

Community Environmental Monitoring
Program (CEMP) of the Eagle Mine,
Marquette County, Michigan



Abbie Debiak Field Ecologist abbie@superiorwatersheds.org www.superiorwatersheds.org (906)228-6095 ext. 18

### 100% Local, Communities, Watersheds

The mission of the Superior Watershed Partnership is to protect and improve the natural resources of the Upper Peninsula of Michigan on a watershed basis; by promoting responsible individual and community actions that ensure a sustainable environment, encourage a sustainable economy and help improve quality of life.

### LAKE SUPERIOR, LAKE MICHIGAN, LAKE HURON

Great Lakes Protection, Restoration and Education

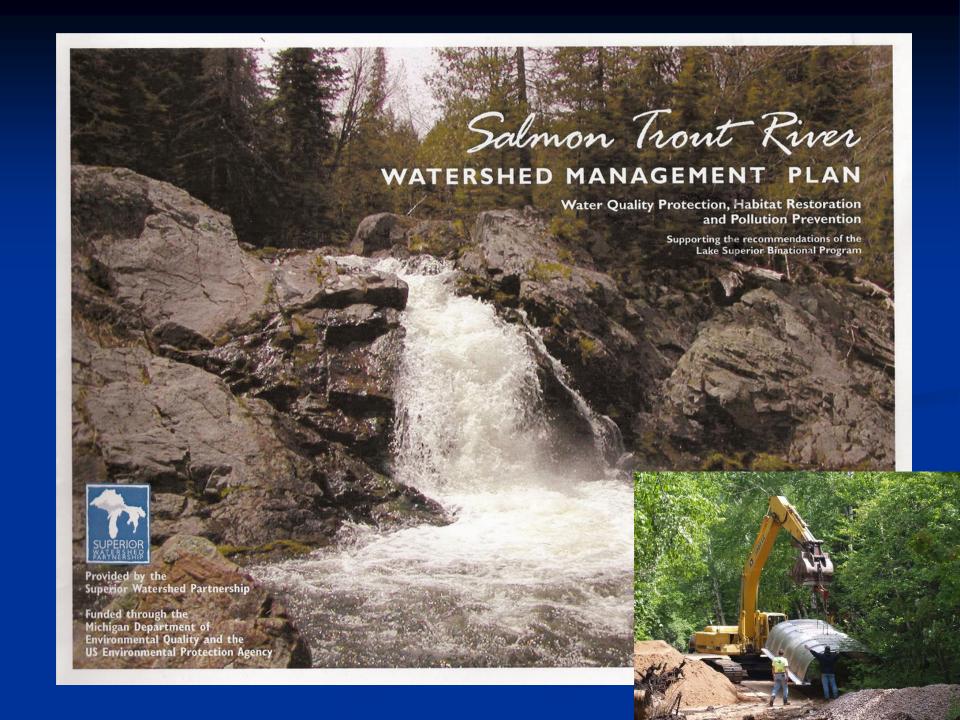
**Real Work, Sound Science, Documented Results** 

www.superiorwatersheds.org









### INDEPENDENT

### COMMUNITY ENVIRONMENTAL MONITORING PROGRAM



Monitoring of the Eagle Mine, Humboldt Mill and Transportation Route includes:

- Groundwater
- Surface Water
- Facilities
- Flora and Fauna
- Air Quality
- Noise and Vibration
- Other monitoring based on community input.







In partnership with the Marquette County Community Foundation.

INDEPENDENT, TRANSPARENT PROTECTING OUR WATER PROTECTING OUR COMMUNITY

> To learn more www.swpcemp.org Public input is invited.

### THE CHRONOLOGY OF EVENTS:

SWP begins monitoring the health of the Salmon 1999 Trout River (STR) in North Marquette County.

2001 SWP completes first of over 20 restoration projects on the STR.

Rio Tinto/Kennecott discovers precious metals in the 2002 STR Watershed.

SWP participates on Governor Granholm's committee to draft new sulfide mining legislation.

2006 Rio Tinto applies for its first permit to mine in the STR Watershed.

2006 SWP completes a comprehensive watershed management plan for the Salmon Trout River which is approved by the EPA. The plan includes the recommendation to "prohibit sulfide-based mining."

> Following the nomination by the SWP, the Salmon Trout River is designated one of the "10 Most Endangered Rivers" by American Rivers out of Washington D.C.

Surface construction begins at Eagle Mine.

State of the Great Lakes Report highlights the work 2010 of the SWP and a 70% increase in the coaster brook trout population of the STR.

Underground construction begins at Eagle Mine. 2011

**Community Environmental Monitoring Program** 2012 (CEMP) begins in October 2012.

2012 Humboldt Mill construction begins.

2013 Lundin Mining Corp purchases Eagle Mine fro Tinto for \$325 million.

SWP discovers uranium at the Temporary Development Rock Storage Area of the Eagle

New DEQ Groundwater Discharge Permit for the 2014 Mine to include uranium as a reporting param

2014 Eagle Mine underground mining operations t (Lake Superior Watershed); Humboldt Mill operations begin (Lake Michigan Watershed)

SWP completes second year of independent monitoring at Eagle Mine.











