

**2019 WORK PLAN**  
for the  
**Community Environmental Monitoring Program**  
of the Eagle Mine

Submitted by  
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**Commonly Used Acronyms and Abbreviations**

CEMP	Community Environmental Monitoring Program
CWB	Contact Water Basins
DEQ	Michigan Department of Environmental Quality
Eagle	Eagle Mine
EPA	U.S. Environmental Protection Agency
GW	Groundwater
GWDP	Groundwater Discharge Permit
HTDF	Humboldt Tailings Disposal Facility
Foundation	Community Foundation of Marquette County
MP	Mine Permit
PM	Particulate Matter (dust) measured in microns
SWP	Superior Watershed Partnership
TBD	To Be Determined
TDRSA	Temporary Development Rock Storage Area
TWIS	Treated Water Infiltration System
WTP	Water Treatment Plant

Diagram of Eagle Mine Facilities



### Diagram of Humboldt Mill Facilities



1 Coarse Ore Storage Area

2 Secondary and Tertiary Crushers

3 Transfer Conveyor

4 Mill Services Building

5 Concentrator

6 Concentrate Load Out

7 Administrative Office

8 Tailings Facility

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## **Introduction**

The Community Environmental Monitoring Program (CEMP) of the Eagle Mine is implemented by two community-based organizations; the Superior Watershed Partnership (SWP) and the Community Foundation of Marquette County (Foundation). The CEMP is defined and governed by formal agreements between these organizations and Lundin Mining, who purchased the Eagle Mine from Rio Tinto during 2013. The CEMP is designed to build a comprehensive and accurate picture of any environmental impacts that may be a result of Eagle Mine's operations at the mine site, the Humboldt Mill, and along the designated Transportation Route. The CEMP is independent, transparent, and based on the highest scientific standards.

The CEMP consists of four main components: 1) Verification Monitoring, which includes verifying the environmental monitoring done by Eagle Mine as required by its permits 2) Additional monitoring, which includes environmental monitoring done by SWP over and above the monitoring that Eagle Mine is required to do under its permits; and 3) Publication of results and ratings of Eagle Mine's environmental performance; and 4) Community Outreach, to inform the public and provide opportunities for the community to provide input regarding CEMP activities.

In July 2016, the SWP and the Foundation negotiated renewal of the CEMP Agreement with Eagle Mine to allow for continued environmental monitoring of operations at the Mine and the Humboldt Mill through 2018. Monitoring of Eagle Mine's environmental performance will continue during 2019 under a one year agreement. The 2019 Work Plan marks the eighth year of CEMP monitoring and the sixth year of monitoring under the "operational" phase of production. The most significant change for this year is an expanded partnership with the Keweenaw Bay Indian Community (KBIC) who will be more active in monitoring, including additional studies related to ongoing operations, mine expansion and mineral exploration as well as community outreach.

The Work Plan is organized into three sections that describe CEMP activities 1) Annual Monitoring Objectives, 2) Monitoring Results and Performance Ratings, and 3) Community Input and Public Outreach. A summary of the annual monitoring objectives including work plan tasks,

standards and frequency of activities is provided in Table 1. Community Environmental Monitoring Program monitoring locations and parameters for laboratory analyses are provided in Figures 1-9 and Tables 2-14 respectively.

## **1. Annual Monitoring Objectives**

### ***1.1. Verification Monitoring and Data Review***

#### *1.1.1. Baseline Data Review*

The SWP will continue to review and evaluate pre-mining (baseline) environmental data as it relates to data generated during monitoring of mining operations. The SWP recognizes that baseline data in and around the Eagle Mine includes data collected prior to September 2011. Data collected from the Humboldt Mill, Powell Township Air Station, and along the transportation route will be considered baseline through September 2014.

#### *1.1.2. Operations Data Review*

Eagle Mine will continue to provide SWP with environmental monitoring data in the form of reports, a data base or summary reports. SWP will review this data from three perspectives. The first is to verify the validity (precision, accuracy representativeness) of the data. The second is to analyze data for indications of impacts from mining operations. The last is to analyze data from background (including upgradient, baseline and reference monitoring points) for indications of local (e.g., logging), regional (e.g., atmospheric deposition) or global (e.g., climate change) impact related to other non-mine activity.

#### *1.1.3. Procedures Review/Observations*

SWP will continue to review and observe data collection at Eagle Mine and the Humboldt Mill during 2019. The objective is to verify that the procedures used are appropriate and will result in the generation of data sets that are representative of environmental conditions.

#### *1.1.4 Interpretations Review*

SWP will continue to interpret results of Eagle Mine's permit required environmental monitoring data. The interpretations review will focus primarily on assigning likely root cause (mine impacts, data quality issues or unrelated impacts) to monitoring point values

that exceed permit specified benchmarks or thresholds. The SWP will utilize relevant baseline and secondary data (data from other sources) where appropriate to document interpretations of results and/or make comparisons to other local or regional environmental data.

#### *1.1.5 Split Sampling*

SWP will carry out split sampling at permit required monitoring sites at the Eagle Mine site and the Humboldt Mill (groundwater, surface water, and facilities) in conjunction with Eagle Mine's scheduled monitoring. Split sampling is when a sample taken from a single source (e.g. a groundwater well) is divided in two, with each sample analyzed by a different certified laboratory. The objective of the split sampling is to verify that the laboratories used are appropriate and the results are representative of environmental conditions. Split samples will be conducted at Eagle Mine and the Humboldt Mill at the locations shown in Figures 1-6. The frequency and number of samples collected at each site are described in Table 2. Samples will be submitted to an independent laboratory for analyses. Analytical parameters, methods and reporting limits for split sampling are presented in Tables 3-10. The samples may be analyzed for the full parameter list or a subset of the parameters specified for that monitoring point. Results will be compared to baseline data and applicable permit benchmarks and limits.

### **1.2 Additional Monitoring**

The 2019 CEMP Agreement (February 2019 - December 2019) and CEMP Annual Work Plan (this plan) summarize the objectives and procedures for additional (non-permit required) environmental monitoring of Eagle Mine's operations. Ongoing additional monitoring proposed for 2019 is summarized below.

#### *1.2.1 Powell Township Air Quality*

During November of 2012, an air quality and meteorological station was installed in Powell Township per the *CEMP Agreement*. The station is located in the community of Big Bay behind Crams General Store (Figures 7 and 8). The objective of the Powell Township air quality monitoring station is to generate data that can be used to identify potential air

quality impacts in the community that may be a result of mining operations. Air quality data are compared to National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels. The meteorological station measures wind speed and direction, temperature, barometric pressure, precipitation, solar radiation, and relative humidity on a continuous basis. During 2019, the station will monitor particulate matter (dust) in the 10 micron size range (PM10) on a continuous basis. Particulate matter filters will also be sent to a laboratory for analysis of metal concentrations (Table 11) on a quarterly basis. Modems installed at the station will provide real-time meteorological and air quality data (PM10) via the CEMP website.

### *1.2.2 Edible/Traditional Plant Tissue Monitoring*

Edible/traditional plant tissue monitoring began in 2015 to evaluate concerns voiced by the Keweenaw Bay Indian Community and other community members regarding potential impacts from mining activities on native plant species of high cultural value. The monitoring includes collection and analysis of berries, leaves and roots of important native plant species (including but not limited to: blueberry, Juneberry, chokecherry, pin cherry, raspberry, blackberry, strawberry, thimbleberry, cranberry, juniper berry, and wild rice). A list of parameters for analysis are provided in Table 12.

Collections include plant tissue in the form of berries, leaves, and/or roots from sites located within a two-mile radius of the Eagle Mine and Humboldt Mill as well as a control location (Figure 7). Plant tissue samples will be collected and sent out for analysis at a certified laboratory and compared to guidelines and daily intake recommendations including the US Environmental Protection Agency's oral Tolerable Intake Values (TDI) and the Food and Drug Administration's recommended Daily Values (DV). Based upon results of initial studies and consultation with KBIC, additional monitoring and analysis will take place during 2019. The SWP will provide Eagle Mine with a plan (including locations, procedures, methodologies and standards) for any changes to the monitoring program to commencing with any new activities.

### *1.2.3 New CEMP Groundwater Monitoring Well*

On August 28-30, 2017, a new CEMP groundwater monitoring well was installed near Eagle Mine to expand the existing monitoring infrastructure and further evaluate potential groundwater impacts as a result of mining activities. The new well is located outside of the mine perimeter (fence) between the Treated Water Infiltration System (TWIS) and the headwaters of the East Branch of the Salmon Trout River, with a groundwater depth of 166-176 feet. Access to the site is made possible through an agreement with Weyerhaeuser Company (property owners). During 2019, groundwater data will be collected on a quarterly basis from the new well (Figure 8). A list of parameters for analysis are provided in Table 13. Results of the monitoring will be compared to results from Eagle Mine's groundwater discharge permit groundwater monitoring sites.

### *1.2.4 Salmon Trout River Headwaters "Seep" Monitoring*

During 2017, CEMP in cooperation with the KBIC began water quality monitoring at 8 sites in the headwaters of the Salmon Trout River. The headwaters of the Salmon Trout River begin as "seeps" or natural springs at locations where groundwater daylight and becomes surface water (Figure 9). A list of parameters for analysis on a quarterly basis are provided in Table 14. The objective of additional monitoring of the headwaters (seeps) of the Salmon Trout River is to monitor potential water quality impacts from Eagle Mine's operations at sites previously monitored by the U.S. Geological Survey (USGS) and the Keweenaw Bay Indian Community. Results of the monitoring will be used to assess potential impacts from mining activities to the Salmon Trout River.

### *1.2.5 Other Based on Results or New Activities*

The SWP and KBIC may also collect additional data related to mining activities, including exploration site activities, during 2019 based on results or new information, community input, and/or new activities. The SWP and KBIC will provide Eagle Mine with a plan (including locations, procedures, methodologies and standards) for any additional monitoring prior to commencing with monitoring activities.

## 2 Monitoring Results and Performance Ratings

### 2.1 Data Processing/Publication

#### 2.1.1 Data Processing

SWP laboratory(s) will deliver monitoring results in electronic format to SWP no later than 45 days of receipt of samples and the data will be processed by SWP within 5 working days of receipt from the laboratory. Data processing procedures will be conducted in a manner consistent with the *CEMP Agreement* and other agreed upon standards/operating procedures. Primary processing consists of verification that samples, parameters, analytical methods, and detection limits were completed as requested. Secondary processing will consist of the evaluation of laboratory quality control data and duplicate data for evidence of quality control issues. Tertiary processing consists of comparison of data to appropriate baseline data, permit specified criteria/benchmarks, or other agreed upon state or federal criteria. The final data processing step follows receipt of Eagle data and consists of the comparison of Eagle's laboratory derived values with values produced by SWP's laboratory(s).

