



## Community Environmental Monitoring Program of Eagle Mine

### Summary of Transportation Route Surface Water and Air Quality Monitoring in the City of Marquette, Michigan

Environmental monitoring along the Eagle Mine ore transportation route includes collection of baseline water quality data at road stream crossing sites and air quality data (particulate matter) at established sites along the transportation route between Eagle Mine and the Humboldt Mill. The objective of the monitoring is to evaluate potential impacts to the environment from transportation of ore during mining operations. Data collected along the transportation route will be considered baseline through September 2014, when Eagle Mine began full operations and ore transport between the mine and the Humboldt Mill began. Data collected after September 2014 will be used to evaluate trends and potential impacts through the duration of mining operations. Standards and Methodologies for surface water and air quality monitoring along the transportation route are attached. This report provides a summary of initial baseline data collected within the City of Marquette.

#### *Surface Water Quality Monitoring*

The objective of surface water quality monitoring is to collect baseline data for evaluation of potential environmental impacts to surface waters from the transportation of ore during mining operations. During June and July 2014, baseline surface water quality monitoring was conducted at 28 sites including 5 sites in the Dead River Watershed in the City of Marquette (see Appendix A - Standards and Methodologies for Transportation Route Surface Water Quality Monitoring for a complete list of sites and monitoring parameters). Data gathered will be used to establish baseline surface water quality values and will be compared to the Michigan Surface Water Standards, Rule 57 reference values. Additional monitoring will be conducted once per year for at least three years after Eagle Mine commences maximum production levels. Results for sites located in the Dead River Watershed in the City of Marquette are provided in Table 1 and Table 2 below.



## Community Environmental Monitoring Program of Eagle Mine

Table 1. Surface Water Quality Results for Dead River Watershed - City of Marquette

| Stream/Road Crossing Name | Unknown Tributary to Dead River @ Wright Street | Backyard Creek @ Wright Street | Badger Creek @ Wright Street | Raney Creek @ Wright Street | Dead River @ CR 550* |
|---------------------------|---|--------------------------------|------------------------------|-----------------------------|----------------------|
| Water Quality Parameters  |   |                                |                              |                             |                      |
| Temperature (C)           | 11.54   | 12.34                          | 13.63                        | 13.04                       | 17.96                |
| pH (SU)                   | 7.87  | 7.84                           | 7.83                         | 7.58                        | 7.28                 |
| ORP                       | 76.8  | 286                            | 305                          | 303.4                       | 288.9                |
| Dissolved Oxygen (%)      | 86.4  | 82.1                           | 83.1                         | 75.7                        | 78.1                 |
| Conductivity ms/cm        | 442   | 436.3                          | 407.9                        | 417.8                       | 80.09                |
| Average Depth (ft)        | 0.25  | 0.47                           | 0.96                         | 0.35                        | 2.25                 |
| Average Width (ft)        | 4.65  | 7.2                            | 7.7                          | 4.35                        | 48.45                |
| Streamflow (ft/sec)       | 0.7   | 0.6                            | 1.7                          | 0.3                         | NA                   |
| Substrate Composition     | Cobble, Gravel, Sand                            | Gravel, Sand                   | Cobble, Gravel, Sand         | Sand, Organic Material      | Boulder, Cobble      |

\*See also CEMP Independent Laboratory Results for the Dead River at CR 550 (Table 2)



*CEMP Field Technician collecting a water sample to establish baseline surface water quality data for road stream crossing sites along the ore Transportation Route between Eagle Mine and the Humboldt Mill.*



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Table 2. Laboratory Surface Water Quality Results for the Dead River at County Road 550

Client Name: Superior Watershed Partnership & Land Trust

Report #: 320094

Sampling Point: HR-DR CEM-10010176

PWS ID: Not Supplied

| General Chemistry |                         |           |           |      |        |               |                  |                |          |
|-------------------|-------------------------|-----------|-----------|------|--------|---------------|------------------|----------------|----------|
| Analyte ID #      | Analyte                 | Method    | Reg Limit | MRL† | Result | Units         | Preparation Date | Analyzed Date  | EEA ID # |
| ---               | Alkalinity, Bicarbonate | 2320 B    | ---       | 1.00 | 27.2   | mg/L as CaCO3 | ---              | 07/01/14 20:03 | 3051941  |
| ---               | Alkalinity, Carbonate   | 2320 B    | ---       | 1.0  | < 1.0  | mg/L as CaCO3 | ---              | 07/01/14 20:03 | 3051941  |
| ---               | Solids, Dissolved       | 2540 C    | 500 ^     | 10   | 60     | mg/L          | ---              | 06/27/14 13:34 | 3051941  |
| 14808-79-8        | Sulfate                 | 300.0     | 250 ^     | 5.0  | < 5.0  | mg/L          | ---              | 07/02/14 23:23 | 3051941  |
| 16984-48-8        | Fluoride                | 4500-F- C | 4 *       | 0.1  | < 0.1  | mg/L          | ---              | 07/03/14 12:45 | 3051941  |

| Metals       |            |        |           |       |        |       |                  |                |          |
|--------------|------------|--------|-----------|-------|--------|-------|------------------|----------------|----------|
| Analyte ID # | Analyte    | Method | Reg Limit | MRL†  | Result | Units | Preparation Date | Analyzed Date  | EEA ID # |
| 7440-70-2    | Calcium    | 200.7  | ---       | 0.1   | 9.8    | mg/L  | 07/02/14 11:30   | 07/03/14 15:53 | 3051942  |
| 7439-89-6    | Iron       | 200.7  | 0.3 ^     | 0.020 | 0.36   | mg/L  | 07/02/14 11:30   | 07/03/14 15:53 | 3051942  |
| 7439-95-4    | Magnesium  | 200.7  | ---       | 0.1   | 1.8    | mg/L  | 07/02/14 11:30   | 07/03/14 15:53 | 3051942  |
| 7440-09-7    | Potassium  | 200.7  | ---       | 0.2   | 0.5    | mg/L  | 07/02/14 11:30   | 07/03/14 15:53 | 3051942  |
| 7440-23-5    | Sodium     | 200.7  | ---       | 0.1   | 3.4    | mg/L  | 07/02/14 11:30   | 07/03/14 15:53 | 3051942  |
| 7429-90-5    | Aluminum   | 200.8  | 50 ^      | 2.0   | 83     | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-36-0    | Antimony   | 200.8  | 6 *       | 1.0   | < 1.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-38-2    | Arsenic    | 200.8  | 10 *      | 1.0   | < 1.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-39-3    | Barium     | 200.8  | 2000 ^    | 2.0   | 8.0    | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-41-7    | Beryllium  | 200.8  | 4 *       | 0.3   | < 0.3  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-42-8    | Boron      | 200.8  | ---       | 5.0   | 6.7    | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-48-4    | Cobalt     | 200.8  | ---       | 2.0   | < 2.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-50-8    | Copper     | 200.8  | 1300 !    | 1.0   | 1.5    | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7439-92-1    | Lead       | 200.8  | 15 !      | 1.0   | < 1.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7439-93-2    | Lithium    | 200.8  | ---       | 2.0   | < 2.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7439-96-5    | Manganese  | 200.8  | 50 ^      | 2.0   | 39     | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7439-98-7    | Molybdenum | 200.8  | ---       | 2.0   | < 2.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-02-0    | Nickel     | 200.8  | ---       | 1.0   | < 1.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7782-49-2    | Selenium   | 200.8  | 50 *      | 2.0   | < 2.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-22-4    | Silver     | 200.8  | 100 ^     | 2.0   | < 2.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |
| 7440-66-6    | Zinc       | 200.8  | 5000 ^    | 5.0   | < 5.0  | ug/L  | 07/02/14 11:30   | 07/03/14 16:40 | 3051942  |