### Rio Tinto Eagle Mine Community Environmental Monitoring Program Agreement

By and between

Kennecott Eagle Minerals (doing business as Rio Tinto Eagle Mine)

And

**Superior Watershed Partnership** 

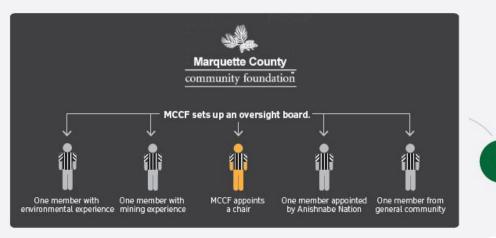
Funded through the Marquette County Community Foundation



### Community Environmental Monitoring of the Rio Tinto Eagle Mine

Rio Tinto Eagle Mine already has State of Michigan regulatory oversight. In addition, independant third-party monitoring provides community oversight of the mine's environmental performance. This is how it works:





Funds Superior Watershed Partnership.

Oversight of monitoring program implementation.

Dispute resolution.



State of Michigan regulatory oversight. Transparency and community reporting.

Provides funds to pay for Community Monitoring





Checking what Eagle already does. New monitoring.





# CEMP Independent Monitoring

- The CEMP consists of four main components:
  - 1. Environmental monitoring required by Eagle Mine's permits
  - 2. Environmental monitoring *not* required by State or Federal Permits
  - 3. Publication of results and rating of environmental performance
  - 4. Community outreach to inform the public and provide opportunities for the community to provide input

# CEMP Independent Monitoring

- The CEMP consists of four main components:
  - 1. Environmental monitoring required by Eagle Mine's permits
  - 2. Environmental monitoring *not* required by State or Federal Permits
  - 3. Publication of results and rating of environmental performance
  - 4. Community outreach to inform the public and provide opportunities for the community to provide input

CEMP Verifies Eagle Mine's Environmental Monitoring Required by Two Permits:

- Mining Permit
  - Facilities (Temporary Development Rock Storage Area, influent)
  - Groundwater
  - Surface Water
  - Flora/Fauna
- Groundwater Discharge Permit
  - Wastewater Treatment Facility Discharge (effluent)
  - Groundwater



Humboldt Mill

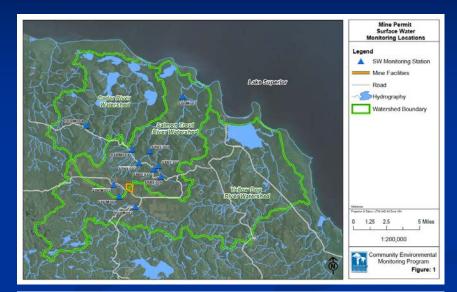


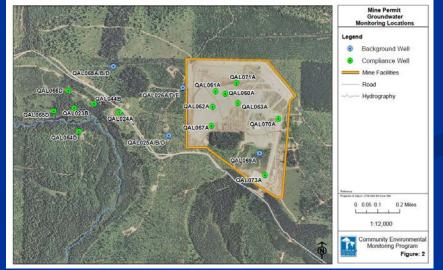
Eagle Mine

Monitoring Location/Type	Permit	Frequency	Total Number of Monitoring Sites			
EAGLE MINE						
Surface Water	Mine Permit	Quarterly	11			
Groundwater	Mine Permit	Quarterly	24 (10 background and 14 compliance)			
Facilities: Temporary Development Rock Storage Area (TDRSA) Contact Water Sump and Leak Detection Sump, Contact Water Basins/WTP Influent, and Underground	Mine Permit	Quarterly	4			
Facilities: Water Treatment Facility	Groundwater Discharge Permit	Monthly	1			
Groundwater	Groundwater Discharge Permit	Quarterly	15 (7 background and 8 compliance)			
Total Eagle Mine Sites			55			
HUMBOLDT MILL						
Groundwater	Mine Permit	Quarterly	23			
Surface Water	Mine Permit	Quarterly	8			
Sediment	Mine Permit	Quarterly	7			
Facilities: Water Treatment Facility	Surface Water Discharge Permit	Monthly	1			
Total Humboldt Mill Sites			39			