### 2.1 Performance Ratings

#### 2.2.1 CEMP Report Card

The CEMP Report Card is located on the CEMP website and includes a red light, orange light, yellow light, and green light system used by SWP to rate Eagle Mine on its environmental performance on a quarterly basis by location (Mine or Mill) and type of monitoring (facilities, groundwater, surface water, flora/fauna, etc.). The CEMP website and Report Card will be improved during the first half of 2019 to better communicate results of environmental monitoring at specific locations on a quarterly basis. In addition, the SWP will work with KBIC, Eagle Mine and additional partners to improve data interpretation and risk communication to the public, including, but not limited to, third party analysis and interpretation of data, and risk communication. In addition to quarterly updates via the CEMP website, monitoring results may also be share with local media outlets (Mining Journal, Marquette Monthly, etc.) and other outlets in cooperation with the KBIC.

### 2.2.2 *CEMP Monitoring Reports*

In addition to the website and Report Card updates, CEMP will continue to periodically publish summary reports of monitoring activities and results to the CEMP website.

## **3. Community Outreach**

The SWP conducts community outreach to inform the public about Eagle Mine's environmental performance and to obtain input from community members regarding CEMP activities. This includes:

- Direct contacts/meetings with community members and interested groups.
- Presentations to schools/universities and local, regional and Great Lakes groups.
- Data/information sharing via the CEMP website ([swpcemp.org](http://swpcemp.org)), local news/media outlets, social media, printed materials, and publications.
- Distribution of CEMP program information and findings to other communities and interested parties.






<b>PROJECT MANAGEMENT, OVERSIGHT and OUTREACH</b>		<b>Rate</b>	<b>Hours</b>	<b>Total</b>
Executive Director	*Fee for Service Rate	120.00	350	\$ 42,000
Senior Planner	*Fee for Service Rate	91.15	640	\$ 58,340
Data Management Specialist	*Fee for Service Rate	43.15	635	\$ 27,400
Field Technician	*Fee for Service Rate	43.15	825.33	\$ 35,613
Administrator	*Fee for Service Rate	45.50	350	\$ 15,930
*NOTE: Fee for Service Rates for SWP staff include 10-40% in fringe benefits (health insurance, social security, workers compensation, retirement, etc.) and approximately 35% in overhead costs (lease, utilities, office equipment, etc.)				
KBIC Natural Resources Department: Initial \$25,000 with additional funding up to 50% of project management budget				\$ 25,000
<b>TOTAL PROJECT MANAGEMENT, OVERSIGHT AND OUTREACH</b>				<b>\$ 204,283</b>
<b>CONTRACTUAL SERVICES</b>		<b># Samples</b>	<b>Cost/Sample</b>	<b>Total</b>
<i>Verification Monitoring and Data Review</i>				
White Water - Eagle Mine Water Treatment Plant		4	\$ 592	\$ 2,368
White Water - Eagle Mine GWDP Groundwater		8	\$ 574	\$ 4,592
White Water - Eagle Mine Mine Permit Groundwater		8	\$ 504	\$ 4,032
White Water - Eagle Mine Mine Permit Surface Water		8	\$ 660	\$ 5,280
White Water - Eagle Mine Temp Development Rock Storage Area		4	\$ 491	\$ 1,963
White Water - Humboldt Mill Water Treatment Plant		4	\$ 481	\$ 1,924
White Water - Humboldt Mill Mine Permit Groundwater		8	\$ 626	\$ 5,008
White Water - Humboldt Mill Mine Permit Surface Water		8	\$ 720	\$ 5,760
<i>Total Verification Monitoring and Data Review</i>				\$ 30,927
<i>Additional Monitoring</i>				
White Water - CEMP/KBIC Edible/Traditional Plant Study		10	\$ 563	\$ 5,630
White Water - CEMP Monitoring Well near Eagle Mine		4	\$ 649	\$ 2,596
White Water - CEMP/KBIC Salmon Trout River "Seeps"		24	\$ 294	\$ 7,056
Met One - Air Station BAM - Factory Calibration and Maintenance		1	\$ 5,000	\$ 5,000
Eastern Research Group - Air Station Metals		3	\$ 440	\$ 1,320
TBD - Assist with Outreach		1	\$ 5,000	\$ 5,000
<i>Total Additional Monitoring</i>				\$ 26,602
<b>TOTAL CONTRACTUAL</b>				<b>\$ 57,529</b>
<b>OTHER</b>				
Training/Certifications		1	\$ 590	\$ 590
Cram's Store - Air Station Site Lease Fee		1	\$ 900	\$ 900
Equipment Rentals (seep monitoring pump, etc.)				\$ 500
Website Maintenance/Updates				\$ 3,000
<b>TOTAL OTHER</b>				<b>\$ 4,990</b>
<b>SUPPLIES AND MATERIALS</b>				
Printing (educational materials, reports, etc.)				\$ 1,200
Shipping - Fed Ex				\$ 4,500
Field and Office Supplies				\$ 4,000
Public Meetings (media announcements, room rental, etc.)				\$ 500
<b>TOTAL OUTREACH &amp; SUPPLIES</b>				<b>\$ 10,200</b>
<b>TRAVEL</b>				
Travel for sampling events/meetings	5500 Miles		\$ 0.545	\$ 2,998
<b>TOTAL TRAVEL</b>				<b>\$ 2,998</b>
<b>TOTAL CEMP 2019 BUDGET</b>				<b>\$ 280,000</b>
<b>MCCF MANAGEMENT FEE</b>				<b>\$ 20,000</b>
<b>TOTAL 2019 BUDGET</b>				<b>\$ 300,000</b>
<b>2018 RESERVE FUND</b>				<b>\$ (124,498)</b>
<b>2019 FUNDING REQUEST</b>				<b>\$ 175,501</b>





**Mine Permit  
Surface Water  
Monitoring Locations**


**Legend**

-  SW Monitoring Station
-  Mine Facilities
-  Road
-  Hydrography
-  Watershed Boundary

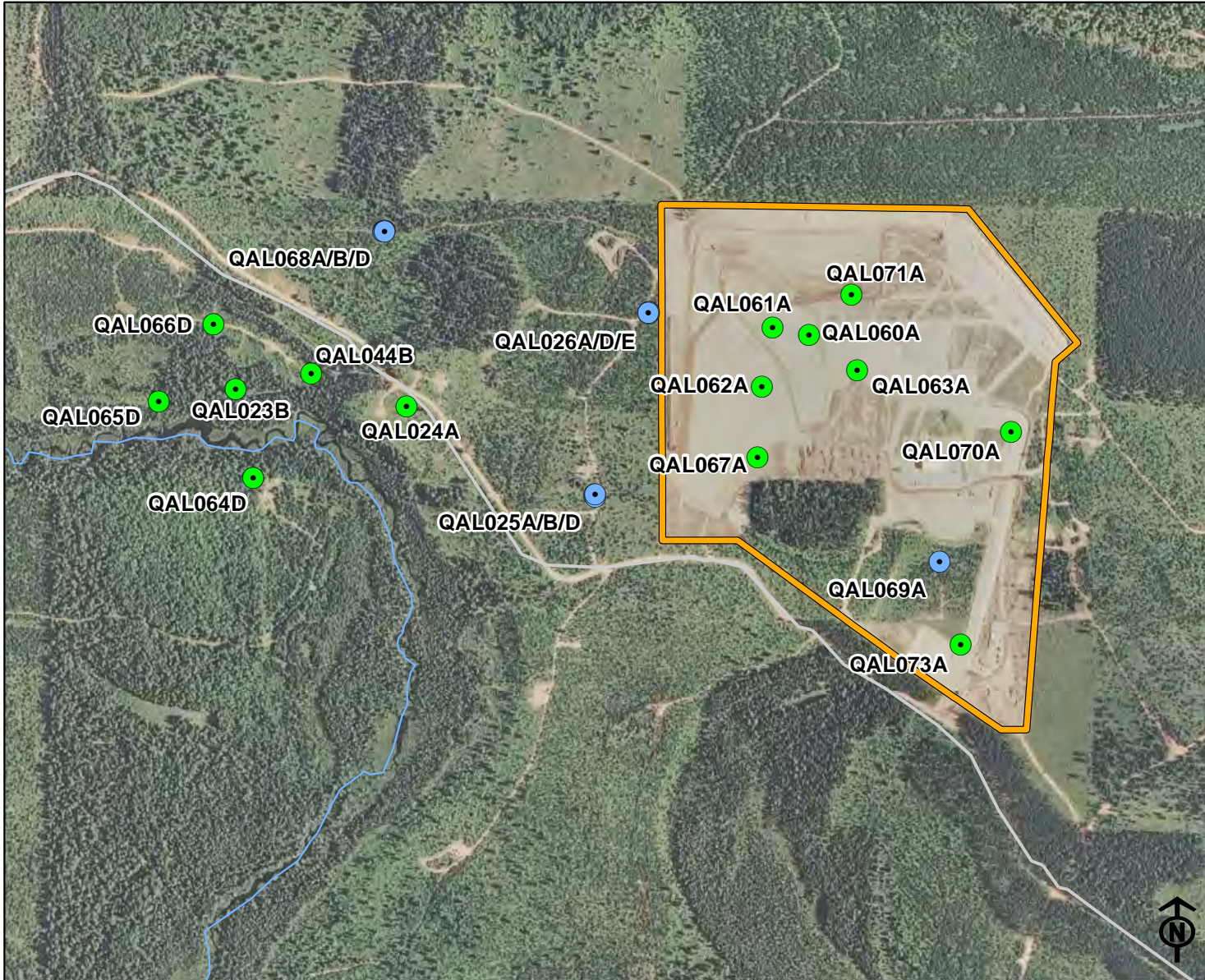
Reference  
Projection & Datum: UTM NAD 83 Zone 16N

