2014 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 2014 for birds, small mammals, and frogs and toads. This report is intended to describe the findings of the surveys conducted during 2014 and to supplement the previous reports, *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME, 2007) and *Biological Survey Supplement: Plant Communities, Wildlife, and Wetland Evaluation* (King & MacGregor Environmental, Inc., 2008).

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.

2.0 BIRDS

2.1. Methods

The methodologies used and described in *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME, 2007) were employed during the 2014 bird surveys. A breeding bird survey was conducted on June 12, 13, and 26, 2014, and a fall bird survey was conducted September 17 and 18, 2014, 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 (Appendix D.).

2.2 Results

During the June 2014 breeding bird survey, 335 birds representing 50 species were observed (Tables 2-1a. and 2-1b.). During the September 2014 survey, 403 birds representing 23 species were observed (Tables 2-2a. and 2-2b.). A combined total of 738 birds representing 57 species were identified during these 2014 (June and September) bird surveys (Table 2-3.). Red-winged blackbird, American robin, and red-eyed vireo were the

most abundant birds observed during the June 2014 survey, while the Canada goose was the most abundant during the September 2014 survey.

2.3 Discussion

The bird species identified during the 2014 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.

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 *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME, 2007). Capture techniques 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. Eleven survey points were sampled during the 2014 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

Twenty-nine small mammals representing eight species were collected during the September survey period (Table 3): deer mouse (*Peromyscus maniculatus*), eastern chipmunk (*Tamias striatus*), least chipmunk (*Tamias minimus*), meadow vole (*Microtis pennsylvanicus*), northern flying squirrel (*Glaucomys sabrinus*), pygmy shrew (*Sorex hoyi*), southern redback vole (*Clethrionomys gapperi), and* white-footed mouse (*Peromyscus leucopus*). The most common small mammal identified during the survey was the deer mouse. Red squirrels (*Sciurus vulgaris*) were observed throughout the Study Area during the 2014 surveys, but not captured in traps.

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 consistent with previous survey results. Ponding along the western edge of the Study Area appears to be the result of beaver (*Castor canadensis***)** activity. Other regionally common species likely present within the Study Area, but not noted during the 2014 surveys include: muskrat (*Ondatra zibethicus*), porcupine (*Erethizon dorsatum*), and raccoon (*Procyon lotor*).

3.2 Large Mammals

3.2.1 Methods

The methodologies described in *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (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*) tracks were observed throughout the Study Area and coyote (*Canis latrans*) vocalizations were detected near Survey Point 1 during the 2014 frog and toad surveys.

3.2.3 Discussion

Similar to previous years, both large mammal species detected during the 2014 surveys are regionally common species and are expected to utilize the habitats present.

4.0 FROGS AND TOADS

4.1 Methods

The methodologies used and described in *Biological Survey: Plant Communities, Wildlife, and Wetland Evaluation* (KME, 2007) were employed during the 2014 frog and toad survey. KME used the same five frog and toad sampling points previously established in 2006 (Figure 1-3.). Surveys were conducted after sunset on May 28 and June 9, 2014. Due to

extended ice and snow cover in April, an early spring (April 1 – May 5) survey was not conducted in 2014.

4.2 Results

Four frog species were observed during the survey (Table 4.): gray treefrog (*Hyla versicolor*), green frog (*Rana clamitans*), northern spring peeper (*Pseudacris crucifer*), and western chorus frog (*Pseudacris triseriata*). Calling activity included Call Index values of 1, 2, and 3, with a median Call Index Value of 2. These findings are consistent with previous surveys.

4.3 Discussion

All five 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.

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 to determine if any listed species or rare natural features have been found within 1.5 miles of the Study Area. The MNFI review 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. A copy of the MNFI report is provided in Appendix C. 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 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

The MNFI states that the optimal survey period for Canada rice grass in Michigan is July and August (MNFI, 2007). The survey for Canada rice grass yielded no observations of suitable habitat or individuals. A total of five American bittern observations were made during the 2014 bird surveys at Survey Points 4 and 5. An active bald eagle nest was observed in a standing dead tree along the north shore of Lake Lory (Fig. 1-3.) in 2006 and 2007. Although the nest itself appeared to be intact in May 2014, no bald eagles were observed. No bald eagles or ospreys were observed by KME in the Study Area during 2014. Also previously noted in 2006 and 2007, a heron rookery is located in a stand of snags in an open water area just to the north of Lake Lory (Fig. 1-3. & Fig. 5-2.). Approximately 10 active nests were identified in this location in May of 2014.

5.3 Discussion

According to the MNFI, Canada rice grass was last observed near the Study Area in 1936. The habitat of Canada rice grass in Marquette County is a dry, sandy upland forest of jack pine (*Pinus banksiana*), red pine (*Pinus resinosa*), and quaking aspen (*Populus tremuloides*). The American bittern is a wader in the same taxonomic family as the herons and egrets (*Ardeidae*), with a preferred habitat of dense herbaceous wetlands. Bald eagles prefer to nest in large snags near open water and are best viewed nesting in suitable habitat from the third week of March to the second week of July. Although the bald eagle nest is located in such habitat, it was inactive during May, June, July, and August, 2014 surveys (MNFI, 2007). However, this doesn't necessarily indicate that the nest has been abandoned. Bald eagles may alternate breeding seasons between several nests in a breeding area (National Park Service, 2015). Ospreys are best viewed during the second week of May through the first week of August perched or foraging above or near water, and frequent similar habitat as bald eagles (MNFI 2007).

