool, moist microhabitats, including drainages, shaded moist depressions, wet seepage areas, near or along rivers, and areas of filtered light. Natural communities include Hardwood-conifer swamp, mesic northern forest, and rich conifer swamp.	yes	May, June, July
Mimulus guttatus	Western Monkeyflower	Plant	Special Concern	--	MNFI	In and along cold, calcium-rich springs, seeps, and streams.	potential - coordination with Aquatic Survey team is required	June, July, August
Potamogeton vaseyi	Vasey's Pondweed	Plant	Threatened	--	MNFI	Small lakes, recorded water depths of 6 and 12-15 feet, occurring in moderately alkaline or soft waters.	potential - if small lakes are present (coordination with Aquatic Survey team)	June, July, August
Ribes oxyacanthoides	Northern Gooseberry	Plant	Special Concern	--	MNFI	igneous bedrock outcrops in the western Upper Peninsula - natural communities include glade, bald, lakeshore, and cliff	unlikely - last recorded in Ontonagon Co. in 1950, in the Porcupine Mts.	June, July

Client: White Pine Copper LLC
Project: White Pine North Project

Project Number: 193710518
Location: Ontonagon County, Michigan



Photo 1: View NW - Upland Meadow



Photo 2: View S - Upland Meadow



Photo 3: View W - Upland Meadow



Photo 4: View S - Upland Meadow



Photo 5: View N - Mesic Northern Forest - Early Successional



Photo 6: View N - Northern Wet Meadow



Photo 7: View E - Mesic Northern Forest - Early Successional



Photo 8: View N - Northern Wet Meadow



Photo 9: View W - Emergent Marsh Open Water



Photo 10: View S - Emergent Marsh



Photo 11: View E - Emergent Marsh



Photo 12: View W - Emergent Marsh



Photo 13: View N - Emergent Marsh

F-14

Fish Tissue Metals Survey 2026

White Pine Copper Fish Tissue Metals Survey 2026

August 11, 2026

Prepared for:

White Pine Copper, LLC
White Pine, MI

Prepared by:

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List of Abbreviations, Acronyms, and Symbols

AEM	Advanced Ecological Management LLC
$\bar{x}$	Average
MDEQ	Michigan Department of Environmental Quality
mg/kg	Milligrams per kilogram
MDL	Adjusted method detection limit
n	Sample size

1.0 EXECUTIVE SUMMARY

A total of 45 creek chubs (*Semotilus atromaculatus*) were collected among nine sample stations for metals analysis on May 16, 2026 (Figure 1). Five creek chubs were collected from each of the nine sample stations. The sample stations included one location from Portal Creek (PTL55), two from the Mineral River (MIN1 and MIN2), one from Perch Creek (PERCH), one from Pine Creek (PINE), two from Argentine Creek (ARG1 and ARG2), and two from Duck Creek (DUCK1 and DUCK2).

Sample stations classified as downgradient from the proposed White Pine North Project site had higher concentrations of all metals excluding mercury and cadmium, which were higher in concentration in the upgradient streams (Table 4-11). The average copper concentration was 1.517 mg/kg higher in the sample stations located downgradient from the proposed Project site compared to upgradient sample stations. The average mercury concentration was 0.003 mg/kg higher in the sample stations located upgradient from the proposed Project site compared to the sample stations located downgradient. The average copper concentration among all sample stations was 4.044 mg/kg.

2.0 INTRODUCTION

In support of the White Pine North Project (Project) proposed by White Pine Copper LLC (WPC) Advanced Ecological Management, LLC (AEM) conducted a sampling event to determine metals content in creek chubs from nine sample stations among six streams within the vicinity of the proposed White Pine North Project site, located in White Pine, Michigan (Figure 1-1). The purpose of the 2026 fish metals survey was to identify baseline metal levels within representative fish found in the proposed mine vicinity.

Since fish species traditionally consumed are not present, and/or populations are limited in the streams near the project site, creek chubs were selected as the representative sample species to detect background concentrations of metals, due to their abundance throughout each of the six sample streams. Selection of this species was discussed during a virtual meeting held with Michigan Department of Environment, Great lakes, and Energy personnel on July 10, 2025. Information from this survey is intended to provide baseline data regarding metals concentrations within creek chubs that were collected from the Project vicinity prior to commencement of mining operations by White Pine Copper.

3.0 METHODS

The 2026 creek chub metals survey was conducted in locations that were sampled in the summer of 2024 as part of the White Pine Copper baseline aquatic survey (Figure 1) using a backpack electroshocker to collect fish. The survey was completed on May 16, 2026.

3.1 Fish Collection

A backpack electroshocker was used to collect five creek chubs from each of the nine sampling stations. Electroshocking was initiated at the downstream extent of each established transect and was conducted in an upstream direction until five creek chubs were captured. If an insufficient number of creek chubs were collected from the sample station extent, AEM would extend the survey area beyond the sample station boundaries (usually approximately 100 feet or less) until a sufficient number of creek chubs were collected.

3.3.1 Sample Processing/Metals Analysis

All collected creek chubs were placed immediately in water-filled tubs to keep the fish alive until the target number of fish was achieved from each sample station. Upon capturing the required number of five fish from each sample station, the creek chubs were removed from the water-filled tubs and placed in a sample bag for storage. The samples were labeled with the sample station identification, the collection date and time, and the personnel who collected the sample. In addition to writing the sample information directly onto the sample bag, an identification sticker provided by Pace Analytical Services, Inc (Pace) was also filled out and placed onto the bag. All bags were placed on ice, and samples were subsequently frozen prior to shipping samples to the laboratory the next day. Chain of Custody forms provided by the laboratory were completed where processing was conducted. All samples were placed in a cooler provided by the laboratory, along with completed Chain of Custody forms and ice, and sent to Pace located in Green Bay, Wisconsin, via next-day courier service following the completion of fish collection from all six streams.

Fish were processed by Pace using the Inductively Coupled Plasma-Mass-Spectrometry EPA Method 6020B and EPA Method 245.6. All five fish from each sample station were ground into one composite sample for the metals analysis. Fish were processed for the following metals: arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, and zinc. Analytical reporting limits for each parameter are summarized in Table 4-10.

The metals content reported for each individual sample station are presented in Tables 4-1 through 4-9. Average metals concentrations among all sample stations are presented in Table 4-11, and Table 4-12 presents metals concentrations for sample stations grouped by their gradient in relation to the site (i.e. upgradient and downgradient). The adjusted method detection limit (MDL) values were used in the calculation of average statistics for samples that were recorded as non-detect in Tables 4-11 and 4-12.

4.0 RESULTS

All creek chubs that were analyzed for metals content were collected from nine sampling stations located within the six streams in proximity to the White Pine North Project Area. Sampling was conducted on May 16, 2026, using a backpack electroshocker. Creek chubs ranged in length from 1.3 to 6.3 inches, with an average length of 2.6 inches. A summary of the results follows in the sections below.

4.1 Metals Concentration in Tissues

The report discussion focuses on copper and mercury concentrations since mercury is a common contaminant found in all fish species and Michigan and the White Pine North Project is a proposed copper mine. All other metals data, including arsenic, barium, cadmium, chromium, lead, selenium, and zinc, are summarized within Tables 4-1 through 4-09. Chain of Custody forms are presented in Exhibit C.

4.1.1 Portal Creek

PTL55

PTL55 is located near the southwest corner of the legacy tailings facility and is classified as downgradient for the purposes of this report. The copper content of the composite sample was 8.4 mg/kg and the mercury content of the composite sample was non-detect (<0.013 mg/kg; Table 4-1).

4.1.2 Mineral River

MIN1

MIN1 is located on the northwest corner of the legacy tailings facility and is downgradient of the Project site. The copper content of the composite sample was 6.0 mg/kg and the mercury content of the composite sample was 0.14 mg/kg (Table 4-2).

MIN2

MIN2 is located upgradient of the Project Site. The copper content of the composite sample was 3.4 mg/kg and the mercury content of the composite sample was 0.020 mg/kg (Table 4-3).

4.1.3 Perch Creek

PERCH

PERCH is located downgradient of the Project site near the location of the permitted discharge outfall. The copper content of the composite sample was 2.9 mg/kg and the mercury content of the composite sample was non-detect (<0.012 mg/kg; Table 4-4).

4.1.4 Pine Creek

PINE

PINE is located on the northeast corner of the tailings facility and is considered downgradient. The copper content of the composite sample was 1.9 mg/kg and the mercury content of the composite sample was non-detect (<0.012 mg/kg; Table 4-5).

4.1.5 Argentine Creek

ARG1

ARG1 is located approximately three miles northeast of the Project site and is considered downgradient for this report. The copper content of the composite sample was 6.2 mg/kg and the mercury content of the composite sample was 0.035 mg/kg (Table 4-6).

ARG2

ARG2 is located upgradient of the Project site. The copper content of the composite sample was 3.2 mg/kg and the mercury content of the composite sample was 0.019 mg/kg (Table 4-7).

4.1.6 Duck Creek

DUCK1

DUCK1 is located upgradient of the Project site. The copper content of the composite sample was 2.5 mg/kg and the mercury content of the composite sample was 0.015 mg/kg (Table 4-8).

DUCK2

DUCK2 is located about 1.5 miles northeast of the Project sites and is considered downgradient. The copper content of the composite sample was 1.9 mg/kg and the mercury content of the composite sample was 0.016 mg/kg (Table 4-9).

4.1.7 Summary and Sample Site Comparison

Downgradient location, Portal Creek (PTL55), had the highest concentration of copper and lead among all sample sites (8.4 mg/kg; Table 4-1). Argentine Creek sample station 1 (ARG1), located approximately three miles northeast of the site, had the highest concentration of mercury among all sample stations (0.035 mg/kg; Table 4-6). Upgradient location Mineral River Sample Station 2 (MIN2) had the second highest concentration of copper among all sample stations (6.0 mg/kg; Table 4-2).

The average copper concentration among all sample stations was 4.044 mg/kg and ranged from a minimum concentration of 1.900 mg/kg to a maximum concentration of 8.400 mg/kg, with a standard deviation of 2.277 mg/kg (Table 4-11). The average mercury concentration among all sample stations was 0.018 mg/kg and ranged from a minimum concentration of 0.012 mg/kg to a maximum concentration of 0.035 mg/kg, with a standard deviation of 0.008 mg/kg (Table 4-11).

Among all sample stations, the average copper concentrations were higher in the sample stations classified as downgradient of the proposed Project site (Sample Stations PTL55, MIN1, PERCH, PINE, DUCK 2 and ARG1) in comparison to sample stations located upgradient (Sample Stations MIN2, DUCK 1, and ARG2; Table 4-12). Mercury was slightly lower (0.003 mg/kg lower) in the sample stations located downgradient from the proposed Project site in comparison to sample stations located upgradient (Table 4-12). The average arsenic, barium, chromium, lead, selenium, and zinc concentrations were higher in the sample stations that were downgradient from the proposed Project site in comparison to the concentrations within the sample stations that were located upgradient (Table 4-12). The average cadmium concentration was higher in sample stations located upgradient from the proposed Project site in comparison to sites located downgradient (Table 4-12).

EXHIBIT A

REPORT FIGURES



Figure 1. Sample Station Locations
White Pine Copper, LLC

EXHIBIT B

REPORT TABLES

Table 4-1. Portal Creek (PTL55) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.18	0.10	0.030	1
Barium	mg/kg	4.4	0.10	0.031	1
Cadmium	mg/kg	0.13	0.10	0.011	1
Chromium	mg/kg	0.18J	0.29	0.088	1
Copper	mg/kg	8.4	0.88	0.26	1
Lead	mg/kg	0.052J	0.10	0.030	1
Mercury	mg/kg	<0.013	0.042	0.013	1
Selenium	mg/kg	0.48	0.17	0.051	1
Zinc	mg/kg	23.0	4.7	1.4	1

mg/kg - milligram per kilogram
mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-2. Mineral River site 1 (MIN1) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.072J	0.10	0.030	1
Barium	mg/kg	1.8	0.10	0.031	1
Cadmium	mg/kg	0.20	0.10	0.011	1
Chromium	mg/kg	0.10J	0.29	0.088	1
Copper	mg/kg	6.0	0.88	0.26	1
Lead	mg/kg	0.031J	0.10	0.030	1
Mercury	mg/kg	0.014J	0.042	0.013	1
Selenium	mg/kg	0.48	0.17	0.051	1
Zinc	mg/kg	23.0	4.7	1.4	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-3. Mineral River site 2 (MIN2) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.080J	0.094	0.028	1
Barium	mg/kg	2.9	0.095	0.029	1
Cadmium	mg/kg	0.47	0.093	0.010	1
Chromium	mg/kg	<0.082	0.27	0.082	1
Copper	mg/kg	3.4	0.93	0.28	1
Lead	mg/kg	<0.028	0.093	0.028	1
Mercury	mg/kg	0.020J	0.040	0.012	1
Selenium	mg/kg	0.43	0.16	0.047	1
Zinc	mg/kg	28.1	4.3	1.3	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-4. Perch Creek (PERCH) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.11	0.091	0.027	1
Barium	mg/kg	7.7	0.092	0.028	1
Cadmium	mg/kg	0.12	0.090	0.0099	1
Chromium	mg/kg	0.26J	0.27	0.080	1
Copper	mg/kg	2.9	0.91	0.27	1
Lead	mg/kg	0.030J	0.090	0.027	1
Mercury	mg/kg	<0.012	0.042	0.012	1
Selenium	mg/kg	0.29	0.15	0.046	1
Zinc	mg/kg	53.6	4.2	1.3	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-5. Pine Creek (PINE) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.064J	0.096	0.029	1
Barium	mg/kg	2.5	0.097	0.029	1
Cadmium	mg/kg	0.15	0.095	0.010	1
Chromium	mg/kg	<0.084	0.28	0.084	1
Copper	mg/kg	1.9	0.94	0.28	1
Lead	mg/kg	<0.028	0.095	0.028	1
Mercury	mg/kg	<0.012	0.040	0.012	1
Selenium	mg/kg	0.28	0.16	0.048	1
Zinc	mg/kg	36.6	4.4	1.3	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-6. Argentine Creek site 1 (ARG1) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.097	0.096	0.029	1
Barium	mg/kg	5.9	0.097	0.029	1
Cadmium	mg/kg	0.24	0.095	0.010	1
Chromium	mg/kg	0.10J	0.28	0.085	1
Copper	mg/kg	6.2	0.84	0.25	1
Lead	mg/kg	0.033J	0.095	0.029	1
Mercury	mg/kg	0.035J	0.041	0.012	1
Selenium	mg/kg	0.66	0.16	0.048	1
Zinc	mg/kg	28.4	4.4	1.3	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-7. Argentine Creek site 2 (ARG2) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	<0.030	0.099	0.030	1
Barium	mg/kg	2.0	0.010	0.030	1
Cadmium	mg/kg	0.061J	0.098	0.011	1
Chromium	mg/kg	0.14J	0.29	0.087	1
Copper	mg/kg	3.2	0.93	0.28	1
Lead	mg/kg	<0.029	0.098	0.029	1
Mercury	mg/kg	0.019J	0.041	0.013	1
Selenium	mg/kg	0.44	0.17	0.050	1
Zinc	mg/kg	44.7	4.6	1.4	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-8. Duck Creek site 1 (DUCK1) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	0.079J	0.093	0.028	1
Barium	mg/kg	2.7	0.093	0.028	1
Cadmium	mg/kg	0.13	0.092	0.010	1
Chromium	mg/kg	0.29	0.27	0.081	1
Copper	mg/kg	2.5	0.93	0.28	1
Lead	mg/kg	<0.027	0.092	0.027	1
Mercury	mg/kg	0.015J	0.042	0.013	1
Selenium	mg/kg	0.37	0.15	0.046	1
Zinc	mg/kg	35.6	4.3	1.3	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-9. Duck Creek (DUCK2) metals concentrations.

Parameter	Units	Results	PQL	MDL	DF
Arsenic	mg/kg	<0.032	0.11	0.032	1
Barium	mg/kg	4.8	0.11	0.032	1
Cadmium	mg/kg	0.068J	0.11	0.012	1
Chromium	mg/kg	0.41	0.31	0.094	1
Copper	mg/kg	1.9	1.0	0.30	1
Lead	mg/kg	<0.032	0.11	0.032	1
Mercury	mg/kg	0.016J	0.026	0.0079	1
Selenium	mg/kg	0.32	0.18	0.054	1
Zinc	mg/kg	62.5	4.9	1.5	1

mg/kg - milligram per kilogram
PQL – Practical Quantitation Limit
MDL – Adjusted Method Detection Limit
DF – Dilution Factor
J – Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit (PQL)

Table 4-10. Reporting limits for metal analyses.

Parameter	Units	Reporting Limit
Arsenic	mg/kg	0.101
Barium	mg/kg	0.102
Cadmium	mg/kg	0.1
Chromium	mg/kg	0.295
Copper	mg/kg	0.948
Lead	mg/kg	0.1
Mercury	mg/kg	0.043
Selenium	mg/kg	0.169
Zinc	mg/kg	4.66

mg/kg – milligram per kilogram

Table 4-11. Average metals concentration among all nine sample stations.

Parameter	Units	Minimum	Maximum	Mean Value	Standard Deviation
Arsenic	mg/kg	0.030	0.180	0.083*	0.045
Barium	mg/kg	1.800	7.700	3.856	1.997
Cadmium	mg/kg	0.061	0.470	0.174	0.125
Chromium	mg/kg	0.082	0.410	0.183*	0.114
Copper	mg/kg	1.900	8.400	4.044	2.277
Lead	mg/kg	0.027	0.052	0.032*	0.008
Mercury	mg/kg	0.012	0.035	0.018*	0.008
Selenium	mg/kg	0.280	0.660	0.417	0.119
Zinc	mg/kg	23.000	62.500	37.278	13.840

mg/kg - milligram per kilogram
***At least one adjusted MDL value was used to calculate average concentration due to one or more sites having a measured value below the MDL value.**

Table 4-12. Average metal content for sites grouped by their gradient in relation to the project area. Upgradient averages included sites MIN2, DUCK1, ARG2 and downgradient averages included sites PTL55, MIN1, PERCH, PINE, DUCK2, and ARG1.

Location	Parameter	Units	Mean Value	Standard Deviation
Upgradient	Arsenic	mg/kg	0.063*	0.029
Downgradient	Arsenic	mg/kg	0.093*	0.051
Upgradient	Barium	mg/kg	2.533	0.473
Downgradient	Barium	mg/kg	4.517	2.172
Upgradient	Cadmium	mg/kg	0.220	0.219
Downgradient	Cadmium	mg/kg	0.151	0.061
Upgradient	Chromium	mg/kg	0.171*	0.107
Downgradient	Chromium	mg/kg	0.189*	0.127
Upgradient	Copper	mg/kg	3.033	0.473
Downgradient	Copper	mg/kg	4.550	2.699
Upgradient	Lead	mg/kg	0.028*	0.001
Downgradient	Lead	mg/kg	0.034*	0.009
Upgradient	Mercury	mg/kg	0.020	0.001
Downgradient	Mercury	mg/kg	0.017*	0.009
Upgradient	Selenium	mg/kg	0.413	0.038
Downgradient	Selenium	mg/kg	0.418	0.149
Upgradient	Zinc	mg/kg	36.133	8.313
Downgradient	Zinc	mg/kg	37.850	16.659

mg/kg - milligram per kilogram
***At least one adjusted MDL value was used to calculate average concentration due to one or more sites having a measured value below the MDL value.**

EXHIBIT C

CHAIN OF CUSTODY FORMS

Pace® Location Requested (City/State):
Pace Analytical Green Bay
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

40313110

Scan QR Code for instructions

Company Name:	ADVANCED ECOLOGICAL MANAGEMENT	Contact/Report To:	DOUG WORKMAN
Street Address:	22071 Seven Mile Road Reed City, MI 49677	Phone #:	231-912-0506
		E-Mail:	dworkman@advancedecological.com
		Cc E-Mail:	
Customer Project #:			
Project Name:	White Pine Mine	Invoice To:	DOUG WORKMAN
		Invoice E-Mail:	dworkman@advancedecological.com
Site Collection Info/Facility ID (as applicable):		Purchase Order # (if applicable):	
		Quote #:	

Time Zone Collected: [ ] AK [ ] PT [ ] MT [X] CT [ ] ET

County / State origin of sample(s): Michigan

Data Deliverables: [X] Level II [ ] Level III [ ] Level IV [ ] EQUIS [ ] Other

Regulatory Program (DW, RCRA, etc.) as applicable: Reportable [ ] Yes [ ] No

Rush (Pre-approval required): [ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day [ ] Other

DW PWSID # or WW Permit # as applicable:

Date Results Requested:

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk (CK), Leachate (LL), Biosolid (BS), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Composite Start Date	Composite Start Time	Collected or Composite End Date	Collected or Composite End Time	# Cont.	Res. Chlorine Results	Res. Chlorine Units	245.6 Mercury	6020 Metals (As,Ba,Cd, Cr,Cu, Pb,Se,Ag, Zn)	Sample Comment
PTL 55					5-14-26	8:40						001
MIN 1					5-14-26	9:04						002
PERCH					5-14-26	9:32						003
PINE					5-14-26	10:03						004
MIN 2					5-14-26	11:42						005
ARG 1					5-14-26	12:00						006
ARG 2					5-14-26	12:26						007
DVLK 1					5-14-26	11:10						008
DVLK 2					5-14-26	12:54						009

Specify Container Size **: 10 | 10

Identify Container Preservative Type***: 1 | 1

Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) 90mL, (10) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only

Proj. Mgr: Heather Greve

AcctNum / Client ID:

Table #:

Profile / Template: 1792

Prelog / Bottle Ord. ID: EZ 3405518

Preservation non-conformance identified for sample.

Additional Instructions from Pace®:

Collected By:
(Printed Name) Doug Workman
Signature:

Customer Remarks / Special Conditions / Possible Hazards:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)	On Ice:
1	145	-0.5	0.5	0.0	Y

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Tracking Number:
DDW	2:05pm 5/28/26			1Z6V18X01339090 14
VPS	05/29/2026 10:05	Matt Vanstemwell Pace	05/29/2026 10:05	Delivered by: [ ] In- Person [ ] Courier [ ] FedEx [✓] UPS [ ] Other
				Page: 1 of 1

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

Pace Container Order #3405518

heather.greve@pacelabs.com

40313110

Addresses

Order By :		Ship To :		Return To:	
Company	ADVANCED ECOLOGICAL	Company	ADVANCED ECOLOGICAL	Company	Green Bay, WI (Pace Analytical
Contact	DOUG WORKMAN	Contact	DOUG WORKMAN	Contact	Heather Greve
Email	dworkman@advancedecological.com	Email	dworkman@advancedecological.com	Email	heather.greve@pacelabs.com
Address	22071 Seven Mile Road	Address	22071 Seven Mile Road	Address	1241 Bellevue Street
Address 2		Address 2		Address 2	Suite 9
City	Reed City	City	Reed City	City	Green Bay
State	MI Zip 49677	State	MI Zip 49677	State	WI Zip 54302
Phone	231-912-0506	Phone	231-912-0506	Phone	

Info

Project Name	White Pine Mine	**Due Date**	05/13/2026	**Profile**	1792	**Quote**	
Project Manager	Greve, Heather	**Return Date**		**Carrier**	FedEx Ground	**Location**	MI

Return Shipping Labels

Return Label Type

- [ ] No Shipper
- [ ] With Shipper

Bottle Labels

- [ ] Blank
- [X] Pre-Printed No Sample IDs
- [ ] Pre-Printed With Sample IDs

Bottles

- [ ] Boxed Cases
- [ ] Individually Wrapped
- [ ] Grouped By Sample ID/Matrix

Trip Blanks

- [ ] Include Trip Blanks

COC Options

- [ ] Number of Blanks
- [X] Pre-Printed

Misc

- [ ] Sampling Instructions
- [X] Custody Seal
- [X] Temp. Blanks
- [X] Coolers 1 Large
- [ ] Syringes
- [ ] Extra Bubble Wrap
- [ ] Short Hold/Rush Stickers
- [ ] DI Water
- [ ] USDA Regulated Soils
- [ ] Dry Weight

# of Samp	Matrix	Analysis	Qty / Samp	Container	Total	# of QC	Lot #	Notes
9	TS	245.6 Mercury	1	Ziploc Bag	9		n/a	
9	TS	6020 Metals (As,Ba,Cd, Cr,Cu, Pb,Se,Ag, Zn)	1	Ziploc Bag	9		n/a	

Hazard Shipping Placard In Place : N/A

*Sample receiving hours are typically 8am-5pm, but may differ by location. Please check with your Pace Project Manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal.

*Payment term are net 30 days.

*Please include the proposal number on the chain of custody to ensure proper billing.

Sample Notes :

LAB USE:

Ship Date :	05/11/2026
Prepared By:	YH
Verified By:	

CLIENT USE (Optional):

Date Rec'd:	
Received By:	

DC#_Title: ENV-FRM-GBAY-0035 v03_Sample Preservation Receipt Form
Effective Date: 8/16/2022

Sample Preservation Receipt Form

Client Name: Advanced Ecological Management Project # V40313110

All containers needing preservation have been checked and noted below: ☐Yes ☐No ☑N/A Initial when completed: MK Date/Time:

Lab Lot# of pH paper: Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass							Plastic						Vials						Jars				General				VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2							
001																																	2.5 / 5
002																																	2.5 / 5
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020																																	2.5 / 5

05/24/2026

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☑N/A ***If yes look in headspace column***

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	
						GN 2	

Sample Condition Upon Receipt Form (SCUR)

Client Name: Advanced Ecological Management Project #: mrs 05/29/26

WO#: 40313110

40313110

Courier: ☐ CS Logistics ☐ Fed Ex ☐ Speedee ☑ UPS ☐ Purple Mountain ☐ Client ☐ Pace Other:

Tracking #: 1Z6V18X10133909014

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Thermometer Used SR - 145 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 0.5 /Corr: 0.0

Temp Blank Present: ☐ yes ☑ no **Biological Tissue is Frozen:** ☐ yes ☑ no

Person examining contents:
Date: 05/29/2026 Initials: MRS

Labeled By Initials: MRS

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- DI VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9.
Correct Type: Pace Green Bay Pace IR (Non-Pace) MRS 05/29/2026		
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: Biota	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☑N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution:

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

Appendix G

Phase I Archaeological Investigations for the White Pine Copper North Project, Ontonagon County, Michigan

GRAY & PAPE
HERITAGE MANAGEMENT



Phase I Archaeological Investigations for the White Pine Copper North Project, Ontonagon County, Michigan

Contract/PID #: 24-99301.001

Lead Agency:
Michigan Department of Environment, Great Lakes and Energy (EGLE)

PREPARED FOR:
White Pine Copper, LLC
310 U.S. Highway 2 East
Wakefield, Michigan 49968

PREPARED BY:
Gray & Pape, Inc.
950 S. Ausable Trail
Grayling, Michigan 49738

24-99301.001

GRAY & PAPE
HERITAGE MANAGEMENT

Project No. 24-99301.001

Phase I Archaeological Investigations for the White Pine Copper North Project, Ontonagon County, Michigan

Contract/PID #: 24-99301.001

Prepared for:
White Pine Copper, LLC
310 U.S. Highway 2 East
Wakefield, Michigan 49968

Prepared by:
James C. Renn, MA, RPA
Wes Cunningham, MA
Cooper Shields, MS

Gray & Pape, Inc.
950 S. Ausable Trail
Grayling, Michigan 49738

James C. Renn
Principal Investigator
December 9, 2024

ABSTRACT

White Pine Copper, LLC contracted Gray & Pape, Inc. to conduct a Phase I archaeological survey for the White Pine North Project, a proposed copper mine in Michigan's Upper Peninsula. The survey results will contribute to the baseline information in accordance with Part 632 of the Natural Resources and Environmental Protection Act. An application for a mining permit requires completion of an environmental impact assessment that includes identification and understanding of cultural and historical areas of significance within the Project Area. An archaeological survey was conducted to determine if the project has the potential to adversely affect significant archaeological resources within the Area of Potential Effects which is also the Project Area.

White Pine Copper, LLC is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine. The project is considering expanding the northern part of the existing tailings basin and will locate and develop a new mine portal and associated processing infrastructure. The project is in Township 50 North, Range 42 West, Section 4, Township 51 N, Range 42 West, Section 36, and Township 51 North, Range 41 West, Sections 19, 20, 21, 28, 29, 30, and 31 on the White Pine, Bergland, Green, and Matchwood NW 7.5-minute topographic quadrangle.

No archaeological surveys have been conducted in the Project Area. No National Historic Preservation Act-listed archaeological resources, archaeological sites, or cemeteries have been recorded within the Project Area, but three previously recorded historic archaeological mining sites have been documented nearby. Eleven tribal parties with known cultural patrimony of the area were engaged with a request for information deemed significant regarding known cultural resources or concerns within the Project Area. No known cultural resources were identified, or concerns raised. Additionally, an invitation was offered to the tribes to participate alongside Gray & Pape archaeologists during survey or to monitor fieldwork, of which two bands sent representatives.

The Project Area is located on poorly drained soils that are frequently inundated. Additionally, the area has been impacted by past mining and logging activities. During the week of June 10, 2024, Gray & Pape, Inc, along with tribal members from Keweenaw Bay Indian Community and Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan, conducted a Phase I survey, as well as excavating 103 shovel tests. No cultural resources were identified within the Project Area.

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1.0 INTRODUCTION

Under contract to White Pine Copper, LLC (WPC), Gray& Pape, Inc. (Gray & Pape) performed a Phase I Archaeological Survey for the White Pine North Project (Project) in Ontonagon County, Michigan (Figure 1-1). The Project is in the Western Upper Peninsula, near the village of White Pine, Michigan. The Project is a proposed copper mine, consisting of office buildings, industrial buildings related to copper processing, ponding areas, tailings ponds, parking areas, and related infrastructure, with some forested areas. The proposed elements of the Project include the footprint for new plant facilities, additional transmission lines, expansion of the tailings area, and a railroad corridor (Figure 1-2).

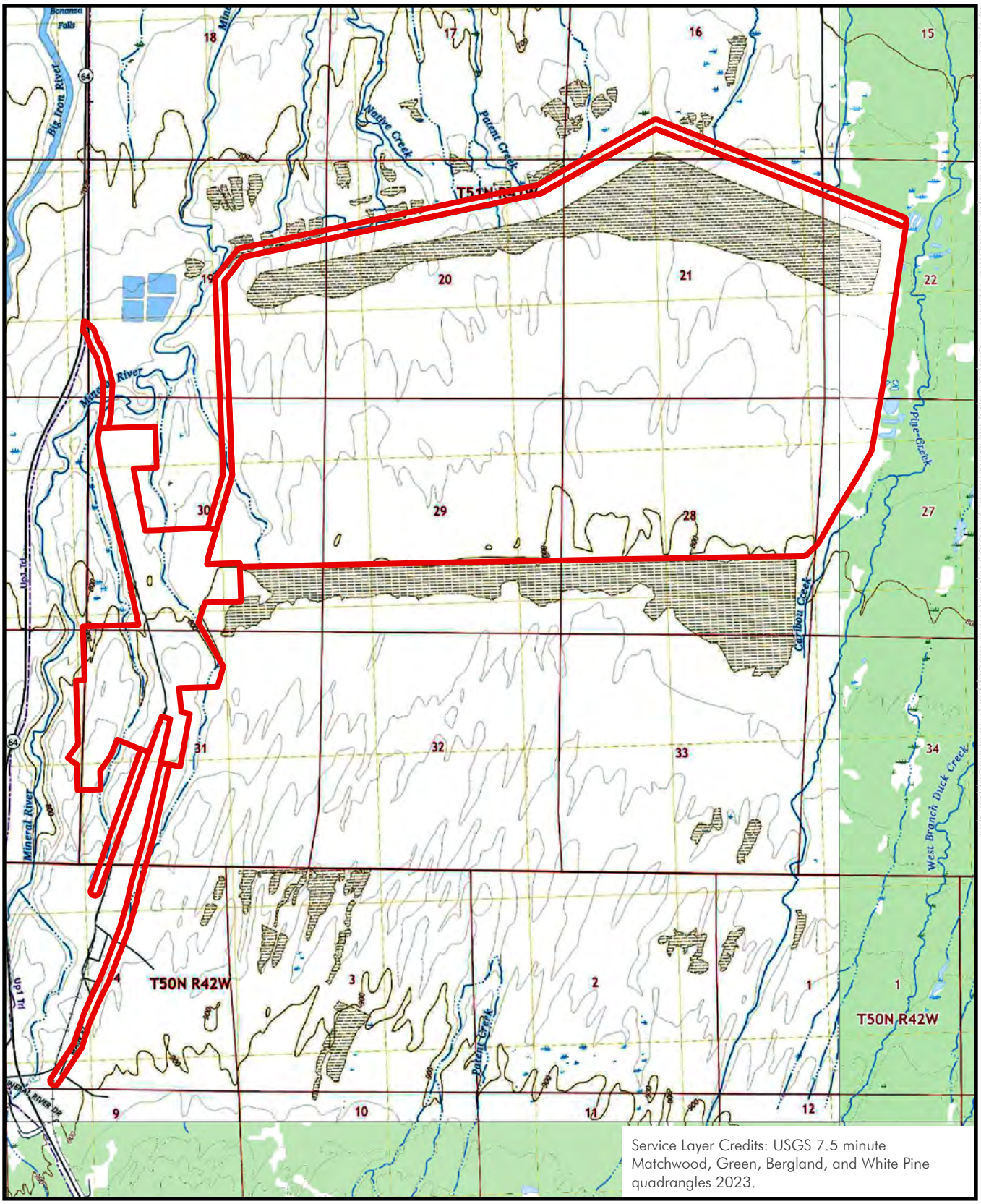
The Area of Potential Effects (APE) for the Project, also referred to as the Project Area, is comprised of approximately 3,155-acres encompassing the proposed development. Approximately 490 acres of the Project Area were the focus of the Phase I survey and shovel testing. The remaining acres, predominantly containing the tailings area, which have been completely disturbed by previous mining activity, were not included in the Phase I survey, but were included in the desktop review submitted by memo to White Pine Copper, LLC on May 10, 2024 (Appendix A). The goal of the Phase I survey was to identify archaeological sites and evaluate whether any identified sites are eligible for listing in the National Register of Historic Places (NRHP). This Phase I survey was conducted in accordance with the Michigan State Historic Preservation Office (MISHPO)'s Archaeological Standards, Technical Guides, and Forms (MISHPO 2023).

1.1 Project Overview

The White Pine North Project is a proposed underground mine, adjacent to the historic mine workings, that will be accessed through a portal located within the surface facility area. All facilities will be constructed on land currently owned by WPC, no state or federal land is located within the Project Area. A site plan has been developed (Figure 1-2). Specific locations of buildings may change but the overall footprint of the Project will remain the same.

Created in ArcGIS 10.8.1 for G&P Project 24-99301

8/1/2024 <LINK> C:\Users\kmayer\OneDrive - <LINK> Gray & Pape, Inc\Documents\ArcGIS\Projects\WhitePineCopper\WhitePineCopper.aprx



Service Layer Credits: USGS 7.5 minute Matchwood, Green, Bergland, and White Pine quadrangles 2023.

N

0 0.25 0.5 Miles

0 0.4 0.8 Kilometers

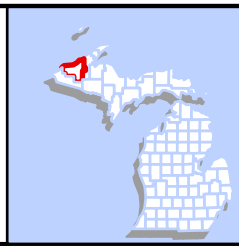
Project Area Location in Ontonagon county, Michigan.

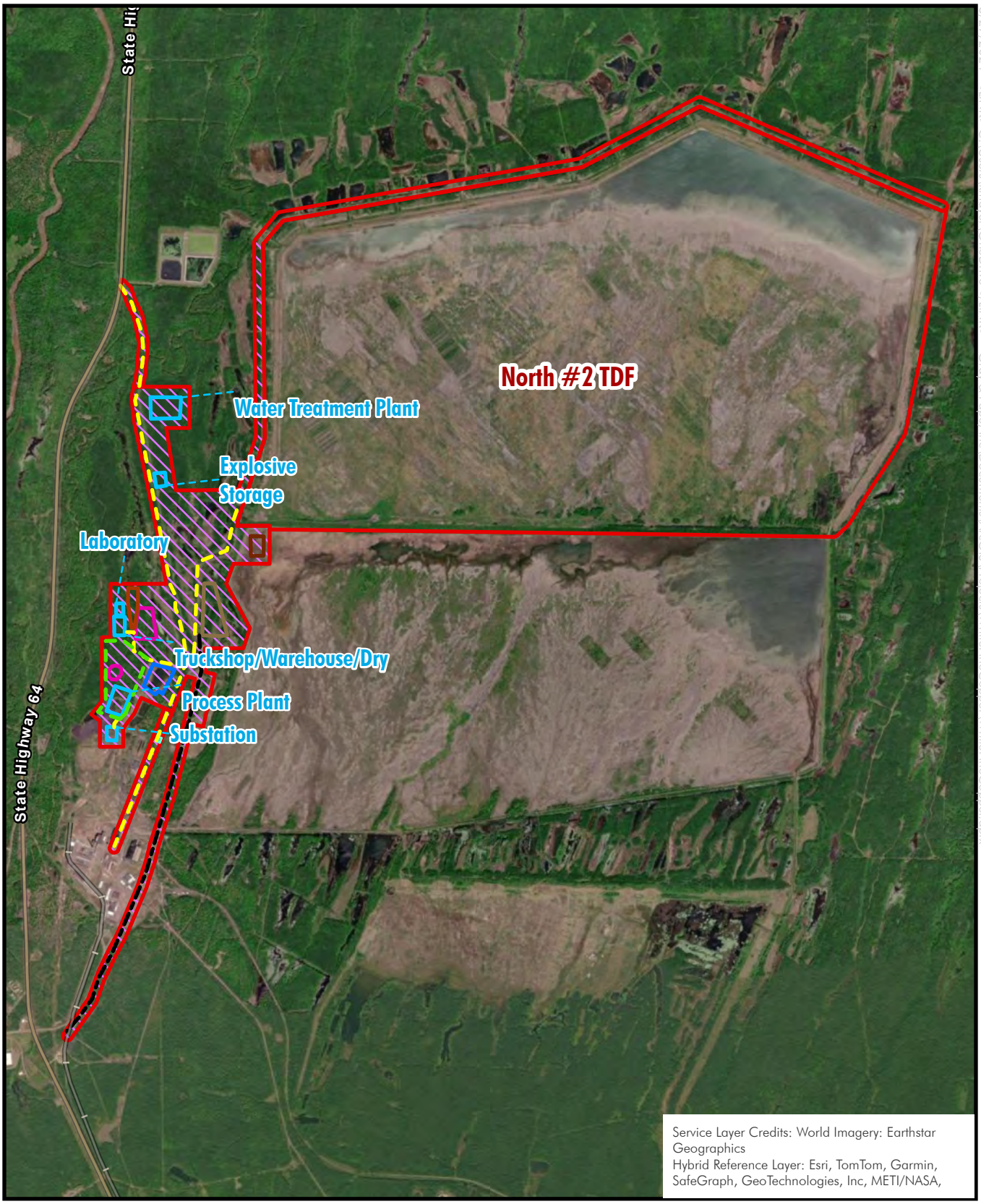
GRAY & PAPE HERITAGE MANAGEMENT

Figure 1-1

Legend

Area of Potential Effects





N

0 1,000 2,000 Feet

0 225 450 Meters

Proposed White Pine Copper Project layout.

GRAY & PAPE HERITAGE MANAGEMENT

Figure 1-2

Legend

- APE/Project Area
- Survey Area
- Proposed Building
- Proposed Ore Stockpile
- Stormwater Pond
- Waste Stockpile
- Topsoil Storage
- Portal
- Guard Shack
- Railroad to Build
- Proposed Fence
- Proposed Electrical Transmission Line

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8/27/2024 <LINK>C:\Users\kmayer\OneDrive - <LINK> Gray & Pape, Inc\Documents\ArcGIS\Projects\WhitePineCopper\WhitePineCopper.aprx

2.0 ENVIRONMENTAL CONTEXT

2.1 Physiography and Geomorphology

The United States Environmental Protection Agency (2021) has established ecoregions as a spatial framework for environmental research, assessment, monitoring, and management. Ecoregions are identified by analyzing the patterns and composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Omernik 1987, 1995). These phenomena include geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level.

The ecoregion approach is differentiated from more traditional approaches to environmental classification, such as physiographic analysis, ecological zones, etc., by the fact that it incorporates as many factors as possible within the combination. The ecoregion approach recognizes that these factors are interrelated and may combine in unexpected ways thus providing a strong tool for characterizing the environment. Ecoregions are defined in four levels, with Level IV being the most refined.

The Level I ecoregion for the APE is Northern Forests. This region has closed stands of conifers, white and black spruce, jack pine, balsam fir and tamarack. Further south, the region is more diverse with white birch, trembling aspen, balsam poplar, white pine, red pine, sugar maple, beech, red spruce, and various species of oak (Omernik 1995). The Northern Forests ecoregion extends from northern Saskatchewan east to Newfoundland. Much of this region remains a relative wilderness (Omernik 1995).

The APE is located on the Lake Superior Clay Plain Level III ecoregion, Northern Lakes and Forest. The Lake Superior Clay Plain is a flat, clayey, lake plain marking the extent of Glacial Lake Algonquin, Glacial Lake Ontonagon, Glacial Lake Agassiz. This region has dense hardwood-conifer forests, with hemlock, white pine, northern white-cedar, black ash, basswood, and sugar maple, as well as balsam fir, black and white spruce. Much of the second growth forest is aspen. The Northern Lakes and Forests are less well suited to agriculture due to shorter growing seasons, lower temperatures, and poor soil conditions.

Soils of this ecoregion are generally calcareous red clays which range from well to poorly drained. Soils within the APE consist of Pickford and Bergland silt clay loams that are deep, poorly drained to somewhat poorly drained with a seasonal high-water table. The bulk of soil types mapped in the APE are directly related to past mine activity consisting primarily of Slickens, Udorthents-Alfic, Udarents-Epiaquents complex, and Udorthents results from mine spoils and fill. Combined these make up 92.5 percent of the APE. Big Iron-Flintsteel-Gull Point, Flintsteel-Watton-Gull Point, and Rockland Moquah soils make up 6 percent of the APE, all are poorly drained and frequently inundated. Nonesuch loam comprises 0.1 percent of the APE and is a moderately well drained stoney, sandy loam. The remaining area is standing water/ponding areas (United States Department of Agriculture [USDA], Natural Resources Conservation Service [NRCS] Soil Survey Staff [SSS] 2024).

2.2 Natural Environment

2.2.1 Flora and Fauna

The soils support northern hardwoods in well-drained areas and balsam fir (*Abies balsamea*), spruce (*Picea* spp.), and white cedar (*Thuja occidentalis*) in poorly drained areas (Woods et al. 2007). Some common fauna in these ecoregions include a variety of fish such as northern brook lamprey (*Ichthyomyzon fossor*), lake sturgeon (*Acipenser fulvescens*), longnose gar (*Lepisosteus osseous*), bowfin (*Amia calva*), lake whitefish (*Coregonus clupeaformis*), round whitefish or menominee (*Prosopium cylindraceum*), cisco or lake herring (*Coregonus artedi*), arctic grayling (*Thymallus arcticus*), lake trout (*Salvelinus namaycush*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), northern pike (*Esox lucius*), muskellunge (*E. masquinongy*), a variety of minnows of the family Cyprinidae, redhorse and suckers (*Moxostoma* spp.), bullhead catfish (*Ictalarus* spp.), burbot or eelpout (*Lota lota*), sculpins (*Cottus* spp.) black crappie (*Pomoxis nigromacultaus*), rock bass (*Ambloplites cavifrons*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), sunfishes (*Lepomis* spp.), walleye (*Stizostedion vitreum*), sauger (*S. canadense*), yellow perch (*Perca flavascens*) and a variety of darters of the subfamily Etheostomatinae (Page and Burr 1991).

Common reptiles and amphibians include bullfrog (*Lithobates catesbeinanus*), leopard frog (*Rana pipiens*), snapping turtle (*Chelydra serpentina*), spiny soft-shell turtle (*Apalone spinifera*), eastern box turtle (*Terrapene carolina*), painted turtle (*Chrrysemys picta*), and wood turtle (*Glyptemus insculpta*) (Collins et al. 1998).

Birds inhabiting these ecoregions include the common loon (*Gavia immer*), pied-billed grebe (*Podilymbus podiceps*), Canada goose (*Branta canadensis*), snow goose (*Chen caerulescens*), a variety of marsh ducks (*Anas* spp.), diving ducks (*Melanitta* spp. and *Aythya* spp.), mergansers (*Mergus* spp. and *Lophodytes cucullatus*), American coot (*Fulica americana*), common gallinule (*Gallinula chloropus*), a variety of gulls (*Larus* spp.), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), least bittern (*Ixobrychus exilis*), American bittern (*Botaurus lentiginosus*), sandhill crane (*Antigone canadensis*), Virginia rail (*Rallus limicola*), American woodcock (*Scolopax minor*), common snipe (*Gallinago gallinago*), wild turkey (*Meleagris gallopavo*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Canachites canadensis*), sharp-tailed grouse (*Pedioecetes phasianellus*), a variety of hawks (*Accipiter* spp. and *Buteo* spp.), bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), turkey vulture (*Cathartes aura*), great horned owl (*Bubo virginianus*), barred owl (*Strix varia*), mourning dove (*Zenaida macroura*), (formerly) passenger pigeon (*Ectopictes migratorius*), ruby-throated hummingbird (*Archilochus colubris*), belted kingfisher (*Megaceryle alcyon*), woodpeckers (including *Melanerpes erythrocepahalus, Dryocarpus pileatus,* and *Picoides* spp.), American crow (*Corvus brachyrhynchos*), common raven (*C. corax*), blue jay (*Cyanocitta cristata*), and a wide variety of songbirds of many families and genera (Peterson 1998).

Common mammals include shrews (*Sorex* spp.), starnose mole (*Condylura cristara*), a variety of bats of various families and genera, bobcat (*Lynx rufus*), black bear (*Ursus americanus*), raccoon (*Procyon lotor*), marten (*Martes americana*), fisher (*M. pennanti*), weasels (*Mustela* spp.), mink (*Neovison vison*), river otter (*Lontra canadensis)*, American badger (*Taxidea taxes*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), wolf (*Canis lupus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargentus*), cougar (*Puma concolor*), bobcat (*Lynx rufus*), ground hog (*Marmota monax*), chipmunk (*Tamias striatus*), gray squirrel (*Sciurus carolinensys*) fox squirrel (*S. niger*), red squirrel (*Tamiasciurus hudsonicus*), flying squirrels (*Glaucomys* spp.), beaver (*Castor canadensis*), meadow vole (*Microtus montanus*), muskrat (*Ondatra zibethicus*), porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*), eastern

cottontail (*Sylvilagus floridanus*), elk (*Cervus canadensis*), and white-tail deer (*Odocoileus virginianus*) (Burt and Grossenheider 1980).

2.2.2 Climate

The climate is lake moderated. Areas closer to the lake shore have a longer growing season (105–125 days). Lake effect snow is heavy, upwards of 508 centimeters (cm) (200 inches [in]) annually near the Lake Superior Shore.

2.3 Land Use

Due to soil conditions, the Lake Superior Clay Plains are not suited to agriculture and are mostly forested. Land use today in this ecoregion is primarily in timber production and recreation.

3.0 CULTURAL CONTEXT

3.1 Prehistoric Context

Humans have occupied the area that now comprises Michigan and the Upper Great Lakes for at least the last 1,000 years (Fitting 1970; Ricky 1998; Shott and Wright 1999), but research is continually pushing the dates for the occupation of northeastern North America, and indeed across the continent, further back in time (Lothrop et al. 2016). During this time, climate and environmental changes caused people to adapt with new technologies, subsistence strategies, and lifeways. Numerous chronologies have been put forth by archaeologists to organize the approximately 12,000-year history of human settlement in Michigan. Fitting (1970) provides a functional chronology consisting of the following time periods: Early Paleoindian, Late Paleoindian, Early and Middle Archaic, Late Archaic, Early Woodland, Middle Woodland, and Late Woodland. The classification of these time periods is not based solely on age, but also on technology, subsistence strategies, and environmental changes that in turn lead to further changes in technology and subsistence strategies.

3.1.1 Paleoindian (11,000 BCE to 7000 BCE)

During the Paleoindian period, climate and environmental changes caused people to adapt with new technologies, subsistence strategies, and lifeways (Ricky 1998; Fitting 1970). Much of the region had been covered with, or was significantly affected by, glacial ice. Spruce-fir forests, muskeg, swamps, and barren glacial outwash plains occurred over most of the area, while tundra persisted along the fringes of the receding ice. The transition from a post-glacial environment to forest communities more similar to today may have been quite rapid, with modern floral communities becoming established by 8000 Before Common Era (BCE) in the upper Midwest (Davis 1983; Huber 1995; Kapp 1999).

Climate and water levels during the Paleoindian period in the Great Lakes region were in flux, resulting in a forested environment that was different from the present era. Following the retreat of the Two Rivers glacial advance, the region experienced isostatic rebound and downcutting of outlet channels to the east. Paleoindian sites have been identified on Lake Algonquin shorelines and other pro-glacial lake features, as well as in inland contexts, such as river terraces and glacial moraines (Buckmaster and Paquette 1996; Dudzik 1993; Mulholland et al. 1997).

3.1.1.1 Early Paleoindian (11,000 BCE to 9000 BCE)

The first of the periglacial hunters came to the Great Lakes region when the ice that had covered the land began retreating. This period is characterized by the post-glacial environmental variety in the region, which included boreal and deciduous forest, and spruce parkland or periglacial forest-tundra edge. The tundra-forest began to decrease in size and richness during this time, while the deciduous forest began to expand. In the northern region, the periglacial hunters either relocated farther north when the ice sheet retreated, or they stayed to develop what would become a Late Paleoindian cultural tradition in the boreal forest (Fitting 1970; Shott and Wright 1999).

People of the Early Paleoindian period were present in the area that now comprises Michigan in considerable numbers, as evidenced by several distribution studies that have examined the locations and aerial densities of fluted projectile points, the majority of which are lanceolate. These tools were likely used by periglacial hunters or by those who were in comparable environments. Many of the identified points were recovered from areas previously covered by late Cary glacial ice, and all were from elevations no less than 184 meters (m) (605 feet [ft]) above sea level. A variety of fluting techniques

and lithic tool styles have been identified within regional archaeological studies, which might indicate the presence of distinct cultural groups during this time (Fitting 1970).

Early Paleoindian sites are poorly represented in the upper Great Lakes, although several early Paleoindian sites have been identified in eastern Wisconsin (Mason 1966; Nero 1955; Palmer and Stoltman 1976; Ritzenthaler 1966). Evidence from Early Paleoindian sites suggests that the first occupants of the region entered from the south during late glacial times, around 9500 BCE. These populations were apparently well adapted to the forest-steppe environment and pursued big game hunting. Early Paleoindian sites are interpreted as short-term encampments with material culture characterized by large, lanceolate projectile points (Mason 1966:198).

3.1.1.2 Late Paleoindian (9000 BCE to 7000 BCE)

Late Paleoindian archaeological finds in the Upper Great Lakes of Michigan have largely been comprised of scattered surficial artifacts and sporadic sites in the northern forests. After the ice retreated from these areas, the land rose and rebounded. Hunting remained the key subsistence strategy during this time for these forest-oriented peoples, with the most distinctive artifacts being stemmed, lanceolate projectile points. Many of the most informative sites from this time period may now be located underwater. The most advantageous environment was the shoreline, but water levels in the Great Lakes during this time were as much as four hundred feet below current lake levels. Therefore, the areas that were once occupied along the shoreline of the past are now a great distance from the current shores and submerged under, in some cases, hundreds of feet of water (Fitting 1970).

The late Paleoindian stage is marked by changes in projectile point styles and an expansion of populations northward into recently deglaciated areas and the newly exposed shores of the downward-draining Great Lakes. These changes reflect the development of an adaptation to lake and forest environments as areas became deglaciated and the level of the Great Lakes dropped. During the Lake Chippewa low phase, between 8000 BCE and 5500 BCE, the water level of Lake Michigan dropped approximately 113 m (370 ft) from 183 m (600 ft) to 70 m (230 ft) above mean sea level (amsl) (Larsen 1987:14). The vast tracts of newly exposed lake plain were colonized by plants and animals. Late Paleoindian hunters and gatherers were probably attracted to the lake-plain forest and lake margin because of the ecological productivity and diversity of these areas. Unfortunately, many late Paleoindian sites are probably now inundated by up to 122 m (400 ft) of water (Mason 1966:192–193).

Paleoindians are traditionally viewed as big game hunters (such as caribou, bison, and mammoths). Late Paleoindian material culture is known from sites in the Lake Superior, Lake Huron, and Lake Michigan basins (Greenman and Stanley 1943; Julig 1984; Lee 1954, 1955; Mason 1966; Mason and Irwin 1960; Salzer 1974). Buckmaster and Paquette (1989, 1996) have identified a series of late Paleoindian or Plano sites in the Upper Peninsula in association with quartzite outcrops, inland lakes, and glacial outwash features of the Marquette glacial readvance. Scottsbluff, Eden, Agate Basin, and other collaterally flaked points have been found in concentrations that suggest cremations or other discrete activities. Several other late Paleoindian sites have been identified in the upper Great Lakes (Cleland and Ruggles 1996; Dudzik 1993; Mason 1981, 1986; Salzer 1974). Although poorly understood, late Paleoindian adaptations in the Upper Great Lakes are thought to have been nomadic, focusing primarily on the hunting of large game such as elk and caribou and opportunistically exploiting a variety of other resources (Cleland 1982; Kelly and Todd 1988; Mason 1981). Investigations in northern Wisconsin suggest that late Paleoindian hunters of the region were exploiting a wide variety of mid-sized and small game on a regular basis, perhaps relying on such game as the primary mode of subsistence (Kuehn 1998; Meinholz and Kuehn 1996).

3.1.2 Archaic (7500 BCE to 600 BCE)

There are three defining characteristics of the Archaic tradition; a subsistence economy based on exploitation of a wide variety of wild plant and animal resources; the absence of pottery; and burial of the dead in discrete areas or natural knolls. The Archaic cultural tradition evolved during a period of major environmental change. At this time, post-glacial lake levels fluctuated dramatically in the Huron and Michigan basins (e.g., Anderton 1993, Hough 1958, Larsen 1985a, b) and the phytogeography of the region changed (Davis 1983; Webb et al. 1983). The tundra and spruce landscape of the Paleoindian tradition began to be replaced by pine forests circa (ca.) 8000 BCE, and then changed to a mixed deciduous-coniferous forest ca. 6000 BCE. This gave way to the current Canadian-Carolinian biotic province by 5500 BCE. The large game that the Paleoindian hunters relied on began to disappear, and subsistence assemblages reflect an increasing use of small game, aquatic resources, and plants. The tool kit expanded to include tool forms for efficient exploitation of the new suite of resources (see Meinholz and Kuehn 1996).

3.1.2.1 Early and Middle Archaic

The Early and Middle Archaic period dates from ca. 8000 BCE to 3000 BCE (Fitting 1970; Shott 1999). In the northern portions of Michigan, the earliest part of this time period was characterized by the persistence of Paleoindian type assemblages, with very little influence of what came to be known as the Archaic. Archaic projectile points have been discovered within Paleoindian artifact assemblages, so these technologies could potentially have existed at the same time. According to Rolingson and Schwartz (1966), the term Paleoindian refers "to that cultural stage dependent of big game hunting adapted to late Pleistocene and early recent climatic and physiographic conditions" while the term Archaic refers "to a stage of cultural adaptation which utilized a wide variety of local fauna" (Fitting 1970:64). As the environment became more productive, periglacial hunters of the Paleoindian period permanently occupied the area and a hunting, fishing, and gathering culture developed.

While people during the Paleoindian period appear to have favored the boreal lakeshores, the people of the Archaic timeframe seem to have adapted to a deciduous forest-riverine environment. Populations during this period in Michigan appear to have been very low, possibly due to a lower frequency of plant and animal resources in the boreal environment of the time. Another potential explanation for the apparent poor representation of the Early and Middle Archaic in the Upper Great Lakes is that occupations almost certainly took place on the lakeshores and, similar to Paleoindian period sites, archaeological evidence of these people might now be inundated since the lake levels have risen substantially (Fitting 1970). Alternatively, Stoltman (1986:213) suggests that archaeologists "have not learned to discriminate the archaeological remains of these peoples from those of either earlier or later cultures." It is possible that lanceolate-shaped spear points characteristic of the Plano/Late Paleoindian stage were manufactured by Early Archaic populations. It is also possible that large, side-notched points currently ascribed to the Middle Archaic stage were manufactured earlier. A third possibility is that large points with diagonal or corner notches, expanding stems, or bifurcate base points—dated to the Early Archaic period in other states—may be of comparable age in northern Michigan (e.g., Mason 1981; Stoltman 1986).

The Middle Archaic stage is particularly noted for distinctive, large, side-notched projectile points, and/or chert knives (Lovis 1999). Copper tools and ornaments, as well as groundstone items, are also associated with this stage. The Old Copper culture, which is primarily identified as a mortuary complex, flourished during the Middle Archaic stage (Ritzenthaler 1957). Copper goods were manufactured from Lake Superior copper using a cold-hammer technique. Most Old Copper culture sites in the upper Great Lakes have been surface finds. A few Old Copper sites have been systematically excavated;

however, sites in Wisconsin (e.g., Oconto, Reigh, and Osceola) provide some insight into the varied mortuary practices of this cultural tradition. Burials were interred in what some interpret to be cemeteries. Burials occurred both singularly and in multiple interments; in both extended and flexed positions; as secondary bundle burials; and as cremations. Grave goods were often interred with burials. There has been considerable controversy over the Old Copper culture time frame because of inconsistencies in the radiocarbon dates from these sites. Current evidence suggests that the Old Copper culture postdates the Lake Nipissing maximum, with a span between 2300 BCE and 1200 BCE (Stoltman 1986); however, it should be noted that Salzer (1986) has suggested that many of the so-called Old Copper artifacts may actually have been produced by Initial Woodland peoples.

3.1.2.2 Late Archaic (3000 BCE to 1000 BCE)

During this time period, the climate began to resemble current conditions and the population greatly increased. Rising temperatures contributed to continued glacial melting, altering the landscape of Michigan, and increasing the distribution of the deciduous forests (Robertson et al. 1999). The Great Lakes rose to their current levels, submerging the formerly subaerial landscape and slowing the flow of rivers. The Late Archaic period in the region is distinguished by the use of copper, pointing to the development of trade networks. The increased variety of resources utilized by the people of the Late Archaic allowed for greater environmental resiliency (Fitting 1970).

In contrast to the preceding Early and Middle Archaic stages, the Terminal or Late Archaic stage is documented at a number of sites in the Upper Great Lakes region (Anderton 1993; Benchley et al. 1988; Conway 1980; Dunham and Anderton 1999; Fitting 1974; Franzen 1987; Wright 1972). Late Archaic populations were hunter-gatherers. While the availability and productivity of large terrestrial animals, nuts and the potential for agricultural production were limited in the Upper Great Lakes, fish were an abundant, highly productive, and reliable resource. The earliest evidence for fishing in the Upper Great Lakes is found in the context of the Old Copper culture, where fishing equipment is a common component of the artifact assemblages (Cleland 1982).

The evolution of Late Archaic settlement/subsistence strategies is a major research interest for archaeologists in the region. Based on archaeological data derived from several sites in the Great Lakes, Cleland (1982) posited a general settlement/subsistence model for the Late Archaic in which hunting was a year-round activity. During the spring and summer, populations moved to coastal locales where they subsisted by spearing shallow-water spawning fish, hunting waterfowl and mammals in adjacent wetlands, and collecting wild plant foods.

Research in the Upper Peninsula suggests that some of the aceramic sites associated with relict Nipissing and Algoma shoreline features may be Late Archaic in age (Anderton 1993; Conway 1980; Franzen 1987, 1998). Since the occupation of a shoreline cannot predate the creation of that landform, those sites below 193 m (633 ft) amsl could not have been occupied prior to ca. 2700 BCE, and those below 189 m (620 ft) amsl could not have been occupied before ca. 2000 BCE (Anderton 1993). Thus, the elevation of a paleoshoreline provides a potential horizon marker for dating these sites. Additionally, a recent study of the raw material composition of debitage has demonstrated a relationship between raw material type and the relative age of coastal archaeological sites in the Munising Bay area (Drake et al. 2009). Based on this study, Archaic sites typically include 70 percent or more quartzite in their lithic assemblage, whereas Woodland sites include less than 30 percent. The proportion of quartzite on multicomponent sites falls between 30 and 70 percent. In other words, the elevation of a site and its raw material composition of debitage can be used in tandem to date aceramic coastal archaeological sites in the Upper Peninsula.

3.1.3 Woodland Period (3000 BP to CE 1600)

The Woodland period is characterized by the introduction of ceramics, the construction of burial mounds, and the use of domesticated plants (Brashler et al. 2000). Throughout much of the Midwest the Woodland tradition is divided into three stages: Early Woodland (3000 Before Present [BP] to 2200 BP); Middle Woodland (2200 BP to CE 600); and Late Woodland (CE 600 to CE 1600).

3.1.3.1 Early Woodland (3000 BP to 2200 BP)

The introduction of ceramics in the south of Michigan designates the beginning of the Early Woodland period (Garland and Beld 1999). The ceramics of this time were thick and typically cord-marked on the interior and exterior surfaces. Cultigens such as sunflower, chenopodium, gourd, marsh elder, and squash have been identified at Early Woodland sites by researchers; however, seasonal subsistence patterns do not appear to have been largely affected by the use of these cultigens and remained similar to patterns of the Late Archaic (Fitting 1970).

In the upper Great Lakes, the Archaic tradition persists about 1,000 years longer than in more southerly parts of the Midwest, and the Woodland tradition does not begin until around CE 1 (see Brose and Hambacher 1999; Kingsley et al. 1999; Fitting 1975). Ceramics do not appear in the eastern Upper Peninsula until then, which corresponds to the Middle Woodland tradition in other parts of the upper Great Lakes. The first ceramics to appear in the eastern Upper Peninsula are Middle Woodland forms representing Laurel and North Bay expressions (Brose 1970; Brose and Hambacher 1999; Janzen 1968; Kingsley et al. 1999; Mason 1981). Thus, the terms Initial and Terminal Woodland are often substituted for Middle and Late Woodland in the Upper Peninsula.

3.1.3.2 Middle Woodland (2200 BP to CE 600)

There is a paucity of information regarding the transition from Early Woodland into Middle Woodland, and it is difficult to identify Middle Woodland sites in Michigan. According to Fitting (1970), "the term 'Middle Woodland' refers to the period when most of eastern North America was dominated by the Hopewellian culture, between 2200 BP and CE 400" (Fitting 1970:96; Kingsley et al. 1999). Mound burials, platform pipes, corner-notched projectile points, bear teeth, cut animal jaws, and dentate-stamped, rocker-stamped, and incised ceramics are all associated with the Hopewell culture. Hopewell-type ceramics from the Middle Woodland period have been recovered from the Holtz site in the Traverse Corridor, located between Traverse City and Mackinaw City. A mixed forest association, called the Lake Forest formation, subsumed the northern portion of Michigan during this time period. Fish and freshwater mussels appear to have been the main resources exploited during the Middle Woodland, based on the locations of archaeological sites, the large amount of fishing gear and aquatic animal remains recovered, and the contrastingly low number of projectile points and large game remains that have been found (Fitting 1970).

The Middle Woodland stage in the northern Great Lakes represents the first widespread introduction of ceramics in the region. In general, Middle Woodland sites in the Upper Peninsula may represent Lake Forest (Fitting 1975) or Northern Tier (Mason 1966) adaptations, sharing material culture affinities with Laurel sites to the south, north, and west (Janzen 1968). Settlement and subsistence patterns suggest seasonal fishing, collecting, and hunting, with an increasing emphasis on exploiting aquatic resources. Initial Woodland sites such as Summer Island (Brose 1970), Winter (Richner 1973), and Naomikong Point (Janzen 1968) are interpreted as warm season fishing villages. Martin (1989) argues that several coastal sites in this region attest to the use of fall-spawning fish and the possible early use of gill-net technology. In the St. Ignace area, a number of sites having Initial Woodland components are thought

to have been satellite summer or winter camps (Fitting and Clarke 1974; Fitting 1978). Spider Cave on the Garden Peninsula may have been a ritual locale (Cleland and Peske 1968).

3.1.3.3 Late Woodland (CE 600 to CE 1600)

The Late Woodland is marked by an increase in population density. The vast majority of pre-contact sites in Michigan date to this time period. Although there is evidence that cultigens were available in the region since approximately 600 BCE, they did not seem to be very important during the Early and Middle Woodland periods. By contrast, agriculture played a crucial role in the economies of the Late Woodland period, which allowed for a better use of available resources, which then influenced the social structures and settlement patterns of the day. The increase in agricultural practices may have been a result of the Neo-Atlantic climatic episode, which created more favorable environmental conditions. The ceramic technology associated with the Late Woodland culture was less varied than the Middle Woodland but was more abundant (Brashler et al. 1999; Fitting 1970).

The Late Woodland stage is perhaps the best-documented cultural period in the northern Great Lakes. Archaeological data suggests there were two separate populations within the Upper Peninsula. Cultural affiliations for the western Upper Peninsula are clearly associated with Oneota populations to the south and west in Wisconsin. The eastern Upper Peninsula, Straits, and northern Lower Peninsula reflect a shift from a more western Blackduck affiliation during the early Late Woodland to an eastern Iroquoian influence during the Late Woodland (McPherron 1967). A variety of new tools were developed in the latter part of the Woodland period including the bow and arrow, the birchbark canoe, and ceramic vessels (Taylor and Dunham 2002).

The Juntunen archaeological site, located on Bois Blanc Island, southeast of St. Ignace, and to the east of the survey areas, is one of the most extensively excavated sites in the vicinity and dates to the Late Woodland period. The site was seasonally occupied during the warmer months between approximately CE 800 and CE 1400. McPherron (1967) identified three occupational phases at the site: Mackinac, Bois Blanc, and Juntunen. The main ceramic categories identified at the site included Mackinac Ware, Blackduck Ware, Bois Blanc Ware, and Juntunen Ware. Other artifacts discovered at the site include various types of projectile points, scrapers, cores, core tools, numerous copper materials, bone awls, harpoons, bird bone tubes, and pipes (Fitting 1970).

An intensive study of the Traverse Corridor was conducted by Michigan State University from Traverse City to Mackinaw City. Other archaeological sites dating to the Late Woodland period that have been identified around the Straits more closely resemble the Juntunen site than sites that have been investigated in the southern portion of the Traverse Corridor and include the Ponshewana site near Conway, the Wycamp Creek site, and the Halberg site located in St. Ignace. There is very little evidence of occupations post-dating approximately CE 1400 until the Early Historic Period when the European fur trade was introduced (Fitting 1970).

