



Graham Environmental Services, Inc.

GES

University of Iowa Biological Resources Report Hancher Site



Iowa City, Iowa

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University of Iowa Rare Plants Report

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Introduction

Project Purpose and Objectives

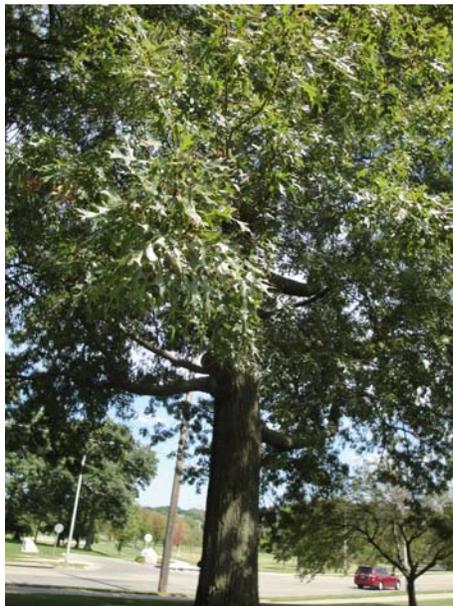
This report summarizes the results of an inventory and analysis of the biological resources of an area on the University of Iowa campus at Iowa City, Iowa. The biological resources survey was conducted on September 8th, 2011. This project was undertaken by Graham Environmental Services in partnership with Seneca to provide baseline ecological information for a University of Iowa construction project. This report accompanies other reports on wetland resources and rare plant species biological resources for the project area.

The primary objectives of project are:

- To identify key biological resource for the project area
- To summarize resource opportunities for the project area

Biologic Attributes covered in this report include:

- Landscape Ecology
- Rare Plants and Animals
- Plant Communities
- Plant and Animal Diversity
- Stormwater Management
- Invasive Species
- Environmental Education



Description of the Study Area

Biological Context



The area of study for this project is located on the University of Iowa campus in Iowa City. Historically, this landscape was dominated by open prairies and savannas, and woodlands bordering rivers and streams. Mesic prairie dominated most of the landscape but it also included dry prairie species from the plains to the east and tree and shrub species found in the deciduous forest to the east. Fire that was started by Native Americans or lightening was the primary factor keeping the prairie landscape open and un-forested. In many cases, Native Americans started fires to maintain ideal habitat for Bison, elk and deer. Other species that relied on the prairie habitat included badger, prairie chickens, a wide variety of songbirds and even wolves.

Following European settlement, farmsteads started establishing across the landscape, and the rich prairie soils were plowed for crop production. Wetlands were also drained and trees cut down for building, heating and to expand fields. This process of landscape conversion from natural habitats occurred over several decades. Today around 60% of the landscape is in annual crops. The populations of many wildlife species decreased due to a combination of over hunting and habitat loss.

Scattered woodlots, wetlands and conservations plantings are also part of the rural landscape around Iowa City. The planting of native vegetation along roadsides has been a focus in Iowa and these areas add to the biological diversity of the rural landscape. Through restoration and conservation efforts many wildlife species such as turkey, deer, bobcat, peregrine falcons and trumpeter swans are re-establishing in the state.

The current landscape of Iowa City is a combination of commercial, residential and industrial development. North and south of the city the Iowa River winds through the agricultural landscape

creating an important corridor of wildlife habitat. As the river winds through the city the corridor shrinks in size but widens where there are parks, steep slopes, or ravines leading down to the river.

Much of the city is dominated with mature street trees including many oaks. A wide variety of plant species have been planted on the University of Iowa campus and in private residences in the area, including both native plants and horticultural varieties.

Special Status Species

Lists of State and Federal Threatened, Endangered and Special Concern species have been developed for Iowa are available through the Iowa Natural Areas Inventory (INAI) Interactive Website. The information in the database is from a variety of sources, including surveys to locate rare plants and animals in their natural habitats, collection of information from museums, herbariums, and scientific literature, and observations from naturalists around the state. Over 8000 records are contained in the database, ranging from historical observations made in the 1800s to present day sightings. Records in the complete INAI Database are protected as "ecologically sensitive sites" within the Open Records Law (Iowa Code 22.7(21)) and are used by professional natural resource managers to identify opportunities for conservation, to improve natural resource management, and to conduct environmental reviews to avoid conflicts between development and listed species. (Iowa DNR)

The following are definitions for Endangered Species, Threatened Species and Special Concern Species from the Iowa Department of Natural Resources:

Endangered Species means any species of fish, plant life, or wildlife which is in danger of extinction throughout all or a significant part of its range. Protected by law.

