

OFFICE OF RESOURCE CONSERVATION

State of Illinois

Grant Proposal

PROJECT NUMBER:

PROJECT TITLE: Wapello Land & Water Reserve Habitat Restoration Project.

PURPOSE: The purpose of the Wapello Land & Water Reserve Habitat Restoration Project is to create 63 acres of significant natural area quality short grass mesic prairie on former cropland and enhance adjacent 12 acres of upland forest in order to protect mussel beds and threatened and endangered mussel species of 4 acres along the Apple River, enhance native perennial wildlife habitat for grassland bird species of concern, and also preserve a significant archaeological site. The project will also serve as a public recreation area that will help improve the economy of southwest Jo Daviess County.

NEED: The state of Illinois, after determining that this property is critical to permanently protect from development, registered it as Wapello Land & Water Reserve (WLWR) in February 2006 through the Illinois Nature Preserves Commission (INPC). The reserve was established, according to INPC, to “preserve, protect, and perpetuate natural communities and provide habitat for endangered and threatened species which are found within or utilize this reserve and provide permanent protection for the archaeological resources” (Moorehouse & Anderson 2006). This is very significant in the fact that this is the first IPNC project in the State of Illinois that permanently protects both natural and cultural resources.

This project is necessary because, without it, the natural and cultural resources cannot be adequately protected and enhanced. Currently, 80% of the land is in row crops and 20% is forested. This project is needed to restore the row crop land into prairie and manage the previously unmanaged forest land in order to:

1. Prevent further erosion and runoff into the Apple River which jeopardizes the state listed mussel species that the WLWR was established to protect.
2. Provide habitat for grassland birds in the greatest need for conservation, which currently does not exist on this land.
3. Prevent degradation of the land above the archaeological remains which threatens preservation of those remains and provide appropriate cover that helps prevent looting. The site is incredibly vulnerable to illegal site collecting and looting until a permanent cover crop can be established.

It is important that these actions take place on this particular site because of its highly strategic location between two of the main Conservation Opportunity Areas identified in

the Wisconsin Driftless natural division of the Illinois Wildlife Action Plan (Illinois Wildlife Action Plan, 2005, Section IV. Natural Division Assessment O. The Wisconsin Driftless Natural Division p. 245) as well as being one property away from the 1,000+ acres of protected land collectively known as the Hanover Bluff Management Area (Bacon 2004, Cagnoni 1997), which, in turn, is adjacent to the 9,857 acre Lost Mound Unit of the Upper Mississippi River Fish & Wildlife Refuge (Illinois Wildlife Action Plan, 2005, Section IV. Natural Division Assessment C. Illinois River and Mississippi River Sand Areas Natural Division p. 141; L. Upper Mississippi River and Illinois River Bottomland Natural Division p. 213).

The WLWR is located along a ½ mile stretch of the 5.3 mile Apple River Illinois Natural Area Inventory (INAI) high mussel diversity site which contains 29 mussel species including the Illinois-threatened Black Sandshell, Purple Wartyback, and Spike. It also contains the Rock Pocketbook, Creek Heelsplitter, and Ellipse mussels which are species in the greatest need of conservation (Illinois Natural Area Inventory, 2003, #1647).

Currently the majority of the property adjacent to the 5.3 mile INAI site is in row crop production. Little or no activities have been done to restore and buffer the land-water transitions and enhance the near stream processes to improve the quality of the INAI site. This project is needed to considerably increase and enhance important wildlife habitat and improve water quality by addressing action goals 1, 3, and 4 of the Illinois Wildlife Action Plan Stream Campaign (Illinois Wildlife Action Plan, 2005, Section III. Statewide Overview, E. Priority Conservation Actions – Stream Campaign p. 61). This project will establish native perennial vegetation that will improve water quality by buffering a land-water transition; protect, restore and enhance near stream processes; and buffer and restore a stream segment supporting state threatened mussels in the Wisconsin Driftless natural division. The grant will not actively conduct stream restoration work beyond improving the vegetation cover of WLWR located adjacent to the Apple River.

