APPENDIX D

Biological Surveys

Eastern Prairie Fringed Orchid – July 2012

Eastern Prairie Fringed Orchid – June 2013

Aquatic Survey Report (Blanding's Turtle) – July 2011

Avian Assessment Report – August 2014

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

Results of *Platanthera leucophaea* (Nutt.) Lindl. (Eastern Prairie Fringed Orchid) Surveys in the IL 31 (FAU 336) Bull Valley Road to IL 176 IDOT Project Area McHenry County, Illinois

IDOT Sequence Number: 1340

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INHS/IDOT
Statewide Biological Survey & Assessment
Program Report 2012(7)

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INTRODUCTION

A request was received by the Illinois Natural History Survey (INHS) in March 2012 for a botanical survey to be conducted within the Illinois Department of Transportation (IDOT) FAU 336 project area (Illinois 31, Bull Valley Road to Illinois 176), in McHenry County, Illinois. The specific request was a survey for *Platanthera leucophaea* (Nutt.) Lindl. (eastern prairie fringed orchid [EPFO]), a species listed as federally threatened and within Illinois, state endangered (IESPB 2011). Surveys for EPFO were requested within wetlands (sites #21, #24, #27, and #35) (**Appendix 1**) identified during surveys conducted by the INHS Wetland Science Program during the 2010 growing season (Marcum et al. 2011).

METHODS

Surveys for *Platanthera leucophaea* deviated slightly from the United States Fish and Wildlife Service (USFWS) protocol (http://www.fws.gov/midwest/endangered/plants/epfo.html). This protocol requires EPFO surveys to be conducted between 28 June and 11 July. However, due to unseasonably warm temperatures during the spring and early summer of 2012, the option to conduct surveys slightly earlier and outside of this window was approved (Cathy Pollack, USFWS, pers. comm., 12 June, 2012). Following this, 2012 surveys at this site were conducted on 27 & 29 June, and 6 July.

After laboratory analysis of plant specimens collected during the 2012 growing season, a floristic quality assessment (FQA) based on Taft et al. (1997) was conducted on wetland sites visited during surveys. Floristic quality assessments (**Appendices 2, 3 and 4**) are based on combined lists of plant species observed at these sites during the 2010 growing season (Marcum et al. 2011) and the 2012 growing season. Collected specimens are deposited in the INHS herbarium (ILLS), in Champaign, Illinois. Botanical nomenclature follows Taft et al. (1997) and if not specifically stated scientific names followed by an asterisk (*) denote vascular plants that are adventive to the region.

RESULTS

The initial visit to wetland site #27 showed this site to be of very poor quality - dominated by dense stands of the highly aggressive *Phragmites australis* (common reed grass) – and not suitable habitat for EPFO. No repeat visits were made to this site. At the remaining sites (#21, #24, and #35), no individuals of *Platanthera leucophaea* were found during 2012 surveys. Complete results of the FQA for sites #21, #24 and #35 are provided in **Appendices 2, 3, and 4,** respectively.

Site #21 (shrub-scrub wetland) is a highly degraded habitat that is dominated by large zones of *Phalaris arundinacea** (reed canary grass) and *Salix exigua* (sandbar willow), with much smaller, scattered patches of hairy-fruited lake sedge (*Carex tricocharpa*). A total of 37 species were observed at this site during survey work conducted during the 2010 and 2012 growing seasons, with 30 (81.1%) representing native species and 7 (18.9%) representing non-native species (**Appendix 2**). The native floristic quality index (FQI) for this site was 16.2 (14.6 with non-native species), with a native mean C of 3.0 (2.4 with non-native species) (**Appendix 2**). Results of the FQA support the interpretation of a vegetation community that has been highly degraded.

Site #24 represents a highly degraded calcareous seep. This remnant habitat is being severely encroached upon and dominated by *Phragmites australis* and cattails (*Typha latifolia* and *Typha angustifolia**). Most of the more conservative species occurring at this site that are indicators of historic conditions (e.g. *Carex hystericina* [porcupine sedge], *Eupatorium maculatum* [spotted joe pye weed], *Solidago ohiensis* [Ohio goldenrod], and *Symplocarpus foetidus* [skunk cabbage], etc.) are much less abundant and patchy in distribution. A total of 35 species were observed at this site during survey work conducted during the 2010 and 2012 growing seasons, with 28 (80%) representing native species and 7 (20%) representing non-native species (**Appendix 3**). Results of the FQA support the interpretation of a highly degraded community, with a native FQI of 17.6 (15.7 with non-native species), and a native mean C of 3.3 (2.7 with non-native species) (**see also Appendix 3**).

Site #35 represents a remnant seep community. This site is very small and relatively degraded, but still moderately diverse. Twenty-two species (36.1%) at this site represented non-native taxa, and several were dominant to subdominant, including *Mentha* X *piperita* (peppermint), *Nasturtium officinale* (water cress), and *Phalaris arundinacea*. Additionally, several species at this site are planted and/or have escaped from nearby residential areas, including *Ligularia* X *palmatiloba* (palm leaf Ligularia), *Ligustrum vulgare* (common privet), *Salix alba* 'Tristis' (weeping willow), and *Viburnum opulus* (European high-bush cranberry). A total of 61 species were observed at this site during surveys conducted during the 2010 and 2012 growing seasons, with 39 (63.9%) representing native species (**Appendix 4**). The native FQI at this site was 21.8 (17.4 with adventive species), with a native mean C of 3.5 (2.2 with adventive species) (**see also Appendix 4**). Results of the FQA support the interpretation of a remnant community still possessing a noteworthy assemblage of vascular plants, but one that has had a significant level of degradation – with non-native species representing an unusually high percentage of the flora.

SUMMARY

Of the wetland sites identified during the 2010 growing season in (Marcum et al. 2011), sites #21, #24, #27, and #35, though heavily to moderately degraded, possessed the greatest amount of natural quality relative to other wetland sites found within the survey limits. These four sites were evaluated and/or surveyed for EPFO during the 2012 growing season. After the initial evaluation of wetland #27, this area was determined to be unsuitable habitat for EPFO and no repeat visits were made. The remaining sites were surveyed intensively during the blooming period for EPFO, and no individuals were located.

REFERENCES

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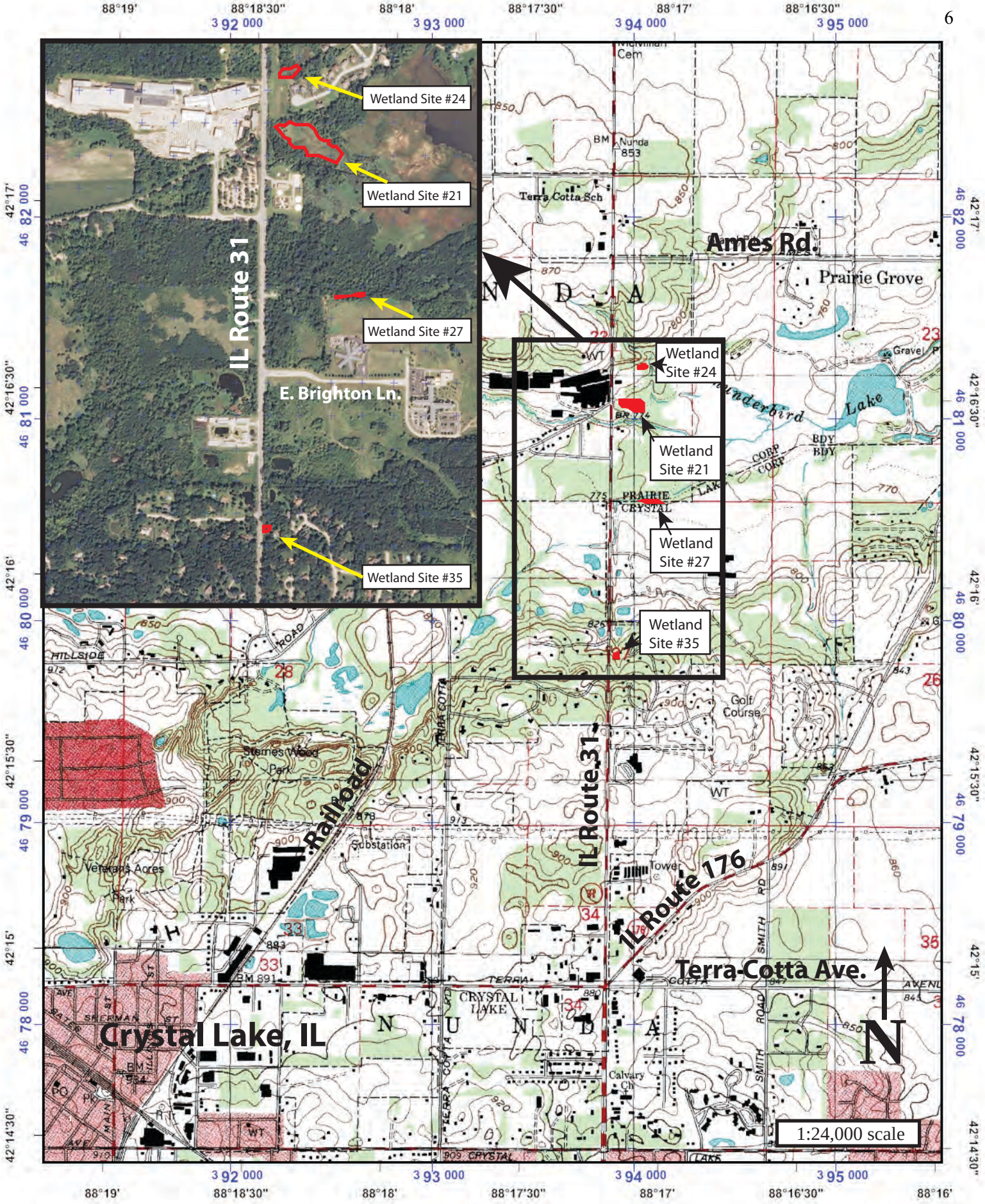
Taft, J. B., G. S. Wilhelm, D. M. Ladd, and L. A. Masters. 1997. Floristic quality assessment for vegetation in Illinois. A method for assessing vegetation integrity. Erigenia 15:3-95.



Appendix 1. Map showing locations of wetland sites #21 (shrub-scrub wetland), #24 (calcareous seep), #27 (wet meadow), and #35 (seep) from INHS Wetlands Report [Marcum et al. 2011]), in McHenry Co., Illinois, where EPFO surveys were requested during the 2012 growing season.

Appendix 2. Floristic quality assessment of vascular plant species occurring in shrub-scrub wetland (wetland site #21 from INHS wetlands report [Marcum et al. 2011]) in McHenry County, Illinois, where EPFO surveys were conducted during the 2012 growing season. Abbreviations are as follows: **FQI** = floristic quality index; **C** = coefficient of conservatism; **W** = numeric wetness values for wetland categories (see end of appendix); **Wetness** = wetland classification category (see end of appendix); **Physiog.** = physiognomy (combination of structural attributes, life history and taxonomic classification). Single letter prefixes accompanying Forb, Grass, Sedge, or Vine classifications are: **A** = annual, **H** = herbaceous, **P** = perennial, and **W** = woody. Scientific names in all capital letters indicate taxa adventive to the region. Community dominants are indicated in bold type.

FLORISTIC QUALITY DATA	Native	30	81.1%	Adventive	7	18.9%
30 NATIVE SPECIES	Tree	2	5.4%	Tree	1	2.7%
37 Total Species	Shrub	1	2.7%	Shrub	3	8.1%
3.0 NATIVE MEAN C	W-Vine	2	5.4%	W-Vine	1	2.7%
2.4 W/Adventives	H-Vine	1	2.7%	H-Vine	0	0.0%
16.2 NATIVE FQI	P-Forb	14	37.8%	P-Forb	1	2.7%
14.6 W/Adventives	B-Forb	0	0.0%	B-Forb	0	0.0%
-3.1 NATIVE MEAN W	A-Forb	4	10.8%	A-Forb	0	0.0%
-2.3 W/Adventives	P-Grass	3	8.1%	P-Grass	1	2.7%
AVG: Fac. Wetland	A-Grass	0	0.0%	A-Grass	0	0.0%
	P-Sedge	3	8.1%	P-Sedge	0	0.0%
	A-Sedge	0	0.0%	A-Sedge	0	0.0%
	Fern	0	0.0%			

C	Scientific Name	W	Wetness	Physiognomy	Common Name
0	Agrostis alba	-3	FACW	P-Grass	RED TOP
6	Angelica atropurpurea	-5	OBL	P-Forb	ANGELICA
3	Apios americana	-3	FACW	H-Vine	GROUND NUT
1	Bidens frondosa	-3	FACW	A-Forb	COMMON BEGGAR'S TICKS
2	Bidens tripartita	-5	OBL	A-Forb	SWAMP TICKSEED
3	Boehmeria cylindrica	-5	OBL	P-Forb	FALSE NETTLE
1	Calystegia sepium	0	FAC	P-Forb	AMERICAN BINDWEED
5	Carex stricta	-5	OBL	P-Sedge	COMMON TUSSOCK SEDGE
6	**Carex trichocarpa**	**-5**	**OBL**	**P-Sedge**	**HAIRY-FRUITED LAKE SEDGE**
0	CIRSIUM ARVENSE	3	FACU	P-Forb	FIELD THISTLE
3	Eleocharis acicularis	-5	OBL	P-Sedge	NEEDLE SPIKE RUSH
3	Epilobium coloratum	-5	OBL	P-Forb	CINNAMON WILLOW HERB
5	Eupatorium maculatum	-5	OBL	P-Forb	SPOTTED JOE PYE WEED
2	Eupatorium rugosum	3	FACU	P-Forb	WHITE SNAKEROOT
3	Euthamia graminifolia	-2	FACW-	P-Forb	GRASS-LEAVED GOLDENROD
2	Fraxinus pennsylvanica v. subintegerrima	-3	FACW	Tree	GREEN ASH
2	Geum canadense	0	FAC	P-Forb	WHITE AVENS
4	Glyceria striata	-5	OBL	P-Grass	FOWL MANNA GRASS
2	**Impatiens capensis**	**-3**	**FACW**	**A-Forb**	**SPOTTED TOUCH-ME-NOT**
3	Leersia oryzoides	-5	OBL	P-Grass	RICE CUT GRASS
0	LONICERA MAACKII	5	UPL	Shrub	AMUR HONEYSUCKLE
0	MORUS ALBA	0	FAC	Tree	WHITE MULBERRY
2	Parthenocissus quinquefolia	1	FAC-	W-Vine	VIRGINIA CREEPER
0	**PHALARIS ARUNDINACEA**	**-4**	**FACW+**	**P-Grass**	**REED CANARY GRASS**
6	Pilea fontana	-3	FACW	A-Forb	BOG CLEARWEED
0	RHAMNUS CATHARTICA	3	FACU	Shrub	COMMON BUCKTHORN
0	ROSA MULTIFLORA	3	FACU	Shrub	JAPANESE ROSE
4	Sagittaria latifolia	-5	OBL	P-Forb	COMMON ARROWHEAD
1	**Salix exigua**	**-5**	**OBL**	**Shrub**	**SANDBAR WILLOW**

Appendix 2 continued

C	Scientific Name	W	Wetness	Physiognomy	Common Name
3	Salix nigra	-5	OBL	Tree	BLACK WILLOW
0	SOLANUM DULCAMARA	0	FAC	W-Vine	BITTERSWEET NIGHTSHADE
1	Solidago canadensis	3	FACU	P-Forb	CANADA GOLDENROD
3	Solidago gigantea	-3	FACW	P-Forb	LATE GOLDENROD
8	Symplocarpus foetidus	-5	OBL	P-Forb	SKUNK CABBAGE
1	Typha latifolia	-5	OBL	P-Forb	BROAD-LEAVED CATTAIL
2	Urtica dioica	-1	FAC+	P-Forb	TALL NETTLE
2	Vitis riparia	-2	FACW-	W-Vine	RIVERBANK GRAPE

Wetland classification categories follow Reed (1988) for Region 3. Further details are from Taft et al. (1997). Plants are placed within one of five wetland indicator categories: Obligate Wetland (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), and Upland (UPL). Within any of these five categories, a "+" indicates that a particular taxon has a greater tendency to occur in wetlands while a "-" indicates a lesser tendency. Following this, indicator status categories, in descending order of probability of occurrence in wetland habitat, would be:

-5 Obligate Wetland	(OBL)
-4 Facultative Wetland +	(FACW+)
-3 Facultative Wetland	(FACW)
-2 Facultative Wetland -	(FACW-)
-1 Facultative +	(FAC+)
0 Facultative	(FAC)
1 Facultative -	(FAC-)
2 Facultative Upland +	(FACU+)
3 Facultative Upland	(FACU)
4 Facultative Upland -	(FACU-)
5 Upland	(UPL)

Appendix 3. Floristic quality assessment of vascular plant species occurring in calcareous seep (wetland site #24 from INHS wetlands report [Marcum et al. 2011]) in McHenry County, Illinois, where EPFO surveys were conducted during the 2012 growing season. Abbreviations are as follows: **FQI** = floristic quality index; **C** = coefficient of conservatism; **W** = numeric wetness values for wetland categories (see end of appendix); **Wetness** = wetland classification category (see end of appendix); **Physiog.** = physiognomy (combination of structural attributes, life history and taxonomic classification). Single letter prefixes accompanying Forb, Grass, Sedge, or Vine classifications are: **A** = annual, **H** = herbaceous, **P** = perennial, and **W** = woody. Scientific names in all capital letters indicate taxa adventive to the region. Community dominants are indicated in bold type.