8.0 CONCLUSION

The majority of the AOI consists chiefly of transportation infrastructure, facility structures, and other highly disturbed areas such as spoil piles, borrow pits, and mine tailings (Appendix D: Photographs). The AOI also contains some second growth forested areas populated by quaking aspen, paper birch (*Betula papyrifera*), and balsam poplar (*Populus balsamifera*). This habitat is considered to be largely unsuitable for Canada rice grass.

Canada rice grass was not observed in 2014 and is not expected to occur in 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. Survey Points 4 and 5 are located next to large wetland and stream complexes containing dense vegetation. American bitterns would be expected to utilize this type of habitat and appear to tolerate the current activities as Survey Point 4 is immediately adjacent to ongoing mill operations and County Road 601. The great blue heron rookery, occupied by ten breeding pairs appears to be active, robust, and unaffected by mill operations. With many waterbodies including wetlands, streams and Lake Lory adjacent to or within the Study Area, bald eagles and ospreys would be expected to continue to occur in and near the Study Area.

9.0 REFERENCES AND LITERATURE CITED

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APPENDIX A:
FIGURES

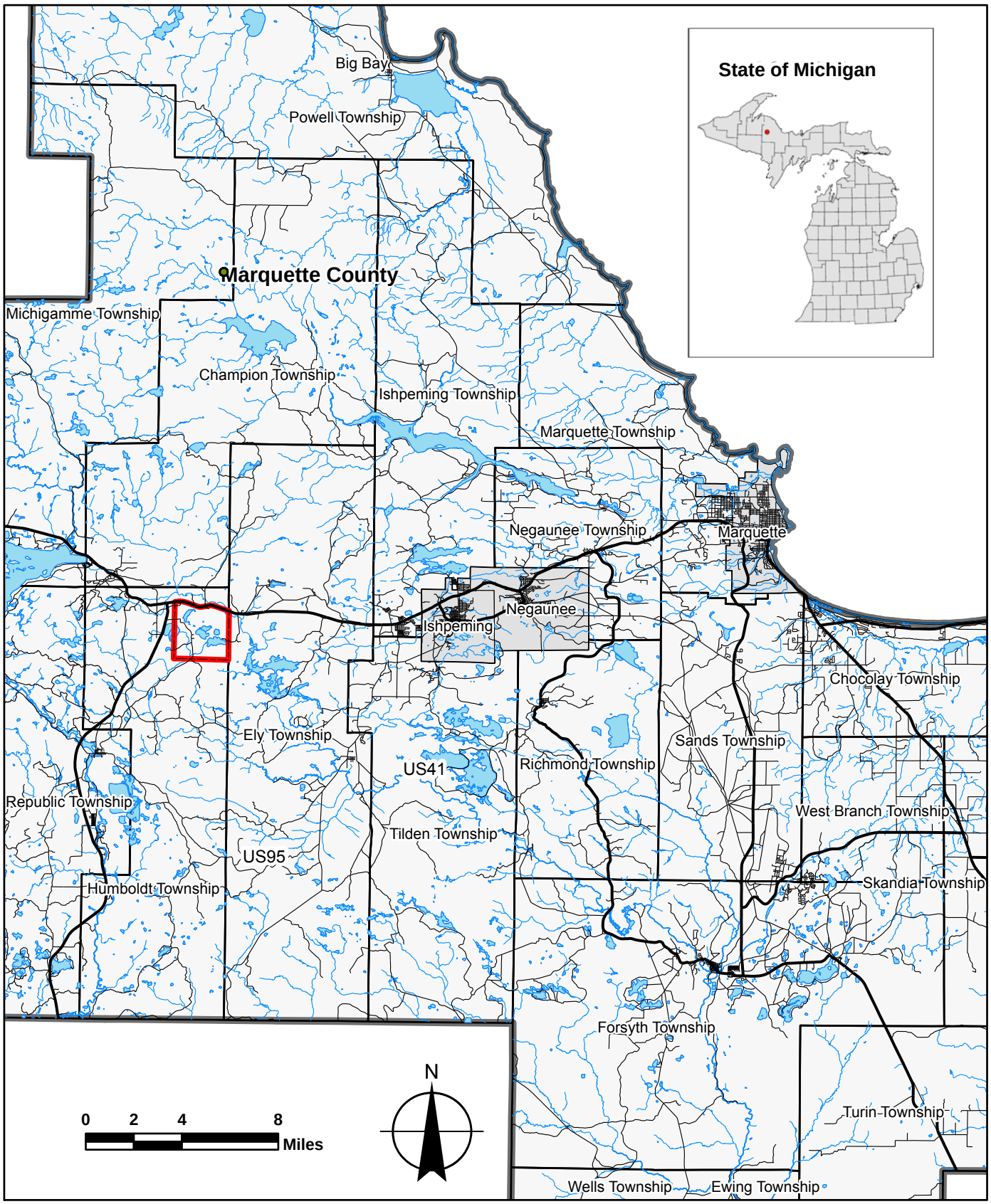

Figure 1-1. Project Location

King & MacGregor Environmental, Inc.

