APPENDIX C:

Section 2: University of Iowa Biological Resources Report – Art School Site

Graham Environmental Services, Inc.
GES

University of Iowa Biological Resources Report
Art School Site

Iowa City, Iowa

Prepared for: Seneca
September 12, 2011

GES Project No. 2011.024

University of Iowa Rare Plants Report

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Table of Contents

Introduction **2**
Project Purpose and Objectives 2
Description of the Study Area. **3**
Biological Context 3
Special Status Species 4
Study Locations 7
Overview of Methods **9**
Planning and Pre-Survey Data 9
Field Surveys 9
Summary of Observations and Resource Opportunities **10**
Glossary of Terms Used in This Report **12**
References **12**
Appendix A
Endangered, Threatened, and Special Concern Plants and Animals and Native Natural Communities Iowa 13
Appendix B
Species Lists for Project Sites 16

Introduction

Project Purpose and Objectives

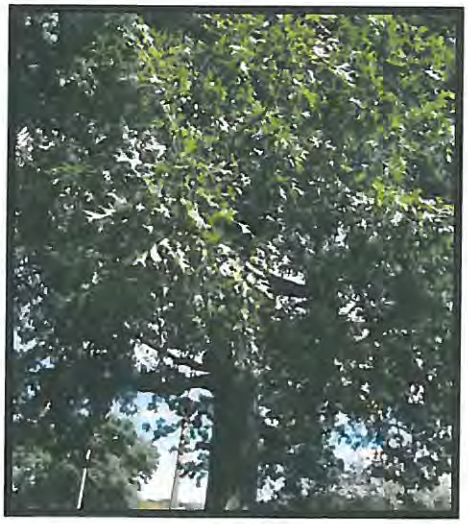
This report summarized the results of an inventory and analysis of the biological resources of an area on the University of Iowa campus at Iowa City, Iowa. The biological resources survey was conducted on September 8th, 2011. This project was undertaken by Graham Environmental Services in partnership 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.

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University of Iowa Rare Plants Report
9-12-11