# Mining Permit

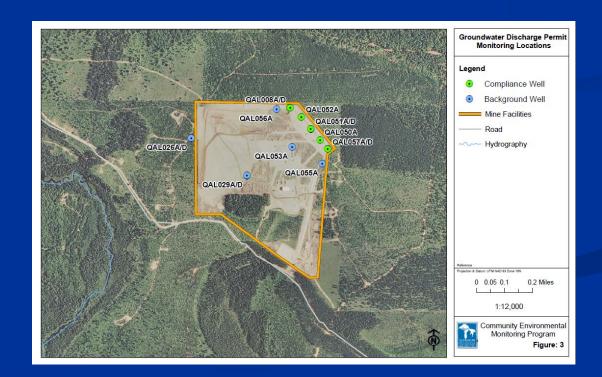
- Mining Permit
  - Facilities
    - ✓ Temporary Development Rock Storage Area
    - Influent
  - Groundwater
  - Surface Water
  - → Flora/Fauna





# Groundwater Discharge Permit

- Groundwater Discharge Permit
  - Wastewater Treatment Facility Discharge (effluent)
  - Groundwater



### **2015 WORK PLAN**

for the

COMMUNITY ENVIRONMENTAL MONITORING PROGRAM

of the Eagle Mine

December 31, 2014



Submitted by

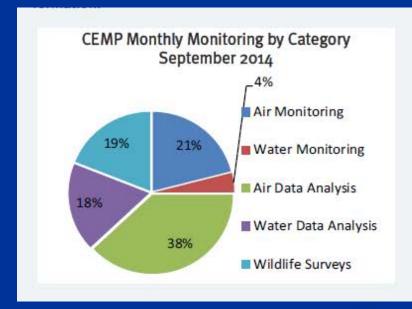


SUPERIOR WATERSHED PARTNERSHIP 2 Peter White Drive, • Presque Isle Park Marquette, Michigan 49855 (906) 228-6095 www.superiorwatersheds.org

http://www.cempmonitoring.com/



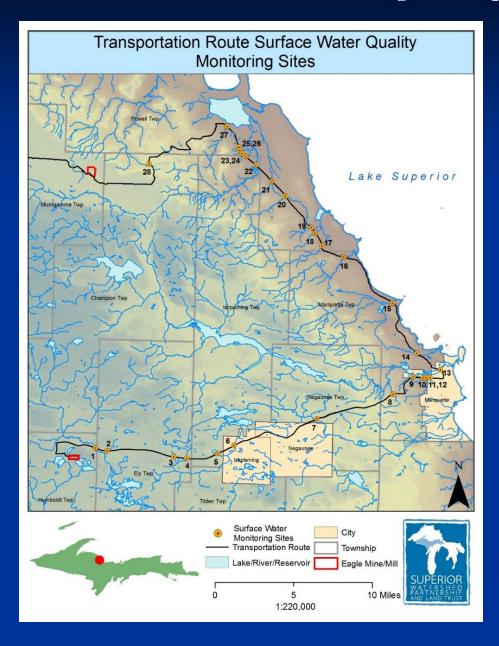






# CEMP Independent Monitoring

- The CEMP consists of four main components:
  - 1. Environmental monitoring required by Eagle Mine's permits
  - 2. Environmental monitoring *not* required by State or Federal Permits
  - 3. Publication of results and rating of environmental performance
  - 4. Community outreach to inform the public and provide opportunities for the community to provide input



# Transportation Route Monitoring

- Independent Monitoring:
  - Surface Water Quality
  - Air Quality (Portable Air Station)
  - Noise Impacts



Air Quality Monitoring

### **CEMP Air Quality Monitoring Program Components:**

- CEMP Air/Met Station
  - Big Bay
- Eagle Mine Air/Met Station
  - Mine Site
- Portable Unit
  - Mine Site
  - Humboldt Mill (with RT Floating Met Station)
  - Transportation Route

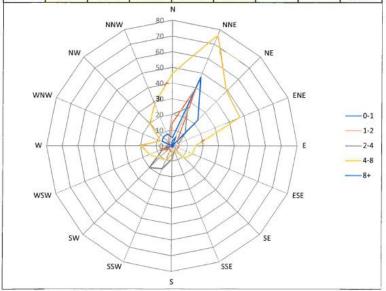


### Air Quality Monitoring

### CEMP Air/Met Station (Big Bay)

- Particulates (PM10) Continuous
- Particulates (PM2.5) EPA Schedule
- Metals Quarterly
- Meteorological Data Continuous
  - Wind Direction
  - Wind Speed
  - Air Temperature
  - Relative Humidity
  - Solar Radiation

	0-1	1-2	2-4	4-8	8+	AVERAGE SPEED	EVENTS	%
N	3	14	20	46	5	4.5	88	11.8%
NNE	6	40	26	76	47	5.4	195	26.2%
NE	0	5	12	49	23	6.3	89	12.0%
ENE	0	4	5	47	0	5.3	56	7.5%
E	0	5	4	15	0	4.4	24	3.2%
ESE	1	4	2	14	0	4.7	21	2.8%
SE	0	4	4	11	0	4.6	19	2.6%
SSE	0	3	4	3	0	3.0	10	1.3%
S	1	5	9	5	0	2.9	20	2.7%
SSW	1	3	16	10	0	3.7	30	4.0%
SW	0	3	20	11	0	3.6	34	4.6%
WSW	0	8	6	15	4	4.6	33	4.4%
W	1	2	3	20	0	5.1	26	3.5%
WNW	0	1	3	8	7	6.1	19	2.6%
NW	0	2	3	20	8	6.1	33	4.4%
NNW	1	4	5	29	8	5.7	47	6.3%
EVENTS	14	107	142	379	102		744	
%	1.9%	14.4%	19.1%	50.9%	13.7%			100.0%