This project will replace row crop with an extremely high quality native prairie which will implement action goals 1, 2, 3, and 4 of the Illinois Wildlife Action Plan Farmland & Prairie Campaign (Illinois Wildlife Action Plan, 2005, Section III. Statewide Overview, E. Priority Conservation Actions – Farmland & Prairie Campaign p. 71). In addition the high quality native prairie and enhanced forest will not only benefit the above-mentioned mussel species, but also benefit the state and federally listed Bald Eagle and the 2004 de-listed Illinois-threatened American River Otter that currently use the INAI site. Additionally, it will create habitat that will attract critical and indicator grassland bird species such as the grasshopper sparrow, Henslow's sparrow, lark sparrow, savannah sparrow, dickcissel, bobolink, western meadowlark, and eastern meadowlark (Illinois Wildlife Action Plan, 2005, Section IV. Natural Division Assessment; O. The Wisconsin Driftless Natural Division p. 245).

The high quality prairie planting will also protect the John Chapman archaeological site (11JD12) located on the property, which dates back to approximately 1050 to 1350 A.D. This site contains the only known platform mound remaining in the Apple River valley and is considered highly significant by the University of Illinois which conducted a dig there in 2003 and found evidence of how two distinctly different cultures—the Terminal

Late Woodland and Mississippian--intermingled and coexisted for several hundred years (Millhouse, P.G. 2003a, Millhouse, P.G. 2003b, Hargrave, M.L. 2005). The archaeologically significant areas of the WLWR are entirely within the row crop acreage. This project will enable the archaeological site to be covered by a high quality short grass mesic prairie, thus creating a significant natural area and maintaining the site's condition and integrity, while at the same time helping to prevent illegal surface collecting of artifacts.

Scientific and archaeological research is allowed within the reserve. All scientific and archaeological research on the site will require a permit from INPC and IDNR as well as permission from the landowner. All archaeological activities on the property shall be conducted in accordance with accepted professional archaeological practices. All archaeological artifacts and historical items removed from the site are to be donated in the name of the landowner to and curated at the Illinois State Museum. With a research permit approved by INPC, IDNR and the landowner, archaeological researchers will have the right to park vehicles, trailers and/or temporary structures on the property during periods of archaeological activities, as long as the vehicles, trailers and/or temporary structures do not interfere with either the landowners activities associated with the use of the property or conservation values. The researchers will be responsible for returning areas impacted by archaeological excavations to the condition of the land prior to excavation work as specified by the landowner (Moorehouse & Anderson 2006).

Ground-disturbing activities, beyond the previous plow line depth within the agricultural field, will require written permission from INPC and IDNR and may necessitate an archaeological investigation of the area to ensure the protection of archaeological and historical values (Moorehouse & Anderson 2006).

This project is needed to help connect two of the main Conservation Opportunity Areas (COA) identified in the Wisconsin Driftless natural division of the Illinois Wildlife Action Plan--Apple River COA and Lost Mound-Hanover Bluff-Palisades COA—as this property is a part of both COAs. (Illinois Wildlife Action Plan, 2005, Section IV. Natural Division Assessment C. Illinois River and Mississippi River Sand Areas Natural Division p. 141; L. Upper Mississippi River and Illinois River Bottomland Natural Division p. 213; O. The Wisconsin Driftless Natural Division p. 245). The INPC has developed action goals for the Lost Mound-Hanover Bluff-Palisades COA which includes further acquisition and restoration of key parcels. This property and project are part of these action goals.

OBJECTIVES:

1. Restore the former crop field and terrace slope (63 acres) to a significant natural area grade short grass mesic prairie.
 - 1.1 Plant 28 acres of short mesic prairie grasses (approximately 15 species) in spring 2007. This will use 4% of the funds.

- 1.2 Plant 28 acres of mesic prairie forbs (approximately 94 species) in fall 2007. This will use 36% of the funds.
- 1.3 Plant 30 acres of short mesic prairie grasses (approximately 15 species) in spring 2008. This will use 4% of the funds.
- 1.4 Plant 30 acres of mesic prairie forbs (approximately 94 species) and 5 acres of short mesic prairie grasses and forbs (approximately 109 species) in fall 2008. This will use 43%.
- 2. Improve the upland forest communities (12 acres).
 - 2.1 Prepare upland forest acres for planting by removal of undesirable tree and shrub species in fall 2007 and winter 2008. This will use 7% of the funds.
 - 2.2 Plant native hardwood tree species (Approximately 12 species) in areas that the undesirable tree and shrub species were removed in spring 2008. This will use 7% of the funds.

