VOLUME II

IMPACTS OF THE ELGIN, JOLIET, AND EASTERN RAILWAY LINE ON NATURAL AREAS IN THE WESTERN CHICAGO METROPOLITAN AREA

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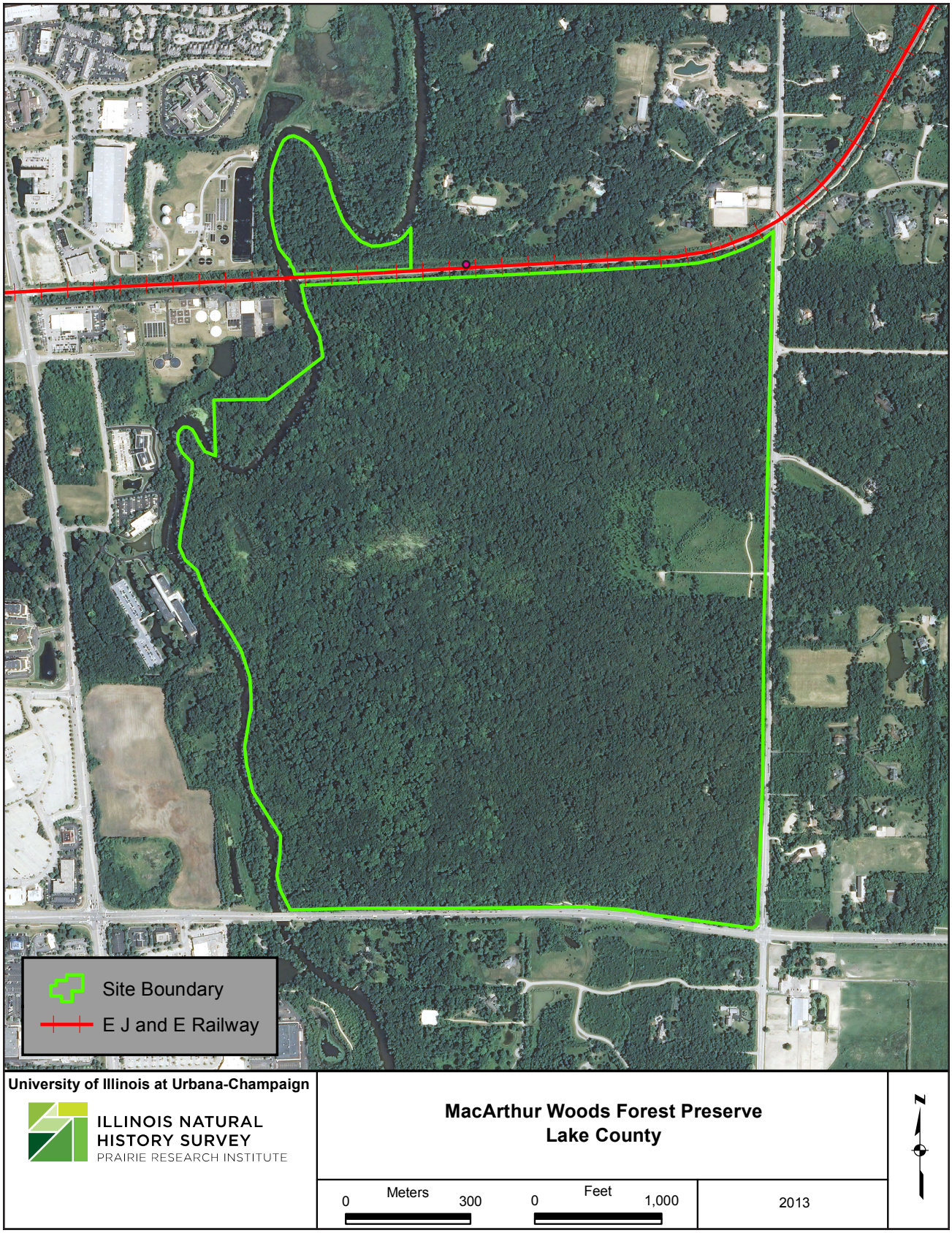
Site	VT	Scientific Name	Common Name	June		July		August		September		Total (T)	T-S
				A (S)	B	A	B	A	B	A	B		
MW		NONE											
CM	M	*Didelphis virginiana*	Virginia opossum								1	**1**	**1**
		Odocoileus virginianus	white-tailed deer	1 (O)								**1**	**0**
	B	*Tachycineta bicolor*	tree swallow				1					**1**	**1**
	R	*Chelydra serpentina*	snapping turtle	1 (L)								**1 (L)**	**1 (L)**
		Chrysemys picta	painted turtle	1 (L)				1 (L)				**2 (L)**	**2 (L)**
SC	M	*Odocoileus virginianus*	white-tailed deer				1		1			**2**	**2**
	B	*Ana platyrhynchos*	mallard duck			1			1			**2**	**2**
	A	*Rana pipiens*	northern leopard frog						1		1	**2**	**2**
PC	M	*N/A*	small canid	1 (O)								**1**	**0**
		Didelphis virginiana	Virginia opossum				1	1				**2**	**2**
		Sylvilagus floridanus	eastern cottontail					1		1	1	**3**	**3**
	B	*Turdus migratorius*	American robin				1					**1**	**1**
	A	*Rana pipiens*	northern leopard frog								1	**1**	**1**
	R	*Thamnophis sirtalis*	common garter snake								1	**1**	**1**
PW	M	*Mustela frenata*	long-tailed weasel				1					**1**	**1**
		Sylvilagus floridanus	eastern cottontail								1	**1**	**1**
	B	*Quiscalus quiscula*	common grackle			1						**1**	**1**
	A	*Rana catesbeiana*	bullfrog								1	**1**	**1**
		Rana pipiens	northern leopard frog				2	2		1	3	**8**	**8**
	R	*Chrysemys picta*	painted turtle				1 (L)					**1 (L)**	**1 (L)**
FL	M	*Didelphis virginiana*	Virginia opossum								1	**1**	**1**
	B	*Zenaida macroura*	mourning dove				1					**1**	**1**
	A	*Rana clamitans*	green frog					1				**1**	**1**
		Rana pipiens	northern leopard frog						1			**1**	**1**
LR	M	*Didelphis virginiana*	Virginia opossum	2 (O)		1		1				**4**	**2**
		Marmota monax	woodchuck	1 (O)								**1**	**0**
		Procyon lotor	raccoon			1						**1**	**1**
		Sciurus niger	eastern fox squirrel								1	**1**	**1**
	B	*Melospiza melodia*	song sparrow	1								**1**	**1**
		Quiscalus quiscula	common grackle	1								**1**	**1**
	R	*Apalone spinifera*	spiny softshell turtle				1	1 (L)		1		**3 (1L)**	**3 (1L)**
		Chrysemys picta	painted turtle	1 (L)	1 (L)							**2 (L)**	**2 (L)**
		Chelydra serpentina	snapping turtle			1						**1**	**1**
LP	M	*Peromyscus maniculatus*	white-footed mouse						1			**1**	**1**
	B	*Porzana carolina*	sora							1		**1**	**1**
	A	*Rana pipiens*	northern leopard frog								1	**1**	**1**
	R	*Chelydra serpentina*	snapping turtle						1 (L)			**1 (L)**	**1 (L)**

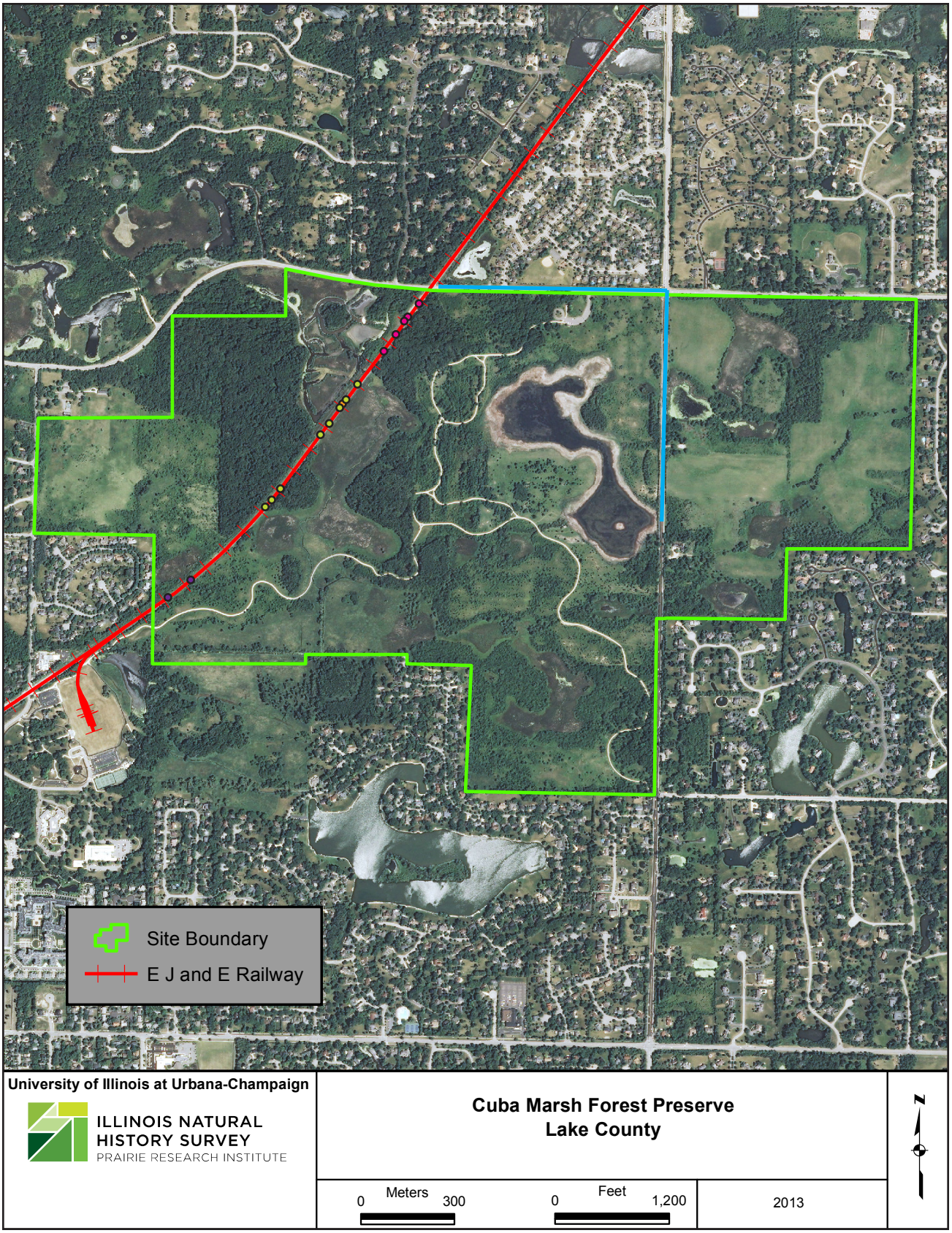
APPENDIX 3.1 (b) Records of vertebrate animals found on EJ&E tracks at eight study sites during bi-weekly surveys (A and B) in 2010. Data are arranged by site and vertebrate type (VT). "L" indicates live animals (i.e., not actual mortalities) and "O" indicates old remains. "Total" = sum of all surveys; "T-S" = total minus records recorded as old at first survey; MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie. M = mammal, B = bird, A = amphibian, and R = reptile.

Site	VT	Scientific Name	Common Name	May		June		July		August		September		Total (T)	T-S	MM
				A (S)	B	A	B	A	B	A	B	A	B			
MW	R	*Chelydra serpentina*	snapping turtle										1 (L)	**1 (L)**	**1 (L)**	
CM	A	*Bufo americanus*	American toad						1					**1**	**1**	
		Rana pipiens	northern leopard frog			2			2		1		3	**11**	**11**	
	R	*Chrysemys picta*	painted turtle											**0**	**0**	**1 (L)**
		Storeria occipitomaculata	redbelly snake										1 (L)	**1 (L)**	**1 (L)**	
SC	B	*Ana platyrhynchos*	mallard duck			1								**1**	**1**	
	A	*Rana pipiens*	northern leopard frog					2					1	**3**	**3**	
	R	*Chelydra serpentina*	snapping turtle											**0**	**0**	**1 (L)**
		Terrapene carolina	eastern box turtle										1 (L)	**1 (L)**	**1 (L)**	
		Thamnophis sirtalis	common garter snake											**0**	**0**	**1 (L)**
PC	A	*Bufo americanus*	American toad					2	4 (2L)			2	4 (3L)	**12 (5L)**	**12**	
		Rana pipiens	northern leopard frog										1	**1**	**1**	
	R	*Chelydra serpentina*	snapping turtle				1 (L)							**1 (L)**	**1 (L)**	
		Thamnophis sirtalis	common garter snake									1		**1**	**1**	
PW	M	*Didelphis virginiana*	Virginia opossum	1 (O)										**1**	**0**	
		Procyon lotor	raccoon											**0**	**0**	**1**
	B	*Columba livia*	rock dove											**0**	**0**	**1**
	A	*Rana pipiens*	northern leopard frog				3	1					6	**6**	**6**	
	R	*Chelydra serpentina*	snapping turtle											**0**	**0**	**1 (L)**
		Chrysemys picta	painted turtle										1 (L)	**1 (L)**	**1 (L)**	
FL	M	*Didelphis virginiana*	Virginia opossum								1	1		**2**	**2**	
		Sylvilagus floridanus	eastern cottontail	1										**1**	**1**	
	A	*Rana pipiens*	northern leopard frog										3	**3**	**3**	
LR	M	*Didelphis virginiana*	Virginia opossum	3 (O)	1	1						2	1	**8**	**5**	
		Marmota monax	woodchuck	1 (O)										**1**	**0**	
		Mephitis mephitis	striped skunk	1 (O)										**1**	**0**	
		Odocoileus virginianus	white-tailed deer	3 (O)										**3**	**0**	
		Ondatra zibethicus	muskrat						1					**1**	**1**	
		Sylvilagus floridanus	eastern cottontail		1									**1**	**1**	
	B	*Branta canadensis*	Canada goose		1									**1**	**1**	
		Phalacrocorax auritus	Double-crested cormorant				1							**1**	**1**	
	A	*Rana pipiens*	northern leopard frog			2								**2**	**2**	
	R	*Chrysemys picta*	painted turtle						1 (L)					**1 (L)**	**1 (L)**	
		Elaphe obsoleta obsoleta	black rat snake								1 (L)			**1 (L)**	**1 (L)**	
		Graptemys geographica	common map turtle						1 (L)					**1 (L)**	**1 (L)**	
		Trachemys scripta	slider											**0**	**0**	**1 (L)**
LP	M	*Didelphis virginiana*	Virginia opossum		2									**2**	**2**	
		Ondatra zibethicus	muskrat					1						**1**	**1**	
	B	*Porzana carolina*	sora									1		**1**	**1**	
	A	*Rana pipiens*	northern leopard frog				1		1				2	**4**	**4**	
	R	*Chrysemys picta*	painted turtle										1 (L)	**1 (L)**	**1 (L)**	
		Storeria dekayi	brown snake				1							**1**	**1**	
		Thamnophis sirtalis	common garter snake										1	**1**	**1**	

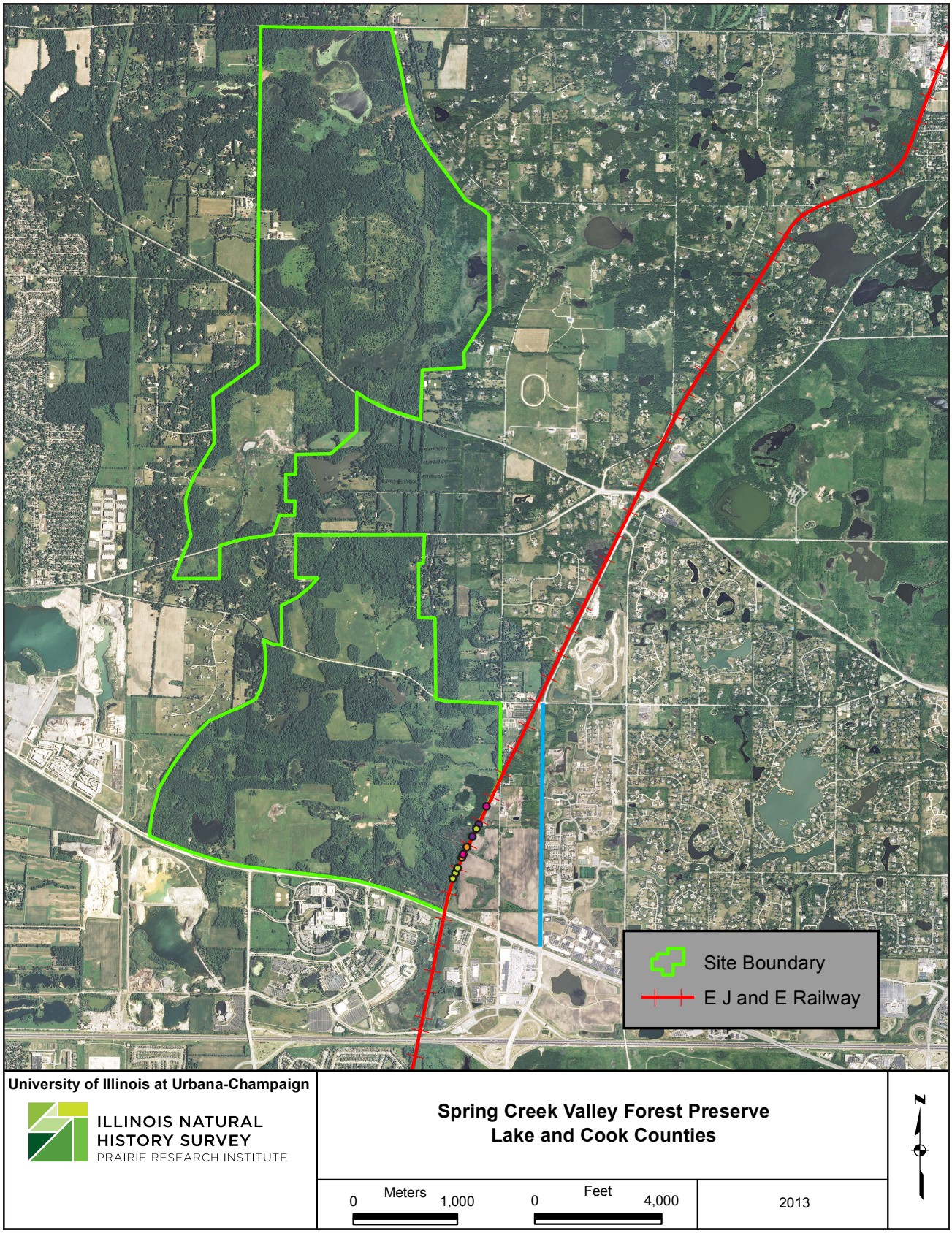
APPENDIX 3.2 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. ● = reptile.



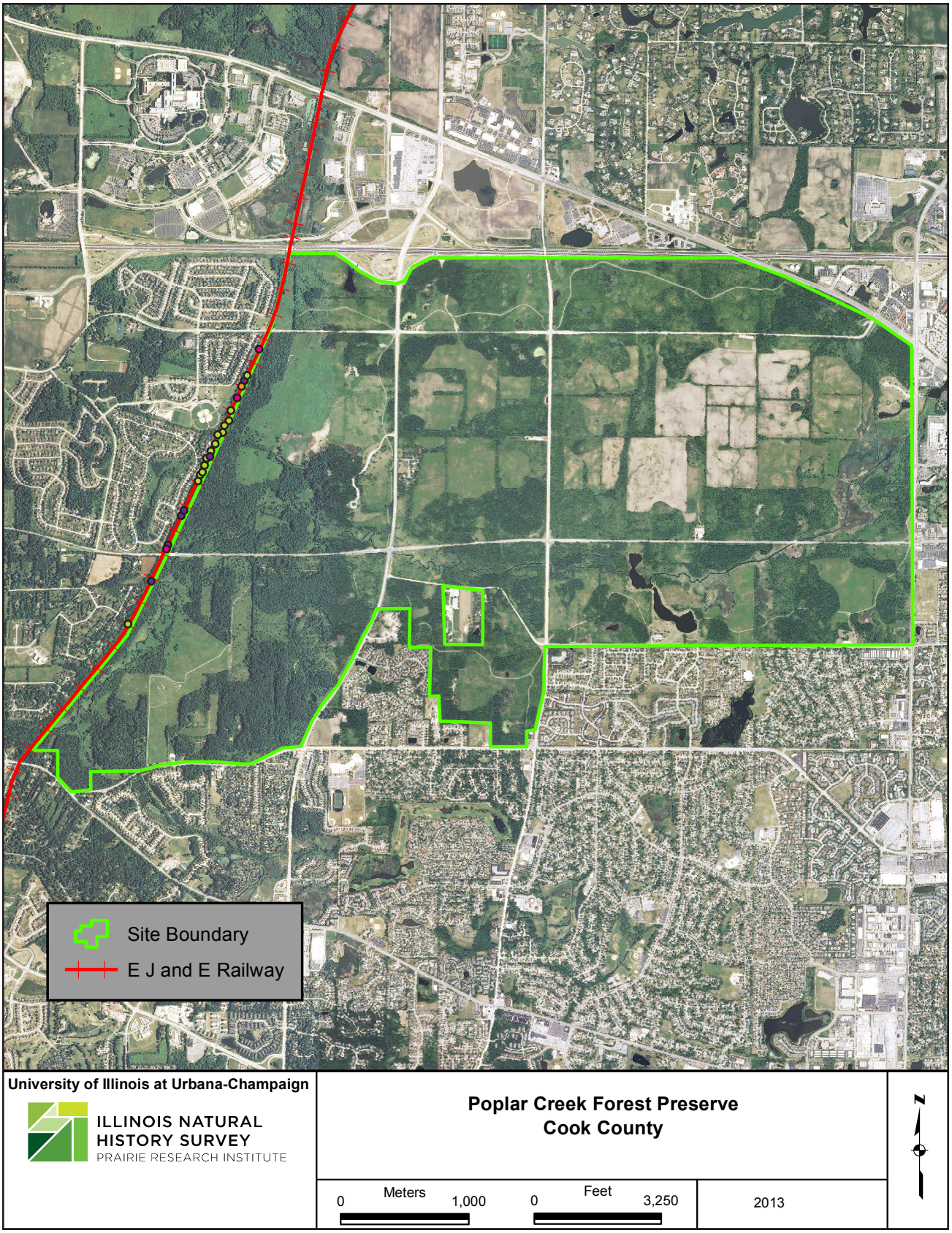
APPENDIX 3.2 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. Length of road surveyed for roadkill is indicated in blue. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



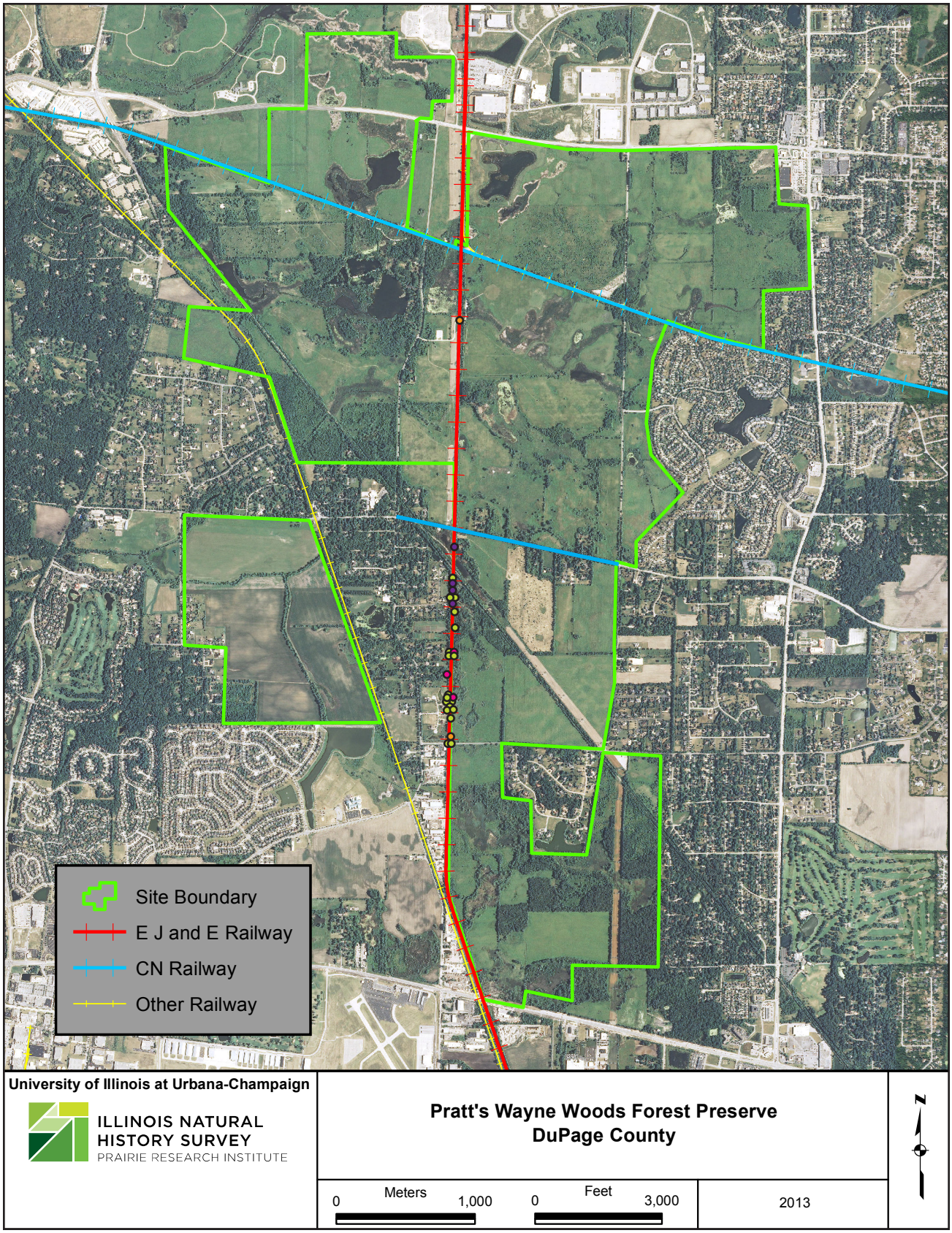
APPENDIX 3.2 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. Length of road surveyed for roadkill is indicated in blue. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



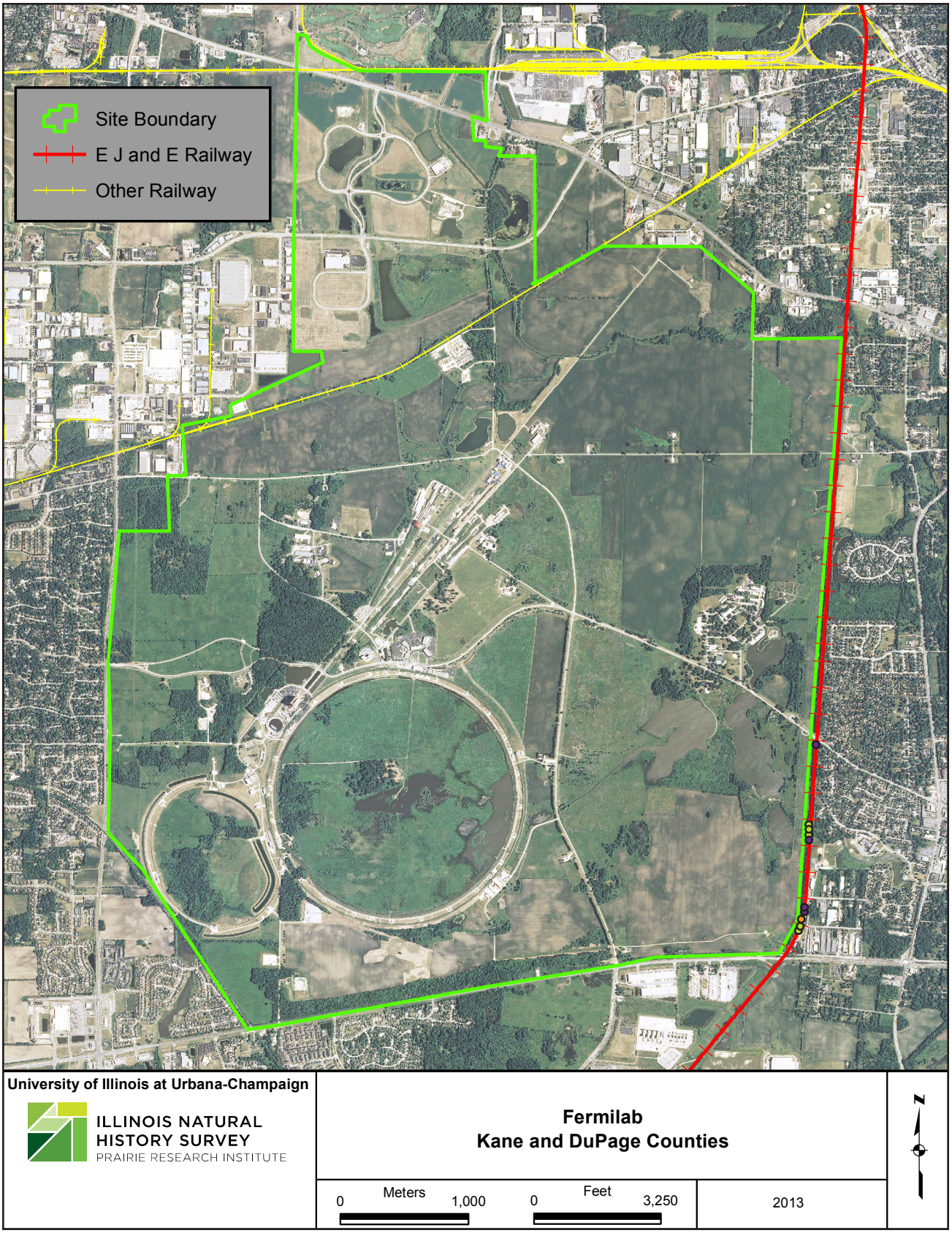
APPENDIX 3.2 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



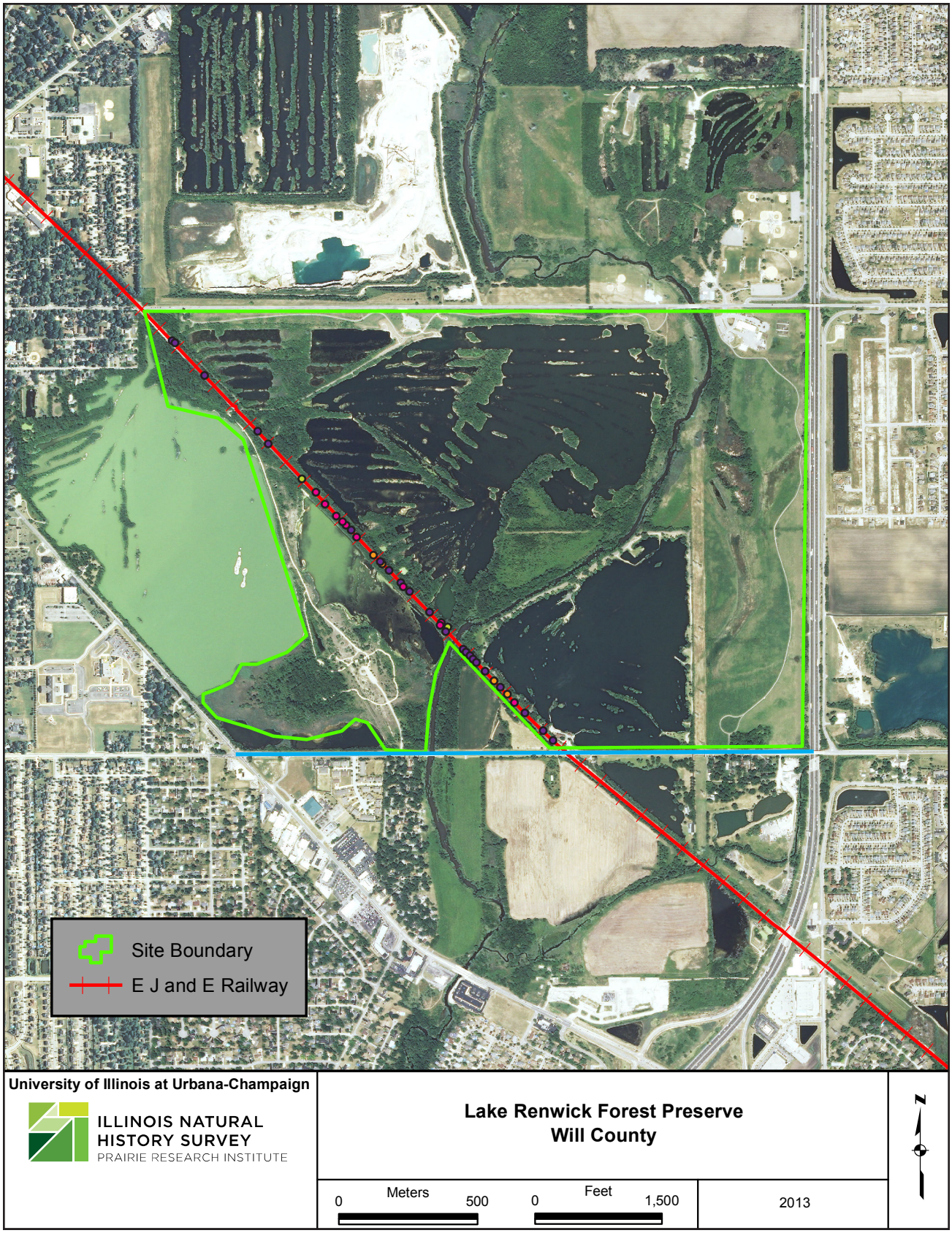
APPENDIX 3.2 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. Length of road surveyed for roadkill is indicated in blue. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



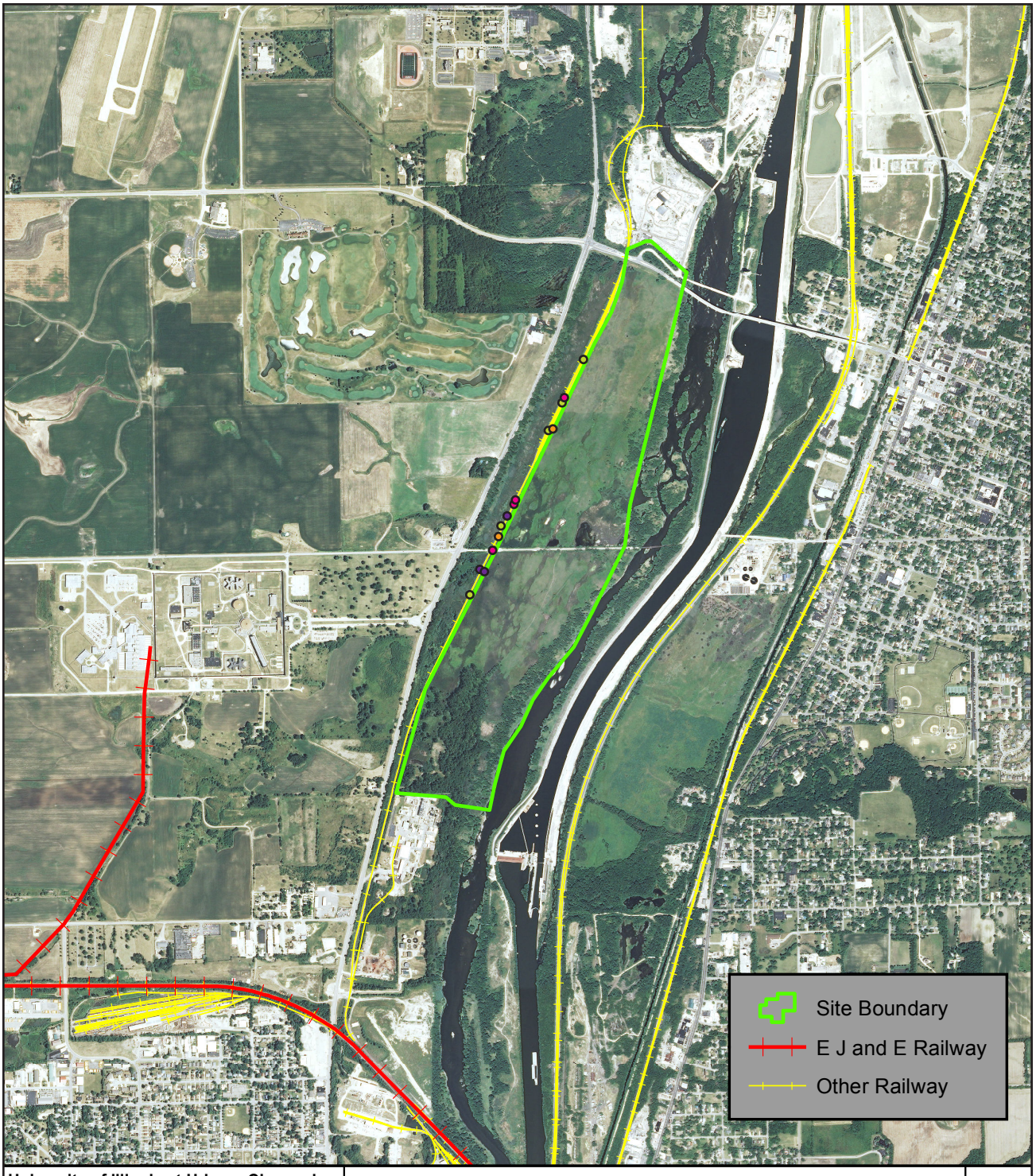
APPENDIX 3.2 (f) Map of the Fermilab (FL) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. ● = mammal, ● = bird, and ● = amphibian.



APPENDIX 3.2 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. Length of road surveyed for roadkill is indicated in blue. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



APPENDIX 3.2 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing the location of vertebrate animals recorded in 2009 and 2010 (reported in Appendices 3.1–2). EJ&E tracks indicated in red. ● = mammal, ● = bird, ● = amphibian, and ● = reptile.



APPENDIX 3.3 Species of bird and mammal carcasses set out on EJ&E tracks to estimate scavenging rates. All carcasses were picked up as freshly road-killed on the day set out while travelling between sites for daily surveys in May 2010. Days detectable is the number of days a carcass was still observed during the daily track surveys. CM = Cuba Marsh, SC = Spring Creek, PW = Pratt's Wayne Woods, LR = Lake Renwick, and LP = Lockport Prairie. Daily surveys were ended at Lockport Prairie on May 28 because of on-site construction (rail replacement). Daily surveys ended on June 2nd at other sites.

	Scientific Name	Common Name	Day set out	Day carcass gone	Days detectable
CM	*Turdus migratorius*	American robin	20 May	24 May	<4 days
	Ana platyrhynchos	mallard duck	20 May	past 2 June	>13 days
	Turdus migratorius	American robin	24 May	past 2 June	>9 days
SC	*Ana platyrhynchos*	mallard duck	18 May	past 2 June	>15 days
	Turdus migratorius	American robin	21 May	23 May	<2 days
	Turdus migratorius	American robin	25 May	27 May	<2 days
	Sylvilagus floridanus	eastern cottontail	27 May	28 May	<1 day
PW	*Columba livia*	rock dove*	11 May	14 May	<4 days
	Sylvilagus floridanus	eastern cottontail	18 May	20 May	<2 days
	Turdus migratorius	American robin	20 May	25 May	<5 days
	Tamias striatus	eastern chipmunk	20 May	21 May	<1 day
	Turdus migratorius	American robin	25 May	26 May	<1 day
	Turdus migratorius	American robin	26 May	28 May	<2 days
	Sciurus niger	eastern fox squirrel	26 May	28 May	<2 days
LR	*Sylvilagus floridanus*	eastern cottontail*	17 May	past 2 June	>16 days
	Procyon lotor	raccoon	18 May	past 2 June	>15 days
	Sciurus niger	eastern fox squirrel	19 May	20 May	<1 day
	Turdus migratorius	American robin	24 May	26 May	<2 days
	Turdus migratorius	American robin	25 May	28 May	<3 days
LP	*Quiscalus quiscula*	common grackle	19 May	past 28 May	>9 days
	Agelaius phoeniceus	red-winged blackbird	24 May	past 28 May	>4 days
	Turdus migratorius	American robin	25 May	past 28 May	>3 days

* found dead on tracks and left in place; only some fur and a few bones of cottontail

APPENDIX 3.4 Comparison of track mortality and road-killed vertebrates at four study sites in 2010. A length of two-lane paved road equal to the length of the EJ&E tracks was surveyed at each site during daily surveys in May and bi-weekly surveys through September. CM = Cuba Marsh, SC = Spring Creek, PW = Pratt's Wayne Woods, and LR = Lake Renwick.

	VT	Scientific Name	Common Name	May RR track	May roadkill	Bi-weekly RR	Bi-weekly road	Total RR Mortality	Total Roadkill
CM	M	*Didelphis virginiana*	Virginia opossum				1	**0**	**1**
		Odocoileus virginianus	white-tailed deer				1	**0**	**1**
	B	*Cardinalis cardinalis*	northern cardinal				1	**0**	**1**
		Turdus migratorius	American robin		1			**0**	**1**
		Tyrannus tyrannus	eastern kingbird				1	**0**	**1**
	R	*Chrysemys picta*	painted turtle	1 (L)	2			**1 (L)**	**2**
		Storeria occipitomaculata	redbelly snake			1 (L)		**1 (L)**	**0**
SC	M	*Didelphis virginiana*	Virginia opossum		1		1	**0**	**2**
	B	*Ana platyrhynchos*	mallard duck	1				**1**	**0**
		Passer domesticus	house sparrow				1	**0**	**1**
		Turdus migratorius	American robin		1			**0**	**1**
	R	*Chelydra serpentina*	snapping turtle	1 (L)				**1 (L)**	**0**
		Terrapene carolina	eastern box turtle			1 (L)		**1 (L)**	**0**
		Thamnophis sirtalis	common garter snake	1 (L)				**1 (L)**	**0**
PW	M	*Didelphis virginiana*	Virginia opossum				2	**0**	**2**
		Procyon lotor	raccoon	1			1	**1**	**1**
		Sciurus niger	eastern fox squirrel				1	**0**	**1**
		Tamias striatus	eastern chipmunk		1		2	**0**	**3**
	B	*Columba livia*	rock dove	1				**1**	**0**
		Turdus migratorius	American robin		1			**0**	**1**
	R	*Chelydra serpentina*	snapping turtle	1 (L)	1			**1 (L)**	**1**
		Chrysemys picta	painted turtle			1 (L)		**1 (L)**	**0**
		Thamnophis sirtalis	common garter snake				1	**0**	**1**
LR	M	*Didelphis virginiana*	Virginia opossum	2	2	3	3	**5**	**5**
		Ondatra zibethicus	muskrat			1	1	**1**	**1**
		Procyon lotor	raccoon		2		1	**0**	**3**
		Sylvilagus floridanus	eastern cottontail	1			1	**1**	**1**
	B	*Branta canadensis*	Canada goose	1				**1**	**0**
		Phalacrocorax auritus	Double-crested cormorant			1		**1**	**0**
		Quiscalus quiscula	common grackle		1		1	**0**	**2**
		Turdus migratorius	American robin		1			**0**	**1**
	R	*Chrysemys picta*	painted turtle			1 (L)		**1 (L)**	**0**
		Elaphe obsoleta obsoleta	black rat snake			1 (L)		**1 (L)**	**0**
		Graptemys geographica	common map turtle			1 (L)		**1 (L)**	**0**
		Trachemys scripta	slider	1 (L)				**1 (L)**	**0**

SECTION 4 APPENDICES: AVIAN ECOLOGY

COMPOSITION AND REPRODUCTIVE ECOLOGY OF BREEDING BIRD ASSEMBLAGES AT SELECTED NATURAL AREAS ALONG THE EJ&E RAIL CORRIDOR, 2009–2013

Christopher J. Whelan, Lester A. Leong, Manette E. Sandor, Allison K. Barner, and J. Dylan Maddox

APPENDIX SUMMARY

APPENDIX 4.1 (a)–(i) Maps of the nine study sites examined in this avian ecology study, showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.

APPENDIX 4.2 Bird species detected close to (T) and away from (A) EJ&E tracks at nine study sites from 2009–2012. Bird species recorded as "close to tracks" (T) were estimated to be within 50 m of the tracks, while those recorded as "away from tracks" (A) were beyond 50 m from the tracks. Birds were detected by sight and sound on repeated visits to each site. * indicates migrant.

APPENDIX 4.3 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2010 in descending order, averaged over all nine sites.

APPENDIX 4.4 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2011 in descending order, averaged over all nine sites.

APPENDIX 4.5 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2012 in descending order, averaged over all nine sites.

APPENDIX 4.6 Variation in abundance (mean individuals/0.785 ha) as indexed by 50-m radius, 5-min point counts from 2010–2012.

APPENDIX 4.7 Plots of joint bird abundances (based on 50-m, 5-min point counts) in track and away habitat at study sites in 2010–2012. The 45° line shows expected joint abundances if the species perceives both habitats to be qualitatively and quantitatively equivalent. Points above the line indicate the species perceives the away habitat to be superior, while points below indicate the species perceives tracks habitat to be superior. The number of symbols for any given species may vary among years because not all species were detected in both habitats in each of the three years. Only 19 species were sufficiently abundant to be subject to this modified isodar analysis.

APPENDIX 4.8 Total number of nests found from 2010–2013 at seven study sites (i.e., MacArthur Woods, Cuba Marsh, Spring Creek Valley, Poplar Creek, Pratt's Wayne Woods, Lake Renwick, and Lockport Prairie) for 42 bird species. All nests were active when initially found, and all but nests of one Cooper's hawk, one red-bellied woodpecker, two blue-gray gnatcatchers, one brown thrasher, one European starling, one yellow warbler, 2 red-winged blackbirds and one Baltimore oriole were followed successfully to final completion (fledge or fail).

APPENDIX 4.9 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2010. All nests listed were active at the time of discovery, and all but one Cooper's hawk, one red-bellied woodpecker, two blue-gray gnatcatchers, one European starling, and one yellow warbler, and 2 red-winged blackbirds were followed successfully to ultimate completion (fledge or fail).

APPENDIX 4.10 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2011. All nests listed were active at the time of discovery, and all but one brown thrasher and one Baltimore oriole were followed successfully to ultimate completion (fledge or fail).

APPENDIX 4.11 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2012. All nests listed were active at the time of discovery, and all but one northern flicker were followed successfully to ultimate completion (fledge or fail).

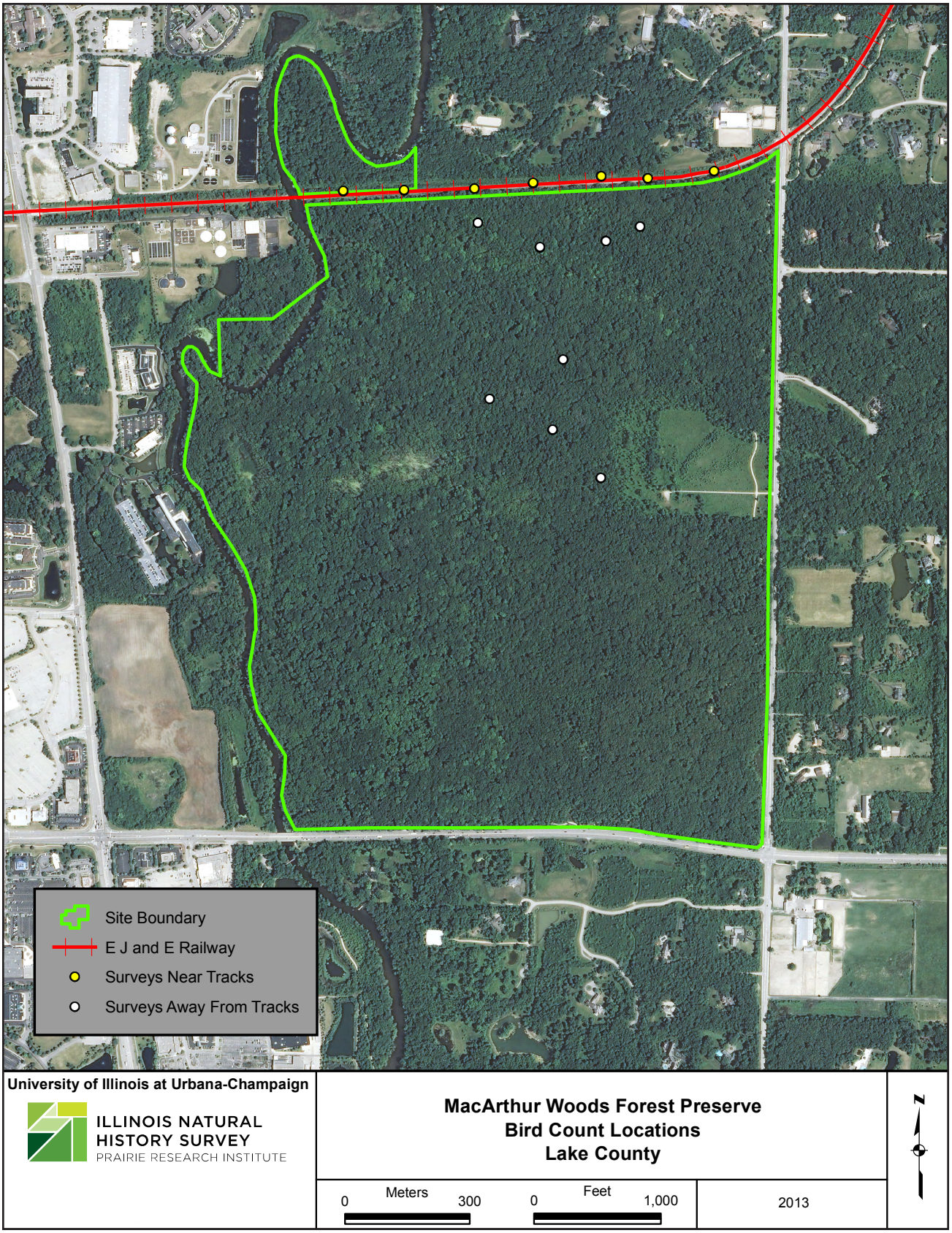
APPENDIX 4.12 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2013. All nests listed were active at the time of discovery, and were followed to active completion.

APPENDIX 4.13 Opportunistic behavioral observations of parents and/or nestlings at focal nests in respnse to train passage events in 2012.

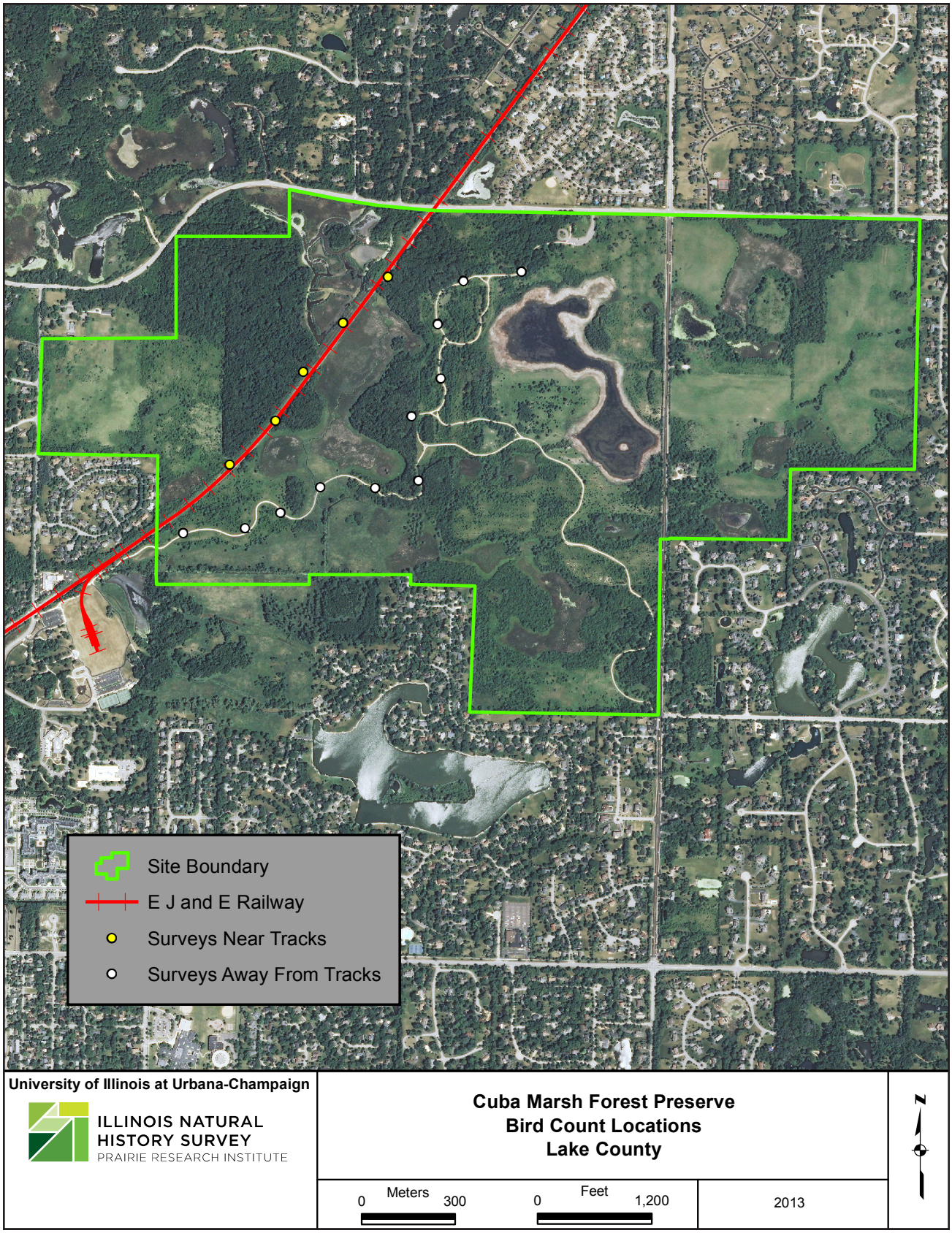
APPENDIX 4.14 Birds and mammals photographed by motion-sensitive camera traps that were deployed within 5–10 m of the ROW of the EJ&E rail corridor (T) or beyond 50 m (A) from the ROW. Camera were deployed at Cuba Marsh, Spring Creek, and Poplar Creek Forest Preserves.

APPENDIX 4.15 Summary of timed behavioral observations of egrets and herons nesting within rookery at Lake Renwick Forest Preserve, Will County.