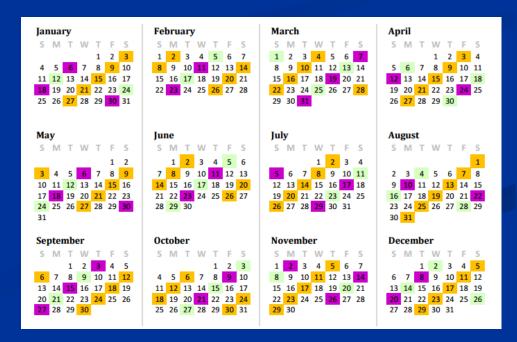


### EPA/DEQ Air Quality Monitoring Schedule

Air Quality Monitoring

### CEMP Air/Met Station (Big Bay)

- Particulates (PM10) Continuous
- Particulates (PM2.5) EPA
   Schedule
- Metals Quarterly
- Meteorological Data Continuous
  - Wind Direction
  - Wind Speed
  - Air Temperature
  - Relative Humidity
  - Solar Radiation



Air Quality Monitoring

### RT Air/Met Station (Mine Site)

- Particulates (PM10) Continuous
- Meteorological Data Continuous
  - Wind Direction
  - Wind Speed
  - Air Temperature
  - Relative Humidity
  - Solar Radiation

### Portable Air Quality Monitoring

- Capable of Monitoring Continuous (24-hour)
   PM10, PM2.5, PM1
- Portable can be sited anywhere

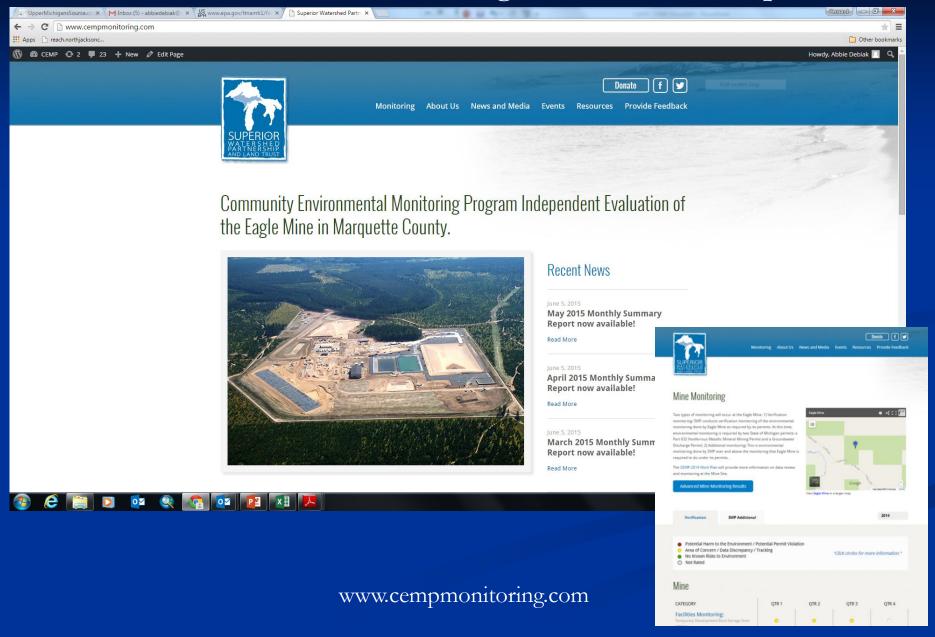




# CEMP Independent Monitoring

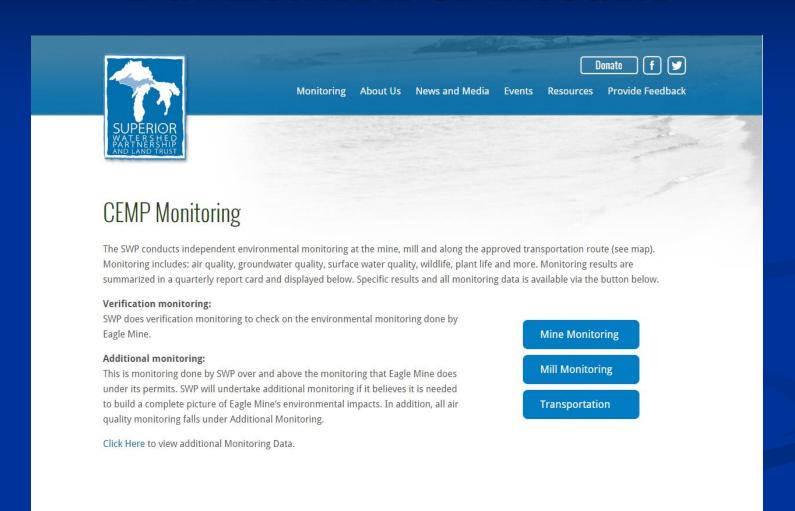
- The CEMP consists of four main components:
  - 1. Environmental monitoring required by Eagle Mine's permits
  - 2. Environmental monitoring *not* required by State or Federal Permits
  - 3. Publication of results and rating of environmental performance
  - 4. Community outreach to inform the public and provide opportunities for the community to provide input