Holman and Lovis's (2008) discussion of Late Woodland period subsistence practices and mobility in the Upper Great Lakes region note a similarity to that of the contact era practices of the Ojibwe and Odawa peoples residing in Northern Lower Michigan and the Straits area. Observances of the archaeological assemblages from Late Woodland period sites and observations of subsistence activities of the historic Ojibwe and Odawa indicate a pattern of seasonal mobility exploiting seasonally available resources. The Mackinac Phase of the Late Woodland period subsistence patterns is similar to those of the early contact era Ojibwe, wherein warm weather sites are found in locations suitable to exploit freshwater fisheries at coastal sites. During cold weather, Late Woodland sites are distributed across the

interior where it is assumed that, like the Ojibwe, represent cold weather hunting activities. The Juntunen phase of the Late Woodland period subsistence pattern is similar to that as practiced by the early contact era Odawa, wherein semi-permanent and permanent villages were situated to exploit the abundant fisheries at coastal sites. Hunting was also practiced during the cold season, although it is assumed to a lesser extent, and maize was cultivated, but does not appear to be a staple in prehistoric Juntunen diets as much as a supplement. Food security concerns appear to have relied heavily on fish in the Juntunen Phase supplemented by hunting and some agriculture. It is known that the Odawa cultivated maize for trade to other Indigenous groups, like the Ojibwe, to obtain meat and hides from those for whom hunting was a more substantial practice. It is unknown at this time if Juntunen phase people had similar trade interactions (Holman and Lovis 2008).

3.2 Historic Context

3.2.1 Native American History Including Treaties, Tribes, and Tribal Organizations

The Western Upper Peninsula of Michigan has been occupied by Native Americans for at least 8,000 years. This means that the area was inhabited very soon after the last of the glaciers retreated from the region. Archaeological sites, such as those found on the Keweenaw Peninsula, uncovered evidence of the earliest metal workers, as copper spear points, and other copper tools were found.

The people who occupied the land lived in small, nomadic groups, and were inherently familiar with the land, its resources, and how to best use them in order to flourish and survive in the region. Specific details of these cultures' lives are difficult to reconstruct, but settlements, like that at Aztalan, and others in Michigan and Wisconsin give some idea into how they lived (Michigan Technological University 2007). The dwellings likely held a single family, and were rectangular or round, and made of wattle-and-daub, with bark or thatch roofs. Designs that included south facing doors indicate that the builders used the north wind as a design factor. Archaeological sites of the time are typically found near water, which show their dependance on streams and rivers as both a food source, and a transportation method (Michigan Technological University 2007).

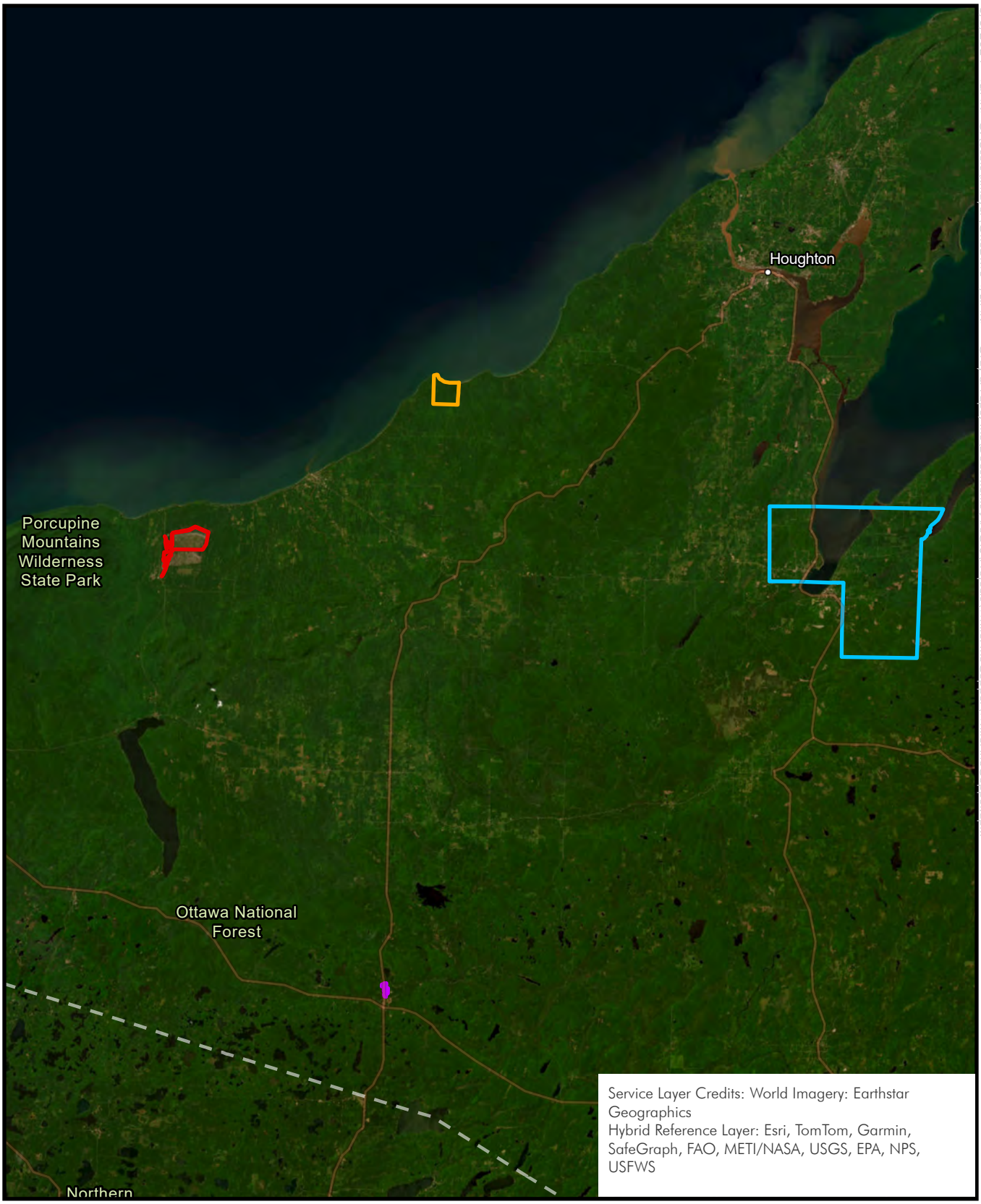
While indigenous peoples were present throughout the area, research and archaeological sites have suggested that Sault Ste. Marie, on the eastern side of the Upper Peninsula, was a major trade center that flourished for a period of 450 years, between 1000 and 1450 AD (Michigan Technological University 2007).

In more recent history, three Native American tribes, the Ojibwa, Odawa, and Potawatomi, collectively known as Anishinaabe, have inhabited the Upper Peninsula. The Ojibwe started to inhabit the area in the Lake Superior basin sometime around the start of the sixteenth century. The Ojibwe split up into two groups, one each on the north and south shore of the Upper Peninsula (Rural Insights 2020).

While the Upper Peninsula has long been home to different groups of indigenous people, there are several groups that reside near the Project Area today as described below and depicted in Figure 3-1. The Lac Vieux Desert Band of Lake Superior Chippewa Indians came into formal existence as the Ojibwe Nation divided into two and expanded west from Sault Ste. Marie, with one group on the north side of the Upper Peninsula, and the southern going into the area known as the Lac Vieux Desert. The band did not achieve federal recognition until 1988, when their nearly 20-year journey paid off with the signing of the "Lac Vieux Desert Band of Lake Superior Chippewa Indians Act" signed by President Reagan (La Vieux Desert Band of Lake Superior Chippewa Indians 2024) The act officially recognized the band as separate and distinct from the Keweenaw Bay Indian Community (KBIC).

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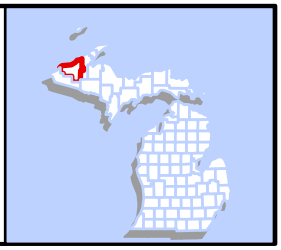
APE/Project Area in relation to local reservations.

GRAY & PAPE HERITAGE MANAGEMENT

Figure 3-1

Legend

- APE/Project Area
- Lac Vieux Desert Reservation
- LAnse Reservation
- Ontonagon Reservation



The other recognized tribe near the Project Area in the Upper Peninsula is the KBIC, located east of the Project Area. Like the Lac Vieux Band, the KBIC is primarily composed of Ojibwa peoples, members of the Anishinaabe people who were the largest group of Native Americans in the Great Lakes region. They were the northern half of the Ojibwa Nation that divided when they headed west. The KBIC primarily live on the L'Anse Indian Reservation in Baraga County, approximately 48.2 kilometers (km) (30 miles [mi]) south of Houghton, Michigan, on the Keweenaw Peninsula. The Tribe was officially established under the Treaty of 1854, which also established Reservation land bases including the L'Anse, and the nearby Ontonagon Indian Reservation. No tribes have been recorded as dwelling on the site of the Ontonagon Indian Reservation, and no permanent residents are listed. The Lake Superior Chippewa Tribe retains hunting, fishing, and lumbering rights on the reservation and has since signing the Treaty of 1854.

A series of treaties took place in the Upper Peninsula that revolved around the Native American communities in the region. The first of which was the Washington Treaty in 1836, which saw the Ottawa and Chippewa tribes cede approximately 13.8 million acres of land in the northwest portion of the Lower Peninsula and the eastern portion of the Upper Peninsula (Mackinac State Historic Parks 2017). The amount of land accounted for nearly 37 percent of the current land area of the State of Michigan. In the latter half of 1836, the Cedar Point Treaty was drafted, mostly concerning land in the State of Wisconsin (Wisconsin Historical Society 2024). The Menominee Indian Nation ceded 4,000,000 acres to the United States government for $700,000. The La Pointe Treaty of 1842 saw the Ojibwa cede a series of tracts of land, much of which is now the Upper Peninsula of Michigan, part of the northeastern corner of the State of Wisconsin, as well as a large part of Lake Superior (Figure 3-1) (Central Michigan University 2024). These treaties guaranteed fishing, hunting, and gathering rights to indigenous peoples on the land they historically owned.

3.2.1.1 Memorandum of Understanding

A single Memorandum of Understanding (MOU) was found pertaining to both the NHPA and tribes in the region. The MOU is between the Lac Vieux Desert Band of Lake Superior Chippewa Indians, the KBIC, and the USDA Forest Service Ottawa National Forest. The MOU related to the Lac Vieux Desert-L'Anse Trail Corridor Plan, and its purpose is to provide a framework for the Ottawa National Forest, The KBIC, and the Lac Vieux Desert Band of Lake Superior Chippewa to cooperatively manage and protect the Lac Vieux Desert-L'Anse trail resources. The trail is located approximately 54 miles east of the Project Area (USDA 1999).

3.2.2 Ontonagon County

Before the Upper Peninsula of Michigan was known as a mining haven, it was occupied by a series of indigenous tribes, one of whom was the Chippewa. The Chippewa had a large rock that they used as a shrine of worship, the Ontonagon Boulder, which was located on the west branch of the Ontonagon River near the area now known as the Victoria Reservoir. The boulder was actually a large piece of native copper, that would later serve as a magnet drawing copper prospectors to the area hoping to cash in on the lucrative industry. The Ontonagon Boulder is currently at the National Museum of Natural History in Washington, D.C.

The interest in commercial mining started in the middle of the eighteenth century by French immigrants stationed at military outposts in the area. The first attempt of commercial mining was in the 1770s organized by an English fur trader, which ended with little ore mined. Mining interest in the area didn't return until the early nineteenth century when a series of Michigan residents attempted their own small-scale expeditions and mining extractions. The results of an 1840 survey by the Michigan State Geologist

which published the purity of the aforementioned copper rock, as well as the presence of iron ore, set off the copper rush. This brought thousands of anxious miners who, within two years, transformed the Upper Peninsula into a burgeoning region full of mines and company towns (Hometown Chronicles 2024). The County of Ontonagon was established in 1843 as an attachment to Chippewa County for judicial purposes. In 1848, through the state legislature, the County of Ontonagon was officially separated as an independent county.

The copper boom in the Upper Peninsula lasted until the late nineteenth century when mines and veins had been exhausted. Following this, the copper boom was replaced by a spike in the lumber industry spurred on by the vast amounts of white pine trees. Logging is still a major part of the economy in the Upper Peninsula, which is bolstered, in small part, by its mining industry and tourism.

3.2.3 The White Pine Copper Mine

Modern copper mining in Michigan began as early as the 1840s when mines in the Keweenaw and Ontonagon Districts opened. Of the nearly 5 million tons of copper produced in Michigan from the mid-eighteenth century through the mid-twentieth century, which itself accounted for approximately 12 percent of all copper produced in the United States, 85 percent of it came from the Calumet and Houghton areas of the Upper Peninsula (Author Unknown ca. 1955). This area, which encompasses Keweenaw, Houghton, and Ontonagon Counties, has collectively become known as Copper Country. Within this region, mining operations are widespread due in large part to the native, or pure copper chunks, found in the area. However, copper oxides and sulfides were also extant, but they presented challenges regarding profitable mining operations (Johanson 2024). One of the rare occurrences of copper that existed in Copper Country was known as the Nonesuch lode, deriving its name from its uniqueness. Nonesuch lode "contained native copper, but much of its rock was a shale containing copper sulfide, called chalcocite" (Lankton 2010:243). This posed issues in processing because "the grains of chalcocite were 'so small as to be practically invisible' and so were the grains of native copper, making them hard to capture in the milling process" (Lankton 2010:243). It was atop this lode that the original White Pine Copper Mine sat (Lankton 2010).

The mineralization around the future site of the White Pine Copper Mine was originally discovered and named by Captain Thomas Hooper around 1879. The original site was just a couple miles east of the Nonesuch Mine, which was originally incorporated in the late 1860s and prompted the speculation of all the land in the vicinity (Lankton 2010; Johanson 1985; Chabot 1979). The original venture, operated by Captain Hooper, Byron White, and Charles A. Parker, was only in operation for two years, from 1879–1881, during which time they dug four pits and a shaft (Chabot 1979). Mining in the area remained mostly abandoned for the next couple of decades until the early twentieth century when the mining giant, Calumet & Hecla (C&H), took an interest in the land. This led to the organization of the White Pine Copper Company, controlled by C&H, in 1909 (Lankton 2010). The White Pine Copper Mine, which originally stood just west of present-day M-64 and east of the present town of White Pine, began production in 1915 and ceased operations in November 1920 (Figure 3-2) (White Pine Copper Company of Michigan 1910–1928). During this period, it produced over 18 million pounds of copper and, thanks to the high prices of copper during wartime, it experienced some financial success, marking the only time money was made from mining Nonesuch lode since its discovery in the 1860s (Lankton 2010).



Figure 3-2. Historic view of the original White Pine mill.

The mine remained unused for nearly a decade before the property and all of the equipment and structures left there went up for auction on the Ontonagon County Courthouse steps in 1929 (Lankton 2010). F.W. Paine, the new president of the Copper Range Company, and William Schat, eventual president of the company, placed a winning bid of $119,000 to own the property outright, barely outbidding their rivals, C&H, and bidding just over $1,000 more than what the property was indebted for (Lankton 2010).

The Copper Range Company was established in 1899 under the leadership of William A. Paine, a businessman from Boston. The company's original operations included the Copper Range Railroad Company and the Champion Copper Company, the latter of which was established in the new town of Painesdale, named for William A. Paine, which also served as the early headquarters of the Copper Range Company (Michelson 2014). In the subsequent years, the Copper Range Company delved into several successful business ventures, many of which centered on copper mining and the operations in the Copper Country.

By the late 1930s, Copper Range began to explore the White Pine site, reopening one of the old shafts and developing a plan on how to make the acquisition profitable. Copper Range Company partnered with the Michigan College of Mining and Technology in an attempt to develop techniques to mine the chalcocite effectively and profitably. By 1940, 2,800 tons of rock had been removed from White Pine, and over the next decade, that number would increase to at least 100,000 tons (Lankton 2010).

After World War II ended, the Copper Range Company lost some of its valuable government contracts and had to shutter some of its operations (Lankton 2010). It was at this time that the company sank the Bill Schacht Shaft at White Pine that ran over 426.7 m (1,400 ft) through the Nonesuch lode. The ore

removed from this shaft was sent to a concentrating mill in Freda, Michigan, at Champion Mine's stamp mill (Lankton 2010). Between 1945 and 1950, the Copper Range Company, the Michigan College of Mining and Technology, and the Battelle Memorial Institute developed an efficient method of milling the Nonesuch lode.

Due to the copper shortage across the country between 1951 and 1953, the federal government aided and incentivized the opening of new mines, including one in Michigan. This resulted in the Reconstruction Finance Corporation providing a loan to Copper Range for $57,185,000, later raised to $67,685,000, to develop a fully functional mining operation at White Pine (Michelson 2014). Copper Range finally opened a mine and built a mill, smelter, and townsite at White Pine between 952 and 1955 (Figure 3-3) (Michelson 2014).



Figure 3-3. Aerial view of the White Pine facility under construction, ca. 1953.

One thing that was not necessarily unique to White Pine, but was still a significant undertaking, was the construction of a town site to house the workers and their families. The townsite plan at one point consisted of over 500 homes, a trailer park, a shopping mall, schools, a church, dormitories, and recreational facilities, however, not all original plans came to fruition (Figure 3-4). The construction stopped at about 175 houses and several apartment buildings, as the company soon learned that employees were commuting from neighboring counties and had no intention of living on site (Johanson

1985). The town also provided free, clean water to all residents. While this does not seem revolutionary, Copper Range was one of the first in the area to provide fluoridated water to the community, which resulted in the children from White Pine reporting the lowest incidence of tooth decay in Michigan (Johanson 1985). Copper Range also provided an on-site sewage disposal facility, two modern school buildings, a modern hospital, a shopping center that housed a coffee shop, a motel, a supermarket, a post office, a barber shop, and steam heat for all public buildings, something that was a luxury during winters in the Upper Peninsula (Author Unknown ca. 1955; Johanson 1985).

At the White Pine facility, the main entrance to the underground mine was a tunnel-like portal, instead of a shaft, which ran from the surface gradually down to the top of the orebody, approximately eighty feet underground. Once underground, the mine was excavated in a room and pillar pattern, something that had been tried in other ventures but never on such an orebody as the Nonesuch lode, leaving "pillars" to support the roof while extracting the orebody from the "rooms," creating a checkerboard-like pattern (Ruutila et al. 2024; Christian ca. 1955). The underground network was expansive and employed conveyor belts to move ore around, was large enough for heavy machinery to move freely, and for crusher stations to be placed intermittently to aid in the process (Lankton 2010; Ruutila et al. 2024). Once the chalcocite was mined, it was loaded onto trucks and hauled to the underground crushing stations where it was crushed into pieces less than six inches in diameter. This product was then transported to the mill at the surface via conveyor belt where it would be crushed again, first to less than 5 cm (2 in), then less than 1 cm (3/8 in). Finally, it was ground in a ball mill to the consistency of flour and then taken to the metallurgic process where the waste was separated from the copper-bearing material called concentrate. The concentrate was then transported via conveyor to the smelter where it would be refined to the final product and poured into copper molds. At this point, the copper material was 99.9 percent pure copper (Figure 3-5). It would finally be shipped to the consumer via railroad as either 600–700-pound cakes or as 60–80-pound ingot bars (Author Unknown ca. 1955).

In 1954, the year before the first refined copper was poured from the smelter, White Pine employed 650 workers. Just 15 years later, it employed over 2,800, making it the second largest employer in the Upper Peninsula, and by 1975 the total employed was above 3,000 (Lankton 2010; Johanson 1985). While White Pine could not keep up with the production numbers of the giant firms in the American west, it was extremely important in the Upper Peninsula, not only as a large employer and producer of copper, but as an operation that figured out how to turn the chalcocite profitable (Lankton 2010).

Over the years, the mine also increased the size of its underground workings and the scale of its facilities. This was in part due to the need to constantly expand outward to reach more ore, and new technologies being developed and employed on site. The engineers initially estimated that the mine output would be between 10,500 and 12,500 tons per day, but by 1975 at the mine's peak production, the facility reached a mine output of 25,000 tons per day (Lankton 2010).

In the mid-to-late-1970s, several factors combined to hurt Copper Range's success at White Pine and production and operations began to slowly decline. These included opposition by environmental organizations, the end of the Vietnam War causing a drop in copper demand and thus price, and labor shortages, strikes, and difficulties with the labor union, all of which led to Copper Range seeking a company they could partner with to weather the storm (Lankton 2010; Johanson 1985). The next two decades were laden with acquisitions, ongoing battles with labor unions and environmental groups, and a steady decrease in copper price and production.



Figure 3-4. Original early plans of the White Pine Mine facility and associated town site. Note that there were plans for the townsite to expand as growth was expected.

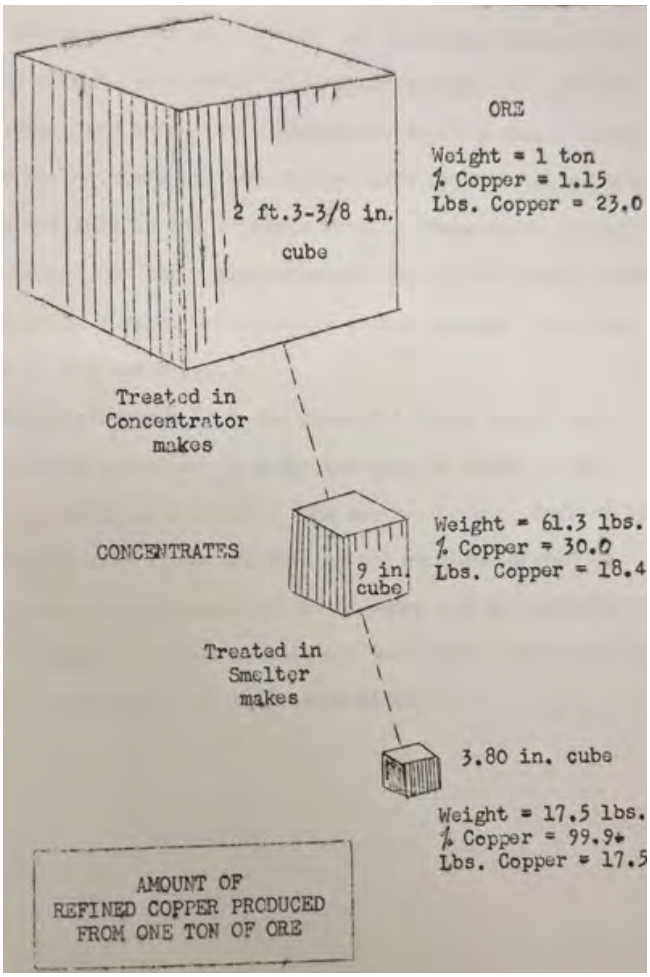


Figure 3-5. Illustration showing the amount of refined copper produced from one ton of Nonesuch lode orebody.

In 1977, Copper Range was purchased by Louisiana Land and Exploration Company (LL&E) and the headquarters were moved to Denver. Five years later, LL&E temporarily closed the White Pine Mine and put it up for sale due to low profits. In 1984, Echo Bay Mines, Ltd (Echo Bay) entered into another deal with LL&E which required Echo Bay to acquire ownership of the White Pine Mine, who subsequently began preparations for permanent closure. However, a year later, Echo Bay agreed to sell the Copper Range Company and all its assets, including the White Pine Mine, to the mine's employees and a management group. The resulting company was reorganized as "a Delaware corporation owned 70% by an employee stock ownership plan and 30 percent by a management group called Northern Copper Corporation, headed by Russell Wood, a former Vice President of mining for LL&E" (Michaud et al. 2023:6–3). In 1987, there were plans to go public with the company, but a ground failure in a part of the mine postponed production and ultimately the public plans. In 1989, Metall Mining Corporation acquired the former Copper Range Company and four years later, viability studies commenced at the White Pine Copper Mine. During these intervening years, there was somewhat continuous mining done on site, although the facility experienced reduced production, frequent closures, and intermittent layoffs (Figure 3-6). In 1995, Inmet Mining Corporation, formerly Metall Mining Corporation, announced that "all conventional mining and milling operations at the White Pine Mine" would be suspended on September 30 of that year (Michaud et al. 2023:6–3). The smelter stopped in February of 1995 due to environmental issues, but the refinery continued to operate for a time after the mine's closure.



Figure 3-6. Aerial of the White Pine Mine facility near its final closure, ca. 1993.

In 1996, plans were announced for a new mining operation, but environmental concerns and tribal objections put the project on hold. In 1997, all plans for additional mining operations were ended and plans for removing all underground assets began as did final environmental agreements. In 1998, the refinery was sold to BHP Copper USA who in turn sold it to HudBay Minerals in 2000. It was sold again in 2011 to Traxys North America LLC. In 2013, Inmet Mining Corporation, the parent company of the Copper Range Company, was acquired by First Quantum Minerals who then sold it to Upper Peninsula Copper Holdings Inc., a subsidiary of Highland Copper Company Inc., in 2014. The final closing of the acquisition of the White Pine Project was completed in 2021, at which point White Pine Copper LLC, a wholly owned subsidiary of Highland, "assumed all the rights, responsibilities, and obligations" of Copper Range Company (Michaud et al. 2023:6–3). In April 2015, White Pine Copper LLC "entered into a 20-year lease agreement over certain mineral rights located within the White Pine North Project Area" (Michaud et al. 2023:6–3). Finally, "in July 2023, Highland Copper and Kinterra Copper USA LLC ('Kinterra') signed a joint venture agreement in which Kinterra holds a 66% stake in the White Pine North project" (Michaud et al. 2023:6–3).

At its peak, the White Pine Copper Mine was one of a kind in the world, both in size and process employed there. White Pine was a self-contained mine, with everything needed for the process existing on site from electric production, the mine itself, a mill, smelter, etc. At one time the complex included

the largest man-made lake in the Upper Peninsula in the form of the tailings pond, which was considered to be one of 'the largest man-made structures in the State of Michigan, and perhaps the most expensive,' which covered approximately nine square miles. The mined area itself toward the end of the site's operation stretched over 64.7 square kilometers (km^2) (25 square miles [mi^2]) and the entire operation was the second largest underground copper mine in the United States (Lankton 2010:258; Ruutila et al. 2024). Today, some of the buildings have been demolished while others are leased to other businesses or individuals.

4.0 METHODOLOGY

While this project is not an undertaking as defined by the National Historic Preservation Act implementing regulations at 36 CRF Part 800.16(y), a Phase I archaeological survey was conducted using standard professionally accepted field methods within the region and in accordance with MI SHPO's Archaeological Standards, Technical Guides, and Forms (https://www.miplace.org/historic-preservation/archaeology/standards-archaeology-fact-sheets/). Evaluation of historic properties and management recommendations of those properties, when encountered, follows procedures outlined by the National Park Service (National Park Service 1997) for the National Register of Historic Places (36 CFR Part 60) criteria for evaluation. A Gray & Pape archaeologist who met the Secretary of Interior's Professional Qualifications for Archaeology directed all fieldwork to locate and document significant cultural resources within the Project Area and to make recommendations for the proper management of these resources (United States Department of the Interior 1983). The methods implemented during Phase I were defined by the results of the site file and literature review as well as in field conditions at the time of survey.

Additionally, Gray& Pape sent letters of notification/intent to Tribal consulting parties identified with having cultural patrimony within the Project Area (Appendix B). The letter provided project information, relevant contact information, a request to share any information deemed significant regarding known cultural resources or concerns, and an invitation to participate alongside Gray & Pape Archaeologists during Phase 1 fieldwork. Eleven tribes were contacted (Table 4-1), three of which responded to the letter. Copies of the correspondence are included in Appendix B.

Tribal members from KBIC and Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan participated and monitored Phase I fieldwork.

Table 4-1. List of Tribal Communities Engaged for White Pine North Project.

Tribal Community	Location	Response
Keweenaw Bay Indian Community (KBIC)	Baraga, Michigan	Participated and monitored Phase I Fieldwork
Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan	Watersmeet, Michigan	Participated and monitored Phase I Fieldwork
Lac du Flambeau Tribe, Lac du Flambeau Band of Lake Superior Chippewa Indians	Lac du Flambeau, Wisconsin	No Response
Menominee Indian Tribe of Wisconsin	Keshena, Wisconsin	No Response
Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin	Bayfield, Wisconsin	No Response
Sault Ste. Marie Tribe of Chippewa Indians, Michigan	Sault Ste. Marie	No Response
Sokaogon Chippewa Community, Wisconsin	Crandon, Wisconsin	No Response
Forest County Potawatomi	Crandon, Wisconsin	Responded - Finding of No Historic Properties Affected

Tribal Community	Location	Response
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin	Hayward, Wisconsin	No Response
St. Croix Chippewa Indians of Wisconsin	Webster, Wisconsin	No Response
Bad River Band of the Lake Superior Tribe of Chippewa Indians of the Bad River Reservation, Wisconsin	Odanah, Wisconsin	Request for Additional Information

4.1 Site File and Literature Review

Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with MISHPO to identify any previously recorded archaeological sites or surveys documented within 1.6 km (1 mi) of the Project Area, identified as the study area (Figures 4-1 and 4-2).

4.1.1 Archaeological Surveys

No archaeological surveys have been conducted within the APE, and no archaeological surveys have been conducted within the study area or immediately adjacent to it.

4.1.2 Archaeological Sites

Three archaeological sites have been previously recorded within the study area, and a small portion of one archaeological site (20ON430) is located just inside the APE (Table 4-2).

Table 4-2. Previously Recorded Archaeological Sites within 1.6 kilometers of the Proposed Project Area

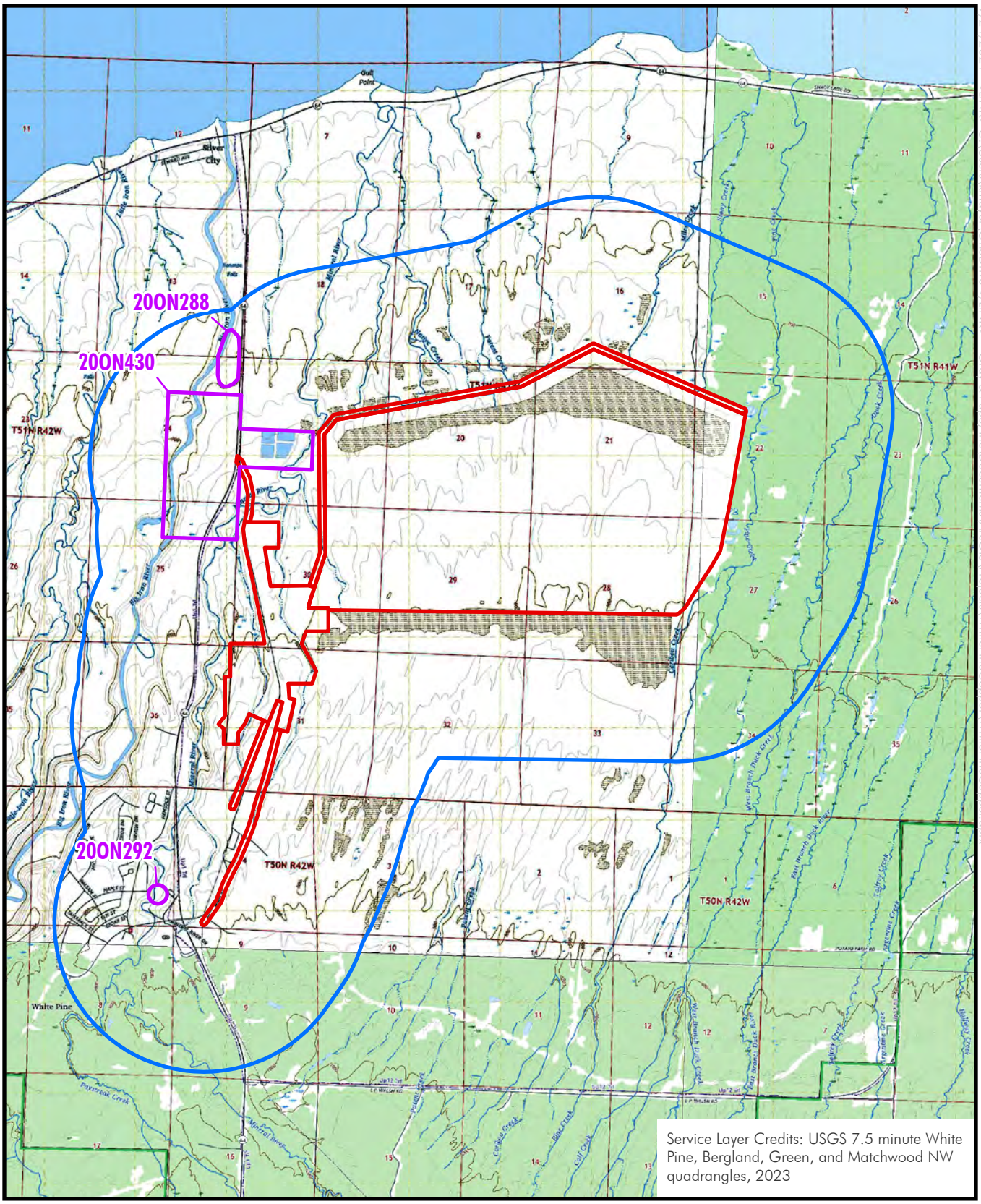
Site No.	Site Name	Description	Time Signature	SHPO Evaluation	Distance from Project Area
20ON288	Superior Mine	Historic Mine	Late 19th Century	Unevaluated	1102 m Northwest
20ON430	Republic Mining Company	Historic Mine	Late 19th through Late 20th Centuries	Unevaluated	Portion of Site Within Survey Area
20ON292	White Pine Ball Mill	Historic Mining	Early 20th Century	Unevaluated	554 m West

4.1.3 Cemeteries

Based on Gray & Pape's review of modern and historical maps (ESRI 2022; United States Geologic Survey [USGS] 2023) and additional sources including Find a Grave (2022) and the U.S. Geographic Names Information System Cemeteries geodatabase provided by ESRI (USGS 2022), there are no known cemeteries within the study area (Figures 4-1 and 4-2).

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N

0 2,000 4,000 Feet

0 500 1,000 Meters

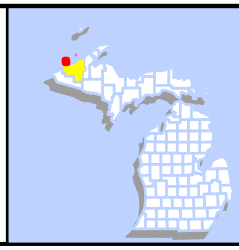
Area of Potential Effects and previously Identified Sites within 1 Mile (1.6-Kilometer) on aerial imagery

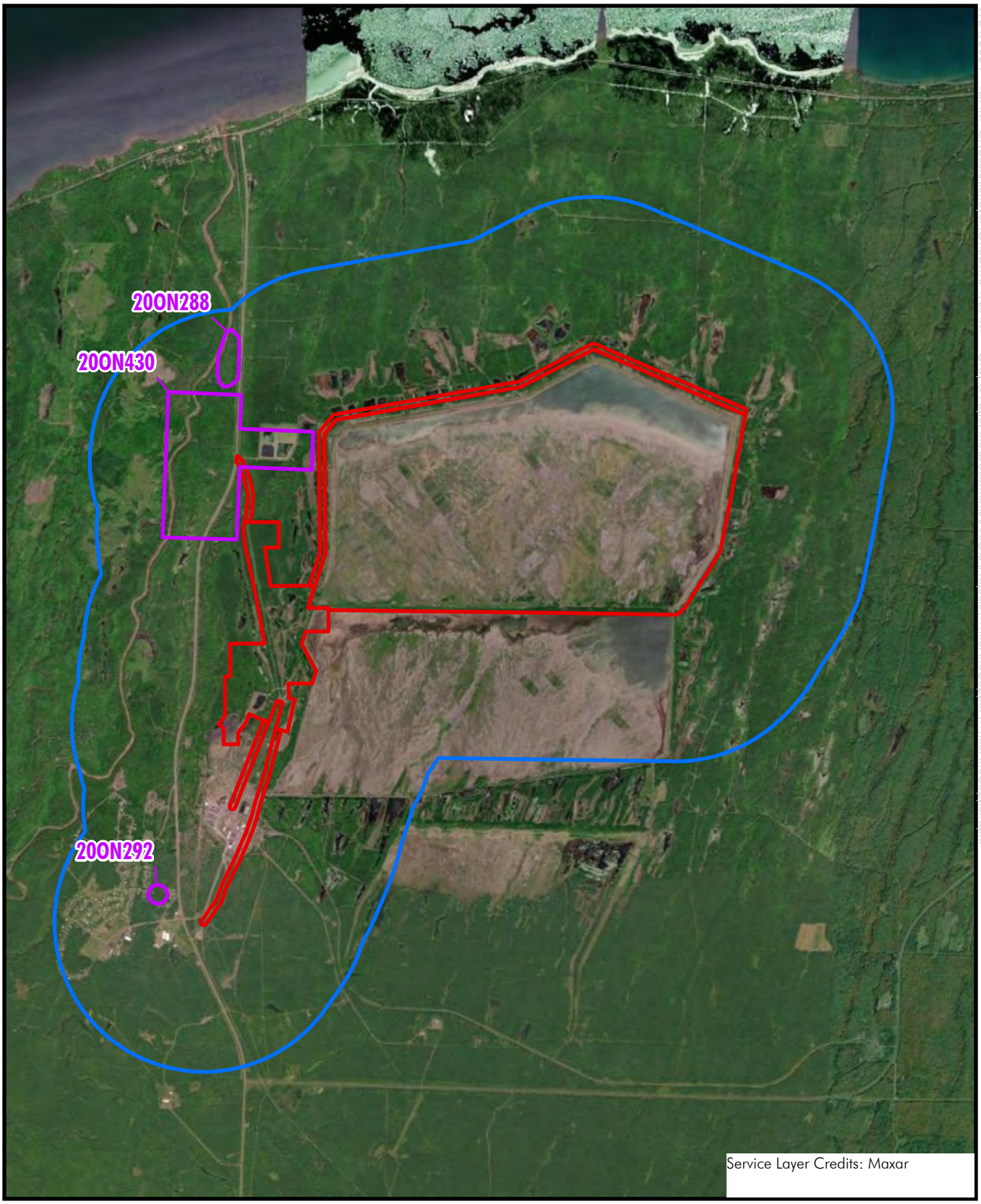
GRAY & PAPE HERITAGE MANAGEMENT

Figure 4-1

Legend

- 1-mile Study Area
- APE/Project Area
- Previously Identified Sites





N

0 2,000 4,000 Feet

0 500 1,000 Meters

Area of Potential Effects and previously Identified Sites within 1 Mile (1.6-Kilometer) on aerial imagery

GRAY & PAPE HERITAGE MANAGEMENT

Figure 4-2

Legend

- 1-mile Study Area
- APE/Project Area
- Previously Identified Sites

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While there are no recorded cemeteries within the APE, the discovery of unmarked cemeteries is always a possibility. Intentional disturbance of a burial is a violation of Act 328 of 1931 of the Michigan Penal Code (Michigan Compiled Laws 750.160). An exception is included in the law for scientific study. It is also a violation of the same act (Michigan Compiled Laws 750.387) to destroy or remove anything involved with memorials to the dead. Additional regulations regarding cemeteries can be found in Chapter 128 of the Michigan Compiled Laws (King 2004).

4.2 Field Methods

Fieldwork included two types of surveys, a Phase 1A visual assessment and Phase IB shovel testing. Most of the Project Area has been disturbed by past mining activity. A review of the National Resources Conservation Service's soils data clearly indicated that Project Area soils were poorly drained clays which are frequently inundated (USDA NRCS SSS 2024). Phase I survey locations were selected that appeared to be less disturbed and were dry in comparison to the greater Project Area as having the best potential for cultural materials. Every effort was made to inspect the entirety of the Project Area although several areas were not visually inspected due to the presence of standing water, safety precautions, or visible disturbances.

4.2.1 Phase IA Visual Assessment

Where field conditions allowed, the Project Area was subjected to pedestrian survey at 15-m intervals. Although pedestrian survey is typically used to inspect the ground surface for the presence of artifacts, field conditions (e.g., surface vegetation) were generally not conducive for the recovery of surface artifacts. In the Project Area, pedestrian survey was useful for identifying areas of disturbance versus areas of relatively intact soils, and wet versus dry areas for Phase IB shovel testing. Shovel test pits where soil conditions were visibly disturbed were designated as "shovel test disturbed", while those where no visible disturbance was observed were designated as "shovel test negative".

4.2.2 Shovel Testing

A series of shovel test pits (STP) were excavated judgmentally due to field conditions. Shovel test survey is not suitable in locations with standing water, slopes over 20 percent, impermeable surfaces (pavement or heavily compacted gravels), or in areas where health and safety requirements prohibit excavation within existing utility installations.

Soils within the APE are poorly drained clay and are seasonally inundated. During periods of higher precipitation, much of the survey area is wet. Due to these conditions, shovel testing was completed in areas of the APE where conditions were conducive, in this case dry. In all areas, shovel tests were judgmentally placed. Shovel test pits (STP) were a minimum of 40.0 cm (15.8 in) in diameter and were excavated to cultural sterile substrates. Excavated soils were screened through 0.64-cm (¼-in) wire mesh. Shovel test locations were plotted, and all pertinent data were gathered with a Samsung Tablet using the Collector application and an EOS Arrow Global Positioning System (GPS) receiver, if the strength of the signal permitted with sub-meter accuracy. Information recorded included Munsell soil color designation and soil texture following the USDA's Soils Survey Manual (USDA 2017). Shovel test data are provided in Appendix C. All soil and sod were replaced following completion of the shovel test.

5.0 RESULTS OF INVESTIGATIONS

The Phase I survey was conducted between June 9 and 14, 2024 by Gray & Pape along with tribal members from KBIC and Lac Vieux Desert. The weather was mostly sunny, with temperatures in the mid-70s, though several periods of light rain were experienced throughout the week. The APE is located at the White Pine Mine, Ontonagon County, Michigan.

5.1 Results of Field Investigations

Most of the Project Area has been impacted by past mining activity and more recent logging. Surface disturbance was evident as push piles, two-track skidder roads, access roads, rutting from heavy equipment, borrow areas, pits, slag piles, and mechanical blade scraping (Figures 5-1–5-5). The soils of the Project Area are poorly drained clays. Due to the wetness of these soils and the propensity for much of the Project Area to be inundated during periods of high precipitation (Figures 5-6 and 5-7), survey and shovel testing was confined to those areas that were slightly higher in elevation and relatively drier, when compared to the surrounding area.

Gray & Pape excavated 103 STPs during the survey (Figures 5-8, 5-9–5-14, and Appendix B). Soil profiles were homogenous across the Project, with two horizons present in all negative STPs, the upper horizon was composed of a clay loam (5YR 6/4). This horizon was present in forested areas of the APE and associated with accumulations of leaf litter and pine needles. The color and texture of this horizon are the result of decomposing humates leaching down, composting, and building soil. The average depth of the upper horizon was 12 cm (4.7 in). The second horizon was dense brown clay (2.5YR 5/8), excavation halted when this clay lens was exposed. In disturbed areas, only the brown clay horizon was evident (Figure 5-15). No cultural resources were observed during survey or recovered while shovel testing, which is understandable given the poorly drained soils encountered in the Project Area.

Lack of direct evidence does not contradict that this area was utilized by past Indigenous people for subsistence-based tasks, such as hunting, trapping, fishing, and foraging for plant resources. If these areas were accessed, it would likely have been during colder weather, as part of seasonal subsistence rounds (Henry 1901; Holman and Lovis 2008; Kay 1979; Roberts 2017; Schoolcraft 1852:50–55). Very rarely do these types of activities leave behind tangible material remains that would be readily identified during Phase I survey and shovel testing. Today, many indigenous people still practice these traditional cultural activities, but no evidence was observed within the Project Area of recent use and no concerns of use were raised by Tribal parties.



Figure 5-1. Disturbance – Push Piles.



Figure 5-2. Disturbance – Deeply Rutted Skidder Road.



Figure 5-3. Mechanical Disturbance – Borrow Area.



Figure 5-4. Slag Piles.



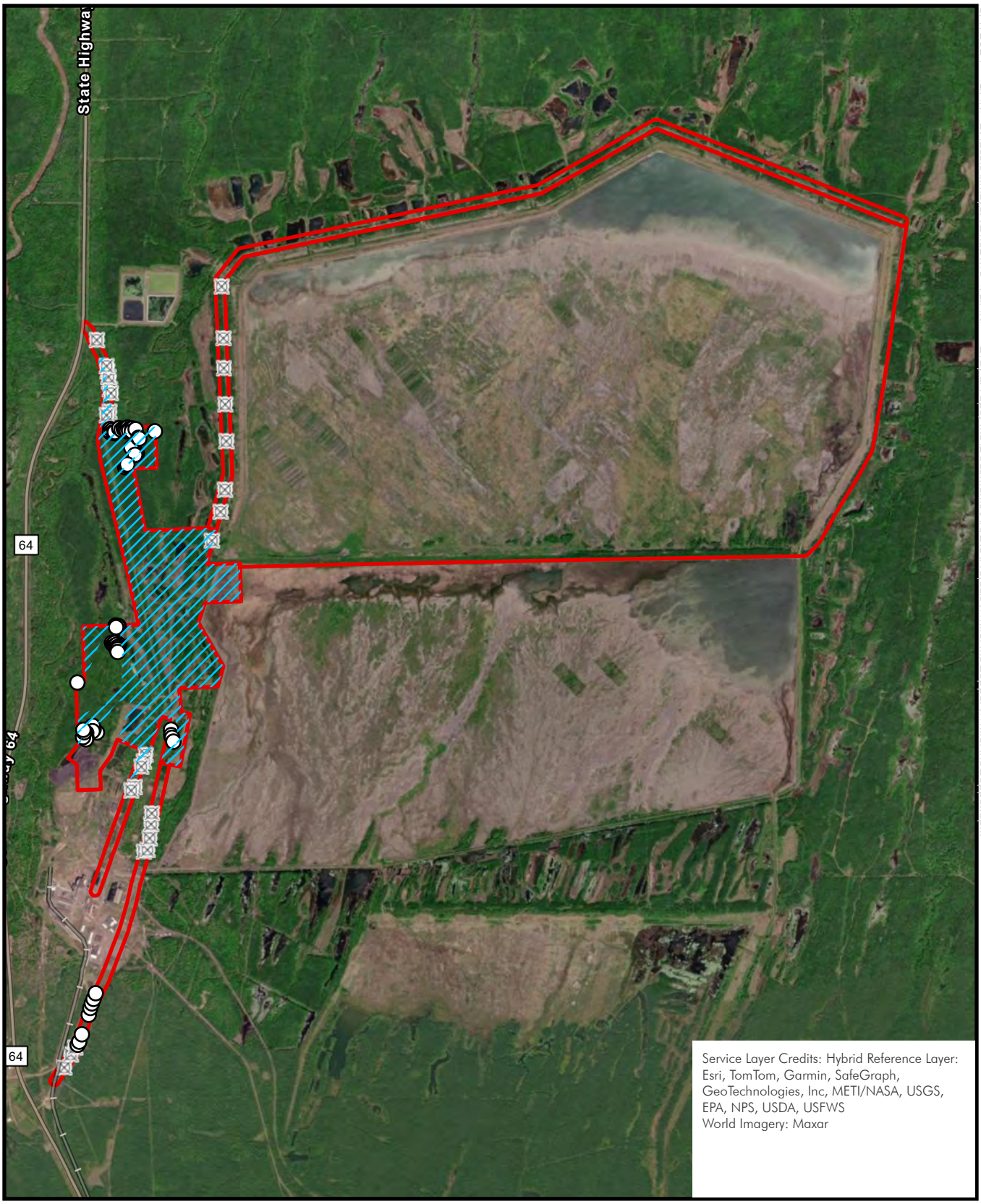
Figure 5-5. Mechanical Disturbance – Blade Scraping.



Figure 5-6. Frequently inundated wet area.



Figure 5-7. Standing water in survey area.



N

0 0.35 0.7 Miles

0 0.4 0.8 Kilometers

Survey Results

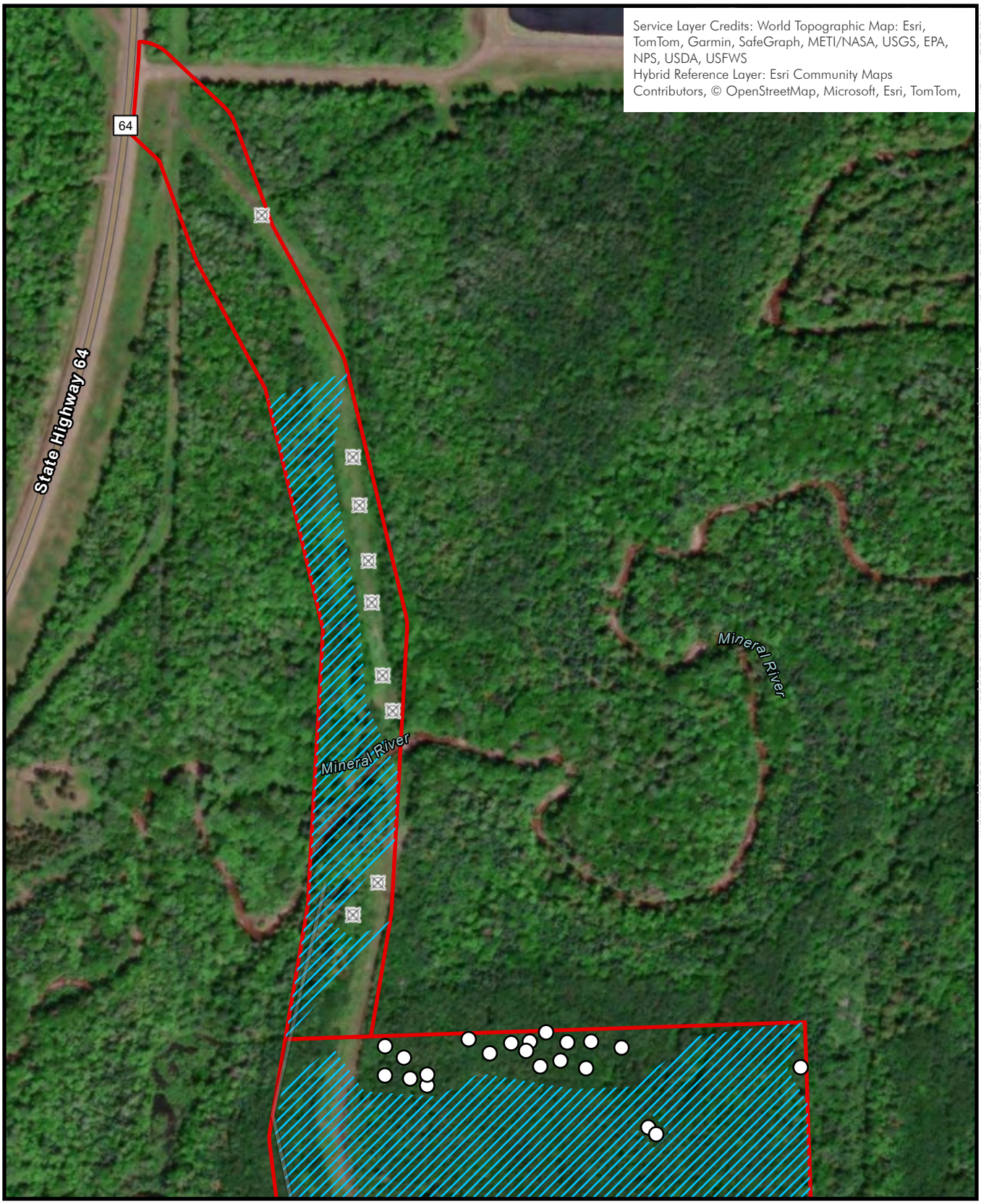
GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-8

Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed
- Inundated/Disturbed

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N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

(Page 1 of 6).

GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-9

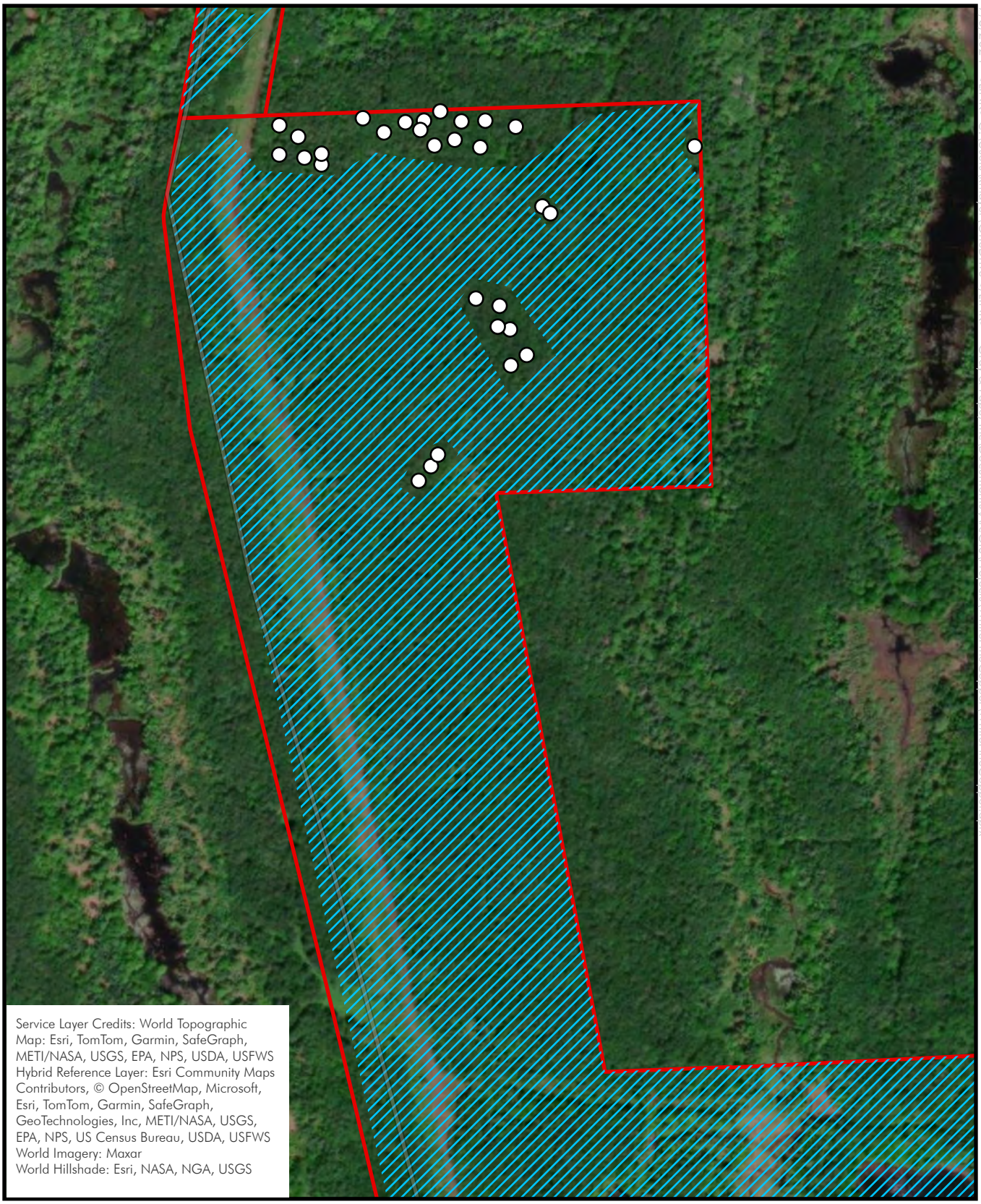
Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed
- Inundated/Disturbed

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Service Layer Credits: World Topographic Map: Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS
Hybrid Reference Layer: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS
World Imagery: Maxar
World Hillshade: Esri, NASA, NGA, USGS

N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

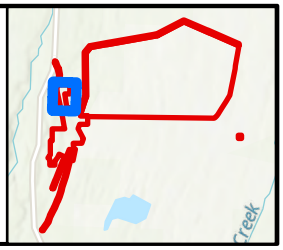
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GRAY & PAPE HERITAGE MANAGEMENT

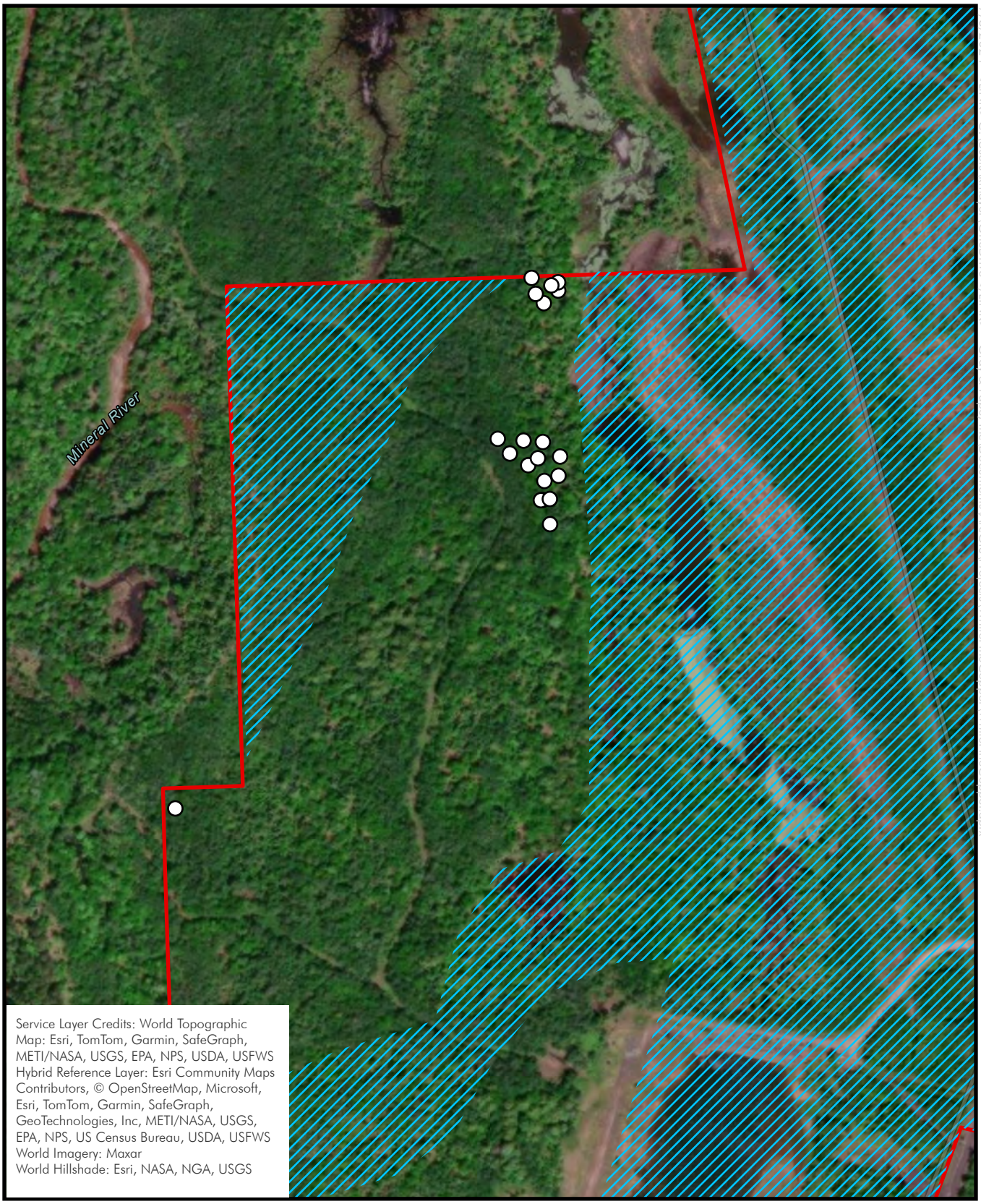
Figure 5-10

Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed
- Inundated/Disturbed



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N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

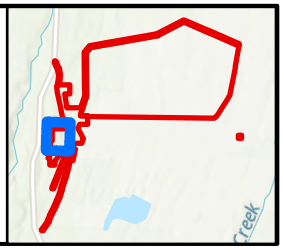
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GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-11

Legend

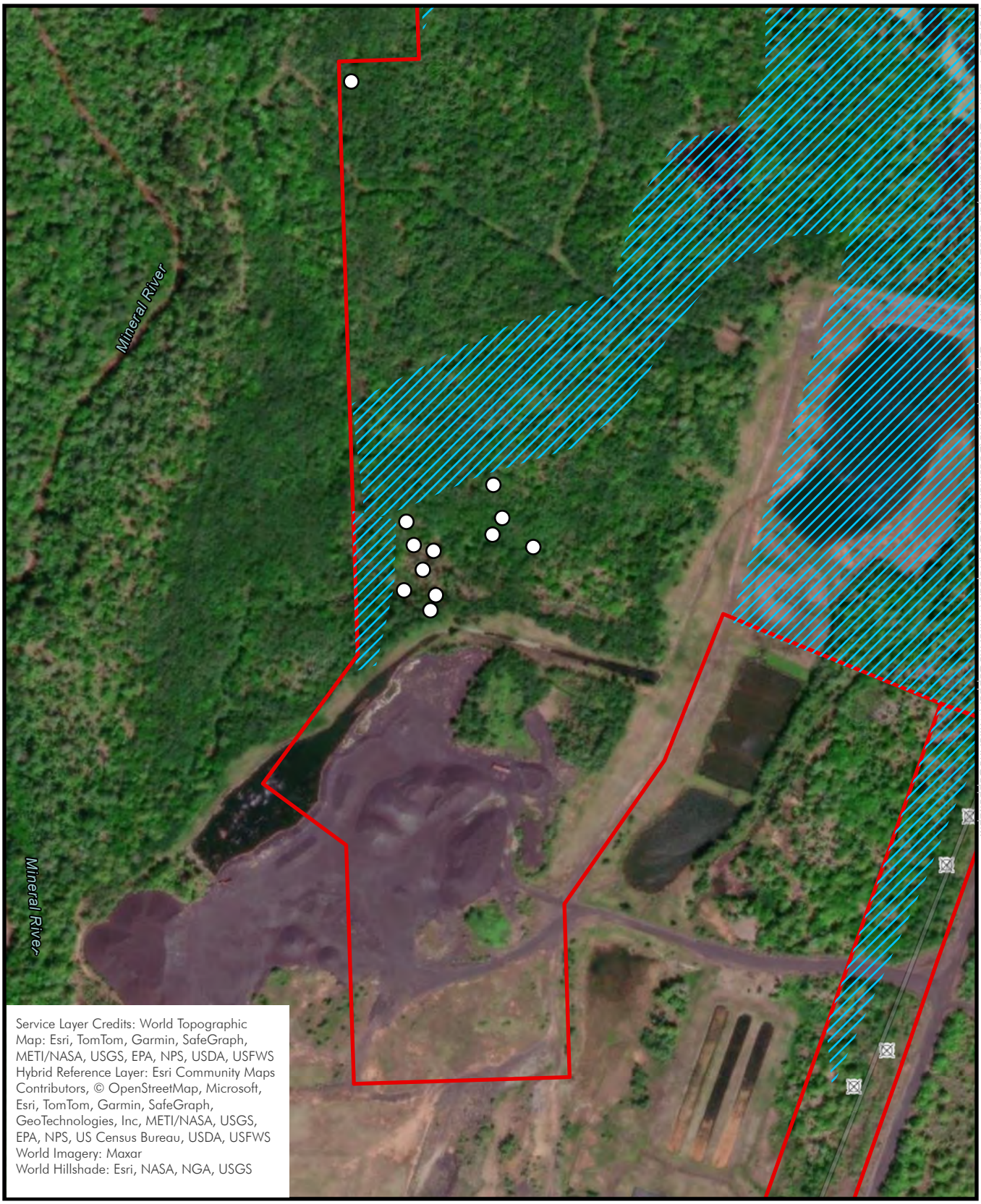
- Area of Potential Effects
- Shovel Test - Negative
- Inundated/Disturbed



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N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

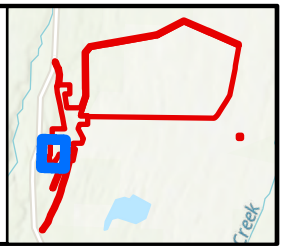
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GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-12

Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed
- Inundated/Disturbed



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N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

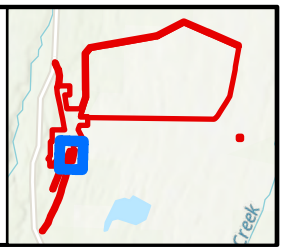
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GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-13

Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed
- Inundated/Disturbed





N

0 200 400 Feet

0 50 100 Meters

Detailed survey results

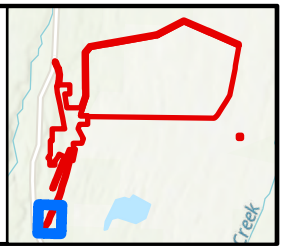
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GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-14

Legend

- Area of Potential Effects
- Shovel Test - Negative
- Shovel Test - Disturbed



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Figure 5-15. STP with Dense Brown Clay (2.5YR 5/8).

6.0 CONCLUSIONS AND RECOMMENDATIONS

The Project Area overall was wet, standing water was observed across survey areas and many areas would be inundated quickly during times of higher precipitation. The weather during fieldwork had several periods of light rain showers, and due to the saturated nature of the soils, water was observed quickly ponding on surface areas. The absence of archaeological sites in the areas surveyed within the Project APE is understandable given these conditions and soil types present. These types of soil are poorly drained and frequently inundated and not conducive to past human occupation.

Due to past disturbances, poorly drained soils and wet conditions, the Project Area is unlikely to contain significant archaeological remains. No evidence of past human activity was observed during Phase I survey or recovered during shovel testing. No evidence of present traditional use by Indigenous people was observed in the Project Area and no issues of traditional use were raised by Tribal Parties. Gray & Pape recommends a finding of no effect with no further work needed within the APE.

No above ground historic resources were documented within the Project APE. Neither the original White Pine Copper mine nor the later twentieth-century mine are located within the current Project APE. The proposed Project will not disturb any of the historic mine's aboveground historic resources, nor will it introduce anything to the landscape that would visually impact the integrity of the mine's remaining resources or the neighboring community of White Pine. Gray & Pape recommends a finding of no effect with no further work needed within the APE.



Figure 6-1. View of the former White Pine Copper Mine facility.



Figure 6-2. View of the demolished former mill and silos at the White Pine Copper Mine.



Figure 6-3. View of the Welcome sign seen as one enters White Pine. In the background, the shopping center can be seen.



Figure 6-4. Current representative streetscape in the White Pine townsite.



Figure 6-5. Ball mills from the original White Pine mill from the early twentieth century that are still present in between the White Pine townsite and the modern White Pine facility. Photos were taken during a site visit with a former White Pine employee and local expert.

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APPENDIX A: DESKTOP REVIEW

GRAY & PAPE
HERITAGE MANAGEMENT

MEMO

TO: Amanda Zeidler

FROM: James Renn

DATE: May 13, 2024

RE: *White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey*

Gray & Pape, Inc. (Gray & Pape) is pleased to provide you with this review for the White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey, Ontonagon, Ontonagon County, Michigan. White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine (Figure 1). The White Pine North Project (Project) will expand the northern part of the existing tailings basin and will locate and develop a new mine portal and associated processing infrastructure. As part of this process, WPC has commenced various engineering and environmental studies to advance development of this Project which includes a cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits.

Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with the Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6 kilometer (1 mile) of the Project area. The results of this review are provided in detail in this memo as outlined in the workplan and be used to define the scope and methods to be used during Phase I fieldwork.

Archaeological Surveys

No archaeological surveys have been conducted within the Area of Potential Effects (APE; Figure 2). No archaeological surveys have been conducted within the study area or immediately adjacent to it (Figure 2).

Archaeological Sites

Three archaeological sites have been previously recorded within the study area (Figure 2) and a small portion of one archaeological site (20ON430) is located just inside the APE (Figure 2; Table 1).