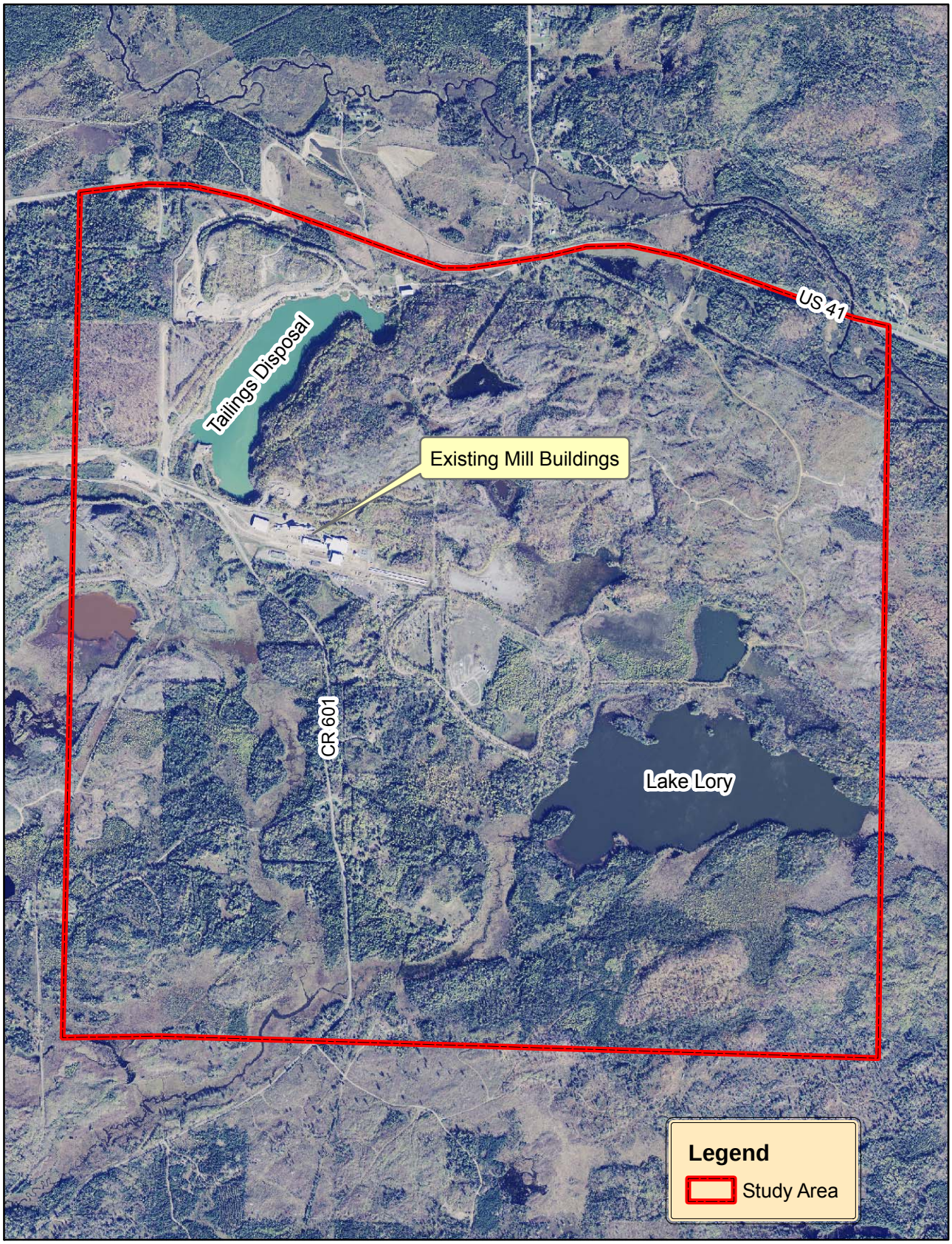

Figure 1-2. Study Area

King & MacGregor Environmental, Inc.