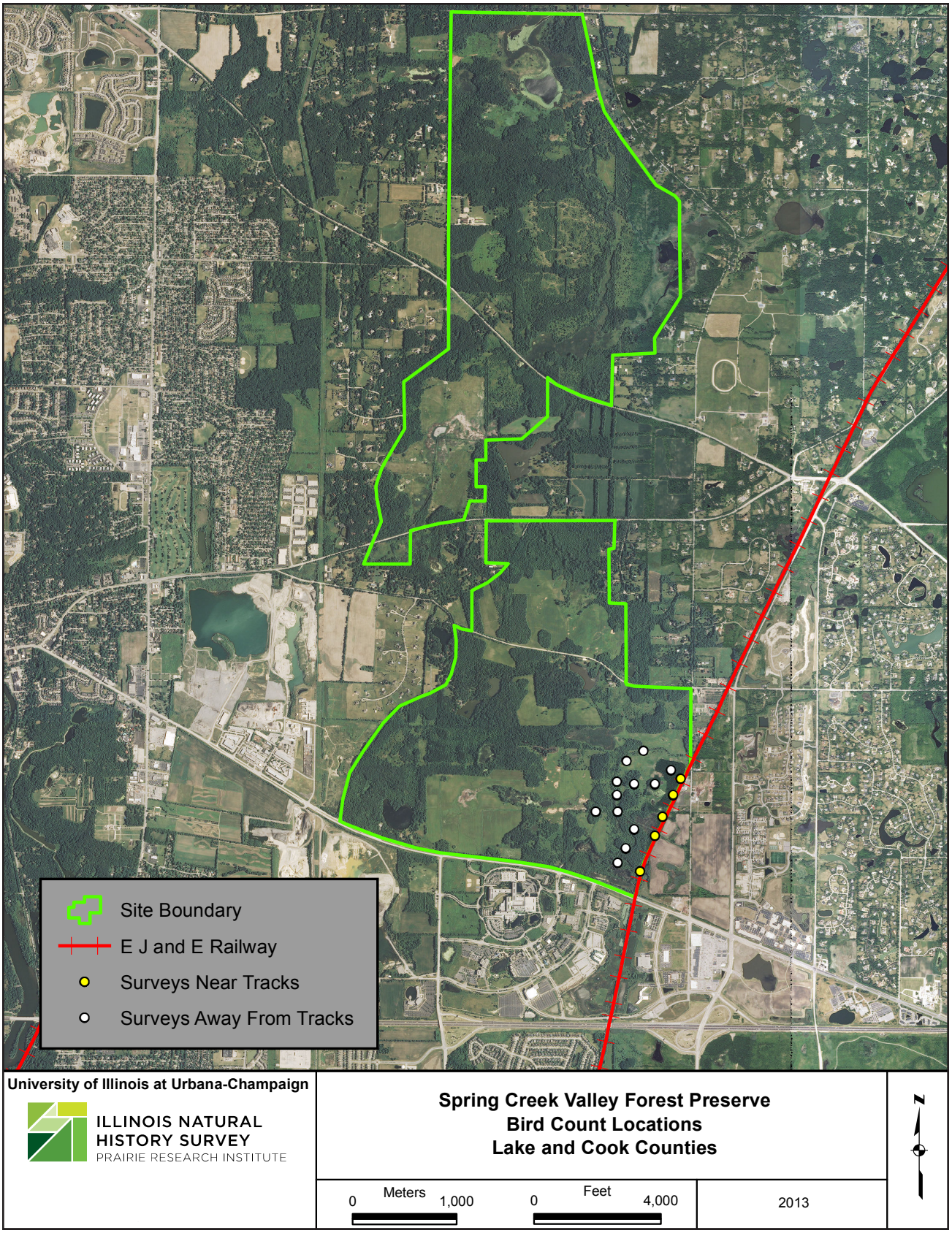
APPENDIX 4.1 (a) Map of MacArthur Woods Forest Preserve (MW), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



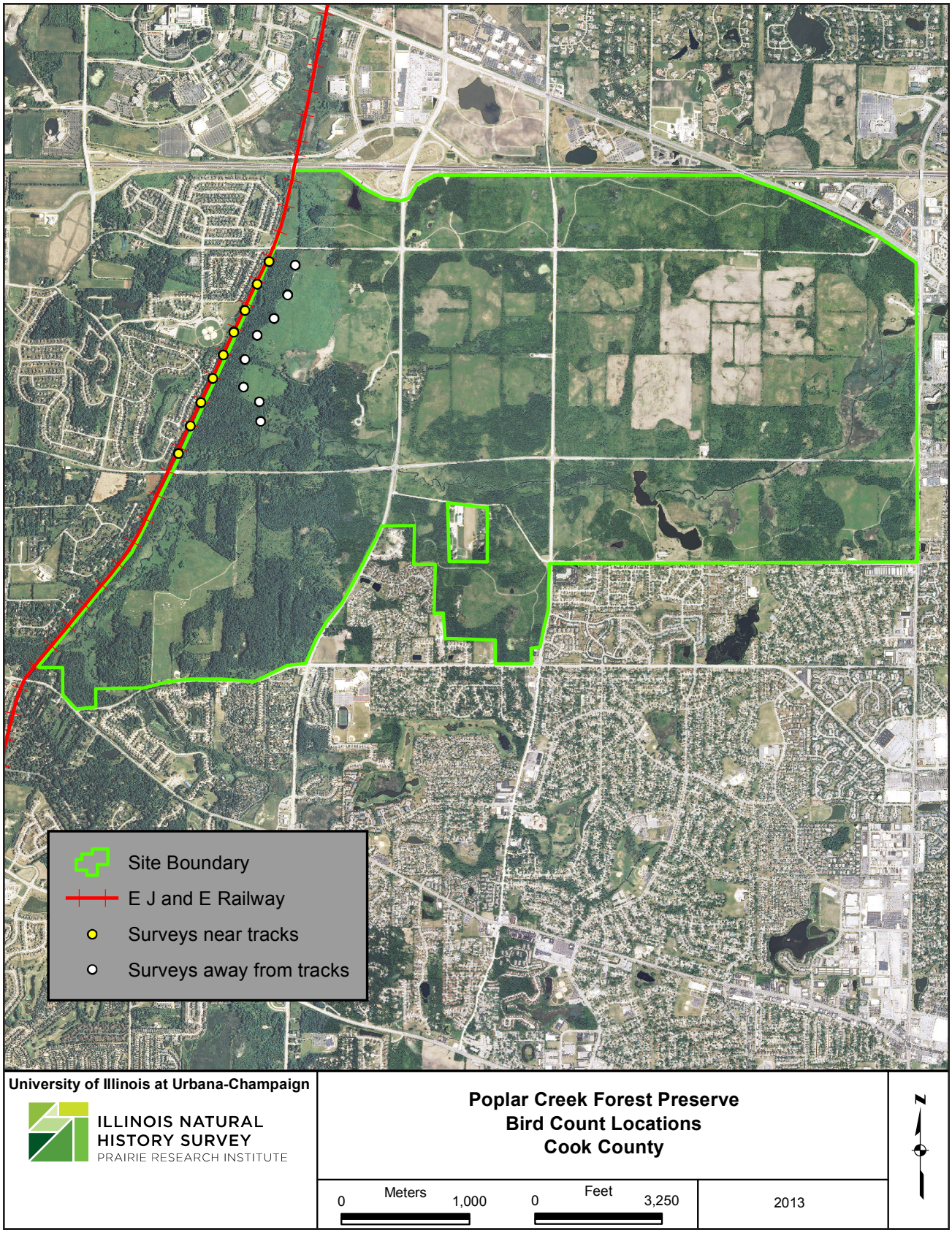
APPENDIX 4.1 (b) Map of Cuba Marsh Forest Preserve (CM), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



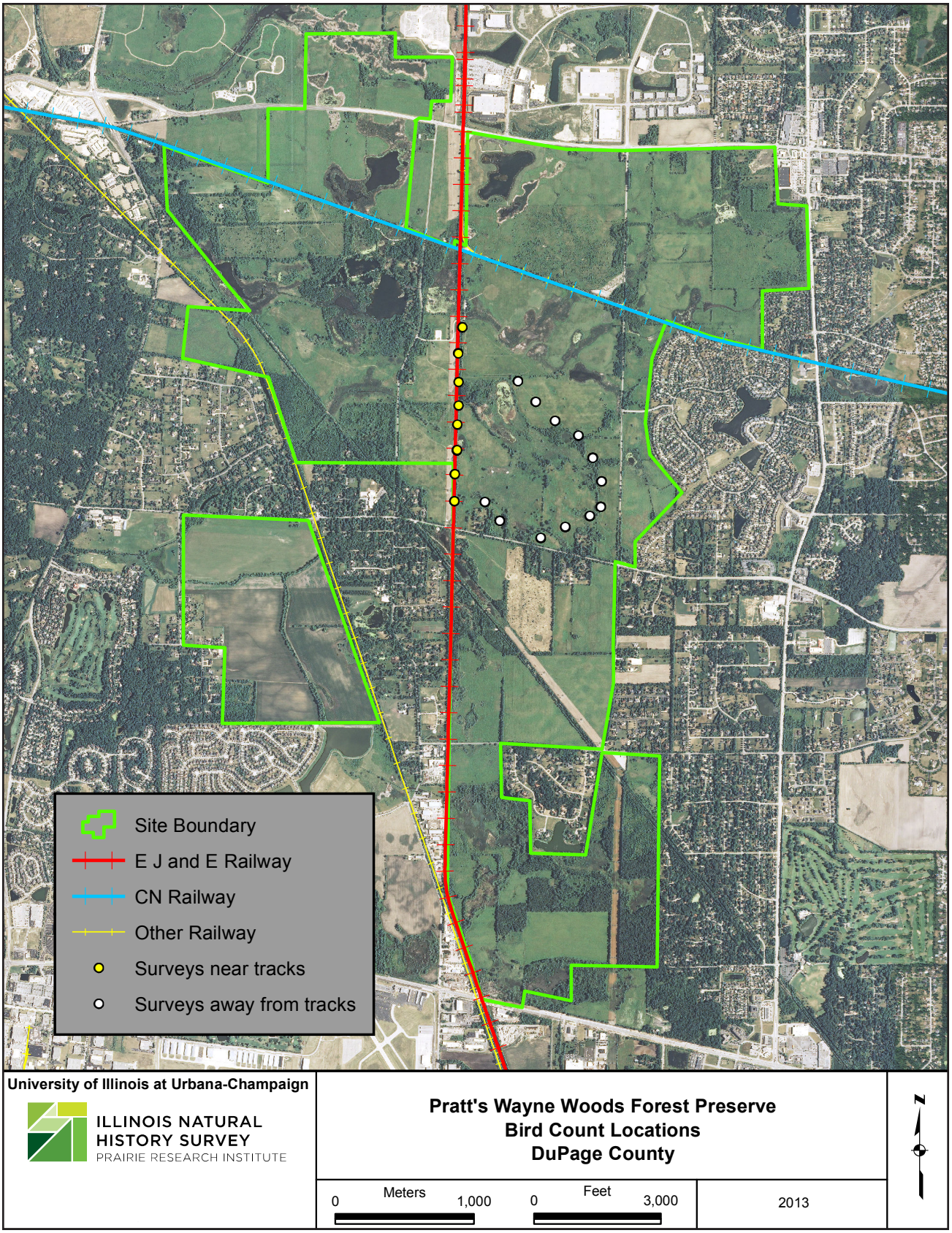
APPENDIX 4.1 (c) Map of Spring Creek Valley Forest Preserve (SC), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



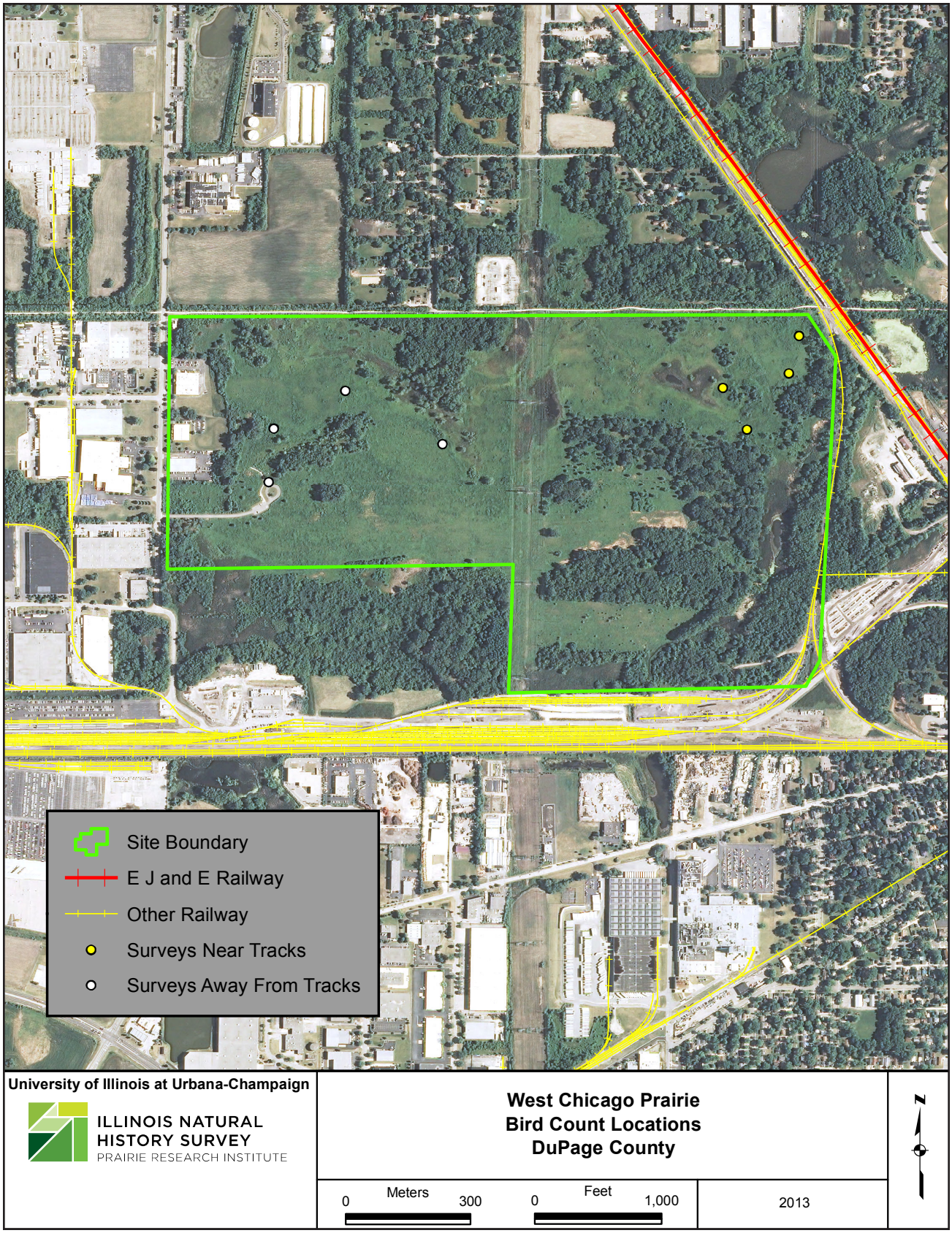
APPENDIX 4.1 (d) Map of Poplar Creek Forest Preserve (PC), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



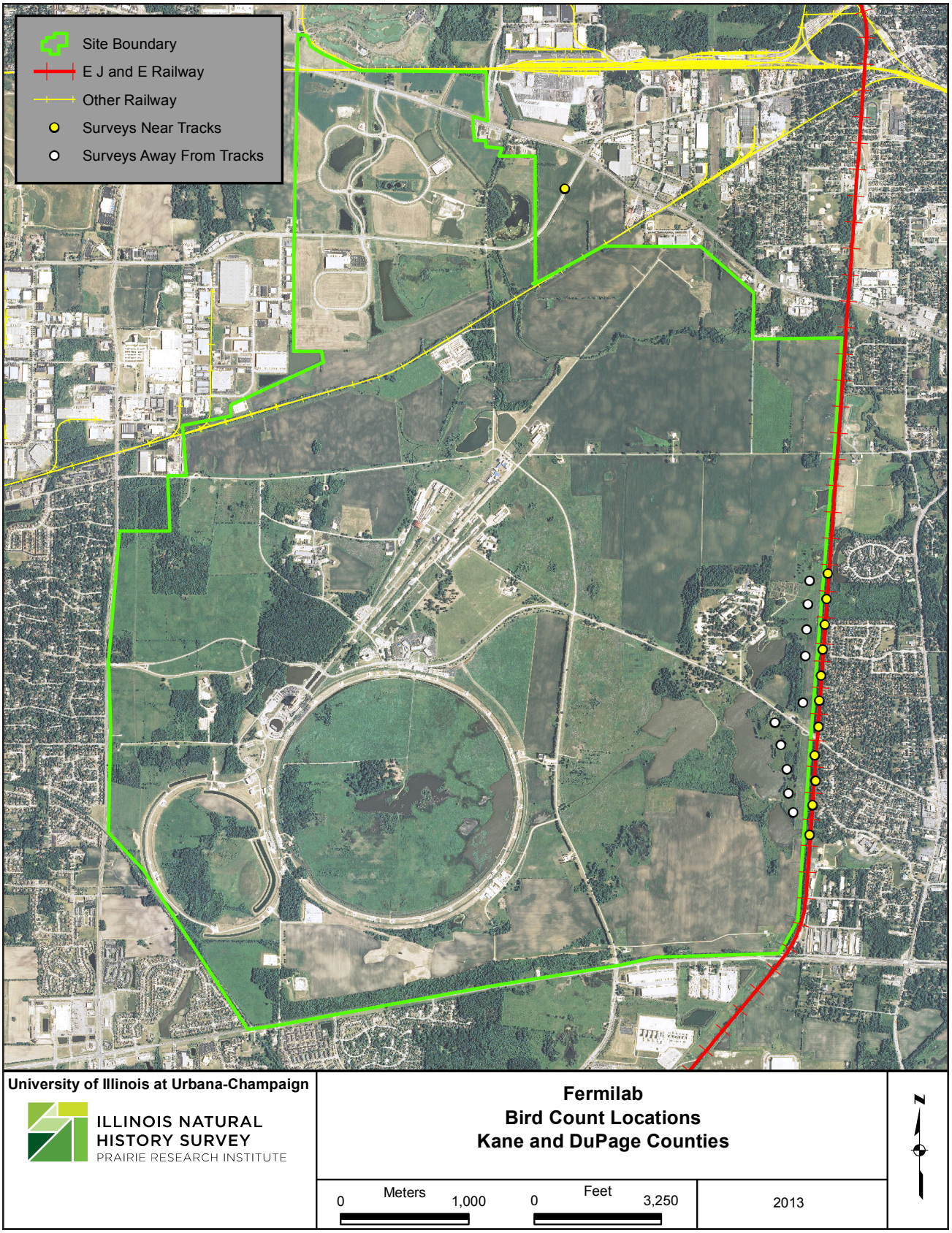
APPENDIX 4.1 (e) Map of Pratt's Wayne Woods Forest Preserve (PW), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



APPENDIX 4.1 (f) Map of West Chicago Prairie (WC), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.

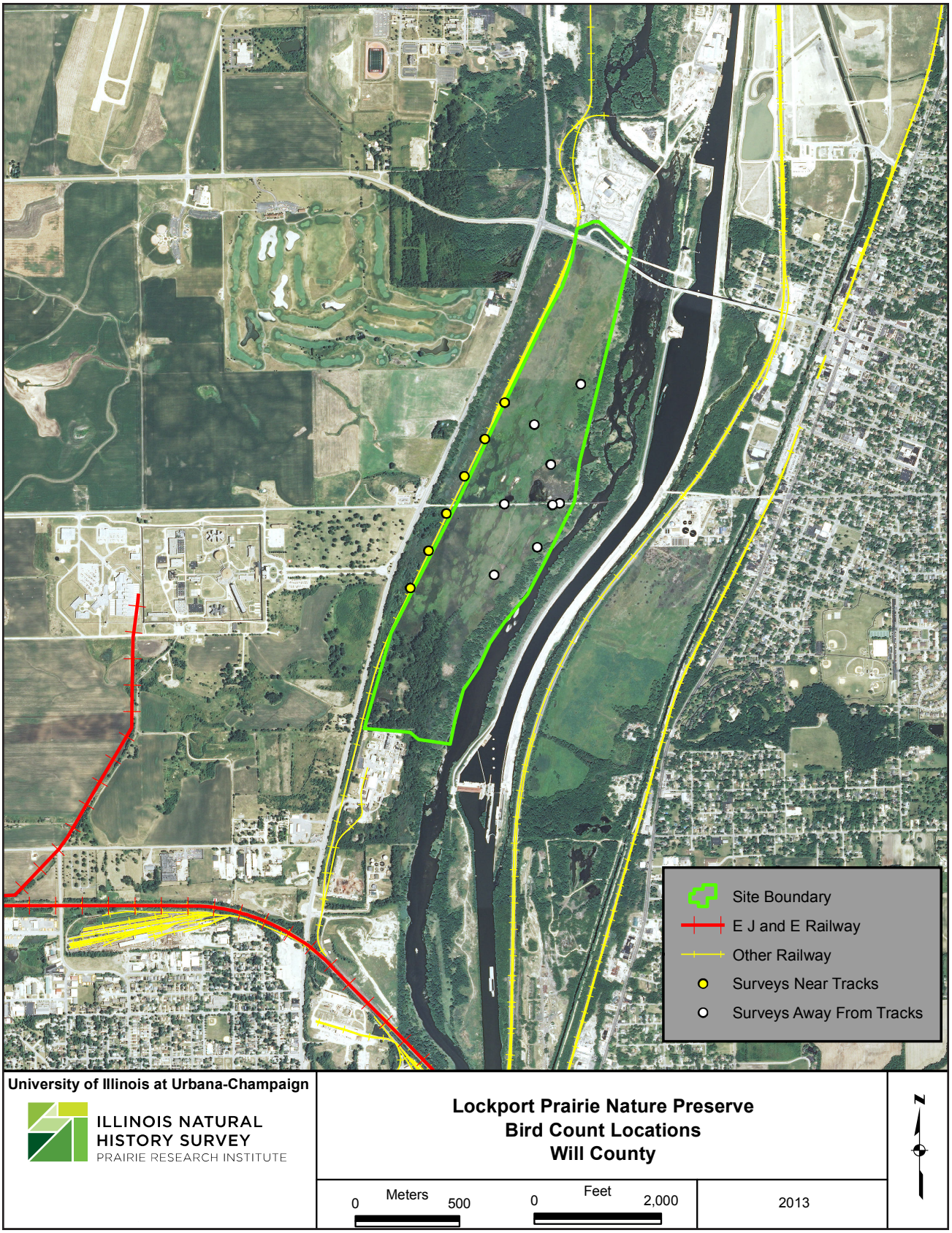


APPENDIX 4.1 (g) Map of Fermilab (FL), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



APPENDIX 4.1 (h) Map of Lake Renwick Forest Preserve (LR), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.

APPENDIX 4.1 (i) Map of Lockport Prairie Nature Preserve (LP), showing site boundaries, the EJ&E railway line, and location of 5-minute, 50-m-radius (0.785 ha) point counts near (yellow) and away (white) from the EJ&E.



APPENDIX 4.2 Bird species detected close to (T) and away from (A) EJ&E tracks at nine study sites from 2009–2012. Bird species recorded as "close to tracks" (T) were estimated to be within 50 m of the tracks, while those recorded as "away from tracks" (A) were beyond 50 m from the tracks. Birds were detected by sight and sound on repeated visits to each site. * indicates migrant.

		MW		CM		SC		PC		PW		WC		FL		LR	LP	
Common Name	**Scientific Name**	**T**	**A**	**T**	**A**	**T**	**A**	**T**	**A**	**T**	**A**	**T**	**A**	**T**	**A**	**---**	**T**	**A**
Canada goose	*Branta canadensis*	●	●	●	●		●		●	●	●				●	●		●
mute swan	*Cygnus olor*				●											●		
unidentified swan species	---				●													
wood duck	*Aix sponsa*	●				●	●		●	●	●					●		●
American wigeon	*Anas americana*										●							
black duck	*Anas rubripes*										●							
mallard	*Anas platyrhynchos*		●		●	●	●	●	●	●	●				●			●
blue-winged teal	*Anas discolor*					●	●			●	●				●			●
northern shoveler	*Anas clypeata*										●							
ring-necked duck	*Aythya collaris*										●							
hooded merganser	*Lophodytes cucullatus*					●	●											
ruddy duck	*Oxyura jamaicensis*										●							
pied-billed grebe	*Podilymbus podiceps*						●		●	●	●				●			●
double-crested cormorant	*Phalacrocorax auritus*									●	●			●	●	●		
American bittern	*Botaurus lentiginosus*						●											
least bittern	*Ixobrychus exilis*				●													
great blue heron	*Ardea herodias*	●		●	●		●	●	●	●	●				●	●		●
great egret	*Ardea alba*				●		●	●	●	●	●				●	●		●
cattle egret	*Bubulcus ibis*															●		
green heron	*Butorides virescens*						●			●	●				●		●	●
black-crowned night heron	*Nycticorax nycticorax*															●		
turkey vulture	*Cathartes aura*			●	●	●	●			●	●				●		●	●
osprey	*Pandion haliaetus*										●							
northern harrier *	*Circus cyaneus*																●	●
sharp-shinned hawk *	*Accipiter striatus*						●											
Cooper's hawk	*Accipter cooperii*	●				●	●	●	●									
broad-winged hawk *	*Buteo platypterus*			●														
red-tailed hawk	*Buteo jamaicensis*	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●
American kestrel	*Falco sparverius*			●											●			
peregrine falcon	*Falco peregrinus*						●											
yellow rail	*Coturnicops noveboracensis*			?														
black rail	*Laterallus jamaicensis*										●							
Virginia rail	*Rallus limicola*										●						●	●
sora rail	*Porzana carolina*					●				●	●							
American coot	*Fulica americana*									●	●							
unidentified rail	---						●											
sandhill crane	*Grus canadensis*				●		●				●							
killdeer	*Charadrius vociferus*			●	●			●		●	●				●			
American woodcock	*Scolopax minor*		●		●		●											
Wilson's snipe	*Gallinago delicata*									●	●	●						
spotted sandpiper	*Actitis macularius*						●											
solitary sandpiper	*Tringa solitaria*						●											
greater yellowlegs	*Tringa melanoleuca*								●									
ring-billed gull	*Larus delawarensis*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
black tern	*Chlidonias niger*										●							
rock dove	*Columba livia*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
mourning dove	*Zenaida macroura*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

APPENDIX 4.2 Contd.

Common Name	Scientific Name	MW		CM		SC		PC		PW		WC		FL		LR	LP	
		T	A	T	A	T	A	T	A	T	A	T	A	T	A	---	T	A
unidentified parakeet	---							●										
yellow-billed cuckoo	*Coccyzus americanus*		●		●				●	●								
black-billed cuckoo	*Coccyzus erythropthalmus*		●		●		●		●	●								
great horned owl	*Bubo virginianus*	●	●		●	●	●	●	●									
common nighthawk	*Chordeiles minor*						●											
chimney swift	*Chaetura pelagica*					●	●	●	●	●	●			●	●		●	●
ruby-throated hummingbird	*Archilochus colubris*	●						●	●									
belted kingfisher	*Ceryle alcyon*			●	●	●	●	●	●	●	●	●		●	●	●	●	●
red-headed woodpecker	*Melanerpes erythrocephalus*	●																●
red-bellied woodpecker	*Melanerpes carolinus*	●	●	●	●	●	●	●	●	●	●	●		●	●	●		●
downy woodpecker	*Picoides pubescens*	●	●	●	●	●	●	●	●	●	●	●		●	●	●		●
hairy woodpecker	*Picoides villosus*	●	●	●		●	●	●	●	●				●	●			
northern flicker	*Colaptes auratus*	●	●	●	●	●	●	●	●		●			●	●	●		●
eastern wood-pewee	*Contopus virens*	●	●	●	●	●	●	●	●	●		●		●	●	●	●	●
Acadian flycatcher	*Empidonax virescens*								●									
willow flycatcher	*Empidonax traillii*				●		●	●		●	●	●	●		●		●	●
least flycatcher	*Empidonax minimus*								●	●	●							
eastern phoebe	*Sayornis pheobe*	●				●	●	●	●	●	●	●	●	●	●	●		
great-crested flycatcher	*Myiarchus crinitus*	●	●	●	●	●	●	●	●	●	●			●	●	●		
eastern kingbird	*Tyrannus tyrannus*	●			●	●	●	●	●	●	●	●		●	●	●		●
white-eyed vireo	*Vireo griseus*															●		
yellow-throated vireo	*Vireo flavifrons*								●					●				
warbling vireo	*Vireo gilvus*					●		●		●	●	●	●	●	●	●	●	●
red-eyed vireo	*Vireo olivaceus*	●	●	●	●	●	●	●	●							●		
blue jay	*Cyanocitta cristata*	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●
American crow	*Corvus brachyrhynchos*	●	●		●	●	●	●	●	●	●	●		●	●	●	●	●
barn swallow	*Hirundo rustica*				●	●	●	●	●	●	●			●	●			
north rough-wing swallow	*Stelgidopteryx serripennis*					●	●			●	●			●	●			
bank swallow	*Riparia riparia*					●	●	●	●	●	●			●	●			
tree swallow	*Tachycineta bicolor*					●	●	●	●	●	●	●		●	●	●	●	●
black-capped chickadee	*Poecile atricapillus*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
white-breasted nuthatch	*Sitta carolinensis*	●	●	●	●	●	●	●	●	●	●			●	●		●	
house wren	*Troglodytes aedon*	●	●		●	●	●	●	●	●	●	●		●	●	●	●	●
sedge wren	*Cistothorus platensis*										●		●					
marsh wren	*Cistothorus palustris*			●							●						●	●
ruby-crowned kinglet	*Regulus calendula*							●										
blue-gray gnatcatcher	*Polioptila caerulea*				●	●	●	●	●	●	●	●		●	●	●		●
eastern bluebird	*Sialia sialis*				●			●	●	●	●			●	●			
American robin	*Turdus migratorius*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
wood thrush	*Hylocychla mustelina*	●		●		●	●	●	●									
veery	*Catharus fusca*		●			●	●	●										
Swainson's thrush	*Catharus swainsonii*								●									
gray catbird	*Dumetella carolinensis*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
brown thrasher	*Toxostoma rufum*			●	●	●	●	●	●	●	●	●	●	●	●	●		
European starling	*Sturnus vulgaris*	●	●		●	●		●	●	●	●			●	●	●		
cedar waxwing	*Bombycilla cedrorum*	●	●	●	●	●	●	●	●	●	●	●		●	●	●		
blue-winged warbler	*Vermivora pinus*						●											
Tennessee warbler *	*Vermivora peregrinus*					●												
Nashville warbler *	*Vermivora ruficapilla*					●		●										

APPENDIX 4.2 Contd.

Common Name	Scientific Name	MW		CM		SC		PC		PW		WC		FL		LR	LP	
		T	A	T	A	T	A	T	A	T	A	T	A	T	A	---	T	A
yellow warbler	*Setophaga petechia*				●	●	●	●	●	●	●	●		●	●	●	●	●
magnolia warbler *	*Setophaga magnolia*					●		●										
yellow-rumped warbler *	*Setophaga coronata*			●		●	●	●	●		●							
blue-throated green warbler *	*Setophaga virens*	●	●	●														
palm warbler *	*Setophaga palmarum*			●					●		●							
black and white warbler *	*Mniotilta varia*								●									
American redstart	*Setophaga ruticilla*	●				●		●			●							
ovenbird	*Seiurus aurocapilus*		●				●	●	●									
common yellowthroat	*Geothlypis trichas*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
hooded warbler	*Wilsonia citrina*		●															
yellow-breasted chat	*Icteria virens*											●	●					
eastern towhee	*Pipilo erythrophthalmus*	●	●	●	●	●	●	●	●	●	●		●	●	●	●		
chipping sparrow	*Spizella passerina*								●	●	●			●	●			
field sparrow	*Spizella pusila*	●	●	●	●		●	●	●	●	●	●	●	●	●	●		
savanna sparrow	*Passerculus sandwichensis*								●		●							
grasshopper sparrow	*Ammodramus savannarum*								●		●							
Henslow's sparrow	*Ammodramus henslowii*						●		●	●	●				●			
fox sparrow	*Passerella iliaca*										●							
song sparrow	*Melospiza melodia*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
swamp sparrow	*Melospiza georgiana*			●	●												●	
white-throated sparrow	*Zonotrichia albicollis*							●										
scarlet tanager	*Piranga olivacea*	●	●	●	●	●			●									
northern cardinal	*Cardinalis cardinalis*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
rose-breasted grosbeak	*Pheucticus ludovicianus*	●	●	●	●	●	●		●	●				●	●	●		
indigo bunting	*Passerina cyanea*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
dickcissel	*Spiza americana*										●				●			
bobolink	*Dolichonyx oryzivorus*								●		●							
red-winged blackbird	*Agelaius phoeniceus*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
eastern meadowlark	*Sturnella magna*								●	●	●				●		●	●
yellow-headed blackbird	*Xanthocephalus xanthocephalus*										●							
common grackle	*Quiscalus quiscula*	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●
brown-headed cowbird	*Molothrus ater*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
orchard oriole	*Icterus spurius*	●	●			●	●		●	●	●	●	●	●	●			
Baltimore oriole	*Icterus galbula*	●	●	●	●	●	●	●	●	●	●	●		●	●	●		●
house finch	*Carpodacus mexicanus*			●				●		●	●			●				
American goldfinch	*Spinus tristis*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
house sparrow	*Passer domesticus*					●					●			●				

APPENDIX 4.3 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2010 in descending order, averaged over all nine sites.

Common Name	Scientific Name	Mean
red-winged blackbird	*Agelaius phoeniceus*	4.989
American robin	*Turdus migratorius*	3.100
common yellowthroat	*Geothlypis trichas*	1.724
song sparrow	*Melospiza melodia*	1.530
gray catbird	*Dumetella carolinensis*	1.389
indigo bunting	*Passerina cyanea*	1.090
northern cardinal	*Cardinalis cardinalis*	0.923
field sparrow	*Spizella pusila*	0.883
black-capped chickadee	*Poecile atricapillus*	0.875
American goldfinch	*Carduelis trista*	0.813
brown-headed cowbird	*Molothrus ater*	0.701
blue jay	*Cyanocitta cristata*	0.696
house wren	*Troglodytes aedon*	0.607
common grackle	*Quiscalus quiscula*	0.412
red-eyed vireo	*Vireo olivaceus*	0.360
eastern meadowlark	*Sturnella magna*	0.345
willow flycatcher	*Empidonax traillii*	0.342
eastern wood-pewee	*Contopus virens*	0.329
yellow warbler	*Setophaga petechia*	0.316
eastern towhee	*Pipilo erythrophthalmus*	0.298
blue-grey gnatcatcher	*Polioptila caerulea*	0.267
mallard	*Anas platyrhynchos*	0.258
American crow	*Corvus brachyrhynchos*	0.244
mourning dove	*Zenaida macroura*	0.229
brown thrasher	*Toxostoma rufum*	0.226
warbling vireo	*Vireo gilvus*	0.223
tree swallow	*Tachycineta bicolor*	0.194
wood duck	*Aix sponsa*	0.186
Baltimore oriole	*Icterus galbula*	0.183
cedar waxwing	*Bombycilla cedrorum*	0.182
downy woodpecker	*Picoides pubescens*	0.172
red-bellied woodpecker	*Melanerpes carolinus*	0.154
Canada goose	*Branta canadensis*	0.150
swamp sparrow	*Melospiza georgiana*	0.148
double-crested cormorant	*Phalacrocorax auritus*	0.121
scarlet tanager	*Piranga olivacea*	0.117
Tennessee warbler	*Vermivora peregrinus*	0.110
great egret	*Ardea alba*	0.105
eastern kingbird	*Tyrannus tyrannus*	0.098
marsh wren	*Cistothorus palustris*	0.097
great blue heron	*Ardea herodias*	0.095
mute swan	*Cygnus olor*	0.089
northern flicker	*Colaptes auratus*	0.085
white-breasted nuthatch	*Sitta carolinensis*	0.084
rose-breasted grosbeak	*Pheucticus ludovicianus*	0.079
ovenbird	*Seiurus aurocapilus*	0.078
great-crested flycatcher	*Myiarchus crinitus*	0.077
Henslow's sparrow	*Ammodramus henslowii*	0.074
American redstart	*Setophaga ruticilla*	0.071
sedge wren	*Cistothorus platensis*	0.069
hairy woodpecker	*Picoides villosus*	0.063
house finch	*Carpodacus mexicanus*	0.059
house sparrow	*Passer domesticus*	0.056
wood thrush	*Hylocychla mustelina*	0.054
barn swallow	*Hirundo rustica*	0.054
dickcissel	*Spiza americana*	0.053
eastern phoebe	*Sayornis pheobe*	0.049
orchard oriole	*Icterus spurius*	0.046
killdeer	*Charadrius vociferus*	0.042
belted kingfisher	*Ceryle alcyon*	0.042
Cooper's hawk	*Accipter cooperii*	0.041
yellow-rumped warbler	*Setophaga coronata*	0.033
red-tailed hawk	*Buteo jamaicensis*	0.025
bank swallow	*Riparia riparia*	0.024
yellow-breasted chat	*Icteria virens*	0.019
savanna sparrow	*Passerculus sandwichensis*	0.017
European starling	*Sturnus vulgaris*	0.014
red-headed woodpecker	*Melanerpes erythrocephalus*	0.014
common peafowl	*Pavo cristatus*	0.013
blue-winged warbler	*Vermivora pinus*	0.013
eastern bluebird	*Sialia sialis*	0.012
veery	*Catharus fusca*	0.012
Virginia rail	*Rallus limicola*	0.009
yellow-throated vireo	*Vireo flavifrons*	0.007
northern rough-wing swallow	*Stelgidopteryx serripennis*	0.007
chimney swift	*Chaetura pelagica*	0.005
green heron	*Butorides virescens*	0.005
bobolink	*Dolichonyx oryzivorus*	0.005

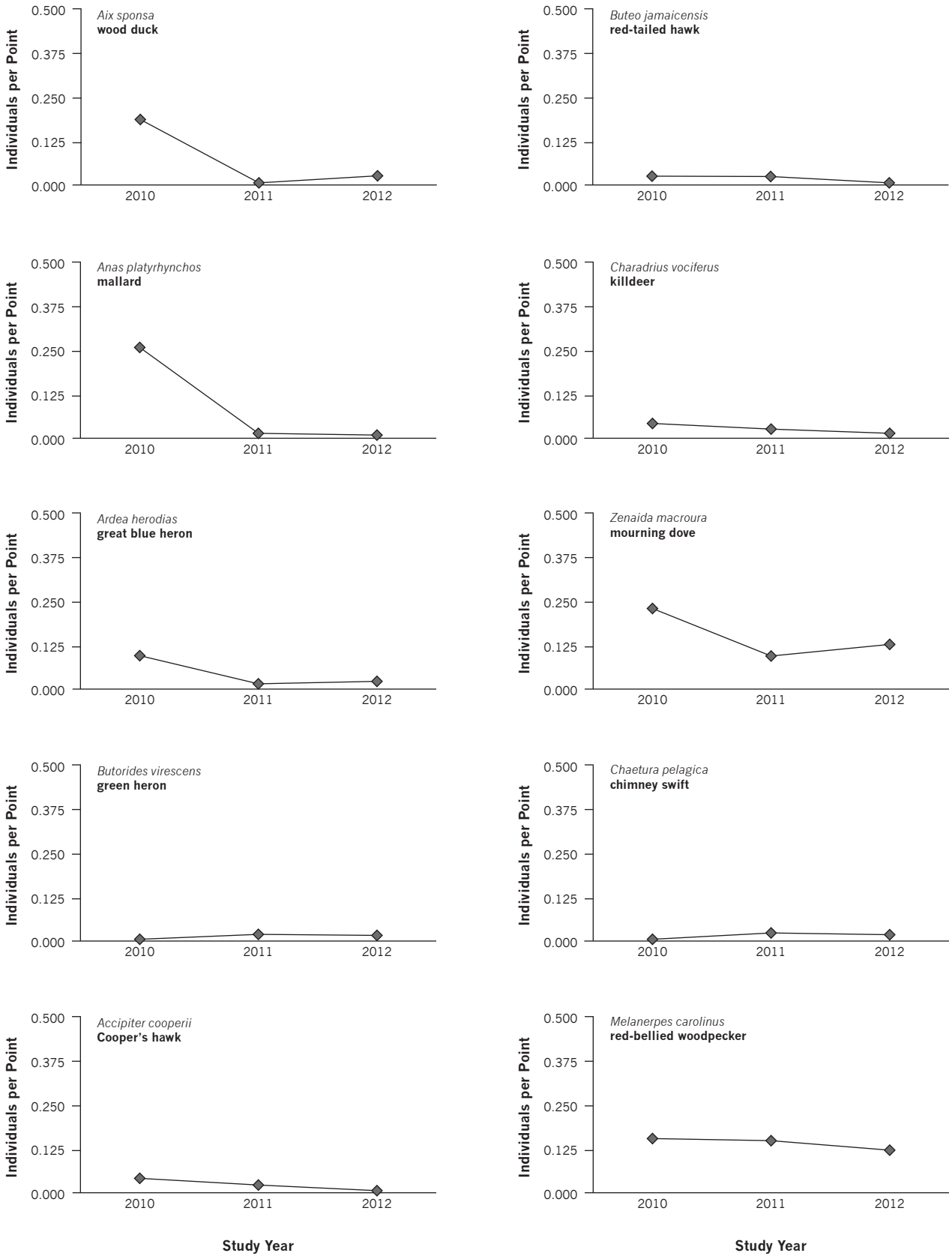
APPENDIX 4.4 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2011 in descending order, averaged over all nine sites.

Common Name	Scientific Name	Mean
red-winged blackbird	*Agelaius phoeniceus*	2.157
American robin	*Turdus migratorius*	1.645
song sparrow	*Melospiza melodia*	1.256
indigo bunting	*Passerina cyanea*	1.139
common yellowthroat	*Geothlypis trichas*	1.098
gray catbird	*Dumetella carolinensis*	0.960
brown-headed cowbird	*Molothrus ater*	0.767
northern cardinal	*Cardinalis cardinalis*	0.715
house wren	*Troglodytes aedon*	0.547
American goldfinch	*Carduelis trista*	0.483
yellow warbler	*Setophaga petechia*	0.482
black-capped chickadee	*Poecile atricapillus*	0.453
blue jay	*Cyanocitta cristata*	0.343
red-eyed vireo	*Vireo olivaceus*	0.327
blue-grey gnatcatcher	*Polioptila caerulea*	0.326
field sparrow	*Spizella pusila*	0.316
willow flycatcher	*Empidonax traillii*	0.285
eastern towhee	*Pipilo erythrophthalmus*	0.258
tree swallow	*Tachycineta bicolor*	0.242
warbling vireo	*Vireo gilvus*	0.240
cedar waxwing	*Bombycilla cedrorum*	0.237
eastern meadowlark	*Sturnella magna*	0.233
Baltimore oriole	*Icterus galbula*	0.224
downy woodpecker	*Picoides pubescens*	0.192
eastern kingbird	*Tyrannus tyrannus*	0.167
red-bellied woodpecker	*Melanerpes carolinus*	0.148
eastern wood-pewee	*Contopus virens*	0.141
common grackle	*Quiscalus quiscula*	0.127
northern flicker	*Colaptes auratus*	0.095
mourning dove	*Zenaida macroura*	0.094
orchard oriole	*Icterus spurius*	0.089
European starling	*Sturnus vulgaris*	0.086
rose-breasted grosbeak	*Pheucticus ludovicianus*	0.084
white-breasted nuthatch	*Sitta carolinensis*	0.083
marsh wren	*Cistothorus palustris*	0.081
great-crested flycatcher	*Myiarchus crinitus*	0.066
swamp sparrow	*Melospiza georgiana*	0.061
barn swallow	*Hirundo rustica*	0.058
eastern bluebird	*Sialia sialis*	0.058
Henslow's sparrow	*Ammodramus henslowii*	0.055
brown thrasher	*Toxostoma rufum*	0.055
American redstart	*Setophaga ruticilla*	0.052
red-headed woodpecker	*Melanerpes erythrocephalus*	0.044
yellow-breasted chat	*Icteria virens*	0.042
hairy woodpecker	*Picoides villosus*	0.039
ovenbird	*Seiurus aurocapilus*	0.036
wood thrush	*Hylocychla mustelina*	0.034
dickcissel	*Spiza americana*	0.033
scarlet tanager	*Piranga olivacea*	0.029
killdeer	*Charadrius vociferus*	0.026
red-tailed hawk	*Buteo jamaicensis*	0.024
ring-billed gull	*Larus delawarensis*	0.024
chimney swift	*Chaetura pelagica*	0.023
Cooper's hawk	*Accipter cooperii*	0.022
eastern phoebe	*Sayornis pheobe*	0.020
green heron	*Butorides virescens*	0.019
great blue heron	*Ardea herodias*	0.015
house sparrow	*Passer domesticus*	0.015
mallard	*Anas platyrhynchos*	0.014
bobolink	*Dolichonyx oryzivorus*	0.010
yellow-throated vireo	*Vireo flavifrons*	0.009
American crow	*Corvus brachyrhynchos*	0.009
veery	*Catharus fusca*	0.009
ruby-throated hummingbird	*Archilochus colubris*	0.007
wood duck	*Aix sponsa*	0.006
bank swallow	*Riparia riparia*	0.005
northern rough-wing swallow	*Stelgidopteryx serripennis*	0.005

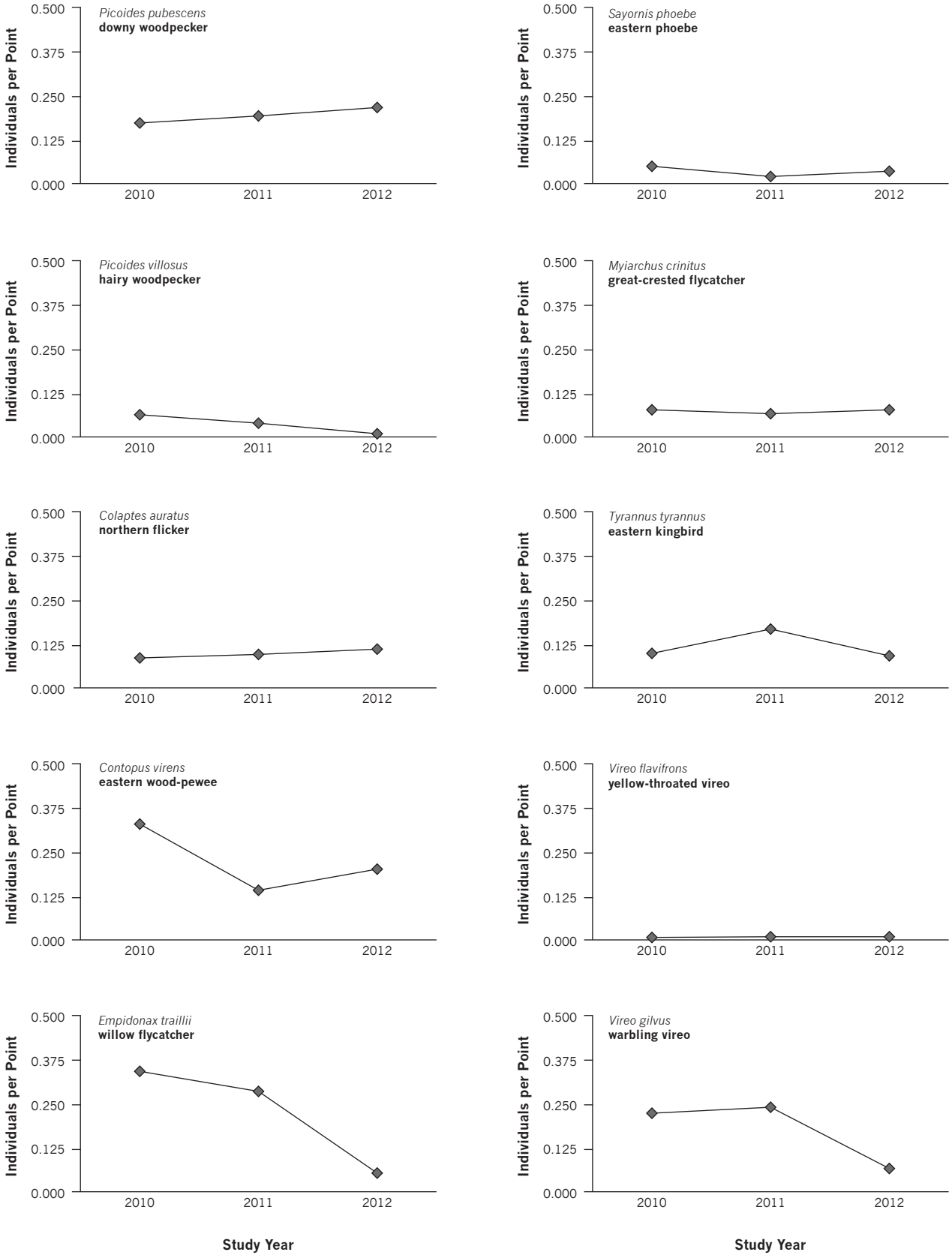
APPENDIX 4.5 Mean number of individuals per point detected on 50-m radius (0.785 ha), 5-min. point counts in 2012 in descending order, averaged over all nine sites.

Common Name	Scientific Name	Mean
American robin	*Turdus migratorius*	2.004
red-winged blackbird	*Agelaius phoeniceus*	1.159
gray catbird	*Dumetella carolinensis*	1.132
song sparrow	*Melospiza melodia*	1.041
common yellowthroat	*Geothlypis trichas*	0.963
indigo bunting	*Passerina cyanea*	0.913
northern cardinal	*Cardinalis cardinalis*	0.584
American goldfinch	*Carduelis trista*	0.510
black-capped chickadee	*Poecile atricapillus*	0.488
cedar waxwing	*Bombycilla cedrorum*	0.448
house wren	*Troglodytes aedon*	0.374
brown-headed cowbird	*Molothrus ater*	0.362
field Sparrow	*Spizella pusila*	0.345
common grackle	*Quiscalus quiscula*	0.333
tree swallow	*Tachycineta bicolor*	0.323
blue jay	*Cyanocitta cristata*	0.310
red-eyed vireo	*Vireo olivaceus*	0.290
downy woodpecker	*Picoides pubescens*	0.216
eastern wood-pewee	*Contopus virens*	0.201
yellow warbler	*Setophaga petechia*	0.187
blue-grey gnatcatcher	*Polioptila caerulea*	0.173
eastern meadowlark	*Sturnella magna*	0.155
swamp sparrow	*Melospiza georgiana*	0.153
dickcissel	*Spiza americana*	0.151
rose-breasted grosbeak	*Pheucticus ludovicianus*	0.140
Baltimore oriole	*Icterus galbula*	0.133
mourning dove	*Zenaida macroura*	0.127
European starling	*Sturnus vulgaris*	0.125
red-bellied woodpecker	*Melanerpes carolinus*	0.121
northern flicker	*Colaptes auratus*	0.110
eastern kingbird	*Tyrannus tyrannus*	0.091
Henslow's sparrow	*Ammodramus henslowii*	0.088
eastern towhee	*Pipilo erythrophthalmus*	0.086
scarlet tanager	*Piranga olivacea*	0.082
ovenbird	*Seiurus aurocapilus*	0.082
great-crested flycatcher	*Myiarchus crinitus*	0.077
wood thrush	*Hylocychla mustelina*	0.074
orchard oriole	*Icterus spurius*	0.072
ruby-throated hummingbird	*Archilochus colubris*	0.070
warbling vireo	*Vireo gilvus*	0.066
brown thrasher	*Toxostoma rufum*	0.054
willow flycatcher	*Empidonax traillii*	0.053
American redstart	*Setophaga ruticilla*	0.049
Tennessee warbler	*Vermivora peregrinus*	0.046
house finch	*Carpodacus mexicanus*	0.044
eastern bluebird	*Sialia sialis*	0.039
eastern phoebe	*Sayornis pheobe*	0.035
wood duck	*Aix sponsa*	0.026
sedge wren	*Cistothorus platensis*	0.025
American crow	*Corvus brachyrhynchos*	0.025
barn swallow	*Hirundo rustica*	0.025
white-breasted nuthatch	*Sitta carolinensis*	0.023
great blue heron	*Ardea herodias*	0.022
marsh wren	*Cistothorus palustris*	0.021
bank swallow	*Riparia riparia*	0.019
chimney swift	*Chaetura pelagica*	0.018
green heron	*Butorides virescens*	0.016
killdeer	*Charadrius vociferus*	0.014
chipping sparrow	*Spizella passerina*	0.012
mallard	*Anas platyrhynchos*	0.009
hairy woodpecker	*Picoides villosus*	0.009
yellow-throated vireo	*Vireo flavifrons*	0.009
yellow-rumped warbler	*Setophaga coronata*	0.009
belted kingfisher	*Ceryle alcyon*	0.007
northern mockingbird	*Mimus polyglottos*	0.007
Cooper's hawk	*Accipter cooperii*	0.006
red-tailed hawk	*Buteo jamaicensis*	0.006

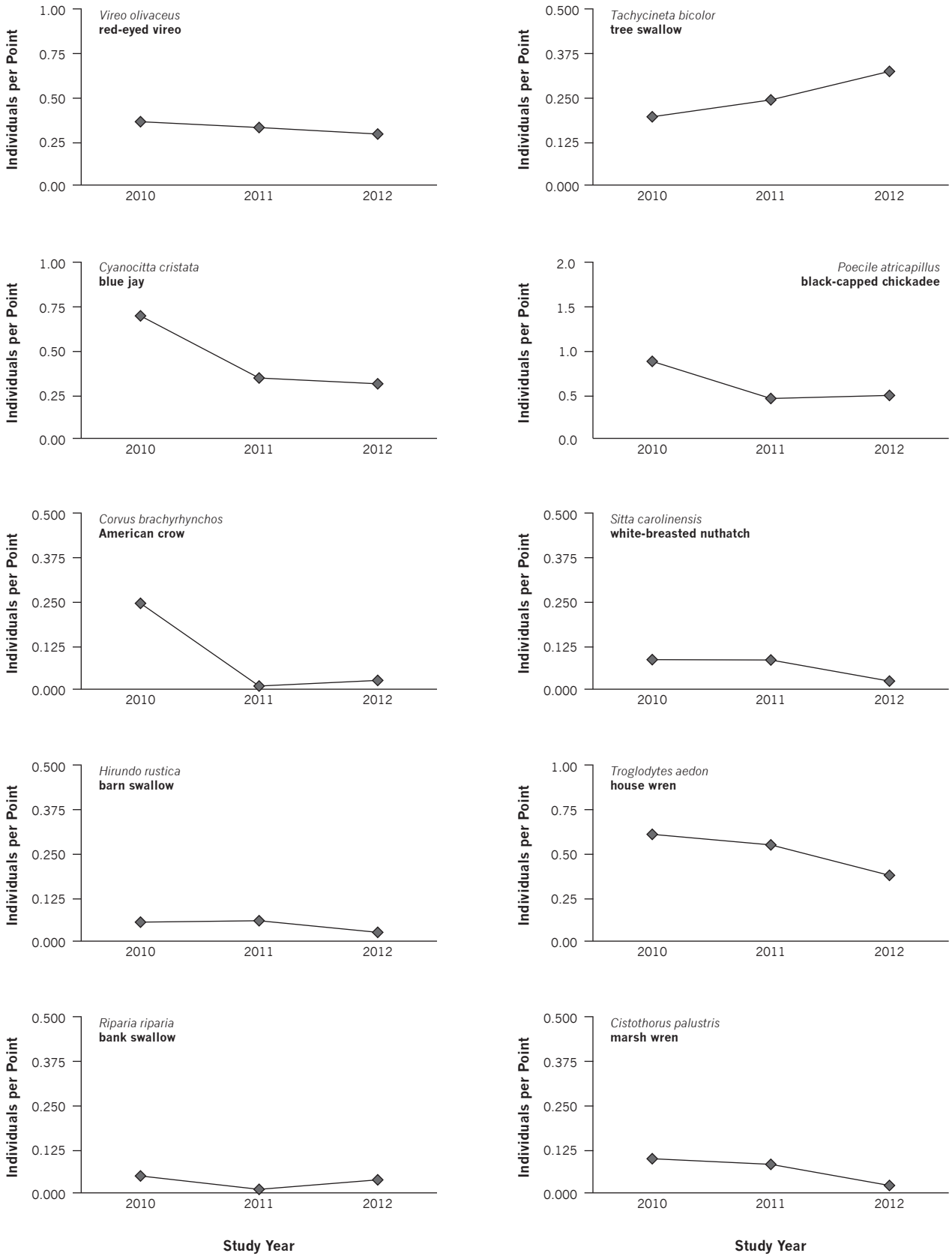
APPENDIX 4.6 Variation in abundance (mean individuals/0.785 ha) as indexed by 50-m radius, 5-min point counts from 2010–2012.



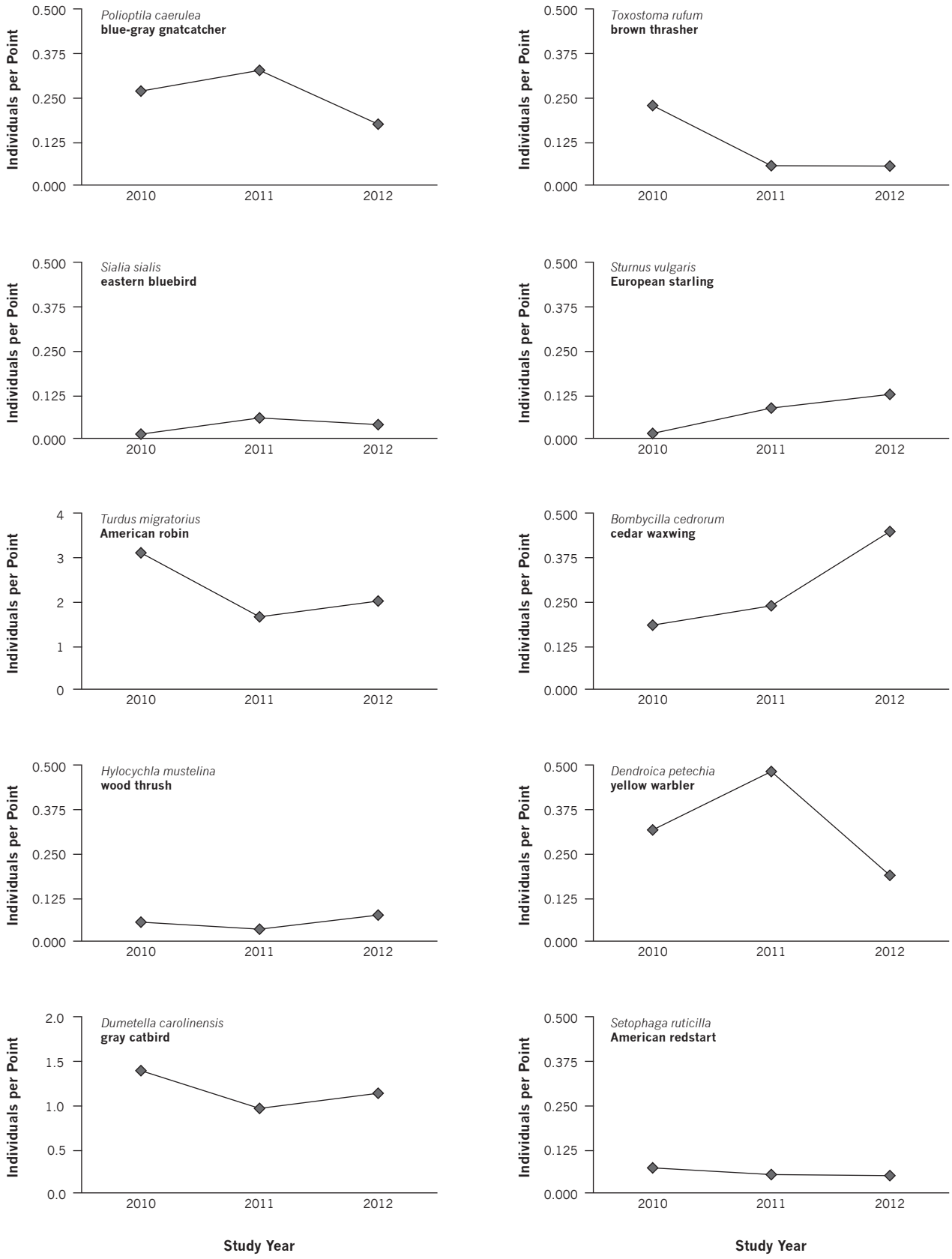
APPENDIX 4.6 Contd.



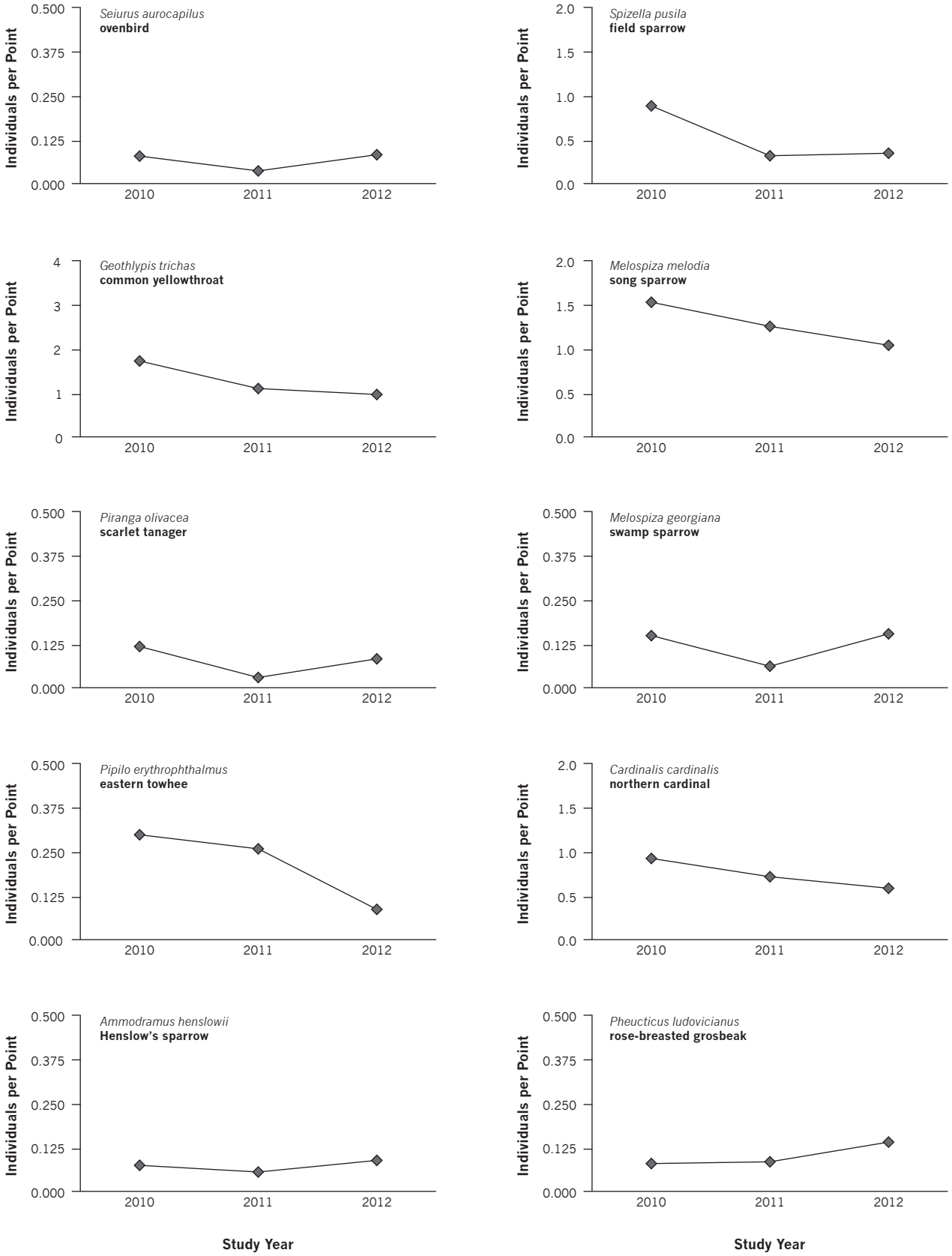
APPENDIX 4.6 Contd.



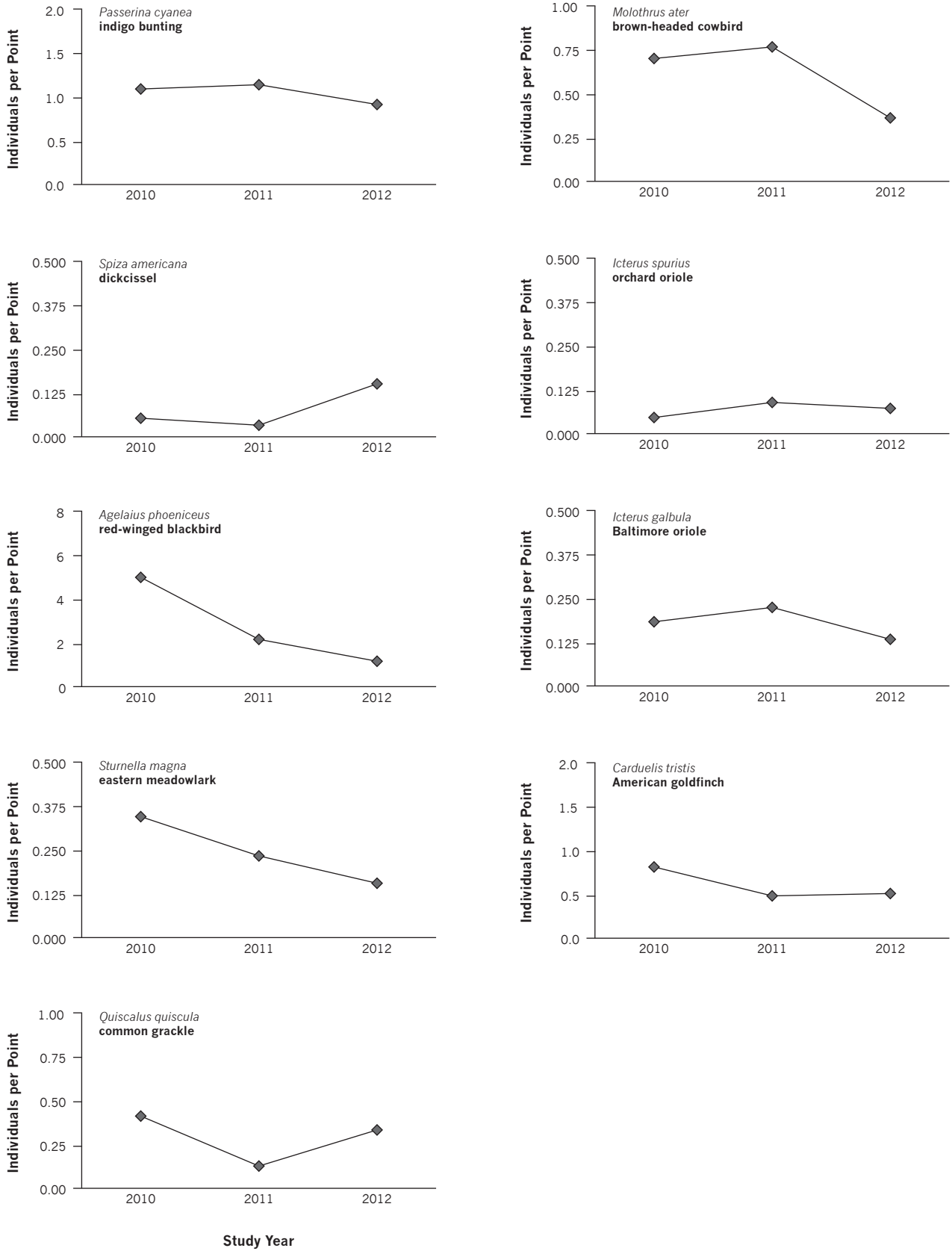
APPENDIX 4.6 Contd.



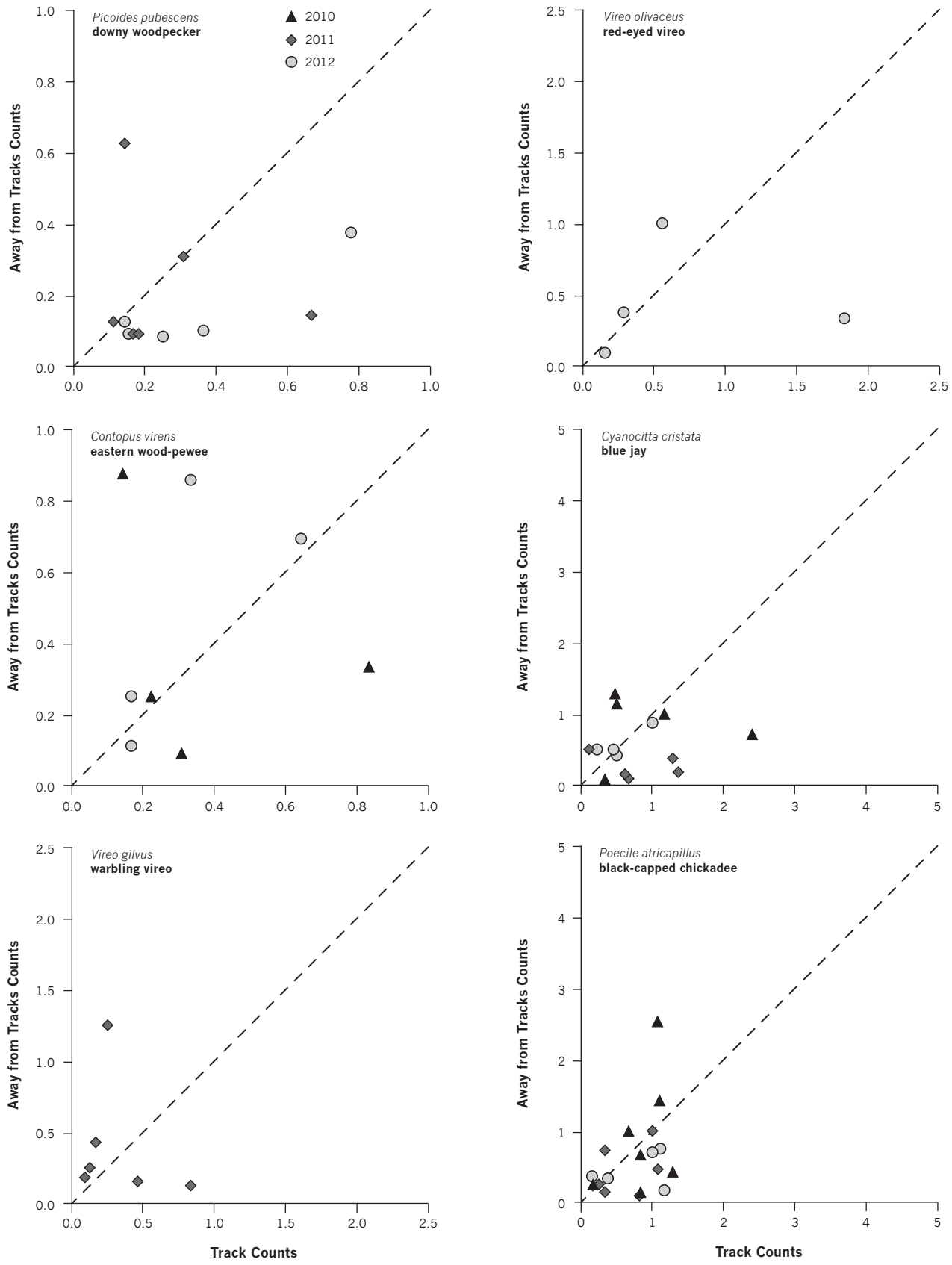
APPENDIX 4.6 Contd.