EXPECTED RESULTS OR BENEFITS:

This project will enable the nonprofit Jo Daviess Conservation Foundation (JDCF), which purchased the property in March 2006, to implement INPC's management plan for Wapello Land & Water Reserve (Moorehouse & Anderson 2006) which calls for high quality native prairie re-vegetation of the crop field and restoration of forested areas, thus, significantly enhancing habitat for wildlife identified as important in the Illinois Wildlife Action Plan. Specifically, it will enable us to achieve the top four management goals set by INPC:

- 1.) Restore the former crop field and terrace slope (63 acres) to appropriate native prairie vegetation and develop a plan to maintain the prairie community.
- 2.) Maintain favorable habitat within the lower Apple River (4 acres) to support a high diversity of mussel species as well as endangered, threatened and rare aquatic invertebrates found within the river.
- 3.) Manage the upland forest communities (12 acres) through the use of prescribed fire and control of exotic species.
- 4.) Promote suitable habitat for endangered and threatened species as well as area sensitive breeding wildlife.

The project will directly address action goals of the Illinois Wildlife Action Plan Stream Campaign and the Wisconsin Driftless natural division Conservation Opportunity Areas.

The project specifically addresses the action goals of the Illinois Wildlife Action Plan Stream Campaign of developing and promoting upland agricultural practices that decrease the energy, sediment load, temperature, and pollutant load in drainage ways by establishing native perennial vegetation, buffer a land-water transition, and wetland enhancement and restoration. (Illinois Wildlife Action Plan, 2005, Section III. Statewide Overview, E. Priority Conservation Actions – Stream Campaign p. 61). It also addresses the action goal of protecting, restoring, and enhancing near stream and in-stream habitats and processes by restoring and managing grassy buffers, wetlands, riparian forests, and floodplains. The project also addresses the action goal of restoring tributary streams to reduce head cutting and sediment transitions to large rivers by buffering and restoring

channels in a smaller headwater stream segment to support listed mussel species in the Wisconsin Driftless natural division (Illinois Wildlife Action Plan, 2005, Section III. Statewide Overview, E. Priority Conservation Actions – Stream Campaign p. 62).

This project specifically addresses the action goals of the Illinois Wildlife Action Plan Farmland & Prairie Campaign. By planting 63 acres of natural area quality short grass mesic prairie this will establish and maintain native grasslands, moderate disturbance regimes and enhance the condition of farmland habitats, restore and manage native prairie communities and populations of imperiled or extirpated prairie wildlife, as well as emphasize multiple resource benefits of conservation in agricultural landscapes. (Illinois Wildlife Action Plan, 2005, Section III. Statewide Overview, E. Priority Conservation Actions – Farmland & Prairie Campaign p. 71).

The project specifically addresses the conservation philosophy of Apple River Conservation Opportunity Area in the Regional Assessment of the Wisconsin Driftless Natural Division of the Illinois Wildlife Action Plan by protecting, managing and restoring the natural communities of the area and providing for compatible recreational opportunities. This project works to restore the continuum of the Lower Apple River to the Lost Mound-Hanover Bluff-Mississippi Palisades Conservation Opportunity Area (Illinois Wildlife Action Plan, 2005, Section IV. Natural Division Assessment O. The Wisconsin Driftless Natural Division p. 245).

This project will create 63 acres of significant natural area quality short grass mesic prairie and improve approximately 12 acres of upland forest that will create and enhance habitat of the Wapello Land & Water Reserve. It will also improve water quality along the Apple River by buffering a land-water transition and enhancing near stream processes.

Within the COA the WLWR is one property away from 1,000 acres of protected land known as the Hanover Bluff Management Area, owned by a consortium of partners including The Nature Conservancy, Natural Land Institute, The Prairie Enthusiasts, Illinois Department of Natural Resources, and Illinois Nature Preserves Commission. Collectively these partners have developed the Hanover Bluff Ecosystem Restoration Plan, which includes expansion to key adjacent land through acquisition and additional land protection efforts. This project works towards these goals and will be integrated into the Hanover Bluff Ecosystem Restoration Plan. The Hanover Bluff Management Area is contiguous to the 9,857-acre Lost Mound Unit of the Upper Mississippi River Fish & Wildlife Refuge. The Lost Mound Unit is also an Important Bird Area and our project can be a population sink for several species of birds that use the area.

