

2016 Wildlife Species Assessment

Humboldt Mill, Eagle Mine LLC

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1.0 INTRODUCTION

King & MacGregor Environmental Inc. (KME) was contracted by Eagle Mine LLC to collect ecological information within the Humboldt Mill Project Site (Study Area) located in western Marquette County, Michigan (Figure 1-1.). All figures are provided in Appendix A. KME conducted ecological surveys in 2016 for birds, small mammals, frogs and toads, and potential Canada rice grass habitat. This report is intended to describe the findings of the surveys conducted during 2016 and to supplement the previous reports including: *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME, 007), *Biological Survey Supplement: Plant Communities, Wildlife, and Wetland Evaluation* (KME 2008), *2014 Wildlife Species Assessment* (KME 2015), and *2015 Wildlife Species Assessment* (KME 2016).

1.1 Study Area

The Study Area is located in Sections 11 through 14, Humboldt Township (T47N, R29W), Marquette County, Michigan (Figure 1-2.).

1.2 Project Purpose

The purpose of these surveys is to continue the ecological investigation of birds, small mammals, and frogs and toads within the Study Area. All methodologies used during the 2016 bird, frog and toad, small mammal, and large mammal surveys are described in *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME 2007).

2.0 BIRDS

2.1. Methods

A breeding bird survey was conducted on June 14 and 15, 2016, and a fall bird survey was conducted on September 26, 27, and 30, 2016, at the eleven survey points established in 2006 (Figure 1-3.). Points were surveyed twice (i.e., two days) during the breeding and fall surveys.

2.2 Results

During the June 2016 breeding bird survey, 318 birds representing 43 species were identified by audial or visual observation (Tables 2-1a. and 2-1b.). During the September 2016 survey, 160 birds representing 19 species were observed (Tables 2-2a. and 2-2b.). A

combined total of 478 birds representing 45 species were identified during these 2016 (June and September) bird surveys (Table 2-3.). The red-eyed vireo (*Vireo olivaceus*), red-winged blackbird, (*Agelaius phoeniceus*), and white-throated sparrow (*Zonotrichia albicollis*), were the most abundant birds observed during the June 2016 survey, while the Canada goose (*Branta canadensis*), dark-eyed junco (*Junco hyemalis*), and American crow (*Corvus brachyrhynchos*) were the most abundant during the September 2016 survey.

2.3 Discussion

The bird species identified during the 2016 bird surveys are similar to those bird 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. The reduction in count by over 70 individuals from September 2015 to those from September 2016 was largely due to the reduced numbers of blue jay (*Cyanocitta cristata*) rock pigeon (*Columbia livia*), and American crow observed in September 2016.

3.0 MAMMALS

3.1 Small Mammals

3.1.1 Methods

Small mammal capture techniques employed the use of an array of 4 traps including Sherman box traps, large snap traps, and small snap traps at every survey point. Sampling was conducted on September 27 through 29, 2016. Eleven survey points were sampled during the 2016 survey (Figure 1-3.). Each survey point was sampled on three consecutive days, for a total of thirty-three sampling events.

3.1.2 Results

Thirty-two small mammals representing eight species were collected during the September survey period (Table 3): deer mouse (*Peromyscus maniculatus*), least chipmunk (*Tamias minimus*), masked shrew (*Sorex cinereus*), meadow jumping mouse (*Zapus hudsonius*) northern flying squirrel (*Glaucomys sabrinus*), red squirrel (*Sciurus vulgaris*), southern redback vole (*Clethrionomys gapperi*), and white-footed mouse (*Peromyscus leucopus*). The most common small mammal identified during the survey was the deer mouse. Total number of individuals captured in 2016 were nearly double those of 2015.

3.1.3 Discussion

The small mammals encountered within the Study Area during the 2016 surveys are typical of those expected in the habitats present, and are consistent with previous survey results. However, numbers of captured individuals appear to vary greatly from year to year. Beaver (*Castor canadensis*) activity was observed in the ponded area along the western edge of the Study Area boundary. Other regionally common species likely present within the Study Area, but not noted during the 2016 surveys include: muskrat (*Ondatra zibethicus*), porcupine (*Erethizon dorsatum*), and raccoon (*Procyon lotor*).

3.2 Large Mammals

3.2.1 Methods

Although the methodology does 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*) tracks were observed throughout the Study Area and scat of coyote (*Canis latrans*), American black bear (*Ursus americanus*), and the federally endangered gray wolf (*Canis lupus*) were observed in September 2016. Other regionally common species possibly present within the Study Area, but not observed during the 2016 surveys, include red fox (*Vulpes vulpes*) and bobcat (*Lynx rufus*).

3.2.3 Discussion

Similar to previous years, the large mammal species detected during the 2016 surveys are regionally common species and are expected to utilize the habitats present.

4.0 FROGS AND TOADS

4.1 Methods

KME used the same five frog and toad sampling points previously established in 2006 (Figure 1-3.). Surveys were conducted at late night or early morning on May 3 and 4, June 1, and July 6, 2016.