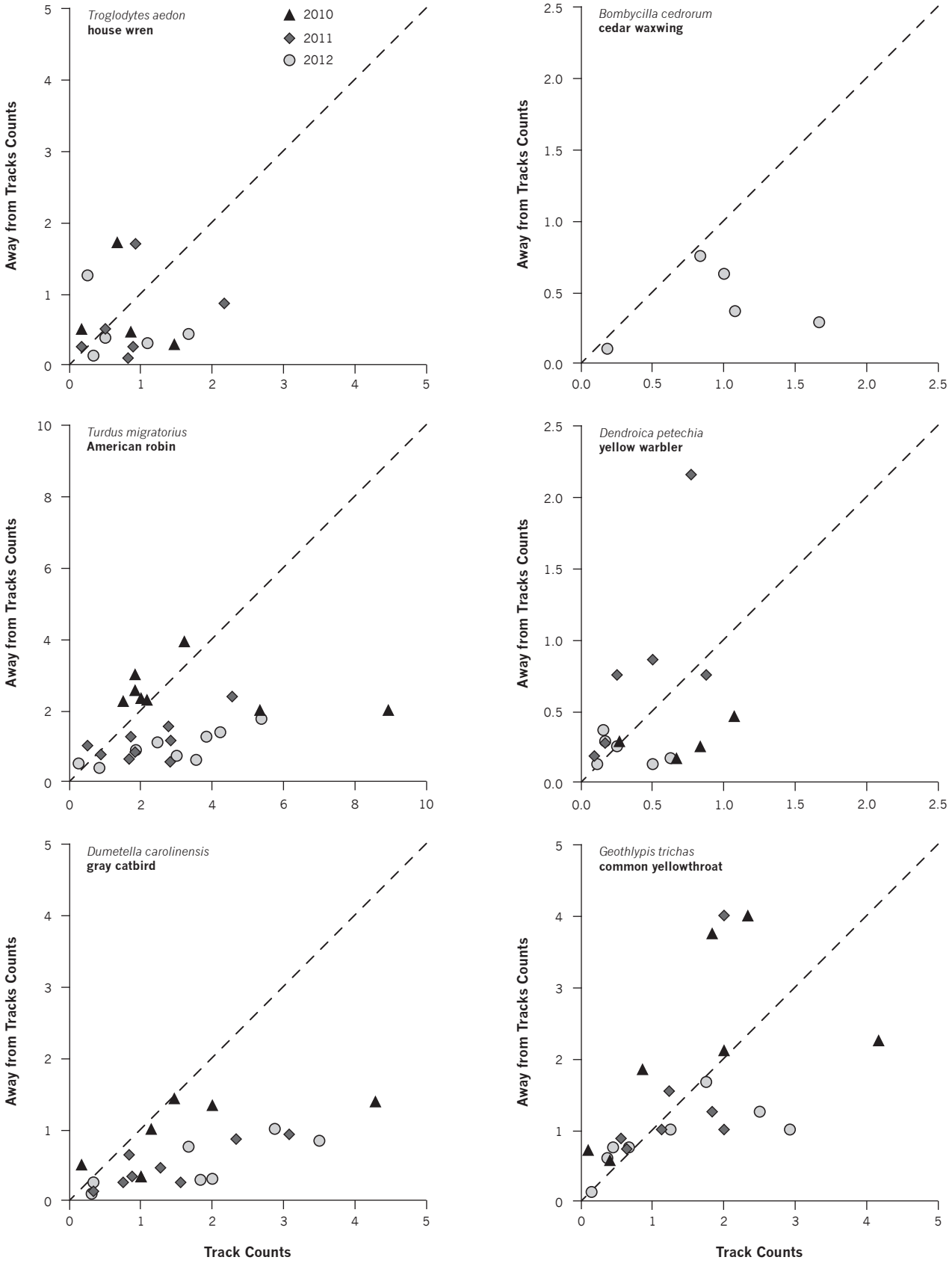
APPENDIX 4.6 Contd.



APPENDIX 4.7 Plots of joint bird abundances (based on 50-m, 5-min point counts) in track and away habitat at study sites in 2010–2012. The 45° line shows expected joint abundances if the species perceives both habitats to be qualitatively and quantitatively equivalent. Points above the line indicate the species perceives the away habitat to be superior, while points below indicate the species perceives tracks habitat to be superior. The number of symbols for any given species may vary among years because not all species were detected in both habitats in each of the three years. Only 19 species were sufficiently abundant to be subject to this modified isodar analysis.



APPENDIX 4.7 Contd.



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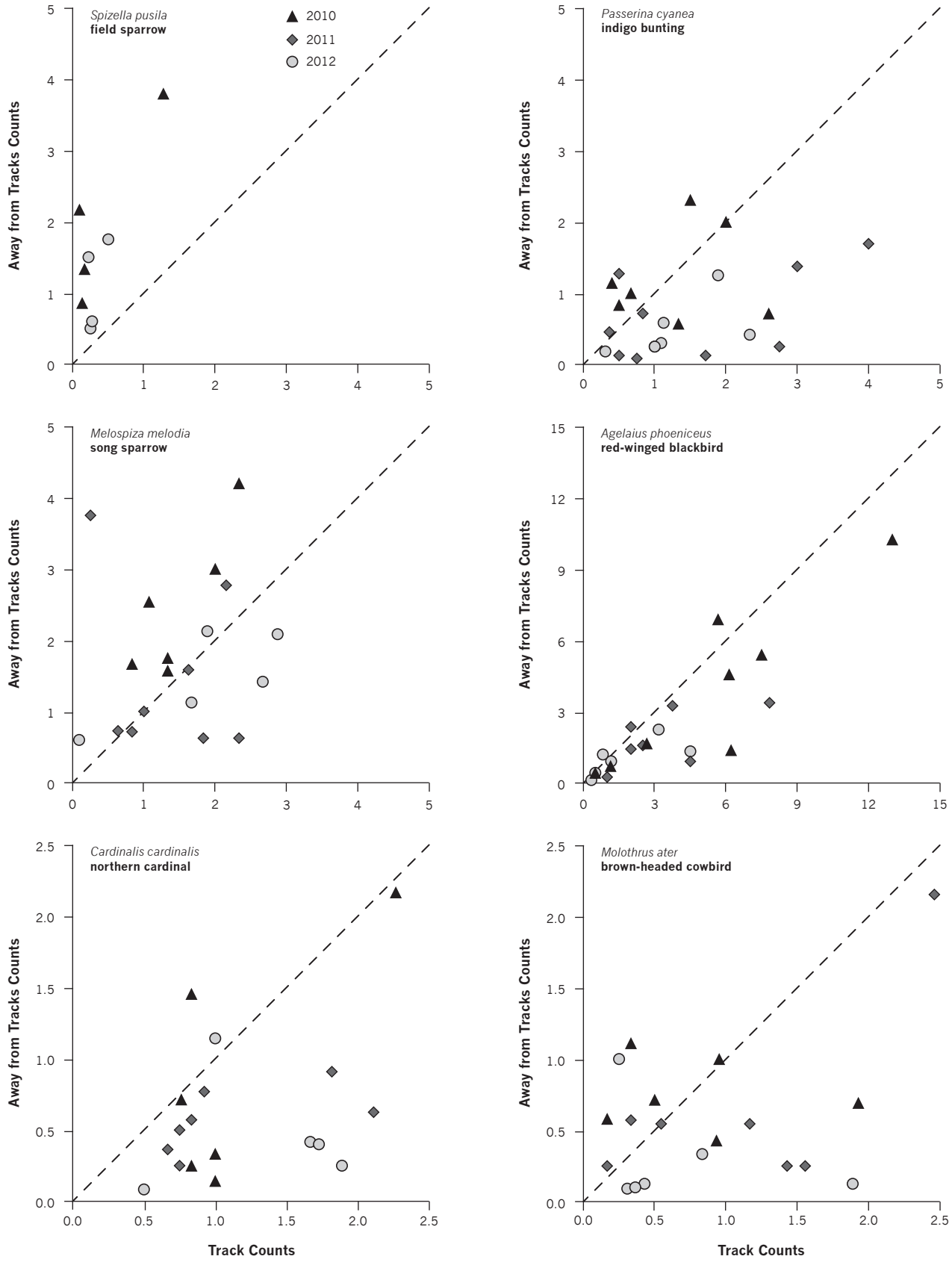

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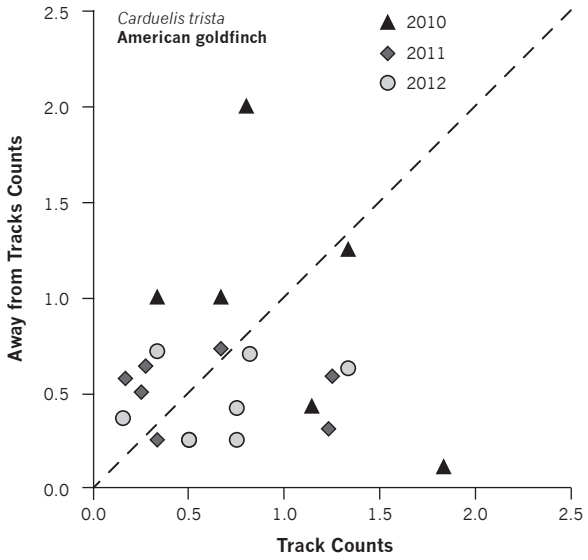


APPENDIX 4.8 Total number of nests found from 2010–2013 at seven study sites (i.e., MacArthur Woods, Cuba Marsh, Spring Creek Valley, Poplar Creek, Pratt's Wayne Woods, Lake Renwick, and Lockport Prairie) for 42 bird species. All nests were active when initially found, and all but nests of one Cooper's hawk, one red-bellied woodpecker, one northern flicker, one house wren, two blue-gray gnatcatchers, one brown thrasher, one European starling, one yellow warbler, two red-winged blackbirds, and one Baltimore oriole were followed successfully to final completion (fledge or fail).

Common Name	Scientific Name	Total
American robin	*Turdus migratorius*	120
gray catbird	*Dumetella carolinensis*	59
northern cardinal	*Cardinalis cardinalis*	40
red-winged blackbird	*Agelaius phoeniceus*	36
brown thrasher	*Toxostoma rufum*	29
yellow warbler	*Setophaga petechia*	18
cedar waxwing	*Bombycilla cedrorum*	13
wood thrush	*Hylocychla mustelina*	12
blue jay	*Cyanocitta cristata*	11
great blue heron	*Ardea herodias*	7
mourning dove	*Zenaida macroura*	7
field sparrow	*Spizella pusila*	5
eastern kingbird	*Tyrannus tyrannus*	4
blue-gray gnatcatcher	*Polioptila caerulea*	4
song sparrow	*Melospiza melodia*	4
rose-breasted grosbeak	*Pheucticus ludovicianus*	4
mallard	*Anas platyrhynchos*	3
willow flycatcher	*Empidonax traillii*	3
American goldfinch	*Carduelis trista*	3
northern flicker	*Colaptes auratus*	3
downy woodpecker	*Picoides pubescens*	2
red-eyed vireo	*Vireo olivaceus*	2
house wren	*Troglodytes aedon*	2
orchard oriole	*Icterus spurius*	2
Baltimore oriole	*Icterus galbula*	2
Cooper's hawk	*Accipter cooperii*	1
red-tailed hawk	*Buteo jamaicensis*	1
killdeer	*Charadrius vociferus*	1
woodcock	*Scolopax minor*	1
yellow-billed cuckoo	*Coccyzus americanus*	1
black-billed cuckoo	*Coccyzus erythropthalmus*	1
great horned owl	*Bubo virginianus*	1
hairy woodpecker	*Picoides villosus*	1
red-bellied woodpecker	*Melanerpes carolinus*	1
eastern wood-pewee	*Contopus virens*	1
barn swallow	*Hirundo rustica*	1
white-breasted nuthatch	*Sitta carolinensis*	1
European starling	*Sturnus vulgaris*	1
American redstart	*Setophaga ruticilla*	1
eastern towhee	*Pipilo erythrophthalmus*	1
indigo bunting	*Passerina cyanea*	1
dickcissel	*Spiza americana*	1
	Total Nests	**412**

APPENDIX 4.9 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2010. All nests listed were active at the time of discovery, and all but one Cooper's hawk, one red-bellied woodpecker, two blue-gray gnatcatchers, one European starling, and one yellow warbler, and 2 red-winged blackbirds were followed successfully to ultimate completion (fledge or fail).

Site	Bird Species	Tracks	Away
MW	woodcock		1
	American robin		1
CM	killdeer	1	
	great horned owl		1
	American robin	5	8
	brown thrasher		2
	European starling		1
SC	northern flicker	1	
	blue-gray gnatcatcher	1	
	American robin	2	9
	wood thrush	1	3
	gray catbird	3	5
	brown thrasher		2
	cedar waxwing		2
	yellow warbler	1	
	field sparrow		2
	song sparrow	1	2
	northern cardinal	1	
	rose-breasted grosbeak		1
	red-winged blackbird		3
	American goldfinch	1	
PC	Cooper's hawk	1	
	yellow-billed cuckoo		1
	hairy woodpecker		1
	red-bellied woodpecker	1	
	blue jay	1	
	American robin	1	
	gray catbird	3	
	brown thrasher		2
	northern cardinal	2	
PW	American robin	5	
	gray catbird	1	
	yellow warbler	1	1
	red-winged blackbird	1	4
	orchard oriole		1
LR	yellow warbler		1
	northern cardinal		1
LP	blue-gray gnatcatcher		1
	red-winged blackbird		2
	Total	**35**	**58**

APPENDIX 4.10 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2011. All nests listed were active at the time of discovery, and all but one house wren and one Baltimore oriole were followed successfully to ultimate completion (fledge or fail).

Site	Species	Tracks	Away
CM	mallard		1
	northern flicker		1
	willow flycatcher		1
	eastern kingbird		1
	blue jay	1	3
	white-breasted nuthatch	1	
	American robin	7	18
	gray catbird	2	7
	brown thrasher		5
	yellow warbler		4
	northern cardinal		5
	rose-breasted grosbeak		1
SC	black-billed cuckoo		1
	downy woodpecker		1
	blue jay		4
	blue-gray gnatcatcher		1
	American robin	2	8
	wood thrush		4
	gray catbird	2	8
	brown thrasher	1	5
	yellow warbler		1
	eastern towhee		1
	field sparrow		2
	northern cardinal	4	4
	rose-breasted grosbeak	1	
	American goldfinch		1
PC	blue jay	1	
	American robin	7	
	wood thrush	1	2
	gray catbird	3	1
	brown thrasher	1	2
	northern cardinal	3	2
	Baltimore oriole		1
PW	mallard	1	1
	red-tailed hawk		1
	mourning dove		3
	willow flycatcher		1
	eastern kingbird		1
	house wren		1
	American robin	7	1
	gray catbird		1
	brown thrasher	3	1
	cedar waxwing	1	1
	yellow warbler		3
	song sparrow		1
	red-winged blackbird	1	9
	Total	**50**	**121**

APPENDIX 4.11 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2012. All nests listed were active at the time of discovery, and all but one northern flicker and one brown thrasher were were followed successfully to ultimate completion (fledge or fail).

Site	Species	Tracks	Away
CM	downy woodpecker	1	
	American robin	6	14
	gray catbird		4
	brown thrasher		3
	cedar waxwing	1	2
	Yellow Warbler		4
	yellow warbler		4
	northern cardinal		1
	rose-breasted grosbeak	1	1
	Baltimore oriole		1
SC	great blue heron		4
	northern flicker		1
	red-eyed vireo		1
	blue jay		1
	American robin	4	3
	wood thrush		1
	gray catbird	7	2
	brown thrasher		1
	field sparrow		1
	northern cardinal	5	2
	dickcissel		1
PC	American robin	4	
	gray catbird	4	1
	brown thrasher		1
	cedar waxwing	1	
	northern cardinal	4	2
	indigo bunting	1	
	American goldfinch	1	
PW	mourning dove	2	2
	eastern wood-pewee		1
	willow flycatcher	1	
	eastern kingbird	2	
	barn swallow	1	
	house wren	1	
	blue-gray gnatcatcher		1
	American robin	6	
	gray catbird	4	
	cedar waxwing	4	
	yellow warbler	2	
	northern cardinal	1	
	red-winged blackbird	9	4
	orchard oriole		1
	Total	**73**	**65**

APPENDIX 4.12 Nest records by study site, bird species, and survey location with respect to the EJ&E rail corridor for 2013. All nests listed were active at the time of discovery, and were followed to active completion.

Site	Species	Tracks	Away
CM	American robin	1	
	cedar waxwing		1
	red-winged blackbird	1	
SC	great blue heron		3
	red-eyed vireo	1	
	American redstart	1	
PC	American robin	1	
	gray catbird	1	
	Total	**6**	**4**

APPENDIX 4.13 Opportunistic behavioral observations of parents and/or nestlings at focal nests in respnse to train passage events in 2012.

Site	Survey Date	Common Name	Scientific Name	Observation Time (min)	Behavior
SC	9 July	American robin	*Turdus migratorius*	30	Parents engaged in feeding nestlings throughout observation period.
	13 July	gray catbird	*Dumetella carolinensis*	*	Parents away from nest as nest approached; as train passed, parents flew near and alarm-called at observer.
	13 July	northern cardinal	*Cardinalis cardinalis*	*	Female remained stationary as train passed.
PC	19 July	northern cardinal	*Cardinalis cardinalis*	18	Male and female feeding nestlings as train passed.
	21 July	northern cardinal	*Cardinalis cardinalis*	19	Stationary on nest.
	23 July	American goldfinch	*Carduelis trista*	21	Female in attendance; remained stationary as train passed.
	23 July	northern cardinal	*Cardinalis cardinalis*	10	Female incubating; shifted position once.
	1 August	gray catbird	*Dumetella carolinensis*	3	Female in attendance; remained perched on nest rim throughout.
	2 August	American goldfinch	*Carduelis trista*	3	Nestling remained stationary as train passed.
PW	5 July	cedar waxwing	*Bombycilla cedrorum*	3	Two nestlings remained stationary in nest as train passed.
	12 July	eastern kingbird	*Tyrannus tyrannus*	3	Three nestlings remained stationary in nest as train passed.
	21 July	gray catbird	*Dumetella carolinensis*	9	Attendant adult did not move as train approached and passed.
	24 July	mourning dove	*Zenaida macroura*	7	Attendant adult did not move as train approached and passed.

* Time of observation not recorded but lasted throughout the passage of the train in the vicinity of the focal nest, approximately 3 minutes.

APPENDIX 4.14 Birds and mammals photographed by motion-sensitive camera traps that were deployed within 5–10 m of the ROW of the EJ&E rail corridor (T) or beyond 50 m (A) from the ROW. Camera were deployed at Cuba Marsh, Spring Creek, and Poplar Creek Forest Preserves.

		Cuba Marsh (CM)			Spring Creek (SC)			Poplar Creek (PC)			Grand		
	Common Name	**T**	**A**	**Total**	**T**	**A**	**Total**	**T**	**A**	**Total**	**T**	**A**	**Total**
2009	American robin	81	4	**85**	34	58	**92**	40	0	**40**	155	62	**217**
	gray catbird	21	3	**24**	2	0	**2**	0	0	**0**	23	3	**26**
	blue jay	3	0	**3**	0	0	**0**	0	0	**0**	3	0	**3**
	brown thrasher	7	3	**10**	0	0	**0**	1	0	**1**	8	3	**11**
	chickadee	3	0	**3**	0	0	**0**	3	0	**3**	6	0	**6**
	cardinal	7	0	**7**	3	0	**3**	6	0	**6**	16	0	**16**
	woodpecker	8	0	**8**	4	1	**5**	0	0	**0**	12	1	**13**
	grackle	4	0	**4**	0	0	**0**	0	0	**0**	4	0	**4**
	unknown bird	0	3	**3**	0	0	**0**	1	3	**4**	1	6	**7**
	mouse	6	0	**6**	10	7	**17**	6	0	**6**	22	7	**29**
	chipmunk	16	11	**27**	1	1	**2**	18	0	**18**	35	12	**47**
	squirrel	8	3	**11**	8	8	**16**	3	1	**4**	19	12	**31**
	opossum	1	0	**1**	2	3	**5**	6	0	**6**	9	3	**12**
	raccoon	3	10	**13**	8	1	**9**	5	4	**9**	16	15	**31**
	deer	141	214	**355**	198	69	**267**	134	330	**464**	473	613	**1086**
	fawn	27	67	**94**	3	2	**5**	96	168	**264**	126	237	**363**
	coyote	2	0	**2**	0	0	**0**	17	3	**20**	19	3	**22**
	skunk	0	0	**0**	1	0	**1**	0	0	**0**	1	0	**1**
	unclear	0	0	**0**	5	12	**17**	0	0	**0**	5	12	**17**
	2009 Total	**338**	**318**	**656**	**279**	**162**	**441**	**336**	**509**	**845**	**953**	**989**	**1942**
2010	American robin	2	0	**2**	23	17	**40**	...	...	**---**	25	17	**42**
	gray catbird	3	0	**3**	6	0	**6**	...	...	**---**	9	0	**9**
	blue jay	0	0	**0**	1	0	**1**	...	...	**---**	1	0	**1**
	mouse	12	0	**12**	0	1	**1**	...	...	**---**	12	1	**13**
	chipmunk	10	5	**15**	39	0	**39**	...	...	**---**	49	5	**54**
	squirrel	24	13	**37**	0	1	**1**	...	...	**---**	24	14	**38**
	opossum	0	0	**0**	8	0	**8**	...	...	**---**	8	0	**8**
	raccoon	7	3	**10**	0	0	**0**	...	...	**---**	7	3	**10**
	deer	0	6	**6**	19	9	**28**	...	...	**---**	19	15	**34**
	fawn	0	0	**0**	5	0	**5**	...	...	**---**	5	0	**5**
	coyote	0	0	**0**	1	0	**1**	...	...	**---**	1	0	**1**
	unclear	0	0	**0**	4	0	**4**	...	...	**---**	4	0	**4**
	2010 Total	**58**	**27**	**85**	**106**	**28**	**134**	**0**	**0**	**0**	**164**	**55**	**219**
2011	American robin	12	11	**23**	37	19	**56**	9	19	**28**	58	49	**107**
	gray catbird	4	0	**4**	15	3	**18**	0	0	**0**	19	3	**22**
	blue jay	7	0	**7**	0	0	**0**	0	0	**0**	7	0	**7**
	brown thrasher	0	0	**0**	0	3	**3**	0	0	**0**	0	3	**3**
	cardinal	3	0	**3**	2	0	**2**	5	6	**11**	10	6	**16**
	unknown bird	10	0	**10**	0	3	**3**	0	3	**3**	10	6	**16**
	mouse	3	0	**3**	6	7	**13**	1	4	**5**	10	11	**21**
	chipmunk	8	3	**11**	9	0	**9**	3	0	**3**	20	3	**23**
	squirrel	51	26	**77**	11	24	**35**	22	19	**41**	84	69	**153**
	opossum	5	3	**8**	20	1	**21**	1	1	**2**	26	5	**31**
	raccoon	11	5	**16**	13	6	**19**	90	14	**104**	114	25	**139**
	deer	176	130	**306**	51	58	**109**	107	269	**376**	334	457	**791**
	fawn	87	56	**143**	0	6	**6**	45	104	**149**	132	166	**298**
	coyote	3	1	**4**	7	1	**8**	4	4	**8**	14	6	**20**
	rabbit	0	0	**0**	12	0	**12**	0	0	**0**	12	0	**12**
	unclear	17	5	**22**	17	17	**34**	8	5	**13**	42	27	**69**
	2011 Total	**397**	**240**	**637**	**200**	**148**	**348**	**295**	**448**	**743**	**892**	**836**	**1728**

APPENDIX 4.15 Summary of timed behavioral observations of egrets and herons nesting within rookery at Lake Renwick Forest Preserve, Will County.

Observation Date and Time		Species	Behavior (time in minutes)							Notes
			Focal Bird	Brood	Perch	Mate-Feeding	Copulate	Alert-Perch	Flush	
12 April	Pre-train[A]	great egret	♀1	5	12		1			♂ flew to nest
		great egret	♀2	19						
		great egret	♀3	19						
		great egret	♀4	13	4					♂ flew to nest after other three females were under observation for 2 minutes
	Train approaches from south and passes to north	great egret	♀1		5					
		great egret	♀2	5						
		great egret	♀3	5						
		great egret	♀4	5						
	Post-train	great egret	♀1		5					♂ flew from nest 1 during this period of observation
		great egret	♀2	5						
		great egret	♀3	5						
		great egret	♀4	5						
12 April	Pre-observer[B]	great blue heron	♀1	10						
		great blue heron	♀2	10						
		great blue heron	♀3	10						
	Observer stands in clearing but away from shoreline	great blue heron	♀1	8						
		great blue heron	♀2	8						♂ flew to nest 2 and fed ♀ and then flew away from nest
		great blue heron	♀3	8						
	Observer moved to shoreline	great blue heron	♀1	8						
		great blue heron	♀2	8						
		great blue heron	♀3	8						♂ flew to nest 3 and perched for 1 minute and then flew away from nest
21 April	Pre-train	great blue heron	♀1	5						
		great blue heron	♀2	5						
		great blue heron	♀3	5						
		great blue heron	♀4	5						
		great blue heron	♀5	5						
		great blue heron	♀6	5						
	Train approaches from south and passes to nortn	great blue heron	♀1	3						
		great blue heron	♀2	3						
		great blue heron	♀3	3						
		great blue heron	♀4		3					Sat after train passed
		great blue heron	♀5	3						
		great blue heron	♀6	3						
	Post-train	great blue heron	♀1	12	5					
		great blue heron	♀2	6	11					
		great blue heron	♀3	9	8					
		great blue heron	♀4	17						Stood briefly
		great blue heron	♀5	17						
		great blue heron	♀6	17						
21 April	Train approaches from north while FPDWC truck backs up to water's edge[C]	great blue heron	♀1	2						
		great blue heron	♀2	1					1	
		great blue heron	♀3	2						
		great blue heron	♀4	2						
		great blue heron	♀5	2						♂ flew to nest after train passed and fed ♀, then flew away from nest

APPENDIX 4.15 Contd.

Observation Date and Time		Species	Behavior (time in minutes)							Notes
			Focal Bird	Brood	Perch	Mate-Feeding	Copulate	Alert-Perch	Flush	
21 May	Pre-train	great blue heron	hatchling	30	7					
		great blue heron	♀1	3		6				Adult under observation at nest flew off after 9 minutes of observation
		great blue heron	hatchlings[D]	27	9					
		great blue heron	♀2		36					
		great blue heron	hatchlings[E]	13	23					
		great blue heron	♀3	7						
		great blue heron	♀4	1	6					
		great blue heron	♀5	7						
	Train approaches from south and passes to north	great blue heron	hatchling	3						
		great blue heron	♀1	---	---					Adult not present because it flew away from nest in pre-train observation period
		great blue heron	hatchlings[D]		3					
		great blue heron	♀2		3					
		great blue heron	hatchlings[E]		3					
		great blue heron	♀3		3					Adult sat down in nest following passage of train to north
		great blue heron	♀4		3					
		great blue heron	♀5		3					
	Post-train	great blue heron	hatchling	5						
		great blue heron	♀1	---	---					Adult not present because it flew away from nest in pre-train observation period
		great blue heron	hatchlings[D]	5						
		great blue heron	♀2		5					
		great blue heron	hatchlings[E]		5					
		great blue heron	♀3	5						
		great blue heron	♀4		5					
		great blue heron	♀5		5					

[A] Helicopter flew by to east of rookery at beginning of observations

[B] Small airplane flew low almost directly over rookery

[C] After the observations reported above were made, the boat from the Forest Preserve District was launched from shore and slowly trolled towards the rookery. We made the following observations: no individuals at the rookery of any species showed noticeable reaction to the boat until it was <100 m from the rookery island. At that distance, both individual Great Blue Herons and Great Egrets displayed "alert-perching," though many remained brooding. When the boat was <90 m from the island, many individual Double-crested Cormorants flushed from the island, but some Great Egrets remained brooding and some Great Blue Herons preened while perched. As the boat approached 20m from the island, many individual Great Blue Herons and Great Egrets were alert-perching, and then many took flight as the boat trolled to about 10m from the island. After this, many birds of all species flew to and from the rookery, in apparent agitation.

[D] Hatchlings in nest of ♀1

[E] Hatchlings in nest of ♀2

SECTION 5 APPENDICES: AVIAN ACOUSTIC STUDIES

EFFECTS OF TRAIN NOISE ON BIRD VOCAL BEHAVIOR IN NATURAL AREAS ALONG THE EJ&E RAIL LINE WEST OF CHICAGO

David Enstrom, T. J. Benson, and David Tcheng

APPENDIX SUMMARY

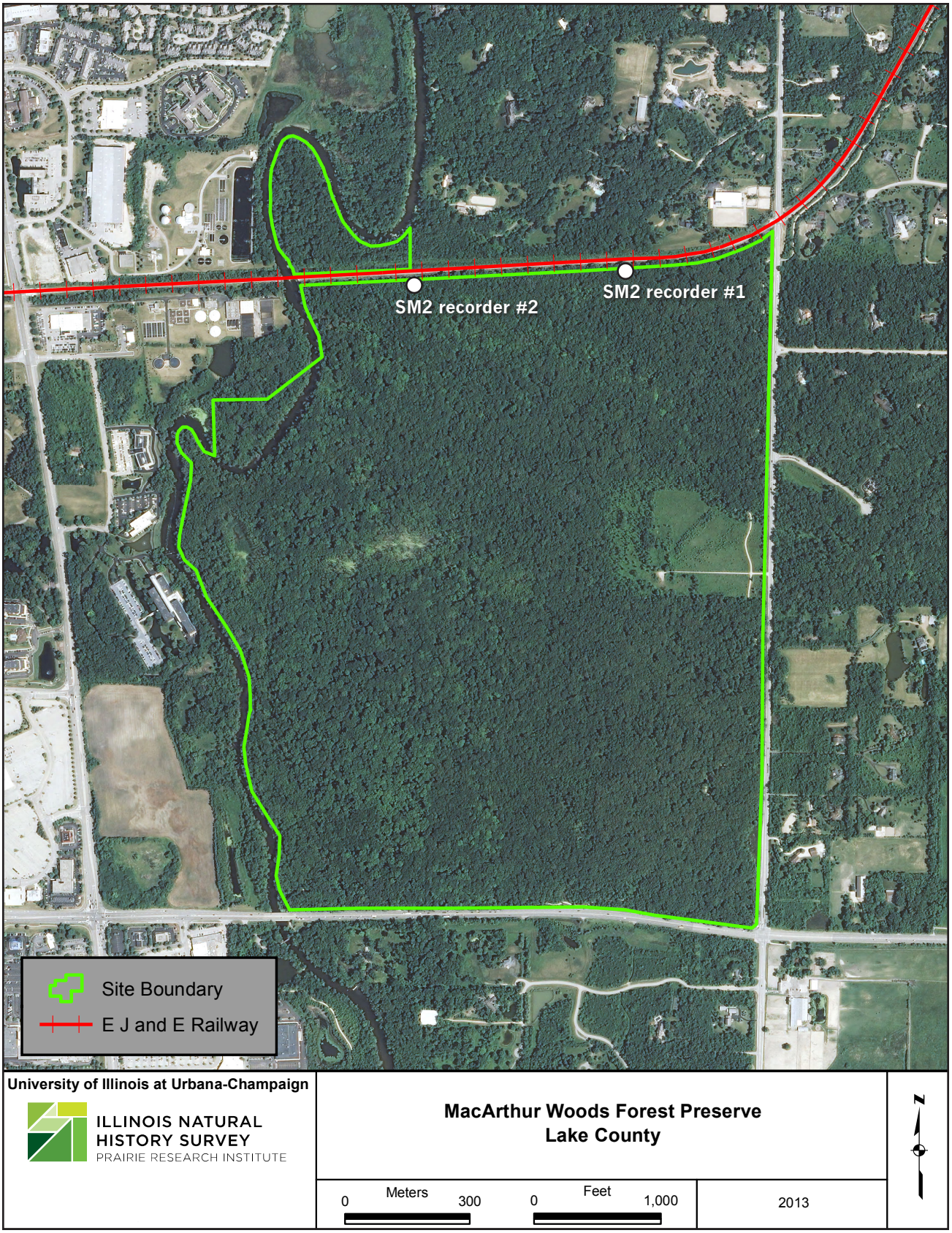
APPENDIX 5.1 Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices.

APPENDIX 5.2 Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices.

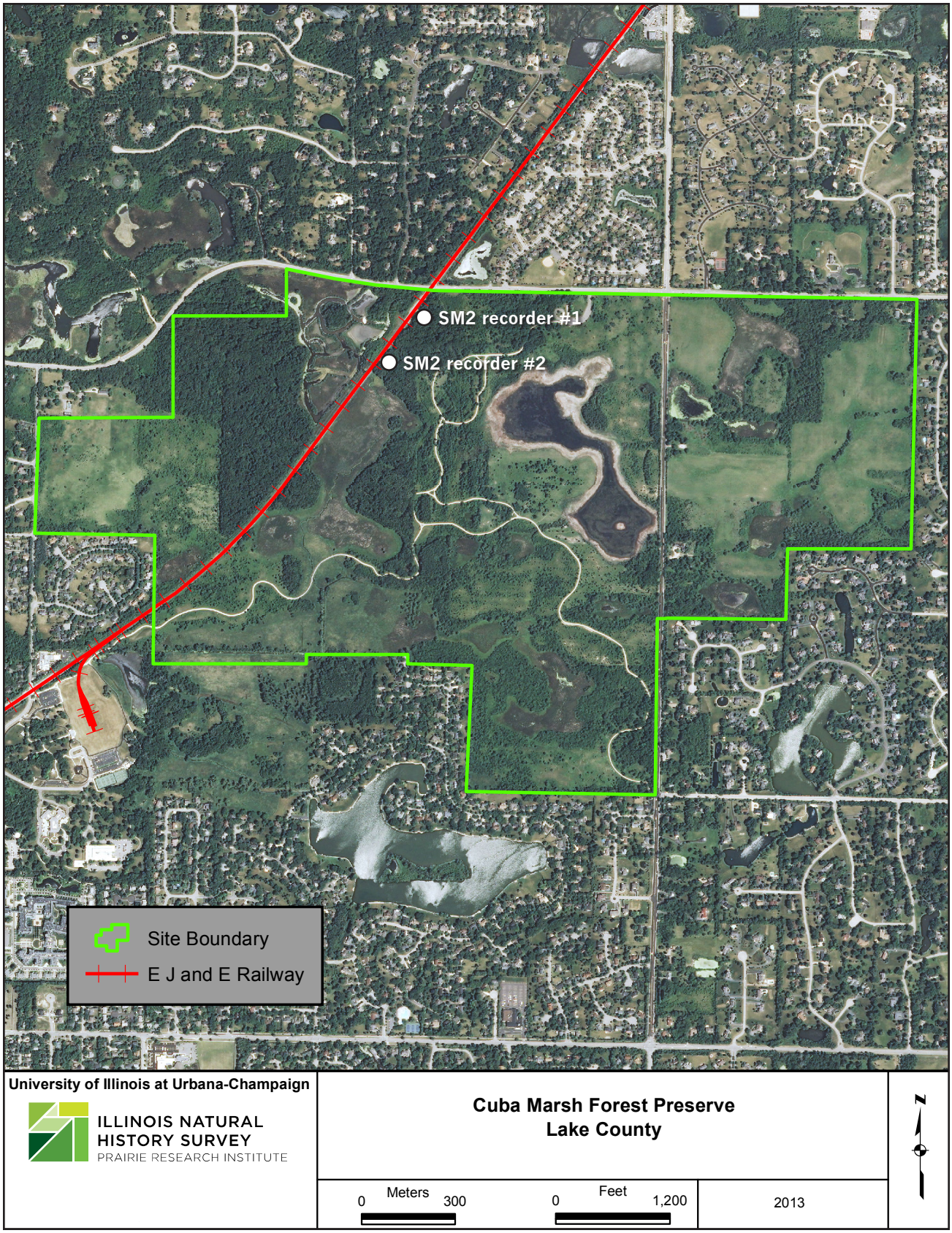
APPENDIX 5.3 Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices; yellow outline indicates the area in which the microphone tracking study was conducted.

APPENDIX 5.4 Bird species detected during acoustic studies. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PW = Pratt's Wayne Woods, and WC = West Chicago Prairie.

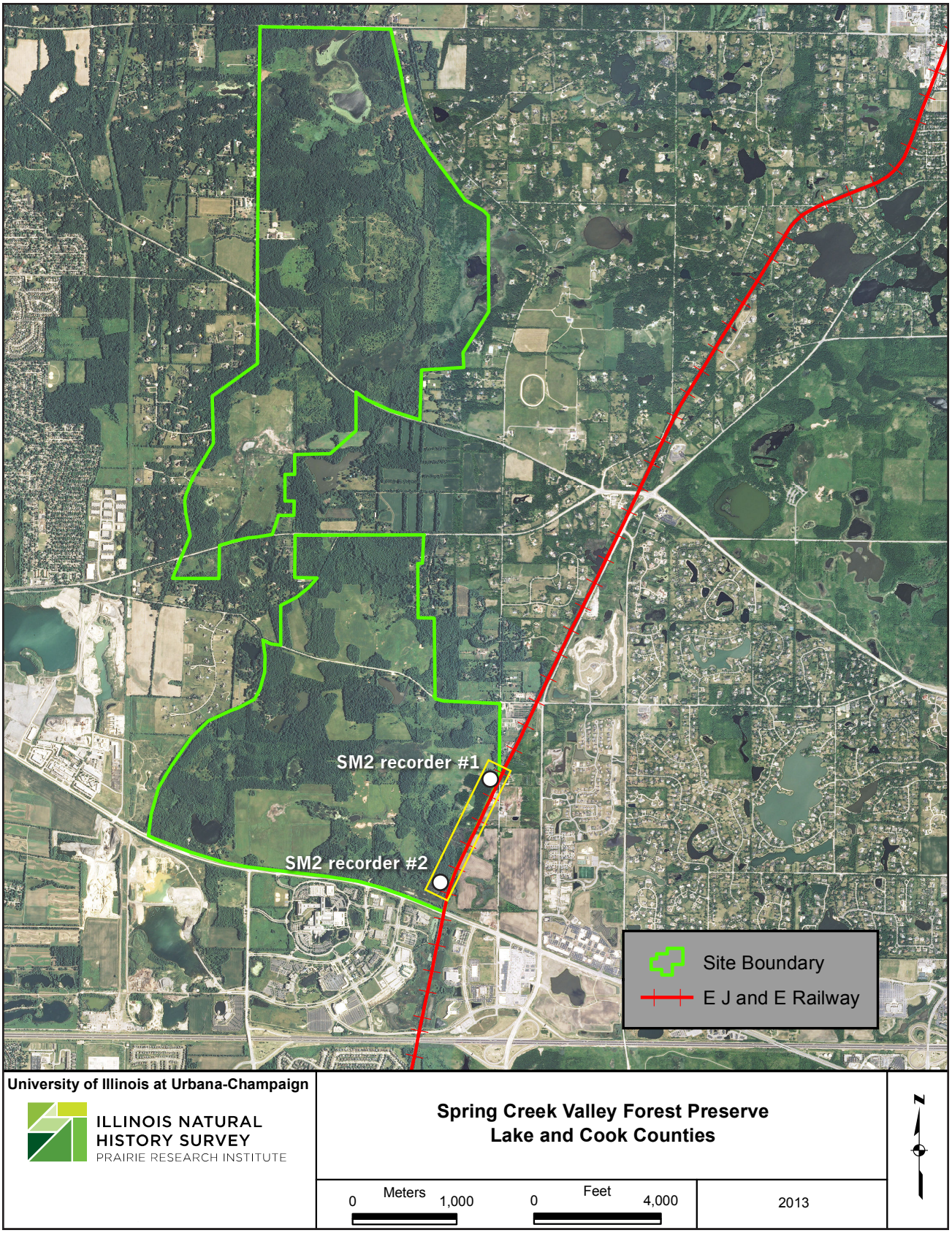
APPENDIX 5.1 Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices.



APPENDIX 5.2 Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices.



APPENDIX 5.3 Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line. White circles indicate the position of SM2 recording devices; yellow outline indicates the area in which the microphone tracking study was conducted.



APPENDIX 5.4 Bird species detected during the acoustic studies. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PW = Pratt's Wayne Woods, and WC = West Chicago Prairie.

Family	Common Species Name	Scientific Species Name	MW	CM	SC	PW	WC
Anatidae	Canada goose	*Branta canadensis*			●	●	
	wood duck	*Aix sponsa*			●	●	
	mallard	*Anas platyrhynchos*			●	●	
	blue-winged teal	*Anas discors*				●	
Phasianidae	ring-necked pheasant	*Phasianus colchicus*			●	●	●
Podicipedidae	pied-billed grebe	*Podilymbus podiceps*				●	
Ardeidae	least bittern	*Ixobrychus exilis*				●	
	great blue heron	*Ardea herodias*			●	●	●
	green heron	*Butorides virescens*				●	
	black-crowned night-heron	*Nycticorax nycticorax*				●	
Rallidae	king rail	*Rallus elegans*				●	
	Virginia rail	*Rallus limicola*				●	
	sora	*Porzana carolina*				●	
	common moorhen	*Gallinula chloropus*				●	
	American coot	*Fulica americana*				●	
Gruiformes	sandhill crane	*Grus canadensis*				●	
Sternidae	black tern	*Chlidonias niger*					
Charadriidae	killdeer	*Charadrius vociferus*		●	●	●	●
Scolopacidae	upland sandpiper	*Bartramia longicauda*				●	
Laridae	ring-billed gull	*Larus delawarensis*				●	
Columbidae	mourning dove	*Zenaida macroura*	●	●	●	●	●
Strigidae	great horned owl	*Bubo virginianus*			●		
Caprimulgidae	common nighthawk	*Chordeiles minor*			●		●
Apodidae	chimney swift	*Chaetura pelagica*	●	●	●	●	●
Picidae	red-bellied woodpecker	*Melanerpes carolinus*	●	●	●	●	●
	downy woodpecker	*Picoides pubescens*	●	●	●	●	●
	northern flicker	*Colaptes auratus*	●	●	●	●	●
Tyrannidae	eastern wood-pewee	*Contopus virens*	●	●	●		●
	willow flycatcher	*Empidonax traillii*				●	●
	eastern phoebe	*Sayornis phoebe*		●	●		
	great crested flycatcher	*Myiarchus crinitus*	●	●	●		●
	eastern kingbird	*Tyrannus tyrannus*			●	●	●
Vireonidae	warbling vireo	*Vireo gilvus*			●	●	
	white-eyed vireo	*Vireo griseus*			●		●
	red-eyed vireo	*Vireo olivaceus*	●	●			
Corvidae	blue jay	*Cyanocitta cristata*	●	●	●	●	●
	American crow	*Corvus brachyrhynchos*	●	●	●	●	●
Hirundinidae	tree swallow	*Tachycineta bicolor*		●		●	●
	barn swallow	*Hirundo rustica*		●	●	●	●
Paridae	black-capped chickadee	*Poecile atricapillus*	●	●	●		●
	tufted titmouse	*Baeolophus bicolor*	●	●	●		●
Sittidae	white-breasted nuthatch	*Sitta carolinensis*	●	●	●		
Troglodytidae	house wren	*Troglodytes aedon*	●	●	●		●
	sedge wren	*Cistothorus platensis*				●	
	marsh wren	*Cistothorus palustris*				●	
Polioptilidae	blue-gray gnatcatcher	*Polioptila caerulea*		●	●		
Turdidae	eastern bluebird	*Sialia sialis*			●	●	●
	wood thrush	*Hylocichla mustelina*		●	●		
	American robin	*Turdus migratorius*	●	●	●	●	●

APPENDIX 5.4 Contd.

Family	Common Species Name	Scientific Species Name	MW	CM	SC	PW	WC
Mimidae	gray catbird	*Dumetella carolinensis*		●	●		●
	brown thrasher	*Cinclocerthia ruficauda*			●		
Sturnidae	European starling	*Sturnus vulgaris*	●	●	●	●	●
Bombycillidae	cedar waxwing	*Bombycilla cedrorum*		●	●		●
Parulidae	common yellowthroat	*Geothlypis trichas*		●	●	●	●
	American redstart	*Setophaga ruticilla*		●	●		●
	yellow warbler	*Setophaga petechia*			●	●	●
Emberizidae	eastern towhee	*Pipilo erythrophthalmus*	●	●	●	●	●
	chipping sparrow	*Spizella passerina*		●			●
	field sparrow	*Spizella pusilla*			●	●	●
	savannah sparrow	*Passerculus sandwichensis*				●	
	song sparrow	*Melospiza melodia*	●	●	●	●	●
Cardinalidae	scarlet tanager	*Piranga olivacea*		●	●	●	
	northern cardinal	*Cardinalis cardinalis*	●	●	●	●	●
	rose-breasted grosbeak	*Pheucticus ludovicianus*	●	●	●		
	indigo bunting	*Passerina cyanea*	●	●	●	●	●
	dickcissel	*Spiza americana*				●	
Icteridae	bobolink	*Dolichonyx oryzivorus*				●	
	red-winged blackbird	*Agelaius phoeniceus*		●	●	●	●
	eastern meadowlark	*Sturnella magna*		●	●	●	●
	yellow-headed blackbird	*Xanthocephalus xanthocephalus*				●	
	common grackle	*Quiscalus quiscula*			●	●	●
	brown-headed cowbird	*Molothrus ater*	●	●	●	●	●
	orchard oriole	*Icterus spurius*			●		●
	Baltimore oriole	*Icterus galbula*	●		●		●
Fringillidae	American goldfinch	*Spinus tristis*	●	●	●	●	●
Passeridae	house sparrow	*Passer domesticus*					●
	TOTAL	**74 species**	**24 species**	**36 species**	**52 species**	**53 species**	**41 species**

SECTION 6 APPENDICES: AQUATIC COMMUNITIES

AQUATIC COMMUNITIES IN FIVE WEST-CHICAGO FOREST PRESERVES SUBJECT TO THE IMPACTS OF THE EJ&E RAILROAD

Yong Cao, Patrick Wilkins, and Edward Heske

APPENDIX SUMMARY

APPENDIX 6.1 (a) Cuba Marsh: Three marsh sites and 2 stream sites were sampled for macroinvertebrates in Cuba March Preserve. Cuba Marsh East (CME) is a small and shallow pond right beside the railroad with a plenty of macrophytes, subject to the potential impact of the railroad (treatment). The other two marsh sites (Cuba Marsh West [CMW] and Cuba Marsh Middle [CMM]) are considered as "controls". Fisher Creek runs through a marsh with substrates dominated by pebble and silt. The site located directly south of the EJ&E line is more subject to the potential impact of the railroad (FC1; treatment) than the site located farther downstream (FC2; control).

APPENDIX 6.1 (b) Poplar Creek: Two Poplar Creek sites located upstream (PCU; control) and downstream (PCD; treatment) of the railroad were sampled for macroinvertebrates, fish and mussels.

APPENDIX 6.1 (c) Pratt's Wayne Woods: The upstream site in Brewster Creek (BCU1) is right below a beaver dam in the exit of a pond, about 300 m upstream of the railroad. Substrates are mainly gravels and cobbles. The middle site (BCU2) is 30 m upstream of the railroad with sandy substrates and a plenty of aquatic plants. Both sites are considered as controls. The third site is 10 m downstream of the railroad (BCD; treatment). Substrates mainly consisted of gravel and sand, and aquatic plants were abundant.

APPENDIX 6.1 (d) Fermilab: Two sites were sampled for macroinvertebrates. The west site, upstream of the railroad (FLU; control) is channel-like and deep with plenty of weeds along the banks. The east site (FLD; downstream and subject to potential impact; treatment) is shallow and fast-running, with the substrates dominated by pebbles and cobbles.

APPENDIX 6.1 (e) Lake Renwick: The two sites along Darter Pond are located in the northern (LRN; treatment) and southern shorelines (LRS; control). Both sites were sampled for macroinvertebrates and fish. Two sampling sites in Lily Cache River, upstream (LCU; control) and downstream (LCD; treatment) of the railroad were sampled for macroinvertebrates.

APPENDIX 6.2 Field datasheet for calculating Qualitative Habitat Evaluation Index (QHEI).

APPENDIX 6.3 (a) Macroinvertebrate samples (300 individuals) collected from all sites except Spring Creek in 2009 and 2010 (see Table 6.3 for sampling location codes).

APPENDIX 6.3 (b) Macroinvertebrate samples (300 individuals) collected from all sites except Spring Creek in 2009 and 2010 (see Table 6.3 for sampling location codes).

APPENDIX 6.4 Macroinvertebrate samples (300 individuals) collected from all sampling locations in 2011 (see Table 6.3 for sampling location codes).

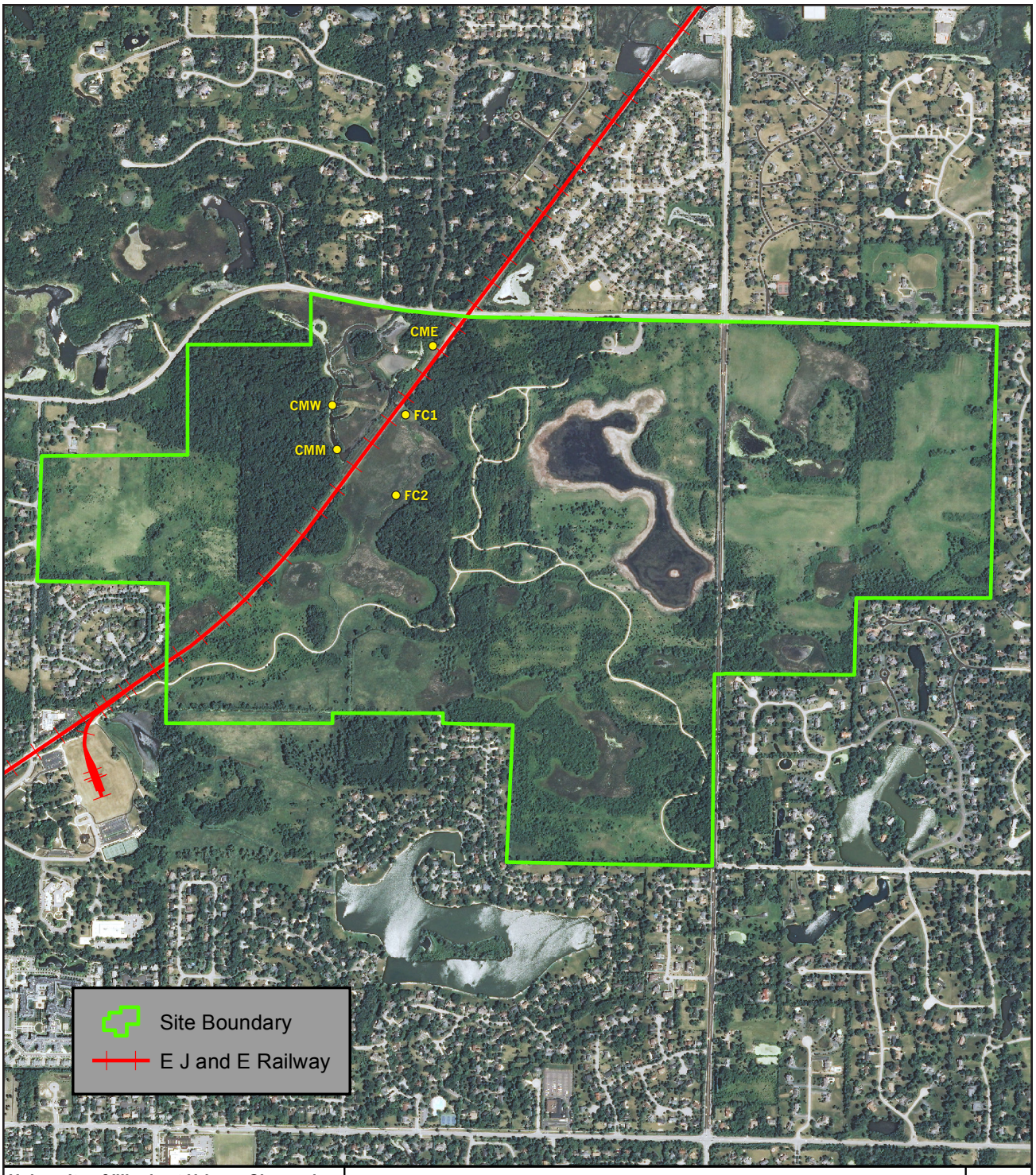
APPENDIX 6.5 Macroinvertebrate samples (300 individuals) collected from all sampling locations in 2012 (see Table 6.3 for sampling location codes).

APPENDIX 6.6 Summary of fish samples collected from two sites in Poplar Creek during 2009–2012, including the abundance of individual species, total number of fish individuals and species collected, and estimates of IL-EPA-IBI.

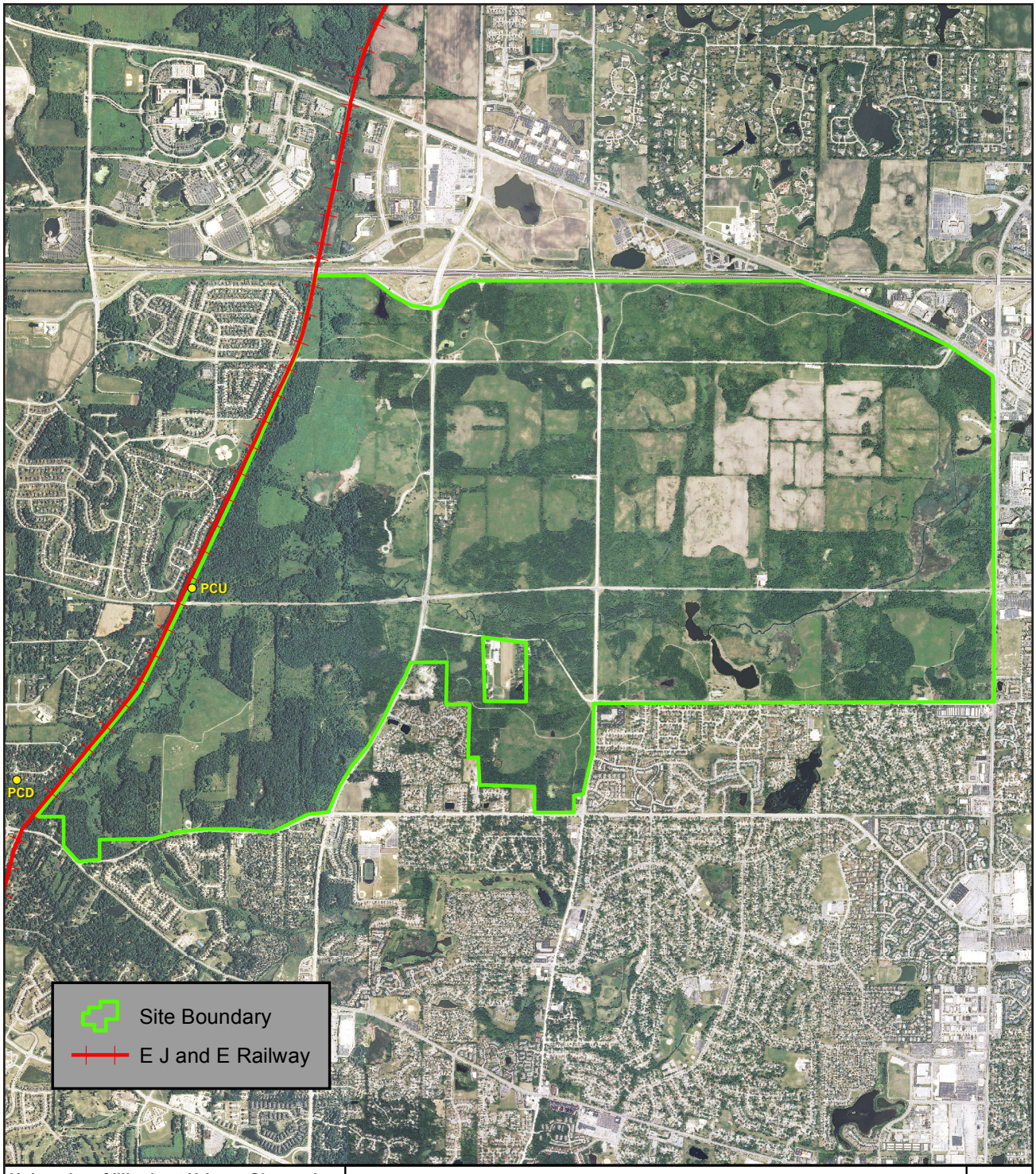
APPENDIX 6.7 Summary of fish samples collected at two sites in Darter Pond at Lake Renwick in 2009–2012.

APPENDIX 6.8 Abudance of eight mussel species found at two locations in Poplar Creek. Four man-hours per survey were spent in 2010 and 2012, while eight man-hours per survey were spent in 2011.

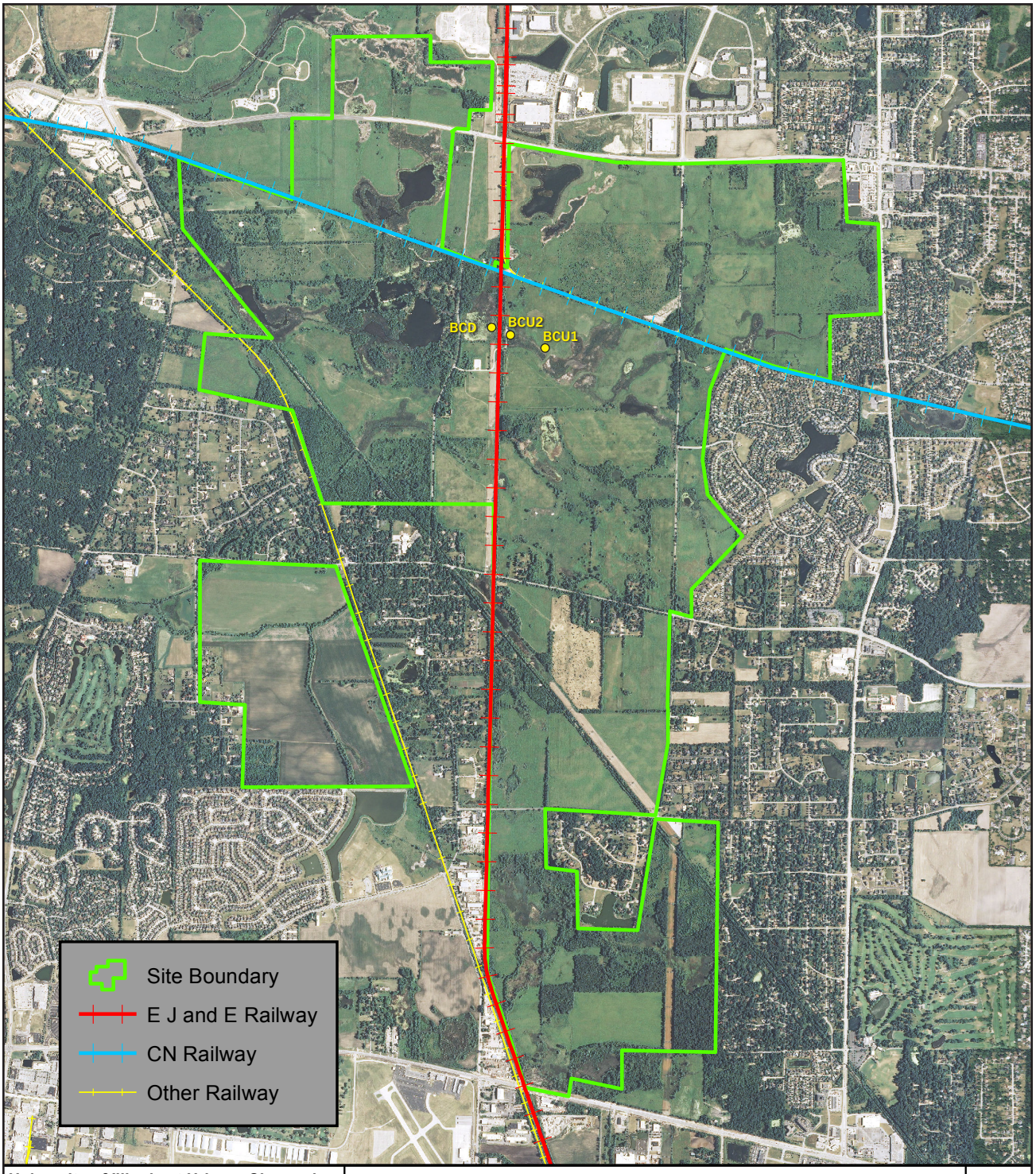
APPENDIX 6.1 (a) Cuba Marsh: Three marsh sites and 2 stream sites were sampled for macroinvertebrates in Cuba March Preserve. Cuba Marsh East (CME) is a small and shallow pond right beside the railroad with a plenty of macrophytes, subject to the potential impact of the railroad (treatment). The other two marsh sites (Cuba Marsh West [CMW] and Cuba Marsh Middle [CMM]) are considered as "controls". Fisher Creek runs through a marsh with substrates dominated by pebble and silt. The site located directly south of the EJ&E line is more subject to the potential impact of the railroad (FC1; treatment) than the site located farther downstream (FC2; control).



