

2014 Wildlife Species & Vegetative Assessment

Eagle Mine LLC

January 2015

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1.0 INTRODUCTION

King & MacGregor Environmental, Inc. (KME) was contracted by Eagle Mine LLC to collect ecological information within the Eagle Project Site (Study Area) located in northern Marquette County, Michigan (Figure 1-1.). All figures are provided in Appendix A. KME conducted ecological surveys in 2006-2008 and 2011-2014 for birds, small mammals, large mammals, and frogs and toads. In addition, wetland monitoring and upland vegetative surveys were conducted in 2007, 2008, and 2011-2014. This report is intended to describe the findings of the surveys conducted during 2014, and is considered a supplement to the previously submitted surveys.

In 2014, five survey points had no survey conducted or diminished survey results due to a variety of site disturbances. Point 3 was inaccessible due to active drilling. No data was collected at Points 11W and 12W as they have become active roadways for logging and drilling traffic. Point 14 was not surveyed in June as a result of clearing for Triple A Road improvements. By August, the area was regraded, seeded and strawed. A new plot was then established and surveyed. Limited data was also collected at Point 30 as it was mostly devegetated due to logging activity.

1.1 Study Area

The Study Area is located in Sections 1, 2, 3, 10, 11, and 12, Michigamme Township (T50N, R29W), Marquette County, Michigan (Figure 1-2.).

1.2 Project Purpose

The purpose of these surveys is to continue ecological investigation of birds, small mammals, large mammals, frogs and toads, wetland vegetation, and upland vegetation within the Study Area. Sampling points are shown on Figure 1-3.

2.0 BIRDS

2.1. Methods

The methodologies used and described in the *2007 Wildlife Species & Vegetative Assessment* (KME, 2007) were employed during the 2014 bird surveys. A breeding bird survey was conducted on June 10 and 11, 2014, at 26 survey points, two meander surveys—one north and one south from Triple A Road—were conducted on June 10, 2014,

and a fall bird survey was conducted during September 15 through 18, 2014, at 18 survey points (Figure 1-3.). Points were surveyed twice (i.e., two days) during the breeding and fall surveys. Any incidental observations of bird species not associated with survey points were also recorded and reported.

2.2 Results

During the June 2014 breeding bird survey, 516 birds representing 35 species were observed (Tables 2-1a. and 2-1b.). All tables are provided in Appendix B. During the September 2014 survey, 521 birds representing 19 species were observed (Tables 2-2a. and 2-2b.). A combined total of 1,037 birds representing 40 species were identified during these 2014 (June and September) bird surveys (Table 2-3.). Nashville warbler was by far the most abundant bird observed during the June 2014 survey, while the Canada goose was the most abundant species during the September 2014 survey. Additionally, ruffed grouse (*Bonasa umbellus*), American woodcock (*Scolopax minor*) and spruce grouse (*Falci pennis canadensis*) were detected while traveling between survey points in June and September 2014 near survey points 22, 23, 24, 28, and 29.

2.3 Discussion

The bird species identified during 2014 are similar to those species identified in previous surveys conducted within the Study Area and are consistent with the bird species expected to be found in the habitats present.

3.0 MAMMALS

3.1 Small Mammals

3.1.1 Methods

The methodologies utilized during the 2014 small mammal survey were consistent with those used and described in the *2011 Wildlife Species & Vegetative Assessment* (KME, 2011). Sampling methods employed the use of two small Sherman box traps, one large snap trap, and one small snap trap at every survey point. Sampling was conducted on September 16 through 18, 2014. Nine survey points were sampled during the 2014 survey (Figure 1-3.). Each survey point was sampled on three consecutive days, for a total of 27 sampling events.

3.1.2 Results

Twenty small mammals representing seven species were collected during the September survey period: deer mouse (*Peromyscus maniculatus*), eastern chipmunk (*Tamias striatus*), least chipmunk (*Tamias minimus*), northern flying squirrel (*Glaucomys sabrinus*), snowshoe hare (*Lepus americanus*), southern redback vole (*Clethrionomys gapperi*), and white-footed mouse (*Peromyscus leucopus*; Table 3.). The most common small mammal identified during the survey was the least chipmunk. Snowshoe hares and red squirrels (*Sciurus vulgaris*) were incidentally observed throughout the Study Area during the 2014 surveys.

3.1.3 Discussion

The small mammals encountered within the Study Area during the 2014 surveys are typical of those expected in the habitats present and are generally consistent with previous survey results. Red squirrels appear to be relatively common throughout the Study Area but appear to be highly adept at trap avoidance. A pine marten (*Martes americana*), fisher (*Martes pennanti*), and porcupine (*Erethizon dorsatum*) were observed during navigation between monitoring points. Other regionally common species possibly present or previously observed within the Study Area but not noted during the 2014 surveys include muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), river otter (*Lutra canadensis*), and raccoon (*Procyon lotor*). Small mammals appear to be distributed throughout wooded and open areas, in both upland and wetland habitats.

3.2 Large Mammals

3.2.1 Methods

The methodologies described in the 2007 *Wildlife Species & Vegetative Assessment* (KME, 2007) were employed during the 2014 large mammal surveys. Although the methodology did not include surveying specifically for large mammals, all observed evidence of large mammal presence was noted in the course of conducting field work for other wildlife and vegetation within the Study Area.

3.2.2 Results

Whitetail deer (*Odocoileus virginianus*) was the only large mammal species directly observed during the 2014 surveys. Deer were seen infrequently throughout the Study Area during the course of the ecological surveys. Fresh scat and tracks of moose (*Alces alces*) and coyote (*Canis latrans*) were observed occasionally throughout the Study Area.

3.2.3 Discussion

All of the large mammal species detected during the 2014 surveys are species that would be expected in the habitats present. Other regionally common species possibly present or previously observed within the Study Area but not observed during the 2014 surveys include red fox (*Vulpes vulpes*), the federally endangered gray wolf (*Canis lupus*), and bobcat (*Lynx rufus*). Indirect evidence of gray wolves, which included tracks and scat, was observed during the 2006, 2007, 2011, and 2012 ecological surveys. KME biologists also directly observed a single gray wolf in 2012.

4.0 FROGS AND TOADS

4.1 Methods

The methodologies used and described in the 2007 *Wildlife Species & Vegetative Assessment* (KME, 2007) were employed during the 2014 frog and toad survey. KME used the same three frog and toad sampling points previously established in 2006 (Figure 1-3.). Surveys were conducted after sunset during May 27, and June 11, 2014. Due to weather conditions including low temperatures and persistent ice and snow cover, an early spring (April 1 – May 5) survey was not conducted in 2014.

4.2 Results

Four frog species were heard during the survey: gray treefrog (*Hyla versicolor*), green frog (*Rana clamitans*), northern spring peeper (*Pseudacris crucifer*), and western chorus frog (*Pseudacris triseriata*; Table 4). Calling activity included Call Index values of 1, 2, and 3.

4.3 Discussion

All three of the sampling points exhibited use by frogs for breeding. The most frequently recorded species was the northern spring peeper. The frog species identified are typical of

those expected in the habitats present in the Study Area. The 2014 survey results are similar to those of previous years.

5.0 THREATENED AND ENDANGERED SPECIES

5.1 Methods

The Michigan Natural Features Inventory (MNFI) maintains a database of rare plants and animals in Michigan. KME requested a Rare Species Review (Appendix C) to determine if any protected species are known to occur within or nearby the Study Area. MNFI lists the narrow-leaved gentian (NLG; *Gentiana linearis*) as a state threatened species, and the spruce grouse as a state special concern species. In accordance with Michigan Department of Natural Resources (MDNR) guidelines (MDNR, 2001), KME surveyed for MNFI listed species and/or their habitats during the appropriate season.

As in past years, the MNFI Rare Species Review indicated the presence of NLG along the Salmon Trout River within the Study Area. The methods used to conduct the 2014 NLG field investigation were consistent with the previous NLG studies. Photographic and Global Positioning System documentation was collected on August 27 and 28, 2014 (Appendix D and Figure 5-1.). The area of investigation was expanded to include the area just north of the Yellow Dog River, in addition to the main branch of the Salmon Trout River south of Triple A Road. Local climate changes and overall health of the NLG colonies were assessed relative to previous years.

5.2 Results

The 2014 NLG survey results were similar to those of the 2010-2013 surveys (Meier, 2010 and KME, 2012). Flowering NLG were found in abundance (hundreds of individual plants) both along the Salmon Trout River in approximately the same areas where they were previously observed in previous years, and in the expanded search area north of the Yellow Dog River.

In 2006, the state and federally endangered Kirtland's warbler (*Dendroica kirtlandii*) was observed in Marquette County. Kirtland's warbler was not detected at any time during any of the 2014 ecological surveys. Spruce grouse is a state species of special concern; this species was occasionally observed in 2014 during the seasonal ecological surveys south

and east of the Salmon Trout River. Scat and tracks of moose, also listed as state species of special concern, were observed occasionally in 2014 throughout the Study Area. No evidence of gray wolf was discovered.

5.3 Discussion

The NLG colonies appeared healthy in 2014 relative to previous observances. According to National Oceanic and Atmospheric Administration data, precipitation totals were approximately 27% above the mean for the area during the 2014 water year and temperatures were near average. Flow in the Salmon Trout River and Yellow Dog River appeared normal. The necessary hydrology to support the NLG population appears to have been present in 2014. Evidence of gray wolf activity and direct observation have been recorded as recently as 2012. Kirtland's warbler has not been detected in the Study Area since KME began monitoring; however, suitable habitat for the species exists on site. Moose and spruce grouse appear to be active residents of the Study Area.

6.0 WETLAND VEGETATIVE MONITORING

6.1 Methods

The methodologies used and described in the *2007 Wildlife Species & Vegetative Assessment* (KME, 2007) were employed during the 2014 wetland vegetative monitoring. Eight of the original ten wetland sampling points established in 2006 were surveyed (Figure 1-3.). As noted in the introduction, Points 11W and 12W were not surveyed due to permanent disturbance. Wetland indicator statuses, native species ratings, and coefficients of conservatism have been updated from previous reports in order to remain current with the *National Wetland Plant List* (U.S. Army Corps of Engineers, 2014) and the University of Michigan Herbarium's online database (Reznicek et al., 2011). Wetland points were surveyed on June 10 and 11, 2014.

6.2 Results

The 2014 wetland sampling point data are presented in Tables 6a. through 6c. Table 6a. summarizes the herbaceous data collected within each wetland quadrat; percent duff/bare soil, dead vegetation, and moss cover are also listed for each quadrat. Table 6b. summarizes the woody species data collected within each 30-foot radius wetland plot. Table 6c. is an overall species list of the plants found within all of the wetland sampling

plots; this table summarizes the combined data and lists the total number of species, total number of native species, mean wetland indicator number, floristic quality index (FQI), and mean coefficient of conservatism.

A total of 58 different vascular plant species were observed during the 2014 wetland vegetation surveys, of which at least 52 were native. Three plants could not be identified to the species level making native status uncertain. Three species were positively identified as non-native. Overall, the plots contain an average of at least 90 percent native species. The combined six plants identified exhibit a low percent cover (Table 6c.). Wetland indicator values in the herbaceous stratum range from UPL to OBL (Table 6a.). Plants most often encountered in this stratum were tussock sedge (*Carex stricta*) and low sweet blueberry (*Vaccinium angustifolium*). In the shrub/sapling and overstory stratum (i.e., woody species), the values range from FACU to OBL (Table 6b.). The most commonly encountered species were red maple (*Acer rubrum*), black spruce (*Picea mariana*), speckled alder (*Alnus incana* ssp. *rugosa*), and balsam fir (*Abies balsamea*). The coefficients of conservatism ranged from 0 to 10 for all plots combined, with a mean of 4.5 (Table 6c.). The FQI for all wetland plots was 34.3 (Table 6c.). Mean wetland indicator value was -0.4 (Table 6c.).

6.3 Discussion

The data gathered provide qualitative and quantitative baselines against which to measure future monitoring results and determine if significant changes are occurring. Overall, the wetland botanical species assemblages do not appear to have changed significantly since the beginning of the KME study period. The mean wetland indicator code value for all of the plots is within the FAC to FACW range, indicating a species assemblage adapted to moderately wet conditions. The coefficients of conservatism associated with each plot generally indicate a flora with moderate to low fidelity to specific natural communities. One notable exception to this is plot 26W, which is within a bog/muskeg. Photos of wetland vegetation plots are provided in Appendix E.

7.0 UPLAND VEGETATIVE MONITORING

7.1 Methods

The methodologies used and described in the *2007 Wildlife Species & Vegetative Assessment* (KME, 2007) were employed during the 2014 upland vegetative monitoring.

The 2014 early growing season monitoring of upland vegetation was conducted during June 10 and 11; monitoring occurred at 16 survey points along seven transects. Late summer monitoring was conducted on August 27 and 28, at 17 upland survey points (Fig. 1-3.). Survey Point 3 was not sampled because it was occupied by an exploratory drilling operation during both study periods. Point 14 was not monitored in June, 2014 due to road right-of-way work, which included grading and clearing the trees from much of the sampling plot and surrounding area. During the August monitoring period, Point 14 was reestablished several feet to the east. At that time, the area appeared to have been recently seeded and mulched to stabilize the bare soil. As a result, no plant species were observed in the herbaceous layer.

7.2 Results

The 2014 upland vegetative survey plot data are presented in Tables 7-1a. through 7-2c. Tables 7-1a. (June) and 7-2a. (August) summarize the herbaceous data collected within each quadrat; percent duff/bare soil is also listed for each quadrat. Tables 7-1b. (June) and 7-2b. (August) summarize the woody species data collected within each 30-foot radius plot. Table 7-1c. is an overall species list of the plants found within all of the upland vegetative survey plots during June. Table 7-2c. is an overall species list of the plants found within all of the upland vegetative survey plots during August. Tables 7-1c. and 7-2c. summarize the combined data and list the total number of species, total number of native species, mean wetland indicator number, and mean coefficient of conservatism. A total of 42 different vascular plant species were observed during the June 2014 upland vegetative surveys (Table 7-1c.). A total of 40 different vascular plant species were observed during the August 2014 upland vegetative surveys (Table 7-2c.). Each plot exhibited 100 percent native species during both upland survey periods.

In the June upland survey, the most commonly observed plants within the herbaceous quadrats were bracken fern (*Pteridium aquilinum*), low sweet blueberry, and an unidentified moss species. In the August upland survey, the most commonly observed plants within the quadrats were velvetleaf blueberry (*Vaccinium myrtilloides*), low sweet blueberry, and an unidentified moss species. Bare soil/duff was also frequently noted in both June and August. Because the foliage of different species can overlap, the total cover in some plots exceeds 100 percent.

Within the 30-foot radius circular plots, 20 woody species were identified in a combination of both the June and August upland surveys. The most frequently encountered species in June and August were red maple (*Acer rubrum*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), and jack pine (*Pinus banksiana*).

The coefficients of conservatism ranged from 0 to 10, with an average of 4.7 for all June plots and average of 4.7 for all August plots (Table 7-1c. and 7-2c.). No state or federally protected plant species were documented. Photos of upland vegetation plots are provided in Appendix F. The overall FQI for upland plots was 30.3 in June and 30.0 in August.

7.3 Discussion

The data gathered provide qualitative and quantitative baselines against which to measure future monitoring results and determine if significant changes are occurring. The minor difference between the June and August 2014 herbaceous plant lists is likely due to seasonal plant emergence and senescence. The slight seasonal variation within the 30-foot radius plots is likely attributable to natural mortality and recruitment. The wide range of wetland indicator codes indicates a wide variability of microtopographical conditions. The moderate overall mean coefficient of conservatism reflects the lack of non-native species encountered. In general, the vegetative assemblage appears to be similar to previous vegetation surveys.

8.0 CONCLUSION

The wildlife and plant species identified during the 2014 surveys within the Study Area are similar to those identified during previous KME surveys. Forty species of birds, none of which are threatened or endangered, were observed during the bird surveys, and three additional bird species were identified during other KME surveys (e.g., vegetation surveys). Seven small mammal species, none of which are threatened or endangered, were documented. Only one large mammal species was directly observed in 2014, and no evidence of threatened or endangered large mammal species was recorded. Vegetative sampling plots in both wetland and upland communities identified plant species that are common within the region. No threatened or endangered plant species were encountered within the vegetative survey plots. The population of narrow-leafed gentian observed within the revised study area was robust. All of the wildlife and plant species identified within the

Study Area are typically associated with vegetative communities that are relatively common within the region.