FLORISTIC QUALITY DATA	Native	28	80.0%	Adventive	7	20.0%
28 NATIVE SPECIES	Tree	0	0.0%	Tree	0	0.0%
35 Total Species	Shrub	2	5.7%	Shrub	2	5.7%
3.3 NATIVE MEAN C	W-Vine	1	2.9%	W-Vine	1	2.9%
2.7 W/Adventives	H-Vine	0	0.0%	H-Vine	0	0.0%
17.6 NATIVE FQI	P-Forb	11	31.4%	P-Forb	3	8.6%
15.7 W/Adventives	B-Forb	0	0.0%	B-Forb	0	0.0%
-3.2 NATIVE MEAN W	A-Forb	2	5.7%	A-Forb	0	0.0%
-2.7 W/Adventives	P-Grass	4	11.4%	P-Grass	1	2.9%
AVG: Fac. Wetland	A-Grass	0	0.0%	A-Grass	0	0.0%
	P-Sedge	7	20.0%	P-Sedge	0	0.0%
	A-Sedge	0	0.0%	A-Sedge	0	0.0%
	Fern	1	2.9%			

C	Scientific Name	W	Wetness	Physiog.	Common Name
0	Agrostis alba	-3	FACW	P-Grass	RED TOP
2	Agrostis hyemalis	1	FAC-	P-Grass	HAIR GRASS
0	Ambrosia trifida	-1	FAC+	A-Forb	GIANT RAGWEED
2	Apocynum cannabinum	0	FAC	P-Forb	DOGBANE
4	Aster novae-angliae	-3	FACW	P-Forb	NEW ENGLAND ASTER
7	Carex crawei	-5	OBL	P-Sedge	EARLY FEN SEDGE
2	Carex granularis	-4	FACW+	P-Sedge	PALE SEDGE
6	Carex hystericina	-5	OBL	P-Sedge	PORCUPINE SEDGE
3	Eleocharis erythropoda	-5	OBL	P-Sedge	RED-ROOTED SPIKE RUSH
3	Epilobium coloratum	-5	OBL	P-Forb	CINNAMON WILLOW HERB
0	Equisetum arvense	0	FAC	Fern	COMMON HORSETAIL
2	Erechtites hieracifolia	3	FACU	A-Forb	FIREWEED
5	Eupatorium maculatum	-5	OBL	P-Forb	SPOTTED JOE PYE WEED
4	Eupatorium perfoliatum	-4	FACW+	P-Forb	COMMON BONESET
3	Euthamia graminifolia	-2	FACW-	P-Forb	GRASS-LEAVED GOLDENROD
4	Glyceria striata	-5	OBL	P-Grass	FOWL MANNA GRASS
2	Helianthus grosseserratus	-2	FACW-	P-Forb	SAWTOOTH SUNFLOWER
3	Lycopus americanus	-5	OBL	P-Forb	COMMON WATER HOREHOUND
0	LYTHRUM SALICARIA	-5	OBL	P-Forb	PURPLE LOOSESTRIFE
2	Parthenocissus quinquefolia	1	FAC-	W-Vine	VIRGINIA CREEPER
1	**Phragmites australis**	**-4**	**FACW+**	**P-Grass**	**COMMON REED**
0	POA PRATENSIS	1	FAC-	P-Grass	KENTUCKY BLUE GRASS
0	RHAMNUS CATHARTICA	3	FACU	Shrub	COMMON BUCKTHORN
0	RHAMNUS FRANGULA	-1	FAC+	Shrub	GLOSSY BUCKTHORN
4	Salix discolor	-3	FACW	Shrub	PUSSY WILLOW
1	Salix exigua	-5	OBL	Shrub	SANDBAR WILLOW
6	Scirpus acutus	-5	OBL	P-Sedge	HEARD-STEMMED BULRUSH
4	Scirpus atrovirens	-5	OBL	P-Sedge	DARK GREEN RUSH
4	Scirpus tabernaemontanii	-5	OBL	P-Sedge	GREAT BULRUSH
0	SOLANUM DULCAMARA	0	FAC	W-Vine	BITTERSWEET NIGHTSHADE

Appendix 3 continued

C	Scientific Name	W	Wetness	Physiog.	Common Name
10	**Solidago ohioensis**	**-5**	**OBL**	**P-Forb**	**OHIO GOLDENROD**
8	Symplocarpus foetidus	-5	OBL	P-Forb	SKUNK CABBAGE
0	TARAXACUM OFFICINALE	3	FACU	P-Forb	COMMON DANDELION
0	TYPHA ANGUSTIFOLIA	-5	OBL	P-Forb	NARROW-LEAVED CATTAIL
1	**Typha latifolia**	**-5**	**OBL**	**P-Forb**	**BROAD-LEAVED CATTAIL**

Wetland classification categories follow Reed (1988) for Region 3. Further details are from Taft et al. (1997). Plants are placed within one of five wetland indicator categories: Obligate Wetland (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), and Upland (UPL). Within any of these five categories, a "+" indicates that a particular taxon has a greater tendency to occur in wetlands while a "-" indicates a lesser tendency. Following this, indicator status categories, in descending order of probability of occurrence in wetland habitat, would be:

-5 Obligate Wetland	(OBL)
-4 Facultative Wetland +	(FACW+)
-3 Facultative Wetland	(FACW)
-2 Facultative Wetland -	(FACW-)
-1 Facultative +	(FAC+)
0 Facultative	(FAC)
1 Facultative -	(FAC-)
2 Facultative Upland +	(FACU+)
3 Facultative Upland	(FACU)
4 Facultative Upland -	(FACU-)
5 Upland	(UPL)

Appendix 4. Floristic quality assessment of vascular plant species occurring in remnant seep (wetland site #35 from INHS wetlands report [Marcum et al. 2011]) in McHenry County, Illinois, where EPFO surveys were conducted during the 2012 growing season. Abbreviations are as follows: **FQI** = floristic quality index; **C** = coefficient of conservatism; **W** = numeric wetness values for wetland categories (see end of appendix); **Wetness** = wetland classification category (see end of appendix); **Physiog.** = physiognomy (combination of structural attributes, life history and taxonomic classification). Single letter prefixes accompanying Forb, Grass, Sedge, or Vine classifications are: **A** = annual, **H** = herbaceous, **P** = perennial, and **W** = woody. Scientific names in all capital letters indicate taxa adventive to the region. Community dominants are indicated in bold type.

FLORISTIC QUALITY DATA	Native	39	63.9%	Adventive	22	36.1%
39 NATIVE SPECIES	Tree	2	3.3%	Tree	1	1.6%
61 Total Species	Shrub	4	6.6%	Shrub	7	11.5%
3.5 NATIVE MEAN C	W-Vine	2	3.3%	W-Vine	1	1.6%
2.2 W/Adventives	H-Vine	0	0.0%	H-Vine	0	0.0%
21.8 NATIVE FQI	P-Forb	17	27.9%	P-Forb	7	11.5%
17.4 W/Adventives	B-Forb	0	0.0%	B-Forb	3	4.9%
-3.2 NATIVE MEAN W	A-Forb	3	4.9%	A-Forb	0	0.0%
-1.9 W/Adventives	P-Grass	4	6.6%	P-Grass	3	4.9%
AVG: Fac. Wetland	A-Grass	0	0.0%	A-Grass	0	0.0%
	P-Sedge	7	11.5%	P-Sedge	0	0.0%
	A-Sedge	0	0.0%	A-Sedge	0	0.0%
	Fern	0	0.0%			

C	Scientific Name	W	Wetness	Physiog.	Common Name
1	Acer negundo	-2	FACW-	Tree	BOXELDER
0	**Agrostis alba**	**-3**	**FACW**	**P-Grass**	**RED TOP**
0	ALLIARIA PETIOLATA	0	FAC	B-Forb	GARLIC MUSTARD
4	Asclepias incarnata	-5	OBL	P-Forb	SWAMP MILKWEED
7	Aster puniceus	-5	OBL	P-Forb	BRISTLY ASTER
0	BARBAREA VULGARIS	0	FAC	B-Forb	WINTER CRESS
1	Bidens frondosa	-3	FACW	A-Forb	COMMON BEGGAR'S TICKS
3	Boehmeria cylindrica	-5	OBL	P-Forb	FALSE NETTLE
7	Caltha palustris	-5	OBL	P-Forb	COWSLIP
6	Carex hystericina	-5	OBL	P-Sedge	PORCUPINE SEDGE
4	Carex lanuginosa	-5	OBL	P-Sedge	WOOLY SEDGE
5	Carex stricta	-5	OBL	P-Sedge	COMMON TUSSOCK SEDGE
3	Carex vulpinoidea	-5	OBL	P-Sedge	BROWN FOX SEDGE
2	Circaea lutetiana v. canadensis	3	FACU	P-Forb	ENCHANTER'S NIGHTSHADE
0	CIRSIUM ARVENSE	3	FACU	P-Forb	FIELD THISTLE
4	Cornus stolonifera	-3	FACW	Shrub	RED OSIER DOGWOOD
0	DIPSACUS LACINIATUS	5	UPL	B-Forb	CUT-LEAVED TEASEL
3	Eleocharis erythropoda	-5	OBL	P-Sedge	RED-ROOTED SPIKE RUSH
3	Epilobium coloratum	-5	OBL	P-Forb	CINNAMON WILLOW HERB
5	Eupatorium maculatum	-5	OBL	P-Forb	SPOTTED JOE PYE WEED
4	Eupatorium perfoliatum	-4	FACW+	P-Forb	COMMON BONESET
2	Eupatorium rugosum	3	FACU	P-Forb	WHITE SNAKEROOT
0	FESTUCA ARUNDINACEA	2	FACU+	P-Grass	TALL FESCUE
4	**Glyceria striata**	**-5**	**OBL**	**P-Grass**	**FOWL MANNA GRASS**
0	HYDRANGEA SP.	-	-	Shrub	CULTIVATED HYDRANGEA
2	Impatiens capensis	-3	FACW	A-Forb	SPOTTED TOUCH-ME-NOT
0	IRIS PSEUDACORUS	-5	OBL	P-Forb	TALL YELLOW IRIS
5	Iris shrevei	-5	OBL	P-Forb	SOUTHERN BLUE FLAG
4	Juncus dudleyi	0	FAC	P-Forb	DUDLEY'S RUSH
3	Leersia oryzoides	-5	OBL	P-Grass	RICE CUT GRASS
0	LIGULARIA X PALMATILOBA	-	-	P-Forb	PALM LEAF LIGULARIA
0	LIGUSTRUM VULGARE	5	UPL	Shrub	COMMON PRIVET

Appendix 4 continued

C	Scientific Name	W	Wetness	Physiog.	Common Name
0	LONICERA X BELLA	3	FACU	Shrub	SHOWY FLY HONEYSUCKLE
3	Lycopus americanus	-5	OBL	P-Forb	COMMON WATER HOREHOUND
0	LYTHRUM SALICARIA	-5	OBL	P-Forb	PURPLE LOOSESTRIFE
0	**MENTHA X PIPERITA**	**-5**	**OBL**	**P-Forb**	**PEPPERMINT**
0	**NASTURTIUM OFFICINALE**	**-5**	**OBL**	**P-Forb**	**WATER CRESS**
2	Parthenocissus quinquefolia	1	FAC-	W-Vine	VIRGINIA CREEPER
0	**PHALARIS ARUNDINACEA**	**-4**	**FACW+**	**P-Grass**	**REED CANARY GRASS**
3	Pilea pumila	-3	FACW	A-Forb	CANADA CLEARWEED
7	Poa palustris	-4	FACW+	P-Grass	FOWL BLUE GRASS
0	POA PRATENSIS	1	FAC-	P-Grass	KENTUCKY BLUE GRASS
0	RHAMNUS CATHARTICA	3	FACU	Shrub	COMMON BUCKTHORN
0	RHAMNUS FRANGULA	-1	FAC+	Shrub	GLOSSY BUCKTHORN
5	Ribes americanum	-3	FACW	Shrub	WILD BLACK CURRENT
0	ROSA MULTIFLORA	3	FACU	Shrub	JAPANESE ROSE
0	RUMEX CRISPUS	-1	FAC+	P-Forb	CURLY DOCK
0	SALIX ALBA 'TRISTIS'	3	FACU	Tree	WEEPING WILLOW
1	Salix exigua	-5	OBL	Shrub	SANDBAR WILLOW
2	Sambucus canadensis	4	FACU-	Shrub	COMMON ELDER
4	Scirpus atrovirens	-5	OBL	P-Sedge	DARK GREEN RUSH
4	Scirpus tabernaemontanii	-5	OBL	P-Sedge	GREAT BULRUSH
0	SOLANUM DULCAMARA	0	FAC	W-Vine	BITTERSWEET NIGHTSHADE
1	Solidago canadensis	3	FACU	P-Forb	CANADA GOLDENROD
3	Solidago gigantea	-3	FACW	P-Forb	LATE GOLDENROD
8	**Symplocarpus foetidus**	**-5**	**OBL**	**P-Forb**	**SKUNK CABBAGE**
1	Typha latifolia	-5	OBL	P-Forb	BROAD-LEAVED CATTAIL
5	Ulmus americana	-2	FACW-	Tree	AMERICAN ELM
3	Verbena hastata	-4	FACW+	P-Forb	BLUE VERVAIN
0	VIBURNUM OPULUS	0	FAC	Shrub	EUROPEAN HIGH-BUSH CRANBERRY
2	Vitis riparia	-2	FACW-	W-Vine	RIVERBANK GRAPE

Wetland classification categories follow Reed (1988) for Region 3. Further details are from Taft et al. (1997). Plants are placed within one of five wetland indicator categories: Obligate Wetland (OBL), Facultative Wetland (FACW), Facultative (FAC), Facultative Upland (FACU), and Upland (UPL). Within any of these five categories, a "+" indicates that a particular taxon has a greater tendency to occur in wetlands while a "-" indicates a lesser tendency. Following this, indicator status categories, in descending order of probability of occurrence in wetland habitat, would be:

-5 Obligate Wetland	(OBL)
-4 Facultative Wetland +	(FACW+)
-3 Facultative Wetland	(FACW)
-2 Facultative Wetland -	(FACW-)
-1 Facultative +	(FAC+)
0 Facultative	(FAC)
1 Facultative -	(FAC-)
2 Facultative Upland +	(FACU+)
3 Facultative Upland	(FACU)
4 Facultative Upland -	(FACU-)
5 Upland	(UPL)

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

Results of searches for Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) at IL 31 (FAU 336) Addendum C, Bull Valley Road to IL 176, Job No: P-91-135-99, Sequence # 1340C, McHenry County, Illinois

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INHS/IDOT
Statewide Biological Survey & Assessment
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INTRODUCTION

This report is submitted in response to a request made by Susan Dees Hargrove of the Illinois Department of Transportation (IDOT) to Joe Merritt and John Taft of the Illinois Natural History Survey (INHS), dated 19 June 2013, for a botanical survey for *Platanthera leucophaea* (Nutt.) Lindley, Eastern prairie fringed orchid (EPFO], at and near a portion of the IDOT IL 31 (FAU 336) Addendum C project area, Bull Valley Road to IL 176, Job No: P-91-135-99, Sequence # 1340C , McHenry County, Illinois. The project involved the previously delineated Wetland Site 28 (Marcum et al. 2011) as well as an eastern extension of Wetland Site 21 as defined by Shawn Cirton (U.S. Fish and Wildlife Service [USFWS] – Chicago Illinois Field Office). Both sites were located east of IL 31 between Ames Road and IL 176 in Prairie Grove and Crystal Lake. The extended Wetland Site 21 included approximately 100 acres adjoining the west side of Thunderbird Lake, and Wetland Site 28 included 0.08 acres north of East Brighton Lane (Appendix 1, Maps 1 and 2). The specified goal of this INHS portion of the project was to conduct a botanical survey for, and to report on any occurrences of, the Federally Threatened (USFWS 1988) and State Endangered (Herkert and Ebinger 2002; Illinois Endangered Species Protection Board [IESPB] 2011) orchid *Platanthera leucophaea* within the specified project corridor.