4.2 Results

Five frog species were observed during the 2016 surveys (Table 4.): gray treefrog (*Hyla versicolor*), green frog (*Rana clamitans*), mink frog (*Lithobates septentrionalis*), northern spring peeper (*Pseudacris crucifer*), and western chorus frog (*Pseudacris triseriata*). Calling activity included Call Index Values of 1, 2, and 3. As during the 2015 surveys, the spring peeper was the most frequently observed species. The 2016 observations are generally consistent with previous surveys.

4.3 Discussion

Breeding frog calls were observed at all five sampling points in the early and late spring surveys. As in 2015, mill operation noise was noted at this point and others throughout the survey periods. This elevated noise level appears to be routine now that operations are fully on-line, and may diminish the observers' ability to hear and distinguish calls, especially in areas closest to the mill such as Survey Points 2 & 3. This noise may explain the absence of calls observed at Survey Point 3 during the summer. Breeding frogs may have been present, but possibly imperceptible due to the noise. The frog species identified are typical of those expected in the habitats present in the Study Area.

5.0 THREATENED AND ENDANGERED SPECIES

5.1 Methods

The methodologies used during the 2016 threatened and endangered species survey are described in the 2014 report (KME 2015). In accordance with Michigan Department of Natural Resources (MDNR) guidelines (MDNR, 2001), KME surveyed for any MNFI listed species and their habitats during the appropriate season. An MNFI Rare Species Review conducted in 2014 returned the following species: Canada rice grass (*Oryzopsis canadensis*), a threatened species legally protected in Michigan; American bittern (*Botaurus lentiginosus*), bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*), all considered state special concern species; and a great blue heron (*Ardea herodias*) rookery, a rare natural feature (MNFI, 2014). A copy of the Rare Species Review is provided in Appendix C.

As in previous surveys, an Area of Investigation (AOI), limited to approximately five hundred feet from the active mill operation, was surveyed for Canada rice grass in late August. This area was considered most likely to be disturbed if any land clearing were to be conducted.

5.2 Results

Consistent with previous reports, the survey for Canada rice grass yielded no observations of suitable habitat or individuals within the AOI. Suitable habitat includes sandy, moist areas recently removed of jack pine cover in particular, but also often in edges of small depressions, and within large peatland complexes (MNFI 2007). Although American bittern observations have been routinely made at Survey Point 5 in the past, none were made in 2016. The bald eagle nest on the north shore of Lake Lory was occupied by two adults and two juveniles over the course of May and June, 2016 (Fig. 1-3.). In June of 2016, approximately 17 nests were identified in the great blue heron rookery just to the north of Lake Lory (Fig. 1-3. & Fig. 5-2.).

5.3 Discussion

The Canada rice grass AOI remains chiefly comprised of transportation infrastructure, facility structures, and other highly disturbed and/or maintained areas such as lay-down areas, spoil piles, borrow pits, mine tailings, and mowed turf. As in previous years, Canada rice grass was not observed in 2016 and is not expected to colonize the AOI due to the lack of suitable habitat. Therefore, this species is unlikely to be affected by current or expanded operations within the AOI. American bitterns, which have previously utilized the suitable habitat in the Study Area, were not observed during the 2016 survey dates. In the great blue heron rookery, as many as 16 of 17 available nests were occupied during three different surveys in May and June. The rookery appears to be active, robust, and unaffected by mill operations. Bald eagles returned to the Lake Lory nesting site again in 2016. With the presence of many waterbodies including wetlands, streams, and lakes adjacent to or within the footprint of current milling operations, bald eagles would be expected to continue to occur in and near the Study Area. Although habitat within the Study Area appears suitable, osprey were not observed in 2014, 2015, or 2016.

6.0 CONCLUSION

The findings of the 2016 ecological surveys for birds, small mammals, frogs and toads, and potential Canada rice grass habitat were generally consistent with those of previous

surveys, indicating that the current, routine operational activities do not appear to be negatively impacting the presence of vegetation or wildlife within the Study Area.

7.0 REFERENCES AND LITERATURE CITED

- King & MacGregor Environmental, Inc. 2007. Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation, Kennecott Eagle Minerals Company, Humboldt Mill, Marquette County, Michigan.
- King & MacGregor Environmental, Inc. 2008. Biological Survey Supplement: Plant Communities, Wildlife, and Wetland Evaluation, Humboldt Mill, Marquette County, Michigan.
- King & MacGregor Environmental, Inc. 2015. 2014 Wildlife Species Assessment, Humboldt Mill, Eagle Mine LLC
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- Michigan Department of Natural Resources. 2001. Guidelines for Conducting Endangered and Threatened Species Surveys. http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/TE_surveyguide.pdf.
- Michigan Natural Features Inventory. 2014. Rare Species Review #1415 – May 29, 2014.
- Michigan Natural Features Inventory. 2007. Rare Species Explorer (Web Application). Available online at <http://mnfi.anr.msu.edu/explorer> [Accessed Jan 14, 2015].