9.0 REFERENCES AND LITERATURE CITED

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APPENDIX A: FIGURES

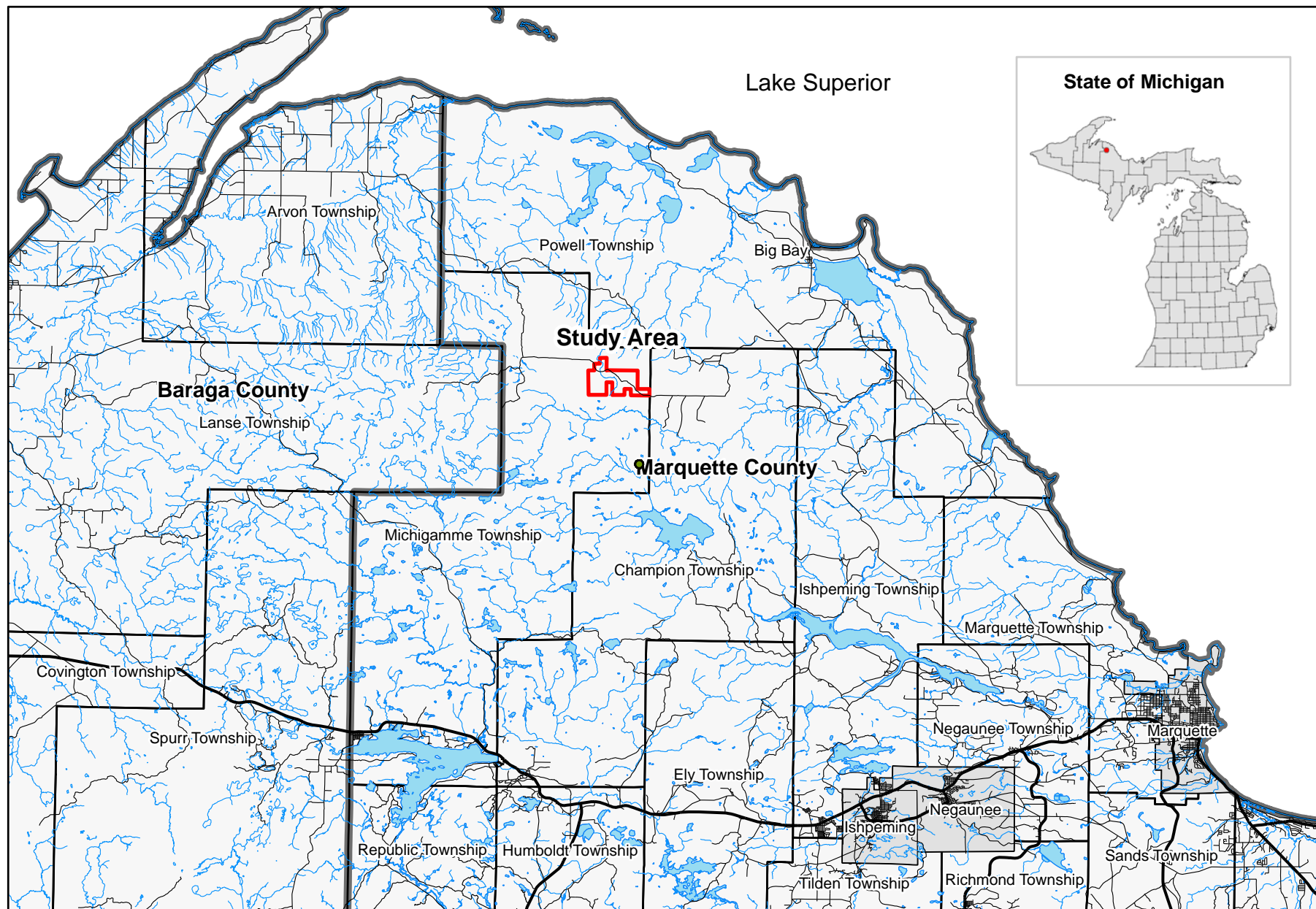








Figure 1-1. Project Location

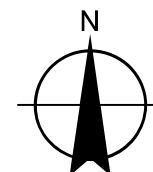


King & MacGregor Environmental, Inc.

Legend

- | | | | |
|---------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------|-----------------|
|  | Study Area |  | State Highways |
|  | City |  | Roads |
|  | County |  | Lakes & Streams |

0 2 4 8 Miles



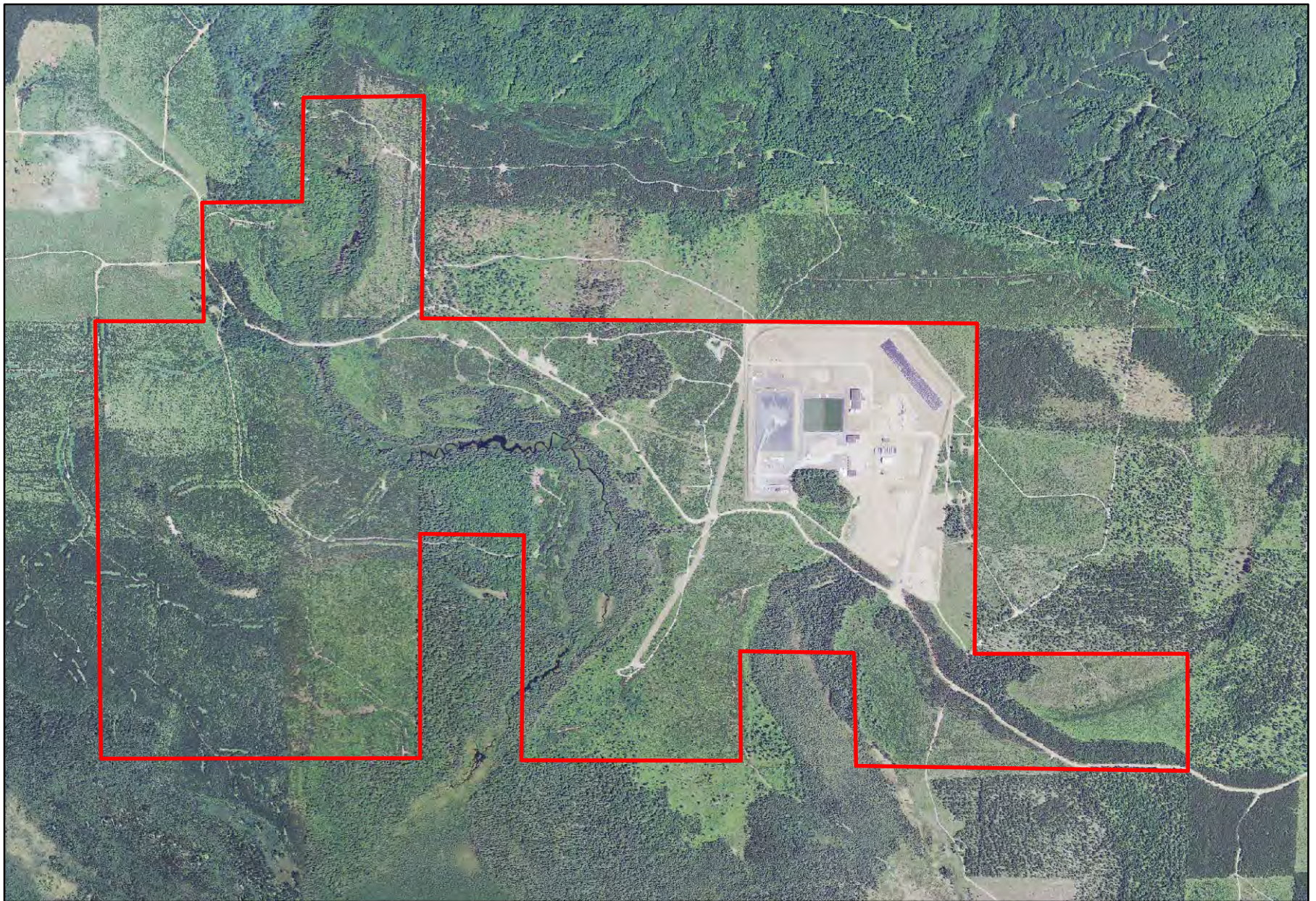
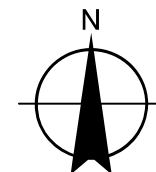
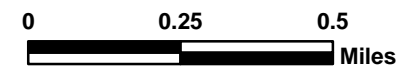
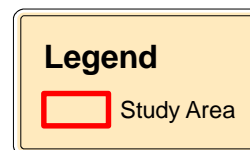


Figure 1-2. Study Area



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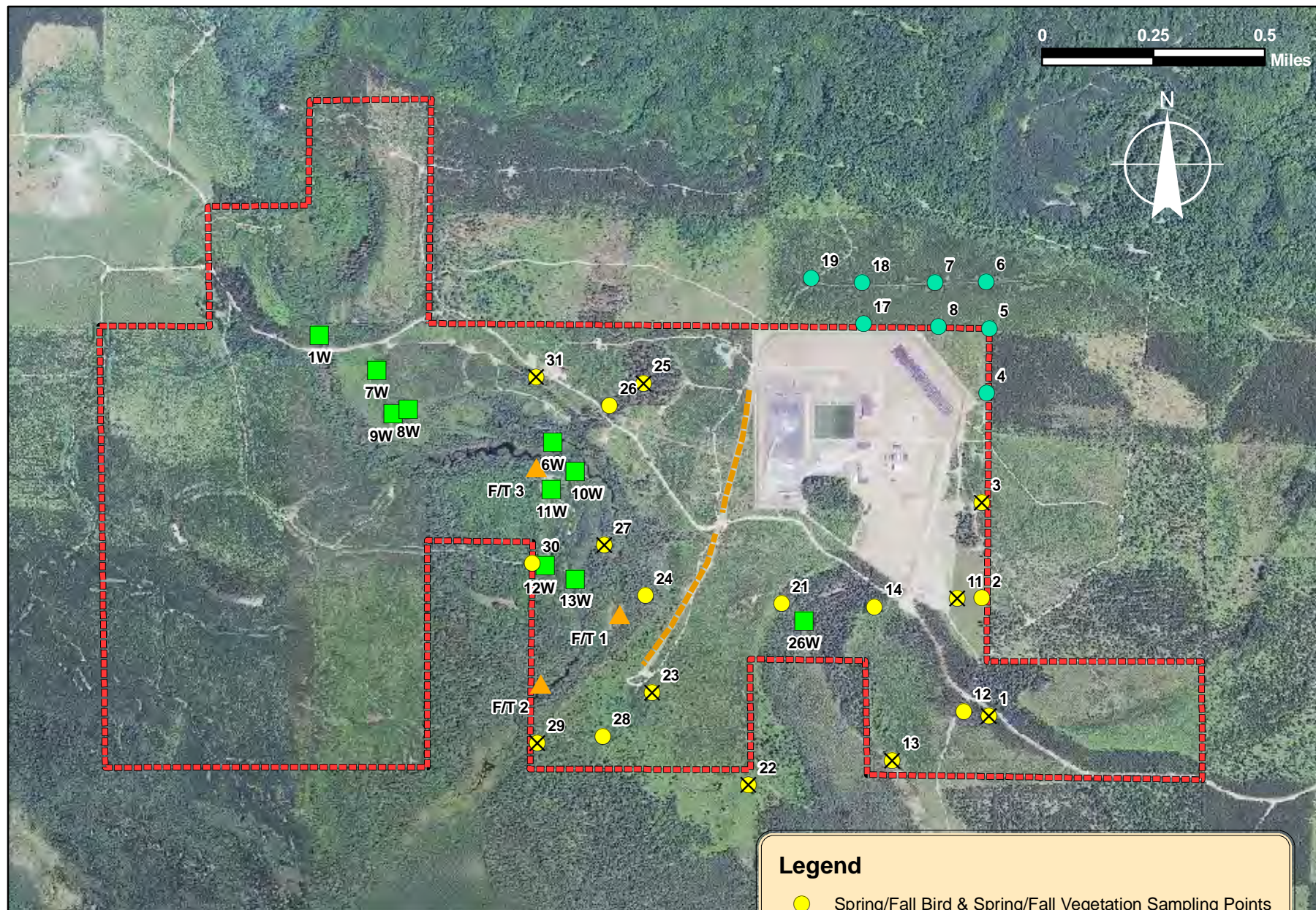


Figure 1-3. Biological and Wetland Sampling Areas



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Legend

- Spring/Fall Bird & Spring/Fall Vegetation Sampling Points
- Spring-Only Bird Sampling Points
- Meander Survey
- X Small Mammal Trapping Points (Fall Only)
- Wetland Vegetation Sampling Point
- ▲ Frog/Toad Sampling Point
- Study Area

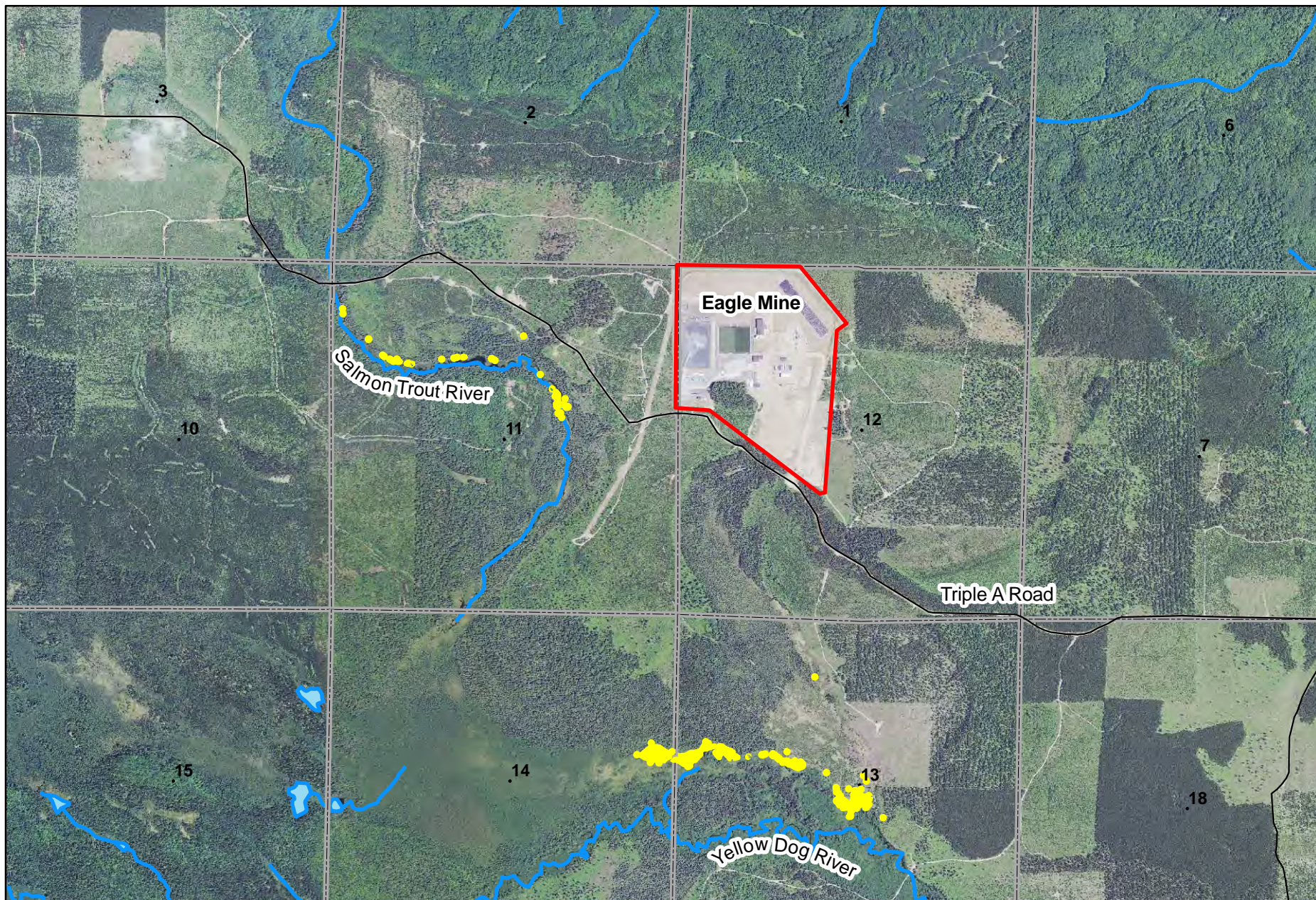



Figure 5-1. Narrow-leaved Gentian Survey (August 2014)

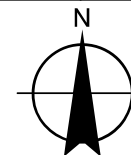


King & MacGregor Environmental, Inc.