Table 1. Archaeological Sites

Site No.	Site Name	Description	Time Signature	SHPO Evaluation	Distance from Project Area
20ON288	Superior Mine	Historic Mine	Late 19th Century	Unevaluated	1102 meters Northwest
20ON430	Republic Mining Company	Historic Mine	Late 19th through Late 20th Centuries	Unevaluated	Portion of Site Within Survey Area
20ON292	White Pine Ball Mill	Historic Mining	Early 20th Century	Unevaluated	554 meters West

Cemeteries

Based on Gray & Pape's review of modern and historical maps (ESRI 2022; USGS 2022a) and additional sources including Find A Grave (2022) and the U.S. Geographic Names Information System Cemeteries geodatabase provided by ESRI (USGS 2016), there are no known cemeteries within the study area (Figure 2).

While there are no recorded cemeteries within the APE, the discovery of unmarked cemeteries is always a possibility. Intentional disturbance of a burial is a violation of Act 328 of 1931 of the Michigan Penal Code (Michigan Compiled Laws 750.160). An exception is included in the law for scientific study. It is also a violation of the same act (Michigan Compiled Laws 750.387) to destroy or remove anything involved with memorials to the dead. Additional regulations regarding cemeteries can be found in Chapter 128 of the Michigan Compiled Laws (King 2004).

Summary and Conclusions

None of the APE has been previously surveyed for archaeological resources. One archaeological site (20ON430), a historic mine, is adjacent to the APE with a small portion of the site within the APE. No archaeological surveys have been completed in the study area or immediately adjacent to it. No National Register of Historic Places (NRHP)-listed archaeological resources or cemeteries have been recorded within the APE.

The White Pine North Project area is located on White Pine Mine lands, which began operations in 1880. The White Pine mine has not been in continuous operation but has had several periods of operation throughout the 20th century, with the longest period of operation between 1955 and 1995 when it closed. The White Pine North Project is adjacent to the unincorporated village of White Pine, Ontonagon County, Michigan, approximately 19.3 kilometers (12 miles) west-southwest of Ontonagon, Michigan. Most of the APE has been impacted by past mining related activities comprising tailings impoundments, roads, railroad grades, and past infrastructure, the remaining area of the APE is primarily poorly drained wetland.

Given the fact that the Project area is located within disturbed landscapes and poorly drained wetland, there is little potential for precontact archaeological sites, unless these have been preserved below the tailings impoundment, which would effectively seal and preserve the site. There is a potential for archaeological remains related to the Project area's past mining industry.

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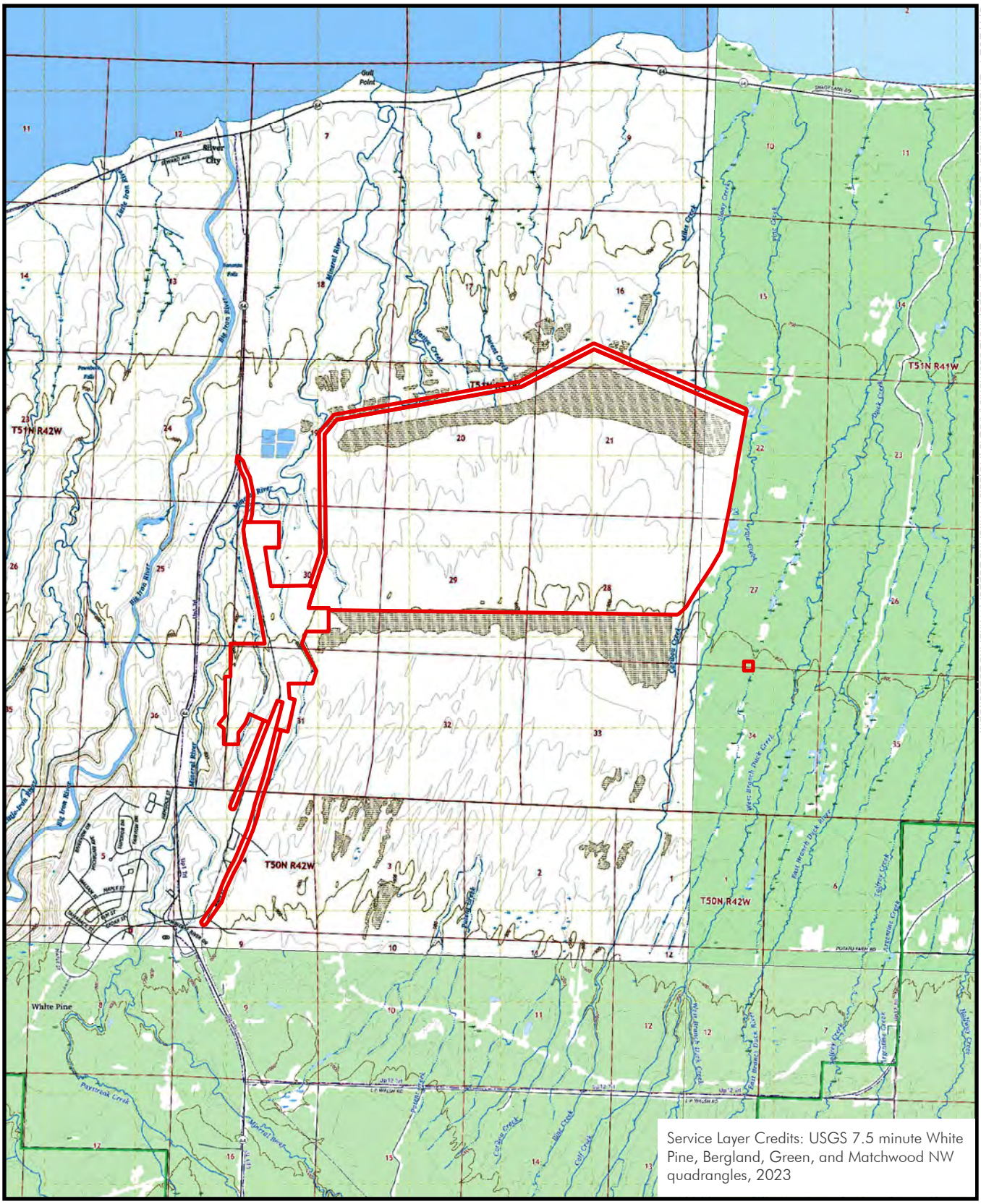
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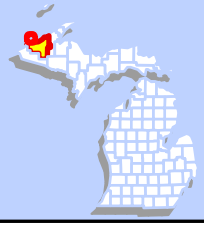
Project Area Location

GRAY & PAPE HERITAGE MANAGEMENT

Figure 1

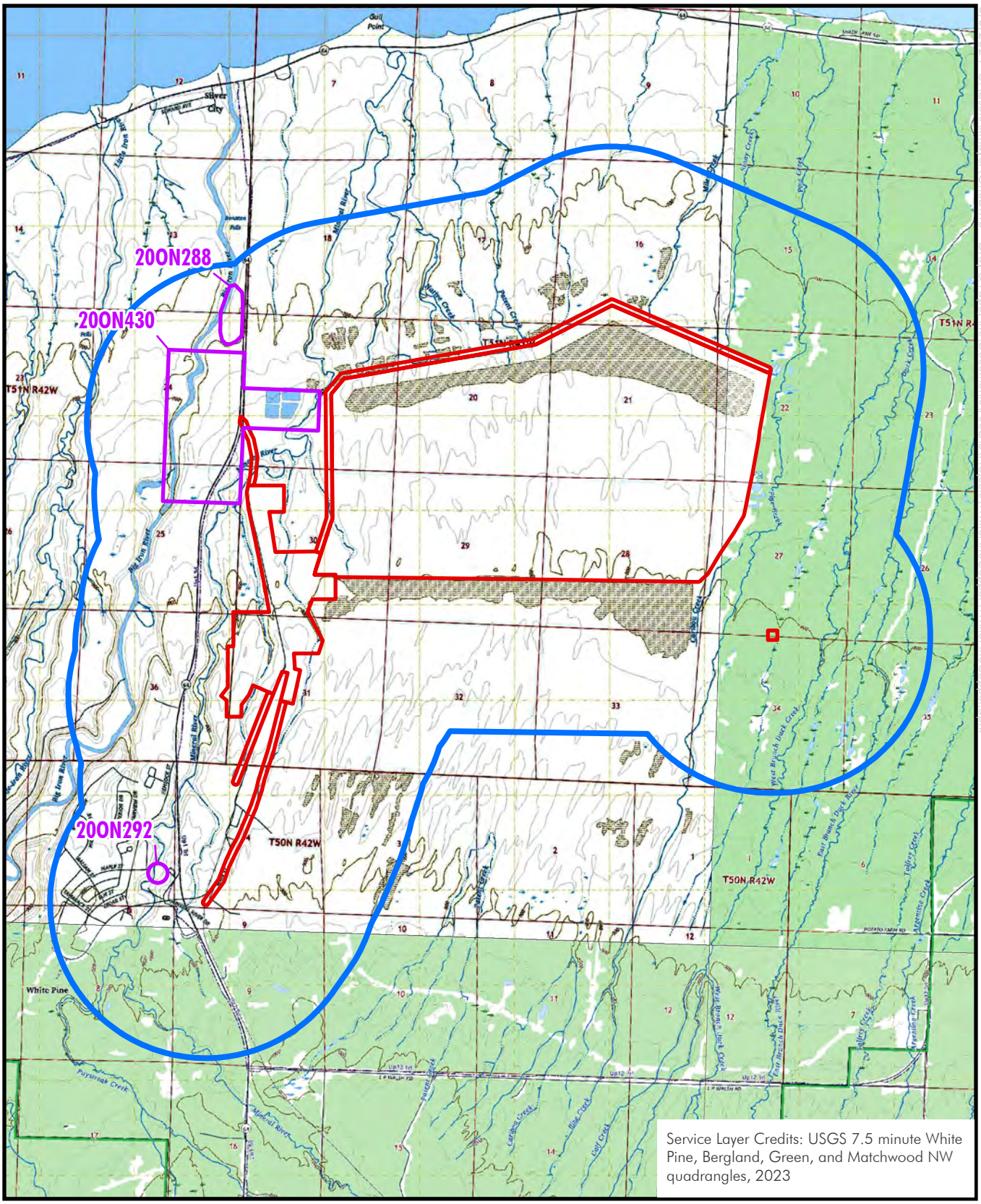
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Area of Potential Effects



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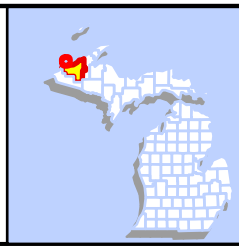
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Area of Potential Effects and Previously Identified sites within 1-mile.

GRAY & PAPE HERITAGE MANAGEMENT

Legend

- 1-mile Study Area
- Area of Potential Effects
- Previously Identified Sites



APPENDIX B: TRIBAL LETTERS AND RESPONSES

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Robert Blanchard
Bad River Band of Lake Superior Tribe of Chippewa Indians, Wisconsin
Chief Blackbird Center 72682
Odanah, WI 54861
Phone 715-682-7111

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Blanchard,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Bad River Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History,

will conduct in-depth research and a Phase I survey of aboveground resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Bad River Band may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Bad River Band of Lake Superior Tribe of Chippewa Indians of the Bad River Reservation.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,

Michael Striker
Archaeology Practice Leader

James C. Renn
Michigan Branch Manager

BAD RIVER BAND OF LAKE SUPERIOR
TRIBE OF CHIPPEWA INDIANS

CHIEF BLACKBIRD CENTER

P.O.Box 39 • Odanah, Wisconsin 54861

Date: 06-14-2024

Michael Striker
Archeology Practice Leader
1318 Main Street
Cincinnati, OH 45202

RE: Applicant THPO Section 106 Initiation

Project Name: Applicant Archaeological, Cultural, and Historic Resources Review (Phase I Cultural Resources Survey) White Pine, MI.

Project Territory: Treaty of 1842 Territory

Dear Mr. Striker,

Chairman Blanchard forwarded the attached Letter to me for reply. My name is Lawrence Plucinski. I am the Historic Preservation Officer for the Band. Ahead of identifying the above Project's area could you send:

1. The Project construction and excavation area required to construct, modify, improve, or maintain any facilities; any right-of-way or easement areas necessary for construction, operation, and maintenance; areas used for excavation of borrow material; and construction staging areas, access routes, utilities, spoil areas, and stockpiling areas.
2. The United States Agency determining the geographic scope of the Project and contact information.

Additionally, I'd like to note that the area is in Treaty of 1842 Territory and includes Federal Lands.

I believe this interaction will support and encourage the consideration of impacts to historic properties earlier in the project planning. Please reply to me at:

Bad River Band Of Lake Superior Tribe Of Chippewa Indians

CHIEF BLACKBIRD CENTER

P.O.Box 39 • Odanah, Wisconsin 54861

Tribal Historic Preservation Officer,
72682 Maple St, PO Box 39
Odanah, WI 54861.

My telephone number is (715) 682-7123 x. 1662, and Email at thpo@badriver-nsn.gov.

Sincerely,

Lawrence Plucinski

Lawrence Plucinski
Tribal Historic Preservation Officer

cc: Chairman Robert Blanchard

June 17, 2024

Mr. Lawrence Plucinski
Tribal Historic Preservation Officer
72682 Maple Street, P.O. Box 39
Odanah, WI 54861

Mr. Plucinski,

This letter is in response to the request for additional information on the White Pine Copper Project that was sent to Mr. Michael Striker at Gray & Pape, dated June 14, 2024. Mr. Striker did not have the requested information and therefore sent the request to me to respond.

First, I would like to say thank you for your response and interest in the Project. The cultural, historical, and archaeological studies underway at White Pine Copper are part of the permitting process required under Michigan's Part 632 Mining Regulation and National Resources and Environmental Protection Act (NREPA). The regulations require completion of an environmental impact assessment that includes identification and understanding of cultural and historical areas of significance within the Project area and consideration of potential impacts and identification of mitigation measures if needed. Gary & Pape reached out to see if you were interested in participating in the process to help ensure that there is a full understanding of any historical considerations within the Project area. The formal consultation process will occur at a later date as determined by the State of Michigan Department of Environment, Great Lakes, and Energy. We welcome your input and participation in the process if desired.

The following are the answers to the questions asked in the June 14th letter to Mr. Striker at Gray & Pape:

1. ***The project construction and excavation area required to construct, modify, improve, or maintain any facilities; any right-of-way or easement areas necessary for construction, operation, and maintenance; areas used for excavation, borrow material; and construction staging areas, access routes, utilities, spoil area, and stockpiling areas.***

   The general site plan has been developed for the Project and is attached. All facilities will be constructed on land currently owned by White Pine Copper. There is no State of Michigan or Federal land located directly within the proposed Project area. Please note that the locations of specific buildings may change but are planned to remain within a similar footprint.

   The Project is an underground mine which is accessed through a portal, also located within the surface facility area. Except for ventilation/exhaust raises there will be little to no surface impact over the proposed mining area. Surface ownership over the orebody is a combination of White Pine Copper and private citizens.

   Due to the early stage of the Project we have not identified areas that will be used for construction staging and if borrow material will be obtained onsite or procured from local suppliers. This information can be shared at a later date if desired.

2. ***The United States Agency determining the geographic scope of the Project and contact information*.**

   All permitting for the Project is overseen by the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE). The Part 632 Mining Permitting Process and corresponding Environmental Impact Assessment is overseen by the EGLE Office of Oil, Gas, and Minerals. The Marquette Unit Supervisor is Jolene Melchiori 906-250-2076, melchiorij@michigan.gov.

Thank you again for your interest in the Project and please reach out with any additional questions. I can be reached directly at 906-204-6500 or azeidler@whitepinecu.com.

Sincerely,

Amanda Zeidler
Senior Director, Environment
White Pine Copper

PROPOSED PLANT INFRASTRUCTURE

- Proposed Exhaust Raise
- Proposed Intake Raise
- Proposed Outfall Location
- Existing Railroad
- Railroad to Rebuild
- Railroad to Build
- Proposed Electrical Transmission Line
- Proposed Fence
- Proposed Building
- Proposed Ore Stockpile
- Proposed Pond
- Proposed Portal
- Proposed Topsoil Storage
- Proposed Waste Stockpile

Outfall 001A
Electrical Transmission Line
Water Treatment Plant
North #2 TDF
Explosive Storage
Intake Raise
Ore Stockpile
Portal
Laboratory
Truckshop/Warehouse/Dry
Topsoil Storage
Exhaust Raise
Process Plant
Waste Stockpile
Stormwater Pond
Substation
Railroad to Build
Guard Shack
North #1 TDF
South TDF
Existing Railroad

Perch Creek
Native Creek
Patent Creek
Miles Creek
Stony Creek
Duck Creek
Caribou Creek
Tolfrey Creek
Ash Creek
Little Iron River
Mineral River
M-64
Big Iron River
Hemlock St
Pine Creek
West Branch Duck Creek
East Branch Duck River
Argentine Creek
L-P Walsh Rd
Halfway Creek
Town Line Creek
Potato Farm Rd

NOTES:

1. Base air photo from the USDA.
2. Horizontal coordinate system is NAD1983 UTM Zone, 16N, units in meters.
3. Hydrographic data from the USGS.
4. Road and boundary data from Michigan GIS Open Data and the USFS.

This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only.

LEGEND

- Major Road
- Minor Road
- River/Stream
- Lake/Pond
- Ottawa National Forest Boundary
- Proposed White Pine North Underground Mine Area
- Proposed Project Surface Extent (3,151 Acres)
- Proposed Tailings Disposal Facility (2340 Acres)
- Proposed Plant Footprint (325 Acres)
- Proposed Transmission Line Corridor (128 Acres)
- Proposed Railroad Corridor (35 Acres)
- Proposed Exhaust Raise Footprint (4.9 Acres)
- Historic Underground Mine Workings

Foth

N

0 1,500 3,000 Feet

WHITE PINE COPPER LLC

FIGURE 2

SITE PLAN
WHITE PINE NORTH
ONTONAGON COUNTY, MICHIGAN

Date: DECEMBER 2023	Revision Date:	
Drawn By: BJW1	Checked By: JMW3	Project: 23W200

Path: Q:\White Pine Copper\23W200\GIS\mxd\Wetlands and Streams RFP\Figure 2 - White Pine Site Plan.mxd Date: 12/20/2023

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

James Crawford
Forest County Potawatomi Community, Wisconsin
5416 Everybody's Road
Crandon, WI 54520
Phone 715-478-7200

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Crawford,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Forest County Potawatomi Community to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Forest County Potawatomi Community may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Forest County Potawatomi Community.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

From: Olivia Nunway
To: James Renn
Subject: RE: White Pine Copper, White Pine North Project, Ontonagon County, Michigan
Date: Tuesday, May 21, 2024 4:08:43 PM

Pursuant to consultation under Section 106 of the National Historic Preservation Act (1966 as amended), the Forest County Potawatomi Community, a Federally Recognized Native American Tribe, reserves the right to comment on Federal undertakings, as defined under the act.

We have consulted our cultural resources database and archival materials. The Tribal Historic Preservation Office on behalf of Forest County Potawatomi Community would like to offer the finding of NO HISTORIC PROPERTIES AFFECTED. Should the SHPOs comment differ, the Tribe reserves the right to revisit the finding offered. In the case of inadvertent discovery of human remains and/or archaeological materials, the Tribe requests to be notified of discovery and to participate in consultation regarding treatment and recovery protocols, prior to removal, with appropriate state and federal agencies.

Your interest in protecting cultural and historic properties is appreciated. If you have any questions or concerns, please contact me at the email or number listed below.

Respectfully,

Olivia Nunway | Assistant Tribal Historic Preservation Officer | Land & Natural Resources
Forest County Potawatomi | 5320 Wensaut Lane | PO Box 340, Crandon, WI 54520
P: 715-478-4538 | C: 715-889-4882 | Main: 715-478-7222
www.fcpotawatomi.com | Olivia.Nunway@fcp-nsn.gov
Please note the office hours are Monday – Thursday: 7:00 am – 5:00 pm. Our office is closed on Fridays.

From: James Renn <jrenn@graypape.com>
Sent: Tuesday, May 21, 2024 10:12 AM
To: James Crawford <james.crawford@fcp-nsn.gov>
Cc: Benjamin Rhodd <Benjamin.Rhodd@fcp-nsn.gov>
Subject: White Pine Copper, White Pine North Project, Ontonagon County, Michigan

Honorable Chairman Crawford,

This email is a follow up to the letter and email sent May 7th, 2024 concerning cultural resources within the White Pine North Project area in Ontonagon County, Michigan. In that letter, an invitation was extended to discuss and identify cultural resources within the Project area that you may have knowledge of and would like to share. Additionally, an invitation to participate and monitor alongside Gray & Pape archaeologists while the survey is completed

the week of June 10th was also made.

If you have information to share or questions concerning this project, please contact me.

Thank you for your valuable time.

Respectfully,
Jim Renn

James C. Renn
Principal Investigator/Michigan Branch Manager

950 South Ausable Trail
Grayling, Michigan 49738
Ph. 513.287.7700 (Main Office Cincinatti, OH)
Cell. 915.487.7082
Fax 513.287.7703
jrenn@graypape.com

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GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Doreen Blaker
Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, MI 49908
Phone 906-353-6623

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

President Blaker,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Keweenaw Bay Indian Community to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Keweenaw Bay Indian Community may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Keweenaw Bay Indian Community.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,

Michael Striker
Archaeology Practice Leader

James C. Renn
Michigan Branch Manager

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Louis Taylor
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
13394 West Trepania Road
Hayward, WI 54843
Phone 715-634-8934

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Taylor,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Lac Courte Oreilles Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History,

will conduct in-depth research and a Phase I survey of aboveground resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Lac Courte Oreilles Band may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Lac Courte Oreilles Band of Lake Superior Chippewa Indians.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort

regarding the proposed Project and to schedule and coordinate participation in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

John Johnson
Lac du Flambeau Tribe, Lac du Flambeau Band of Lake Superior Chippewa Indians
418 Little Pines Road
Lac du Flambeau, WI 54538
Phone 715-588-4206

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

President Johnson,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Lac du Flambeau Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History,

will conduct in-depth research and a Phase I survey of aboveground resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

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Tribal Engagement

Gray & Pape recognizes the Lac du Flambeau Band may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Lac du Flambeau Band of Lake Superior Chippewa Indians.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort

regarding the proposed Project and to schedule and coordinate participation in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

James Williams
Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan
East 23968 Pow Wow Trail
Waters, MI 49969
Phone 906-358-4577

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Williams,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Lac Vieux Desert Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

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- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History,

will conduct in-depth research and a Phase I survey of aboveground resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

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- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Lax Vieux Desert Band may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort

regarding the proposed Project and to schedule and coordinate participation in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

From: Alina Shively <alina.shively@LVD-NSN.GOV>
Sent: Tuesday, May 7, 2024 12:01 PM
To: James Renn
Cc: Jim Williams Jr; Lisa McGeshick; Alden Connor
Subject: Fwd: White Pine Copper, White Pine North Project
Attachments: Gray & Pape White Pine Copper Lac Vieux Desert Band (2).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Sir:

The Lac Vieux Desert Band of Lake Superior Chippewa Indians' Tribal Historic Preservation Office (THPO) hereby requests that consultation on effects to environmental, treaty, historical, and cultural resources occur with our office. We look forward to reviewing the Phase I Archaeological/Cultural Resources Survey and any National Environmental Policy Act (NEPA) studies that are required. We support shovel testing and site delineation to truly identify, protect, and locate burials and Cultural Resources. Please ensure that transects are properly mapped using GIS/GPS and are recorded in your report, along with actual shovel test locations. Please ensure that we receive accurate maps of the project area, which should encompass all the Area of Potential Effect (APE).

We appreciate the invitation to participate and monitor fieldwork; however, I will need to assess our availability during the planned timeline. Is your company willing to compensate Tribal experts for their time and traveling expenses during the fieldwork? I look forward to hearing from you.

Miigwech,

Alina J. Shively, THPO/THPO Director
Lac Vieux Desert Band of Lake Superior Chippewa Indians
P.O. Box 249
E23709 US Hwy 2 West
Watersmeet, MI 49969
(906) 358-0137 Office
(906) 287-0448 Cell
alina.shively@lvd-nsn.gov

From: Lisa McGeshick <lisa.mcgeshick@LVD-NSN.GOV>
Sent: Tuesday, May 7, 2024 11:05:43 AM

To: Alina Shively <alina.shively@LVD-NSN.GOV>
Subject: Fw: White Pine Copper, White Pine North Project

Looks like this was sent to Chairman and myself~

From: James Renn <jrenn@graypape.com>
Sent: Tuesday, May 7, 2024 10:25 AM
To: Jim Williams Jr <jim.williams@LVD-NSN.GOV>
Cc: Lisa McGeshick <lisa.mcgeshick@LVD-NSN.GOV>
Subject: White Pine Copper, White Pine North Project

The Honorable Chairman Williams,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Lac Vieux Desert Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Thanks,
Jim Renn

James C. Renn
Principal Investigator/Michigan Branch Manager
GRAY & PAPE
HERITAGE MANAGEMENT
950 South Ausable Trail
Grayling, Michigan 49738
Ph. 513.287.7700 (Main Office Cincinatti, OH)
Cell. 915.487.7082
Fax 513.287.7703
jrenn@graypape.com

Facebook | LinkedIn | Website

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HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Gena Kakkak
Menominee Indian Tribe of Wisconsin
W2908 Tribal Office Loop
Keshen, WI 54135
Phone 715-799-1500

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairwoman Kakkak,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Menominee Indian Tribe of Wisconsin to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Menominee Indian Tribe may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Menominee Indian Tribe.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,

Michael Striker
Archaeology Practice Leader

James C. Renn
Michigan Branch Manager

GRAY & PAPE
HERITAGE MANAGEMENT
Since 1987

1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Nicole Boyd
Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
5681South 630 Road
Bayfield, WI 54814
Phone 715-779-3700

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairwoman Boyd,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Red Cliff Band to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Red Cliff Band may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

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Phone 517-287-7700

Austin Lowes
Sault Ste. Marie Tribe of Chippewa Indians, Michigan
523 Ashmun Street
Sault Ste. Marie, MI 49783
Phone 906-635-6050

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairperson Lowes,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Sault Ste. Marie Tribe to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

- Following analysis, Gray & Pape will write a report that meets all MI SHPO standards. This report will document the results of all fieldwork and provide a summary of the natural and cultural setting of the Project. The report will describe each resource and management recommendations regarding any historical/architecture resource or archaeological sites identified during survey. A copy of the final report will be available upon request to Tribal Consulting Parties for their records.

Tribal Engagement

Gray & Pape recognizes the Sault Ste. Marie Tribe may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Sault Ste. Marie Tribe of Chippewa Indians.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,

Michael Striker
Archaeology Practice Leader

James C. Renn
Michigan Branch Manager

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1318 Main Street
Cincinnati, OH 45202
Phone 517-287-7700

Robert Vanzile
Sokaogon Chippewa Community, Wisconsin
6051 Sand Lake Road
Crandon, WI 54520
Phone 715-478-7500

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Vanzile,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the Sokaogon Chippewa Community to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

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Tribal Engagement

Gray & Pape recognizes the Sokaogon Chippewa Community may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the Sokaogon Chippewa Community.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,

Michael Striker
Archaeology Practice Leader

James C. Renn
Michigan Branch Manager

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Cincinnati, OH 45202
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Thomas Fowler
St. Croix Chippewa Indians of Wisconsin
24663 Angeline Avenue
Webster, WI 54893
Phone 715-349-2195

Re: White Pine Copper LLC, White Pine North Project – Archaeological, Cultural, and Historic Resources Review and Phase I Cultural Resources Survey

The Honorable Chairman Fowler,

On behalf of White Pine Copper LLC, Gray & Pape, Inc. (Gray & Pape) is initiating informal tribal engagement for the proposed White Pine North Project (the Project). White Pine Copper, LLC (WPC) is proposing an underground mine targeting mineralized resources previously undeveloped by the White Pine Mine in Ontonagon County, Michigan (Figure 1). As part of this process WPC has commenced various engineering and environmental studies to advance development of this project which includes cultural, historical, and archaeological studies to support design of the Project and meet regulatory requirements to secure environmental permits. We invite the St. Croix Chippewa Indians to engage in discussion on the identification of cultural resources that may be of concern to the tribe in the proposed Project area and to monitor or participate alongside Gray & Pape during Phase I fieldwork.

Scope of Work

For the Project, WPC has identified several tasks to be completed which includes a desktop review, the development of a Tribal and Historic Context Narrative for the White Pine Mine and surrounding communities, an archaeological survey with shovel testing, tribal engagement, and report production.

- Gray & Pape submitted a request on April 2, 2024, to review all available records and files archived with Michigan State Historic Preservation Office (MISHPO) to identify any previously recorded archaeological sites or surveys documented within 1.6-km (1-mile) of the Project area. This request generally takes between 30 and 45 days to be completed, receipt of all available files and records is anticipated in early May 2024.

- Gray & Pape historians who meet the Secretary of the Interior's Professional Qualification Standards for History and Architectural History, will conduct in-depth research and a Phase I survey of aboveground

resources within the Project Area, as supplied by the client, WWPC, located at the White Pine site in Ontonagon County, Michigan. The research portion of this task will take place, both via desktop and in person. Repositories that will be visited on-site for research includes, but are not limited to, the Ontonagon County Historical Society, the Ontonagon Township Library, and other local and regional sources uncovered during the preliminary pre-field research, particularly institutions specializing in mining in Michigan's Upper Peninsula.

- Gray & Pape archaeologists, who meet the Secretary of Interior's Professional Qualifications for Archaeology, will conduct Phase I fieldwork to locate and document significant cultural resources within the project area and to make recommendations for the proper management of these resources. The scope and methods of the survey will be defined by the results of the Desktop Review and the Tribal and Historic Context Narrative, but will include two types of survey, a Phase IA visual assessment and Phase IB shovel testing.

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Tribal Engagement

Gray & Pape recognizes the St. Croix Chippewa Indians may possess traditional knowledge and special expertise necessary for identifying, evaluating, assessing, avoiding, and resolving adverse effects to historic properties of religious and cultural significance to the Tribe. Gray & Pape invites the Tribe to participate in open, respectful dialogue regarding the proposed Project, the proposed Phase I cultural resources survey, and the identification of cultural resources significant to the St. Croix Chippewa Indians of Wisconsin.

We would also like to extend an invitation to interested tribal citizens to monitor or participate alongside Gray & Pape Staff during Phase I Archaeological Fieldwork at the White Pine North Project Area.

Gray & Pape will follow up receipt of this letter with a phone call to confirm the Tribe's expressed desire to participate in this informal engagement effort regarding the proposed Project and to schedule and coordinate participation

in the fieldwork if interested. Fieldwork is currently scheduled to occur the week of June 10, 2024. If desired, comments may be submitted to James Renn at jrenn@graypape.com or 915.487.7082. Please contact me if you have any questions or need any additional information. Thank you very much for your valuable time.

Sincerely,



Michael Striker
Archaeology Practice Leader



James C. Renn
Michigan Branch Manager

APPENDIX C: SHOVEL TEST LOG

OBJECT ID	Object Name	STP Type	Strat I Depth	Strat I Munsell	Strat I Texture	Strat II Depth	Strat II Munsell	Strat II Texture	Strat III Depth	Strat III Munsell	Strat III Texture	Comment
1	STP	ST-N	0-10	5YR 6/4	clay							
2	STP	ST-N	0-10	5YR 6/4	clay							
3	STP	ST-N	0-10	5YR 6/4	clay							
4	STP	ST-N	0-10	5YR 6/4	clay							
5	STP	ST-N	0-10	5YR 6/4	clay							
6	STP	ST-N	0-5	5YR 6/4	clay							
7	STP	ST-N	0-8	5YR 6/4	clay							
8	STP	ST-N	0-8	5YR 6/4	clay							
9	STP	ST-N	0-5	5YR 6/4	clay							
10	STP	ST-N	0-10	5YR 6/4	clay							
11	STP	ST-N	0-3	5YR 6/4	clay							
12	STP	ST-N	0-20	5YR 6/4	clay							
13	STP	ST-N	0-8	5YR 6/4	clay							
14	STP	ST-N	0-8	5YR 6/4	clay							
15	STP	ST-N	0-8	5YR 6/4	clay							
16	STP	ST-N	0-2	5YR 6/4	clay							
17	STP	ST-N	0-6	5YR 6/4	clay							
18	STP	ST-N	0-8	5YR 6/4	clay							
19	STP	ST-N	0-2	5YR 6/4	clay							
20	STP	ST-N	0-15	5YR 6/4	clay							
21	STP	ST-N	0-5	5YR 6/4	clay							
22	STP	ST-D	0-10	5YR 6/4	clay							secondary fill
23	STP	ST-D	0-10	5YR 6/4	clay							
24	STP	ST-D	0-10	5YR 6/4	clay							
25	STP	ST-D	0-10	5YR 6/4	clay							
26	STP	ST-D	0-10	5YR 6/4	clay							
27	STP	ST-D	0-10	5YR 6/4	clay							
28	STP	ST-D	0-10	5YR 6/4	clay							
29	STP	ST-D	0-10	5YR 6/4	clay							
30	STP	ST-D	0-7	5YR 6/4	clay							
31	STP	ST-D	0-10	5YR 6/4	Wet							
32	STP	ST-D	O -30	5YR 6/4	clay							
33	STP	ST-D	O -15	5YR 6/4	clay							
34	STP	ST-D	O - 10	5YR 6/4	clay							
35	STP	ST-D	O - 10	5YR 6/4	clay							
36	STP	ST-D	0-5	5YR 6/4	clay							
37	STP	ST-N	0-4	5YR 6/4	loam, clay	4-17	5YR 6/4	.clay				
38	STP	ST-N	0.-18	5YR 6/4	humates clay	18-36	5YR 6/4	clay				

OBJECT ID	Object Name	STP Type	Strat I Depth	Strat I Munsell	Strat I Texture	Strat II Depth	Strat II Munsell	Strat II Texture	Strat III Depth	Strat III Munsell	Strat III Texture	Comment
39	STP	ST-N	0-11	5YR 6/4	humates clay	11-30	5YR 6/4	clay				
40	STP	ST-N	0-11	5YR 6/4	humates	11-22	5YR 6/4	clay loam				
41	STP	ST-N	0-20	5YR 6/4	loam clay	20-30	5YR 6/4	clay				
42	STP	ST-N	0-10	5YR 6/4	loam clay	10-18	5YR 6/4	clay				
43	STP	ST-N	0-11	5YR 6/4	clay	10-24	5YR 6/4	clay				
44	STP	ST-N	0-10	5YR 6/4	clay	18-30	5YR 6/4	clay				
45	STP	ST-N	0-10	5YR 6/4		10-20	5YR 6/4	clay				
46	STP	ST-N	010	5YR 6/4	clay loam	10-20	5YR 6/4	clay loam	-20-38	2.5YR 5/8	clay	
47	STP	ST-N	0-18	5YR 6/4	clay loam	18-26	2.5YR 5/8	clay loam				
48	STP	ST-N	0-10	5YR 6/4	clay loam	10-18	2.5YR 5/8	clay				
49	STP	ST-N	0-10	5YR 6/4	clay loam	10-38	2.5YR 5/8	clay				
50	STP	ST-D	0-19	2.5YR 5/8	clay							
51	STP	ST-D	0-20	2.5YR 5/8	clay							
52	STP	ST-N	0-20	2.5YR 5/8	clay							
53	STP	ST-N	0-20	2.5YR 5/8	clay							
54	STP	ST-N	0-18	2.5YR 5/8	clay							
55	STP	ST-N	0-14	2.5YR 5/8	clay							
56	STP	ST-N	0-16	2.5YR 5/8	clay							
57	STP	ST-N	0-16	5YR 6/4	clay							
58	STP	ST-N	0-16	5YR 6/4	clay							
59	STP	ST-N	0-14	2.5YR 5/8	clay							
60	STP	ST-N	016	2.5YR 5/8	clay							
61	STP	ST-N	0-14	5YR 6/4	clay							
62	-STP	ST-N	0-14	5YR 6/4	clay							
63	STP	ST-N	0-13	5YR 6/4	clay							
64	STP	ST-N	0-16	2.5 yr 4/4	clay							
65	STP	ST-N	0-12	2.5YR 5/8	clay							
66	STP	ST-N	0-20	5YR 6/4	clay							
67	STP	ST-N	0-18	5YR 6/4	clay							
68	STP	ST-N	0-16	5YR 6/4	clay							
69	STP	ST-N	0-11	5YR 6/4	clay							
70	STP	ST-N	0-15	7.5yr 2.5/2	loam clay	15-19	5YR 6/4	clay				
71	STP	ST-N	0-18	5YR 6/4	clay							
72	STP	ST-N	0-16	5YR 6/4	clay							
73	STP	ST-D	0-20	2.5YR 5/8	clay							clay mixed with crushed limestone gravel
74	STP	ST-D	0-15	2.5YR 5/8	clay							clay with crushed gravel
75	STP	ST-D	0-25	2.5YR 5/8	clay loam gravel							push pile

OBJECT ID	Object Name	STP Type	Strat I Depth	Strat I Munsell	Strat I Texture	Strat II Depth	Strat II Munsell	Strat II Texture	Strat III Depth	Strat III Munsell	Strat III Texture	Comment
76	STP	ST-N	0-12	2.5YR 5/8	clay							
77	STP	ST-N	0-20	2.5YR 5/8	clay							
78	STP	ST-N	0-15	2.5YR 5/8	clay							
79	STP	ST-N	0-10	2.5YR 5/8	clay							
80	STP	ST-N	0-5	2.5YR 5/8	clay							
81	STP	ST-N	0-5	2.5YR 5/8	clay							
82	STP	ST-N	0-12	2.5YR 5/8	clay							
83	STP	ST-N	0-10	2.5YR 5/8	clay							
84	STP	ST-D	0-10	2.5YR 5/8	clay							
85	STP	ST-D	0-20	2.5YR 5/8	clay loam							
86	STP	ST-D	0-20	2.5YR 5/8	clay loam							
87	STP	ST-D	0-2	2.5YR 5/8	clay							
88	STP	ST-D	0-5	2.5YR 5/8	clay							
89	STP	ST-N	0-12	2.5YR 5/8	clay							
90	STP	ST-N	0-3	2.5YR 5/8	clay							
91	STP	ST-N	0-25	2.5YR 5/8	clay loam							
92	STP	ST-N	0-15	2.5YR 5/8	clay							
93	STP	ST-D	0-2	2.5YR 5/8	clay							
94	STP	ST-D	0-2	2.5YR 5/8	clay							
95	STP	ST-D	0-4	2.5YR 5/8	clay							
96	STP	ST-D	0-4	2.5YR 5/8	clay							
97	STP	ST-D	0-10	2.5YR 5/8	clay							
98	STP	ST-N	0-10	2.5YR 5/8	clay							
99	STP	ST-N	0-5	2.5YR 5/8	clay							
100	STP	ST-N	0-3	2.5YR 5/8	clay							
101	STP	ST-N	0-12	2.5YR 5/8	clay							
102	STP	ST-N	0-3	2.5YR 5/8	clay							
103	STP	ST-N	0-5	2.5YR 5/8	clay							

Appendix H

Aesthetics (Noise, Visual, Vibrations)

H-1 Lighting Impact Assessment
H-2 Noise and Vibration Analysis Report

H-1

Lighting Impact Assessment

Lighting Impact Assessment

Assessment of the Change in Lighting at Night due to the White Pine North Project

Date:
July 3, 2026

Prepared for:
White Pine Copper LLC

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Project/File:
193710518

Stantec

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Revision	Description	Author	Date	Quality Check	Date
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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by White Pine Copper LLC (White Pine) to conduct a Lighting Impact Assessment for the White Pine North Project (the Project) located in White Pine, Michigan.

The lighting impact assessment includes baseline monitoring of existing lighting conditions, and modeling of the lighting from the Project based on the intended lighting design for the Project activities during construction and operation. The predicted light levels in the nearby community were compared to international guidelines levels of illuminance, glare, and sky glow.

Existing nighttime light conditions were characterized through baseline monitoring at receptor locations near to the project area. The baseline monitoring conducted at each receptor location included measurements of illuminance and sky glow, and occurred during period of clear skies and no moon. The light levels at each of the monitoring locations except for in the town of White Pine were consistent with the relatively uninhabited rural area.

An initial lighting design for the Project was completed by Ausenco Engineering Canada, ULC (Ausenco) and used as the basis for the Lighting Impact Assessment. Exterior lighting at night is predominantly required for hauling and vehicle traffic on site, and safety lighting near the processing plant. The lighting design incorporated luminaires with a full cut-off design to reduce environmental impacts. Light trespass, glare, and upward light ratio were predicted using the AGi32 photometric analysis software. AGi32 is an industry standard commercial software package used for industrial lighting design.

The trespass, glare, and upward light ratio levels are predicted to comply with guidelines developed by the Commission Internationale de l'Éclairage for each of the nearby receptors. Illuminance is predicted to be less than 0.001 lux within 200 m of the luminaires.

1 Introduction

Stantec Consulting Ltd. (Stantec) was retained by White Pine Copper LLC (White Pine) to conduct a Lighting Impact Assessment for the White Pine North Project (the Project) located in White Pine, Michigan.

The Lighting Impact Assessment has been completed as part of an assessment of the potential impacts of the Project on the environment. The Lighting Impact Assessment provides an overview of the existing conditions in the Project area and predicts the potential effects of lighting on nearby sensitive receptors.

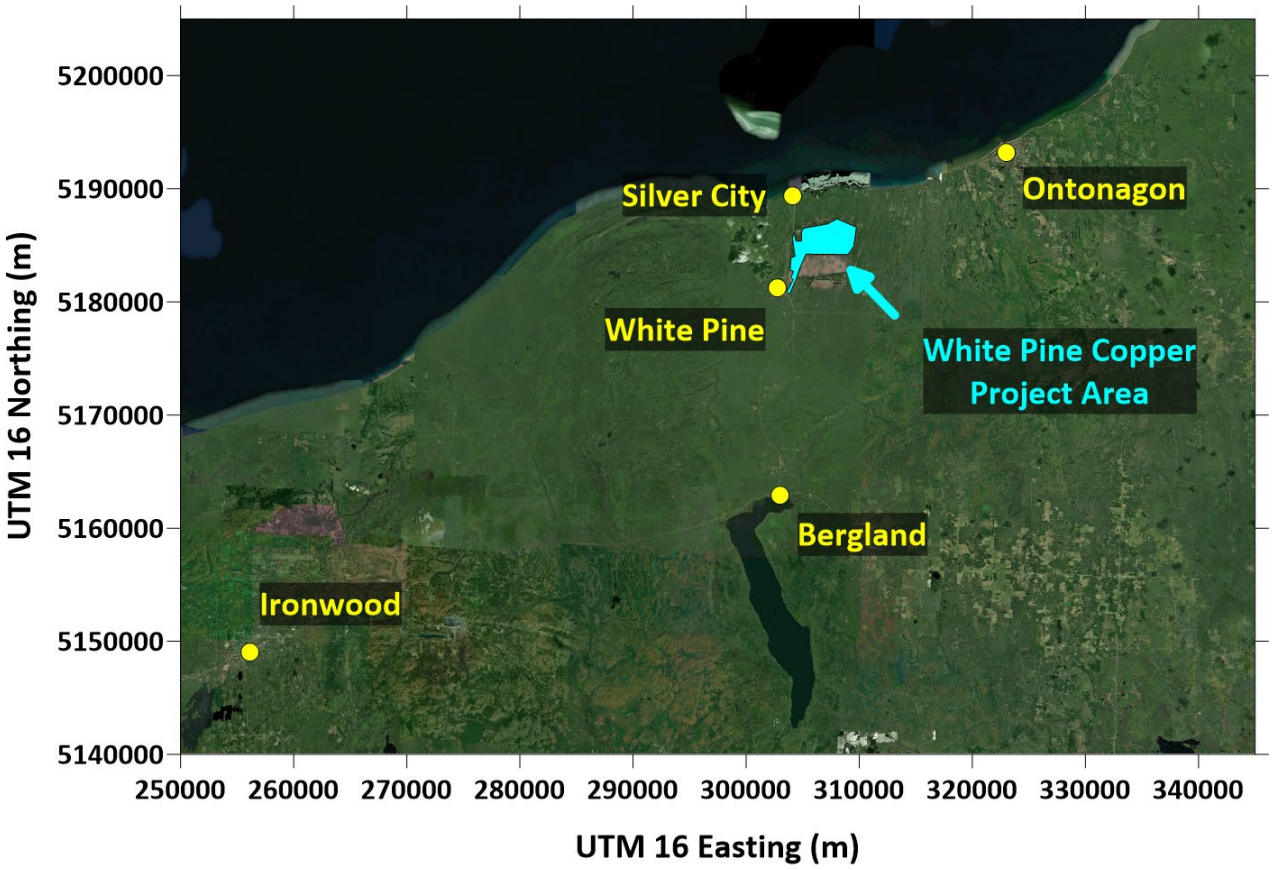
1.1 Project description

White Pine Copper is wholly owned by Kinterra Copper USA LLC. White Pine is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan. The White Pine Mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and the South Dam. Mining and processing ceased in 1997.

White Pine is planning to mine underground east of, and separate from, the historic underground mine workings of White Pine Mine. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams.

The proposed boundary of the Project along with the location of select towns near the Project are shown in Figure 1.1.

Figure 1.1 Project Location



2 Lighting Impact Assessment Methodology

Lighting associated with an industrial development is critical to the safe and efficient operation of the enterprise. Excessive or poorly designed lighting can have detrimental effects on the environment; whereas careful and progressive design can achieve the operational requirements while minimizing the residual impact to the environment.

The lighting impact assessment includes baseline monitoring of existing lighting conditions, and modelling of the changes in light levels during the operation of the Project.

2.1 Types of Obtrusive Light

The potential exposure of nearby receptors to obtrusive lighting is typically categorized using three attributes:

- Light Trespass, also known as light spill, is a measure of light levels beyond the intended area being lit. Light trespass reaches problematic levels, for example, when lights (also referred to as luminaires) located on the outside of an industrial facility shine in through the windows of nearby

residential homes at levels that could disrupt sleep or distract from normal levels. The unit of measure for light trespass is called the illuminance and is typically measured in lux. A lux is equal to one lumen of lighting up an area of one square meter (m^2), or one lumen/m^2.

- Glare is a measure of the contrast between the ambient light environment and specific luminaires within an individual's line of sight. The most common example of glare is oncoming high-beam vehicle headlights that provide ample light for the driver in the oncoming vehicle but result in potentially hazardous conditions of poor visibility for the driver meeting the oncoming vehicle. The unit of measure for brightness is luminance, which is equal to lumens per steradian, and measured in candela (cd).
- Sky Glow is the illumination of the clouds by light sources on the surface of the Earth, such as street lighting, and haze in the atmosphere that replaces the natural nighttime sky with a translucent to opaque lighted dome. When present, the sky appears washed out and may be devoid of visible stars in the extreme. Sky glow is the cumulative effect of many lights at the earth's surface either emitting upward or being reflected upward by the surface plus the emission from photochemical activity in the atmosphere. The typical unit of measure for sky glow is magnitudes per square arcsecond (mag/arcsec^2), which relates the sky's average brightness to the magnitude scale used to describe the brightness of celestial objects. Another way to measure changes in contributions to sky glow is by estimating the amount of light directed above the horizon, also known as the upward light ratio.

3 Regulatory Background

Most lighting guidelines and regulations have been directed toward the provision of suitable lighting for the safe and efficient activities of humans. For example, street lighting, indoor lighting and lighting around industrial plants are all subjects of various guidelines to facilitate a safe work environment.

Currently there are no legally binding requirements in Michigan to regulate obtrusive light being emitted from facilities; however, there are some requirements for assessing the impacts of lighting on the environment through the Environmental Impact Assessment process in Michigan (Mich. Admin. Code R. 425.202, 2006).

Baseline studies required for the Project are rooted in the requirements for the Environmental Impact Assessment specified in the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 632 Regulation, R425.201(1)(c). The baseline studies are required to provide a comprehensive data set for assessing potential impacts from the Project. Characterization of the impacts from lighting from the Project is required under R425.202 (2)(jj), and includes the following:

- Characterization of existing light and visual properties in and around the Project area
- Identification of potential receptors
- Analysis of impacts to potential receptors and to baseline light and visual conditions of the Project area

- Appropriate best management practices and mitigation measures that can reduce or eliminate potential impacts

4 Light Impact Assessment Criteria

There are international organizations, including the International Dark Sky Association (IDA) and the Commission Internationale de L'Éclairage (CIE), also known as the International Commission on Illumination, that have developed guidelines and recommendations to limit light pollution and associated impacts to humans and wildlife. The Illuminating Engineering Society of North America (IESNA) and the Unites States Bureau of Land Management have adopted such guidelines and recommendations for use in developing new outdoor lighting (Sullivan et al. 2023).

CIE has established guidelines for light trespass and sky glow for various levels of urban development. These guidelines have been adopted by regulators in the United Kingdom and Canada, and have also been incorporated into best practices recommended by the Illumination Engineering Society (IES 2011).

The values represented in the guidelines are based on environmental zones and time of day. Five environmental zones have been established by the CIE as a basis for outdoor lighting (CIE 2017). The five zones are listed in Table 4.1.

Table 4.1 Environmental Zones for Nighttime Lighting

Zone	Lighting Environment	Examples
E0	Intrinsically dark	Dark Sky Parks
E1	Dark	Relatively uninhabited rural areas
E2	Low distinct brightness	Sparsely inhabited rural areas
E3	Medium distinct brightness	Well inhabited rural and urban settlements
E4	High distinct brightness	Town and city centres and other commercial areas

Source: CIE (2017)

The maximum values recommended by CIE for light trespass (illuminance) on properties by environmental zone and time of day are presented in Table 4.2.

Table 4.2 Illuminance Guidelines Levels by Time of Day and Environmental Zone

Time of Day	Environmental Zones				
	E0	E1	E2	E3	E4
19:00 – 23:00	n/a	2 lux	5 lux	10 lux	25 lux
23:00 – 6:00	n/a	0 lux	1 lux	2 lux	5 lux

Source: CIE (2017)

The guidelines levels recommended by the CIE for glare depend on the distance from the light source and the apparent size of the luminaire from the perspective of the receptor. The recommended glare values by environmental zone and time of day are presented in Table 4.3.

Table 4.3 Glare Guideline Values by Time of Day and Environmental Zone

Environmental Zone	Recommended Glare Threshold (candela) by Time of Day	
	19:00 – 23:00	**23:00 – 6:00**
E0	0	0
E1	0.29 * d	0
E2	0.57 * d	0.29 * d
E3	0.86 * d	0.29 * d
E4	1.4 * d	0.29 *

Source: CIE (2017)
Note: d is the distance in meters between the luminaire and the receptor

Sky glow is addressed by the CIE by calculating the upward light ratio for luminaires from the Project. The upward light ratio is the total lumens directed above the horizon divided by the total lumens emitted by the luminaire. The maximum values recommended by CIE for upward light ratio by environmental zone and time of day are presented in Table 4.4.

Table 4.4 Upward Light Ratio Guideline Levels by Environmental Zone

Criterion	Environmental Zones				
	E0	**E1**	**E2**	**E3**	**E4**
Upward Light Ratio (%)	0%	0%	2.5%	5%	15%

Source: CIE (2017)

5 Existing Conditions

Existing nighttime light conditions were characterized through baseline monitoring at receptor locations near to the project area. The location of receptor locations near the project are shown in Figure 5.1.

Baseline monitoring locations were selected to characterize light levels for receptor locations near the project area. The selected baseline monitoring locations are also shown in Figure 5.1 and summarized in Table 5.1. Some locations were selected to characterize more rural areas near the project site, while other locations were chosen to be in more developed areas close to the project. Two locations were selected to capture nighttime light conditions in Porcupine Mountains State Park.

Baseline monitoring at each site included measurements of illuminance (lux) and sky glow. Illuminance was measured using a conventional, integrating hemispherical light metre (Extech EA33) with a resolution of 0.01 lux. Sky glow was measured using a Unihedron Sky Quality Meter with lens (SQM-L). This meter was developed for astronomical applications to document the level of sky brightness, with the measurement consisting of light within an approximate 60 degree solid angle of sky. This instrument measures in magnitudes/square arc-second (mag/arcsec^2).

Prior to conducting the baseline light assessment, the sky condition forecast was reviewed to confirm clear skies without cloud cover and without the moon in the sky during the measurements.

Figure 5.1 Nearby Potential Receptors and Baseline Light Monitoring Locations

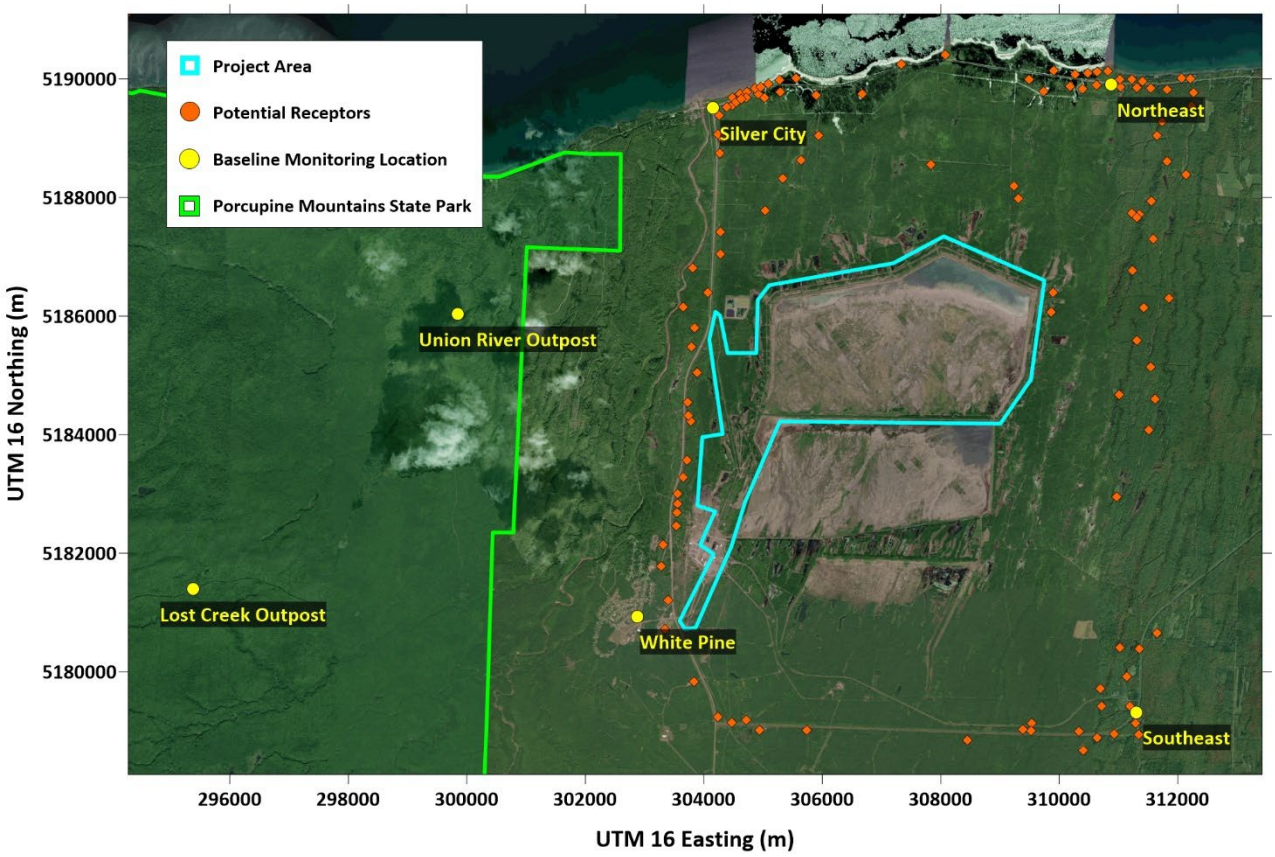


Table 5.1 Baseline Light Monitoring Locations

Location Name	Coordinates (UTM 16)		Rationale
	Easting (m)	Northing (m)	
Lost Creek Outpost	295376	5181394	Nearby park area that is a popular camping location
Union River Outpost	299848	5186034	Nearby park area that is a popular camping location
Silver City	304156	5189510	Nearby community with several dwellings
White Pine	302882	5180932	Closest town with many dwellings
Northeast	310871	5189904	Relatively rural area with some dwellings
Southeast	311304	5179319	Relatively rural area with some dwellings

Baseline light measurements were collected on September 19, 2025, during conditions of clear skies, no snow cover, and during periods when the moon was below the horizon. Follow-up monitoring was attempted in November 2025 to represent winter conditions including snow cover and reduced tree foliage; however. the meteorological conditions were cloudy during the monitoring event and thus the follow up monitoring was not completed at that time.

The illuminance and sky glow measurements from the September 2025 monitoring event are shown in Table 5.2 for each location. Measurements of incident light (light trespass) were below 0.01 Lux at each monitoring location.

Table 5.2 Summary of Baseline Light Measurements

Site	**Average Sky Brightness (mag/arcsec^2)**	**Light Trespass[1] (Lux)**	**CIE Environmental Zone**
Lost Creek Outpost	21.7	< 0.01	E1
Union River Outpost	21.8	< 0.01	E1
Silver City	21.5	< 0.01	E1
White Pine	20.7	< 0.01	E2
Northeast	21.5	< 0.01	E1
Southeast	21.5	< 0.01	E1
[1] Lux levels were below instrument detection limit			

The light levels at each of the monitoring locations (except for White Pine) were consistent with the relatively uninhabited rural area environmental zone E1. Higher sky brightness (20.7) was measured within the town of White Pine. The difference is likely due to the increased number of lights from roadways and residences in the town. The measurements are more consistent with the environmental zone E2.

6 Light Impact Assessment

An initial lighting design was completed by Ausenco and used as the basis for the Lighting Impact Assessment. Exterior lighting is predominantly required for safe night time hauling and vehicle traffic on site, and safety lighting near the processing plant. Drawings showing the locations of the luminaires are provided in Appendix A.

6.1 Predictive Modelling Approach

Light trespass, glare, and upward light ratio were predicted using the AGi32 photometric analysis software. AGi32 is an industry standard commercial software package used for industrial lighting design. Features of AGi32 include:

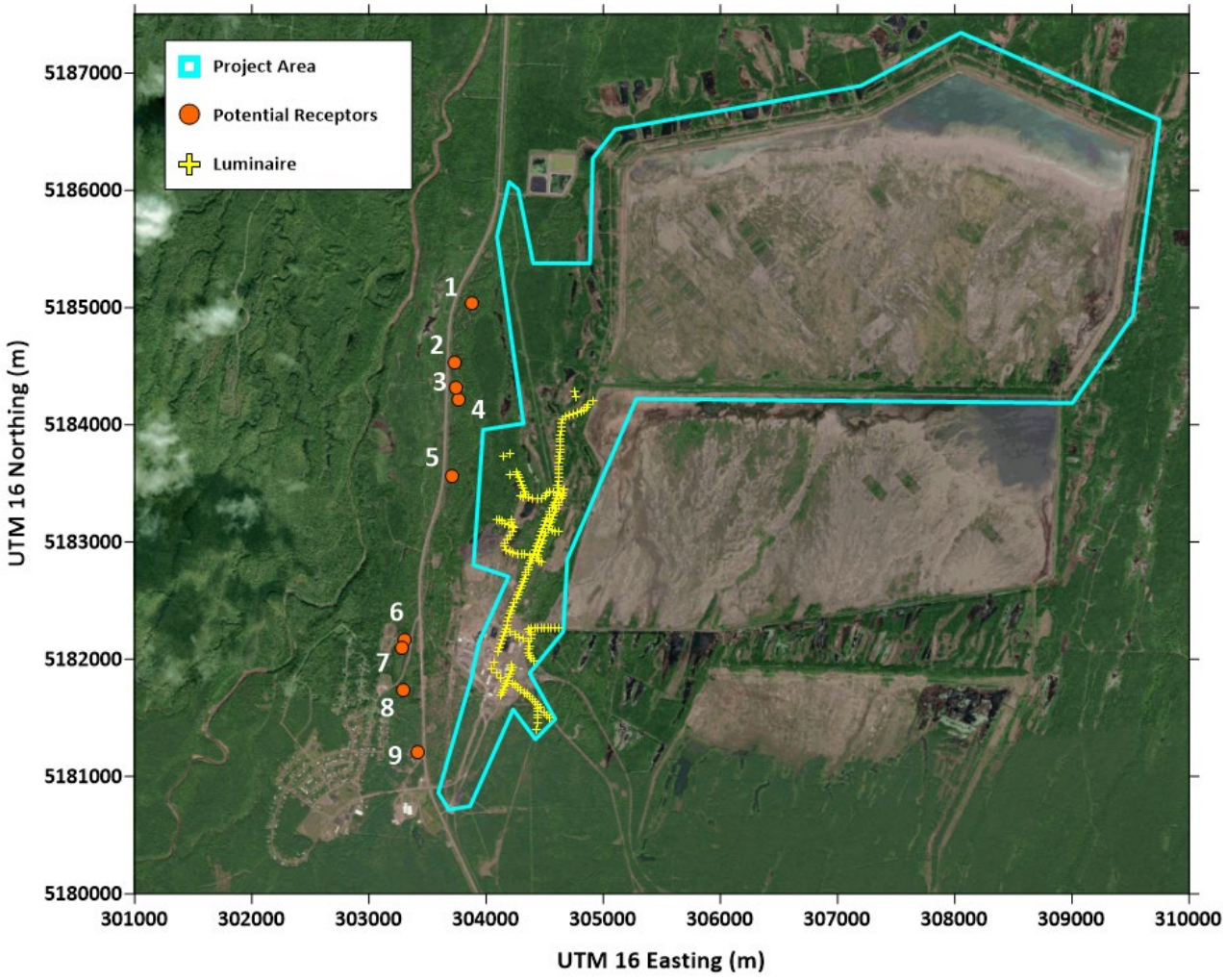
- Creating 3D models of Project site layouts to scale that incorporate distribution optics, mounting height, tilt, rotation, and electrical power;

- Utilizing international standard photometry data for luminaires;
- Providing realistic textures and colours for objects and buildings created in the 3D model; and
- Inserting calculation areas and points, via 3D objects, into the model to represent receptor locations.

An AGi32 model was created based on the lighting plans provided by Ausenco. Those plans are shown in Appendix A.

The nearest receptors to the project are located to the west of the Project area and are shown in Figure 6.1, along with the location of the project luminaires. Specifications for the luminaires are provided in Appendix B. The luminaires were full cut-off fixtures that also reduce backlight, uplight, and glare. Each of the luminaires used for road lighting were set to a height of 25 feet.

Figure 6.1 Location of Nearby Receptors and Planned Locations of Project Luminaires



6.2 Predictive Modelling Results

The predicted levels of light trespass, glare, and upward light ratio resulting from the Project are presented in Table 6.2. The light trespass values shown in Table 6.2 are shown to the detection limit of most incident light meters and indicate no measurable increase in lux from the Project at the receptors.

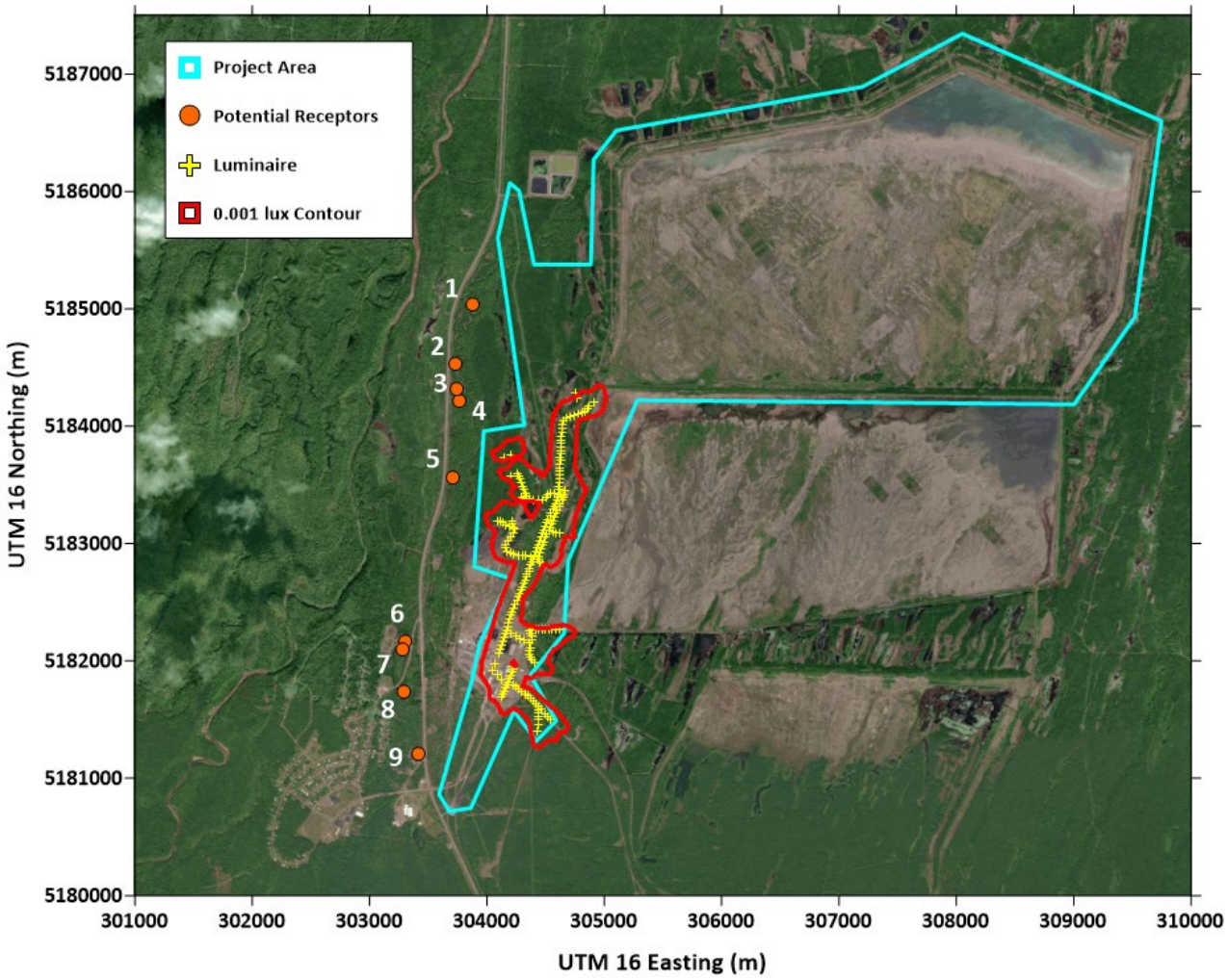
The applicable CIE guidelines levels are also shown in Table 6.2. The trespass, glare, and upward light ratio levels are predicted to be well below CIE guidelines for each of the nearby receptors. The predicted illuminance levels are also shown in Figure 6.2. Illuminance is predicted to be less than 0.001 lux within 200 m of the luminaires. The luminaires proposed for the lighting design follow best management practices by being full-cut off fixtures that reduce light impacts.

Additional mitigation measures are not required or proposed in order to meet the CIE guideline levels.