0 1.25 2.5 5 Miles

1:200,000

 Community Environmental  
Monitoring Program

**Figure: 1**



**Mine Permit  
Groundwater  
Monitoring Locations**


**Legend**

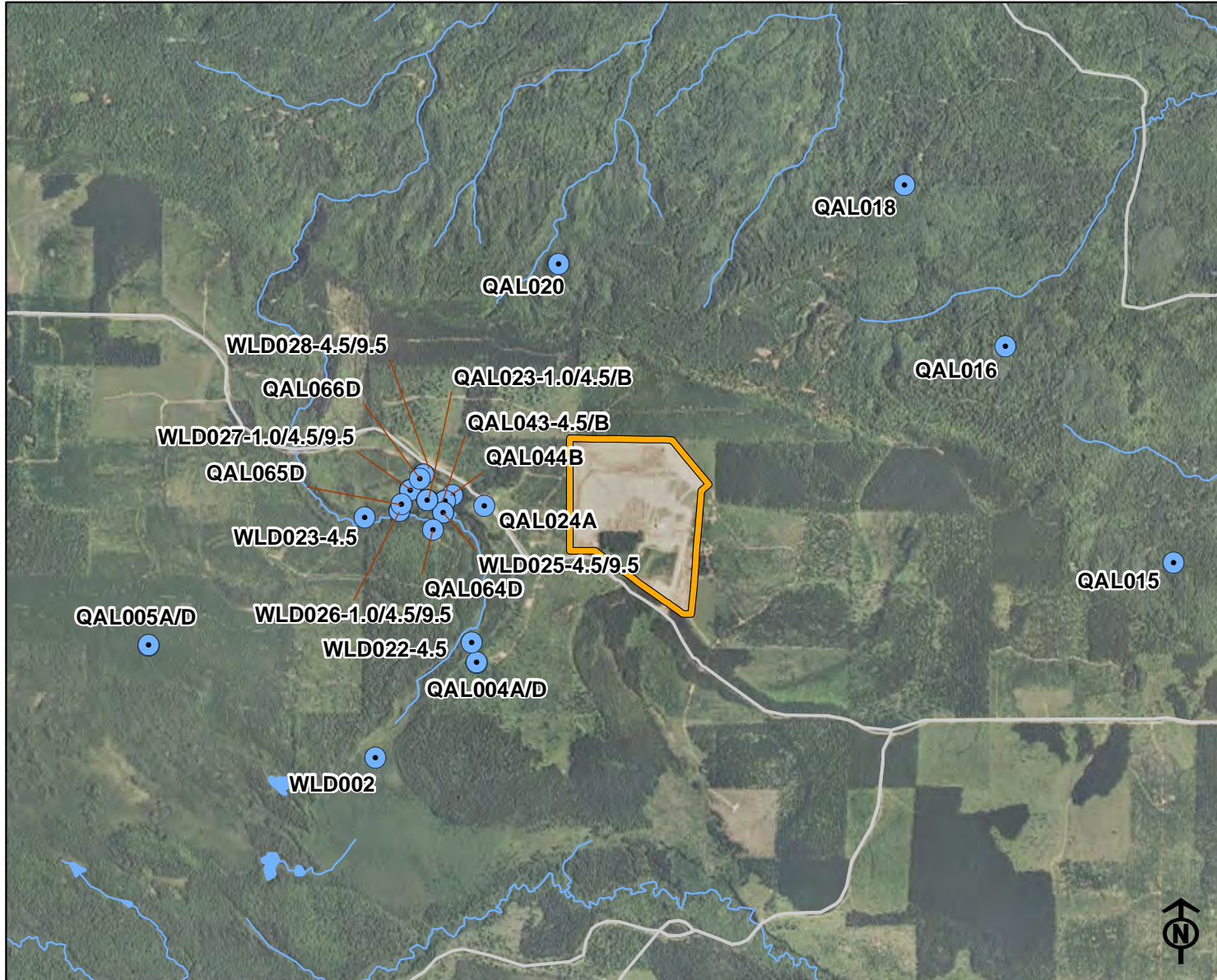
- Background Well
- Compliance Well
- Mine Facilities
- Road
- ~ Hydrography

Reference  
Projection & Datum: UTM NAD 83 Zone 16N

0 0.05 0.1 0.2 Miles





1:12,000


 Community Environmental  
Monitoring Program  
**Figure: 2**



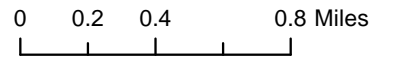
**Mine Permit  
Groundwater Elevation  
Monitoring Locations**

**Legend**

-  GW Elevation Monitoring Well
-  Mine Facilities
-  Road
-  Hydrography

Reference

Projection & Datum: UTM NAD 83 Zone 16N

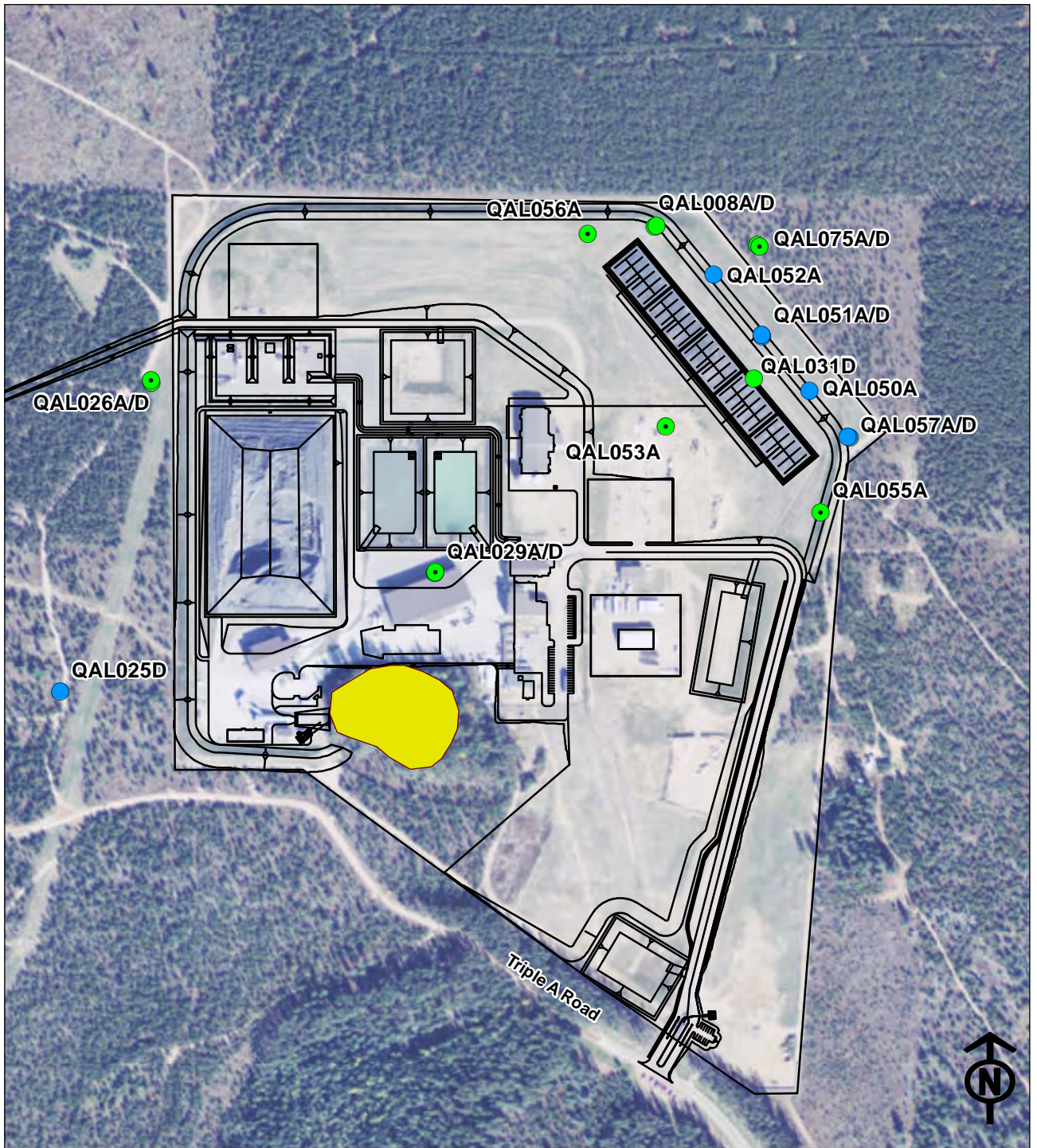


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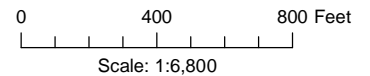
Community Environmental  
Monitoring Program

**Figure: 3**



**GROUNDWATER DISCHARGE PERMIT  
GROUNDWATER MONITORING LOCATIONS**

- COMPLIANCE WATER QUALITY
- BACKGROUND WATER QUALITY
- ELEVATION
- *Instrumented for continuous monitoring*
- MINE FACILITIES
- OUTCROP



**Eagle Mine**  
a subsidiary of **Iron Ore Mining**

Eagle Mine  
Groundwater Discharge Permit  
GW1810162

**Reference**

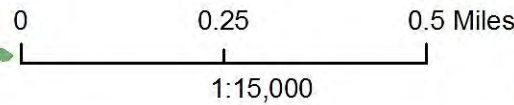
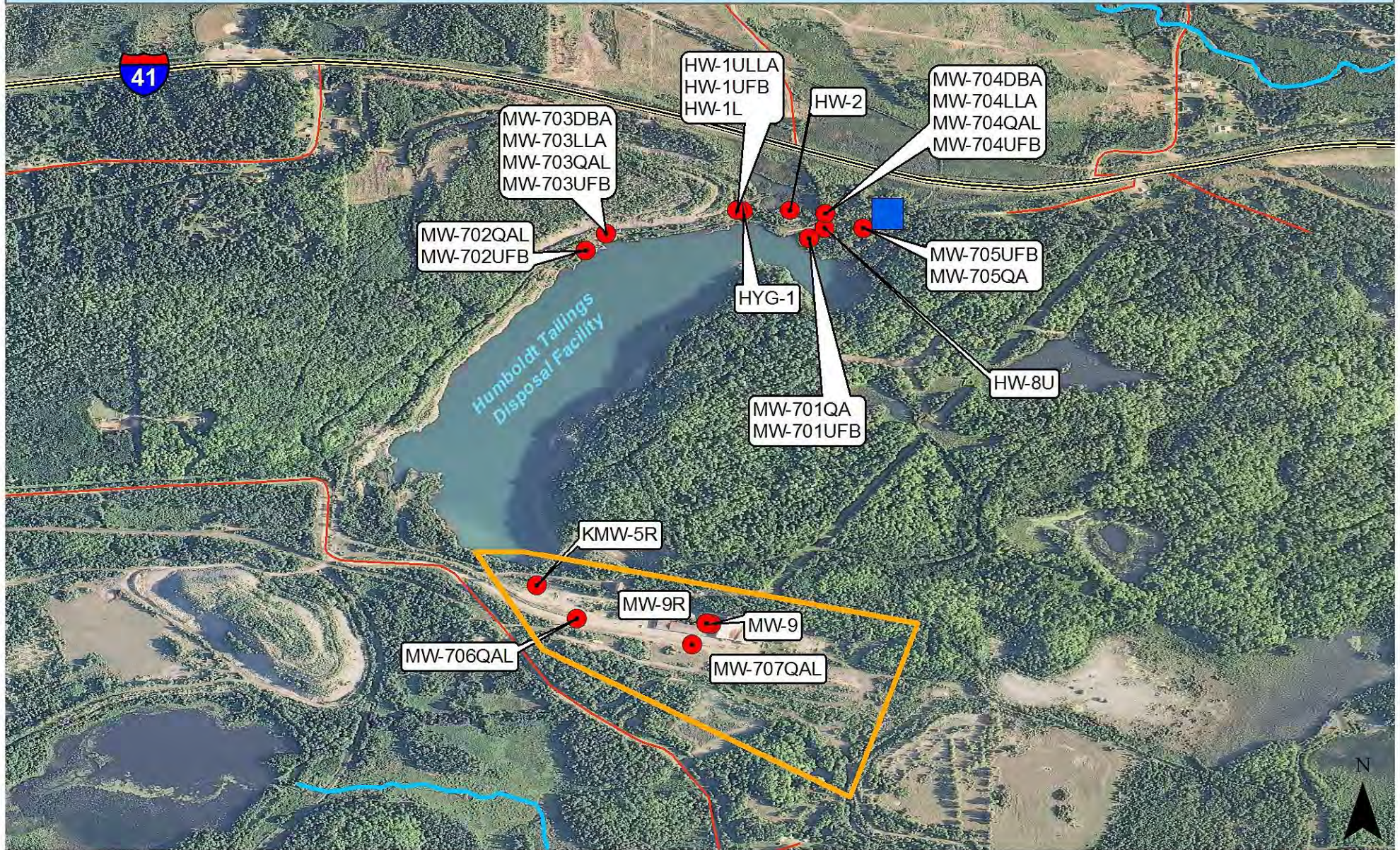
Data provided by Eagle Mine and North Jackson Company  
Projection & Datum: UTM NAD 83 Zone 16N