### 3. Publication of results and rating of environmental performance

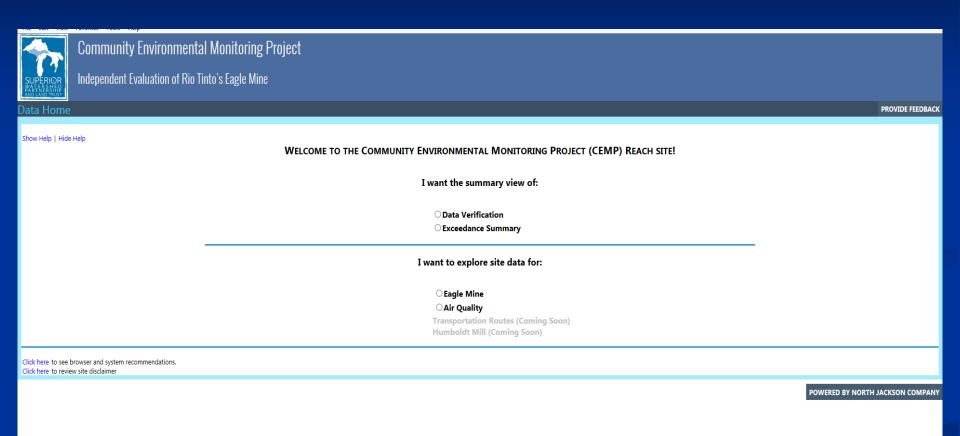


3. Publication of results and rating of environmental performance

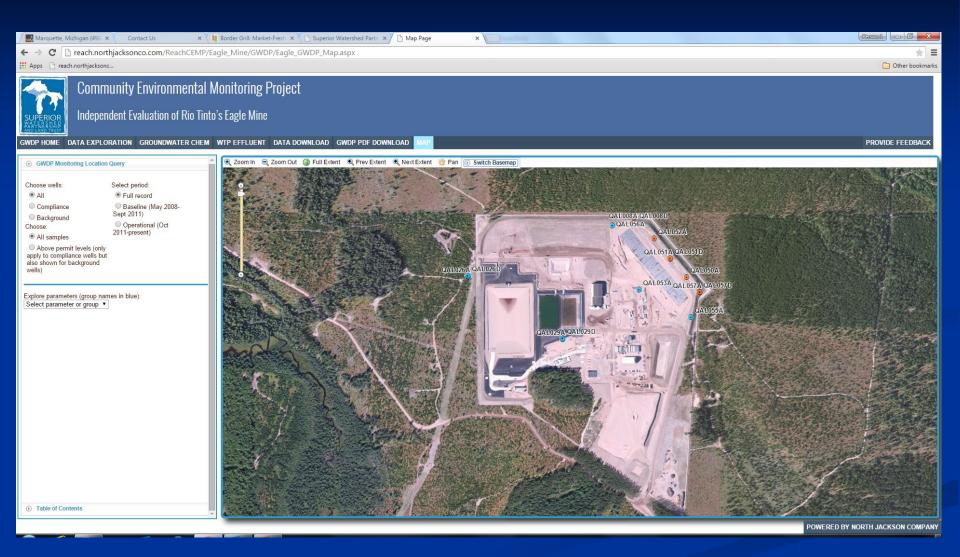
### Publication of Results



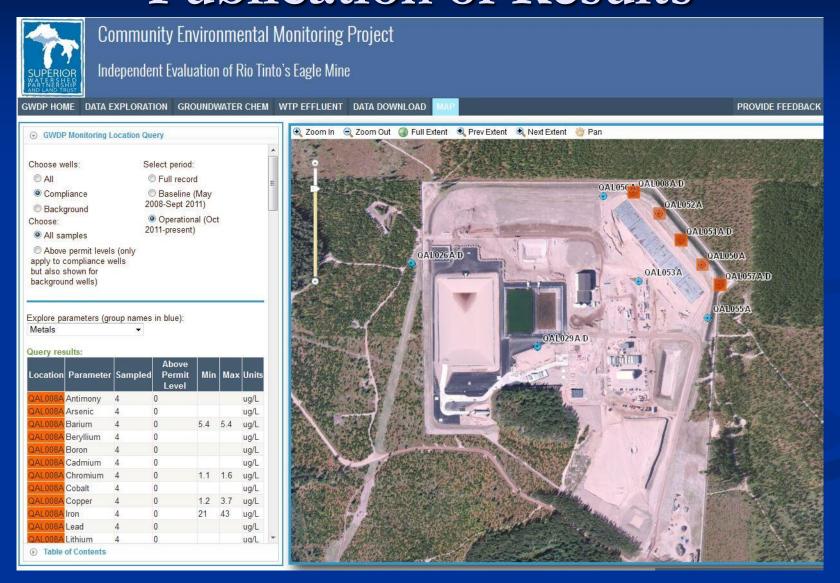
# 3. Publication of results and rating of environmental performance Publication of Results