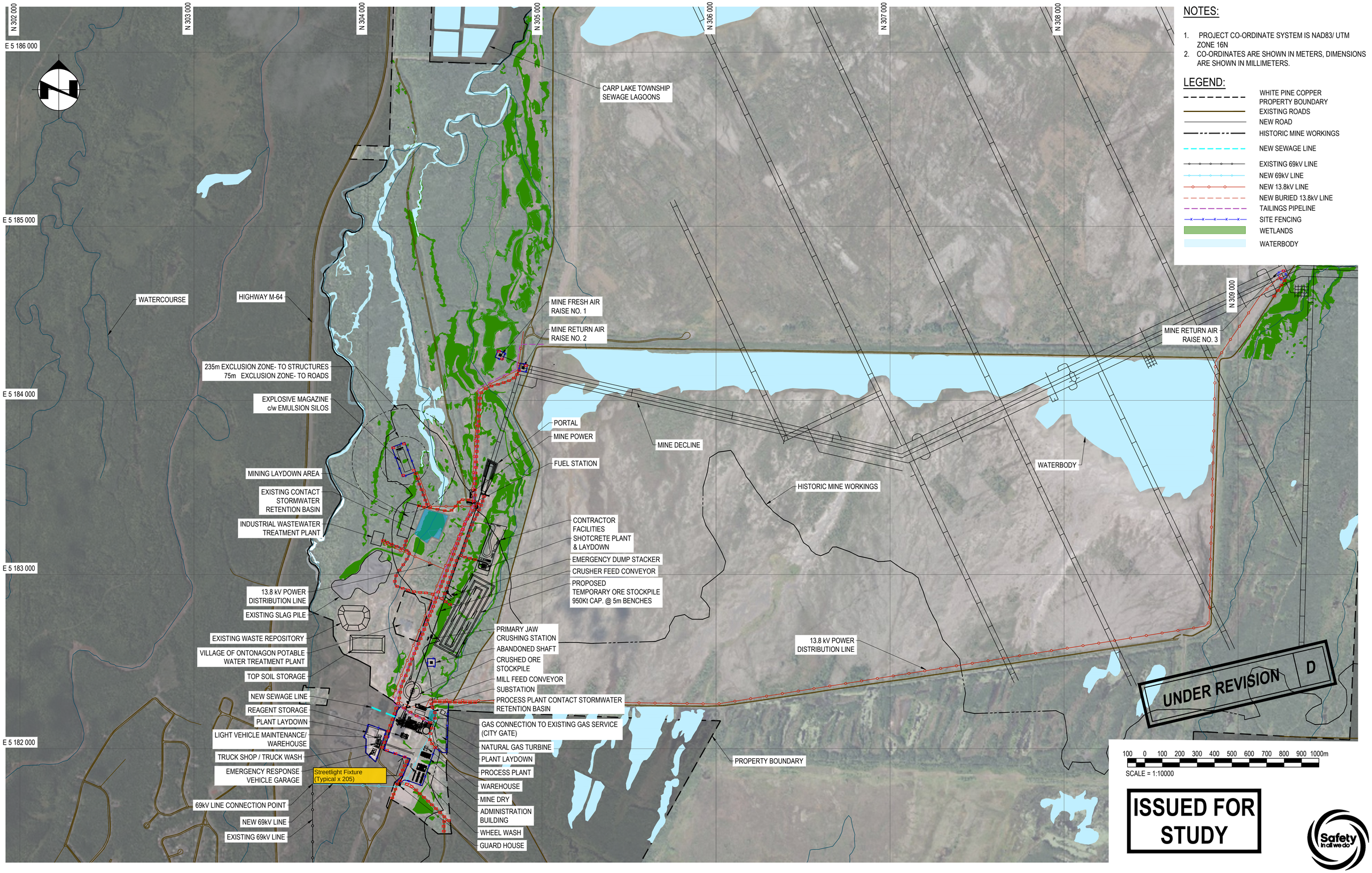
Table 6.1 Predicted Light Levels from Project Lighting and Applicable CIE Guidelines

Receptor Location	Predicted Light Trespass (Lux)	CIE Guidelines for Light Trespass (Lux)	Predicted Maximum Glare (cd)	CIE Guidelines for Glare (cd)	Predicted Upward Light Ratio (%)	CIE Guidelines for Upward Light Ratio (%)
1	< 0.001	< 0.1	0	0	0%	0%
2	< 0.001	< 0.1	0	0	0%	0%
3	< 0.001	< 0.1	0	0	0%	0%
4	< 0.001	< 0.1	0	0	0%	0%
5	< 0.001	< 0.1	0	0	0%	0%
6	< 0.001	< 0.1	0	0	0%	0%
7	< 0.001	< 0.1	0	0	0%	0%
8	< 0.001	< 0.1	0	0	0%	0%
9	< 0.001	< 0.1	0	0	0%	0%

Figure 6.2 Predicted Illuminance Levels (lux) from Project Lighting



Appendix A Lighting Design



NOTES:

1. PROJECT CO-ORDINATE SYSTEM IS NAD83/ UTM ZONE 16N
2. CO-ORDINATES ARE SHOWN IN METERS, DIMENSIONS ARE SHOWN IN MILLIMETERS.

LEGEND:

- WHITE PINE COPPER PROPERTY BOUNDARY
- EXISTING ROADS
- NEW ROAD
- HISTORIC MINE WORKINGS
- NEW SEWAGE LINE
- EXISTING 69kV LINE
- NEW 69kV LINE
- NEW 13.8kV LINE
- NEW BURIED 13.8kV LINE
- TAILINGS PIPELINE
- SITE FENCING
- WETLANDS
- WATERBODY

ISSUED FOR STUDY

Safety in all we do

WHITE PINE COPPER

DRAWING No.	REFERENCE DRAWING TITLE	No	BY	DATE	REVISION DETAILS	CHKD	ENG	APPR
		D	RJ	02MAR2026	ISSUED FOR STUDY	JR		DM
		C	RJ	19JAN2026	ISSUED FOR CLIENT REVIEW	JR		DM
		B	RJ	18DEC2025	ISSUED FOR CLIENT REVIEW	SB		DM
		A	RJ	17DEC2025	ISSUED FOR INTERNAL REVIEW	SB		DM

DRAWN	R.JOKI	25NOV2025
CHECKED	S. BOUGIE	16DEC2025
DESIGNED	R. JOKI	18NOV2025
DES. APPR	D. MOSQUEIRA	16DEC2025
PROJ APPR		

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Ausenco

CLIENT: WHITE PINE COPPER

TITLE: WHITE PINE COPPER NORTH PROJECT
PRE-FEASIBILITY STUDY
OVERALL SITE LAYOUT
GENERAL ARRANGEMENT

PROJ No

COPYRIGHT © Ausenco

SIZE A1

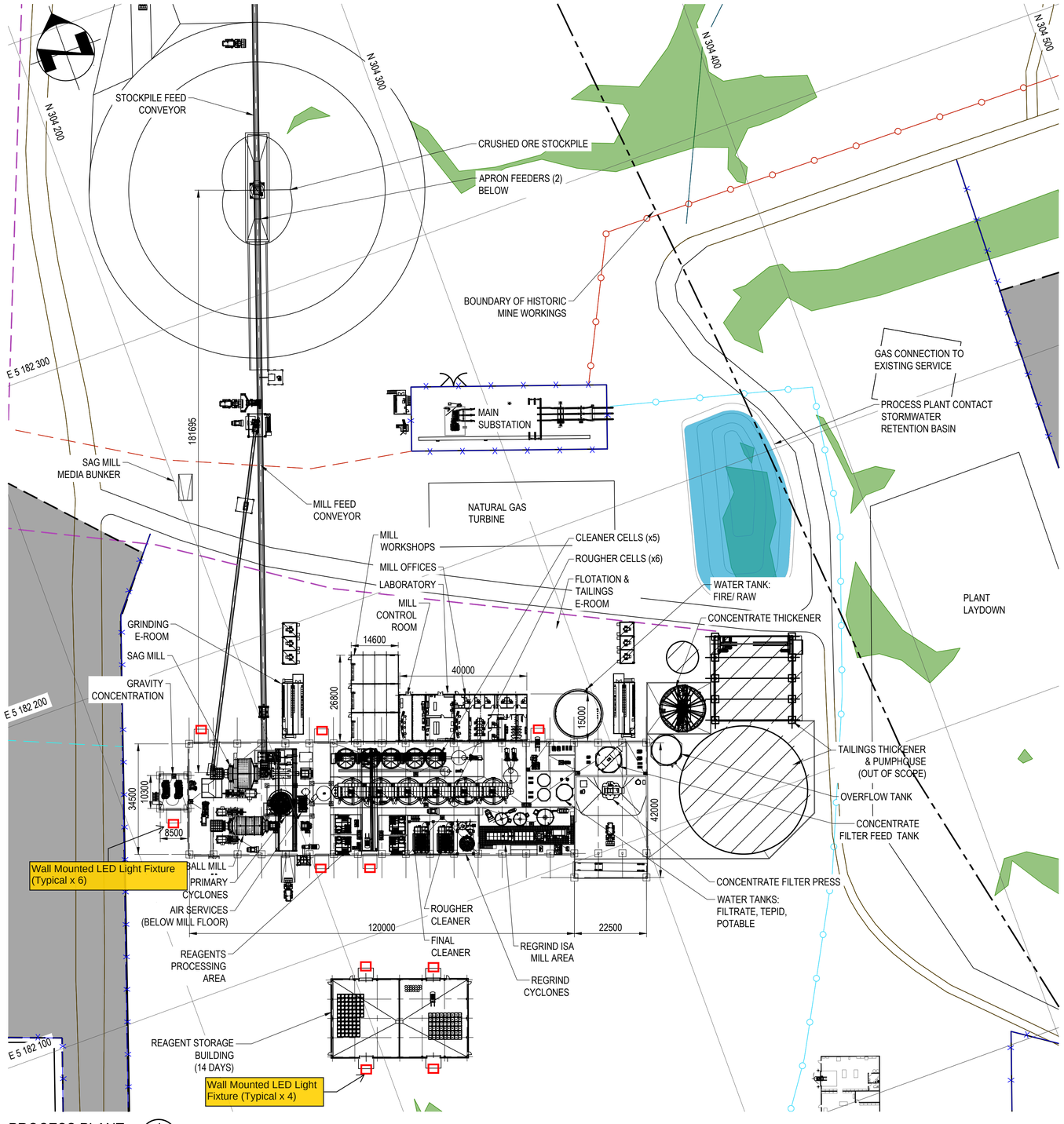
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SHEET 1 OF 1

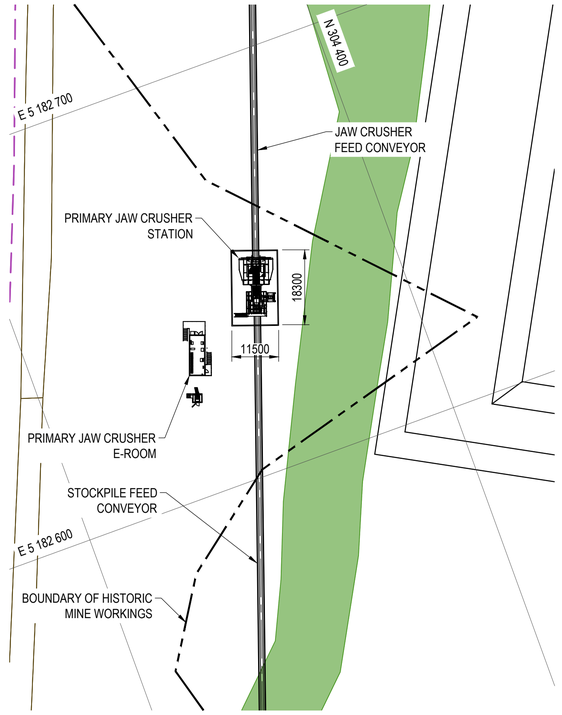
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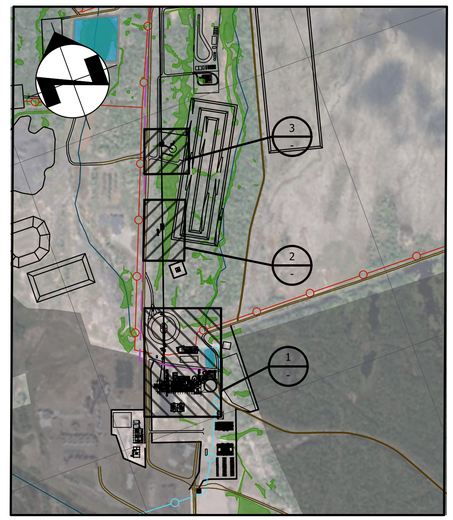
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PROCESS PLANT 1
1:750



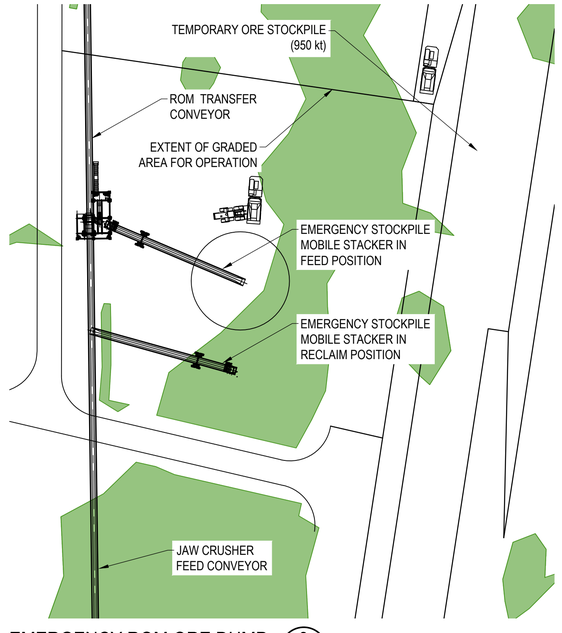
CRUSHING PLANT 2
1:750



KEY PLAN

NOTES:

1. PROJECT CO-ORDINATE SYSTEM IS NAD83/ UTM ZONE 16N
2. CO-ORDINATES ARE SHOWN IN METERS, DIMENSIONS ARE SHOWN IN MILLIMETERS.



EMERGENCY ROM ORE DUMP 3
1:750

LEGEND:

- WHITE PINE COPPER PROPERTY BOUNDARY
- EXISTING ROADS
- NEW ROAD
- HISTORIC MINE WORKINGS
- NEW SEWAGE LINE
- EXISTING 69kV LINE
- NEW 69kV LINE
- NEW 13.8kV LINE
- NEW BURIED 13.8kV LINE
- TAILINGS PIPELINE
- SITE FENCING
- WETLANDS
- WATERBODY
- OUT OF SCOPE

UNDER REVISION D

1 : 750 — 7.5 0 7.5 15 22.5 30 37.5 m

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No	BY	DATE	REVISION DETAILS	CHKD	ENG	APPR
D	RJ	02MAR2026	ISSUED FOR STUDY	JR		DM
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DRAWN	R.JOKI	25NOV2025
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CLIENT: WHITE PINE COPPER

TITLE: WHITE PINE COPPER NORTH PROJECT
PRE-FEASIBILITY STUDY
PROCESS PLANT AREA
GENERAL ARRANGEMENT

PROJ No | COPYRIGHT © Ausenco | SIZE A1
SCALE 1:750 | SHEET 1 OF 1
DRAWING No 108571-GX-00000-31345-002-02 | REV D
CLIENT DRAWING No

Appendix B Luminaire Specifications

Project		Catalog #		Type	
Prepared by		Notes		Date	



Streetworks

Caretaker

Dusk-to-Dawn Area/Roadway Luminaire

Interactive Menu

- **Ordering Information** page 2
- **Full Dimensional Details** page 3
- **Mouting Details** page 3
- **Energy and Performance Data** page 4
- **Control Options** page 7

Product Certifications & Features

Product Specifications

PHYSICAL CHARACTERISTICS

- Robust die-cast aluminum housing for durability
- Stamped aluminum door accessible via single captive screw
- Corrosion-resistant hardware for harsh environments
- 2.5-mil nominal thickness for coastal construction environments

OPTICAL

- Precision molded optics optimizes light distribution, increases efficiency, and provides maximum coverage in T2, T3, and T5R distributions
- 7 lumen packages at 4000K CCT, with optional packages at 3000K / 70CRI, 5000K / 70CRI, and 2700K / 80CRI
- Compatible with SR Acrylic refractor and ANSI/ NEMA Standard refractor assembly
- Field-installable house-side shields available for superior spill light control

ELECTRICAL

- The luminaire comes with a standard universal voltage LED driver with 0-10V control having an integrated 6kV surge protection
- Parallel or series protection levels of 10kV or 20kV offered
- Standard 3-position terminal block
- Pre-set to highest position at selected lumen output

MOUNTING

- Luminaire has been specifically designed to fit pipe-arms with an outer diameter ranging from 1-5/8' to 2-3/8'
- Available with bracket for mounting to wood, square pole, or wall without pipe-arm

FINISH

- Luminaire comes in unfinished raw aluminum as standard
- Optional five-stage super TGIC polyester powder coat paint for superior protection

CONTROLS

- Optional Field Adjustable Dimming Control (FADC) module allows for manual adjustment of lumen output and power usage; factory preset to highest output level. Enables a single SKU to cover multiple field applications
- Fully compatible with CLS Trellix Infrastructure UNB (Ultra Narrow Band) and cellular network lighting controls platforms. Enables wireless collection of luminaire performance and status data and asset management for luminaires installed in the field
- Optional 4-pin Zhaga Book 18 receptacle for integration of onboard sensors with DALI-enabled drivers

COMPLIANCE

- Meets ANSI C136.25 for IP66 Optical enclosure rating
- Meets ANSI C136.31 for 3G luminaire vibration. Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications
- Meets ANSI C136.15 for luminaire field identification label standard
- Meets ANSI C136.22 internal label standard
- Safety listing - Wet Location UL 1598
- U0 option provides a full cutoff with a spun aluminum shield
- DarkSky approved for 3000K CCT and warmer, with mounting options less than 10° of tilt
- DLC and DLC Premium listed- visit designlights.org to confirm listed variations
- BAA domestic preference option meets BAA requirements. See DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information
- FHWA and FTA agencies are utilizing their BAA rules for BABA compliance. Cooper's products with a BAA designation are manufactured in the US and utilize a BAA COTS exemption rule for compliance. To verify a configured product with specific accessories and options meet BABA Domestic Preference Requirements; submit this catalog number to Cooper Lighting Quotation team for validation by our Engineering and Manufacturing teams. Please refer to the DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information. Components shipped separately may be separately analyzed under domestic preference requirements

SHIPPING DATA

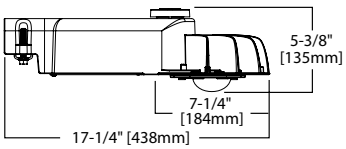
- Approximate Weight: 6.5 lbs | 7 lbs with refractor
- EPA:0.48 | 0.56 with refractor
- Carton Size: 19.56" x 6.38" x 11.63
  - » With SR Lens: 19.38" x 8.2" x 11.88"
  - » With Arm: 25.5 x 8.5" x 12.88"
- Pallet Size: 42" x 50"
  - » With SR Lens: 42" x 50"
  - » With Arm: 44" x 42"
- Cartons/Pallet: 56
  - » With SR Lens: 35
  - » With Arm: 20

WARRANTY

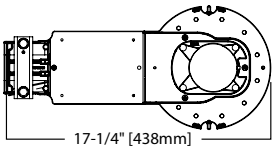
- Five-year limited warranty. Consult website for details. www.cooperlighting.com/legal

Dimensional Overview

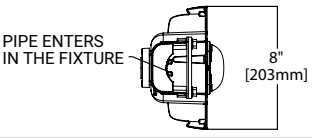
Standard (by it self)



Small arcylic refractor (order separately)



Zero uplight shield (order separately)



Ordering Information

SAMPLE ORDER NUMBER:

Product Family	Light Engine	Driver	Voltage	Distribution
CRTK2=Caretaker **BAA-CRTK2**=Caretaker, Buy American Act Compliant [9] **TAA-CRTK2**=Caretaker, Trade Agreements Act Compliant [9] **BABA-CRTK2**=Caretaker, Build America Buy America Act Compliant [19]	**C013**=1 LED, Approximately 30% Output **C015**=1 LED, Approximately 50% Output **C016**=1 LED, Approximately 60% Output **C018**=1 LED, Approximately 80% Output **C01**=1 LED, Full Output **C01H**=1 LED, High Lumen Output **C01HO**=1 LED, Very High Lumen Output [12]	**D**=Dimming (0-10V) **5LTD**=DALI [12]	**U**=Universal (120-277V)	**T2**=Type II **T3**=Type III **T5R**=Type V Round

Options (Add as Suffix)	Controls	Color	Accessories (Order Separately)
7030=70 CRI / 3000K **7050**=70 CRI / 5000K **8027**=80 CRI / 2700K **SR**=Small Acrylic Refractor (Factory Installed) **TSR**=Tool-less Small Acrylic Refractor (Factory Installed) **U0**=Zero Uplight Shield [1, 13] **TH**=Tool-less Door Hardware **4N7**= NEMA 7-PIN Photocontrol Receptacle **S**=Shorting Cap **10K**=10kV UL 1449 Surge Protection Device **10MSP**=10kV MOV Surge Protection Device **20K**=20kV UL 1449 Surge Protection Device **20MSP**=20kV MOV Surge Protection Device **CC**=Coastal Construction [2] **V**=(3) 5' #14 External Leads [14] **B18**=18" Wood Pole Pipe Arm [16] **B24**=24" Wood Pole Pipe Arm [16] **B30**=30" Wood Pole Pipe Arm [16] **WPBKT**=Wall or Pole Mounting Bracket **5**=120V NEMA Photocontrol Included [5] **LLPC**=Long-life Photocontrol **PW**=PackWise Packaging [15, 16] **Dxxxxx**=DOT Configuration - Contact Quotes Team **Uxxxxx**=Utility Configuration - Contact Quotes Team	**WLS2XX**= WaveLinx LITE, SR Driver, Dimming Motion and Daylight, Bluetooth Programmable, 7' - 15' Mounting [7, 8, 18] **WLS4XX**=WaveLinx LITE, SR Driver, Dimming Motion and Daylight, Bluetooth Programmable, 15' - 40' Mounting [7, 8, 18] **FADC**=Field Adjustable Dimming Controller [11, 17]	**A**=Raw Aluminum **AP**=Grey	**RMARROA5**=ANSI/NEMA Standard Refractor Assembly **SR-CARETAKER**=Small Acrylic Refractor **U0-XX**=Zero Uplight Shield [3] **LLPC**=Long-life Photocontrol **LLPC-FO**=Long-life Photocontrol (Fail Off) **HSS-CRTK2**=Field Install House Side Shield [4] **DS-HSS-CRTK2**=Drop Shield House Side Shield **OA1226**=10kV Surge Module Replacement **OA/RA1013**=Shorting Cap **VGS-F/B**=Vertical Glare Shield, Front/Back **VGS-SIDE**=Vertical Glare Shield, Side **FS-XX**=Fluted Decorative Shield [3] **HB-XX**=Hillbrook Bell Decorative Shield [3] **TSR-CARETAKER**=Tool-less Small Acrylic Refractor **B18PK**=18" Wood Pole Pipe Arm **B24PK**=24" Wood Pole Pipe Arm **B30PK**=30" Wood Pole Pipe Arm

NOTES:

1. U0 not offered with SR or TSR option
2. Anti-corrosion treatment on external components, external screws/mounting bolts, and standard pipe clamp
3. Replace XX with color
4. Not for use on T5R optical distribution
5. 120V input voltage only required
6. Not available with 10MSP or 20MSP surge options
7. Not available standard with 4N7 7-pin receptacle option. ETO required
8. Replace XX with sensor color desired. (WH, BZ, or BK)
9. Only product configurations with these prefixes are built to be compliant with the Buy America Act of 1933 (BAA) or Buy America Build America Act (BABA). Please see the Compliance section in Product Specifications for more detail
10. Customer specific specifications utilizes standard products with small adjustments to meet unique requirements such as packaging, labels, wattage adjustments, etc
11. Cannot be used with 4N7 or other motion response control options including 5LTD DALI driver. Control leads are used with FADC only when selected
12. C01HO not available with DALI driver
13. Required to be IDA Certified when used with 3000K and warmer CCTs
14. When leads are specified, the terminal block is replaced with serviceable connectors
15. 9% package dunnage reduction by weight. Only available in order increments of 20, quantity per carton
16. B18, B24, and B30 are not available with PackWise packaging
17. Cannot be used with PR7 or other motion response control options
18. Controls system is not available with photocontrol receptacles (PR , PR7) or other controls systems (FADC, SPBx)
19. FHWA and FTA agencies are utilizing their BAA rules for BABA compliance. Cooper's products with a BAA designation are manufactured in the US and utilize a BAA COTS exemption rule for compliance. To verify a configured product with specific accessories and options meet BABA Domestic Preference Requirements; submit this catalog number to Cooper Lighting Quotation team for validation by our Engineering and Manufacturing teams. Please refer to the DOMESTIC PREFERENCES website or consult the CLS Domestic Preferences team for more information. Components shipped separately may be separately analyzed under domestic preference requirements

Energy and Performance Data

Supplemental Lumen Tables | Caretaker IES Files

Power and Lumens (UNV) (70CRI - 4000K)

Light Engine		C013	C015	C016	C018	C01	C01H	C01HO
Power(Watts)		20	30	42	50	61.0	70	79
Wattage Label		20	30	40	50	60	70	80
Input Current @ 120V (A)		0.17	0.25	0.35	0.42	0.51	0.60	0.66
Input Current @ 277V (A)		0.07	0.11	0.15	0.18	0.25	0.28	0.29
Optics								
T2	Lumens	3,011	4,413	5,895	6,877	8,680	9,726	11,442
	BUG Rating	B1-U2-G1	B1-U3-G1	B1-U3-G2	B1-U3-G2	B2-U3-G2	B2-U3-G2	B2-U3-G3
	Lumens per Watt	148	148	142	136	142	139	145
T2-U0	Lumens	2,907	4,261	5,691	6,679	8,380	9,390	11,047
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U3-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2
	Lumens per Watt	143	143	137	133	137	134	140
T3	Lumens	3,052	4,473	5,975	6,971	8,798	9,858	11,598
	BUG Rating	B1-U2-G1	B1-U3-G1	B1-U3-G2	B1-U3-G2	B2-U3-G2	B2-U3-G2	B2-U3-G2
	Lumens per Watt	150	150	144	138	144	140	147
T3-U0	Lumens	2,941	4,310	5,758	6,717	8,478	9,500	11,176
	BUG Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	Lumens per Watt	144	144	138	133	139	135	141
T5R	Lumens	3,209	4,703	6,283	7,329	9,251	10,366	12,194
	BUG Rating	B2-U2-G1	B3-U2-G1	B3-U3-G1	B3-U3-G2	B3-U3-G2	B4-U3-G2	B4-U3-G2
	Lumens per Watt	157	157	151	145	152	148	154
T5R-U0	Lumens	3,167	4,642	6,200	7,233	9,130	10,230	12,035
	BUG Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2
	Lumens per Watt	155	155	149	144	150	146	152
T5R-SR	Lumens	3,162	4,634	6,191	7,222	9,115	10,214	12,016
	BUG Rating	B2-U3-G1	B3-U3-G2	B3-U3-G2	B3-U3-G2	B3-U3-G3	B4-U3-G3	B4-U3-G3
	Lumens per Watt	155	155	149	143	149	145	152

Define Luminaire

Add: Browse/Recent | Collections | Import | Instabase | Command resets 'Undo' sequence | Settings | Apply | Help | Cancel | Ok

Count 1

	Qty	Label	Description	Tag	LLF	Arrangeme	Drawing Sy	Polar Plot
▶	115	TYPE 2 POLE LIGHT	CRTK2-C01H-5TLD-U-T2-7030-U0	PL	0.599	SINGLE		

Photometric Center Offset From Insertion Point X 0.617 Y 0 Z -0.0015

Rotate Photometry 90-Degrees Clockwise | View Photometric File...

Metrics

Roadway Classification	Type II
Longitudinal Classification	Short
Upward Waste Light Ratio	0.00
Indoor Classification	Direct
Luminaire Efficacy Rating (LER)	126
Maximum UGR	47
BUG Rating	B2-U0-G2
Cutoff Classification (deprecated)	N.A.

More...

Symbols

Calculation: Factory Symbols \ Pole Arm -- Circular Cobra 2

Housing | Luminous | Insertion Point...

Vertical: Bottom

Horizontal: 180

Drawing: Factory Symbols \ Pole Arm -- Circular Cobra 2

Wireframe | Line Width: Pixel

Configuration

Pole or | Pendant Mounted

Dynamic: Attach to Z = | Static: Length = 7.62

Arrangement

Factory Arrangements \ Single

Arm Length 0.762

Lumen Maintenance

Light Engine	Ambient Temperature	25,000 hours*	50,000 hours*	60,000 hours*	100,000 hours*	L70*
C013	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C015	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C016	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C018	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C01	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C01H	25°C	96.01%	92.36%	90.94%	85.47%	> 110,000
	40°C	95.78%	91.89%	90.38%	84.58%	> 110,000
C01HO	25°C	93.12%	87.65%	85.55%	77.66%	> 66,000
	40°C	92.34%	86.19%	83.84%	75.09%	> 66,000

Note: *Calculations provided in accordance with IES TM-21-11 using the configuration resulting in highest LED temperature. Previous versions of IES TM-21 where theoretical calculations were used are no longer recommended as a proxy of lumen depreciation.

LED Color Multipliers

	LED					
	CCT					
	2200	2700	3000	3500	4000	5000
CRI	Lumen Multiplier					
70	–	–	0.971	–	1.00	1.012
80	–	0.878	–	–	–	–

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99

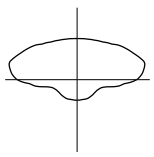
FADC Settings

FADC Postion	Percent of Typical Lumen Output
1	25%
2	48%
3	56%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

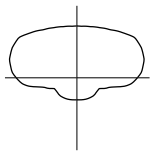
Note: +/-5% typical value

Optical Distributions

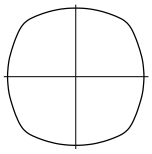
T2R
(Type II Roadway)



T3
(Type III)



T5R
(Type V Roadway)



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Specifications and dimensions
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Stantec Consulting Ltd.
165 Maple Hills Avenue
Charlottetown PE C1C 1N9
stantec.com

H-2

Noise and Vibration Analysis Report

White Pine North - Noise and Vibration Analysis Report

Stantec

Prepared for:
White Pine Copper LLC

Prepared by:
Stantec Consulting Services Inc.

Date:
May 26, 2026

Project/File:
193710518

Stantec Consulting Services Inc.

Disclaimer

The conclusions in the Report titled White Pine North - Noise and Vibration Analysis Report are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Prepared by:	Digitally signed by Poling, Jacob Date: 2026.05.26 14:58:02-05'00'	Greuer, Wilhelm Digitally signed by Greuer, Wilhelm Date: 2026.06.01 10:04:10 -04'00'
	Signature	Signature
	Jacob Poling, INCE Bd. Cert.	Wilhelm Greuer, P.E.
	Printed Name	Printed Name
Reviewed by:	Yong Ma, P.Eng. Digitally signed by Yong Ma, P.Eng. Date: 2026.05.26 14:15:25 -06'00'	Dan Welch Digitally signed by Dan Welch Date: 2026.06.03 08:23:41 -07'00'
	Signature	Signature
	Yong Ma, P.Eng.	Dan Welch
	Printed Name	Printed Name
Approved by:	Chui, Jonathan Digitally signed by Chui, Jonathan	
	Signature	
	Jonathan Chui, P.Eng., INCE	
	Printed Name	

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Executive Summary

White Pine Copper (WPC), which is wholly owned by Kinterra Copper USA LLC, is proposing to construct and operate the White Pine North Project (Project). The proposed mine will be located at the historic White Pine Mine site located in Carp Lake Township, Ontonagon County Michigan. WPC is planning to mine underground in an area separate from the historic underground mine workings and construct an onsite processing plant to produce a copper concentrate. The proposed mine is currently at the prefeasibility design stage.

WPC retained the services of Stantec Consulting Services Inc. (Stantec) to conduct a noise and vibration analysis for the Project. The purpose of the noise and vibration analysis was to collect site-specific baseline sound data to characterize existing acoustic conditions, predict future noise and vibration generated by Project activities, assess potential noise and vibration impacts to sensitive receptors, and identify mitigation measures and/or best practices to minimize noise and vibration impacts. The noise and vibration analysis was completed to meet the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 632 requirements.

A baseline sound survey was completed at four measurement locations to establish existing ambient sound levels within the vicinity of the Project. Daytime L_{eq} sound levels ranged from 44 to 48 dBA and nighttime L_{eq} sound levels ranged from 35 to 38 dBA.

Noise during construction at nearby residences is not expected to exceed commonly used construction noise impact criteria and major construction activities will occur during daytime hours. The operational noise assessment identified equipment and facilities that are expected to require noise mitigation to meet the recommended Project noise design goal of 45 dBA at night, including the gas turbine plant, mine ventilation fans, primary crushing station, conveyors, and the Process Plant. The identified noise mitigation requirements are preliminary due to the prefeasibility stage of the Project and should be reassessed as the mine design progresses. Predictions of vibration due to blasting, construction, and mine operation indicated that published industry vibration criteria are not expected to be exceeded at nearby residences.

With best management practices and mitigation measures incorporated into the Project, mine construction and operation are not expected to result in noise and vibration impact in the adjacent community.

Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ANSI	American National Standards Institute
D	Distance
dB	Decibel
dBA	Decibel (A-weighted)
EGLE	Michigan Department of Environment, Great Lakes, and Energy
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
in	inches
L_{eq}	Equivalent continuous sound level
L_{10}	Sound level exceeded 10% of the time
L_{50}	Sound level exceeded 50% of the time
L_{90}	Sound level exceeded 90% of the time
m	Meters
mph	Miles per hour
Model	Datakustik CadnaA noise prediction software model
NIST	National Institute of Standards and Technology
NP1	North Pond 1
NP2	North Pond 2
pcf	Pounds per cubic foot
PPA	Peak particle acceleration
PPV	Peak particle velocity
Project	White Pine North
PWL	Sound power level
RMS	Root mean square
SD	Scaled distance factor
SLM	Sound level meter
SPL	Sound pressure level
Stantec	Stantec Consulting Services Inc
STC	Sound transmission class
TNM	Traffic Noise Model
USBM	U.S. Bureau of Mines
USDOT	United States Department of Transportation
VdB	Vibration decibels
W	Explosive charge weight
WHO	World Health Organization
WPC	White Pine Copper

1 Introduction

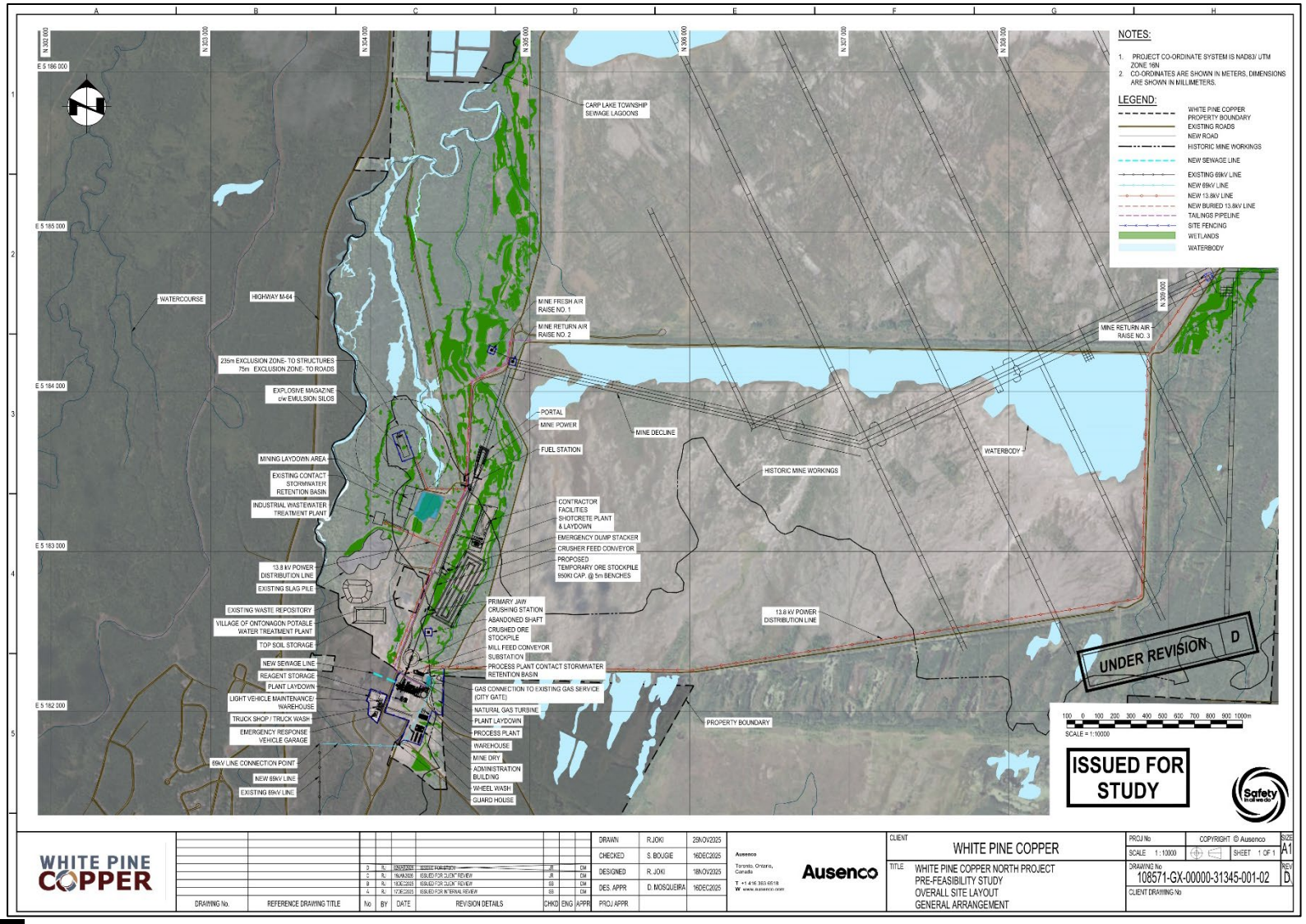
White Pine Copper (WPC), which is wholly owned by Kinterra Copper USA LLC, retained Stantec Consulting Services Inc (Stantec) to complete a noise and vibration analysis for the White Pine North mine (Project) in Ontonagon County, Michigan. The purpose of the noise and vibration analysis was to collect site-specific baseline sound data to characterize existing acoustic conditions, predict future noise and vibration generated by Project activities, assess potential noise and vibration impacts to sensitive receptors, and identify mitigation measures and/or best practices to minimize noise and vibration impacts.

2 Project Description

WPC is seeking to develop the brownfield site of White Pine Mine located approximately three miles south of Lake Superior, east of M-64, in Carp Lake Township, Ontonagon County Michigan. The original underground mine was part of the Upper Peninsula of Michigan's historical copper mining district. Underground mining on site began in the late 1800's. In 1952, the Copper Range Company began construction of a fully functioning underground mine and surface processing facilities including a concentrator, smelter, and refinery. Tailings were placed in three tailings areas: North Dam 1, North Dam 2, and South Dam. Mining and processing ceased in 1997, and a State of Michigan Consent Decree was established.

WPC is planning to mine underground east of, and separate from, the historic underground mine workings. Copper ore will be extracted using conventional drill and blast room and pillar mining methods. A processing plant will be constructed on site to produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Tailings will be managed through re-use of one or more of the existing tailings dams. **Figure *1*** shows the proposed Project site layout.

Figure 1. Proposed Project Site Layout



3 Terminology

3.1 Noise

Sound is caused by vibrations that generate waves of minute pressure fluctuations in the surrounding air. Sound levels are measured using a logarithmic decibel (dB) scale. Noise is typically defined as unwanted sound.

Human hearing ranges from 20 to 20,000 Hz. Human hearing varies in sensitivity for different sound frequencies, and the frequency sensitivity changes based on the overall sound level. The ear is most sensitive to middle frequency sounds between 800 and 8,000 Hertz (Hz) and is least sensitive to low frequency sounds below 400 Hz and high frequency sounds above 12,500 Hz. Consequently, several different frequency weighting networks have been used to approximate the way the human ear responds to various frequencies at different sound levels. A-weighting discriminates against low frequency sounds similar to the response of the human ear at the low to moderate sound levels typical of environmental sources. A-weighted decibels, or dBA, are most widely used for regulatory requirements. Sound levels without a frequency weighting applied, referred to as unweighted or linear, are generally reported as dB.

Broadband (overall) sound levels which are expressed as a single number in decibels, account for acoustical energy across the frequency spectrum, including energy at low, middle, and high frequencies. To assess how much acoustical energy is present in different ranges of the frequency spectrum, sound can be separated into spectral (frequency) components using octave band filters. For environmental noise assessments, octave band sound levels are often expressed in unweighted decibels (dB) at octave band center frequencies from 31.5 to 8,000 Hz.

Environmental sound is variable in time; therefore, it is appropriate to analyze sound levels statistically. Numerous metrics and indices have been developed to quantify the temporal characteristics (changes over time) of environmental noise. A common metric for assessing environmental noise is the equivalent sound level, or L_{eq}. The L_{eq} is a metric that corresponds to the average, or equivalent, sound level over a defined period of time. Other common metrics include the maximum and minimum sound levels, L_{max} and L_{min}, respectively. L_{max} is the highest sound level that occurred during a period of time, while L_{min} is the lowest sound level during a period of time. The L_{max} is particularly useful for evaluating high level, impulsive noise events; L_{min} is useful for understanding low sound levels in an area.

Other statistical metrics useful to understanding environmental sound levels include sound percentile levels, or Ln. Of most use are the L_{10}, L_{50}, and L_{90} metrics. The L_{10} metric is the sound level that is exceeded 10% of the time and is generally called the intermittent sound level. The L_{50} metric is the sound level that is exceeded 50% of the time and represents median sound level. The L_{90} metric is the sound level that is exceeded 90% of the time and is generally considered to be representative of the steady background or ambient noise environment; thus, the L_{90} is referred to as the background sound level.

A change in sound levels of 3 decibels is generally considered to be the threshold of perception, whereas a change of 5 decibels is clearly perceptible, and a change of 10 decibels is perceived as a doubling or

halving of loudness. Each time the number of noise sources is doubled or halved, logarithmic addition (or subtraction) of decibels results in a 3 decibel change in sound levels

The sound power level (PWL) of a noise source is related to the acoustic energy that the source emits regardless of the environment in which it is placed (e.g., the way a light bulb has the same wattage regardless of location). Sound power is a property of the source and therefore is independent of distance. The radiating sound power then produces a sound pressure level (SPL) at a point which human beings can perceive as audible sound. The sound pressure level is dependent on the acoustical environment (e.g., indoor, outdoor, absorption, reflections) and the distance from the noise source. Unless otherwise stated, sound levels in this report refer to sound pressure levels.

The ability of a building's components or materials to mitigate noise can be quantified using the single-number Sound Transmission Class (STC) rating. A higher STC rating represents a higher ability of a component to reduce transmitted sound through it.

3.2 Vibration

Groundborne vibration refers to oscillatory waves that propagate through the ground. Both natural and man-made sources can cause groundborne vibration. Groundborne vibration is commonly described in terms of velocity and acceleration. Velocity represents the speed of ground particle movement and acceleration is the rate of change of the speed.

Vibration metrics include the following:

- Peak particle velocity (PPV) represents the peak amplitude of an oscillating velocity signal and is measured in units of inches per second. For blasting, PPV is the measure of how fast ground particles move when subjected to compressive and shear blast energy transmitted through the ground.
- Root-mean-square (RMS) velocity represents an average of the amplitude of an oscillating velocity signal and is measured in units of inches per second or vibration decibels (VdB) with a reference quantity of 1 micro-inch per second.
- Peak particle acceleration (PPA) represents the maximum rate of change of ground particle velocity and is measured in units of inches per second-squared.

Blasting delay ("delay") is a specialized explosive detonator which is used in rock blasting for detonating patterns of blast holes in a timed sequence. This limits the instantaneous blast vibration energy release, where the timing of the blast sequence is calculated to control seismic vibration intensity. Delay times are commonly in the order of milliseconds.

A round is a unit of mining/tunneling advance which is equivalent to a group of development or production blast holes.

Emulsion is a high energy blasting agent to be used for development and production blasting, in accordance with the White Pine North prefeasibility study mine plan and air quality permit.

4 Regulatory Environment and Design Goals

Baseline environmental studies are required to be completed for the Project in accordance with Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 632 Regulation, R425.201(1)(c) to provide information to assess potential impacts in the Project Environmental Impact Assessment. Further, assessment of noise and vibration effects from the Project is required under R425.202(2) (ii-kk). The noise and vibration analysis was completed to meet the EGLE Part 632 requirements.

The EGLE Part 632 regulations do not include quantitative noise or vibration limits established that are applicable to the Project. Further discussion of regulations and recommended design goals for noise and vibration are included below.

4.1 Noise

Project noise is potentially regulated by State, County, and local laws and ordinances. These regulations were reviewed for their applicability to Project noise. The State of Michigan does not have general statewide noise regulations nor specific noise regulations for mining activities. No Ontonagon County or Carp Lake Township noise regulations were identified that are applicable to noise generated by the Project.

Because there are no quantitative noise limits identified in any jurisdiction, it is appropriate to recommend a Project noise goal to minimize the potential impact of noise on nearby noise-sensitive receptors.

Due to the rural nature of the surrounding area, Project mine operation noise goals of 55 dBA L_{eq} during the day (7 A.M. to 10 P.M.) and 45 dBA L_{eq} during the night (10 P.M. to 7 A.M.) at residential structures are recommended. These sound levels are similar to and consistent with noise regulations commonly found throughout the United States and recommended internationally. For example, the State of Michigan limits noise from renewable energy projects to 55 dBA during day and night at residences; the State of Wisconsin limits noise from conventional power and renewable energy projects to 55 dBA during the day and 45 dBA at night at residences; and the State of Minnesota establishes noise limits (which apply to mining activities) of 60 dBA during the day and 50 dBA during the night at residences (State of Michigan 2023, PSCW 2025, State of Minnesota 2017). Further, the World Health Organization (WHO) recommends a nighttime limit of 45 dBA at residential buildings (WHO, 1999). Designing the Project to meet an operational sound level of 55 dBA during the day and 45 dBA during the night at residences will reduce the potential impact of Project noise on nearby receptors.

During daytime periods, noise limits for the construction phase of a project are typically higher than the operational phase to reflect the temporary nature of the construction activities. Common daytime noise limits for large construction projects range from approximately 70 to 80 dBA at residences (Thalheimer 2000, FTA 2018). It is recommended that daytime Project construction noise be limited to an hourly L_{eq} sound level ($L_{eq(1h)}$) of 70 dBA at nearby residences. If construction activities occur during nighttime hours, it is recommended that noise be limited to 45 dBA L_{eq} at residences, consistent with the recommended operational noise design goal.

Table 4.1 summarizes the recommended Project noise design goals.

Table 4.1. Recommended Project Noise Design Goals

Project Phase	Sound Level, dBA $L_{eq(1h)}$	
	Daytime (7 A.M. to 10 P.M.)	Nighttime (10 P.M. to 7 A.M.)
Construction	70	45
Operation	55	45

4.2 Vibration

4.2.1 Blasting

There are no specific standards limiting blast vibration energy in Michigan. Specific criteria rely on published industry guidelines applied to rock blasting projects, as deemed appropriate. Industry guidelines frequently cited in a regulatory context in the United States include:

1. Siskind, D. et.al. Structure response and damage produced by ground vibration from surface mine blasting. USBM RI 8507, 1980.

2. USDOT Federal Highway Administration. Managing the impacts of blast-induced vibration and overpressure on fish and fish habitat. Publication No. FHWA-FLH/TD-19-001. January 2019.

Siskind (USBM 8507) defines structural damage thresholds of blast energy PPV. USDOT cites previous studies defining harmful PPV thresholds to aquatic wildlife (ADFG 1991, Wright et.al. 2019).

These industry guidelines are recommended as Project design goals for blast vibration.

4.2.2 Construction and Operations

There are no State or local regulations that limit the amount of vibration generated by Project activities during construction or operation. The Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual provides vibration criteria that are commonly used to assess the potential for vibration to result in human annoyance or structural damage (FTA, 2018). The relevant FTA vibration criteria are summarized in **Table 4.2** and the criteria apply at residential structures. These criteria are recommended as Project design goals for construction and operational vibration at nearby sensitive receptors.

Table 4.2. Recommended Project Vibration Design Goals – Construction and Operations

Vibration Damage Criteria[1]		Vibration Annoyance Criteria[2]
PPV, in/sec	Vibration Level, VdB[3]	Vibration Level, VdB[3]
0.2	94	72

Notes:

[1] Based on FTA vibration criteria for non-engineered timber and masonry buildings.

[2] Based on FTA Category 2 residential uses with frequent vibration events.

[3] RMS velocity in decibels, VdB re 1 micro-in/sec

5 Sensitive Receptor Locations

Noise and vibration sensitive uses located in the vicinity of the Project were identified based on information provided by WPC and further review of aerial imagery. The sensitive receptors include residences and known camp sites, all of which were considered to have both daytime and nighttime noise and vibration sensitivity. A total of 202 sensitive receptors were identified and included in the analysis. Sound levels were predicted at each receptor and vibration predictions were completed at the nearest receptors to the vibration sources. Receptors are shown in **Figure 2** and the predicted sound levels at each receptor are included in **Appendix B**.

6 Noise Analysis

The following sections document an assessment of noise associated with the construction and operational stages of the Project.

6.1 Ambient Sound Level Measurements

6.1.1 Methodology

Ambient sound level measurements were completed at four locations within the White Pine Copper Mine Project area in Ontonagon County, Michigan continuously during daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) periods over seven days. The sound monitoring sites were selected to represent typical ambient sound levels in residential areas adjacent to the Project. Coordinates for the monitoring locations are provided in **Table 6.1**. The sound level measurement equipment and monitoring approach used for the ambient sound level survey were generally consistent with guidance for quiet residential areas per the American National Standards Institute (ANSI) S12.100-2014 standard (ANSI/ASA, 2014).

Four Larson Davis Model 821 sound level meters (SLMs) were used to measure long-term ambient sound levels. The microphones of the SLMs were mounted on tripods approximately five feet (1.5 meters [m]) above ground and covered with 3-inch diameter foam windscreens. The SLMs were equipped with external battery packs for power, housed in environmental protection cases, and deployed unattended to collect sound levels over a 7-day period. Broadband sound levels were logged continuously in 1-hour and 1-

second intervals for the L_{eq}, L_{10}, L_{50}, and L_{90} metrics in A-weighted and unweighted decibels. One-third octave band sound levels were also logged continuously in 1-second intervals using the L_{eq} metric in unweighted decibels.

The SLMs meet the ANSI S1.4-2014/Part 1 / IEC 61672-1-2013 (R2024) standard Type 1 requirements for sound level meters and were calibrated by a National Institute of Standards and Technology (NIST) certified laboratory within 12 months of use (ANSI/ASA, 2019). The SLMs were calibrated in the field before and after the sound survey with a Larson Davis CAL1200 acoustical calibrator, which meets the ANSI/ASA S1.40-2006 (R2020) standard Type 1 requirements and calibration interval requirements (ANSI/ASA, 2020). Equipment calibration certificates are available upon request.

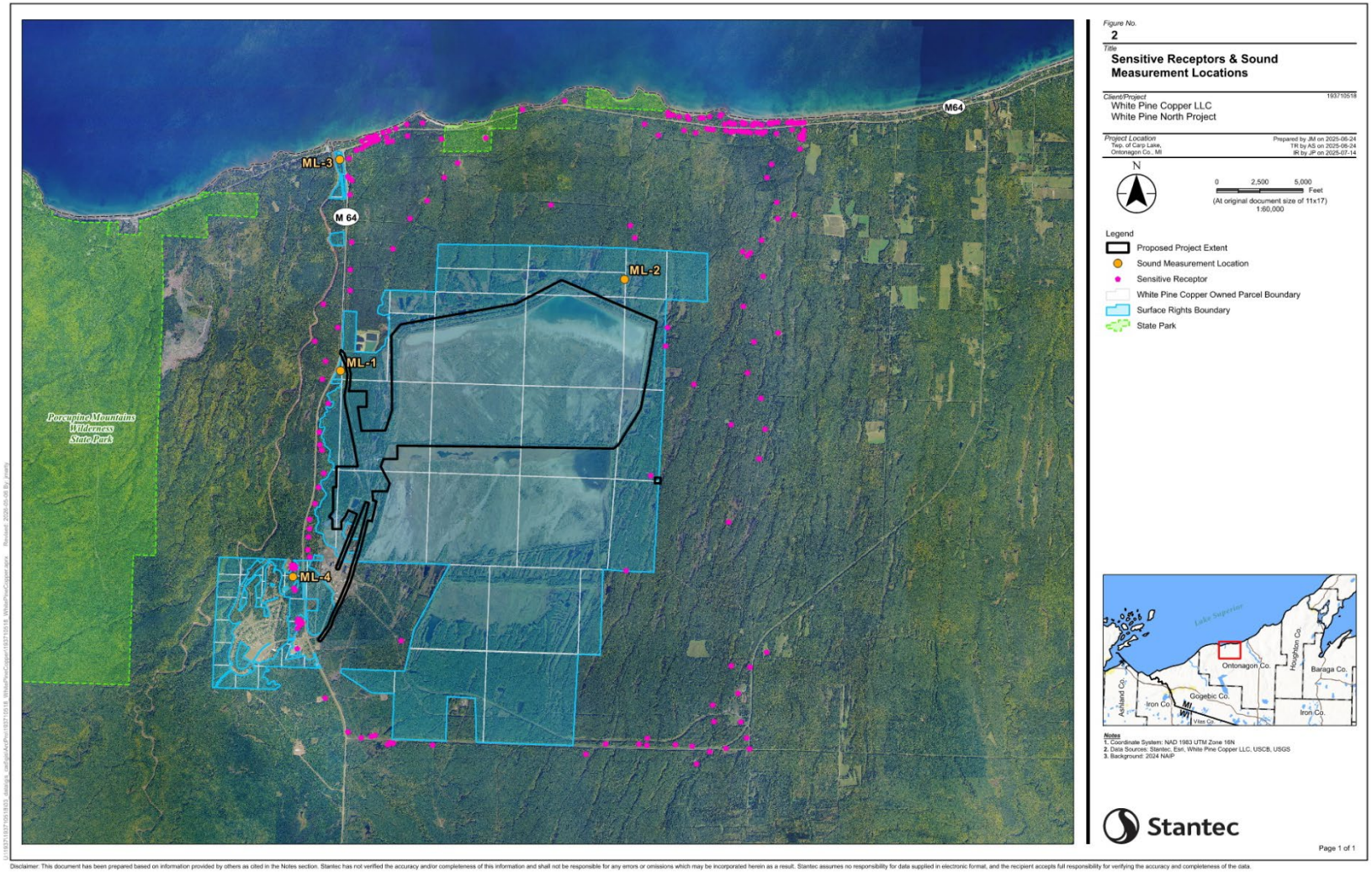
Weather data was collected from the Ontonagon County Weather Station in Ontonagon, MI approximately 15 miles northeast of the Project area, and were retrieved from Weather Underground (Weather Underground, 2026). The sound measurement and meteorological data were analyzed to identify and exclude time periods with precipitation or wind speeds greater than 11 mph in accordance with the ANSI S12.9-1993/Part 3 standard.

The four ambient sound monitoring locations are described in **Table *6.1*** and shown in **Figure *2***. The four long-term monitoring location names include the prefix “ML”. **Appendix A** includes photos of the sound monitoring systems at each site.

Table 6.1 Ambient Sound Monitoring Locations

Monitoring Location	Description	Measurement Period	Equipment	Latitude	Longitude
ML-1	Located on the western side of the Project area adjacent to highway M-64 to represent residences and camps close to the proposed mine portal and processing plant.	10/6/25 2:49 PM - 10/13/25 3:00 PM	LD Model 821 S/N 40708	46.795	-89.566
ML-2	Located northeast of the Project area in a remote section located further from roadways. Representative of ambient sound levels expected at more remote residences and in Porcupine Mountain State Park.	10/6/25 12:59 PM - 10/13/25 12:55 PM	LD Model 821 S/N 40706	46.810	-89.501
ML-3	Located near the north edge of the Project area to establish ambient sound levels at the most populous residential area that is north of the Project.	10/6/25 4:26 PM - 10/13/25 5:03 PM	LD Model 821 S/N 40704	46.829	-89.568
ML-4	Located near the southwest portion of the Project area to establish ambient sound levels at residences along Hemlock Street, Trailer Court Road, Copper Street, and Copper Court.	10/6/25 3:01 PM - 10/13/25 3:18 PM	LD Model 821 S/N 40707	46.763	-89.575

Figure 2. Sensitive Receptors and Sound Measurement Locations



6.1.2 Results

Ambient sound levels were measured from October 6 through October 13, 2025 at each monitoring location. During this period weather conditions included 37-68°F hourly temperatures, 34-93% relative humidity, and wind gust speeds of 0-45 miles per hour (mph) at 33 feet (10 m) above ground. A total of 0.1 inches (in) of precipitation was measured during this time.

The ambient sound monitoring results are summarized in the following sections. A-weighted ambient sound levels are presented for the daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 PM to 7:00 A.M.) periods. The daytime sound levels are the averaged A-weighted sound levels over 15-hour period and the nighttime sound levels are the averaged sound levels over 9-hour period. After excluding data based on weather conditions as discussed above, a total of 118 hours (4.9 days) of valid measurement data were included in the analysis for each measurement location.

6.1.2.1 Location ML-1

Audible sound sources observed at ML-1 included vehicle traffic and wind gusts. The measured daytime and nighttime L_{eq} sound levels are 48 dBA and 39 dBA, respectively; and background L_{90} sound levels are 36 dBA and 26 dBA, respectively.

Table 6.2 Ambient Sound Level Measurement Results at ML-1

Time Period	Measured Sound Level, dBA			
	L_{eq}	L_{10}	L_{50}	L_{90}
Day	48	52	43	36
Night	39	39	30	26

6.1.2.2 Location ML-2

Audible sound sources observed at ML-2 included wind in the trees and birds. The measured daytime and nighttime L_{eq} sound levels are 47 dBA and 43 dBA, respectively; and background L_{90} sound levels are 37 dBA and 33 dBA, respectively.

Table 6.3 Ambient Sound Level Measurement Results at ML-2

Time Period	Measured Sound Level, dBA			
	L_{eq}	L_{10}	L_{50}	L_{90}
Day	47	53	45	37
Night	43	46	37	33

6.1.2.3 Location ML-3

Audible sound sources observed at ML-3 included vehicle traffic on local roads, people talking, and birds. The measured daytime and nighttime L_{eq} sound levels are 47 dBA and 45 dBA, respectively; and background L_{90} sound levels are 41 dBA and 43 dBA, respectively.

Table 6.4 Ambient Sound Level Measurement Results at ML-3

Time Period	Measured Sound Level, dBA			
	L_{eq}	L_{10}	L_{50}	L_{90}
Day	47	50	45	41
Night	45	48	44	43

6.1.2.4 Location ML-4

Audible sound sources observed at ML-4 included occasional vehicle traffic and wind in the trees. Comparing the L_{90} and L_{10} sound metrics, measured sound levels ranged from 32 to 45 dBA during daytime periods and 25 to 38 dBA during nighttime periods.

Table 6.5 Ambient Sound Level Measurement Results at ML-4

Time Period	Measured Sound Level, dBA			
	L_{eq}	L_{10}	L_{50}	L_{90}
Day	44	45	39	32
Night	38	38	28	25

6.1.2.5 Summary

The measured background L_{90} sound levels at monitoring locations ML-1, ML-2, and ML-4 of 32 to 37 dBA daytime and 25 to 33 dBA nighttime are typical of more remote and rural areas without significant nearby development. The higher measured background L_{90} sound levels of 41 dBA daytime and 43 dBA nighttime at location ML-3 to the north of the mine along roadway reflect the closer proximity to roadways and commercial activities.

6.2 Noise Modeling

Noise modeling was completed to predict future noise generated by the Project during the construction and operational phases and assess the potential for noise impact in the surrounding community. Methods, assumptions, and results of the noise modeling are summarized in the following sections.

6.2.1 Methodology

Sound attenuates between a source and receptor location due to a variety of factors, including but not limited to, distance between source and receptor, atmospheric absorption, ground type, topography, shielding from solid structures, vegetation, and meteorological conditions. Construction and operational sound levels were assessed using the Datakustik CadnaA noise prediction software (the “model”). CadnaA is a widely used modeling tool to estimate outdoor sound propagation. The ISO 9613-2 standard algorithms for outdoor sound propagation were used for industrial sources and the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) algorithms were used for heavy trucks (ISO 9613-2 2024, USDOT 2005). The model was developed by importing topographic data from the U.S. Geological Survey National Elevation Dataset and aerial imagery. In the model, a ground absorption factor (G) of 0.5 was used to simulate the mix of hard surfaces and absorptive ground within and surrounding the Project area. Larger structures within the mine plant area were included in the model to account for the reflective effects and barrier effects of nearby buildings.

Sources that emit noise into the environment from a stationary point were modeled as point sources (e.g., ventilation fan, exhaust stack, crusher). Sources that emit noise over a larger area (e.g., interior equipment with sound radiating through building walls, mobile equipment operating throughout a larger work area) were modeled as vertical or horizontal area sources. Mobile sources operating on a defined path (e.g., trucks on haul routes or roadways) were modeled as line sources. Locations of mine operational facilities, work areas, and construction activities were modeled based on the site layout drawings and equipment details provided by WPC.

Additional assumptions that were used to conservatively predict construction and operational noise included the following:

- No sound attenuation from vegetation (foliage) to simulate a worst-case condition when leaves are not present on trees.
- Meteorological conditions are conducive to sound propagation with all receptors located downwind of all noise sources and moderate temperature inversions.

Noise receptors were modeled at a height of 5 feet (1.5 m) above ground. The model produces predicted sound levels at the specified receptor locations as well as sound level contours as outputs. Note that this analysis was carried out in octave frequency bands, and the results are displayed as the A-weighted sound level. The octave band results are consistent with the A-weighted sound level findings presented in this report.

6.2.1.1 Construction Noise Sources

Project construction is expected to last approximately two years. The primary construction phases will be associated with earthworks and installation of piping prior to tailings deposition on North Pond 1 (NP1), prior to mine operations commencing, and on North Pond 2 (NP2) during year 10 of mining. Earthworks will also be required through the life of the mine to raise access causeways to tailings deposition towers.

The peak construction phase will coincide with pre-NP1 and NP2 deposition activities during the two years prior to mine operations commencing. Construction of facilities at the plant will also be occurring during this period. This scenario has been selected for the modeling of construction noise because it represents the worst-case scenario of expected equipment usage during construction.

The construction noise modeling was based on the following assumptions:

1. Tailing disposal facility
    - 150 truck haul trips will be required per day and trucks will travel at 15 mph.
    - The primary haul routes will be established within the perimeter of the TDFs and from the waste rock conveyor to the south perimeter of NP1.
    - Mobile equipment will be used along the north and south perimeter of NP1 to support earthworks and piping installation.
    - Construction occurs during daytime hours (7:00 A.M. to 10:00 P.M.) for 10 hours per day
    - All equipment operates at full capacity 50% of the time.

2. Plant area
    - Haul trucks will move between the Process Plant, tailings facility, and temporary ore stockpile at 15 mph.
    - Mobile equipment and stationary equipment (such as light towers) will be used for construction at the Process Plant, tailings facility, and temporary ore stockpile
    - Construction occurs during daytime hours for 10 hours per day
    - All equipment operates at full capacity 50% of the time

Locations of the modeled construction activities were based on site layout drawings and information provided by WPC. Construction equipment inputs for the noise model were established using the following information sources:

- Equipment lists and quantities provided by WPC or estimated based on similar mining construction activities from prior Stantec projects.
- Publications that provide reference sound levels for common construction equipment (USDOT, 2018)
- Equipment noise measurements from prior Stantec projects.

Construction noise equipment types, quantities, and sound power levels included in the modeling are summarized in **Table 6.6** with additional details provided in **Appendix B**.

The construction noise levels represent anticipated hourly L_{eq} sound levels during construction. For equipment where maximum (L_{max}) sound data were provided from a reference publication or measurement, the equipment was either modeled as a moving source using the L_{max} sound level or the equipment L_{eq} sound level was estimated using the L_{max} sound level.

Table 6.6 Construction Equipment Summary

Equipment	Quantity	Noise Metric	Sound Power Level[a]
			dBA
Tailing Detention Facility Construction			
Haul truck, passby	13	L_{max}	114
Haul truck, idle	2	L_{eq}	108
Excavator	3	L_{eq}	107
Dozer	11	L_{eq}	112
Compactor	3	L_{max}	114
Loader	4	L_{eq}	104
Water truck	1	L_{max}	104
Plant Area Construction			
Haul truck, passby	3	L_{max}	114
Haul truck, idle	3	L_{eq}	108
Backup alarm	3	L_{max}	112
Light tower	3	L_{eq}	92
Dozer	5	L_{eq}	112
Compactor	3	L_{max}	114
Loader	2	L_{eq}	104
Man lift	1	L_{eq}	104
Grader	1	L_{max}	110
Excavator	3	L_{eq}	107
Rock drill	1	L_{eq}	123
Highway truck	2	L_{max}	106
Water truck	1	L_{max}	104
Crane	2	L_{eq}	106

Notes:

[a] Sound power level per unit or individual piece of equipment

6.2.1.2 Operational Noise Sources

During mine operations, copper ore will be extracted underground. At the surface, the material will be conveyed to the plant area. The Processing Plant will produce a copper concentrate, and processing will include crushing, grinding, flotation, concentrate thickening, and filtration. Trucks will access the site for deliveries of fuel, reagents, propane and concentrates. Mobile equipment will move material from various stockpiles in the plant area.

Mine operations will include stationary equipment at the plant area both outdoors and within buildings, mine portal, and ventilation raises and mobile equipment traveling between different areas onsite. The operational noise assessment focused on predicting typical sound levels during mine operations. The noise model included a combination of stationary and mobile noise sources that are described further below.

The primary stationary noise sources during mine operation are expected to include the following:

- Fans at the mine portal and ventilation raises
- Gas turbine intake and exhaust
- Primary jaw crushing station
- Mill feed conveyor
- Substation power transformer
- Noise radiating from several onsite buildings:
    - Gas turbine building
    - Process plant
    - Industrial wastewater treatment plant
    - Shotcrete plant
    - Truck shop

Additional mobile noise sources during mine operation include:

- Mobile equipment moving throughout the plant area
- Heavy trucks accessing the site

The operational noise modeling was based on the following assumptions:

- All stationary sources operate continuously during daytime and nighttime periods
- All mobile sources operate at full capacity 50% of the time during daytime and nighttime periods
- Heavy trucks will access and exit the mine site from the south along M-64 during daytime periods and travel at 45 mph on M-64 and 15 mph on the Project site. Truck accessing the site include:
    - 12 concentrate trucks per day
    - 1 reagent truck per day
    - 1 fuel truck every 3 days
    - 1 propane truck every 6 days

Locations of the modeled operational equipment and activities were based on site layout drawings and information provided by WPC. Operational equipment inputs for the noise model were established using the following information sources:

- Equipment lists, quantities, and noise emission data provided by WPC.
- Publications that provide reference sound levels for common construction equipment (USDOT, 2018)
- Estimated sound levels from acoustical industry references (Bies and Hansen, 2018)
- Representative equipment noise emission data identified through a literature review or from Stantec's database from prior projects.