**North Jackson Company**  
ENVIRONMENTAL SCIENCE & ENGINEERING

**Figure: 4**

Figure: 5

# Humboldt Mill Mine Permit Groundwater Monitoring Locations

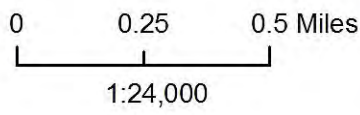
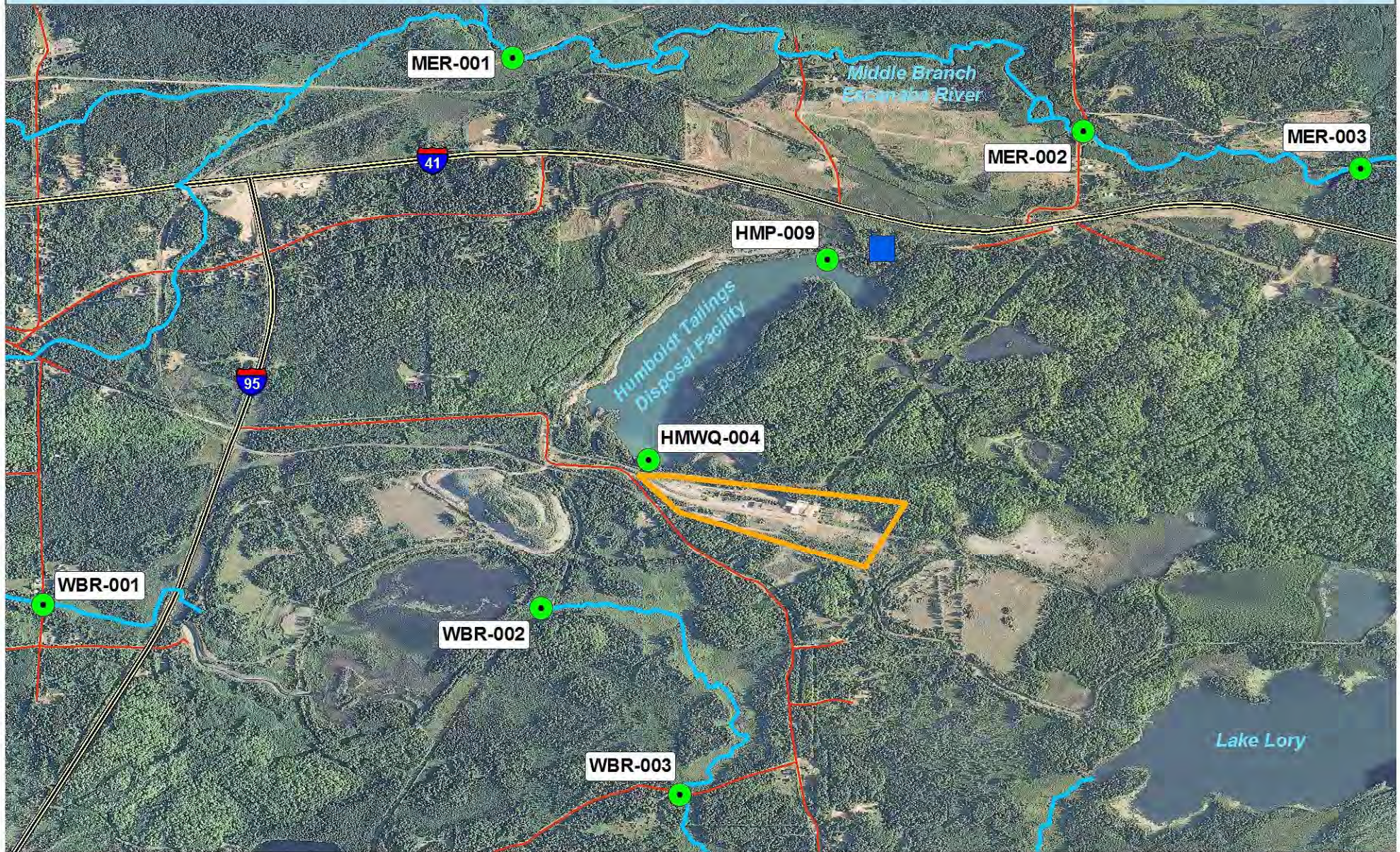


- All Roads
- River
- == State Roads
- Groundwater Monitoring Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 6

# Humboldt Mill Mine Permit Surface Water/Sediment Monitoring Locations



- All Roads
- River
- State Roads
- Surface Water/Sediment Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 7