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

|                 |     |      |    |
|-----------------|-----|------|----|
| Reg Limit Type: | MCL | SMCL | AL |
| Symbol:         | *   | ^    | !  |

## Air Quality Monitoring

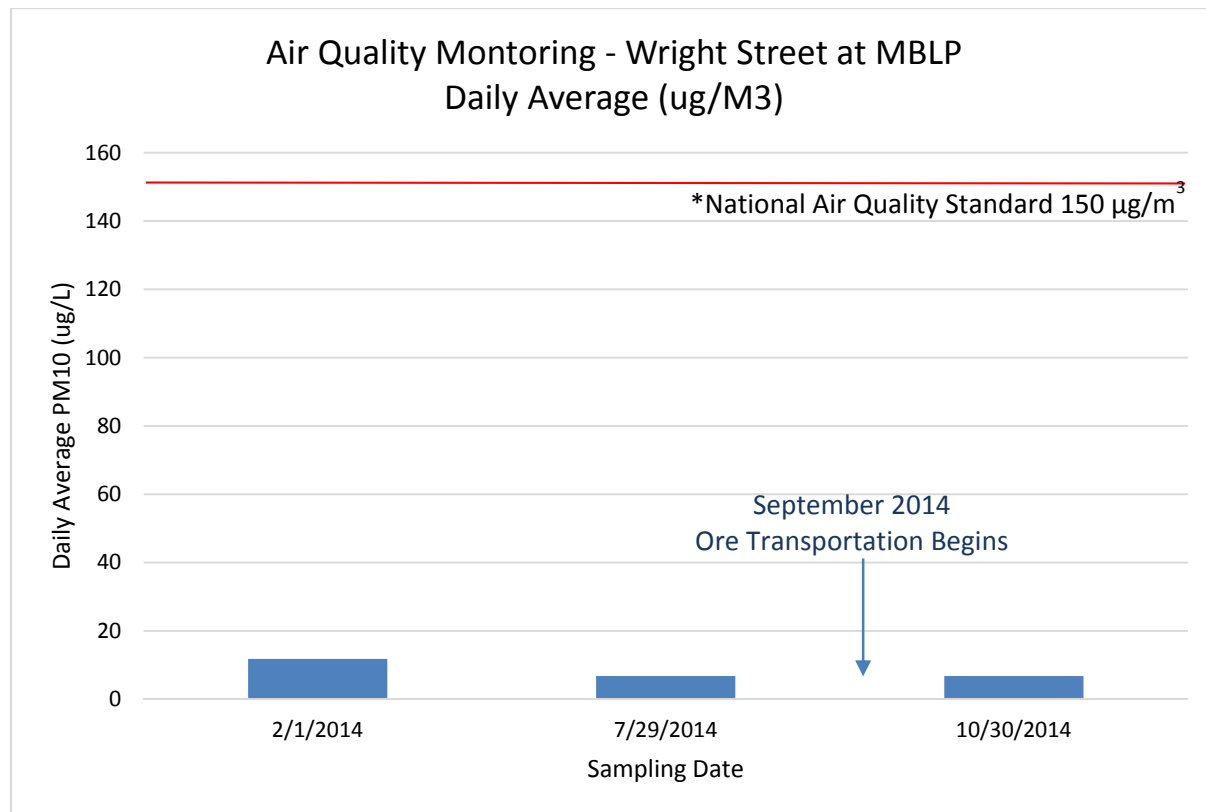
The objective of the air water quality monitoring is to collect baseline data for evaluation of potential environmental impacts to ambient air quality from the transportation of ore during mining operations. During February 2014, baseline air quality monitoring began at 7 sites between Eagle Mine and the Humboldt Mill including a site near the Marquette Board of Light and Power office in the City of Marquette (see Appendix B - Standards and Methodologies for Transportation Route



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Air Quality Monitoring for a complete list of sites and monitoring parameters). Data gathered will be used to establish baseline air quality values for particulate matter (dust) and will be compared to the U.S. Environmental Protection Agency – Clean Air Act National Ambient Air Quality Standards. Air quality monitoring will be conducted on a quarterly basis for at least three years after Eagle Mine commences maximum production levels. Results for the monitoring site located in the City of Marquette are provided in Figure 1 and Tables 3-5 below. Note: air quality monitoring was not conducted during the second quarter 2014 as the portable sampler was sent in for factory equipment calibration.

Figure 1. Air Quality Monitoring Results for City of Marquette -Wright Street at MBLP



\* 24 hour (daily average) not to be exceeded more than once per year on average over 3 years



## Community Environmental Monitoring Program of Eagle Mine

Table 3. CEMP Air Quality Monitoring  
Wright Street at MBLP

| Sampling Date: February 1, 2014 |                            |
|---------------------------------|----------------------------|
| Hour                            | PM10 Concentration (ug/m3) |
| 0:00                            | 3.81                       |
| 1:00                            | 5.61                       |
| 2:00                            | 4.46                       |
| 3:00                            | 4.1                        |
| 4:00                            | 4.62                       |
| 5:00                            | 4.68                       |
| 6:00                            | 5.41                       |
| 7:00                            | 7.49                       |
| 8:00                            | 9.21                       |
| 9:00                            | 8.92                       |
| 10:00                           | 10.67                      |
| 11:00                           | 12.48                      |
| 12:00                           | 14.14                      |
| 13:00                           | 15.43                      |
| 14:00                           | 18.69                      |
| 15:00                           | 19.27                      |
| 16:00                           | 17.74                      |
| 17:00                           | 15.87                      |
| 18:00                           | 15.92                      |
| 19:00                           | 16.7                       |
| 20:00                           | 16.35                      |
| 21:00                           | 16.89                      |
| 22:00                           | 17.54                      |
| 23:00                           | 18.19                      |
| Daily Average                   | 11.8                       |
| Daily Maximum                   | 19.3                       |