APPENDIX A: FIGURES

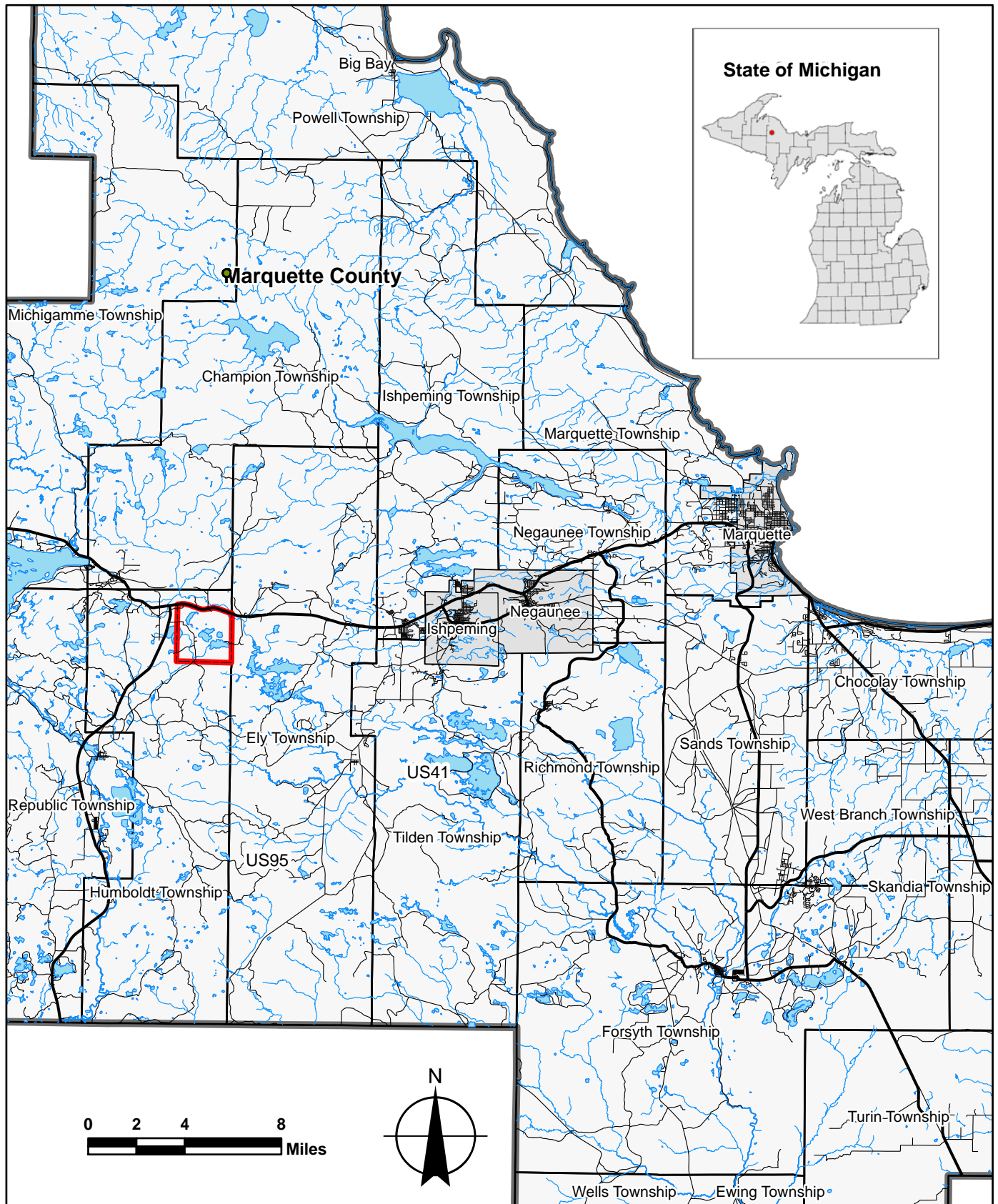


Figure 1-1. Project Location



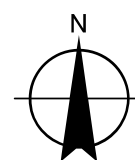
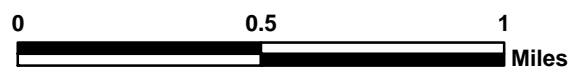
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Legend