Threatened Species means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Protected by law.

Special Concern means any species about which problems of status or distribution are suspected, but not documented. Not protected by the Iowa Threatened and Endangered Species law, but many animal species listed as Special Concern are protected under other state and federal laws addressing hunting, fishing, collecting, and harvesting.

The follow table is a summary of listed species for Johnson County Iowa where Iowa City and the project area is located. Appendix A of this report includes a complete list of endangered, threatened and special concern species for the entire state of Iowa.



Natural Areas Inventory

The Iowa Department of Natural Resources

JOHNSON County, IA

Summary by Species Report

Total Unique Listed Species In This County: 61

County	Common Name	Scientific Name	Class	State Status	Federal Status
JOHNSON	Bald Eagle	<i>Haliaeetus leucocephalus</i>	BIRDS	S	
JOHNSON	Barn Owl	<i>Tyto alba</i>	BIRDS	E	
JOHNSON	Northern Harrier	<i>Circus cyaneus</i>	BIRDS	E	
JOHNSON	Freckled Madtom	<i>Noturus nocturnus</i>	FISH	E	
JOHNSON	Orangethroat Darter	<i>Etheostoma spectabile</i>	FISH	T	
JOHNSON	Creeper	<i>Strophitus undulatus</i>	FRESHWATER MUSSELS	T	
JOHNSON	Fat Pocketbook	<i>Potamilus capax</i>	FRESHWATER MUSSELS		E
JOHNSON	Pistolgrip	<i>Tritogonia verrucosa</i>	FRESHWATER MUSSELS	E	
JOHNSON	Purple Wartyback	<i>Cyclonaias tuberculata</i>	FRESHWATER MUSSELS	T	
JOHNSON	Round Pigtoe	<i>Pleurobema sintoxia</i>	FRESHWATER MUSSELS	E	
JOHNSON	Sheepnose	<i>Plethobasus cyphus</i>	FRESHWATER MUSSELS	E	C
JOHNSON	Yellow Sandshell	<i>Lampsilis teres</i>	FRESHWATER MUSSELS	E	
JOHNSON	Byssus Skipper	<i>Problema byssus</i>	INSECTS	T	
JOHNSON	Purplish Copper	<i>Lycaena helloides</i>	INSECTS	S	
JOHNSON	Spotted Skunk	<i>Spilogale putorius</i>	MAMMALS	E	
JOHNSON	Cleft Phlox	<i>Phlox bifida</i>	PLANTS (DICOTS)	S	
JOHNSON	Cream Violet	<i>Viola striata</i>	PLANTS (DICOTS)	S	
JOHNSON	Earleaf Foxglove	<i>Tomanthera auriculata</i>	PLANTS (DICOTS)	S	
JOHNSON	Fineberry Hawthorn	<i>Crataegus chrysocarpa</i>	PLANTS (DICOTS)	S	
JOHNSON	Frost Grape	<i>Vitis vulpina</i>	PLANTS (DICOTS)	S	
JOHNSON	Hedge Nettle	<i>Stachys aspera</i>	PLANTS (DICOTS)	S	
JOHNSON	Hill's Thistle	<i>Cirsium hillii</i>	PLANTS (DICOTS)	S	
JOHNSON	Hortulan Plum	<i>Prunus hortulana</i>	PLANTS (DICOTS)	S	
JOHNSON	Humped Bladderwort	<i>Utricularia gibba</i>	PLANTS (DICOTS)	S	
JOHNSON	Lance-leaved Violet	<i>Viola lanceolata</i>	PLANTS (DICOTS)	S	
JOHNSON	Limestone Rockcress	<i>Arabis divaricarpa</i>	PLANTS (DICOTS)	S	
JOHNSON	Muskroot	<i>Adoxa moschatellina</i>	PLANTS (DICOTS)	S	
JOHNSON	Pearly Everlasting	<i>Anaphalis margaritacea</i>	PLANTS (DICOTS)	S	
JOHNSON	Pinesap	<i>Monotropa hypopithys</i>	PLANTS (DICOTS)	T	
JOHNSON	Pink Milkwort	<i>Polygala incarnata</i>	PLANTS (DICOTS)	T	
JOHNSON	Sage Willow	<i>Salix candida</i>	PLANTS (DICOTS)	S	