Table 4. CEMP Air Quality Monitoring  
Wright Street at MBLP

| Sampling Date: July 29, 2014 |                            |
|------------------------------|----------------------------|
| Hour                         | PM10 Concentration (ug/m3) |
| 0:00                         | 2.57                       |
| 1:00                         | 3.05                       |
| 2:00                         | 4.76                       |
| 3:00                         | 5.07                       |
| 4:00                         | 4.81                       |
| 5:00                         | 5.96                       |
| 6:00                         | 7.21                       |
| 7:00                         | 6.59                       |
| 8:00                         | 4.97                       |
| 9:00                         | 5.32                       |
| 10:00                        | 6.04                       |
| 11:00                        | 7.13                       |
| 12:00                        | 8.17                       |
| 13:00                        | 8.87                       |
| 14:00                        | 8.35                       |
| 15:00                        | 8.16                       |
| 16:00                        | 7.64                       |
| 17:00                        | 7.17                       |
| 18:00                        | 8.08                       |
| 19:00                        | 9.44                       |
| 20:00                        | 8.45                       |
| 21:00                        | 8.62                       |
| 22:00                        | 9.16                       |
| 23:00                        | 8.06                       |
| Daily Average                | 6.8                        |
| Daily Maximum                | 9.4                        |





## Community Environmental Monitoring Program of Eagle Mine

| Table 5. CEMP Air Quality Monitoring<br>Wright Street at MBLP |                            |
|---|----------------------------|
| Sampling Date: October 30, 2014                               |                            |
| Hour  | PM10 Concentration (ug/m3) |
| 0:00  | 4.43                       |
| 1:00  | 3.2                        |
| 2:00  | 3.2                        |
| 3:00  | 3.94                       |
| 4:00  | 4.23                       |
| 5:00  | 4.61                       |
| 6:00  | 4.55                       |
| 7:00  | 6.15                       |
| 8:00  | 6.91                       |
| 9:00  | 8.61                       |
| 10:00   | 9.82                       |
| 11:00   | 7.59                       |
| 12:00   | 6.43                       |
| 13:00   | 5.26                       |
| 14:00   | 5.99                       |
| 15:00   | 6.32                       |
| 16:00   | 6.81                       |
| 17:00   | 8.4                        |
| 18:00   | 7.65                       |
| 19:00   | 7.98                       |
| 20:00   | 9.47                       |
| 21:00   | 10.67                      |
| 22:00   | 11.02                      |
| 23:00   | 10.6                       |
| Daily Average   | 6.8                        |
| Daily Maximum   | 11.0                       |



*CEMP portable monitoring equipment used to monitor ambient air quality along the ore Transportation Route between Eagle Mine and the Humboldt Mill.*

**APPENDIX A**  
**Community Environmental Monitoring Program**  
**Standards, Methodologies, and Baseline Data for Surface Water Quality**  
**Monitoring along the Eagle Mine Transportation Route**

**I. Program Implementation and Quality Assurance**

**A. Annual Work Plan**

1. The Annual Work Plan summarizes the objectives for environmental monitoring along the transportation route between the Eagle Mine and the Humboldt Mill. The objective of surface water quality monitoring is to collect baseline data for evaluation of potential environmental impacts to surface waters from the transportation of ore during mining operations.

**B. Quality Assurance**

1. Data will be collected in accordance with established protocols by experienced Superior Watershed Partnership staff and/or contractor(s).
2. Equipment operation, calibration, and QA/QC are to be handled in accordance with specified operating procedures.

**II. Elements of the Monitoring Program**

**A. Target Parameters and Equipment**

1. Data will be collected in accordance with *Mine Permit Surface Water Monitoring* protocols and standards. Parameters, frequency of analysis, analytical methods and reporting limits are provided in Table 1.
2. Equipment to be used includes a multi-parameter water quality meter (YSI Model 556 MPS). The unit is able to capture field water quality parameters including, temperature, conductivity, percent saturation dissolved oxygen, pH, and oxidative-reduction potential (ORP).
3. Laboratory analyses of anions and metals will be conducted by CEMP/EPA approved laboratories: Underwriters Laboratories, Inc., 110 South Hill Street, South Bend, Indiana 46617; low-level mercury concentrations will be analyzed at: North Shore Analytical, Inc, 4511 West 1<sup>st</sup> Street, Ste. #1, Duluth, Minnesota 55807.

**B. Monitoring Sites**

1. There are 28 mapped road stream crossings along the Eagle Mine transportation route including 26 in the Dead-Kelsey Watershed (USGS Hydrologic Unit Code: 04020105, Lake Superior basin) and 2 in the Escanaba Watershed (USGS Hydrologic Unit Code: 04030110, Lake Michigan basin). Baseline surface water quality data will be collected from a downstream location at each site (Figure 1 and Table 2).

**C. Monitoring Period**

1. Begin monitoring program in the spring of 2014, prior to commencement of Eagle Mine ore production and processing (Fall 2014).
2. Conduct monitoring once per year for at least three years after Eagle Mine commences maximum production levels.

**D. Data Analysis and Publication**

1. Data gathered will be used to establish baseline surface water quality values and will be compared to the Michigan Surface Water Standards, Rule 57 reference values.
2. Data will be published in accordance with the CEMP Notification Plan (September 2013) including procedures for data processing, notification process, and schedule.