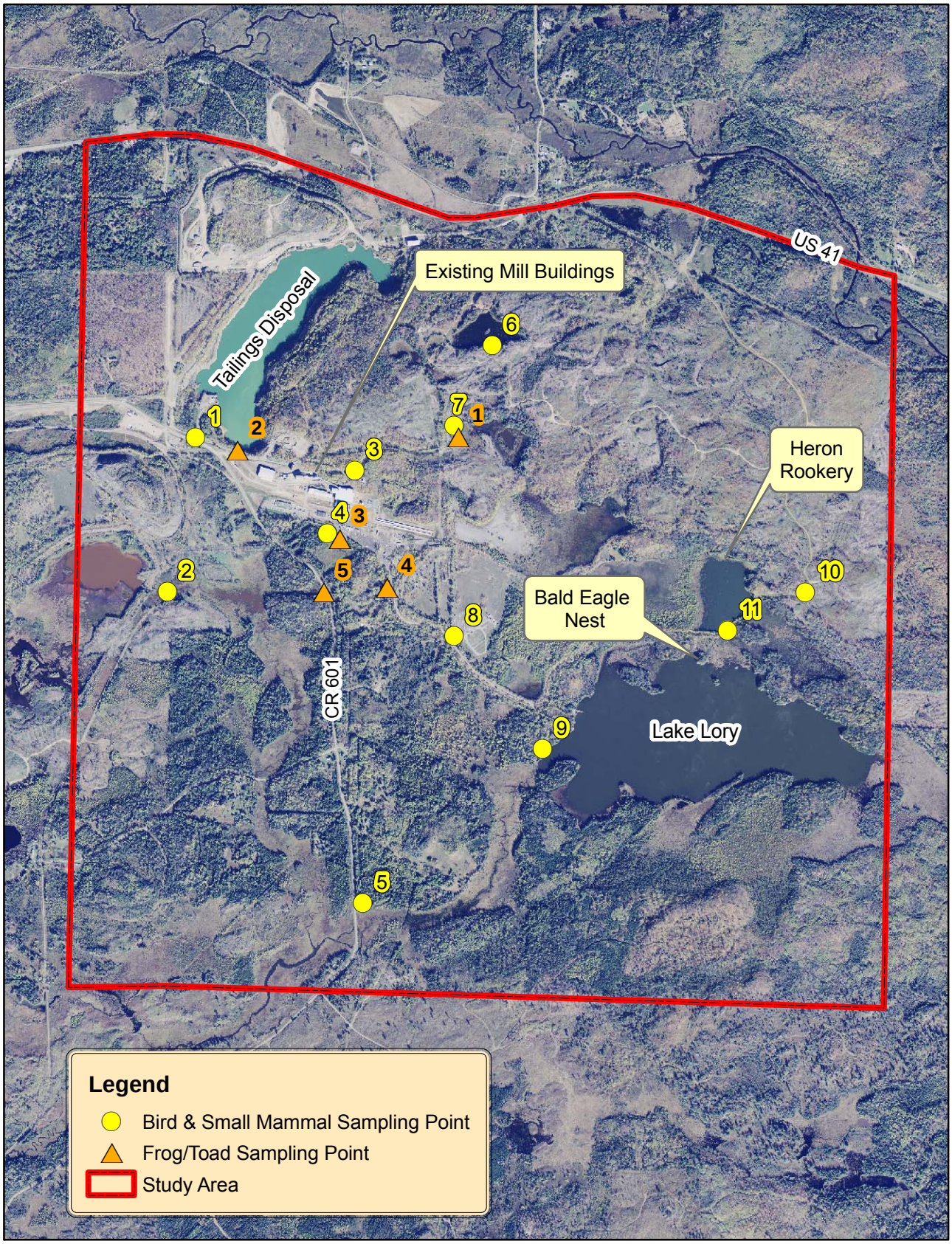

Figure 1-3. Biological Sampling Areas

0 0.5 1 Miles

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King & MacGregor Environmental, Inc.

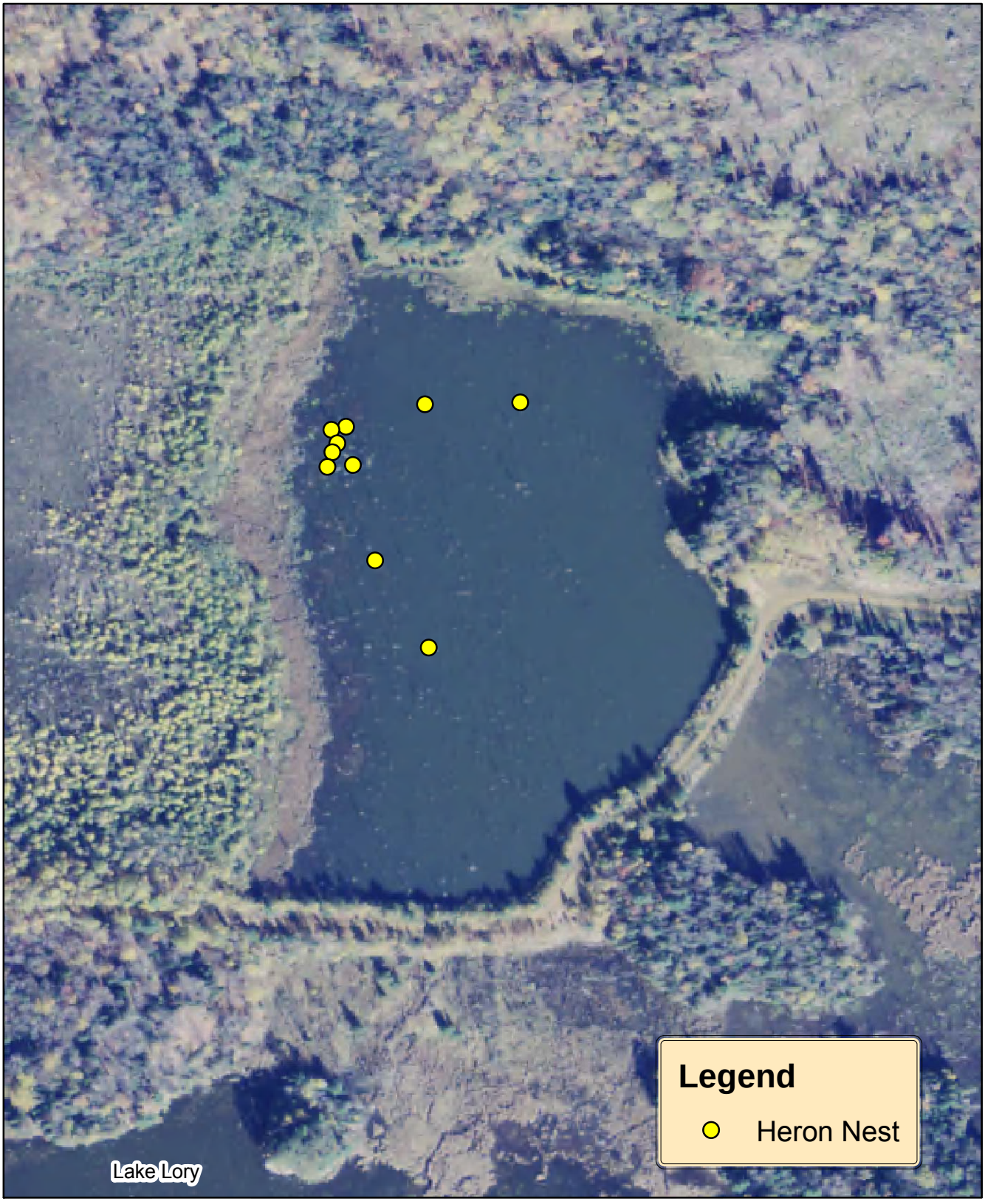

Figure 5-1. Great Blue Heron Rookery

0 305 610
Feet

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King & MacGregor Environmental, Inc.