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



Figure 1-2. Study Area



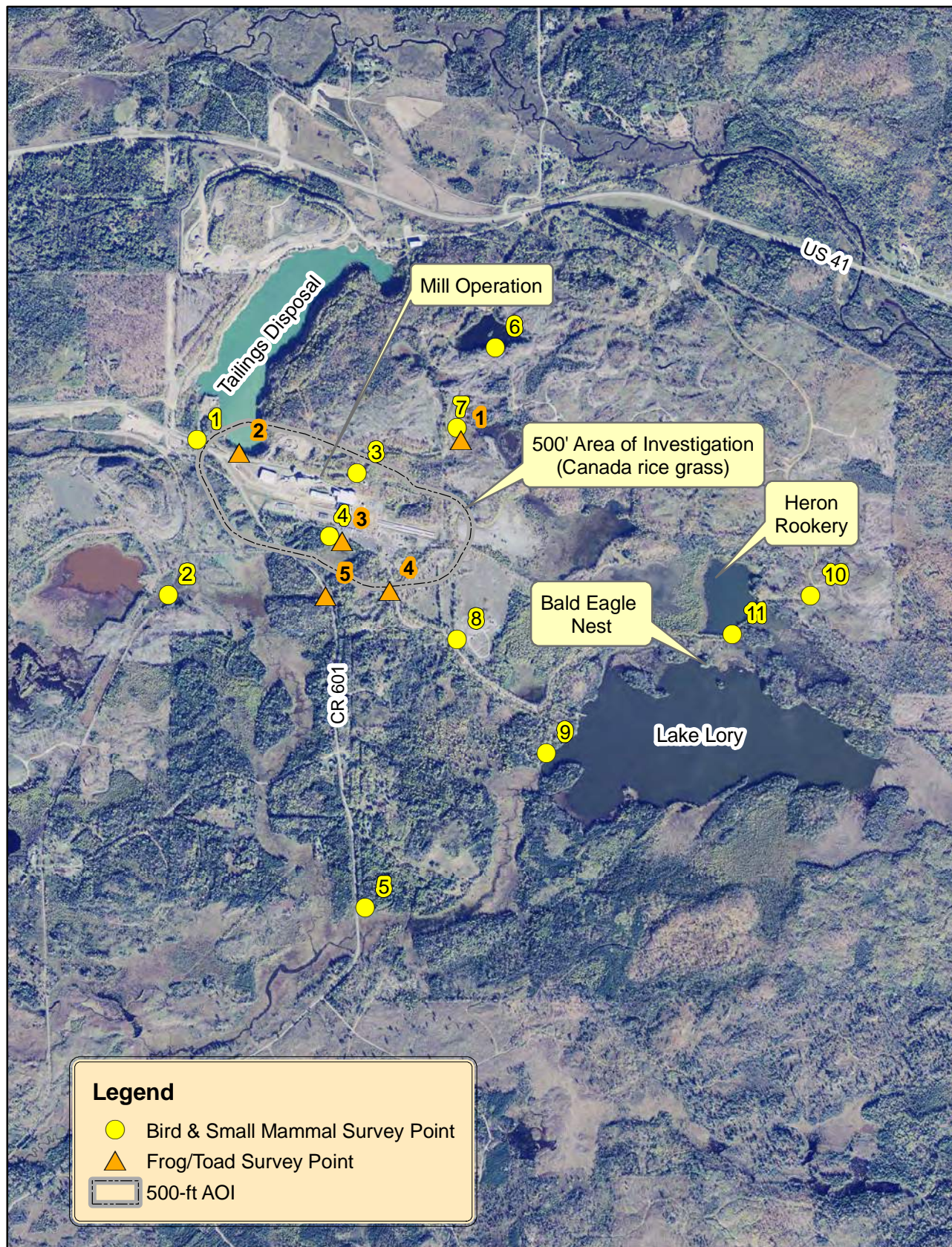
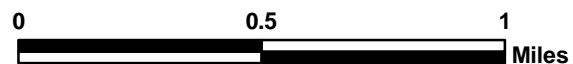
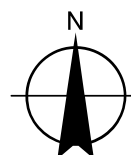


Figure 1-3. Biological Survey Areas



King & MacGregor Environmental, Inc.



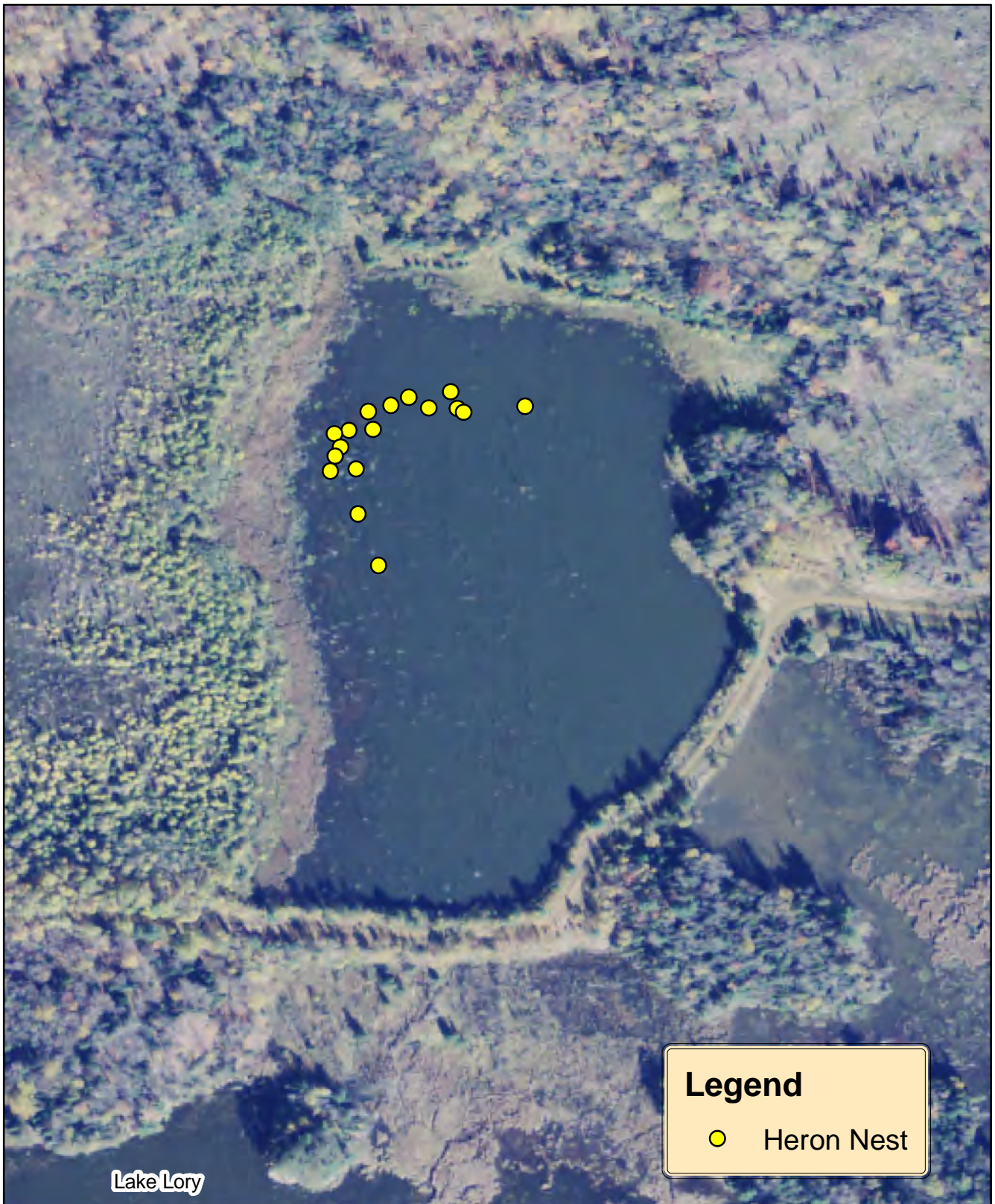
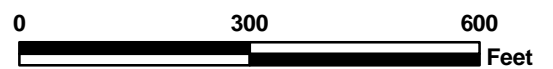
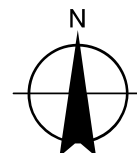