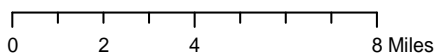
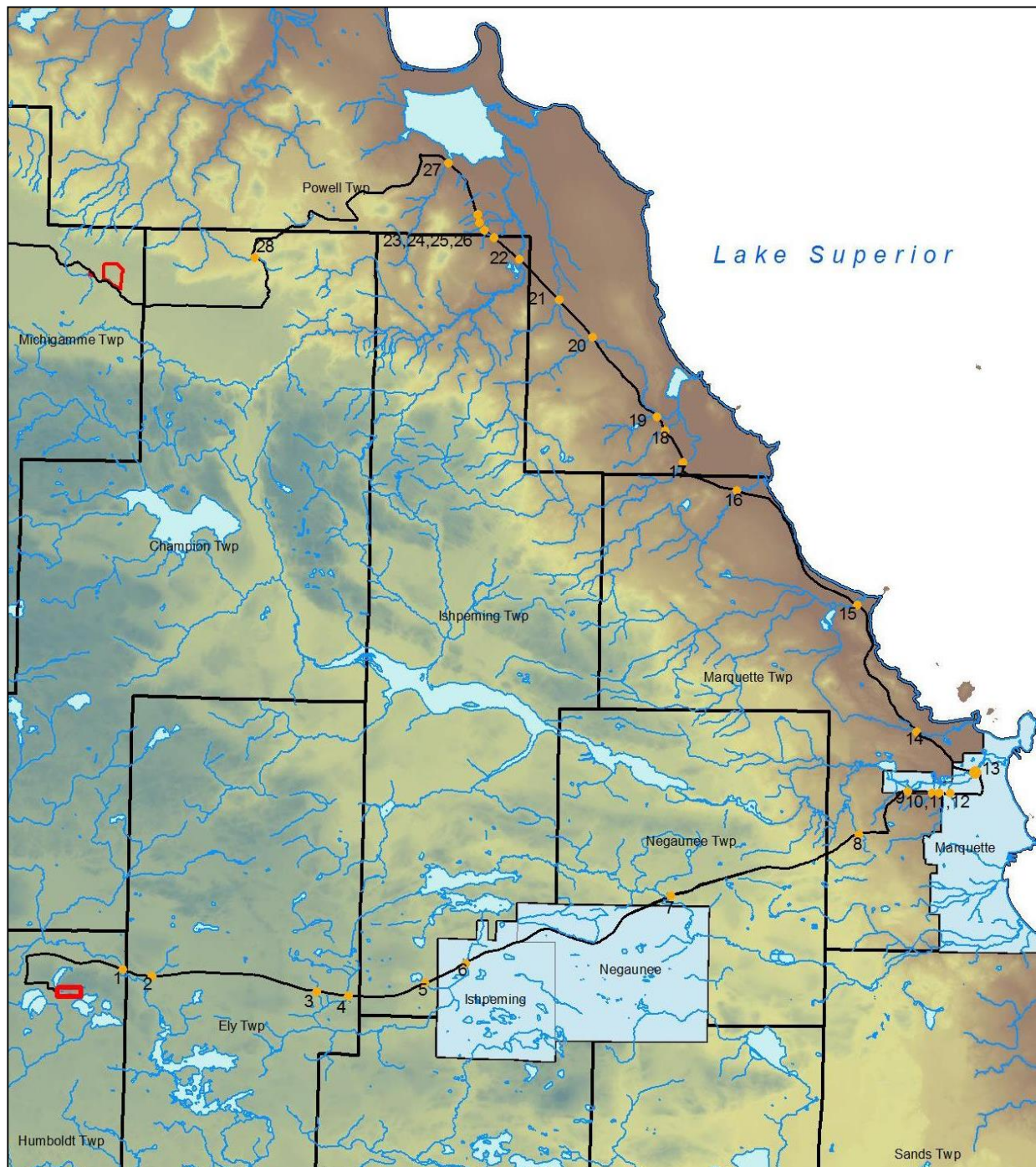
**Table 1**  
**Parameters, Frequency, Analytical Methods and Reporting Limits**  
**for Surface Water Quality Monitoring along the Eagle Mine Transportation Route**

| Parameters              | Frequency of Analysis | Analytical Methods  | Laboratory Reporting Limit | Units    |
|-------------------------|-----------------------|---------------------|----------------------------|----------|
| <b>Field</b>            |                       |                     |                            |          |
| Temperature             | Annual                | Field               | na                         | °C       |
| Dissolved Oxygen        | Annual                | Field               | na                         | mg/L     |
| pH                      | Annual                | Field               | na                         | SU       |
| Specific Conductance    | Annual                | Field               | na                         | umhos/cm |
| Flow                    | Annual                | Field               | na                         | cfs      |
| <b>Anions</b>           |                       |                     |                            |          |
| Alkalinity, Bicarbonate | Annual                | 310.1/SM 2320 B     | 2.0                        | mg/L     |
| Alkalinity Carbonate    | Annual                | 310.1/SM 2320 B     | 2.0                        | mg/L     |
| Chloride                | Annual                | EPA-325.2/4599-CL E | 1.0                        | mg/L     |
| Flouride                | Annual                | SM 4500 F-C         | 0.10                       | mg/L     |
| Nitrate Nitrogen        | Annual                | EPA-353.2/4500 NO3F | 0.050                      | mg/L     |
| Sulfate                 | Annual                | EPA-375.4/9038      | 1.0                        | mg/L     |
| <b>Cations</b>          |                       |                     |                            |          |
| Calcium                 | Annual                | EPA-200.7/6010B     | 0.50                       | mg/L     |
| Potassium               | Annual                | EPA-200.7/6010B     | 0.50                       | mg/L     |
| Magnesium               | Annual                | EPA-200.7/6010B     | 0.50                       | mg/L     |
| Sodium                  | Annual                | EPA-200.7/6010B     | 0.50                       | mg/L     |
| Total Dissolved Solids  | Annual                | EPA-160.1           | 50                         | mg/L     |
| <b>Metals</b>           |                       |                     |                            |          |
| Aluminum                | Annual                | EPA-200.7/6010B     | 50                         | ug/L     |
| Lithium                 | Annual                | EPA-200.7/6010B     | 10                         | ug/L     |
| Antimony                | Annual                | EPA-200.8/6020      | 2.0                        | ug/L     |
| Arsenic                 | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Barium                  | Annual                | EPA-200.8/6020      | 10                         | ug/L     |
| Iron                    | Annual                | EPA-200.7/6010B     | 20                         | ug/L     |
| Beryllium               | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Boron                   | Annual                | EPA-200.8/6020      | 50                         | ug/L     |
| Cadium                  | Annual                | EPA-200.8/6020      | 0.20                       | ug/L     |
| Chromium                | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Copper                  | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Cobalt                  | Annual                | EPA-200.8/6020      | 10                         | ug/L     |
| Lead                    | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Manganese               | Annual                | EPA-200.8/6020      | 10                         | ug/L     |
| Molybdenum              | Annual                | EPA-200.8/6020      | 10                         | ug/L     |
| Nickel                  | Annual                | EPA-200.8/6020      | 1.0                        | ug/L     |
| Selenium                | Annual                | EPA-200.8/6020      | 2.0                        | ug/L     |
| Silver                  | Annual                | EPA-200.8/6020      | 0.20                       | ug/L     |
| Zinc                    | Annual                | EPA-200.8/6020      | 10                         | ug/L     |
| Mercury <sup>1</sup>    | Annual                | EPA-1631E           | 0.00025                    | ug/L     |

<sup>1</sup> Acceptable by MDEQ to use 0.005 ug/L as reporting limit for mercury.