A botanical survey for this orchid and for other Illinois listed threatened or endangered plants (T&E) had previously been conducted within the IL 31 (FAU 336) project area by Michael Murphy (2012). Murphy's surveys did not include either Wetland Site 28 or the newly circumscribed areas extending east from the original Wetland Site 21. While no individuals of *Platanthera leucophaea* were found during the 2012 surveys, potential suitable habitats were present. No T&E plant species have been reported previously from within the Addendum C site.

METHODS

Protocols established by the USFWS for surveys for the Eastern Prairie Fringed Orchid (http://www.fws.gov/midwest/Endangered/section7/s7process/plants/epfos7guide.html) were followed during the course of the surveys. Instructions regarding EPFO associates were at http://www.fws.gov/midwest/Endangered/section7/s7process/plants/epfo_associates.html. According to the tasking sheet, the native mean C for Wetland Site 28 was 3.5 or more using Swink and Wilhelm (1994), plus there were 4 associates each with a conservation coefficient of 2 or more (Table 1). The additional portion of the wetland east of Wetland Site 21 also appeared to have potential habitat for the EPFO according to the USFWS, though it had not previously been surveyed. The USFWS protocols required EPFO surveys to be conducted on three non-consecutive days between 28 June and 11 July. According to Cathy Pollack (USFWS, pers. comm. via Taft) the EPFO flowering in the northern tier of counties in Illinois was on schedule in 2013. Field work was conducted on site on July 1, July 2, July 3 and July 9. Bradley Daugherty (INHS hourly) assisted in the field.

Lists of the plant species found as well as their relative frequencies were recorded for each site (Appendix 2) and floristic quality assessments were based upon these current lists (Appendix 3) following methods in Taft et al. (1997). Location data were recorded using a hand-held Garmin eTrex Vista GPS unit. Selected representative plant specimens were pressed and dried using standard herbarium techniques (Hill 1995) and field notes about them were made on site. Plant specimen vouchers collected by S. R. Hill have been indicated in this report by a boldface **H** followed by the

collection number. Selected voucher specimens will be deposited in the INHS herbarium (ILLS). Botanical nomenclature follows Taft et al. (1997). Non-native species are indicated throughout this report by means of an asterisk (*).

Table 1. Associate Plant Species List for the Eastern Prairie Fringed Orchid in Northeastern Illinois. (From USFWS 2013). Taft = Taft et al. 1997; S&W = Swink and Wilhelm 1994.

Species	Common name	Co-efficient of Conservatism	
		Taft	S&W
Andropogon gerardii Vitman	Big bluestem	5	5
Apocynum sibiricum Jacq.	Prairie Indian hemp	2	2
Aster ericoides L.	Heath aster	4	5
Aster novae-angliae L.	New England aster	4	4
Aster simplex Willd.	Panicled aster	3	3
Calamagrostis canadensis (Michx.) Beauv.	Blue joint grass	3	3
Carex stricta Lam.	Tussock sedge	5	5
Carex spp.	Sedge	0 – 10	0 – 10
Cassia (Chamaecrista) fasciculata Michx.	Partridge pea	1	5
Eupatorium perfoliatum L.	Common boneset	4	4
Galium obtusum Bigel.	Wild madder	5	5
Gentiana puberulenta J. Pringle	Prairie gentian	9	10
Helianthus grosseserratus M.Martens	Sawtooth sunflower	2	2
Iris virginica var. *shrevei* (Small) E.S.Anderson [= *Iris shrevei*]	Blueflag iris	5	5
Liatris aspera Michx.	Rough blazing star	7	6
Liatris spicata	Marsh blazing star / gayfeather	7	6
Lycopus americanus Muhl.	Common water horehound	3	5
Mentha arvensis L. var. *villosa* (Benth.) S.R.Stewart	Wild mint	4	5
Pycnanthemum virginianum (L.) T.Durand & B.D.Jacks.	Common mountain mint	5	5
Solidago gigantea Ait.	Late goldenrod	3	4
Solidago graminifolia nuttallii [= *Euthamia graminifolia* (L.) Salisb. var. *nuttallii* (Greene) W.Stone]	Hairy grass-leaved goldenrod	3	3
Sorghastrum nutans (L.) Nash	Indian grass	4	5
Tradescantia ohiensis Raf.	Common spiderwort	3	2

RESULTS

No individuals of the State Endangered and Federal Threatened *Platanthera leucophaea* were found within the study area during the July 2013 surveys. There were no other T&E plants found. One orchid species was located, *Platanthera hyperborea* (L.) Lindl. var. *huronensis* (Nutt.) Luer (= *Platanthera huronensis* (Nutt.) Lindl.; the Huron green orchid), but this is not an Illinois T&E species. This orchid was found east of the Addendum C study area in the area east of the previously delineated Wetland Site 21, here named Site 21-west. Plants of this area were inventoried and searches were made for the EPFO at the west side of Thunderbird Lake. A C+ quality sedge meadow with eleven of the twenty-three EPFO associated species and four very conservative species (C=10) was found in the western portion of the study area. Wetland Site 28, the other surveyed area, was judged to be of poor quality and unlikely habitat for the EPFO because of prolonged inundation and the presence of coarse invasive species.

The wetland area delineated by the USFWS on the west side of Thunderbird Lake, east of previously delineated **Wetland Site 21** of Marcum et al. (2011) was approximately 100 acres in size (Appendix 1, Map 2). The previously surveyed portion within the original project area was not surveyed again during this visit, and had been described as a Shrub-scrub Wetland of 0.07 acres, with a mean C of 3.9 and an FQI of 18.8 by Marcum et al. (2011). The larger area inventoried for this report (**Site 21-west**) was accessed from its northwest margin below a park with a pergola within the Prairie Grove development community along the southeast side of Thunderbird Lane (Appendix 1, Map 2; Appendix 4, Figure 1). It was also separately accessed from the Sanitary Treatment facility on the southwest located along IL 31 where a second plant list was made (**Site 21-south**, Appendix 1, Map 2; Appendix 2). The overall site contained several different vegetation types. The most extensive of these was a cattail (*Typha*) marsh that occupied the majority of the area (Appendix 1, Figure 1). This was bordered intermittently with large thickets of the invasive species *Phragmites australis* (Giant reed grass) that formed a monoculture. Other areas were dominated by **Phalaris arundinacea*, but this was not as common. Areas at the immediate margin of the lake were exposed mud flats with sparse vegetation such as *Alisma* and *Sagittaria*. The wetland below the park had an area of sedge meadow dominated by *Carex stricta*, and a small portion between the sedge meadow and the wet **Rhamnus* thicket could be described as a narrow wet prairie remnant. There was overlap between the cattail marsh and the sedge meadow (Appendix 4, Figures 2 and 3). The marshes and meadow were surrounded by a dense thicket of **Rhamnus cathartica* with no natural quality. The relatively narrow border area between the cattail marshes and forested area contained a variety of native herbs and shrubs. Of these six general vegetation types, the sedge meadow demonstrated the highest relative quality within the site, as demonstrated by the lists in Appendix 2. While limited in size, this was a very good quality sedge meadow remnant with almost no exotic species. Several noteworthy species were found within this sedge meadow, including one orchid, *Platanthera hyperborea* var. *huronensis* (Nutt.) Luer (Huron green orchid, Appendix 4, Figure 4), and a colony of *Eriophorum angustifolium* (Cotton grass), a sedge approaching its southern range limit in the Midwest. The sedge meadow and wet prairie remnants provided potential habitat for the EPFO, but no individuals were found.

A total of 79 species, only six (7.6 %) of which were non-natives, were found in the western portion (**Site 21-west**) of the overall surveyed area. The overall mean C was 4.0 and the native mean C was 4.4. The overall FQI was 35.8 and the native FQI was 37.2. This site had very good natural quality, and was the portion rated C+ in natural quality; small areas of the sedge meadow were of higher quality, B-. Eleven of the 23 EPFO associated species occurred here, or 47.8 % (Table 1; Appendix 2). The area

fulfilled the requirements needed for EPFO surveys.

The Huron green orchid (*Platanthera hyperborea* var. *huronensis*) was found within the sedge meadow at this site at 42.27495 ° N. Lat., 088.28292 ° W. Long., at an elevation of 760 feet (Appendix 1, Map 2). This orchid, with a C value of 10, was found in between *Carex stricta* hummocks and it was much shorter than the surrounding vegetation (Appendix 4, Figure 4). Two flowering individuals and two immature plants were found here. Other noteworthy plants found here included *Bromus ciliatus* (C=10), *Campanula uliginosa* (C=10), and *Eriophorum angustifolium* (C=10). The *Eriophorum* is generally characteristic of northern bog, fen and calcareous wetland plant communities.

The southern access survey of the marsh (**Site 21-south**) revealed a very poor quality area without sedge meadow or prairie species. There were many dead trees, and the dominant plant was *Phragmites australis* (Appendix 4, Figure 6), followed by **Phalaris arundinacea* (Appendix 4, Figure 5). The forested area at its margin was dominated by **Rhamnus cathartica*. There appeared to be no supportive habitat for the EPFO. Because of the poor quality, only a relatively small portion of the site was surveyed. Twenty-three species were recorded here, of which nine (39%) were non-native (Appendix 2). No noteworthy species were found here, the most conservative being *Aster puniceus* (C=7) which was common throughout the extended Wetland Site 21study area.

Wetland Site 28, a wet meadow approximately 235 feet north of East Brighton Lane, was a small area of 0.08 acres (Marcum et al. 2011; Appendix 1, Map 1). It was associated with a seep-fed stream to its east. The Wet Meadow itself appeared to be an excavated site with many non-native species (Appendix 2; Appendix 4; Figure 7). Marcum et al. (2011) recorded this site as a Wet Meadow, saturated, emergent, palustrine wetland, with a High Habitat Value and a mean coefficient of conservatism (mean C) of 3.9, and a Floristic Quality Index (FQI) of 12.3. The current inventory produced an overall mean C of 1.7, a native mean C of 2.4 and an overall FQI of 12.3. It was rated D+ in natural quality. There were four plants found that can be associated with the EPFO: *Carex* sp. *Helianthus grosseserratus*, *Lycopus americanus*, and *Solidago gigantea*. The most conservative species found were *Carex crawei* (C =10) and *Solidago riddellii* (C = 7). In contrast to previous surveys, the overall site appeared to fail to meet the USFWS protocols for the EPFO. Fourteen (27.4 %) of the 51 plants noted here were non-native.

SUMMARY

No individuals of the State Endangered and Federal Threatened *Platanthera leucophaea* (Eastern prairie fringed orchid, EPFO) were found within the study area during the July 2013 botanical surveys.

No T&E plant species were found in the study area. A very uncommon orchid, Platanthera hyperborean var. huronensis = P. huronensis) was found east of the Addendum C study area, east of previously delineated Wetland Site 21, in Site 21-west. This site had potentially suitable habitat for the EPFO and was found at the west side of Thunderbird Lake and inventoried. This sedge meadow was of good quality and rated at least a C+ in natural quality. Eleven of the 23 typical EPFO associated species occurred here. Site 21-south was accessed from IL 31, and was of poor quality, consisting mostly of *Phalaris* and *Phragmites*, with no suitable habitat for the EPFO. Wetland Site 28 was judged to be of poor quality and exhibited non-supportive habitat for the EPFO.

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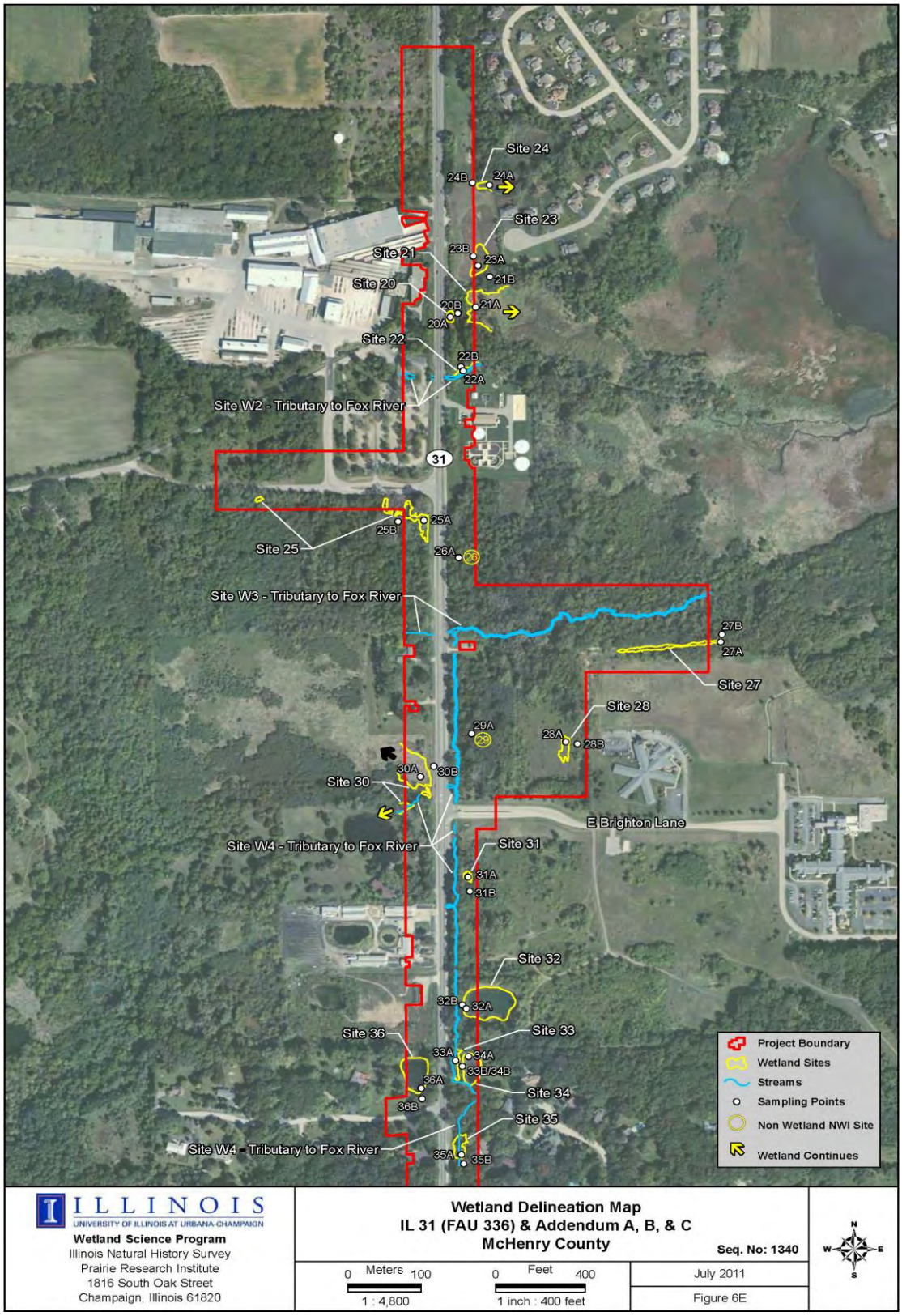
Appendix 1. Map 1. Wetland Delineation Map, IL 31 (FAU 336) & Addendum A, B, and C, McHenry County, IL. From Marcum et al 2011, p. 194. Wetland Sites 21 and 28 are of concern in this report.



Map 2. Wetlands on west and south sides of Thunderbird Lake. Blue outline indicates the tasked survey area. Locations for *Platanthera hyperborea* var. *huronensis*, the C+ quality sedge meadow, and general survey sites have been indicated.

Appendix 2. Plant Lists

Relative Abundance Values:

1=rare
2=occasional
3=common
4=abundant
5=very abundant
*=adventive species

boldface H numbers represent Hill collections

highlighting indicates a typical associate of *Platanthera leucophaea* (see Table 1)

Inventory Site 21 - west. Western - northwestern Thunderbird Lake margins. Includes C+ Sedge meadow with areas of wet prairie, bounded by **Rhamnus cathartica* woodland and cattail marshes closer to lake. Outside of *Typha* zone were several extensive areas of solid *Phragmites*. Visited 7/1/2013, 7/3/2013, and 7/9/2013. Entered site at thicket/sedge meadow edge at 42.27622° N. Lat., 088.28237 W. Long. Wet prairie remnant was at 42.27502° N. Lat., 088.28292° W. Long. At the southwestern survey limit, *Phragmites* begins at 42.27455° N. Lat., 088.28344 W. Long. Northeast edge of sedge meadow: 42.27617° N. Lat., 088.28194° W. Long. Quality is lower towards northeast. Northern limit of survey: 42.27702° N. Lat., 088.28069 W. Long. Appendix 1, Map 2; Appendix 4, Figures 2 and 3.