Legend

 Narrow-leaved Gentian

0 0.25 0.5 1 Miles



APPENDIX B: TABLES

Table 2-1a. Bird Survey Point Data - June 2014

Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Redstart	American Robin	American Yellow Warbler	Black-throated Green Warbler	Blue Jay	Brown Thrasher	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Clay-colored Sparrow	Common Night Hawk	Dark-eyed Junco	Eastern Whip-poor-will	Hermit Thrush	Merlin	Mourning Dove	Nashville Warbler	Northern Cardinal	Northern Flicker	Ovenbird	Pine Warbler	Red-eyed Vireo	Red-winged Blackbird	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Spruce Grouse	Veery	Vesper Sparrow	White-breasted Nuthatch	White-throated Sparrow	Yellow-rumped Warbler	Total Count	Species Richness			
1	6/10/14					1										1		1			4				1										2		10	6			
1	6/11/14	1											2			1					3																7	4			
2	6/10/14					1				1			1	1		2		2			1				1										1		11	9			
2	6/11/14												2			1		1	1		2																7	5			
1N	6/10/14	1				3										3		1			6												2			16	6				
2S	6/10/14	1									2					2					4				1										1		11	6			
N	6/11/14	2											1								1												1			5	4				
S	6/11/14	2							1				1								2						1										7	5			
4	6/10/14	1				1									1	1		1			2				1										2		10	8			
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18	6/10/14					1										4		2			3					1													11	5	
18	6/11/14			1									1	1		1		1			1	1				1													8	8	
19	6/10/14					1			1							1		1			2				1														7	6	
19	6/11/14												1			2		2			4					1													10	5	
21	6/10/14	1														1					2															1			5	4	
21	6/11/14	1														1					3																		6	4	
22	6/10/14																																						0	0	
22	6/11/14														1	1					2															2			8	5	
23	6/10/14					1							1			4		2			3															1			12	6	
23	6/11/14	2	1													5		3			4									2						2			19	7	
24	6/10/14					2		1													3															2			8	4	
24	6/11/14				1											1			1																					4	4
25	6/10/14															1					2																		4	3	
25	6/11/14	1				1			1				1			2		2			2				1											1			12	9	
26	6/10/14				1											1					3				1											2			8	5	
26	6/10/14	1							1				1			4					2																		9	5	

Table 2-1a. Bird Survey Point Data - June 2014

Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Redstart	American Robin	American Yellow Warbler	Black-throated Green Warbler	Blue Jay	Brown Thrasher	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Clay-colored Sparrow	Common Night Hawk	Dark-eyed Junco	Eastern Whip-poor-will	Hermit Thrush	Merlin	Mourning Dove	Nashville Warbler	Northern Cardinal	Northern Flicker	Ovenbird	Pine Warbler	Red-eyed Vireo	Red-winged Blackbird	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Spruce Grouse	Veery	Vesper Sparrow	White-breasted Nuthatch	White-throated Sparrow	Yellow-rumped Warbler	Total Count	Species Richness	
26	6/11/14	2									3		1			2		1			3				2											1		15	8
27	6/10/14																				3					1									3		7	3	
27	6/11/14	1																		1				1	1	1			1						1		10	8	
28	6/10/14					1			1							2		1			2															1		8	6
28	6/11/14	2							1							3		1			3								1							2		13	7
29	6/10/14								1							1		1			1															2		7	6
29	6/11/14	1					1		2							1					2					1										2		9	6
30	6/10/14					1										1							1	1											2		6	5	
30	6/11/14	2										1			1	1	1	3			2			1	1	1										2		16	11
31	6/10/14	1				1							1			3					3					1										1		11	7
31	6/11/14	2							1							3		3			3					1										2		15	7
	Total	31	2	2	3	28	1	1	13	6	5	2	21	4	5	78	1	57	2	1	135	2	1	5	18	19	1	2	3	2	3	1	7	3	50	1	516	35	

¹N - Meander North²S - Meander South

Mean of Species Richness per Survey Point per Day 6

Median of Species Richness per Survey Point per Day 6

Mean Count per Species 15

Median Count per Species 15

Table 2-1b. Bird Species Abundance Rankings - June 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Nashville Warbler	<i>Vermivora ruficapilla</i>	135	26.2%
Dark-eyed Junco	<i>Junco hyemalis</i>	78	15.1%
Hermit Thrush	<i>Catharus guttatus</i>	57	11.0%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	50	9.7%
American Crow	<i>Corvus brachyrhynchos</i>	31	6.0%
American Robin	<i>Turdus migratorius</i>	28	5.4%
Chipping Sparrow	<i>Spizella passerina</i>	21	4.1%
Red-eyed Vireo	<i>Vireo olivaceus</i>	19	3.7%
Pine Warbler	<i>Dendroica pinus</i>	18	3.5%
Blue Jay	<i>Cyanocitta cristata</i>	13	2.5%
Vesper Sparrow	<i>Pooecetes gramineus</i>	7	1.4%
Brown Thrasher	<i>Toxostoma rufum</i>	6	1.2%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	5	1.0%
Common Nighthawk	<i>Chordeiles minor</i>	5	1.0%
Ovenbird	<i>Seiurus aurocapilla</i>	5	1.0%
Clay-colored Sparrow	<i>Spizella pallida</i>	4	0.8%
American Redstart	<i>Setophaga ruticilla</i>	3	0.6%
Sandhill Crane	<i>Grus canadensis</i>	3	0.6%
Spruce Grouse	<i>Falcipennis canadensis</i>	3	0.6%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	3	0.6%
American Goldfinch	<i>Spinus tristis</i>	2	0.4%
American Herring Gull	<i>Larus smithsonianus</i>	2	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	0.4%
Merlin	<i>Falco columbarius</i>	2	0.4%
Northern Cardinal	<i>Cardinalis cardinalis</i>	2	0.4%
Song Sparrow	<i>Melospiza melodia</i>	2	0.4%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2	0.4%
American Yellow Warbler	<i>Dendroica petechia</i>	1	0.2%
Black-throated Green Warbler	<i>Dendroica virens</i>	1	0.2%
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	1	0.2%
Mourning Dove	<i>Zenaidura macroura</i>	1	0.2%
Northern Flicker	<i>Colaptes auratus</i>	1	0.2%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1	0.2%
Veery	<i>Catharus fuscescens</i>	1	0.2%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	1	0.2%

Total Count **516**
Mean Count per Species **15**
Median Count per Species **3**
Total Number of Species **35**

Table 2-2a. Bird Survey Point Data - September 2014

Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Kestrel	American Robin	Black-capped Chickadee	Blue Jay	Canada Goose	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Common Raven	Dark-eyed Junco	Hairy Woodpecker	Hermit Thrush	Northern Flicker	Spruce Grouse	White-breasted Nuthatch	White-throated Sparrow	Total Count	Species Richness
1	9/15/14		1			1		1		3				1	1						8	6
1	9/16/14						1	1											1		3	3
2	9/15/14					1		2					1	2		1			1		8	6
2	9/16/14		4											2		1					7	3
4	9/15/14	2			1		4	1					1	1					1		11	7
4	9/16/14				1			1				1		2							5	4
11	9/15/14		3					5						1							9	3
11	9/16/14		1									1									2	2
12	9/15/14													1							1	1
12	9/16/14													2							2	1
13	9/15/14	1						1									1				3	3
13	9/16/14							1													1	1
14	9/15/14	1					2			1				3							7	4
14	9/16/14	1		1										1							3	3
21	9/15/14												1	3				2			6	3
21	9/16/14	1						1				1		1							4	4
22	9/15/14													1							1	1
22	9/16/14	1				1		1													3	3
23	9/16/14							3						1			2				6	3
23	9/17/14					1								2							3	2
24	9/16/14	2	1			1	2	2													8	5
24	9/17/14	2					1	245					1				1				250	5
25	9/15/14						2	2									2				6	3
25	9/16/14	2	2					4													8	3
26	9/16/14		1				3	2	3					1							10	5
26	9/18/14							3									1				4	2
27	9/16/14	1						3													4	2
27	9/18/14										2									1	3	2
28	9/16/14							3													3	1
28	9/17/14	1							43												44	2
29	9/16/14							1						1							2	2
29	9/17/14							2	61												63	2
30	9/15/14							3									3				6	2
30	9/16/14							2		4				1							7	3
31	9/15/14	1						2													3	2
31	9/16/14	1						3						3							7	3
Total		17	13	1	2	5	14	51	352	8	2	3	4	30	1	2	10	2	2	2	521	19

Mean of Species Richness per Survey Point per Day 3
 Median of Species Richness per Survey Point per Day 3
 Mean Count per Species 27

Table 2-2b. Bird Species Abundance Rankings - September 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	352	67.6%
Blue Jay	<i>Cyanocitta cristata</i>	51	9.8%
Dark-eyed Junco	<i>Junco hyemalis</i>	30	5.8%
American Crow	<i>Corvus brachyrhynchos</i>	17	3.3%
Black-capped Chickadee	<i>Poecile atricapilla</i>	14	2.7%
American Goldfinch	<i>Carduelis tristis</i>	13	2.5%
Northern Flicker	<i>Colaptes auratus</i>	10	1.9%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	8	1.5%
American Robin	<i>Turdus migratorius</i>	5	1.0%
Common Raven	<i>Corvus corax</i>	4	0.8%
Chipping Sparrow	<i>Spizella passerina</i>	3	0.6%
American Kestrel	<i>Falco sparverius</i>	2	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	0.4%
Hermit Thrush	<i>Catharus guttatus</i>	2	0.4%
Spruce Grouse	<i>Falcipennis canadensis</i>	2	0.4%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	2	0.4%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	2	0.4%
Hairy Woodpecker	<i>Picoides villosus</i>	1	0.2%
American Herring Gull	<i>Larus smithsonianus</i>	1	0.2%

Total Count	521
Mean Count per Species	27
Median Count per Species	4
Total Number of Species	19

Table 2-3. Bird Species Abundance Rankings - June/September Combined 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	352	33.9%
Nashville Warbler	<i>Vermivora ruficapilla</i>	135	13.0%
Dark-eyed Junco	<i>Junco hyemalis</i>	108	10.4%
Blue Jay	<i>Cyanocitta cristata</i>	64	6.2%
Hermit Thrush	<i>Catharus guttatus</i>	59	5.7%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	52	5.0%
American Crow	<i>Corvus brachyrhynchos</i>	48	4.6%
American Robin	<i>Turdus migratorius</i>	29	2.8%
Chipping Sparrow	<i>Spizella passerina</i>	26	2.5%
Red-eyed Vireo	<i>Vireo olivaceus</i>	19	1.8%
Pine Warbler	<i>Dendroica pinus</i>	18	1.7%
American Goldfinch	<i>Carduelis tristis</i>	15	1.4%
Black-capped Chickadee	<i>Poecile atricapilla</i>	14	1.4%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	13	1.3%
Northern Flicker	<i>Colaptes auratus</i>	11	1.1%
Vesper Sparrow	<i>Pooecetes gramineus</i>	7	0.7%
Brown Thrasher	<i>Toxostoma rufum</i>	6	0.6%
Common Nighthawk	<i>Chordeiles minor</i>	5	0.5%
Ovenbird	<i>Seiurus aurocapilla</i>	5	0.5%
Spruce Grouse	<i>Falci pennis canadensis</i>	5	0.5%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	5	0.5%
American Redstart	<i>Setophaga ruticilla</i>	4	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	4	0.4%
Clay-colored Sparrow	<i>Spizella pallida</i>	4	0.4%
Common Raven	<i>Corvus corax</i>	4	0.4%
American Herring Gull	<i>Larus smithsonianus</i>	3	0.3%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	3	0.3%
Sandhill Crane	<i>Grus canadensis</i>	3	0.3%
American Kestrel	<i>Falco sparverius</i>	2	0.2%
Merlin	<i>Falco columbarius</i>	2	0.2%
Northern Cardinal	<i>Cardinalis cardinalis</i>	2	0.2%
Song Sparrow	<i>Melospiza melodia</i>	2	0.2%
American Yellow Warbler	<i>Dendroica petechia</i>	1	0.1%
Black-throated Green Warbler	<i>Dendroica virens</i>	1	0.1%
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	1	0.1%
Hairy Woodpecker	<i>Picoides villosus</i>	1	0.1%
Mourning Dove	<i>Zenaida macroura</i>	1	0.1%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1	0.1%
Veery	<i>Catharus fuscescens</i>	1	0.1%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	1	0.1%

Total Count	1037
Mean Count per Species	18
Median Count per Species	5
Total Number of Species	40

Table 3. Small Mammal Survey Point Data - 2014

Eagle Mine LLC

Survey Point	Date	Sherman Live Trap					Large Snap Trap			Small Snap Trap			
		Deer Mouse (<i>Peromyscus maniculatus</i>)	Eastern Chipmunk (<i>Tamias striatus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Southern Redback Vole (<i>Clethrionomys gapperi</i>)	White-footed Mouse (<i>Peromyscus leucopus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Northern Flying Squirrel (<i>Glaucomys sabrinus</i>)	Snowshoe hare (<i>Lepus americanus</i>)	Deer Mouse (<i>Peromyscus maniculatus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Total Count	Species Richness
1	9/16/14			1							1	2	1
1	9/17/14			1								1	1
1	9/18/14											0	0
11	9/16/14		1									1	1
11	9/17/14											0	0
11	9/18/14			1								1	1
13	9/16/14				1						1	2	2
13	9/17/14				1							1	1
13	9/18/14											0	0
22	9/16/14		1									1	1
22	9/17/14											0	0
22	9/18/14											0	0
23	9/16/14											0	0
23	9/17/14											0	0
23	9/18/14	1							1			2	2
25	9/16/14											0	0
25	9/17/14											0	0
25	9/18/14											0	0
27	9/16/14											0	0
27	9/17/14											0	0
27	9/18/14											0	0
29	9/16/14	1										1	1
29	9/17/14											0	0
29	9/18/14											0	0
31	9/16/14					1						1	1
31	9/17/14			1		1		1			1	4	3
31	9/18/14	1					1			1		3	2
Total		3	2	4	2	2	1	1	1	1	3	20	7

Mean of Species Richness per Survey Point per Day 1
 Median of Species Richness per Survey Point per Day 0
 Mean Count per Species 2
 Median Count per Species 2

Table 4. Frog and Toad Survey Point Data - 2014

Eagle Mine LLC

Survey Point	Survey Period	Date	Time	Temp (°F)	Wind Speed (MPH)	Call Index Value*				Median Call Index Value per Survey Point	Species Richness
						Northern Spring Peeper (<i>Pseudacris crucifer</i>)	Green Frog (<i>Rana clamitans</i>)	Western Chorus frog (<i>Pseudacris triseriata</i>)	Gray Treefrog (<i>Hyla versicolor</i>)		
FT01	Late Spring	5/27/14	9:55 PM	58.1	0	3		3	2	3	3
FT02	Late Spring	5/27/14	9:36 PM	56.7	0	3		3		3	2
FT03	Late Spring	5/27/14	10:38 PM	53.5	0	3		3		3	2
FT01	Summer	6/11/14	10:09 PM	59.8	0	2	1		2	2	3
FT02	Summer	6/11/14	9:48 PM	60.3	0	2	1		2	2	3
FT03	Summer	6/11/14	10:44 PM	59.8	0	3	1			2	2
					Total	16	3	9	6	2.5	4

*1 = Individuals can be counted and there is space between calls.

2 = Individuals can be counted but there is some overlapping of calls.

3 = Full chorus; calls are continuous and overlapping.

Mean of Species Richness per Survey Point per Day 3
 Median of Species Richness per Survey Point per Day 3
 Mean Call Index Value per Survey Point per Day 3
 Median Call Index Value per Survey Point per Day 3
 Median Call Index Value for All Species 2

Table 6a. Herbaceous Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Herbaceous Species Percent Cover Per 1m Quadrat							
							Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes			5	5		5		
<i>Agrostis scabra</i>	Tickle-grass	4	FAC	0	Herb	Yes					5			
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes				5				
<i>Anemone quinquefolia</i>	Wood Anemone	5	FAC	0	Herb	Yes	5							
<i>Avenella flexuosa</i>	Wavy Hair Grass	6	UPL	5	Herb	Yes					20			
<i>Brachyelytrum erectum</i>	Short-glume Grass	7	FACU	3	Herb	Yes	5							
<i>Calamagrostis canadensis</i>	Blue-joint	3	OBL	-5	Herb	Yes		5	10	5			5	
<i>Carex lasiocarpa</i>	Woolly-fruit Sedge	8	OBL	-5	Herb	Yes		5						
<i>Carex leptalea</i>	Bristly-stalk Sedge	5	OBL	-5	Herb	Yes	20							
<i>Carex oligosperma</i>	Few-seeded Sedge	10	OBL	-5	Herb	Yes								5
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes	45	65					20	
<i>Carex trisperma</i>	Three-seeded Sedge	9	OBL	-5	Herb	Yes						5		
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes								5
<i>Cirsium sp.</i>	Thistle	NA	NA	NA	Herb	NA				5				
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes				5		5		
<i>Cornus canadensis</i>	Bunchberry, Dwarf Cornel	6	FAC	0	Herb	Yes				5	5	5		
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes					20			
<i>Diervilla lonicera</i>	Bush Honeysuckle	4	UPL	5	Shrub	Yes					5			
<i>Dryopteris carthusiana</i>	Spinulose Woodfern	5	FACW	-3	Herb	Yes	5							
<i>Dryopteris intermedia</i>	Intermediate Fern	5	FAC	0	Herb	Yes						10		
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes				15				
<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	UPL	5	Herb	No					15			
<i>Hieracium caespitosum</i>	Yellow Hawkweed	0	UPL	5	Herb	No				15				
<i>Hieracium sp.</i>	Hawkweed	0	UPL	5	Herb	No			5					
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes							5	
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes								10
<i>Linnaea borealis</i>	Twin Flower	6	FAC	0	Herb	Yes				5				
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes			5		5			
<i>Osmunda cinnamomea</i>	Cinnamon Fern	5	FACW	-3	Herb	Yes						10		
<i>Oxalis acetosella</i>	Northern Wood Sorrel	7	FACU	3	Herb	Yes						5		
<i>Panax trifolius</i>	Dwarf Gensing	8	UPL	5	Herb	Yes					5			
<i>Phleum pratense</i>	Timothy	0	FACU	3	Herb	No					5			
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes			5					