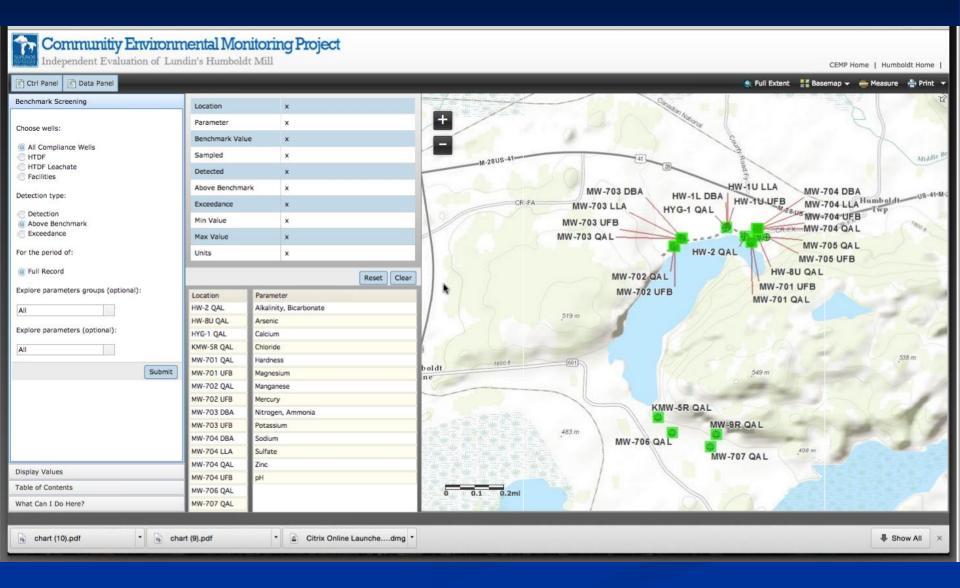
### 3. Publication of results and rating of environmental performance



# 3. Publication of results and rating of environmental performance Publication of Results

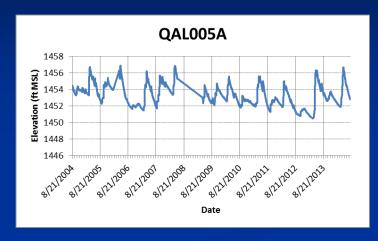


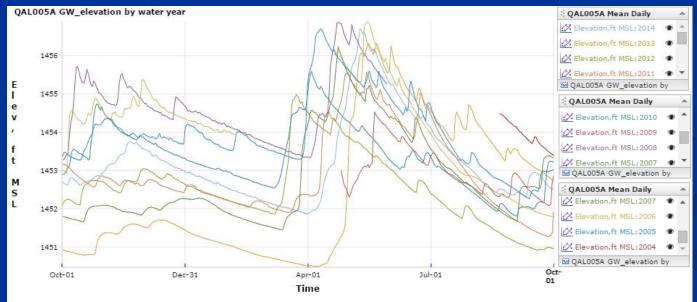
### 3. Publication of results and rating of environmental performance



### 3. Publication of results and rating of environmental performance

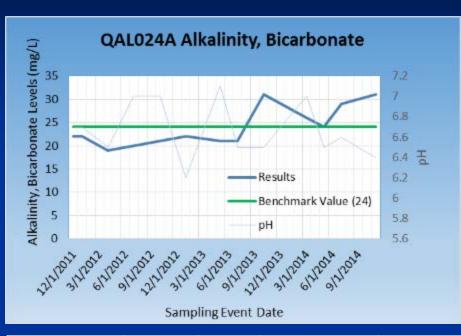
### QAL005A

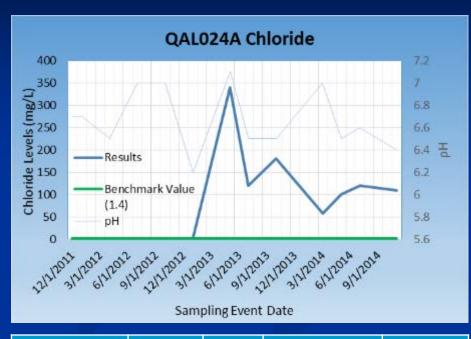




Elevation ft (MSL)				
MIN	1450.49			
MAX	1456.88			
AVG	1453.284			
RANGE	6.39			

### Mine Permit Groundwater: **QAL024A**





PARAMETER	EVENT DATE	UNIT	BENCHMARK VALUE	RESULT
	3/10/14	mg/L	24	26
Alkalinity, Bicarbonate	7/29/14	mg/L	24	29
	11/13/14	mg/L	24	31