2-3	*Alliaria petiolata [thicket]
2-3	Aster puniceus
2	Bidens vulgata
2-3	*Cirsium arvense
2	Echinocystis lobata
2	Acer negundo [margin]
2	Anemone canadensis
2	Anemone virginiana [prairie margin]
2	Angelica atropurpurea
2	Apios americana [margin]
2	Apocynum sibiricum
2	Asclepias incarnata
2	Asclepias syriaca
3-4	Aster puniceus
1	Aster umbellatus
2	Bidens vulgata
2	Bromus ciliatus [widely scattered with sedges] **H39218**
2	Calamagrostis canadensis
2-3	Caltha palustris [wetter areas w/ Typha]
2	Calystegia sepium
1-2	Campanula uliginosa
3-4	Carex stricta
1	Chelone glabra
1-2	Circaea lutetiana var. canadensis [mostly thicket]
2-3	*Cirsium arvense
2	Cirsium discolor
2	Cirsium muticum
2	Comandra umbellata [prairie 42.27502° N. Lat., 088.28292° W. Long.]
2	Cornus obliqua
2-3	Cornus racemosa
2	Echinocystis lobata
1-2	Erigeron strigosus [prairie]
1-2	Eriophorum angustifolium [42.275785° N. Lat., 088.282466° W. Long.] **H39224**
2	Eupatorium maculatum
2	Galium obtusum
2	Galium triflorum
1	Gentiana andrewsii
2	Geum allepicum
2	Geum canadensis
2	Geum laciniatum
2	Glyceria striata
2	Helianthus grosseserratus
2-3	Impatiens capensis

2	Iris shrevei
2	Lathyrus palustris **H39216**
1	Lilium michiganense [margin]
2	Lycopus americanus
1-2	Lysimachia quadriflora
1-2	*Lythrum salicaria
2-3	Mentha arvensis var. villosa
2-3	Parthenocissus inserta
2	Pedicularis lanceolata
2-4	*Phalaris arundinacea [local – not at all common in sedge meadow] common towards east and elsewhere
3-5	Phragmites australis [locally dominant in area outside sedge meadow
1	Platanthera hyperborea var. huronensis 2 mature, fl, 2 juvenile at 42.27495° N. Lat., 88.28292° W. Long. **H39232**
1-2	Polemonium reptans [margin]
2	Polygonum amphibium
2	Pycnanthemum virginianum
3	*Rhamnus cathartica [in thickets]
2	Ribes americanum
2	Rosa carolina
1-2	Rudbeckia hirta [prairie]
2	Rumex orbiculatus
1-2	Sagittaria latifolia
2	Salix eriocephala **H39217**
2-3	Salix exigua
2	Sambucus canadensis [margin]
2	Scirpus fluviatilis
2	Scutellaria galericulata **H39219**
2	Sium suave
2-3	*Solanum dulcamara
3-4	Solidago canadensis
2-3	Solidago gigantea
2	Stachys palustris
1-2	Symplocarpos foetidus [margin]
2	Tradescantia ohiensis [prairie margin]
3-5	*Typha angustifolia
3-5	Typha latifolia [towards lake]
2	Ulmus rubra [margin]
2	Urtica dioica [margin]
2	Verbena hastata
1-2	Veronicastrum virginicum [prairie]
2	Viburnum lentago
2-3	Vitis riparia [co-dominant on shrubs towards east, least common in sedge meadow]

Inventory Site 21-south; east of sanitary treatment plant, **SW area of overall site**: a wall of *Phragmites*, with no sedge meadows or suitable EPFO habitat. Margin of wooded thicket transitions into marsh. Shallow standing water, many dead trees in this area. *Phragmites* dominance starts at 42.27267° N. Lat., 088.28459° W. Long. *Populus deltoides*/**Rhamnus* margin at 42.27325° N. Lat., 088.28442° W. Long. Appendix 1, Map 2; Appendix 4, Figures 5 and 6. thicket = in **Rhamnus* thicket.

2-3	*Alliaria petiolata [thicket]
2-3	Aster puniceus
2	Bidens vulgata
2-3	*Cirsium arvense
2	Echinocystis lobata
2-3	*Glechoma hederacea [thicket]
2-3	Glyceria striata [local]
2-3	Impatiens capensis
2	*Lonicera x bella
2	*Lonicera tatarica [glabrous]
2-3	Parthenocissus inserta
3-4	*Phalaris arundinacea [locally frequent, esp. among dead trees]
4-5	Phragmites australis solid stand
2-3	*Polygonum cespitosum var. longisetum [thicket]
2	Populus deltoides [margin]
3-4	*Rhamnus cathartica [thicket dominant]
2	Ribes americanum
2-3	Sagittaria latifolia [with *Phalaris]
2	Salix amygdaloides

3	*Solanum dulcamara	2	Stachys palustris
3	Solidago gigantea	2-3	Vitis riparia [margin]

Wetland Site 28. Wet meadow. Combination of seep/stream on the east and excavated wetland on the west. Probably formerly pastured. Due west of Retirement complex. Quality appeared to be poor, D+. Wetland starts at 42.26892° N. Lat., 088.28468° W. Long. South end resembles a panne / calcareous panne, with significant area of bare soil with *Solidago riddellii* at 42.26857° N. Lat., 088.28476° W. Long. List generally excludes the elevated ridge between the two wetland areas. Plants noted as 'margin' are often in this area and in the adjoining old field. Visited 7/2/2013, 7/9/2013. Appendix 1, Map 1; Appendix 4, Figure 7.

2	Acer saccharinum [margin]	2	Monarda fistulosa [margin]
2	*Agropyron repens	2-3	Panicum implicatum
2	Agrostis alba	2	Parthenocissus inserta [margin]
2-3	Ambrosia artemisiifolia	2-3	Penstemon digitalis
2	Apocynum cannabinum	2-3	*Phalaris arundinacea [locally common]
2	Asclepias verticillata		
2-3	*Bromus inermis [margin]	2	*Phleum pratense [margin]
2	Calystegia sepium	2	Plantago rugelii
2	Carex blanda	3	*Poa compressa
2	Carex crawei [S end flats]	2	Populus deltoides [stream, seedlings elsewhere]
2	Carex granularis		
2	Carex vulpinoidea [stream]	2	Prunus serotina margin
2	*Convolvulus arvensis	3	*Rhamnus cathartica [margin]
2	Cornus racemosa [margin]	2	Rudbeckia hirta
2	*Daucus carota [margins]	2	Salix exigua stream
2	*Dipsacus laciniatus [margin]	2	Salix nigra
2	Equisetum arvense [stream]	2	Scirpus pendulus
2	Erigeron strigosus	2	Solanum carolinense
2	Galium cf. triflorum	3	Solidago canadensis
2	Helianthus grosseserratus	2	Solidago gigantea
2	Juncus dudleyi	3	Solidago riddellii [S end flats]
2	Juniperus virginiana	1-2	Solidago rigida
2	*Leucanthemum vulgare	2	*Taraxacum officinale
2	*Lonicera maackii [margin]	3	Teucrium canadensis
2-3	Lycopus americanus	2	Ulmus rubra [margin]
2	*Melilotus alba	2-3	Vitis riparia [margin]
2	*Melilotus officinalis		

Appendix 3. List of all plants noted at Wetland Sites 21 [extended portion] and 28, including FQA values.

Details from Taft et al. (1997). **NOTE:** Taxa with a C value of 7 or above have been highlighted (19). Total: 121 taxa. 23 are non-native (19%).

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
ACENEG	1	Acer negundo	-2	FACW-	Nt Tree	BOXELDER
ACESAI	1	Acer saccharinum	-3	FACW	Nt Tree	SILVER MAPLE
AGRRER	0	AGROPYRON REPENS	3	FACU	Ad P-Grass	QUACK GRASS
AGRALA	0	Agrostis alba	-3	FACW	Nt P-Grass	RED TOP
ALLPET	0	ALLIARIA PETIOLATA	0	FAC	Ad B-Forb	GARLIC MUSTARD
AMBART	0	Ambrosia artemisiifolia	3	FACU	Nt A-Forb	COMMON RAGWEED
ANECAN	4	Anemone canadensis	-3	FACW	Nt P-Forb	MEADOW ANEMONE
ANEVIR	4	Anemone virginiana	5	UPL	Nt P-Forb	TALL ANEMONE
ANGATR	6	Angelica atropurpurea	-5	OBL	Nt P-Forb	ANGELICA
APIAME	3	Apios americana	-3	FACW	Nt H-Vine	GROUND NUT
APOCAN	2	Apocynum cannabinum	0	FAC	Nt P-Forb	DOGBANE
APOSIB	2	Apocynum sibiricum	-1	FAC+	Nt P-Forb	INDIAN HEMP
ASCINC	4	Asclepias incarnata	-5	OBL	Nt P-Forb	SWAMP MILKWEED
ASCSYR	0	Asclepias syriaca	5	UPL	Nt P-Forb	COMMON MILKWEED
ASCVER	1	Asclepias verticillata	5	UPL	Nt P-Forb	HORSETAIL MILKWEED
ASTPUN	7	Aster puniceus	-5	OBL	Nt P-Forb	BRISTLY ASTER
ASTUMB	8	Aster umbellatus	-3	FACW	Nt P-Forb	FLAT-TOP ASTER
BIDVUL	0	Bidens vulgata	-3	FACW	Nt A-Forb	TALL BEGGAR'S-TICKS
BROCIL	10	Bromus ciliatus	-5	OBL	Nt P-Grass	FRINGED BROME
BROINE	0	BROMUS INERMIS	5	UPL	Ad P-Grass	HUNGARIAN BROME
CALCAN	3	Calamagrostis canadensis	-5	OBL	Nt P-Grass	BLUE JOINT GRASS
CALTPA	7	Caltha palustris	-5	OBL	Nt P-Forb	COWSLIP
CALSEP	1	Calystegia sepium	0	FAC	Nt P-Forb	AMERICAN BINDWEED
CAMULI	10	Campanula uliginosa	-5	OBL	Nt P-Forb	MARSH BELLFLOWER
CXBLAN	2	Carex blanda	0	FAC	Nt P-Sedge	COMMON WOOD SEDGE
CXCRAE	7	Carex crawei	-5	OBL	Nt P-Sedge	EARLY FEN SEDGE
CXGRNG	2	Carex granularis	-4	FACW+	Nt P-Sedge	PALE SEDGE
CXSTRC	5	Carex stricta	-5	OBL	Nt P-Sedge	COMMON TUSSOCK SEDGE
CXVULP	3	Carex vulpinoidea	-5	OBL	Nt P-Sedge	BROWN FOX SEDGE
CHEGLB	7	Chelone glabra	-5	OBL	Nt P-Forb	WHITE TURTLEHEAD
CIRLUT	2	Circaea lutetiana v. canadensis	3	FACU	Nt P-Forb	ENCHANTER'S NIGHTSHADE
CIRARV	0	CIRSIUM ARVENSE	3	FACU	Ad P-Forb	FIELD THISTLE
CIRDIS	3	Cirsium discolor	5	UPL	Nt B-Forb	PASTURE THISTLE
CIRMUT	9	Cirsium muticum	-5	OBL	Nt B-Forb	FEN THISTLE
COMUMB	6	Comandra umbellata	3	FACU	Nt P-Forb	BASTARD TOAD-FLAX
CONARV	0	CONVOLVULUS ARVENSIS	5	UPL	Ad P-Forb	FIELD BINDWEED
COROBL	4	Cornus obliqua	-5	OBL	Nt Shrub	PALE DOGWOOD
CORRAC	2	Cornus racemosa	-2	FACW-	Nt Shrub	GRAY DOGWOOD
DAUCAR	0	DAUCUS CAROTA	4	FACU-	Ad B-Forb	QUEEN ANNE'S LACE
DIPLAC	0	DIPSACUS LACINIATUS	5	UPL	Ad B-Forb	CUT-LEAVED TEASEL
ECHLOB	4	Echinocystis lobata	1	FAC-	Nt P-Forb	WILD CUCUMBER
EQUARV	0	Equisetum arvense	0	FAC	Nt Fern	COMMON HORSETAIL
ERISTR	2	Erigeron strigosus	1	FAC-	Nt P-Forb	DAISY FLEABANE

ERIANG	10 Eriophorum angustifolium	-5	OBL	Nt P-Sedge	NARROW-LEAVED COTTON GRASS
EUPMAC	5 Eupatorium maculatum	-5	OBL	Nt P-Forb	SPOTTED JOE-PYE WEED
GALOBT	5 Galium obtusum	-4	FACW+	Nt P-Forb	WILD MADDER
GALTRO	4 Galium triflorum	2	FACU+	Nt P-Forb	SWEET-SCENTED BEDSTRAW
GANAND	7 Gentiana andrewsii	-3	FACW	Nt P-Forb	CLOSED GENTIAN
GEUALE	6 Geum aleppicum	-1	FAC+	Nt P-Forb	YELLOW AVENS
GEUCAN	2 Geum canadense	0	FAC	Nt P-Forb	WHITE AVENS
GEULAC	2 Geum laciniatum	-3	FACW	Nt P-Forb	ROUGH AVENS
GLEHED	0 GLECHOMA HEDERACEA	3	FACU	Ad P-Forb	GROUND IVY
GLYSTR	4 Glyceria striata	-5	OBL	Nt P-Grass	FOWL MANNA GRASS
HELGRO	2 Helianthus grosseserratus	-2	FACW-	Nt P-Forb	SAWTOOTH SUNFLOWER
IMPCAP	2 Impatiens capensis	-3	FACW	Nt A-Forb	SPOTTED TOUCH-ME-NOT
IRISHR	5 Iris shrevei	-5	OBL	Nt P-Forb	SOUTHERN BLUEFLAG
JUNDUD	4 Juncus dudleyi	0	FAC	Nt P-Forb	DUDLEY'S RUSH
JUNVIR	1 Juniperus virginiana	3	FACU	Nt Tree	EASTERN RED CEDAR
LATPAP	7 Lathyrus palustris	-5	OBL	Nt P-Forb	MARSH VETCHLING
LEUVUL	0 LEUCANTHEMUM VULGARE	5	UPL	Ad P-Forb	OX-EYE DAISY
LILMIC	6 Lilium michiganense	-1	FAC+	Nt P-Forb	MICHIGAN LILY
LONBEL	0 LONICERA X BELLA	3	FACU	Ad Shrub	SHOWY FLY HONEYSUCKLE
LONMAA	0 LONICERA MAACKII	5	UPL	Ad Shrub	AMUR HONEYSUCKLE
LONTAT	0 LONICERA TATARICA	3	FACU	Ad Shrub	TARTARIAN HONEYSUCKLE
LYCAME	3 Lycopus americanus	-5	OBL	Nt P-Forb	COMMON WATER HOREHOUND
LYSQUR	8 Lysimachia quadriflora	-5	OBL	Nt P-Forb	NARROW-LEAVED LOOSESTRIFE
LYTSAL	0 LYTHRUM SALICARIA	-5	OBL	Ad P-Forb	PURPLE LOOSESTRIFE
MELALB	0 MELILOTUS ALBA	3	FACU	Ad B-Forb	WHITE SWEET CLOVER
MELOFC	0 MELILOTUS OFFICINALIS	3	FACU	Ad B-Forb	YELLOW SWEET CLOVER
MENARV	4 Mentha arvensis v. villosa	-3	FACW	Nt P-Forb	WILD MINT
MONFIS	4 Monarda fistulosa	3	FACU	Nt P-Forb	WILD BERGAMOT
PANIMP	2 Panicum implicatum	1	FAC-	Nt P-Grass	OLD-FIELD PANIC GRASS
PARINS	1 Parthenocissus inserta	3	FACU	Nt P-Forb	THICKET CREEPER
PEDLAN	9 Pedicularis lanceolata	-4	FACW+	Nt P-Forb	FEN BETONY
PENDIG	4 Penstemon digitalis	1	FAC-	Nt P-Forb	FOXGLOVE BEARD TONGUE
PHAARU	0 PHALARIS ARUNDINACEA	-4	FACW+	Ad P-Grass	REED CANARY GRASS
PHLPRA	0 PHLEUM PRATENSE	3	FACU	Ad P-Grass	TIMOTHY
PHRAUS	1 Phragmites australis	-4	FACW+	Nt P-Grass	COMMON REED
PLRUG	0 Plantago rugelii	0	FAC	Nt A-Forb	RED-STALKED PLANTAIN
PLAHYH	10 Platanthera hyperborea	-3	FACW	Nt P-Forb	GREEN ORCHID
POACOM	0 POA COMPRESSA	2	FACU+	Ad P-Grass	CANADIAN BLUE GRASS
POLREP	5 Polemonium reptans	0	FAC	Nt P-Forb	JACOB'S LADDER
POLAMP	3 Polygonum amphibium	-5	OBL	Nt P-Forb	WATER KNOTWEED
POLCES	0 POLYGONUM CESPITOSUM v. LONGISETUM	5	UPL	Ad A-Forb	CREEPING SMARTWEED