Table 6a. Herbaceous Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Herbaceous Species Percent Cover Per 1m Quadrat							
							Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Potentilla palustris</i>	Marsh Cinquefoil	7	OBL	-5	Herb	Yes		5						
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes				5				
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes	5							
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes					5			
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes								40
<i>Rubus pubescens</i>	Dwarf Raspberry	4	FACW	-3	Herb	Yes	10							
<i>Rubus setosus</i>	Setose Blackberry	3	FACW	-3	Shrub	Yes			5		5			
<i>Solidago juncea</i>	Early Goldenrod	3	UPL	5	Herb	Yes				5				
<i>Thalictrum dasycarpum</i>	Hairy-fruit Meadow-rue	3	FACW	-3	Herb	Yes	5							
<i>Utricularia sp.</i>	Bladderwort	0	OBL	-5	Herb	Yes		5						
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes				45	30			
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes					10			
<i>Viola sp.</i>	Violet; Pansie	NA	NA	NA	Herb	NA				5				
NA	Dead Vegetation	NA	NA	NA	NA	NA		50	75	5			95	
NA	Duff / Bare Soil	NA	NA	NA	NA	NA					5			
NA	Moss	NA	NA	NA	Moss	Yes			5	25		20		95
Total Number of Species							8	5	6	13	13	7	3	4
Total Number of Native Species							8	5	5	10	11	7	3	4
Mean Wetland Indicator Value (W)							-1.6	-5.0	-0.5	1.0	2.2	-1.1	-5.0	-5.0
Mean Coefficient of Conservatism (C)							4.4	4.4	2.0	2.8	3.6	5.4	4.0	9.0
Floristic Quality Index (FQI)							12.4	9.8	4.9	10.3	13.0	14.4	6.9	18.0

Table 6b. Woody Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

							Woody Species Stems Per Permanent 30' Radius Plot							
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	23		9	69	19	17	2	
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	47		172	31	49	192		
<i>Alnus incana ssp. rugosa</i>	Speckled Alder	5	FACW	-5	Shrub	Yes	83	56	3					
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes	4		14	6	4			
<i>Aronia prunifolia (A. melanocarpa)</i>	Chokeberry	5	FACW	-3	Shrub	Yes							1	
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes			5	7	11			
<i>Crataegus sp.</i>	Hawthorn	NA	NA	NA	Tree	NA			1					
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes		1				9	4	9
<i>Lonicera canadensis</i>	Canada Honeysuckle	5	FACU	3	Shrub	Yes	8							
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes						5	1	
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	26			47	14	25	15	25
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes			4	19	12		1	
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes			2					
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes								2
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes			9		4			
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes					5			
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes	10		32	12	19			
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes	21							
Total Number of Species							8	2	10	7	9	5	6	3
Total Number of Native Species							8	2	9	7	9	5	6	3
Mean Wetland Indicator Value (W)							-0.3	-4.0	0.4	0.4	0.7	-2.8	-2.3	-1.0
Mean Coefficient of Conservatism (C)							3.0	5.0	2.5	2.7	2.6	4.4	5.2	4.7
Floristic Quality Index (FQI)							8.5	7.1	7.9	7.2	7.7	9.8	12.7	8.1

Table 6c. Overall Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Agrostis scabra</i>	Ticklegrass	4	FAC	0	Herb	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Anemone quinquefolia</i>	Wood Anemone	5	FAC	0	Herb	Yes
<i>Avenella flexuosa</i>	Flexuosa Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Brachyelytrum erectum</i>	Short-glume Grass	7	FACU	3	Herb	Yes
<i>Calamagrostis canadensis</i>	Blue-joint	3	OBL	-5	Herb	Yes
<i>Carex lasiocarpa</i>	Woolly-fruit Sedge	8	OBL	-5	Herb	Yes
<i>Carex leptalea</i>	Sedge	5	OBL	-5	Herb	Yes
<i>Carex oligosperma</i>	Few-seeded Sedge	10	OBL	-5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Carex trisperma</i>	Three-seeded Sedge	9	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Cirsium</i> sp.	Thistle	NA	NA	NA	Herb	NA
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Crataegus</i> sp.	Hawthorn	NA	NA	NA	Tree	NA
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Diervilla lonicera</i>	Bush-Honeysuckle	4	UPL	5	Shrub	Yes
<i>Dryopteris carthusiana</i>	Spinulose Woodfern	5	FACW	-3	Herb	Yes
<i>Dryopteris intermedia</i>	Intermediate Fern	5	FAC	0	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	UPL	5	Herb	No
<i>Hieracium caespitosum</i>	Yellow Hawkweed	0	UPL	5	Herb	No
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Kalmia polifolia</i>	Swamp-laurel	10	OBL	-5	Shrub	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Linnaea borealis</i>	Twin Flower	6	FAC	0	Herb	Yes
<i>Lonicera canadensis</i>	Canada Honeysuckle	5	FACU	3	Shrub	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Osmunda cinnamomea</i>	Cinnamon Fern	5	FACW	-3	Herb	Yes
<i>Oxalis acetosella</i>	Northern Wood-sorrel	7	FACU	3	Herb	Yes
<i>Panax trifolius</i>	Dwarf Ginseng	8	UPL	5	Herb	Yes
<i>Phleum pratense</i>	Timothy	0	FACU	3	Herb	No
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Potentilla palustris</i>	Marsh Cinquefoil	7	OBL	-5	Herb	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Rubus pubescens</i>	Dwarf Raspberry	4	FACW	-3	Herb	Yes
<i>Rubus setosus</i>	Setose Blackberry	3	FACW	-3	Shrub	Yes
<i>Salix discolor</i>	Pussy Willow	1	FACW	-3	Shrub	Yes
<i>Solidago juncea</i>	Early Goldenrod	3	UPL	5	Herb	Yes
<i>Thalictrum dasycarpum</i>	Hairy-fruit Meadow-rue	3	FACW	-3	Herb	Yes
<i>Utricularia</i> sp.	Bladderwort	0	OBL	-5	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes
<i>Viola</i> sp.	Violet	NA	NA	NA	Herb	NA

Total Number of Species	58
Total Number of Native Species	52
Mean Wetland Indicator Value (W)	-0.4
Mean Coefficient of Conservatism (C)	4.5
Floristic Quality Index (FQI)	34.3

Table 7-1a. Herbaceous Species Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

							Herbaceous Species Percent Cover Per 1m Quadrat															
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes														5	5	
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes											10	10		5	10	
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes							5		5			5				
<i>Aronia prunifolia (A. melanocarpa)</i>	Chokeberry	5	FACW	-3	Shrub	Yes												5				
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes						5		10		5	5		5			5
<i>Carex lucorum</i>	Blue Ridge Sedge	4	UPL	5	Herb	Yes			10													
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes												70				
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes					5							5				
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes									5			5		5		
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes									5			5		5	5	
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes									5			5		5	5	
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes											5					
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes							5									
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes	5	15				5				5			20			
<i>Gaultheria hispida</i>	Creeping Snowberry	8	FACW	-3	Herb	Yes												5				
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes	5			10				5	5	10		5	5			
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes												5				
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes									5							
<i>Linnaea borealis</i>	Twinflower	6	FAC	0	Herb	Yes	5															
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes	10	5	5	5				5						5	10	5
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes								5								
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes	5															
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes								25								
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes									5							
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes	5			5			5	5		5	20		5			10
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes									20			5				
<i>Rubus hispida</i>	Swamp Dewberry	4	FACW	-3	Shrub	Yes												5				
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes													5			
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes	15	5	60	5	85	30	25		20	5	5	5	5		5	10
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes		15		20		5	5							50	10	
NA	Duff / Bare Soil	NA	NA	NA	NA	NA	25		10			65	60	80	10	20	80		50	50	60	70
NA	Lichen	NA	NA	NA	Lichen	Yes	5	90	10			5				10						
NA	Moss	NA	NA	NA	Moss	Yes	5			90	95	5		5	50	80	5	80	5	60	5	30
Total Number of Species							7	4	3	5	2	5	9	4	8	4	6	14	5	7	7	4
Total Number of Native Species							7	4	3	5	2	5	9	4	8	4	6	14	5	7	7	4
Mean Wetland Indicator Value (W)							2.4	1.3	2.7	1.2	-1.0	2.6	1.6	3.5	-0.9	4.0	1.8	-1.9	3.2	-1.3	-0.9	2.8
Mean Coefficient of Conservatism (C)							4.7	4.8	4.0	3.4	6.0	4.2	2.8	3.3	5.4	4.3	3.5	4.9	3.8	4.0	3.9	3.5
Floristic Quality Index (FQI)							12.5	9.5	6.9	7.6	8.5	9.4	8.3	6.5	15.2	8.5	8.6	18.2	8.5	10.6	10.2	7.0

Table 7-1b. Woody Species Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

							Woody Species Stems Per Permanent 30-Foot Radius Circular Plot															
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	9	1		1			2	1	4	2	6			13	19	22
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	45			4		8	1	6	31	6	16	91	9	20	10	17
<i>Alnus incana ssp. rugosa</i>	Speckled Alder	5	FACW	-5	Shrub	Yes												43				
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes	10			3		1	4	4	4			10	10	6		4
<i>Aronia prunifolia</i>	Chokeberry	5	FACW	-3	Shrub	Yes									1							
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes												1			1	1
<i>Corylus cornuta</i>	Beaked Hazelnut	5	UPL	5	Shrub	Yes															1	
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes					6				1			7				
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes									11			6		5		
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes							1									
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	16	26		23	62	23		1	25	10		81	1	17		18
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes	17	2	32	24	32	10	19	21		11	8		7			11
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes													7			
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes	2			1		2	3	2	2	4	5		2	4	3	
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes							44	1			2		55			
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes								4					1			
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes							25	18		3			22	1		2
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes													1			
<i>Rhododendron groenlandicum</i>	Labrador Tea	-5	OBL	-5	Shrub	Yes									1							
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes	6	1				1										
Total Number of Species							7	4	1	6	3	6	8	9	9	6	5	7	10	7	5	7
Total Number of Native Species							7	4	1	6	3	6	8	9	9	6	5	7	10	7	5	7
Mean Wetland Indicator Value (W)							0.4	0.0	3.0	0.0	-1.0	1.0	1.1	0.7	-2.1	0.5	0.6	-1.9	1.5	-0.7	1.6	0.4
Mean Coefficient of Conservatism (C)							3.1	4.5	5.0	3.0	5.3	3.2	2.3	2.7	2.8	3.3	2.6	3.7	2.9	3.1	2.8	2.7
Floristic Quality Index (FQI)							8.3	9.0	5.0	7.3	9.2	7.8	6.4	8.0	8.3	8.2	5.8	9.8	9.2	8.3	6.3	7.2

Table 7-1c. Overall Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Aronia prunifolia</i> (<i>A. melanocarpa</i>)	Chokeberry	5	FACW	-3	Shrub	Yes
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Carex lucorum</i>	Lucorum Sedge	4	UPL	5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Corylus cornuta</i>	Beaked Hazelnut	5	UPL	5	Shrub	Yes
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Gaultheria hispidula</i>	Snowberry	8	FACW	-3	Herb	Yes
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Kalmia polifolia</i>	Swamp-laurel	10	OBL	-5	Shrub	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Linnaea borealis</i>	Twinline	6	FAC	0	Herb	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthis mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Rubus hispidus</i>	Swamp Dewberry	4	FACW	-3	Herb	Yes
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes

Total Number of Species	42
Total Number of Native Species	42
Mean Wetland Indicator Value (W)	0.1
Mean Coefficient of Conservatism (C)	4.7
Floristic Quality Index (FQI)	30.3

Table 7-2a. Herbaceous Species Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

							Herbaceous Species Percent Cover Per 1m Quadrat																
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 14	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes															5	10	
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	5											10	10		5	10	
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes								5		5							
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes		5					5		25			10		15			5
<i>Carex lucorum</i>	Blue Ridge Sedge	4	UPL	5	Herb	Yes			15														
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes													60				
<i>Carex trisperma</i>	Threeseeded Sedge	9	OBL	-5	Herb	Yes										5							
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes					5								5				
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes										5			5		5		
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes										5			5		5	5	
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes										5			5		10	5	
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes												5					
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes								5						15			
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes	10	10					5				10						
<i>Gaultheria hispida</i>	Creeping Snowberry	8	FACW	-3	Herb	Yes													5				
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes	15			10	5			5	5	20		5	5		10		
<i>Goodyera tessellata</i>	Tesselated Rattlesnake Plantain	8	FACU	3	Herb	Yes										5							
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes													5				
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes																	
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes	5	5	5	5	5			5								10	5
<i>Oryzopsis asperifolia</i>	Rough-leaved Rice-grass	6	UPL	5	Herb	Yes	5																
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes								5									
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes	5																
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes								30									
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes															5		
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes	70	10	5	35			85	50	100		40	95		50	5		75
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes										20			5				
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes														5			
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes	20	25	60	10	85		40	45		30	20	20		5			10
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes	5	25		30			10		10	5					60	10	
NA	Duff / Bare Soil	NA	NA	NA	NA	NA	20		10			100	50	60	60	15	20	80		45	40	75	70
NA	Lichen	NA	NA	NA	Lichen	Yes	5	65	10				5		5		5						
NA	Moss	NA	NA	NA	Moss	Yes	10			85	95		5		5	40	75	5	90	10	50	5	25

Total Number of Species	9	6	4	5	4	0	5	8	4	10	3	6	10	5	9	6	4
Total Number of Native Species	9	6	4	5	4	0	5	8	4	10	3	6	10	5	9	6	4
Mean Wetland Indicator Value (W)	2.1	2.2	2.8	1.2	0.3	N/A	2.6	2.1	2.0	-0.7	3.7	1.8	-2.3	3.2	0.0	-1.5	2.8
Mean Coefficient of Conservatism (C)	4.2	4.2	3.0	3.4	5.3	N/A	4.2	2.6	3.8	5.4	3.7	3.5	5.5	3.8	3.4	3.8	3.5
Floristic Quality Index (FQI)	12.7	10.2	6.0	7.6	10.5	N/A	9.4	7.4	7.5	17.1	6.4	8.6	17.4	8.5	10.3	9.4	7.0

Table 7-2b. Woody Species Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

							Woody Species Stems Per Permanent 30' Foot Radius Plot																				
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 14	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31				
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	10	1		1		2		3	1	5	2	6			15	19	28				
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	41			6			9	2	5	32	7	18	98		24	6	23				
<i>Alnus incana ssp. rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes													32								
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes	5			3		1	1	2	3	5			10	13	7		3				
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes									1				1		1	1	1				
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes					5					2			7								
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes										19			6		5						
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes								1													
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	18	29		23	63	12	27		1	23	11		73	1	20		17				
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes	17	2	34	24	28	10	10	18	19		11	8		7			11				
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes														8							
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes	2			1			3	5	2	2	4	6		2	7	4					
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes								42	1			2		56							
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes									7					2							
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes								25	16		3			23			3				
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes														1							
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes	6			1		1	1														

Total Number of Species	7	3	1	7	3	5	6	8	10	7	6	5	7	9	7	4	7
Total Number of Native Species	7	3	1	7	3	5	6	8	10	7	6	5	7	9	7	4	7
Mean Wetland Indicator Value (W)	0.4	-1.0	3.0	0.4	-1.0	0.0	1.0	1.1	0.9	-1.6	0.5	0.6	-1.6	1.7	-0.7	0.8	0.4
Mean Coefficient of Conservatism (C)	3.1	4.7	5.0	3.1	5.3	3.6	3.2	2.3	2.6	3.6	3.3	2.6	3.7	3.1	3.1	2.3	2.7
Floristic Quality Index (FQI)	8.3	8.1	5.0	8.3	9.2	8.0	7.8	6.4	8.2	9.4	8.2	5.8	9.8	9.3	8.3	4.5	7.2

Table 7-2c. Overall Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Carex lucorum</i>	Lucorum Sedge	4	UPL	5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Carex trisperma</i>	Threeseeded Sedge	9	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Gaultheria hispidula</i>	Snowberry	8	FACW	-3	Herb	Yes
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes
<i>Goodyera tessellata</i>	Tesselated Rattlesnake Plantain	8	FACU	3	Herb	Yes
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Oryzopsis asperifolia</i>	Rough-leaved Ric-grass	6	UPL	5	Herb	Yes
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Polygala paucifolia</i>	Fringed polygala	7	FACU	3	Herb	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes

Total Number of Species	40
Total Number of Native Species	40
Mean Wetland Indicator Value (W)	0.3
Mean Coefficient of Conservatism (C)	4.7
Floristic Quality Index (FQI)	30.0

**APPENDIX C:
MICHIGAN NATURAL FEATURES INVENTORY REPORT**

John R. Vigna
King & MacGregor Environmental, Inc.
2520 Woodmeadow Drive SE
Grand Rapids, MI 49546
jvigna@king-macgregor.com

December 4, 2013

**Re: Rare Species Review #1313 – Eagle Mine Ecological Survey, Michigamme Township,
Marquette County, Michigan, T50N, R29W, Section 12.**

John:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.



MSU EXTENSION

**Michigan Natural
Features Inventory**

PO Box 13036
Lansing MI 48901

(517) 373-1552
Fax (517) 373-9566

mnfi.anr.msu.edu

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

According to the natural heritage database, legally protected species have been known to occur within 1.5 miles of the proposed project site. Therefore, it is **likely** that listed species will be negatively impacted. Keep in mind that MNFI cannot fully assess potential impacts without an on-site survey. MNFI offers more detailed reviews including field surveys which I would be happy to discuss with you.