Operational noise equipment types, quantities, and sound power levels included in the modeling are summarized in **Table *6.7*** with additional details provided in **Appendix B**.

Given the early (pre-feasibility) stage of the Project, detailed information on building designs and equipment within several of the onsite buildings was not available. Noise radiating from the onsite buildings was predicted based on interior sound levels, wall/roof types, and standard (non-acoustical) ventilation openings typical of industrial buildings. Details on the building acoustical characteristics, including the sound

transmission class (STC), and interior sound pressure levels (SPL) which were assumed for the model are provided in **Table *6.8***.

The operational noise levels represent anticipated hourly L_{eq} sound levels during mine operations.

Table 6.7 Operational Equipment Summary – Exterior Noise Sources

Equipment	Quantity	Noise Metric	Sound Power Level[a] dBA	Notes[b]
Mobile Equipment				
Loader	6	L_{eq}	104	
Crane	3	L_{eq}	106	
Light tower	5	L_{eq}	92	
Skid steer	1	L_{eq}	104	
Concrete mixer	5	L_{eq}	113	
Haul truck, idle	3	L_{eq}	108	
Backup alarm	2	L_{max}	112	
Stationary Equipment				
Gas turbine combustion exhaust, SGT400	3	L_{eq}	119	1, 2
Gas turbine intake and exhaust, SGT400	3	L_{eq}	125	2
Primary jaw crusher	1	L_{eq}	112	2
Crusher apron feeder	1	L_{eq}	113	2
Mine portal fan	4	L_{eq}	114	1, 2
Mine raise #1 fan	2	L_{eq}	114	1, 2
Mine raise #2 fan	2	L_{eq}	114	1, 2
Mine raise #3 fan	1	L_{eq}	114	1
Substation transformer, 20 MVA	1	L_{eq}	88	
Conveyor	1	L_{eq}	108	2
Conveyor motor	4	L_{eq}	95	

Notes:

[a] Sound power level per unit or individual piece of equipment

[b] 1. Sound power level includes base noise mitigation measures (silencers) from the available equipment information.

2. Additional noise mitigation is expected to be necessary for this equipment to meet the noise design goal. The additional noise mitigation is not accounted for in the sound power levels provided in this table. See **Table 6.10** for these additional noise mitigation requirements.

Table 6.8 Building Acoustical Characteristics – Interior Noise Sources

Building	Building Component	Acoustical Characteristic
Industrial Wastewater Treatment Plant	Walls and roof	STC 32
	Interior sound level	85 dBA SPL
Process Plant	Walls and roof	STC 32
	Interior sound level	90 dBA SPL
Truck Shop	Walls and roof	STC 32
	Interior sound level	85 dBA SPL
Shotcrete Plant	Walls and roof	STC 32
	Interior sound level	85 dBA SPL

6.2.2 Results

6.2.2.1 Construction

The predicted Project-generated sound levels during peak construction activities are summarized in **Table *6.9*** and shown graphically as sound contour lines on **Figure C.1** in **Appendix C**. The sound contour lines do not include the contribution of ambient sound levels.

Table 6.9 Summary of Predicted Construction L_{eq} Sound Levels

Estimated L_{eq} Sound Level	Number of Receptors
	Daytime
35 dBA or less	163
36 to 40 dBA	8
41 to 45 dBA	7
46 to 50 dBA	20
51 to 55 dBA	4
Greater than 55 dBA	0

At nearby sensitive receptor locations, daytime sound levels during construction are predicted to be 53 dBA or less. Sound levels during construction are expected to be highest at the nearest residences to the west of the mine plant area along M-64. **Table 6.9** shows that 31 sensitive receptors are expected to experience sound levels greater than 40 dBA during daytime construction. Construction activities are not planned to occur at night.

6.2.2.2 Operations

The noise modeling results using the base equipment noise emission levels shown in **Section 6.2** indicated that additional noise mitigation measures would be required to meet the nighttime noise design goal of 45 dBA at residences to the west of the mine plant area. The noise model results allowed for identification of the major noise sources, which included natural gas turbines, mine ventilation fans, the primary crushing station, conveyors, and the Process Plant. Noise mitigation was assessed for each source to identify the noise reduction expected to be necessary to meet the noise design goal. The resulting noise mitigation requirements for each source are provided in **Table *6.10***. Given that the noise mitigation requirements were developed based on prefeasibility stage design details and information, the requirements are preliminary and should be reassessed as Project design progresses.

Table 6.10 Preliminary Operational Noise Mitigation Requirements

Noise Source	Noise Mitigation Requirements
Natural gas turbines	Design of gas turbine building and exhaust silencers to meet sound level of 53 dBA at 400 feet during full load operation
Mine portal ventilation fans	Silencers and/or barriers to meet sound level of 60 dBA at 400 feet with all fans operating
Mine raise #1 ventilation fans	Silencers and/or barriers to meet sound level of 59 dBA at 400 feet with all fans operating
Mine raise #2 ventilation fans	Silencers and/or barriers to meet sound level of 59 dBA at 400 feet with all fans operating
Mine raise #3 ventilation fans	Silencers and/or barriers to meet sound level of 64 dBA at 400 feet with all fans operating
Primary crushing station	Noise barrier or acoustic enclosure to meet sound level of 58 dBA at 400 feet with crusher and feeder operating
Conveyors (mine portal to process plant)	Transfer point barriers, selection of low noise equipment, and/or acoustic enclosure to meet sound level of 66 dBA at 3.3 feet (1 meter)
Process Plant Building	STC 45 building system including ventilation openings

The predicted Project-generated sound levels during mine operation after inclusion of the noise mitigation measures described above are summarized in ***Table 6.11***. The results are also shown graphically as sound contour lines on **Figures C.2 and C.3** in **Appendix C**. The sound contour lines do not include the ambient sound levels.

Table 6.11. Summary of Predicted Operational L_{eq} Sound Levels with Noise Mitigation

Estimated L_{eq} Sound Level	Number of Receptors	
	Daytime	Nighttime
35 dBA or less	162	165
36 to 40 dBA	10	18
41 to 45 dBA	25	19
46 to 50 dBA	5	0
51 to 55 dBA	0	0
Greater than 55 dBA	0	0

At nearby sensitive receptor locations, sound levels during mine operations are predicted to be 46 dBA or less during daytime and 45 dBA or less during nighttime. Sound levels are expected to be highest at the nearest residences to the west of the mine plant area along M-64. **Table 6.11** shows that 30 and 19 sensitive receptors are expected to experience sound levels greater than 40 dBA during daytime and nighttime, respectively.

6.3 Noise Impact Assessment

Mine construction is anticipated to occur over a two-year period, with peak construction including hauling and earthworks for the TDF and mine facility construction at the plant area. Major construction activities and equipment usage are expected to be limited to daytime hours. Daytime construction sound levels at residences are predicted to be 53 dBA or less, which is well below the recommended noise design goal of 70 dBA for daytime construction.

Mine operations will occur 24-hours per day with both stationary and mobile equipment operating. With implementation of the noise mitigation measures discussed in **Section 8.1**, operational sound levels at the nearest residences to the mine plant are predicted to be 46 dBA or less during daytime and 45 dBA or less during nighttime, which meet the recommended operational noise design goals of 55 dBA for daytime and 45 dBA for nighttime. During mine operation, most nearby residences are expected to experience sound levels of 40 dBA or less during both day and night.

Baseline ambient L_{eq} sound levels at residences in the area surrounding the mine are 44 to 48 dBA during the day and 38 to 45 dBA at night, which is typical of rural and more remote areas. During both mine construction and operation, noise generated by mine activities is expected to be perceptible in outdoor areas at some nearby residences, though the level of perceptibility will likely vary depending on the time of day, weather conditions, and an individual's sensitivity to noise. In addition to the identified noise mitigation measures, best practice recommendations for WPC to consider that would further limit noise impact, such as installation of broadband backup alarms on mobile equipment, are discussed in **Section 8**.

7 Vibration Analysis

The following sections document an assessment of vibration associated with the construction and operational stages of the Project.

7.1 Vibration Modeling

Vibration modeling was completed to estimate future noise generated by the Project during the construction and operational phases and assess the potential for vibration impact in the surrounding community. Methods, assumptions, and results of the vibration modeling are summarized in the following sections.

7.1.1 Methodology

7.1.1.1 Blasting

PPV propagation is determined by an empirical equation which relates the explosive charge per delay in a round, the distance from detonation, and empirical site-specific constants which characterize the behavior of blast energy in the ground and host rock (Snodgrass, 1974):

$PPV = K_1 (SD)^{-n}$

Where PPV is in inches per second. SD is the scaled distance factor, which is used to blast vibration impacts by correlating charge weight and distance from detonation:

$SD = D/(W^b)$

D is the distance from detonation, expressed in feet for this study. W is the explosive charge weight per delay, expressed in pounds. The scaling factor “b” indicates cube root or square root scaling. Cube root scaling (b=1/3) assumes a spherical charge where an increase in blast energy is proportional to charge radius (blast-impacted volume = π x radius^3). Cube root scaling is appropriate for characterizing explosive energy released in all directions. Square root scaling (b=1/2) assumes a cylindrical charge where increasing blast energy is proportional to charge radius (blast-impacted volume = π x radius^2 x round length). Square root scaling assumes an outward release of energy normal to the drill hole axis and is more appropriately applied to mining (Nicholls et.al., 1971). K_1 is a site-specific ground transmission constant which is equal to 104 with square root scaling, based on historic records of blast vibration analysis at the White Pine Mine. The exponential decay of blast energy over distance is represented by the constant n, which is 1.55 for square root scaling at White Pine (Snodgrass, 1974).

The charge weight W per delay is based on one detonator per blast hole, with each blast hole in a round fired sequentially. Emulsion with a specific gravity of 1.2 (75 pcf) will be used for development blasting, in accordance with the White Pine North prefeasibility study mine plan and air quality permit. The mine plan round length is 4 meters (13.1 feet) with a pull (advance factor) of 95%, which requires 4.2 meters (13.8 feet) blast hole drilling.

PPA relates ground particle velocity change to SD:

$PPA = K_2 (SD)^{-m}$

Where PPA is in inches per second squared. K_2 is a site-specific ground transmission constant which is equal to 25,000 and the exponential decay constant m is 2.21 for square and cube root scaling, based on historic records of blast vibration analysis at the White Pine Mine (Snodgrass, 1974). Blast energy wave frequency f is defined by the relationship between PPA and PPV:

f (Hz) = PPA / 2πPPV

High-frequency ground vibrations are where f exceeds 40 Hz, while low-frequency vibrations are regarded as f less than 40 Hz (Siskind, 1980).

Standard development (perimeter and face/column) blast holes will be drilled with a 48 mm drill bit size (1-7/8 inches diameter). Reamer and burn holes will be drilled with a 100 mm drill bit size (4 inches diameter) (Stantec, 2026). This study assumes a stemming column for each blast hole, with a stemming column length equal to the blast hole diameter increased by a factor of 20 (Dyno Nobel, 2010). The stemming column is subtracted from the blast hole drilled length and emulsion density is combined with the blast hole dimensions (minus stemming) for the charge weight W.

At this stage the project assumes a conventional burn-cut development pattern consisting of burn holes (charged) and reamer (relief) holes (uncharged). The detailed timing design (including maximum charge per delay) will be finalized during implementation with the selected blasting contractor. For blast vibration study purposes, the geometry and charge characteristics summarized in this report are assumed (Stantec, 2026). The detailed delay sequence is not yet defined in the PFS-level design.

7.1.1.2 Construction and Operations

Mine construction and operation activities are expected to include use of heavy construction equipment, haul and delivery trucks that generate vibration.

During mine construction, the analysis focused on construction equipment at the plant area, which is the closest construction area to residences. The construction equipment anticipated to be used at the plant that generates the highest vibration levels includes:

- Trucks hauling material for TDF earthworks
- Vibratory rollers for mine facility construction
- Bulldozer for demolition of existing onsite structures

Pile driving is not expected to be required for mine facility construction.

During mine operation, the analysis focused on vehicles at the plant area and along offsite roadways. The equipment expected to generate higher vibration levels during mine operation includes:

- Trucks hauling material between various areas of the plant
- Heavy trucks driving along offsite roadways for deliveries

Estimates of vibration at nearby sensitive receptors were completed using the FTA construction vibration assessment methods (FTA, 2018). These methods include reference equipment vibration emission data as well as vibration propagation equations to estimate vibration at specific distances from the source.

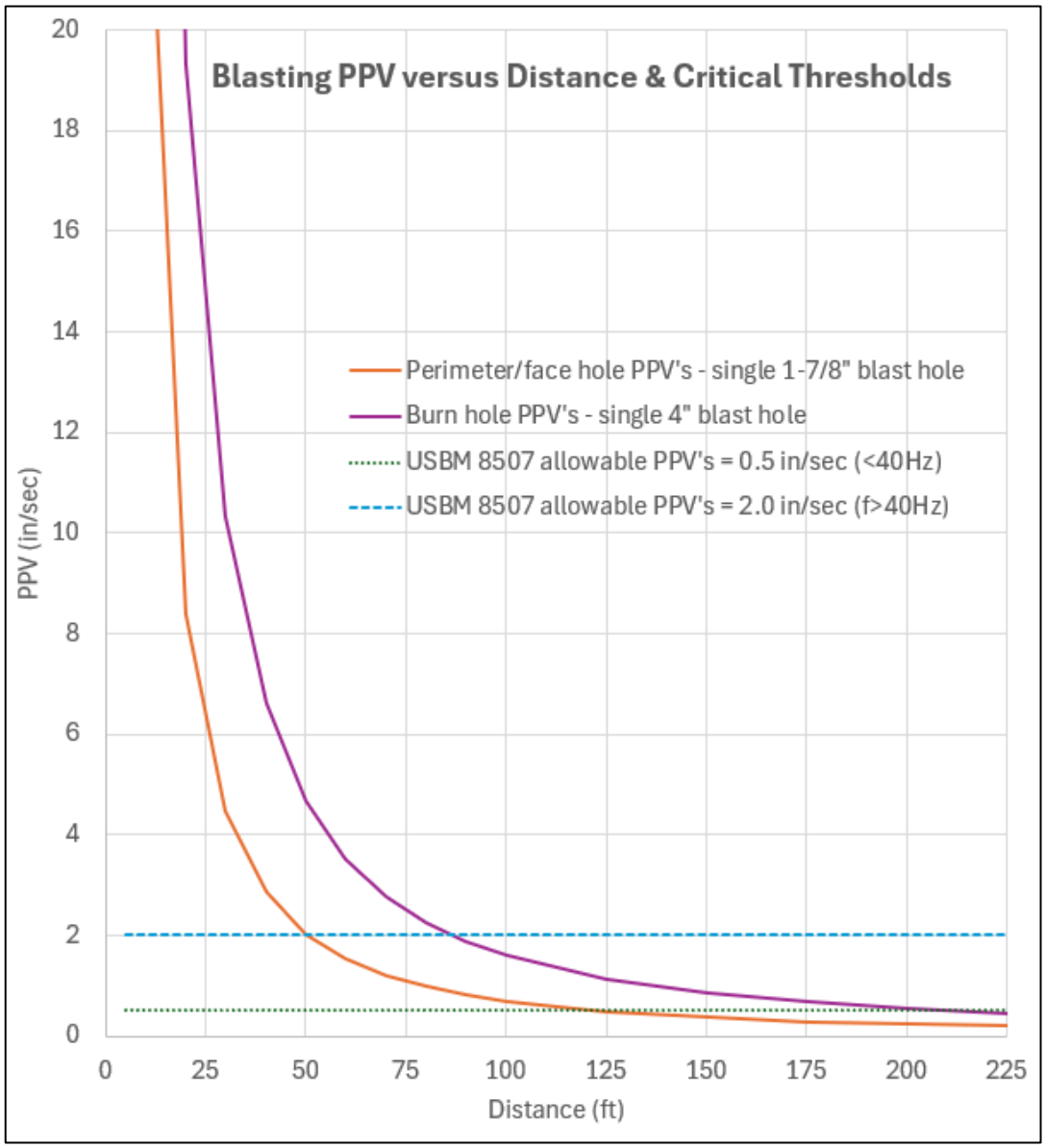
7.1.2 Results

7.1.2.1 Blasting

To limit PPV propagation, each blast hole pattern is assumed timed in individual sequence on an order of milliseconds delay time. PPV calculations account for one blast hole per timed delay, with stemming for good control of fragmentation, fly rock, noise, and air overpressure. Accounting for blast hole dimensions, W is 16 pounds of emulsion and square root scaling is assumed for perimeter and face holes. For burn holes, PPV calculations are based on W at 46 pounds of emulsion per delay and square root scaling.

Expected blast ground vibration PPV versus distance from detonation are shown in **Figure *3*** for the given blast hole diameters.

Figure 3. Blasting PPV versus distance and critical thresholds



The 1-7/8 inch diameter blast hole energy propagation is regarded as low frequency, with f < 40 Hz. For 4" diameter blast holes, the energy propagation is high-frequency (f > 40 Hz) for less than ten feet out from the point of detonation, beyond which energy waves decelerate to the low frequency range, so blast energy is regarded as low frequency. **Table *7.1*** shows allowable PPV and the minimum stand-off distance from the point of detonation to keep PPV exposure under these thresholds.

Table 7.1 Maximum PPV exposure and stand-off distance (standard round, f<40 Hz)

Criteria	Structural (older)*	Structural (newer)*	Human detection threshold*	Fish**
Allowable PPV (in/sec)	0.5	0.75	0.011	2
Min. stand-off distance, 1-7/8” hole (ft)	123	95	1,446	50
Min. stand-off distance, 4” hole (ft)	212	163	2,482	86

**USBM 8507; **ADFG 1991*

The older versus newer structural categories presented in Table 7.1 refer primarily to construction methods and materials. Modern structures, typically composed of poured concrete and gypsum board (“drywall”), are more resilient than the stone block and mortar foundation with plaster on lathe interior construction, typical of older (generally pre-1945 in the United States) structures. Testing has shown that poured concrete and drywall materials, characteristic of newer structures, are less brittle and require higher PPV to induce cracking than typical pre-1945 construction (Siskind et.al., 1980).

Minimum stand-off distances for protecting structures and aquatic wildlife from excessive PPV exposure are considered as the safe distance from the point of detonation (> 212 feet). Structures greater than 212 feet from portal and decline development blasting are not expected to be impacted. The human detection threshold is regarded as the most barely perceptible level of detection by human senses so some people within a 2,500-foot radius may feel blast tremors.

7.1.2.2 Construction and Operations

Estimates of vibration during mine construction and operation are provided in **Table 7.2.** The estimated vibration level at the nearest residences to the plant area is expected to be 42 VdB or less during construction and 35 VdB or less during operation. Vibration during both scenarios is well below the recommended vibration design goals of 94 VdB for building damage and 72 VdB for human annoyance.

The nearest receptor locations identified in **Table 7.2** are shown in **Figure C.1** in **Appendix C.** Receptors R-113 and R-145 are west of the plant area along M-64 and receptor R-045 is south of the mine site along M-64.

Table 7.2 Estimated Vibration at Sensitive Receptors

Phase	Equipment	Equipment Reference Vibration Level		Estimated Vibration at Nearest Receptor Location			
		PPV at 25 ft, in/sec	Lv at 25 ft, VdB	Receptor ID	Distance, ft	PPV, in/sec	Lv, VdB
Construction	Loaded truck	0.076	86	R-113	1,214	0.0002	35
	Vibratory roller	0.21	94	R-145	2,050	0.0003	37
	Bulldozer	0.089	87	R-145	777	0.0005	42
Operation	Loaded truck (plant)	0.076	86	R-113	1,214	0.0002	35
	Loaded truck (offsite road)	0.076	86	R-045	161	0.0047	62

7.2 Vibration Impact Assessment

7.2.1.1 Blasting

Vibration generated by blasting is regarded as low frequency. Low frequency blast wave energy is generally more damaging to structures than high frequency blasting since low frequency waves carry greater displacement potential, may match a structure's natural resonant frequency, and may have a longer duration and be subject to less damping than high frequency blast vibrations.

For surface blasting at the mine portal face and near-surface blasting of the initial decline rounds, structures located greater than 212 ft from blasting are not expected to be impacted.

Slight blasting tremors may be felt within a 2,500 feet radius of blasting at the portal location.

It is important to note that the delays for underground development blasting and White Pine production blasting will be "LP" delays, which can vary in length from 200 ms up to nearly one second. With this type of delay, there is little chance of a blast creating harmonic motion with the surface as can happen with the much faster delays (~25ms) that are used for surface blasting. With LP's, the detonation of the already smaller underground charges (vs surface blasting) are spread apart, minimizing vibration

7.2.1.2 Construction and Operations

The construction and operational vibration assessment focused on vibration generated by heavy construction equipment and trucks. The assessment found that vibration at nearby residences is expected to be well below common vibration criteria for structural damage and human annoyance. Use of heavy equipment during Project construction and operation is not anticipated to generate vibration that is readily perceptible at residences on a regular basis.

8 Best Management Practices and Mitigation Measures

8.1 Noise

The preliminary noise mitigation measures that have been identified as necessary for the Project to meet the recommended noise design goals of 55 dBA during daytime and 45 dBA during nighttime at residences are summarized in **Table *6.10***. These operational noise mitigation measures have been included in the noise model and are reflected in the predicted sound levels presented in this report. It is recommended that WPC reassess the noise mitigation requirements as the Project design progresses.

Additional recommended best management practices to further minimize noise impact, which were not incorporated into the noise model, include the following:

- Install “broadband” backup alarms on onsite mobile equipment. Noise from typical “tonal” backup alarms are commonly the largest source of noise complaints at sites with mobile equipment. Broadband backup alarms are loud enough to alert vehicles and workers in the immediate vicinity for safety purposes and are significantly less perceptible and annoying in the surrounding community compared to tonal backup alarms. Ambient-sensing broadband backup alarms are also available, which vary the backup alarm signal level based on the ambient sound level, to further reduce offsite audibility of backup alarms.

- Ensure that construction vehicles and equipment are maintained in proper operating condition and equipped with manufacturers’ standard noise control devices. Promptly replace defective exhaust mufflers.

- Limit construction activities to daytime hours as much as possible. If nighttime construction is anticipated to be necessary, communicate the construction plans to the nearby residences in advance and plan nighttime construction so that high noise equipment and activities are located as far away from residences as possible.

- Develop a noise complaint resolution process to log, investigate, and respond to noise complaints from the community.

8.2 Vibration

8.2.1 Blasting

Recommended best management practices to minimize blast vibration impact include the following:

- Design surface or near-surface blasting to limit blast vibration exposure to newer-type (poured concrete and drywall) construction at 2 inches per second PPV (Siskind et.al., 1980)

- Design surface or near-surface blasting to limit blast vibration exposure to older-type construction (typically pre-1945) at 0.5 inches per second PPV (Siskind et.al., 1980)
- Design surface or near-surface blasting to limit blast vibration exposure to aquatic wildlife (fish) at 2 inches per second PPV (USDOT, 2019)
- Deployment of seismographs to sensitive surface locations for monitoring PPV of the initial portal blast, to allow modification of blast design subsequent near-surface decline development rounds if allowable PPV is exceeded at the portal
- Deployment of seismographs to sensitive surface locations for monitoring PPV of underground mass blasting and modification of underground mass blast design if allowable PPV is exceeded
- Revise blast designs if changing blasting products to ensure PPV is limited
- Use “LP” delays for sequencing the blasts.

8.2.2 Construction and Operation

Recommended best management practices to limit vibration impact during mine construction and operation include the following:

- Operate heavy loaded trucks and earth-moving equipment as far away from residences as possible.
- Consider phasing construction activities so that demolition and earth-moving activities are not occurring simultaneously, to the degree feasible.
- Limit construction activities, trucking, and use of heavy earth moving equipment to daytime periods when vibration sensitivity is lower.

9 Conclusions

This noise and vibration assessment was completed to establish baseline acoustic conditions and evaluate potential noise and vibration impacts from the White Pine North mine in Ontonagon County Michigan. No State or local quantitative limits apply to noise or vibration generated by the Project; thus, noise and vibration design goals were identified and recommended to minimize impact.

A baseline sound survey was completed at four measurement locations to establish existing ambient sound levels within the vicinity of the Project. Daytime L_{eq} sound levels ranged from 44 to 48 dBA and nighttime L_{eq} sound levels ranged from 38 to 45 dBA.

Predictions of noise at nearby residences during Project construction and operation were completed. Noise during construction at nearby residences is not predicted to exceed typical construction noise impact criteria and major construction activities will occur during daytime hours. The operational noise assessment identified equipment and facilities that are expected to require noise mitigation to meet the recommended

Project noise design goal of 45 dBA at night, including the gas turbine plant, mine ventilation fans, primary crushing station, conveyors, and the Process Plant. The identified noise mitigation requirements are preliminary due to the prefeasibility stage of the Project and should be reassessed as the mine design progresses.

Predictions of vibration due to blasting, construction, and mine operation were completed and the results indicated that published industry vibration criteria are not expected to be exceeded at nearby residences based on the preliminary Project design details. Vibration due to mine activities is not anticipated to adversely impact the surrounding community.

Along with the recommended noise and vibration design goals and preliminary noise mitigation requirements, best management practices to minimize noise and vibration impact from the Project were also identified.

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Appendix A Sound Monitoring Data and Photos

White Pine Copper Mine
Sound Monitoring Results - Site ML-1

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/6/2025 15:49	53	50	41	36	NO
10/6/2025 16:00	47	52	40	29	NO
10/6/2025 17:00	47	51	38	25	YES
10/6/2025 18:00	44	49	31	19	NO
10/6/2025 19:00	45	50	33	19	YES
10/6/2025 20:00	44	49	28	19	YES
10/6/2025 21:00	43	47	28	24	YES
10/6/2025 22:00	38	38	31	26	YES
10/6/2025 23:00	37	37	30	27	YES
10/7/2025 0:00	28	30	27	25	YES
10/7/2025 1:00	36	30	24	23	YES
10/7/2025 2:00	30	34	27	22	YES
10/7/2025 3:00	31	24	23	21	NO
10/7/2025 4:00	36	27	24	24	YES
10/7/2025 5:00	40	39	29	26	NO
10/7/2025 6:00	43	46	35	31	NO
10/7/2025 7:00	46	50	39	33	YES
10/7/2025 8:00	47	50	39	35	YES
10/7/2025 9:00	48	53	43	34	YES
10/7/2025 10:00	51	55	48	41	YES
10/7/2025 11:00	51	55	50	44	YES
10/7/2025 12:00	51	55	50	44	YES
10/7/2025 13:00	52	55	51	47	NO
10/7/2025 14:00	53	56	51	46	NO
10/7/2025 15:00	51	54	49	43	NO
10/7/2025 16:00	50	53	48	43	NO
10/7/2025 17:00	49	53	47	40	NO
10/7/2025 18:00	48	52	44	37	NO
10/7/2025 19:00	45	49	40	34	NO
10/7/2025 20:00	44	48	39	32	NO
10/7/2025 21:00	41	43	35	30	NO
10/7/2025 22:00	34	34	29	25	YES
10/7/2025 23:00	36	38	31	25	YES
10/8/2025 0:00	34	34	26	22	YES
10/8/2025 1:00	28	25	23	22	YES
10/8/2025 2:00	23	24	23	22	YES
10/8/2025 3:00	29	23	22	22	YES
10/8/2025 4:00	37	31	23	22	YES
10/8/2025 5:00	38	38	25	24	YES
10/8/2025 6:00	45	49	30	26	YES
10/8/2025 7:00	50	51	37	28	YES
10/8/2025 8:00	47	51	37	30	YES
10/8/2025 9:00	48	52	40	29	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-1

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/8/2025 10:00	47	52	36	24	YES
10/8/2025 11:00	46	51	36	23	YES
10/8/2025 12:00	49	53	43	35	YES
10/8/2025 13:00	49	53	45	37	YES
10/8/2025 14:00	47	51	43	37	YES
10/8/2025 15:00	47	51	43	37	NO
10/8/2025 16:00	46	51	42	35	NO
10/8/2025 17:00	46	50	38	29	YES
10/8/2025 18:00	45	50	34	19	NO
10/8/2025 19:00	44	49	34	19	NO
10/8/2025 20:00	43	48	32	19	YES
10/8/2025 21:00	41	41	19	19	YES
10/8/2025 22:00	39	34	20	19	YES
10/8/2025 23:00	34	27	20	19	YES
10/9/2025 0:00	35	28	22	19	YES
10/9/2025 1:00	24	26	23	23	YES
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10/9/2025 3:00	39	34	31	29	YES
10/9/2025 4:00	39	37	34	29	YES
10/9/2025 5:00	40	41	36	33	YES
10/9/2025 6:00	44	48	38	35	YES
10/9/2025 7:00	46	50	40	37	YES
10/9/2025 8:00	50	51	42	39	YES
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10/9/2025 10:00	50	53	47	42	YES
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10/9/2025 12:00	49	53	47	42	YES
10/9/2025 13:00	51	54	48	42	YES
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10/9/2025 15:00	49	52	47	41	YES
10/9/2025 16:00	49	52	47	40	NO
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10/9/2025 18:00	47	52	39	31	NO
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10/9/2025 20:00	45	50	37	32	YES
10/9/2025 21:00	43	46	36	32	YES
10/9/2025 22:00	50	53	47	38	YES
10/9/2025 23:00	47	50	44	35	YES
10/10/2025 0:00	43	48	37	29	YES
10/10/2025 1:00	47	50	45	36	YES
10/10/2025 2:00	45	48	44	40	NO
10/10/2025 3:00	49	52	48	43	YES
10/10/2025 4:00	49	51	47	44	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-1

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/10/2025 5:00	47	49	45	42	YES
10/10/2025 6:00	47	50	44	41	NO
10/10/2025 7:00	47	51	42	37	YES
10/10/2025 8:00	50	52	41	35	NO
10/10/2025 9:00	51	55	49	41	YES
10/10/2025 10:00	51	55	49	43	YES
10/10/2025 11:00	52	55	50	44	NO
10/10/2025 12:00	53	56	52	47	NO
10/10/2025 13:00	53	56	51	47	NO
10/10/2025 14:00	52	55	50	45	NO
10/10/2025 15:00	52	55	50	45	NO
10/10/2025 16:00	51	54	49	43	NO
10/10/2025 17:00	50	54	48	41	NO
10/10/2025 18:00	48	52	41	35	NO
10/10/2025 19:00	48	52	41	32	NO
10/10/2025 20:00	48	53	39	28	NO
10/10/2025 21:00	44	48	29	26	NO
10/10/2025 22:00	40	43	25	23	YES
10/10/2025 23:00	42	43	24	21	YES
10/11/2025 0:00	39	38	20	19	YES
10/11/2025 1:00	33	25	20	19	NO
10/11/2025 2:00	36	29	22	21	YES
10/11/2025 3:00	35	26	24	23	YES
10/11/2025 4:00	31	28	25	23	YES
10/11/2025 5:00	38	36	25	24	YES
10/11/2025 6:00	42	45	26	24	YES
10/11/2025 7:00	42	46	28	24	YES
10/11/2025 8:00	50	51	37	27	YES
10/11/2025 9:00	48	52	40	24	YES
10/11/2025 10:00	49	55	41	28	YES
10/11/2025 11:00	50	54	43	33	YES
10/11/2025 12:00	48	53	42	33	YES
10/11/2025 13:00	48	53	42	30	YES
10/11/2025 14:00	48	52	42	32	YES
10/11/2025 15:00	47	51	42	33	YES
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10/11/2025 17:00	49	53	46	37	YES
10/11/2025 18:00	49	53	45	31	YES
10/11/2025 19:00	49	53	45	30	YES
10/11/2025 20:00	47	52	36	20	YES
10/11/2025 21:00	44	49	27	19	NO
10/11/2025 22:00	41	44	32	28	YES
10/11/2025 23:00	41	43	33	30	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-1

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/12/2025 0:00	41	40	33	29	YES
10/12/2025 1:00	38	41	35	30	YES
10/12/2025 2:00	38	40	36	32	YES
10/12/2025 3:00	39	42	37	33	YES
10/12/2025 4:00	43	46	41	34	YES
10/12/2025 5:00	45	48	44	38	YES
10/12/2025 6:00	39	40	31	25	YES
10/12/2025 7:00	47	45	33	26	YES
10/12/2025 8:00	49	53	46	41	YES
10/12/2025 9:00	51	55	49	45	YES
10/12/2025 10:00	53	56	51	45	YES
10/12/2025 11:00	51	55	50	42	YES
10/12/2025 12:00	50	54	47	38	YES
10/12/2025 13:00	51	54	49	43	NO
10/12/2025 14:00	50	54	49	44	NO
10/12/2025 15:00	52	56	51	45	YES
10/12/2025 16:00	53	56	51	47	YES
10/12/2025 17:00	51	54	49	45	NO
10/12/2025 18:00	50	53	48	43	NO
10/12/2025 19:00	50	54	49	44	NO
10/12/2025 20:00	52	55	50	46	NO
10/12/2025 21:00	53	56	51	47	NO
10/12/2025 22:00	54	57	52	48	NO
10/12/2025 23:00	53	56	51	47	NO
10/13/2025 0:00	53	56	51	47	NO
10/13/2025 1:00	50	53	48	43	NO
10/13/2025 2:00	46	49	44	40	NO
10/13/2025 3:00	50	53	48	43	YES
10/13/2025 4:00	43	47	40	34	YES
10/13/2025 5:00	42	46	39	35	YES
10/13/2025 6:00	44	47	38	33	YES
10/13/2025 7:00	45	49	31	25	YES
10/13/2025 8:00	47	51	43	37	YES
10/13/2025 9:00	49	53	45	39	YES
10/13/2025 10:00	50	54	47	40	YES
10/13/2025 11:00	48	52	45	39	YES
10/13/2025 12:00	49	53	47	41	NO
10/13/2025 13:00	48	52	45	38	NO
10/13/2025 14:00	49	52	46	41	YES
10/13/2025 15:00	49	53	47	41	YES
10/13/2025 16:00	60	65	55	51	NO

White Pine Copper Mine
Sound Monitoring Results - Site ML-2

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/6/2025 13:59	43	47	41	35	NO
10/6/2025 14:00	36	40	33	25	NO
10/6/2025 15:00	21	24	19	19	YES
10/6/2025 16:00	29	32	27	19	NO
10/6/2025 17:00	37	42	30	23	YES
10/6/2025 18:00	46	49	43	36	YES
10/6/2025 19:00	48	51	47	43	YES
10/6/2025 20:00	41	46	37	29	YES
10/6/2025 21:00	28	32	24	20	YES
10/6/2025 22:00	32	37	28	21	YES
10/6/2025 23:00	22	25	21	19	YES
10/7/2025 0:00	35	40	26	19	YES
10/7/2025 1:00	45	49	42	35	NO
10/7/2025 2:00	54	58	51	38	YES
10/7/2025 3:00	37	41	28	22	NO
10/7/2025 4:00	45	47	39	32	NO
10/7/2025 5:00	54	57	52	48	YES
10/7/2025 6:00	56	59	55	51	YES
10/7/2025 7:00	51	54	48	44	YES
10/7/2025 8:00	52	54	50	45	YES
10/7/2025 9:00	53	57	51	45	YES
10/7/2025 10:00	54	57	52	48	YES
10/7/2025 11:00	56	59	54	49	NO
10/7/2025 12:00	57	61	56	51	NO
10/7/2025 13:00	56	59	54	50	NO
10/7/2025 14:00	53	56	51	47	NO
10/7/2025 15:00	55	59	53	48	NO
10/7/2025 16:00	57	60	55	51	NO
10/7/2025 17:00	60	63	58	54	NO
10/7/2025 18:00	57	60	55	50	NO
10/7/2025 19:00	57	60	55	51	NO
10/7/2025 20:00	59	63	57	53	YES
10/7/2025 21:00	55	58	53	48	YES
10/7/2025 22:00	54	57	53	47	YES
10/7/2025 23:00	55	58	53	48	YES
10/8/2025 0:00	47	51	38	24	YES
10/8/2025 1:00	51	53	49	46	YES
10/8/2025 2:00	45	48	44	39	YES
10/8/2025 3:00	36	39	33	27	YES
10/8/2025 4:00	46	46	39	34	YES
10/8/2025 5:00	41	44	37	33	YES
10/8/2025 6:00	44	47	43	36	YES
10/8/2025 7:00	45	48	44	40	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-2

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/8/2025 8:00	45	48	43	39	YES
10/8/2025 9:00	46	49	44	39	YES
10/8/2025 10:00	49	53	43	35	YES
10/8/2025 11:00	49	53	45	37	YES
10/8/2025 12:00	47	51	43	37	YES
10/8/2025 13:00	47	51	43	37	NO
10/8/2025 14:00	46	51	42	35	NO
10/8/2025 15:00	46	50	38	29	YES
10/8/2025 16:00	45	50	34	19	NO
10/8/2025 17:00	44	49	34	19	NO
10/8/2025 18:00	43	48	32	19	YES
10/8/2025 19:00	41	41	19	19	YES
10/8/2025 20:00	39	34	20	19	YES
10/8/2025 21:00	34	27	20	19	YES
10/8/2025 22:00	35	28	22	19	YES
10/8/2025 23:00	24	26	23	23	YES
10/9/2025 0:00	41	34	30	26	YES
10/9/2025 1:00	39	34	31	29	YES
10/9/2025 2:00	39	37	34	29	YES
10/9/2025 3:00	40	41	36	33	YES
10/9/2025 4:00	44	48	38	35	YES
10/9/2025 5:00	46	50	40	37	YES
10/9/2025 6:00	50	51	42	39	YES
10/9/2025 7:00	49	53	45	40	YES
10/9/2025 8:00	50	53	47	42	YES
10/9/2025 9:00	51	54	49	44	YES
10/9/2025 10:00	49	53	47	42	YES
10/9/2025 11:00	51	54	48	42	YES
10/9/2025 12:00	49	52	46	40	YES
10/9/2025 13:00	49	52	47	41	YES
10/9/2025 14:00	49	52	47	40	NO
10/9/2025 15:00	50	53	47	40	YES
10/9/2025 16:00	47	52	39	31	NO
10/9/2025 17:00	46	51	36	28	YES
10/9/2025 18:00	45	50	37	32	YES
10/9/2025 19:00	43	46	36	32	YES
10/9/2025 20:00	50	53	47	38	YES
10/9/2025 21:00	47	50	44	35	YES
10/9/2025 22:00	43	48	37	29	YES
10/9/2025 23:00	47	50	45	36	YES
10/10/2025 0:00	45	48	44	40	NO
10/10/2025 1:00	49	52	48	43	YES
10/10/2025 2:00	49	51	47	44	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-2

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/10/2025 3:00	47	49	45	42	YES
10/10/2025 4:00	47	50	44	41	NO
10/10/2025 5:00	47	51	42	37	YES
10/10/2025 6:00	50	52	41	35	NO
10/10/2025 7:00	51	55	49	41	YES
10/10/2025 8:00	51	55	49	43	YES
10/10/2025 9:00	52	55	50	44	NO
10/10/2025 10:00	53	56	52	47	NO
10/10/2025 11:00	53	56	51	47	NO
10/10/2025 12:00	52	55	50	45	NO
10/10/2025 13:00	52	55	50	45	NO
10/10/2025 14:00	51	54	49	43	NO
10/10/2025 15:00	50	54	48	41	NO
10/10/2025 16:00	48	52	41	35	NO
10/10/2025 17:00	48	52	41	32	NO
10/10/2025 18:00	48	53	39	28	NO
10/10/2025 19:00	44	48	29	26	NO
10/10/2025 20:00	40	43	25	23	YES
10/10/2025 21:00	42	43	24	21	YES
10/10/2025 22:00	39	38	20	19	YES
10/10/2025 23:00	33	25	20	19	NO
10/11/2025 0:00	36	29	22	21	YES
10/11/2025 1:00	35	26	24	23	YES
10/11/2025 2:00	31	28	25	23	YES
10/11/2025 3:00	38	36	25	24	YES
10/11/2025 4:00	42	45	26	24	YES
10/11/2025 5:00	42	46	28	24	YES
10/11/2025 6:00	50	51	37	27	YES
10/11/2025 7:00	48	52	40	24	YES
10/11/2025 8:00	49	55	41	28	YES
10/11/2025 9:00	50	54	43	33	YES
10/11/2025 10:00	48	53	42	33	YES
10/11/2025 11:00	48	53	42	30	YES
10/11/2025 12:00	48	52	42	32	YES
10/11/2025 13:00	47	51	42	33	YES
10/11/2025 14:00	48	53	46	38	YES
10/11/2025 15:00	49	53	46	37	YES
10/11/2025 16:00	49	53	45	31	YES
10/11/2025 17:00	49	53	45	30	YES
10/11/2025 18:00	47	52	36	20	YES
10/11/2025 19:00	44	49	27	19	NO
10/11/2025 20:00	41	44	32	28	YES
10/11/2025 21:00	41	43	33	30	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-2

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/11/2025 22:00	41	40	33	29	YES
10/11/2025 23:00	38	41	35	30	YES
10/12/2025 0:00	38	40	36	32	YES
10/12/2025 1:00	39	42	37	33	YES
10/12/2025 2:00	43	46	41	34	YES
10/12/2025 3:00	45	48	44	38	YES
10/12/2025 4:00	39	40	31	25	YES
10/12/2025 5:00	47	45	33	26	YES
10/12/2025 6:00	49	53	46	41	YES
10/12/2025 7:00	51	55	49	45	YES
10/12/2025 8:00	53	56	51	45	YES
10/12/2025 9:00	51	55	50	42	YES
10/12/2025 10:00	50	54	47	38	YES
10/12/2025 11:00	51	54	49	43	NO
10/12/2025 12:00	50	54	49	44	NO
10/12/2025 13:00	52	56	51	45	YES
10/12/2025 14:00	53	56	51	47	YES
10/12/2025 15:00	51	54	49	45	NO
10/12/2025 16:00	50	53	48	43	NO
10/12/2025 17:00	50	54	49	44	NO
10/12/2025 18:00	52	55	50	46	NO
10/12/2025 19:00	53	56	51	47	NO
10/12/2025 20:00	54	57	52	48	NO
10/12/2025 21:00	53	56	51	47	NO
10/12/2025 22:00	53	56	51	47	NO
10/12/2025 23:00	50	53	48	43	NO
10/13/2025 0:00	46	49	44	40	NO
10/13/2025 1:00	50	53	48	43	YES
10/13/2025 2:00	43	47	40	34	YES
10/13/2025 3:00	42	46	39	35	YES
10/13/2025 4:00	44	47	38	33	YES
10/13/2025 5:00	45	49	31	25	YES
10/13/2025 6:00	47	51	43	37	YES
10/13/2025 7:00	49	53	45	39	YES
10/13/2025 8:00	50	54	47	40	YES
10/13/2025 9:00	48	52	45	39	YES
10/13/2025 10:00	49	53	47	41	NO
10/13/2025 11:00	48	52	45	38	NO
10/13/2025 12:00	49	52	46	41	NO
10/13/2025 13:00	49	53	47	41	NO

White Pine Copper Mine
Sound Monitoring Results - Site ML-3

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/6/2025 17:26	49	50	43	39	YES
10/6/2025 18:00	45	49	42	36	YES
10/6/2025 19:00	44	48	40	35	YES
10/6/2025 20:00	43	46	39	35	YES
10/6/2025 21:00	44	46	39	35	YES
10/6/2025 22:00	41	44	39	34	YES
10/6/2025 23:00	39	42	37	35	YES
10/7/2025 0:00	37	38	35	35	YES
10/7/2025 1:00	37	39	36	36	NO
10/7/2025 2:00	44	46	43	41	YES
10/7/2025 3:00	49	50	49	45	NO
10/7/2025 4:00	47	49	47	42	NO
10/7/2025 5:00	44	47	42	41	YES
10/7/2025 6:00	45	42	40	39	YES
10/7/2025 7:00	43	45	41	40	YES
10/7/2025 8:00	43	46	41	38	YES
10/7/2025 9:00	46	49	42	39	YES
10/7/2025 10:00	49	52	48	43	YES
10/7/2025 11:00	50	52	49	46	NO
10/7/2025 12:00	53	55	53	51	NO
10/7/2025 13:00	52	54	52	50	NO
10/7/2025 14:00	55	56	54	53	NO
10/7/2025 15:00	55	56	55	53	NO
10/7/2025 16:00	53	55	53	52	NO
10/7/2025 17:00	54	54	53	52	NO
10/7/2025 18:00	53	54	53	51	NO
10/7/2025 19:00	53	54	52	51	NO
10/7/2025 20:00	52	53	51	50	YES
10/7/2025 21:00	52	54	52	51	YES
10/7/2025 22:00	51	53	51	49	YES
10/7/2025 23:00	50	52	50	48	YES
10/8/2025 0:00	50	52	50	48	YES
10/8/2025 1:00	50	52	49	46	YES
10/8/2025 2:00	47	49	47	45	YES
10/8/2025 3:00	47	48	46	45	YES
10/8/2025 4:00	46	48	45	43	YES
10/8/2025 5:00	46	48	46	43	YES
10/8/2025 6:00	45	45	44	43	YES
10/8/2025 7:00	45	47	44	42	YES
10/8/2025 8:00	45	48	43	41	YES
10/8/2025 9:00	48	50	43	41	YES
10/8/2025 10:00	46	49	43	40	YES
10/8/2025 11:00	45	49	42	36	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-3

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/8/2025 12:00	45	49	42	37	YES
10/8/2025 13:00	46	50	43	39	NO
10/8/2025 14:00	47	50	46	42	NO
10/8/2025 15:00	47	50	45	41	YES
10/8/2025 16:00	46	49	43	39	NO
10/8/2025 17:00	45	49	42	37	NO
10/8/2025 18:00	48	49	41	35	YES
10/8/2025 19:00	45	49	41	34	YES
10/8/2025 20:00	43	47	39	33	YES
10/8/2025 21:00	43	47	39	33	YES
10/8/2025 22:00	39	43	34	33	YES
10/8/2025 23:00	40	41	33	32	YES
10/9/2025 0:00	35	34	32	31	YES
10/9/2025 1:00	37	39	35	33	YES
10/9/2025 2:00	39	41	39	37	YES
10/9/2025 3:00	41	42	39	38	YES
10/9/2025 4:00	42	44	41	39	YES
10/9/2025 5:00	42	44	42	40	YES
10/9/2025 6:00	43	45	42	40	YES
10/9/2025 7:00	45	47	44	41	YES
10/9/2025 8:00	46	48	45	42	YES
10/9/2025 9:00	48	50	46	43	YES
10/9/2025 10:00	48	51	47	43	YES
10/9/2025 11:00	49	52	48	44	YES
10/9/2025 12:00	49	52	47	44	YES
10/9/2025 13:00	50	53	48	44	YES
10/9/2025 14:00	50	53	49	44	NO
10/9/2025 15:00	48	51	46	41	YES
10/9/2025 16:00	50	52	47	42	NO
10/9/2025 17:00	48	51	47	42	YES
10/9/2025 18:00	49	51	46	42	YES
10/9/2025 19:00	46	50	44	39	YES
10/9/2025 20:00	44	48	40	34	YES
10/9/2025 21:00	44	48	41	36	YES
10/9/2025 22:00	49	52	48	44	YES
10/9/2025 23:00	51	54	48	43	YES
10/10/2025 0:00	48	53	43	32	NO
10/10/2025 1:00	43	47	40	36	YES
10/10/2025 2:00	54	57	53	44	YES
10/10/2025 3:00	50	54	47	42	YES
10/10/2025 4:00	54	58	53	49	NO
10/10/2025 5:00	53	56	52	49	YES
10/10/2025 6:00	50	53	49	47	NO

White Pine Copper Mine
Sound Monitoring Results - Site ML-3

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/10/2025 7:00	49	52	48	44	YES
10/10/2025 8:00	46	49	45	41	YES
10/10/2025 9:00	49	53	46	40	NO
10/10/2025 10:00	54	57	53	49	NO
10/10/2025 11:00	56	58	56	54	NO
10/10/2025 12:00	56	58	56	53	NO
10/10/2025 13:00	57	59	57	55	NO
10/10/2025 14:00	57	57	56	54	NO
10/10/2025 15:00	56	57	56	54	NO
10/10/2025 16:00	54	55	54	53	NO
10/10/2025 17:00	55	56	55	54	NO
10/10/2025 18:00	53	55	52	50	NO
10/10/2025 19:00	50	52	50	48	NO
10/10/2025 20:00	49	51	49	47	YES
10/10/2025 21:00	49	51	48	47	YES
10/10/2025 22:00	48	49	47	46	YES
10/10/2025 23:00	48	49	48	47	NO
10/11/2025 0:00	48	49	47	46	YES
10/11/2025 1:00	49	51	49	48	YES
10/11/2025 2:00	47	48	47	46	YES
10/11/2025 3:00	48	49	47	46	YES
10/11/2025 4:00	47	50	46	45	YES
10/11/2025 5:00	45	46	45	44	YES
10/11/2025 6:00	44	44	43	43	YES
10/11/2025 7:00	44	46	43	42	YES
10/11/2025 8:00	45	48	44	42	YES
10/11/2025 9:00	48	49	43	41	YES
10/11/2025 10:00	47	50	45	40	YES
10/11/2025 11:00	49	52	46	40	YES
10/11/2025 12:00	50	53	47	42	YES
10/11/2025 13:00	51	53	47	42	YES
10/11/2025 14:00	51	52	47	41	YES
10/11/2025 15:00	52	54	50	44	YES
10/11/2025 16:00	53	55	52	49	YES
10/11/2025 17:00	52	54	51	46	YES
10/11/2025 18:00	50	53	48	43	YES
10/11/2025 19:00	48	51	46	40	NO
10/11/2025 20:00	47	51	46	39	YES
10/11/2025 21:00	45	49	42	36	YES
10/11/2025 22:00	44	46	39	34	YES
10/11/2025 23:00	45	48	44	41	YES
10/12/2025 0:00	46	49	44	40	YES
10/12/2025 1:00	48	50	47	44	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-3

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/12/2025 2:00	46	49	44	36	YES
10/12/2025 3:00	34	37	32	31	YES
10/12/2025 4:00	36	38	35	32	YES
10/12/2025 5:00	37	41	35	32	YES
10/12/2025 6:00	43	46	42	37	YES
10/12/2025 7:00	43	46	40	35	YES
10/12/2025 8:00	45	48	43	35	YES
10/12/2025 9:00	47	50	43	36	YES
10/12/2025 10:00	52	55	51	46	YES
10/12/2025 11:00	51	54	49	43	NO
10/12/2025 12:00	49	52	47	42	NO
10/12/2025 13:00	49	52	47	42	YES
10/12/2025 14:00	50	53	48	43	YES
10/12/2025 15:00	51	55	49	45	NO
10/12/2025 16:00	55	58	53	48	NO
10/12/2025 17:00	55	58	53	48	NO
10/12/2025 18:00	55	58	52	48	NO
10/12/2025 19:00	52	55	49	45	NO
10/12/2025 20:00	51	54	48	43	NO
10/12/2025 21:00	55	59	53	48	NO
10/12/2025 22:00	58	61	55	51	NO
10/12/2025 23:00	59	62	57	53	NO
10/13/2025 0:00	59	62	57	54	NO
10/13/2025 1:00	59	62	56	52	YES
10/13/2025 2:00	53	56	51	47	YES
10/13/2025 3:00	50	53	49	45	YES
10/13/2025 4:00	50	53	48	43	YES
10/13/2025 5:00	45	49	39	33	YES
10/13/2025 6:00	47	50	46	43	YES
10/13/2025 7:00	46	48	43	39	YES
10/13/2025 8:00	43	46	39	35	YES
10/13/2025 9:00	48	51	47	45	YES
10/13/2025 10:00	48	50	46	43	NO
10/13/2025 11:00	49	51	48	46	NO
10/13/2025 12:00	52	54	51	49	YES
10/13/2025 13:00	53	55	53	52	YES
10/13/2025 14:00	54	55	53	52	NO
10/13/2025 15:00	53	54	52	51	NO
10/13/2025 16:00	51	53	50	48	NO
10/13/2025 17:00	50	52	49	47	NO
10/13/2025 18:00	52	52	47	46	NO

White Pine Copper Mine
Sound Monitoring Results - Site ML-4

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/6/2025 16:01	46	46	40	34	NO
10/6/2025 17:00	44	45	38	31	YES
10/6/2025 18:00	42	42	33	24	YES
10/6/2025 19:00	40	41	31	22	YES
10/6/2025 20:00	45	43	33	22	YES
10/6/2025 21:00	41	42	32	23	YES
10/6/2025 22:00	39	39	32	25	YES
10/6/2025 23:00	36	38	33	29	YES
10/7/2025 0:00	36	38	33	30	YES
10/7/2025 1:00	34	33	29	25	NO
10/7/2025 2:00	32	29	24	22	YES
10/7/2025 3:00	24	24	22	20	NO
10/7/2025 4:00	26	26	24	22	NO
10/7/2025 5:00	30	30	26	24	YES
10/7/2025 6:00	34	36	30	27	YES
10/7/2025 7:00	40	42	37	32	YES
10/7/2025 8:00	45	47	43	40	YES
10/7/2025 9:00	47	47	42	39	YES
10/7/2025 10:00	45	47	42	37	YES
10/7/2025 11:00	51	54	49	45	NO
10/7/2025 12:00	53	56	51	47	NO
10/7/2025 13:00	51	55	50	45	NO
10/7/2025 14:00	55	58	53	49	NO
10/7/2025 15:00	54	57	53	49	NO
10/7/2025 16:00	53	56	52	48	NO
10/7/2025 17:00	52	55	50	45	NO
10/7/2025 18:00	51	54	49	44	NO
10/7/2025 19:00	46	50	44	37	NO
10/7/2025 20:00	39	42	33	25	YES
10/7/2025 21:00	39	42	32	22	YES
10/7/2025 22:00	38	40	23	20	YES
10/7/2025 23:00	38	31	23	21	YES
10/8/2025 0:00	28	28	25	23	YES
10/8/2025 1:00	29	27	24	22	YES
10/8/2025 2:00	25	26	24	23	YES
10/8/2025 3:00	24	27	23	22	YES
10/8/2025 4:00	28	31	26	24	YES
10/8/2025 5:00	37	34	25	23	YES
10/8/2025 6:00	33	34	26	23	YES
10/8/2025 7:00	39	42	30	27	YES
10/8/2025 8:00	47	45	35	28	YES
10/8/2025 9:00	42	43	35	31	YES
10/8/2025 10:00	44	44	36	31	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-4

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/8/2025 11:00	40	40	34	25	YES
10/8/2025 12:00	40	40	33	25	YES
10/8/2025 13:00	43	44	38	30	NO
10/8/2025 14:00	44	47	41	36	NO
10/8/2025 15:00	46	49	44	40	YES
10/8/2025 16:00	46	49	45	40	NO
10/8/2025 17:00	46	49	44	39	NO
10/8/2025 18:00	43	46	39	33	YES
10/8/2025 19:00	43	43	33	23	YES
10/8/2025 20:00	42	45	33	19	YES
10/8/2025 21:00	41	44	32	21	YES
10/8/2025 22:00	38	38	25	21	YES
10/8/2025 23:00	36	35	24	21	YES
10/9/2025 0:00	30	29	24	22	YES
10/9/2025 1:00	33	33	27	24	YES
10/9/2025 2:00	30	30	27	25	YES
10/9/2025 3:00	31	30	27	24	YES
10/9/2025 4:00	32	33	27	25	YES
10/9/2025 5:00	32	33	28	25	YES
10/9/2025 6:00	38	40	35	32	YES
10/9/2025 7:00	40	40	35	32	YES
10/9/2025 8:00	49	44	37	33	YES
10/9/2025 9:00	43	44	39	35	YES
10/9/2025 10:00	47	47	42	39	YES
10/9/2025 11:00	47	50	44	39	YES
10/9/2025 12:00	49	52	48	44	YES
10/9/2025 13:00	49	52	48	43	YES
10/9/2025 14:00	48	51	47	43	NO
10/9/2025 15:00	48	51	46	40	YES
10/9/2025 16:00	48	52	47	43	NO
10/9/2025 17:00	51	53	48	45	YES
10/9/2025 18:00	48	52	47	41	YES
10/9/2025 19:00	46	48	41	34	YES
10/9/2025 20:00	42	45	33	26	YES
10/9/2025 21:00	43	45	37	31	YES
10/9/2025 22:00	45	49	42	37	YES
10/9/2025 23:00	51	53	50	46	YES
10/10/2025 0:00	49	53	48	43	NO
10/10/2025 1:00	44	47	42	37	YES
10/10/2025 2:00	46	50	43	36	YES
10/10/2025 3:00	44	47	43	39	YES
10/10/2025 4:00	46	48	44	40	NO
10/10/2025 5:00	47	49	46	43	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-4

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/10/2025 6:00	46	48	45	43	NO
10/10/2025 7:00	46	48	44	42	YES
10/10/2025 8:00	44	47	43	39	YES
10/10/2025 9:00	48	46	42	38	NO
10/10/2025 10:00	48	52	46	40	NO
10/10/2025 11:00	52	56	51	46	NO
10/10/2025 12:00	54	57	52	47	NO
10/10/2025 13:00	56	59	54	49	NO
10/10/2025 14:00	55	58	54	49	NO
10/10/2025 15:00	55	58	54	49	NO
10/10/2025 16:00	53	56	52	46	NO
10/10/2025 17:00	51	55	50	46	NO
10/10/2025 18:00	49	53	48	42	NO
10/10/2025 19:00	45	46	41	35	NO
10/10/2025 20:00	42	43	36	29	YES
10/10/2025 21:00	42	45	34	23	YES
10/10/2025 22:00	40	42	28	22	YES
10/10/2025 23:00	35	37	26	22	NO
10/11/2025 0:00	38	39	24	21	YES
10/11/2025 1:00	38	38	24	22	YES
10/11/2025 2:00	34	28	24	22	YES
10/11/2025 3:00	34	29	23	22	YES
10/11/2025 4:00	32	28	23	22	YES
10/11/2025 5:00	26	27	23	22	YES
10/11/2025 6:00	32	35	25	22	YES
10/11/2025 7:00	37	38	29	26	YES
10/11/2025 8:00	38	41	29	26	YES
10/11/2025 9:00	50	44	36	29	YES
10/11/2025 10:00	42	44	36	29	YES
10/11/2025 11:00	42	43	37	29	YES
10/11/2025 12:00	46	47	41	34	YES
10/11/2025 13:00	45	46	40	34	YES
10/11/2025 14:00	42	43	38	32	YES
10/11/2025 15:00	43	45	40	34	YES
10/11/2025 16:00	45	47	42	37	YES
10/11/2025 17:00	47	50	45	40	YES
10/11/2025 18:00	47	50	44	39	YES
10/11/2025 19:00	45	48	42	36	NO
10/11/2025 20:00	43	46	39	30	YES
10/11/2025 21:00	42	46	33	24	YES
10/11/2025 22:00	40	42	33	27	YES
10/11/2025 23:00	40	42	35	31	YES
10/12/2025 0:00	40	43	37	32	YES

White Pine Copper Mine
Sound Monitoring Results - Site ML-4

Date/Time	1-Hour A-Weighted Sound Level, dBA				Valid: Yes/No
	L_{eq}	L_{10}	L_{50}	L_{90}	
10/12/2025 1:00	42	44	39	36	YES
10/12/2025 2:00	38	41	36	31	YES
10/12/2025 3:00	39	42	38	33	YES
10/12/2025 4:00	41	44	40	36	YES
10/12/2025 5:00	47	51	44	38	YES
10/12/2025 6:00	42	48	35	27	YES
10/12/2025 7:00	36	40	32	22	YES
10/12/2025 8:00	45	46	41	37	YES
10/12/2025 9:00	47	50	45	40	YES
10/12/2025 10:00	50	53	49	45	YES
10/12/2025 11:00	51	54	50	46	NO
10/12/2025 12:00	47	51	45	40	NO
10/12/2025 13:00	49	52	46	40	YES
10/12/2025 14:00	50	53	49	44	YES
10/12/2025 15:00	50	53	48	44	NO
10/12/2025 16:00	52	55	51	45	NO
10/12/2025 17:00	50	53	48	44	NO
10/12/2025 18:00	51	54	49	43	NO
10/12/2025 19:00	49	51	47	42	NO
10/12/2025 20:00	50	52	48	43	NO
10/12/2025 21:00	49	52	47	44	NO
10/12/2025 22:00	51	54	50	46	NO
10/12/2025 23:00	51	53	49	46	NO
10/13/2025 0:00	51	54	50	47	NO
10/13/2025 1:00	52	55	51	46	YES
10/13/2025 2:00	51	54	49	45	YES
10/13/2025 3:00	47	50	45	41	YES
10/13/2025 4:00	50	53	49	45	YES
10/13/2025 5:00	50	53	48	44	YES
10/13/2025 6:00	45	48	43	39	YES
10/13/2025 7:00	43	46	40	34	YES
10/13/2025 8:00	40	39	33	26	YES
10/13/2025 9:00	43	45	39	34	YES
10/13/2025 10:00	48	50	45	38	NO
10/13/2025 11:00	49	52	48	43	NO
10/13/2025 12:00	47	51	45	40	YES
10/13/2025 13:00	48	51	46	40	YES
10/13/2025 14:00	48	52	46	41	NO
10/13/2025 15:00	49	52	47	42	NO
10/13/2025 16:00	50	52	48	45	NO

White Pine Copper Mine Meteorological Data

Date/Time	Wind speed mph	Wind gust mph	Precip in	Humidity %	Pressure in
10/6/2025 0:53	25	41	0	67	28.66
10/6/2025 1:53	31	45	0	75	28.69
10/6/2025 2:53	29	43	0	72	28.72
10/6/2025 3:53	24	38	0	72	28.74
10/6/2025 4:53	16	26	0	67	28.79
10/6/2025 5:53	13	0	0	72	28.81
10/6/2025 6:53	17	23	0	69	28.84
10/6/2025 7:53	13	21	0	66	28.87
10/6/2025 8:53	12	20	0	71	28.89
10/6/2025 9:53	15	23	0	66	28.91
10/6/2025 10:53	8	20	0	64	28.93
10/6/2025 11:53	10	21	0	55	28.95
10/6/2025 12:53	9	0	0	57	28.95
10/6/2025 13:53	9	20	0	56	28.96
10/6/2025 14:53	10	0	0	53	28.95
10/6/2025 15:53	13	20	0	51	28.93
10/6/2025 16:53	7	0	0	57	28.93
10/6/2025 17:53	8	0	0	57	28.92
10/6/2025 18:53	5	0	0	64	28.91
10/6/2025 19:53	5	0	0	66	28.91
10/6/2025 20:53	5	0	0	64	28.91
10/6/2025 21:53	3	0	0	55	28.90
10/6/2025 22:53	0	0	0	50	28.89
10/6/2025 23:53	3	0	0	63	28.89
10/7/2025 0:53	12	0	0	53	28.88
10/7/2025 1:53	10	0	0	61	28.86
10/7/2025 2:53	12	0	0	66	28.86
10/7/2025 3:53	14	0	0	49	28.86
10/7/2025 4:53	9	0	0	54	28.85
10/7/2025 5:53	0	0	0	63	28.85
10/7/2025 6:53	0	0	0	71	28.85
10/7/2025 7:53	6	0	0	71	28.85
10/7/2025 8:53	3	0	0	68	28.84
10/7/2025 9:53	10	0	0	53	28.84
10/7/2025 10:53	18	30	0	53	28.84
10/7/2025 11:53	21	33	0	49	28.86
10/7/2025 12:53	20	35	0	46	28.88
10/7/2025 13:53	23	31	0	44	28.89
10/7/2025 14:53	23	30	0	42	28.91
10/7/2025 15:53	18	31	0	39	28.93
10/7/2025 16:53	12	0	0	42	28.94
10/7/2025 17:53	18	26	0	41	28.96
10/7/2025 18:53	9	21	0	48	28.99
10/7/2025 19:53	6	0	0	52	29.02

White Pine Copper Mine Meteorological Data

Date/Time	Wind speed mph	Wind gust mph	Precip in	Humidity %	Pressure in
10/7/2025 20:53	9	0	0	48	29.04
10/7/2025 21:53	7	0	0	52	29.05
10/7/2025 22:53	5	0	0	54	29.06
10/7/2025 23:53	7	0	0	56	29.08
10/8/2025 0:53	6	0	0	62	29.09
10/8/2025 1:53	3	0	0	77	29.10
10/8/2025 2:53	3	0	0	79	29.12
10/8/2025 3:53	6	0	0	73	29.13
10/8/2025 4:53	5	0	0	76	29.14
10/8/2025 5:53	6	0	0	77	29.16
10/8/2025 6:53	3	0	0	83	29.18
10/8/2025 7:53	5	0	0	79	29.20
10/8/2025 8:53	3	0	0	79	29.22
10/8/2025 9:53	6	0	0	50	29.24
10/8/2025 10:53	3	0	0	47	29.25
10/8/2025 11:53	5	0	0	48	29.26
10/8/2025 12:53	12	0	0	45	29.27
10/8/2025 13:53	6	16	0	45	29.26
10/8/2025 14:53	8	0	0	44	29.25
10/8/2025 15:53	9	16	0	45	29.25
10/8/2025 16:53	9	18	0	40	29.24
10/8/2025 17:53	8	0	0	45	29.23
10/8/2025 18:53	5	0	0	50	29.24
10/8/2025 19:53	0	0	0	76	29.24
10/8/2025 20:53	5	0	0	82	29.24
10/8/2025 21:53	3	0	0	86	29.25
10/8/2025 22:53	0	0	0	86	29.25
10/8/2025 23:53	3	0	0	76	29.26
10/9/2025 0:53	5	0	0	79	29.26
10/9/2025 1:53	3	0	0	82	29.26
10/9/2025 2:53	1.5	0	0	81	29.26
10/9/2025 3:53	0	0	0	79	29.26
10/9/2025 4:53	0	0	0	73	29.27
10/9/2025 5:53	3	0	0	79	29.26
10/9/2025 6:53	5	0	0	79	29.26
10/9/2025 7:53	3	0	0	86	29.27
10/9/2025 8:53	3	0	0	86	29.27
10/9/2025 9:53	3	0	0	76	29.27
10/9/2025 10:53	8	0	0	66	29.26
10/9/2025 11:53	8	0	0	57	29.25
10/9/2025 12:53	9	0	0	49	29.22
10/9/2025 13:53	13	20	0	42	29.19
10/9/2025 14:53	10	0	0	41	29.15
10/9/2025 15:53	12	0	0	38	29.12