POPDEL	2 Populus deltoides	-1	FAC+	Nt Tree	EASTERN COTTONWOOD
PRUSER	1 Prunus serotina	3	FACU	Nt Tree	WILD BLACK CHERRY
PYCVIR	5 Pycnanthemum virginianum	-4	FACW+	Nt P-Forb	COMMON MOUNTAIN MINT
RHACAT	0 RHAMNUS CATHARTICA	3	FACU	Ad Shrub	COMMON BUCKTHORN
RIBAME	5 Ribes americanum	-3	FACW	Nt Shrub	WILD BLACK CURRANT
ROSCAR	4 Rosa carolina	4	FACU-	Nt Shrub	PASTURE ROSE
RUDHIR	2 Rudbeckia hirta	3	FACU	Nt P-Forb	BLACK-EYED SUSAN
RUMORB	7 Rumex orbiculatus	-5	OBL	Nt P-Forb	GREAT WATER DOCK
SAGLAT	4 Sagittaria latifolia	-5	OBL	Nt P-Forb	COMMON ARROWHEAD
SALAMY	4 Salix amygdaloides	-3	FACW	Nt Tree	PEACH-LEAVED WILLOW
SALERI	8 Salix eriocephala	-3	FACW	Nt Shrub	HEART-LEAVED WILLOW
SALEXI	1 Salix exigua	-5	OBL	Nt Shrub	SANDBAR WILLOW
SALNIG	3 Salix nigra	-5	OBL	Nt Tree	BLACK WILLOW
SAMCAN	2 Sambucus canadensis	4	FACU-	Nt Shrub	COMMON ELDER
SCIFLU	3 Scirpus fluviatilis	-5	OBL	Nt P-Sedge	RIVER BULRUSH
SCIPEN	3 Scirpus pendulus	-5	OBL	Nt P-Sedge	RED BULRUSH
SCUGAL	6 Scutellaria galericulata	-5	OBL	Nt P-Forb	MARSH SKULLCAP
SIUSUA	5 Sium suave	-5	OBL	Nt P-Forb	WATER PARSNIP
SOLCAR	0 Solanum carolinense	4	FACU-	Nt P-Forb	HORSE NETTLE
SOLDUL	0 SOLANUM DULCAMARA	0	FAC	Ad W-Vine	BITTERSWEET NIGHTSHADE
SOLCAN	1 Solidago canadensis	3	FACU	Nt P-Forb	CANADA GOLDENROD
SOLGIG	3 Solidago gigantea	-3	FACW	Nt P-Forb	LATE GOLDENROD
SOLRID	7 Solidago riddellii	-5	OBL	Nt P-Forb	RIDDELL'S GOLDENROD
SOLRIG	4 Solidago rigida	4	FACU-	Nt P-Forb	RIGID GOLDENROD
STAPAL	5 Stachys palustris	-5	OBL	Nt P-Forb	WOUNDWORT
SYMFOE	8 Symplocarpos foetidus	-5	OBL	Nt P-Forb	SKUNK CABBAGE
TAROFF	0 TARAXACUM OFFICINALE	3	FACU	Ad P-Forb	COMMON DANDELION
TEYCAB	3 Teucrium canadensis	-2	FACW-	Nt P-Forb	GRAY GERMANDER
TRAOHI	3 Tradescantia ohiensis	2	FACU+	Nt P-Forb	COMMON SPIDERWORT
TYPANG	0 TYPHA ANGUSTIFOLIA	-5	OBL	Ad P-Forb	NARROW-LEAVED CATTAIL
TYPLAT	1 Typha latifolia	-5	OBL	Nt P-Forb	BROAD-LEAVED CATTAIL
ULMRUB	3 Ulmus rubra	0	FAC	Nt Tree	SLIPPERY ELM
URTDIO	2 Urtica dioica	-1	FAC+	Nt P-Forb	TALL NETTLE
VERHAS	3 Verbena hastata	-4	FACW+	Nt P-Forb	BLUE VERVAIN
VERVIM	6 Veronicastrum virginicum	0	FAC	Nt P-Forb	CULVER'S ROOT
VIBLEN	4 Viburnum lentago	-1	FAC+	Nt Shrub	NANNYBERRY
VITRIP	2 Vitis riparia	-2	FACW-	Nt W-Vine	RIVERBANK GRAPE

Appendix 4. Images.

Figure 1. View of Thunderbird Lake marshes towards southeast through a forested area from the park along Thunderbird Lane, Prairie Grove. Mudflats, cattail marshes and forest margin visible. 7/1/2013.

Figure 2. Transition area at margin of cattail marsh and sedge meadow below the community park. Dominants are *Typha*, *Carex stricta*, and *Aster puniceus*. Site 21-west. 7/1/2013.

Figure 3. Overall view of transition area at margin of cattail marsh and sedge meadow with forested margin beyond. Site 21-west. 7/1/2013.

Figure 4. Individual of *Platanthera hyperborea* var. *huronensis* in between hummocks of *Carex stricta*. Site 21-west. 7/1/2013.

Figure 5. Typical **Phalaris arundinacea* marsh within Site 21-south. 7/9/2013.

Figure 6. Typical *Phragmites australis* marsh within Site 21-south. 7/9/2013.

Figure 7. Wetland Site 28, north of East Brighton Lane, Crystal Lake. 7/2/2013.

Aquatic Survey Report

Surveys for Blanding's Turtle along Illinois Route 31 (IDOT FAU 336) between Bull Valley Road and Illinois Route 176, McHenry County, Illinois

IDOT Job No.: P-91-135-99 (Seq. No.: 1340C)

Andrew R. Kuhns

INHS/IDOT Statewide Biological Survey & Assessment Program
Report 2014 (33)

25 July 2014

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

PROJECT SUMMARY

This report details results of trapping for freshwater turtles along the Illinois Route 31 (IDOT FAU 336) project boundary from Bull Valley Road to Illinois Route 176, McHenry County, IL. There are recent records for the Blanding's Turtle, *Emydoidea blandingii*, from the area, but no record is closer than approximately 2 miles from Thunderbird Lake (**Appendix C**). A brief examination of the natural history and ecology of the Blanding's Turtle is included in **Appendix A**. INHS herpetologist Andrew Kuhns trapped for turtles from three locations along the project corridor from 20 – 23 May 2014. No Blanding's Turtles were captured in the corridor. A description of trapping methods can be found in **Appendix B** and map of trapping locations is available in **Appendix C**. Spatial data including trapping locations is presented in **Appendix E**.

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Cover Photo: Thunderbird Lake, McHenry County, Illinois. Photo by A.R. Kuhns, INHS.

INTRODUCTION

In a further studies transmittal dated 07 March 2014, Susan Hargrove of the Illinois Department of Transportation (IDOT) Bureau of Design and Environment tasked the Illinois Natural History Survey (INHS) to conduct herpetological surveys for Blanding's Turtles along the Illinois Route 31 (IDOT FAU 336) Addendum C (Job No.: P-91-135-99; Seq. No.: 1340C) project boundary from Bull Valley Road to Illinois Route 176, McHenry County, Illinois. In addition to the project boundaries, the transmittal requested surveys between Illinois Route 31 and the west bank of Thunderbird Lake, which is an Illinois Natural Areas Inventory (INAI) site. Construction in the project corridor is to include adding additional lanes, reconfiguring intersections, and relocating streams. This report summarizes the results of database searches and trapping for the species in the project boundary. A brief description of the natural history and ecology of this species can be found in **Appendix A**.

PROJECT AREA

The project boundary begins at the intersection of Illinois Route 176 and Illinois Route 31 in Crystal Lake, Illinois and extends north along Illinois Route 31 for 5.14 miles to its terminus at Bull Valley Road in McHenry, Illinois. This project boundary occurs in parts of T 44N, R 08E, Sec. 2, 10, 15, 22, 27, & 34 in McHenry County, Illinois (**Appendix C: Figure C.1**). Thunderbird Lake occurs east of the project boundary, is 117.98 acres in size, and is classified as an INAI site by virtue of its high quality natural community and natural community restorations (Category I) and specific suitable habitat for state-listed species or state-listed species relocations (Category II).

METHODS

Database Review

The Illinois Natural Heritage Database maintained by the Illinois Department of Natural Resources (IDNR) was queried for Element Occurrence Records (EOR) of threatened and endangered amphibians and reptiles within six miles of the project boundary. Each EOR may be subdivided into multiple Element of Occurrence Identification numbers (EOID) to record separate identification events or sub-locations. The locations of any results were plotted onto aerial photographs (**Appendix C, Figure C.1**) of the project area and examined to search for suitable habitat for the species.

Field Surveys

The Illinois Route 31 (IDOT FAU 336) project boundary, from Bull Valley Road to Illinois Route 176 in McHenry County, Illinois was inspected on 20 May 2014 by INHS IDOT Herpetologist A. R. Kuhns and three additional INHS employees. The initial visit consisted of walking the INAI wetland to search for water deep enough to trap and also to conduct visual encounter surveys in the wet meadow. A description of suitable habitat for Blanding's Turtles can be found in **Appendix A**. Three double-throated collapsible hoop traps were set from 20 – 23 May, in an

unnamed stream that flows under Illinois Route 31 (IDOT FAU 336) and into Thunderbird Lake. (**Appendix C, E**). Trapping and Visual Encounter Survey methods are described in **Appendix B**.

RESULTS

Database Review

Blanding's Turtles have never been recorded from the Illinois Route 31 project boundary or from the Thunderbird INAI site although multiple sites in the region are known to harbor the species (**Appendix C, Figure C.1**). Thunderbird Lake INAI site appeared to contain suitable habitat based upon aerial photographs **(Appendix C, Figure C.2)**.

Field Surveys

On 21 May 2014, one juvenile Snapping Turtle, *Chelydra serpentina*, was captured from a trap (**Appendix D, Plate D. 4; Appendix E)** set in the unnamed ditch running into Thunderbird Lake. This was the only turtle capture recorded from the nine trap nights of sampling at this site (**Table 1**). This stream (**Appendix D, Plate D.3**) was the only water, found to be deep enough to submerge the trap throats. The lake itself was not trapped as it is greater than 0.5 miles from the project boundary and the west bank of the lake was shallow and choked with 100 to 300 feet of cattails (*Typha* sp.) prior to reaching open water (**Appendix D, Plate D.1**). Although much of the site appeared suitable for Blanding's Turtles (**Appendix D, Plate D.2**), no turtles were observed in 5.2 man-hours of visual encounter surveys in the wet meadow (Site 21 from Marcum et al. 2011, Hill 2013) between the western shore of Thunderbird Lake and Illinois Route 31 (IDOT FAU 336). One Green Frog, *Lithobates clamitans*, captured near the stream was vouchered (INHS 23965), as was the juvenile Snapping Turtle (INHS 23966).

Table 1. Locations, dates, and capture results of turtle traps set in an unnamed ditch flowing under Illinois Route 31 and into Thunderbird Lake, McHenry County, Illinois.

Trap	Latitude	Longitude	Date set	Date pulled	*Chelydra serpentina*
1	42.27354	-88.2835	5/20/2014	5/23/2014	0
2	42.23600	-88.2838	5/20/2014	5/23/2014	0
3	42.27371	-88.2841	5/20/2014	5/23/2014	1

DISCUSSION

The only place between the Illinois Route 31 (IDOT FAU 336) project boundary and western bank of Thunderbird Lake found with water deep enough to submerge the throats of turtle traps was an unnamed stream. Traps were placed in this system, downstream of a water reclamation facility. The surveyors noted that the stream and substrate exuded a foul odor when the sediments were disturbed. No Blanding's Turtles were detected in the Illinois Route

31 (IDOT FAU 336) project boundary, and no suitable habitat for the species was found anywhere within the project boundary. The large marsh/wet meadow/shrub-scrub wetland complex (Site 21 from Marcum et al 2011, Hill 2013) that occupies the western shore of Thunderbird Lake does appear to be suitable habitat for Blanding's Turtles although the species was not detected.

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Appendix A

Natural history of reptiles listed as threatened or endangered in the state of Illinois, known from the vicinity of the project boundary.

Synopsis

This appendix contains information on the Blanding's Turtle, *Emydoidea blandingii*. The species account includes: diagnostic characters, range in Illinois, habitat requirements, spatial ecology and activity, reproduction, and the suitable sampling season in Illinois. Standard and scientific names follow Crother (2008).

Species range maps were created by Ethan J. Kessler. Maps were based upon data in the Illinois Natural History Survey's All Illinois Herps Database which contains records of vouchered and un-vouchered specimens in the Illinois Natural History Survey (INHS), University of Illinois Museum of Natural History (UIMNH), and amphibian and reptile specimens from ~30 other scientific museums. The database is maintained by INHS/UIMNH Amphibian and Reptile Curator Christopher A. Phillips, with records from other institutions updated annually.

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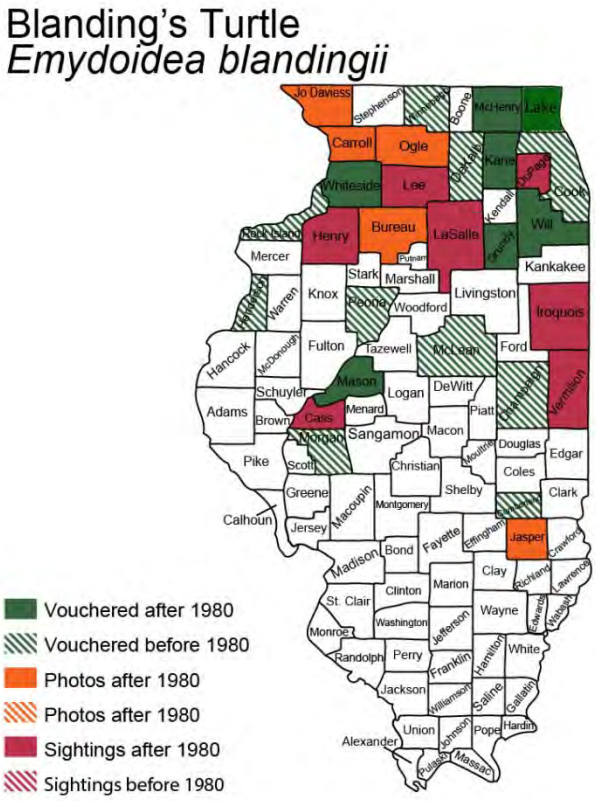
BLANDING'S TURTLE, *EMYDOIDEA BLANDINGII*

General Description for Identification: The Blanding's Turtle is distinguishable from other North American turtle species by the presence of a hinged plastron coupled with a bright yellow chin and throat (Ernst et al. 1994).

Range:
Within Illinois, *E. blandingii* was historically present in the extensive marsh systems of the northern half of the state (Kennicott 1855).

Suitable Habitat: Throughout their range, *E. blandingii* occupy eutrophic habitats with clear water and abundant aquatic vegetation with adjacent uplands available for nesting (Ernst et al. 1994). Typical Blanding's Turtle sites in northeastern Illinois are a mosaic of multiple wetland types interspersed in a prairie or savanna landscape (Kuhns et al. 2007). Blanding's Turtles are not great swimmers and typically prefer shallow wetlands with little to no discernable water flow.



Reproduction: Blanding's Turtles are long lived, with wild-caught individuals over 77 years of age having been documented in the field (Congdon et al. 2001). Females typically mature between 14 and 20 years of age (Congdon et al. 1983; Ross 1989). Mature females lay only one clutch of eggs per year but may not nest annually. Nests of up to 19 eggs are laid in sand or sandy loam soils with good drainage and low canopy cover (Ross and Anderson 1990**;** Kuhns et al. 2007).

Spatial ecology and activity: Blanding's turtles in northern Illinois are active from late March through October (Rowe and Moll 1991; Kuhns et al. 2007). Females can travel considerable distances (up to 1 mi.) from their activity areas to nest (Congdon et al. 1983; Ross and Anderson 1990; Joyal et al. 2001; Kuhns et al. 2007). Radio-telemetry data from northeastern Illinois indicate that Blanding's Turtles moved an average straight-line distance of 60 to 75 feet/day (Kuhns et al 2007). Annual home range size is highly variable depending on individuals but in northern Illinois averaged 123,000 sq. ft. to 150000 sq. ft. (Kuhns et al. 2007).

Suitable Sampling Seasons: The greatest trapping success in northern Illinois occurs from May through mid-July (Benda et al. 2007, Kuhns et al. 2007).

Illinois Status: The Blanding's Turtle is considered endangered in Illinois (Illinois Endangered Species Protection Board 2011; Mankowski 2010, 2012).

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Appendix B

Sampling methods appropriate for the detection of amphibians and reptiles listed as endangered or threatened in the state of Illinois.

Table B.1. Species listed as threatened or endangered in Illinois and potential sampling methods for their detection.