Figure 5-1. Great Blue Heron Rookery



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APPENDIX B: TABLES

Table 2-1a. Bird Survey Point Data - June 2016

Humboldt Mill, Eagle Mine LLC

Survey Point	Date	Alder Flycatcher	American Crow	American Goldfinch	American Redstart	American Robin	American Yellow Warbler	Arcadian Flycatcher	Barn Swallow	Belted Kingfisher	Black-and-White Warbler	Black-capped Chickadee	Black-throated Blue Warbler	Blue Jay	Blue-headed Vireo	Canada Goose	Chestnut-sided Warbler	Chipping Sparrow	Common Grackle	Common Raven	Common Yellowthroat	Dark-eyed Junco	Eastern Wood Pee Wee	Great Blue Heron	Grey Catbird	Hermit Thrush	Mallard	Mourning Dove	Nashville Warbler	Northern Flicker	Ovenbird	Red-eyed Vireo	Red-winged Blackbird	Rock Pigeon	Rose-breasted Grosbeak	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Tree Swallow	Veery	White-breasted Nuthatch	White-throated Sparrow	Wood Duck	Yellow-rumped Warbler	Total Count	Species Richness			
1	6/14/16		1	1	2															1					2					2	2						1								12	8			
1	6/15/16		1		1									1							1					2				1	1					1									6	6			
2	6/14/16	1				1																1	2								2											5				12	6		
2	6/15/16	2	1														1					3	2							3	1	3				1					3				19	9			
3	6/14/16		1		1	1											1					1								1	2			1			1									10	9		
3	6/15/16				1	1		1						3																	1															7	5		
4	6/14/16					2							1				4					1	2								1	4	3				1										19	9	
4	6/15/16				1	3			1			2						1				2	1									1	2							1							15	10	
5	6/14/16	2	1																		2	1								1		1					1	2				2				13	9		
5	6/15/16		1			3															1	2					1			2	1	2				1						1				15	10		
6	6/14/16	1	1										1				1									1									1				1			1				8	8		
6	6/15/16	1	1											2			1			1					1					1		1	1					1		1		3		1		16	13		
7	6/14/16	1		1		1								4			2					1										1	1								1	1					14	10	
7	6/15/16	1				1	1							1			1			1		1											2			1							2				12	10	
8	6/14/16					3					1								1										1				2					1					3				13	8	
8	6/15/16					1								1					1													1	1							1							6	6	
9	6/14/16				1	1				1												1										1	1	1									1	2	1			11	10
9	6/15/16	1									1			3								3						1			1		2	2								1						15	9
10	6/14/16					1					1				1		1				1		1								1	1	1				4				1	1					15	12	
10	6/15/16										1	1		1			2		1	1	1		1			2		1	1			1	1										2				16	13	
11	6/14/16	1				1								1					2					7					2				2	3						5			1					25	10
11	6/15/16					1	2							1		1								14					2		1		2	7						8								39	10
	Total	11	8	1	6	24	2	1	1	1	4	3	1	19	1	5	10	1	5	3	16	13	2	21	1	5	2	6	9	6	7	27	26	3	3	2	6	6	14	3	3	26	2	2	318	43			