# Plant Tissue Analysis

## Community Environmental Monitoring Program

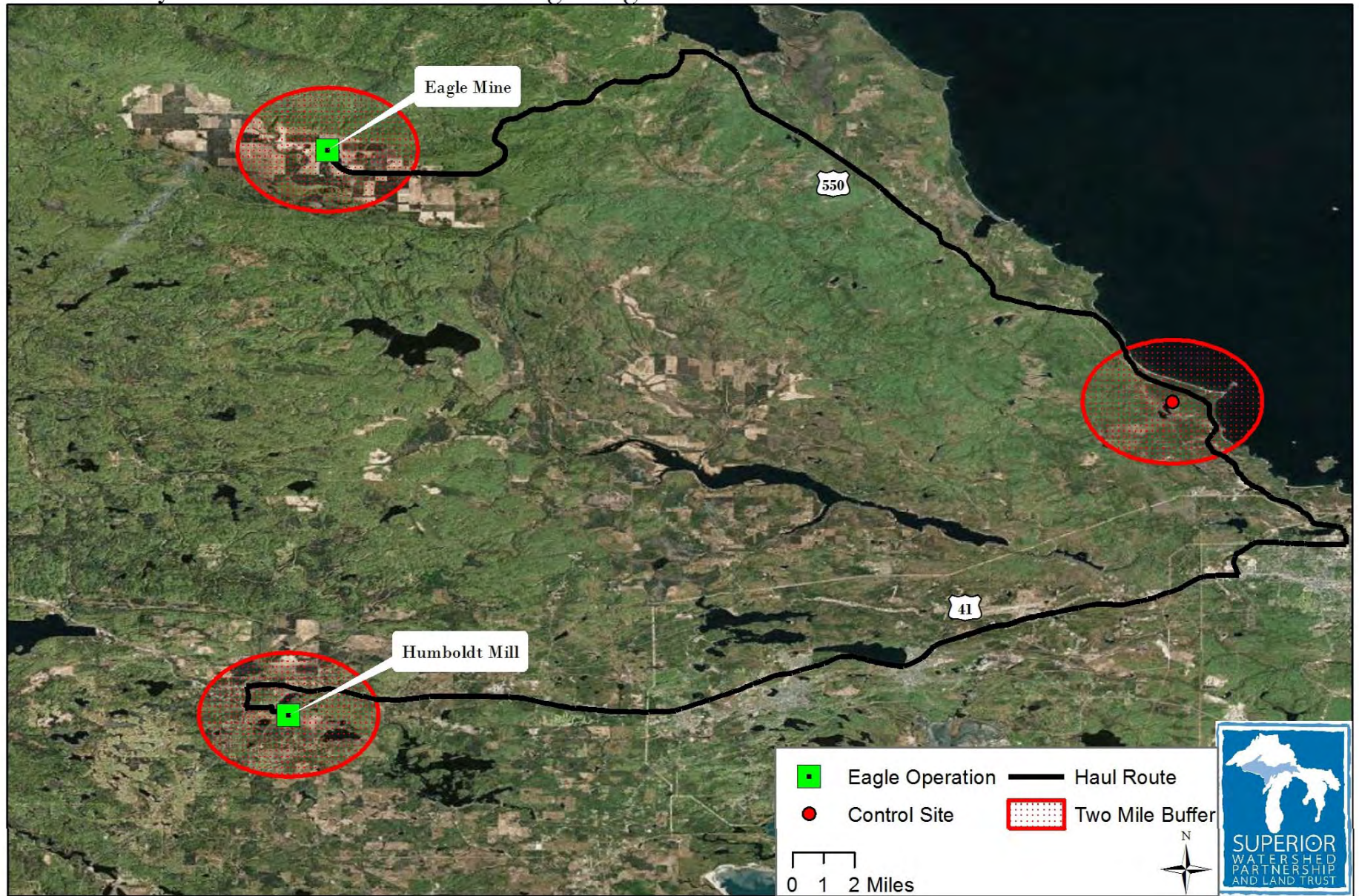





Figure 8

# CEMP New Groundwater Well Location



-  CEMP New Groundwater Well Location
-  River
-  Quarter section lines

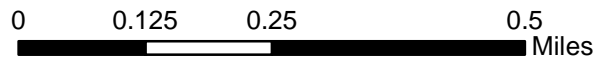
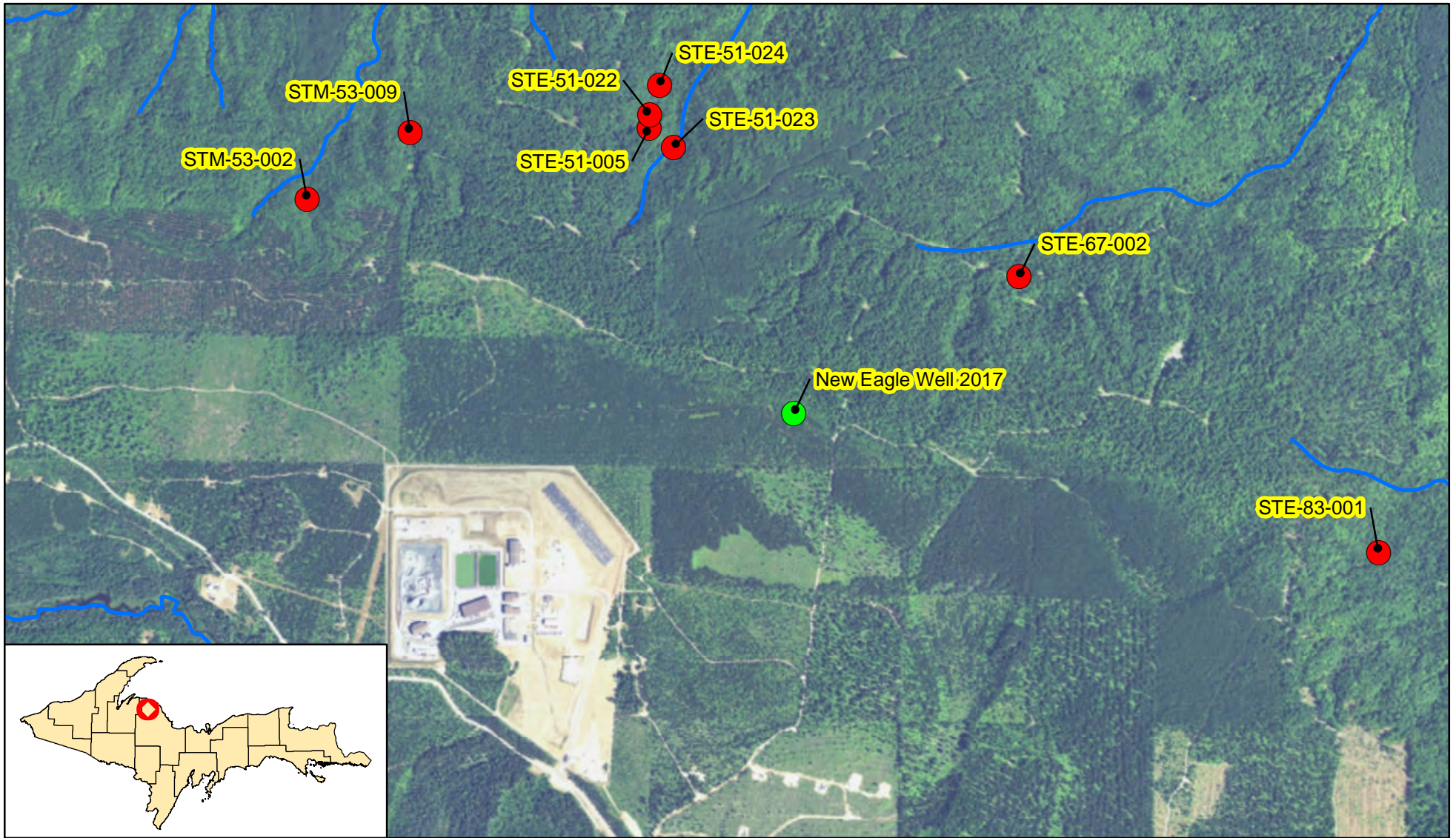


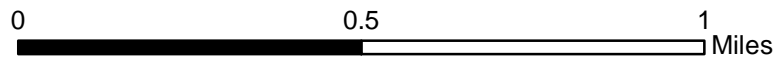


Figure 9

# CEMP Seep Monitoring Locations



- CEMP Seep Monitoring Locations (8)
- Eagle East new Well 2017
- Streams



**Table 1.  
Summary of 2019 Annual Monitoring Objectives**

<b>WORK PLAN TASK</b>	<b>SITE(S)</b>	<b>PARAMETERS</b>	<b>STANDARDS</b>	<b>PERIOD</b>	<b>FREQUENCY</b>
<b>Verification Monitoring and Data Review</b>					
Baseline Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of pre-mining data (groundwater, surface water, air, aquatics, and flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected prior to September 2011, Mill data through September 2014	Ongoing
Operations Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of operations data (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected after September 2011, Mill data collected after September 2014	Ongoing, based on Eagle Mine scheduled monitoring
Procedures Review/Observations	Permit compliance and background monitoring sites (Mine and Mill)	Review of procedures and field data collection (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2019	Ongoing, based on Eagle Mine scheduled monitoring
Interpretation Review	Permit compliance and background monitoring sites (Mine and Mill)	Interpretation of results: groundwater, surface water, and facilities wastewater (quantity, elevation, flow, and quality)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2019	Ongoing, based on Eagle Mine scheduled monitoring
Split Sampling	Permit compliance and background monitoring sites (Mine and Mill)	Groundwater, surface water, and facilities wastewater quality	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2019	Ongoing, based on Eagle Mine scheduled monitoring
<b>Additional Monitoring</b>					
Powell Township Air Quality	Stationary Air/Meteorological Station in Big Bay	PM10, metals analysis; wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels	2012-2019	Continuous (PM10 and meteorological data) and Quarterly (Metals)
Edible/Traditional Plant Study	Eagle Mine, Humboldt Mill, and Control Area	Metals analysis plant tissue and fruit	US Environmental Protection Agency's (US EPA) oral tolerable intake values (TDI) and the Food and Drug Administration's (FDA) recommended Daily Values (DV)	2015-2019	Annually
New Groundwater Monitoring Well	Eagle Mine - between TWIS and Salmon Trout River	Groundwater quality	Comparison with Eagle Mine Part 632 Mining Permit and Groundwater Discharge Permit Monitoring Sites	2017-2019	Quarterly

**Table 1.  
Summary of 2019 Annual Monitoring Objectives**

<b>WORK PLAN TASK</b>	<b>SITE(S)</b>	<b>PARAMETERS</b>	<b>STANDARDS</b>	<b>PERIOD</b>	<b>FREQUENCY</b>
Salmon Trout River Headwaters "Seep" Monitoring	North of Eagle Mine - 8 sites formerly monitored by KBIC/USGS	Groundwater quality	Comparison with Eagle Mine Part 632 Mining Permit and Groundwater Discharge Permit Monitoring Sites	2017-2019	Quarterly
Other Based on Community Input, Results and/or New Activities	Sites (TBD) near Eagle Mine, Humboldt Mill, Transportation Route, and exploration sites	TBD	TBD	2019	TBD
<b>Monitoring Results and Performance Ratings</b>					
Data Processing/Publication	N/A	Process results from CEMP/Eagle Mine Monitoring; post summaries of results on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2019	Quarterly
Performance Ratings	N/A	Report Card ratings of environmental performance on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2019	Quarterly
<b>Community Outreach</b>					
Public Outreach Activities	N/A	CEMP website, local news/media, email updates, social media, CEMP hotline, etc.	CEMP Agreement and Notification Plan	2019	Ongoing

**Table 2**  
**Summary of Permit Required “Split Sampling” Monitoring Sites at**  
**Eagle Mine and the Humboldt Mill**

<b>Monitoring Location/Type</b>	<b>Data Range (years)</b>	<b>Permit</b>	<b>Frequency</b>	<b>Number of Monitoring Sites</b>	<b>2019 CEMP Samples/Year</b>
<b>EAGLE MINE</b>					
Surface Water	2002-2018	Mine Permit	Quarterly	11	8
Groundwater	2011-2018	Mine Permit	Quarterly	24 (10 background and 14 compliance)	8
Facilities: Temporary Development Rock Storage Area (TDRSA) Contact Water Sump and Leak Detection Sump, Contact Water Basins/WTP Influent	2012-2018	Mine Permit	Quarterly (Varies)	4	4
Facilities: Water Treatment Facility Effluent	2012-2018	Groundwater Discharge Permit	Weekly	2	4
Groundwater	2008-2018	Groundwater Discharge Permit	Quarterly	15 (7 background and 8 compliance)	8
<b>Total Eagle Mine</b>				<b>55</b>	<b>32</b>

Monitoring Location/Type	Data Range (years)	Permit	Frequency	Number of Monitoring Sites	2019 CEMP Samples/Year
<b>HUMBOLDT MILL</b>					
Groundwater	2014-2018	Mine Permit	Quarterly	23	8
Surface Water	2014-2018	Mine Permit	Quarterly	8	8
Facilities: Water Treatment Facility	2014-2018	Surface Water Discharge Permit	Monthly	2	8
<b>Total Humboldt Mill</b>				<b>35</b>	<b>24</b>

### 2019 Additional Monitoring

- Powell Township Air Station Metals: 1 sample/quarter = 3 samples/year.
- Berry Study (Year 4): Mine, Mill, Control = 10 tissue/berry samples/year. Note: additional sites may be added.
- CEMP Groundwater Well at Eagle Mine: 1 samples per quarter = 4 water samples/year.
- Salmon Trout River Headwaters “Seep” Monitoring (Year 2): 8 samples three times per year = 24 samples/year.
- Additional monitoring TDB

**Total Additional Monitoring: 41 samples/year**

**Table 3**  
**Eagle Mine - Mine Permit Surface Water Monitoring**  
**Parameters, Frequency, Analytical Method and Laboratory Reporting Limits**

		White Water Associates Laboratory			
Parameters	Eagle Frequency	Analytical Method <sup>1</sup>	Limit of Detection (LOD)	Units	Unit Price
<b>Field</b>					
Temperature	Quarterly	Field	na	°C	-
Dissolved Oxygen	Quarterly	Field	na	mg/L	-
Flow	Quarterly	Field	na	cfs	-
pH	Quarterly	Field	na	SU	-
Specific Conductance	Quarterly	Field	na	umhos/cm	-
<b>Anions</b>					
Alkalinity, Bicarbonate	Annual	310.2	2	mg/L	\$12
Alkalinity Carbonate	Annual	310.2	2	mg/L	\$12
Chloride	Annual	4500-Cl- E	3	mg/L	\$12
Flouride	Annual	300.0	0.017	mg/L	\$25
Nitrate Nitrogen	Annual	4500-NO3-	0.1	mg/L	\$15
Sulfate	Quarterly	4500-SO4-	2.5	mg/L	\$15
<b>Cations</b>					
Calcium	Annual	200.7	0.03	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
Sodium	Annual	200.7	0.15	mg/L	\$10
<b>General</b>					
Total Dissolved Solids	Quarterly	2540C	10	mg/L	\$12
<b>Metals</b>					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadmium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Quarterly	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	Quarterly	200.7	0.2	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10