White Pine Copper Mine Meteorological Data

Date/Time	Wind speed mph	Wind gust mph	Precip in	Humidity %	Pressure in
10/9/2025 16:53	10	0	0	37	29.10
10/9/2025 17:53	7	0	0	34	29.06
10/9/2025 18:53	5	0	0	44	29.05
10/9/2025 19:53	5	0	0	55	29.05
10/9/2025 20:53	5	0	0	51	29.04
10/9/2025 21:53	8	0	0	53	29.01
10/9/2025 22:53	9	0	0	55	28.97
10/9/2025 23:53	7	18	0	55	28.98
10/10/2025 0:53	8	0	0	53	28.97
10/10/2025 1:53	5	0	0	55	28.96
10/10/2025 2:53	0	0	0	74	28.94
10/10/2025 3:53	6	0	0.1	83	28.90
10/10/2025 4:53	9	0	0	86	28.85
10/10/2025 5:53	13	24	0	86	28.82
10/10/2025 6:53	8	0	0	83	28.80
10/10/2025 7:53	5	0	0	86	28.78
10/10/2025 8:53	13	22	0	69	28.76
10/10/2025 9:53	20	36	0	72	28.76
10/10/2025 10:53	18	33	0	69	28.78
10/10/2025 11:53	22	38	0	55	28.80
10/10/2025 12:53	24	37	0	62	28.83
10/10/2025 13:53	25	36	0	57	28.85
10/10/2025 14:53	23	38	0	53	28.86
10/10/2025 15:53	23	32	0	51	28.88
10/10/2025 16:53	15	26	0	53	28.90
10/10/2025 17:53	18	28	0	57	28.91
10/10/2025 18:53	14	23	0	60	28.93
10/10/2025 19:53	10	0	0	66	28.95
10/10/2025 20:53	8	0	0	71	28.97
10/10/2025 21:53	0	0	0	77	28.99
10/10/2025 22:53	12	0	0	69	29.00
10/10/2025 23:53	5	0	0	66	29.01
10/11/2025 0:53	3	0	0	74	29.01
10/11/2025 1:53	3	0	0	80	29.03
10/11/2025 2:53	5	0	0	89	29.04
10/11/2025 3:53	3	0	0	85	29.05
10/11/2025 4:53	5	0	0	89	29.04
10/11/2025 5:53	0	0	0	83	29.04
10/11/2025 6:53	3	0	0	83	29.04
10/11/2025 7:53	3	0	0	93	29.04
10/11/2025 8:53	0	0	0	90	29.05
10/11/2025 9:53	3	0	0	83	29.07
10/11/2025 10:53	0	0	0	83	29.07
10/11/2025 11:53	3	0	0	80	29.06

White Pine Copper Mine Meteorological Data

Date/Time	Wind speed mph	Wind gust mph	Precip in	Humidity %	Pressure in
10/11/2025 12:53	7	0	0	80	29.05
10/11/2025 13:53	8	0	0	80	29.04
10/11/2025 14:53	7	0	0	77	29.02
10/11/2025 15:53	8	0	0	70	28.99
10/11/2025 16:53	9	0	0	67	28.97
10/11/2025 17:53	10	0	0	72	28.96
10/11/2025 18:53	12	0	0	80	28.94
10/11/2025 19:53	9	0	0	83	28.94
10/11/2025 20:53	7	0	0	86	28.94
10/11/2025 21:53	6	0	0	89	28.93
10/11/2025 22:53	7	0	0	89	28.92
10/11/2025 23:53	7	0	0	89	28.91
10/11/2025 0:53	9	0	0	93	28.90
10/11/2025 1:53	10	0	0	89	28.88
10/11/2025 2:53	8	0	0	86	28.87
10/11/2025 3:53	8	0	0	86	28.86
10/11/2025 4:53	8	0	0	83	28.85
10/11/2025 5:53	10	0	0	80	28.85
10/11/2025 6:53	7	0	0	86	28.85
10/11/2025 7:53	9	0	0	83	28.84
10/11/2025 8:53	9	0	0	83	28.83
10/11/2025 9:53	9	0	0	80	28.82
10/11/2025 10:53	14	0	0	72	28.80
10/11/2025 11:53	15	24	0	64	28.79
10/11/2025 12:53	10	0	0	64	28.78
10/11/2025 13:53	9	0	0	62	28.76
10/11/2025 14:53	10	22	0	60	28.76
10/11/2025 15:53	15	24	0	62	28.74
10/11/2025 16:53	13	0	0	64	28.72
10/11/2025 17:53	15	0	0	60	28.70
10/11/2025 18:53	15	0	0	62	28.70
10/11/2025 19:53	12	0	0	70	28.71
10/11/2025 20:53	14	0	0	64	28.70
10/11/2025 21:53	12	0	0	64	28.70
10/11/2025 22:53	15	0	0	67	28.68
10/11/2025 23:53	14	24	0	67	28.68
10/12/2025 0:53	10	0	0	89	28.88
10/12/2025 1:53	8	0	0	86	28.87
10/12/2025 2:53	8	0	0	86	28.86
10/12/2025 3:53	8	0	0	83	28.85
10/12/2025 4:53	10	0	0	80	28.85
10/12/2025 5:53	7	0	0	86	28.85
10/12/2025 6:53	9	0	0	83	28.84
10/12/2025 7:53	9	0	0	83	28.83

White Pine Copper Mine Meteorological Data

Date/Time	Wind speed mph	Wind gust mph	Precip in	Humidity %	Pressure in
10/12/2025 8:53	9	0	0	80	28.82
10/12/2025 9:53	14	0	0	72	28.80
10/12/2025 10:53	15	24	0	64	28.79
10/12/2025 11:53	10	0	0	64	28.78
10/12/2025 12:53	9	0	0	62	28.76
10/12/2025 13:53	10	22	0	60	28.76
10/12/2025 14:53	15	24	0	62	28.74
10/12/2025 15:53	13	0	0	64	28.72
10/12/2025 16:53	15	0	0	60	28.70
10/12/2025 17:53	15	0	0	62	28.70
10/12/2025 18:53	12	0	0	70	28.71
10/12/2025 19:53	14	0	0	64	28.70
10/12/2025 20:53	12	0	0	64	28.70
10/12/2025 21:53	15	0	0	67	28.68
10/12/2025 22:53	14	24	0	67	28.68
10/12/2025 23:53	15	27	0	64	28.67
10/13/2025 0:53	16	30	0	60	28.66
10/13/2025 1:53	9	0	0	62	28.69
10/13/2025 2:53	14	25	0	67	28.70
10/13/2025 3:53	12	21	0	72	28.71
10/13/2025 4:53	9	0	0	84	28.71
10/13/2025 5:53	9	0	0	87	28.72
10/13/2025 6:53	10	0	0	87	28.74
10/13/2025 7:53	7	0	0	84	28.76
10/13/2025 8:53	6	0	0	87	28.79
10/13/2025 9:53	20	32	0	72	28.81
10/13/2025 10:53	18	32	0	74	28.83
10/13/2025 11:53	18	28	0	67	28.85
10/13/2025 12:53	23	33	0	65	28.88
10/13/2025 13:53	23	31	0	60	28.89
10/13/2025 14:53	21	26	0	51	28.90
10/13/2025 15:53	20	26	0	56	28.90
10/13/2025 16:53	22	31	0	53	28.92
10/13/2025 17:53	20	32	0	57	28.93
10/13/2025 18:53	17	29	0	69	28.96
10/13/2025 19:53	18	0	0	66	28.98
10/13/2025 20:53	21	0	0	69	29.00
10/13/2025 21:53	21	30	0	64	29.01
10/13/2025 22:53	18	0	0	69	29.03
10/13/2025 23:53	18	29	0	66	29.04

Stantec

Site: ML-1	
 **North**	 **East**
 **South**	 **West**

Stantec

Site: ML-2	
	
North	**East**
	
South	**West**

Stantec

Site: ML-3	
 **North**	 **East**
 **South**	 **West**

Stantec

Site: ML-4	
 **North**	 **East**
 **South**	 **West**

Appendix B Noise Modeling Input and Results Tables

Table B-1: Construction Equipment Noise Inputs

Equipment	Quantity	Noise Metric	Octave Band Sound Power Level, dB[a]									Sound Power Level[a]
			31.5	63	125	250	500	1000	2000	4000	8000	dBA
Tailing Detention Facility Construction												
Haul truck, passby	13	Lmax	108	111	110	109	110	110	107	103	97	114
Haul truck, idle	2	Leq	119	122	104	105	103	104	101	96	91	108
Excavator	3	Leq	99	102	107	110	107	101	96	92	85	107
Dozer	11	Leq	96	101	106	114	109	106	102	95	91	112
Compactor	3	Lmax	115	120	111	118	111	109	101	96	89	114
Loader	4	Leq	97	101	98	103	102	97	95	96	95	104
Water truck	1	Lmax	98	101	98	105	102	99	93	89	86	104
Plant Area Construction												
Haul truck, passby	3	Lmax	108	111	110	109	110	110	107	103	97	114
Haul truck, idle	3	Leq	119	122	104	105	103	104	101	96	91	108
Backup alarm	3	Lmax	102	104	99	100	108	105	108	91	79	112
Light tower	3	Leq	95	98	93	95	89	86	83	79	74	92
Dozer	5	Leq	96	101	106	114	109	106	102	95	91	112
Compactor	3	Lmax	115	120	111	118	111	109	101	96	89	114
Loader	2	Leq	97	101	98	103	102	97	95	96	95	104
Man lift	1	Leq	91	113	100	107	102	98	91	85	79	104
Grader	1	Lmax	112	98	101	103	112	98	97	90	82	110
Excavator	3	Leq	99	102	107	110	107	101	96	92	85	107
Rock drill	1	Leq	102	111	107	113	119	116	115	116	114	123
Highway truck	2	Lmax	97	98	103	108	105	100	96	91	82	106
Water truck	1	Lmax	98	101	98	105	102	99	93	89	86	104
Crane	2	Leq	99	107	105	107	106	100	95	90	83	106

Notes:

a Sound power level per unit or individual piece of equipment

Table B-2: Operational Equipment Noise Inputs

Equipment	Quantity	Noise Metric	Octave Band Sound Power Level, dB[a]									Sound Power Level[a]	Notes[b]
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Plant Area Mobile Equipment													
Loader	6	Leq	97	101	98	103	102	97	95	96	95	104	
Crane	3	Leq	99	107	105	107	106	100	95	90	83	106	
Light tower	5	Leq	95	98	93	95	89	86	83	79	74	92	
Skid steer	1	Leq	97	101	98	103	102	97	95	96	95	104	
Concrete mixer	5	Leq	100	102	109	110	112	105	105	101	97	113	
Haul truck, idle	3	Leq	119	122	104	105	103	104	101	96	91	108	
Backup alarm	2	Lmax	102	104	99	100	108	105	108	91	79	112	
Stationary Operational Equipment													
Gas turbine combustion exhaust, SGT400	3	Leq	127	129	123	119	115	110	105	108	115	119	1, 2
Gas turbine intake and exhaust, SGT400	3	Leq	117	120	121	121	121	119	117	114	109	125	2
Primary jaw crusher	1	Leq	115	115	115	111	109	106	104	100	91	112	2
Crusher apron feeder	1	Leq	113	113	113	111	109	108	106	100	93	113	2
Mine portal fan	4	Leq	-	107	105	108	115	107	104	103	99	114	1, 2
Mine raise #1 fan	2	Leq	-	127	125	118	108	104	97	91	85	114	1, 2
Mine raise #2 fan	2	Leq	-	127	125	118	108	104	97	91	85	114	1, 2
Mine raise #3 fan	1	Leq	-	127	125	118	108	104	97	91	85	114	1
Substation transformer, 20 MVA	1	Leq	85	91	93	88	88	82	77	72	65	88	
Conveyor	1	Leq	107	113	109	106	107	102	101	95	87	108	2
Conveyor motor	4	Leq	82	82	85	87	90	90	89	84	76	95	

Notes:

a Sound power level per unit or individual piece of equipment

b 1 Sound power level includes base noise mitigation measures (silencers)

2 Equipment sound power level provided does not include additional noise mitigation expected to be necessary. See Section 6.2.2.2 for discussion of noise mitigation requirements.

Table B-3. Estimated Construction and Operational Sound Levels with Noise Mitigation

Receptor ID	Estimated Project Sound Level			Coordinates (UTM 16N)			Height above ground
	Construction Daytime	Operation Daytime	Operation Nighttime	X	Y	Z (ground)	
	dBA L_{eq}	dBA L_{eq}	dBA L_{eq}	m	m	m	m
R-001	46	42	38	303,399	5,181,204	269	1.5
R-002	29	29	29	305,339	5,188,319	200	1.5
R-003	32	36	36	309,894	5,186,391	223	1.5
R-004	28	31	31	309,316	5,187,977	210	1.5
R-005	27	30	30	309,235	5,188,196	210	1.5
R-006	33	38	38	309,861	5,186,062	226	1.5
R-007	27	29	29	307,831	5,188,557	211	1.5
R-008	51	45	45	303,561	5,182,833	256	1.5
R-009	24	26	26	305,560	5,190,008	185	1.5
R-010	25	29	29	311,358	5,187,712	205	1.5
R-011	26	31	31	311,851	5,186,297	220	1.5
R-012	28	29	28	305,643	5,188,634	200	1.5
R-013	29	33	33	311,621	5,184,594	235	1.5
R-014	28	33	33	311,423	5,186,139	222	1.5
R-015	31	36	36	311,017	5,184,674	231	1.5
R-016	29	34	34	311,309	5,185,589	225	1.5
R-017	31	33	33	310,975	5,182,950	246	1.5
R-018	29	33	33	311,515	5,184,072	239	1.5
R-019	25	30	30	311,586	5,187,298	210	1.5
R-020	25	29	29	311,223	5,187,734	209	1.5
R-021	27	32	32	311,235	5,186,765	215	1.5
R-022	24	28	28	311,558	5,187,935	205	1.5
R-023	25	29	29	311,307	5,187,662	207	1.5
R-024	50	43	42	303,312	5,182,139	265	1.5
R-025	27	26	26	310,717	5,179,423	280	1.5
R-026	29	34	34	311,547	5,185,140	230	1.5
R-027	27	27	26	311,143	5,179,924	275	1.5
R-028	22	26	26	311,653	5,189,044	195	1.5
R-029	22	27	27	311,825	5,188,607	197	1.5
R-030	22	27	27	312,135	5,188,385	201	1.5
R-031	21	26	26	311,734	5,189,278	190	1.5
R-032	19	25	24	312,237	5,189,548	191	1.5
R-033	18	24	24	312,267	5,189,765	190	1.5
R-034	27	27	27	311,355	5,180,385	271	1.5
R-035	28	27	27	311,021	5,180,411	269	1.5
R-036	25	25	25	311,346	5,178,942	290	1.5
R-037	27	27	26	310,693	5,179,717	276	1.5
R-038	26	26	26	311,192	5,179,418	282	1.5
R-039	26	27	27	311,647	5,180,650	270	1.5
R-040	29	27	26	309,536	5,179,133	290	1.5
R-041	28	27	26	309,528	5,179,007	290	1.5
R-042	29	27	26	309,390	5,179,027	290	1.5

Table B-3. Estimated Construction and Operational Sound Levels with Noise Mitigation

Receptor ID	Estimated Project Sound Level			Coordinates (UTM 16N)			Height above ground
	Construction Daytime	Operation Daytime	Operation Nighttime	X	Y	Z (ground)	
	dBA L_{eq}	dBA L_{eq}	dBA L_{eq}	m	m	m	m
R-043	35	34	30	304,475	5,179,138	305	1.5
R-044	36	33	31	304,722	5,179,181	305	1.5
R-045	36	43	31	304,242	5,179,240	302	1.5
R-046	26	25	25	310,406	5,178,677	291	1.5
R-047	24	26	26	305,282	5,189,984	185	1.5
R-048	35	31	30	304,941	5,179,016	305	1.5
R-049	30	27	27	308,450	5,178,847	290	1.5
R-050	39	39	32	303,838	5,179,838	287	1.5
R-051	25	25	25	310,929	5,178,952	290	1.5
R-052	34	30	30	305,739	5,179,011	308	1.5
R-053	30	30	30	305,036	5,187,782	205	1.5
R-054	27	26	26	310,329	5,178,990	289	1.5
R-055	26	25	25	310,640	5,178,892	289	1.5
R-056	25	25	25	311,294	5,179,134	287	1.5
R-057	31	31	31	304,282	5,187,414	210	1.5
R-058	26	27	27	304,311	5,188,991	195	1.5
R-059	27	28	28	304,276	5,188,743	197	1.5
R-060	25	26	26	304,487	5,189,555	190	1.5
R-061	25	26	26	305,295	5,189,780	189	1.5
R-062	25	26	26	304,392	5,189,527	190	1.5
R-063	26	27	27	304,237	5,189,063	195	1.5
R-064	25	27	26	304,260	5,189,381	190	1.5
R-065	25	26	26	304,609	5,189,741	185	1.5
R-066	25	26	26	304,488	5,189,685	185	1.5
R-067	25	26	26	304,727	5,189,781	185	1.5
R-068	25	26	26	304,547	5,189,606	189	1.5
R-069	25	26	26	304,924	5,189,751	185	1.5
R-070	25	26	26	304,712	5,189,687	189	1.5
R-071	25	26	26	305,025	5,189,686	190	1.5
R-072	25	26	26	304,861	5,189,837	185	1.5
R-073	25	26	26	304,966	5,189,866	185	1.5
R-074	25	26	26	304,636	5,189,662	188	1.5
R-075	24	26	26	305,088	5,189,911	185	1.5
R-076	25	27	26	306,679	5,189,744	191	1.5
R-077	25	27	26	305,898	5,189,727	189	1.5
R-078	50	45	45	303,560	5,183,002	255	1.5
R-079	20	25	25	311,031	5,189,864	188	1.5
R-080	19	25	24	311,820	5,189,821	188	1.5
R-081	22	26	25	309,911	5,190,140	186	1.5
R-082	22	26	26	310,186	5,189,875	187	1.5
R-083	24	26	26	307,329	5,190,244	185	1.5
R-084	23	26	26	309,733	5,189,791	190	1.5

Table B-3. Estimated Construction and Operational Sound Levels with Noise Mitigation

Receptor ID	Estimated Project Sound Level			Coordinates (UTM 16N)			Height above ground
	Construction Daytime	Operation Daytime	Operation Nighttime	X	Y	Z (ground)	
	dBA L_{eq}	dBA L_{eq}	dBA L_{eq}	m	m	m	m
R-085	23	26	25	308,074	5,190,400	186	1.5
R-086	27	28	28	305,942	5,189,045	195	1.5
R-087	22	26	25	310,635	5,189,897	190	1.5
R-088	22	25	25	310,271	5,190,074	185	1.5
R-089	20	25	25	311,545	5,189,844	188	1.5
R-090	23	26	26	309,488	5,189,988	191	1.5
R-091	22	26	26	310,393	5,189,832	190	1.5
R-092	20	25	25	311,225	5,189,993	185	1.5
R-093	20	25	25	311,312	5,189,855	187	1.5
R-094	20	25	25	311,408	5,189,963	185	1.5
R-095	20	25	25	311,025	5,189,993	186	1.5
R-096	47	45	45	303,722	5,183,567	250	1.5
R-097	18	24	24	312,062	5,190,011	185	1.5
R-098	44	43	43	303,779	5,184,223	240	1.5
R-099	41	40	40	303,892	5,185,049	229	1.5
R-100	49	46	45	303,658	5,183,277	251	1.5
R-101	21	25	25	310,640	5,190,122	185	1.5
R-102	18	24	24	312,211	5,190,003	185	1.5
R-103	33	32	32	303,809	5,186,806	217	1.5
R-104	20	25	25	310,823	5,190,130	185	1.5
R-105	38	38	37	303,788	5,185,477	230	1.5
R-106	35	34	34	304,063	5,186,394	220	1.5
R-107	22	25	25	310,479	5,190,096	185	1.5
R-108	35	34	34	303,656	5,186,150	220	1.5
R-109	43	43	43	303,743	5,184,320	240	1.5
R-110	33	32	32	304,280	5,187,046	214	1.5
R-111	37	36	36	303,846	5,185,796	230	1.5
R-112	42	42	42	303,732	5,184,541	235	1.5
R-113	52	46	45	303,545	5,182,689	260	1.5
R-114	53	46	45	303,533	5,182,463	260	1.5
R-115	49	42	40	303,286	5,181,782	265	1.5
R-116	43	40	35	303,344	5,180,714	270	1.5
R-117	36	33	30	304,653	5,179,163	305	1.5
R-119	35	31	30	304,974	5,179,049	305	1.5
R-120	35	31	30	305,043	5,179,041	306	1.5
R-121	35	31	30	305,016	5,179,042	306	1.5
R-123	30	27	27	308,801	5,179,031	290	1.5
R-124	27	26	26	310,035	5,179,017	290	1.5
R-125	23	27	27	311,844	5,188,318	200	1.5
R-126	18	24	24	312,240	5,189,740	190	1.5
R-127	18	24	24	312,241	5,189,781	190	1.5
R-128	18	24	24	312,297	5,189,838	190	1.5

Table B-3. Estimated Construction and Operational Sound Levels with Noise Mitigation

Receptor ID	Estimated Project Sound Level			Coordinates (UTM 16N)			Height above ground
	Construction Daytime	Operation Daytime	Operation Nighttime	X	Y	Z (ground)	
	dBA L_{eq}	dBA L_{eq}	dBA L_{eq}	m	m	m	m
R-129	18	24	24	312,296	5,189,772	190	1.5
R-130	18	24	24	312,288	5,189,718	190	1.5
R-131	18	24	24	312,307	5,189,880	190	1.5
R-132	18	24	24	312,096	5,189,889	188	1.5
R-133	25	26	26	304,941	5,189,671	188	1.5
R-134	25	26	26	304,782	5,189,719	188	1.5
R-135	25	26	26	304,668	5,189,753	185	1.5
R-136	25	26	26	304,632	5,189,752	185	1.5
R-137	25	26	26	304,581	5,189,744	185	1.5
R-138	25	26	26	304,746	5,189,696	189	1.5
R-139	25	26	26	304,741	5,189,784	185	1.5
R-140	25	26	26	304,716	5,189,780	185	1.5
R-141	25	26	26	304,610	5,189,643	188	1.5
R-142	26	27	27	304,263	5,189,034	195	1.5
R-143	30	30	29	304,306	5,187,902	205	1.5
R-144	46	46	45	303,813	5,183,814	250	1.5
R-145	53	46	45	303,568	5,182,332	260	1.5
R-146	50	43	42	303,310	5,182,171	265	1.5
R-147	50	43	42	303,287	5,182,188	265	1.5
R-148	49	43	42	303,245	5,182,192	264	1.5
R-149	49	43	42	303,257	5,182,142	265	1.5
R-150	50	43	42	303,279	5,182,132	265	1.5
R-151	49	43	42	303,246	5,182,145	265	1.5
R-152	49	42	40	303,302	5,181,746	265	1.5
R-153	46	42	38	303,362	5,181,236	267	1.5
R-154	46	42	38	303,381	5,181,219	268	1.5
R-155	46	42	38	303,416	5,181,183	270	1.5
R-156	46	43	38	303,433	5,181,168	270	1.5
R-157	46	41	37	303,345	5,181,184	266	1.5
R-158	46	42	37	303,395	5,181,129	269	1.5
R-159	45	42	37	303,348	5,181,075	270	1.5
R-160	22	25	25	309,901	5,190,195	185	1.5
R-161	22	26	25	309,932	5,190,151	185	1.5
R-162	22	26	25	309,994	5,190,152	185	1.5
R-163	22	26	25	310,099	5,190,116	185	1.5
R-164	22	25	25	310,246	5,190,126	185	1.5
R-165	22	25	25	310,489	5,190,093	185	1.5
R-166	21	25	25	310,523	5,190,093	185	1.5
R-167	20	25	25	310,847	5,190,157	185	1.5
R-168	22	26	25	310,593	5,189,907	190	1.5
R-169	22	25	25	310,702	5,189,890	190	1.5
R-170	20	25	25	310,904	5,189,987	187	1.5

Table B-3. Estimated Construction and Operational Sound Levels with Noise Mitigation

Receptor ID	Estimated Project Sound Level			Coordinates (UTM 16N)			Height above ground
	Construction Daytime	Operation Daytime	Operation Nighttime	X	Y	Z (ground)	
	dBA L_{eq}	dBA L_{eq}	dBA L_{eq}	m	m	m	m
R-171	21	25	25	310,924	5,189,876	189	1.5
R-172	20	25	25	311,057	5,189,859	188	1.5
R-173	21	25	25	311,015	5,189,848	188	1.5
R-174	20	25	25	310,992	5,190,019	186	1.5
R-175	20	25	25	311,084	5,189,996	185	1.5
R-176	20	25	25	311,212	5,190,017	185	1.5
R-177	20	25	25	311,268	5,189,999	185	1.5
R-178	20	25	25	311,149	5,189,867	187	1.5
R-179	20	25	25	311,205	5,189,859	187	1.5
R-180	20	25	25	311,270	5,189,849	187	1.5
R-181	20	25	25	311,362	5,189,839	187	1.5
R-182	20	25	25	311,393	5,189,971	185	1.5
R-183	20	25	25	311,484	5,190,003	185	1.5
R-184	20	25	25	311,428	5,190,002	185	1.5
R-185	20	25	25	311,475	5,189,845	188	1.5
R-186	20	25	25	311,568	5,189,821	188	1.5
R-187	20	25	25	311,623	5,189,855	186	1.5
R-188	19	25	24	311,563	5,189,970	185	1.5
R-189	19	24	24	311,688	5,190,004	185	1.5
R-190	19	24	24	311,713	5,189,997	185	1.5
R-191	19	24	24	311,740	5,189,999	185	1.5
R-192	19	24	24	311,777	5,190,014	185	1.5
R-193	19	24	24	311,847	5,190,022	185	1.5
R-194	18	24	24	312,019	5,190,013	185	1.5
R-195	18	24	24	312,089	5,190,032	185	1.5
R-196	18	24	24	312,140	5,190,002	185	1.5
R-197	18	24	24	312,189	5,190,011	185	1.5
R-198	18	24	24	312,259	5,190,012	185	1.5
R-199	18	24	24	312,308	5,190,015	185	1.5
R-200	26	27	27	306,183	5,189,301	194	1.5
R-201	33	40	40	310,361	5,185,387	231	1.5
R-202	39	41	41	309,596	5,183,772	245	1.5
R-203	39	33	33	309,161	5,182,093	260	1.5
R-204	45	38	37	305,182	5,180,854	278	1.5

Appendix C Estimated Project Sound Contour Figures

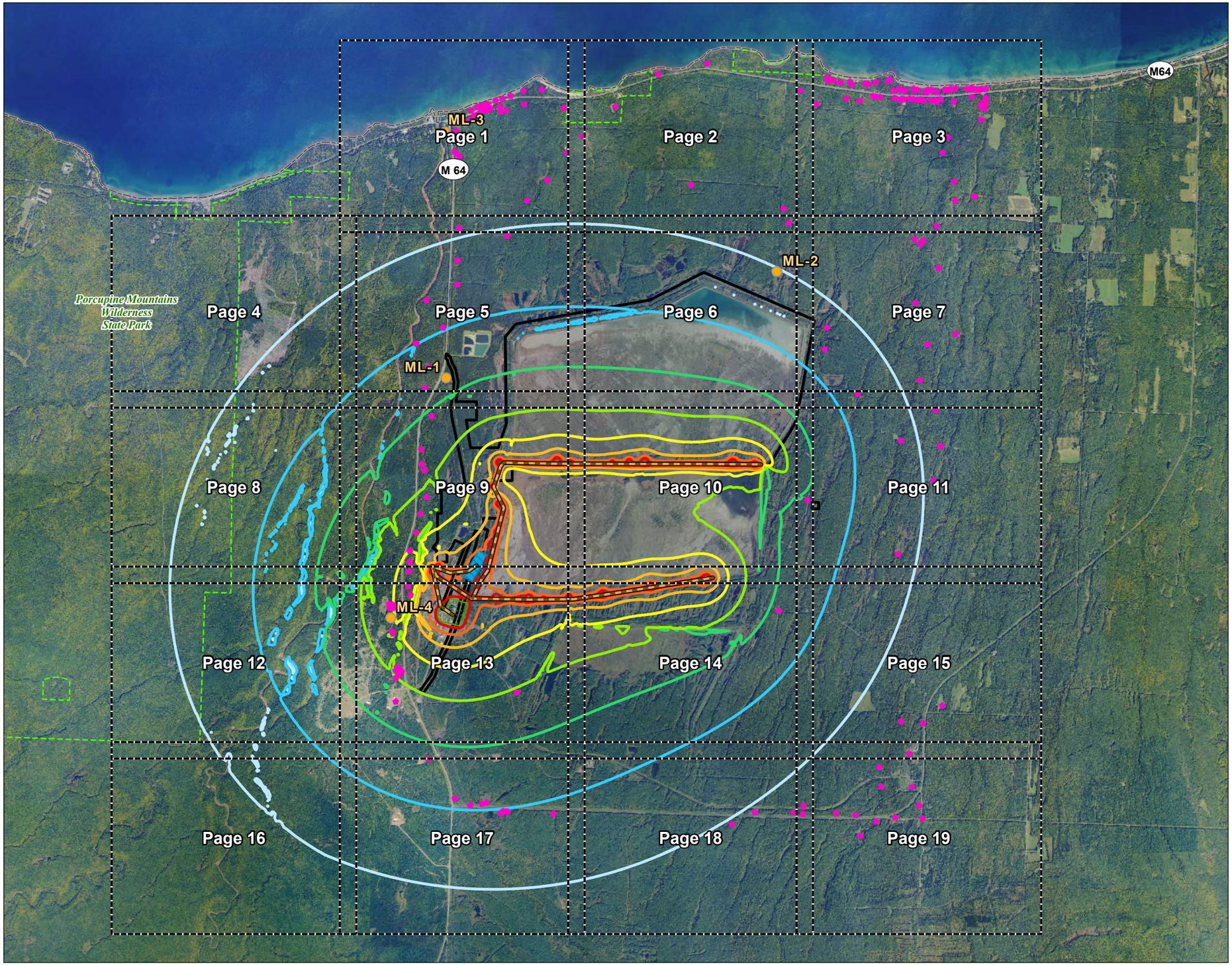


Figure No.
C.1

Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

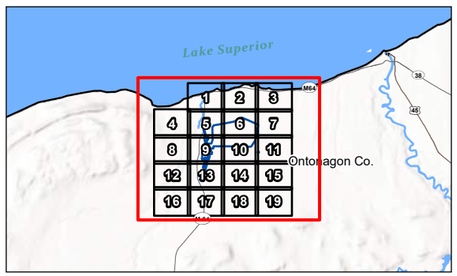
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TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park
- Construction Haul Route
- Plant Area
- Temporary Ore Stockpile
- Waste Stockpile

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Index Map

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Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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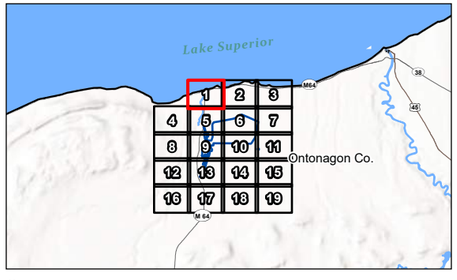
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Legend

- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park

Construction Noise Level Contour (dBA)

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Figure No.
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Client/Project 193710518
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White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

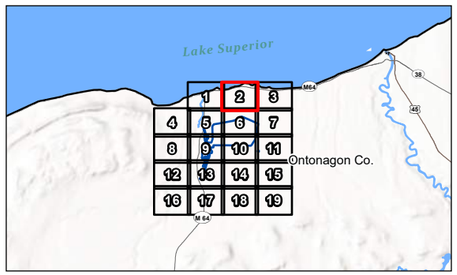
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Legend
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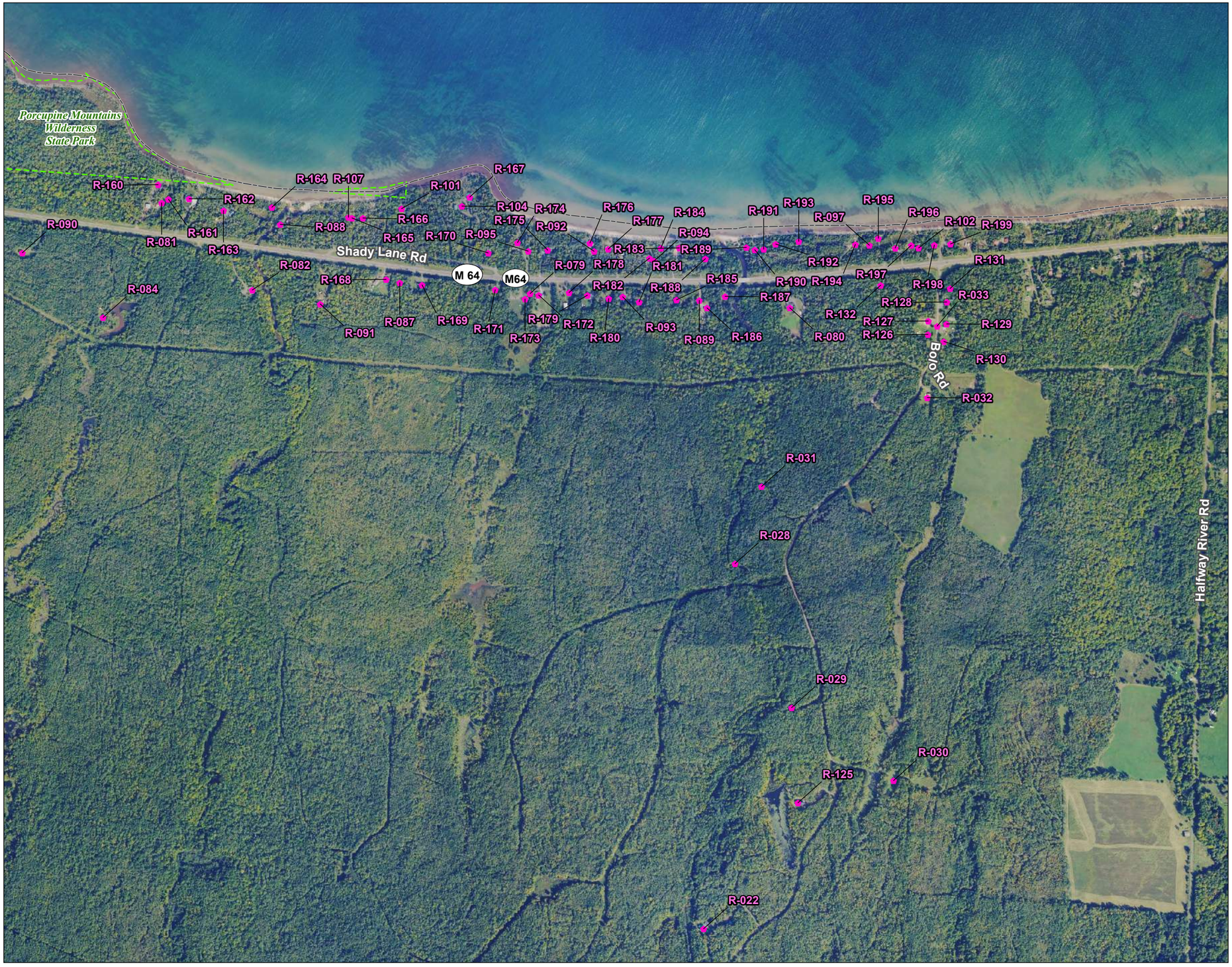


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Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

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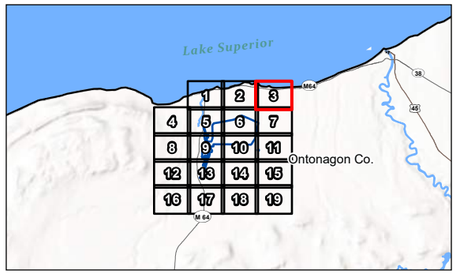
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Legend

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- State Park

Construction Noise Level Contour (dBA)

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Client/Project
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White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

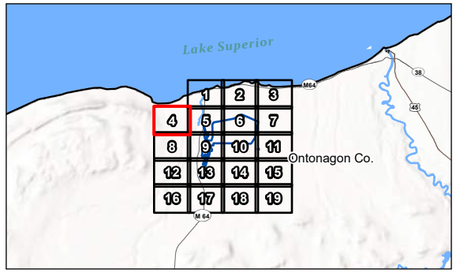
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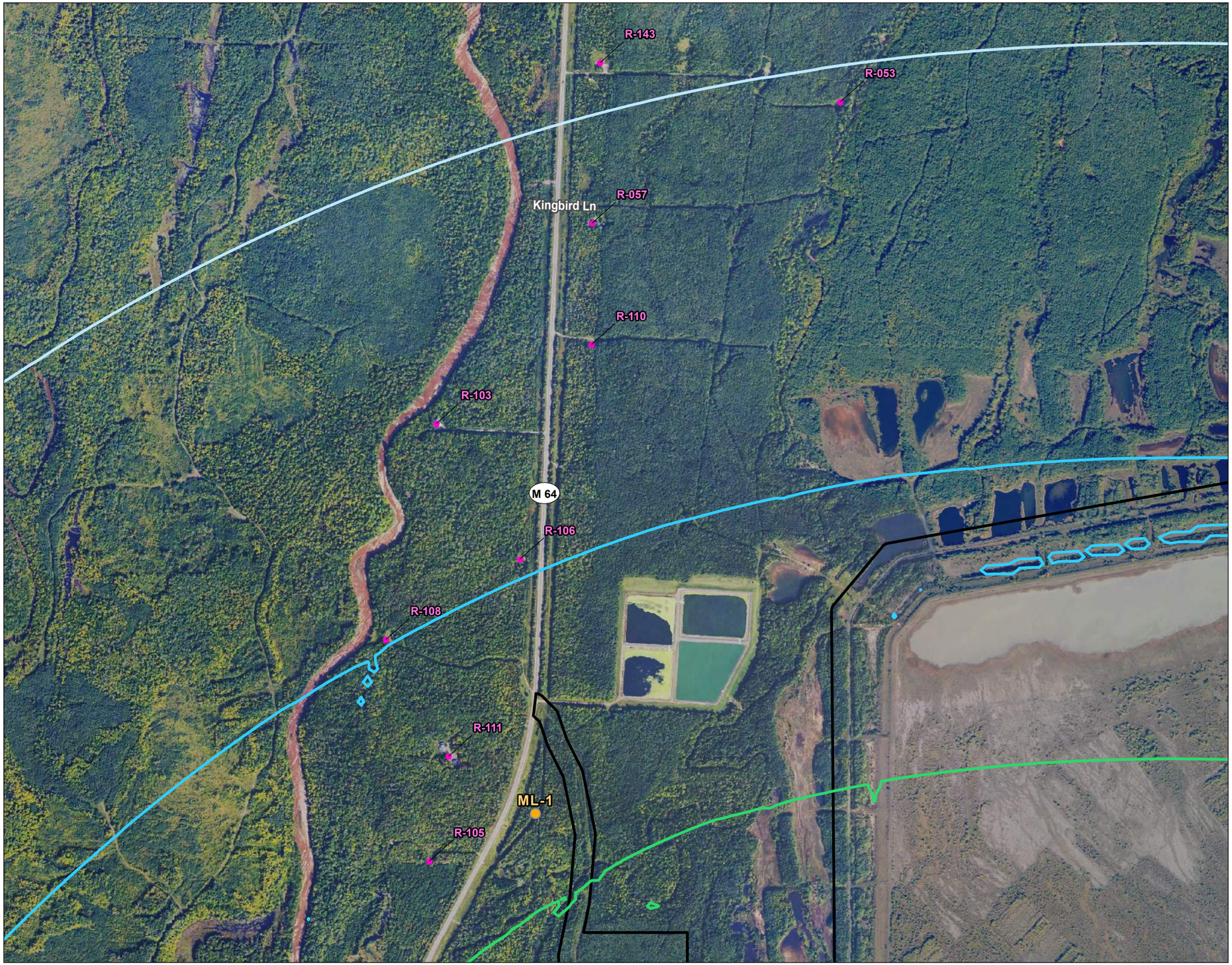


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Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

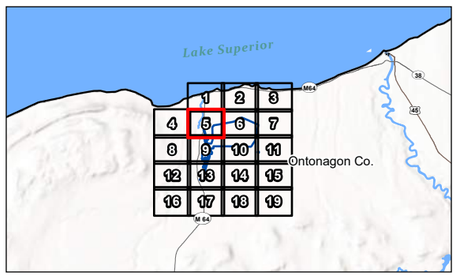
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Legend
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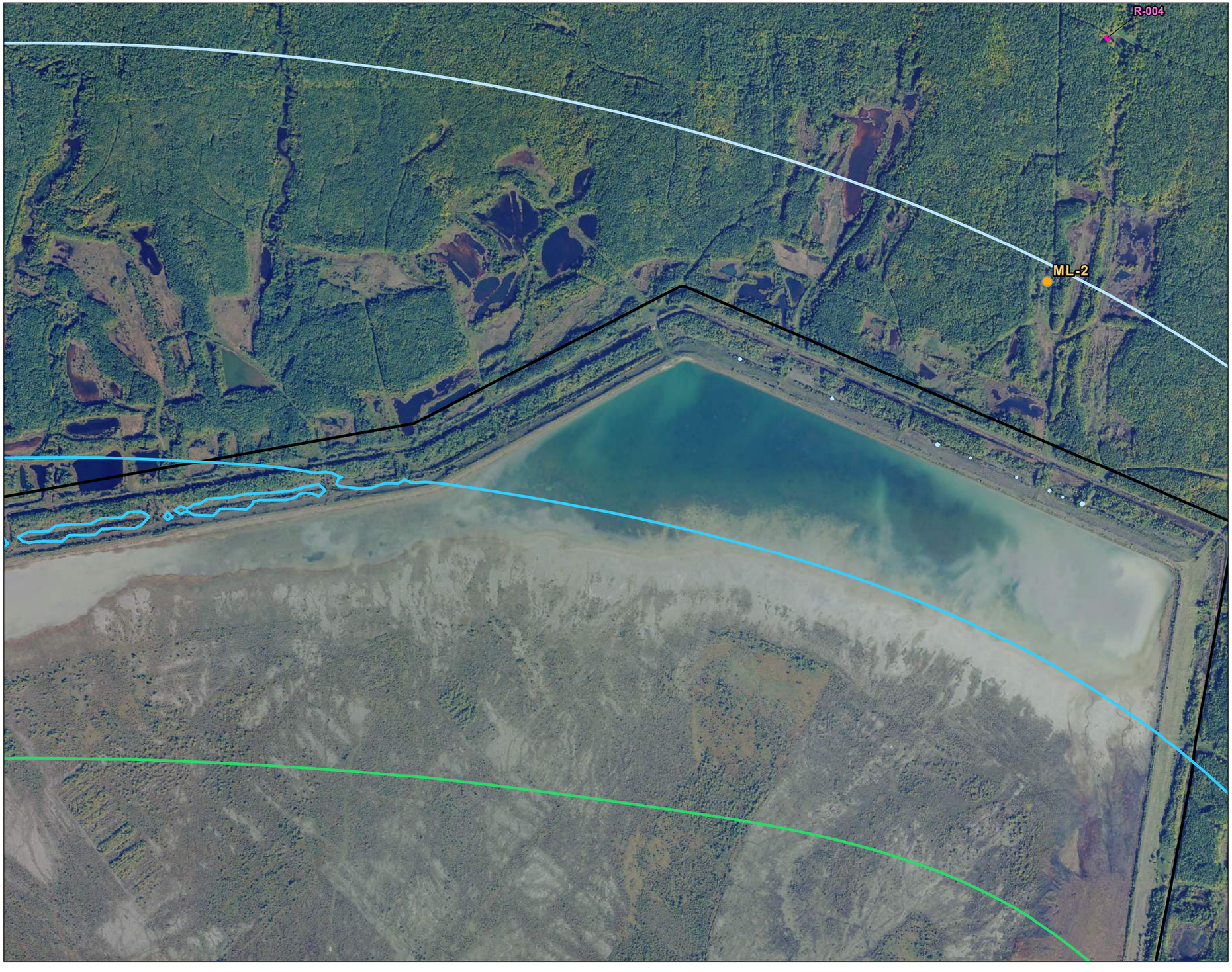


Figure No.
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Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

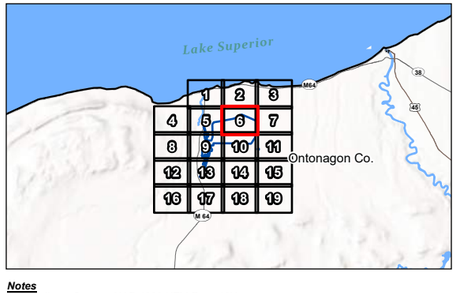
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Legend
- Proposed Project Extent
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Notes
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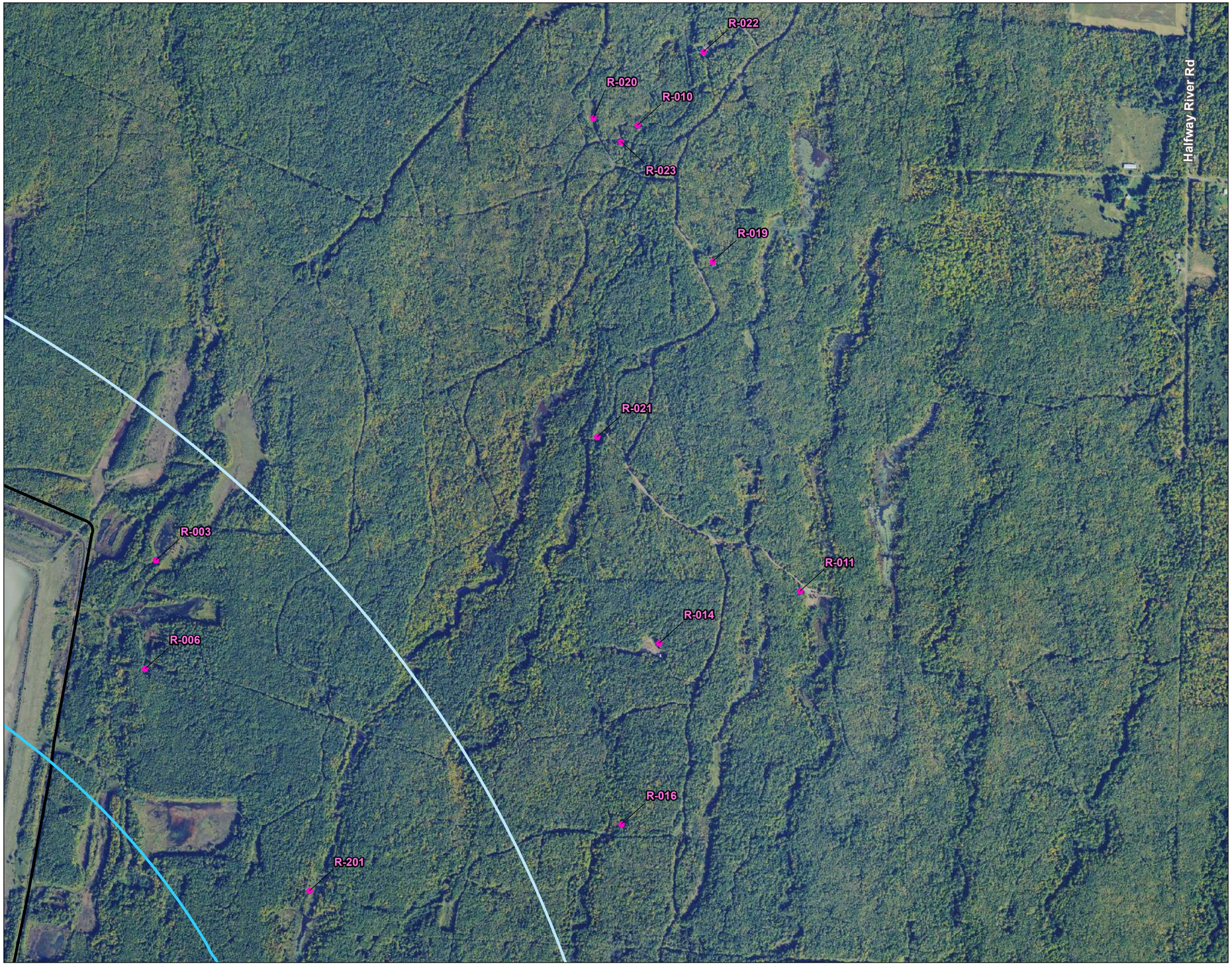


Figure No.

C.1

Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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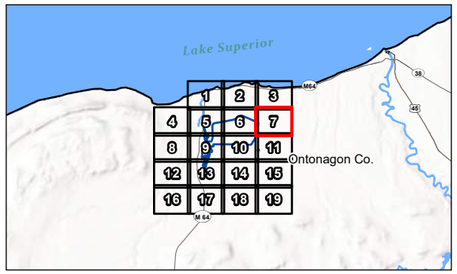
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Legend

- Proposed Project Extent
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Construction Noise Level Contour (dBA)

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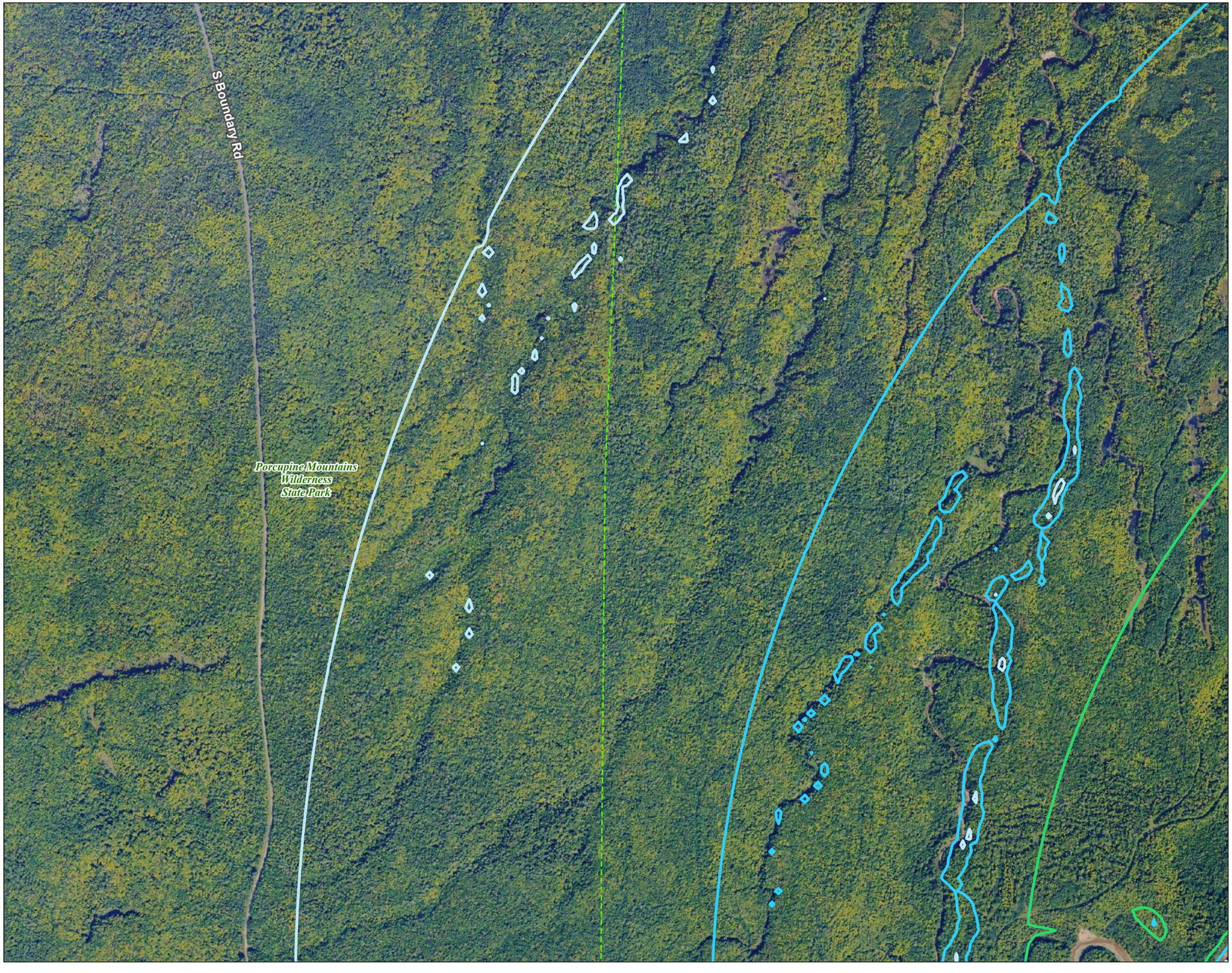


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Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

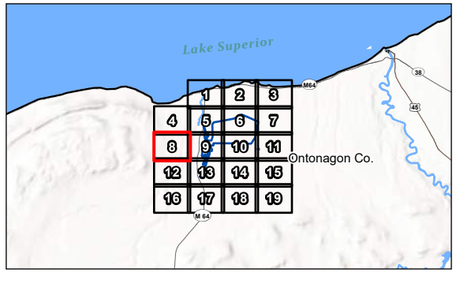
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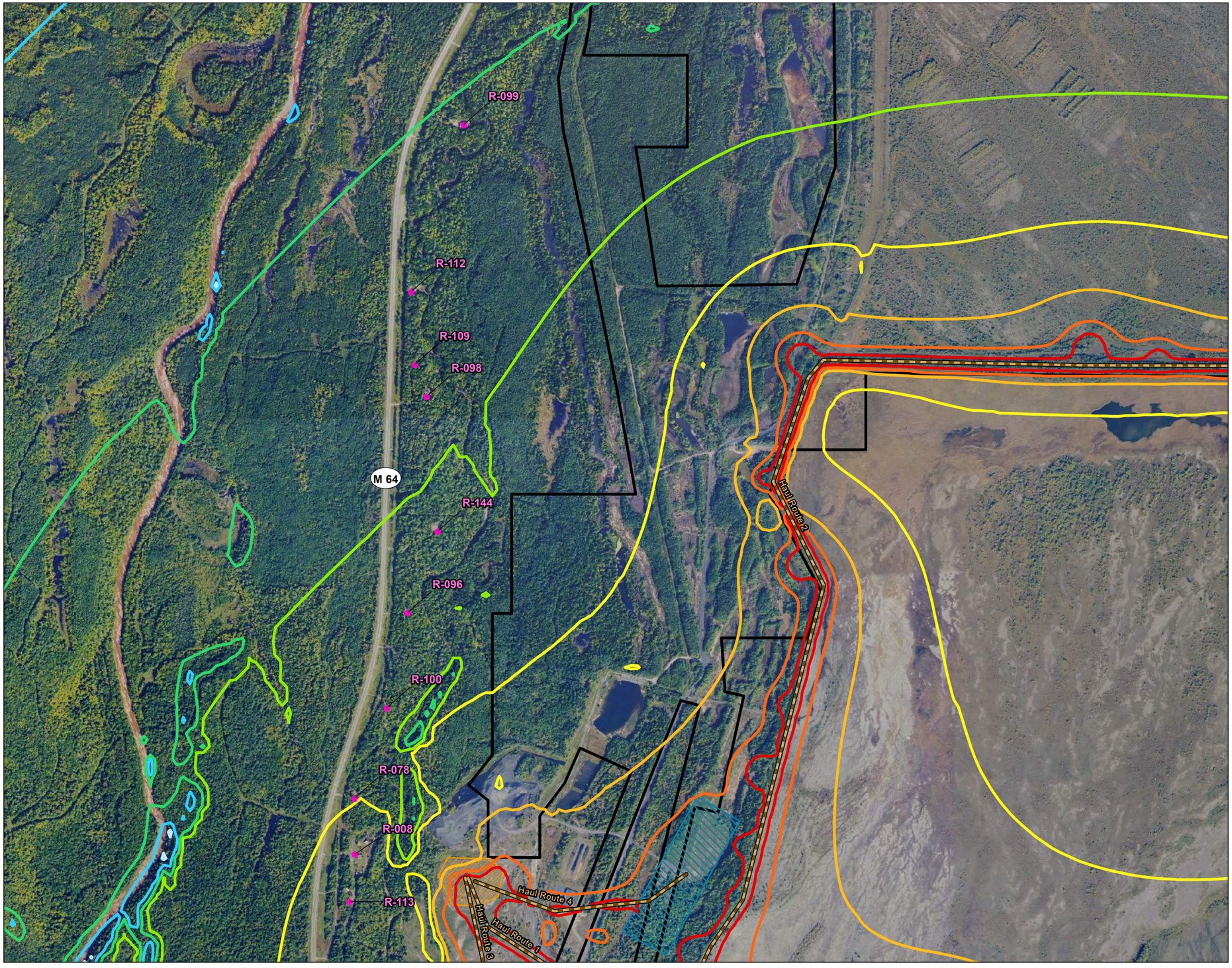


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Estimated Daytime Project Sound Contours - Construction Phase

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Project Location
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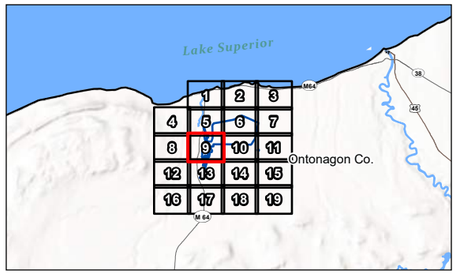
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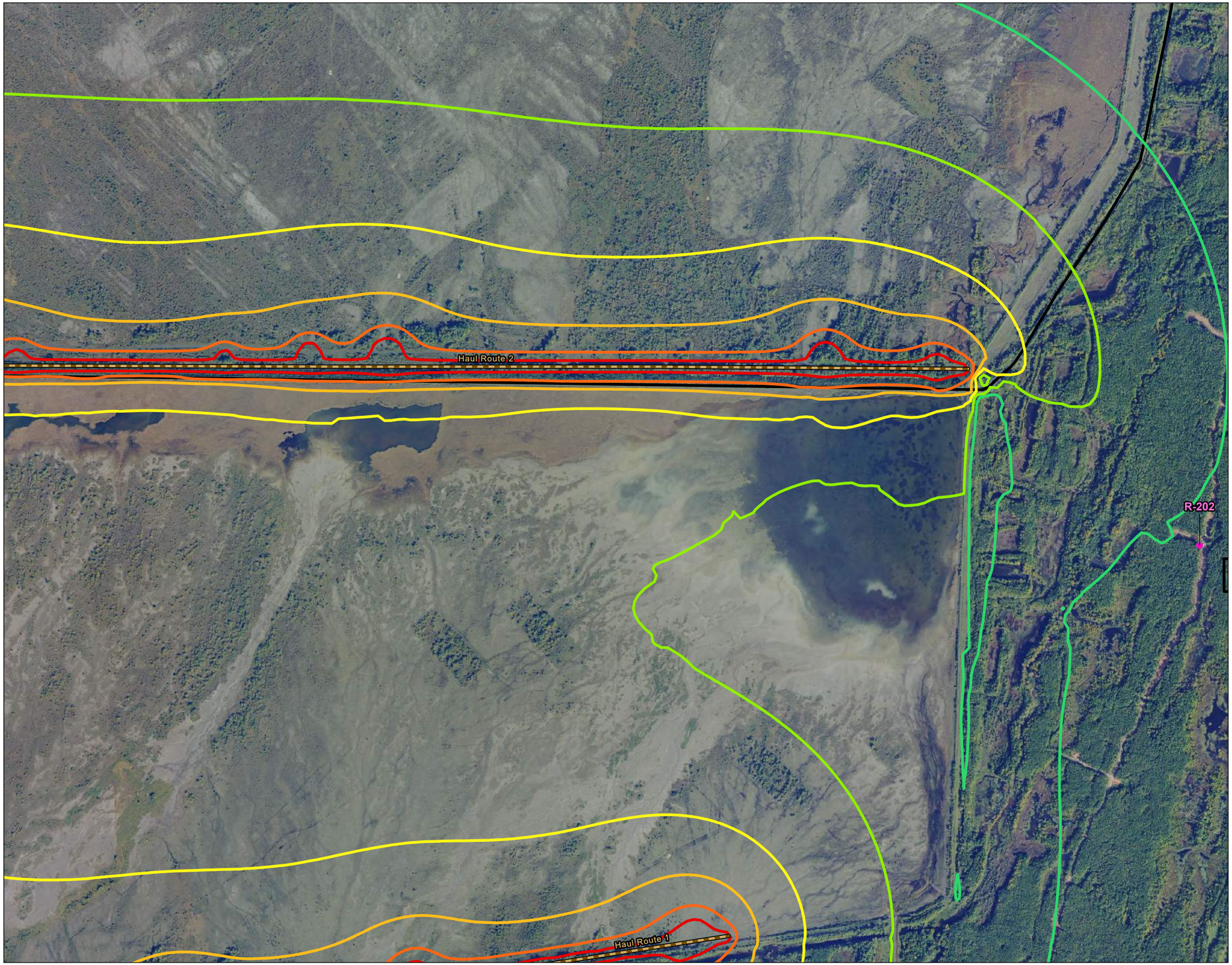


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Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
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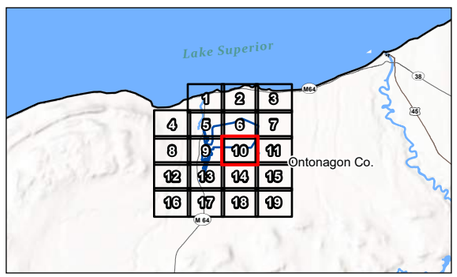
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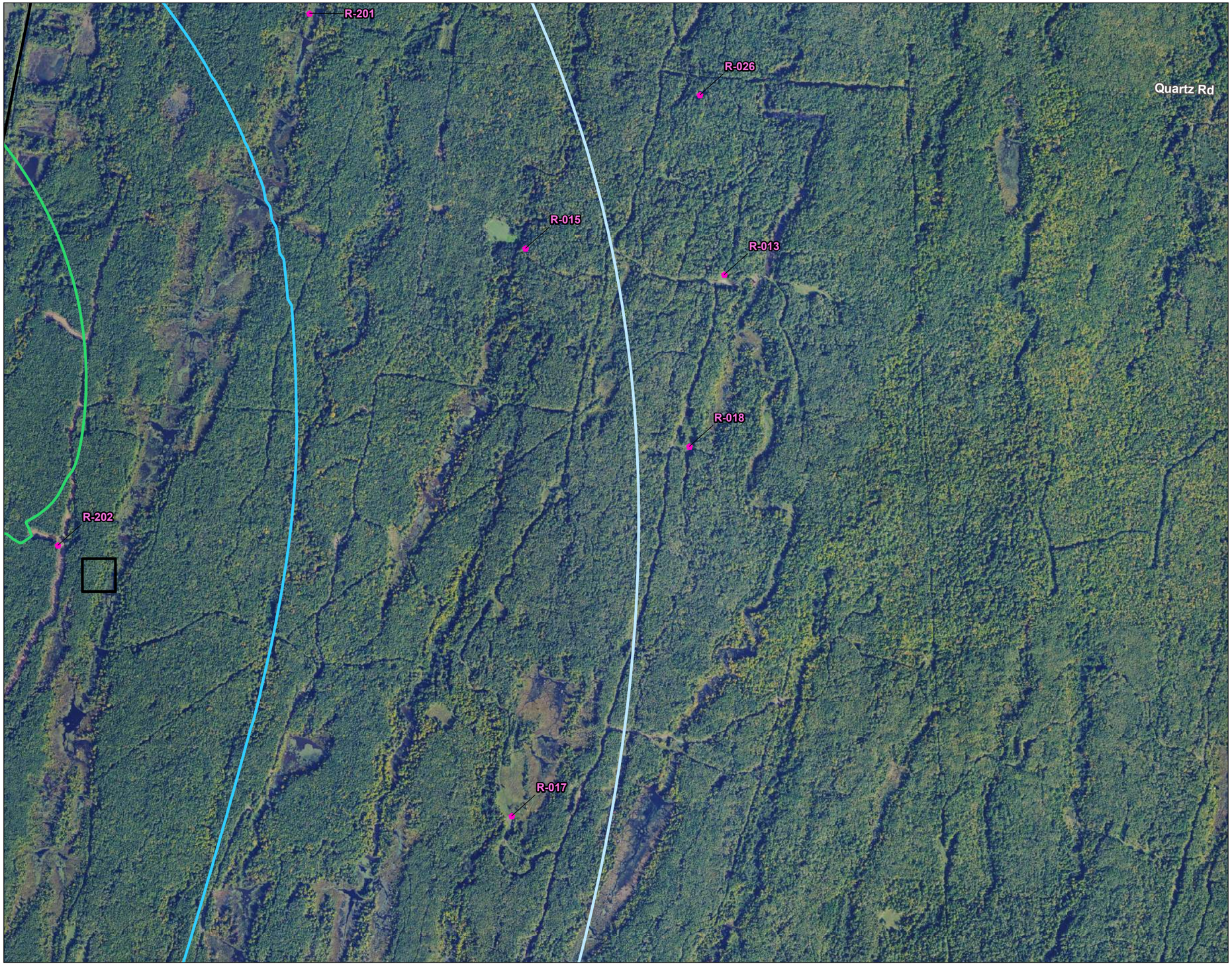


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Twp. of Carp Lake,
Ontonagon Co., MI

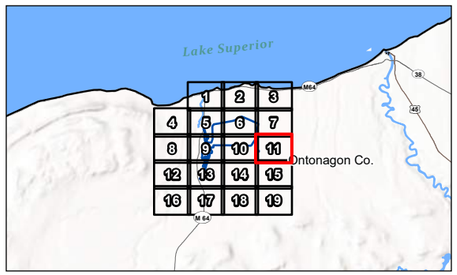
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TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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(At original document size of 11x17)
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Legend
- Proposed Project Extent
- Sensitive Receptor

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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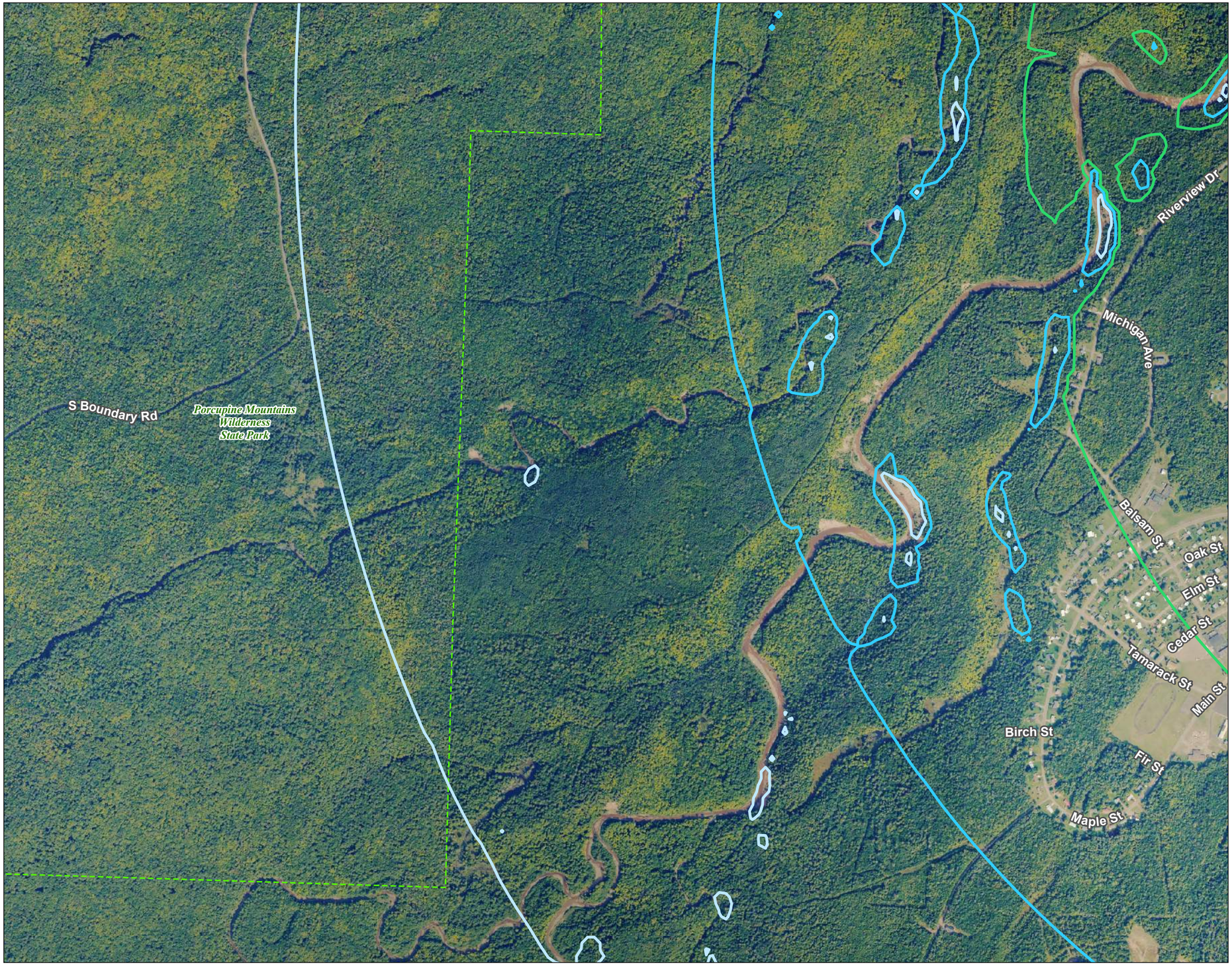


Figure No.
C.1

Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project
193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

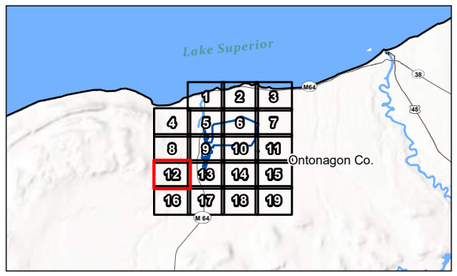
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TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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(At original document size of 11x17)
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Legend
- Proposed Project Extent
- State Park

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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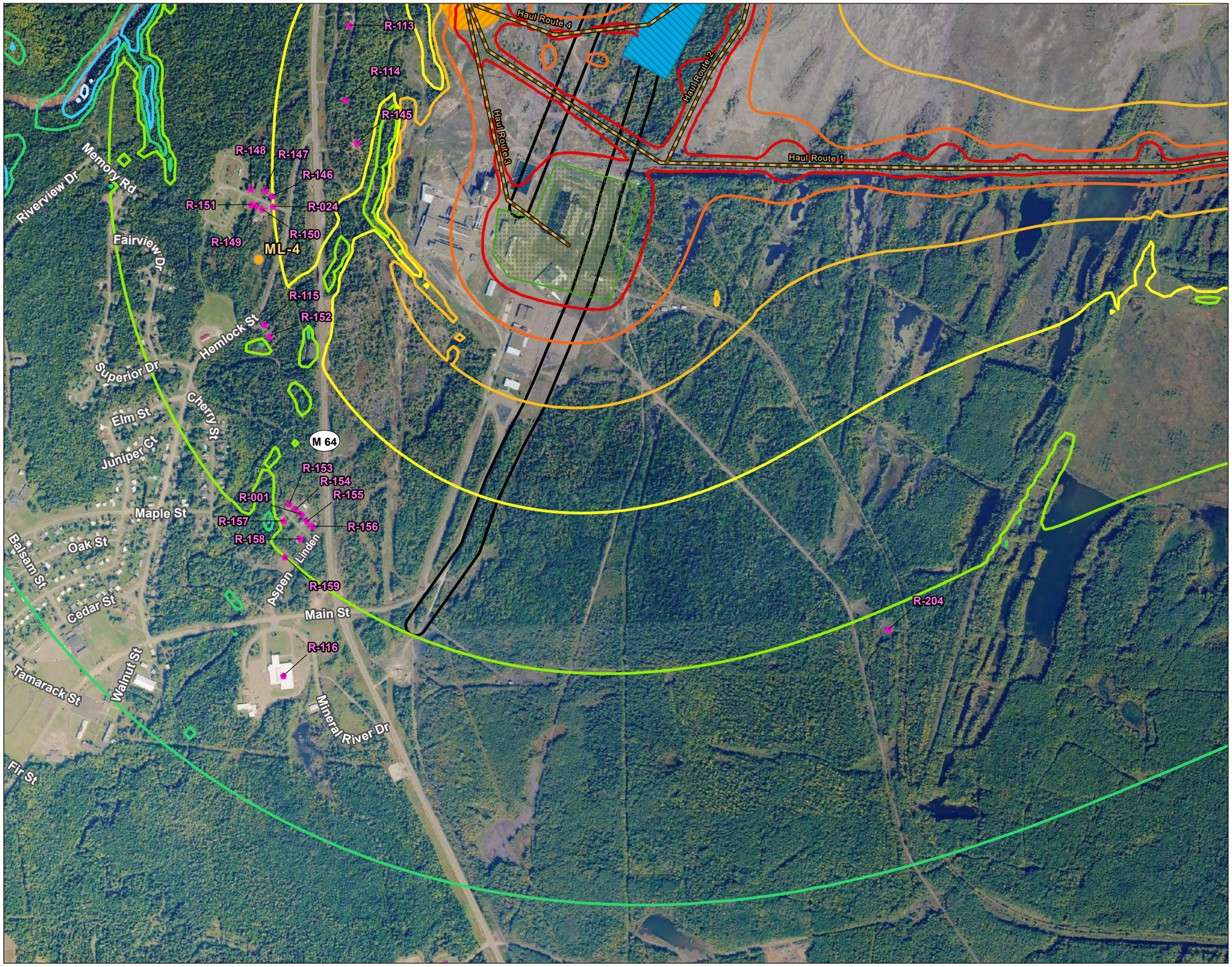


Figure No.