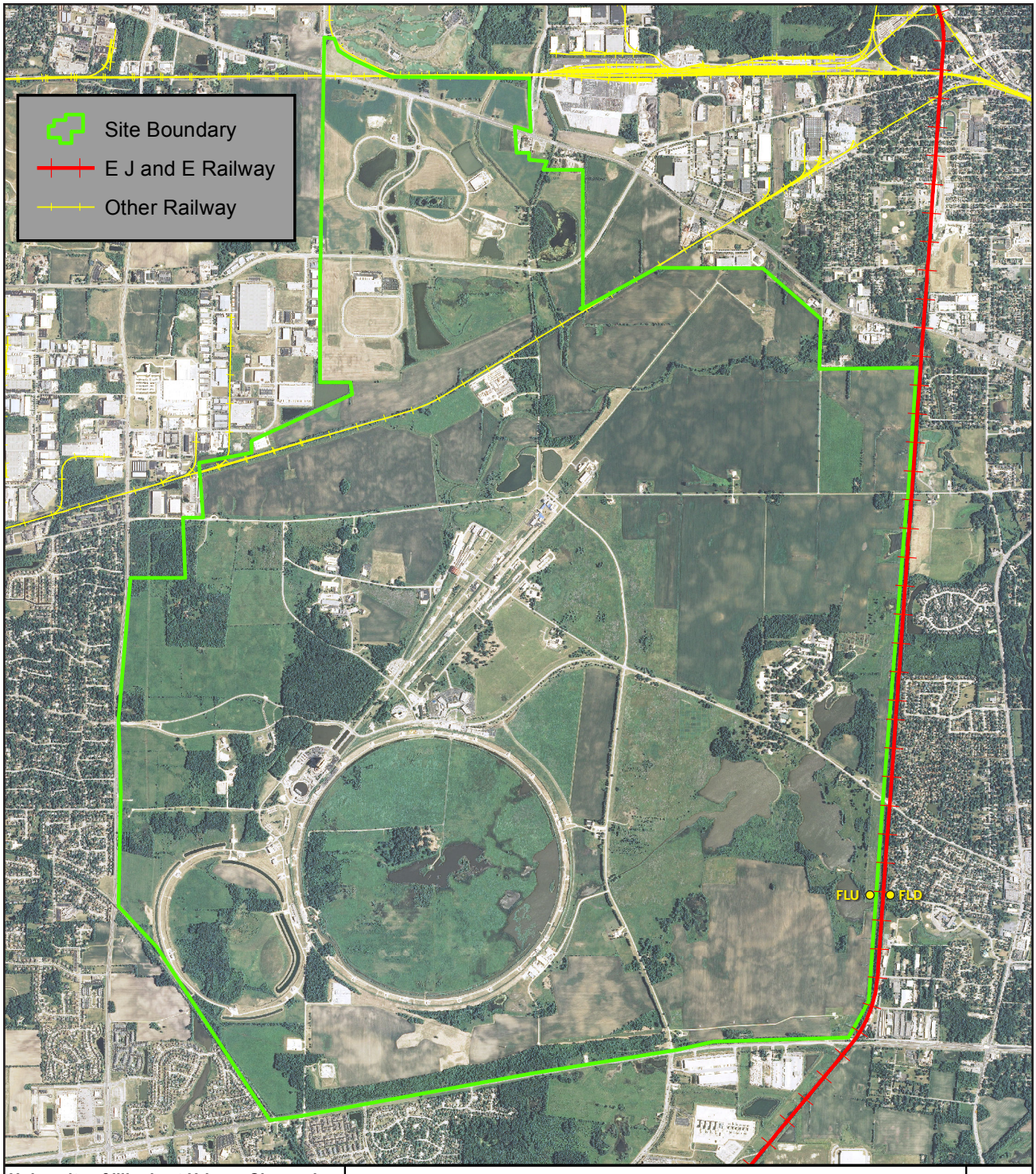
APPENDIX 6.1 (b) Poplar Creek: Two Poplar Creek sites located upstream (PCU; control) and downstream (PCD; treatment) of the railroad were sampled for macroinvertebrates, fish and mussels.



APPENDIX 6.1 (c) Pratt's Wayne Woods: The upstream site in Brewster Creek (BCU1) is right below a beaver dam in the exit of a pond, about 300 m upstream of the railroad. Substrates are mainly gravels and cobbles. The middle site (BCU2) is 30 m upstream of the railroad with sandy substrates and a plenty of aquatic plants. Both sites are considered as controls. The third site is 10 m downstream of the railroad (BCD; treatment). Substrates mainly consisted of gravel and sand, and aquatic plants were abundant.

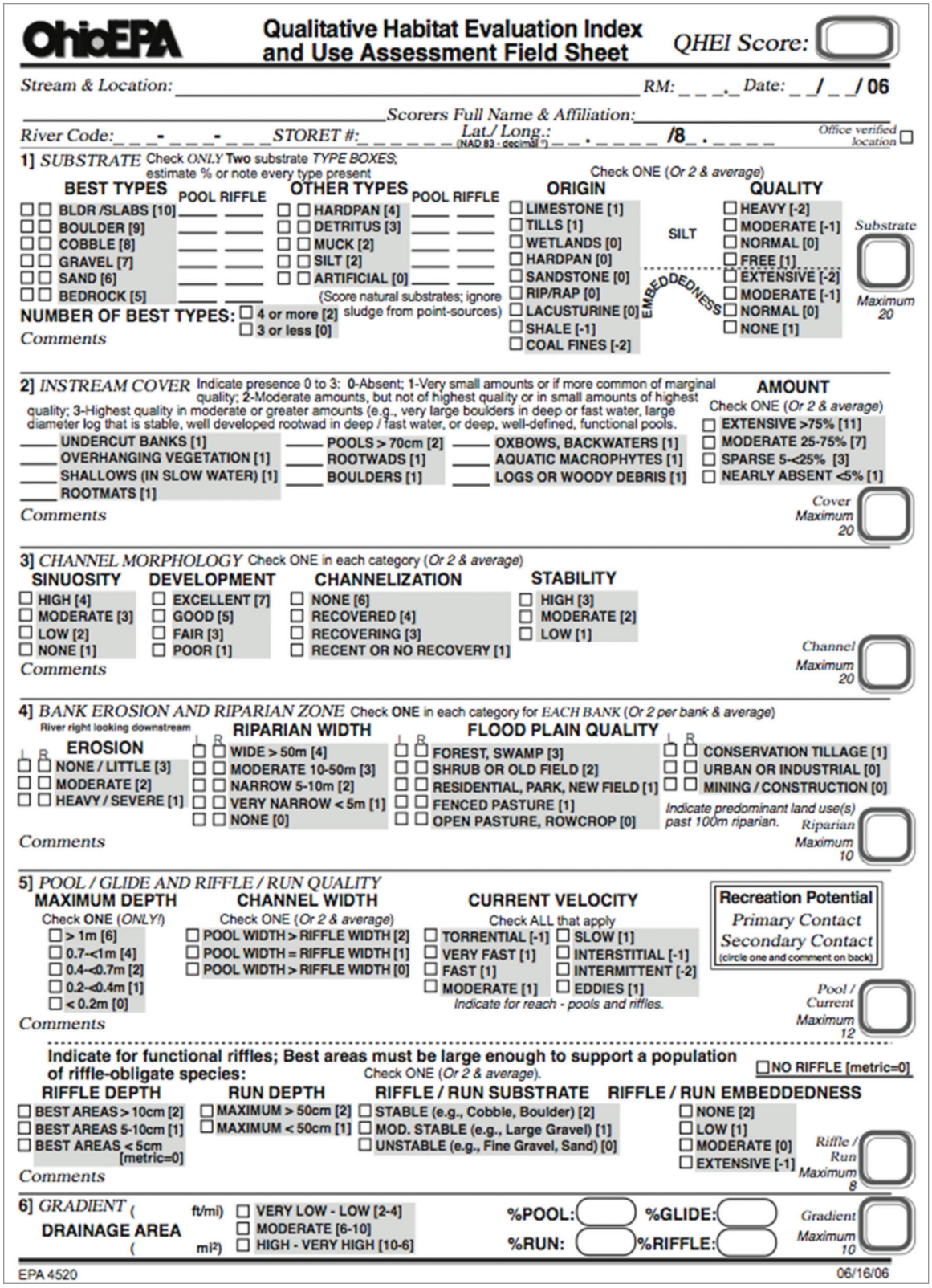


APPENDIX 6.1 (d) Fermilab: Two sites were sampled for macroinvertebrates. The west site, upstream of the railroad (FLU; control) is channel-like and deep with plenty of weeds along the banks. The east site (FLD; downstream and subject to potential impact; treatment) is shallow and fast-running, with the substrates dominated by pebbles and cobbles.



APPENDIX 6.1 (e) Lake Renwick: The two sites along Darter Pond are located in the northern (LRN; treatment) and southern shorelines (LRS; control). Both sites were sampled for macroinvertebrates and fish. Two sampling sites in Lily Cache River, upstream (LCU; control) and downstream (LCD; treatment) of the railroad were sampled for macroinvertebrates.

APPENDIX 6.2 Field datasheet for calculating Qualitative Habitat Evaluation Index (QHEI).



OhioEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: ____

Stream & Location: _____ RM: _ _ _._ Date: _ _/ _ _/ 06

Scorers Full Name & Affiliation: _____

River Code: _ _ _ - _ _ _ - _ _ _ STORET #: _ _ _ _ _ _ Lat./ Long.: (NAD 83 - decimal °) _ _ . _ _ _ _ /8_ . _ _ _ _ Office verified location ☐

1] SUBSTRATE Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]	____	____
☐☐ GRAVEL [7]	____	____	☐☐ SILT [2]	____	____
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	____	____
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

ORIGIN	SILT / EMBEDDEDNESS	QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
☐ TILLS [1]		☐ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]		☐ EXTENSIVE [-2]
☐ RIP/RAP [0]		☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Comments

Substrate ____ Maximum 20

2] INSTREAM COVER Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
____ OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)

☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20 ____

3] CHANNEL MORPHOLOGY Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20 ____

4] BANK EROSION AND RIPARIAN ZONE Check **ONE** in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]
☐☐ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]
	☐☐ NONE [0]	☐☐ OPEN PASTURE, ROWCROP [0]

(L R)
☐☐ CONSERVATION TILLAGE [1]
☐☐ URBAN OR INDUSTRIAL [0]
☐☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian Maximum 10 ____

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current Maximum 12 ____

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 ____

6] GRADIENT (ft/mi) ☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (mi²)

%POOL: ____ %GLIDE: ____
%RUN: ____ %RIFFLE: ____

Gradient Maximum 10 ____

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APPENDIX 6.3 (a) Macroinvertebrate samples (300 individuals) collected from all sites except Spring Creek in 2009 and 2010 (see Table 6.3 for sampling location codes).

Taxa	FC2	FC1	CMM		CMW		CME		PCU		PCD		BCU1	
	2010	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Turbellaria	1	9	0	4	0	2	0	0	2	1	1	0	0	0
Hirudinea	2	2	0	1	1	3	1	1	0	0	1	4	5	5
Oligochaeta	20	7	35	8	17	6	33	95	8	0	3	3	51	20
Mullusca														
Corbicula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeriidae	14	21	0	0	0	1	0	16	22	22	2	6	3	1
Amnicola sp.	0	0	0	0	0	0	0	0	0	6	0	0	0	0
Stagnicola sp.	0	0	0	0	0	0	22	7	0	0	0	0	0	1
Lymnaeidae	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Menetus sp.	5	1	0	5	0	3	0	0	0	0	0	0	1	1
Gyraulus sp.	0	0	10	0	0	0	0	0	0	0	0	0	0	0
Helisoma sp.	0	0	9	0	0	0	0	0	0	0	0	0	1	0
Physa sp.	74	0	0	29	2	27	33	22	2	2	5	2	3	9
Planorbella sp.	0	0	0	0	0	1	0	4	0	0	0	0	0	2
Elimia sp.	0	0	0	0	0	0	0	0	4	8	6	17	0	0
Pleurocera sp.	0	0	0	0	0	0	0	0	3	20	2	11	3	0
Crustacea														
Crangonyx sp.	0	0	0	0	0	0	0	0	0	0	0	0	4	1
Gammarus sp.	0	0	0	0	0	0	0	1	0	0	0	0	17	19
Hyalella sp.	36	11	0	55	21	60	0	6	11	3	0	0	5	0
Cambaridae	0	0	11	0	0	0	0	0	0	1	0	1	0	0
Asselidae	23	12	1	0	0	0	0	13	3	2	1	1	182	219
Dubiraphia sp.	0	0	0	0	0	0	0	0	4	5	3	2	0	0
Macronychus sp.	0	0	0	0	0	0	0	0	3	2	3	1	0	0
Coleoptera														
Optioservus sp.	0	0	0	0	0	0	0	0	3	3	0	1	0	0
Stenelmis sp.	0	0	0	0	0	0	0	0	17	56	32	65	0	0
Dineutus sp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Ectopria sp.	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Diptera-Ceratopogonidae														
Atrichopogon sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Bezzia sp.	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Culicoides sp.	0	0	0	0	0	23	0	0	0	0	0	0	0	0
Probezzia sp.	0	0	0	6	0	0	0	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	0	3	7	14	0	0	0	0	0	0	0	0
Diptera-Chaoboridae														
Chaoborus sp.	0	0	0	0	0	0	0	8	0	0	0	0	0	0
Diptera-Chironomidae														
Ablabesmyia sp.	2	0	13	0	4	0	13	5	0	0	0	0	0	0
Acricotopus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brillia sp.	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Cardiocladius sp.	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Chironomus sp.	1	0	53	2	8	0	33	8	0	0	0	0	0	0
Cladopelma sp.	0	0	0	16	9	26	3	8	0	0	0	0	0	0
Cladotanytarsus sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Clinotanypus sp.	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Cricotopus sp.	10	6	0	0	2	0	2	0	1	2	5	1	0	0
Cryptochironomus sp.	1	0	25	4	4	3	0	3	3	2	13	4	0	0
Dicrotendipes sp.	0	1	51	0	23	2	48	7	0	0	0	0	0	0
Endochironomus sp.	20	29	12	29	27	7	4	12	0	1	0	0	0	0

APPENDIX 6.3 (a) Contd.

Taxa	FC2	FC1	CMM		CMW		CME		PCU		PCD		BCU1	
	2010	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Eukiefferiella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glyptotendipes sp.	0	4	0	1	0	0	13	2	3	0	0	0	0	0
Guttipelopia sp.	0	0	0	7	7	4	13	0	0	0	0	0	0	0
Harnischia sp.	0	0	10	0	0	0	0	0	0	0	0	0	0	0
Labrundinia sp.	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Larsia sp.	0	0	0	0	0	0	12	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meropelopia sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Micropsectra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Microtendipes sp.	0	0	0	0	0	0	0	0	17	19	33	55	0	0
Nanocladius sp.	0	0	0	0	0	0	0	5	0	0	0	0	0	0
Parachironomus sp.	55	44	0	7	0	0	1	2	0	0	0	0	0	0
Paramerina sp.	0	5	0	1	3	0	9	14	0	0	0	0	1	1
Parametriocnemus sp.	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Paratanytarsus sp.	1	0	0	0	0	0	14	6	2	0	4	1	0	0
Paratendipes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pentaneura sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Phaenopsectra sp.	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Polypedilum sp.	3	15	0	0	5	0	2	5	28	17	15	13	0	0
Procladius sp.	0	1	0	6	11	11	7	9	0	1	0	0	0	0
Psectrocladius sp.	0	0	0	0	0	0	1	0	0	0	0	0	4	0
Psectrotanypus sp.	0	0	7	0	0	0	0	0	0	0	0	0	0	0
Psephenus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheocricotopus sp.	0	0	0	0	0	0	0	0	2	0	0	2	0	0
Rheotanytarsus sp.	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Stictochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanypus sp.	0	0	2	2	6	2	18	14	0	0	0	0	0	0
Tanytarsus sp.	0	0	2	0	2	0	3	0	0	0	1	0	0	0
Thienemanniella sp.	7	3	0	0	0	0	0	0	44	0	42	1	3	2
Thienemannimyia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zavreliella marmorata	0	0	0	0	11	4	3	6	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	1	0	0	2	0	0	0	0	0	0	0	0
Diptera-Simuliidae														
Simulium sp.	0	110	0	0	0	0	0	2	0	3	48	3	11	13
Diptera-Stratiomyidae	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Diptera-Tabanidae														
Chrysops sp.	1	0	0	0	1	9	0	0	0	0	0	0	0	0
Tabanus sp.	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Diptera-Tipulidae														
Ormosia sp.	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Tipula sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Ephemeroptera														
Baetis sp.	0	0	0	0	0	0	0	0	0	18	14	64	0	0
Caenis sp.	22	15	0	68	106	57	0	0	2	0	4	0	0	0
Hexagenia sp.	0	0	40	0	0	0	0	0	0	0	0	0	0	0
Heptageniidae	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Tricorythodes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Perlidae														
Trichoptera	0	0	0	0	0	0	0	0	32	4	22	0	0	0

APPENDIX 6.3 (a) Contd.

Taxa	FC2	FC1	CMM		CMW		CME		PCU		PCD		BCU1	
	2010	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Helicopsyche borealis	0	0	0	0	0	0	0	0	0	13	0	6	0	0
Ceratopsyche sp.	0	0	0	0	0	0	0	0	17	21	9	19	0	0
Cheumatopsyche sp.	0	3	0	0	0	0	0	0	54	39	20	12	2	0
Hydropsyche sp.	0	0	0	0	0	0	0	0	3	18	1	1	0	0
Orthotrichia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptocerus sp.	0	0	0	46	21	33	0	0	0	0	0	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oecetis sp.	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Triaenodes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chimarra sp.	0	0	0	0	0	0	0	0	0	7	2	1	0	0
Lepidoptera														
Fossaria sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	3
Odonata														
Aeshnidae	0	0	0	0	0	0	0	3	1	0	0	0	0	0
Hetaerina sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Argia sp.	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Coenagrion-Enallagma sp.	0	0	0	0	0	0	0	0	0	3	1	0	0	0
Ishnura sp.	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Lestes sp.	0	0	0	0	1	0	4	14	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	7	0	0	0	0	0	2	0

APPENDIX 6.3 (b) Macroinvertebrate samples (300 individuals) collected from all sites except Spring Creek in 2009 and 2010 (see Table 6.3 for sampling location codes).

Taxa	BCU2		BCD		FLU		FLD		LRS		LRN		LCU	LCD
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2010	2010
Turbellaria	0	0	0	0	0	0	0	0	2	6	9	12	3	0
Hirudinea	7	19	14	7	0	13	0	0	4	26	3	28	31	0
Oligochaeta	41	26	17	10	25	15	0	10	8	5	7	8	21	11
Mullusca														
Corbicula sp.	0	0	0	0	0	0	0	0	0	0	0	0	11	0
Sphaeriidae	14	18	9	2	0	3	1	0	0	0	0	0	12	4
Amnicola sp.	0	0	0	0	0	0	0	0	0	0	0	0	6	1
Stagnicola sp.	0	24	0	1	0	0	0	0	0	0	0	0	0	0
Lymnaeidae	1	12	0	2	0	0	0	0	0	0	0	0	0	29
Menetus sp.	0	5	0	0	0	0	0	0	3	20	0	35	4	4
Gyraulus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Helisoma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physa sp.	7	26	2	40	0	10	5	6	2	8	2	13	21	26
Planorbella sp.	0	42	0	32	0	0	0	1	0	0	0	0	0	0
Elimia sp.	0	0	3	0	0	0	0	0	0	0	0	0	6	0
Pleurocera sp.	0	0	0	0	0	0	0	0	0	0	0	0	12	0
Crustacea														
Crangonyx sp.	0	2	21	0	0	0	0	0	0	0	0	0	0	0
Gammarus sp.	2	11	12	0	0	0	0	0	0	0	0	0	0	0
Hyalella sp.	7	29	12	131	4	1	0	2	234	165	253	99	40	1
Cambaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Asselidae	18	11	155	49	0	66	1	0	3	0	0	0	6	0
Dubiraphia sp.	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Macronychus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coleoptera														
Optioservus sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Stenelmis sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Dineutus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ectopria sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ceratopogonidae														
Atrichopogon sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bezzia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Culicoides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Probezzia sp.	0	0	0	0	0	1	0	0	1	1	0	12	0	0
Sphaeromias sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Diptera-Chaoboridae														
Chaoborus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Chironomidae														
Ablabesmyia sp.	0	0	0	0	0	0	0	0	0	0	1	8	0	0
Acricotopus sp.	0	0	7	0	0	0	0	0	0	0	0	0	0	0
Brillia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardiocladius sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomus sp.	57	23	1	0	0	0	0	0	1	2	10	15	0	0
Cladopelma sp.	0	0	0	0	5	0	1	0	3	0	0	2	3	2
Cladotanytarsus sp.	0	0	1	0	0	0	0	0	5	0	0	0	0	0
Clinotanypus sp.	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Cricotopus sp.	0	0	7	1	20	20	2	120	0	0	0	0	0	0
Cryptochironomus sp.	0	1	0	0	7	0	1	0	5	0	0	0	0	0
Dicrotendipes sp.	9	7	0	0	17	1	1	15	0	3	0	2	1	0
Endochironomus sp.	0	0	0	0	23	6	0	26	0	4	0	6	0	0

APPENDIX 6.3 (b) Contd.

Taxa	BCU2		BCD		FLU		FLD		LRS		LRN		LCU	LCD
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2010	2010
Eukiefferiella sp.	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Glyptotendipes sp.	0	0	0	0	132	6	30	26	0	3	0	2	0	0
Guttipelopia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harnischia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0	0	1	0	0	4	0	0
Larsia sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lauterborniella sp.	1	0	0	0	0	0	0	0	0	17	0	6	0	0
Meropelopia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micropsectra sp.	0	4	5	0	0	0	0	0	0	0	0	0	0	0
Microtendipes sp.	6	0	0	0	0	0	0	0	0	0	0	0	3	0
Nanocladius sp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Parachironomus sp.	0	0	4	0	32	27	4	66	0	2	0	2	0	0
Paramerina sp.	4	1	0	1	0	0	0	0	5	5	0	8	2	0
Parametriocnemus sp.	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Paratanytarsus sp.	67	2	11	1	18	1	1	7	3	0	0	0	7	0
Paratendipes sp.	0	1	0	0	0	0	0	0	0	0	0	0	4	0
Pentaneura sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaenopsectra sp.	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Polypedilum sp.	3	0	0	0	1	1	1	0	1	1	0	0	7	1
Procladius sp.	0	1	0	0	6	0	1	0	1	0	0	0	2	0
Psectrocladius sp.	0	0	4	4	0	0	0	0	4	0	1	0	0	1
Psectrotanypus sp.	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Psephenus sp.	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0	0	3	0	1	0	0
Rheocricotopus sp.	22	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheotanytarsus sp.	10	1	7	1	0	0	0	0	0	0	0	0	0	0
Stictochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanypus sp.	2	3	0	0	0	0	0	0	0	0	0	0	0	1
Tanytarsus sp.	2	3	2	1	1	0	0	0	0	0	0	2	0	0
Thienemanniella sp.	0	0	4	0	0	0	0	0	0	0	0	0	5	0
Thienemannimyia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zavreliella marmorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Simuliidae														
Simulium sp.	0	0	1	1	5	126	251	1	0	0	0	0	0	0
Diptera-Stratiomyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Diptera-Tabanidae														
Chrysops sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tabanus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Tipulidae														
Ormosia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tipula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ephemeroptera														
Baetis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caenis sp.	2	1	0	0	0	0	0	13	11	19	6	15	4	0
Hexagenia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heptageniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tricorythodes sp.	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Perlidae														
Trichoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 6.3 (b) Contd.

Taxa	BCU2		BCD		FLU		FLD		LRS		LRN		LCU	LCD
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2010	2010
Helicopsyche borealis	0	0	0	0	0	0	0	0	0	0	0	0	41	0
Ceratopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Cheumatopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	11	0
Hydropsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	17	0
Orthotrichia sp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0
Leptocerus sp.	0	0	0	0	0	0	0	0	0	1	0	2	0	0
Nectopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Oecetis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triaenodes	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Chimarra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepidoptera														
Fossaria sp.	0	22	0	16	0	0	0	0	0	0	0	0	0	0
Odonata														
Aeshnidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hetaerina sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Argia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coenagrion-Enallagma sp.	0	0	0	0	0	0	0	1	1	7	7	10	5	3
Ishnura sp.	13	0	0	0	0	0	0	5	2	2	0	3	1	1
Lestes sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Libellulidae	0	1	0	0	0	0	0	0	0	0	1	0	0	0

APPENDIX 6.4 Macroinvertebrate samples (300 individuals) collected from all sampling locations in 2011 (see Table 6.3 for sampling location codes).

Taxa	FC2	FC1	CMM	CMW	CME	PCU	PCD	BCU1	BCU2	BCD	FLU	FLD	LRS	LRN	LCD	LCU
Turbellaria	0	3	2	0	0	1	2	0	0	0	0	0	1	7	0	2
Oligochaeta	8	4	7	0	1	1	11	12	8	12	145	46	5	2	9	74
Hirudinea	11	0	1	1	2	0	3	2	13	4	1	10	5	6	20	2
Mollusca																
Corbicula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeriidae	2	17	3	0	6	41	0	0	6	1	0	0	0	0	0	8
Dubiraphia sp.	10	0	0	0	0	19	12	0	0	0	0	0	0	0	40	2
Macronychus sp.	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Ancylidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrobiidae	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	2
Lymnaeidae	0	1	0	0	46	0	1	12	32	14	3	2	0	0	0	5
Physa sp.	47	13	10	23	5	17	10	60	6	1	25	4	24	18	1	56
Gyraulus sp.	3	10	5	0	1	0	0	20	0	2	0	0	155	96	1	5
Helisoma sp.	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Planorbella sp.	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Planorbula armigera	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Promenetus exa	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Pleurocera sp.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Cipangopaludina sp.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	22	0
Viviparus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valvata tricarinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea																
Crangonyx sp.	0	0	0	0	14	0	0	1	0	0	0	0	0	0	0	0
Hyalella sp.	13	2	16	2	0	1	0	55	15	28	6	0	20	16	0	4
Cambaridae	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2
Asselidae	22	31	0	0	48	0	0	4	1	7	0	20	0	0	0	0
Acari	1	0	32	82	3	0	4	8	1	1	10	1	22	83	20	0
Coleoptera																
Optioservus sp.	0	0	0	0	0	12	5	0	0	0	0	0	0	0	0	0
Stenelmis sp.	0	1	0	0	0	61	117	0	0	0	0	0	0	0	1	0
Dineutus sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Gyrinus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tropisternus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ceratopogonidae																
Bezzia sp.	2	0	3	3	2	0	0	0	0	0	2	0	19	16	0	0
Palpomyia sp.	0	0	0	0	70	0	0	31	3	2	0	0	0	0	0	0
Sphaeromias sp.	6	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Diptera-Chironomidae																
Ablabesmyia sp.	0	0	0	0	16	0	3	0	0	1	0	0	3	3	0	0
Acricotopus sp.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Brillia sp.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Chaetocladius sp.	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Chironomus sp.	0	0	3	1	1	0	0	1	12	0	4	0	3	11	0	0
Cladopelma sp.	0	0	8	2	0	0	0	0	0	0	2	0	1	0	0	0
Cladotanytarsus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clinotanypus sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Corynoneura sp.	0	0	0	0	2	0	0	1	12	8	0	0	0	0	0	0
Cricotopus sp.	1	3	0	1	0	0	0	44	48	144	41	7	1	1	0	16
Cryptochironomus sp.	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0
Cryptotendipes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dicrotendipes sp.	0	0	4	0	22	0	1	1	13	2	0	1	4	3	0	0

APPENDIX 6.4 Contd.

Taxa	FC2	FC1	CMM	CMW	CME	PCU	PCD	BCU1	BCU2	BCD	FLU	FLD	LRS	LRN	LCD	LCU
Einfeldia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endochironomus sp.	4	11	6	5	1	0	0	1	1	1	1	0	2	6	0	0
Glyptotendipes sp.	3	2	1	0	0	0	1	0	0	0	31	50	2	3	0	0
Guttipelopia sp.	5	1	18	14	0	0	0	0	0	0	0	0	0	1	0	0
Harnischia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0	0	0	0	0	0	3	8	0	0
Larsia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Limnophyes sp.	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
Micropsectra sp.	0	0	0	0	0	0	0	0	40	8	0	4	0	0	0	0
Microtendipes sp.	0	0	0	0	0	16	38	0	0	0	0	0	0	0	0	0
Nanocladius sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parachironomus sp.	4	1	0	3	0	1	0	0	0	0	10	9	0	0	0	0
Parakiefferiella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paralauterborniella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parametriocnemus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paratanytarsus sp.	0	0	0	0	14	0	4	3	24	15	0	0	2	0	0	0
Paratendipes sp.	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Pentaneura sp.	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Phaenopsectra sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Polypedilum sp.	1	35	0	1	5	72	30	11	7	7	0	0	1	2	0	74
Procladius sp.	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
Psectrocladius sp.	0	0	0	0	11	0	0	0	0	3	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Rheocricotopus sp.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rheotanytarsus sp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Stempellina sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Stenochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stictochironomus sp.	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Tanypus sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Tanytarsus sp.	0	0	1	0	1	0	1	2	34	13	0	0	0	0	0	0
Thienemanniella sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Thienemannimyia sp.	15	4	0	0	0	8	15	3	1	5	0	0	0	0	0	4
Tribelos sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zavreliella sp.	1	0	24	4	0	0	0	0	0	0	0	0	0	1	0	0
Diptera-Dolichopodidae																
Dolichopodidae	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ephydridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Empididae	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Diptera-Sciomyzidae	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0
Diptera-Simuliidae																
Simulium sp.	0	114	0	0	0	0	3	14	0	2	0	143	0	0	0	35
Diptera-Stratiomyidae	2	0	1	1	1	0	0	7	1	5	0	0	0	1	0	0
Diptera-Tabanidae																
Chrysops sp.	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0
Diptera-Tipulidae																
Tipula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ephemeroptera																
Baetis flavistriga	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Baetis intercalaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 6.4 Contd.

Taxa	FC2	FC1	CMM	CMW	CME	PCU	PCD	BCU1	BCU2	BCD	FLU	FLD	LRS	LRN	LCD	LCU
Caeni sp.	131	44	143	138	0	0	1	2	7	9	0	0	17	10	0	2
Hexagenia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenacron sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tricorythodes sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Lepidoptera																
Parapoynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petrophila sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Megaloptera																
Corydalidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sialis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera																
Perlidae	0	0	0	0	0	11	6	1	0	0	0	0	0	0	0	0
Trichoptera																
Helicopsyche sp.	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Cheumatopsyche sp.	0	0	0	0	0	16	6	0	0	0	0	0	0	0	0	0
Hydropsyche sp	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0
Hydroptila sp.	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Ceraclea sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Leptocerus sp.	0	0	6	17	0	0	0	0	0	0	0	0	2	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Oecetis sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Triaenodes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orthotrichia sp.	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Chimarra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odonata																
Aeshnidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calopteryx sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Hetaerina sp.	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Argia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coenagrion/Enallagma	3	2	0	0	0	1	6	0	0	2	18	0	2	0	0	2
Corduliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lestes sp.	0	0	1	0	19	0	0	0	3	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0

APPENDIX 6.5 Macroinvertebrate samples (300 individuals) collected from all sampling locations in 2012 (see Table 6.3 for sampling location codes).

Taxa	FCD	FCU	CMM	CMW	PCU	PCD	BCM	BCD	FLU	FLD	LRS	LRN	LCU	LCD
Turbellaria	2	14	0	0	1	2	0	0	0	0	0	2	4	0
Oligochaeta	34	14	11	28	4	8	2	3	209	140	0	25	14	7
Hirudinea	2	10	0	0	4	0	56	40	0	6	0	0	20	5
Mollusca														
Corbicula sp.	0	0	0	0	0	0	0	0	0	0	0	0	13	2
Sphaeriidae	0	51	1	0	15	7	119	2	0	3	0	0	17	3
Ancylidae	0	0	0	0	0	0	3	1	0	0	0	0	2	0
Hydrobiidae	0	0	0	0	2	0	0	0	0	0	0	0	5	0
Lymnaeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physa sp.	2	46	12	4	13	4	0	8	9	67	32	3	19	16
Gyraulus sp.	2	11	10	13	0	0	2	5	0	0	62	20	0	9
Helisoma anc	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Planorbella sp.	0	0	0	0	0	0	5	10	0	0	0	0	0	0
Planorbula armigera	0	0	0	0	0	0	10	0	0	0	0	0	0	0
Promenetus exa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleurocera sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cipangopaludina sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Valvata tricarinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viviparus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari	63	13	40	61	5	1	2	0	18	5	39	32	6	14
Crustacea														
Cambaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crangonyx sp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hyalella sp.	46	22	26	14	2	0	53	22	0	0	4	43	11	144
Asselidae	7	57	0	0	1	0	3	145	0	6	0	0	4	0
Coleoptera														
Dubiraphia sp.	0	0	0	0	6	0	0	0	0	0	0	0	6	8
Macronychus sp.	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Optioservus sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Stenelmis sp.	0	0	0	0	37	28	0	0	0	0	0	0	6	0
Dineutus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gyrinus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tropisternus sp.	0	0	0	0	1	0	0	0	1	1	0	0	0	0
Diptera-Ceratopogonidae														
Bezzia sp.	6	5	5	2	0	0	0	2	0	0	25	18	0	0
Palpomyia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	5	4	0	0	0	0	0	0	0	0	0	0
Diptera-Chironomidae														
Ablabesmyia sp.	4	0	9	5	0	0	0	0	0	0	11	1	0	0
Acricotopus sp.	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Brillia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaetocladius sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomus sp.	1	0	16	11	2	0	3	1	2	3	0	0	0	6
Cladopelma sp.	1	0	1	1	0	0	0	1	1	1	0	0	3	4
Cladotanytarsus sp.	0	0	0	0	0	0	0	0	0	0	4	0	0	2
Clinotanypus sp.	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Corynoneura sp.	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Cricotopus sp.	0	2	6	2	1	9	0	3	4	22	4	0	2	10
Cryptochironomus sp.	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Cryptotendipes sp.	0	0	0	0	1	0	0	0	0	0	4	0	0	2
Dicrotendipes sp.	0	1	3	0	0	0	3	0	0	0	2	0	3	4

APPENDIX 6.5 Contd.

Taxa	FCD	FCU	CMM	CMW	PCU	PCD	BCM	BCD	FLU	FLD	LRS	LRN	LCU	LCD
Einfeldia	0	0	0	0	0	0	0	0	12	6	0	0	0	0
Endochironomus sp.	1	0	3	0	0	0	0	1	0	0	0	0	0	0
Glyptotendipes sp.	4	0	0	0	0	0	0	0	27	13	0	0	0	0
Guttipelopia sp.	8	0	18	2	0	0	0	2	0	0	1	1	0	0
Harnischia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0	0	0	0	8	14	0	1
Larsia sp.	0	0	1	4	0	0	0	0	0	0	3	10	0	0
Lauterborniella sp.	0	0	0	0	0	0	0	0	0	0	7	30	0	0
Limnophyes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micropsectra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Microtendipes	0	0	0	0	30	49	0	0	0	0	0	0	0	0
Nanocladius sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Orthocladius complex	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Parachironomus sp.	5	1	3	0	0	0	0	0	7	10	1	0	0	0
Parakiefferiella sp.	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Paralauterborniella sp.	0	0	0	0	0	0	0	0	0	0	0	0	4	6
Parametriocnemus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paratanytarsus sp.	0	1	1	0	14	22	12	3	0	0	2	0	0	2
Paratendipes sp.	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Pentaneura sp.	0	0	0	0	0	5	0	0	0	0	0	0	2	0
Phaenopsectra sp.	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Polypedilum	0	1	2	23	18	14	2	0	0	0	1	1	23	16
Procladius sp.	8	1	0	1	3	1	0	1	4	3	2	1	9	7
Psectrocladius sp.	0	0	0	0	0	0	0	0	0	0	3	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0	0	0	3	3	0	0
Rheocricotopus sp.	0	0	0	0	3	6	0	0	0	0	0	0	0	0
Rheotanytarsus	0	0	0	0	11	14	0	0	0	0	0	0	1	0
Stempellina sp.	0	0	0	0	0	0	0	0	0	0	2	1	0	0
Stenochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stictochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanypus sp.	6	0	0	3	0	0	0	0	0	4	0	0	22	4
Tanytarsus sp.	0	0	0	0	8	1	1	2	0	0	0	1	11	2
Thienemanniella sp.	0	0	0	0	1	2	0	0	0	0	0	0	0	2
Thienemannimyia sp.	0	0	0	0	19	13	4	0	0	0	0	0	4	0
Tribelos sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zavreliella sp.	0	0	0	0	0	0	4	2	0	0	2	2	0	0
Diptera-Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Empididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ephydridae	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Simuliidae														
Simulium sp.	0	0	0	0	0	11	1	0	0	9	0	0	0	0
Diptera-Stratiomyidae	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Diptera-Tabanidae														
Chrysops sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Tipulidae														
Tipula sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Ephemeroptera														
Baetis flavistriga	0	0	0	0	10	24	0	0	0	0	0	0	1	0
Baetis intercalaris	0	0	0	0	0	5	0	0	0	0	0	0	16	0
Caenis sp.	98	47	117	118	3	2	12	41	0	0	73	83	4	1

APPENDIX 6.5 Contd.

Taxa	FCD	FCU	CMM	CMW	PCU	PCD	BCM	BCD	FLU	FLD	LRS	LRN	LCU	LCD
Hexagenia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stenacron sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tricorythodes sp.	0	0	0	0	0	0	0	0	0	0	0	0	35	0
Lepidoptera														
Parapoynx sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Megaloptera														
Corydalidae	0	0	1	0	0	0	0	0	1	0	0	0	0	1
Sialis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera														
Perlidae	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Trichoptera														
Helicopsyche borealis	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Cheumatopsyche sp.	0	0	0	0	44	28	0	0	0	0	0	0	3	0
Hydropsyche sp	0	0	0	0	28	35	0	0	0	0	0	0	0	0
Orthotrichia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydroptila sp.	0	0	0	0	2	5	0	0	0	0	0	0	3	0
Ceraclea sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptocerus ame	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	14	1
Oecetis sp.	0	0	1	0	0	1	0	0	0	0	0	1	0	0
Triaenodes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chimarra sp.	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Petrophila sp.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Odonata														
Aeshnidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calopteryx sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hetaerina sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coenagrion/Enallagma	0	2	8	3	2	0	0	0	5	1	5	4	3	15
Argia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corduliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lestes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	1	3	0	0	0	3	0	0

APPENDIX 6.6 Summary of fish samples collected from two sites in Poplar Creek during 2009–2012, including the abundance of individual species, total number of fish individuals and species collected, and estimates of IL-EPA-IBI.

			PCU (Upstream)				PCD (Downstream)			
Family	**Scientific Name**	**Common Name**	**2009**	**2010**	**2011**	**2012**	**2009**	**2010**	**2011**	**2012**
Atherinidae	*Labidesthes sicculus*	Brook Silverside	0	0	2	1	0	0	2	6
Catostomidae	*Catostomus commersoni*	White Sucker	20	19	18	7	28	1	0	0
	Hypentelium nigricans	Northern Hogsucker	0	3	11	0	0	9	3	8
Centrarchidae	*Micropterus salmoides*	Largemouth Bass	28	21	13	3	32	12	1	1
	Micropterus dolomieui	Smallmouth Bass	6	6	0	9	38	11	33	53
	Lepomis macrochirus	Bluegill	4	28	48	33	50	9	47	76
	Lepomis cyanellus	Green Sunfish	14	4	12	27	4	11	12	70
	Lepomis microlophus	Redear Sunfish	0	0	0	0	0	0	0	1
	Lepomis gibbosus	Pumpkinseed	0	1	0	0	0	0	0	0
Cyprinidae	*Campostoma anomalum*	Central Stoneroller Minnow	283	58	77	51	21	20	35	16
	Cyprinus carpio	Common Carp	0	0	0	1	0	1	0	2
	Luxilus cornutus	Common Shiner	127	23	1	6	58	25	10	26
	Nocomis biguttatus	Hornyhead Chub	17	15	20	4	94	17	15	23
	Semotilus atromaculatus	Creek Chub	77	57	39	34	40	25	7	8
	Pimephales notatus	Bluntnose Minnow	296	98	149	333	490	75	70	208
Cyprinodontidae	*Fundulus notatus*	Blackstrip Topminnow	0	0	1	133	0	0	0	14
Ictaluridae	*Ameiurus natalis*	Yellow Bullhead	2	6	12	3	8	3	8	6
Percidae	*Etheostoma nigrum*	Johnny Darter	25	8	14	26	40	8	3	4
	Etheostoma flabellare	Fantail Darter	24	16	20	14	47	8	9	10
Scenidae	*Aplodinotus grunniens*	Freshwater Drum	0	0	0	0	1	0	0	0
		Total number of individuals	**923**	**363**	**437**	**685**	**951**	**235**	**255**	**531**
		Total Richness	**13**	**12**	**15**	**16**	**14**	**15**	**14**	**16**
		Fish IBI	**34**	**38**	**36**	**30**	**30**	**36**	**33**	**33**

APPENDIX 6.7 Summary of fish samples collected at two sites in Darter Pond at Lake Renwick in 2009–2012.

			LRS (South Bank)				LRN (North Bank)			
Family	**Scientific Name**	**Common Name**	**2009**	**2010**	**2011**	**2012**	**2009**	**2010**	**2011**	**2012**
Centrarchidae	*Lepomis cyanellus*	Green sunfish	17	3	0	1	4	4	0	1
	Lepomis macrochirus	Bluegill	15	82	5	9	0	17	6	1
	Micropterus salmoides	Large-mouth bass	7	0	3	1	6	4	6	0
	Notemigonus crysoleucas	Golden shiner	1	0	0	0	0	0	0	0
	Pomoxis nigromaculatus	Black Crappie	0	0	1	0	0	0	1	0
Cyprinodontidae	*Fundulus notatus*	Blackstrip topminnow	1	0	0	7	0	0	0	0
Esocidae	*Esox americanus*	Grass pickerel	2	2	0	0	2	0	1	0
Percidae	*Etheostoma exile*	Iowa darter	4	1	0	*1	3	1	0	0
	Etheostoma nigrum	Johnny darter	2	1	0	0	0	1	0	0
	Perca flavescens	Yellow perch	4	2	0	0	2	0	0	0
		Total number of fish	**53**	**91**	**9**	**19**	**17**	**32**	**14**	**2**
		Total Richness	**9**	**6**	**3**	**5**	**5**	**5**	**4**	**2**

APPENDIX 6.8 Abudance of eight mussel species found at two locations in Poplar Creek. Four man-hours per survey were spent in 2010 and 2012, while eight man-hours per survey were spent in 2011.

		PCU (Upstream)			PCD (Downstream)		
Scientific Name	**Common Name**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Anodontoides ferussacianus	Cylindrical papershell	8	2	2	0	0	0
Fusconaia flava	Wabash pigtoe	1	0	0	0	0	0
Lampsilis cardium	Plain pocketbook	0	0	0	0	1	0
Lasmigona complanata	White heelsplitter	0	1	0	0	0	1
Pyganodon grandis	Giant floater	1	33	39	0	0	0
Strophitus undulatus	Creeper	1	2	0	0	0	0
Venustaconcha ellipsiformis	Ellipse	0	29	131	8	9	4
Alasmidonta viridis	Slippershell mussel	0	0	1	0	0	0
	Total number of mussels	**11**	**67**	**173**	**8**	**10**	**5**
	Total Richness	**4**	**5**	**3**	**1**	**2**	**2**

SECTION 7 APPENDICES: STREAM QUALITY

MACROINVERTEBRATES, HABITAT QUALITY, AND WATER QUALITY IN TWO URBAN STREAMS: INFLUENCE OF FOREST PRESERVES AND PROXIMITY TO EJ&E RAILROAD TRACKS

Yong Cao, Patrick Wilkins, Edward Heske, and Jeff Levengood

APPENDIX SUMMARY

APPENDIX 7.1 Macroinvertebrate samples (300 individuals) collected from six sampling locations in Poplar Creek in 2009 and 2010 (see Table 7.1 for sampling location codes).

APPENDIX 7.2 Macroinvertebrate samples (300 individuals) collected from seven sampling locations in Poplar Creek in 2011 (see Table 7.1 for sampling location codes).

APPENDIX 7.3 Macroinvertebrate samples (300 individuals) collected from six sampling locations in Spring Creek in 2011 (see Table 7.1 for sampling location codes).

APPENDIX 7.4 Macroinvertebrate samples (300 individuals) collected from seven sampling locations in Poplar Creek in 2012 (see Table 7.1 for sampling location codes).

APPENDIX 7.5 Field datasheet for calculating Qualitative Habitat Evaluation Index (QHEI).

APPENDIX 7.6 Competing set of top candidate models for water quality (WQ), habitat quality (HQ), land cover (LC), and distance downstream from first sampling location (DIST) for each metric in Poplar Creek. K = no. estimable parameters, L = likelihood of model, AIC_c = Akaike's Information Criterion corrected for small sample size, ΔAIC_c : AIC_i – minimum AIC_i and w_i are Akaike weights. (-) = negative relationship with metric.

APPENDIX 7.7 Competing set of top candidate models for water quality (WQ), habitat quality (HQ), land cover (LC), and distance downstream from first sampling location (DIST) for each metric in Spring Creek. K = no. estimable parameters, L = likelihood of model, AIC_c = Akaike's Information Criterion corrected for small sample size, ΔAIC_c : AIC_i – minimum AIC_i and w_i are Akaike weights. (-) = negative relationship with metric.

APPENDIX 7.1 Macroinvertebrate samples (300 individuals) collected from six sampling locations in Poplar Creek in 2009 and 2010 (see Table 7.1 for sampling location codes).

Taxa	P1	P2	P3	P4		NP5		NP6
	2010	2010	2010	2009	2010	2009	2010	2010
Turbellaria	1	4	0	2	1	1	0	0
Hirudinea	2	17	0	0	0	1	4	8
Oligochaeta	0	18	8	8	0	3	3	15
Mullusca								
Corbicula sp.	0	1	0	0	0	0	0	0
Sphaeriidae	6	14	21	22	22	2	6	15
Amnicola sp.	0	0	10	0	6	0	0	29
Stagnicola sp.	0	0	0	0	0	0	0	0
Lymnaeidae	1	0	1	0	0	0	0	0
Menetus sp.	0	0	0	0	0	0	0	0
Gyraulus sp.	0	0	0	0	0	0	0	0
Helisoma sp.	0	0	0	0	0	0	0	0
Physa sp.	0	11	17	2	2	5	2	20
Planorbella sp.	0	0	0	0	0	0	0	0
Elimia sp.	0	0	0	4	8	6	17	0
Pleurocera sp.	0	0	0	3	20	2	11	29
Crustacea								
Crangonyx sp.	6	0	0	0	0	0	0	0
Gammarus sp.	0	0	0	0	0	0	0	0
Hyalella sp.	30	32	0	11	3	0	0	8
Cambaridae	3	0	0	0	1	0	1	0
Asselidae	11	1	0	3	2	1	1	3
Dubiraphia sp.	0	6	11	4	5	3	2	14
Macronychus sp.	0	0	0	3	2	3	1	0
Coleoptera								
Optioservus sp.	0	0	0	3	3	0	1	0
Stenelmis sp.	0	5	20	17	56	32	65	2
Dineutus sp.	0	0	0	0	0	0	0	0
Ectopria sp.	0	0	0	4	0	0	0	0
Diptera-Ceratopogonidae								
Atrichopogon sp.	0	0	0	0	0	0	0	0
Bezzia sp.	0	0	0	0	0	0	0	0
Culicoides sp.	0	0	0	0	0	0	0	0
Probezzia sp.	0	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	0	0	0	0	0	0
Diptera-Chaoboridae								
Chaoborus sp.	0	0	0	0	0	0	0	0
Diptera-Chironomidae								
Ablabesmyia sp.	0	0	0	0	0	0	0	0
Acricotopus sp.	0	0	0	0	0	0	0	0
Brillia sp.	0	0	0	0	0	0	0	0
Cardiocladius sp.	0	0	0	0	0	0	0	0
Chironomus sp.	0	0	0	0	0	0	0	0
Cladopelma sp.	0	0	0	0	0	0	0	0
Cladotanytarsus sp.	0	0	0	0	0	0	0	0
Clinotanypus sp.	0	0	0	0	0	0	0	0
Cricotopus sp.	1	8	6	1	2	5	1	0
Cryptochironomus sp.	0	6	5	3	2	13	4	12
Dicrotendipes sp.	0	16	3	0	0	0	0	0

APPENDIX 7.1 Contd.

Taxa	P1	P2	P3	P4		NP5		NP6
	2010	2010	2010	2009	2010	2009	2010	2010
Endochironomus sp.	0	4	0	0	1	0	0	17
Eukiefferiella sp.	0	0	0	0	0	0	0	0
Glyptotendipes sp.	0	1	0	3	0	0	0	3
Guttipelopia sp.	0	0	0	0	0	0	0	0
Harnischia sp.	0	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0	0
Larsia sp.	0	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0	0
Meropelopia sp.	0	0	0	0	0	1	0	0
Micropsectra sp.	0	0	0	0	0	0	0	0
Microtendipes sp.	1	46	28	17	19	33	55	27
Nanocladius sp.	0	2	0	0	0	0	0	1
Parachironomus sp.	0	0	0	0	0	0	0	0
Paramerina sp.	0	3	3	0	0	0	0	0
Parametriocnemus sp.	0	0	0	0	0	0	0	0
Paratanytarsus sp.	0	5	2	2	0	4	1	5
Paratendipes sp.	0	0	0	0	0	0	0	12
Pentaneura sp.	0	0	0	1	0	0	0	0
Phaenopsectra sp.	0	0	0	0	0	0	0	0
Polypedilum sp.	8	45	34	28	17	15	13	18
Procladius sp.	2	0	0	0	1	0	0	5
Psectrocladius sp.	0	0	0	0	0	0	0	0
Psectrotanypus sp.	0	0	0	0	0	0	0	0
Psephenus sp.	0	0	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0
Rheocricotopus sp.	0	2	0	2	0	0	2	0
Rheotanytarsus sp.	0	0	0	1	0	1	0	0
Stictochironomus sp.	0	0	2	0	0	0	0	1
Tanypus sp.	0	0	0	0	0	0	0	0
Tanytarsus sp.	1	0	1	0	0	1	0	0
Thienemanniella sp.	0	1	2	44	0	42	1	3
Thienemannimyia sp.	2	0	0	0	0	0	0	0
Zavreliella marmorata	0	0	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	0	0	0	0	0	0
Diptera-Simuliidae								
Simulium sp.	195	12	77	0	3	48	3	0
Diptera-Stratiomyidae	0	0	0	0	0	0	0	0
Diptera-Tabanidae								
Chrysops sp.	0	0	0	0	0	0	0	0
Tabanus sp.	0	0	0	0	0	2	0	0
Diptera-Tipulidae								
Ormosia sp.	0	0	0	2	0	0	0	0
Tipula sp.	0	0	0	0	0	1	0	0
Ephemeroptera								
Baetis sp.	5	2	7	0	18	14	64	5
Caenis sp.	0	1	0	2	0	4	0	5
Hexagenia sp.	0	0	0	0	0	0	0	0
Heptageniidae	0	0	0	0	0	0	2	4
Tricorythodes sp.	0	0	0	0	0	0	0	0
Perlidae								

APPENDIX 7.1 Contd.

Taxa	P1	P2	P3	P4		NP5		NP6
	2010	2010	2010	2009	2010	2009	2010	2010
Trichoptera	0	0	0	32	4	22	0	0
Helicopsyche borealis	0	0	0	0	13	0	6	11
Ceratopsyche sp.	0	0	0	17	21	9	19	0
Cheumatopsyche sp.	21	34	41	54	39	20	12	0
Hydropsyche sp.	2	1	1	3	18	1	1	1
Orthotrichia sp.	0	0	0	0	0	0	0	0
Leptocerus sp.	0	0	0	0	0	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0	0
Oecetis sp.	0	0	0	0	0	1	0	0
Triaenodes	0	0	0	0	0	0	0	0
Chimarra sp.	0	0	0	0	7	2	1	0
Lepidoptera								
Fossaria sp.	0	0	0	0	1	0	0	14
Odonata								
Aeshnidae	2	0	0	1	0	0	0	0
Hetaerina sp.	0	0	0	0	0	1	0	1
Argia sp.	0	0	0	1	0	0	1	0
Coenagrion-Enallagma sp.	0	2	0	0	3	1	0	11
Ishnura sp.	0	0	0	0	0	0	0	1
Lestes sp.	0	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	0	0

APPENDIX 7.2 Macroinvertebrate samples (300 individuals) collected from seven sampling locations in Poplar Creek in 2011 (see Table 7.1 for sampling location codes).

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Turbellaria	3	1	9	1	2	2	2
Oligochaeta	7	24	7	1	11	20	16
Hirudinea	7	22	2	0	3	8	2
Mollusca	3						0
Corbicula sp.		4	18	0	0	0	
Sphaeriidae	0	2	19	41	0	5	0
Dubiraphia sp.	4	17	23	19	12	33	24
Macronychus sp.	3	1	0	0	3	5	1
Ancylidae	0	0	0	0	0	0	2
Hydrobiidae	0	5	7	6	0	30	0
Lymnaeidae	0	0	1	0	1	0	1
Physa sp.	0	36	64	17	10	9	0
Gyraulus sp.	34	3	0	0	0	0	1
Helisoma sp.	1	0	0	0	0	0	0
Planorbella sp.	0	0	0	0	0	0	0
Planorbula armigera	0	0	0	0	0	0	0
Promenetus exa	0	0	0	0	0	0	0
Pleurocera sp.	0	0	0	1	0	34	0
Cipangopaludina sp.	0	0	0	0	0	0	4
Viviparus sp.	29	0	0	0	0	0	0
Valvata tricarinata	0	0	0	0	0	0	2
Crustacea	0						0
Crangonyx sp.		0	0	0	0	0	
Hyalella sp.	0	1	10	1	0	2	0
Cambaridae	0	0	0	1	2	23	1
Asselidae	2	0	0	0	0	1	2
Acari	4	3	2	0	4	10	0
Coleoptera							
Optioservus sp.	0	0	0	12	5	3	3
Stenelmis sp.	10	15	38	61	117	19	79
Dineutus sp.	0	0	0	0	0	0	0
Gyrinus sp.	0	0	0	0	0	1	0
Tropisternus sp.	0	0	0	0	0	0	0
Diptera-Ceratopogonidae							
Bezzia sp.	0	0	0	0	0	0	0
Palpomyia sp.	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	0	0	0	0	0
Diptera-Chironomidae							
Ablabesmyia sp.	0	0	0	0	3	0	0
Acricotopus sp.	0	0	0	0	0	0	0
Brillia sp.	0	0	0	1	0	0	0
Chaetocladius sp.	0	0	0	0	0	0	0
Chironomus sp.	1	0	0	0	0	0	0
Cladopelma sp.	0	0	0	0	0	0	0
Cladotanytarsus sp.	0	1	0	0	0	0	0
Clinotanypus sp.	0	0	0	0	0	0	0
Corynoneura sp.	0	0	0	0	0	0	0
Cricotopus sp.	9	1	1	0	0	0	2
Cryptochironomus sp.	4	6	2	2	0	5	3
Cryptotendipes sp.	0	3	0	0	0	0	0
Dicrotendipes sp.	0	9	3	0	1	0	0

APPENDIX 7.2 Contd.

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Einfeldia sp.	0	0	0	0	0	0	0
Endochironomus sp.	1	4	1	0	0	0	0
Glyptotendipes sp.	0	5	1	0	1	0	0
Guttipelopia sp.	0	0	0	0	0	0	0
Harnischia sp.	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0
Larsia sp.	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0
Limnophyes sp.	0	0	0	1	0	0	0
Micropsectra sp.	0	0	0	0	0	0	0
Microtendipes sp.	6	22	35	16	38	4	56
Nanocladius sp.	0	0	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	1	0
Parachironomus sp.	0	1	0	1	0	0	0
Parakiefferiella sp.	0	0	0	0	0	0	0
Paralauterborniella sp.	0	0	0	0	0	0	0
Parametriocnemus sp.	0	0	0	0	0	0	0
Paratanytarsus sp.	0	0	1	0	4	7	1
Paratendipes sp.	0	0	0	0	0	0	0
Pentaneura sp.	0	0	0	0	0	0	0
Phaenopsectra sp.	0	1	0	0	1	5	0
Polypedilum sp.	54	42	17	72	30	24	13
Procladius sp.	0	1	0	0	0	0	0
Psectrocladius sp.	0	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0
Rheocricotopus sp.	0	0	0	1	0	0	2
Rheotanytarsus sp.	0	1	1	0	0	0	0
Stempellina sp.	0	0	0	0	0	0	0
Stenochironomus sp.	0	0	0	0	0	0	0
Stictochironomus sp.	0	1	0	1	0	4	0
Tanypus sp.	0	0	0	0	0	0	0
Tanytarsus sp.	0	0	0	0	1	0	1
Thienemanniella sp.	0	0	1	0	0	0	0
Thienemannimyia sp.	9	1	1	8	15	11	5
Tribelos sp.	0	0	0	0	0	0	0
Zavreliella sp.	0	0	0	0	0	0	0
Diptera-Dolichopodidae							
Dolichopodidae	0	0	0	0	0	0	0
Diptera-Ephydridae	0	0	0	0	0	0	0
Diptera-Empididae	0	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	0	0	0	0	0
Diptera-Simuliidae							
Simulium sp.	84	0	6	0	3	4	35
Diptera-Stratiomyidae	0	0	0	0	0	0	0
Diptera-Tabanidae							
Chrysops sp.	0	0	0	0	0	0	0
Diptera-Tipulidae							
Tipula sp.	0	0	0	0	0	0	0
Ephemeroptera							
Baetis flavistriga	0	0	0	0	5	0	12
Baetis intercalaris	0	0	0	0	0	0	5

APPENDIX 7.2 Contd.

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Caeni sp.	0	1	2	0	1	2	0
Hexagenia sp.	0	0	0	0	0	0	0
Stenacron sp.	0	0	0	0	0	0	1
Tricorythodes sp.	0	0	0	0	1	0	0
Lepidoptera							
Parapoynx	0	0	0	0	0	0	0
Petrophila sp.	0	0	0	0	1	0	0
Megaloptera							
Corydalidae	0	1	0	0	0	0	0
Sialis sp.	0	0	0	0	0	0	0
Plecoptera							
Perlidae	3	0	2	11	6	1	1
Trichoptera							
Helicopsyche sp.	0	0	0	2	0	3	0
Cheumatopsyche sp.	21	2	12	16	6	2	19
Hydropsyche sp	0	0	0	2	5	1	1
Hydroptila sp.	1	2	3	2	0	3	0
Ceraclea sp.	0	0	0	0	1	0	1
Leptocerus sp.	0	0	0	0	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0
Oecetis sp.	0	2	1	0	0	2	0
Triaenodes sp.	0	0	0	0	0	0	0
Orthotrichia sp.	0	0	0	0	0	0	0
Chimarra sp.	0	0	0	0	0	0	2
Odonata							
Aeshnidae	0	0	0	0	0	0	0
Calopteryx sp.	0	0	1	0	1	2	0
Hetaerina sp.	0	0	0	2	0	0	0
Argia sp.	0	0	0	0	0	0	0
Coenagrion/Enallagma	0	20	9	1	6	14	0
Corduliidae	0	0	0	0	0	0	0
Lestes sp.	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	0

APPENDIX 7.3 Macroinvertebrate samples (300 individuals) collected from six sampling locations in Spring Creek in 2011 (see Table 7.1 for sampling location codes).

	NS1		S2		S3		S4		S5		S6	
Taxa	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
Turbellaria	0	0	0	0	59	5	25	0	11	1	0	0
Oligochaeta	14	20	24	32	5	34	5	27	38	11	0	6
Hirudinea	1	1	1	1	0	0	1	0	14	11	0	2
Mollusca	1	2	1	4	1	0	2	3	0	2	2	7
Corbicula sp.												
Sphaeriidae	0	0	0	0	0	0	0	0	0	0	0	0
Dubiraphia sp.	5	2	4	5	33	3	4	1	5	10	1	5
Macronychus sp.	44	57	5	8	56	11	122	81	7	6	107	5
Ancylidae	0	0	0	0	0	0	0	0	14	4	2	0
Hydrobiidae	14	0	3	0	0	0	0	0	0	0	0	0
Lymnaeidae	0	0	0	0	0	0	0	0	0	0	0	0
Physa sp.	3	0	1	1	0	1	0	0	1	1	1	3
Gyraulus sp.	5	19	0	21	2	0	0	0	86	166	35	11
Helisoma sp.	0	0	0	0	0	2	0	0	0	0	26	8
Planorbella sp.	0	0	0	0	0	0	0	0	0	0	0	0
Planorbula armigera	0	0	0	0	0	0	0	0	0	0	0	0
Promenetus exa	0	0	0	0	0	0	0	0	0	0	0	0
Pleurocera sp.	0	0	0	0	0	0	0	0	0	0	0	0
Cipangopaludina sp.	0	0	0	0	0	0	0	0	0	0	0	0
Viviparus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Valvata tricarinata	0	0	0	0	0	0	0	0	0	0	0	0
Crustacea	0	0	0	0	0	0	0	0	0	0	0	0
Crangonyx sp.												
Hyalella sp.	0	0	1	3	0	0	2	0	0	0	0	0
Cambaridae	10	0	0	0	0	3	1	0	0	0	24	12
Asselidae	0	3	0	1	1	1	0	0	0	1	0	0
Acari	9	31	31	144	0	3	18	68	8	15	0	1
Coleoptera												
Optioservus sp.	0	0	33	0	0	0	1	0	0	0	0	1
Stenelmis sp.	0	0	52	5	4	0	40	42	3	1	0	0
Dineutus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Gyrinus sp.	0	0	0	0	0	0	0	0	0	0	1	0
Tropisternus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ceratopogonidae												
Bezzia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Palpomyia sp.	0	0	0	1	0	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Chironomidae												
Ablabesmyia sp.	0	0	0	0	0	0	2	2	0	0	0	0
Acricotopus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Brillia sp.	0	0	0	2	0	0	0	0	0	0	0	0
Chaetocladius sp.	0	0	0	0	0	0	0	0	0	1	0	0
Chironomus sp.	0	0	0	0	0	1	0	1	0	0	0	0
Cladopelma sp.	0	0	0	0	0	0	0	0	0	0	0	0
Cladotanytarsus sp.	0	0	0	0	1	0	0	0	0	0	0	0
Clinotanypus sp.	0	0	0	0	0	0	0	0	0	0	9	0
Corynoneura sp.	0	0	0	0	0	0	1	0	0	0	0	0
Cricotopus sp.	8	31	1	2	0	9	0	0	16	0	1	2
Cryptochironomus sp.	0	1	0	0	2	2	0	3	0	0	0	1
Cryptotendipes sp.	1	0	0	0	0	0	0	0	2	0	0	0

APPENDIX 7.3 Contd.

Taxa	NS1		S2		S3		S4		S5		S6	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Dicrotendipes sp.	1	1	3	1	21	11	1	5	5	10	2	1
Einfeldia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Endochironomus sp.	0	3	0	0	0	7	1	0	0	0	0	2
Glyptotendipes sp.	0	0	0	0	37	9	0	0	5	0	0	0
Guttipelopia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Harnischia sp.	0	0	0	0	0	0	0	0	1	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Larsia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0	0	0	0	0	0
Limnophyes sp.	0	0	0	0	0	2	0	0	0	0	0	1
Micropsectra sp.	0	0	0	2	0	0	0	1	0	0	0	0
Microtendipes sp.	0	0	0	0	0	0	0	0	1	0	1	0
Nanocladius sp.	1	1	0	1	0	11	1	2	1	1	0	0
Orthocladius complex	0	0	1	1	0	0	0	0	0	0	0	0
Parachironomus sp.	0	1	0	0	0	4	0	0	0	1	0	0
Parakiefferiella sp.	3	0	0	0	0	3	5	0	1	0	0	0
Paralauterborniella sp.	0	0	0	0	0	0	3	5	2	0	0	0
Parametriocnemus sp.	0	0	1	0	0	0	0	0	0	0	0	0
Paratanytarsus sp.	123	40	61	12	0	5	0	0	0	0	1	0
Paratendipes sp.	0	0	0	0	0	0	0	1	0	0	0	0
Pentaneura sp.	0	0	0	0	0	0	1	0	0	0	1	5
Phaenopsectra sp.	0	0	1	0	0	0	0	2	0	1	0	0
Polypedilum sp.	21	51	8	23	15	97	3	25	32	15	11	22
Procladius sp.	0	0	1	0	1	0	3	3	0	0	1	0
Psectrocladius sp.	0	0	0	0	0	0	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Rheocricotopus sp.	0	0	0	0	0	0	0	0	3	0	0	0
Rheotanytarsus sp.	0	1	10	19	0	0	0	0	4	0	0	11
Stempellina sp.	0	0	0	0	0	0	0	0	0	0	0	0
Stenochironomus sp.	0	0	1	0	0	0	3	0	1	0	0	0
Stictochironomus sp.	0	0	0	0	0	0	0	3	0	0	0	0
Tanypus sp.	0	0	0	0	0	0	0	0	0	0	0	0
Tanytarsus sp.	0	0	0	0	0	1	0	8	7	0	3	0
Thienemanniella sp.	1	0	0	0	0	0	0	0	2	0	0	0
Thienemannimyia sp.	0	10	0	3	0	7	0	1	6	1	0	3
Tribelos sp.	0	0	0	0	0	1	2	1	0	0	0	0
Zavreliella sp.	0	0	0	0	0	0	0	1	0	0	0	0
Diptera-Dolichopodidae												
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Ephydridae	6	1	0	0	1	0	0	0	0	0	2	0
Diptera-Empididae	6	0	0	0	0	0	0	0	0	0	1	1
Diptera-Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0
Diptera-Simuliidae												
Simulium sp.	0	6	10	1	0	11	0	0	3	33	1	112
Diptera-Stratiomyidae	0	0	0	0	0	1	0	1	0	0	0	0
Diptera-Tabanidae												
Chrysops sp.	0	0	0	0	0	0	0	0	2	0	0	0
Diptera-Tipulidae												
Tipula sp.	0	0	0	0	0	0	0	1	0	0	0	0
Ephemeroptera												

APPENDIX 7.3 Contd.