**Table 4**  
**Eagle Mine - Mine Permit Groundwater Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Eagle Frequency of Analysis	White Water Associates Laboratory			
		White Water Associates Analytical Method	Limit of Detection (LOD)	Units	Unit Price
<b>Field</b>					
Static Water Elevation	Quarterly	Field	--	ft/msl	-
Redox	Quarterly	Field	--	meV	-
Temperature	Quarterly	Field	--	°C	-
Dissolved Oxygen	Quarterly	Field	--	mg/L	-
pH	Quarterly	Field	--	su	-
Specific Conductance	Quarterly	Field	--	umhos/cm	-
<b>Anions</b>					
Alkalinity, Bicarbonate	Quarterly	310.2	2.0	mg/L	\$12
Alkalinity Carbonate	Quarterly	310.2	2.0	mg/L	\$12
Nitrate Nitrogen	Quarterly	4500-NO3- F	0.100	mg/L	\$15
Sulfate	Quarterly	4500-SO4- E	2.5	mg/L	\$15
Flouride	Annual	300.0	0.017	mg/L	\$25
Chloride	Quarterly	4500-Cl- E	3	mg/L	\$12
<b>Cations</b>					
Calcium	Annual	200.7	0.03	mg/L	\$10
Sodium	Quarterly	200.7	0.15	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
<b>Metals</b>					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadmium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Annual	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	200.7	0.2	ug/L	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Annual	200.7	0.2	ug/L	\$10
Thallium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Vanadium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10

**Table 5**  
**Eagle Mine - Mine Permit Facilities (TDRSA and CWB) Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

		White Water Associates Laboratory			
Parameters	Eagle Frequency of Analysis	Analytical Method <sup>1</sup>	Limit of Detection (LOD)	Units	Unit Price
<b>Field</b>					
pH	Quarterly	Field	--	su	-
Specific Conductance	Quarterly	Field	--	umhos/cm	-
<b>Metals</b>					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Annual	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	Quarterly	200.7	0.2	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Annual	200.7	0.2	ug/L	\$10
Thallium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Vanadium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10
<b>Major Anions</b>					
Alkalinity, Bicarbonate	Quarterly	310.2	2	mg/L	\$12
Alkalinity Carbonate	Quarterly	310.2	2	mg/L	\$12
Chloride	Quarterly	4500-Cl- E	3	mg/L	\$12
Flouride	Annual	300.0	0.017	mg/L	\$25
Nitrogen, Ammonia	Quarterly	350.1	0.2	mg/L	\$15
Nitrogen, Nitrate	Quarterly	4500-NO3- F	0.1	mg/L	\$15
Nitrogen, Nitrite	Quarterly	4500-NO3- F	0.01	mg/L	\$15
Sulfate	Quarterly	4500-SO4- E	2.5	mg/L	\$15
<b>Major Cations</b>					
Calcium	Annual	200.7	0.03	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
Sodium	Annual	200.7	0.15	mg/L	\$10



**Table 6**  
**Eagle Mine - Groundwater Discharge Permit WTP Effluent Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Eagle Frequency of Analysis	White Water Associates Laboratory			
		Analytical Method <sup>1</sup>	Limit of Detection (LOD)	Units	Unit Price
pH (Minimum)	Continuous Measurement	-	-	SU	-
pH (Maximum)	Continuous Measurement	-	-	SU	-
Dissolved Oxygen	Weekly	-	-	mg/l	-
Specific Conductance	Continuous Measurement	-	-	umhos/cm	-
Influent Flow	Daily	-	-	GPD	-
Effluent Flow	Daily	-	-	GPD	-
Biochemical Oxygen	Weekly	-	-	mg/l	-
Ammonia Nitrogen	Weekly	350.1	0.2	mg/L	\$15
Nitrate Nitrogen	Weekly	4500-NO3- F	0.1	mg/L	\$15
Nitrite Nitrogen	Weekly	4500-NO3- F	0.01	mg/L	\$15
Total Phosphorus	Weekly	4500-P	0.01	mg/L	\$15
Total Aluminum	Weekly	200.7	50	ug/L	\$10
Total Antimony	Weekly	200.8/6020	0.1	ug/L	\$10
Total Arsenic	Weekly	200.8/6020	0.17/0.17	ug/L	\$10
Total Barium	Weekly	200.7	0.3	ug/L	\$10
Total Beryllium	Weekly	200.7	0.2	ug/L	\$10
Total Boron	Weekly	200.7	20	ug/L	\$10
Total Cadmium	Weekly	200.8/6020	0.10/0.10	ug/L	\$10
Total Chloride	Weekly	4500-Cl- E	3	mg/L	\$12
Total Chromium	Weekly	200.7	0.6	ug/L	\$10
Total Cobalt	Weekly	200.7	2	ug/L	\$10
Total Copper	Weekly	200.7	1	ug/L	\$10
Total Fluoride	Weekly	300.0	0.017	mg/L	\$25
Total Iron	Weekly	200.7	10	ug/L	\$10
Total Lead	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Lithium	Weekly	200.7	6	ug/L	\$10
Total Manganese	Weekly	200.7	0.2	ug/L	\$10
Total Mercury	Weekly	1631E	0.1	ng/L	\$110
Total Molybdenum	Weekly	200.7	3	ug/L	\$10
Total Nickel	Weekly	200.7	2	ug/L	\$10
Total Potassium	Weekly	200.7	0.12	mg/L	\$10
Total Selenium	Weekly	200.8/6020	1.4/0.5	ug/L	\$10
Total Silver	Weekly	200.8/6020	0.2 /0.2	ug/L	\$10
Total Sodium	Weekly	200.7	0.15	mg/L	\$10
Total Strontium	Weekly	200.7	0.2	ug/L	\$10
Total Sulfate	Weekly	4500-SO4- E	2.5	mg/L	\$15
Total Thallium	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Uranium	Weekly	200.8	0.0007	ug/L	\$45
Total Vanadium	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Zinc	Weekly	200.7	10	ug/L	\$10

**Table 7**  
**Eagle Mine - Groundwater Discharge Permit Groundwater Monitoring**  
**Parameters, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Eagle			White Water Associates Laboratory			
	Frequency of Analysis	Maximum Daily Limit	Unit	Analytical Method	Limit of Detection (LOD)	Units	Unit Price
<b>Field</b>							
Static Water Elevation	Quarterly	Report	USGS-Ft	Field		USGS-Ft	-
Dissolved Oxygen	Quarterly	Report	mg/l	Field		mg/l	-
pH (Minimum)	Quarterly	6.5	S.U.	Field		S.U.	-
pH (Maximum)	Quarterly	9.7	S.U.	Field		S.U.	-
Specific Conductance	Quarterly	Report	umhos/cm	Field		umhos/cm	-
<b>Anions</b>							
Bicarbonate Alkalinity	Quarterly	Report	mg/l	310.2	2	mg/L	\$12
Chloride	Quarterly	Report	mg/l	4500-Cl- E	3	mg/L	\$12
Ammonia Nitrogen	Quarterly	10.0	mg/l	350.1	0.2	mg/L	\$15
Nitrate Nitrogen	Quarterly	10.0	mg/l	4500-NO3- F	0.1	mg/L	\$15
Nitrite Nitrogen	Quarterly	Report	mg/l	4500-NO3- F	0.01	mg/L	\$15
Total Phosphorus	Quarterly	Report	mg/l	4500-P	0.01	mg/L	\$15
Sulfate	Quarterly	250	mg/l	4500-SO4- E	2.5	mg/L	\$15
<b>Cations</b>							
Calcium	Quarterly	Report	mg/l	200.7	0.03	mg/L	\$10
Sodium	Quarterly	Report	mg/l	200.7	0.15	mg/L	\$10
Magnesium	Quarterly	Report	mg/l	200.7	0.04	mg/L	\$10
Potassium	Quarterly	Report	mg/l	200.7	0.12	mg/L	\$10
<b>Metals</b>							
Aluminum	Quarterly	150	ug/l	200.7	50	ug/L	\$10
Antimony	Quarterly	5.0	ug/l	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	6.0	ug/l	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Quarterly	1000	ug/l	200.7	0.3	ug/L	\$10
Beryllium	Quarterly	3	ug/l	200.7	0.2	ug/L	\$10
Boron	Quarterly	285	ug/l	200.7	20	ug/L	\$10
Cadium	Quarterly	3.0	ug/l	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Quarterly	52	ug/l	200.7	0.6	ug/L	\$10
Cobalt	Quarterly	23	ug/l	200.7	2	ug/L	\$10
Copper	Quarterly	10	ug/l	200.7	1	ug/L	\$10
Fluoride, Total	Quarterly	1000	ug/l	300.0	0.017	mg/L	\$25
Iron	Quarterly	Report	ug/l	200.7	10	ug/L	\$10
Lead	Quarterly	3.0	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Quarterly	88	ug/l	200.7	6	ug/L	\$10
Manganese	Quarterly	50	ug/l	200.7	0.2	ug/L	\$10
Mercury	Quarterly	Report	ug/l	1631E	0.1	ng/L	\$110
Molybdenum	Quarterly	22	ug/l	200.7	3	ug/L	\$10
Nickel	Quarterly	57	ug/l	200.7	2	ug/L	\$10
Selenium	Quarterly	5.0	ug/l	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Quarterly	0.4	ug/l	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Quarterly	2300	ug/l	200.7	0.2	ug/L	\$10
Thallium	Quarterly	1	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Uranium	Quarterly	Report	ug/l	200.8	0.0007	ug/L	\$45
Vanadium	Quarterly	3.1*	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	1200	ug/l	200.7	10	ug/L	\$10