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JOHNSON	Saskatoon Service-berry	<i>Amelanchier alnifolia</i>	PLANTS (DICOTS)	S	
JOHNSON	Spring Avens	<i>Geum vernum</i>	PLANTS (DICOTS)	S	
JOHNSON	Toothcup	<i>Rotala ramosior</i>	PLANTS (DICOTS)	S	
JOHNSON	Water Shield	<i>Brasenia schreberi</i>	PLANTS (DICOTS)	S	
JOHNSON	Water Starwort	<i>Callitriche heterophylla</i>	PLANTS (DICOTS)	S	
JOHNSON	Woolly Milkweed	<i>Asclepias lanuginosa</i>	PLANTS (DICOTS)	T	
JOHNSON	Bur-reed	<i>Sparganium androcladum</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Capitate Spikerush	<i>Eleocharis olivacea</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Chapman Bluegrass	<i>Poa chapmaniana</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Eastern Prairie Fringed Orchid	<i>Platanthera leucophaea</i>	PLANTS (MONOCOTS)	E	T
JOHNSON	Glomerate Sedge	<i>Carex aggregata</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Green Adder's Mouth	<i>Malaxis unifolia</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Oval Ladies'-tresses	<i>Spiranthes ovalis</i>	PLANTS (MONOCOTS)	T	
JOHNSON	Pale Green Orchid	<i>Platanthera flava</i>	PLANTS (MONOCOTS)	E	
JOHNSON	Showy Lady's Slipper	<i>Cypripedium reginae</i>	PLANTS (MONOCOTS)	T	
JOHNSON	Slender Fimbrly	<i>Fimbristylis autumnalis</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Slender Ladies'-tresses	<i>Spiranthes lacera</i>	PLANTS (MONOCOTS)	T	
JOHNSON	Slim-leaved Panic Grass	<i>Dichanthelium linearifolium</i>	PLANTS (MONOCOTS)	T	
JOHNSON	Tall Cotton Grass	<i>Eriophorum angustifolium</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Wolf Spike-rush	<i>Eleocharis wolfii</i>	PLANTS (MONOCOTS)	S	
JOHNSON	Crowfoot Clubmoss	<i>Lycopodium digitatum</i>	PLANTS (PTERIODOPHYTES)	S	
JOHNSON	Ground Pine	<i>Lycopodium clavatum</i>	PLANTS (PTERIODOPHYTES)	E	
JOHNSON	Limestone Oak Fern	<i>Gymnocarpium robertianum</i>	PLANTS (PTERIODOPHYTES)	S	
JOHNSON	Northern Adder's-tongue	<i>Ophioglossum pusillum</i>	PLANTS (PTERIODOPHYTES)	S	
JOHNSON	Oak Fern	<i>Gymnocarpium dryopteris</i>	PLANTS (PTERIODOPHYTES)	T	
JOHNSON	Blanding's Turtle	<i>Emydoidea blandingii</i>	REPTILES	T	
JOHNSON	Common Musk Turtle	<i>Sternotherus odoratus</i>	REPTILES	T	
JOHNSON	Massasauga Rattlesnake	<i>Sistrurus catenatus</i>	REPTILES	E	
JOHNSON	Ornate Box Turtle	<i>Terrapene ornata</i>	REPTILES	T	
JOHNSON	Smooth Green Snake	<i>Liochlorophis vernalis</i>	REPTILES	S	

Key: Threatened (T), Endangered (E), Special Concern (S), Candidate for Listing (C)

Hancher Site

The Hancher site is outlined in red dashes in the diagram below and also includes areas labeled “Potential Go Well Field, Area A and B”.