Natural Areas Inventory The Iowa Department of Natural Resources

JOHNSON County, IA

Summary by Species Report
Total Unique Listed Species In This County: 61

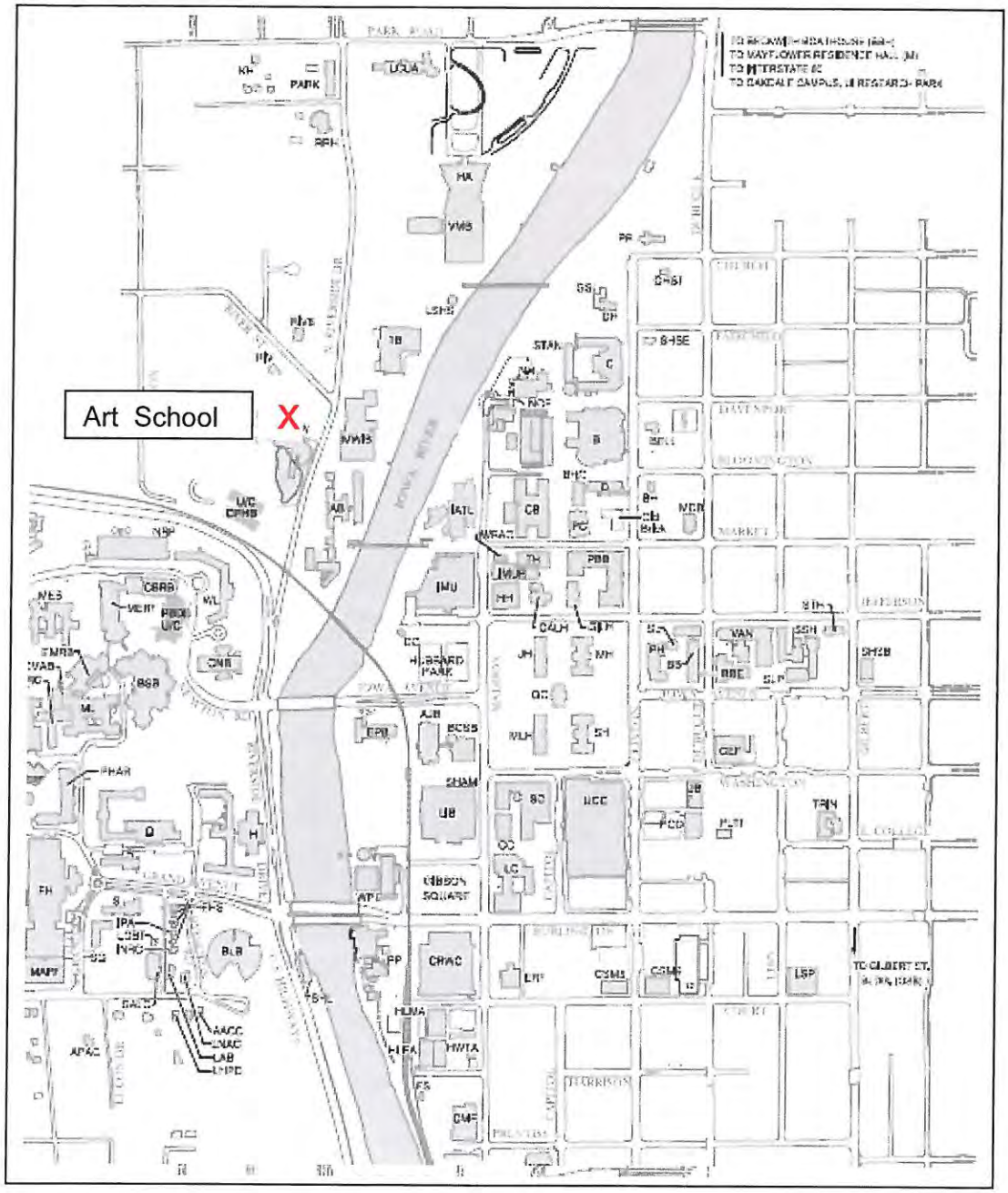
County	Common Name	Scientific Name	Class	State Status	Federal Status
JOHNSON	Bald Eagle	Haliaeetus leucocephalus	BIRDS	S	
JOHNSON	Barn Owl	Tyto alba	BIRDS	E	
JOHNSON	Northern Harrier	Circus cyaneus	BIRDS	E	
JOHNSON	Freckled Madtom	Noturus nocturnus	FISH	E	
JOHNSON	Orangethroat Darter	Etheostoma spectabile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

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

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

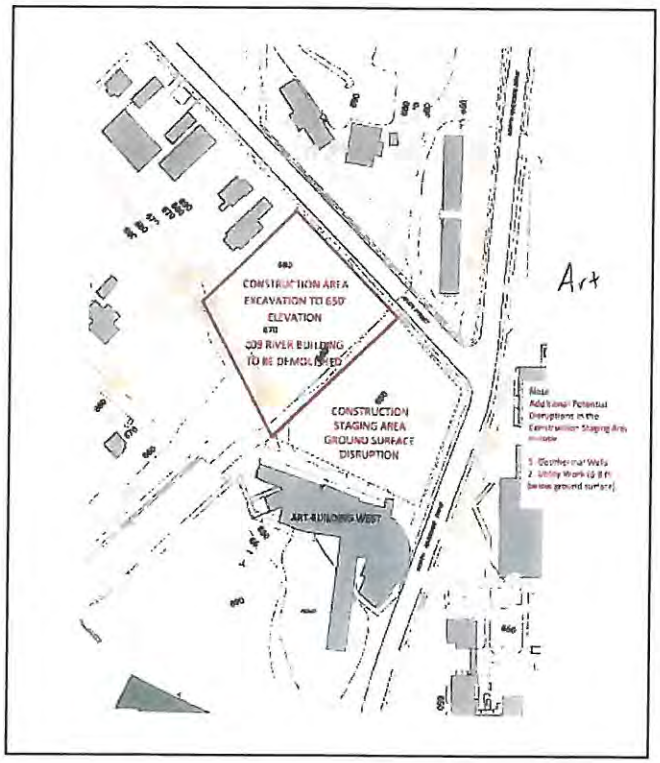
Study Locations

The location of the study are on the University of Iowa campus is shown on the map below, including its proximity to the Iowa River.