\* MWs QAL008A, QA1051A are report only for vanadium

**Table 8**  
**Humboldt Mill - Mine Permit Groundwater Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Eagle		White Water Associates Laboratory		
	Frequency of Analysis	Sample Type	Analytical Method	Limit of Detection (LOD)	Units
<b>Field</b>					
Static Water Elevation	Quarterly	Measured	Field	NA	ft/msl
ORP	Quarterly	Measured	Field	NA	mV
Temperature	Quarterly	Measured	Field	NA	°C
Dissolved Oxygen	Quarterly	Measured	Field	NA	ppm
pH	Quarterly	Grab	Field	NA	SU
Turbidity	Quarterly	Grab	Field	NA	NTU
Specific Conductance	Quarterly	Grab	Field	--	umhos/cm
<b>Anions</b>					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2	2	mg/L
Alkalinity Carbonate	Quarterly	Grab	310.2	2	mg/L
Chloride	Quarterly	Grab	4500-Cl- E	3	mg/L
Fluoride	Quarterly	Grab	300.0	0.017	mg/L
Nitrogen, Ammonia	Quarterly	Grab	350.1	0.2	mg/L
Nitrate Nitrogen	Quarterly	Grab	4500-NO3- F	0.1	mg/L
Nitrite Nitrogen	Quarterly	Grab	4500-NO3- F	0.01	mg/L
Sulfate	Quarterly	Grab	4500-SO4- E	2.5	mg/L
Sulfide	Quarterly	Grab	376.1	0.67	mg/L
<b>Cations</b>					
Calcium	Quarterly	Grab	200.7	0.03	mg/L
Sodium	Quarterly	Grab	200.7	0.15	mg/L
Magnesium	Quarterly	Grab	200.7	0.04	mg/L
Potassium	Quarterly	Grab	200.7	0.12	mg/L
<b>General</b>					
Hardness	Quarterly	Grab	2340B	0.3	mg/L
<b>Metals</b>					
Aluminum	Annual	Grab	200.7	50	ug/L
Antimony	Annual	Grab	200.8/6020	0.1	ug/L
Arsenic	Quarterly	Grab	200.8/6020	0.17/0.17	ug/L
Barium	Annual	Grab	200.7	0.3	ug/L
Beryllium	Annual	Grab	200.7	0.2	ug/L
Boron	Annual	Grab	200.7	20	ug/L
Cadium	Annual	Grab	200.8/6020	0.10/0.10	ug/L
Chromium	Annual	Grab	200.7	0.6	ug/L
Cobalt	Annual	Grab	200.7	2	ug/L
Copper	Quarterly	Grab	200.7	1	ug/L
Iron	Quarterly	Grab	200.7	10	ug/L
Lead	Quarterly	Grab	200.8/6020	0.3/0.3	ug/L
Lithium	Annual	Grab	200.7	6	ug/L
Manganese	Quarterly	Grab	200.7	0.2	ug/L
Mercury	Quarterly	Grab	1631E	0.1	ng/L
Molybdenum	Annual	Grab	200.7	3	ug/L
Nickel	Quarterly	Grab	200.7	2	ug/L
Selenium	Annual	Grab	200.8/6020	1.4/0.5	ug/L
Silver	Annual	Grab	200.8/6020	0.2 /0.2	ug/L
Thallium	Annual	Grab	200.8/6020	0.3/0.3	ug/L
Vanadium	Annual	Grab	200.8/6020	0.3/0.3	ug/L
Zinc	Quarterly	Grab	200.7	10	ug/L

**Table 9**  
**Humboldt Mill - Mine Permit Surface Water Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

Parameter	Eagle		White Water Associates Laboratory		
	Frequency of Analysis	Sample Type	Analytical Method	Limit of Detection (LOD)	Units
<b>Field</b>					
Flow	Quarterly	Grab	Field	NA	cfs
Temperature	Quarterly	Grab	Field	NA	°C
Dissolved Oxygen	Quarterly	Grab	Field	NA	mg/L
Specific Conductance	Quarterly	Grab	Field	NA	µmhos/cm
pH	Quarterly	Grab	Field	NA	S.U.
ORP	Quarterly	Grab	Field	NA	mV
Turbidity	Quarterly	Grab	Field	NA	NTU
<b>Metals</b>					
Aluminum	Annually	Grab	200.7	50	ug/L
Antimony	Annually	Grab	200.8/6020	0.1	ug/L
Arsenic	Quarterly	Grab	200.8/6020	0.17/0.17	ug/L
Barium	Annually	Grab	200.7	0.3	ug/L
Beryllium	Annually	Grab	200.7	0.2	ug/L
Boron	Annually	Grab	200.7	20	ug/L
Cadmium	Annually	Grab	200.8/6020	0.10/0.10	ug/L
Chromium	Annually	Grab	200.7	0.6	ug/L
Cobalt	Annually	Grab	200.7	2	ug/L
Copper	Quarterly	Grab	200.7	1	ug/L
Iron	Quarterly	Grab	200.7	10	ug/L
Lead	Quarterly	Grab	200.8/6020	0.3/0.3	ug/L
Lithium	Annually	Grab	200.7	6	ug/L
Manganese	Quarterly	Grab	200.7	0.2	ug/L
Mercury (low level)	Quarterly	Grab	1631E	0.1	ng/L
Molybdenum	Annually	Grab	200.7	3	ug/L
Nickel	Quarterly	Grab	200.7	2	ug/L
Selenium	Annually	Grab	200.8/6020	1.4/0.5	ug/L
Silver	Annually	Grab	200.8/6020	0.2/0.2	ug/L
Thallium	Annually	Grab	200.8/6020	0.3/0.3	ug/L
Uranium			200.8	0.0007	ug/L
Vanadium	Annually	Grab	200.8/6020	0.3/0.3	ug/L
Zinc	Quarterly	Grab	200.7	10	ug/L
<b>Anions</b>					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2	2	mg/L
Alkalinity, Carbonate	Quarterly	Grab	310.2	2	mg/L
Chloride	Quarterly	Grab	4500-Cl- E	3	mg/L
Fluoride	Quarterly	Grab	300.0	0.017	mg/L
Nitrate	Quarterly	Grab	4500-NO3- F	0.1	mg/L
Nitrite	Quarterly	Grab	4500-NO3- F	0.01	mg/L
Nitrogen, Ammonia	Quarterly	Grab	350.1	0.2	mg/L
Sulfate	Quarterly	Grab	4500-SO4- E	2.5	mg/L
Sulfide	Quarterly	Grab	376.1	0.67	mg/L
<b>Cations</b>					
Calcium (Total)	Quarterly	Grab	200.7	0.03	mg/L
Sodium (Total)	Quarterly	Grab	200.7	0.15	mg/L
Magnesium (Total)	Quarterly	Grab	200.7	0.04	mg/L
Potassium	Quarterly	Grab	200.7	0.12	mg/L
<b>General Chemistry</b>					
Hardness	Quarterly	Grab	2340B	0.3	mg/L
Total Dissolved Solids	Quarterly	Grab	2540C	10	mg/L
Total Suspended Solids	Quarterly	Grab	2540D	1	mg/L

**Table 10**  
**Humboldt Mill - NPDES Permit Water Treatment Plant Effluent Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

WTP Effluent	Eagle		White Water Associates Laboratory		
	Frequency of Analysis	Sample Type	Analytical Methods	Limit of Detection (LOD)	Units
<b>Field</b>					
Dissolved Oxygen	Daily	Grab	Field	NA	mg/l
Outfall Observation	Daily	Grab	Field	-	-
pH	Daily	Grab	Field	NA	SU
Temperature	Continuous	Grab	Field	NA	°C
<b>Other</b>					
Acute Toxicity	Monthly	Grab	-	-	-
Biochemical Oxygen Demand (BOD)	2 x Month	Grab	5210B	5210B	mg/L
Chronic Toxicity	Monthly	Grab	-	-	-
Total Dissolved Solids	Weekly	Grab	2540C	2540C	mg/L
Total Hardness	Monthly	Grab	2340B	0.3	mg/L
Total Suspended Solids	Weekly	Grab	2540D	1	mg/L
<b>Anions</b>					
Alkalinity (Bicarb and Carb)		Grab	310.2	2	mg/L
Ammonia Nitrogen	2 x Month	Grab	350.1	0.2	mg/L
Available Cyanide	Weekly	Grab	-	-	-
Chloride		Grab	4500-CL-E	3	mg/L
Fluoride	2 x Month	Grab	300.0	0.017	mg/L
Nitrate		Grab	4500-NO3- F	0.1	mg/L
Sulfate	Weekly	Grab	4500-SO4- E	2.5	mg/L
Total Phosphorus	Weekly	Grab	4500-P	0.01	mg/L
Total Residual Chlorine	Daily	Grab	-	-	-
<b>Metals</b>					
Total Aluminum		Grab	200.7	50	ug/L
Total Antimony	2 x Month	Grab	200.8/6020	0.1	ug/L
Total Arsenic	Weekly	Grab	200.8/6020	0.17/0.17	ug/L
Total Barium	2 x Month	Grab	200.7	0.3	ug/L
Total Beryllium		Grab	200.7	0.2	ug/L
Total Boron	2 x Month	Grab	200.7	20	ug/L
Total Cadmium	Weekly	Grab	200.8/6020	0.10/0.10	ug/L
Total Chromium	2 x Month	Grab	200.7	0.6	ug/L
Total Cobalt	Weekly	Grab	200.7	2	ug/L
Total Copper	Weekly	Grab	200.7	1	ug/L
Total Iron		Grab	200.7	1,000	ug/L
Total Lead	Weekly	Grab	200.8/6020	0.3/0.3	ug/L
Total Lithium	2 x Month	Grab	200.7	6	ug/L
Total Manganese	Weekly	Grab	200.7	0.2	ug/L
Total Mercury	Weekly	Grab	1631E	0.1	ng/L
Total Molybdenum	2 x Month	Grab	200.7	3	ug/L
Total Nickel	Weekly	Grab	200.7	2	ug/L
Total Selenium	Weekly	Grab	200.8/6020	1.4/0.5	ug/L
Total Silver		Grab	200.8/6020	0.2	ug/L
Total Strontium	2 x Month	Grab	200.7	0.2	ug/L
Total Thallium		Grab	200.8/6020	0.3	ug/L
Total Vanadium		Grab	200.8/6020	0.3	ug/L
Total Zinc	Weekly	Grab	200.7	10	ug/L

Orange shading indicates additional parameters added by CEMP

**Table 10**  
**Humboldt Mill - NPDES Permit Water Treatment Plant Effluent Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