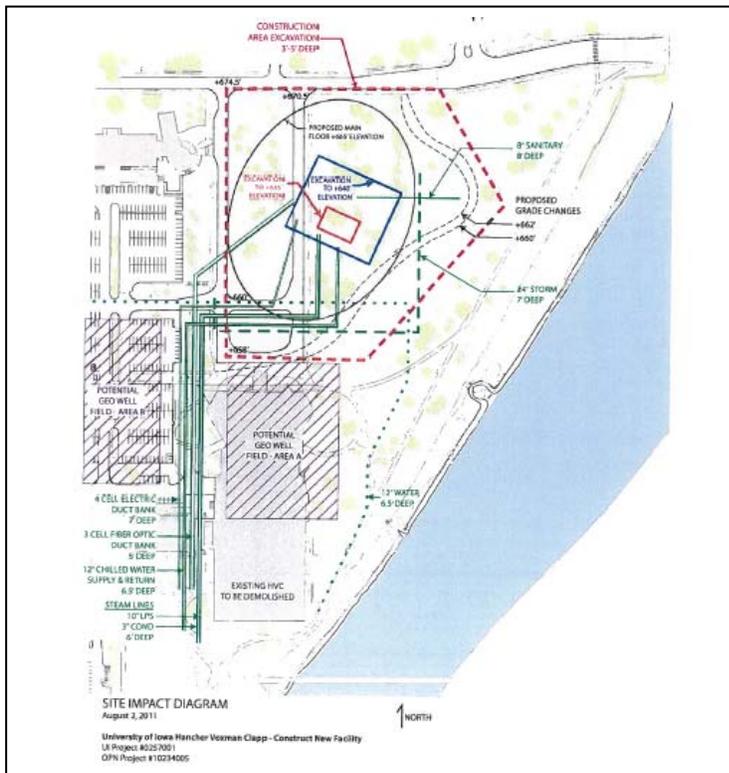
The Hancher site consists of buildings, parking lots and lawn areas with scattered plantings of trees and shrubs. A high diversity of tree species (12 species) were found at the site. Some of the more mature tree species include white pine, red oak, bur oak, Scotch Pine, and Blue Spruce. Some crabapple trees were planted in separate mulch beds though many of these trees were in poor condition. The lawn is dominated by typical lawn grasses and lawn weeds. A long swale runs through the lawn area; this swale likely aids stormwater infiltration and filtering as water flows toward the Iowa River. No invasive species were observed during the survey.



Swale running through the lawn area of the Hancher site

The Hancher site is located near the Iowa river, through the river is not part of the project area. The buffer along the river is dominated by reed canary grass and other weed species. A few native willows and vervain are growing amongst the reed canary grass but are widely dispersed.

No State or Federally listed plant species were found at the Hancher site.



The Hancher site is located south of East Park Rd. and east of North Riverside Drive

Overview of Methods

Planning and Pre-Survey Data Collection

Prior to the survey aerial images were studied to determine locations of plant communities, where State and Federally listed species would most likely be found at each site as well as other biological attributes. Information was also collected about historical land use, as well as information about rare and declining species in the project area. This included species that have been documented in the County, as well as species that are State or Federally listed statewide. Information was also collected about key taxonomical differences between rare plant species that could be found at the project site, and more common species within similar genus. Examples are the *Poa* and *Vitis* genus that include both State listed species and species that are common in the landscape.

Field Surveys

Upon visiting the site an analysis of the site boundaries and dominant plant communities was conducted, as well as an analysis of likely areas of listed species. This was followed by a detailed meander search of the project site to develop a complete list of species found, and to search for any species that were State or Federally listed. A complete list of all species found was developed to ensure that listed species in the same genus as common species (not listed species) could be differentiated. Any species that could not be positively identified in the field were photographed. Leaf samples were collected for trees, shrubs and vines and for herbaceous species if large populations were present. Notes were also taken during the field surveys about key biological attributes at the site.

Summary of Observations and Resource Opportunities

Landscape Ecology

Observations: The site is located near the Iowa River, but generally, has little habitat or natural hydrologic connection to the river due to the nature of the developed landscape and lack of naturally vegetated corridors and waterways.

Opportunities: Future construction efforts may allow for plantings that can reconnect the river with other natural features in the landscape such as a long swale running through the lawn area, and develop stormwater treatment systems that can treat and infiltrate water before it reaches the river.