Taxa	NS1		S2		S3		S4		S5		S6	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Baetis flavistriga	0	0	3	0	0	0	0	0	0	0	0	0
Baetis intercalaris	0	0	1	0	0	0	7	0	0	0	0	0
Caeni sp.	7	3	0	0	9	39	2	6	0	0	15	47
Hexagenia sp.	0	0	0	0	0	0	0	0	0	0	1	0
Stenacron sp.	0	0	0	0	0	0	21	0	0	0	0	0
Tricorythodes sp.	0	0	0	0	0	0	0	0	0	0	0	0
Lepidoptera												
Parapoynx	0	0	0	0	0	0	0	0	0	0	2	0
Petrophila sp.	0	0	0	0	0	0	0	0	0	0	0	0
Megaloptera												
Corydalidae	0	0	0	0	0	0	0	0	0	0	0	0
Sialis sp.	0	0	0	0	0	0	0	0	0	0	1	0
Plecoptera												
Perlidae	0	0	0	0	0	0	1	2	0	3	0	4
Trichoptera												
Helicopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0
Cheumatopsyche sp.	4	1	17	4	30	7	5	3	1	0	0	7
Hydropsyche sp	0	0	22	0	12	0	0	0	0	0	0	0
Hydroptila sp.	0	1	2	2	0	1	0	0	0	0	0	12
Ceraclea sp.	0	0	0	1	0	0	0	0	0	0	0	0
Leptocerus sp.	0	0	0	0	0	0	0	0	0	0	0	1
Nectopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0
Oecetis sp.	0	0	0	0	6	3	5	0	14	4	10	3
Triaenodes sp.	0	0	0	0	0	0	1	0	0	0	3	0
Orthotrichia sp.	0	0	0	0	0	0	0	0	0	0	0	0
Chimarra sp.	0	0	1	0	0	0	2	1	0	0	0	0
Odonata												
Aeshnidae	0	2	0	0	0	0	0	0	0	0	0	0
Calopteryx sp.	0	0	0	0	0	0	0	0	3	0	0	0
Hetaerina sp.	7	8	0	0	0	0	9	0	0	1	1	0
Argia sp.	0	2	0	0	0	0	0	0	0	0	0	0
Coenagrion/Enallagma	5	0	0	0	4	5	0	0	0	0	33	4
Corduliidae	0	0	0	0	0	0	0	0	0	0	1	0
Lestes sp.	0	1	0	0	0	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	0	0	1	0	0	0

APPENDIX 7.4 Macroinvertebrate samples (300 individuals) collected from seven sampling locations in Poplar Creek in 2012 (see Table 7.1 for sampling location codes).

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Turbellaria	15	2	2	1	2	2	11
Oligochaeta	19	10	4	4	8	0	8
Hirudinea	3	15	1	4	0	1	0
Mollusca							
Corbicula sp.	0	11	33	0	0	0	0
Sphaeriidae	21	17	16	15	7	9	29
Ancylidae	3	0	1	0	0	1	0
Hydrobiidae	2	3	1	2	0	2	0
Lymnaeidae	0	0	0	0	0	0	0
Physa sp.	10	41	64	13	4	29	0
Gyraulus sp.	0	1	1	0	0	1	0
Helisoma anc	0	0	0	0	0	0	0
Planorbella sp.	0	0	0	0	0	0	0
Planorbula armigera	0	0	0	0	0	0	0
Promenetus exa	0	0	0	0	0	0	0
Pleurocera sp.	0	0	0	0	0	0	0
Cipangopaludina sp.	1	0	0	0	0	0	0
Valvata tricarinata	2	0	0	0	0	0	0
Viviparus sp.	0	0	0	0	0	0	0
Acari	1	2	3	5	1	0	2
Crustacea							
Cambaridae	5	0	1	0	0	1	0
Crangonyx sp.	4	0	0	0	0	0	0
Hyalella sp.	3	15	17	2	0	3	0
Asselidae	2	0	0	1	0	0	4
Coleoptera							
Dubiraphia sp.	7	2	8	6	0	8	0
Macronychus sp.	0	0	0	0	0	2	0
Optioservus sp.	0	0	0	1	0	3	1
Stenelmis sp.	2	4	29	37	28	23	65
Dineutus sp.	0	0	0	0	0	0	0
Gyrinus sp.	0	0	1	0	0	0	0
Tropisternus sp.	0	0	0	1	0	0	0
Diptera-Ceratopogonidae							
Bezzia sp.	0	0	0	0	0	0	0
Palpomyia sp.	0	0	0	0	0	0	0
Sphaeromias sp.	0	0	0	0	0	0	0
Diptera-Chironomidae							
Ablabesmyia sp.	2	1	0	0	0	4	0
Acricotopus sp.	0	0	0	0	0	0	0
Brillia sp.	0	0	0	0	0	0	0
Chaetocladius sp.	0	0	0	0	0	0	0
Chironomus sp.	2	0	0	2	0	0	0
Cladopelma sp.	0	0	0	0	0	0	0
Cladotanytarsus sp.	0	2	0	0	0	2	0
Clinotanypus sp.	0	0	0	0	0	0	0
Corynoneura sp.	0	0	0	0	0	0	0
Cricotopus sp.	32	5	0	1	9	2	1
Cryptochironomus sp.	7	0	1	1	1	1	0
Cryptotendipes sp.	2	0	0	1	0	4	0
Dicrotendipes sp.	15	2	1	0	0	3	0

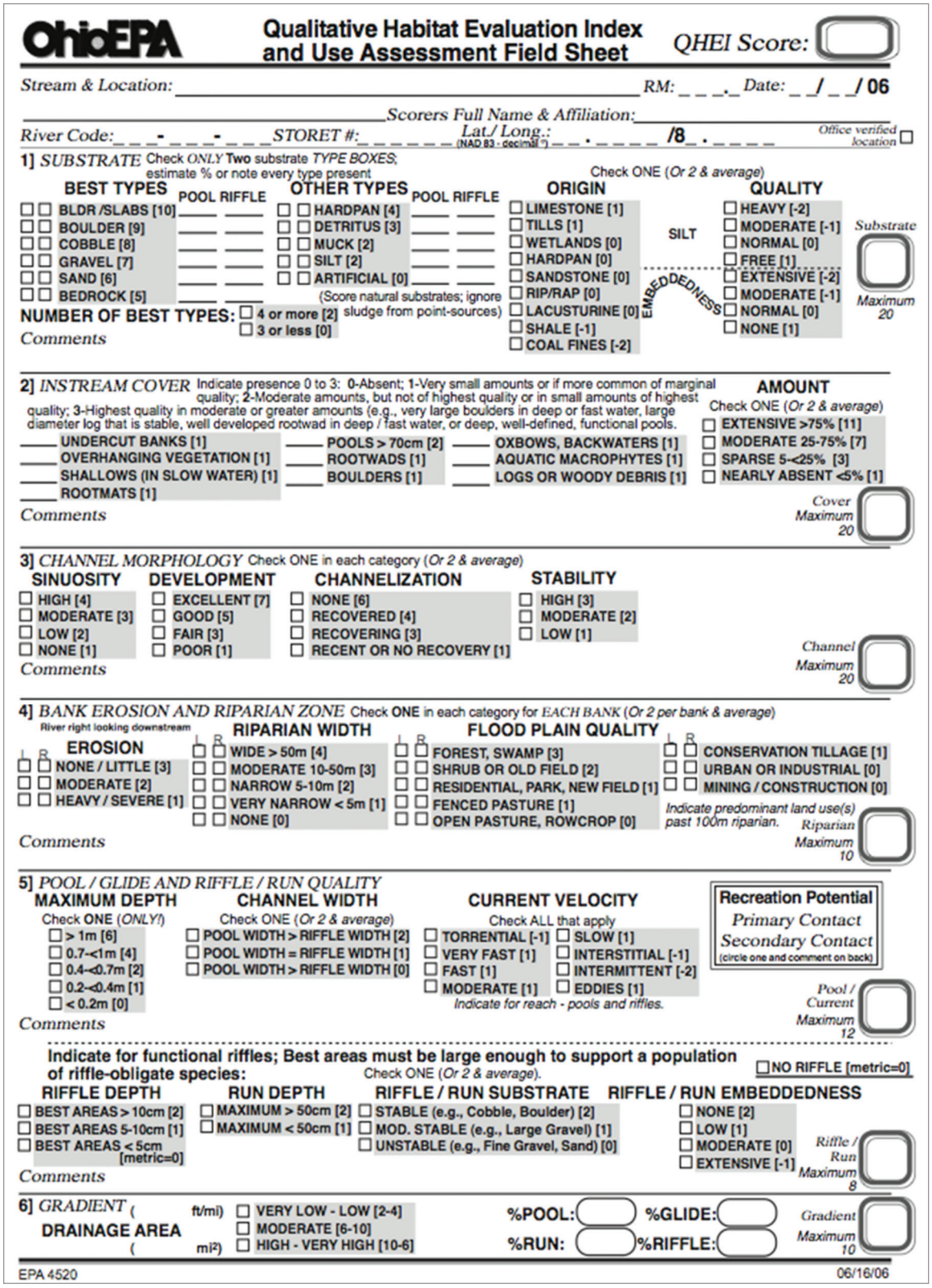
APPENDIX 7.4 Contd.

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Einfeldia	0	0	0	0	0	0	0
Endochironomus sp.	0	1	0	0	0	0	0
Glyptotendipes sp.	0	4	0	0	0	0	0
Guttipelopia sp.	0	0	0	0	0	0	0
Harnischia sp.	0	0	0	0	0	0	0
Labrundinia sp.	0	0	0	0	0	0	0
Larsia sp.	0	0	0	0	0	0	0
Lauterborniella sp.	0	0	0	0	0	0	0
Limnophyes sp.	0	0	0	0	0	0	0
Micropsectra sp.	0	0	0	0	0	1	0
Microtendipes	3	3	17	30	49	42	9
Nanocladius sp.	0	0	0	0	0	0	0
Orthocladius complex	0	1	0	0	0	0	0
Parachironomus sp.	0	0	0	0	0	0	0
Parakiefferiella sp.	0	0	0	2	0	3	0
Paralauterborniella sp.	0	1	0	0	0	0	0
Parametriocnemus sp.	0	0	0	0	0	0	0
Paratanytarsus sp.	13	15	16	14	22	85	0
Paratendipes sp.	5	0	0	1	0	4	0
Pentaneura sp.	0	0	1	0	5	0	0
Phaenopsectra sp.	0	0	1	0	1	0	1
Polypedilum	37	31	6	18	14	8	7
Procladius sp.	4	0	3	3	1	2	0
Psectrocladius sp.	0	0	0	0	0	0	0
Pseudochironomus sp.	0	0	0	0	0	1	0
Rheocricotopus sp.	0	0	0	3	6	0	0
Rheotanytarsus	4	4	8	11	14	4	0
Stempellina sp.	0	0	0	0	0	0	0
Stenochironomus sp.	0	0	0	0	0	0	0
Stictochironomus sp.	0	0	0	0	0	0	0
Tanypus sp.	0	0	0	0	0	0	0
Tanytarsus sp.	7	4	0	8	1	3	0
Thienemanniella sp.	0	0	0	1	2	1	0
Thienemannimyia sp.	9	9	10	19	13	12	3
Tribelos sp.	0	0	0	0	0	0	0
Zavreliella sp.	0	0	0	0	0	0	0
Diptera-Dolichopodidae	0	0	0	0	0	0	0
Diptera-Empididae	0	0	0	0	0	0	0
Diptera-Ephydridae	0	0	0	0	0	0	0
Diptera-Sciomyzidae	0	0	0	0	0	0	0
Diptera-Simuliidae							
Simulium sp.	1	26	0	0	11	1	1
Diptera-Stratiomyidae	0	0	0	0	0	0	0
Diptera-Tabanidae							
Chrysops sp.	0	0	0	0	0	0	0
Diptera-Tipulidae							
Tipula sp.	0	0	0	0	0	0	0
Ephemeroptera							
Baetis flavistriga	0	0	0	10	24	0	123
Baetis intercalaris	0	0	1	0	5	0	6
Caenis sp.	3	11	15	3	2	5	0

APPENDIX 7.4 Contd.

Taxa	P1	P2	P3	P4	NP5	NP6	NP7
Hexagenia sp.	0	0	0	0	0	0	0
Stenacron sp.	0	0	0	0	0	0	0
Tricorythodes sp.	0	0	0	0	0	0	0
Lepidoptera							
Parapoynx sp.	0	0	0	0	0	0	0
Megaloptera							
Corydalidae	0	0	0	0	0	0	0
Sialis sp.	0	0	0	0	0	0	0
Plecoptera							
Perlidae	0	0	0	0	0	0	0
Trichoptera							
Helicopsyche borealis	0	0	2	3	0	4	0
Cheumatopsyche sp.	6	27	26	44	28	0	14
Hydropsyche sp	0	1	0	28	35	0	7
Orthotrichia sp.	0	0	0	0	0	0	0
Hydroptila sp.	25	12	6	2	5	12	2
Ceraclea sp.	0	0	0	0	0	0	0
Leptocerus ame	0	0	0	0	0	0	0
Nectopsyche sp.	0	0	0	0	0	0	0
Oecetis sp.	0	3	2	0	1	1	0
Triaenodes sp.	0	0	0	0	0	0	0
Chimarra sp.	0	0	0	1	1	0	6
Petrophila sp.	0	0	0	0	0	0	0
Odonata							
Aeshnidae	1	0	0	0	0	0	0
Calopteryx sp.	0	0	0	0	0	0	0
Hetaerina sp.	0	0	0	0	0	0	0
Coenagrion/Enallagma	22	14	2	2	0	10	0
Argia sp.	0	0	0	0	0	0	0
Corduliidae	0	0	0	0	0	0	0
Lestes sp.	0	0	0	0	0	0	0
Libellulidae	0	0	0	0	0	0	0

APPENDIX 7.5 Field datasheet for calculating Qualitative Habitat Evaluation Index (QHEI).



Ohio EPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: ____

Stream & Location: _____ *RM:* _ _ _._ *Date:* _ _/_ _/ 06

Scorers Full Name & Affiliation: _____

River Code: _ _ _-_ _ _-_ _ _ *STORET #:* _ _ _ _ _ _ *Lat./ Long.:* (NAD 83 - decimal °) _ _ . _ _ _ _ /8_ . _ _ _ _ *Office verified location* ☐

1] *SUBSTRATE* Check *ONLY* **Two** substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]	____	____
☐☐ GRAVEL [7]	____	____	☐☐ SILT [2]	____	____
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	____	____
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

ORIGIN	SILT / EMBEDDEDNESS	QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
☐ TILLS [1]		☐ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]		☐ EXTENSIVE [-2]
☐ RIP/RAP [0]		☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Substrate ____ *Maximum 20*

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3: **0**-Absent; **1**-Very small amounts or if more common of marginal quality; **2**-Moderate amounts, but not of highest quality or in small amounts of highest quality; **3**-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
____ OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT

Check ONE (*Or 2 & average*)

☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Cover Maximum 20 ____

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Channel Maximum 20 ____

Comments

4] *BANK EROSION AND RIPARIAN ZONE* Check **ONE** in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]
☐☐ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]
	☐☐ NONE [0]	☐☐ OPEN PASTURE, ROWCROP [0]

☐☐ CONSERVATION TILLAGE [1]
☐☐ URBAN OR INDUSTRIAL [0]
☐☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Riparian Maximum 10 ____

Comments

5] *POOL / GLIDE AND RIFFLE / RUN QUALITY*

MAXIMUM DEPTH Check **ONE** (*ONLY!*)
☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH > RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current Maximum 12 ____

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Riffle / Run Maximum 8 ____

Comments

6] *GRADIENT* (ft/mi) ☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (mi²)

%POOL: ____ %GLIDE: ____
%RUN: ____ %RIFFLE: ____

Gradient Maximum 10 ____

EPA 4520 06/16/06

APPENDIX 7.6 Competing set of top candidate models for water quality (WQ), habitat quality (HQ), land cover (LC), and distance downstream from first sampling location (DIST) for each metric in Poplar Creek. K = no. estimable parameters, L = likelihood of model, AIC_c = Akaike's Information Criterion corrected for small sample size, ΔAIC_c : AIC_i – minimum AIC_i and w_i are Akaike weights. (-) = negative relationship with metric.

Metric	Model	Parameters	k	-2log(L)	ΔAIC_c	w_i
Richness	WQ	(-)PCA1	3	74.17	3.38	0.053
	HQ	QHEI	3	73.76	2.97	0.066
	LC	WT_%Veg.	3	70.79	0.00	0.290
	DIST	DistDwnst	3	71.76	0.98	0.178
	WQ + HQ	(-)PCA1 + QHEI	4	72.43	5.11	0.023
	WQ + LC	(-)PCA1 + WT_%Veg.	4	70.09	2.77	0.073
	WQ + DIST	(-)PCA1 + DistDwnst	4	71.10	3.78	0.044
	HQ + LC	QHEI + WT_%Veg.	4	70.12	2.79	0.072
	HQ + DIST	QHEI + DistDwnst	4	70.76	3.44	0.052
	LC + DIST	WT_%Veg. + DistDwnst	4	70.77	3.44	0.052
	WQ + HQ + LC	(-)PCA1 + QHEI + WT_%Veg.	5	69.62	6.64	0.011
	WQ + HQ + DIST	(-)PCA1 + QHEI + DistDwnst	5	70.34	7.35	0.007
	WQ + LC + DIST	(-)PCA1 + WT_%Veg. + DistDwnst	5	70.00	7.01	0.009
	HQ + LC + DIST	QHEI + WT_%Veg. + DistDwnst	5	70.11	7.12	0.008
	WQ + HQ + LC + DIST	(-)PCA1 + QHEI + WT_%Veg. + DistDwnst	6	69.57	12.15	0.001
	---	Null	2	76.67	3.05	0.063
MIBI	WQ	(-)PCA1	3	94.32	19.03	0.000
	HQ	Ave. Chan. Wdth. + QHEI	3	73.93	2.97	0.106
	LC	WT_%Veg.	3	75.29	0.00	0.468
	DIST	DistDwnst	3	77.27	1.98	0.174
	WQ + HQ	(-)PCA1 + Ave. Chan. Wdth. + QHEI	4	73.78	8.39	0.007
	WQ + LC	(-)PCA1 + WT_%Veg.	4	74.64	3.68	0.074
	WQ + DIST	(-)PCA1 + DistDwnst	4	76.95	5.99	0.023
	HQ + LC	Ave. Chan. Wdth. + QHEI + WT_%Veg.	5	69.84	4.45	0.051
	HQ + DIST	Ave. Chan. Wdth. + QHEI + DistDwnst	5	72.62	7.24	0.013
	LC + DIST	WT_%Veg. + DistDwnst	4	74.60	3.64	0.076
	WQ + HQ + LC	(-)PCA1 + Ave. Chan. Wdth. + QHEI + WT_%Veg.	6	69.67	11.71	0.001
	WQ + HQ + DIST	(-)PCA1 + Ave. Chan. Wdth. + QHEI + DistDwnst	6	72.57	14.61	0.000
	WQ + LC + DIST	(-)PCA1 + WT_%Veg. + DistDwnst	5	74.11	8.72	0.006
	HQ + LC + DIST	Ave. Chan. Wdth. + QHEI + WT_%Veg. + DistDwnst	6	69.80	11.85	0.001
	WQ + HQ + LC + DIST	(-)PCA1 + Ave. Chan. Wdth. + QHEI + WT_%Veg. + DistDwnst	7	69.60	22.04	0.000
	---	Null	2	96.29	17.53	0.000
%EPT	WQ	(-)PCA1	3	-16.25	2.55	0.079
	HQ	QHEI	3	-18.29	0.51	0.220
	LC	RT_%Veg.	3	-17.99	0.81	0.190
	DIST	DistDwnst	3	-15.39	3.41	0.052
	WQ + HQ	(-)PCA1 + QHEI	4	-18.57	4.57	0.029
	WQ + LC	(-)PCA1 + RT_%Veg.	4	-18.31	4.83	0.029
	WQ + DIST	(-)PCA1 + DistDwnst	4	-16.26	6.87	0.009
	HQ + LC	QHEI + RT_%Veg.	4	-19.04	4.10	0.037
	HQ + DIST	QHEI + DistDwnst	4	-18.49	4.65	0.028
	LC + DIST	RT_%Veg. + DistDwnst	4	-18.91	4.22	0.034
	WQ + HQ + LC	(-)PCA1 + QHEI + RT_%Veg.	5	-19.20	9.50	0.002
	WQ + HQ + DIST	(-)PCA1 + QHEI + DistDwnst	5	-18.94	9.77	0.002
	WQ + LC + DIST	(-)PCA1 + RT_%Veg. + DistDwnst	5	-19.60	9.11	0.003
	HQ + LC + DIST	QHEI + RT_%Veg. + DistDwnst	5	-20.15	8.55	0.004
	WQ + HQ + LC + DIST	(-)PCA1 + QHEI + RT_%Veg. + DistDwnst	6	-20.62	15.52	0.000
		Null	2	-15.33	0.00	0.285

APPENDIX 7.7 Competing set of top candidate models for water quality (WQ), habitat quality (HQ), land cover (LC), and distance downstream from first sampling location (DIST) for each metric in Spring Creek. K = no. estimable parameters, L = likelihood of model, AIC_c = Akaike's Information Criterion corrected for small sample size, ΔAIC_c : AIC_i – minimum AIC_i and w_i are Akaike weights. (·) = negative relationship with metric.

Metric	Model	Parameters	k	-2log(L)	ΔAIC_c	w_i
Richness	WQ	(·)PCA1	3	67.37	2.00	0.094
	HQ	Detritus	3	67.13	1.76	0.106
	LC	(·)R_%Veg.	3	66.03	0.66	0.184
	DIST	DistDwnst	3	66.32	0.95	0.159
	WQ + HQ	(·)PCA1 + Detritus	4	67.03	5.33	0.018
	WQ + LC	(·)PCA1 + (·)R_%Veg.	4	65.64	3.94	0.036
	WQ + DIST	(·)PCA1 + DistDwnst	4	66.28	4.58	0.026
	HQ + LC	Detritus + (·)R_%Veg.	4	65.44	3.74	0.039
	HQ + DIST	Detritus + DistDwnst	4	66.30	4.60	0.026
	LC + DIST	(·)R_%Veg. + DistDwnst	4	65.21	3.51	0.044
	WQ + HQ + LC	(·)PCA1 + Detritus + (·)R_%Veg.	5	65.42	8.44	0.004
	WQ + HQ + DIST	(·)PCA1 + Detritus + DistDwnst	5	66.20	9.21	0.003
	WQ + LC + DIST	(·)PCA1 + (·)R_%Veg. + DistDwnst	5	65.19	8.20	0.004
	HQ + LC + DIST	Detritus + (·)R_%Veg. + DistDwnst	5	65.21	8.22	0.004
	WQ + HQ + LC + DIST	(·)PCA1 + Detritus + (·)R_%Veg. + DistDwnst	6	65.18	14.48	0.000
	···	Null	2	68.30	0.00	0.255
MIBI	WQ	(·)PCA1	3	84.81	2.44	0.079
	HQ	Ave. Chan. Wdth.	3	83.18	0.81	0.179
	LC	(·)R_%Veg.	3	84.52	2.15	0.092
	DIST	DistDwnst	3	82.85	0.48	0.211
	WQ + HQ	(·)PCA1 + Ave. Chan. Wdth.	4	82.77	5.12	0.021
	WQ + LC	(·)PCA1 + (·)R_%Veg.	4	83.71	6.05	0.013
	WQ + DIST	(·)PCA1 + DistDwnst	4	82.80	5.15	0.021
	HQ + LC	Ave. Chan. Wdth. + (·)R_%Veg.	4	80.74	3.09	0.057
	HQ + DIST	Ave. Chan. Wdth. + DistDwnst	4	82.74	5.09	0.021
	LC + DIST	(·)R_%Veg. + DistDwnst	4	82.32	4.66	0.026
	WQ + HQ + LC	(·)PCA1 + Ave. Chan. Wdth. + (·)R_%Veg.	5	80.67	9.30	0.003
	WQ + HQ + DIST	(·)PCA1 + Ave. Chan. Wdth. + DistDwnst	5	82.62	11.25	0.001
	WQ + LC + DIST	(·)PCA1 + (·)R_%Veg. + DistDwnst	5	82.27	10.90	0.001
	HQ + LC + DIST	Ave. Chan. Wdth. + (·)R_%Veg. + DistDwnst	5	78.87	7.50	0.006
	WQ + HQ + LC + DIST	(·)PCA1 + Ave. Chan. Wdth. + (·)R_%Veg. + DistDwnst	6	76.68	14.11	0.000
	···	Null	2	86.04	0.00	0.269
%EPT	WQ	(·)PCA1	3	-17.65	3.06	0.063
	HQ	QHEI	3	-19.62	1.08	0.168
	LC	W_%Veg.	3	-20.71	0.00	0.290
	DIST	DistDwnst	3	-17.64	3.07	0.062
	WQ + HQ	(·)PCA1 + QHEI	4	-22.44	2.98	0.065
	WQ + LC	(·)PCA1 + W_%Veg.	4	-20.85	4.57	0.030
	WQ + DIST	(·)PCA1 + DistDwnst	4	-18.06	7.36	0.007
	HQ + LC	QHEI + W_%Veg.	4	-22.05	3.37	0.054
	HQ + DIST	QHEI + DistDwnst	4	-20.00	5.43	0.019
	LC + DIST	W_%Veg. + DistDwnst	4	-20.83	4.59	0.029
	WQ + HQ + LC	(·)PCA1 + QHEI + W_%Veg.	5	-23.10	8.61	0.004
	WQ + HQ + DIST	(·)PCA1 + QHEI + DistDwnst	5	-22.84	8.86	0.003
	WQ + LC + DIST	(·)PCA1 + W_%Veg. + DistDwnst	5	-21.14	10.57	0.001
	HQ + LC + DIST	QHEI + W_%Veg. + DistDwnst	5	-22.28	9.43	0.003
	WQ + HQ + LC + DIST	(·)PCA1 + QHEI + W_%Veg. + DistDwnst	6	-24.37	16.13	0.000
		Null	2	-16.31	0.73	0.201

SECTION 8 APPENDICES: ENVIRONMENTAL CONTAMINANTS

EVALUATION OF ENVIRONMENTAL CONTAMINANTS IN WETLANDS AND WATERWAYS ALONG THE FORMER EJ&E LINE

Jeffrey M. Levengood

APPENDIX SUMMARY

APPENDIX 8.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing its two sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing its six sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing its three sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing its five sampling locations (see Table 8.1 for descriptions).

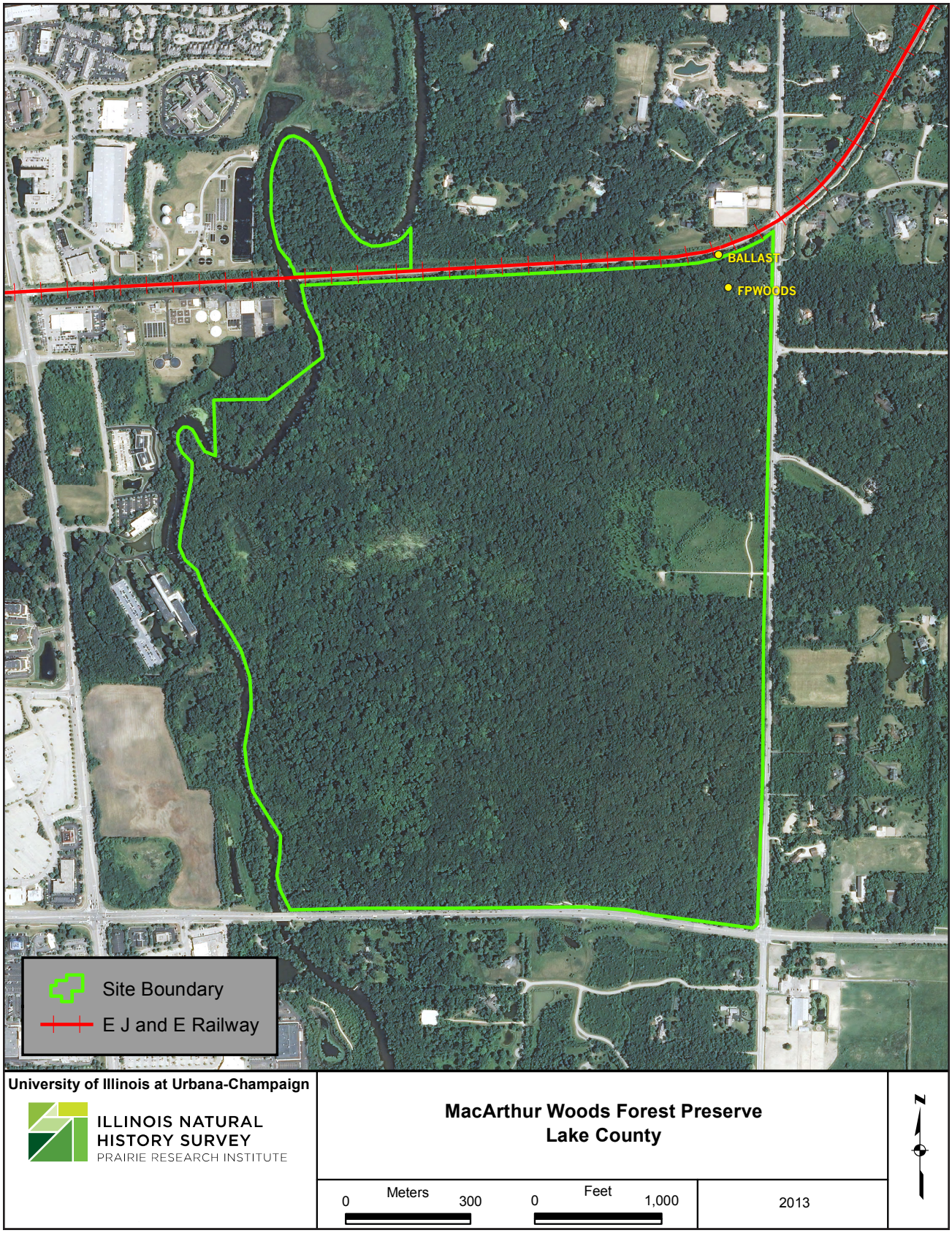
APPENDIX 8.1 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing its four sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (f) Map of the Fermilab (FL) study site showing its two sampling locations (see Table 8.1 for descriptions).

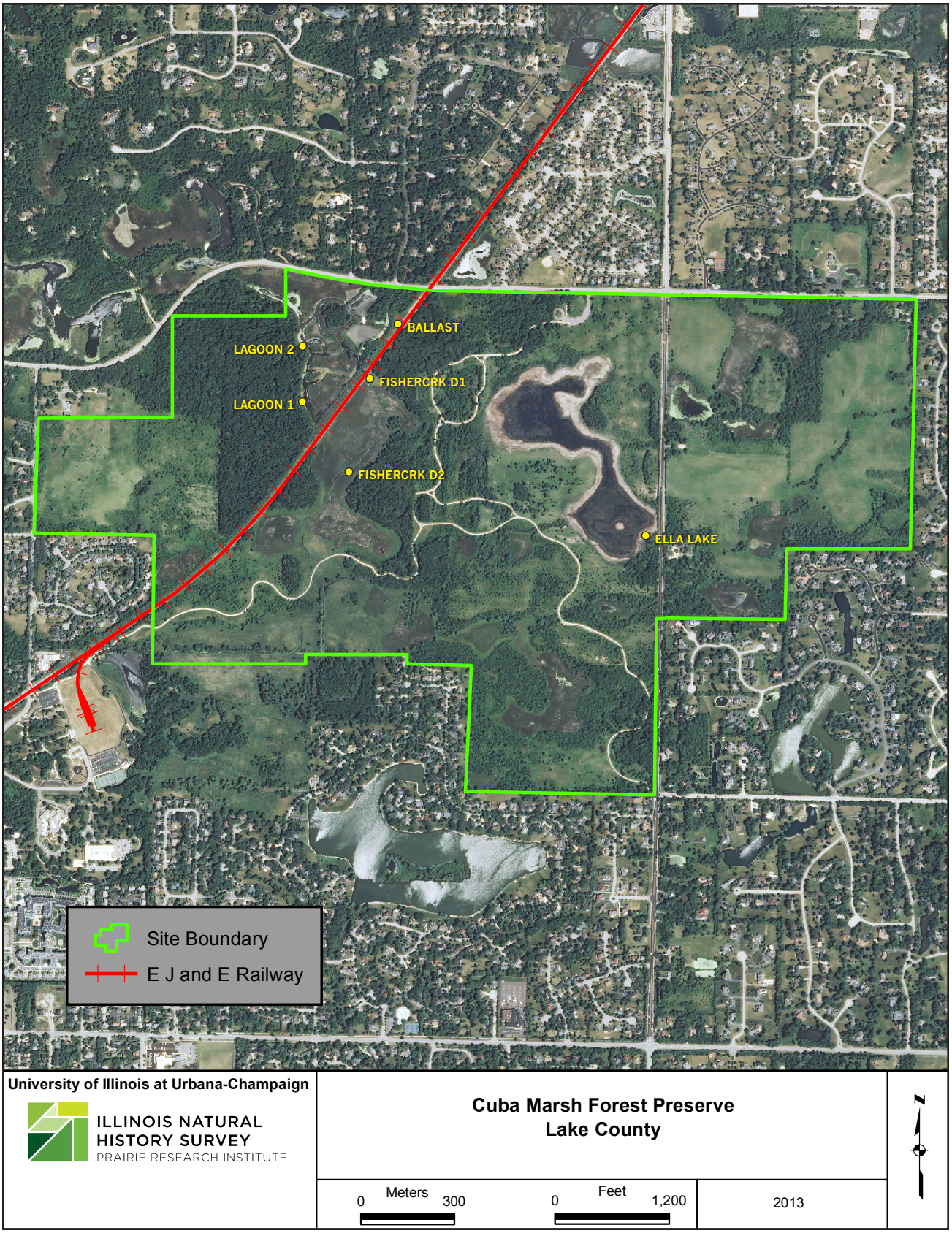
APPENDIX 8.1 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing its six sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing its four sampling locations (see Table 8.1 for descriptions).

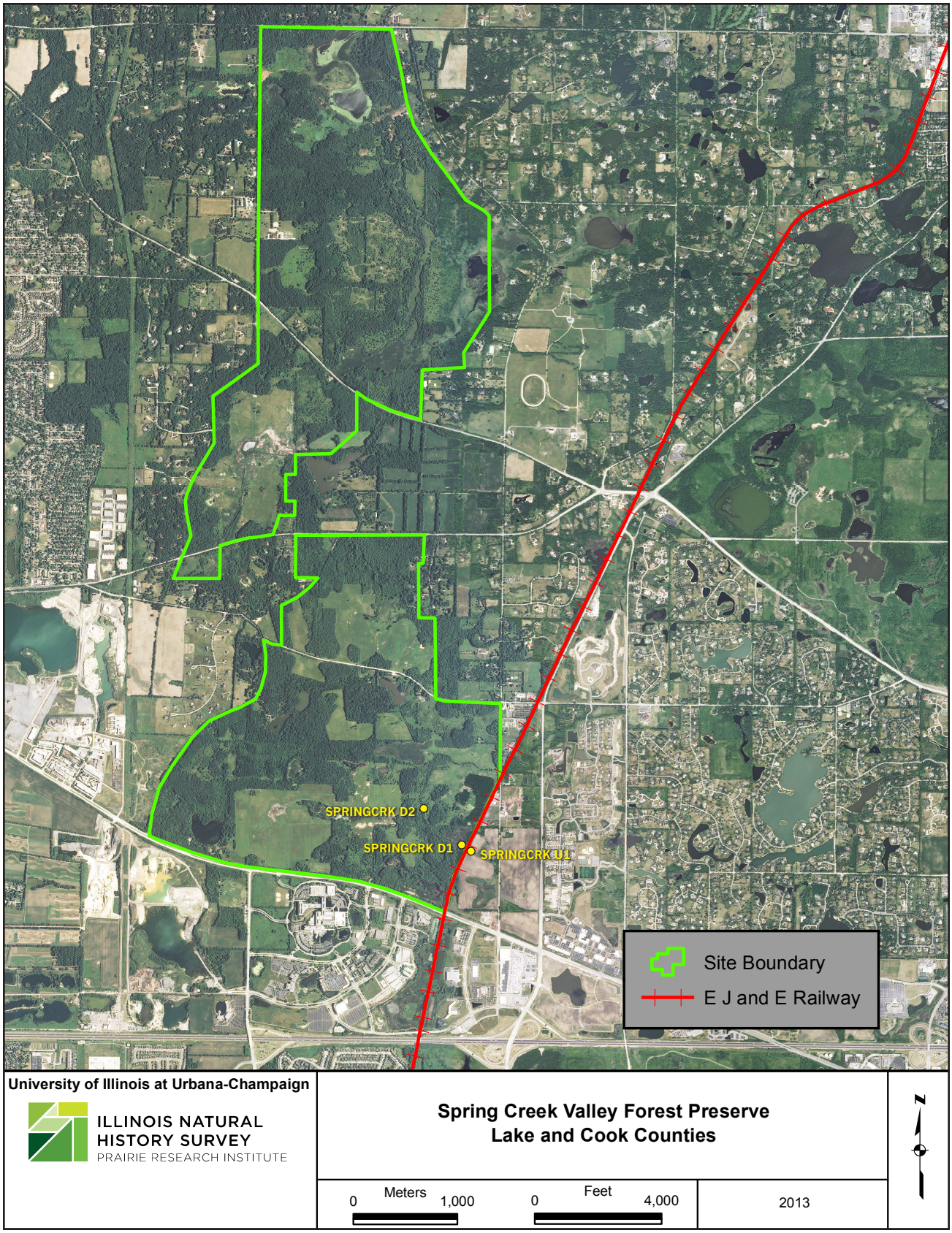
APPENDIX 8.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing its two sampling locations (see Table 8.1 for descriptions).



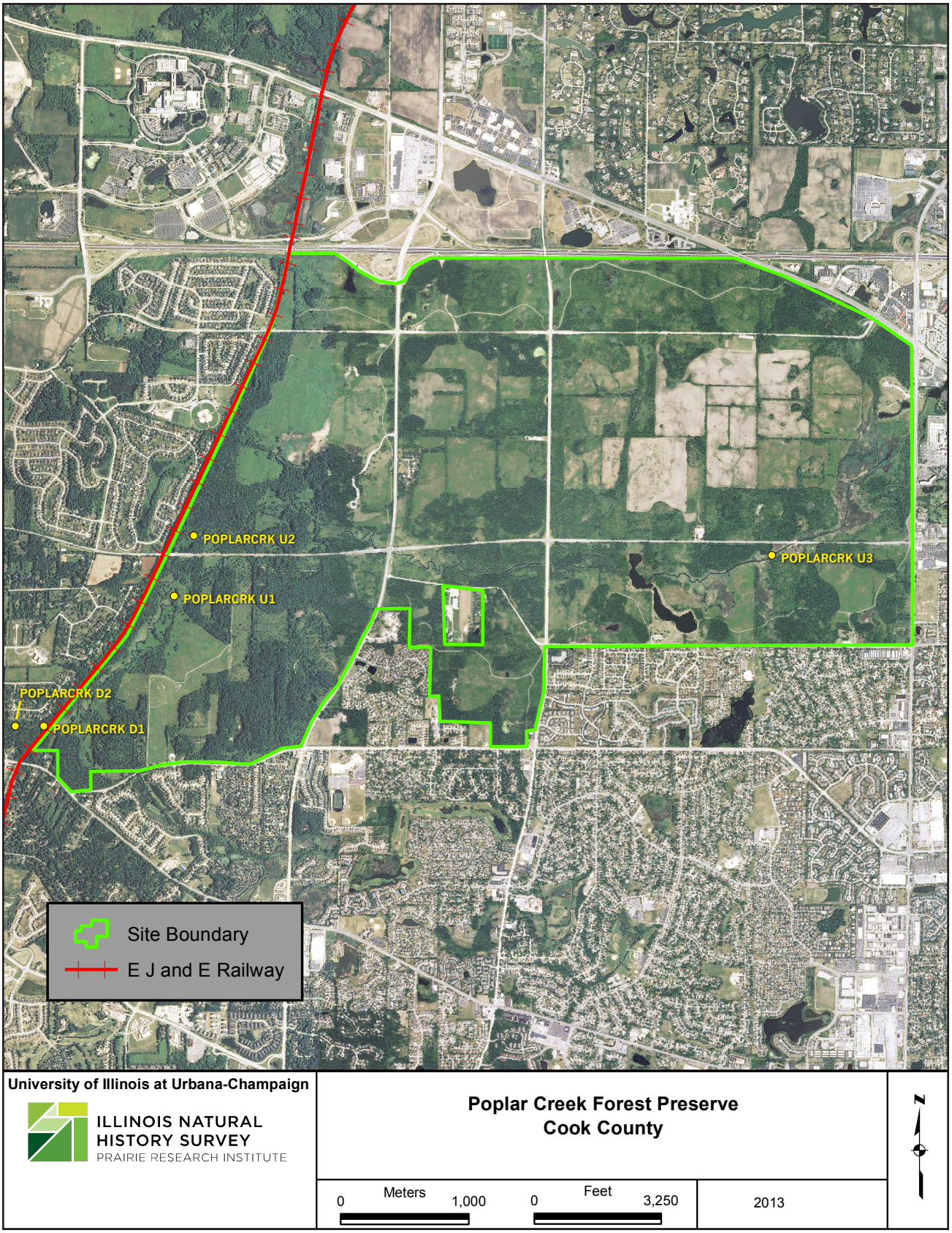
APPENDIX 8.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing its six sampling locations (see Table 8.1 for descriptions).



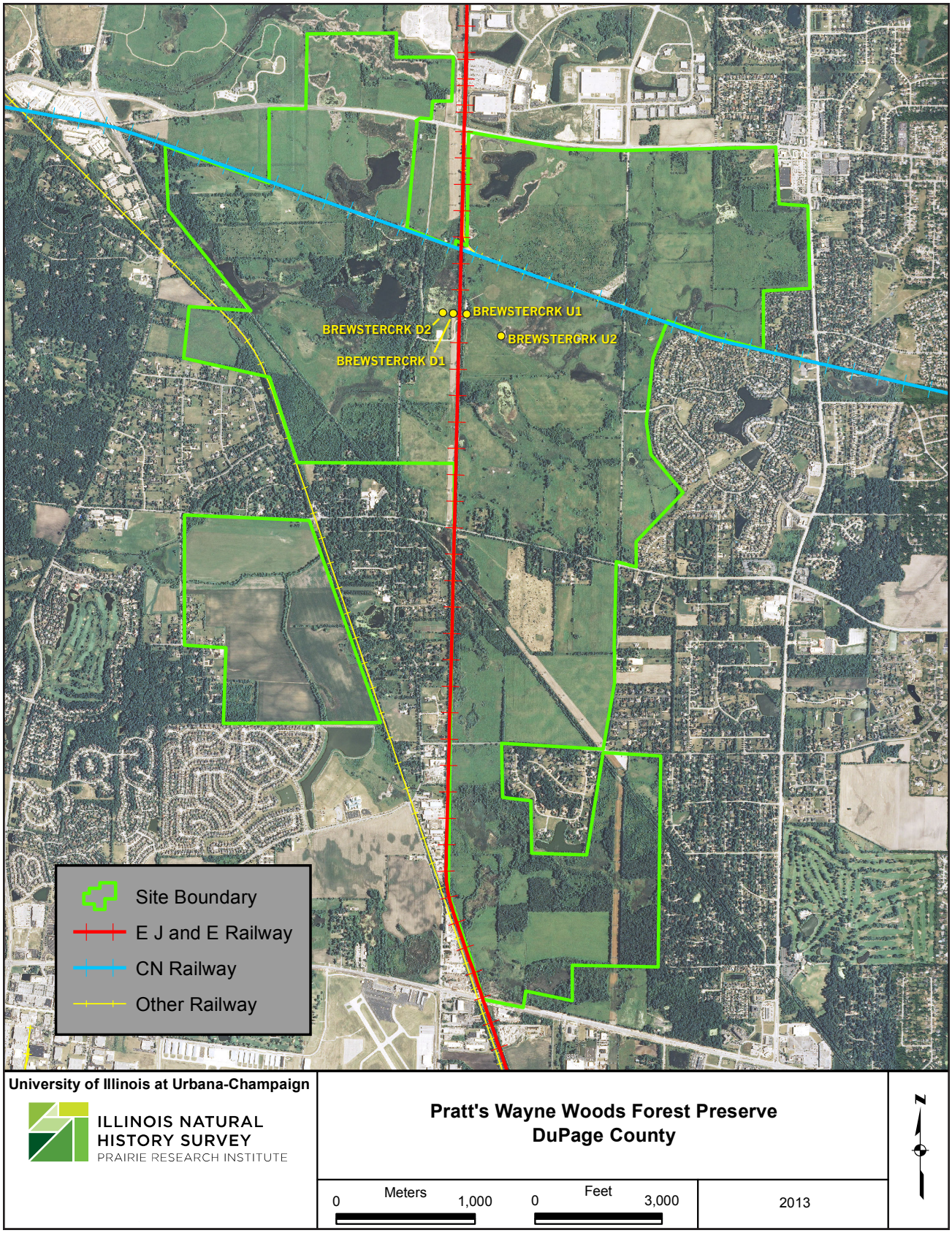
APPENDIX 8.1 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing its three sampling locations (see Table 8.1 for descriptions).



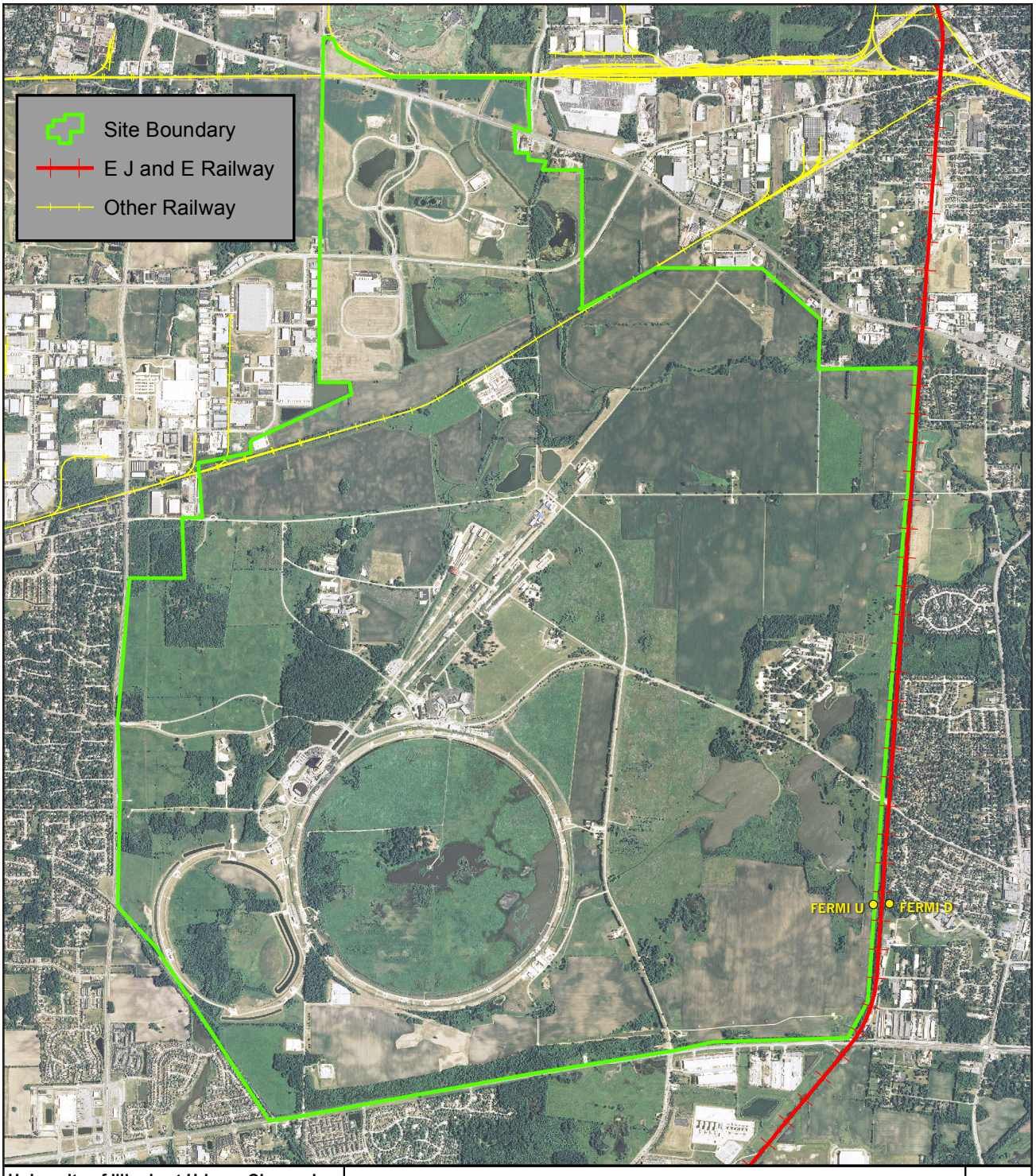
APPENDIX 8.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing its five sampling locations (see Table 8.1 for descriptions).



APPENDIX 8.1 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing its four sampling locations (see Table 8.1 for descriptions).

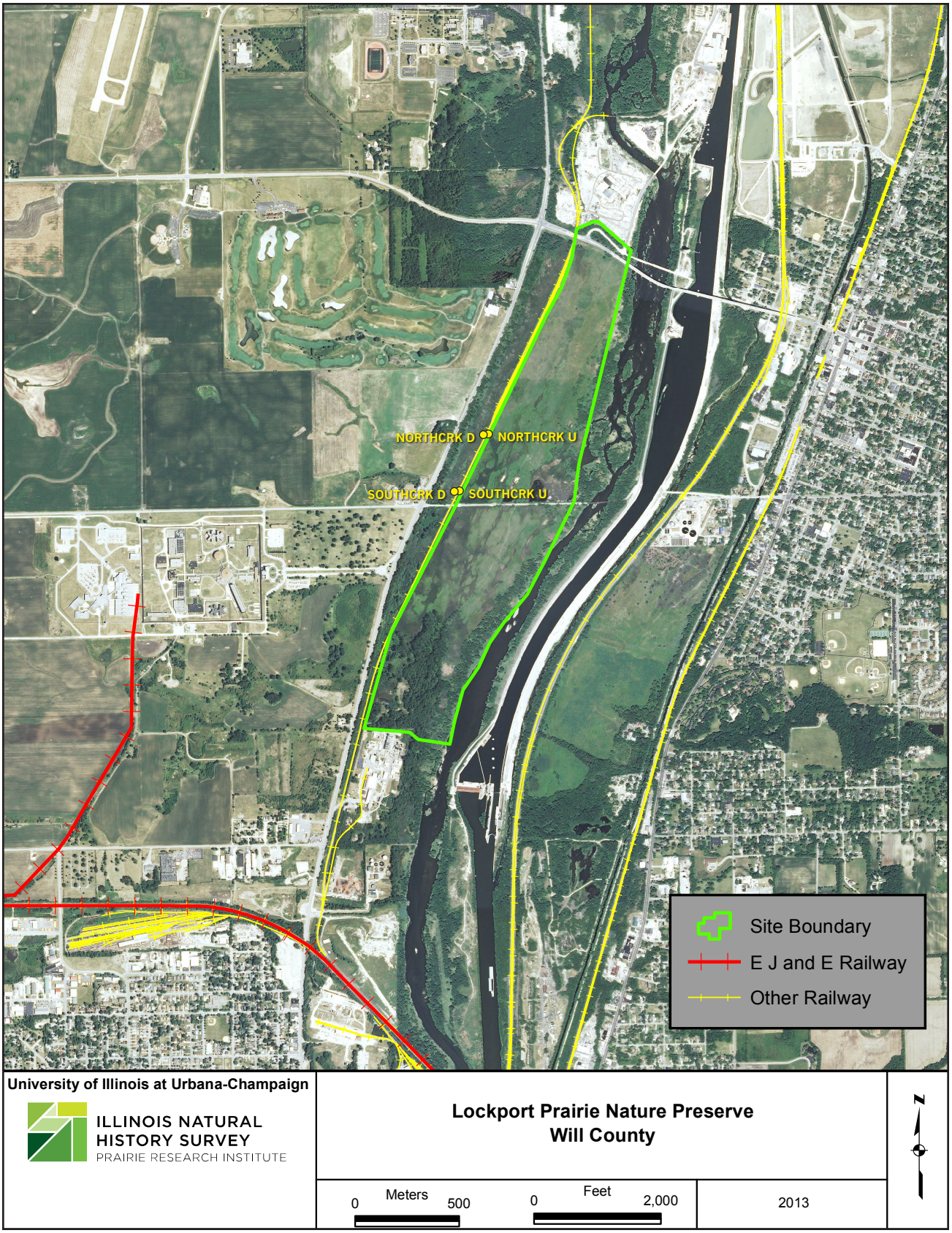


APPENDIX 8.1 (f) Map of the Fermilab (FL) study site showing its two sampling locations (see Table 8.1 for descriptions).



APPENDIX 8.1 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing its six sampling locations (see Table 8.1 for descriptions).

APPENDIX 8.1 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing its four sampling locations (see Table 8.1 for descriptions).



SECTION 9 APPENDICES: REPTILES AND AMPHIBIANS

ASSESSMENT OF THE HERPETOLOGICAL FAUNA AT SELECTED NATURAL AREAS POTENTIALLY IMPACTED BY THE EJ&E LINE, 2009 AND 2010

John K. Tucker and Kristopher A. Maxson

APPENDIX SUMMARY

APPENDIX 9.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (f) Map of the Fermilab (FL) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

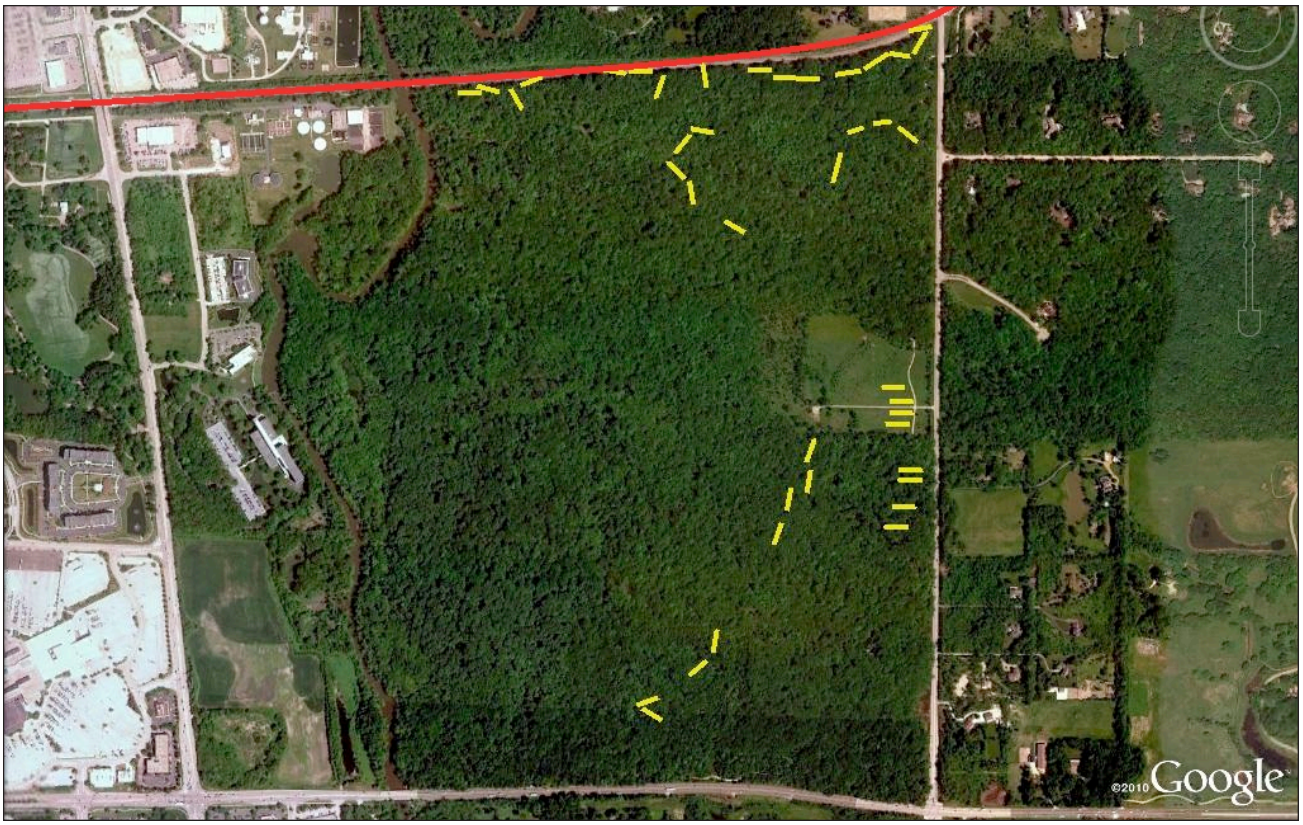
APPENDIX 9.1 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow. Boxes show locations of observations of spotted turtles.

APPENDIX 9.2 Reptiles and amphibians encountered at eight natural areas along the EJ&E line during visual encounter surveys (VES) in 2009. "Type" indicates proximity to EJ&E tracksat each site (Near = <50 m, Away = >100 m). MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie. West Chicago Prairie is not included, as no herps were encountered there during 10 VES.

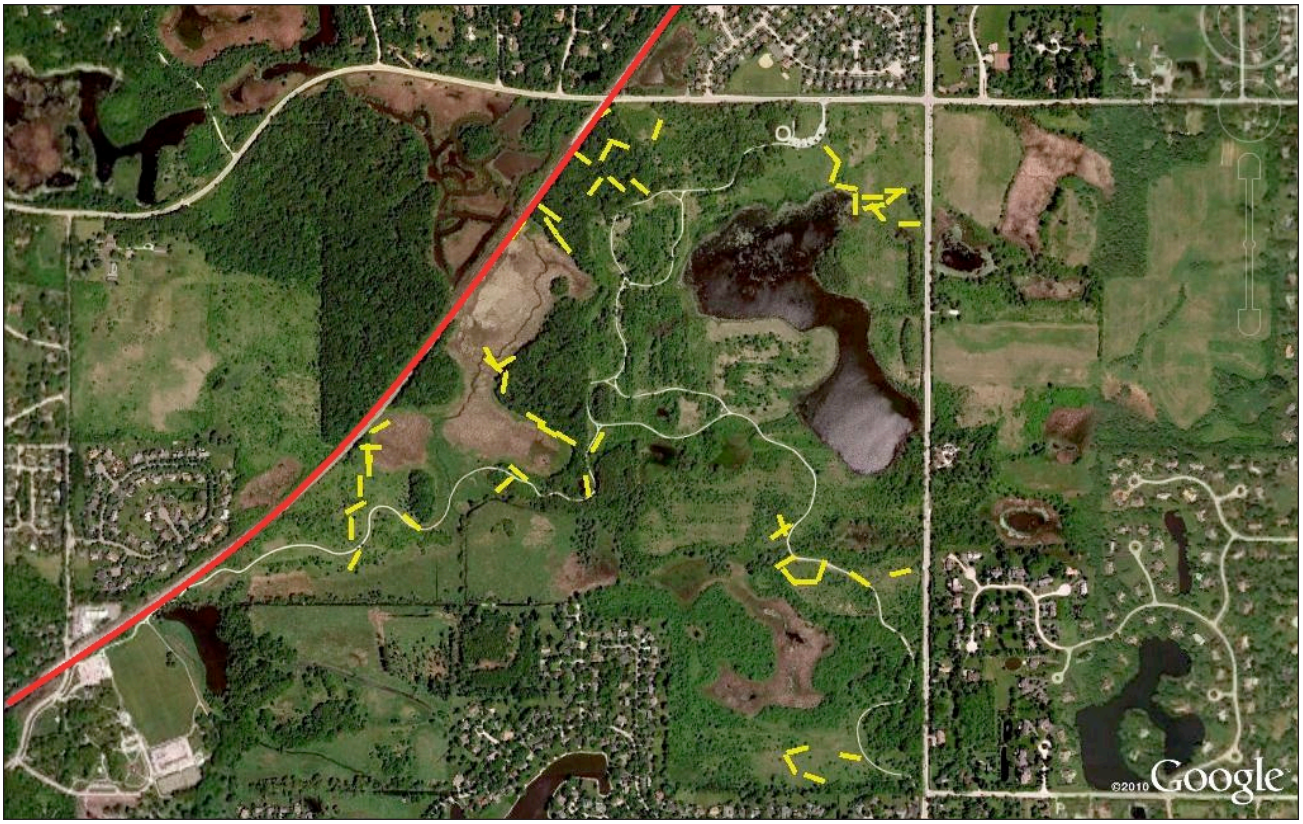
APPENDIX 9.3 Species of reptiles and amphibians encountered in 2009 by turtle trapping (Trap), using cover objects (Cover), or observed during other activities (Obs). Encounters during VES in 2009 are given in Appendix 9.2. "Type" indicates proximity to EJ&E tracks at each study site (near: <50 m; away: >100 m). If a site is not listed in the table, no other encounters in addition to the VES were recorded in 2009. SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

APPENDIX 9.4 Reptiles and amphibians encountered during visual encounter surveys (VES) at eight natural areas along the EJ&E line in 2010. N = near (<50 m) and A = away (>100 m) from EJ&E tracks at each study site. Number in parentheses indicates number of 50-m VES transects at each site in that category. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, LP = Lockport Prairie. See Table 2 in text for common names.

APPENDIX 9.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.