		State Listed Herptiles	Threatened	Endangered	Dip-Net	Minnow Trap	Call Survey	Visual Encounter	Hoop Trap	Fyke Net	Seine	Drift Fence	Coverboard
AMPHIBIANS	SALIENTIA	*Ambystoma jeffersonianum*	X		■	■		■				■	
		Ambystoma platineum		X	■	■		■				■	
		Cryptobranchus alleganiensis		X				■					
		Desmognathus conanti		X	■			■					
		Hemidactylium scutatum	X					■				■	
		Nectutus maculosus	X		■	■		■			■		
	ANURA	*Hyla avivoca*		X	■	■	■	■					
		Pseudacris streckerii		X	■	■	■	■				■	
		Gastrophryne carolinensis	X		■	■	■	■				■	
REPTILES	TESTUDINES	*Apalone mutica*		X				■	■	■			
		Clemmys guttata		X				■	■				
		Emydoidea blandingii		X				■	■				
		Kinosternon flavescens		X				■	■				
		Macrochelys temminckii		X					■				
		Pseudemys concinna		X				■		■			
		Terrapene ornata	X					■				■	
	SERPENTES	*Clonophis kirtlandii*	X					■				■	■
		Crotalus horridus	X					■				■	
		Pantherophis emoryi		X				■				■	■
		Heterodon nasicus	X					■				■	■
		Masticophis flagellum		X				■				■	■
		Nerodia fasciata		X				■				■	■
		Nerodia cyclopion	X					■				■	■
		Sistrurus catenatus		X				■				■	
		Tantilla gracilis	X					■				■	■
		Thamnophis sauritus	X					■				■	■
		Tropidoclonion lineatum	X					■				■	■

Sampling Methods for the Detection of State Listed Amphibians and Reptiles

Call Survey. This method is only effective for anurans during the breeding season. The researcher either visits wetlands in the evening hours to listen to the frog chorus, or places an audio recording device at the wetland during the day and returns the following morning to retrieve the recording. In either case, the researcher must be familiar with the calls of frogs and toads in the area in order to identify the species based only upon the calls in the chorus. To be effective, the researcher must also be familiar with the ecology of the target species and sample during its breeding season in habitats where it is likely to reside.

Dip Netting. A dip net is useful for sampling aquatic animals and can be used to capture individuals observed or as a means of blindly sampling for aquatic organisms in vegetation choked or turbid water. Typically, a researcher will pull the net along the substrate and through the water column for approximately 3 feet, and then finish the net sweep by pulling the net up and out of the water with the net opening facing upward. The researcher can then remove any substrate or detritus from the net and search for captured animals.

Seine. A seine is a fishing net that hangs vertically in the water column suspended by floats with the bottom edge held down by weights. The net is dragged along the bottom of aquatic habitats and captures aquatic amphibians and reptiles when it is drawn onto shore or scooped out of the water. In many ways, it functions much like a large dip net when used for amphibian and reptile sampling.

Visual Encounter Survey (VES). Visual encounter surveys involve searching appropriate habitat (mainly turning cover items such as logs, rocks and miscellaneous debris and also visually scanning open habitats) and recording all species encountered. Surveys can be regimented such as by walking pre-defined grid patterns and time limits, or in a more haphazard wandering pattern. This method is most effective if the researcher is familiar with the target species ecology and can focus on habitat areas where the species is most likely to be encountered, as well as time of day and seasons when the species is most active. A thorough explanation of this technique can be found in Heyer et al. (1994).

Passive Sampling Methods

Drift Fence. A drift fence is any object that is placed perpendicular to the ground surface as a way to intercept animals that may be passing through. It is often constructed of hardware cloth or silt fencing buries a few inches into the ground to prevent burrowing; but natural cover items such as large logs or rock formations may also function as a drift fence. Animals are captured by travelling parallel to the fence until they fall into a receptacle, such as a bucket or coffee can, that has been buried flush with the substrate. Similarly, funnel traps can be placed along the drift fence to capture animals that are walking along the fence. This technique is covered in Heyer et al. (1994) and McDairmid et al. (2012).

Coverboards. Coverboards are essentially any item sitting flush with the substrate under which an amphibian or reptile may seek refuge. Artificial coverboards are often made of plywood or corrugated tin and are placed in areas likely to harbor the species of interest. Coverboards often attract small mammals and invertebrates as well, which may enhance their ability to attract amphibians and reptiles. Well-seasoned artificial cover objects with little vegetation underneath them seem to work better in attracting herptiles, therefore their use most effective for long term projects when they can be set out many months in advance of surveys.

Minnow Trap. Traps may be constructed of rope, monofilament, or steel and may have funnels or throats, at one or both ends, which allow the animal to enter into the trap body but prevent them from easily exiting the trap. Minnow traps may be cylindrical or rectangular and can be baited or not depending on the target species. If baited, the bait is refreshed every 2 to 4 days. Traps are usually placed so that a portion of the trap placed in water is emergent so that captured animals have access to air and will not drown. However, in riverine environments, where there is little to no probability of capturing non-gilled species, the traps may be fully submerged. Effort is recorded in trap hours (i.e. number of traps multiplied by the number of hours the traps were deployed). Results are reported as the numbers of each species captured.

Hoop Trap. These traps work on the same principal as minnow traps but are larger in diameter and have larger throats to allow for the capture of larger animals such as turtles (Legler 1960). All hoop traps are placed such that at least 5cm of the trap is above the surface of the water to ensure captured turtles have access to air. Traps are tied via string or rope to surrounding vegetation to ensure that captured turtles do not roll traps into deeper water and drown. Traps are placed parallel to either the shoreline or potential basking sites. Traps are baited (usually with sardines canned in spring water or oil). Traps are checked daily and bait is changed every 2 to 4 days. Effort is recorded in trap hours (i.e., number of traps multiplied by the number of hours the traps were deployed). Results are reported as the numbers of each species captured.

Fyke Net. This trapping method is essentially a combination of a Drift Fence and a Hoop Trap. It consists of a hoop trap body with a single throat, and long wings and a lead that extend out from the throat in a double V formation (**Figure B.1**). Wings and leads have a lead-line that makes them hang vertically in the water column. This essentially extends the reach of the throat and works well for turtle species that are not attracted to readily available baits. It can be used to intercept turtles entering a cove or attempting to access a popular basking site, by funneling them into the trap body where the throat prevents them from escaping. A description of Fyke Nets can be found in Vogt (1980).

Literature Cited in Appendix B.

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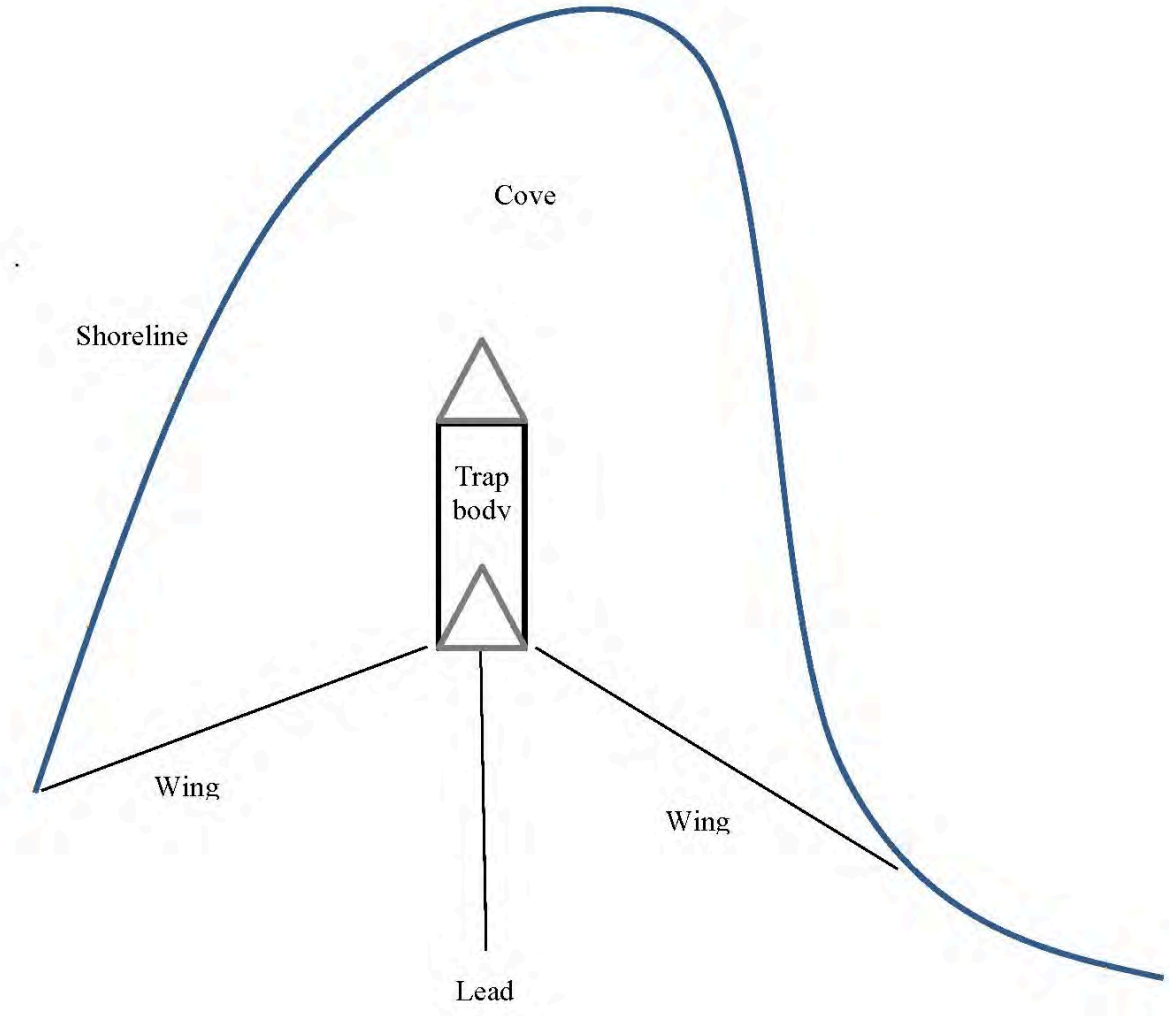
Figure B.1. Fyke Net set to capture turtles attempting to enter a cove (as viewed from above).



Appendix C

Maps and figures relevant to Illinois Route 31 (IDOT FAU 336) Addendum C project area in McHenry County, Illinois.

Figure C.1. Element occurrence records for Blanding's Turtles in the vicinity of Thunderbird Lake, McHenry County, Illinois.

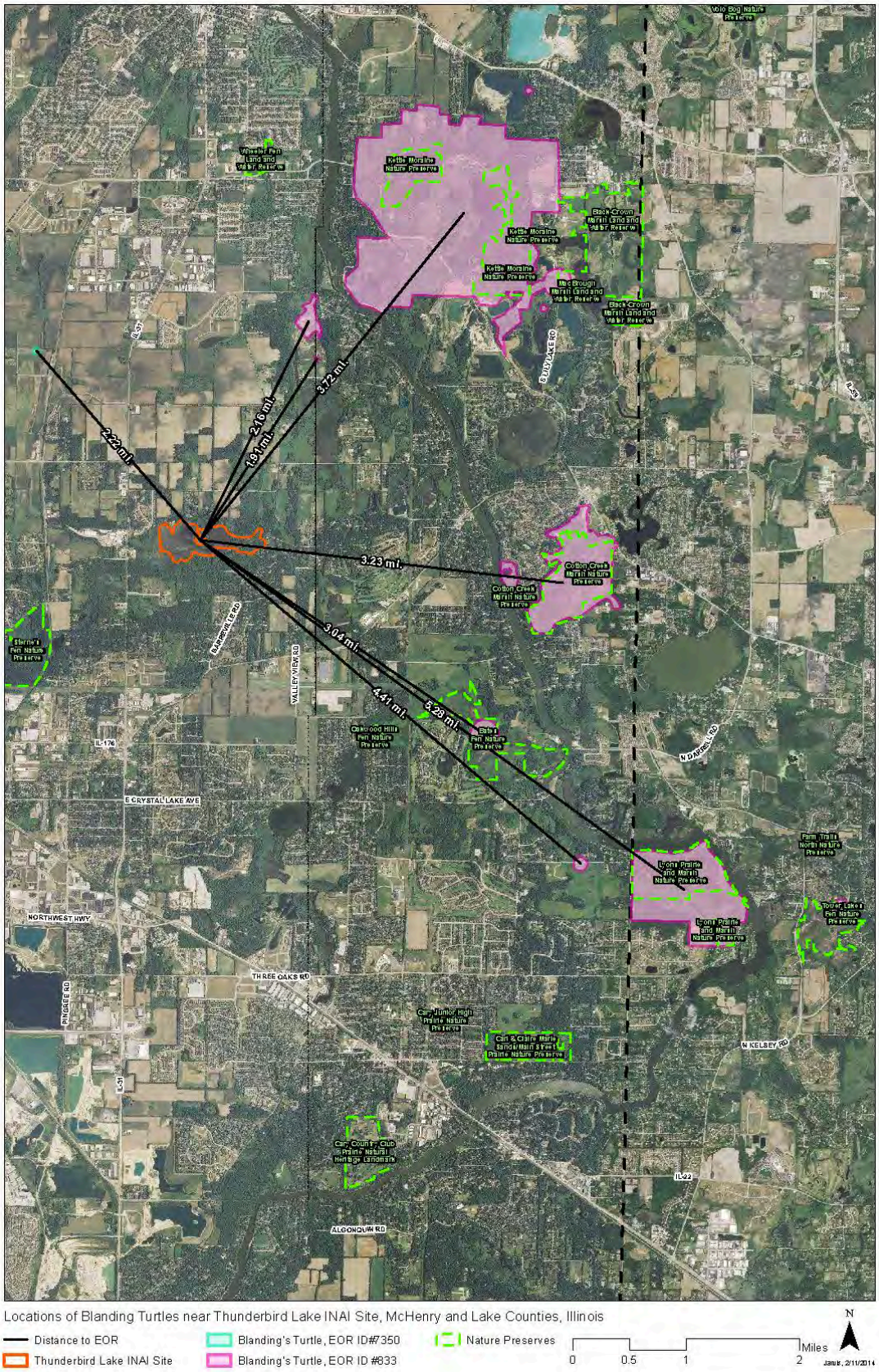
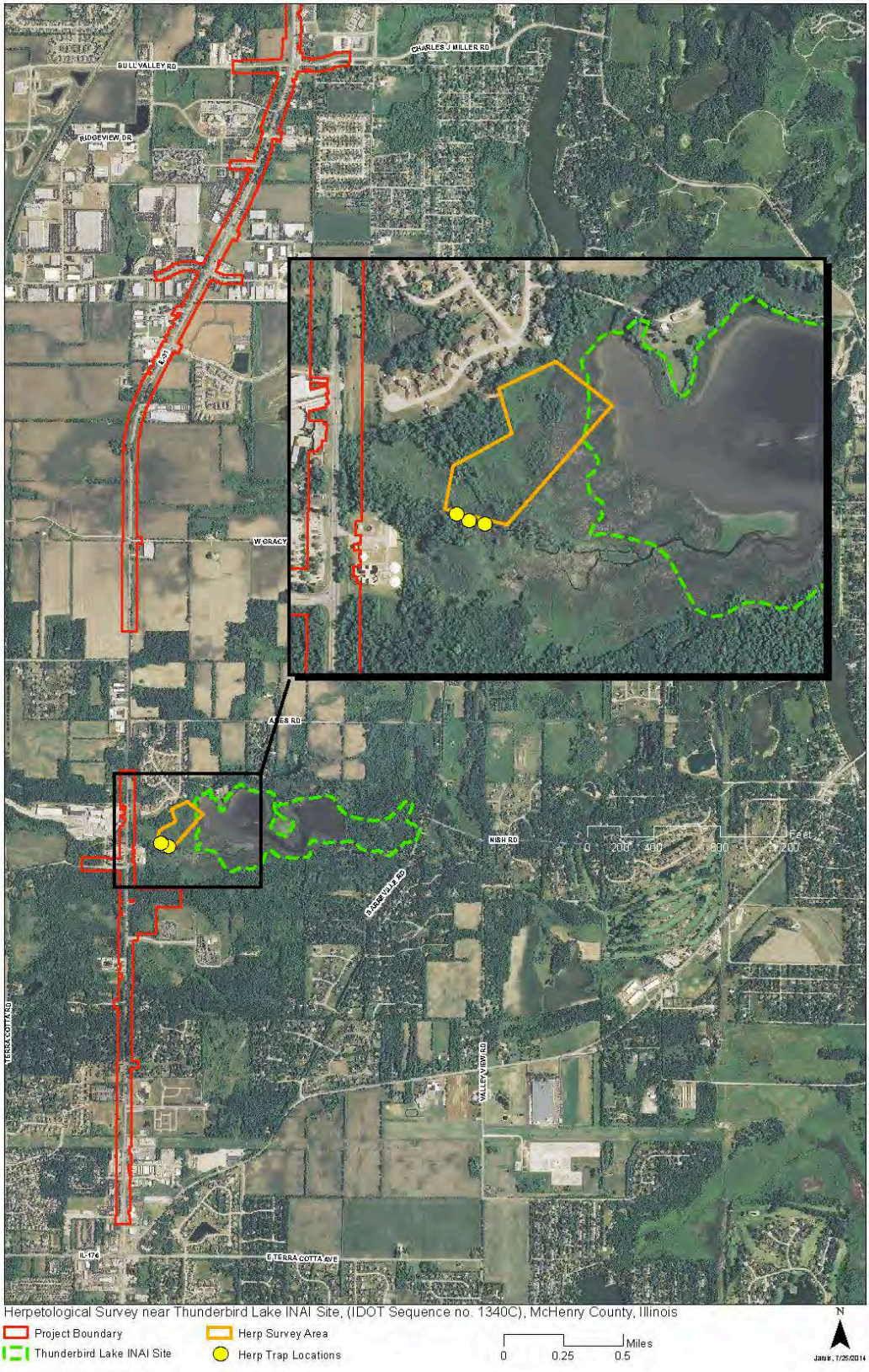


Figure C.2. Illinois Route 31 project boundary and insert of Visual Encounter Survey area and turtle trap locations near Thunderbird Lake, McHenry County, Illinois**.**



Appendix D

Photographs taken while conducting turtle trapping and visual encounter surveys for the Illinois Route 31 (IDOT FAU 336) project at Thunderbird Lake, McHenry County, Illinois.