Mean of Species Richness per Survey Point per Day 9
Mean Count per Species 7

Table 2-1b. Bird Species Abundance Rankings - June 2016

Humboldt Mill, Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Red-eyed Vireo	<i>Vireo olivaceus</i>	27	8.5%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	26	8.2%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	26	8.2%
American Robin	<i>Turdus migratorius</i>	24	7.5%
Great Blue Heron	<i>Ardea herodias</i>	21	6.6%
Blue Jay	<i>Cyanocitta cristata</i>	19	6.0%
Common Yellowthroat	<i>Geothlypis trichas</i>	16	5.0%
Tree Swallow	<i>Tachycineta bicolor</i>	14	4.4%
Dark-eyed Junco	<i>Junco hyemalis</i>	13	4.1%
Alder Flycatcher	<i>Empidonax alnorum</i>	11	3.5%
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	10	3.1%
Nashville Warbler	<i>Vermivora ruficapilla</i>	9	2.8%
American Crow	<i>Corvus brachyrhynchos</i>	8	2.5%
Ovenbird	<i>Seiurus aurocapilla</i>	7	2.2%
American Redstart	<i>Setophaga ruticilla</i>	6	6.0%
Mourning Dove	<i>Zenaida macroura</i>	6	1.9%
Northern Flicker	<i>Colaptes auratus</i>	6	1.9%
Sandhill Crane	<i>Grus canadensis</i>	6	1.9%
Song Sparrow	<i>Melospiza melodia</i>	6	1.9%
Canada Goose	<i>Branta canadensis</i>	5	1.6%
Common Grackle	<i>Quiscalus quiscula</i>	5	1.6%
Hermit Thrush	<i>Catharus guttatus</i>	5	1.6%
Black-and-White Warbler	<i>Mniotilta varia</i>	4	1.3%
Black-capped Chickadee	<i>Poecile atricapillus</i>	3	0.9%
Common Raven	<i>Corvus corax</i>	3	0.9%
Rock Pigeon	<i>Columba livia</i>	3	0.9%
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	3	0.9%
Veery	<i>Catharus fuscescens</i>	3	0.9%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	3	0.9%
American Yellow Warbler	<i>Setophaga petechia</i>	2	0.6%
Eastern Wood Pee Wee	<i>Contopus virens</i>	2	0.6%
Mallard	<i>Anas platyrhynchos</i>	2	0.6%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2	0.6%
Wood Duck	<i>Aix sponsa</i>	2	0.6%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	2	0.6%
American Goldfinch	<i>Carduelis tristis</i>	1	0.3%
Arcadian Flycatcher	<i>Empidonax virescens</i>	1	0.3%
Barn Swallow	<i>Hirundo rustica</i>	1	0.3%
Belted Kingfisher	<i>Megasceryle alcyon</i>	1	0.3%
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	1	0.3%
Blue-headed Vireo	<i>Vireo solitarius</i>	1	0.3%
Chipping Sparrow	<i>Spizella passerina</i>	1	0.3%
Grey Catbird	<i>Dumetella carolinensis</i>	1	0.3%

Total Count **318**
Mean Count per Species **7**
Total Number of Species **43**

Table 2-2a. Bird Survey Point Data - September 2016

Humboldt Mill, Eagle Mine LLC

Survey Point	Date	American Crow	American Goldfinch	American Herring Gull	American Robin	Bald Eagle	Black-capped Chickadee	Blue Jay	Canada Goose	Chipping Sparrow	Common Raven	Dark-eyed Junco	Hermit Thrush	Mallard	Northern Flicker	Rock Pigeon	Song Sparrow	White-breasted Nuthatch	White-throated Sparrow	Wood Duck	Total Count	Species Richness
1	9/26/16	2		1							1	1									5	4
1	9/27/16	3							4												7	2
2	9/26/16	1										1		2					1	3	8	5
2	9/30/16	2										1						1		2	6	4
3	9/26/16	3																			3	1
3	9/30/16																1		1		2	2
4	9/26/16	3	1		1				5												10	4
4	9/30/16	1							2							3					6	3
5	9/26/16							1		1		2									4	3
5	9/27/16	1										1									2	2
6	9/26/16							1				3						1			5	3
6	9/30/16				1		3	1							1				2		8	5
7	9/26/16							1				2		2					1	6	12	5
7	9/30/16				1							1		2							4	3
8	9/26/16	2			2																4	2
8	9/30/16	1			1																2	2
9	9/26/16				1			1	44									1			47	4
9	9/27/16							1					1								2	2
10	9/26/16					1						2									3	2
10	9/27/16					1						2									3	2
11	9/26/16					1						5									6	2
11	9/27/16									1		10									11	2
Total		19	1	1	7	3	3	6	55	2	1	31	1	6	1	3	1	3	5	11	160	19

Mean of Species Richness per Survey Point per Day 3

Mean Count per Species 8

Table 2-2b. Bird Species Abundance Rankings - September 2016

Humboldt Mill - Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	55	34.4%
Dark-eyed Junco	<i>Junco hyemalis</i>	31	19.4%
American Crow	<i>Corvus brachyrhynchos</i>	19	11.9%
Wood Duck	<i>Aix sponsa</i>	11	6.9%
American Robin	<i>Turdus migratorius</i>	7	4.4%
Blue Jay	<i>Cyanocitta cristata</i>	6	3.8%
Mallard	<i>Anas platyrhynchos</i>	6	3.8%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	5	3.1%
Bald Eagle	<i>Haliaeetus leucocephalus</i>	3	1.9%
Black-capped Chickadee	<i>Poecile atricapilla</i>	3	1.9%
Rock Pigeon	<i>Columba livia</i>	3	1.9%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	3	1.9%
Chipping Sparrow	<i>Spizella passerina</i>	2	1.3%
American Goldfinch	<i>Carduelis tristis</i>	1	0.6%
American Herring Gull	<i>Larus smithsonianus</i>	1	0.6%
Common Raven	<i>Corvus corax</i>	1	0.6%
Hermit Thrush	<i>Catharus guttatus</i>	1	0.6%
Northern Flicker	<i>Colaptes auratus</i>	1	0.6%
Song Sparrow	<i>Melospiza melodia</i>	1	0.6%