Sincerely,

Michael Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

Table 1: Legally protected species within 1.5 miles of #1315

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Gentiana linearis</i>	Narrow-leaved gentian		1959-07-21		T	G4G5	S2	Plant
<i>Gentiana linearis</i>	Narrow-leaved gentian	1952	1952-07-28		T	G4G5	S2	Plant
<i>Gentiana linearis</i>	Narrow-leaved gentian	2004-08-21	2005-09-09		T	G4G5	S2	Plant

Table 2: Special Concern Species and Rare Natural Communities within 1.5 miles of #1315

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Falci pennis canadensis</i>	Spruce grouse	2004-09-05	2004-09-05		SC	G5	S2S3	Animal

Comments for Rare Species Review #1313: Legally protected species have been documented within 1.5 miles of the proposed project. Therefore, it is **likely** that rare natural resources will be impacted by this project. Keep in mind that MNFI cannot fully assess potential impacts without conducting an on-site field survey.

Populations of **narrow-leaved gentian** (*Gentian linearis*) in Michigan are located primarily in areas with soils derived from granite and at least somewhat acidic. This species thrives in wet meadows dominated by sedges and grasses, typically located along river or stream margins and kettle-holes. Narrow-leaved gentian has also been found along sandy lakeshores and bog margins, and can colonize moist disturbed ground such as borrow pits and depressions along road cuts. Elsewhere in its range, this species has a similar close association with granitic soils, occurring in bogs, springy areas, wet meadows, and shores. *G. linearis* flowers from about mid-July to August and possibly as late as early September. Flowers and fruit may occur simultaneously. Management notes: This gentian is a wetland species undoubtedly sensitive to hydrological alterations, and requiring protection from both flooding and excessive drainage. Please see [MNFI's Rare Species Explorer](#) for further information on this and other rare natural features.

Note: If a State listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-373-9418, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Codes to accompany Tables 1 & 2

State Protection Status Code Definitions (SPROT)

E: Endangered

T: Threatened

SC: Special concern

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions.

SX = apparently extirpated from state.

**APPENDIX D:
NARROW LEAVED GENTIAN PHOTOGRAPHS**



Robust population of NLG North of Yellow Dog River



Typical NLG Specimen



NLG North of Yellow Dog River



NLG East side of Salmon Trout River

**APPENDIX E:
WETLAND VEGETATIVE SURVEY PHOTOGRAPHS**

(All photos taken during June, 2014)

Photo 1. Plot 1W, north view



Photo 2. Plot 1W, south view



Photo 3. Plot 1W, quadrat view



Photo 4. Plot 6W, north view



Photo 5. Plot 6W, south view



Photo 6. Plot 6W, quadrat view



Photo 7. Plot 7W, north view



Photo 8. Plot 7W, south view



Photo 9. Plot 7W, quadrat view



Photo 10. Plot 8W, north view



Photo 11. Plot 8W, south view



Photo 12. Plot 8W, quadrat view



Photo 13. Plot 9W, north view



Photo 14. Plot 9W, south view



Photo 15. Plot 9W, quadrat view



Photo 16. Plot 10W, north view



Photo 17. Plot 10W, south view



Photo 18. Plot 10W, quadrat view

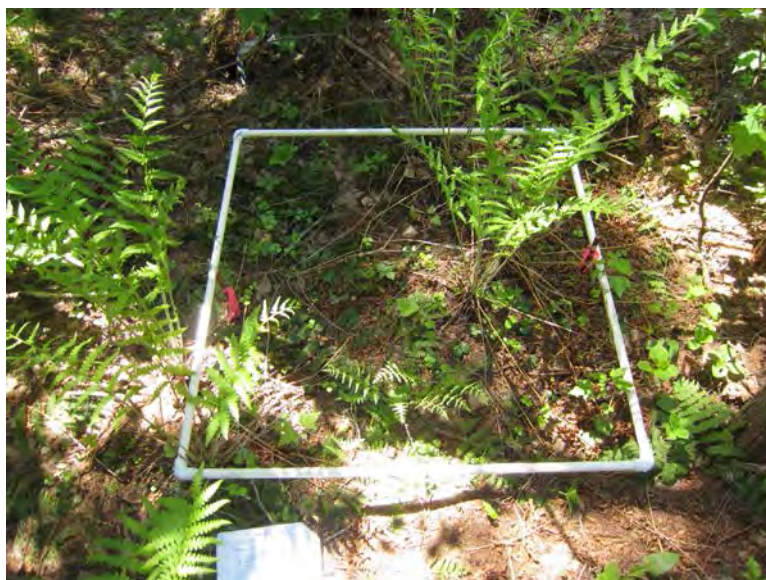


Photo 19. Plot 13W, north view



Photo 20. Plot 13W, south view



Photo 21. Plot 13W, quadrat view



Photo 22. Plot 26W, north view



Photo 23. Plot 26W, south view



Photo 24. Plot 26W, quadrat view



**APPENDIX F:
UPLAND VEGETATIVE SURVEY PHOTOGRAPHS**

(All photos taken during August, 2014)

Photo 1. Plot 1, north view



Photo 2. Plot 1, south view



Photo 3. Plot 1, quadrat view



Photo 4. Plot 2, north view



Photo 5. Plot 2, south view

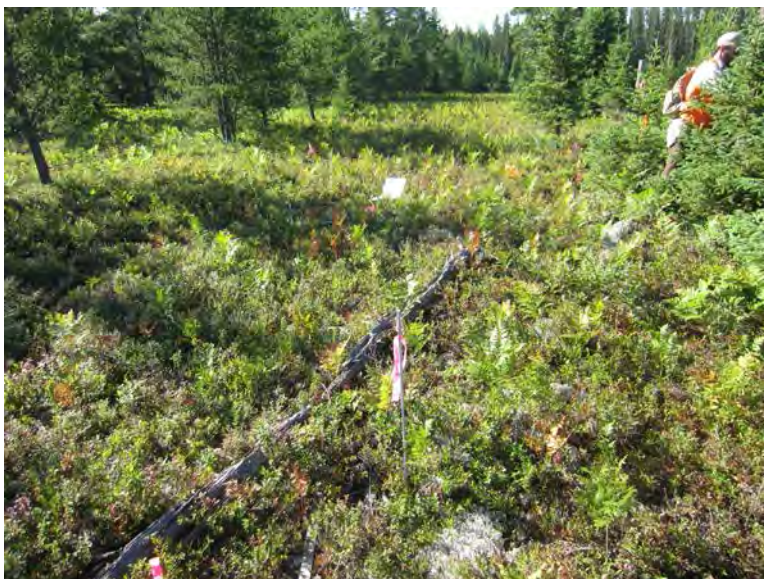


Photo 6. Plot 2, quadrat view



Photo 7. Plot 11, north view



Photo 8. Plot 11, south view



Photo 9. Plot 11, quadrat view



Photo 10. Plot 12, north view



Photo 11. Plot 12, south view



Photo 12. Plot 12, quadrat view



Photo 13. Plot 13, north view



Photo 14. Plot 13, south view



Photo 15. Plot 13, quadrat view



Photo 16. Plot 14, north view



Photo 17. Plot 14, south view



Photo 18. Plot 14, quadrat view



Photo 19. Plot 21, north view



Photo 20. Plot 21, south view



Photo 21. Plot 21, quadrat view



Photo 22. Plot 22, north view



Photo 23. Plot 22, south view



Photo 24. Plot 22, quadrat view



Photo 25. Plot 23, north view



Photo 26. Plot 23, south view



Photo 27. Plot 23, quadrat view



Photo 28. Plot 24, north view



Photo 29. Plot 24, south view



Photo 30. Plot 24, quadrat view



Photo 31. Plot 25, north view



Photo 32. Plot 25, south view



Photo 33. Plot 25, quadrat view



Photo 34. Plot 26, north view



Photo 35. Plot 26, south view



Photo 36. Plot 26, quadrat view



Photo 37. Plot 27, north view



Photo 38. Plot 27, south view



Photo 39. Plot 27, quadrat view



Photo 40. Plot 28, north view



Photo 41. Plot 28, south view



Photo 42. Plot 28, quadrat view



Photo 43. Plot 29, north view



Photo 44. Plot 29, south view



Photo 45. Plot 29, quadrat view



Photo 46. Plot 31, north view



Photo 47. Plot 31, south view



Photo 48. Plot 31, quadrat view



APPENDIX A: FIGURES

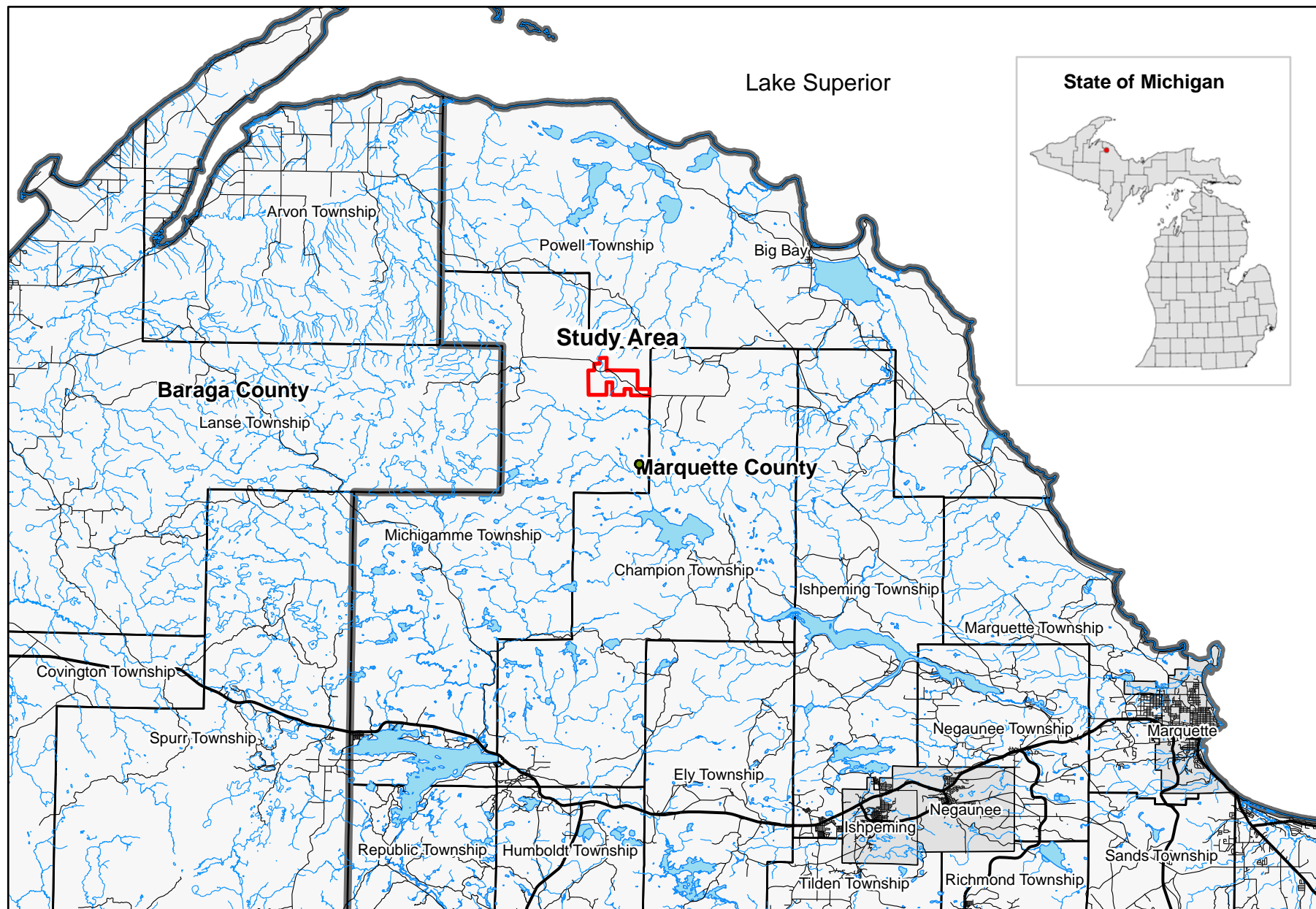








Figure 1-1. Project Location

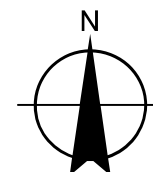


King & MacGregor Environmental, Inc.

Legend

- | | | | |
|---------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------|-----------------|
|  | Study Area |  | State Highways |
|  | City |  | Roads |
|  | County |  | Lakes & Streams |

0 2 4 8 Miles



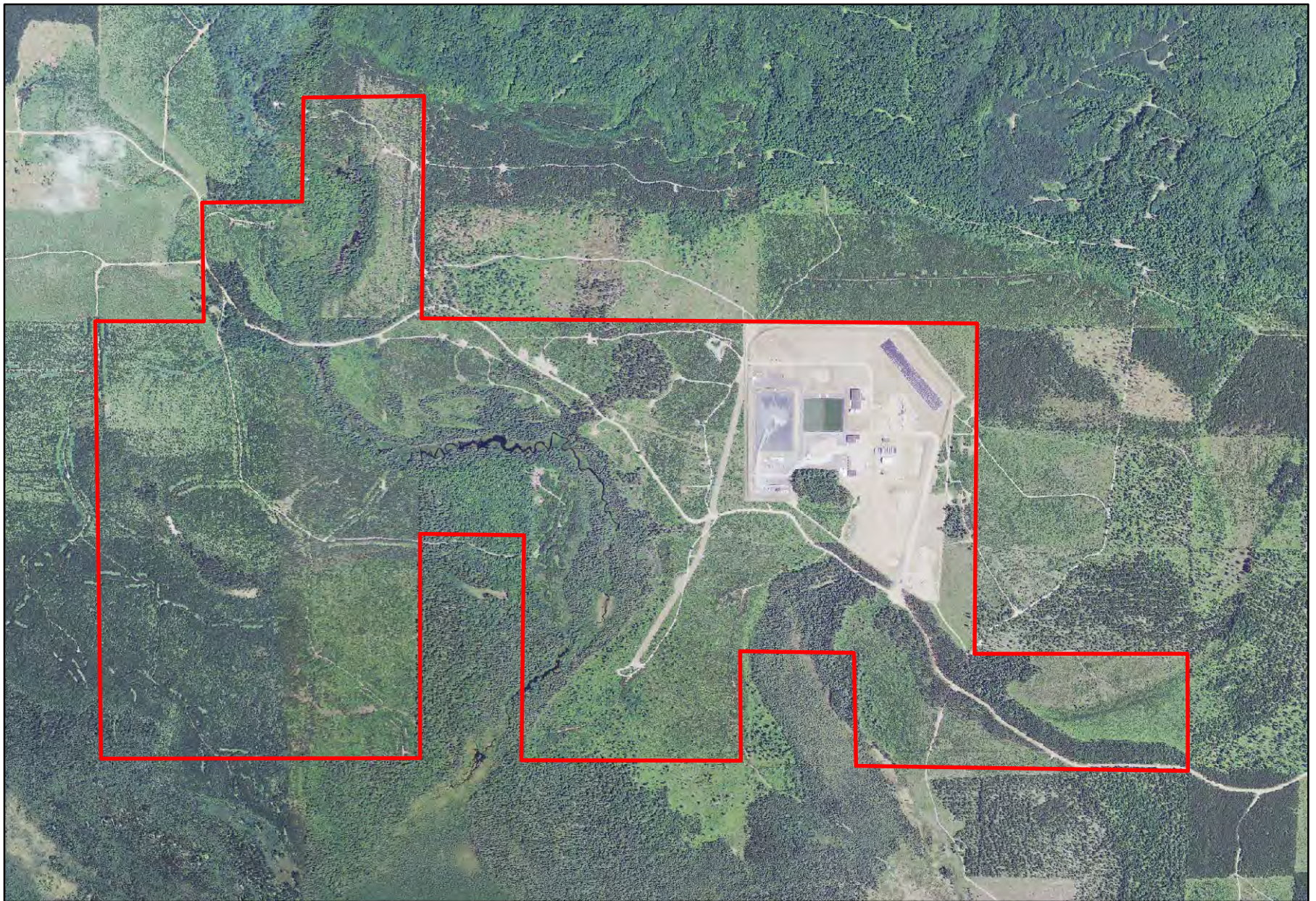



Figure 1-2. Study Area



King & MacGregor Environmental, Inc.

Legend

 Study Area

0 0.25 0.5
Miles

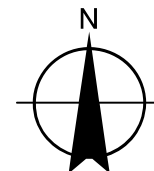









Figure 1-3. Biological and Wetland Sampling Areas



King & MacGregor Environmental, Inc.