Plate D.1. Thunderbird Lake, McHenry County, Illinois viewed from the west.

Plate D.2. Wet meadow along the western edge of Thunderbird Lake, McHenry County, Illinois

Plate D.3. Unnamed stream flowing under Illinois Route 31 (IDOT FAU 336) and into Thunderbird Lake, McHenry County, Illinois.

Plate D.4. Juvenile Snapping Turtle captured in an unnamed stream that flows under Illinois Route 31 (IDOT FAU 336) and into Thunderbird Lake, McHenry County, Illinois.

Appendix E

An ArcGIS shapefile <1304C_Thunderbird_Herps.zip> with locations of traps and visual encounter surveys constitutes this appendix. The ArcGIS shapefile and this report were both submitted to IDOT via the IDOT Site Assessment Tracking System extranet website [Frostycap] on 25 July 2014.

Avian Assessment Report

Breeding Bird Surveys at Thunderbird Lake and the Addendum C Study Area along US 31 (FAU 336) from Bull Valley Road to IL 176, Job No. P-91-135-99, McHenry County, Illinois

IDOT Sequence Numbers: 1340C

Prepared by:
Wendy Schelsky

INHS/IDOT Statewide Biological Survey & Assessment Program
Report 2014 (36)

August 7, 2014

ILLINOIS NATURAL HISTORY SURVEY
PRAIRIE RESEARCH INSTITUTE

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Project Summary

The Illinois Department of Transportation is proposing improvements to U.S. 31 in McHenry County, Illinois and has issued an addendum C to the project corridor between Bull Valley Road and IL 176. The proposed project corridor addendum C is situated adjacent to suitable habitat for marsh/wetland breeding birds and the corridor also contains mature oak woodland, and shrubland habitat, all that can support species listed as Illinois Threatened or Endangered and/or considered Species in Greatest Need of Conservation (SGNC) by the Illinois Department of Natural Resources (IDNR). Significant marsh/wetland habitat exists to the east, but just outside of this proposed project corridor, including Thunderbird Lake and associated marsh and wetlands. Breeding bird surveys, including point counts, playbacks and transects were conducted on June 9 and July 9, 2014 by Steve Bailey to determine the presence of possible Threatened and Endangered species in the Addendum C corridor and Thunderbird Lake. A total of 60 species were documented in or near the project area. One Illinois Threatened species, Least Bittern (nesting pair), was found in habitat along the western bank of Thunderbird Lake that is near, but outside of the designated study area. Of these 60 species, 10 are listed by the IDNR as SGNC including Least Bittern, as well as, numerous Marsh Wrens, several Sandhill Cranes, Field and Savannah sparrows, Chimney Swifts, Northern Flickers and several Willow Flycatchers (also on Partners in Flight WatchList). Most of these SGNC were found within the project corridor with the exception of the Marsh Wrens, Sandhill Cranes, and Least Bittern, all of which were found at Thunderbird Lake and the associated wetlands.

Surveys Conducted By: Steven D. Bailey, Ornithologist
GIS Layers: Janet Jarvis, Remote Sensing Specialist

Table of Contents

Cover Photo: *Glacial Park, part of the McHenry County Conservation District in Illinois*. Photo taken by Tina Shaw

Introduction

The Illinois Department of Transportation (IDOT) is proposing improvements to U.S. 31 in McHenry County, Illinois and has issued an addendum C to the project corridor between Bull Valley Road and IL 176. The proposed addendum C to the U.S. 31 project borders significant wetland/marsh habitat along the western bank of Thunderbird Lake, a ~25 acre Illinois Natural Areas Inventory (INAI) wetland complex. IDOT requested a survey in 2014 to determine which breeding wetland species are present focusing specifically on the western bank of Thunderbird Lake and Threatened or Endangered Species (T&E) and species listed by Partners in Flight, IUCN, and/or Illinois Department of Natural Resources Species in Greatest Need of Conservation (SGNC).

Project Area

The proposed addendum C to the project corridor along U.S. 31 includes residential/business areas interspersed with various tracts of forest, including mature upland oak and secondary forest, wetlands, marshes, sedge meadows, old field grasslands, shrublands, and riparian areas including small creeks. In addition, Thunderbird Lake, a site recognized by the Illinois Natural Areas Inventory as an area of high quality habitat for endangered species, is adjacent to the proposed corridor.

Records and Potential Habitat for Threatened or Endangered Species

I consulted the Illinois Natural Heritage Database (IDNR) to determine whether any records for any T&E species in or near the study area existed. There were four historical records from the Natural Heritage database of T&E species within one mile of the addendum C corridor and all records were from areas outside of the proposed work. Three Illinois Endangered and one Threatened species, including Least Bittern (threatened) (*Ixobrychus exilis*) (August 6, 2008), Common Gallinule (*Gallinula galleata*) (June 22, 2005), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) (2005), and Black Tern (June 13, 2001) were all recorded, within the past 13 years, in the vicinity of the proposed addendum C corridor (Fig. 1).

Thunderbird Lake is site recognized by the Illinois Natural Areas Inventory as an area of high quality habitat for endangered species. This wetland complex/hemi-marsh has a variety of habitats including sedge meadows, small islands with deciduous trees, and various clumps of emergent wetland vegetation including cattails and bulrushes and a significant area of open water. These habitat characteristics make this wetland an ideal location for nesting marsh/wetland species including the four listed above from the Natural Heritage database and other important species such as Virginia Rail (*Rallus limicola*), Sora (*Porzana carolina*), Sandhill Cranes (*Grus canadensis*) and American Bitterns (*Botaurus lentiginosus*).

The habitat along U.S. 31 is highly varied with a mixture of shrublands, forest, agriculture, grasslands, old field, and riparian areas and wetlands. These habitats can be attractive to a variety of SGNC, but are not likely to contain any Threatened or Endangered Species. Some of the SGNC that may be present are Willow Flycatchers (*Empidonax trailii*), Bell's Vireo (*Vireo bellii*), Yellow-breasted Chats (*Icteria virens*), Yellow-billed Cuckoo (*Coccyzus americanus*), Northern Flicker (*Colaptes auratus*), Field (*Spizella pusilla*) and Savannah Sparrows (*Passerculus sandwichensis*) and Bobolinks (*Dolichonyx oryzivorus*). The quality of these habitats was generally degraded because of the various disturbances in the area including mowing, recent forest (within 50 years) clearing, and urban development, however, and will likely not support large populations of any one of these species.

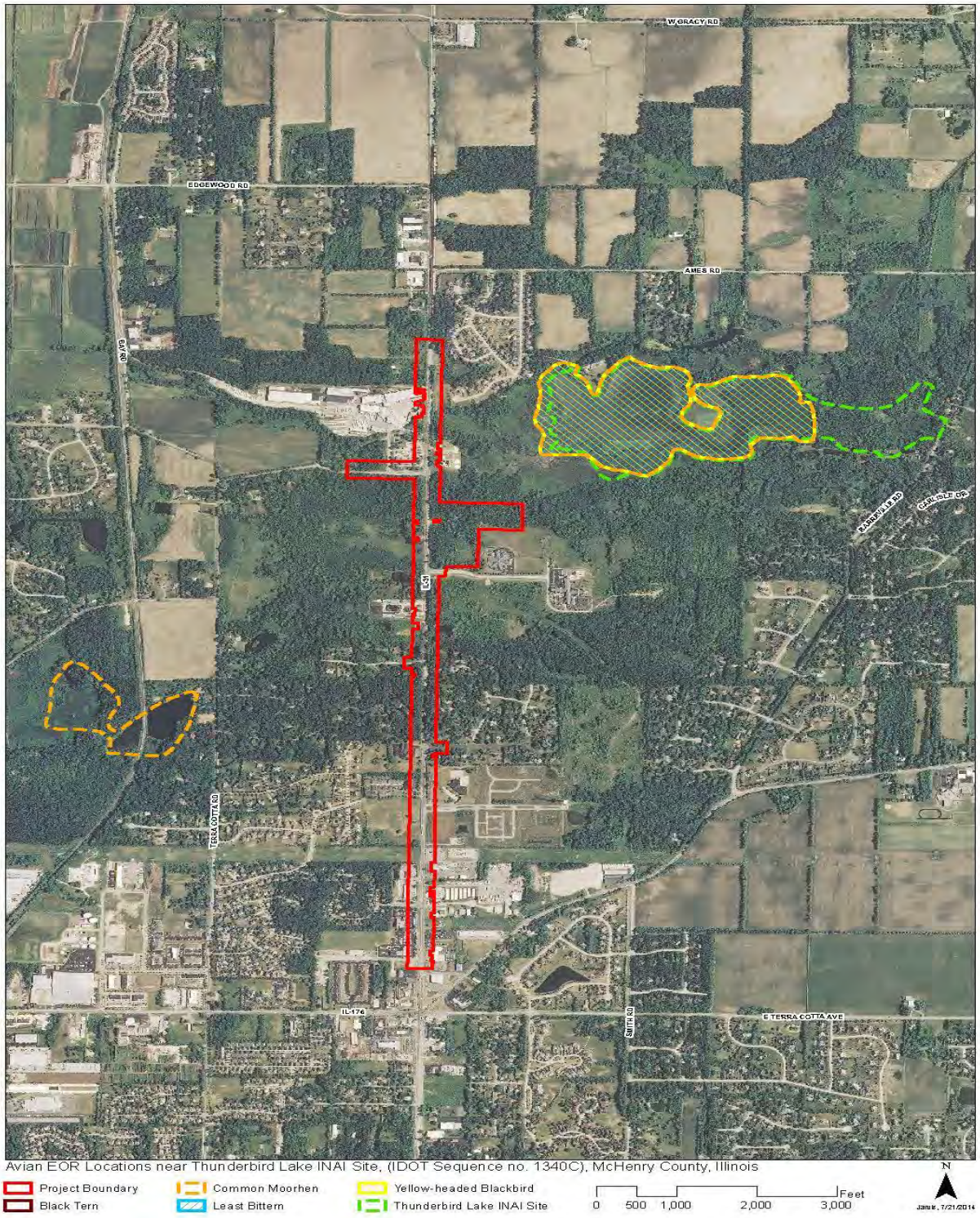


Figure 1. Map of locations of historical records from the Natural Heritage Database for Threatened and Endangered Species in relation to the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq. 1340C). Black Tern is listed but the record is from outside the boundaries of this map and is located approximately 1.3 miles east from the proposed corridor.

Methods

Habitat was assessed using USGS topographic maps, aerial photographs of the study site, and visual assessment during field visits to the study site. I consulted the Illinois Natural Heritage Database for historical records of any listed bird species within one mile of the proposed corridor. From this information, I recorded areas of suitable habitat for listed bird species and decided that a mixture of point counts, a driving transect, walking transect, and playbacks were the most suitable methods for detecting listed bird species.

In 2014, Steve Bailey, Ornithologist at the Illinois Natural History Survey (INHS), visited the project area twice during the breeding season on June 9, and July 9, 2014. During each visit, he conducted point counts at two census points (Fig. 2, Table 1). He conducted point counts for ten minutes between first light and 11 a.m. and recorded all species seen and/or heard out to 300 feet. After each point count he used playbacks of eight wetland species including, Black Rail (*Laterallus jamaicensis*), Sora (*Porzana carolina*), Virginia Rail (*Rallus limicola*), King Rail (*Rallus elegan*), Least Bittern (*Ixobrychus exilis*), American Bittern (*Botaurus lentiginosus*), Pied-billed Grebe (*Podilymbus podiceps*), and Common Gallinule (*Gallinula galleata*) to maximize observation of these difficult to detect species. Each species' song was played for one minute followed by one minute of silence for observation. Steve also surveyed birds along a driving and walking transect through areas that were less suitable for point counts. The driving transect (Table 1) ran along the entire Addendum C corridor on U.S. 31 from Bull Valley Road to IL 176 and was surveyed on the June 9 visit only because traffic speed and noise made it nearly impossible to stop and detect birds. The walking transect was surveyed on both visits and covered suitable habitat along U.S. 31 and several side roads and habitat tracts throughout the corridor (Fig. 2, Table 1) All birds seen or heard along the driving and walking transects were recorded. All transect surveys were conducted between first light and 11 a.m. The numbers reported for each survey are summarized by type and date. The total number of individuals for each species was reported for point counts/playbacks and the total number of species seen or heard was also summarized.

Table 1. Description of two census points, and driving and walking transects at or near the proposed project corridor at the western bank of Thunderbird Lake and the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq 1340C).

Census Point/Transect	Habitat	Physiographic Features	Latitude	Longitude
1	Sedge meadow, Marsh, Open wetland	In sedge meadow, ~150 ft southeast from buckthorn hedge with marsh and open wetland to east, south and southwest	42.275645°	-88.282830°
2	Marsh, Open wetland	Open wetland/marsh with water 6-12 inches deep. Fairly dense but scattered stands of bulrush spp. And cattails	42.275249°	-88.279201°
Rt. 31 driving transect	Mixed Residential, Forest, Wetlands, Shrublands, and Grassland			
Walking Transect	Mixed Residential, Forest, Wetlands, Shrublands, and Grassland	Interspersed upland mature oak woodlands, young forest, old field habitat, small ponds, sedge meadow, and shrubland with several small creeks on the eastern side of Rt. 31	See Figure 2	

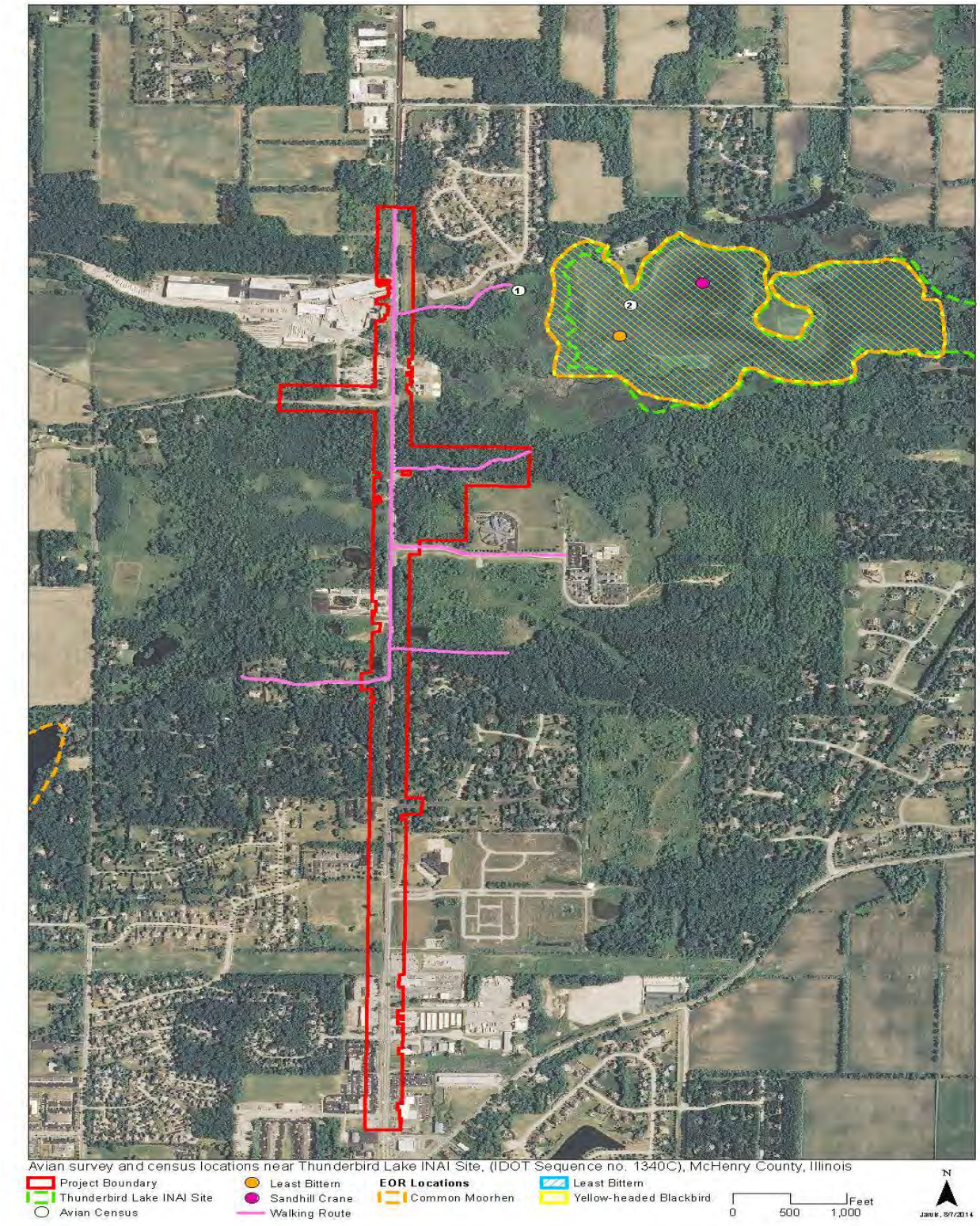


Figure 2. Map of two census points and walking transect at the western bank of Thunderbird Lake and the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq 1340C). Also included is the location for one Illinois Threatened species, Least Bittern, in the vicinity of the study area.