Rare Plants and Animals

Observations: Due to the urban landscape of the project sites no State or Federally listed plant species were found in the project sites. It is unlikely that any listed bird or animal species would be found at the site as it contained not natural plant communities.

Opportunities: The shoreline along the river has significant potential for restoration to improve its value for local and migrating birds and animals.

Plant Communities

Observations: No natural plant communities were found at the project site. There were many mature deciduous and coniferous species in the lawn area.

Opportunities: Native plantings could help improve wildlife habitat and connection with the river.

Plant and Animal Diversity

Observations: The Hancher site was dominated by lawn with interspersed tree and shrub plantings. Many trees at the Hancher site were large and likely provide habitat and stormwater absorption functions.

Opportunities: Efforts to increase diversity as part of new construction efforts will help increase plant and animal diversity at the Hancher site.

Stormwater Management

Observations: Stormwater flowing over impervious surfaces at the project site currently flows into stormwater inlets and is directed to the Iowa River which eventually makes its way to the Mississippi

River. Some areas on the project sites such as lawns with swales help slow stormwater so it can be infiltrated and filtered before reaching the river.

Opportunities: New construction efforts provide opportunities to incorporate stormwater basins, treatment swales, raingardens and other stormwater BMPs to improve infiltration and treatment. Such stormwater features can also increase plant diversity and wildlife habitat

Invasive Species

Observations: No invasive species were found at the Hancher site. Many weed species were found in the large lawn area.

Opportunities: Conversion of lawn to other planting types would help decrease the dominance of weed species.

Environmental Educational

Observations: The proximity of the study area to the Iowa River allows for several educational opportunities for students.

Opportunities: The shoreline of the river is degraded and its restoration to native vegetation would help improve water quality and provide an educational resource for University of Iowa students. Stormwater treatment areas as part of new developments would also allow students to learn about innovative methods to improve water quality.

Glossary of Terms Used in This Report

Diversity - The spectrum of life forms and the ecological processes that support and sustain them. Biological diversity is a complex of four interacting levels: genetic, species, community, and ecosystem. ((Matthiae et al., 1993)

Fragmentation – the breaking up of large and continuous ecosystems, communities, and habitats into smaller discontinuous areas that are surrounded by altered or disturbed lands or aquatic features.

Inventory site - The geographic location at which a biological survey has been conducted.

Natural community - an assemblage of plants and animals, in a particular place at a particular time, interacting with one another and the abiotic environment around them, and subject to primarily natural disturbance regimes. Those assemblages that are repeated across a landscape in an observable pattern constitute a community “type.” No two assemblages, however, are exactly alike.

References

Iowa Natural Areas Inventory (INAI) Interactive Website

<http://www.iowadnr.gov/Environment/ThreatenedEndangered/NaturalAreasInventory.aspx>

Iowa’s Fragile Flora

<http://www.cgrer.uiowa.edu/herbarium/FragFloraIntro.htm>

USDA, NRCS. 2011. The PLANTS Database (<http://plants.usda.gov>, 11 September 2011). National Plant Data Team, Greensboro, NC 27401-4901 USA.



Appendix A

Endangered, Threatened, and Special Concern Plants and Animals and Native Natural Communities in Iowa County

State Status: THR - Threatened, END - Endangered, SC - Special Concern, SC/P - Fully protected, SC/N - No protection, SC/H - Take regulated by open/closed seasons, SC/FL - Federally protected as endangered or threatened, SC/M - Protected by Migratory Bird Act.
 Federal Status (in Wisconsin): LE - Listed as Endangered, LT - Listed as Threatened, C - Candidate for listing.
 Groupname: A - indicates an aquatic/wetland element