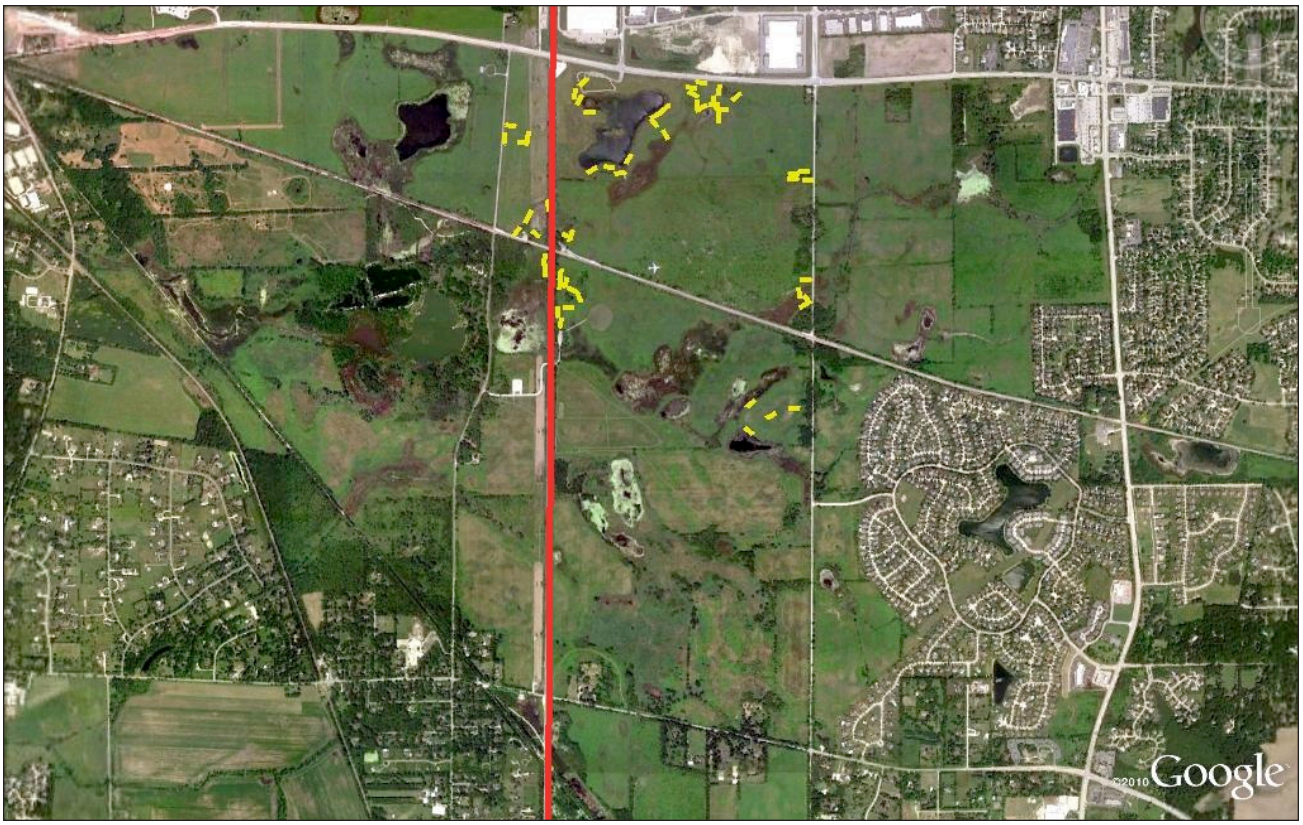
APPENDIX 9.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.



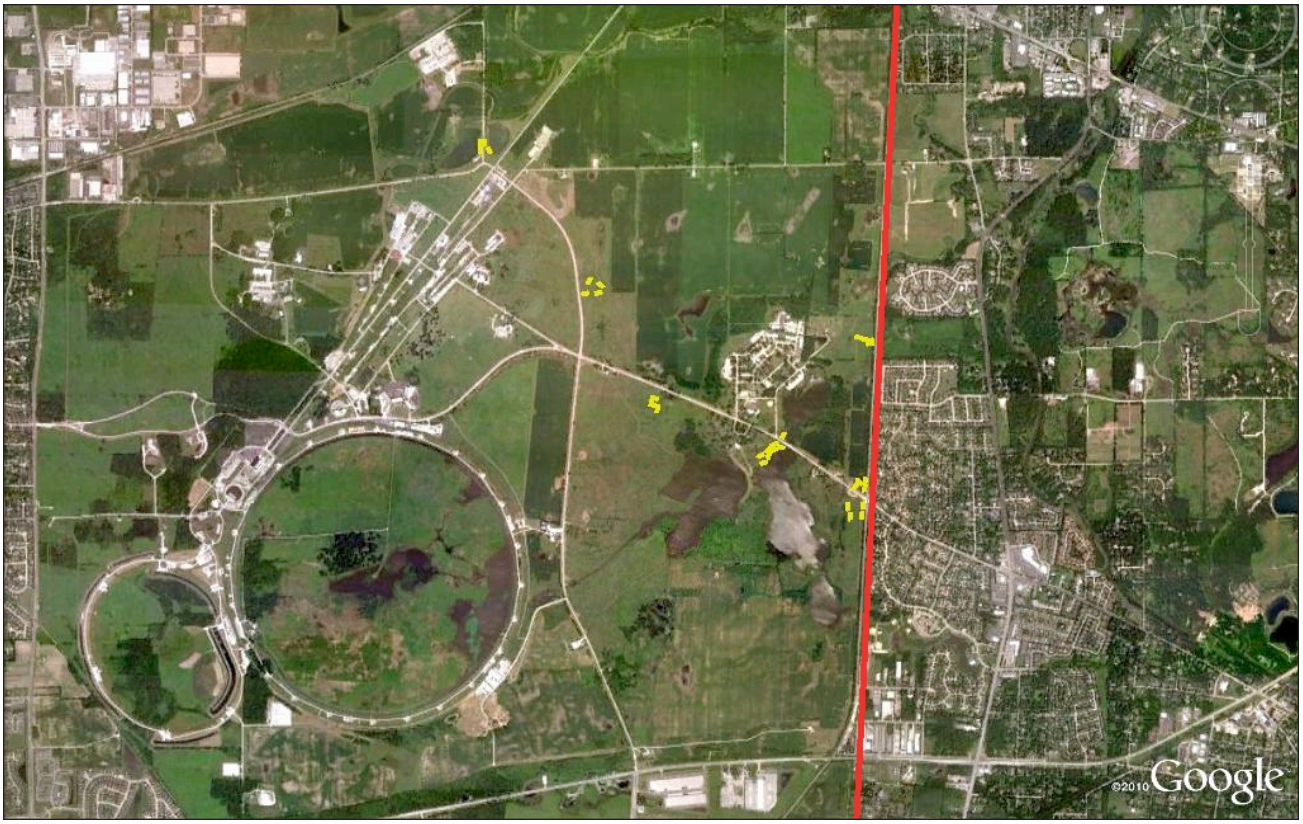
APPENDIX 9.1 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

APPENDIX 9.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.

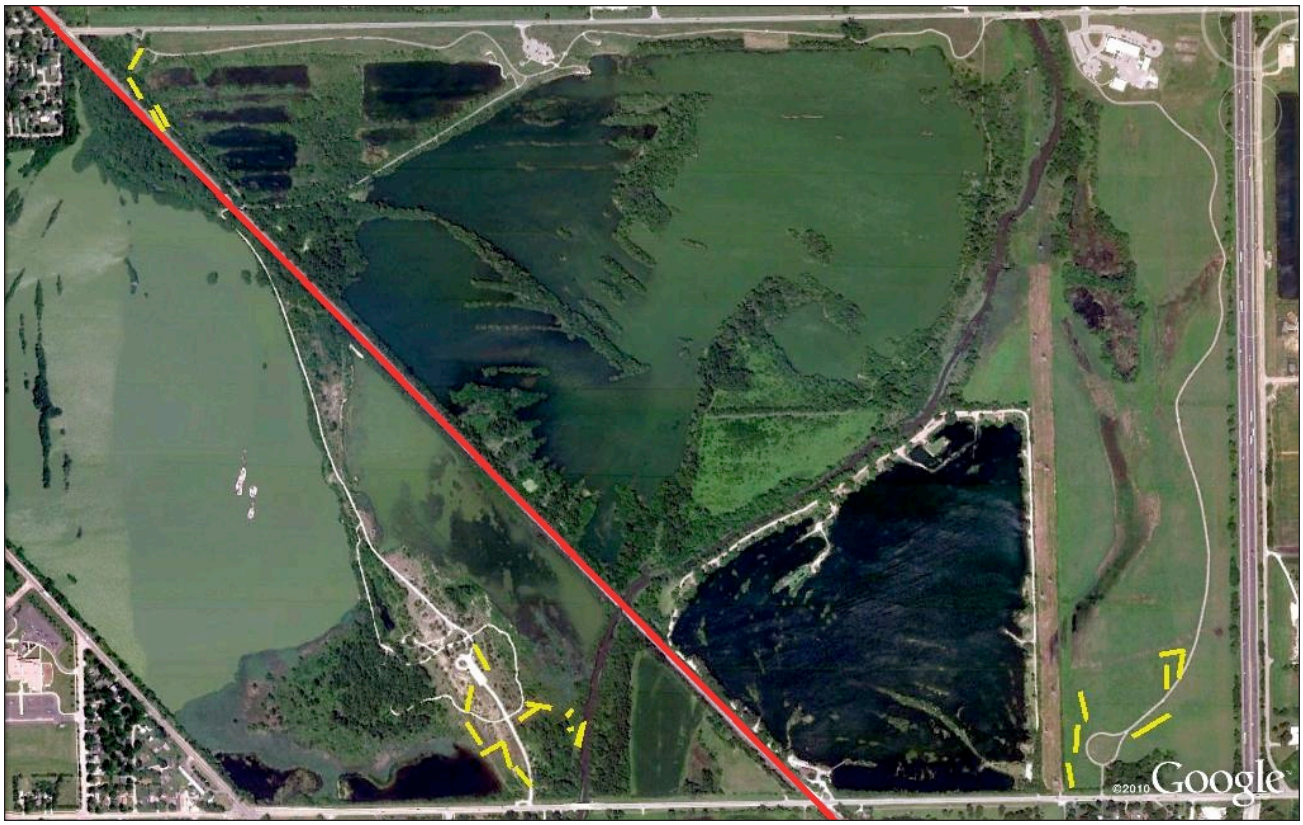
APPENDIX 9.1 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.



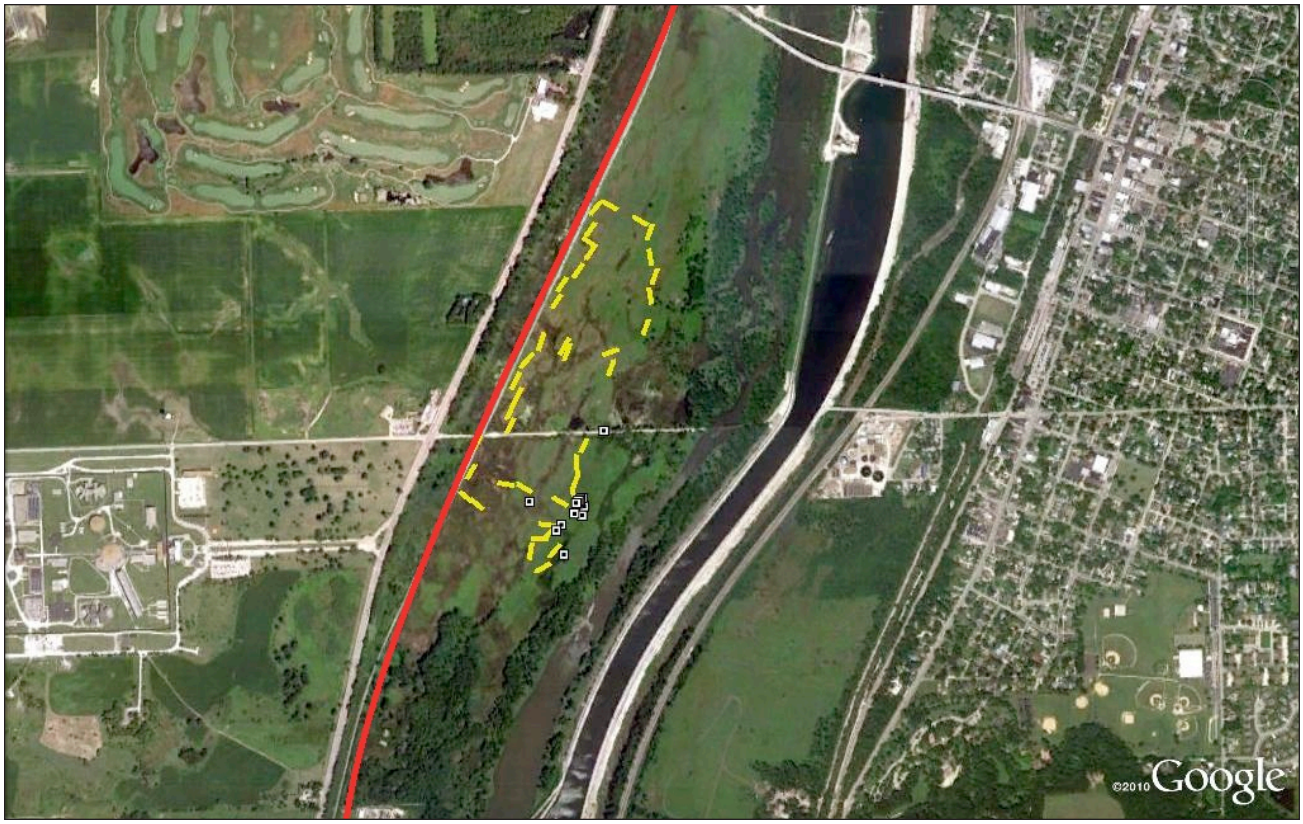
APPENDIX 9.1 (f) Map of the Fermilab (FL) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.



APPENDIX 9.1 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow.



APPENDIX 9.1 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing the location of the EJ&E railway line in red. Herpetological sampling transects are shown in yellow. Boxes show locations of observations of spotted turtles.



APPENDIX 9.2 Reptiles and amphibians encountered at eight natural areas along the EJ&E line during visual encounter surveys (VES) in 2009. "Type" indicates proximity to EJ&E tracksat each site (Near = <50 m, Away = >100 m). MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie. West Chicago Prairie is not included, as no herps were encountered there during 10 VES.

Study Site	Type	No. of Transects	Scientific Name	Common Name	Number	Notes
MW	Near	1	---			
	Away	2	*Rana pipiens*	Northern leopard frog	1	
CM	Near	3	*Bufo americanus*	American toad	1	
			Chrysemys picta	Painted turtle	1	Plastron
	Away	3	---			
SC	Near	0	---			
	Away	3	*Rana clamitans*	Green frog	1	
			Rana pipiens	Northern leopard frog	8	
PC	Near	0	---			
	Away	6	*Bufo americanus*	American toad	2	Young of the year
			Rana catesbeiana	Bullfrog	2	
			Rana pipiens	Northern leopard frog	25	
PW	Near	7	*Rana clamitans*	Green frog	1	Call
			Rana pipiens	Northern leopard frog	168	
	Away	6	*Bufo americanus*	American toad	1	
			Rana catesbeiana	Bullfrog	2	
			Rana pipiens	Northern leopard frog	34+	
			Chrysemys picta	Painted turtle	1	
			Thamnophis sirtalis	Common garter snake	1	
FL	Near	3	*Rana* sp.	---	1	Call
	Away	4	*Chrysemys picta*	Painted turtle	1	Destroyed nest
LR	Near	0	---			
	Away	3	---			
LP	Near	13	*Rana clamitans*	Green frog	1	Call
			Rana pipiens	Northern leopard frog	5	
	Away	11	*Acris* sp.	Cricket frog	-	
			Pseudacris sp.	Chorus frog	2	Call
			Rana clamitans	Green frog	1	
			Thamnophis sirtalis	Common garter snake	1	
			Thamnophis sirtalis	Common garter snake	1	Shed skin
			---	---	3	Chelonian trails

APPENDIX 9.3 Species of reptiles and amphibians encountered in 2009 by turtle trapping (Trap), using cover objects (Cover), or observed during other activities (Obs). Encounters during VES in 2009 are given in Appendix 9.2. "Type" indicates proximity to EJ&E tracks at each study site (near: <50 m; away: >100 m). If a site is not listed in the table, no other encounters in addition to the VES were recorded in 2009. SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

Study Site	Type	Scientific Name	Common Name	Number	Method	Notes
SC	Near	*Thamnophis sirtalis*	Common garter snake	4	Cover	
PC	Near	*Thamnophis sirtalis*	Common garter snake	1	Cover	
	Away	*Thamnophis sirtalis*	Common garter snake	2	Cover	
PW	Near	*Rana pipiens*	Northern leopard frog	Many	Obs.	
		Elaphe vulpina	Western fox snake	1	Cover	
		Thamnophis sirtalis	Common garter snake	1	Cover	
	Away	*Rana pipiens*	Northern leopard frog	2	Cover	
		Chelydra serpentina	Snapping turtle	1	Obs.	
		Thamnophis sirtalis	Common garter snake	1	Cover	
FL	Away	*Rana pipiens*	Northern leopard frog	1	Obs.	
		Chrysemys picta	Painted turtle	15	Trap	
		Chelydra serpentina	Snapping turtle	5	Trap	
		Chrysemys picta	Painted turtle	1	Obs.	Destroyed nest
LR	Away	*Clemmys guttata*	Spotted turtle	3	Obs.	
		Emydoidea blandingii	Blanding's turtle	1	Obs.	
LP	Away	*Thamnophis sirtalis*	Common garter snake	4–5	Cover	

APPENDIX 9.4 Reptiles and amphibians encountered during visual encounter surveys (VES) at eight natural areas along the EJ&E line in 2010. N = near (<50 m) and A = away (>100 m) from EJ&E tracks at each study site. Number in parentheses indicates number of 50-m VES transects at each site in that category. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, LP = Lockport Prairie. See Table 2 in text for common names.

	MW		CM		SC		PC		PW		FL		LR		LP	
Scientific Name	N (16)	A (25)	N (20)	A (34)	N (24)	A (19)	N (24)	A (20)	N (28)	A (28)	N (20)	A (20)	N (8)	A (16)	N (18)	A (23)
Ambystoma laterale	6	3														
Ambystoma tigrinum		1														
Bufo americanus	1	1	2		27	20	1			1			2	2		
Acris crepitans					1				2							7
Pseudacris maculata		1	2	1					2					1		1
Rana sp.				2		1			21	12						1
Rana catesbeiana	2				6	61		1	7			6				
Rana clamitans	2		3	6	30	57	2	3	11	19	1	1	3			
Rana pipiens	8	7	12	7	163	146	3	4	27	102	1	7	1		1	
Chelydra serpentina				2												
Chrysemys picta				2					3			2				1
Clemmys guttata																9
Emydoidea blandingii																1
Sternotherus odoratus																1
Nerodia sipedon									1	1						
Regina septemvittata																2
Thamnophis sirtalis		1		3		1	1	1				1				5

SECTION 10 APPENDICES: VASCULAR PLANTS

VASCULAR PLANT SURVEYS IN FIVE NATURAL COMMUNITIES ALONG THE EJ&E LINE, 2009 AND 2011

Paul Marcum, Brian Wilm, Dave Ketzner, Scott Wiesbrook, Dennis Keene, and Allen Plocher

APPENDIX SUMMARY

APPENDIX 10.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red.

APPENDIX 10.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red.

APPENDIX 10.1 (c) Map of the Fermilab (FL) study site showing the vegetation sampling locations (enclosed in white boxes). EJ&E tracks indicated in red and other railways shown in yellow.

APPENDIX 10.1 (d) Map of the Lockport Prairie Nature Preserve (LP) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red and other railways shown in yellow.

APPENDIX 10.2 MacArthur Woods herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

APPENDIX 10.3 MacArthur Woods herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

APPENDIX 10.4 Cuba Marsh Savanna herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

APPENDIX 10.5 Cuba Marsh Savanna herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

APPENDIX 10.6 Fermilab Marsh herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

APPENDIX 10.7 Fermilab Marsh herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

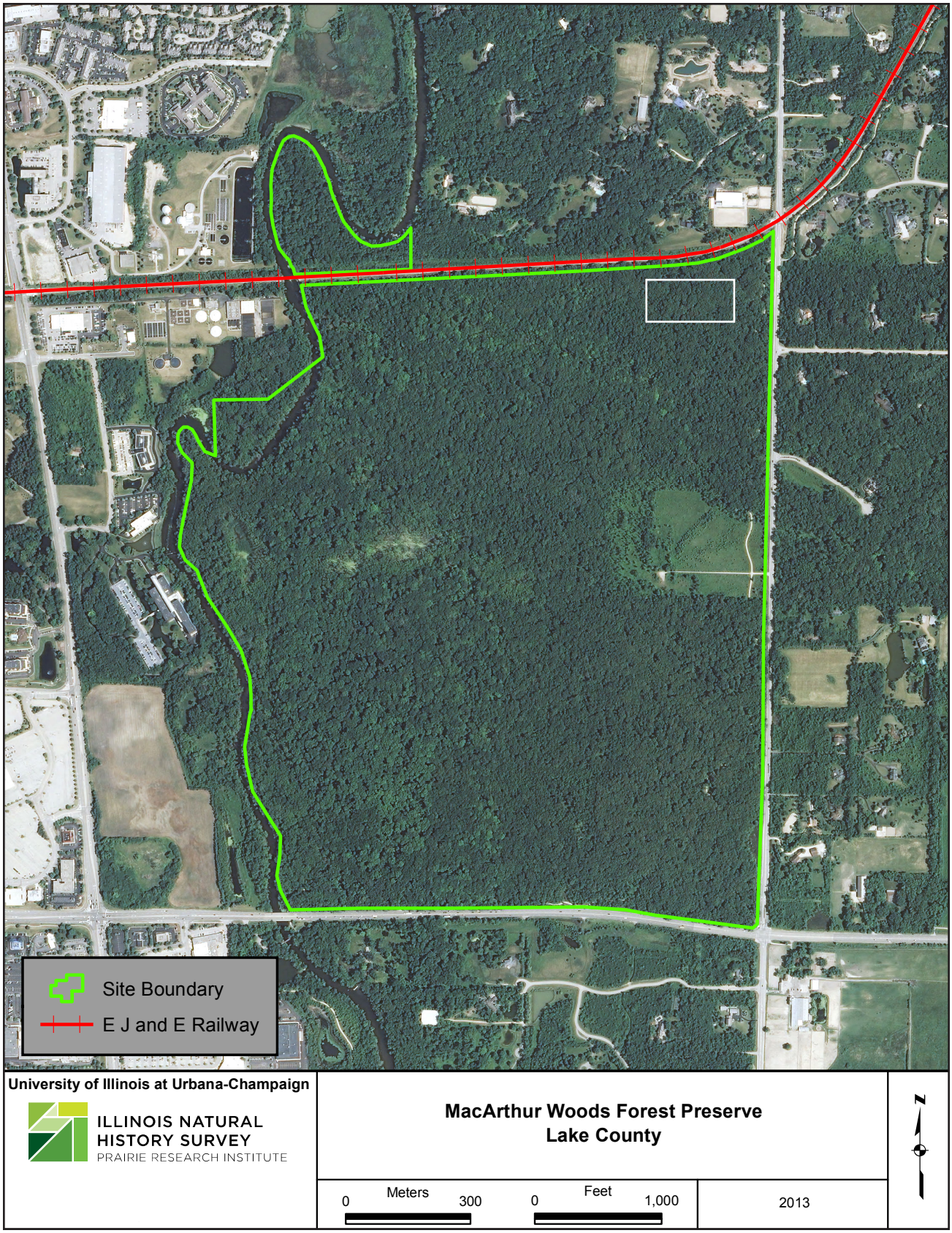
APPENDIX 10.8 Fermilab Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

APPENDIX 10.9 Fermilab Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

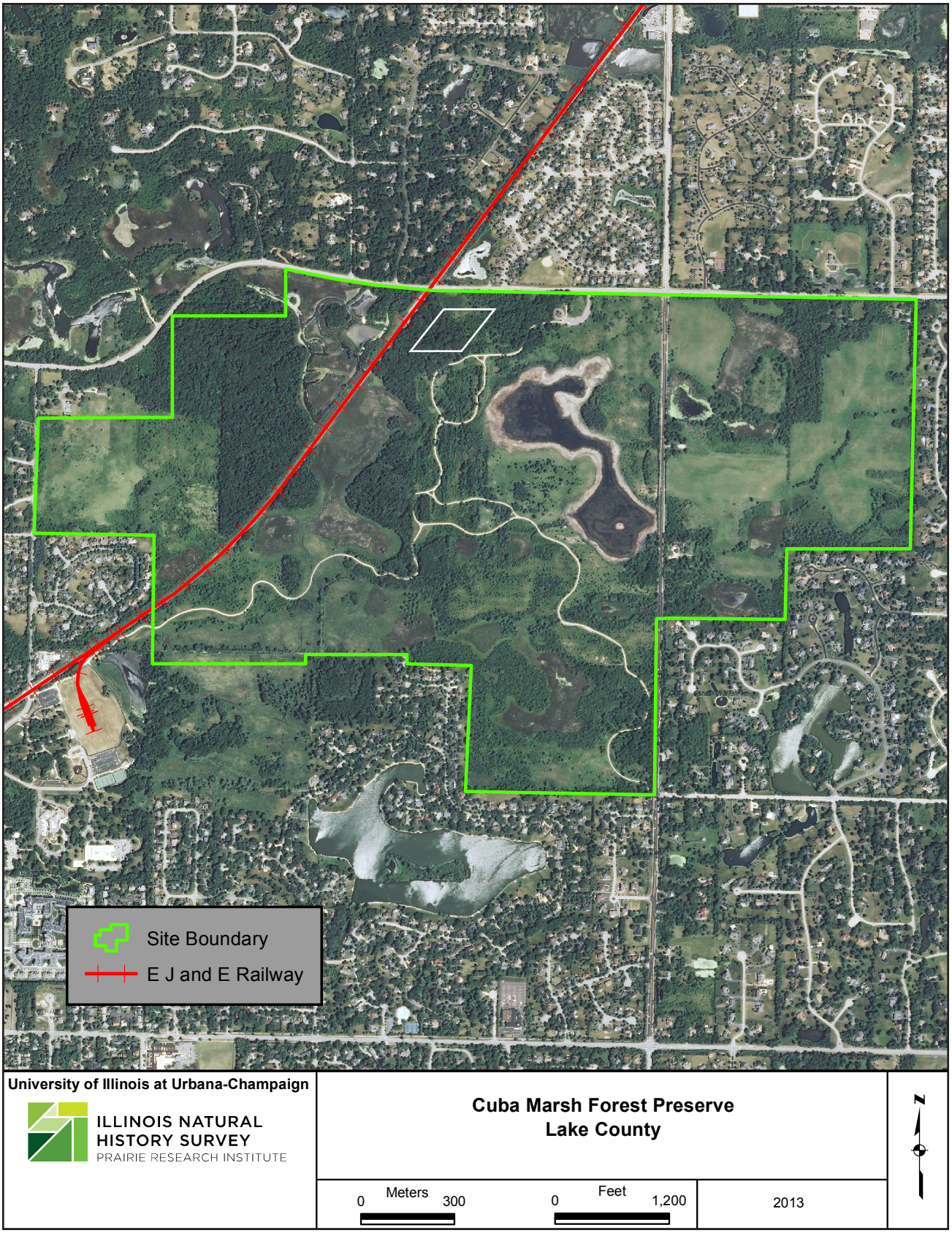
APPENDIX 10.10 Lockport Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

APPENDIX 10.11 Lockport Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

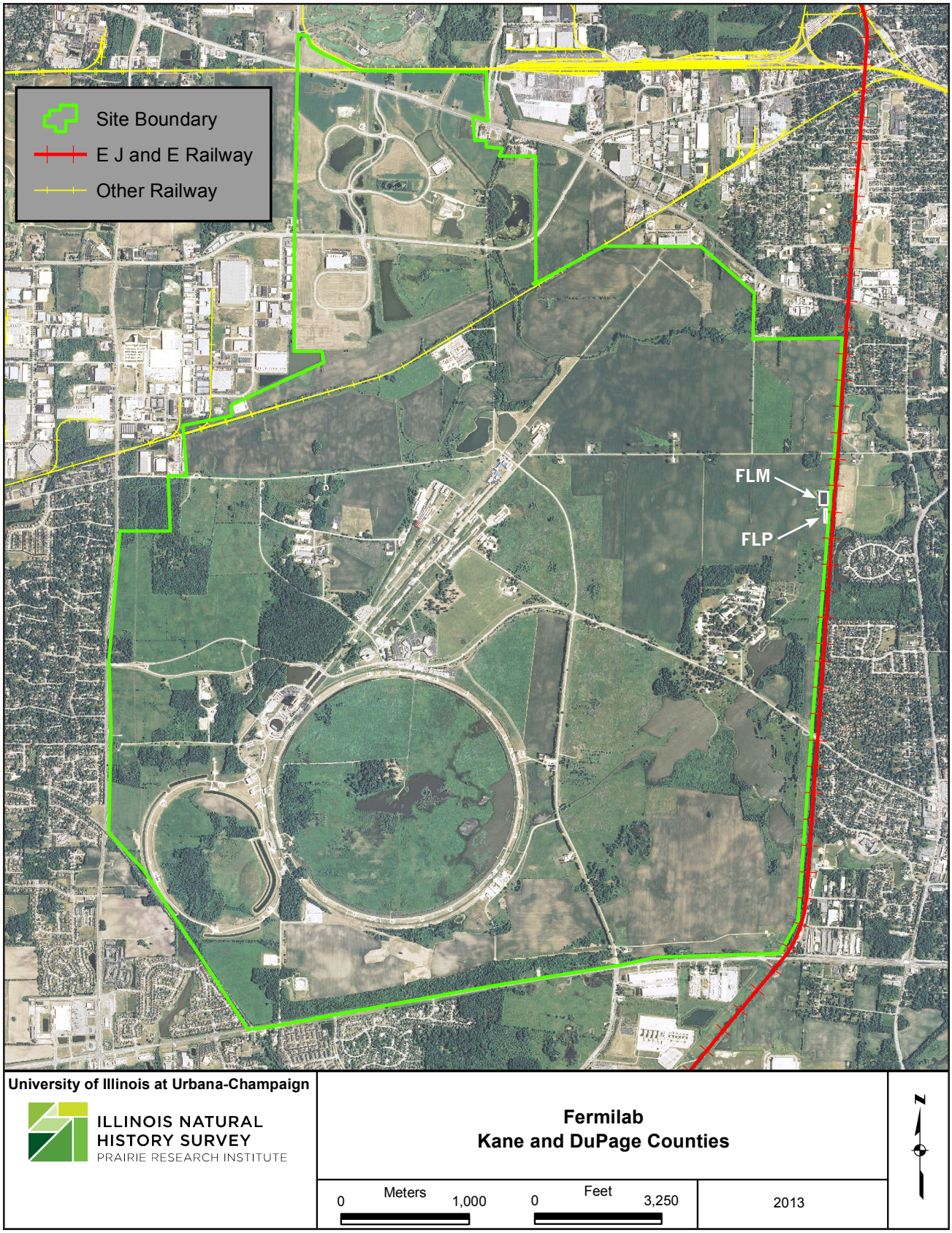
APPENDIX 10.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red.



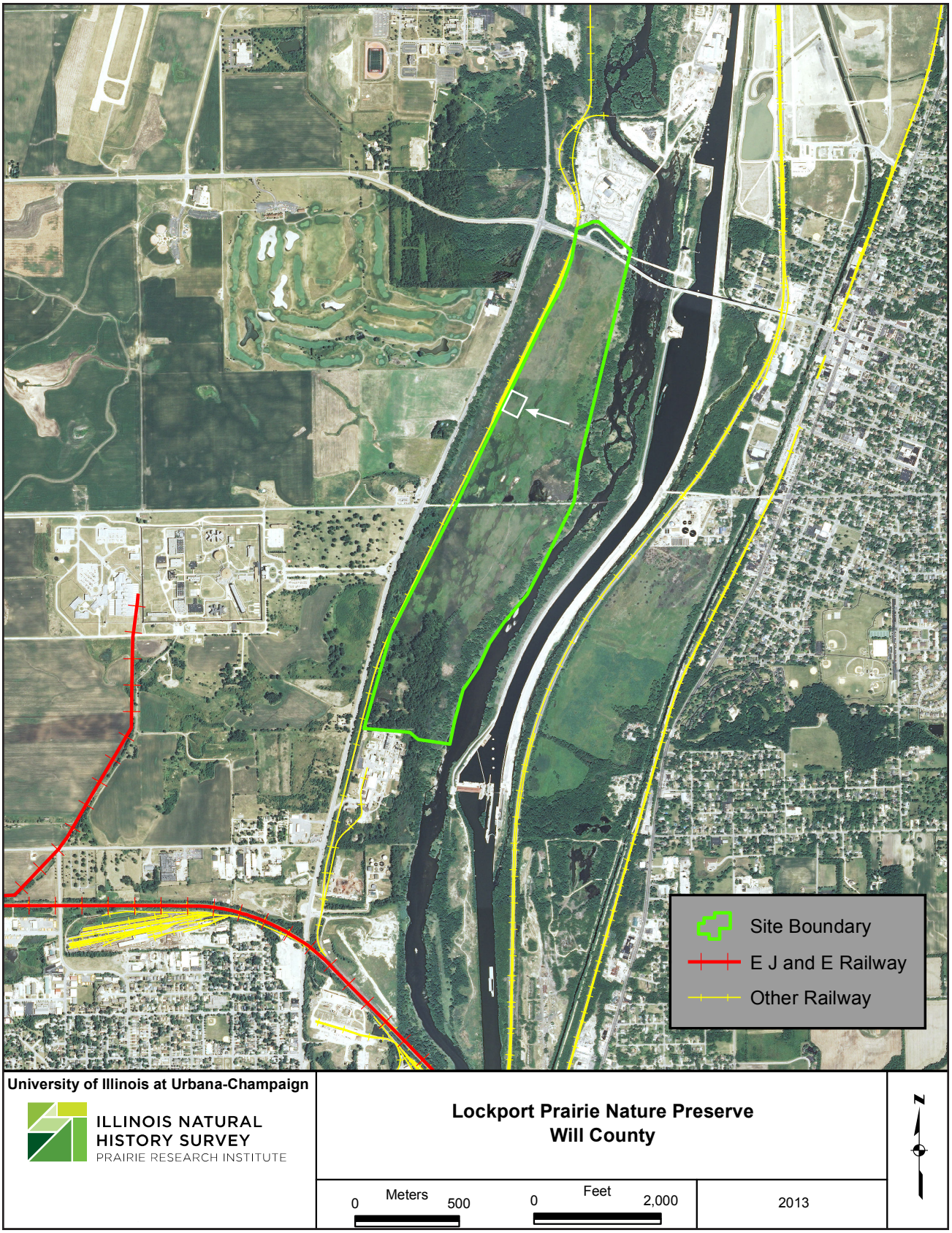
APPENDIX 10.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red.



APPENDIX 10.1 (c) Map of the Fermilab (FL) study site showing the vegetation sampling locations (enclosed in white boxes) at Fermilab Marsh (FLM) and Fermilab Prairie (FLP). EJ&E tracks indicated in red and other railways shown in yellow.



APPENDIX 10.1 (d) Map of the Lockport Prairie Nature Preserve (LP) study site showing the vegetation sampling location (enclosed in white box). EJ&E tracks indicated in red and other railways shown in yellow.



APPENDIX 10.2 MacArthur Woods herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Antenoron virginianum[A]	Virginia knotweed	FAC	3	11.31	27.58	0.90	12.80	20.19
Amphicarpaea bracteata[A]	hog peanut	FAC	4	6.98	17.01	0.29	4.17	10.59
Circaea lutetiana[A]	enchanter's nightshade	FACU	2	2.06	5.03	0.52	7.44	6.23
Rhamnus cathartica[A,B]	common buckthorn	FAC	*	2.60	6.35	0.35	5.06	5.70
Ostrya virginiana[A]	hop hornbeam	FACU	4	1.23	3.00	0.52	7.44	5.22
Fraxinus lanceolata[A]	green ash	FACW	2	1.67	4.06	0.40	5.65	4.86
Galium triflorum	sweet-scented bedstraw	FACU	4	1.67	4.06	0.25	3.57	3.82
Prunus serotina	wild black cherry	FACU	1	0.67	1.63	0.42	5.95	3.79
Toxicodendron radicans	poison ivy	FAC	1	0.96	2.34	0.29	4.17	3.25
Geum canadense	white avens	FAC	2	0.73	1.78	0.31	4.46	3.12
Carex pensylvanica	Pennsylvania oak sedge	UPL	5	1.17	2.84	0.15	2.08	2.46
Carya ovata	shagbark hickory	FACU	4	0.56	1.37	0.21	2.98	2.17
Frangula alnus[B]	glossy buckthorn	FACW	*	0.90	2.18	0.15	2.08	2.13
Viola pratincola	common blue violet	FAC	1	0.35	0.86	0.17	2.38	1.62
Viola pubescens var. *eriocarpa*	smooth yellow violet	FACU	5	0.54	1.32	0.13	1.79	1.55
Geranium maculatum	wild geranium	FACU	4	0.38	0.91	0.15	2.08	1.50
Parthenocissus quinquefolia	Virginia creeper	FACU	2	0.56	1.37	0.08	1.19	1.28
Onoclea sensibilis	sensitive fern	FACW	5	0.77	1.88	0.04	0.60	1.24
Quercus alba	white oak	FACU	5	0.25	0.61	0.13	1.79	1.20
Dioscorea villosa	wild yam	FAC	4	0.44	1.07	0.08	1.19	1.13
Solidago canadensis	Canada goldenrod	FACU	1	0.27	0.66	0.10	1.49	1.07
Oxalis stricta	common wood sorrel	FACU	0	0.38	0.91	0.08	1.19	1.05
Potentilla simplex	common cinquefoil	FACU	3	0.29	0.71	0.08	1.19	0.95
Athyrium filix-femina ssp. *angustum*	lady fern	FAC	6	0.63	1.52	0.02	0.30	0.91
Carya cordiformis	bitternut hickory	FACU	4	0.23	0.56	0.08	1.19	0.87
Cinna arundinacea	common wood reed	FACW	5	0.15	0.36	0.08	1.19	0.77
Caulophyllum thalictroides	blue cohosh	UPL	8	0.29	0.71	0.04	0.60	0.65
Thalictrum dioicum	early meadow rue	FACU	5	0.27	0.66	0.04	0.60	0.63
Viola sororia	woolly blue violet	FAC	3	0.15	0.36	0.06	0.89	0.62
Hackelia virginiana	stickseed	FACU	1	0.08	0.20	0.06	0.89	0.55
Carex hirtifolia	hairy wood sedge	UPL	6	0.13	0.30	0.04	0.60	0.45
Carex jamesii	grass sedge	UPL	4	0.13	0.30	0.04	0.60	0.45
Bromus pubescens	woodland brome	FACU	5	0.10	0.25	0.04	0.60	0.42
Vitis riparia	riverbank grape	FACW	2	0.10	0.25	0.04	0.60	0.42
Carex tribuloides	awl-fruited oval sedge	OBL	3	0.21	0.51	0.02	0.30	0.40
Rosa multiflora[B]	Japanese rose	FACU	*	0.21	0.51	0.02	0.30	0.40
Symphoricarpos orbiculatus	coralberry	FACU	1	0.21	0.51	0.02	0.30	0.40
Alliaria petiolata[B]	garlic mustard	FAC	*	0.06	0.15	0.04	0.60	0.37
Impatiens capensis	spotted touch-me-not	FACW	2	0.06	0.15	0.04	0.60	0.37
Prunus virginiana	common choke cherry	FACU	3	0.06	0.15	0.04	0.60	0.37
Pilea pumila	Canada clearweed	FACW	3	0.04	0.10	0.04	0.60	0.35
Lonicera reticulata	grape honeysuckle	UPL	5	0.15	0.36	0.02	0.30	0.33
Persicaria hydropiper[B]	water pepper	OBL	*	0.15	0.36	0.02	0.30	0.33
Rubus occidentalis	black raspberry	UPL	2	0.15	0.36	0.02	0.30	0.33
Carex rosea	star sedge	UPL	5	0.10	0.25	0.02	0.30	0.28
Carex grisea	wood gray sedge	FAC	3	0.06	0.15	0.02	0.30	0.22
Cornus racemosa	gray dogwood	FAC	2	0.06	0.15	0.02	0.30	0.22
Scrophularia marilandica	late figwort	FACU	4	0.06	0.15	0.02	0.30	0.22
Ulmus americana	American elm	FACW	5	0.06	0.15	0.02	0.30	0.22
Viburnum opulus[B]	European high-bush cranberry	FAC	*	0.06	0.15	0.02	0.30	0.22

APPENDIX 10.2 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Acer saccharum	sugar maple	FACU	4	0.04	0.10	0.02	0.30	0.20
Celastrus scandens	climbing bittersweet	FACU	2	0.04	0.10	0.02	0.30	0.20
Crateagus phaenopyrum	Washington hawthorn	FAC	5	0.04	0.10	0.02	0.30	0.20
Ribes missouriense	Missouri gooseberry	UPL	2	0.04	0.10	0.02	0.30	0.20
Scutellaria lateriflora	mad-dog skullcap	OBL	4	0.04	0.10	0.02	0.30	0.20
Allium tricoccum	wild leek	FACU	7	0.02	0.05	0.02	0.30	0.17
Arisaema triphyllum	Jack-in-the-pulpit	FACW	4	0.02	0.05	0.02	0.30	0.17
Festuca subverticillata	nodding fescue	FACU	5	0.02	0.05	0.02	0.30	0.17
Rosa blanda	early wild rose	FACU	4	0.02	0.05	0.02	0.30	0.17
Smilacina racemosa	feathery false Solomon seal	FACU	4	0.02	0.05	0.02	0.30	0.17
Viburnum recognitum	smooth arrowwood	FAC	6	0.02	0.05	0.02	0.30	0.17
			Total	**41.02**	**100.00**	**7.00**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.3 MacArthur Woods herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Pilea pumila[A]	Canada clearweed	FACW	3	8.72	28.35	0.54	7.67	18.01
Antenoron virginianum[A]	Virginia knotweed	FAC	3	5.05	16.43	0.81	11.50	13.97
Bidens frondosa[A]	common beggar's ticks	FACW	1	2.45	7.96	0.21	2.95	5.46
Circaea lutetiana[A]	enchanter's nightshade	FACU	2	1.42	4.61	0.44	6.19	5.40
Oxalis stricta[A]	common wood sorrel	FACU	0	0.61	2.00	0.48	6.78	4.39
Carex pensylvanica[A]	Pennsylvania oak sedge	UPL	5	1.43	4.64	0.25	3.54	4.09
Viola sororia	woolly blue violet	FAC	3	0.36	1.19	0.40	5.60	3.40
Potentilla simplex	common cinquefoil	FACU	3	0.98	3.18	0.25	3.54	3.36
Glyceria striata	fowl manna grass	OBL	4	1.56	5.08	0.06	0.89	2.98
Hackelia virginiana	stickseed	FACU	1	0.33	1.08	0.29	4.13	2.61
Galium triflorum	sweet-scented bedstraw	FACU	4	0.76	2.47	0.19	2.65	2.56
Rhamnus cathartica[B]	common buckthorn	FAC	*	0.77	2.51	0.17	2.36	2.43
Persicaria punctata	smartweed	OBL	3	0.67	2.17	0.15	2.06	2.12
Geranium maculatum	wild geranium	FACU	4	0.28	0.91	0.23	3.24	2.08
Leersia virginica	white grass	FACW	4	0.60	1.96	0.15	2.06	2.01
Geum canadense	white avens	FAC	2	0.22	0.71	0.23	3.24	1.98
Elymus virginicus	Virginia wild rye	FACW	4	0.23	0.75	0.21	2.95	1.85
Amphicarpaea bracteata	hog peanut	FAC	4	0.69	2.24	0.08	1.18	1.71
Persicaria hydropiper[B]	water pepper	OBL	*	0.51	1.66	0.10	1.47	1.57
Fraxinus lanceolata	green ash	FACW	2	0.16	0.51	0.17	2.36	1.43
Onoclea sensibilis	sensitive fern	FACW	5	0.64	2.07	0.04	0.59	1.33
Carya ovata	shagbark hickory	FACU	4	0.11	0.37	0.13	1.77	1.07
Carex pellita	wooly sedge	OBL	4	0.35	1.15	0.06	0.89	1.02
Erechtites hieracifolia	fireweed	FAC	2	0.06	0.20	0.13	1.77	0.99
Cinna arundinacea	common wood reed	FACW	5	0.13	0.41	0.08	1.18	0.79
Dioscorea villosa	wild yam	FAC	4	0.19	0.61	0.06	0.89	0.75
Ostrya virginiana	hop hornbeam	FACU	4	0.04	0.14	0.08	1.18	0.66
Impatiens capensis	spotted touch-me-not	FACW	2	0.10	0.34	0.06	0.89	0.61
Smilacina racemosa	feathery false Solomon seal	FACU	4	0.08	0.27	0.06	0.89	0.58
Perideridia americana	thicket parsley	UPL	6	0.06	0.20	0.06	0.89	0.54

APPENDIX 10.3 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Arisaema dracontium	green dragon	FACW	4	0.04	0.14	0.06	0.89	0.51
Quercus alba	white oak	FACU	5	0.04	0.14	0.06	0.89	0.51
Aster lateriflorus	side-flowering aster	FACW	2	0.03	0.10	0.06	0.89	0.49
Carex projecta	loose-headed oval sedge	FACW	4	0.21	0.68	0.02	0.30	0.49
Prunus serotina	wild black cherry	FACU	1	0.03	0.10	0.06	0.89	0.49
Rubus pubescens	dwarf raspberry	FACW	10	0.08	0.27	0.04	0.59	0.43
Toxicodendron radicans	poison ivy	FAC	1	0.08	0.27	0.04	0.59	0.43
Elymus hystrix	bottlebrush grass	FACU	5	0.06	0.20	0.04	0.59	0.4
Frangula alnus[B]	glossy buckthorn	FACW	*	0.06	0.20	0.04	0.59	0.4
Arisaema triphyllum	Jack-in-the-pulpit	FACW	4	0.04	0.14	0.04	0.59	0.36
Ranunculus recurvatus	hooked buttercup	FACW	5	0.04	0.14	0.04	0.59	0.36
Aster lanceolatus	panicled aster	FAC	3	0.02	0.07	0.04	0.59	0.33
Aster ontarionis	Ontario aster	FAC	4	0.04	0.14	0.02	0.30	0.22
Boehmeria cylindrica	false nettle	OBL	3	0.04	0.14	0.02	0.30	0.22
Helianthus divaricatus	woodland sunflower	UPL	5	0.04	0.14	0.02	0.30	0.22
Parthenocissus quinquefolia	Virginia creeper	FACU	2	0.04	0.14	0.02	0.30	0.22
Rubus occidentalis	black raspberry	UPL	2	0.04	0.14	0.02	0.30	0.22
Scrophularia marilandica	late figwort	FACU	4	0.04	0.14	0.02	0.30	0.22
Scutellaria lateriflora	mad-dog skullcap	OBL	4	0.04	0.14	0.02	0.30	0.22
Acalypha rhomboidea	three-seeded mercury	FACU	0	0.02	0.07	0.02	0.30	0.18
Botrychium virginianum	rattlesnake fern	FACU	4	0.02	0.07	0.02	0.30	0.18
Solidago canadensis	Canada goldenrod	FACU	1	0.02	0.07	0.02	0.30	0.18
Taraxacum officinale[B]	common dandelion	FACU	*	0.02	0.07	0.02	0.30	0.18
Persicaria vulgaris[B]	lady's thumb	FACW	*	0.01	0.03	0.02	0.30	0.16
Prunus virginiana	common choke cherry	FACU	3	0.01	0.03	0.02	0.30	0.16
Thalictrum dioicum	early meadow rue	FACU	5	0.01	0.03	0.02	0.30	0.16
Ulmus americana	American elm	FACW	5	0.01	0.03	0.02	0.30	0.16
Vitis riparia	riverbank grape	FACW	2	0.01	0.03	0.02	0.30	0.16
			Total	**30.75**	**100.00**	**7.06**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.4 Cuba Marsh Savanna herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Leersia virginica[A]	white grass	FACW	4	12.94	22.17	0.54	4.96	13.57
Amphicarpaea bracteata[A]	hog peanut	FAC	4	4.90	8.39	0.69	6.30	7.34
Ageratina altissima[A]	white snakeroot	FACU	2	5.00	8.57	0.48	4.39	6.48
Elymus virginicus[A]	Virginia wild rye	FACW	4	3.56	6.10	0.5	4.58	5.34
Circaea lutetiana[A]	enchanter's nightshade	FACU	2	2.02	3.46	0.56	5.15	4.31
Solidago ulmifolia[A]	elm-leaved goldenrod	UPL	5	2.75	4.71	0.42	3.82	4.26
Geum canadense[A]	white avens	FAC	2	1.19	2.03	0.50	4.58	3.31
Potentilla simplex[A]	common cinquefoil	FACU	3	1.31	2.25	0.46	4.20	3.22
Solidago gigantea[A]	late goldenrod	FACW	3	2.44	4.18	0.23	2.10	3.14
Frangula alnus[B]	glossy buckthorn	FACW	*	1.88	3.21	0.33	3.05	3.13
Solidago canadensis	Canada goldenrod	FACU	1	1.48	2.53	0.40	3.63	3.08
Torilis japonica[B]	Japanese hedge parsley	UPL	*	1.13	1.93	0.42	3.82	2.87
Antenoron virginianum	Virginia knotweed	FAC	3	1.38	2.36	0.31	2.86	2.61
Rubus allegheniensis	common blackberry	FACU	2	1.08	1.86	0.23	2.10	1.98
Phalaris arundinacea[B]	reed canary grass	FACW	*	1.56	2.68	0.10	0.95	1.82
Rubus occidentalis	black raspberry	UPL	2	0.88	1.50	0.23	2.10	1.80
Allium cernuum	nodding wild onion	FACU	7	1.06	1.82	0.17	1.53	1.67
Carya ovata	shagbark hickory	FACU	4	0.58	1.00	0.25	2.29	1.64
Elymus hystrix	bottlebrush grass	FACU	5	0.58	1.00	0.25	2.29	1.64
Galium triflorum	sweet-scented bedstraw	FACU	4	0.83	1.43	0.19	1.72	1.57
Parthenocissus quinquefolia	Virginia creeper	FACU	2	0.56	0.96	0.23	2.10	1.53
Elymus villosus	silky wild rye	FACU	4	0.52	0.89	0.23	2.10	1.50
Helianthus divaricatus	woodland sunflower	UPL	5	0.67	1.14	0.19	1.72	1.43
Bromus pubescens	woodland brome	FACU	5	0.75	1.29	0.15	1.34	1.31
Apocynum cannabinum	dogbane	FAC	2	0.94	1.61	0.1	0.95	1.28
Cinna arundinacea	common wood reed	FACW	5	0.65	1.11	0.15	1.34	1.22
Oxalis stricta	common wood sorrel	FACU	0	0.19	0.32	0.19	1.72	1.02
Malus sieboldii[B]	Japanese crab apple	UPL	*	0.31	0.54	0.13	1.15	0.84
Ulmus americana	American elm	FACW	5	0.17	0.29	0.15	1.34	0.81
Monarda fistulosa	wild bergamot	FACU	4	0.29	0.50	0.10	0.95	0.73
Acalypha rhomboidea	three-seeded mercury	FACU	0	0.13	0.21	0.13	1.15	0.68
Euthamia graminifolia	grass-leaved goldenrod	FACW	3	0.33	0.57	0.08	0.76	0.67
Pilea pumila	Canada clearweed	FACW	3	0.19	0.32	0.10	0.95	0.64
Carex rosea	star sedge	UPL	5	0.46	0.79	0.04	0.38	0.58
Rosa multiflora[B]	Japanese rose	FACU	*	0.38	0.64	0.04	0.38	0.51
Dichanthelium acuminatum var. *implicatum*	panic grass	FAC	2	0.25	0.43	0.06	0.57	0.50
Bidens frondosa	common beggar's ticks	FACW	1	0.10	0.18	0.08	0.76	0.47
Plantago rugelii	red-stalked plantain	FAC	0	0.10	0.18	0.08	0.76	0.47
Prunella vulgaris var. *elongata*	self-heal	FAC	1	0.08	0.14	0.08	0.76	0.45
Vitis riparia	riverbank grape	FACW	2	0.17	0.29	0.06	0.57	0.43
Alliaria petiolata[B]	garlic mustard	FAC	*	0.10	0.18	0.06	0.57	0.38
Cornus racemosa	gray dogwood	FAC	2	0.10	0.18	0.06	0.57	0.38
Fragaria virginiana	wild strawberry	FACU	2	0.10	0.18	0.06	0.57	0.38
Rudbeckia hirta	black-eyed Susan	FACU	2	0.10	0.18	0.06	0.57	0.38
Hedeoma pulegioides	American pennyroyal	UPL	4	0.06	0.11	0.06	0.57	0.34
Prunus serotina	wild black cherry	FACU	1	0.06	0.11	0.06	0.57	0.34
Rhamnus cathartica[B]	common buckthorn	FAC	*	0.06	0.11	0.06	0.57	0.34
Viola sororia	woolly blue violet	FAC	3	0.06	0.11	0.06	0.57	0.34
Agrimonia rostellata	woodland agrimony	FACU	4	0.17	0.29	0.04	0.38	0.33
Zizia aurea	golden Alexanders	FAC	6	0.15	0.25	0.04	0.38	0.32

APPENDIX 10.4 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Carex cephalophora	short-headed bracted sedge	FACU	3	0.13	0.21	0.04	0.38	0.30
Poa compressa[B]	Canadian blue grass	FACU	*	0.21	0.36	0.02	0.19	0.27
Penstemon digitalis	foxglove beard tongue	FAC	4	0.08	0.14	0.04	0.38	0.26
Viburnum recognitum	smooth arrowwood	FAC	6	0.04	0.07	0.04	0.38	0.23
Persicaria cespitosa[B]	creeping smartweed	UPL	*	0.15	0.25	0.02	0.19	0.22
Carex molesta	field oval sedge	FAC	2	0.10	0.18	0.02	0.19	0.18
Eupatoriadelphus purpureus	purple Joe Pye weed	FAC	5	0.10	0.18	0.02	0.19	0.18
Lithospermum latifolium	American gromwell	UPL	9	0.10	0.18	0.02	0.19	0.18
Asclepias purpurascens	purple milkweed	FACU	7	0.06	0.11	0.02	0.19	0.15
Aster praeltus	willow aster	FACW	4	0.06	0.11	0.02	0.19	0.15
Carex sparganioides	loose-headed bracted sedge	FAC	4	0.06	0.11	0.02	0.19	0.15
Atriplex patula[B]	fat-hen saltbush	FACW	*	0.04	0.07	0.02	0.19	0.13
Erigeron philadelphicus	marsh fleabane	FACW	3	0.04	0.07	0.02	0.19	0.13
Rosa setigera	Illinois rose	FACU	5	0.04	0.07	0.02	0.19	0.13
Sanicula canadensis	Canadian black snakeroot	FACU	4	0.04	0.07	0.02	0.19	0.13
Agrimonia gryposepala	tall agrimony	FACU	3	0.02	0.04	0.02	0.19	0.11
Anemone virginiana	tall anemone	FACU	4	0.02	0.04	0.02	0.19	0.11
Aster ontarionis	Ontario aster	FAC	4	0.02	0.04	0.02	0.19	0.11
Aster shortii	short's aster	UPL	6	0.02	0.04	0.02	0.19	0.11
Carex cristatella	crested oval sedge	FACW	3	0.02	0.04	0.02	0.19	0.11
Carex pensylvanica	Pennsylvania oak sedge	UPL	5	0.02	0.04	0.02	0.19	0.11
Celtis occidentalis	hackberry	FAC	3	0.02	0.04	0.02	0.19	0.11
Daucus carota[B]	Queen Anne's lace	UPL	*	0.02	0.04	0.02	0.19	0.11
Desmodium glutinosum	pointed tick trefoil	UPL	3	0.02	0.04	0.02	0.19	0.11
Erechtites hieracifolia	fireweed	FAC	2	0.02	0.04	0.02	0.19	0.11
Hackelia virginiana	stickseed	FACU	1	0.02	0.04	0.02	0.19	0.11
Rumex crispus[B]	curly dock	FAC	*	0.02	0.04	0.02	0.19	0.11
Sambucus canadensis	common elder	FACW	2	0.02	0.04	0.02	0.19	0.11
Urtica gracilis	stinging nettle	FACW	2	0.02	0.04	0.02	0.19	0.11
Viburnum opulus[B]	European high-bush cranberry	FAC	*	0.02	0.04	0.02	0.19	0.11
Viola pratincola	common blue violet	FAC	1	0.02	0.04	0.02	0.19	0.11
			Total	**58.35**	**100.00**	**10.92**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.5 Cuba Marsh Savanna herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Leersia virginica[A]	white grass	FACW	4	15.23	32.78	0.60	4.62	18.70
Antenoron virginianum[A]	Virginia knotweed	FAC	3	2.57	5.54	0.73	5.57	5.56
Elymus virginicus[A]	Virginia wild rye	FACW	4	2.25	4.84	0.58	4.46	4.65
Amphicarpaea bracteata[A]	hog peanut	FAC	4	1.94	4.17	0.58	4.46	4.31
Oxalis stricta[A]	common wood sorrel	FACU	0	0.78	1.68	0.81	6.21	3.95
Solidago gigantea[A]	late goldenrod	FACW	3	2.77	5.96	0.23	1.75	3.86
Galium triflorum[A]	sweet-scented bedstraw	FACU	4	1.83	3.95	0.48	3.66	3.80
Phalaris arundinacea[A,B]	reed canary grass	FACW	*	2.63	5.65	0.17	1.27	3.46
Solidago ulmifolia[A]	elm-leaved goldenrod	UPL	5	1.25	2.69	0.40	3.03	2.86
Acalypha rhomboidea	three-seeded mercury	FACU	0	0.43	0.92	0.63	4.78	2.85
Torilis japonica[B]	Japanese hedge parsley	UPL	*	0.95	2.04	0.48	3.66	2.85
Ageratina altissima	white snakeroot	FACU	2	0.94	2.02	0.48	3.66	2.84
Cinna arundinacea	common wood reed	FACW	5	1.88	4.04	0.19	1.43	2.73
Pilea pumila	Canada clearweed	FACW	3	1.39	2.98	0.27	2.07	2.53
Hedeoma pulegioides	American pennyroyal	UPL	4	0.49	1.05	0.52	3.98	2.52
Erechtites hieracifolia	fireweed	FAC	2	0.54	1.17	0.44	3.34	2.25
Potentilla simplex	common cinquefoil	FACU	3	0.57	1.23	0.42	3.18	2.21
Geum canadense	white avens	FAC	2	0.44	0.94	0.44	3.34	2.14
Circaea lutetiana	enchanter's nightshade	FACU	2	0.42	0.90	0.44	3.34	2.12
Hackelia virginiana	stickseed	FACU	1	0.39	0.83	0.44	3.34	2.09
Frangula alnus[B]	glossy buckthorn	FACW	*	0.51	1.10	0.25	1.91	1.50
Solidago canadensis	Canada goldenrod	FACU	1	0.44	0.94	0.25	1.91	1.43
Ambrosia artemisiifolia	common ragweed	FACU	0	0.40	0.85	0.25	1.91	1.38
Rubus allegheniensis	common blackberry	FACU	2	0.46	0.99	0.23	1.75	1.37
Rudbeckia triloba	brown-eyed Susan	FACU	3	0.17	0.36	0.21	1.59	0.98
Rubus occidentalis	black raspberry	UPL	2	0.35	0.76	0.15	1.11	0.94
Allium cernuum	nodding wild onion	FACU	7	0.35	0.76	0.10	0.80	0.78
Monarda fistulosa	wild bergamot	FACU	4	0.56	1.21	0.04	0.32	0.76
Glyceria striata	fowl manna grass	OBL	4	0.63	1.35	0.02	0.16	0.75
Apocynum cannabinum	dogbane	FAC	2	0.32	0.70	0.08	0.64	0.67
Parthenocissus quinquefolia	Virginia creeper	FACU	2	0.09	0.20	0.15	1.11	0.66
Rhamnus cathartica[B]	common buckthorn	FAC	*	0.16	0.34	0.13	0.96	0.65
Zizia aurea	golden Alexanders	FAC	6	0.22	0.47	0.10	0.80	0.63
Bromus pubescens	woodland brome	FACU	5	0.29	0.63	0.06	0.48	0.55
Bidens frondosa	common beggar's ticks	FACW	1	0.13	0.27	0.10	0.80	0.53
Elymus villosus	silky wild rye	FACU	4	0.13	0.27	0.10	0.80	0.53
Ulmus americana	American elm	FACW	5	0.09	0.20	0.10	0.80	0.50
Malus sieboldii[B]	Japanese crab apple	UPL	*	0.14	0.29	0.08	0.64	0.46
Helianthus divaricatus	woodland sunflower	UPL	5	0.13	0.27	0.08	0.64	0.45
Viola sororia	woolly blue violet	FAC	3	0.05	0.11	0.10	0.80	0.45
Prunella vulgaris var. *elongata*	self-heal	FAC	1	0.05	0.11	0.08	0.64	0.37
Daucus carota[B]	Queen Anne's lace	UPL	*	0.04	0.09	0.08	0.64	0.36
Plantago rugelii	red-stalked plantain	FAC	0	0.06	0.13	0.06	0.48	0.31
Poa compressa[B]	Canadian blue grass	FACU	*	0.06	0.13	0.06	0.48	0.31
Persicaria hydropiperoides	mild water pepper	OBL	4	0.05	0.11	0.06	0.48	0.29
Alliaria petiolata[B]	garlic mustard	FAC	*	0.03	0.07	0.06	0.48	0.27
Agrimonia rostellata	woodland agrimony	FACU	4	0.04	0.09	0.04	0.32	0.20
Aster lateriflorus	side-flowering aster	FACW	2	0.04	0.09	0.04	0.32	0.20
Carya ovata	shagbark hickory	FACU	4	0.04	0.09	0.04	0.32	0.20
Cornus racemosa	gray dogwood	FAC	2	0.04	0.09	0.04	0.32	0.20