**Figure 1**  
**Community Environmental Monitoring Program**  
**Surface Water Quality Monitoring Sites along the Eagle Mine Transportation Route**



**Table 2**  
**Surface Water Quality Monitoring Sites along the Eagle Mine Transportation Route**

| Map Reference Number | Stream Name                               | Watershed Description  | Location Description                     | Monitoring Description                  |
|----------------------|---|--|--|---|
| 1                    | Middle Branch Escanaba River              | USGS HUC: 04030110, Escanaba Watershed, Lake Michigan basin      | US41 W, Humboldt Township                | Table 2 Field and Laboratory Parameters |
| 2                    | Tributary to Middle Branch Escanaba River | USGS HUC: 04030110, Escanaba Watershed, Lake Michigan basin      | US41 W, Ely Township                     | Table 2 Field Parameters                |
| 3                    | Unknown                                   | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41 W, Ely Township                     | Table 2 Field Parameters                |
| 4                    | Carp Creek                                | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41 W, Ely Township                     | Table 2 Field Parameters                |
| 5                    | Unknown                                   | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41 W, Ishpeming Township               | Table 2 Field Parameters                |
| 6                    | Carp Creek                                | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41 W, City of Ishpeming                | Table 2 Field and Laboratory Parameters |
| 7                    | Carp River                                | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41 W, Negaunee Township                | Table 2 Field and Laboratory Parameters |
| 8                    | Brickyard Creek                           | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | US41W/Brickyard Road, Marquette Township | Table 2 Field Parameters                |
| 9                    | Unnamed Tributary to Dead River           | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | Wright Street, Marquette Township        | Table 2 Field Parameters                |
| 10                   | Backyard Creek                            | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | Wright Street, City of Marquette         | Table 2 Field Parameters                |
| 11                   | Badger Creek                              | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | Wright Street, City of Marquette         | Table 2 Field Parameters                |
| 12                   | Raney Creek                               | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | Wright Street, City of Marquette         | Table 2 Field Parameters                |
| 13                   | Dead River                                | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550, City of Marquette       | Table 2 Field and Laboratory Parameters |
| 14                   | Compeau Creek                             | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550 Marquette Township       | Table 2 Field and Laboratory Parameters |

| Map Reference Number | Stream Name                    | Watershed Description  | Location Description                   | Monitoring Description                  |
|----------------------|--------------------------------|--|--|---|
| 15                   | Harlow Creek                   | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550<br>Marquette Township  | Table 2 Field Parameters                |
| 16                   | Little Garlic                  | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550<br>Marquette Township  | Table 2 Field Parameters                |
| 17                   | Big Garlic                     | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 18                   | Birch Creek                    | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 19                   | Sawmill Creek                  | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 20                   | Wilson Creek                   | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 21                   | Johnson Creek                  | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 22                   | Yellow Dog River               | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Ishpeming Township | Table 2 Field and Laboratory Parameters |
| 23                   | Unknown                        | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Ishpeming Township | Table 2 Field Parameters                |
| 24                   | Unknown                        | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 25                   | Unknown                        | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 26                   | Unknown                        | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 27                   | Alder Creek                    | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | County Road 550,<br>Powell Township    | Table 2 Field Parameters                |
| 28                   | East Branch Salmon Trout River | Dead-Kelsey Watershed<br>USGS HUC: 04020105, Lake Superior basin | Triple A Road,<br>Champion Township    | Table 2 Field and Laboratory Parameters |

**APPENDIX B**  
**Standards, Methodologies, and Baseline Data for Portable Air Quality Monitoring**

**I. Program Implementation and Quality Assurance**

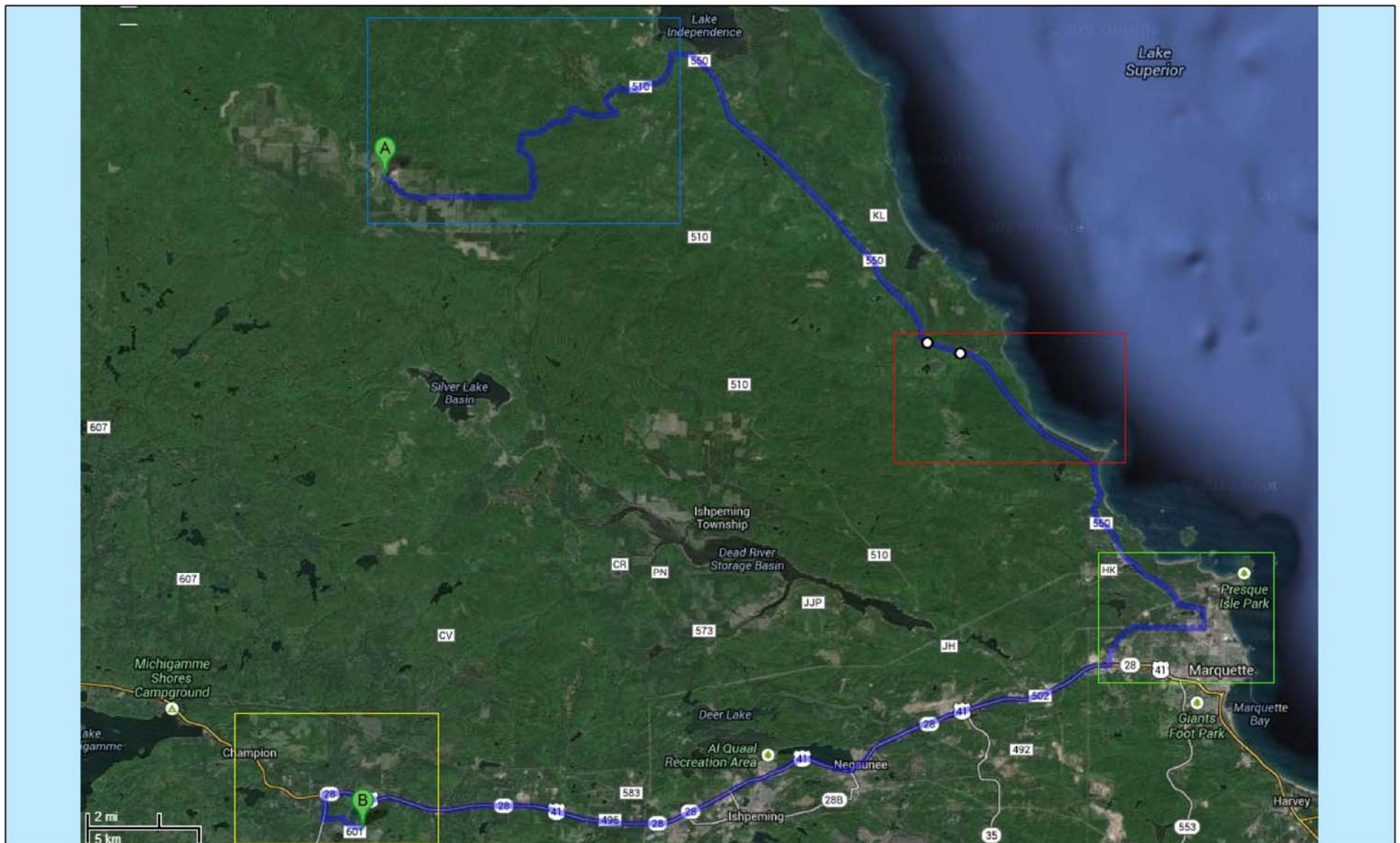
- A. Annual Work Plan
  - 1. The Annual Work Plan will summarize objectives for air quality monitoring using a portable air quality monitoring device.
- B. Quality Assurance
  - 1. A Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOP) will be developed prior to commencing with monitoring activities. The QAPP/SOP will detail monitoring methodology, including: target pollutant(s), type of monitoring device, monitoring locations, collection frequency, coincidental data collection (meteorological, etc.), and monitoring event duration.
  - 2. The QAPP/SOP may be submitted to the Air Monitoring Unit, MDEQ for review and technical oversight
  - 3. Equipment operation, calibration, and QA/QC is to be handled in accordance with the QAPP/SOP and by experienced SWP staff and/or contractor(s).