APPENDIX B:
TABLES

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

Humbolt Mill, Eagle Mine LLC

Survey Point	Date	Alder Flycatcher	American Bittern	American Crow	American Goldfinch	American Redstart	American Robin	Barn Swallow	Belted Kingfisher	Black-capped Chickadee	Black-throated Blue Warbler	Black-throated Green Warbler	Blue Jay	Canada Goose	Cedar Waxwing	Chipping Sparrow	Common Grackle	Common Loon	Common Nighthawk	Common Raven	Common Yellowthroat	Dark-eyed Junco	Domestic Chicken	Eastern Bluebird	Eastern Kingbird	Eastern whip-poor-will	Eastern Wood Pewee	Golden-crowned Kinglet	Gray Catbird	Great Blue Heron	Hermit Thrush	Least Flycatcher	Mallard	Merganser sp.	Nashville Warbler	Northern Flicker	Northern Parula	Ovenbird	Red-eyed Vireo	Red-winged Blackbird	Rock Pigeon	Rose-breasted Grosbeak	Ruby-crowned Kinglet	Sandhill Crane	Song Sparrow	Tree Swallow	White-throated Sparrow	Wilson's Snipe	Wood Duck	Woodpecker sp.	Yellow-rumped Warbler	**Total Count**	**Species Richness**
1	6/12/14					*1*							*1*		*1*						*1*																													**7**	**6**
1	6/13/14															*1*				*1*		*1*																												**5**	**5**
2	6/12/14	*1*					*2*						*1*																						*3*				*1*				*4*				*1*					**12**	**6**
2	6/13/14	*3*					*1*									*1*					*1*	*3*	*1*																							*2*	*2*				**14**	**8**
3	6/12/14						*1*																															*1*	*1*													**3**	**3**
3	6/26/14						*1*									*1*				*1*						*1*						*1*								*3*					*3*			*1*					**12**	**8**
4	6/12/14						*4*								*1*																										*5*						*1*						**11**	**4**
4	6/26/14				*1*		*3*	*1*	*1*						*1*		*3*								*1*						*1*								*1*	*2*	*6*					*1*			*1*				**23**	**13**
5	6/12/14		*1*	*1*									*1*								*1*										*1*				*1*		*1*	*1*		*2*							*1*					**10**	**9**
5	6/13/14	*1*	*3*																		*1*	*1*								*1*													*1*				*3*				**11**	**7**
6	6/12/14						*2*																						*1*							*1*	*1*	*1*					*2*			*2*	*2*			*1*	**13**	**9**
6	6/26/14			*1*			*4*																						*1*						*1*			*1*	*1*	*3*			*1*				*3*				*1*	**17**	**10**
7	6/12/14						*2*				*1*	*1*						*1*	*1*		*1*																*1*	*3*	*3*				*2*			*2*		*1*		*1*	**20**	**13**
7	6/26/14						*1*						*1*									*2*							*1*									*1*	*3*			*1*	*1*				*3*					**14**	**9**
8	6/12/14			*2*			*5*						*1*		*4*							*1*						*1*							*1*	*1*			*1*	*1*	*1*												**19**	**11**
8	6/26/14			*2*						*1*			*2*			*1*						*2*							*1*		*1*				*1*			*1*	*1*								*1*			*1*	*1*	**16**	**13**
9	6/12/14	*1*		*2*			*2*					*1*										*1*						*1*							*1*		*2*		*1*								*1*					**13**	**10**
9	6/26/14			*2*			*2*			*1*			*3*					*1*			*1*	*1*							*1*	*1*							*1*	*2*	*1*					*1*			*1*					*1*	**21**	**16**
10	6/12/14			*1*			*1*					*1*						*1*											*1*		*4*							*2*	*1*													**13**	**9**
10	6/26/14											*1*	*2*														*1*				*2*	*2*	*1*	*1*	*1*			*2*	*1*							*2*				*1*	**17**	**12**
11	6/12/14						*2*		*1*			*2*	*1*	*6*	*3*							*1*		*1*					*10*		*1*								*1*	*7*					*5*						**41**	**13**
11	6/26/14			*1*			*1*															*1*							*6*		*1*	*1*						*1*	*7*					*1*	*3*					**23**	**10**
	Total	**6**	**4**	**12**	**1**	**1**	**34**	**1**	**2**	**2**	**1**	**6**	**13**	**6**	**10**	**4**	**3**	**3**	**1**	**2**	**5**	**15**	**1**	**1**	**1**	**1**	**1**	**1**	**3**	**20**	**2**	**10**	**4**	**1**	**9**	**3**	**6**	**10**	**27**	**36**	**2**	**1**	**3**	**8**	**6**	**9**	**22**	**5**	**2**	**1**	**7**	**335**	**50**

Mean of Species Richness per Survey Point per Day **11**
Median of Species Richness per Survey Point per Day **9**
Mean Count per Species **7**
Median Count per Species **4**