APPENDIX 10.5 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Persicaria cespitosa[B]	creeping smartweed	UPL	*	0.04	0.09	0.04	0.32	0.20
Fragaria virginiana	wild strawberry	FACU	2	0.03	0.07	0.04	0.32	0.19
Scrophularia marilandica	late figwort	FACU	4	0.10	0.22	0.02	0.16	0.19
Vitis riparia	riverbank grape	FACW	2	0.03	0.07	0.04	0.32	0.19
Elymus hystrix	bottlebrush grass	FACU	5	0.06	0.13	0.02	0.16	0.15
Eupatorium perfoliatum	common boneset	OBL	4	0.06	0.13	0.02	0.16	0.15
Penstemon digitalis	foxglove beard tongue	FAC	4	0.06	0.13	0.02	0.16	0.15
Boehmeria cylindrica	false nettle	OBL	3	0.04	0.09	0.02	0.16	0.12
Stellaria media[B]	common chickweed	FACU	*	0.04	0.09	0.02	0.16	0.12
Carex cephalophora	short-headed bracted sedge	FACU	3	0.02	0.04	0.02	0.16	0.10
Cerastium fontanum[B]	common mouse-ear chickweed	FACU	*	0.02	0.04	0.02	0.16	0.10
Cirsium arvense[B]	field thistle	FACU	*	0.02	0.04	0.02	0.16	0.10
Hypericum punctatum	spotted St. John's-wort	FAC	3	0.02	0.04	0.02	0.16	0.10
Juncus tenuis	path rush	FAC	0	0.02	0.04	0.02	0.16	0.10
Lactuca canadensis	wild lettuce	FACU	1	0.02	0.04	0.02	0.16	0.10
Poa pratensis[B]	Kentucky blue grass	FAC	*	0.02	0.04	0.02	0.16	0.10
Celtis occidentalis	hackberry	FAC	3	0.01	0.02	0.02	0.16	0.09
Cuscuta glomerata	rope dodder	UPL	6	0.01	0.02	0.02	0.16	0.09
Quercus alba	white oak	FACU	5	0.01	0.02	0.02	0.16	0.09
Sanicula canadensis	common elder	FACW	4	0.01	0.02	0.02	0.16	0.09
Setaria faberi[B]	giant foxtail	FACU	*	0.01	0.02	0.02	0.16	0.09
Silene stellata	starry campion	UPL	6	0.01	0.02	0.02	0.16	0.09
Taraxacum officinale[B]	common dandelion	FACU	*	0.01	0.02	0.02	0.16	0.09
Verbena urticifolia	white vervain	FAC	3	0.01	0.02	0.02	0.16	0.09
Viburnum recognitum	smooth arrowwood	FAC	6	0.01	0.02	0.02	0.16	0.09
			Total	**46.46**	**100.00**	**13.08**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.6 Fermilab Marsh herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Sagittaria latifolia[A]	common arrowhead	OBL	4	43.15	41.85	0.82	15.70	28.78
Lemna minor[A]	small duckweed	OBL	3	16.74	16.24	0.91	17.41	16.82
Ceratophyllum demersum[A]	coontail	OBL	3	11.84	11.48	0.61	11.60	11.54
Phalaris arundinacea[B]	reed canary grass	FACW	*	13.29	12.89	0.48	9.22	11.05
Spirodela polyrhiza	great duckweed	OBL	5	3.59	3.48	0.82	15.70	9.59
Wolffia columbiana	water meal	OBL	5	0.63	0.61	0.71	13.65	7.13
Bulboschoenus fluviatilis	river bulrush	OBL	3	5.46	5.30	0.23	4.44	4.87
Typha latifolia	broad-leaved cattail	OBL	1	2.60	2.52	0.18	3.41	2.97
Schoenoplectus tabernaemontani	soft-stem bulrush	OBL	4	1.66	1.61	0.18	3.41	2.51
Phragmites australis[B]	common reed	FACW	1	1.46	1.42	0.11	2.05	1.73
Sparganium eurycarpum	common bur reed	OBL	5	1.71	1.65	0.07	1.37	1.51
Carex lacustris	common lake sedge	OBL	6	0.67	0.65	0.02	0.34	0.50
Leersia oryzoides	rice cut grass	OBL	3	0.28	0.27	0.04	0.68	0.48
Bidens cernua	nodding bur marigold	OBL	2	0.02	0.02	0.04	0.68	0.35
Eleocharis palustris (smallii)	marsh spike rush	OBL	5	0.01	0.01	0.02	0.34	0.17
			Total	**103.11**	**100.00**	**5.23**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.7 Fermilab Marsh herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Lemna minor[A]	small duckweed	OBL	3	18.36	31.74	0.96	26.87	29.30
Wolffia columbiana[A]	water meal	OBL	5	13.78	23.82	1.00	27.86	25.84
Ceratophyllum demersum	coontail	OBL	3	10.44	18.05	0.43	11.94	14.99
Stuckenia pectinata	comb pondweed	OBL	5	9.96	17.21	0.32	8.96	13.09
Spirodela polyrhiza	great duckweed	OBL	5	0.85	1.47	0.45	12.44	6.95
Sagittaria latifolia	common arrowhead	OBL	4	2.02	3.49	0.20	5.47	4.48
Phalaris arundinacea[B]	reed canary grass	FACW	*	1.99	3.44	0.13	3.48	3.46
Typha latifolia	broad-leaved cattail	OBL	1	0.32	0.56	0.04	1.00	0.78
Bolboschoenus fluviatilis	river bulrush	OBL	3	0.06	0.11	0.04	1.00	0.55
Persicaria amphibium	water knotweed	OBL	3	0.05	0.09	0.02	0.50	0.30
Lemna trisulsa	forked duckweed	OBL	8	0.01	0.02	0.02	0.50	0.26
			Total	**57.83**	**100.00**	**3.59**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.8 Fermilab Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Schizachyrium scoparium[A]	little bluestem	FACU	5	26.72	20.83	0.81	5.18	13.00
Solidago canadensis[A]	Canada goldenrod	FACU	1	17.25	13.45	0.69	4.38	8.91
Cornus racemosa[A]	gray dogwood	FAC	2	13.78	10.74	0.88	5.58	8.16
Euthamia graminifolia[A]	grass-leaved goldenrod	FACW	3	9.28	7.24	0.63	3.98	5.61
Rhamnus cathartica[AB]	common buckthorn	FAC	*	7.41	5.77	0.75	4.78	5.28
Poa pratensis[AB]	Kentucky blue grass	FAC	*	4.16	3.24	0.94	5.98	4.61
Trifolium pratense[AB]	red clover	FACU	*	5.97	4.65	0.63	3.98	4.32
Monarda fistulosa[A]	wild bergamot	FACU	4	4.94	3.85	0.75	4.78	4.31
Ratibida pinnata	yellow coneflower	UPL	4	3.63	2.83	0.81	5.18	4.00
Medicago lupulina[B]	black medic	FACU	*	2.06	1.61	1.00	6.37	3.99
Daucus carota[B]	Queen Anne's lace	UPL	*	4.03	3.14	0.75	4.78	3.96
Phlox pilosa	sand prairie phlox	FACU	7	2.84	2.22	0.75	4.78	3.50
Comandra umbellata	bastard toad-flax	FACU	6	2.16	1.68	0.63	3.98	2.83
Pycnanthemum virginianum	common mountain mint	FACW	5	4.25	3.31	0.25	1.59	2.45
Securigera varia	crown vetch	UPL	*	3.97	3.09	0.19	1.20	2.14
Euphorbia corollata	flowering spurge	UPL	3	0.59	0.46	0.56	3.59	2.02
Bromus inermis[B]	Hungarian brome	FACU	*	1.59	1.24	0.44	2.79	2.02
Helianthus grosseserratus	sawtooth sunflower	FACW	2	3.47	2.70	0.19	1.20	1.95
Fragaria virginiana	wild strawberry	FACU	2	0.81	0.63	0.38	2.39	1.51
Frangula alnus[B]	glossy buckthorn	FACW	*	0.63	0.49	0.31	1.99	1.24
Erigeron annuus	annual fleabane	FACU	1	0.31	0.24	0.31	1.99	1.12
Elaeagnus umbellata[B]	autumn olive	UPL	*	2.34	1.83	0.06	0.40	1.11
Ambrosia artemisiifolia	common ragweed	FACU	0	0.13	0.10	0.25	1.59	0.85
Rosa carolina	pasture rose	FACU	4	1.13	0.88	0.13	0.80	0.84
Aster pilosus	hairy aster	FACU	0	0.41	0.32	0.19	1.20	0.76
Desmodium illinoense	Illinois tick trefoil	UPL	5	0.25	0.19	0.19	1.20	0.70
Viola pratincola	common blue violet	FAC	1	0.09	0.07	0.19	1.20	0.63
Melilotus alba[B]	white sweet clover	FACU	*	0.09	0.07	0.19	1.20	0.63
Phleum pratense[B]	timothy	FACU	*	0.09	0.07	0.19	1.20	0.63
Taraxacum officinale[B]	common dandelion	FACU	*	0.09	0.07	0.19	1.20	0.63
Carex blanda	common wood sedge	FAC	2	0.94	0.73	0.06	0.40	0.56
Dichanthelium oligosanthes var. *scribnerianum*	Scribner's panic grass	FACU	3	0.94	0.73	0.06	0.40	0.56
Agrostis gigantea	red top	FACW	0	0.38	0.29	0.13	0.80	0.54
Phalaris arundinacea[B]	reed canary grass	FACW	*	0.38	0.29	0.13	0.80	0.54
Carex sp.	sedge	-		0.22	0.17	0.13	0.80	0.48
Apocynum cannabinum	dogbane	FAC	2	0.19	0.15	0.06	0.40	0.27
Polygonatum commutatum	great Solomon seal	FACU	4	0.19	0.15	0.06	0.40	0.27
Iris shrevei	southern blue flag	OBL	5	0.19	0.15	0.06	0.40	0.27
Equisetum arvense	common horsetail	FAC	0	0.03	0.02	0.06	0.40	0.21
Calystegia sepium	*American bindweed*	*FAC*	1	0.03	0.02	0.06	0.40	0.21
Lactuca canadensis	wild lettuce	FACU	1	0.03	0.02	0.06	0.40	0.21
Prunella vulgaris var. *elongata*	self-heal	FAC	1	0.03	0.02	0.06	0.40	0.21
Prunus serotina	wild black cherry	FACU	1	0.03	0.02	0.06	0.40	0.21
Carex molesta	field oval sedge	FAC	2	0.03	0.02	0.06	0.40	0.21
Gaura biennis	biennial gaura	FACU	2	0.03	0.02	0.06	0.40	0.21
Lycopus americanus	common water horehound	OBL	3	0.03	0.02	0.06	0.40	0.21
Sisyrinchium albidum	common blue-eyed grass	FACU	4	0.03	0.02	0.06	0.40	0.21
Carex bicknellii	Bicknell's sedge	FACU	8	0.03	0.02	0.06	0.40	0.21
Achillea millefolium[B]	common milfoil	FACU	*	0.03	0.02	0.06	0.40	0.21
Poa compressa[B]	Canadian blue grass	FACU	*	0.03	0.02	0.06	0.40	0.21

APPENDIX 10.8 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Rumex crispus[B]	curly dock	FAC	*	0.03	0.02	0.06	0.40	0.21
			Total	**128.28**	**100.00**	**15.69**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.9 Fermilab Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Schizachyrium scoparium[A]	little bluestem	FACU	5	27.56	18.75	0.88	5.65	12.20
Rhamnus cathartica[A,B]	common buckthorn	FAC	*	13.25	9.02	1.00	6.45	7.73
Trifolium pratense[A,B]	red clover	FACU	*	15.75	10.72	0.69	4.44	7.58
Solidago canadensis[A]	Canada goldenrod	FACU	1	10.56	7.19	0.94	6.05	6.62
Cornus racemosa[A]	gray dogwood	FAC	2	11.53	7.85	0.69	4.44	6.14
Euthamia graminifolia[A]	grass-leaved goldenrod	FACW	3	10.34	7.04	0.81	5.24	6.14
Helianthus grosseserratus[A]	sawtooth sunflower	FACW	2	11.75	7.99	0.44	2.82	5.41
Monarda fistulosa	wild bergamot	FACU	4	6.25	4.25	0.94	6.05	5.15
Daucus carota[B]	Queen Anne's lace	UPL	*	1.38	0.94	0.88	5.65	3.29
Phlox pilosa	sand prairie phlox	FACU	7	2.38	1.62	0.75	4.84	3.23
Ratibida pinnata	yellow coneflower	UPL	4	3.56	2.42	0.63	4.03	3.23
Melilotus alba[B]	white sweet clover	FACU	*	3.63	2.47	0.56	3.63	3.05
Comandra umbellata	bastard toad-flax	FACU	6	3.75	2.55	0.50	3.23	2.89
Fragaria virginiana	wild strawberry	FACU	2	2.69	1.83	0.50	3.23	2.53
Poa pratensis[B]	Kentucky blue grass	FAC	*	2.66	1.81	0.44	2.82	2.32
Euphorbia corollata	flowering spurge	UPL	3	2.50	1.70	0.44	2.82	2.26
Pycnathemum virginianum	common mountain mint	FACW	5	2.72	1.85	0.19	1.21	1.53
Securigera varia	crown vetch	UPL	*	2.09	1.42	0.25	1.61	1.52
Agrostis gigantea	red top	FACW	0	0.81	0.55	0.38	2.42	1.49
Carex bicknellii	Bicknell's sedge	FACU	8	0.66	0.45	0.38	2.42	1.43
Bromus inermis[B]	Hungarian brome	FACU	*	1.34	0.91	0.25	1.61	1.26
Trifolium repens[B]	white clover	FACU	*	0.47	0.32	0.31	2.02	1.17
Rosa carolina	pasture rose	FACU	4	0.75	0.51	0.25	1.61	1.06
Frangula alnus[B]	glossy buckthorn	FACW	*	1.16	0.79	0.19	1.21	1.00
Silphium terebinthinaceum	prairie dock	FAC	4	2.34	1.59	0.06	0.40	1.00
Aster pilosus	hairy aster	FACU	0	0.28	0.19	0.25	1.61	0.90
Andropogon gerardii	big bluestem	FAC	5	1.13	0.77	0.13	0.81	0.79
Eleocharis compressa	flat-stemmed spike rush	FACW	7	0.94	0.64	0.06	0.40	0.52
Achillea millefolium[B]	common milfoil	FACU	*	0.22	0.15	0.13	0.81	0.48
Iris shrevei	southern blue flag	OBL	5	0.22	0.15	0.13	0.81	0.48
Carex blanda	common wood sedge	FAC	2	0.06	0.04	0.13	0.81	0.42
Dichanthelium acuminatum	panic grass	FAC	2	0.06	0.04	0.13	0.81	0.42
Viola pratincola	common blue violet	FAC	1	0.06	0.04	0.13	0.81	0.42
Asclepias syriaca	common milkweed	FACU	0	0.19	0.13	0.06	0.40	0.27
Aster praealtus	willow aster	FACW	4	0.19	0.13	0.06	0.40	0.27
Cirsium discolor	pasture thistle	FACU	3	0.19	0.13	0.06	0.40	0.27
Elaeagnus umbellata[B]	autumn olive	UPL	*	0.19	0.13	0.06	0.40	0.27
Liatris aspera	rough blazing star	UPL	7	0.19	0.13	0.06	0.40	0.27
Malus ionensis	Iowa crab	UPL	3	0.19	0.13	0.06	0.40	0.27
Muhlenbergia sp.	satin grass	-		0.19	0.13	0.06	0.40	0.27

APPENDIX 10.9 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Oligoneuron rigidum	rigid goldenrod	FACU	4	0.19	0.13	0.06	0.40	0.27
Prunus serotina	wild black cherry	FACU	1	0.19	0.13	0.06	0.40	0.27
Rubus allegheniensis	common blackberry	FACU	2	0.19	0.13	0.06	0.40	0.27
Allium vineale[B]	field garlic	FACU	*	0.03	0.02	0.06	0.40	0.21
Carex sp.	sedge	-		0.03	0.02	0.06	0.40	0.21
Desmodium illinoense	Illinois tick trefoil	UPL	5	0.03	0.02	0.06	0.40	0.21
Dichanthelium oligosanthes var. *scribnerianum*	Scribner's panic grass	FACU	3	0.03	0.02	0.06	0.40	0.21
Panicum virgatum	prairie switch grass	FAC	4	0.03	0.02	0.06	0.40	0.21
Penstemon digitalis	foxglove beard tongue	FAC	4	0.03	0.02	0.06	0.40	0.21
Taraxacum officinale[B]	common dandelion	FACU	*	0.03	0.02	0.06	0.40	0.21
Viola sororia	woolly blue violet	FAC	3	0.03	0.02	0.06	0.40	0.21
			Total	**146.97**	**100.00**	**15.50**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.10 Lockport Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2009.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Solidago canadensis[A]	Canada goldenrod	FACU	1	17.71	22.08	0.79	6.50	14.29
Andropogon gerardii[A]	big bluestem	FAC	5	15.13	18.86	0.85	7.01	12.94
Schizachyrium scoparium[A]	little bluestem	FACU	5	12.25	15.28	0.71	5.81	10.54
Sporobolus heterolepis[A]	rough dropseed	UPL	9	7.53	9.39	0.23	1.88	5.64
Poa pratensis[A,B]	Kentucky blue grass	FAC	*	3.93	4.90	0.40	3.25	4.07
Rhamnus cathartica[A,B]	common buckthorn	FAC	*	1.41	1.75	0.48	3.93	2.84
Aster ericoides	heath aster	FACU	4	0.80	1.00	0.56	4.62	2.81
Sorghastrum nutans	Indian grass	FACU	4	1.77	2.21	0.29	2.39	2.30
Eleocharis compressa	flat-stemmed spike rush	FACW	7	1.44	1.79	0.31	2.56	2.18
Monarda fistulosa	wild bergamot	FACU	4	0.99	1.23	0.35	2.91	2.07
Rudbeckia hirta	black-eyed Susan	FACU	2	0.70	0.87	0.35	2.91	1.89
Senecio pauperculus	balsam ragwort	FAC	3	0.55	0.69	0.38	3.08	1.88
Dichanthelium oligosanthes var. *scribnerianum*	Scribner's panic grass	FACU	3	0.44	0.55	0.35	2.91	1.73
Apocynum cannabinum	dogbane	FAC	2	0.48	0.60	0.33	2.74	1.67
Poa compressa[B]	Canadian blue grass	FACU	*	0.81	1.01	0.27	2.22	1.62
Agrostis gigantea	red top	FACW	0	1.07	1.34	0.21	1.71	1.52
Carex meadii/crawei	mead's stiff sedge/early fen sedge	FAC/W	6.5	0.55	0.69	0.27	2.22	1.46
Medicago lupulina[B]	black medic	FACU	*	0.34	0.43	0.27	2.22	1.33
Celtis occidentalis	hackberry	FAC	3	0.15	0.18	0.29	2.39	1.29
Asclepias verticillata	horsetail milkweed	FACU	1	0.33	0.42	0.25	2.05	1.23
Spartina pectinata	prairie cord grass	FACW	4	1.43	1.78	0.06	0.51	1.15
Ambrosia artemisiifolia	common ragweed	FACU	0	0.42	0.52	0.21	1.71	1.11
Sisyrinchium albidum	common blue-eyed grass	FACU	4	0.21	0.26	0.21	1.71	0.98
Eupatorium altissimum	tall boneset	UPL	2	0.16	0.19	0.21	1.71	0.95
Deschampsia caespitosa	tufted hair grass	FACW	8	0.81	1.01	0.10	0.85	0.93
Equisetum arvense	common horsetail	FAC	0	0.57	0.71	0.13	1.03	0.87
Carex bicknellii	Bicknell's sedge	FACU	8	0.39	0.48	0.15	1.20	0.84
Achillea millefolium[B]	common milfoil	FACU	*	0.24	0.30	0.17	1.37	0.83
Allium cernuum	nodding wild onion	FACU	7	0.47	0.58	0.13	1.03	0.81
Helianthus grosseserratus	sawtooth sunflower	FACW	2	0.56	0.70	0.10	0.85	0.78
Elymus canadensis	Canada wild rye	FACU	4	0.40	0.49	0.08	0.68	0.59
Juncus dudleyi	Dudley's rush	FACW	4	0.11	0.14	0.13	1.03	0.58
Melilotus alba[B]	white sweet clover	FACU	*	0.11	0.14	0.13	1.03	0.58
Carex normalis	spreading oval sedge	FACW	4	0.78	0.97	0.02	0.17	0.57
Onosmodium molle var. *hispidissimum*	rough marbleseed	UPL	5	0.78	0.97	0.02	0.17	0.57
Oligoneuron rigidum	rigid goldenrod	FACU	4	0.21	0.26	0.10	0.85	0.56
Agalinus tenuifolia	slender false foxglove	FACW	5	0.06	0.08	0.13	1.03	0.55
Fragaria virginiana	wild strawberry	FACU	2	0.16	0.19	0.10	0.85	0.52
Solidago gigantea	late goldenrod	FACW	3	0.25	0.31	0.08	0.68	0.50
Pastinaca sativa[B]	wild parsnip	UPL	*	0.33	0.42	0.06	0.51	0.46
Aster pilosus	hairy aster	FACU	0	0.09	0.12	0.08	0.68	0.40
Pycnanthemum virginianum	common mountain mint	FACW	5	0.09	0.12	0.08	0.68	0.40
Solanum dulcamara[B]	bittersweet nightshade	FAC	*	0.09	0.12	0.08	0.68	0.40
Daucus carota[B]	Queen Anne's lace	UPL	*	0.04	0.05	0.08	0.68	0.37
Lycopus americanus	common water horehound	OBL	3	0.04	0.05	0.08	0.68	0.37
Lobelia spicata	pale spiked lobelia	FAC	4	0.08	0.10	0.06	0.51	0.31
Vitis riparia	riverbank grape	FACW	2	0.08	0.10	0.06	0.51	0.31
Blephilia ciliata	Ohio horse mint	UPL	6	0.03	0.04	0.06	0.51	0.28
Carex blanda	common wood sedge	FAC	2	0.31	0.39	0.02	0.17	0.28
Dalea foliosa	leafy prairie clover	UPL	10	0.31	0.39	0.02	0.17	0.28

APPENDIX 10.10 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Equisetum laevigatum	smooth scouring rush	FACW	4	0.03	0.04	0.06	0.51	0.28
Leucanthemum vulgare[B]	ox-eye daisy	UPL	*	0.31	0.39	0.02	0.17	0.28
Malus ionensis	Iowa crab	UPL	3	0.03	0.04	0.06	0.51	0.28
Saponaria officinalis[B]	bouncing bet	FACU	*	0.31	0.39	0.02	0.17	0.28
Scutellaria leonardii	small skullcap	FACU	5	0.03	0.04	0.06	0.51	0.28
Arnoglossum plantagineum	prairie Indian plantain	FAC	10	0.13	0.16	0.04	0.34	0.25
Solidago nemoralis	old field goldenrod	UPL	3	0.13	0.16	0.04	0.34	0.25
Cornus racemosa	gray dogwood	FAC	2	0.07	0.09	0.04	0.34	0.22
Euthamia graminifolia	grass-leaved goldenrod	FACW	3	0.07	0.09	0.04	0.34	0.22
Morus alba[B]	white mulberry	FAC	*	0.07	0.09	0.04	0.34	0.22
Ratibida pinnata	yellow coneflower	UPL	4	0.07	0.09	0.04	0.34	0.22
Rosa setigera	Illinois rose	FACU	5	0.07	0.09	0.04	0.34	0.22
Toxicodendron radicans	poison ivy	FAC	1	0.07	0.09	0.04	0.34	0.22
Viola sororia	woolly blue violet	FAC	3	0.07	0.09	0.04	0.34	0.22
Carex cephalophora	short-headed bracted sedge	FACU	3	0.02	0.03	0.04	0.34	0.18
Cirsium muticum	fen thistle	OBL	9	0.02	0.03	0.04	0.34	0.18
Lycopus uniflorus	nothern bugle weed	OBL	7	0.02	0.03	0.04	0.34	0.18
Oligoneuron riddellii	Riddell's goldenrod	OBL	7	0.02	0.03	0.04	0.34	0.18
Phlox glaberrima	smooth phlox	FACW	6	0.02	0.03	0.04	0.34	0.18
Rubus occidentalis	black raspberry	UPL	2	0.02	0.03	0.04	0.34	0.18
Sporobolus compositus	rough dropseed	UPL	3	0.02	0.03	0.04	0.34	0.18
Bouteloua curtipendula	side-oats grama	UPL	7	0.06	0.08	0.02	0.17	0.12
Carex pellita	wooly sedge	OBL	4	0.06	0.08	0.02	0.17	0.12
Celastrus scandens	climbing bittersweet	FACU	2	0.06	0.08	0.02	0.17	0.12
Juglans nigra	black walnut	FACU	4	0.06	0.08	0.02	0.17	0.12
Juncus torreyi	Torrey's rush	FACW	3	0.06	0.08	0.02	0.17	0.12
Rubus allegheniensis	common blackberry	FACU	2	0.06	0.08	0.02	0.17	0.12
Scirpus atrovirens	dark green rush	OBL	4	0.06	0.08	0.02	0.17	0.12
Arenaria serpyllifolia[B]	thyme-leaved sandwort	FAC	*	0.01	0.01	0.02	0.17	0.09
Calamintha arkansana	low calamint	FACW	8	0.01	0.01	0.02	0.17	0.09
Cirsium altissimum	tall thistle	UPL	3	0.01	0.01	0.02	0.17	0.09
Erigeron annuus	annual fleabane	FACU	1	0.01	0.01	0.02	0.17	0.09
Lactuca canadensis	wild lettuce	FACU	1	0.01	0.01	0.02	0.17	0.09
Lindernia dubia	false pimpernel	OBL	5	0.01	0.01	0.02	0.17	0.09
Nepeta cataria[B]	catnip	FACU	*	0.01	0.01	0.02	0.17	0.09
Oxalis stricta	common wood sorrel	FACU	0	0.01	0.01	0.02	0.17	0.09
Potentilla recta[B]	sulfur cinquefoil	UPL	*	0.01	0.01	0.02	0.17	0.09
Verbascum thapsus[B]	woolly mullein	UPL	*	0.01	0.01	0.02	0.17	0.09
Verbena urticifolia	white vervain	FAC	3	0.01	0.01	0.02	0.17	0.09
			Total	**80.19**	**100.00**	**12.19**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

APPENDIX 10.11 Lockport Prairie herbaceous sampling data, including wetland indicator status (WIS), coefficient of conservatism (CC), cover, frequency and importance values (IV) for all species sampled in 2011.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Schizachyrium scoparium[A]	little bluestem	FACU	5	28.53	25.39	0.88	8.27	16.83
Solidago canadensis[A]	Canada goldenrod	FACU	1	22.31	19.86	0.71	6.69	13.27
Andropogon gerardii[A]	big bluestem	FAC	5	15.63	13.90	0.73	6.89	10.40
Sorghastrum nutans[A]	Indian grass	FACU	4	5.78	5.14	0.46	4.33	4.74
Monarda fistulosa[A]	wild bergamot	FACU	4	4.67	4.15	0.40	3.74	3.95
Sporobolus heterolepis[A]	rough dropseed	UPL	9	6.67	5.93	0.13	1.18	3.56
Rhamnus cathartica	common buckthorn	FAC	*	3.38	3.00	0.35	3.35	3.17
Aster ericoides	heath aster	FACU	4	1.16	1.03	0.48	4.53	2.78
Rudbeckia hirta	black-eyed Susan	FACU	2	0.72	0.64	0.42	3.94	2.29
Dichanthelium acuminatum	panic grass	FAC	2	0.63	0.56	0.42	3.94	2.25
Carex bicknellii	Bicknell's sedge	FACU	8	1.22	1.08	0.29	2.76	1.92
Senecio pauperculus	balsam ragwort	FAC	3	0.38	0.33	0.33	3.15	1.74
Poa pratensis[B]	Kentucky blue grass	FAC	*	2.10	1.87	0.17	1.57	1.72
Asclepias verticillata	horsetail milkweed	FACU	1	0.48	0.43	0.25	2.36	1.39
Pycnanthemum virginianum	common mountain mint	FACW	5	1.26	1.12	0.17	1.57	1.35
Apocynum cannabinum	dogbane	FAC	2	0.57	0.51	0.23	2.17	1.34
Eupatorium altissimum	tall boneset	UPL	2	1.01	0.90	0.19	1.77	1.34
Achillea millefolium[B]	common milfoil	FACU	*	0.43	0.38	0.23	2.17	1.27
Helianthus grosseserratus	sawtooth sunflower	FACW	2	1.14	1.01	0.15	1.38	1.19
Equisetum arvense	common horsetail	FAC	0	0.65	0.57	0.17	1.57	1.07
Rubus allegheniensis	common blackberry	FACU	2	1.63	1.45	0.06	0.59	1.02
Celtis occidentalis	hackberry	FAC	3	0.09	0.08	0.19	1.77	0.93
Ambrosia artemisiifolia	common ragweed	FACU	0	0.48	0.43	0.15	1.38	0.90
Solidago gigantea	late goldenrod	FACW	3	1.11	0.99	0.08	0.79	0.89
Poa compressa[B]	Canadian blue grass	FACU	*	0.32	0.29	0.13	1.18	0.73
Medicago lupulina[B]	black medic	FACU	*	0.07	0.06	0.15	1.38	0.72
Carex sp. 2	sedge	-		0.46	0.41	0.10	0.98	0.70
Rubus occidentalis	black raspberry	UPL	2	0.69	0.61	0.06	0.59	0.60
Spartina pectinata	prairie cord grass	FACW	4	0.69	0.61	0.06	0.59	0.60
Rubus discolor[B]	Himalaya berry	UPL	*	0.84	0.75	0.04	0.39	0.57
Oligoneuron riddellii	Riddell's goldenrod	OBL	7	0.10	0.09	0.10	0.98	0.54
Cornus racemosa	gray dogwood	FAC	2	0.44	0.39	0.06	0.59	0.49
Euthamia graminifolia	grass-leaved goldenrod	FACW	3	0.44	0.39	0.06	0.59	0.49
Juncus dudleyi	Dudley's rush	FACW	4	0.15	0.13	0.08	0.79	0.46
Chamaesyce humistrata	spreading spurge	FACW	1	0.78	0.70	0.02	0.20	0.45
Verbena bracteata	creeping vervain	FACU	1	0.78	0.70	0.02	0.20	0.45
Daucus carota[B]	Queen Anne's lace	UPL	*	0.04	0.04	0.08	0.79	0.41
Sisyrinchium albidum	common blue-eyed grass	FACU	4	0.04	0.04	0.08	0.79	0.41
Eleocharis compressa	flat-stemmed spike rush	FACW	7	0.19	0.17	0.06	0.59	0.38
Elymus canadensis	Canada wild rye	FACU	4	0.19	0.17	0.06	0.59	0.38
Deschampsia caespitosa	tufted hair grass	FACW	8	0.38	0.33	0.04	0.39	0.36
Allium cernuum	nodding wild onion	FACU	7	0.08	0.07	0.06	0.59	0.33
Oligoneuron rigidum	rigid goldenrod	FACU	4	0.08	0.07	0.06	0.59	0.33
Cirsium altissimum	tall thistle	UPL	3	0.03	0.03	0.06	0.59	0.31
Equisetum laevigatum	smooth scouring rush	FACW	4	0.03	0.03	0.06	0.59	0.31
Erigeron annuus	annual fleabane	FACU	1	0.03	0.03	0.06	0.59	0.31
Helianthus pauciflorus	prairie sunflower	UPL	6	0.03	0.03	0.06	0.59	0.31
Oxalis stricta	common wood sorrel	FACU	0	0.03	0.03	0.06	0.59	0.31
Lycopus americanus	common water horehound	OBL	3	0.13	0.11	0.04	0.39	0.25
Carex pellita	wooly sedge	OBL	4	0.31	0.28	0.02	0.20	0.24

APPENDIX 10.11 Contd.

Scientific Name	Common Name	WIS	CC	Avg. Cover	Rel. Cover	Freq.	Rel. Freq.	IV
Digitaria ischaemum[B]	smooth crab grass	FACU	*	0.31	0.28	0.02	0.2	0.24
Helenium autumnale	sneezeweed	FACW	3	0.31	0.28	0.02	0.2	0.24
Juglans nigra	black walnut	FACU	4	0.31	0.28	0.02	0.2	0.24
Panicum virgatum	prairie switch grass	FAC	4	0.31	0.28	0.02	0.2	0.24
Plantago rugelii	red-stalked plantain	FAC	0	0.31	0.28	0.02	0.2	0.24
Cirsium discolor	pasture thistle	FACU	3	0.07	0.06	0.04	0.39	0.23
Dalea foliosa	leafy prairie clover	UPL	10	0.07	0.06	0.04	0.39	0.23
Lythrum alatum	winged loosestrife	OBL	5	0.07	0.06	0.04	0.39	0.23
Nepeta cataria[B]	catnip	FACU	*	0.07	0.06	0.04	0.39	0.23
Calamintha arkansana	low calamint	FACW	8	0.02	0.02	0.04	0.39	0.21
Celastrus scandens	climbing bittersweet	FACU	2	0.02	0.02	0.04	0.39	0.21
Fragaria virginiana	wild strawberry	FACU	2	0.02	0.02	0.04	0.39	0.21
Melilotus alba[B]	white sweet clover	FACU	*	0.02	0.02	0.04	0.39	0.21
Onosmodium molle var. *hispidissimum*	rough marbleseed	UPL	5	0.02	0.02	0.04	0.39	0.21
Phlox glaberrima	smooth phlox	FACW	6	0.02	0.02	0.04	0.39	0.21
Potentilla recta[B]	sulfur cinquefoil	UPL	*	0.02	0.02	0.04	0.39	0.21
Viola sororia	woolly blue violet	FAC	3	0.02	0.02	0.04	0.39	0.21
Acalypha rhomboidea	three-seeded mercury	FACU	0	0.06	0.06	0.02	0.20	0.13
Alliaria petiolata[B]	garlic mustard	FAC	*	0.06	0.06	0.02	0.20	0.13
Arnoglossum plantagineum	prairie Indian plantain	FAC	10	0.06	0.06	0.02	0.20	0.13
Aster novae-angliae	New England aster	FACW	4	0.06	0.06	0.02	0.20	0.13
Aster oblongifolius	aromatic aster	UPL	7	0.06	0.06	0.02	0.20	0.13
Cirsium muticum	fen thistle	OBL	9	0.06	0.06	0.02	0.20	0.13
Craetagus crus-galli	cock-spur hawthorn	FAC	2	0.06	0.06	0.02	0.20	0.13
Geum canadense	white avens	FAC	2	0.06	0.06	0.02	0.20	0.13
Morus alba[B]	white mulberry	FAC	*	0.06	0.06	0.02	0.20	0.13
Oenothera biennis	common evening primrose	FACU	1	0.06	0.06	0.02	0.20	0.13
Phalaris arundinacea[B]	reed canary grass	FACW	*	0.06	0.06	0.02	0.20	0.13
Salix interior	sandbar willow	FACW	1	0.06	0.06	0.02	0.20	0.13
Saponaria officianalis[B]	bouncing bet	FACU	*	0.06	0.06	0.02	0.20	0.13
Ageratina altissima	white snakeroot	FACU	2	0.01	0.01	0.02	0.20	0.10
Blephilia ciliata	Ohio horse mint	UPL	6	0.01	0.01	0.02	0.20	0.10
Carex blanda	common wood sedge	FAC	2	0.01	0.01	0.02	0.20	0.10
Carex sp. 1	sedge	-		0.01	0.01	0.02	0.20	0.10
Conyza canadensis	horseweed	FACU	0	0.01	0.01	0.02	0.20	0.10
Dichanthelium oligosanthes var. *scribnerianum*	Scribner's panic grass	FACU	3	0.01	0.01	0.02	0.20	0.10
Erechtites hieracifolia	fireweed	FAC	2	0.01	0.01	0.02	0.20	0.10
Erigeron philadelphicus	marsh fleabane	FACW	3	0.01	0.01	0.02	0.20	0.10
Eupatorium perfoliatum	common boneset	OBL	4	0.01	0.01	0.02	0.20	0.10
Fallopia scandens	climbing false buckwheat	FAC	2	0.01	0.01	0.02	0.20	0.10
Gleditsia triacanthos	honey locust	FACU	2	0.01	0.01	0.02	0.20	0.10
Juncus torreyi	Torrey's rush	FACW	3	0.01	0.01	0.02	0.20	0.10
Lonicera tatarica/morrowii[B]	Tartarian honeysuckle	FACU	*	0.01	0.01	0.02	0.20	0.10
Pastinaca sativa[B]	wild parsnip	UPL	*	0.01	0.01	0.02	0.20	0.10
Physalis heterophylla	clammy ground cherry	UPL	2	0.01	0.01	0.02	0.20	0.10
Scutellaria leonardii	small skullcap	FACU	5	0.01	0.01	0.02	0.20	0.10
Verbena hastata	blue vervain	FACW	3	0.01	0.01	0.02	0.20	0.10
Vitis riparia	riverbank grape	FACW	2	0.01	0.01	0.02	0.20	0.10
			Total	**112.38**	**100.00**	**10.58**	**100.00**	**100.00**

[A] indicates the species was a dominant.
[B] indicates that the species is not native to Illinois.

SECTION 11 APPENDICES: INSECTS

INSECT STUDIES

Brenda Molano-Flores, Charlie Helm, Adam Wallner, Clark Danderson, and Danielle Ruffatto

APPENDIX SUMMARY

APPENDIX 11A.1 Most common plant species occuring at study sites (MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.) in 2009 (●) and 2010 (○). Note: Only PC and LP were sampled in 2010. Species names followed by an asterisk * are considered to be invasive/introduced species. Lists are for areas near the EJ&E tracks that were surveyed for butterflies and are not comprehensive species lists for entire forest preserves.

APPENDIX 11A.2 Butterfly abundance (A; total number of individuals) per species, site, and survey date in 2009. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

APPENDIX 11B.1 Summary of Auchenorrhyncha species collected at Cuba Marsh (CM) and Lockport Prairie (LP) in 2009 and 2010. CC (Coefficient of Conservatism) values and level of disturbance tolerance are listed for each species. CC values range from 0 to 16. Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS). CC values and levels of disturbance tolerance from Wallner et al. 2012 and Wallner et al. 2013.

APPENDIX 11B.2 Summary of Auchenorrhyncha (i.e., leafhoppers) found in four transects at Lockport Prairie (LP). Species are listed according to the survey date (July 6th and September 2nd, 2009) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS). CC values and levels of disturbance tolerance from Wallner et al. 2012 and Wallner et al. 2013.

APPENDIX 11B.3 Abundance of each Auchenorrhyncha (i.e., leafhoppers) species found at Cuba Marsh (CM) and Lockport Prairie (LP) in 2009. Species are listed according to their level of disturbance tolerance (L DT) and the survey date on which they were collected. Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

APPENDIX 11B.4 (a) Species richness, (b) diversity (Shannon Index) and (c) habitat quality (AQI) metrics for four transects at Lockport Prairie (LP) in 2009, where transect 1 is closest and transect 4 is the farthest from the railroad tracks.

APPENDIX 11B.5 Summary of Auchenorrhyncha found in two transects at Cuba Marsh (CM). Transect 1 was placed in the vegetation adjacent to the railroad tracks, while Transect 2 was 10 meters out from Transect 1. Species are listed according to the survey date (July 1st and August 17th, 2010) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

APPENDIX 11B.6 Summary of Auchenorrhyncha found in two transects at Lockport Prairie (LP). Transect 1 was placed in the vegetation adjacent to the railroad tracks, while Transect 2 was 10 meters out from Transect 1. Species are listed according to the survey date (July 1st and August 17th, 2010) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

APPENDIX 11C.1 (a)–(h) Maps of the eight study sites examined in the Lepidoptera, Auchenorrhyncha, and Coleoptera studies showing the location of the EJ&E railway line. Lepidoptera survey route shown in yellow. Auchenorrhyncha sampling location for 2009–2010 is bounded by a white box. Coleoptera sampling locations for 2009–2010 are indicated by a white dot.

APPENDIX 11C.2 (a)–(d) Maps of the eight study sites examined in the Coleoptera study showing the location of the EJ&E railway line. Coleoptera sampling locations for 2011–2012 are indicated by a white dot.

APPENDIX 11C.3 Summary of arthropods collected by order at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie. * indicates a subclass.

APPENDIX 11C.4 Occurence and abundance of Coleoptera families at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

APPENDIX 11C.5 Occurence and abundance of bark beetle species at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

APPENDIX 11A.1 Most common plant species occuring at study sites (MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.) in 2009 (●) and 2010 (○). Note: Only PC and LP were sampled in 2010. Species names followed by an asterisk * are considered to be invasive/introduced species. Lists are for areas near the EJ&E tracks that were surveyed for butterflies and are not comprehensive species lists for entire forest preserves.

Scientific Name	MW	CM	SC	PC	PW	FL	LR	LP
Abutilon theophrastii				○				
Acer negundo			●	● ○	●	●		
Acer rubrum	●							
Acer saccharinum		●						
*Achillea millefolium**		●	●	○	●			○
Agrimonia pubescens				○				
Alliaria petiolata				○				○
Allium canadensis				○				○
Allium cernuum		●						
Ambrosia artemisiifolia				○				○
Ambrosia trifida				○		●		● ○
Andropogon gerardii				○				● ○
Anemone canadensis	●			○				
Angelica atropurpurea	●			○				○
Apocynum cannabinum		●		○	●			○
Arctium majur				○				
*Arctium minus**					●			
Asclepias incarnata		●						● ○
Asclepias syriaca		●		● ○	●		●	● ○
Asclepias verticillata		●						○
Barbarea vulgaris				○				○
Bromus inermis				○				○
Calystegia sepium								○
Campanula rapunculoides				○				
Campanulastrum americanum							●	
*Carduus nutans**		●		● ○	●		●	
Carex spp.								● ○
Carya ovata	●							
Celtis occidentalis							●	
Cichorium intybus				○				○
Cicuta bulbifera								○
Cicuta maculata		●						
Chamaesyce maculata								○
*Cirsium arvense**	●	●	●	○		●	●	● ○
Cirsium vulgare								○
Clinopodium arkansanum								○
*Convolvulus arvensis**				● ○		●		○
Conyza canadensis								○
Coreopsis grandiflora				● ○				
Cornus obliqua								○
*Coronilla varia**	●			○		●		○
Croton glandulosus								○
*Cynoglossum officinale**		●						● ○
*Daucus carota**	●	●		○	●	●	●	● ○
*Dipsacus laciniatus**								● ○
*Dipsacus sylvestris**				● ○				○
Duchesnea indica				○				
Echinacea purpurea				●				
Equisetum hyemale	●				●			

APPENDIX 11A.1 Contd.

Scientific Name	MW	CM	SC	PC	PW	FL	LR	LP
Erigeron strigosus	●	●	●	●	●	●	●	●
Equisetum arvense				○				○
Erigeron strigosus				○				○
Eupatoriadelphus (=Eupatorium) maculatus	●	●						● ○
Eupatorium altissimum		●						
Eupatorium perfoliatum								●
Eupatorium rugosum				○				
Eupatorium graminifolia				○				○
Fragaria virginiana				○				○
Fraxinus pensylvanicus	●	●		● ○				
Galium aparine				○				○
Galium sp.					●			
Gaura biennis								○
Geum canadense								
Glechoma hederacea				○				
Gleditsia triacanthos				● ○				
Juncus spp.								●
Hackelia virginiana				○				
Helianthus giganteus					●			● ○
*Hemerocallis fulva**			●			●		
*Hesperis matronalis**				● ○		●		
Hibiscus moscheutos								○
Hibiscus trionum								○
*Hieracium caespitosum**		●	●	○				
*Hieracium pilosselloides**		●	●					
*Hypericum perforatum**	●			●				
Hypericum punctatum				○				○
Hypoxis hirsuta								○
Impatiens capensis								○
Iris virginica		●						
Juglans nigra	●							○
Juncus spp.								○
Juniperus communis				○				
Juniperus virginiana		●						
*Leonurus cardiaca**				○	●			
Lepidium virginicum				○				
Lepidium vulgare								○
*Leucanthemum vulgare**	●	●	●	● ○		●		○
Ligustrum vulgare								○
*Linaria vulgaris**	●	●	●	● ○				
*Lonicera maackii**				● ○			●	
*Lonicera tatarica**	●	●	●	● ○	●			○
*Lotus corniculatus**	●			●				○
Lysmacha ciliata	●							
Lythrum salicaria								○
Matricaria matricarioides								○
Medicago lupulina				○				○
*Melilotus alba**	●	●	●	○	●	●	●	● ○
*Melilotus officinalis**		●		● ○	●	●	●	● ○
Mentha arvensis								○
Monarda fistulosa	●	●	●	● ○				● ○

APPENDIX 11A.1 Contd.

Scientific Name	MW	CM	SC	PC	PW	FL	LR	LP
Morus alba								○
*Nepeta cataria**	●	●	●	● ○	●	●	●	● ○
Nuttallanthus (=Linaria) canadensis		●			●			
Oenothera biennis					●	●		○
Oxalis dillenii/stricta				○				○
Packera pauperculus				○				○
Panicum virgatum				○				○
Parthenocissus quinquefolia				○		●		○
*Pastinaca sativa**			●	● ○	●		●	● ○
*Phalaris arundinacea**		●	●	● ○				○
Phragmites australis			●		●			● ○
Physalis subglabrata								○
Phytolacca americana						●		
Pilea pumila				○				
Plantago lanceolata				○				○
Plantago major				○				○
Poa pratensis				○				○
Polanisia dodecandra								○
Populus alba	●	●						
Populus deltoides	●			● ○		●		○
*Potentilla recta**			●	○		●		
Potentilla simplex				○				
*Prunella vulgaris**				● ○				
Prunus serotina	●	●	●	○		●		
Pycnanthemum virginianum								○
Quercus alba	●			●				
Quercus macrocarpa	●	●		○				
Quercus rubra	●			● ○				
Ratibida pinnata	●	●		○				
*Rhamnus cathartica**	●	●	●	● ○	●	●	●	● ○
Ribes missouriense				○				
Robinia pseudoacacia				○				
Rorippa nasturtium								○
*Rosa multiflora**				● ○				
Rubus allegheniensis	●	●		○	●			○
Rubus pensylvanicus		●		○				○
Rudbeckia fulgida								● ○
Rudbeckia hirta	●	●		● ○				○
Rumex crispus								○
Rumex verticillatus								○
Salix spp.				● ○				● ○
Sambucus canadensis			●		●	●		● ○
Sanicula marilandica				○				
Saponaria officinalis								○
Schizachyrium scoparium				○				○
Setaria faberi				○				○
*Silene latifolia**			●	○	●			●
*Silene vulgaris**					●			
Silphium integrifolium					●			
Sinapsis arvensis				●				● ○
Solanum carolinense				● ○				

APPENDIX 11A.1 Contd.

Scientific Name	MW	CM	SC	PC	PW	FL	LR	LP
Solanum dulcamara								○
Solidago canadensis		●		○				● ○
Solidago sp.	●			●				
*Sonchus arvensis**								●
*Sonchus oleraceus**					●	●		○
Sorghastrum nutans								●
Spartina pectinata		●						○
Stachys palustris		●			●			● ○
Symphyotrichum (=Aster) novae-angliae					●			
Taraxacum officinale				○				○
Teucrium canadense		●			●			
Thlaspi arvense				○				
Tilia americana			●					
*Torilis japonica**				● ○	●	●		
Toxicodendron radicans				○				○
Tradescantia ohiensis		●	●	● ○	●		●	
Tragopogon dubius	●	●	●	● ○	●	●		
Trifolium pratense				○				
Trifolium repens				○				
Typha angustifolia								○
Typha latifolia		●	●					●
Typha sp.					●			
Ulmus americana	●	●						
Urtica dioica								○
*Valeriana officinalis**					●			
*Verbascum thapsus**	●	●		● ○	●	●	●	○
Verbena hastata								○
Verbena stricta		●						●
Verbena urticifolia		●		● ○		●		○
Veronicastrum virginicum					●			
Viburnum opulus								○
Vicia americana				○				
Viola pubescens				○				
Vitis sp.		●		○		●		○
Zizia aurea				● ○				

APPENDIX 11A.2 Butterfly abundance (A; total number of individuals) per species, site, and survey date in 2009. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

	Scientific Name	Date	A
MW	*Celastrina neglecta*	Jun 14	1
		Aug 14	2
		Aug 15	2
	Danaus plexippus	Jun 04	1
		Jul 16	1
		Jul 20	4
		Aug 14	1
		Aug 15	1
		Aug 18	1
	Phyciodes tharos	Jun 04	3
		Jun 14	1
	Pieris rapae	Jul 20	4
		Aug 14	1
	Pterourus glaucus	Jun 14	1
		Aug 14	2
	Satyrium calanus falacer	Jul 17	1
CM	*Celastrina neglecta*	Jun 14	4
		Jun 29	2
		Jul 02	2
		Jul 20	1
	Colias eurytheme	Jun 14	6
		Jul 02	1
		Jul 16	1
		Jul 20	2
	Danaus plexippus	Jun 04	2
		Jun 14	3
		Jun 29	1
		Jul 02	1
		Jul 16	8
		Jul 17	2
		Jul 20	7
		Aug 14	2
		Aug 15	2
		Sept 05	1
	Unknown Hesperiidae	Jun 05	1
		Jul 16	1
	Limenitis archippus	Aug 14	2
	Nymphalis antiopa	Jul 02	1
		Jul 16	1
		Jul 20	1
	Pieris rapae	Jun 04	2
		Jun 14	8
		Jul 02	2
		Jul 16	1
		Jul 20	4
	Vanessa virginiana	Jun 14	2
SC	*Celastrina neglecta*	Jun 29	1
	Cercyonis pegala	Jul 17	1
	Colias philodice	Jun 14	2
	Danaus plexippus	Jun 04	2

	Scientific Name	Date	A
SC (contd.)	*Danaus plexippus* (contd.)	Jul 16	1
	Enodia anthedon	Jul 02	2
	Unknown Hesperiidae	Jun 14	1
	Megisto cymela	Jul 02	2
	Nymphalis antiopa	Jul 20	1
	Phyciodes tharos	Jun 05	1
	Pieris rapae	Jun 05	4
		Jun 14	3
		Jun 29	1
		Jul 16	3
		Jul 20	1
		Aug 18	1
		Sept 12	1
	Polygonia comma	Jul 20	2
	Pterourus glaucus	Jun 05	1
	Satyrium calanus falacer	Jul 02	5
PC	*Celastrina neglecta*	Jun 14	7
		Jul 02	1
	Cercyonis pegala	Jul 16	1
		Jul 17	1
	Colias eurytheme	Jul 16	1
	Danaus plexippus	Jun 14	1
		Jun 29	2
		Jul 02	2
		Jul 16	8
		Jul 17	5
		Jul 20	5
		Aug 14	5
		Aug 15	3
		Aug 18	2
		Sept 05	2
		Sept 06	3
	Enodia anthedon	Jun 30	1
		Jul 02	6
		Jul 20	3
	Unknown Hesperiidae	Jul 20	1
	Limenitis arthemis astyanax	Jul 02	2
	Megisto cymela	Jun 29	1
		Jun 30	1
		Jul 02	1
		Jul 20	1
	Nymphalis antiopa	Jun 14	1
	Papilio polyxenes	Jun 05	2
	Phyciodes tharos	Jun 05	4
		Aug 14	1
	Pieris rapae	Jun 14	3
		Jun 29	3
		Jul 02	1
	Papilio polyxenes	Jun 05	2
	Phyciodes tharos	Jun 05	4

	Scientific Name	Date	A
PC (contd.)	*Phyciodes tharos* (contd.)	Aug 14	1
	Pieris rapae	Jun 14	3
		Jun 29	3
		Jul 02	1
		Jul 16	1
		Jul 20	1
		Aug 14	13
		Aug 15	9
		Aug 18	9
		Sept 05	5
		Sept 06	7
		Sept 12	4
	Pterourus glaucus	Jun 14	1
	Satyrodes appalachia leeuwi	Jul 02	1
	Satyrium calanus falacer	Jun 29	1
		Jun 30	6
		Jul 02	5
		Jul 16	7
		Jul 17	1
		Jul 20	3
	Speyeria aphrodite	Jun 29	10
		Jul 02	8
		Jul 20	4
		Aug 14	2
		Aug 15	3
		Aug 18	1
PW	*Celastrina neglecta*	Jun 14	4
		Jul 02	1
		Jul 20	4
	Celastrina neglecta	Aug 14	1
	Danaus plexippus	Jul 16	1
	Phyciodes tharos	Jun 05	1
		Jun 30	1
	Pieris rapae	Jun 04	1
		Jul 20	1
		Aug 14	3
		Aug 18	1
	Pterourus glaucus	Jun 14	1
	Vanessa atalanta	Jun 14	1
FL	*Celastrina neglecta*	Jun 14	2
		Jun 29	5
		Jun 30	2
		Jul 02	1
		Jul 17	1
		Jul 20	11
		Aug 18	2
	Cercyonis pegala	Jul 16	2
	Colias eurytheme	Jul 16	3
		Aug 14	1
		Aug 18	1

APPENDIX 11A.2 Contd.

	Scientific Name	Date	A
FL (contd.)	*Danaus plexippus*	Jul 16	2
	Unknown Hesperiidae	Jul 16	1
		Aug 18	1
	Limenitis arthemis astyanax	Aug 14	1
	Nymphalis antiopa	Jul 16	**1**
	Pieris rapae	Jun 14	**5**
	Pieris rapae	Jun 29	1
		Jul 02	1
		Jul 16	14
		Jul 17	2
		Jul 20	9
		Aug 14	5
		Aug 15	5
		Aug 18	3
		Sept 05	2
		Sept 06	5
		Sept 12	3
	Pterourus glaucus	Jun 14	1
		Jul 16	2
		Aug 14	1
	Satyrium calanus falacer	Jul 17	1
LR	*Asterocampa celtis*	Jul 02	1
	Celastrina neglecta	Jul 02	1
		Jul 16	1
	Colias eurytheme	Jun 29	3
		Jul 02	10
		Jul 16	1
		Jul 20	6
		Aug 14	1
		Aug 18	2
	Colias philodice	Jun 29	3
	Danaus plexippus	Aug 14	1
	Unknown Hesperiidae	Jul 16	1
		Jul 20	1
	Pieris rapae	Jun 05	2
		Jul 20	11
		Aug 06	1
	Vanessa atalanta	Jul 02	1
LP	*Colias eurytheme*	Jun 29	5
		Jul 20	1
	Colias philodice	Jun 29	1
	Danaus plexippus	Jun 04	2
		Jun 30	1
		Jul 02	4
		Jul 16	1
		Jul 17	1
		Jul 20	7
		Aug 14	7
		Aug 15	4
		Aug 18	1
	Unknown Hesperiidae	Jul 02	3

	Scientific Name	Date	A
LP (contd.)	Unknown Hesperiidae (contd.)	Jul 20	1
	Limenitis archippus	Jul 20	5
		Aug 14	1
		Aug 15	2
	Nymphalis antiopa	Jul 02	1
		Jul 20	1
	Papilio polyxenes asterios	Jun 04	1
		Jul 17	1
	Phyciodes tharos	Jun 04	1
	Pieris rapae	Jul 16	6
		Jul 20	2
		Aug 14	11
		Aug 15	7
		Sept 06	1
	Pterourus glaucus	Aug 14	1
	Satyrium calanus falacer	Jul 02	1
	Satyrodes eurydice	Jul 16	1

APPENDIX 11B.1 Summary of Auchenorrhyncha species collected at Cuba Marsh (CM) and Lockport Prairie (LP) in 2009 and 2010. CC (Coefficient of Conservatism) values and level of disturbance tolerance are listed for each species. CC values range from 0 to 16. Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS). CC values and levels of disturbance tolerance from Wallner et al. 2012 and Wallner et al. 2013.

Scientific Name	CC Value	Level of Disturbance Tolerance
Acanalonia bivittata	5.5	N:MDT
Acutalis tartarea	3	N:HDT
Agalliposis novella	4.75	N:HDT
Aphelonema simplex	16	N:DS
Aphrodes bicincta	0	E:HDT
Athysanus argentarius	0	E:HDT
Bakerella cinerea	9.75	N:MDT
Bruchomorpha dorsata	12.25	N:DS
Bruchomorpha oculata	11	N:DS
Campylenchia latipes	6.25	N:MDT
Ceratagallia agricoli	4.75	N:HDT
Chlorotettix spatulatus	10	N:MDT
Chlorotettix unicolor	9.5	N:MDT
Cicadula straminea	10	N:MDT
Commellus comma	11.75	N:DS
Cosmotettix delector	7.25	N:MDT
Delphacodes lutulenta	8	N:MDT
Delphacodes rotundata	9.75	N:MDT
Destria fumida	16	N:DS
Dikraneura mali	5.25	N:MDT
Diplocolenus configuratus	12	N:DS
Doratura stylata	0	E:HDT
Dorydiella kansana	13.5	N:DS
Draeculacephala antica	3.75	N:HDT
Draeculacephala mollipes	4.75	N:HDT
Driotura gammaroides	12.5	N:DS
Empoasca fabae	1.5	N:HDT
Empoasca recurvata	3.25	N:HDT
Endria inimica	4	N:HDT
Erasmoneura vulnerata	2.5	N:HDT
Flexamia prairiana	11.75	N:DS
Flexamia reflexa	11.75	N:DS
Forcipata loca	1.5	N:HDT
Gyponana aculeata	7.25	N:MDT
Haplaxius pictifrons	4	N:HDT
Idiodonus kennicotti	4.75	N:HDT
Kansendria kansiesis	9.5	N:MDT
Kelisia pectinata	13.25	N:DS
Latalus personatus	9	N:MDT
Lepyronia quadrangularis	6.25	N:MDT
Limotettix anthracinus	9.25	N:MDT
Megamelus metzari	14.5	N:DS
Neohecalus magnificus	15.75	N:DS
Osbornellus consors	4	N:HDT
Otiocerus amyotii	6.25	N:MDT
Paraphlepsius irroratus	5.5	N:MDT
Paraphlepsius lobatus	13.5	N:DS
Penthimia americana	6.75	N:MDT
Philaenus spumarius	0	E:HDT
Phylloscellis pallescens	13.75	N:DS
Pissonotus marginatus	9.5	N:MDT
Polyamia caperata	11.5	N:DS
Prosapia ignipectus	11.5	N:DS
Scaphytopius frontalis	4.75	N:HDT
Scolops sulcipes	11.5	N:DS
Tylozygus bifidus	6.25	N:MDT
Xestocephalus pulicarius	4	N:HDT

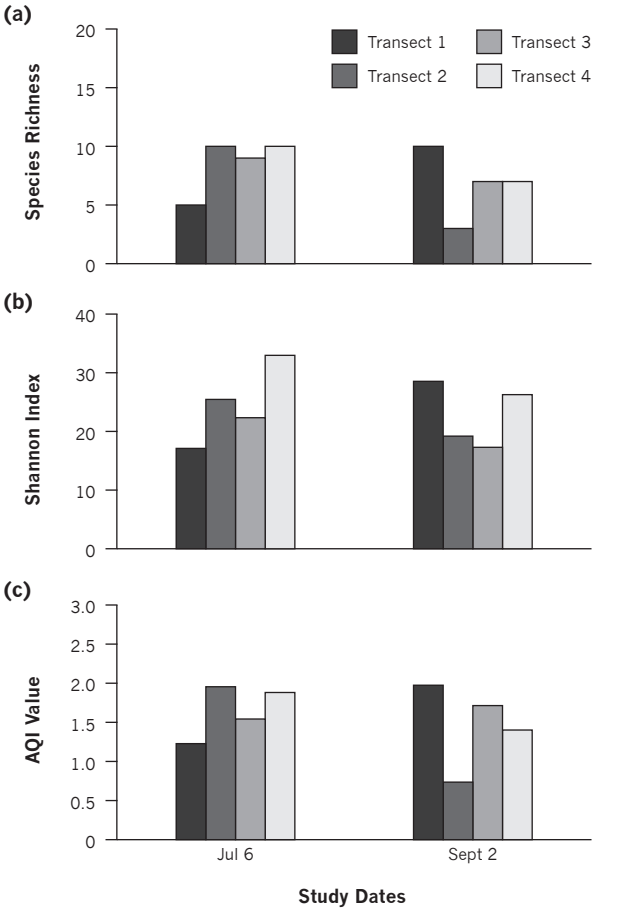
APPENDIX 11B.2 Summary of Auchenorrhyncha (i.e., leafhoppers) found in four transects at Lockport Prairie (LP). Species are listed according to the survey date (July 6th and September 2nd, 2009) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS). CC values and levels of disturbance tolerance from Wallner et al. 2012 and Wallner et al. 2013.

	Date	L of DT	Scientific Name	Abundance
Transect 1	Jul 06	N:DS	*Dorydiella kansana*	2
			Flexamia prairiana	7
			Prosapia ignipectus	1
		N:MDT	*Dikraneura mali*	3
		N:HDT	*Forcipata loca*	15
	Sept 02	N:DS	*Aphelonema simplex*	4
			Bruchomorpha dorsata	1
			Flexamia prairiana	5
			Megamelus metzari	1
			Polyamia caperata	1
		N:MDT	*Bakerella cinerea*	5
			Dikraneura mali	2
			Otiocerus amyotii	1
		N:HDT	*Empoasca fabae*	1
			Forcipata loca	9
Transect 2	Jul 06	N:DS	*Dorydiella kansana*	5
			Flexamia prairiana	6
			Neohecalus magnificus	1
			Polyamia caperata	1
		N:MDT	*Bakerella cinerea*	1
			Cicadula straminea	1
			Dikraneura mali	1
		N:HDT	*Empoasca fabae*	1
			Forcipata loca	1
		E:HDT	*Athysanus argentarius*	1
	Sept 02	N:DS	*Flexamia prairiana*	6
			Polyamia caperata	1
		N:MDT	*Chlorotettix spatulatus*	1
Transect 3	Jul 06	N:DS	*Bruchomorpha dorsata*	1
			Dorydiella kansana	3
			Flexamia prairiana	13
			Polyamia caperata	1
		N:MDT	*Bakerella cinerea*	1
			Dikraneura mali	1
		N:HDT	*Empoasca fabae*	1
			Forcipata loca	1
		E:HDT	*Athysanus argentarius*	1
	Sept 02	N:DS	*Flexamia prairiana*	6
		N:MDT	*Campylenchia latipes*	1
			Chlorotettix spatulatus	1
			Dikraneura mali	2
			Kansendria kansiensis	1
		N:HDT	*Empoasca fabae*	2
			Forcipata loca	2
Transect 4	Jul 06	N:DS	*Bruchomorpha dorsata*	1
			Destria fumida	2
			Dorydiella kansana	3
			Flexamia prairiana	4
			Kelisia pectinata	4

	Date	L of DT	Scientific Name	Abundance
Transect 4 (contd.)		N:DS	*Megamelus metzari*	1
			Polyamia caperata	12
		N:MDT	*Chlorotettix spatulatus*	1
		N:HDT	*Forcipata loca*	1
		E:HDT	*Athysanus argentarius*	1
	Sept 02	N:DS	*Flexamia prairiana*	12
			Neohecalus magnificus	2
			Scolops sulcipes	1
		N:MDT	*Chlorotettix spatulatus*	1
			Delphacodes rotundata	3
			Dikraneura mali	1
			Paraphlepsius irroratus	1

APPENDIX 11B.3 Abundance of each Auchenorrhyncha (i.e., leafhoppers) species found at Cuba Marsh (CM) and Lockport Prairie (LP) in 2009. Species are listed according to their level of disturbance tolerance (L DT) and the survey date on which they were collected. Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

L DT	Scientific Name	CM	LP	
		Jul 09	Jul 06	Sept 02
N:DS	*Aphelonema simplex*			4
	Bruchomorpha dorsata		2	1
	Commellus comma	1		
	Destria fumida		2	
	Dorydiella kansana		13	
	Flexamia prairiana		30	32
	Kelisia pectinata		5	
	Megamelus metzari		1	1
	Neohecalus magnificus		1	2
	Polyamia caperata	1	16	2
	Prosapia ignipectus		1	
	Scolops sulcipes	3		1
N:MDT	*Bakerella cinerea*		1	5
	Campylenchia latipes			1
	Chlorotettix spatulatus		1	3
	Chlorotettix unicolor	8		
	Cicadula straminea		1	
	Cosmotettix delector	1		
	Delphacodes lutulenta	3		
	Delphacodes rotundata			3
	Dikraneura mali	1	7	6
	Gyponana aculeata	1		
	Kansendria kansiesis			1
	Latalus personatus	1		
	Lepyronia quadrangularis		1	
	Otiocerus amyotii			1
	Paraphlepsius irroratus			1
	Penthimia americana			
	Pissonotus marginatus	2		
	Tylozygus bifidus	10		
N:HDT	*Acutalis tartarea*	1		
	Ceratagallia agricoli	2		
	Draeculacephala mollipes	2		
	Empoasca fabae		1	
	Empoasca recurvata	7		
	Endria inimica	1		
	Forcipata loca	2	34	14
	Idiodonus kennicotti	2		
	Osbornellus consors	2		
	Scaphytopius frontalis	1		
E:HDT	*Aphrodes bicincta*	13		
	Athysanus argentarius	10	3	
	Doratura stylata	24		
	Philaenus spumarius			
	TOTAL	**99**	**120**	**78**



APPENDIX 11B.4 (a) Species richness, (b) diversity (Shannon Index) and (c) habitat quality (AQI) metrics for four transects at Lockport Prairie (LP) in 2009, where transect 1 is closest and transect 4 is the farthest from the railroad tracks.