**II. Elements of the Portable Air Monitoring Program**

- A. Target Pollutant(s) and Equipment
  - 1. Target pollutant(s) include particulate matter (PM) that are 10 micrometers in diameter or smaller.
  - 2. Equipment to be used includes a Thermo Scientific Area Dust Monitor (ADR-1500) real-time, ambient dust monitor portable sampler.
  - 3. Data will be collected in accordance with U.S. EPA-designated reference or equivalent sampling method, and/or relevant portions of the U.S. EPA's Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I- III.
- B. Siting
  - 1. The ADR-1500 will be used to monitor ambient air quality outside of designated sites including, but not limited to, the Eagle Mine site, the Humboldt Mill, and along designated transportation routes.
  - 2. The intake valve located on the ADR-1500 must be located within the EPA qualified breathing zone (4-7 feet off the ground).
  - 3. A pole or tri-pod mount system purchased with the ADR-1500 will be the device used to place the system in the required breathing zone.
- C. Monitoring Period
  - 1. Begin monitoring program in January 2013, prior to commencement of Eagle Mine operations (ore production and processing) to establish baseline data near the mine site, the Humboldt Mill, and along designated transportation routes.
  - 2. Conduct monitoring for at least three years after Eagle Mine commences maximum production levels.
- D. Data Analysis and Publication
  - 1. Data will be published in accordance with procedures described in the Communication Plan included in the Annual Work Plan including procedures for data processing, notification process, and schedule.
  - 2. Data gathered will be compared to baseline data collected prior to Eagle operations (early 2014).
  - 3. The results of monitoring events of sufficient duration (i.e., 24 hours) may be averaged in accordance with U.S. EPA procedures and compared against the National Ambient Air Quality Standards.