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

Humbolt Mill, Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Red-winged Blackbird	*Agelaius phoeniceus*	36	10.7%
American Robin	*Turdus migratorius*	34	10.1%
Red-eyed Vireo	*Vireo olivaceus*	27	8.1%
White-throated Sparrow	*Zonotrichia albicollis*	22	6.6%
Great Blue Heron	*Ardea herodias*	20	6.0%
Dark-eyed Junco	*Junco hyemalis*	15	4.5%
Blue Jay	*Cyanocitta cristata*	13	3.9%
American Crow	*Corvus brachyrhynchos*	12	3.6%
Cedar Waxwing	*Bombycilla cedrorum*	10	3.0%
Least Flycatcher	*Empidonax minimus*	10	3.0%
Ovenbird	*Seiurus aurocapilla*	10	3.0%
Nashville Warbler	*Vermivora ruficapilla*	9	2.7%
Tree Swallow	*Tachycineta bicolor*	9	2.7%
Sandhill Crane	*Grus canadensis*	8	2.4%
Yellow-rumped Warbler	*Dendroica coronata*	7	2.1%
Alder Flycatcher	*Empidonax alnorum*	6	1.8%
Black-throated Green Warbler	*Dendroica virens*	6	1.8%
Canada Goose	*Branta canadensis*	6	1.8%
Northern Parula	*Setophaga americana*	6	1.8%
Song Sparrow	*Melospiza melodia*	6	1.8%
Common Yellowthroat	*Geothlypis trichas*	5	1.5%
Wilson's Snipe	*Gallinago delicata*	5	1.5%
American Bittern	*Botaurus lentiginosus*	4	1.2%
Chipping Sparrow	*Spizella passerina*	4	1.2%
Mallard	*Anas platyrhynchos*	4	1.2%
Common Grackle	*Quiscalus quiscula*	3	0.9%
Commom Loon	*Gavia immer*	3	0.9%
Gray Catbird	*Dumetella carolinensis*	3	0.9%
Northern Flicker	*Colaptes auratus*	3	0.9%
Ruby-crowned Kinglet	*Regulus calendula*	3	0.9%
Belted Kingfisher	*Megaceryle alcyon*	2	0.6%
Black-capped Chickadee	*Poecile atricapillus*	2	0.6%
Common Raven	*Corvus corax*	2	0.6%
Hermit Thrush	*Catharus guttatus*	2	0.6%
Rock Pigeon	*Columba livia*	2	0.6%
Wood Duck	*Aix sponsa*	2	0.6%
American Goldfinch	*Spinus tristis*	1	0.3%
American Redstart	*Setophaga ruticilla*	1	0.3%
Barn Swallow	*Hirundo rustica*	1	0.3%
Black-throated Blue Warbler	*Dendroica caerulescens*	1	0.3%
Common Nighthawk	*Chordeiles minor*	1	0.3%
Domestic Chicken	*Gallus gallus*	1	0.3%
Eastern Bluebird	*Sialia sialis*	1	0.3%
Eastern Whip-poor-will	*Caprimulgus vociferus*	1	0.3%
Eastern Wood Pewee	*Contopus virens*	1	0.3%
Golden-crowned Kinglet	*Regulus satrapa*	1	0.3%
Eastern Kingbird	*Tyrannus tyrannus*	1	0.3%
Merganser sp.	N/A	1	0.3%
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	1	0.3%
Woodpecker sp.	N/A	1	0.3%

Total Count	**335**
Mean Count per Species	**7**
Median Count per Species	**4**
Total Number of Species	**50**

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

Humbolt Mill, Eagle Mine LLC

Survey Point	Date	American Bittern	American Crow	American Goldfinch	American Robin	Black-capped Chickadee	Blue Jay	Canada Goose	Cedar Waxwing	Chipping Sparrow	Common Raven	Dark-eyed Junco	Magnolia Warbler	Mallard	Northern Flicker	Pied-Billed Grebe	Red-breasted Nuthatch	Ruby-throated Hummingbird	Swamp Sparrow	Warbler sp.	White-breasted Nuthatch	White-throated Sparrow	Wilson's Snipe	Wood Duck	**Total Count**	**Species Richness**
1	9/17/14		*3*				*3*																		**6**	**2**
1	9/18/14																								**0**	**0**
2	9/17/14							*5*	*3*	*1*				*3*								*1*	*1*	*1*	**15**	**7**
2	9/18/14				*1*														*1*						**2**	**2**
3	9/17/14						*3*		*3*																**6**	**2**
3	9/18/14					*1*														*1*					**2**	**2**
4	9/17/14	*1*				*2*	*4*																		**7**	**3**
4	9/18/14						*6*									*1*									**7**	**2**
5	9/17/14		*2*					*7*										*1*							**10**	**3**
5	9/18/14		*1*			*1*	*5*		*2*								*1*								**10**	**5**
6	9/17/14		*6*		*2*		*7*						*1*												**16**	**4**
6	9/18/14					*1*					*1*		*1*								*1*				**4**	**4**
7	9/17/14			*2*		*4*	*2*				*3*						*1*								**12**	**5**
7	9/18/14		*1*			*2*	*4*						*6*												**13**	**4**
8	9/17/14		*1*			*3*	*2*	*4*							*1*										**11**	**5**
8	9/18/14				*3*		*6*								*2*										**11**	**3**
9	9/17/14					*7*	*4*	*107*							*1*		*1*								**120**	**5**
9	9/18/14						*1*		*2*							*1*									**4**	**3**
10	9/17/14							*70*				*2*			*1*										**73**	**3**
10	9/18/14						*3*																		**3**	**1**
11	9/17/14				*1*	*2*	*4*	*3*	*2*						*3*										**15**	**6**
11	9/18/14						*1*	*54*									*1*								**56**	**3**
	Total	**1**	**14**	**2**	**7**	**23**	**55**	**250**	**12**	**1**	**4**	**2**	**8**	**3**	**8**	**2**	**4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**403**	**23**

Mean of Species Richness per Survey Point per Day 4
Median of Species Richness per Survey Point per Day 3
Mean Count per Species 18
Median Count per Species 2