PARAMETER	EVENT DATE	UNIT	BENCHMARK VALUE	RESULT
011 11	3/10/14	mg/L	1.4	58
	5/14/14	mg/L	1.4	100
Chloride	7/29/14	mg/L	1.4	120
	11/13/14	mg/L	1.4	110

# CEMP Independent Monitoring

- The CEMP consists of four main components:
  - 1. Environmental monitoring required by Eagle Mine's permits
  - 2. Environmental monitoring *not* required by State or Federal Permits
  - 3. Publication of results and rating of environmental performance
  - 4. Community outreach to inform the public and provide opportunities for the community to provide input

- Upload data to CEMP website
- Monthly Summary Reports
- Social Media (Facebook, Twitter)
- Contacts/meetings with concerned citizens/organizations
  - Keweenaw Bay Indian Community
  - U.S. Geological Survey
  - Great Lakes Indian Fish and Wildlife Commission
  - Michigan Department of Environmental Quality
  - Yellow Dog Watershed Preserve





Community Environmental Monitoring Program Independent Evaluation of the Eagle Mine in Marquette County.



# Cotober 30, 2014 Eagle Mine applies to lease 40 acres of state land adjacent to Yellow Dog River Read More October 22, 2014 New Noise and Vibration Study Released! Read More October 21, 2014 CEMP Public Meetings Announced

Read More

### Community Environmental Monitoring Program Update September 2014



#### INTRODUCTION

September 2014 marks the two year anniversary of the Community Environmental Monitoring Program (CEMP) and also the start of the "operations" phase of the Eagle Mine. Prior to this phase, much of the environmental monitoring data collected was baseline or pre-mining data. From this point forward, CEMP will use this baseline data to interpret results of environmental monitoring data collected during the "operations" phase of Eagle Mine.

#### INDEPENDENT MONITORING

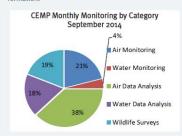
During September 2014, independent environmental monitoring of Eagle Mine by the Superior Watershed Partnership (SWP) included both split sampling and review and observations of data collected in and around the mine site and the Humboldt Mill. This included:

- Independent sampling and analysis of Eagle Mine's Water Treatment Plant discharge
- Contined air quality monitoring in Powell Township at the CEMP Air/Meteorological Station
- Portable air quality monitoring was conducted at Mine Ventilation Air Raise (MVAR) in conjunction with the Michigan DEQ permit required stack test.
- Field staff reviewed procedures and observed data collection by Eagle Mine consultants including small mammal and bird surveys at both the Eagle Mine and Humboldt Mill and fall fish population studies in the Salmon Trout and Yellow Dog Rivers

#### FINDINGS/RESULTS

- CEMP continued to monitor effluent from the Wastewater Treatment Plant prior to discharge to the Treated Water Infiltration System (TWIS). September results were in compliance with the Groundwater Discharge
- Air quality data from the Powell Township Air Station and portable air monitoring site near the Humboldt Mill were in compliance with the National Air Quality Standards.
- Results of the MVAR stack test are pending and will be posted to the CEMP website as soon as available.

- The Michigan Department of Environmental Quality Air Quality Division recently compared CEMP's air quality monitoring results (metal concentrations) from the Powell Township Air Station to appropriate health protective benchmarks in order to characterize the public health significance of the measured levels. Click <u>here</u> to go directly to the DEQ report.
- The CEMP Website Report Card was updated to reflect environmental performance during the Second Quarter of 2014. Eagle Mine received 5 green lights and 2 yellow lights for their performance during the quarter. Click <u>here</u> to go directly to the Report Card for more information



### PUBLIC OUTREACH/COMMUNITY INPUT

- CEMP and Eagle Mine environmental monitoring data continues to be uploaded to the CEMP website. To view recently uploaded data visit the CEMP data portal.
- SWP staff participated in related CEMP technical and policy committee meetings.

The SWP received the following inquiries/input from community members during September 2014:

Monitoring Category	Number of Inquiries
Noise/Vibration	2
Transportation Route	2
Mine Vent. Air Raise Testing	2
Monitoring Data	0
Treated Water Infiltration System	1
Total Inquiries	7

### Community Environmental Monitoring Program Update September 2014



### CEMP SUMMARY OF MONITORING September 2012 – September 2014

The CEMP has conducted the following environmental monitoring of the Eagle Mine since the start of the program in September 2012.