	Eagle		White Water Associates Laboratory		
WTP Effluent	Frequency of Analysis	Sample Type	Analytical Methods	Limit of Detection (LOD)	Units
<b>Field</b>					
Dissolved Oxygen	Daily	Grab	Field	NA	mg/l
Outfall Observation	Daily	Grab	Field	-	-
pH	Daily	Grab	Field	NA	SU
Temperature	Continuous	Grab	Field	NA	°C
<b>Other</b>					
Acute Toxicity	Monthly	Grab	-	-	-
Biochemical Oxygen Demand (BOD)	2 x Month	Grab	5210B	5210B	2
Chronic Toxicity	Monthly	Grab	-	-	-
Total Dissolved Solids	Weekly	Grab	2540C	2540C	10
Total Hardness	Monthly	Grab	2340B	0.3	mg/L
Total Suspended Solids	Weekly	Grab	2540D	1	mg/L
<b>Anions</b>					
Alkalinity (Bicarb and Carb)		Grab	310.2	2	mg/L
Ammonia Nitrogen	2 x Month	Grab	350.1	0.2	mg/L
Available Cyanide	Weekly	Grab	-	-	-
Chloride		Grab	4500-CL-E	3	mg/L
Fluoride	2 x Month	Grab	300.0	0.017	mg/L
Nitrate		Grab	4500-NO3- F	0.1	mg/L
Sulfate	Weekly	Grab	4500-SO4- E	2.5	mg/L
Total Phosphorus	Weekly	Grab	4500-P	0.01	mg/L
Total Residual Chlorine	Daily	Grab	-	-	-
<b>Metals</b>					
Total Aluminum		Grab	200.7	50	ug/L
Total Antimony	2 x Month	Grab	200.8/6020	0.1	ug/L
Total Arsenic	Weekly	Grab	200.8/6020	0.17/0.17	ug/L
Total Barium	2 x Month	Grab	200.7	0.3	ug/L
Total Beryllium		Grab	200.7	0.2	ug/L
Total Boron	2 x Month	Grab	200.7	20	ug/L
Total Cadmium	Weekly	Grab	200.8/6020	0.10/0.10	ug/L
Total Chromium	2 x Month	Grab	200.7	0.6	ug/L
Total Cobalt	Weekly	Grab	200.7	2	ug/L
Total Copper	Weekly	Grab	200.7	1	ug/L
Total Iron		Grab	200.7	1,000	ug/L
Total Lead	Weekly	Grab	200.8/6020	0.3/0.3	ug/L
Total Lithium	2 x Month	Grab	200.7	6	ug/L
Total Manganese	Weekly	Grab	200.7	0.2	ug/L
Total Mercury	Weekly	Grab	1631E	0.1	ng/L
Total Molybdenum	2 x Month	Grab	200.7	3	ug/L
Total Nickel	Weekly	Grab	200.7	2	ug/L
Total Selenium	Weekly	Grab	200.8/6020	1.4/0.5	ug/L
Total Silver		Grab	200.8/6020	0.2	ug/L
Total Strontium	2 x Month	Grab	200.7	0.2	ug/L
Total Thallium		Grab	200.8/6020	0.3	ug/L
Total Vanadium		Grab	200.8/6020	0.3	ug/L
Total Zinc	Weekly	Grab	200.7	10	ug/L

**Table 11**  
**Powell Township Air Station – Air Metals Monitoring**  
**Parameters, Analytical Methods, and Laboratory Reporting Limits**

Eastern Research Group  
 601 Keystone Park Drive  
 Suite 700  
 Morrisville, NC 27560



**2013 Metals MDL - Compendium Method IO-3.5**

Element	47 mm Teflon		8x10" Quartz	
	ng/filter	ng/m3 (assuming 24.04m3)	ng/filter	ng/m3 (assuming 2000 m3)
Aluminum	1481	61.6	41816	20.9
Antimony	1.14	0.048	30.0	0.015
Arsenic	4.77	0.198	140	0.070
Barium	3.14	0.130	5839	2.92
Beryllium	0.374	0.016	5.17	0.003
Cadmium	0.340	0.014	19.4	0.010
Calcium	2539	106	394287	197
Chromium	408	17.0	4912	2.46
Cobalt	0.560	0.023	31.4	0.016
Copper	10.2	0.424	2866	1.43
Iron	376	15.6	33496	16.7
Lead	2.44	0.102	241	0.121
Magnesium	193	8.05	79243	39.6
Manganese	3.25	0.135	260	0.130
Mercury	0.60	0.025	8.91	0.004
Molybdenum	2.44	0.102	278	0.139
Nickel	6.01	0.250	2481	1.24
Rubidium	0.241	0.010	22.4	0.011
Selenium	7.27	0.302	54.9	0.027
Strontium	2.02	0.084	475	0.238
Thallium	0.036	0.001	0.867	0.0004
Thorium	0.354	0.015	3.79	0.002
Uranium	0.020	0.001	11.6	0.006
Zinc	222	9.25	14372	7.19

**2013 Hexavalent Chromium MDL - ASTM D7614**

Element	ng/filter	ng/m3 (assuming 21.6 m3)
Hexavalent Chromium	0.0083	0.00384

**Table 12**  
**Parameters and Analytical Methods for Edible/Traditional Plant Tissue Monitoring**

<b>Parameter</b>	<b>Method</b>
Aluminum	200.7
Antimony	200.8/6020
Arsenic	200.8/6020
Barium	200.7
Beryllium	200.7
Boron	200.7
Cadmium	200.8/6020
Calcium	200.7
Chromium	200.7
Cobalt	200.7
Copper	200.7
Iron	200.7
Lead	200.8/6020
Lithium	200.7
Magnesium	200.7
Manganese	200.7
Mercury	245.1/7470A
Molybdenum	200.7
Nickel	200.7
Potassium	200.7
Selenium	200.8/6020
Sodium	200.7
Strontium	200.7
Thallium	200.8/6020
Vanadium	200.8/6020
Zinc	200.7
Ammonia	350.1
Nitrate/Nitrite Nitrogen	4500-NO3- F
Total Organic Nitrogen - TKN	351.2
Sulfate	4500-SO4- E
Sulfur	200.7
Total Phosphorus	4500-P
Uranium	200.8



**Table 13**  
**CEMP Groundwater Monitoring Well near Eagle Mine**  
**Parameters, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Analytical Method	Maximum Daily Limit	Units
<b>Field</b>				
Static Water Elevation	Quarterly	Field	Report	USGS-Ft
Dissolved Oxygen	Quarterly	Field	Report	mg/l
pH (Minimum)	Quarterly	Field	6.5	S.U.
pH (Maximum)	Quarterly	Field	9.7	S.U.
Specific Conductance	Quarterly	Field	Report	umhos/cm
<b>Anions</b>				
Bicarbonate	Quarterly	--	Report	mg/l
Chloride	Quarterly	--	Report	mg/l
Ammonia Nitrogen	Quarterly	--	10.0	mg/l
Nitrate Nitrogen	Quarterly	--	10.0	mg/l
Nitrite Nitrogen	Quarterly	--	Report	mg/l
Total Phosphorus	Quarterly	--	Report	mg/l
Sulfate	Quarterly	--	250	mg/l
<b>Cations</b>				
Calcium	Quarterly	--	Report	mg/l
Sodium	Quarterly	--	Report	mg/l
Magnesium	Quarterly	--	Report	mg/l
Potassium	Quarterly	--	Report	mg/l
<b>Metals</b>				
Aluminum	Quarterly	--	150	ug/l
Antimony	Quarterly	200.8/6020	5.0	ug/l
Arsenic	Quarterly	200.8/6020	6.0	ug/l
Barium	Quarterly	200.8/6020	1000	ug/l
Beryllium	Quarterly	200.8/6020	3	ug/l
Boron	Quarterly	200.8/6020	285	ug/l
Cadium	Quarterly	200.8/6020	3.0	ug/l
Chromium	Quarterly	200.8/6020	52	ug/l
Cobalt	Quarterly	200.8/6020	23	ug/l
Copper	Quarterly	200.8/6020	10	ug/l
Fluoride, Total	Quarterly	--	1000	ug/l
Iron	Quarterly	--	Report	ug/l
Lead	Quarterly	200.8/6020	3.0	ug/l
Lithium	Quarterly	200.8/6020	88	ug/l
Manganese	Quarterly	200.8/6020	50	ug/l
Mercury	Quarterly	1631/----	Report	ug/l
Molybdenum	Quarterly	200.8/6020	22	ug/l
Nickel	Quarterly	200.8/6020	57	ug/l
Selenium	Quarterly	200.8/6020	5.0	ug/l
Silver	Quarterly	200.8/6020	0.4	ug/l
Strontium	Quarterly	200.8/6020	2300	ug/l
Thallium	Quarterly	200.8/6020	1	ug/l
Uranium	Quarterly	--	Report	ug/l
Vanadium	Quarterly	200.8/6020	3.1*	ug/l
Zinc	Quarterly	200.8/6020	1200	ug/l

**Table 14**  
**CEMP Seeps**  
**Parameters and Analytical Methods**

Parameters	Frequency of Analysis	Analytical Method	Units
<b>Field</b>			
Dissolved Oxygen	Quarterly	Field	mg/l
pH	Quarterly	Field	S.U.
Specific Conductance	Quarterly	Field	umhos/cm
<b>Anions</b>			
Bicarbonate	Quarterly	--	mg/l
Chloride	Quarterly	--	mg/l
Nitrate Nitrogen	Quarterly	--	mg/l
Sulfate	Quarterly	--	mg/l
<b>Cations</b>			
Sodium	Quarterly	--	mg/l
<b>Metals (Dissolved)</b>			
Arsenic	Quarterly	200.8/6020	ug/l
Copper	Quarterly	200.8/6020	ug/l
Iron	Quarterly	--	ug/l
Mercury	Quarterly	1631/----	ug/l
Nickel	Quarterly	200.8/6020	ug/l
Uranium	Quarterly	--	ug/l
Vanadium	Quarterly	200.8/6020	ug/l
<b>Organic Carbon</b>			
Organic Carbon	Quarterly		

**Table 15**  
**Humboldt Mill - NPDES Permit Water Treatment Plant Influent Monitoring**

	Eagle		White Water Associates Laboratory		
WTP Influent		Sample Type	Analytical Methods	Limit of Detection (LOD)	Units
<b>Other</b>					
Total Dissolved Solids		Grab	2540C	2540C	10
Total Suspended Solids		Grab	2540D	1	mg/L
<b>Anions</b>					
Sulfate		Grab	4500-SO4- E	2.5	mg/L
<b>Metals</b>					
Total Cobalt		Grab	200.7	2	ug/L
Total Copper		Grab	200.7	1	ug/L
Total Manganese		Grab	200.7	0.2	ug/L
Total Mercury		Grab	1631E	0.1	ng/L
Total Nickel		Grab	200.7	2	ug/L
Total Selenium		Grab	200.8/6020	1.4/0.5	ug/L

Orange shading indicates additional parameters added by CEMP