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

Humbolt Mill - Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	*Branta canadensis*	250	62.0%
Blue Jay	*Cyanocitta cristata*	55	13.6%
American Crow	*Corvus brachyrhynchos*	14	3.5%
Black-capped Chickadee	*Poecile atricapilla*	23	5.7%
Cedar Waxwing	*Bombycilla cedrorum*	12	3.0%
Magnolia Warbler	*Dendroica magnolia*	8	2.0%
Northern Flicker	*Colaptes auratus*	8	2.0%
American Robin	*Turdus migratorius*	7	1.7%
Common Raven	*Corvus corax*	4	1.0%
Red-breasted Nuthatch	*Sitta canadensis*	4	1.0%
Mallard	*Anas platyrhynchos*	3	0.7%
American Goldfinch	*Carduelis tristis*	2	0.5%
Dark-eyed Junco	*Junco hyemalis*	2	0.5%
Pied-billed Grebe	*Podilymbus podiceps*	2	0.5%
American Bittern	*Botaurus lentiginosus*	1	0.2%
Chipping Sparrow	*Spizella passerina*	1	0.2%
Ruby-throated Hummingbird	*Archilochus colubris*	1	0.2%
Swamp Sparrow	*Melospiza georgiana*	1	0.2%
Warbler sp.	N/A	1	0.2%
White-breasted Nuthatch	*Sitta carolinensis*	1	0.2%
White-throated Sparrow	*Zonotrichia albicollis*	1	0.2%
Wilson's Snipe	*Gallinago delicata*	1	0.2%
Wood Duck	*Aix sponsa*	1	0.2%

Total Count	**403**
Mean Count per Species	**18**
Median Count per Species	**2**
Total Number of Species	**23**

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

Humbolt Mill, Eagle Mine LLC

Common Name	Scientific Name	Count	Relative Abundance
Canada Goose	*Branta canadensis*	256	34.7%
Blue Jay	*Cyanocitta cristata*	68	9.2%
American Robin	*Turdus migratorius*	41	5.6%
Red-winged Blackbird	*Agelaius phoeniceus*	36	4.9%
Red-eyed Vireo	*Vireo olivaceus*	27	3.7%
American Crow	*Corvus brachyrhynchos*	26	3.5%
Black-capped Chickadee	*Poecile atricapilla*	25	3.4%
White-throated Sparrow	*Zonotrichia albicollis*	23	3.1%
Cedar Waxwing	*Bombycilla cedrorum*	22	3.0%
Great Blue Heron	*Ardea herodias*	20	2.7%
Dark-eyed Junco	*Junco hyemalis*	17	2.3%
Northern Flicker	*Colaptes auratus*	11	1.5%
Least Flycatcher	*Empidonax minimus*	10	1.4%
Ovenbird	*Seiurus aurocapilla*	10	1.4%
Nashville Warbler	*Vermivora ruficapilla*	9	1.2%
Tree Swallow	*Tachycineta bicolor*	9	1.2%
Magnolia Warbler	*Dendroica magnolia*	8	1.1%
Sandhill Crane	*Grus canadensis*	8	1.1%
Mallard	*Anas platyrhynchos*	7	0.9%
Yellow-rumped Warbler	*Dendroica coronata*	7	0.9%
Alder Flycatcher	*Empidonax alnorum*	6	0.8%
Black-throated Green Warbler	*Dendroica virens*	6	0.8%
Common Raven	*Corvus corax*	6	0.8%
Northern Parula	*Setophaga americana*	6	0.8%
Song Sparrow	*Melospiza melodia*	6	0.8%
Wilson's Snipe	*Gallinago delicata*	6	0.8%
American Bittern	*Botaurus lentiginosus*	5	0.7%
Chipping Sparrow	*Spizella passerina*	5	0.7%
Common Yellowthroat	*Geothlypis trichas*	5	0.7%
Red-breasted Nuthatch	*Sitta canadensis*	4	0.5%
American Goldfinch	*Carduelis tristis*	3	0.4%
Common Grackle	*Quiscalus quiscula*	3	0.4%
Common Loon	*Gavia immer*	3	0.4%
Gray Catbird	*Dumetella carolinensis*	3	0.4%
Ruby-crowned Kinglet	*Regulus calendula*	3	0.4%
Wood Duck	*Aix sponsa*	3	0.4%
Belted Kingfisher	*Megaceryle alcyon*	2	0.3%
Hermit Thrush	*Catharus guttatus*	2	0.3%
Pied-Billed Grebe	*Podilymbus podiceps*	2	0.3%
Rock (Dove) Pigeon	*Columba livia*	2	0.3%
American Redstart	*Setophaga ruticilla*	1	0.1%
Barn Swallow	*Hirundo rustica*	1	0.1%
Black-throated Blue Warbler	*Dendroica caerulescens*	1	0.1%
Common Nighthawk	*Chordeiles minor*	1	0.1%
Domestic Chicken	*Gallus gallus*	1	0.1%
Eastern Bluebird	*Sialia sialis*	1	0.1%
Eastern Whip-poor-will	*Caprimulgus vociferus*	1	0.1%
Eastern Wood Pewee	*Contopus virens*	1	0.1%
Eastern Kingbird	*Tyrannus tyrannus*	1	0.1%
Golden-crowned Kinglet	*Regulus satrapa*	1	0.1%
Merganser sp.	N/A	1	0.1%
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	1	0.1%
Ruby-throated Hummingbird	*Archilochus colubris*	1	0.1%
Swamp Sparrow	*Melospiza georgiana*	1	0.1%
Warbler sp.	N/A	1	0.1%
Woodpecker sp.	N/A	1	0.1%
White-breasted Nuthatch	*Sitta carolinensis*	1	0.1%

Total Count	**738**
Mean Count per Species	**13**
Median Count per Species	**5**
Total Number of Species	**57**