Animals

Scientific Name	Common Name	State Status	Federal Status	Groupname
<i>Acipenser fulvescens</i>	Lake Sturgeon	SC/H		Fish~
<i>Acris crepitans</i>	Northern Cricket Frog	END		Frog~
<i>Aeropedellus clavatus</i>	Club-horned Grasshopper	SC/N		Grasshopper
<i>Aflexia rubranura</i>	Red-tailed Prairie Leafhopper	END		Leafhopper
<i>Alasmidonta marginata</i>	Elktoe	SC/P		Mussel~
<i>Ammocrypta clara</i>	Western Sand Darter	SC/N		Fish~
<i>Ammodramus henslowii</i>	Henslow's Sparrow	THR		Bird
<i>Amplicephalus kansiensis</i>	A Leafhopper	SC/N		Leafhopper
<i>Anguilla rostrata</i>	American Eel	SC/N		Fish~
<i>Anodonta suborbiculata</i>	Flat Floater	SC/P		Mussel~
<i>Apalone mutica</i>	Smooth Softshell	SC/H		Turtle~
<i>Aphredoderus sayanus</i>	Pirate Perch	SC/N		Fish~
<i>Arcidens confragosus</i>	Rock Pocketbook	THR		Mussel~
<i>Attenuipyga vanduzeei</i>	A Leafhopper	SC/N		Leafhopper
<i>Bartramia longicauda</i>	Upland Sandpiper	SC/M		Bird
<i>Bat Hibernaculum</i>	Bat Hibernaculum	SC		Other
<i>Bird Rookery</i>	Bird Rookery	SC		Other~
<i>Buteo lineatus</i>	Red-shouldered Hawk	THR		Bird~
<i>Caenis hiliaris</i>	A Small Square-gilled Mayfly	SC/N		Mayfly~
<i>Cercobrachys fox</i>	Fox Small Square-gilled Mayfly	SC/N		Mayfly~
<i>Chlosyne gorgone</i>	Gorgone Checker Spot	SC/N		Butterfly
<i>Chondestes grammacus</i>	Lark Sparrow	SC/M		Bird
<i>Cicindela lepida</i>	Little White Tiger Beetle	SC/N		Beetle
<i>Crotalus horridus</i>	Timber Rattlesnake	SC/P		Snake
<i>Crystallaria asprella</i>	Crystal Darter	END		Fish~
<i>Cycleptus elongatus</i>	Blue Sucker	THR		Fish~
<i>Dendroica cerulea</i>	Cerulean Warbler	THR		Bird
<i>Dendroica dominica</i>	Yellow-throated Warbler	END		Bird
<i>Ellipsaria lineolata</i>	Butterfly	END		Mussel~
<i>Empidonax virescens</i>	Acadian Flycatcher	THR		Bird
<i>Emydoidea blandingii</i>	Blanding's Turtle	THR		Turtle~
<i>Epiaeschna heros</i>	Swamp Darner	SC/N		Dragonfly~
<i>Erismyza sugetta</i>	Lake Chubsucker	SC/N		Fish~
<i>Etheostoma asprigene</i>	Mud Darter	SC/N		Fish~
<i>Etheostoma microperca</i>	Least Darter	SC/N		Fish~
<i>Fundulus dispar</i>	Starhead Topminnow	END		Fish~
<i>Fusconaia ebena</i>	Ebony Shell	END		Mussel~
<i>Glyptemys insculpta</i>	Wood Turtle	THR		Turtle~
<i>Graptemys pseudogeographica</i>	False Map Turtle	SC/H		Turtle~
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SC/P		Bird~
<i>Hendersonia occulta</i>	Cherrystone Drop	THR		Snail
<i>Herp Hibernaculum</i>	Herp Hibernaculum	SC		Other
<i>Hiodon alosoides</i>	Goldeye	END		Fish~
<i>Ictiobus niger</i>	Black Buffalo	THR		Fish~
<i>Ixobrychus exilis</i>	Least Bittern	SC/M		Bird~
<i>Laccobius reflexipennis</i>	A Predaceous Diving Beetle	SC/N		Beetle~
<i>Lampsilis higginsii</i>	Higgins' Eye	END	LE	Mussel~
<i>Lampsilis teres</i>	Yellow & Slough Sandshells	END		Mussel~