	Number of Samples/Events
EAGLE MINE	
Air	6
Groundwater	70
Surface Water	32
Flora/Fauna	13
Facilities	38
TOTAL EAGLE MINE	159
HUMBOLDT MILL	
Air	6
Groundwater	0
Surface Water	0
Flora/Fauna	3
Facilities	5
TOTAL HUMBOLDT MILL	14
TRANSPORTATION ROUTE	
Air	9
Groundwater	0
Surface Water	26
Noise	0
TOTAL TRANSPORTATION ROUTE	35
POWELL TOWNSHIP AIR STATION	
Particulate Matter (10 microns)	daily*
Particulate Matter (2.5 microns)	55
Metals	5
Meteorological Station	daily*
TOTAL POWELL TWP AIR STATION	60
TOTAL SAMPLES/EVENTS	268
over 8,000 samples collected annually	

\*over 8,000 samples collected annually



The CEMP deployed the portable air monitoring equipment to collect ambient air quality data at the Mine Ventilation Air Raise (MVAR) during the Michigan DEQ required stack test on September 16.



Eagle contractor and CEMP technician Hunter King conducting fish surveys on the Salmon Trout River, September 2014.



The Community Environmental Monitoring Program (CEMP) is a partnership between the Superior Watershed Partnership (SWP) and the Marquette County Community Foundation (MCCF), to provide independent, third party monitoring of the Eagle Mine located near the headwaters of the Salmon Trout River. This copper and nickel mine is located in Marquette County, Michigan about 10 miles from Lake Superior.

### Questions? Contact Us!

CEMP Hotline 906.228.6095. Ext. 11 or Online Feedback



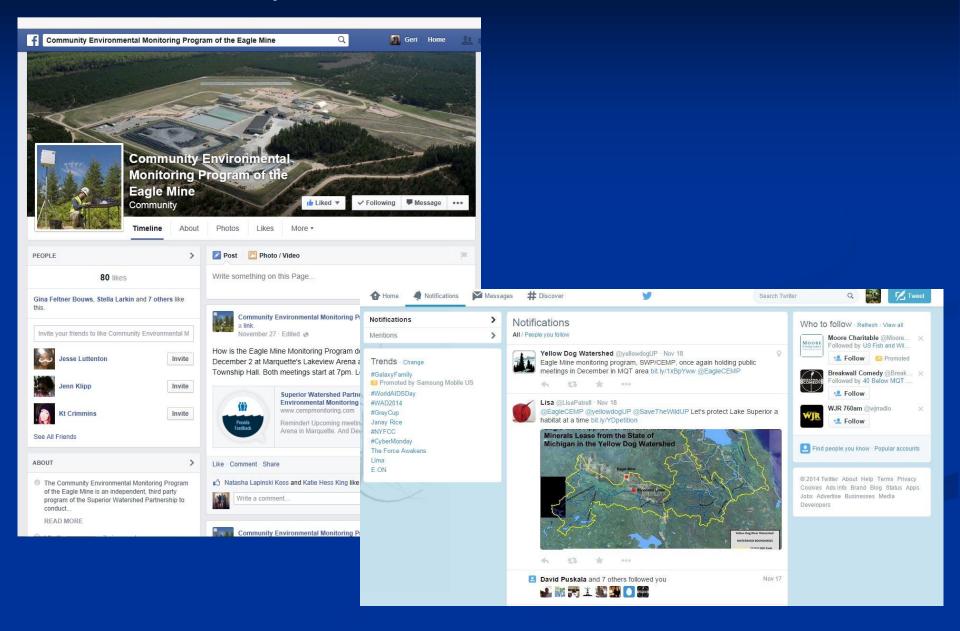
Eagle Mine Rock Storage Area

Francisco de disea de como de

Illustration (above)
of the Eagle Mine
Temporary
Development Rock
Storage Area
(TDRSA). This is the
area where the rock
is stored once it's
pulled from below
ground.

### **NEWS**

One way the CEMP informs the public about the environmental performance of the Eagle Mine is through the online Report Card. This can be found by clicking on the "Monitoring Tab" on the Navigational Bar on the <u>CEMP Website</u>. This

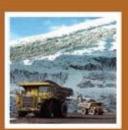


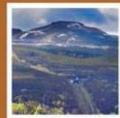
## Community Input

- Air Quality Monitoring in Powell Township (PM 2.5, PM 10, Metals)
- Transportation Route Monitoring (Air, Surface Water, and Noise)
- Humboldt Pit Surface Water Discharge
- Noise and Vibration Studies
- Mine Ventilation Air Raise DEQ required stack test results
- Snow Melt Monitoring

# RESPONSIBLE MINING

Case Studies in Managing Social & Environmental Risks in the Developed World









Edited by Michelle E. Jarvie-Eggart

# Questions?

Abbie Debiak Field Ecologist abbie@superiorwatersheds.org www.superiorwatersheds.org (906)228-6095 ext. 18