C.1

Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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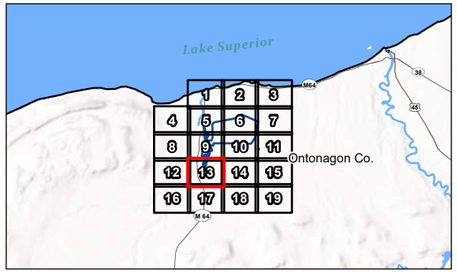
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Legend

- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- Construction Haul Route
- Plant Area
- Temporary Ore Stockpile
- Waste Stockpile

Construction Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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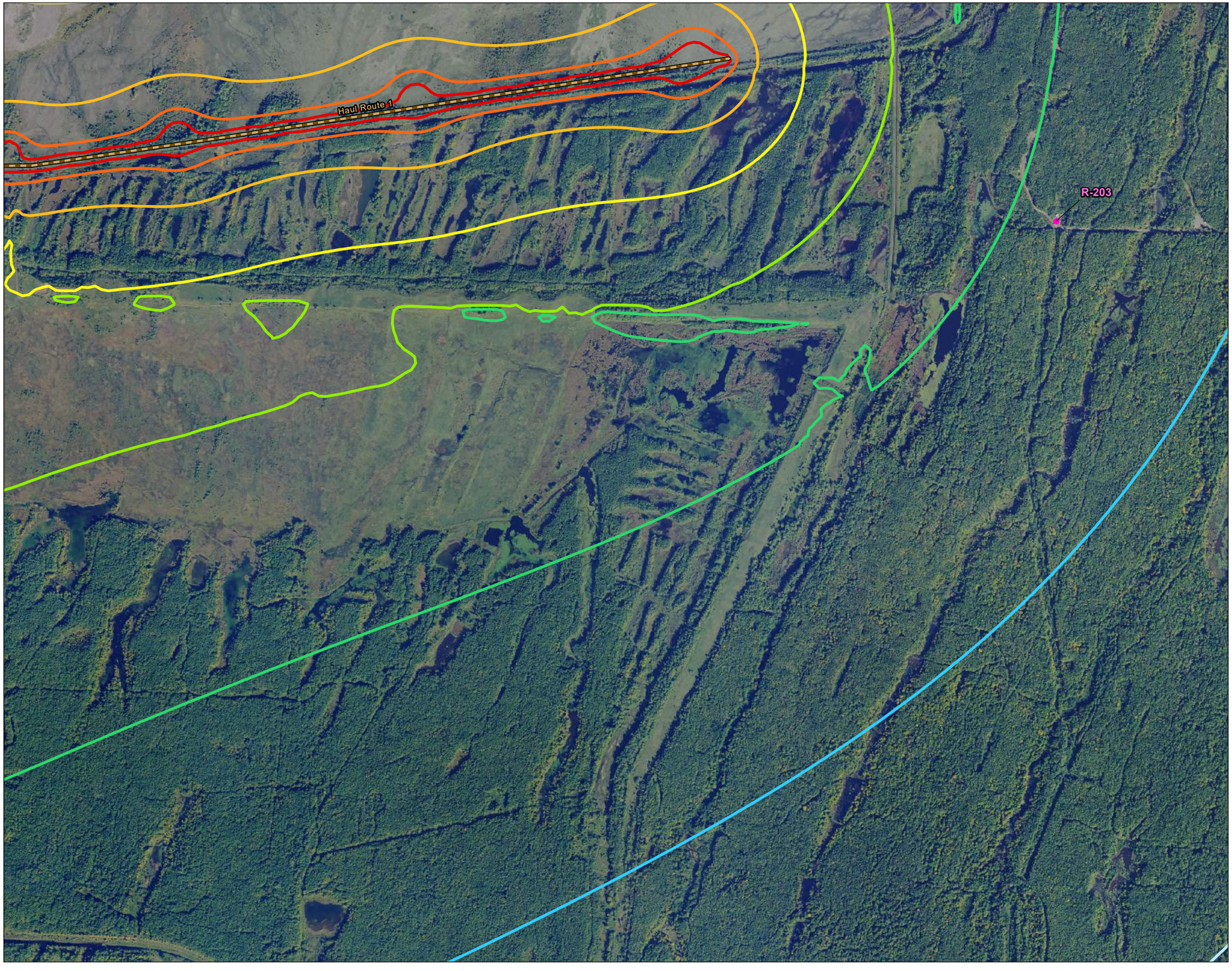


Figure No.
C.1

Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

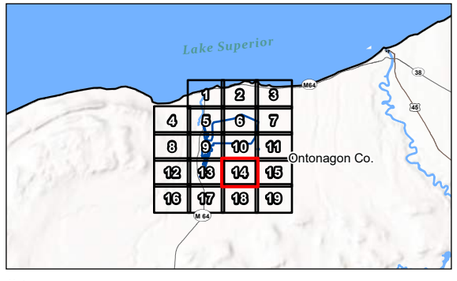
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(At original document size of 11x17)
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Legend
- Proposed Project Extent
- Sensitive Receptor
- Construction Haul Route

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Figure No.

C.1

Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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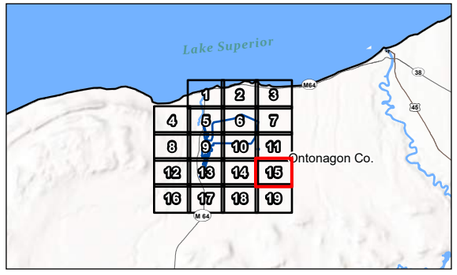
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Legend

- Proposed Project Extent
- Sensitive Receptor

Construction Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
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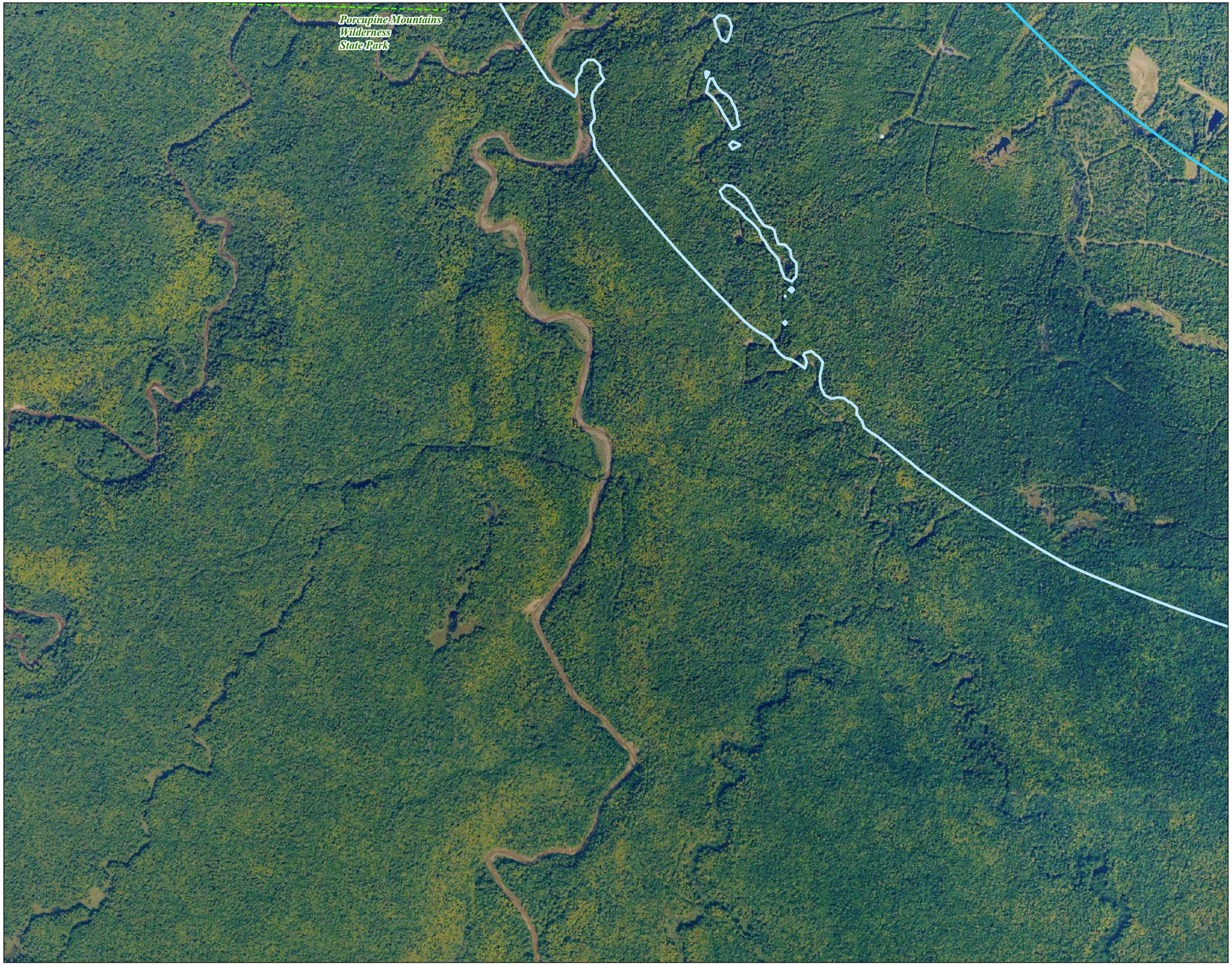


Figure No.

C.1

Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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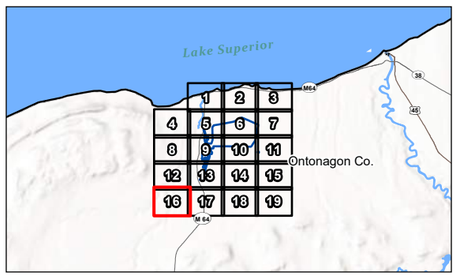
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Legend

- Proposed Project Extent
- State Park

Construction Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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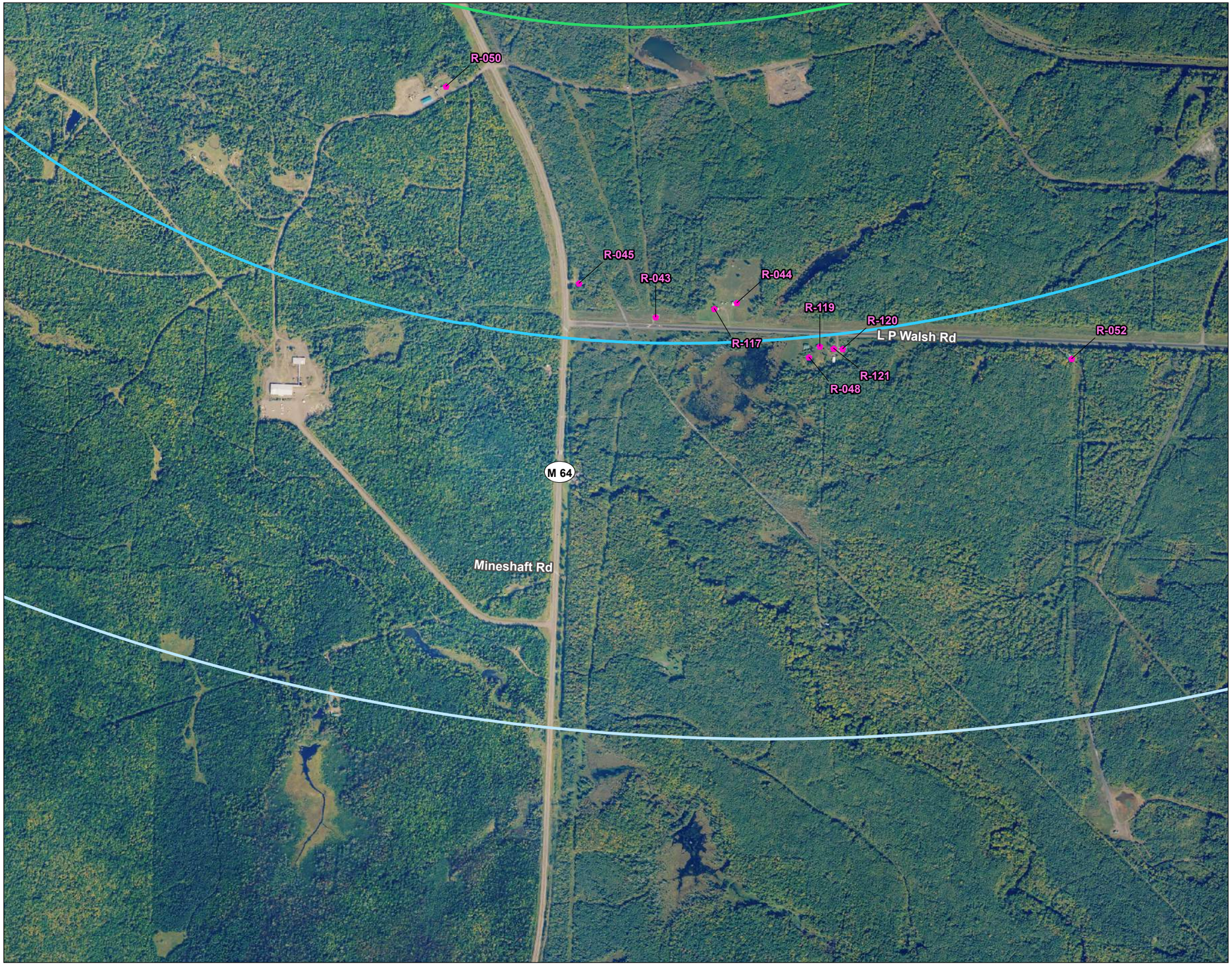


Figure No.
C.1

Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

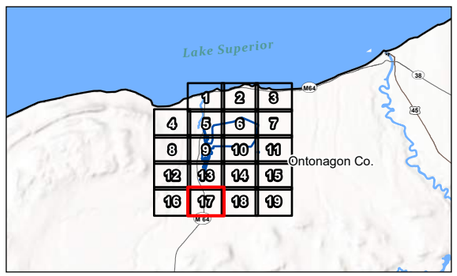
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IR by JP on 2026-05-26

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Legend
- Proposed Project Extent
- Sensitive Receptor

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Figure No.
C.1

Title
Estimated Daytime Project Sound Contours - Construction Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

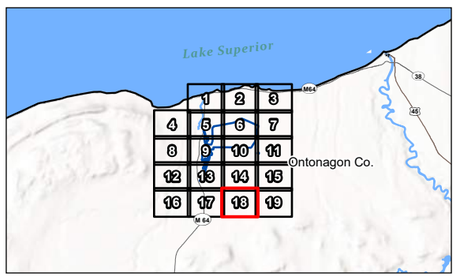
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IR by JP on 2026-05-26

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Legend
- Proposed Project Extent
- Sensitive Receptor

Construction Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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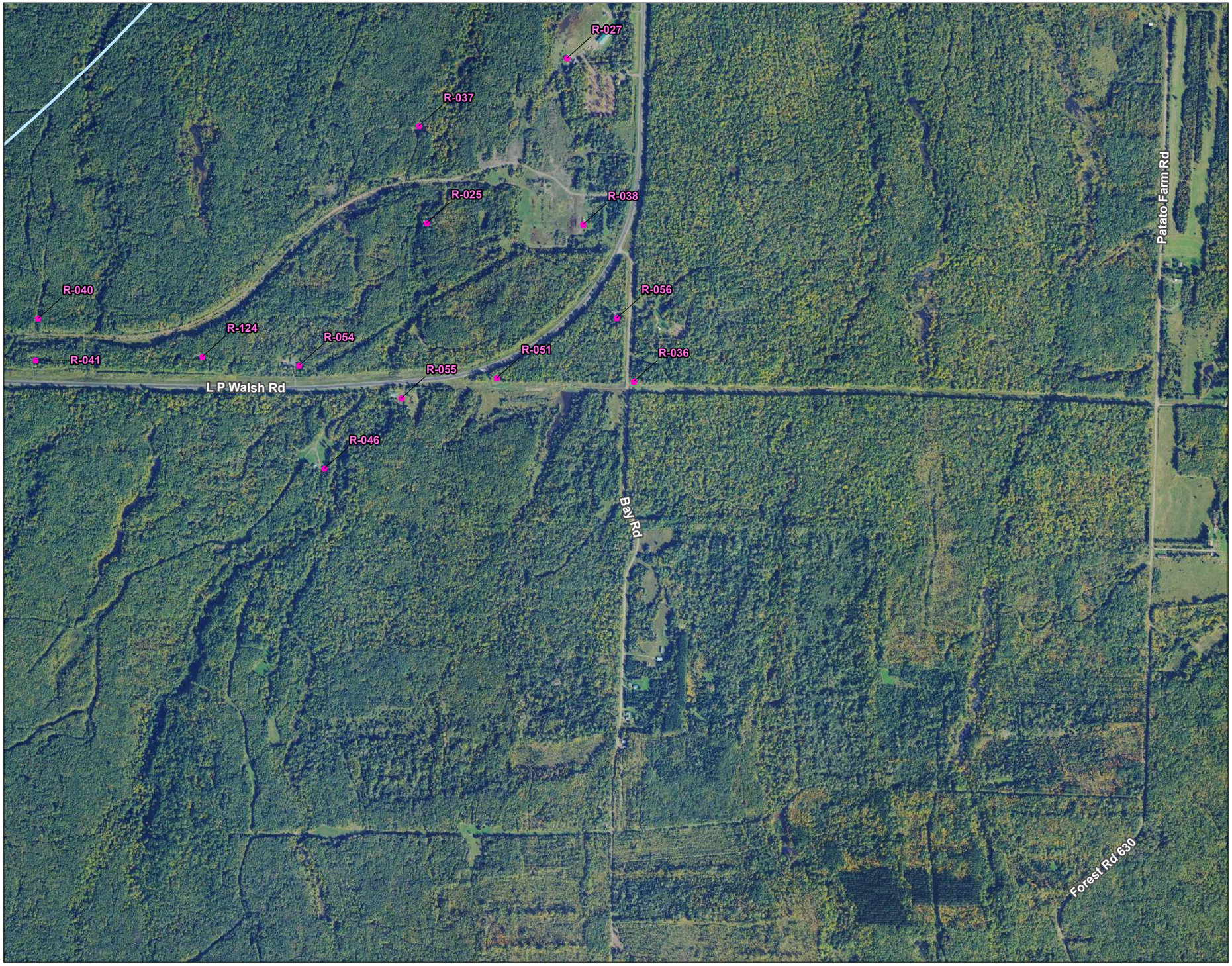


Figure No.

C.1

Title

Estimated Daytime Project Sound Contours - Construction Phase

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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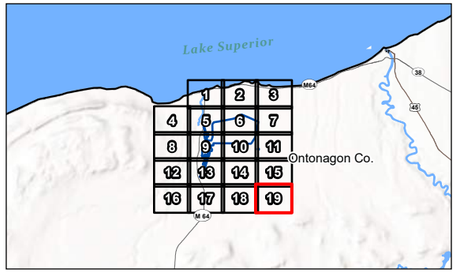
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Legend

- Proposed Project Extent
- Sensitive Receptor

Construction Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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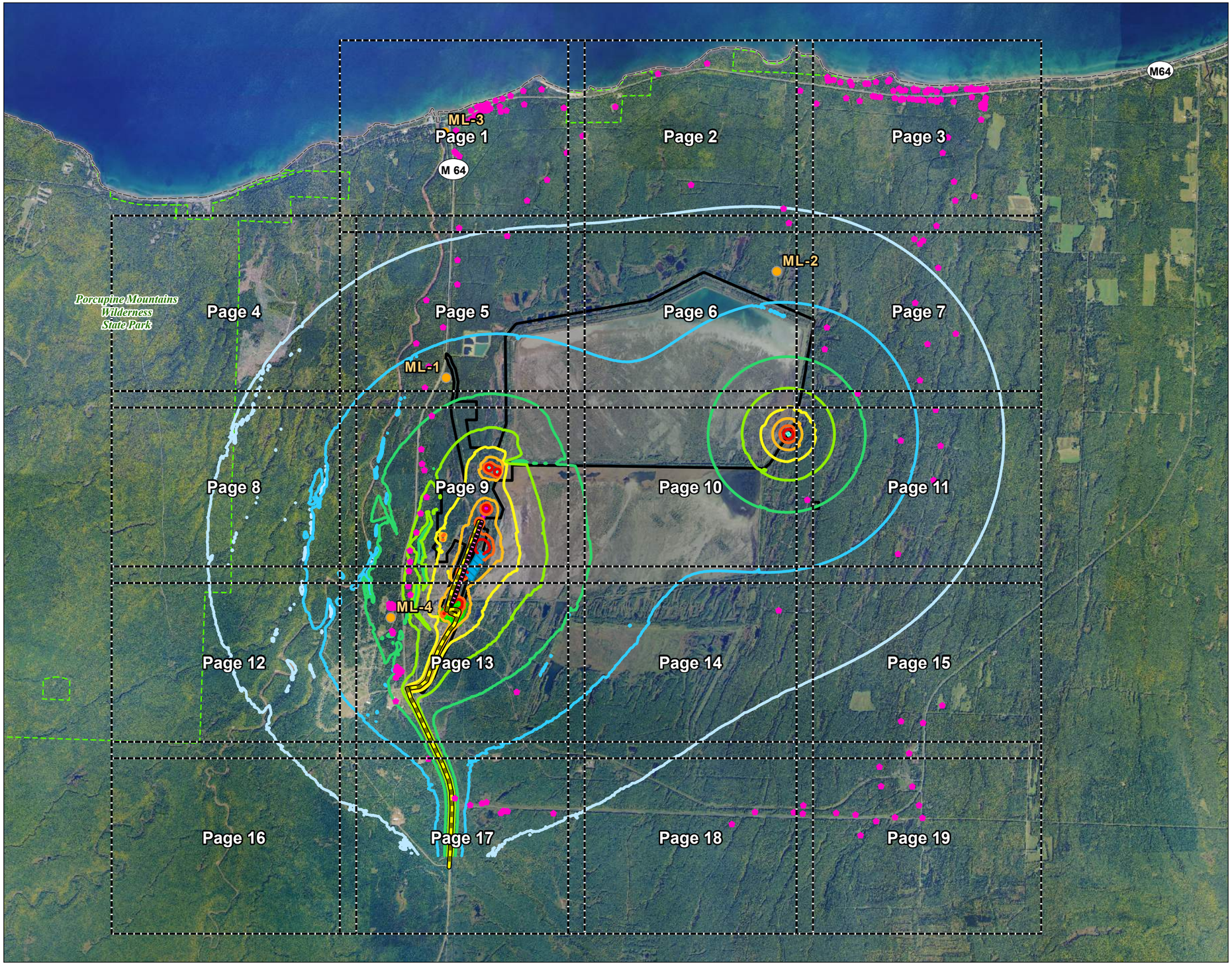


Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

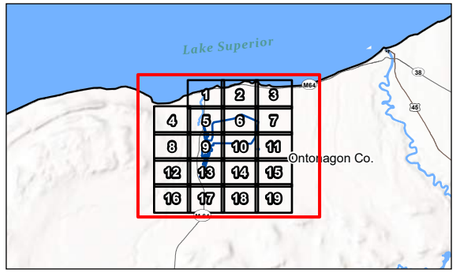
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TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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(At original document size of 11x17)
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park
- Operational Conveyor
- Operational Truck Route
- Crusher
- Mine Portal
- Plant Area
- Temporary Ore Stockpile
- Ventilation Raise

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

Index Map

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Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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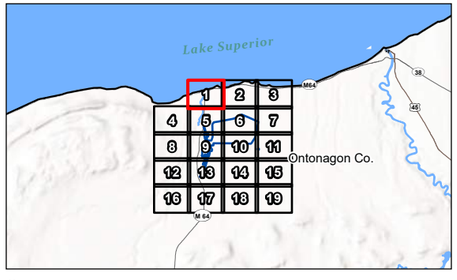
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Legend

- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
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- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

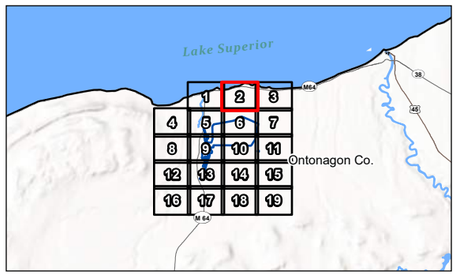
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Legend
- Proposed Project Extent
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
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Notes
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3. Background: 2024 NAIP

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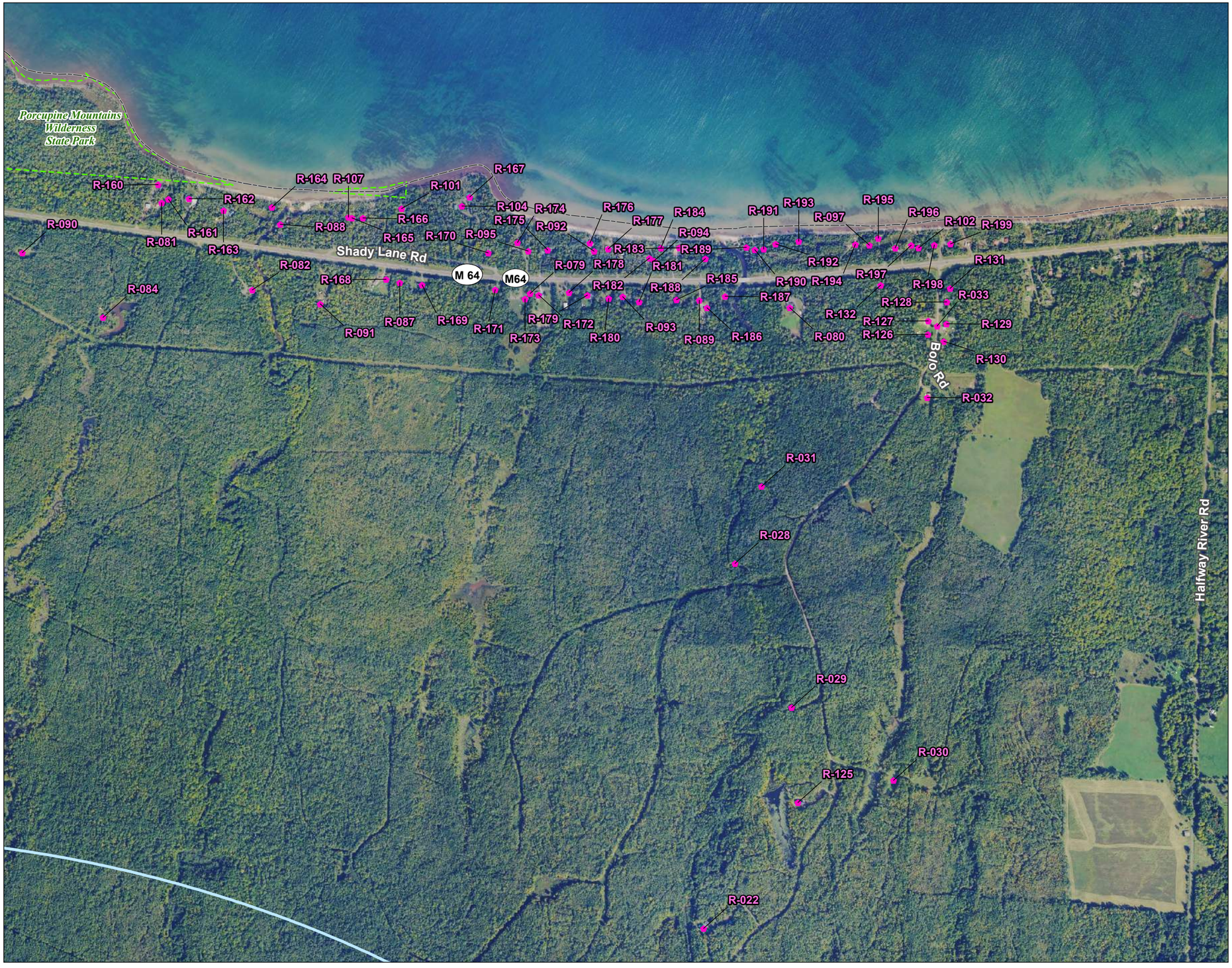


Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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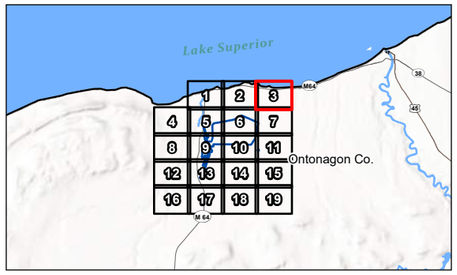
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(At original document size of 11x17)
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Legend

- Proposed Project Extent
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
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- 65



Notes

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Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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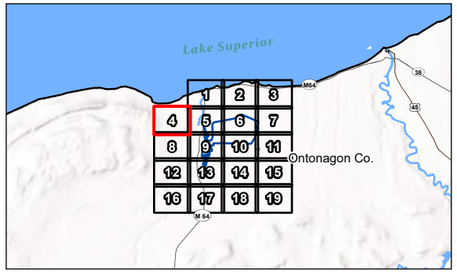
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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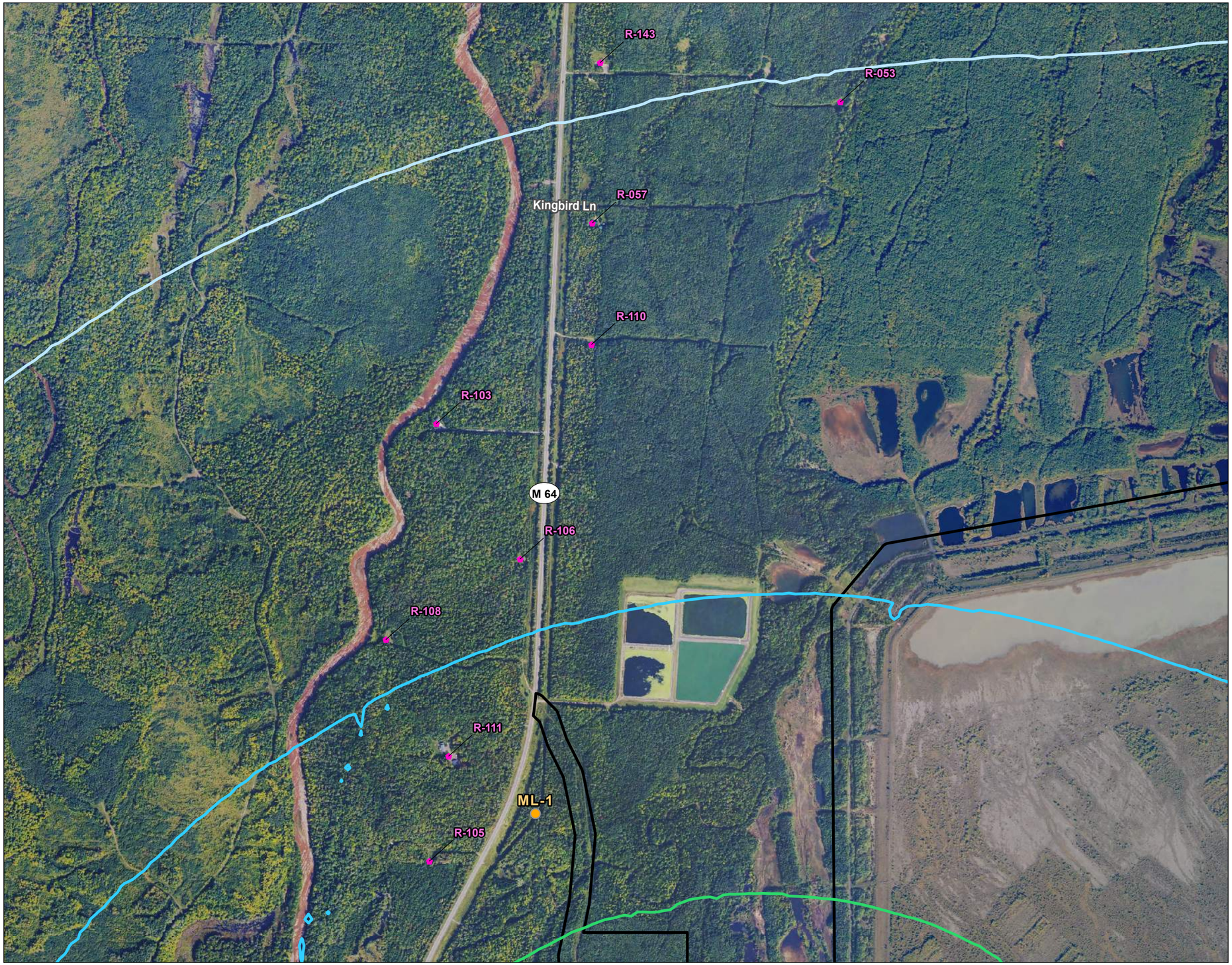


Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

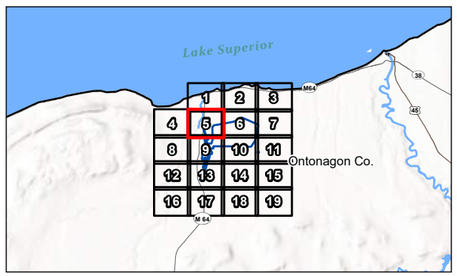
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TR by DJ on 2026-05-06
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(At original document size of 11x17)
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

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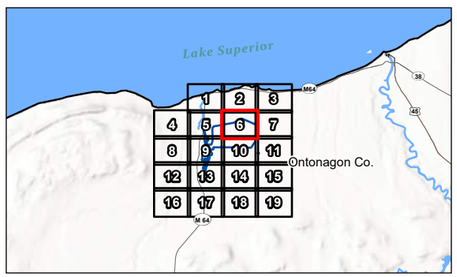
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Legend

- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
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Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
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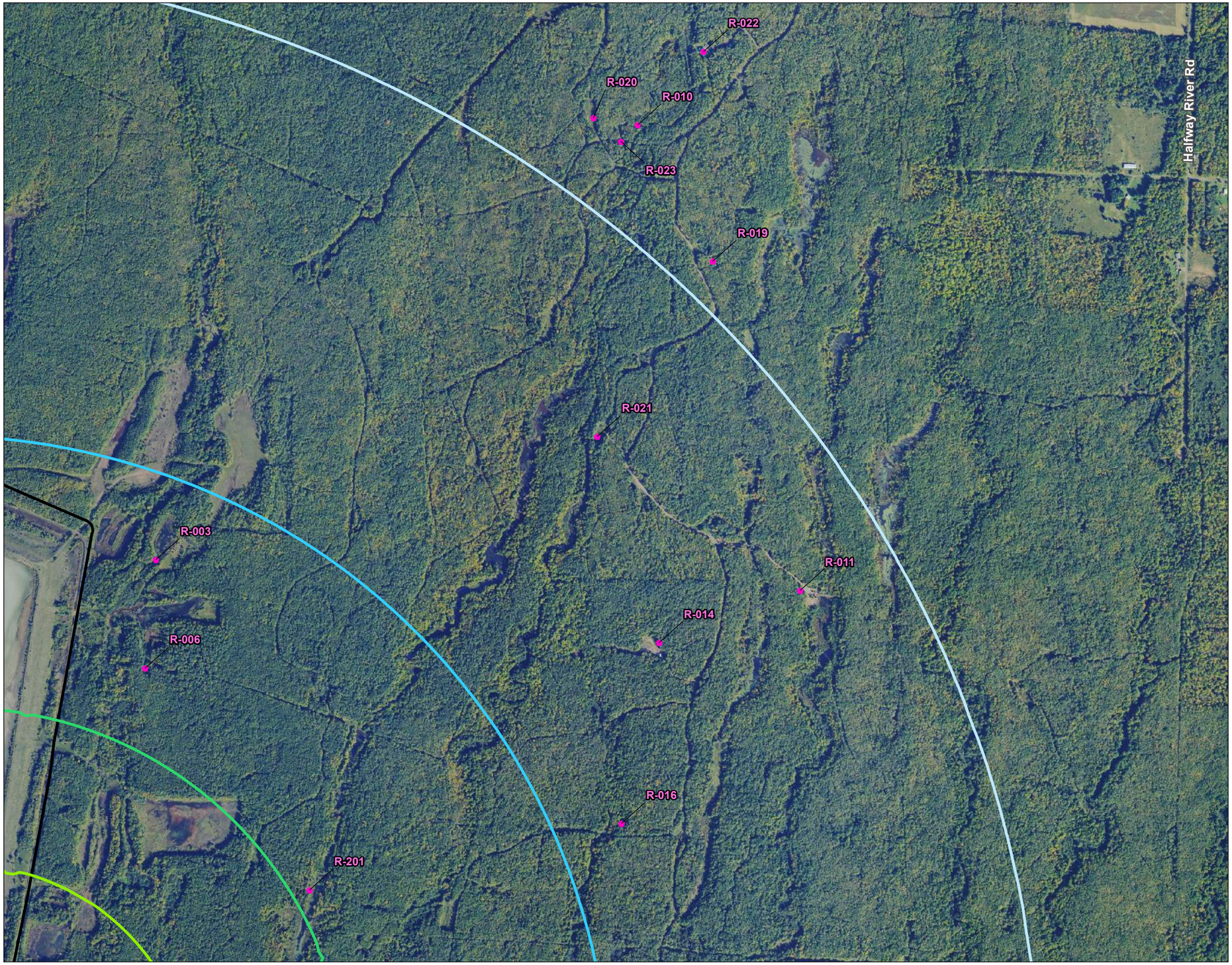


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Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

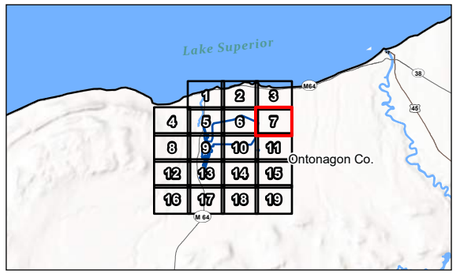
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Legend
- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)
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Notes
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2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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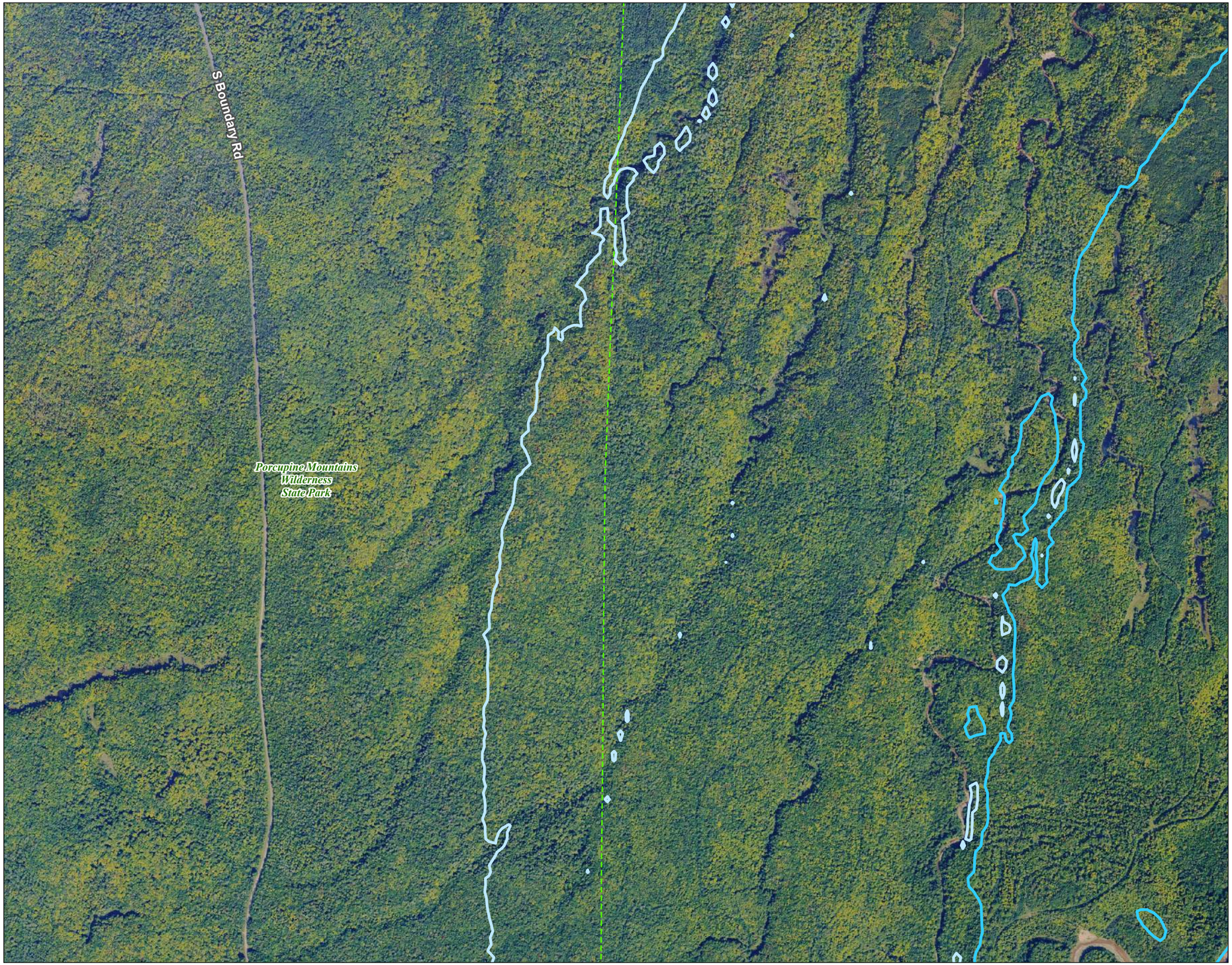


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C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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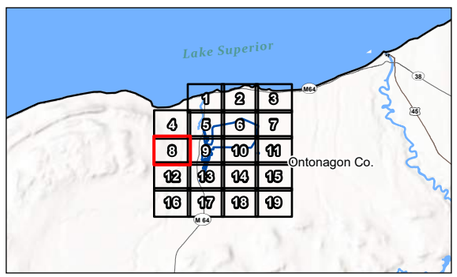
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
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- 65



Notes

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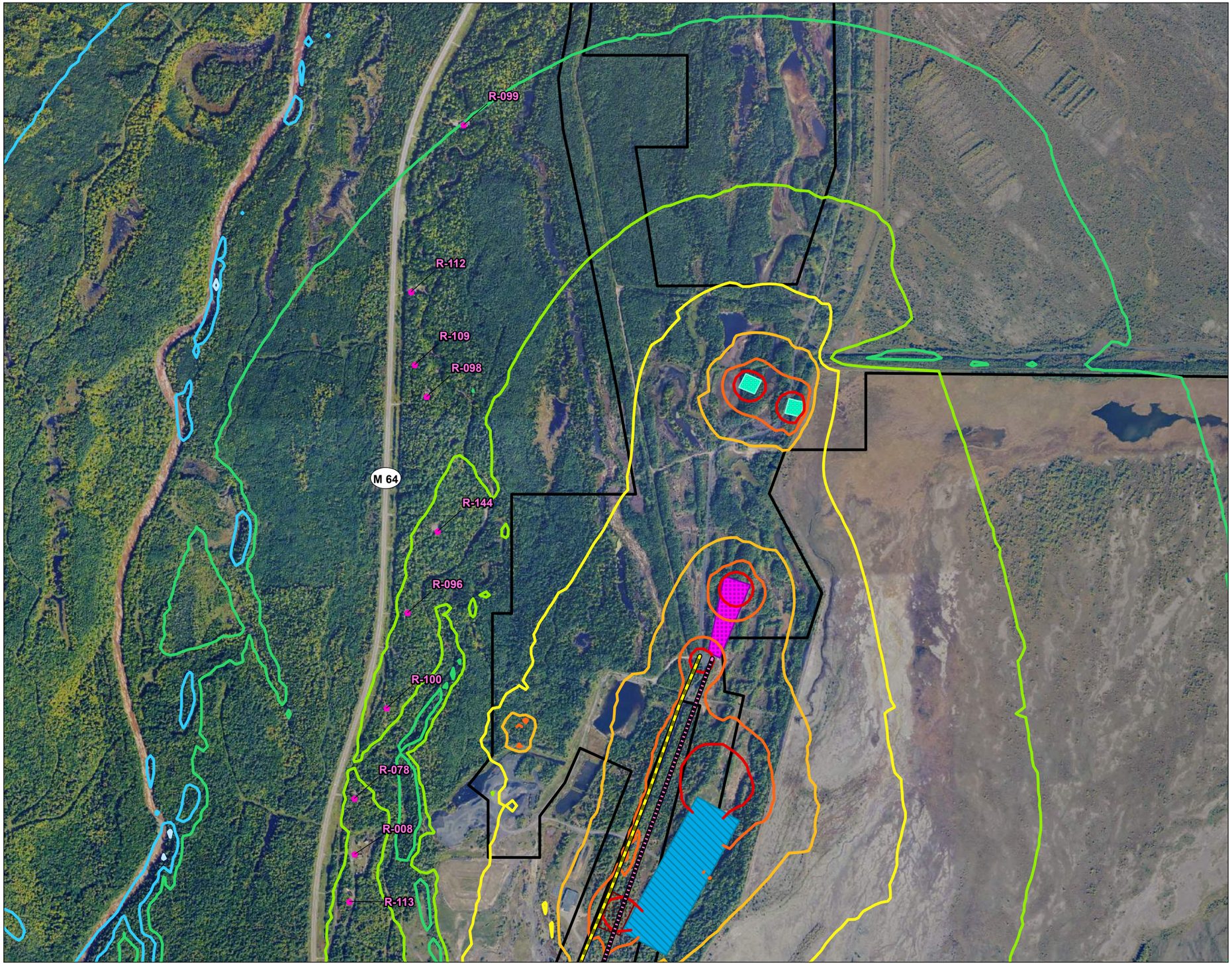


Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

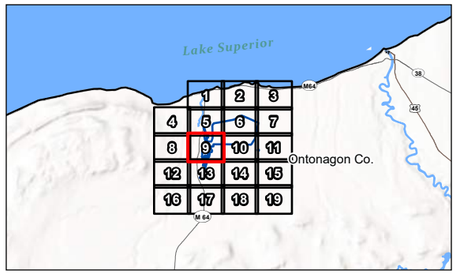
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Legend
- Proposed Project Extent
- Sensitive Receptor
- Operational Conveyor
- Operational Truck Route
- Crusher
- Mine Portal
- Temporary Ore Stockpile
- Ventilation Raise

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

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Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

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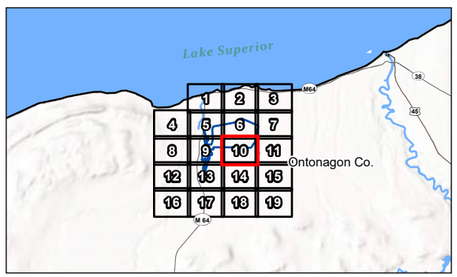
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Legend

- Proposed Project Extent
- Sensitive Receptor
- Ventilation Raise

Operational Noise Level Contour (dBA)

- 30
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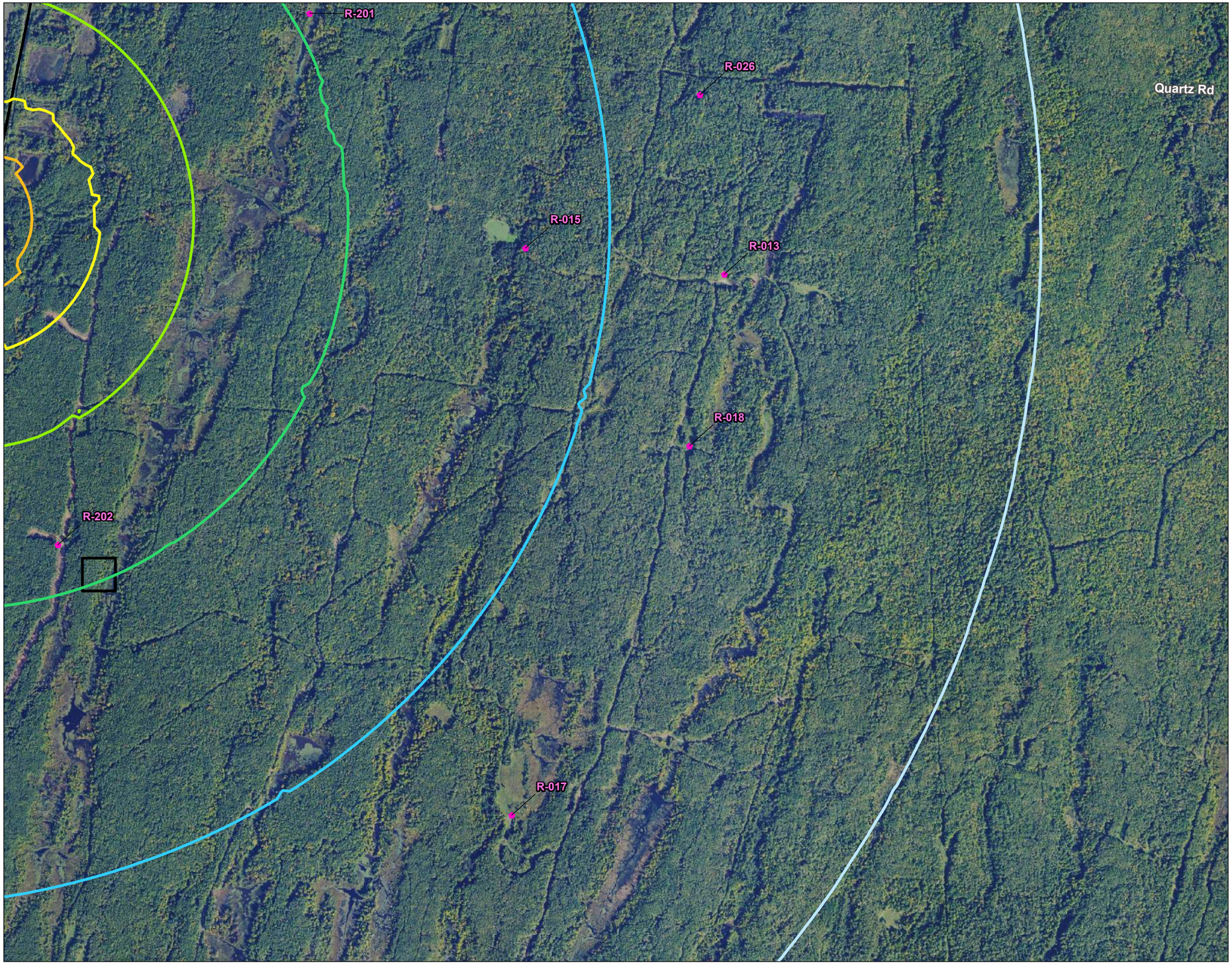


Figure No.
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Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

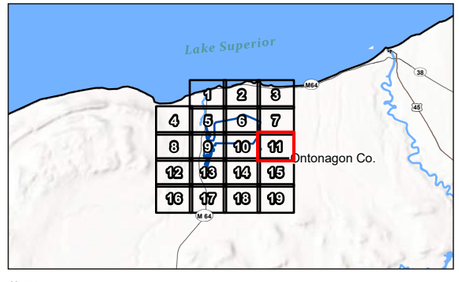
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Legend
- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
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Notes
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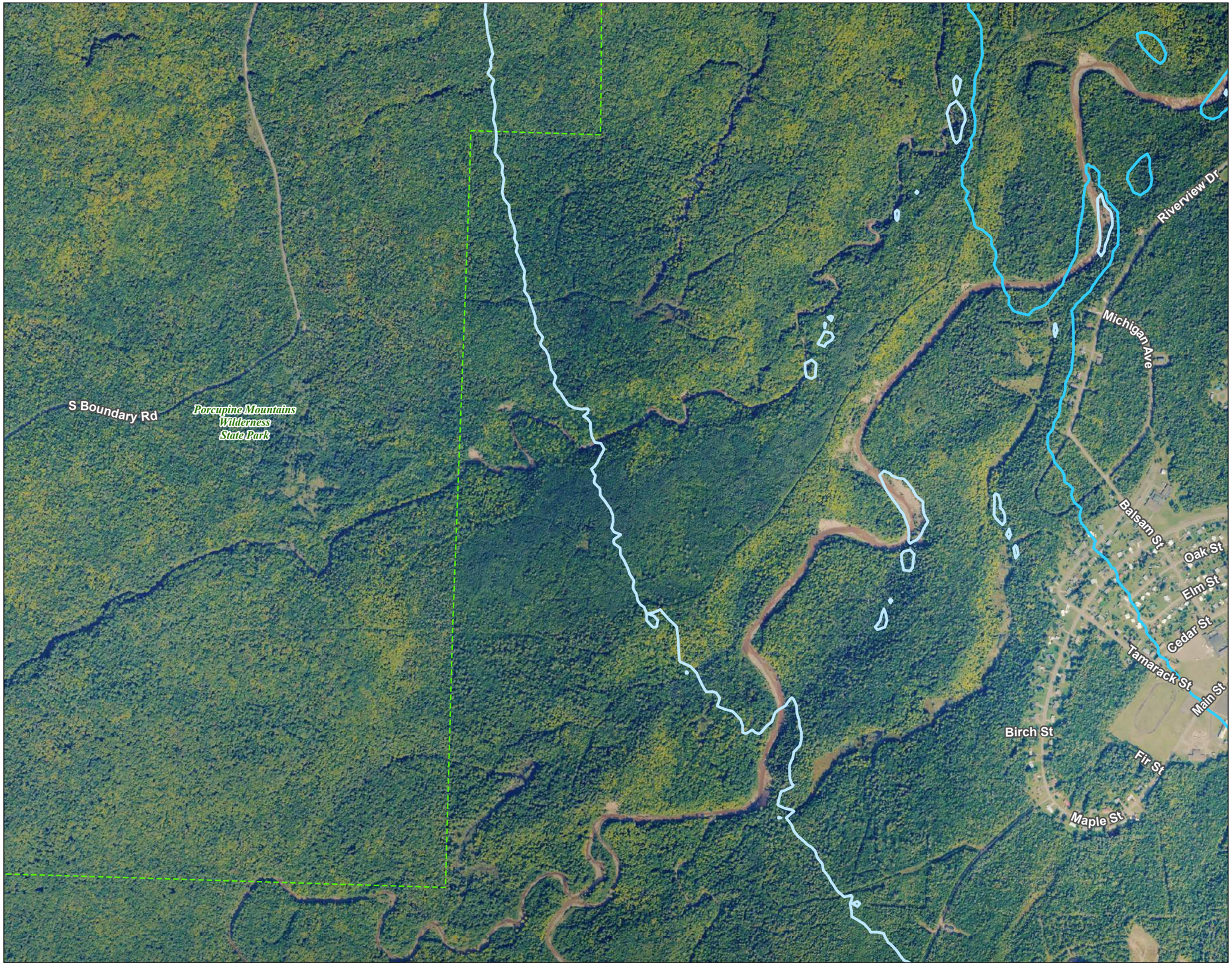


Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

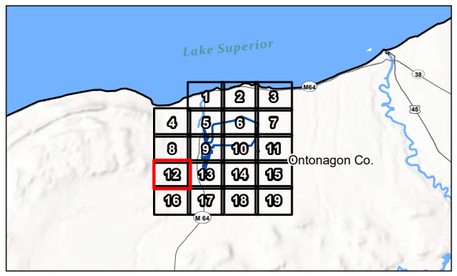
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Legend
- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)
- 30
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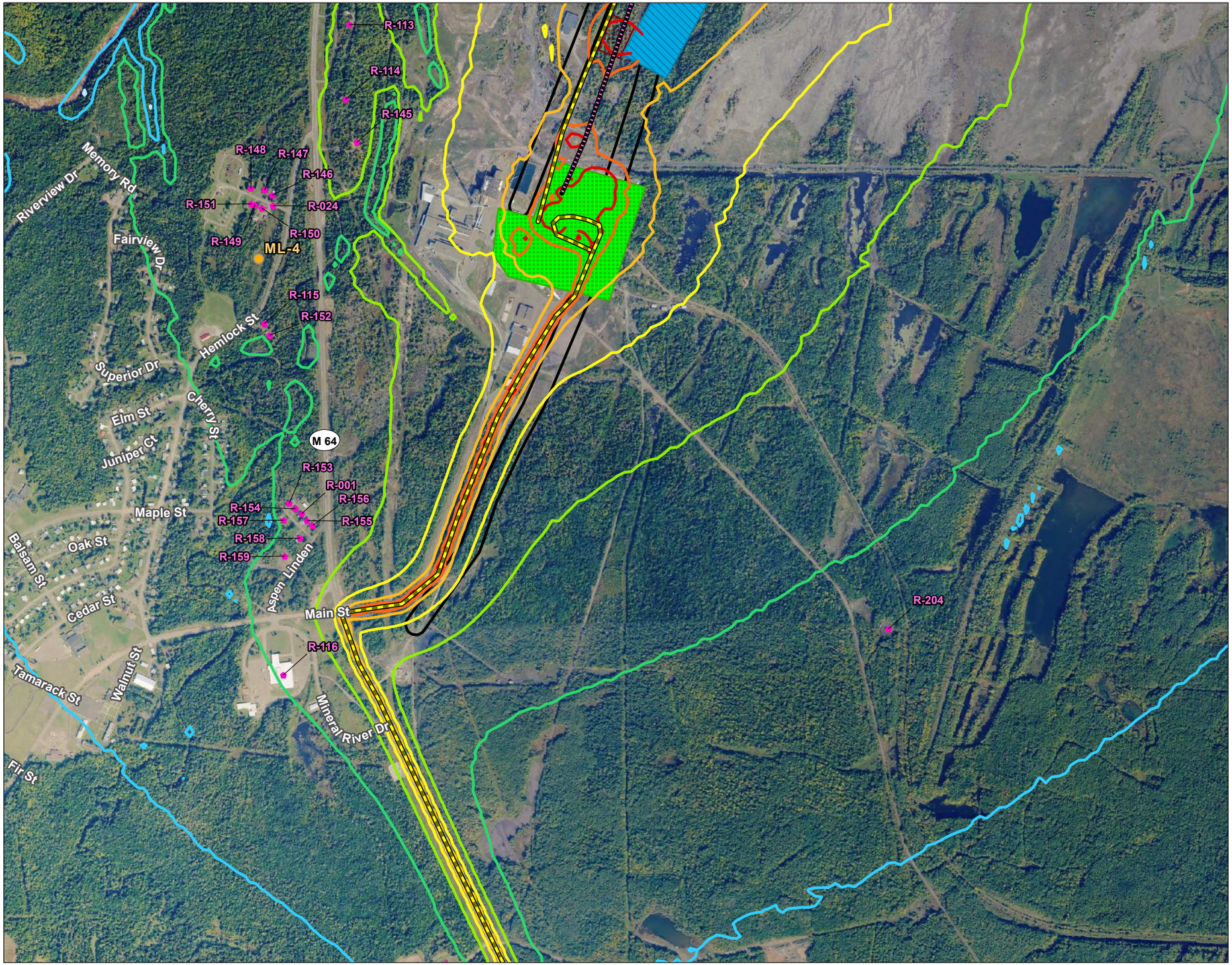


Figure No.
C.2

Title
Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

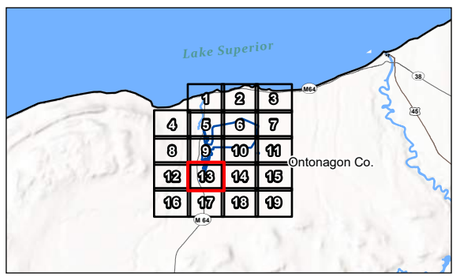
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- Operational Conveyor
- Operational Truck Route
- Crusher
- Plant Area
- Temporary Ore Stockpile

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
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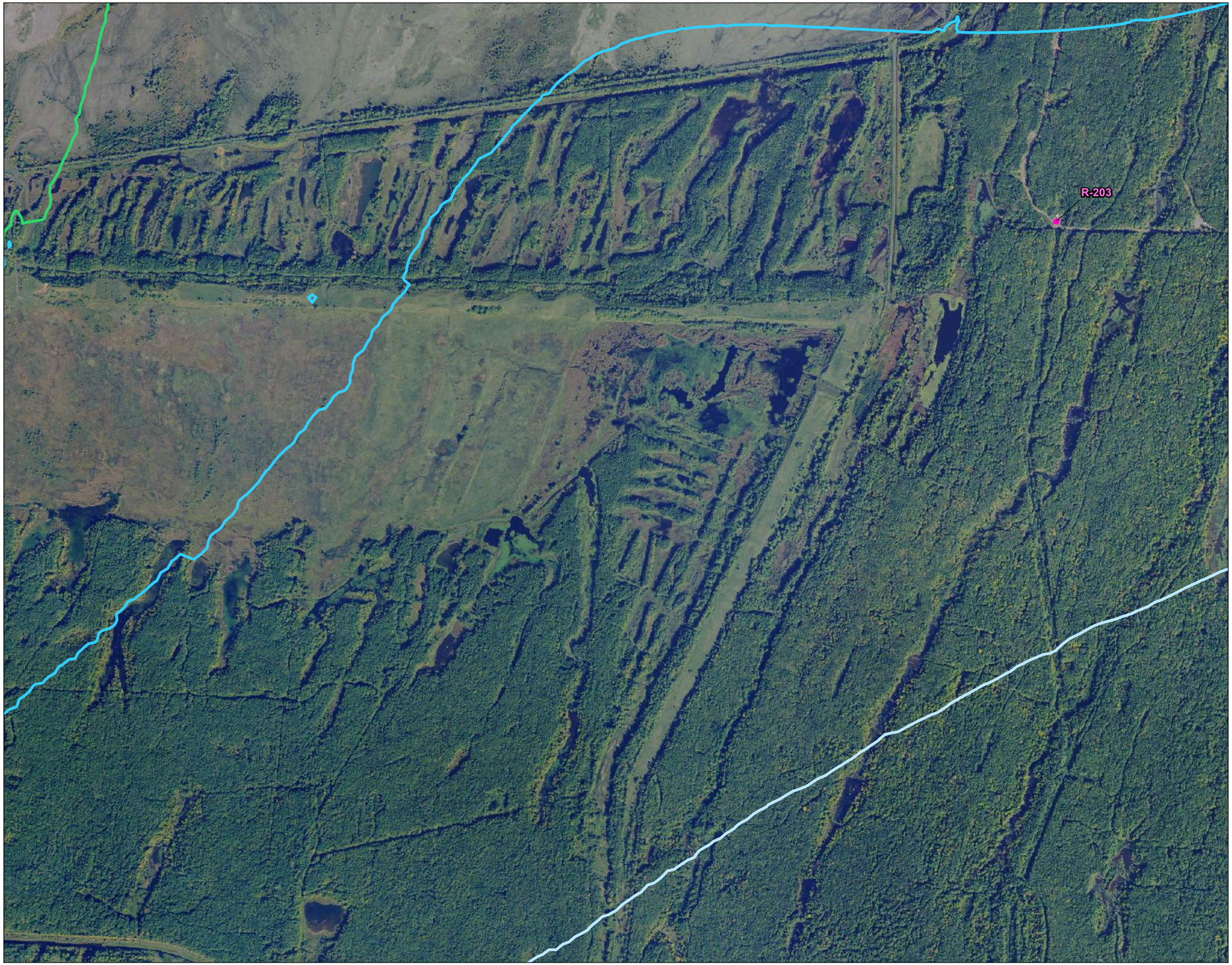