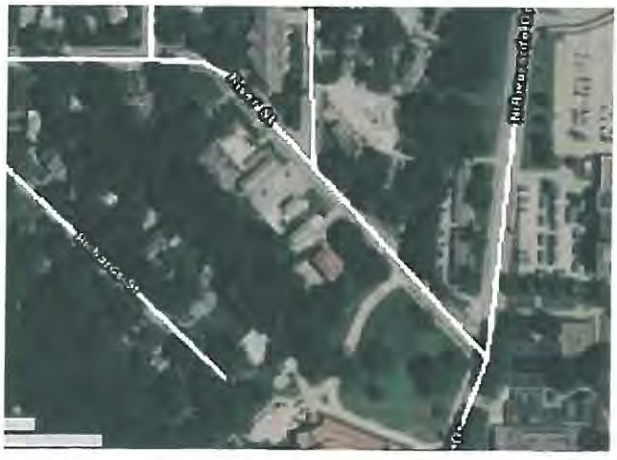
The Art School Site

The Art School is outlined in red in the diagram to the right. The solid red line shows the proposed construction area, and the red dashed line shows the proposed construction staging areas.



The art school site consists of an area in lawn and a wooded area to the west that is bordered by apartments and private residences. A swale that originates in a residential area two city blocks further west ends in the small wooded area. A small wetland dominated with species such as jewel weed, boxelder and wood nettle is found within the project site at the base of the ravine where water collects after large storm events. The ravine likely provides an important corridor for wildlife species. The wooded areas of the Art School site was the most diverse area studied for this project consisting of 49 species. A high percentage of species present are native species, but several invasive species such as Tartarian honeysuckle, garlic mustard and giant knotweed were also present.

The lawn area consisted of a combination of typical lawn grasses and common lawn weeds such as common plantain, dandelion and crabgrass. Several large trees were located in the lawn area that likely aid stormwater absorption and evapotranspiration. It is recommended that areas around the dripline of these trees be protected during construction staging. No state or Federal listed species were found at the Art School Site.



The art School site is located south of the intersection of North Riverside Dr. and River St.

Lawn area at the Art School site

Overview of Methods

Planning and Pre-Survey Data Collection

Prior to the survey aerial images were studies to determine locations of plant communities, where State and Federally listed species would most likely be found at the 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 of the site.

Summary of Observations and Resource Opportunities

Landscape Ecology

Observations: The site is located about one block from the Iowa River. It is also at the east end of a natural ravine that runs to the west. The site has little hydrologic or habitat connection to the river as a University building and road are located between the site and the river.

Opportunities: The connection between the site and the river could be strengthened by planting additional trees and native plantings within the site and by developing stormwater treatment systems that can filter and infiltrate water before it reaches the river.

Rare Plants and Animals

Observations: Due to the urban landscape of the project site no State or Federal listed plant species were found. It is unlikely that any listed bird or animal species would use the site as a large portion of the site was in lawn and the wooded area was relatively small (under one acre). It is possible that listed bird species could be found at the site during spring or fall migration as they follow the river north or south and stop for feeding and roosting.

Opportunities: The shoreline along the river has significant potential for restoration to improve its value for local and migrating birds and animals. The vegetated buffer of the river is relatively wide north of the city, but is narrow along the stretch near the project site.

Plant Communities

Observations: Few natural plant communities were found at the project sites, the wooded ravine (including the small wooded area) at the site consisted of mixed deciduous forest on the upper slopes and lowland hardwood forest (including a small forested wetland area) at the base of the ravine.

Opportunities: Plant communities at the Art school ravine could be enhanced to improve wildlife use through the removal of invasive species (honeysuckle, knotweed, garlic mustard etc.)

Plant and Animal Diversity

Observations: The Art School site also consisted of a large lawn area but contained the small wooded area and ravine base with 49 plant species (27 native species). It is likely that a large number of bird and animal species use this area and the adjoining ravine for nesting, rest, and as a food source.