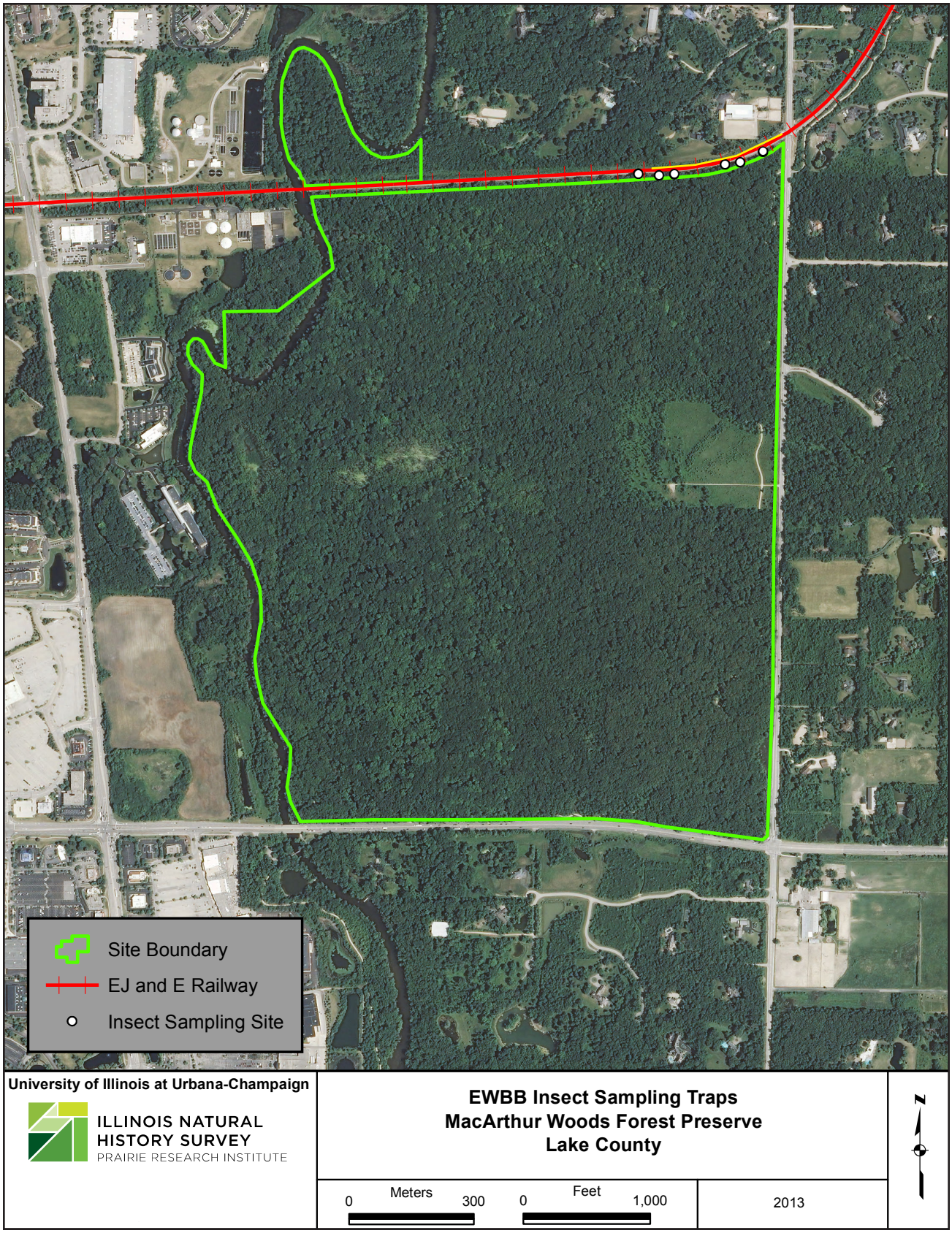
APPENDIX 11B.5 Summary of Auchenorrhyncha found in two transects at Cuba Marsh (CM). Transect 1 was placed in the vegetation adjacent to the railroad tracks, while Transect 2 was 10 meters out from Transect 1. Species are listed according to the survey date (July 1st and August 17th, 2010) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

	Date	L of DT	Scientific Name	Abundance
Transect 1	Jul 01	N:MDT	*Latalus personatus*	5
			Limotettix anthracinus	9
		N:HDT	*Ceratagallia agricola*	4
			Draeculacephala antica	1
			Empoasca recurvata	1
			Erasmoneura vulnerata	2
			Scaphytopius frontalis	1
		E:HDT	*Aphrodes bicincta*	1
			Athysanus argentarius	1
			Doratura stylata	7
			Philaenus spumarius	1
	Aug 17	N:HDT	*Draeculacephala antica*	1
			Empoasca recurvata	1
		E:HDT	*Philaenus spumarius*	1
Transect 2	Jul 01	N:DS	*Diplocolenus configuratus*	2
		N:MDT	*Dikraneura mali*	2
			Pissonotus marginatus	1
		N:HDT	*Agalliposis novella*	1
			Empoasca fabae	1
		E:HDT	*Athysanus argentarius*	5
			Doratura stylata	1
	Aug 17	N:DS	*Driotura gammaroides*	1
			Phylloscellis pallescens	3
		N:MDT	*Latalus personatus*	15
			Penthimia americana	1
			Pissonotus marginatus	2
		N:HDT	*Ceratagallia agricola*	3
			Draeculacephala antica	4
			Empoasca fabae	6
			Erasmoneura vulnerata	2
			Forcipata loca	2
			Xestocephalus pulicarius	1
		E:HDT	*Doratura stylata*	3
			Philaenus spumarius	2

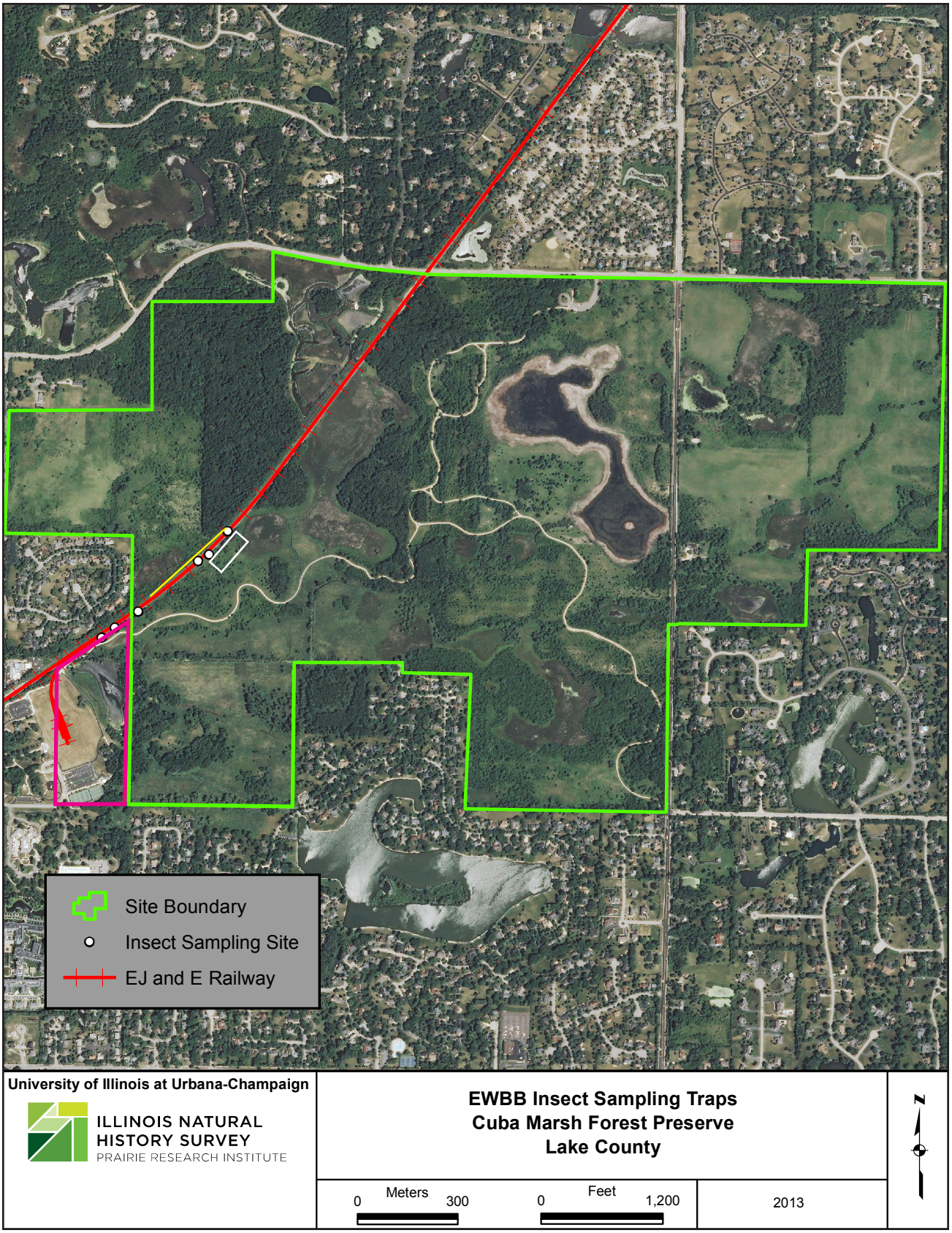
APPENDIX 11B.6 Summary of Auchenorrhyncha found in two transects at Lockport Prairie (LP). Transect 1 was placed in the vegetation adjacent to the railroad tracks, while Transect 2 was 10 meters out from Transect 1. Species are listed according to the survey date (July 1st and August 17th, 2010) on which they were collected and their level of disturbance tolerance (L of DT). Species with CC values of 0–5 are highly adapted to disturbance and can be native or exotic (N:HDT and E: HDT, respectively); 6–10 are native and tolerant to moderate levels of disturbance (N:MDT); and 11–18 are native, sensitive to disturbance, and restricted to grasslands (N:DS).

	Date	L of DT	Scientific Name	Abundance
Transect 1	Jul 01	N:DS	*Bruchomorpha oculata*	1
			Polyamia caperata	11
		N:MDT	*Acanalonia bivittata*	1
			Chlorotettix unicolor	1
			Cicadula straminea	1
			Dikraneura mali	7
		N:HDT	*Draeculacephala antica*	1
			Empoasca fabae	3
	Aug 17	N:DS	*Bruchomorpha dorsata*	1
			Paraphlepsius lobatus	3
			Polyamia caperata	3
		N:MDT	*Dikraneura mali*	1
		N:HDT	*Empoasca fabae*	2
			Haplaxius pictifrons	1
Transect 2	Jul 01	N:DS	*Flexamia reflexa*	1
			Polyamia caperata	2
		N:MDT	*Campylenchia latipes*	2
			Kansendria kansiensis	2
	Aug 17	N:DS	*Flexamia reflexa*	1
			Polyamia caperata	1

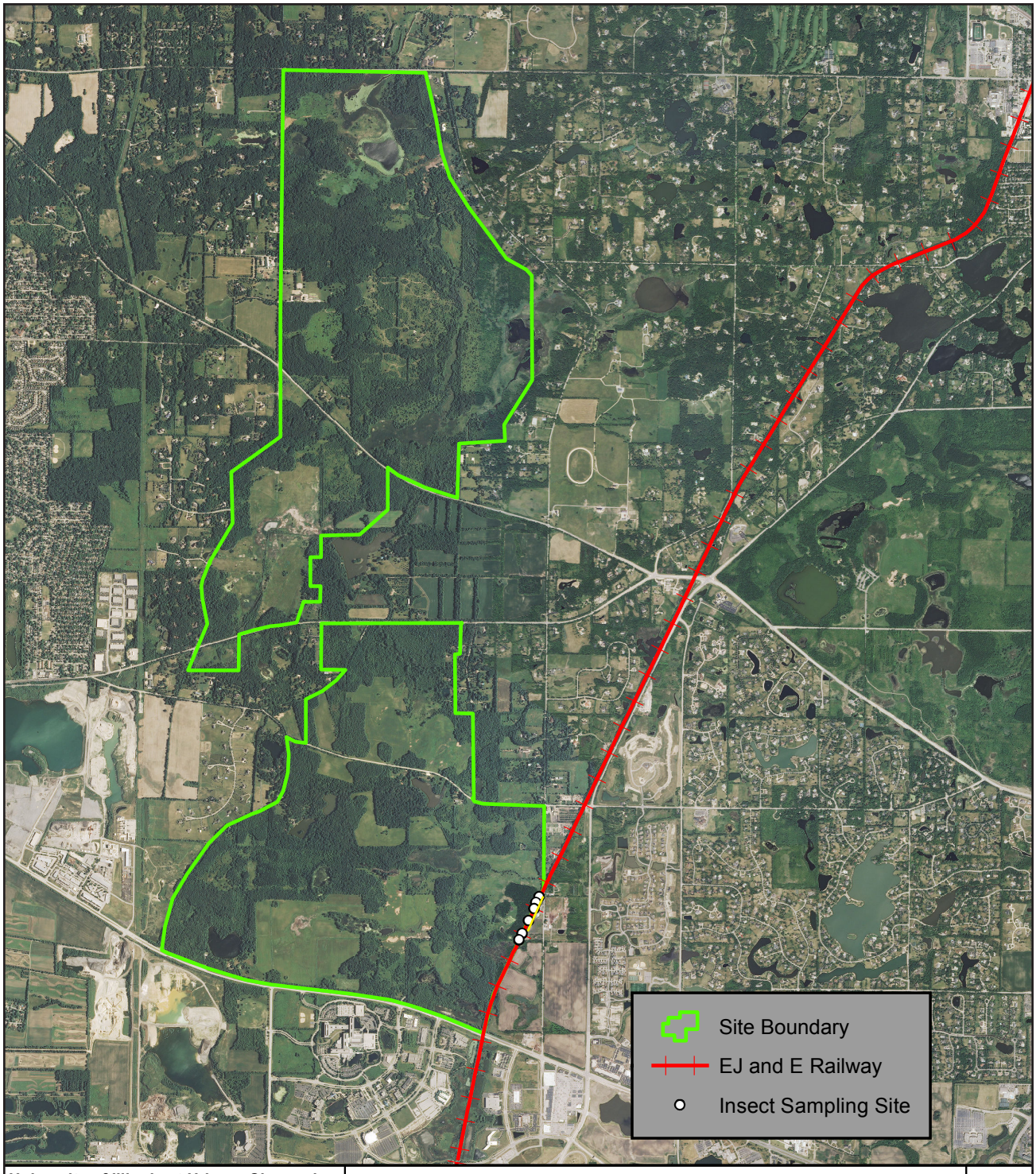
APPENDIX 11C.1 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



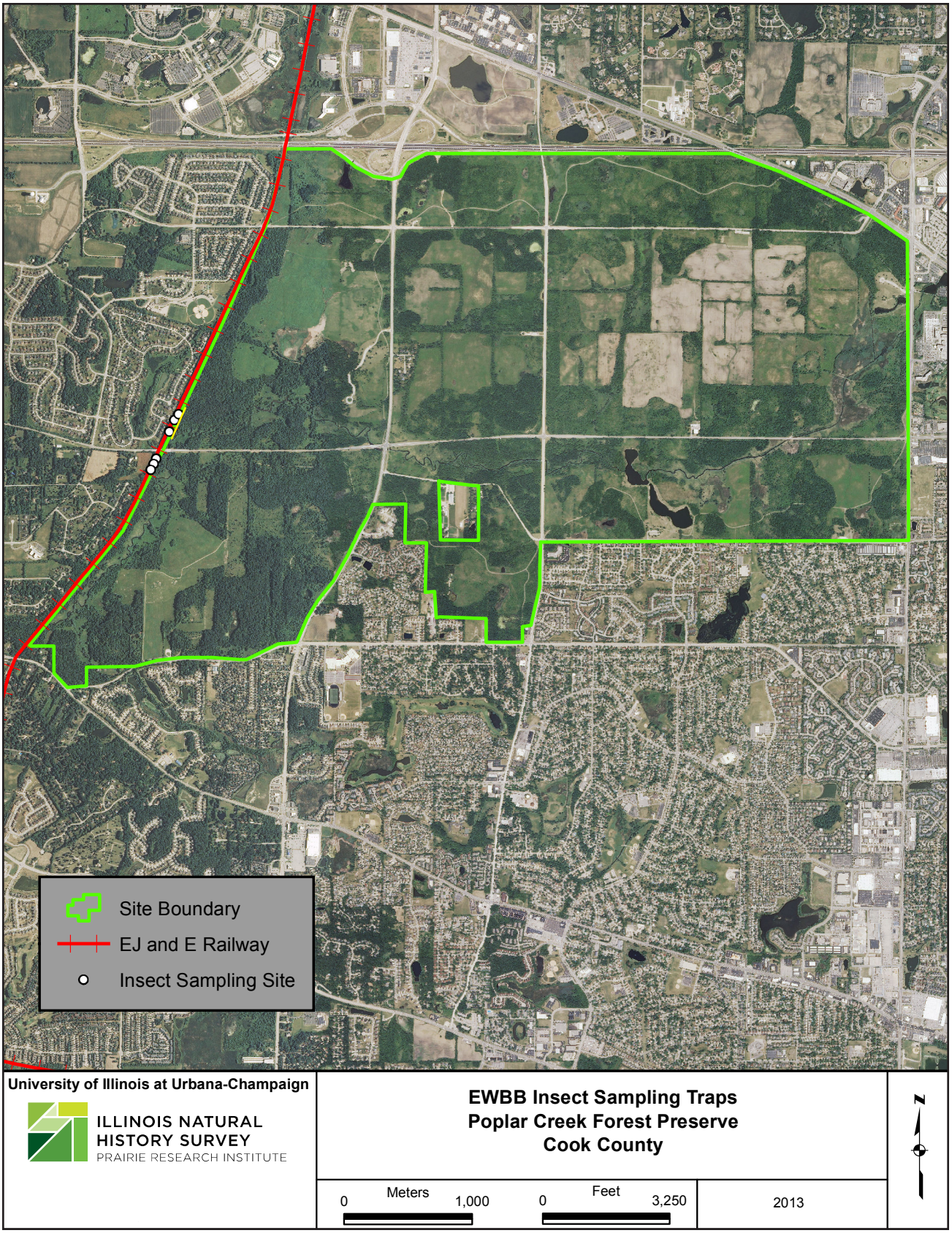
APPENDIX 11C.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Auchenorrhyncha sampling location for 2009–2010 is bounded by a white box. The Cuba Marsh trail map includes the Cuba Marsh Connection Trail (a 0.9-mile gravel trail that winds from the southern loop of the main trail through the southwest corner of the preserve). This section is part of the Barrington's Citizens Park (enclosed in a magenta polygon). Lepidoptera survey route shown in yellow.



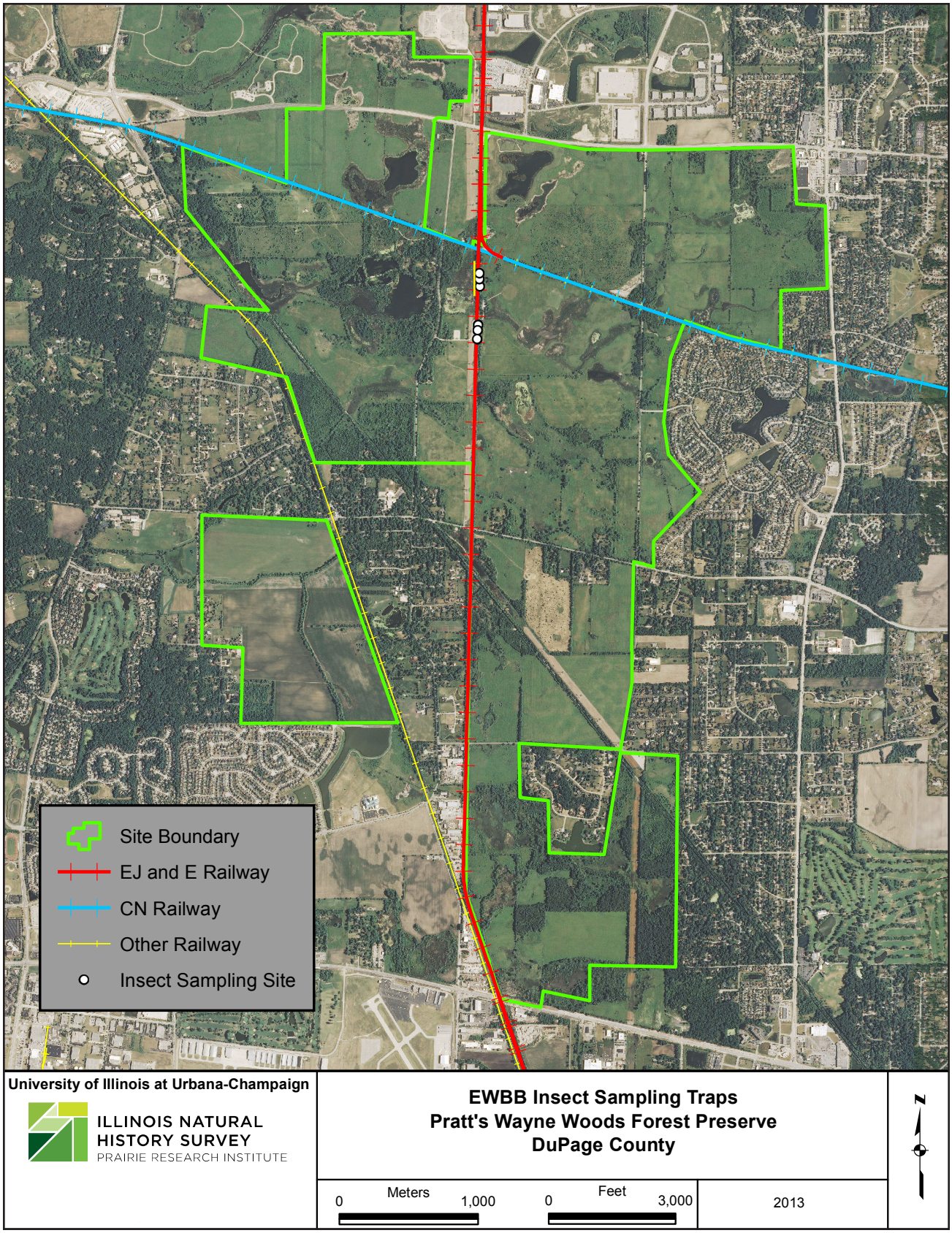
APPENDIX 11C.1 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



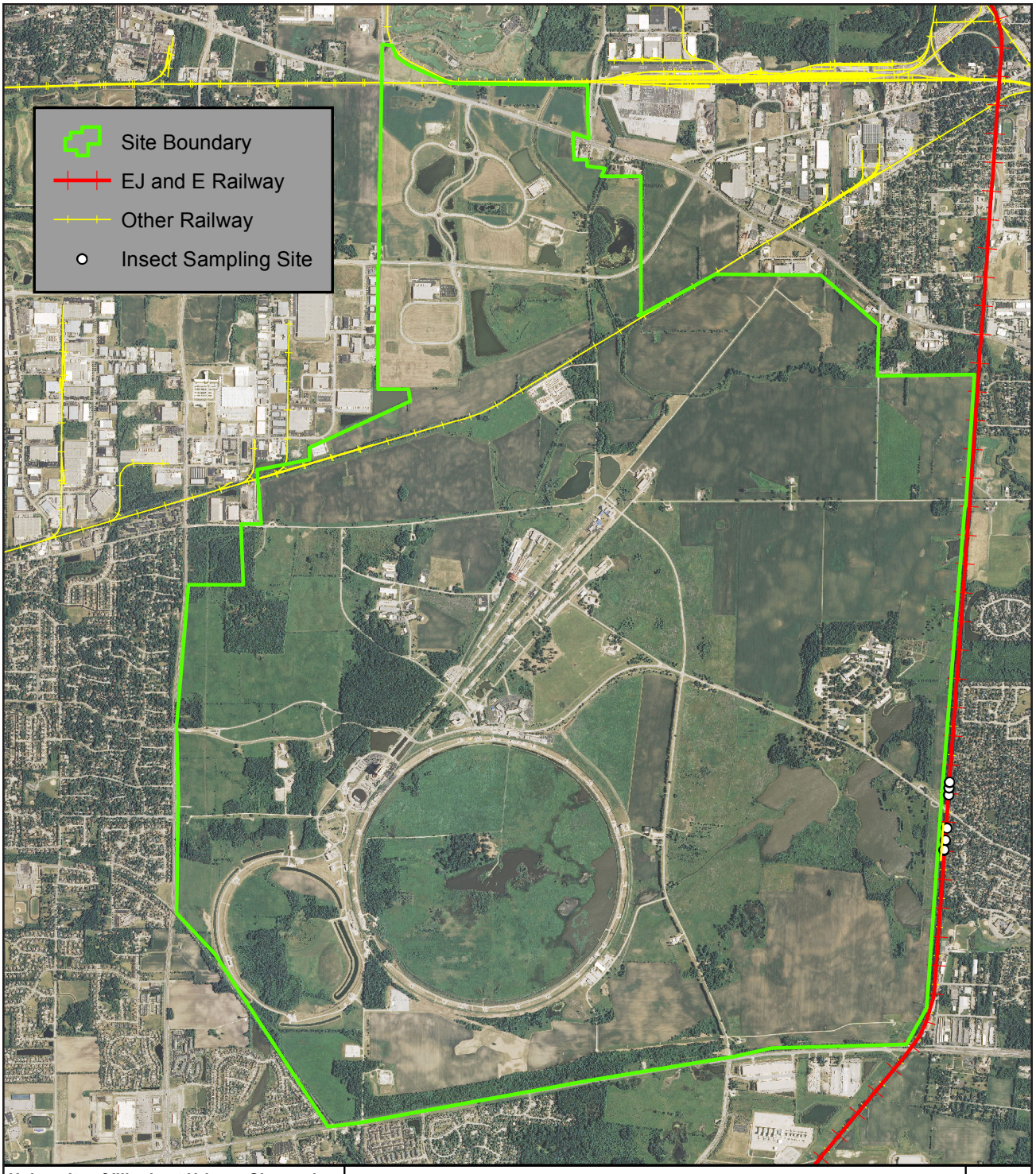
APPENDIX 11C.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



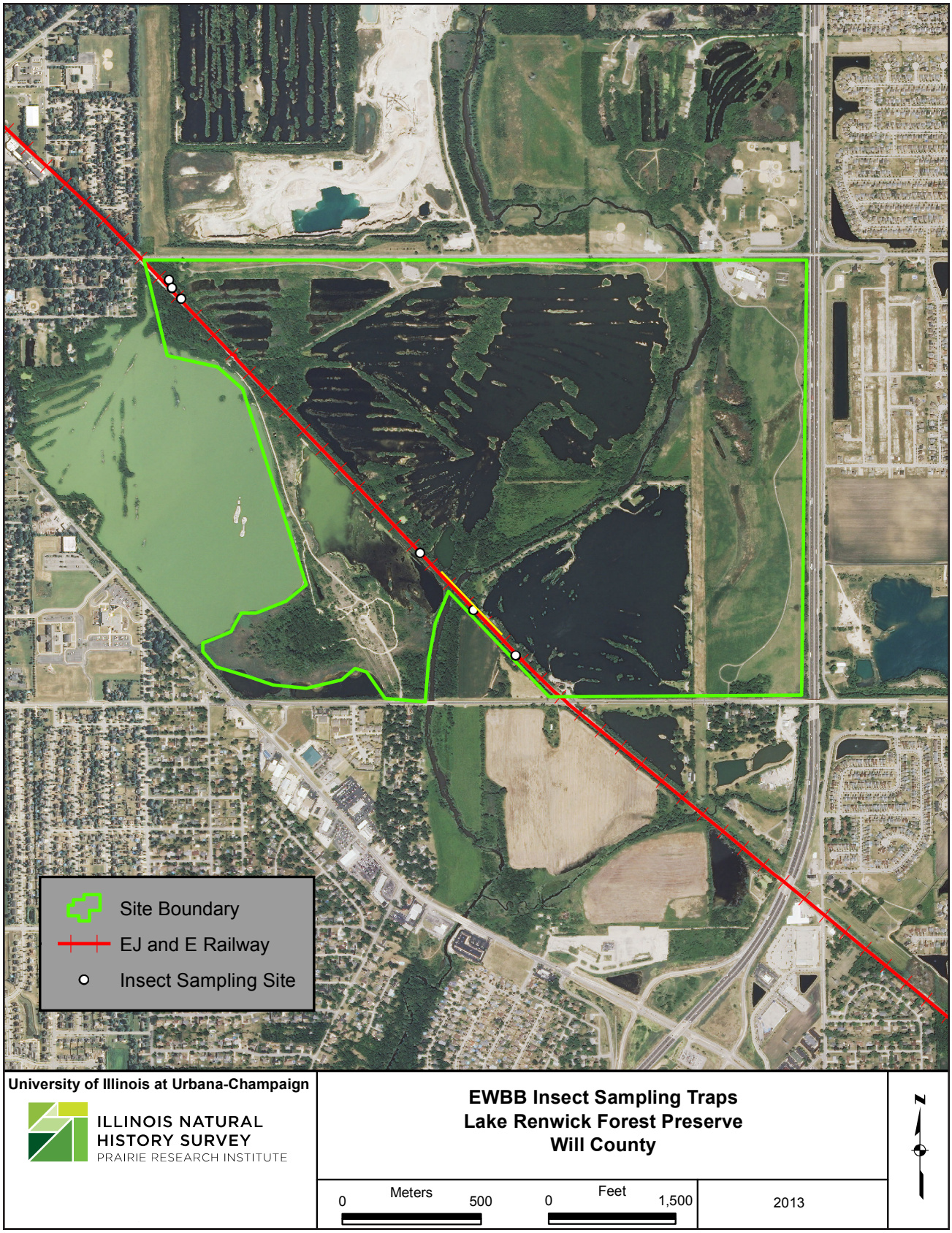
APPENDIX 11C.1 (e) Map of the Pratt's Wayne Woods Forest Preserve (PW) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



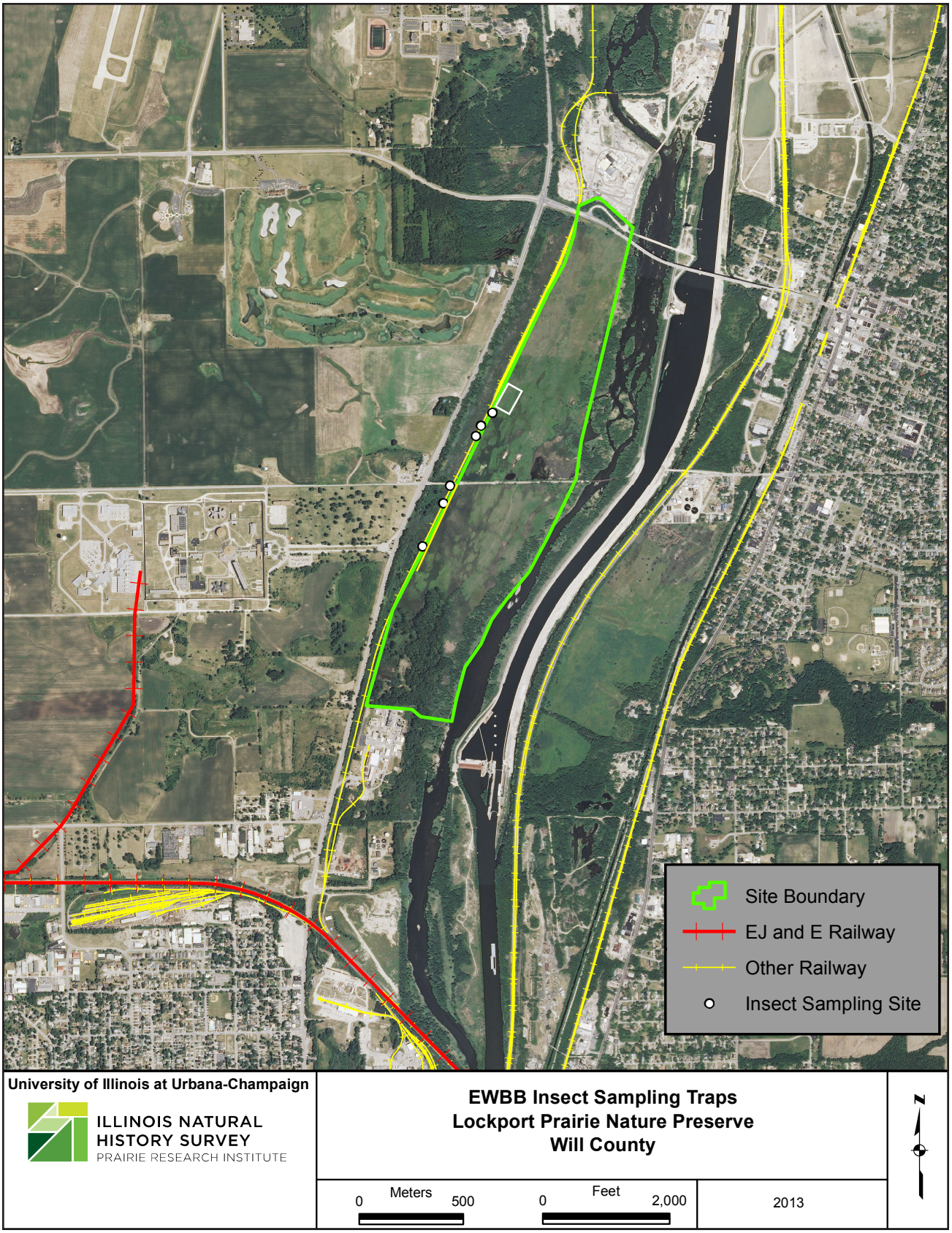
APPENDIX 11C.1 (f) Map of the Fermilab (FL) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



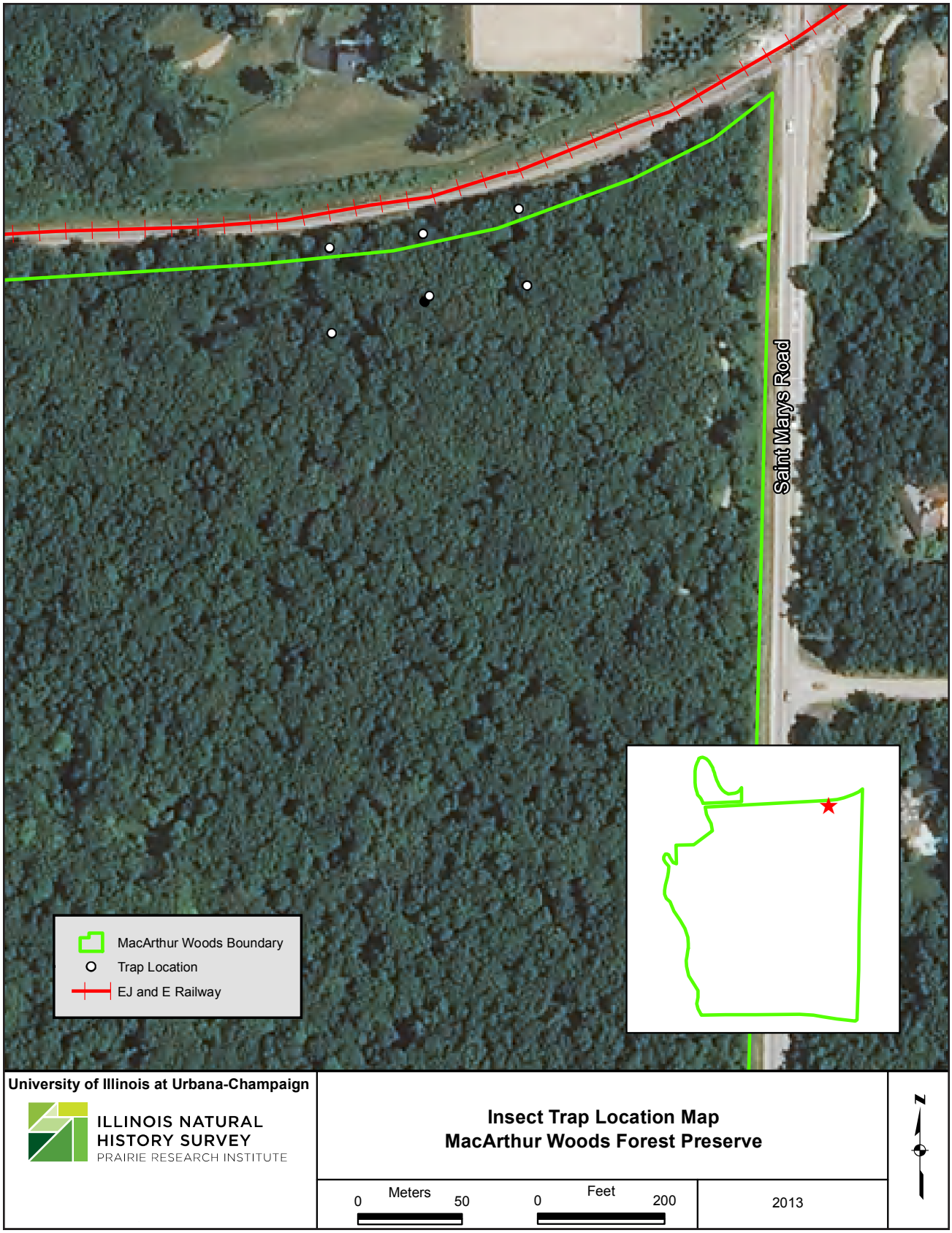
APPENDIX 11C.1 (g) Map of the Lake Renwick Forest Preserve (LR) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Lepidoptera survey route shown in yellow.



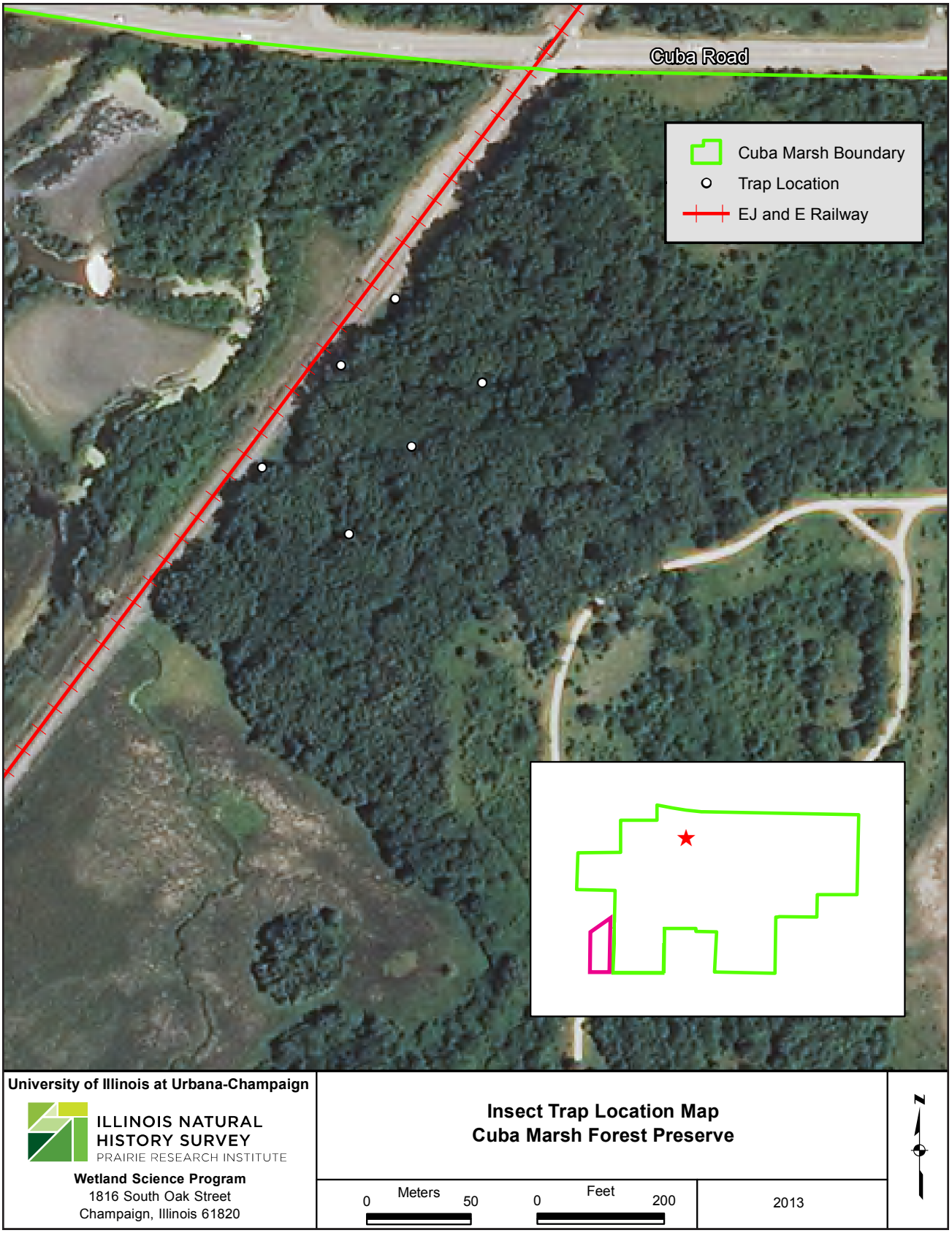
APPENDIX 11C.1 (h) Map of the Lockport Prairie Nature Preserve (LP) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2009–2010 are indicated by a white dot. Auchenorrhyncha sampling location for 2009–2010 is bounded by a white box. Lepidoptera survey route shown in yellow.



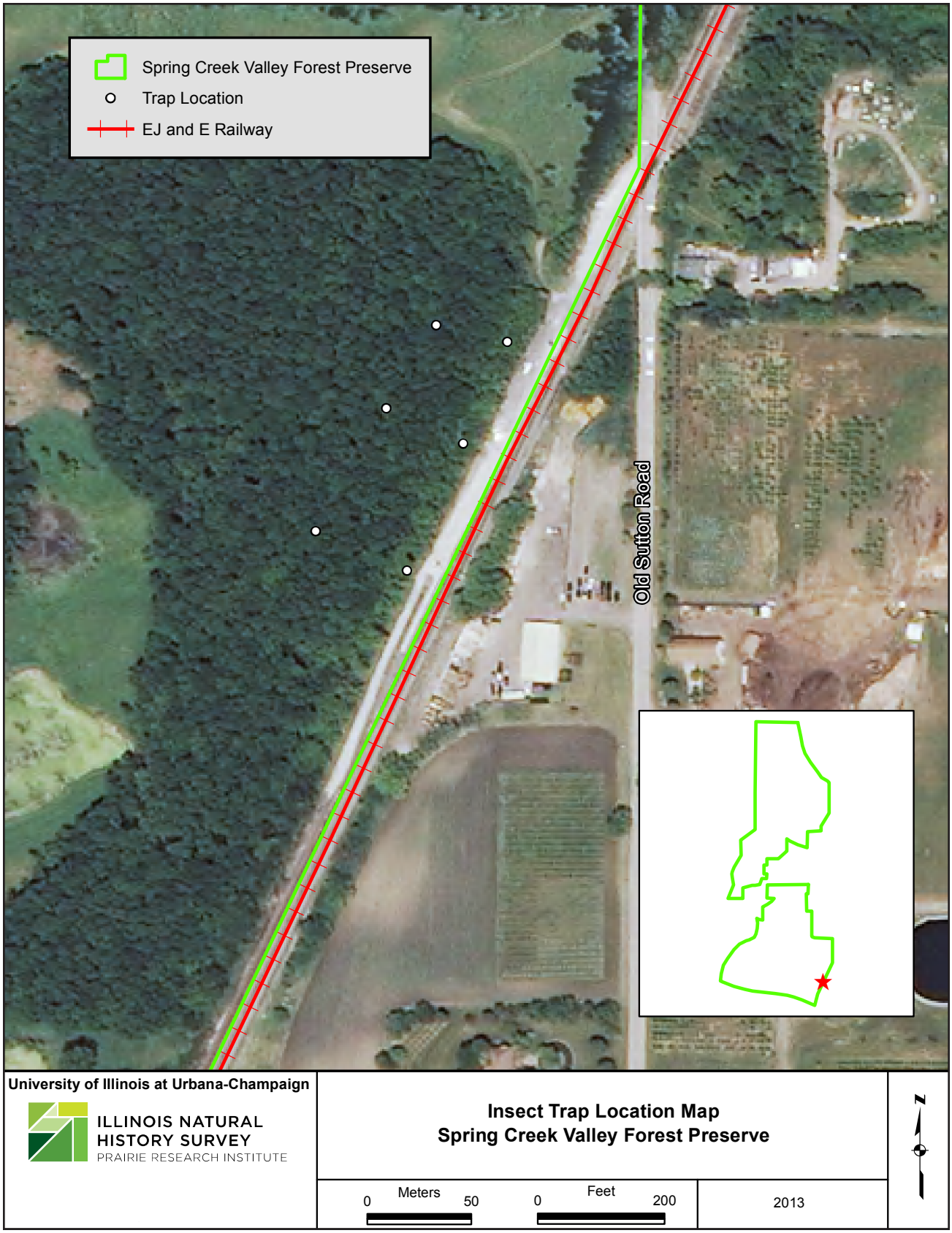
APPENDIX 11C.2 (a) Map of the MacArthur Woods Forest Preserve (MW) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2011–2012 are indicated by a white dot.



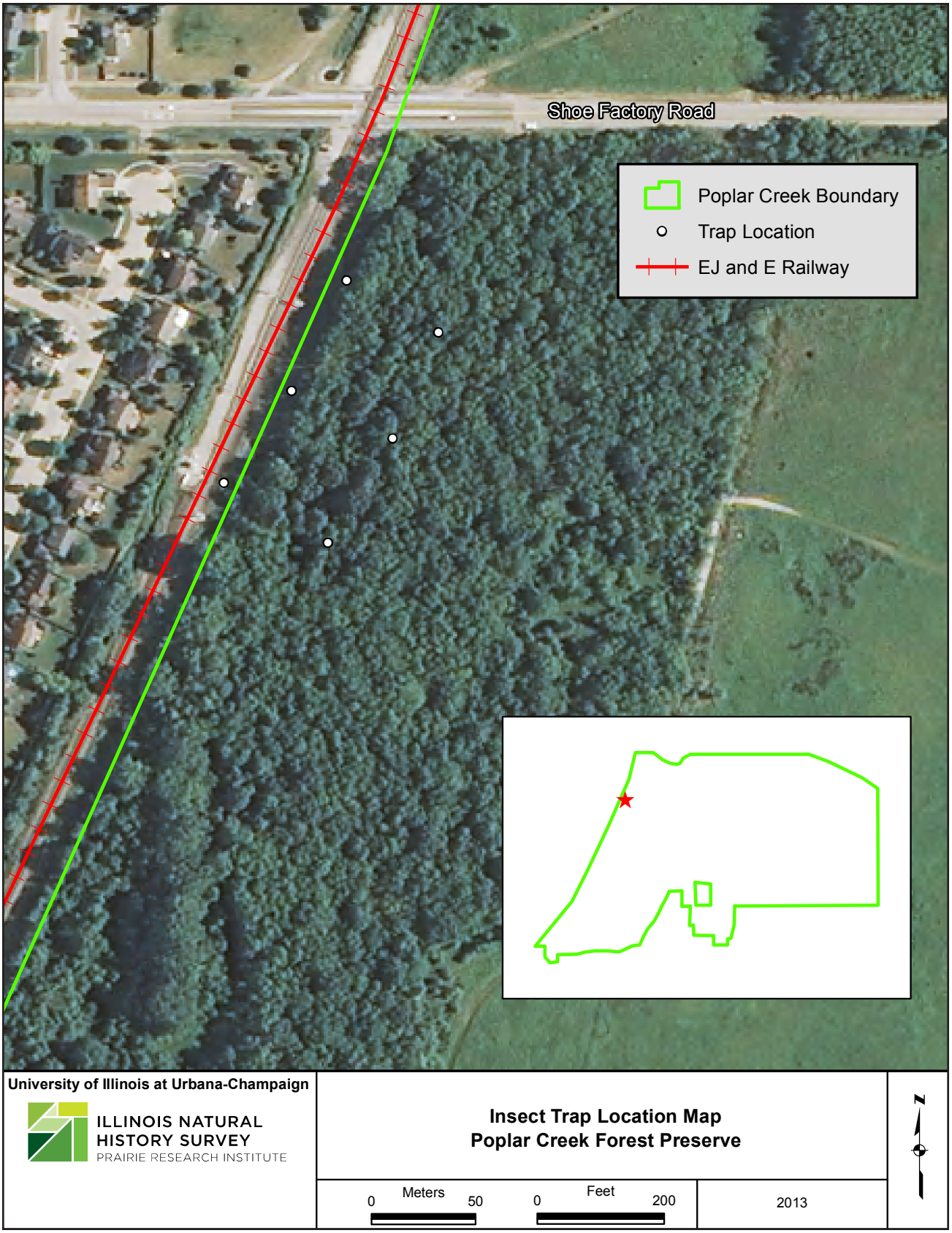
APPENDIX 11C.1 (b) Map of the Cuba Marsh Forest Preserve (CM) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2011–2012 are indicated by a white dot.



APPENDIX 11C.2 (c) Map of the Spring Creek Valley Forest Preserve (SC) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2011–2012 are indicated by a white dot.



APPENDIX 11C.1 (d) Map of the Poplar Creek Forest Preserve (PC) study site showing the location of the EJ&E railway line. Coleoptera sampling locations for 2011–2012 are indicated by a white dot.



APPENDIX 11C.3 Summary of arthropods collected by order at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie. * indicates a subclass.

		2009–2010								2011–2012				
Class	**Order**	**MW**	**CM**	**SC**	**PC**	**PW**	**FL**	**LR**	**LP**	**MW**	**CM**	**SC**	**PC**	**Total**
Arachnida	Araneae	84	95	84	100	81	71	180	103	555	417	156	188	**2114**
	Pseudoscorpion										1		1	**2**
	Acari*	4		16	105	39	5		1	212	30	51	74	**537**
Diplopoda	---	12	3		2		2	2		14			4	**39**
Malacostraca	Isopoda							5	17	2	2		1	**27**
Collembola	---	2	1	1	4	2	3	36	13	126	71	71	97	**427**
Insecta	Blattodea		1					3						**4**
	Coleoptera	1543	1780	2098	2844	2954	2385	3613	3059	4558	5542	5477	3543	**39396**
	Dermaptera	3	30	8	47	38	16	9	4	2	1	8	7	**173**
	Diptera	1581	726	1293	2023	2676	2174	1330	6044	2588	2234	2313	2535	**27517**
	Ephemeroptera							2			1	2	1	**6**
	Hemiptera	78	95	137	199	263	204	116	120	350	398	525	294	**2779**
	Hymenoptera	108	197	120	231	129	164	232	136	464	636	293	314	**3024**
	Lepidoptera	25	18	40	29	55	12	22	17	49	52	82	47	**448**
	Mecoptera	1								6				**7**
	Megaloptera		2	2		48		18	148		1			**219**
	Microcoryphia												1	**1**
	Neuroptera	2	2				1		1	3	3	4	4	**20**
	Odonata			2				6			2	2		**12**
	Orthoptera	2	4	7	5	5	8	3	3	6	4	1	4	**52**
	Plecoptera			1	1									**2**
	Psocodea	18	38	11	20	32	25	21	14	151	198	205	201	**934**
	Siphonaptera									1			2	**3**
	Thysanoptera	171	168	83	11	111	86	91	115	1292	1674	1394	1136	**6332**
	Trichoptera	13	23	26	18	16	3	82	162	21	111	31	26	**532**
	Site Total	**5159**	**9957**	**5771**	**6449**	**3183**	**3647**	**5639**	**3929**	**11378**	**10400**	**8480**	**10615**	**84607**

APPENDIX 11C.4 Occurence and abundance of Coleoptera families at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

	2009–2010								2011–2012				
Family	**MW**	**CM**	**SC**	**PC**	**PW**	**FL**	**LR**	**LP**	**MW**	**CM**	**SC**	**PC**	**Family Total**
Alleculidae	5	1	3	4	4	3	1		9	8	5	2	**45**
Anobiidae	19	10	52	27	6	36	27	14	67	40	98	28	**424**
Anthicidae				1	1	1	11	6	3		1		**24**
Anthribidae		7	2	2	6	11	14	7	1	3	2	1	**56**
Biphyllidae	16	2	10	4	3	9	2		85	127	45	53	**356**
Bostrichidae	6	2	8	1	35	11	40	3	8	13	9	18	**154**
Buprestidae			3		1	1		1	6	3	3	7	**25**
Byturidae										4	2	1	**7**
Cantharidae	4	3	8	7	7	6	7	11	10	21	3	2	**89**
Carabidae	58	214	95	89	347	140	310	114	45	141	28	43	**1624**
Cerambycidae	13	6	13	18	3	18	35	12	19	23	24	13	**197**
Cerylonidae	4	5	9	20	9	35	18	3	14	13	30	11	**171**
Chrysomelidae	2	2	7	4	6	4	10	15	16	54	19	14	**153**
Cicindellidae							1	1				1	**3**
Ciidae	13	7	13	14	18	39	22	19	37	54	19	20	**275**
Cleridae	18	25	15	101	4	94	58	6	93	69	80	130	**693**
Coccinellidae	13	11	5	4	5	4	5	8	31	10	5	2	**103**
Corylophidae	22	83	137	112	200	163	91	35	136	158	788	179	**2104**
Cryptophagidae	5	7	19	18	26	33	14	12	22	33	19	15	**223**
Cucujidae					1	1		1			1	1	**5**
Cupedidae	1					1	3	1		2	1	1	**10**
Curculionidae	406	596	681	762	321	432	1553	315	1896	3040	2401	1209	**13612**
Dermestidae	7	62	16	41	15	62	15	12	11	9	8	7	**265**
Dytiscidae			2	1			2	1		2		1	**9**
Elateridae	136	147	143	254	906	235	325	431	414	257	444	543	**4235**
Elmidae		2	1						2				**5**
Endomychidae				1			3	1	2	3		1	**11**
Erotylidae	5	2	5	5	7	24	19	4	11	5	3	8	**98**
Eucinetidae		1			2	3	9	3					**18**
Eucnemidae	13	5	6	11	5	3	15	1	30	16	26	21	**152**
Haliplidae	1							2					**3**
Heteroceridae		2		2			1		1	12	2		**20**
Histeridae	20	17	35	85	62	84	112	22	27	45	116	30	**655**
Hydraenidae	8	11	5		4				4	19		2	**53**
Hydrophilidae	10	13	7	13	14	1	9	9	20	29	12	30	**167**
Laemophloeidae	7	6	9	13	14	34	40	5	34	17	40	31	**250**
Lagriidae									1		1	1	**3**
Lampyridae	10	17	12	11	15	15	12	27	6	18	5	15	**163**
Lathridiidae	44	42	48	53	78	55	98	79	122	119	118	80	**936**
Leiodidae	10	9	12	15	5	9	10	6	11	6	16	12	**121**
Leptodiridae	5		1	3				10	21	1	9	3	**53**
Limnichidae			1				1	4		1		1	**8**
Lucanidae	1		3		1				2	2		3	**12**
Lyctidae						2	1				1		**4**
Melandryidae	5	7	9	12	15	10	8	1	43	18	12	12	**152**
Meloidae			1	1									**2**
Melyridae									5	2	1	1	**9**
Monotomidae	1	1	6	2					7	7	2	2	**28**
Mordellidae	14	7	27	22	17	22	13	5	33	82	99	165	**506**

APPENDIX 11C.4 Contd.

	2009–2010								2011–2012				
Family	**MW**	**CM**	**SC**	**PC**	**PW**	**FL**	**LR**	**LP**	**MW**	**CM**	**SC**	**PC**	**Family Total**
Mycetophagidae	5	5	11	8	17	27	22	5	11	18	8	10	**147**
Nitidulidae	14	14	26	39	41	109	90	1259	72	24	77	92	**1857**
Passandridae	23	5	25	29	18	5	9	4	22	16	27	16	**199**
Phalacridae	9	12	12	8	9	12	4	6	12	16	15	14	**129**
Phengodidae		6	1	1				1					**9**
Pselaphidae	4	9	8	9	5	11	3	8	5	16	12	7	**97**
Ptiliidae	1	3	3				1		10	43	15	4	**80**
Ptilodactylidae	13	2	28	67	21	74	6	8	47	61	29	22	**378**
Pyrochroidae		3	3	1		2		1	2		2	3	**17**
Rhipiceridae		1	3	1							3	2	**10**
Rhipiphoridae	2	1		1	1	1	1						**7**
Scarabaeidae	110	72	43	143	177	48	110	78	47	87	43	159	**1117**
Scirtidae		8	13	2	54		12	51	2	33	13	8	**196**
Scydmaenidae		2	3	1	1	1	1	3	1	4	1		**18**
Silphidae	233	29	156	451	86	22	12	29	172	5	37	63	**1295**
Silvanidae	2		1	1	5	5	8	3	11	9	5	9	**59**
Sphindidae	1	3	2	3	2	7	3	2	10	5	10	8	**56**
Staphylinidae	155	211	243	212	266	306	249	264	420	497	474	291	**3588**
Synchroidae	25	17	49	83	17	78	48	1	48	17	27	19	**429**
Tenebrionidae	16	19	5	23	54	23	25	10	35	22	21	9	**262**
Tetratomidae	17	7	9	6	1	37	69	99	219	74	16	29	**583**
Throscidae	3		11	3	2	3	4	16	6	14	31	1	**94**
Trogosittidae	7	18	13	17	12	5	10	2	37	25	40	29	**215**
Zopheridae	1	1	1	2	2	8	11	2	64	70	73	28	**263**
Site Total	**1543**	**1780**	**2098**	**2844**	**2954**	**2385**	**3613**	**3059**	**4558**	**5542**	**5477**	**3543**	**39396**

APPENDIX 11C.5 Occurence and abundance of bark beetle species at eight study sites from 2009–2010 and 2011–2012. MW = MacArthur Woods, CM = Cuba Marsh, SC = Spring Creek Valley, PC = Poplar Creek, PW = Pratt's Wayne Woods, FL = Fermilab, LR = Lake Renwick, and LP = Lockport Prairie.

Species		2009–2010								2011–2012				Species Total
		MW	CM	SC	PC	PW	FL	LR	LP	MW	CM	SC	PC	
Introduced Species	*Ambrosiodmus rubricollis*												2	**2**
	Ambrosiophilus atratus				6		2		2	6	1	7	36	**60**
	Cyclorhipidion bodoanum									65	21	6	2	**94**
	Cyclorhipidion pelliculosum											1		**1**
	Hylastinus obscurus			7			1	2				2		**12**
	Scolytus multistriatus	1	1	1		1					2	2		**8**
	Scolytus rugulosus				1		2							**3**
	Scolytus schevyrewi			2	5	1	2	4	2					**16**
	Tomicus piniperda	6	1		10		1			6		1		**25**
	Xyleborinus saxeseni	186	175	170	138	146	186	756	162	853	2056	737	411	**5976**
	Xylosandrus germanus	11	3	2	5	1	6	1	1	47	11	21	22	**131**
Native Species	*Anisandrus obesus*									2				**2**
	Anisandrus sayi	16	4	13	3				1	179	102	60	67	**445**
	Chramesus chapuisii	1								1				**2**
	Chramesus hicoriae										1			**1**
	Corthylus columbianus	6	6		1					10	4	5	2	**34**
	Corthylus punctatissimus	1	1		2					4	1	4	7	**20**
	Dendroctonus valens	2	1	1			1		1	1		1		**8**
	Dryocetes autographus	1									1			**2**
	Dryocoetes granicollis	1	2							6	11		1	**21**
	Gnathotrichus materiarius						1			4		4		**9**
	Hylesinus aculeatus		1	4		2	5			1	2	7	4	**26**
	Hylocurus binodatus										1			**1**
	Hylocurus rudis		2		1	1		2	1		3			**10**
	Hylocurus spadix	1												**1**
	Hypothenemus dissimilis	3		2				1		25	18	3	3	**55**
	Hypothenemus eruditis									3	5	3	2	**13**
	Hypothenemus interstitialis	5				1	3	1	1	40	1	3	4	**59**
	Hypothenemus rotundicollis									1				**1**
	Ips grandicollis	36	52	5	15	26	25	13	9	25	31	12	3	**252**
	Ips pini							1			2	1	1	**5**
	Lymantor decipiens	53	308	179	327	70	91	115	26	240	451	302	430	**2592**
	Micracis suturalis	1			1						1	1		**4**
	Monarthrum fasciatum								1					**1**
	Monarthrum mali	2	2	3		4		1		36	13	11	4	**76**
	Orthotomicus caelatus	3								2	4	7		**16**
	Phloeotribus dentifrons				1							1		**2**
	Phloeotribus liminaris		1	13	1	3	2			35	2	4	7	**68**
	Pityophthorus cariniceps				1									**1**
	Pityophthorus lautus	7	1	2	5	3	1	15		8	3	7	15	**67**
	Pityophthorus puberulus	1	2											**3**
	Pseudopityophthorus asperulus	2				1				2	1			**6**
	Pseudopityophthorus minutissimus	1		2	1		2			18	5	8		**37**
	Pseudothysanoes lecontei							1		1	3			**5**
	Scolytus muticus			2			3					9		**14**
	Xyleborus ferrugineus									1				**1**
	Xyleborus viduus										1			**1**
	Xyleborus xylographus			1					1	1		1		**4**
	Xyloterinus politus									1				**1**
Site Total		**347**	**563**	**409**	**524**	**260**	**334**	**913**	**208**	**1624**	**2758**	**1231**	**1023**	**10194**

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