Total Count **160**
Mean Count per Species **8**
Total Number of Species **19**

Table 2-3. Bird Species Abundance Rankings - June and September Combined, 2016

Humboldt Mill, Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	<i>Branta canadensis</i>	60	12.6%
Dark-eyed Junco	<i>Junco hyemalis</i>	44	9.2%
American Robin	<i>Turdus migratorius</i>	31	6.5%
White-throated Sparrow	<i>Zonotrichia albicollis</i>	31	6.5%
American Crow	<i>Corvus brachyrhynchos</i>	27	5.6%
Red-eyed Vireo	<i>Vireo olivaceus</i>	27	5.6%
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	26	5.4%
Blue Jay	<i>Cyanocitta cristata</i>	25	5.2%
Great Blue Heron	<i>Ardea herodias</i>	21	4.4%
Common Yellowthroat	<i>Geothlypis trichas</i>	16	3.3%
Tree Swallow	<i>Tachycineta bicolor</i>	14	2.9%
Wood Duck	<i>Aix sponsa</i>	13	2.7%
Alder Flycatcher	<i>Empidonax alnorum</i>	11	2.3%
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	10	2.1%
Nashville Warbler	<i>Vermivora ruficapilla</i>	9	1.9%
Mallard	<i>Anas platyrhynchos</i>	8	1.7%
Northern Flicker	<i>Colaptes auratus</i>	7	1.5%
Ovenbird	<i>Seiurus aurocapilla</i>	7	1.5%
Song Sparrow	<i>Melospiza melodia</i>	7	1.5%
Rock Pigeon	<i>Columba livia</i>	6	1.3%
American Redstart	<i>Setophaga ruticilla</i>	6	1.3%
Black-capped Chickadee	<i>Poecile atricapilla</i>	6	1.3%
Hermit Thrush	<i>Catharus guttatus</i>	6	1.3%
Mourning Dove	<i>Zenaidura macroura</i>	6	1.3%
Sandhill Crane	<i>Grus canadensis</i>	6	1.3%
White-breasted Nuthatch	<i>Sitta carolinensis</i>	6	1.3%
Common Grackle	<i>Quiscalus quiscula</i>	5	1.0%
Black-and-White Warbler	<i>Mniotilta varia</i>	4	0.8%
Common Raven	<i>Corvus corax</i>	4	0.8%
Bald Eagle	<i>Haliaeetus leucocephalus</i>	3	0.6%
Chipping Sparrow	<i>Spizella passerina</i>	3	0.6%
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	3	0.6%
Veery	<i>Catharus fuscescens</i>	3	0.6%
American Goldfinch	<i>Carduelis tristis</i>	2	0.4%
American Yellow Warbler	<i>Setophaga petechia</i>	2	0.4%
Eastern Wood Pee Wee	<i>Contopus virens</i>	2	0.4%
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2	0.4%
Yellow-rumped Warbler	<i>Dendroica coronata</i>	2	0.4%
American Herring Gull	<i>Larus smithsonianus</i>	1	0.2%
Arcadian Flycatcher	<i>Empidonax virescens</i>	1	0.2%
Barn Swallow	<i>Hirundo rustica</i>	1	0.2%
Belted Kingfisher	<i>Megasceryle alcyon</i>	1	0.2%
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	1	0.2%
Blue-headed Vireo	<i>Vireo solitarius</i>	1	0.2%
Grey Catbird	<i>Dumetella carolinensis</i>	1	0.2%