Table 3. Small Mammal Survey Point Data - 2014

Humbolt Mill, Eagle Mine LLC

		Sherman Live Trap				Large Snap Trap						Small Snap Trap				
Survey Point	Date	Deer Mouse (*Peromyscus maniculatus*)	Least Chipmunk (*Tamias minimus*)	Southern Redback Vole (*Clethrionomys gapperi*)	White-footed Mouse (*Peromyscus leucopus*)	Deer Mouse (*Peromyscus maniculatus*)	Least Chipmunk (*Tamias minimus*)	Meadow Vole (*Microtis pennsylvanicus*)	Northern Flying Squirrel (*Glaucomys sabrinus*)	Pygmy Shrew (*Sorex hoyi*)	Southern Redback Vole (*Clethrionomys gapperi*)	Deer Mouse (*Peromyscus maniculatus*)	Eastern Chipmunk (*Tamias striatus*)	Least Chipmunk (*Tamias minimus*)	**Total Count**	**Species Richness**
1	9/16/14														**0**	**0**
1	9/17/14														**0**	**0**
1	9/18/14														**0**	**0**
2	9/16/14														**0**	**0**
2	9/17/14														**0**	**0**
2	9/18/14														**0**	**0**
3	9/16/14	*1*									*1*				**2**	**2**
3	9/17/14				*1*						*1*	*1*			**3**	**3**
3	9/18/14	*1*													**1**	**1**
4	9/16/14									*1*					**1**	**1**
4	9/17/14	*1*													**1**	**1**
4	9/18/14							*1*							**1**	**1**
5	9/16/14														**0**	**0**
5	9/17/14														**0**	**0**
5	9/18/14			*1*											**1**	**1**
6	9/16/14			*1*											**1**	**1**
6	9/17/14			*1*											**1**	**1**
6	9/18/14		*1*			*1*									**2**	**2**
7	9/16/14				*1*		*1*								**2**	**2**
7	9/17/14						*1*					*1*			**2**	**2**
7	9/18/14														**0**	**0**
8	9/16/14								*1*						**1**	**1**
8	9/17/14						*1*								**1**	**1**
8	9/18/14														**0**	**0**
9	9/16/14			*1*											**1**	**1**
9	9/17/14														**0**	**0**
9	9/18/14										*1*				**1**	**1**
10	9/16/14	*1*													**1**	**1**
10	9/17/14	*1*			*1*								*1*		**3**	**3**
10	9/18/14	*1*													**1**	**0**
11	9/16/14														**0**	**0**
11	9/17/14														**0**	**0**
11	9/18/14	*1*												*1*	**2**	**2**
	Total	**7**	**1**	**4**	**3**	**1**	**3**	**1**	**1**	**1**	**3**	**2**	**1**	**1**	**29**	**8**

Mean of Species Richness per Survey Point per Day 1
Median of Species Richness per Survey Point per Day 1
Mean Count per Species 3
Median Count per Species 1

Table 4. Frog and Toad Survey Point Data - 2014

Humbolt Mill, Eagle Mine LLC

						Call Index Value*					
Survey Point	Survey Period	Date	Time	Temp (°F)	Wind Speed (MPH)	Gray Treefrog (*Hyla versicolor*)	Green Frog (*Rana clamitans*)	Northern Spring Peeper (*Pseudacris crucifer*)	Western Chorus frog (*Pseudacris triseriata*)	**Median Call Index Value**	**Species Richness**
1	Late Spring	5/28/14	1:25 AM	53.8	1.0	*1*	*1*	*3*	*1*	**1**	**4**
2	Late Spring	5/28/14	1:45 AM	56.2	2.0	*1*		*2*		**1.5**	**2**
3	Late Spring	5/28/14	2:05 AM	55.3	2.0	*1*		*3*	*2*	**2**	**3**
4	Late Spring	5/28/14	2:19 AM	55.8	0.0			*3*	*2*	**2.5**	**2**
5	Late Spring	5/28/14	2:42 AM	57.4	1.0			*3*	*1*	**2**	**2**
1	Summer	6/9/14	10:11 PM	56.3	0.0	*2*	*2*	*2*		**2**	**3**
2	Summer	6/9/14	10:30 PM	58.7	0.0	*2*				**2**	**1**
3	Summer	6/9/14	10:50 AM	56.7	0.0	*1*	*1*	*2*		**1**	**3**
4	Summer	6/9/14	11:05 PM	56.7	0.0	*1*	*1*	*1*		**1**	**3**
5	Summer	6/9/14	11:29 AM	58.7	0.0		*1*	*2*		**1.5**	**2**
					Total	**9**	**6**	**21**	**6**	**1.75**	**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	**2.5**
Median of Species Richness per Survey Point per Day	**3**
Mean Call Index Value per Survey Point per Day	**2**
Median Call Index Value per Survey Point per Day	**2**
Median Call Index Value for All Species	**2**

APPENDIX C:
MICHIGAN NATURAL FEATURES INVENTORY REPORT

MICHIGAN STATE UNIVERSITY | Extension

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.

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

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

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

mnfi.anr.msu.edu

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
Oryzopsis canadensis	Canada rice grass	1936	1936-06-27		T	G5	S2	Plant
Oryzopsis canadensis	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
Pandion haliaetus	Osprey	1993	1994-07-24		SC	G5	S4	Animal
Great Blue Heron Rookery	Great Blue Heron Rookery		1978			G5	SU	Other
Haliaeetus leucocephalus	Bald eagle	1992?	1993-04-13		SC	G5	S4	Animal
Botaurus lentiginosus	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.

APPENDIX D:
PHOTOGRAPHS

Photo 1. **Point 1, north view**

Photo 2. **Point 2, south view**

Photo 3. **Point 3, west view**

Photo 4. Point 4, west view

Photo 5. Point 5, south view

Photo 6. Point 6, northwest view

Photo 7. Point 7, east view

Photo 8. Point 8, east view

Photo 9. Point 9, north view

Photo 10. Point 10, north view

Photo 11. Point 11, south view

Photo 12. Canada rice grass survey. Tailings Basin North. East View

Photo 13. Canada rice grass survey. Tailings Basin South. East View

Photo 14. Top of North Tailings Basin berm. West view