Together, this COA includes a total of 16,000+ acres of INAI sites identified by the INPC, 14,000 of which are permanently protected. This comprises the largest, most significant collection of natural areas in the Wisconsin Driftless natural division. This project will further the IDNR's long term action goals for the area while complementing those of the U.S. Fish and Wildlife Service, and the nonprofit organizations involved in the area.

In addition to implementing portions of the Illinois Wildlife Action Plan, this project will be open for appropriate outdoor recreational activities. This will include off road parking, hiking trails, and interpretive materials to educate the public about the site's many resources and how it is connected to regional and state wide resource conservation efforts. The economy of Northwest Illinois depends largely upon tourism dollars, most of it related to Galena, IL. The WLWR is adjacent to the Village of Hanover, a village that has been economically depressed for several years. The WLWR habitat restoration project would provide public education about the importance of protecting the land's resources while also enhancing the local economy of the Village of Hanover which has been struggling to remain viable. This project will work towards drawing eco-tourism to the area as it is promoted along with the recreational opportunities currently provided on IDNR, FWS, and NGO properties along the Great River Road in Jo Daviess and Carroll Counties.

APPROACH:

Objective 1. Restore the former crop field and terrace slope (63 acres) to significant natural area grade short grass mesic prairie. The 63 acres of cropland remained in production through the 2006 growing season. The north half of the cropland field and bottom land area (28 acres) was planted in soybeans during the 2006 growing season to prepare the site for the high quality short grass mesic prairie mix. This acreage will be planted by seed drill with short mesic prairie grasses (approximately 15 species) in the spring of 2007. This will allow for the short grasses to become established during the first growing season. The mesic prairie forbs for this acreage will be planted by mechanical broadcast in fall of 2007 (approximately 94 species). The remaining 30 acres is being planted into soybeans during the 2007 growing season to prepare for the short grass mesic prairie planting that will begin in the spring 2008. In the spring of 2008 the short mesic prairie grasses will be planted by seed drill on the remaining 30 acres (approximately 15 species). This will allow for the short grasses to become established during the first growing season. The mesic prairie forbs for this acreage will be planted by mechanical broadcast in fall of 2008 (approximately 94 species). The 5 acre terrace slope is currently in cool season grasses and will be treated with herbicide during the 2007 and 2008 growing seasons to prepare for the short grass mesic prairie planting to be mechanically broadcasted in the fall 2008 (approximately 109 species).

During the 2007 growing seasons mowed fire breaks will be planted and established along the perimeter of the prairie plantings as well as along the crest of the terrace slope and to the platform mound. These fire breaks will be used for prescribed burning once the project is completed. The fire breaks will also function as public hiking trails. A management plan for the prairie will be developed by the Northwest Illinois Prairie Enthusiasts and the Hanover Township Park District. This plan will be integrated into the Hanover Bluff Ecosystem Restoration Plan to ensure long term management and protection of the site. The management plan development, and initial prairie planting maintenance will not be part of the State Wildlife Grant.

Seed is needed to plant a total of 63 acres to a high quality short mesic prairie. A high quality natural area would consist of 100-150 plant species, and our plans will create as close as possible the quality and quantity of biodiversity found in a significant natural area. The working species list consists of approximately 109 species of grasses and forbs that we anticipate planting. The commercial value of the species in the working species list for 63 acres is around \$200,000.00. The species composition and seeding rates will change slightly but we anticipate planting around 15 pounds of seed per acre. The majority of the seed mix will be selected for local eco-region seed suppliers which are appropriate to the site's location and soil types. The highest degree of plant species diversity will also create the most effective habitat for grassland bird species in the greatest need for conservation and those that will also attract insect wildlife in the Illinois Wildlife Action Plan (see Appendix A).

The short grass mesic prairie mix will help prevent looting of the American Indian village by providing low vegetation cover. The integrity of the site could be jeopardized like that of the Albany Mounds archaeological site located in Whiteside County. During the late 1980's this site experienced trespassers who, under the cover of tallgrass prairie, looted several mounds over the course of a growing season. The grass species mix we plan to plant will exclude the tallgrass species of big blue stem, Indian grass, and switch grass. Grass species of little blue stem, side-oats gamma, prairie dropseed, rye species, sedges, bulrushes, and shorter panic grasses will be planted.