Results

A total of 60 species were documented within or near the addendum C project area (Table 2). Of these, one, the Least Bittern is Illinois Threatened (Fig. 2, Appendix A). The Least Bittern was detected during the June 9th censuses at census point #2 (Table 3, Appendix A) in the marsh bordering the western edge of Thunderbird Lake outside of the proposed corridor. A total of 10 species detected near or within the project corridor are considered "Species in Greatest Need of Conservation" (SGNC) by the Illinois Department of Natural Resources' Wildlife Action Plan (IDNR). Of these, the Willow Flycatcher, is also listed on the Partners in Flight (PIF) Watch List (Rich et al. 2004) and the Chimney Swift is listed as Near Threatened on the IUCN Redlist (Leary et al. 2008) (Tables 2 & 3). All SGNCs were documented within the addendum C corridor except the Least Bittern, Sandhill Cranes, Bobolink, and Marsh Wrens. These species were detected at Thunderbird Lake along the western bank at the census points or, in the case of the Sandhill Cranes, were seen foraging and flying throughout the open water of the Lake itself beyond the fixed 300-ft distance of the point counts (Fig. 2).

Table 2. A list of species detected at or near the proposed project corridor at the western bank of Thunderbird Lake and along the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq 1340C) including their habitat associations (G=grassland, W=wetland, F=forest, S=shrubland, R=rural, U=urban, O=open); migratory status [Neo=Neotropical (National Migratory Bird Center, Washington, D.C.), NM=North American, and R=resident (Birds of North America, Cornell, Ithaca, N.Y.)]; and designations as Species in Greatest need of Conservation by IDNR, PIF Watch List, and IUCN Redlist status.

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Canada Goose	*Branta canadensis*	W	Neo				Least Concern
Wood Duck	*Aix sponsa*	W, F	Neo				Least Concern
Mallard	*Anas platyrhynchos*	W	Neo				Least Concern
Least Bittern	*Ixobrychus exilis*	W	Neo	Threatened	Yes		Least Concern
Great Blue Heron	*Ardea herodias*	W	Neo				Least Concern
Green Heron	*Butorides virescens*	W	Neo				Least Concern
Turkey Vulture	*Cathartes aura*	F, R, O	Neo				Least Concern
Virginia Rail	*Rallus limicola*	W	Neo				Least Concern

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Sora	*Porzana carolina*	W	Neo				Least Concern
Sandhill Crane	*Grus canadensis*	W	Neo		Yes		Least Concern
Killdeer	Charadrius vociferus	W	Neo				Least Concern
Mourning Dove	*Zenaida macroura*	F, U, R, O	Neo				Least Concern
Yellow-billed Cuckoo	*Coccyzus americanus*	F, S	Neo		Yes		Least Concern
Chimney Swift	*Chaetura pelagica*	F, O	Neo		Yes		Near Threatened
Red-bellied Woodpecker	*Melanerpes carolinus*	F	R				Least Concern
Downy Woodpecker	*Picoides pubescens*	F	R				Least Concern
Hairy Woodpecker	*Picoides villosus*	F	R				Least Concern
Northern Flicker	*Colaptes auratus*	F, O	Neo		Yes		Least Concern
Eastern Wood-Pewee	*Contopus virens*	F	Neo				Least Concern

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Willow Flycatcher	*Empidonax traillii*	S	Neo		Yes	Yes	Least Concern
Eastern Phoebe	*Sayornis phoebe*	F, S, R	Neo				Least Concern
Great Crested Flycatcher	*Myiarchus crinitus*	W, F, U, R	Neo				Least Concern
Eastern Kingbird	*Tyrannus tyrannus*	G, S, R, O	Neo				Least Concern
Warbling Vireo	*Vireo gilvus*	W, F, R	Neo				Least Concern
Red-eyed Vireo	*Vireo olivaceus*	F	Neo				Least Concern
Blue Jay	*Cyanocitta cristata*	F, R, U, O	R				Least Concern
American Crow	*Corvus brachyrhynchos*	All	NM				Least Concern
Horned Lark	*Eremophila alpestris*	G, R, O	NM				Least Concern
Purple Martin	*Progne subis*	R, O	Neo				Least Concern
Tree Swallow	*Tachycineta bicolor*	W, G, O	Neo				Least Concern
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	O	Neo				Least Concern

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Bank Swallow	*Riparia riparia*	W, O	Neo				Least Concern
Barn Swallow	*Hirundo rustica*	R, O	Neo				Least Concern
Black-capped Chickadee	*Poecile atricapillus*	F	R				Least Concern
White-breasted Nuthatch	*Sitta carolinensis*	F	R				Least Concern
House Wren	*Troglodytes aedon*	F, S, R, U	Neo				Least Concern
Marsh Wren	*Cistothorus palustris*	W	Neo		Yes		Least Concern
Blue-gray Gnatcatcher	*Polioptila caerulea*	F	Neo				Least Concern
American Robin	*Turdus migratorius*	F, S, R, U, O	Neo				Least Concern
Gray Catbird	*Dumetella carolinensis*	F, S, R, U	Neo				Least Concern
European Starling	*Sturnus vulgaris*	R, U, O	R/Introduced				Least Concern
Cedar Waxwing	*Bombycilla cedrorum*	F, G, S, R, U	Neo				Least Concern
Common Yellowthroat	*Geothlypis trichas*	F, S, R	Neo				Least Concern

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Yellow Warbler	*Setophaga petechia*	S, F, R	Neo				Least Concern
Chipping Sparrow	*Spizella passerina*	F, S, R, U	Neo				Least Concern
Field Sparrow	*Spizella pusilla*	G	Neo		Yes		Least Concern
Savannah Sparrow	*Passerculus sandwichensis*	G	Neo		Yes		Least Concern
Song Sparrow	*Melospiza melodia*	G, S, R, U	Neo				Least Concern
Swamp Sparrow	*Melospiza georgiana*	W	Neo				Least Concern
Northern Cardinal	*Cardinalis cardinalis*	F, S, R, U	R				Least Concern
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	F, S, R, U, W	Neo				Least Concern
Indigo Bunting	*Passerina cyanea*	F, S, R	Neo				Least Concern
Bobolink	*Dolichonyx oryzivorus*	G	Neo		Yes		Least Concern
Red-winged Blackbird	*Agelaius phoeniceus*	W, S, R	Neo				Least Concern

Table 2

Common Name	Scientific Name	Habitat	Migratory Status	Illinois Threatened / Endangered	Illinois Species in Greatest need of Conservation	Partners in Flight Watch List	IUCN REDLIST Status
Common Grackle	*Quiscalus quiscula*	All	R/NM				Least Concern
Brown-headed Cowbird	*Molothrus ater*	All	Neo				Least Concern
Baltimore Oriole	*Icterus galbula*	S, F	Neo				Least Concern
House Finch	*Carpodacus mexicanus*	R, U	R/NM				Least Concern
American Goldfinch	*Spinus tristis*	G, S, R, O	Neo				Least Concern
House Sparrow	*Passer domesticus*	R, U, O	R/Introduced				Least Concern

Table 3. A list of species detected during point counts, walking routes and driving transects at or near the proposed project corridor at the western bank of Thunderbird Lake and along the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq 1340C) on June 9 (A) and July 9 (B), 2014. (PB) designates species responding to playback only.

Table 3

		Transects			Census Points			
		Walking Transect		Driving Transect	#1		#2	
Common Name	**Scientific Name**	A	B	A	A	B	A	B
Canada Goose	*Branta canadensis*	X						
Wood Duck	*Aix sponsa*	X	X				3	1
Mallard	*Anas platyrhynchos*	X	X				1	3
Least Bittern	*Ixobrychus exilis*						1	
Great Blue Heron	*Ardea herodias*	X	X				1	1
Green Heron	*Butorides virescens*	X						
Turkey Vulture	*Cathartes aura*			X				
Virginia Rail	*Rallus limicola*						1	
Sora	*Porzana carolina*							1(PB)
Sandhill Crane	*Grus canadensis*	X	X				2	2
Killdeer	Charadrius vociferus	X	X		1			1
Mourning Dove	*Zenaida macroura*	X						
Yellow-billed Cuckoo	*Coccyzus americanus*	X					1	
Chimney Swift	*Chaetura pelagica*	X	X		5	1	3	3
Red-bellied Woodpecker	*Melanerpes carolinus*	X			1			
Downy Woodpecker	*Picoides pubescens*		X			2		1
Hairy Woodpecker	*Picoides villosus*		X					
Northern Flicker	*Colaptes auratus*	X	X					
Eastern Wood-Pewee	*Contopus virens*	X						
Willow Flycatcher	*Empidonax traillii*	X			4		1	1
Eastern Phoebe	*Sayornis phoebe*	X						

Table 3

		Transects			Census Points			
		Walking Transect		Driving Transect	#1		#2	
Common Name	**Scientific Name**	A	B	A	A	B	A	B
Great Crested Flycatcher	*Myiarchus crinitus*	X						
Eastern Kingbird	*Tyrannus tyrannus*	X						
Warbling Vireo	*Vireo gilvus*	X			1	1	1	1
Red-eyed Vireo	*Vireo olivaceus*	X	X	X				
Blue Jay	*Cyanocitta cristata*	X	X					
American Crow	*Corvus brachyrhynchos*		X					
Horned Lark	*Eremophila alpestris*							1
Purple Martin	*Progne subis*							1
Tree Swallow	*Tachycineta bicolor*	X					5	1
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	X				1	9
Bank Swallow	*Riparia riparia*	X	X		2		4	8
Barn Swallow	*Hirundo rustica*	X	X	X	3		5	6
Black-capped Chickadee	*Poecile atricapillus*		X		1	1		
White-breasted Nuthatch	*Sitta carolinensis*					1		
House Wren	*Troglodytes aedon*	X	X		1	1		
Marsh Wren	*Cistothorus palustris*	X	X		1		8	3
Blue-gray Gnatcatcher	*Polioptila caerulea*	X	X			2		
American Robin	*Turdus migratorius*	X	X	X	2	5	1	1
Gray Catbird	*Dumetella carolinensis*	X	X		1	2		
European Starling	*Sturnus vulgaris*	X	X	X	1			4
Cedar Waxwing	*Bombycilla cedrorum*	X	X	X	4		4	7
Common Yellowthroat	*Geothlypis trichas*	X	X	X	2	4		3

Table 3

		Transects			Census Points			
		Walking Transect		Driving Transect	#1		#2	
Common Name	**Scientific Name**	A	B	A	A	B	A	B
Yellow Warbler	*Setophaga petechia*	X	X		2	1	1	1
Chipping Sparrow	*Spizella passerina*		X					
Field Sparrow	*Spizella pusilla*	X	X					
Savannah Sparrow	*Passerculus sandwichensis*			X				
Song Sparrow	*Melospiza melodia*	X	X	X	1	2	1	2
Swamp Sparrow	*Melospiza georgiana*		X		1	5		2
Northern Cardinal	*Cardinalis cardinalis*	X	X	X	2	1		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	X	X		2	2		1
Indigo Bunting	*Passerina cyanea*	X	X	X		1		
Bobolink	*Dolichonyx oryzivorus*							1
Red-winged Blackbird	*Agelaius phoeniceus*	X	X	X	26	21	5	10
Common Grackle	*Quiscalus quiscula*	X	X			4	2	2
Brown-headed Cowbird	*Molothrus ater*	X		X		2	2	
Baltimore Oriole	*Icterus galbula*	X					1	
House Finch	*Carpodacus mexicanus*		X	X				
American Goldfinch	*Spinus tristis*	X	X		5	2		1
House Sparrow	*Passer domesticus*	X	X	X				

Discussion

A total of 60 species, including Least Bittern (State Threatened), were detected at or near the proposed project corridor. The Least Bittern was found along the western bank of Thunderbird Lake and was outside, but adjacent to the designated study area limit (Fig. 2). Of the 60 species, 10 are considered SGNC. The Willow Flycatcher is also on the PIF Watch List and the Chimney Swift is recognized as Near Threatened by the IUCN Redlist. Six of the 10 SGNC, were detected within the actual survey limits with the Least Bittern, Sandhill Cranes, Bobolink, and Marsh Wrens being detected in marsh/wetland habitat adjacent to the project corridor in habitats associated with Thunderbird Lake.

All of the SGNC were present during the breeding season and were likely on territories associated with habitat along the addendum C project area. The Least Bittern and Marsh Wrens were breeding within the marsh at Thunderbird Lake and would not be venturing to habitat outside of the marsh itself within the actual proposed corridor. There were also at least two pairs of Sandhill Cranes present during both censuses and were likely nesting within the INAI area. These birds could be moving within the corridor for foraging as Sandhill Cranes are somewhat tolerant of urban areas and will forage in small wetlands and grasslands in addition to the larger wetlands needed for breeding (Tacha et al. 1992).

Willow Flycatcher, a SGNC and listed on the Partners in Flight Watchlist, was detected along the project corridor. They depend on wet shrublands and are rapidly declining throughout the United States. Their decline is largely attributed to Brown-headed Cowbird parasitism and habitat alteration (Sedgwick 2000). Similarly, several other SGNC detected within the Addendum C project corridor including Field and Savannah sparrows, Northern Flicker, and Chimney Swifts have all been declining in the United States most likely because of habitat alteration and destruction.

Although only one Threatened species, Least Bittern, was found at the Thunderbird Lake area, there is certainly sufficient suitable habitat for a variety of wetland/marsh/hemi-marsh-dependent species including Common Gallinule, Yellow-headed Blackbirds, Black Rails, Soras, Virginia Rails and American Bitterns, many of which are State Threatened or Endangered. Indeed, historical records indicate that many of these species have been present at the site in the recent past, but were not detected by our surveys. It is possible that some of these species were present, but went undetected. Wetland species are particularly secretive and often difficult to detect. Our playbacks are typically good tools for drawing these species out and they will often respond to playback, but are not fail-proof. Alternatively, these species could have been absent in 2014, but have used the site in the past. Because of recent extreme weather events including drought and floods in the past several years, they could have moved from the site and have yet to return. Although not directly in the project corridor, Thunderbird Lake has a lot of potential to be recolonized by many of these Threatened or Endangered wetland/marsh species provided that additional disturbance to the site, in terms of road construction and/or increased traffic noise, does not diminish the attractiveness of this site to breeding birds and discourage them from resettling in the area (Findlay & Bourdages 2000; Hirvonen 2001).

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Appendix A. Geographic Coordinates and dates detected for all Illinois Threatened and Endangered species recorded near the proposed project corridor at the western bank of Thunderbird Lake and along the Addendum C study area along Highway 31 from Bull Valley Road to IL 176 (IDOT seq 1340C)

T&E species	Date Seen	migratory status	habitat	T&E status	Species in greatest need of conservation (IL Wildlife Action Plan)	PIF Watch List	IUCN Redlist Status	Lat	Long
Least Bittern	6/9/2014	Neotropical Migrant	wetland, marsh	State Threatened	Yes	No	Least Concern	42.274322°	-88.279511°