Legend

-  Spring/Fall Bird & Spring/Fall Vegetation Sampling Points
-  Spring-Only Bird Sampling Points
-  Meander Survey
-  Small Mammal Trapping Points (Fall Only)
-  Wetland Vegetation Sampling Point
-  Frog/Toad Sampling Point
-  Study Area

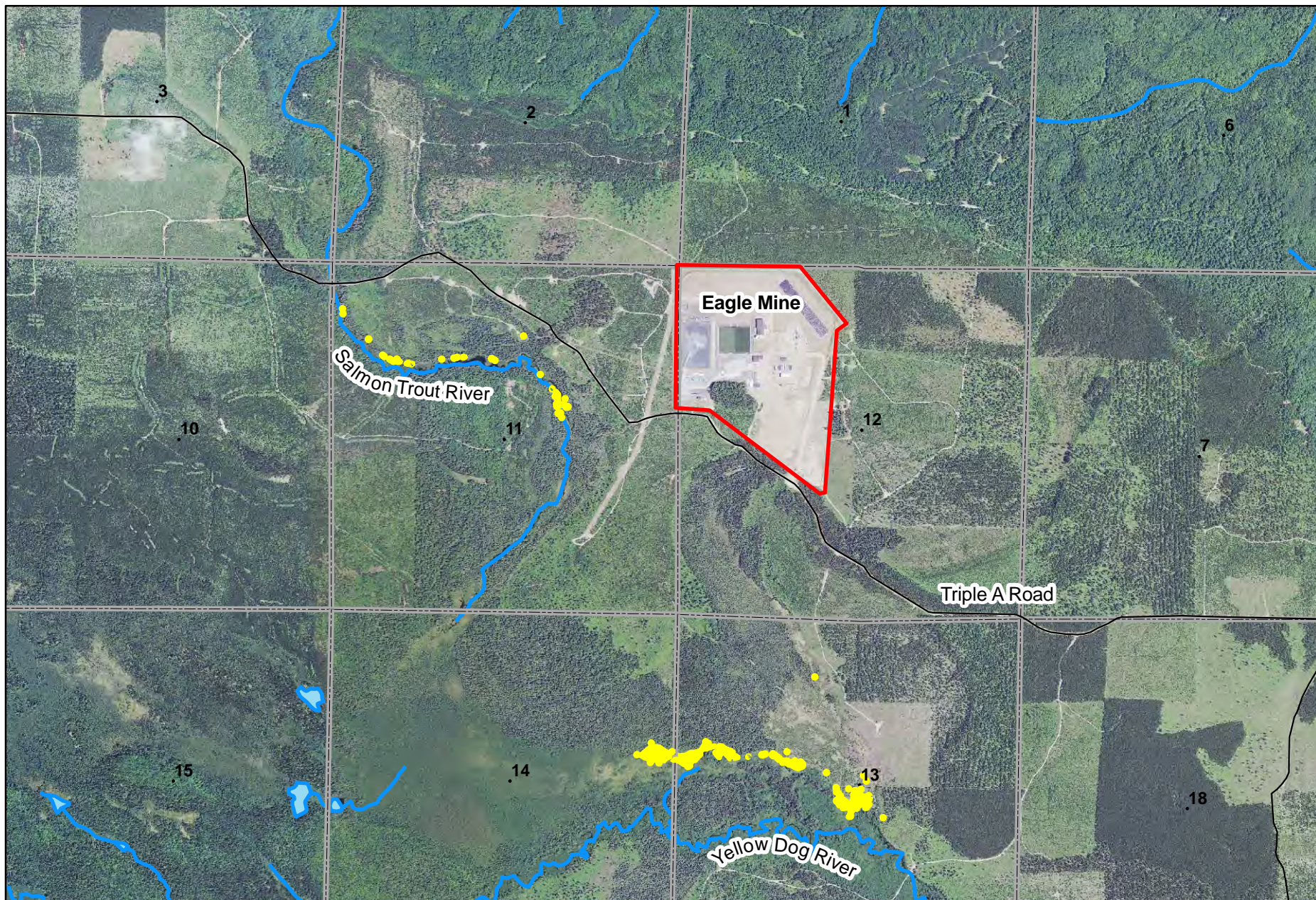



Figure 5-1. Narrow-leaved Gentian Survey (August 2014)

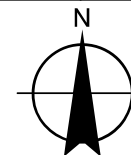


King & MacGregor Environmental, Inc.

Legend

 Narrow-leaved Gentian

0 0.25 0.5 1 Miles



APPENDIX B: TABLES

Table 2-1a. Bird Survey Point Data - June 2014

Eagle Mine LLC

Survey Point	Date	Species																								Total Count	Species Richness											
		American Crow	American Goldfinch	American Herring Gull	American Redstart	American Robin	American Yellow Warbler	Black-throated Green Warbler	Blue Jay	Brown Thrasher	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Clay-colored Sparrow	Common Night Hawk	Dark-eyed Junco	Eastern Whip-poor-will	Hermit Thrush	Merlin	Mourning Dove	Nashville Warbler	Northern Cardinal	Northern Flicker	Ovenbird	Pine Warbler			Red-eyed Vireo	Red-winged Blackbird	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Spruce Grouse	Veery	Vesper Sparrow	White-breasted Nuthatch	White-throated Sparrow	Yellow-rumped Warbler
1	6/10/14					1									1		1				4				1										2		10	6
1	6/11/14	1										2			1						3															7	4	
2	6/10/14					1			1			1	1		2		2				1				1									1		11	9	
2	6/11/14											2			1		1	1			2															7	5	
¹ N	6/10/14	1				3									3		1				6												2			16	6	
² S	6/10/14	1								2					2						4				1									1		11	6	
N	6/11/14	2										1									1												1			5	4	
S	6/11/14	2						1				1									2						1									7	5	
4	6/10/14	1				1									1	1		1			2				1									2		10	8	
4	6/11/14	1		1		2															2					1							1			8	6	
5	6/10/14	1						1							1	2		4			3															12	6	
5	6/11/14					2			1			1				4		3			2																13	6
6	6/10/14					1				1					1	1		2			3			1		1						1				11	8	
6	6/11/14					1								1				2			3			1		1										9	6	
7	6/10/14					1		1										2			3	1				1						1				10	7	
7	6/11/14					1		1	1					1	1						4					1										10	7	
8	6/10/14	1				1									1		2				5					1								2		13	7	
8	6/11/14		1			2						1			1		3				3															11	6	
11	6/10/14	1							1			1									3				1									3		10	6	
11	6/11/14					1			1			3			1		1				1				1											9	7	
12	6/10/14														3		2				3				1									3		12	5	
12	6/11/14				1							1			1						2				1									1		7	6	
13	6/10/14	1																2			4					1						1			4		13	6
13	6/11/14																				3													2		6	3	
14	6/10/14	1													2						1				2	1								1		8	6	
14	6/11/14										1				1						1				2	1			1	1					2		10	8
17	6/10/14														2		3				1															6	3	
17	6/11/14								1						1						3												1			6	4	
18	6/10/14					1									4		2				3					1										11	5	
18	6/11/14			1								1	1		1		1				1	1				1										8	8	
19	6/10/14					1			1						1		1				2				1											7	6	
19	6/11/14											1			2		2				4					1										10	5	
21	6/10/14	1													1						2														1		5	4
21	6/11/14	1													1						3														1		6	4
22	6/10/14																																				0	0
22	6/11/14														1		2				2													2		8	5	
23	6/10/14					1						1			4		2				3													1		12	6	
23	6/11/14	2	1												5		3				4								2					2		19	7	
24	6/10/14					2		1													3									2					2		8	4
24	6/11/14				1										1				1																	4	4	
25	6/10/14					1									1						2															4	3	
25	6/11/14	1				1			1			1			2		2				2				1									1		12	9	
26	6/10/14				1										1						3				1										2		8	5
26	6/10/14	1						1				1			4						2															9	5	

Table 2-1a. Bird Survey Point Data - June 2014

Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Redstart	American Robin	American Yellow Warbler	Black-throated Green Warbler	Blue Jay	Brown Thrasher	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Clay-colored Sparrow	Common Night Hawk	Dark-eyed Junco	Eastern Whip-poor-will	Hermit Thrush	Merlin	Mourning Dove	Nashville Warbler	Northern Cardinal	Northern Flicker	Ovenbird	Pine Warbler	Red-eyed Vireo	Red-winged Blackbird	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Spruce Grouse	Veery	Vesper Sparrow	White-breasted Nuthatch	White-throated Sparrow	Yellow-rumped Warbler	Total Count	Species Richness	
26	6/11/14	2									3		1			2		1			3				2											1		15	8
27	6/10/14																				3					1									3		7	3	
27	6/11/14	1																		1				1	1	1			1						1		10	8	
28	6/10/14					1			1							2		1			2															1		8	6
28	6/11/14	2							1							3		1			3								1							2		13	7
29	6/10/14								1							1		1			1															2		7	6
29	6/11/14	1					1		2							1				2						1										2		9	6
30	6/10/14					1										1							1	1												2		6	5
30	6/11/14	2										1			1	1	1	3			2			1	1	1										2		16	11
31	6/10/14	1				1							1			3					3					1										1		11	7
31	6/11/14	2							1							3		3			3					1										2		15	7
	Total	31	2	2	3	28	1	1	13	6	5	2	21	4	5	78	1	57	2	1	135	2	1	5	18	19	1	2	3	2	3	1	7	3	50	1	516	35	

¹N - Meander North²S - Meander South

Mean of Species Richness per Survey Point per Day 6
Median of Species Richness per Survey Point per Day 6
Mean Count per Species 15
Median Count per Species 15

Table 2-1b. Bird Species Abundance Rankings - June 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Nashville Warbler	<i>Vermivora ruficapilla</i>	135	26.2%
Dark-eyed Junco	<i>Junco hyemalis</i>	78	15.1%
Hermit Thrush	<i>Catharus guttatus</i>	57	11.0%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	50	9.7%
American Crow	<i>Corvus brachyrhynchos</i>	31	6.0%
American Robin	<i>Turdus migratorius</i>	28	5.4%
Chipping Sparrow	<i>Spizella passerina</i>	21	4.1%
Red-eyed Vireo	<i>Vireo olivaceus</i>	19	3.7%
Pine Warbler	<i>Dendroica pinus</i>	18	3.5%
Blue Jay	<i>Cyanocitta cristata</i>	13	2.5%
Vesper Sparrow	<i>Pooecetes gramineus</i>	7	1.4%
Brown Thrasher	<i>Toxostoma rufum</i>	6	1.2%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	5	1.0%
Common Nighthawk	<i>Chordeiles minor</i>	5	1.0%
Ovenbird	<i>Seiurus aurocapilla</i>	5	1.0%
Clay-colored Sparrow	<i>Spizella pallida</i>	4	0.8%
American Redstart	<i>Setophaga ruticilla</i>	3	0.6%
Sandhill Crane	<i>Grus canadensis</i>	3	0.6%
Spruce Grouse	<i>Falcipennis canadensis</i>	3	0.6%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	3	0.6%
American Goldfinch	<i>Spinus tristis</i>	2	0.4%
American Herring Gull	<i>Larus smithsonianus</i>	2	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	0.4%
Merlin	<i>Falco columbarius</i>	2	0.4%
Northern Cardinal	<i>Cardinalis cardinalis</i>	2	0.4%
Song Sparrow	<i>Melospiza melodia</i>	2	0.4%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2	0.4%
American Yellow Warbler	<i>Dendroica petechia</i>	1	0.2%
Black-throated Green Warbler	<i>Dendroica virens</i>	1	0.2%
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	1	0.2%
Mourning Dove	<i>Zenaidura macroura</i>	1	0.2%
Northern Flicker	<i>Colaptes auratus</i>	1	0.2%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1	0.2%
Veery	<i>Catharus fuscescens</i>	1	0.2%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	1	0.2%

Total Count **516**
Mean Count per Species **15**
Median Count per Species **3**
Total Number of Species **35**

Table 2-2a. Bird Survey Point Data - September 2014

Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Kestrel	American Robin	Black-capped Chickadee	Blue Jay	Canada Goose	Cedar Waxwing	Chestnut-sided Warbler	Chipping Sparrow	Common Raven	Dark-eyed Junco	Hairy Woodpecker	Hermit Thrush	Northern Flicker	Spruce Grouse	White-breasted Nuthatch	White-throated Sparrow	Total Count	Species Richness
1	9/15/14		1			1		1		3				1	1						8	6
1	9/16/14						1	1											1		3	3
2	9/15/14					1		2					1	2		1			1		8	6
2	9/16/14		4											2		1					7	3
4	9/15/14	2			1		4	1					1	1					1		11	7
4	9/16/14				1			1				1		2							5	4
11	9/15/14		3					5						1							9	3
11	9/16/14		1									1									2	2
12	9/15/14													1							1	1
12	9/16/14													2							2	1
13	9/15/14	1						1									1				3	3
13	9/16/14							1													1	1
14	9/15/14	1					2			1				3							7	4
14	9/16/14	1		1										1							3	3
21	9/15/14												1	3				2			6	3
21	9/16/14	1						1				1		1							4	4
22	9/15/14													1							1	1
22	9/16/14	1				1		1													3	3
23	9/16/14							3						1			2				6	3
23	9/17/14					1								2							3	2
24	9/16/14	2	1			1	2	2													8	5
24	9/17/14	2					1	245					1				1				250	5
25	9/15/14						2	2									2				6	3
25	9/16/14	2	2					4													8	3
26	9/16/14		1				3	2	3					1							10	5
26	9/18/14							3									1				4	2
27	9/16/14	1						3													4	2
27	9/18/14										2									1	3	2
28	9/16/14							3													3	1
28	9/17/14	1							43												44	2
29	9/16/14							1						1							2	2
29	9/17/14							2	61												63	2
30	9/15/14							3									3				6	2
30	9/16/14							2		4				1							7	3
31	9/15/14	1						2													3	2
31	9/16/14	1						3						3							7	3
Total		17	13	1	2	5	14	51	352	8	2	3	4	30	1	2	10	2	2	2	521	19

Mean of Species Richness per Survey Point per Day 3
 Median of Species Richness per Survey Point per Day 3
 Mean Count per Species 27

Table 2-2b. Bird Species Abundance Rankings - September 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	352	67.6%
Blue Jay	<i>Cyanocitta cristata</i>	51	9.8%
Dark-eyed Junco	<i>Junco hyemalis</i>	30	5.8%
American Crow	<i>Corvus brachyrhynchos</i>	17	3.3%
Black-capped Chickadee	<i>Poecile atricapilla</i>	14	2.7%
American Goldfinch	<i>Carduelis tristis</i>	13	2.5%
Northern Flicker	<i>Colaptes auratus</i>	10	1.9%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	8	1.5%
American Robin	<i>Turdus migratorius</i>	5	1.0%
Common Raven	<i>Corvus corax</i>	4	0.8%
Chipping Sparrow	<i>Spizella passerina</i>	3	0.6%
American Kestrel	<i>Falco sparverius</i>	2	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	2	0.4%
Hermit Thrush	<i>Catharus guttatus</i>	2	0.4%
Spruce Grouse	<i>Falcipennis canadensis</i>	2	0.4%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	2	0.4%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	2	0.4%
Hairy Woodpecker	<i>Picoides villosus</i>	1	0.2%
American Herring Gull	<i>Larus smithsonianus</i>	1	0.2%

Total Count	521
Mean Count per Species	27
Median Count per Species	4
Total Number of Species	19

Table 2-3. Bird Species Abundance Rankings - June/September Combined 2014

Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	352	33.9%
Nashville Warbler	<i>Vermivora ruficapilla</i>	135	13.0%
Dark-eyed Junco	<i>Junco hyemalis</i>	108	10.4%
Blue Jay	<i>Cyanocitta cristata</i>	64	6.2%
Hermit Thrush	<i>Catharus guttatus</i>	59	5.7%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	52	5.0%
American Crow	<i>Corvus brachyrhynchos</i>	48	4.6%
American Robin	<i>Turdus migratorius</i>	29	2.8%
Chipping Sparrow	<i>Spizella passerina</i>	26	2.5%
Red-eyed Vireo	<i>Vireo olivaceus</i>	19	1.8%
Pine Warbler	<i>Dendroica pinus</i>	18	1.7%
American Goldfinch	<i>Carduelis tristis</i>	15	1.4%
Black-capped Chickadee	<i>Poecile atricapilla</i>	14	1.4%
Cedar Waxwing	<i>Bombycilla cedrorum</i>	13	1.3%
Northern Flicker	<i>Colaptes auratus</i>	11	1.1%
Vesper Sparrow	<i>Pooecetes gramineus</i>	7	0.7%
Brown Thrasher	<i>Toxostoma rufum</i>	6	0.6%
Common Nighthawk	<i>Chordeiles minor</i>	5	0.5%
Ovenbird	<i>Seiurus aurocapilla</i>	5	0.5%
Spruce Grouse	<i>Falcipecten canadensis</i>	5	0.5%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	5	0.5%
American Redstart	<i>Setophaga ruticilla</i>	4	0.4%
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	4	0.4%
Clay-colored Sparrow	<i>Spizella pallida</i>	4	0.4%
Common Raven	<i>Corvus corax</i>	4	0.4%
American Herring Gull	<i>Larus smithsonianus</i>	3	0.3%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	3	0.3%
Sandhill Crane	<i>Grus canadensis</i>	3	0.3%
American Kestrel	<i>Falco sparverius</i>	2	0.2%
Merlin	<i>Falco columbarius</i>	2	0.2%
Northern Cardinal	<i>Cardinalis cardinalis</i>	2	0.2%
Song Sparrow	<i>Melospiza melodia</i>	2	0.2%
American Yellow Warbler	<i>Dendroica petechia</i>	1	0.1%
Black-throated Green Warbler	<i>Dendroica virens</i>	1	0.1%
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	1	0.1%
Hairy Woodpecker	<i>Picoides villosus</i>	1	0.1%
Mourning Dove	<i>Zenaidura macroura</i>	1	0.1%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1	0.1%
Veery	<i>Catharus fuscescens</i>	1	0.1%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	1	0.1%

Total Count	1037
Mean Count per Species	18
Median Count per Species	5
Total Number of Species	40