These attributes, as well as the hiking trails/fire breaks were given the highest priorities from public meetings held in Hanover Park District during 2006 by the Jo Daviess Conservation Foundation.

Objective 2. Improve the upland forest communities (12 acres). The upland forest communities located in between the Apple River and the prairie planting require control of exotic species and interseeding of appropriate native mast producing trees in box elder dominated areas. During the 2007 growing season first year herbaceous exotic plants will be sprayed with 2% roundup. During the 2007-2008 dormant season exotic and invasive trees and shrubs <4 inches in diameter will be cut above ground and trees >4 inches in diameter will be girdled, both being treated with Garlon 3A. This work will be done by contractors. Appropriate native mast producing trees such as bur oak, swamp white oak, black oak, red oak, hills oak, black walnut, basswood, shagbark hickory, black willow, sycamore, ash, and silver maple will be purchased and planted in the spring 2008 by contractors. The control of herbaceous exotic species and initial maintenance of the tree plantings will be done by the Jo Daviess Conservation Foundation and will not be part of the State Wildlife Grant.

LOCATION: The property is located in Jo Daviess County in Hanover Township and has a legal description of Township 26 North, Range 2 East, Section 15. Maps are attached that show the site in relation to the state of Illinois, the site and its surrounding area, and the proposed restoration plan. Within the WLWR, the cropland acreage is found along the eastern ³/₄ of the property which is adjacent to IL Rt. 84. The upland forest

acreage is found along the western ¼ of the property which is adjacent to the Apple River.

PROJECT SCHEDULE:

Objectives	June-07	Oct-07	Jan-08	Apr-08	Oct-08
Objective 1: Restore the former crop field and terrace slope (63 acres) to short grass mesic prairie.					
1.1 Plant 28 acres of short mesic prairie grasses in spring 2007.	X				
1.2 Plant 28 acres of mesic prairie forbs in fall 2007.		X			
1.3 Plant 30 acres of short mesic prairie grasses in spring 2008.				X	
1.4 Plant 30 acres of mesic prairie forbs and 5 acres of short mesic prairie grasses and forbs in fall 2008.					X
Objective 2 : Improve the upland forest communities (12 acres)					
2.1 Prepare upland forest acres for planting by removal of undesirable tree and shrub species in fall 2007 and winter 2008.			X		
2.2 Plant native hardwood tree species in areas that the undesirable tree and shrub species were removed in spring 2008.				X	

RELATED GRANTS: We will be using an Illinois Department of Natural Resources (IDNR) C2000 grant to provide the majority of the necessary non-Federal 50% match to our project.

Funds from an Illinois Nature Preserves Commission Natural Area Acquisition allocation will be used in conjunction with the SWG and C2000 for purchase of seed, but will not count as match for this grant.

PERSONNEL: The primary personnel match will be from a combination of the four full time employees of the Jo Daviess Conservation Foundation. The following is the contact information for the full-time project manager.

Christie Trifone
 Land Stewardship Specialist
 Jo Daviess Conservation Foundation
 126 N. Main St. P.O. 216
 Elizabeth, IL 61028
 815-858-9100 work
 815-858-9102 fax
christie@jdcf.org

Angella Moorehouse
 Natural Areas Preservation Specialist
 Illinois Nature Preserves Commission
 640 Argyle Park Road
 Colchester, IL 62326
 309-776-4066
a.moorehouse@illinois.gov

Hal Hassen
Cultural Resource Coordinator
Illinois Department of Natural Resources
One Natural Resource Way
Springfield, IL 62702
217-524-3759
hal.hassen@illinois.gov

Ed Anderson
Heritage Biologist
Illinois Department of Natural Resources
3159 Crim Drive
Savanna, IL 61074
815-273-3184
Ed.A.Anderson2@illinois.gov

LITERATURE CITED:

Bacon, A., Hanover Bluff Ecosystem Restoration Plan, Natural Lands Institute, 2004.

Cagnoni, T. 1997. Preserve Design for Protection of Blufflands, Large Forest Tracts and Significant Natural Resources in and Adjacent to Hanover Bluff, Jo Daviess County, Illinois. Natural Land Institute. Rockford, Illinois. 3 pp.

Fuller, S. (revised by I. Brynildson) 1985. Freshwater mussels of the Upper Mississippi River. Wisconsin Department of Natural Resources. Madison, Wisconsin. 63 pp.