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Lanius ludovicianus	Loggerhead Shrike	END		Bird
Lioporeus triangularis	A Predaceous Diving Beetle	SC/N		Beetle-
Lithobates palustris	Pickerel Frog	SC/H		Frog-
Macrhybopsis aestivalis	Shoal Chub	THR		Fish-
Macrhybopsis storeriana	Silver Chub	SC/N		Fish-
Microtus ochrogaster	Prairie Vole	SC/N		Mammal
Migratory Bird Concentration	Site Migratory Bird Concentration Site	SC		Other
Moxostoma valenciennesi	Greater Redhorse	THR		Fish-
Mussel Bed Mussel	Bed	SC		Other-
Myotis septentrionalis	Northern Long-eared Bat	THR		Mammal
Notropis nubilis	Ozark Minnow	THR		Fish-
Notropis texanus	Weed Shiner	SC/N		Fish-
Noturus exilis	Slender Madtom	END		Fish-
Oporornis formosus	Kentucky Warbler	THR		Bird
Opsopoeodus emiliae	Pugnose Minnow	SC/N		Fish-
Pantherophis spiloides	Gray Ratsnake	SC/P		Snake
Pentagenia vittigera	A Common Burrower Mayfly	SC/N		Mayfly-
Perimyotis subflavus	Eastern Pipistrelle	THR		Mammal
Pituophis catenifer	Gophersnake	SC/P		Snake
Plethobasus cyphus	Bullhead	END	C	Mussel-
Polyamia dilata	Prairie Leafhopper	THR		Leafhopper
Polyodon spathula Paddlefish	THR Fish-			
Protonotaria citrea	Prothonotary Warbler	SC/M		Bird-
Quadrula metanevra	Monkeyface	THR		Mussel-
Quadrula quadrula	Mapleleaf	SC/P		Mussel-
Reithrodontomys megalotis	Western Harvest Mouse	SC/N		Mammal
Simpsoniaias ambigua	Salamander Mussel	THR		Mussel-
Somatochlora hineana	Hine's Emerald	END	LE	Dragonfly-
Sparbarus nasutus	A Small Square-gilled Mayfly	SC/N		Mayfly-
Speyeria idalia	Regal Fritillary	END		Butterfly
Spinadis simplex	Wallace's Deepwater Mayfly	END		Mayfly-
Stenelmis douglasensis	Douglas Stenelmis Riffle Beetle	SC/N		Beetle-
Stenelmis knobeli Knobel's	Riffle Beetle	END		Beetle-
Sturnella neglecta	Western Meadowlark	SC/M		Bird
Terrapene ornata	Ornate Box Turtle	END		Turtle
Tritogonia verrucosa	Buckhorn	THR		Mussel-
Truncilla donaciformis	Fawnsfoot	SC/P		Mussel-
Tyto alba	Barn Owl	END		Bird
Vireo bellii	Bell's Vireo	THR		Bird
Wilsonia citrina	Hooded Warbler	THR		Bird

Plants

Scientific Name	Common Name	State	Status	Federal Status	Groupname
Agalinis gattereri	Roundstem Foxglove		THR		Plant
Agalinis skinneriana	Pale False Foxglove		END		Plant
Arabis shortii Short's	Rock-cress		SC		Plant
Asclepias lanuginosa	Woolly Milkweed		THR		Plant
Asclepias purpurascens	Purple Milkweed		END		Plant
Asplenium pinnatifidum	Lobed Spleenwort		THR		Plant
Botrychium campestre	Prairie Dunewort		END		Plant
Cacalia tuberosa Prairie	Indian-Plantain		THR		Plant
Calamagrostis stricta	Slim-stem Small Reed Grass		SC		Plant-
Callirhoe triangulata	Clustered Poppy-mallow		SC		Plant
Calylophus serrulatus	Yellow Evening Primrose		SC		Plant
Camassia scilloides	Wild Hyacinth		END		Plant
Carex laevivaginata	Smooth-sheath Sedge		END		Plant-
Carex schweinitzii	Schweinitz's Sedge		END		Plant-
Cirsium hillii	Hill's Thistle		THR		Plant
Cypripedium candidum	Small White Lady's-slipper		THR		Plant-
Diarrhena obovata	Beak Grass		END		Plant
Dichanthelium wilcoxianum	Wilcox's Panic Grass		SC		Plant
Diodia teres var. teres	Buttonweed		SC		Plant
Eleocharis engelmannii	Engelmann's Spike-rush		SC		Plant-
Festuca paradoxa	Cluster Fescue		SC		Plant
Gentiana alba	Yellow Gentian		THR		Plant
Jeffersonia diphylla	Twinleaf		SC		Plant