Opportunities: Efforts to remove invasive species as well as increase diversity as part of new construction efforts will help increase plant and animal diversity at the project 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, eventually making its way to the Mississippi River. Some areas on the project sites such as the lawn and the ravine at the Art School site help slow stormwater so it can be infiltrated and filtered before reaching the river.

Opportunities: Future construction projects will provide opportunities to incorporate stormater 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 – Seven species at the Art school site are considered invasive in Iowa (Garlic mustard, Dames Rocket, Amur honeysuckle, Tartarian honeysuckle, and Giant Knotweed). The commonly planted horticultural species, Norway Maple and Japanese Maple can also be invasive in Iowa.

Opportunities - Removal of the invasive species at the Art School site would aid the spread of native species and prevent invasive species from spreading to other nearby wooded areas.

Environmental Educational

Observations: The proximity of the study areas 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.

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

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 nubilus	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 cyphyus	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
Simpsonaias 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 gattingeri	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

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

Art Building Site Species List		
Scientific Name	**Common Name**	**Percent Cover**
Acer negundo	Boxelder	1-5
Acer platanoides	Norway maple	<1
Ageratina altissima	White snakeroot	<1
Alliaria petiolata	Garlic mustard	<1
Arctium minus	Lesser burdock	<1
Arisaema triphyllum	Jack in the pulpit	<1
Berberis thunbergii	Japanese barberry	<1
Celtis occidentalis	Common hackberry	1-5
Chenopodium album	Lambsquarters	<1
Cyperus esculentus	Yellow nut sedge	<1
Digitaria ischaemum	Smooth crabgrass	1-5
Digitaria sanguinalis	Hairy crabgrass	<1
Euonymus alatus	Burning bush	<1
Eupatoriadelphus maculatus	Spotted Joe pye weed	<1
Fraxinus pennsylvanica	Green ash	1-5
Glechoma hederaceae	Creeping Charlie	<1
Gleditsia triacanthos	Honeylocust	1-5
Hackelia virginiana	Beggarslice	<1
Hemerocallis sp.	Daylily cultivar	<1
Hesperis matronalis	Dames Rocket	<1
Impatiens pallid	Pale touch-me-not	1-5
Juglans nigra	Black walnut	1-5
Lactuca Canadensis	Canada lettuce	<1
Laportea Canadensis	Canadian wood nettle	1-5
Leersia virginica	Whitegrass	<1
Lolium perenne ssp. Multiflorum	Italian ryegrass	<1
Lonicera mackii	Amur honeysuckle	<1
Lonicera tatarica	Tartarian honeysuckle	<1
Osmorhiza claytoni	Clayton's sweetroot	<1
Oxalis stricta	Common yellow oxalis	<1
Parthenocissus quinquefolia	Virginia creeper	<1
Phytolacca americana	American pokeweed	<1
Pilea pumila	Canadian clearweed	<1
Pinus nigra	Austrian pine	<1

Plantago major	Common plantain	<1
Poa pratensis	Kentucky bluegrass	75-100
Polygonatum biflorum	Smooth Solomon's seal	<1
Polygonum cuspidatum	Giant knotweed	1-5
Portulaca oleracea	Little hogweed	<1
Prunus serotina	Black cherry	<1
Quercus alba	White oak	1-5
Quercus macrocarpa	Bur oak	1-5
Ribes missouriensis	Missouri gooseberry	<1
Rumex crispus	Curly dock	<1
Setaria pumila	Yellow foxtail	<1
Smilax rotundifolia	Roundleaf greenbriar	<1
Solidago Canadensis	Canada goldenrod	<1
Sonchus arvensis	Field sowthistle	<1
Symphyotrichum pilosum	Hairy white oldfield aster	<1
Syringa vulgaris	Common lilac	<1
Taraxacum officinale	Common dandelion	<1
Toxicodendron radicans	Poison ivy	<1
Ulmus rubra	Red Elm	<1
Viburnum opulus	European cranberrybush	<1
Vinca minor	Common periwinkle	<1
Viola sororia	Common blue violet	<1
Vitis Riparia	Riverbank grape	<1