# CEMP Portable Air Quality Monitoring Sites Locator Map



Mine Sites

Co. Rd. 550 Sites

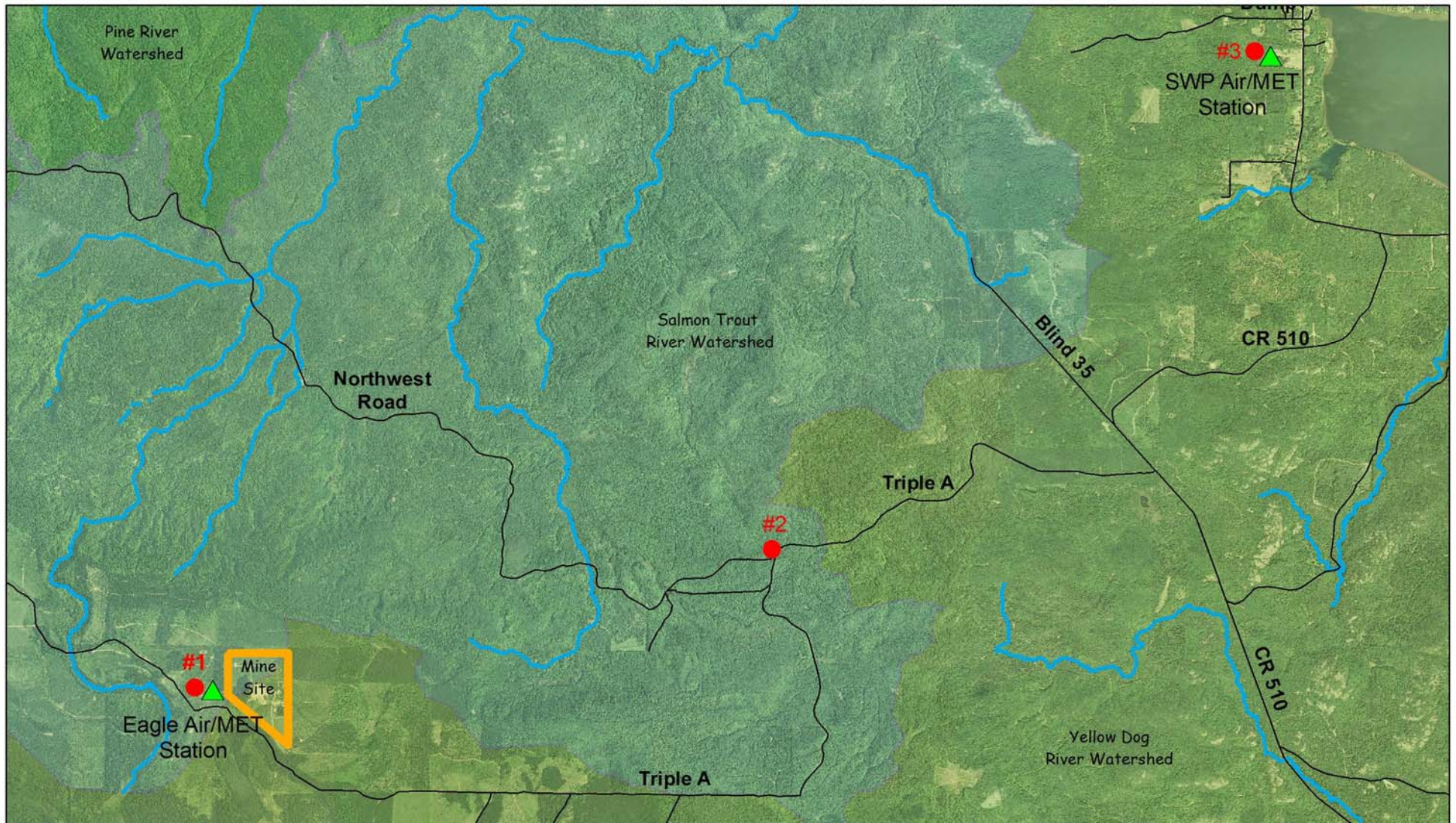
Mill Sites

City of  
Marquette Sites



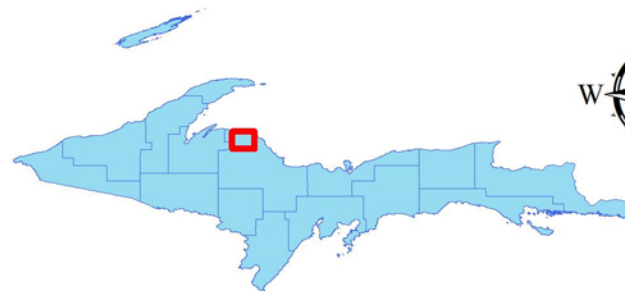


# CEMP Portable Air Quality Monitoring Sites



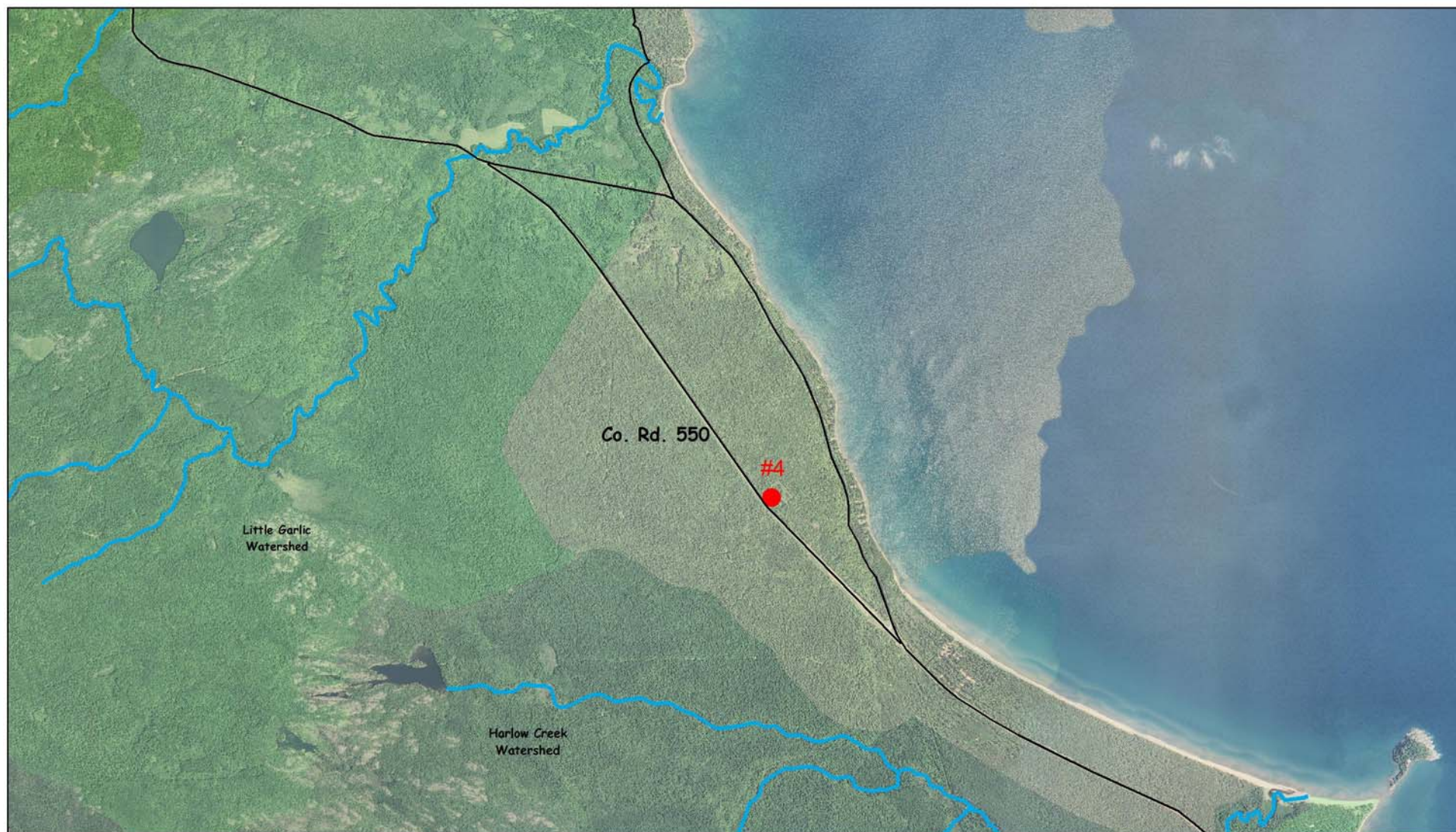
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- #1.....Eagle Air/MET Station
- #2.....Intersection of Triple A and Northwest Road
- #3.....SWP Air/MET Station