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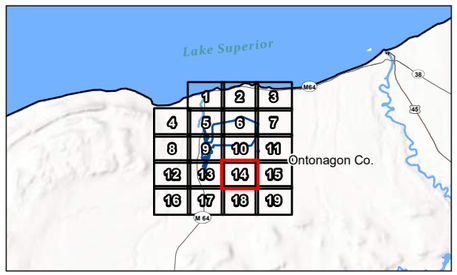
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

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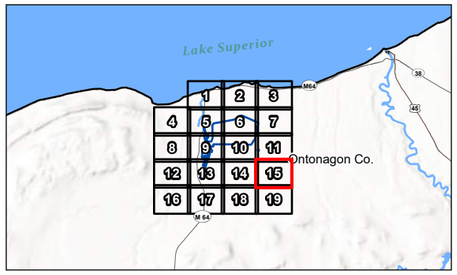
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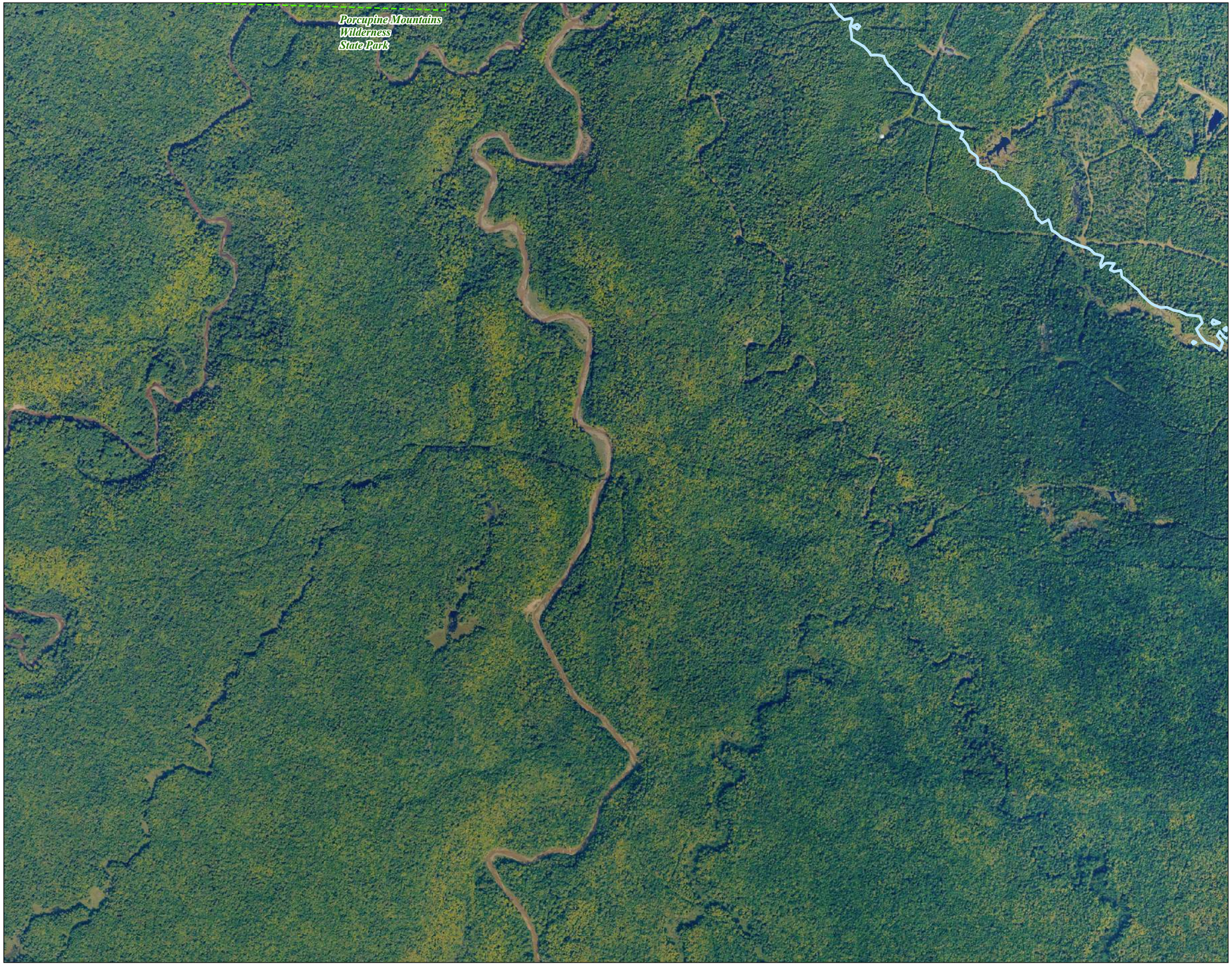


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IR by JP on 2026-05-26

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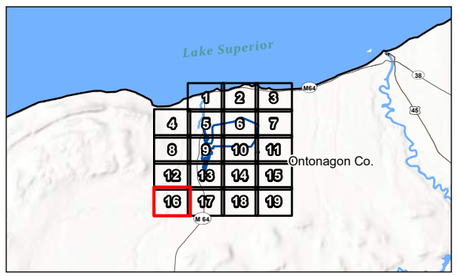
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project

White Pine Copper LLC
White Pine North Project

193710518

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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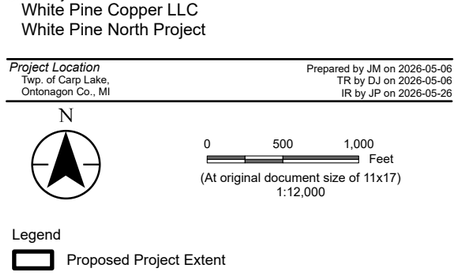
(At original document size of 11x17)
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Legend

- Proposed Project Extent
- Sensitive Receptor
- Operational Truck Route

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

N

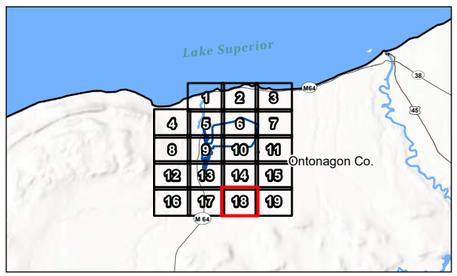
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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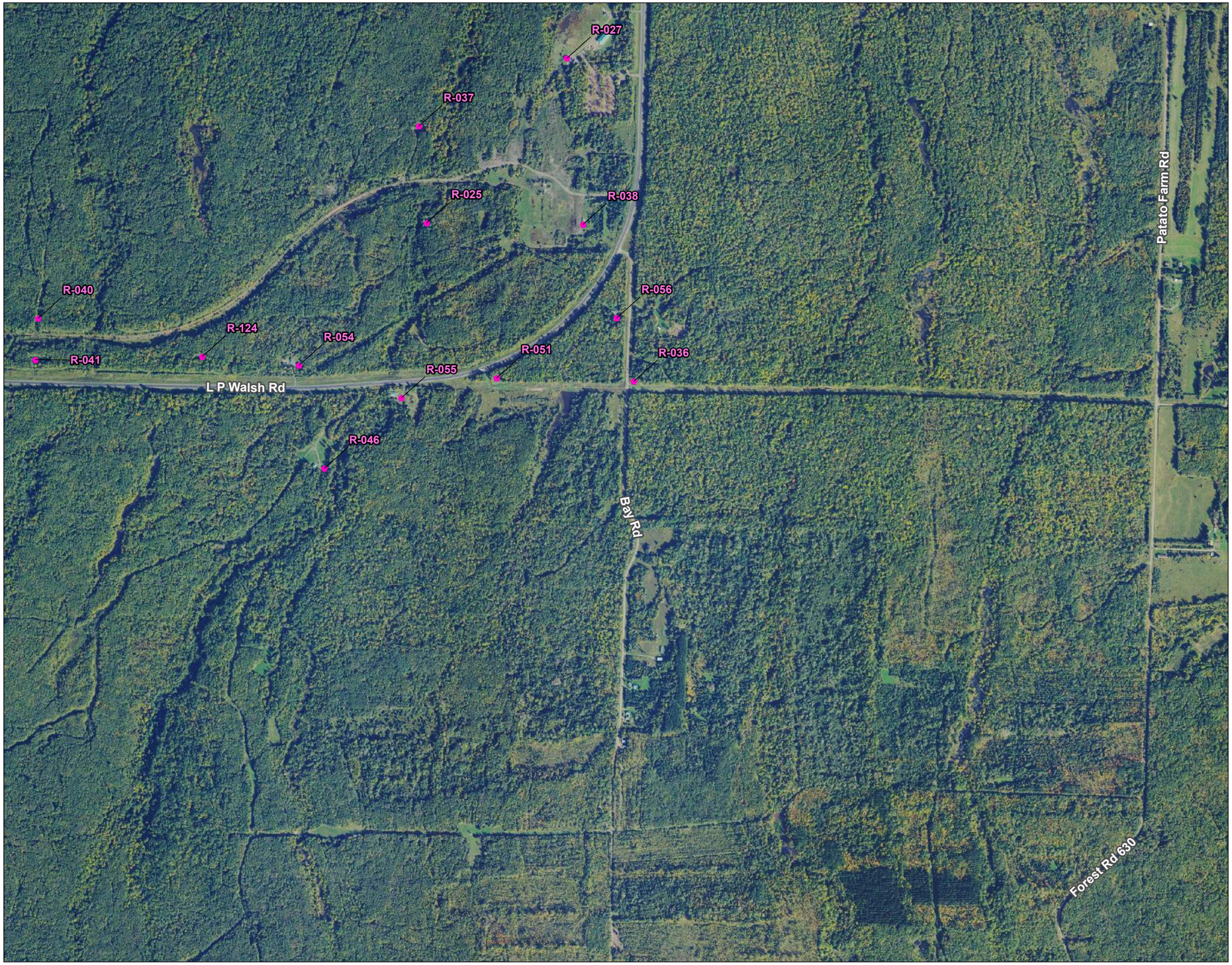


Figure No.

C.2

Title

Estimated Daytime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

N

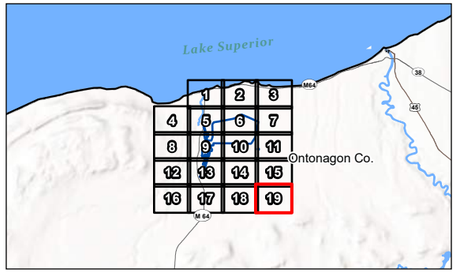
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

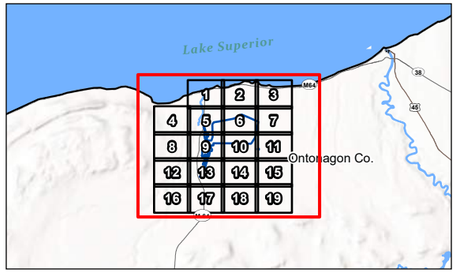
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TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park
- Operational Conveyor
- Crusher
- Mine Portal
- Plant Area
- Temporary Ore Stockpile
- Ventilation Raise

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

Index Map

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Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

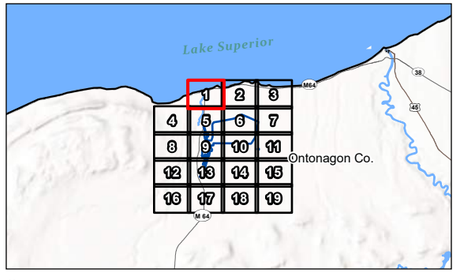
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)
- 30
- 35
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- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
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3. Background: 2024 NAIP

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Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

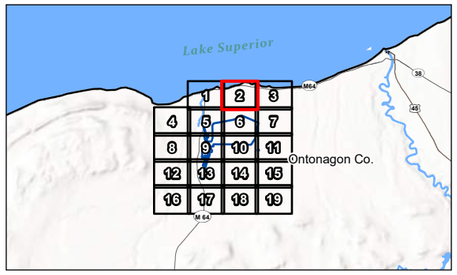
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Legend
- Proposed Project Extent
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)
- 30
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Notes
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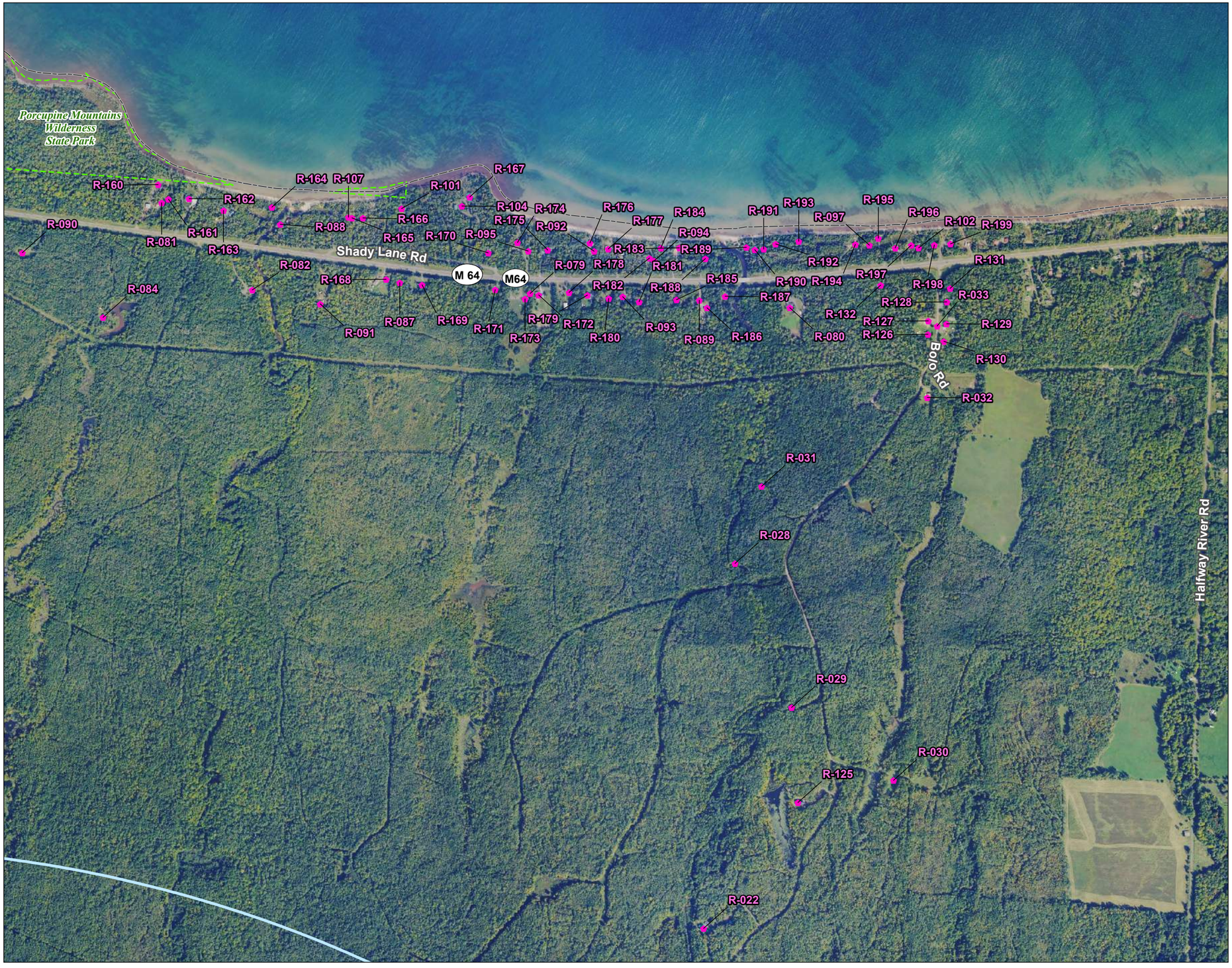


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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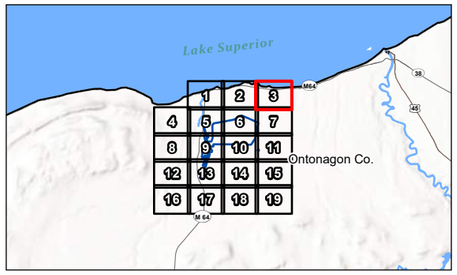
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Legend

- Proposed Project Extent
- Sensitive Receptor
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
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Notes

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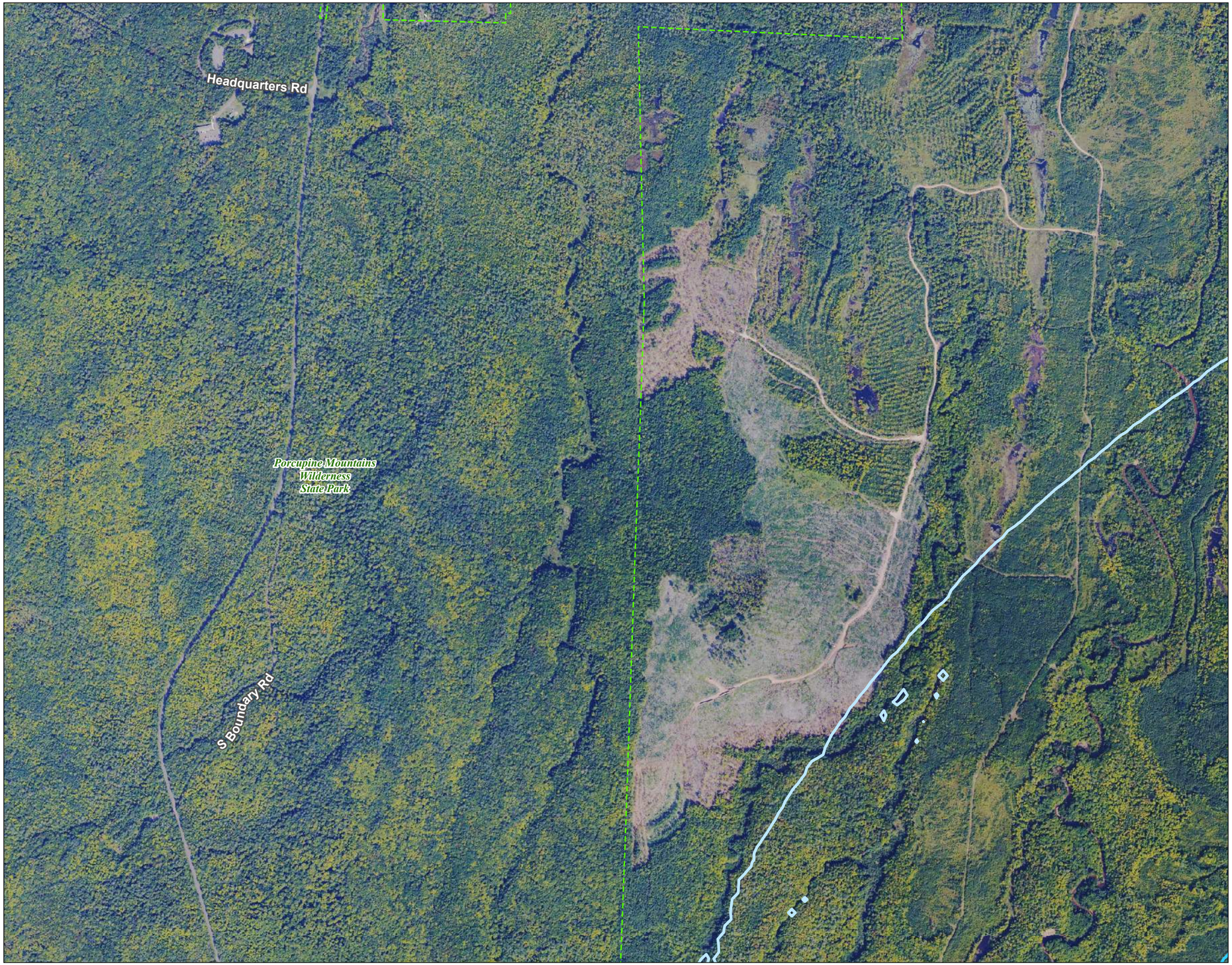


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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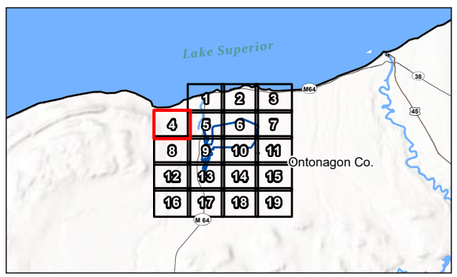
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
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- 60
- 65



Notes

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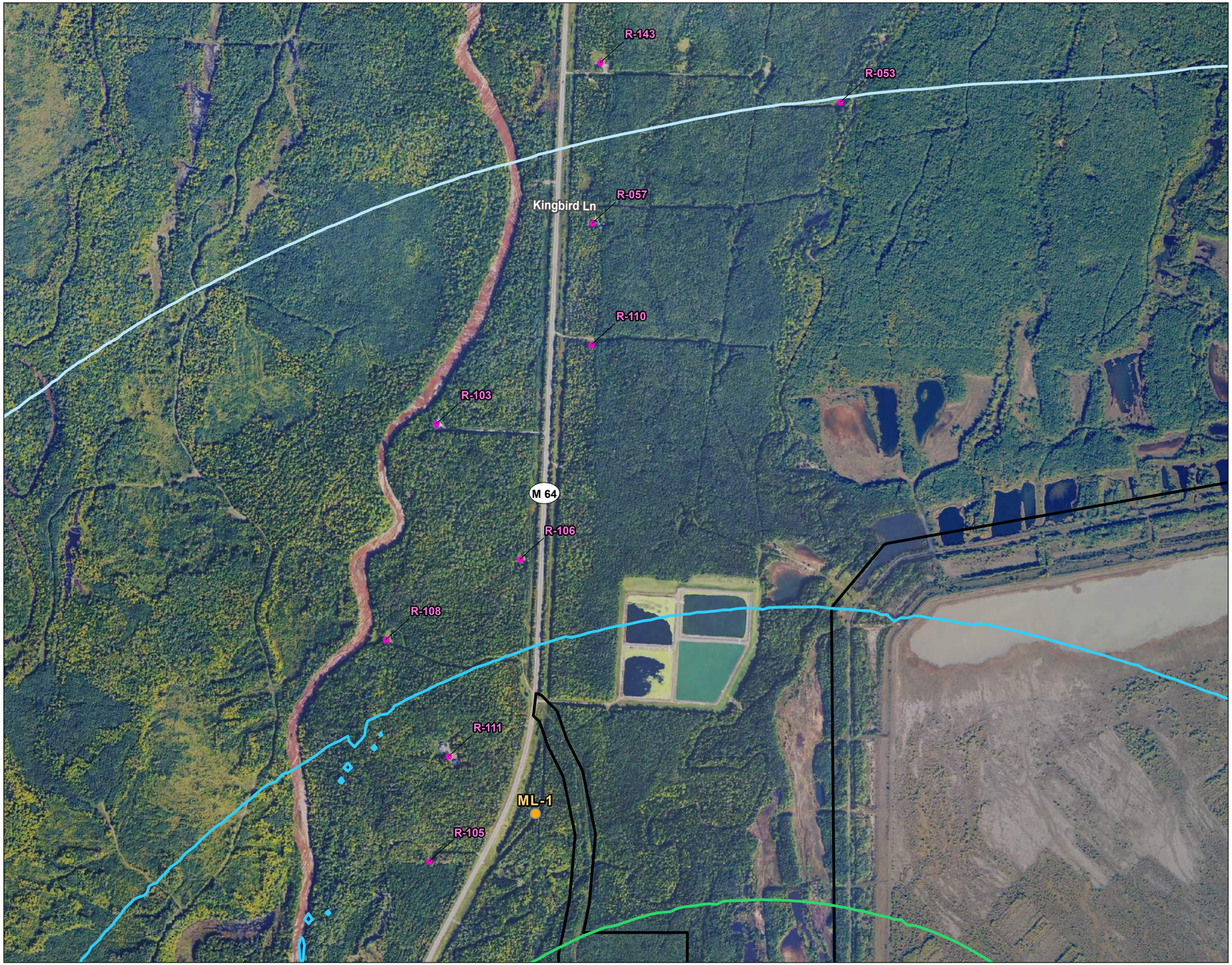


Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

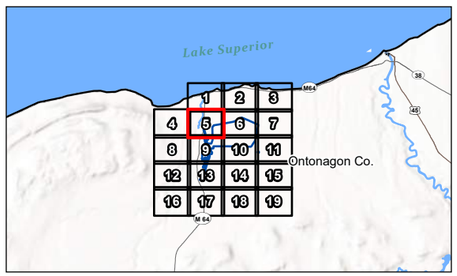
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
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3. Background: 2024 NAIP

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Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

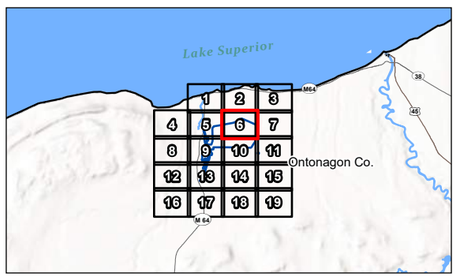
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Legend
- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
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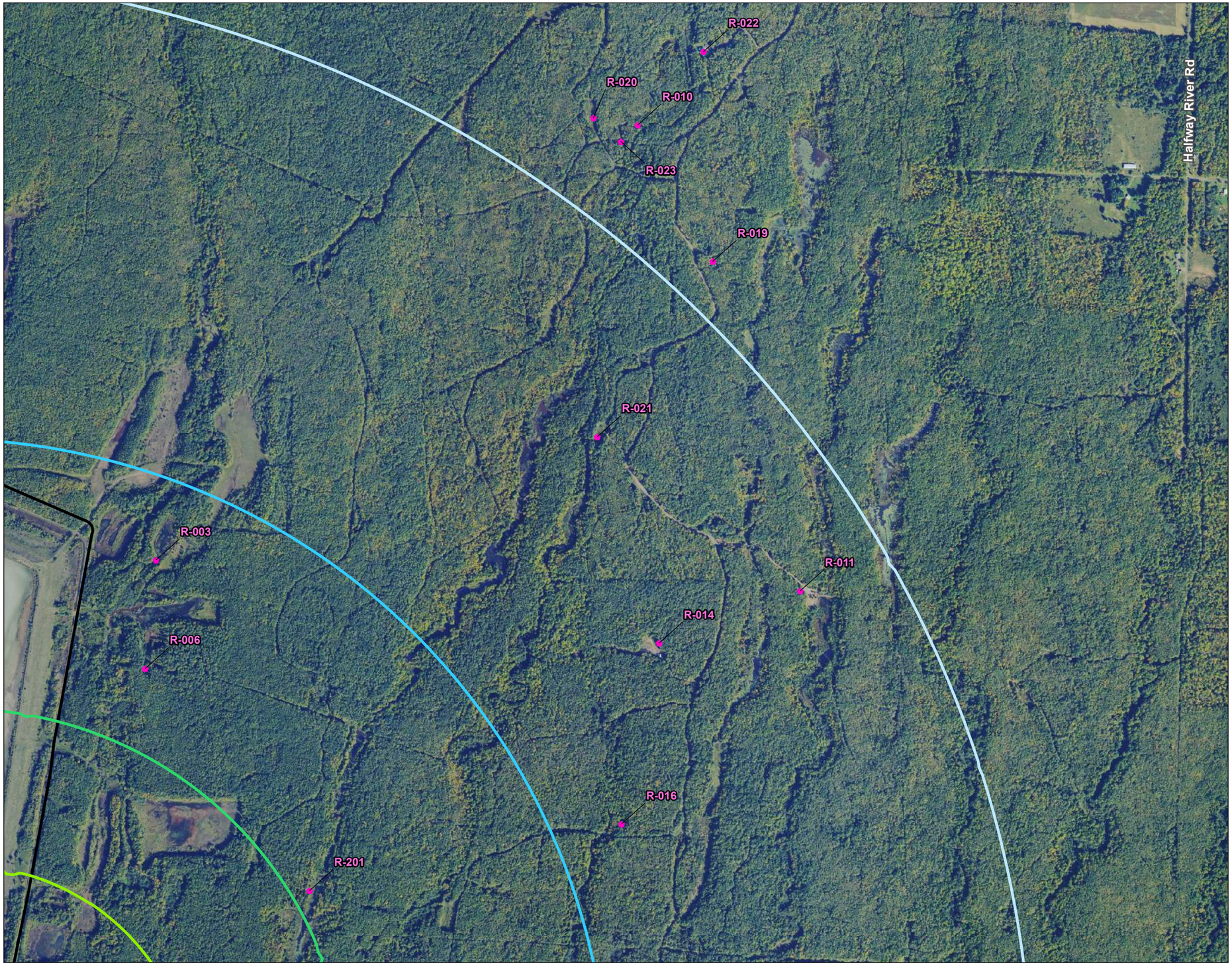


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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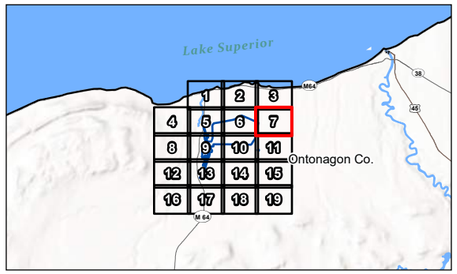
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
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- 65



Notes
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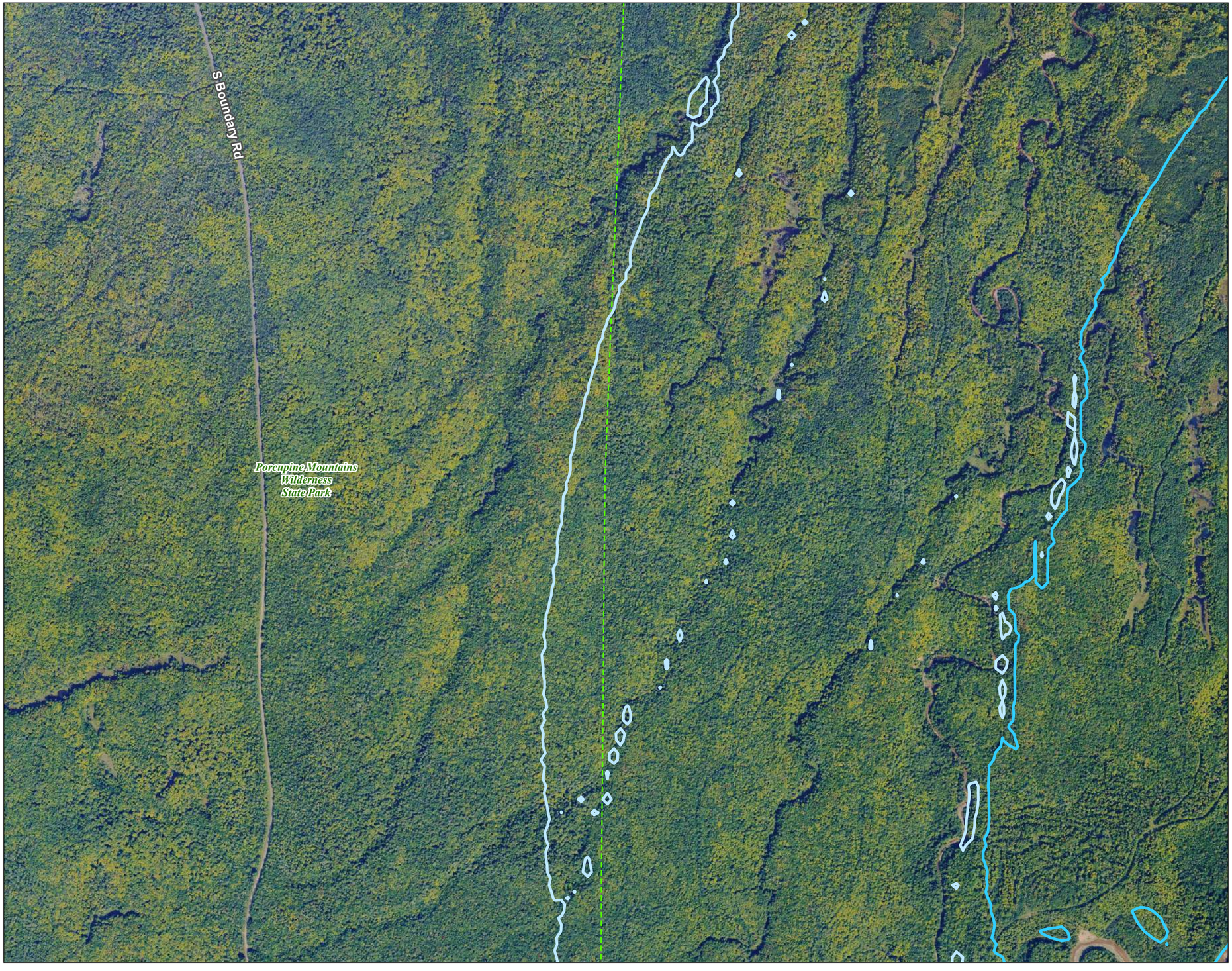


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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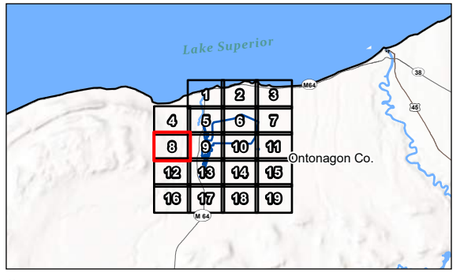
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
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Notes

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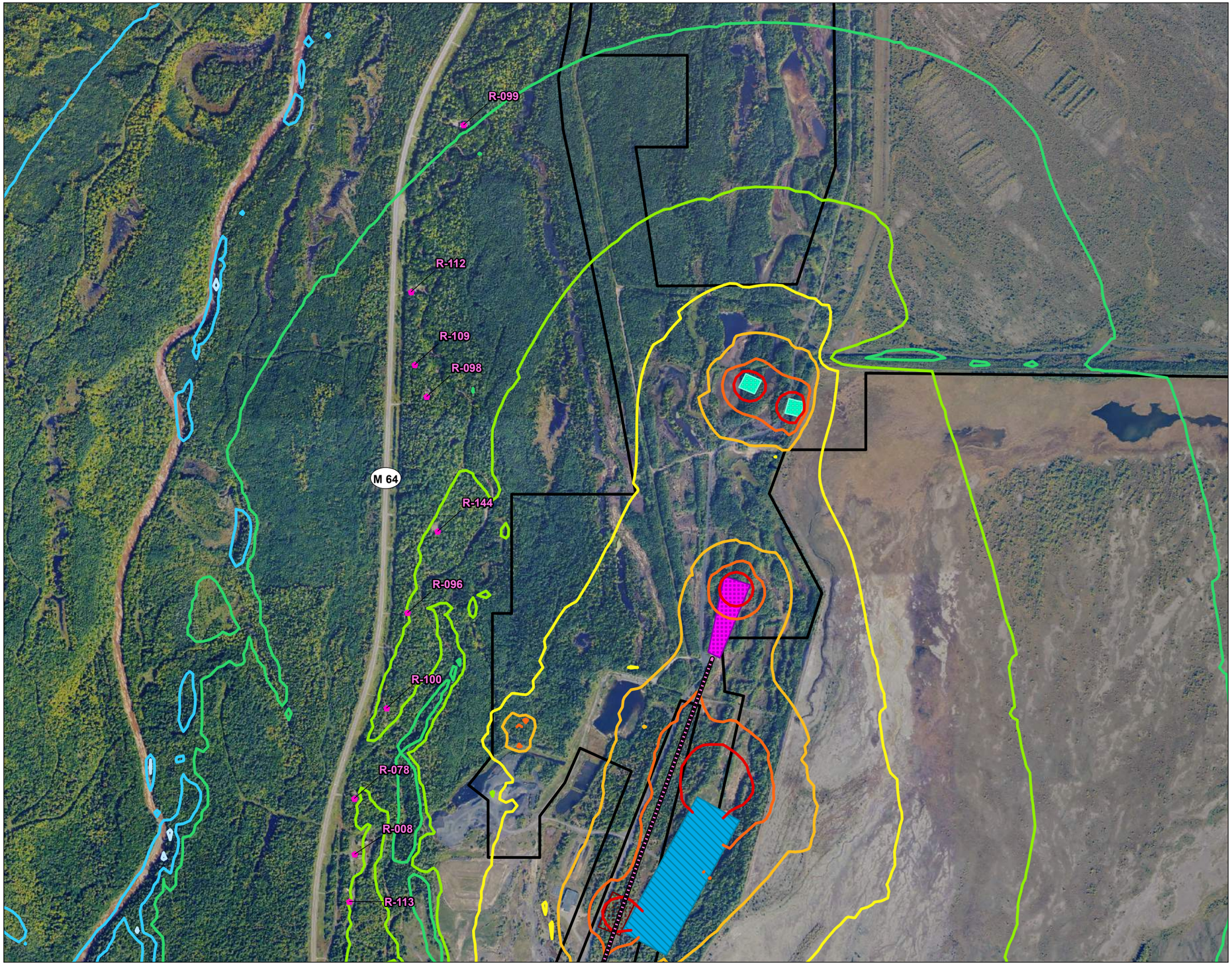


Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

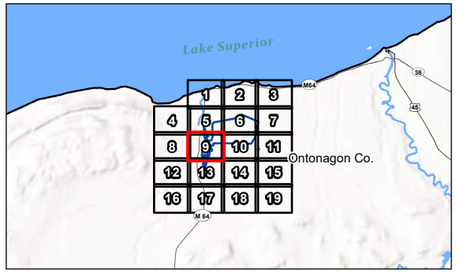
Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
IR by JP on 2026-05-26

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Legend
- Proposed Project Extent
- Sensitive Receptor
- Operational Conveyor
- Crusher
- Mine Portal
- Temporary Ore Stockpile
- Ventilation Raise

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
3. Background: 2024 NAIP

Stantec

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Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
TR by DJ on 2026-05-06
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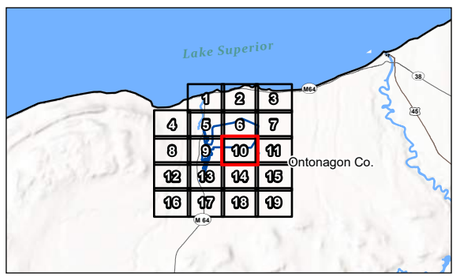
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Legend

- Proposed Project Extent
- Sensitive Receptor
- Ventilation Raise

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
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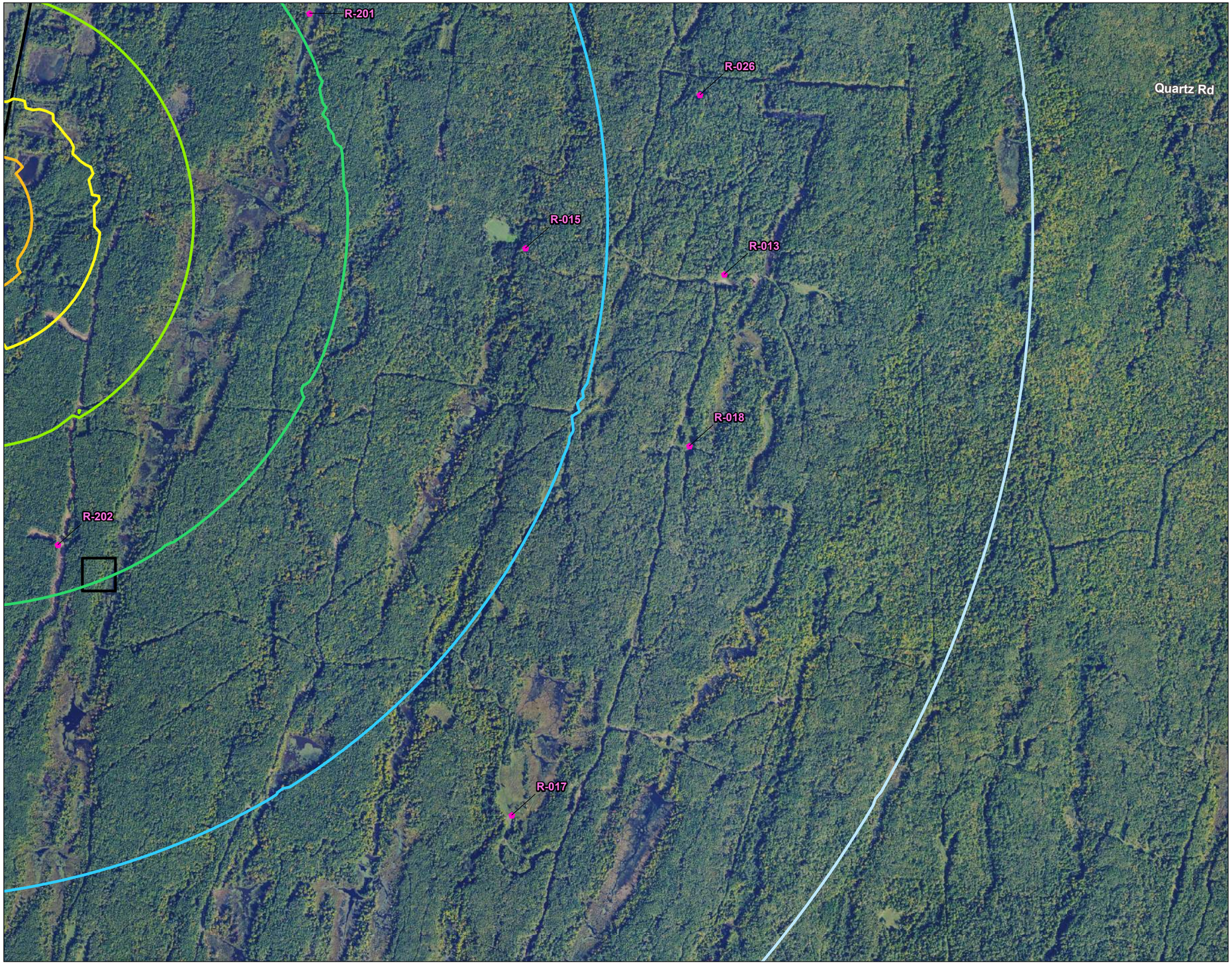


Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518
White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

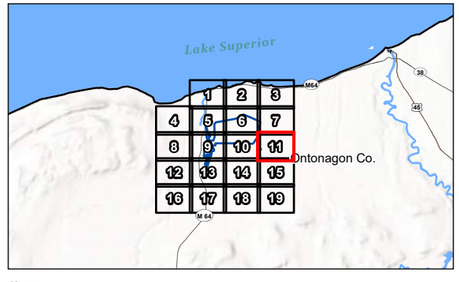
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Legend
- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
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- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
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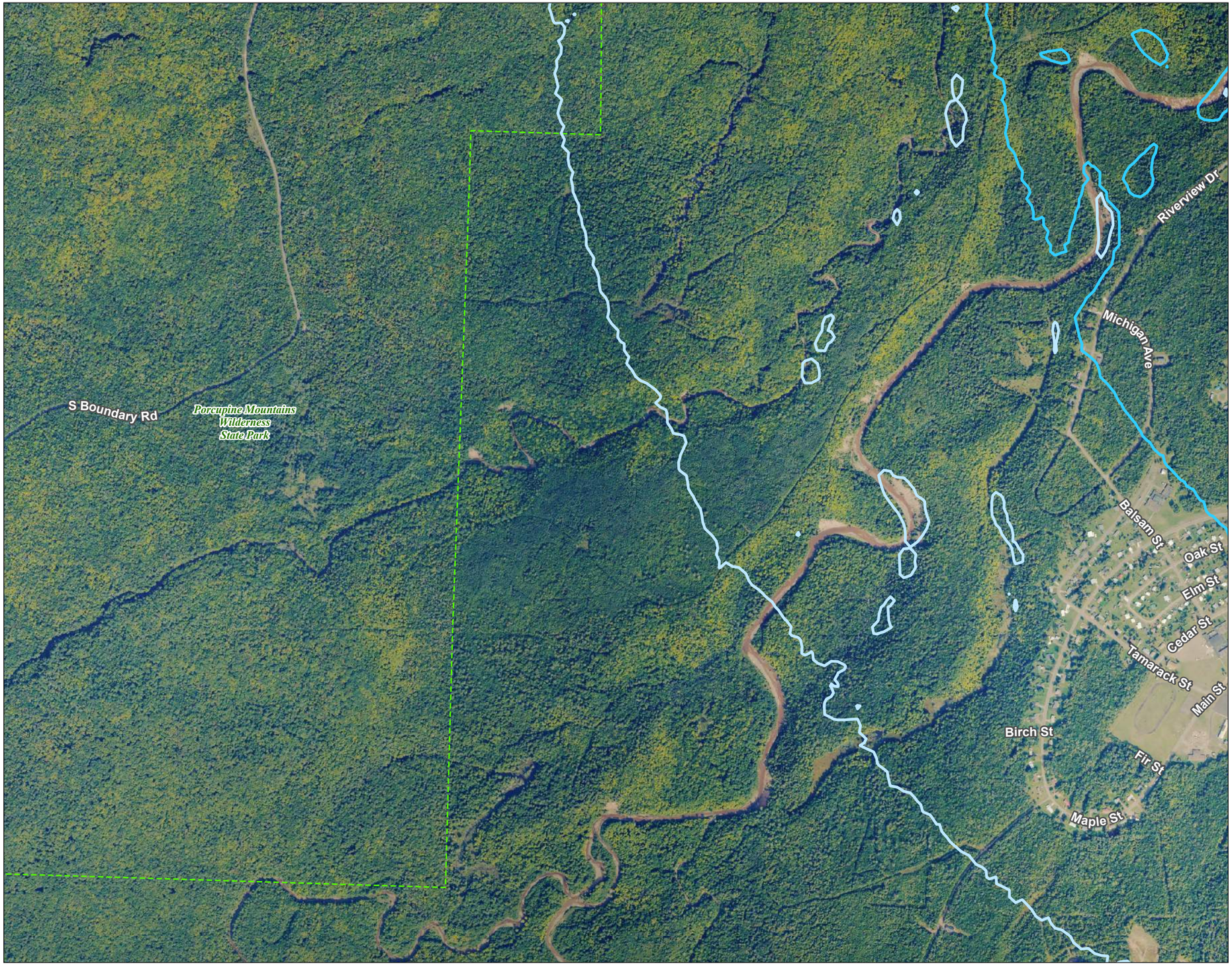


Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

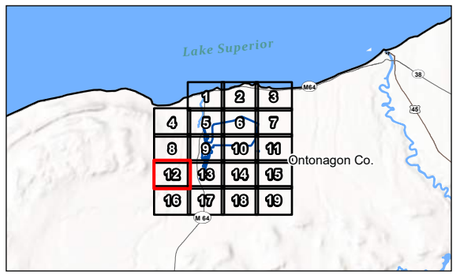
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Legend
- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)
- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Esri, White Pine Copper LLC, USCB, USGS
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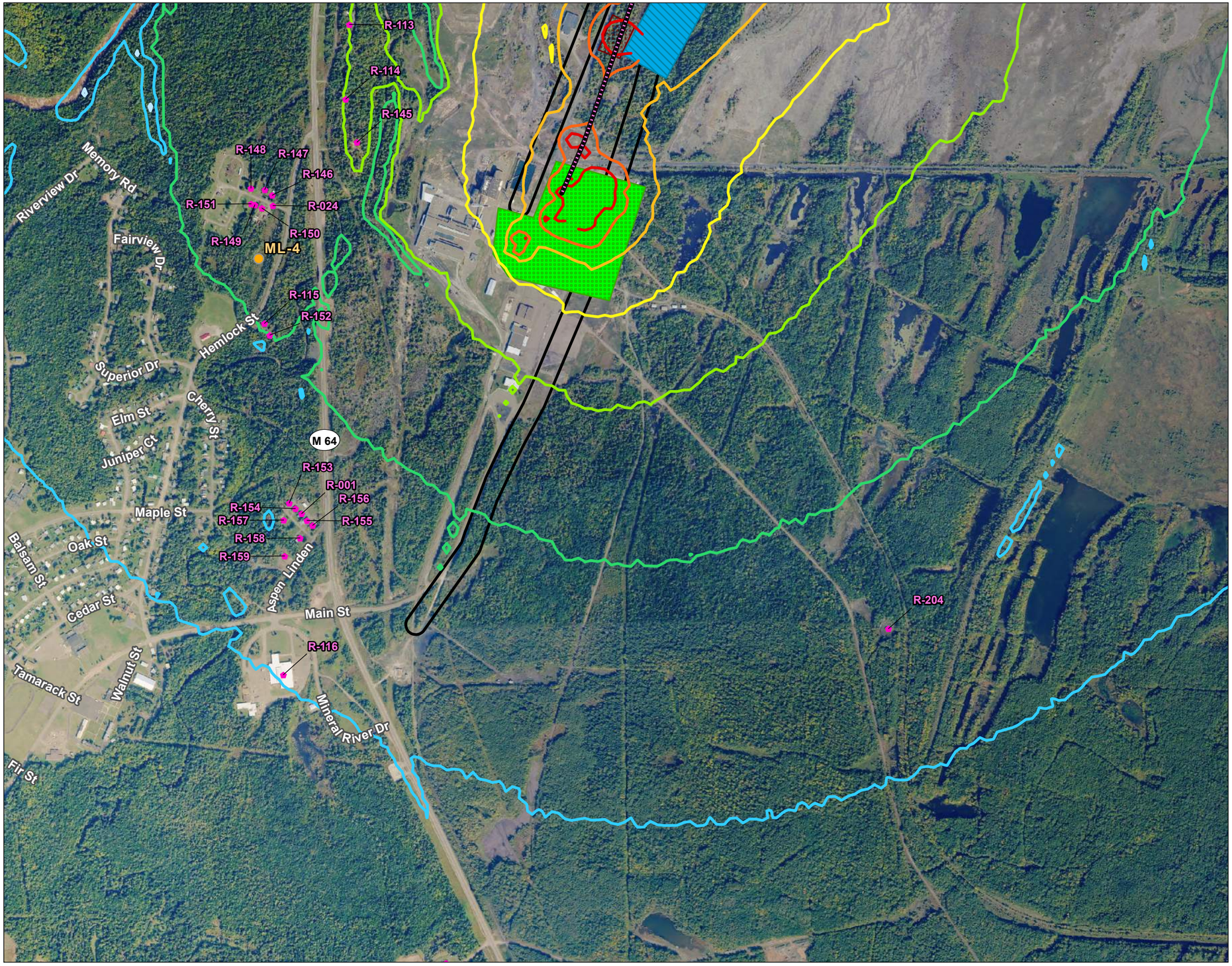


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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IR by JP on 2026-05-26

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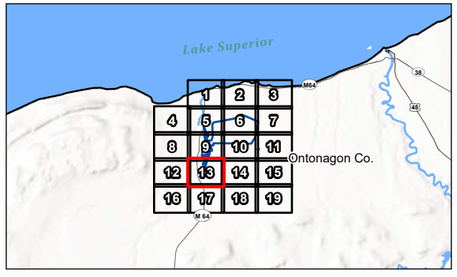
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Legend

- Proposed Project Extent
- Sound Measurement Location
- Sensitive Receptor
- Operational Conveyor
- Crusher
- Plant Area
- Temporary Ore Stockpile

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
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3. Background: 2024 NAIP

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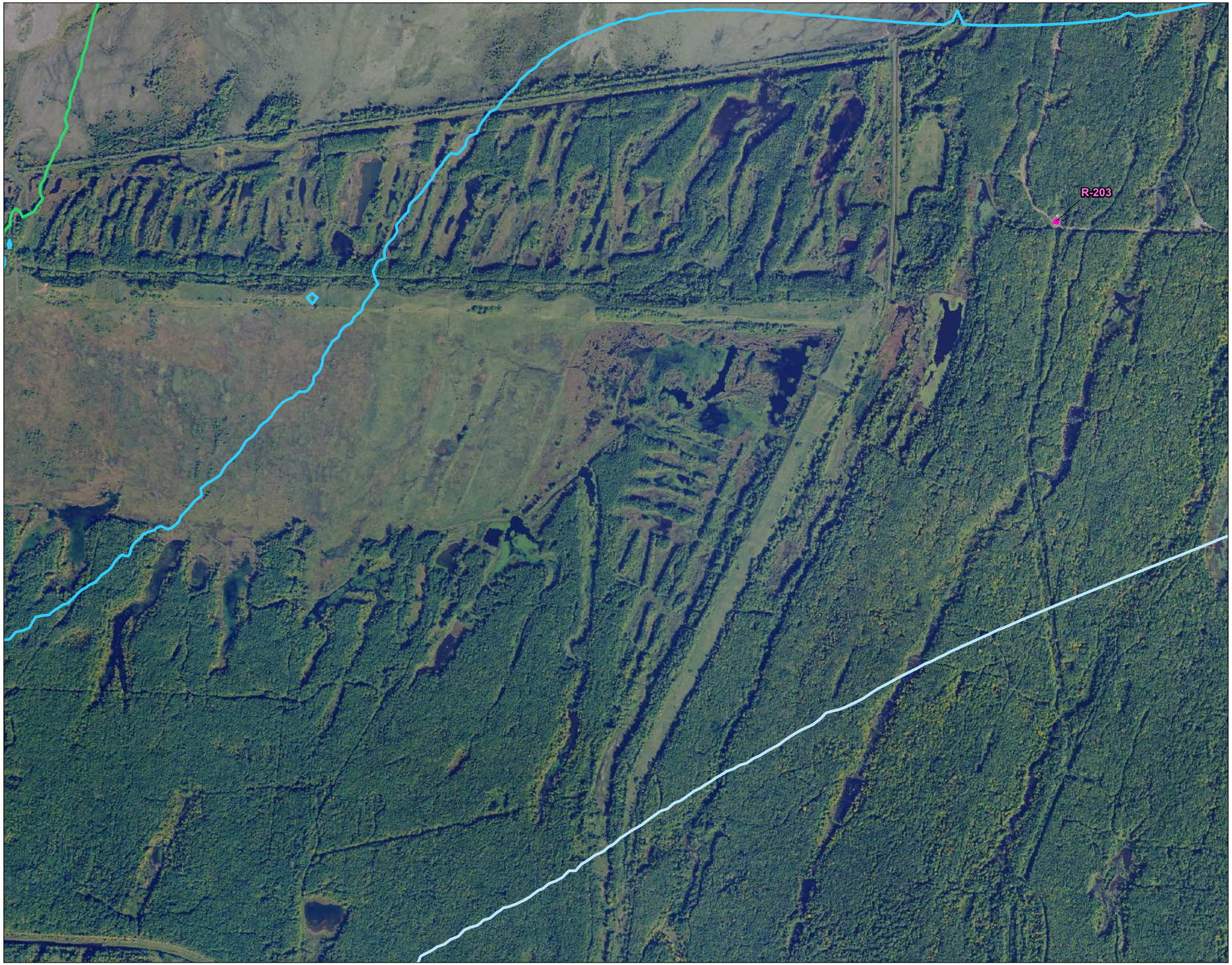


Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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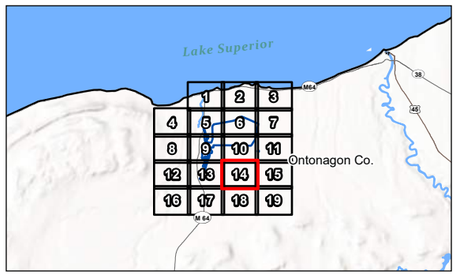
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
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Notes

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3. Background: 2024 NAIP

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Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

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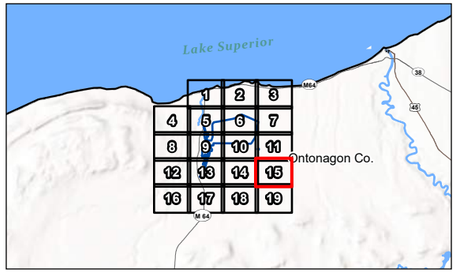
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
- 35
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Figure No.

C.3

Title

Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project 193710518

White Pine Copper LLC
White Pine North Project

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

Prepared by JM on 2026-05-06
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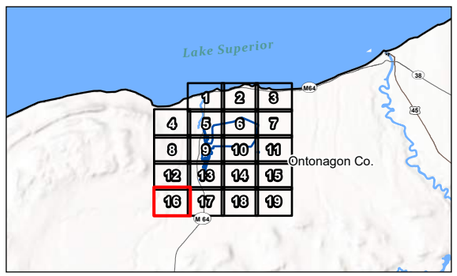
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Legend

- Proposed Project Extent
- State Park

Operational Noise Level Contour (dBA)

- 30
- 35
- 40
- 45
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- 65



Notes

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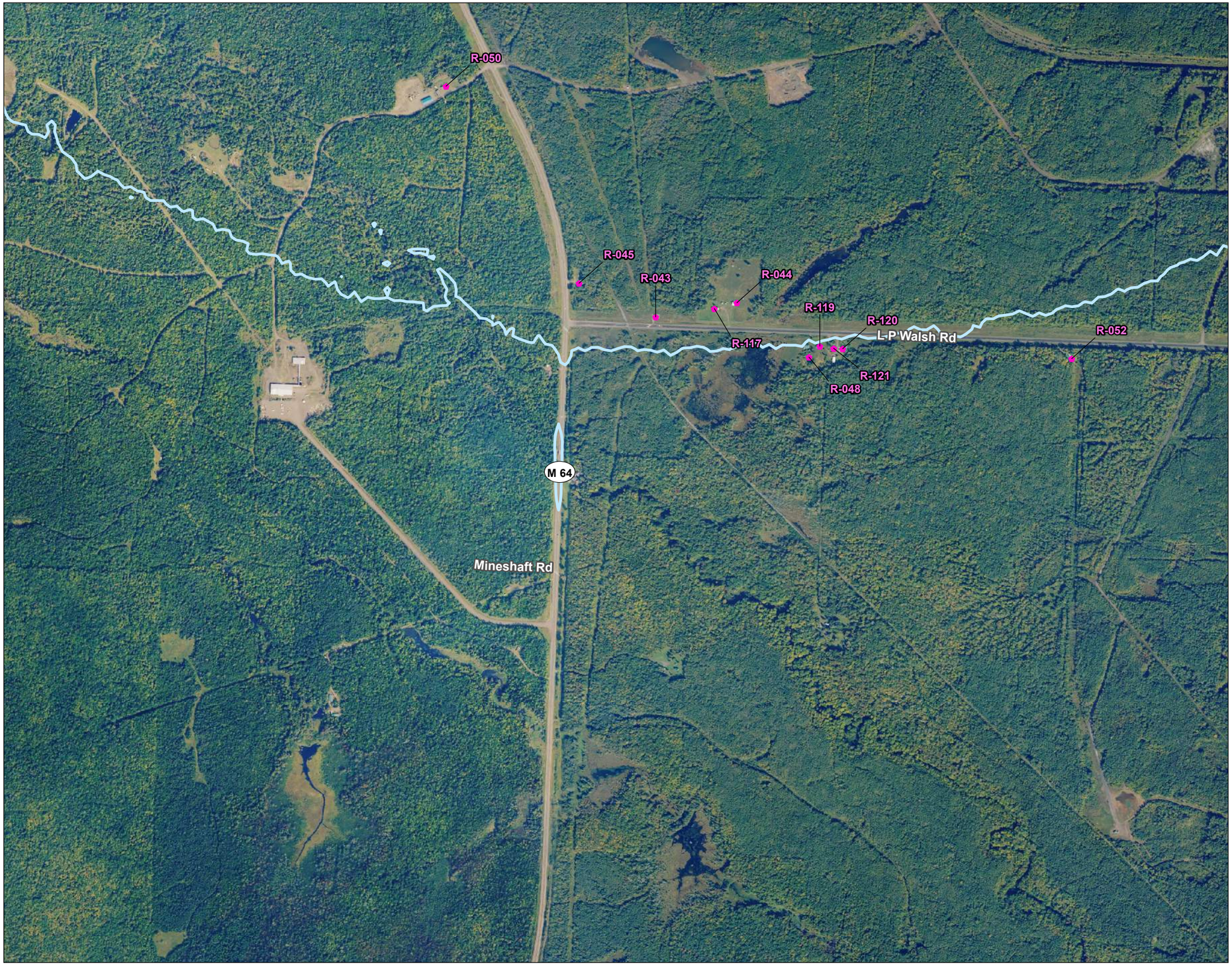


Figure No.
C.3

Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

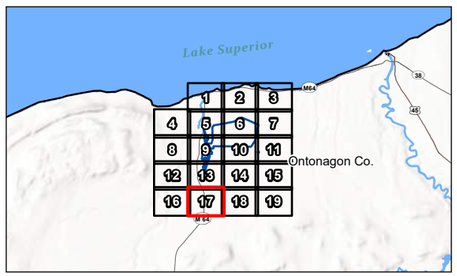
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Legend
- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)
- 30
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Title
Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project
White Pine Copper LLC
White Pine North Project

193710518

Project Location
Twp. of Carp Lake,
Ontonagon Co., MI

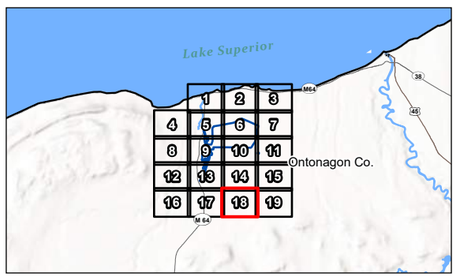
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Legend
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- Sensitive Receptor

Operational Noise Level Contour (dBA)
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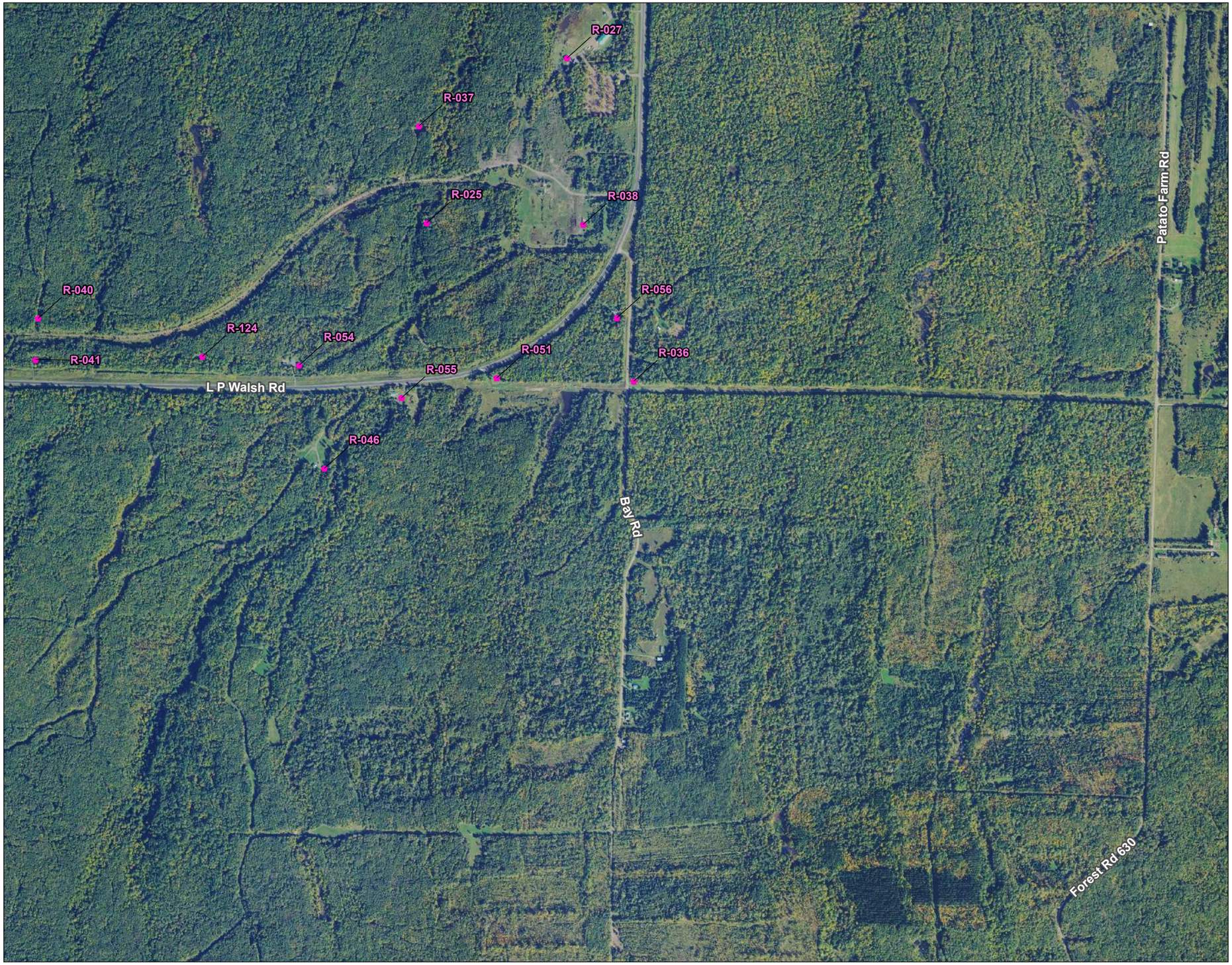


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Estimated Nighttime Project Sound Contours - Operational Phase

Client/Project

193710518

White Pine Copper LLC
White Pine North Project

Project Location

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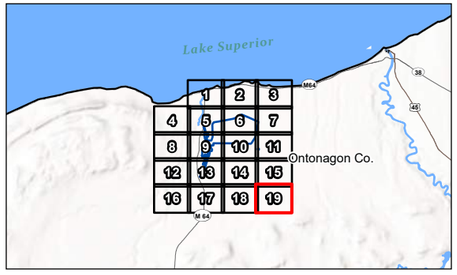
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Legend

- Proposed Project Extent
- Sensitive Receptor

Operational Noise Level Contour (dBA)

- 30
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With every community, we redefine what's possible.

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Plymouth MN 55447-4440
stantec.com