Total Count 478
Mean Count per Species 11
Total Number of Species 45

Table 3. Small Mammal Survey Point Data - 2016

Humboldt Mill, Eagle Mine LLC

Survey Point	Date	Sherman Live Traps (2)						Large Snap Trap			Small Snap Trap			Total Count	Species Richness
		Deer Mouse (<i>Peromyscus maniculatus</i>)	Least Chipmunk (<i>Tamias minimus</i>)	Meadow Jumping Mouse (<i>Zapus hudsonius</i>)	Northern Flying Squirrel (<i>Glaucomys sabrinus</i>)	Southern Redback Vole (<i>Clethrionomys gapperi</i>)	White-footed Mouse (<i>Peromyscus leucopus</i>)	Meadow Jumping Mouse (<i>Zapus hudsonius</i>)	Red Squirrel (<i>Tamiasciurus hudsonicus</i>)	Southern Redback Vole (<i>Clethrionomys gapperi</i>)	Deer Mouse (<i>Peromyscus maniculatus</i>)	Masked Shrew (<i>Sorex cinereus</i>)	Southern Redback Vole (<i>Clethrionomys gapperi</i>)		
1	9/27/16													0	0
1	9/28/16					1								1	1
1	9/29/16													0	0
2	9/27/16						1					1		2	2
2	9/28/16			1				1						2	1
2	9/29/16										1			1	1
3	9/27/16	1									1			2	1
3	9/28/16					1								1	1
3	9/29/16					1								1	1
4	9/27/16		1											1	1
4	9/28/16													0	0
4	9/29/16					1								1	1
5	9/27/16													0	0
5	9/28/16				1									1	1
5	9/29/16					1								1	1
6	9/27/16	1				1			1					3	3
6	9/28/16													0	0
6	9/29/16													0	0
7	9/27/16													0	0
7	9/28/16													0	0
7	9/29/16													0	0
8	9/27/16	1									1			2	1
8	9/28/16	1				1				1				3	2
8	9/29/16	2												2	1
9	9/27/16													0	0
9	9/28/16	1											1	2	2
9	9/29/16	1									1			2	1
10	9/27/16													0	0
10	9/28/16													0	0
10	9/29/16	2												2	1
11	9/27/16										1			1	1
11	9/28/16													0	0
11	9/29/16										1			1	1
Total		10	1	1	1	7	1	1	1	1	6	1	1	32	8

Total Species Richness 8
Mean Species Richness per Survey Point per Day 0.8
Mean Count per Species 4.0

Table 4. Frog and Toad Survey Point Data - 2016

Humboldt Mill, Eagle Mine LLC

Survey Point	Survey Period	Date	Time	Temp (°F)	Wind Speed (MPH)	Call Index Value*					Species Richness
						Gray Treefrog (<i>Hyla versicolor</i>)	Green Frog (<i>Rana clamitans</i>)	Mink Frog (<i>Lithobates septentrionalis</i>)	Northern Spring Peeper (<i>Pseudacris crucifer</i>)	Western Chorus frog (<i>Pseudacris triseriata</i>)	
1	Early Spring	5/4/16	12:11 AM	46	3-7				3		1
2	Early Spring	5/4/16	12:27 AM	45	4				3		1
3	Early Spring	5/4/16	12:40 PM	45	3-8				3		1
4	Early Spring	5/4/16	12:58 AM	45	0			1	3	2	3
5	Early Spring	5/3/16	11:50 PM	47	3				3		1
1	Late Spring	6/1/16	1:00 AM	61	0		1	1	3		3
2	Late Spring	6/1/16	1:16 AM	62	3-5				2		1
3	Late Spring	6/1/16	1:31 AM	63	0			1	2		2
4	Late Spring	6/1/16	1:50 AM	62	0				3		1
5	Late Spring	6/1/16	2:14 AM	60	0			2	2		2
1	Summer	7/6/16	9:55 PM	72	0		2	1			2
2	Summer	7/6/16	10:15 AM	71	0	2					1
3	Summer	7/6/16	10:32 PM	70	0						0
4	Summer	7/6/16	10:46 PM	70	0	2		1			2
5	Summer	7/6/16	11:06 AM	69	0		2				1
Mean						2.0	1.7	1.2	2.7	2.0	1.5
Total											5.0

Mean Call Index Value per Survey Point per Day 1.9

- * 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.

APPENDIX C:
MICHIGAN NATURAL FEATURES INVENTORY REPORT

John R. Vigna
King & MacGregor Environmental, Inc.
2520 Woodmeadow Drive SE
Grand Rapids, MI 49546

May 29, 2014

Re: Rare Species Review #1415 – Humboldt Mill Ecological Monitoring, Marquette, MI T47N, R29W, Sections 11-14.

Hello:

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.

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.



MSU EXTENSION

**Michigan Natural
Features Inventory**

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

According to the natural heritage database several legally protected species have been documented within 1.5 miles of the project site. However, the occurrences are considered to be **Historic** (> 50 years old), so it is **not likely** that negative impacts will occur. Keep in mind that **MNFI cannot fully evaluate this project without conducting a site visit**. MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders
Rare Species Review Specialist
Michigan Natural Features Inventory

Comments for Rare Species Review #1415: It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, 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, 517-284-6216, 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.

Table 1: Legally protected species within 1.5 miles of RSR #1415

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Oryzopsis canadensis</i>	Canada rice grass	1936	1936-06-27		T	G5	S2	Plant
<i>Oryzopsis canadensis</i>	Canada rice grass	1936	1936-06-27		T	G5	S2	Plant

Table 2: Special Concern Species and other Rare Natural Features within 1.5 miles of RSR #1415

SNAME	SCOMNAME	FIRSTOBS	LASTOBS	USESA	SPROT	GRANK	SRANK	ELCAT
<i>Pandion haliaetus</i>	Osprey	1993	1994-07-24		SC	G5	S4	Animal
Great Blue Heron Rookery	Great Blue Heron Rookery		1978			G5	SU	Other
<i>Haliaeetus leucocephalus</i>	Bald eagle	1992?	1993-04-13		SC	G5	S4	Animal
<i>Botaurus lentiginosus</i>	American bittern	2012-05-22	2012-05-22		SC	G4	S3S4	Animal

Special concern species and natural communities are not protected under endangered species legislation but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

Please consult MNFI's Rare Species Explorer for additional information regarding the listed species: <http://mnfi.anr.msu.edu/explorer/search.cfm>.

Codes to accompany Tables 1 and 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.