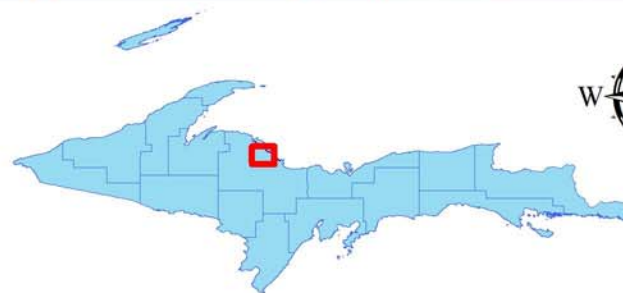


# CEMP Portable Air Quality Monitoring Sites



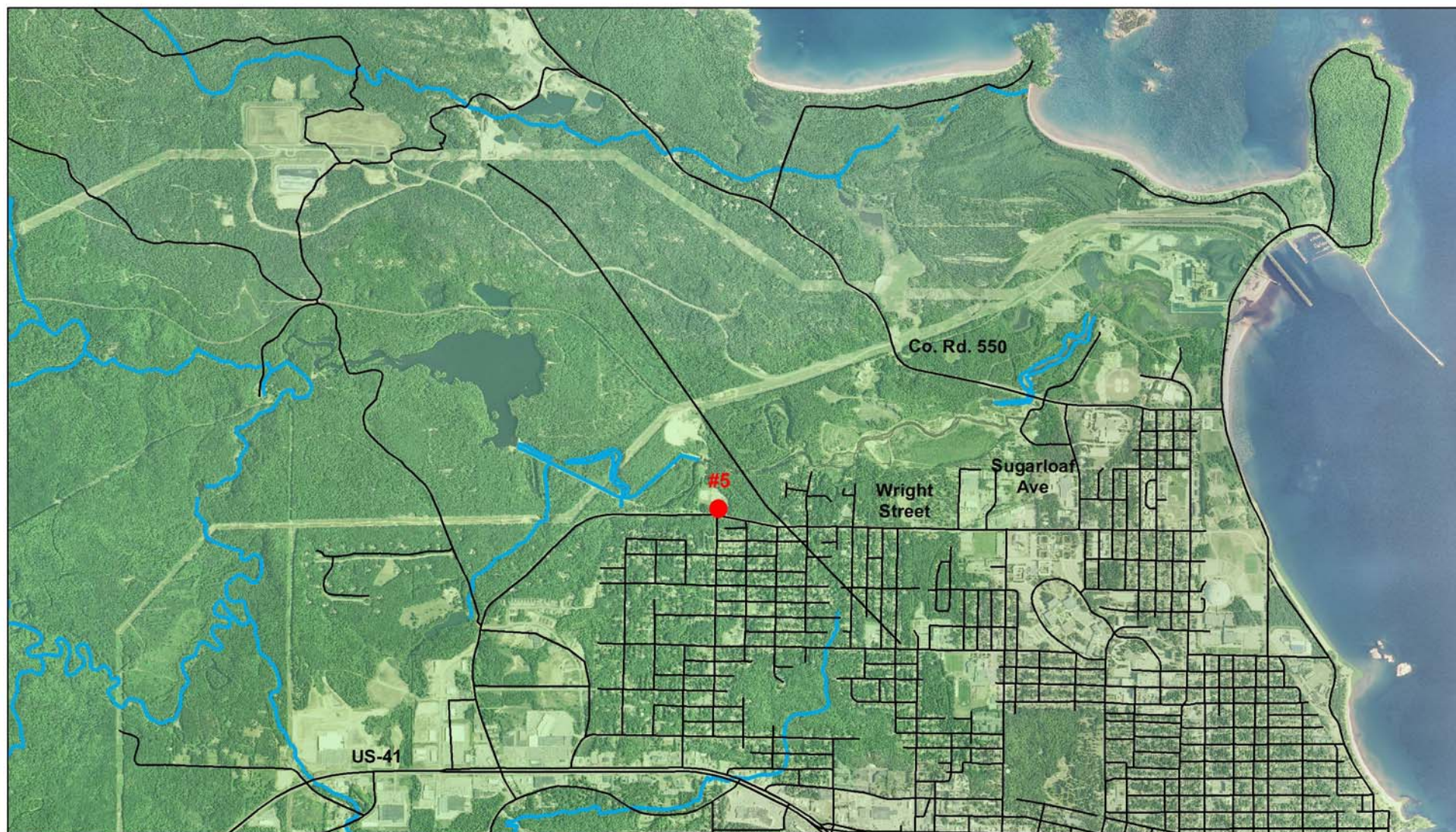
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#4.....MCRC Wetland Restoration Site

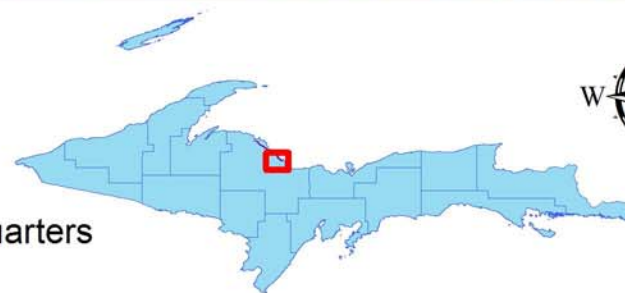




# CEMP Portable Air Quality Monitoring Sites



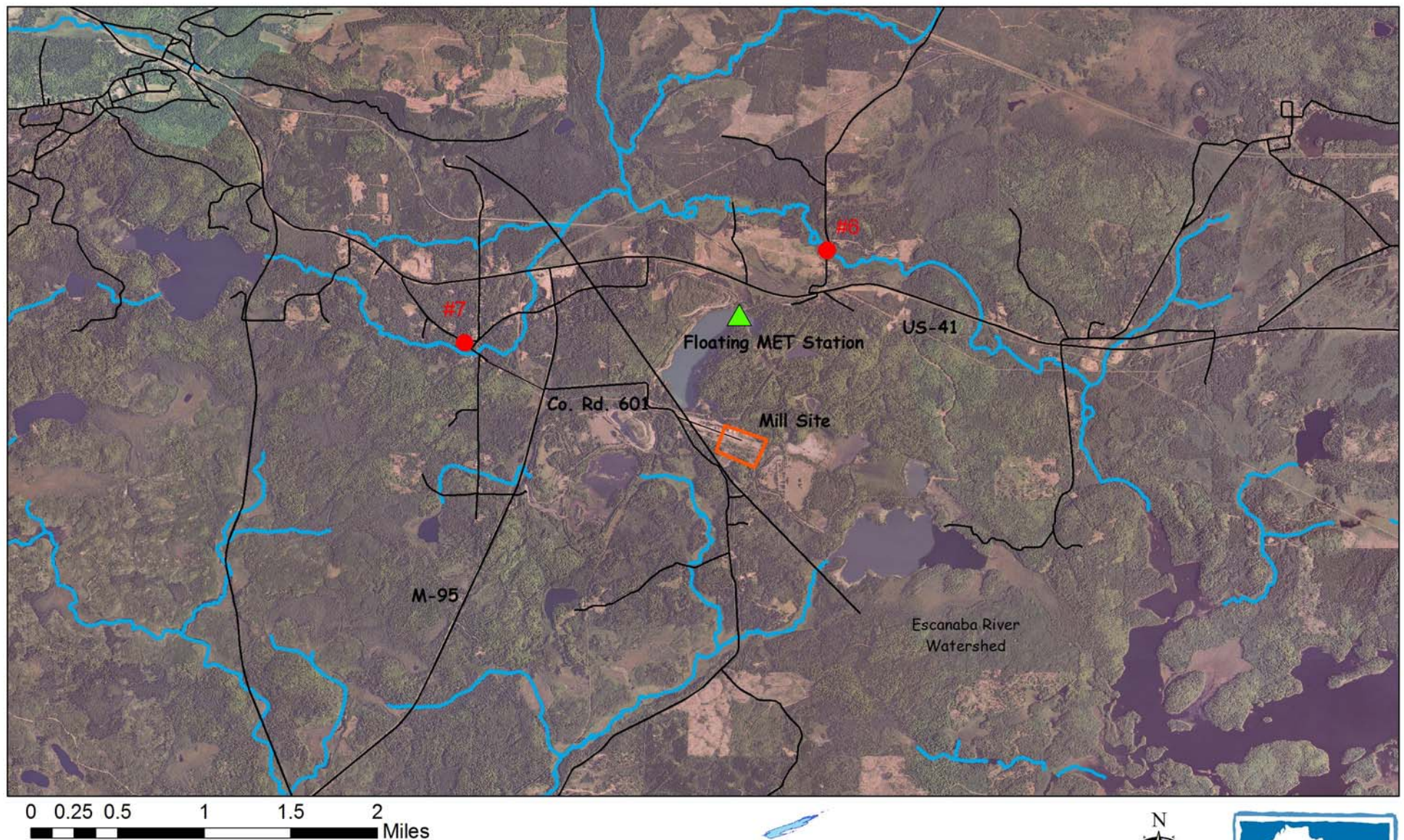
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#5.....Marquette Board of Light and Power Headquarters



# CEMP Portable Air Quality Monitoring Sites



- #6.....Wolf Lake Road at the Middle Branch Escanaba River  
#7.....Co. Rd. 601 at Humboldt Cemetery