Table 3. Small Mammal Survey Point Data - 2014

Eagle Mine LLC

Survey Point	Date	Sherman Live Trap					Large Snap Trap			Small Snap Trap			
		Deer Mouse (<i>Peromyscus maniculatus</i>)	Eastern Chipmunk (<i>Tamias striatus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Southern Redback Vole (<i>Clethrionomys gapperi</i>)	White-footed Mouse (<i>Peromyscus leucopus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Northern Flying Squirrel (<i>Glaucomys sabrinus</i>)	Snowshoe hare (<i>Lepus americanus</i>)	Deer Mouse (<i>Peromyscus maniculatus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Total Count	Species Richness
1	9/16/14			1							1	2	1
1	9/17/14			1								1	1
1	9/18/14											0	0
11	9/16/14		1									1	1
11	9/17/14											0	0
11	9/18/14			1								1	1
13	9/16/14				1						1	2	2
13	9/17/14				1							1	1
13	9/18/14											0	0
22	9/16/14		1									1	1
22	9/17/14											0	0
22	9/18/14											0	0
23	9/16/14											0	0
23	9/17/14											0	0
23	9/18/14	1							1			2	2
25	9/16/14											0	0
25	9/17/14											0	0
25	9/18/14											0	0
27	9/16/14											0	0
27	9/17/14											0	0
27	9/18/14											0	0
29	9/16/14	1										1	1
29	9/17/14											0	0
29	9/18/14											0	0
31	9/16/14					1						1	1
31	9/17/14			1		1		1			1	4	3
31	9/18/14	1					1			1		3	2
Total		3	2	4	2	2	1	1	1	1	3	20	7

Mean of Species Richness per Survey Point per Day 1
 Median of Species Richness per Survey Point per Day 0
 Mean Count per Species 2
 Median Count per Species 2

Table 4. Frog and Toad Survey Point Data - 2014

Eagle Mine LLC

Survey Point	Survey Period	Date	Time	Temp (°F)	Wind Speed (MPH)	Call Index Value*				Median Call Index Value per Survey Point	Species Richness
						Northern Spring Peeper (<i>Pseudacris crucifer</i>)	Green Frog (<i>Rana clamitans</i>)	Western Chorus frog (<i>Pseudacris triseriata</i>)	Gray Treefrog (<i>Hyla versicolor</i>)		
FT01	Late Spring	5/27/14	9:55 PM	58.1	0	3		3	2	3	3
FT02	Late Spring	5/27/14	9:36 PM	56.7	0	3		3		3	2
FT03	Late Spring	5/27/14	10:38 PM	53.5	0	3		3		3	2
FT01	Summer	6/11/14	10:09 PM	59.8	0	2	1		2	2	3
FT02	Summer	6/11/14	9:48 PM	60.3	0	2	1		2	2	3
FT03	Summer	6/11/14	10:44 PM	59.8	0	3	1			2	2
					Total	16	3	9	6	2.5	4

*1 = Individuals can be counted and there is space between calls.

2 = Individuals can be counted but there is some overlapping of calls.

3 = Full chorus; calls are continuous and overlapping.

Mean of Species Richness per Survey Point per Day 3
 Median of Species Richness per Survey Point per Day 3
 Mean Call Index Value per Survey Point per Day 3
 Median Call Index Value per Survey Point per Day 3
 Median Call Index Value for All Species 2

Table 6a. Herbaceous Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Herbaceous Species Percent Cover Per 1m Quadrat							
							Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes			5	5		5		
<i>Agrostis scabra</i>	Tickle-grass	4	FAC	0	Herb	Yes					5			
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes				5				
<i>Anemone quinquefolia</i>	Wood Anemone	5	FAC	0	Herb	Yes	5							
<i>Avenella flexuosa</i>	Wavy Hair Grass	6	UPL	5	Herb	Yes					20			
<i>Brachyelytrum erectum</i>	Short-glume Grass	7	FACU	3	Herb	Yes	5							
<i>Calamagrostis canadensis</i>	Blue-joint	3	OBL	-5	Herb	Yes		5	10	5			5	
<i>Carex lasiocarpa</i>	Woolly-fruit Sedge	8	OBL	-5	Herb	Yes		5						
<i>Carex leptalea</i>	Bristly-stalk Sedge	5	OBL	-5	Herb	Yes	20							
<i>Carex oligosperma</i>	Few-seeded Sedge	10	OBL	-5	Herb	Yes								5
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes	45	65					20	
<i>Carex trisperma</i>	Three-seeded Sedge	9	OBL	-5	Herb	Yes						5		
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes								5
<i>Cirsium sp.</i>	Thistle	NA	NA	NA	Herb	NA				5				
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes				5		5		
<i>Cornus canadensis</i>	Bunchberry, Dwarf Cornel	6	FAC	0	Herb	Yes				5	5	5		
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes					20			
<i>Diervilla lonicera</i>	Bush Honeysuckle	4	UPL	5	Shrub	Yes					5			
<i>Dryopteris carthusiana</i>	Spinulose Woodfern	5	FACW	-3	Herb	Yes	5							
<i>Dryopteris intermedia</i>	Intermediate Fern	5	FAC	0	Herb	Yes						10		
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes				15				
<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	UPL	5	Herb	No					15			
<i>Hieracium caespitosum</i>	Yellow Hawkweed	0	UPL	5	Herb	No				15				
<i>Hieracium sp.</i>	Hawkweed	0	UPL	5	Herb	No			5					
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes							5	
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes								10
<i>Linnaea borealis</i>	Twin Flower	6	FAC	0	Herb	Yes				5				
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes			5		5			
<i>Osmunda cinnamomea</i>	Cinnamon Fern	5	FACW	-3	Herb	Yes						10		
<i>Oxalis acetosella</i>	Northern Wood Sorrel	7	FACU	3	Herb	Yes						5		
<i>Panax trifolius</i>	Dwarf Gensing	8	UPL	5	Herb	Yes					5			
<i>Phleum pratense</i>	Timothy	0	FACU	3	Herb	No					5			
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes			5					

Table 6a. Herbaceous Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Herbaceous Species Percent Cover Per 1m Quadrat							
							Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Potentilla palustris</i>	Marsh Cinquefoil	7	OBL	-5	Herb	Yes		5						
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes				5				
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes	5							
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes					5			
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes								40
<i>Rubus pubescens</i>	Dwarf Raspberry	4	FACW	-3	Herb	Yes	10							
<i>Rubus setosus</i>	Setose Blackberry	3	FACW	-3	Shrub	Yes			5		5			
<i>Solidago juncea</i>	Early Goldenrod	3	UPL	5	Herb	Yes				5				
<i>Thalictrum dasycarpum</i>	Hairy-fruit Meadow-rue	3	FACW	-3	Herb	Yes	5							
<i>Utricularia sp.</i>	Bladderwort	0	OBL	-5	Herb	Yes		5						
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes				45	30			
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes					10			
<i>Viola sp.</i>	Violet; Pansie	NA	NA	NA	Herb	NA				5				
NA	Dead Vegetation	NA	NA	NA	NA	NA		50	75	5			95	
NA	Duff / Bare Soil	NA	NA	NA	NA	NA					5			
NA	Moss	NA	NA	NA	Moss	Yes			5	25		20		95
Total Number of Species							8	5	6	13	13	7	3	4
Total Number of Native Species							8	5	5	10	11	7	3	4
Mean Wetland Indicator Value (W)							-1.6	-5.0	-0.5	1.0	2.2	-1.1	-5.0	-5.0
Mean Coefficient of Conservatism (C)							4.4	4.4	2.0	2.8	3.6	5.4	4.0	9.0
Floristic Quality Index (FQI)							12.4	9.8	4.9	10.3	13.0	14.4	6.9	18.0

Table 6b. Woody Species Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Woody Species Stems Per Permanent 30' Radius Plot							
							Plot 1W	Plot 6W	Plot 7W	Plot 8W	Plot 9W	Plot 10W	Plot 13W	Plot 26W
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	23		9	69	19	17	2	
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	47		172	31	49	192		
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-5	Shrub	Yes	83	56	3					
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes	4		14	6	4			
<i>Aronia prunifolia</i> (A. <i>melanocarpa</i>)	Chokeberry	5	FACW	-3	Shrub	Yes							1	
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes			5	7	11			
<i>Crataegus</i> sp.	Hawthorn	NA	NA	NA	Tree	NA			1					
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes		1				9	4	9
<i>Lonicera canadensis</i>	Canada Honeysuckle	5	FACU	3	Shrub	Yes	8							
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes						5	1	
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	26			47	14	25	15	25
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes			4	19	12		1	
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes			2					
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes								2
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes			9		4			
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes					5			
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes	10		32	12	19			
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes	21							
Total Number of Species							8	2	10	7	9	5	6	3
Total Number of Native Species							8	2	9	7	9	5	6	3
Mean Wetland Indicator Value (W)							-0.3	-4.0	0.4	0.4	0.7	-2.8	-2.3	-1.0
Mean Coefficient of Conservatism (C)							3.0	5.0	2.5	2.7	2.6	4.4	5.2	4.7
Floristic Quality Index (FQI)							8.5	7.1	7.9	7.2	7.7	9.8	12.7	8.1

Table 6c. Overall Wetland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Agrostis scabra</i>	Ticklegrass	4	FAC	0	Herb	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Anemone quinquefolia</i>	Wood Anemone	5	FAC	0	Herb	Yes
<i>Avenella flexuosa</i>	Flexuosa Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Brachyelytrum erectum</i>	Short-glume Grass	7	FACU	3	Herb	Yes
<i>Calamagrostis canadensis</i>	Blue-joint	3	OBL	-5	Herb	Yes
<i>Carex lasiocarpa</i>	Woolly-fruit Sedge	8	OBL	-5	Herb	Yes
<i>Carex leptalea</i>	Sedge	5	OBL	-5	Herb	Yes
<i>Carex oligosperma</i>	Few-seeded Sedge	10	OBL	-5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Carex trisperma</i>	Three-seeded Sedge	9	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Cirsium</i> sp.	Thistle	NA	NA	NA	Herb	NA
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Crataegus</i> sp.	Hawthorn	NA	NA	NA	Tree	NA
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Diervilla lonicera</i>	Bush-Honeysuckle	4	UPL	5	Shrub	Yes
<i>Dryopteris carthusiana</i>	Spinulose Woodfern	5	FACW	-3	Herb	Yes
<i>Dryopteris intermedia</i>	Intermediate Fern	5	FAC	0	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	UPL	5	Herb	No
<i>Hieracium caespitosum</i>	Yellow Hawkweed	0	UPL	5	Herb	No
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Kalmia polifolia</i>	Swamp-laurel	10	OBL	-5	Shrub	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Linnaea borealis</i>	Twin Flower	6	FAC	0	Herb	Yes
<i>Lonicera canadensis</i>	Canada Honeysuckle	5	FACU	3	Shrub	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Osmunda cinnamomea</i>	Cinnamon Fern	5	FACW	-3	Herb	Yes
<i>Oxalis acetosella</i>	Northern Wood-sorrel	7	FACU	3	Herb	Yes
<i>Panax trifolius</i>	Dwarf Ginseng	8	UPL	5	Herb	Yes
<i>Phleum pratense</i>	Timothy	0	FACU	3	Herb	No
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Potentilla palustris</i>	Marsh Cinquefoil	7	OBL	-5	Herb	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Rubus pubescens</i>	Dwarf Raspberry	4	FACW	-3	Herb	Yes
<i>Rubus setosus</i>	Setose Blackberry	3	FACW	-3	Shrub	Yes
<i>Salix discolor</i>	Pussy Willow	1	FACW	-3	Shrub	Yes
<i>Solidago juncea</i>	Early Goldenrod	3	UPL	5	Herb	Yes
<i>Thalictrum dasycarpum</i>	Hairy-fruit Meadow-rue	3	FACW	-3	Herb	Yes
<i>Utricularia</i> sp.	Bladderwort	0	OBL	-5	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes
<i>Viola</i> sp.	Violet	NA	NA	NA	Herb	NA

Total Number of Species	58
Total Number of Native Species	52
Mean Wetland Indicator Value (W)	-0.4
Mean Coefficient of Conservatism (C)	4.5
Floristic Quality Index (FQI)	34.3

Table 7-1a. Herbaceous Species Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

							Herbaceous Species Percent Cover Per 1m Quadrat																		
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31			
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes														5	5				
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes											10	10		5	10				
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes							5		5			5							
<i>Aronia prunifolia</i> (A. melanocarpa)	Chokeberry	5	FACW	-3	Shrub	Yes												5							
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes						5		10		5	5		5			5			
<i>Carex lucorum</i>	Blue Ridge Sedge	4	UPL	5	Herb	Yes			10																
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes												70							
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes					5							5							
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes									5			5		5					
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes									5			5		5	5				
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes									5			5		5	5				
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes											5								
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes							5						20						
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes	5	15				5				5									
<i>Gaultheria hispidula</i>	Creeping Snowberry	8	FACW	-3	Herb	Yes												5							
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes	5			10			5	5	10		5	5							
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes												5							
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes									5										
<i>Linnaea borealis</i>	Twinflower	6	FAC	0	Herb	Yes	5																		
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes	10	5	5	5			5							5	10	5			
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes							5												
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes	5																		
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes							25												
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes								5											
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes	5			5		5	5	5		5	20		5			10			
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes									20			5							
<i>Rubus hispidus</i>	Swamp Dewberry	4	FACW	-3	Shrub	Yes												5							
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes													5						
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes	15	5	60	5	85	30	25		20	5	5	5	5		5	10			
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes		15		20		5	5							50	10				
NA	Duff / Bare Soil	NA	NA	NA	NA	NA	25		10			65	60	80	10	20	80		50	50	60	70			
NA	Lichen	NA	NA	NA	Lichen	Yes	5	90	10			5				10									
NA	Moss	NA	NA	NA	Moss	Yes	5			90	95	5		5	50	80	5	80	5	60	5	30			
Total Number of Species							7	4	3	5	2	5	9	4	8	4	6	14	5	7	7	4			
Total Number of Native Species							7	4	3	5	2	5	9	4	8	4	6	14	5	7	7	4			
Mean Wetland Indicator Value (W)							2.4	1.3	2.7	1.2	-1.0	2.6	1.6	3.5	-0.9	4.0	1.8	-1.9	3.2	-1.3	-0.9	2.8			
Mean Coefficient of Conservatism (C)							4.7	4.8	4.0	3.4	6.0	4.2	2.8	3.3	5.4	4.3	3.5	4.9	3.8	4.0	3.9	3.5			
Floristic Quality Index (FQI)							12.5	9.5	6.9	7.6	8.5	9.4	8.3	6.5	15.2	8.5	8.6	18.2	8.5	10.6	10.2	7.0			

Table 7-1b. Woody Species Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

							Woody Species Stems Per Permanent 30-Foot Radius Circular Plot															
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	9	1		1			2	1	4	2	6			13	19	22
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	45			4		8	1	6	31	6	16	91	9	20	10	17
<i>Alnus incana ssp. rugosa</i>	Speckled Alder	5	FACW	-5	Shrub	Yes												43				
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes	10			3		1	4	4	4			10	10	6		4
<i>Aronia prunifolia</i>	Chokeberry	5	FACW	-3	Shrub	Yes									1							
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes												1			1	1
<i>Corylus cornuta</i>	Beaked Hazelnut	5	UPL	5	Shrub	Yes															1	
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes					6				1			7				
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes									11			6		5		
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes							1									
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	16	26		23	62	23		1	25	10		81	1	17		18
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes	17	2	32	24	32	10	19	21		11	8		7			11
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes													7			
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes	2			1		2	3	2	2	4	5		2	4	3	
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes							44	1			2		55			
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes								4					1			
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes							25	18		3			22	1		2
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes													1			
<i>Rhododendron groenlandicum</i>	Labrador Tea	-5	OBL	-5	Shrub	Yes									1							
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes	6	1				1										
Total Number of Species							7	4	1	6	3	6	8	9	9	6	5	7	10	7	5	7
Total Number of Native Species							7	4	1	6	3	6	8	9	9	6	5	7	10	7	5	7
Mean Wetland Indicator Value (W)							0.4	0.0	3.0	0.0	-1.0	1.0	1.1	0.7	-2.1	0.5	0.6	-1.9	1.5	-0.7	1.6	0.4
Mean Coefficient of Conservatism (C)							3.1	4.5	5.0	3.0	5.3	3.2	2.3	2.7	2.8	3.3	2.6	3.7	2.9	3.1	2.8	2.7
Floristic Quality Index (FQI)							8.3	9.0	5.0	7.3	9.2	7.8	6.4	8.0	8.3	8.2	5.8	9.8	9.2	8.3	6.3	7.2

Table 7-1c. Overall Upland Vegetative Survey Data - June 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Aronia prunifolia</i> (<i>A. melanocarpa</i>)	Chokeberry	5	FACW	-3	Shrub	Yes
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Carex lucorum</i>	Lucorum Sedge	4	UPL	5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Corylus cornuta</i>	Beaked Hazelnut	5	UPL	5	Shrub	Yes
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Gaultheria hispidula</i>	Snowberry	8	FACW	-3	Herb	Yes
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Kalmia polifolia</i>	Swamp-laurel	10	OBL	-5	Shrub	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Linnaea borealis</i>	Twinline	6	FAC	0	Herb	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthis mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Rubus hispidus</i>	Swamp Dewberry	4	FACW	-3	Herb	Yes
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes

Total Number of Species	42
Total Number of Native Species	42
Mean Wetland Indicator Value (W)	0.1
Mean Coefficient of Conservatism (C)	4.7
Floristic Quality Index (FQI)	30.3

Table 7-2a. Herbaceous Species Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

							Herbaceous Species Percent Cover Per 1m Quadrat																
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 14	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes															5	10	
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	5											10	10		5	10	
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes								5		5							
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes		5					5		25			10		15			5
<i>Carex lucorum</i>	Blue Ridge Sedge	4	UPL	5	Herb	Yes			15														
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes													60				
<i>Carex trisperma</i>	Threeseeded Sedge	9	OBL	-5	Herb	Yes										5							
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes					5								5				
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes										5			5		5		
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes										5			5		5	5	
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes										5			5		10	5	
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes												5					
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes								5						15			
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes	10	10					5				10						
<i>Gaultheria hispida</i>	Creeping Snowberry	8	FACW	-3	Herb	Yes													5				
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes	15			10	5			5	5	20		5	5		10		
<i>Goodyera tessellata</i>	Tesselated Rattlesnake Plantain	8	FACU	3	Herb	Yes										5							
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes													5				
<i>Kalmia polifolia</i>	Bog-laurel	10	OBL	-5	Shrub	Yes																	
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes	5	5	5	5	5			5								10	5
<i>Oryzopsis asperifolia</i>	Rough-leaved Rice-grass	6	UPL	5	Herb	Yes	5																
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes								5									
<i>Polygala paucifolia</i>	Fringed Polygala	7	FACU	3	Herb	Yes	5																
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes								30									
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes															5		
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes	70	10	5	35			85	50	100		40	95		50	5		75
<i>Rhododendron groenlandicum</i>	Labrador Tea	8	OBL	-5	Shrub	Yes										20			5				
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes														5			
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes	20	25	60	10	85		40	45		30	20	20		5			10
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes	5	25		30			10		10	5					60	10	
NA	Duff / Bare Soil	NA	NA	NA	NA	NA	20		10			100	50	60	60	15	20	80		45	40	75	70
NA	Lichen	NA	NA	NA	Lichen	Yes	5	65	10				5		5		5						
NA	Moss	NA	NA	NA	Moss	Yes	10			85	95		5		5	40	75	5	90	10	50	5	25

Total Number of Species	9	6	4	5	4	0	5	8	4	10	3	6	10	5	9	6	4
Total Number of Native Species	9	6	4	5	4	0	5	8	4	10	3	6	10	5	9	6	4
Mean Wetland Indicator Value (W)	2.1	2.2	2.8	1.2	0.3	N/A	2.6	2.1	2.0	-0.7	3.7	1.8	-2.3	3.2	0.0	-1.5	2.8
Mean Coefficient of Conservatism (C)	4.2	4.2	3.0	3.4	5.3	N/A	4.2	2.6	3.8	5.4	3.7	3.5	5.5	3.8	3.4	3.8	3.5
Floristic Quality Index (FQI)	12.7	10.2	6.0	7.6	10.5	N/A	9.4	7.4	7.5	17.1	6.4	8.6	17.4	8.5	10.3	9.4	7.0

Table 7-2b. Woody Species Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

							Woody Species Stems Per Permanent 30' Foot Radius Plot																							
Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native	Plot 1	Plot 2	Plot 11	Plot 12	Plot 13	Plot 14	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Plot 26	Plot 27	Plot 28	Plot 29	Plot 30	Plot 31							
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes	10	1		1		2		3	1	5	2	6			15	19	28							
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes	41			6			9	2	5	32	7	18	98		24	6	23							
<i>Alnus incana ssp. rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes													32											
<i>Amelanchier sp.</i>	Serviceberry	NA	NA	NA	S/T	Yes	5			3		1	1	2	3	5			10	13	7		3							
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes									1				1		1	1	1							
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes					5					2			7											
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes										19			6		5									
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes								1																
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes	18	29		23	63	12	27		1	23	11		73	1	20		17							
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes	17	2	34	24	28	10	10	18	19		11	8		7			11							
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes														8										
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes	2			1			3	5	2	2	4	6		2	7	4								
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes								42	1			2		56										
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes									7					2										
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes								25	16		3			23			3							
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes														1										
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes	6			1		1	1																	

Total Number of Species	7	3	1	7	3	5	6	8	10	7	6	5	7	9	7	4	7
Total Number of Native Species	7	3	1	7	3	5	6	8	10	7	6	5	7	9	7	4	7
Mean Wetland Indicator Value (W)	0.4	-1.0	3.0	0.4	-1.0	0.0	1.0	1.1	0.9	-1.6	0.5	0.6	-1.6	1.7	-0.7	0.8	0.4
Mean Coefficient of Conservatism (C)	3.1	4.7	5.0	3.1	5.3	3.6	3.2	2.3	2.6	3.6	3.3	2.6	3.7	3.1	3.1	2.3	2.7
Floristic Quality Index (FQI)	8.3	8.1	5.0	8.3	9.2	8.0	7.8	6.4	8.2	9.4	8.2	5.8	9.8	9.3	8.3	4.5	7.2

Table 7-2c. Overall Upland Vegetative Survey Data - August 2014

Eagle Mine LLC

Scientific Name	Common Name	C	Wet Code	Wet #	Growth Habit	Native
<i>Abies balsamea</i>	Balsam Fir	3	FACW	-3	Tree	Yes
<i>Acer rubrum</i>	Red Maple	1	FAC	0	Tree	Yes
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder	5	FACW	-3	Shrub	Yes
<i>Amelanchier</i> sp.	Serviceberry	NA	NA	NA	S/T	Yes
<i>Avenella flexuosa</i>	Hair-grass	6	UPL	5	Herb	Yes
<i>Betula papyrifera</i>	Paper Birch	2	FACU	3	Tree	Yes
<i>Carex lucorum</i>	Lucorum Sedge	4	UPL	5	Herb	Yes
<i>Carex stricta</i>	Tussock Sedge	4	OBL	-5	Herb	Yes
<i>Carex trisperma</i>	Threeseeded Sedge	9	OBL	-5	Herb	Yes
<i>Chamaedaphne calyculata</i>	Leatherleaf	8	OBL	-5	Shrub	Yes
<i>Clintonia borealis</i>	Blue Beadlily	5	FAC	0	Herb	Yes
<i>Coptis trifolia</i>	Goldthread	5	FACW	-3	Herb	Yes
<i>Cornus canadensis</i>	Bunchberry; Dwarf Cornel	6	FAC	0	Herb	Yes
<i>Cypripedium acaule</i>	Pink Lady-slipper	5	FACW	-3	Herb	Yes
<i>Danthonia spicata</i>	Poverty Grass	4	UPL	5	Herb	Yes
<i>Epigaea repens</i>	Trailing Arbutus	7	UPL	5	Herb	Yes
<i>Gaultheria hispidula</i>	Snowberry	8	FACW	-3	Herb	Yes
<i>Gaultheria procumbens</i>	Wintergreen	5	FACU	3	Herb	Yes
<i>Goodyera tessellata</i>	Tesselated Rattlesnake Plantain	8	FACU	3	Herb	Yes
<i>Iris versicolor</i>	Varicolored Iris	5	OBL	-5	Herb	Yes
<i>Larix laricina</i>	Tamarack	5	FACW	-3	Tree	Yes
<i>Maianthemum canadense</i>	Canada Mayflower	4	FAC	0	Herb	Yes
<i>Nemopanthus mucronatus</i>	Mountain Holly	7	OBL	-5	Shrub	Yes
<i>Oryzopsis asperifolia</i>	Rough-leaved Ric-grass	6	UPL	5	Herb	Yes
<i>Picea glauca</i>	White Spruce	3	FACU	3	Tree	Yes
<i>Picea mariana</i>	Black Spruce	6	FACW	-3	Tree	Yes
<i>Pinus banksiana</i>	Jack Pine	5	FACU	3	Tree	Yes
<i>Pinus resinosa</i>	Red Pine	6	FACU	3	Tree	Yes
<i>Pinus strobus</i>	White Pine	3	FACU	3	Tree	Yes
<i>Polygala paucifolia</i>	Fringed polygala	7	FACU	3	Herb	Yes
<i>Populus tremuloides</i>	Quaking Aspen	1	FAC	0	Tree	Yes
<i>Prunus pensylvanica</i>	Bird Cherry	3	FACU	3	Tree	Yes
<i>Prunus serotina</i>	Black Cherry	2	FACU	3	Tree	Yes
<i>Prunus virginiana</i>	Choke Cherry	2	FACU	3	Shrub	Yes
<i>Pteridium aquilinum</i>	Bracken Fern	0	FACU	3	Herb	Yes
<i>Rhododendron groenlandicum</i>	Labrador-Tea	8	OBL	-5	Shrub	Yes
<i>Salix humilis</i>	Prairie Willow	4	FACU	3	Shrub	Yes
<i>Trientalis borealis</i>	Starflower	5	FAC	0	Herb	Yes
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry	4	FACU	3	Shrub	Yes
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	4	FACW	-3	Herb	Yes

Total Number of Species	40
Total Number of Native Species	40
Mean Wetland Indicator Value (W)	0.3
Mean Coefficient of Conservatism (C)	4.7
Floristic Quality Index (FQI)	30.0

**APPENDIX C:
MICHIGAN NATURAL FEATURES INVENTORY REPORT**

John R. Vigna
King & MacGregor Environmental, Inc.
2520 Woodmeadow Drive SE
Grand Rapids, MI 49546
jvigna@king-macgregor.com

December 4, 2013

**Re: Rare Species Review #1313 – Eagle Mine Ecological Survey, Michigamme Township,
Marquette County, Michigan, T50N, R29W, Section 12.**

John:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.



MSU EXTENSION

**Michigan Natural
Features Inventory**

PO Box 13036
Lansing MI 48901

(517) 373-1552
Fax (517) 373-9566

mnfi.anr.msu.edu

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

According to the natural heritage database, legally protected species have been known to occur within 1.5 miles of the proposed project site. Therefore, it is **likely** that listed species will be negatively impacted. Keep in mind that MNFI cannot fully assess potential impacts without an on-site survey. MNFI offers more detailed reviews including field surveys which I would be happy to discuss with you.

Sincerely,

Michael Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

Table 1: Legally protected species within 1.5 miles of #1315

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Gentiana linearis</i>	Narrow-leaved gentian		1959-07-21		T	G4G5	S2	Plant
<i>Gentiana linearis</i>	Narrow-leaved gentian	1952	1952-07-28		T	G4G5	S2	Plant
<i>Gentiana linearis</i>	Narrow-leaved gentian	2004-08-21	2005-09-09		T	G4G5	S2	Plant

Table 2: Special Concern Species and Rare Natural Communities within 1.5 miles of #1315

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Falci pennis canadensis</i>	Spruce grouse	2004-09-05	2004-09-05		SC	G5	S2S3	Animal

Comments for Rare Species Review #1313: Legally protected species have been documented within 1.5 miles of the proposed project. Therefore, it is **likely** that rare natural resources will be impacted by this project. Keep in mind that MNFI cannot fully assess potential impacts without conducting an on-site field survey.

Populations of **narrow-leaved gentian** (*Gentian linearis*) in Michigan are located primarily in areas with soils derived from granite and at least somewhat acidic. This species thrives in wet meadows dominated by sedges and grasses, typically located along river or stream margins and kettle-holes. Narrow-leaved gentian has also been found along sandy lakeshores and bog margins, and can colonize moist disturbed ground such as borrow pits and depressions along road cuts. Elsewhere in its range, this species has a similar close association with granitic soils, occurring in bogs, springy areas, wet meadows, and shores. *G. linearis* flowers from about mid-July to August and possibly as late as early September. Flowers and fruit may occur simultaneously. Management notes: This gentian is a wetland species undoubtedly sensitive to hydrological alterations, and requiring protection from both flooding and excessive drainage. Please see [MNFI's Rare Species Explorer](#) for further information on this and other rare natural features.

Note: If a State listed species occurs at a project site, and you think you need an endangered species permit please contact: Lori Sargent, Nongame Wildlife Biologist, Wildlife Division, Michigan Department of Natural Resources, P.O. Box 30444, Lansing, MI 48909, 517-373-9418, or SargentL@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Barb Hosler, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-6326, or Barbara_Hosler@fws.gov.

Codes to accompany Tables 1 & 2

State Protection Status Code Definitions (SPROT)

E: Endangered

T: Threatened

SC: Special concern

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions.

SX = apparently extirpated from state.

**APPENDIX D:
NARROW LEAVED GENTIAN PHOTOGRAPHS**



Robust population of NLG North of Yellow Dog River



Typical NLG Specimen



NLG North of Yellow Dog River



NLG East side of Salmon Trout River

**APPENDIX E:
WETLAND VEGETATIVE SURVEY PHOTOGRAPHS**

(All photos taken during June, 2014)

Photo 1. Plot 1W, north view



Photo 2. Plot 1W, south view



Photo 3. Plot 1W, quadrat view



Photo 4. Plot 6W, north view



Photo 5. Plot 6W, south view



Photo 6. Plot 6W, quadrat view



Photo 7. Plot 7W, north view



Photo 8. Plot 7W, south view



Photo 9. Plot 7W, quadrat view



Photo 10. Plot 8W, north view



Photo 11. Plot 8W, south view



Photo 12. Plot 8W, quadrat view



Photo 13. Plot 9W, north view



Photo 14. Plot 9W, south view



Photo 15. Plot 9W, quadrat view



Photo 16. Plot 10W, north view



Photo 17. Plot 10W, south view



Photo 18. Plot 10W, quadrat view

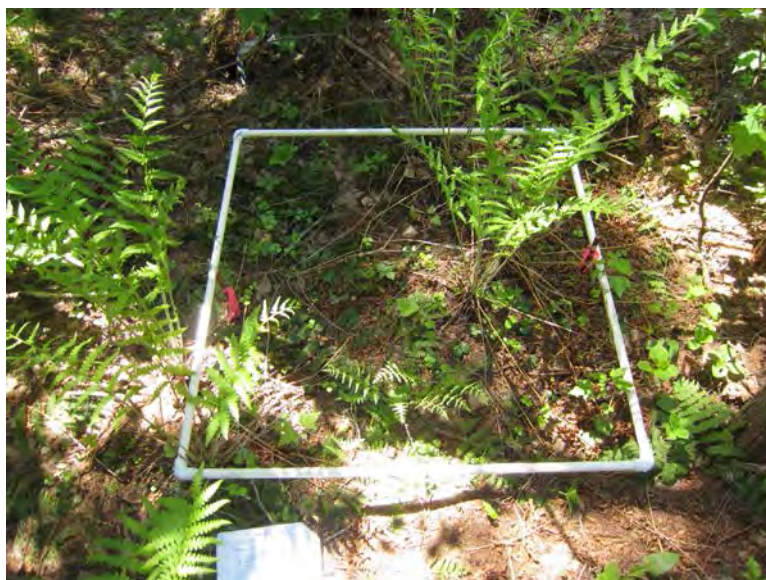


Photo 19. Plot 13W, north view



Photo 20. Plot 13W, south view



Photo 21. Plot 13W, quadrat view



Photo 22. Plot 26W, north view



Photo 23. Plot 26W, south view



Photo 24. Plot 26W, quadrat view



**APPENDIX F:
UPLAND VEGETATIVE SURVEY PHOTOGRAPHS**

(All photos taken during August, 2014)

Photo 1. Plot 1, north view



Photo 2. Plot 1, south view



Photo 3. Plot 1, quadrat view



Photo 4. Plot 2, north view



Photo 5. Plot 2, south view



Photo 6. Plot 2, quadrat view



Photo 7. Plot 11, north view



Photo 8. Plot 11, south view



Photo 9. Plot 11, quadrat view



Photo 10. Plot 12, north view



Photo 11. Plot 12, south view



Photo 12. Plot 12, quadrat view



Photo 13. Plot 13, north view



Photo 14. Plot 13, south view



Photo 15. Plot 13, quadrat view



Photo 16. Plot 14, north view



Photo 17. Plot 14, south view



Photo 18. Plot 14, quadrat view



Photo 19. Plot 21, north view



Photo 20. Plot 21, south view



Photo 21. Plot 21, quadrat view



Photo 22. Plot 22, north view



Photo 23. Plot 22, south view



Photo 24. Plot 22, quadrat view



Photo 25. Plot 23, north view



Photo 26. Plot 23, south view



Photo 27. Plot 23, quadrat view



Photo 28. Plot 24, north view



Photo 29. Plot 24, south view



Photo 30. Plot 24, quadrat view



Photo 31. Plot 25, north view



Photo 32. Plot 25, south view



Photo 33. Plot 25, quadrat view



Photo 34. Plot 26, north view



Photo 35. Plot 26, south view



Photo 36. Plot 26, quadrat view



Photo 37. Plot 27, north view



Photo 38. Plot 27, south view



Photo 39. Plot 27, quadrat view



Photo 40. Plot 28, north view



Photo 41. Plot 28, south view



Photo 42. Plot 28, quadrat view



Photo 43. Plot 29, north view



Photo 44. Plot 29, south view



Photo 45. Plot 29, quadrat view



Photo 46. Plot 31, north view



Photo 47. Plot 31, south view



Photo 48. Plot 31, quadrat view