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<i>Juncus marginatus</i>	Grassleaf Rush	SC		Plant-
<i>Lespedeza leptostachya</i>	Prairie Bush-clover	END	LT	Plant
<i>Lespedeza violacea</i>	Violet Bush-clover	SC		Plant
<i>Melica nitens</i>	Three-flowered Melic Grass	SC		Plant
<i>Myosotis laxa</i>	Small Forget-me-not	SC		Plant-
<i>Nothocalais cuspidata</i>	Prairie False-dandelion	SC		Plant
<i>Orobanche fasciculata</i>	Clustered Broomrape	THR		Plant
<i>Orobanche uniflora</i>	One-flowered Broomrape	SC		Plant
<i>Parthenium integrifolium</i>	American Fever-few	THR		Plant
<i>Pediomelum esculentum</i>	Prairie Turnip	SC		Plant
<i>Phemeranthus rugospermus</i>	Prairie Fame-flower	SC		Plant
<i>Platanthera flava</i> var. <i>herbiola</i>	Pale Green Orchid	THR		Plant
<i>Platanthera hookeri</i>	Hooker's Orchid	SC		Plant
<i>Platanus occidentalis</i>	Sycamore	SC		Plant-
<i>Poa sylvestris</i>	Woodland Bluegrass	SC		Plant
<i>Polygala incarnata</i>	Pink Milkwort	END		Plant-
<i>Polytaenia nuttallii</i>	Prairie Parsley	THR		Plant
<i>Prenanthes crepidinea</i>	Nodding Rattlesnake-root	END		Plant
<i>Rhexia virginica</i>	Virginia Meadow-beauty	SC		Plant-
<i>Scleria triglomerata</i>	Whip Nutrush	SC		Plant-
<i>Scutellaria ovata</i> ssp. <i>ovata</i>	Heart-leaved Skullcap	SC		Plant
<i>Senecio plattensis</i>	Prairie Ragwort	SC		Plant
<i>Senna marilandica</i>	Maryland Senna	SC		Plant
<i>Silene nivea</i>	Snowy Campion	THR		Plant
<i>Silene virginica</i>	Fire Pink	END		Plant
<i>Strophostyles leiosperma</i>	Small-flowered Woolly Bean	SC		Plant
<i>Triphora trianthophora</i>	Nodding Pogonia	SC		Plant

Communities

Dry cliff Community
 Dry prairie Community
 Dry-mesic prairie Community
 Emergent marsh Community-
 Ephemeral pond Community-
 Floodplain forest Community-
 Hemlock relict Community
 Mesic prairie Community
 Moist cliff Community
 Oak barrens Community
 Oak opening Community
 Pine barrens Community
 Pine relict Community
 Riverine Lake/Pond Community-
 Sand barrens Community
 Sand prairie Community
 Shrub-carr Community-
 Southern dry-mesic forest Community
 Southern mesic forest Community
 Southern sedge meadow Community-
 Stream--fast, hard, cold Community-
 Wet-mesic prairie Community-

Appendix B

Species Lists for the Project Site

Hancher Site Species List		
Scientific Name	Common Name	Percent Cover
Acer saccharinum	Silver maple	<1
Celtis occidentalis	Hackberry	<1
Cyperus esculentus	Yellow nutsedge	<1
Elymus repens	Quackgrass	<1
Fraxinus pennsylvanica	Green ash	<1
Glechoma hederaceae	Creeping charlie	<1
Malus sp.	Crabapple variety	1-5
Malva neglecta	Common mallow	<1
Picea pungens	Blue spruce	<1
Pinus nigra	Austrian Pine	<1
Pinus strobes	White pine	1-5
Pinus sylvestris	Scots pine	1-5
Plantago major	Common plantain	<1
Poa pratensis	Kentucky bluegrass	75-100
Polygonum convolvulus	Black bindweed	<1
Populus deltoids	Cottonwood	<1
Portulaca oleracea	Little hogweed	<1
Quercus bicolor	Swamp white oak	<1
Quercus ellipsoidalis	Northern pin oak	<1
Quercus rubra	Red oak	<1
Setaria pumila	Yellow foxtail	<1
Taraxacum officinale	Common dandelion	<1
Trifolium repens	White clover	<1
Tsuga Canadensis	Hemlock	<1
Viola sororia	Common blue violet	<1