Hargrave, M.L. 2005. A geophysical investigation of the John Chapman Site (11-JD-12), Jo Daviess County, Illinois. Report prepared for The Archaeological Conservancy. U.S. Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory, Champaign, Illinois. 5 p.

Illinois Department of Natural Resources. 2005. Illinois Comprehensive Wildlife Conservation Plan-Strategy (Illinois Wildlife Action Plan). Illinois Department of Natural Resources. Version 1.0. xxv+353 pp.

Illinois Endangered Species Protection Board. 2005. Checklist of endangered and threatened animals and plants of Illinois. Illinois Department of Natural Resources, Illinois Endangered Species Protection Board, Springfield, Illinois. 16 pp.

Illinois Natural Areas Inventory. 2005. Natural Area Inventory database for Apple River (INAI#1647).

Jo Daviess Conservation Foundation. 2004. Hanover natural area acquisition proposal. Jo Daviess Conservation Foundation, Elizabeth, Illinois. 6 p.

Millhouse, P.G. 2003a. The Mississippian Outpost Project: identity creation on the northern frontier of the Mississippian world. Dissertation Proposal. University of Illinois, Urbana-Champaign. 8 p.

Millhouse, P.G. 2003b. Recent excavations at the Mississippian John Chapman Site in the Apple River Valley of Northwestern Illinois. 49th Annual Midwest Archaeological Conference. Milwaukee, Wisconsin. University of Illinois, Urbana-Champaign. 12 p.

Moorehouse, A., and E. Anderson. 2004. A proposal for the registration of Hanover Bluff State Natural Area as an Illinois Land and Water Reserve. Illinois Nature Preserves Commission. Springfield, Illinois. 22 p.

Moorehouse, A., and E. Anderson. 2006. A proposal for the registration of Wapello as an Illinois Land and Water Reserve. Illinois Nature Preserves Commission. Springfield, Illinois. 22 p.

Schwegman, J.E. 1973. The Natural Divisions of Illinois. Illinois Nature Preserves Commission. Rockford, Illinois.

Sietman, B.E., E.A Anderson, R. Nyboer, and F.R. Hutto. 2002. The Unionid Mussel Fauna of Lost Mound National Wildlife Refuge (Savanna Army Depot), Upper Mississippi River and Lower Apple River. Unpublished Report prepared for Illinois Department of Natural Resources and U.S. Fish and Wildlife Service.

Willman, H.B., et al. 1975. Handbook of Illinois Stratigraphy. Illinois State Geological Survey, Bulletin 95. Urbana, Illinois. 261pp.

Appendix A

Common Name Used	Scientific Name E/T Status	Habitat
Western Sand Darter	<i>Ammocrypta clarum</i>	stream
Pallid Shiner	<i>Hybopsis amnis</i>	stream
Pickerel Frog	<i>Rana palustris</i>	wetlands
Timber Rattlesnake	<i>Crotalus horridus</i> ST	rocky bluffs
Western Hognose Snake	<i>Heterodon nasicus</i> ST	sandprairie
Henslow's Sparrow	<i>Ammodramus henslowii</i> ST	prairie
Upland Sandpiper	<i>Bartramia longicauda</i> SE	prairie
Red-shouldered Hawk	<i>Buteo lineatus</i>	bottomland forest
Brown Creeper	<i>Certhia americana</i> ST	bottomland forest
Northern Harrier (nb)	<i>Circus cyaneus</i>	marsh, prairie, savanna
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	upland forest
Northern Flicker	<i>Colaptes auratus</i>	upland forest
Cerulean Warbler	<i>Dendrioca cerulea</i> ST	upland forest
Sandhill Crane (nb)	<i>Grus canadensis</i>	riverine, wetlands
Bald Eagle	<i>Haliaeetus leucocephalus</i> FT/ST	riverine, wetlands, bottomland forest
Loggerhead Shrike	<i>Lanius ludovicianus</i> ST	savanna
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	savanna, upland forest
Kentucky Warbler	<i>Oporornis formosus</i>	upland forest
Savannah Sparrow	<i>Passerculus sandwichensis</i>	prairie, savanna, agricultural
Ovenbird	<i>Seiurus aurocapillus</i>	upland forest
Dickcissel	<i>Spiza americana</i>	prairie
Barn Owl (nb)	<i>Tyto alba</i> SE	upland forest, agricultural
Blue-winged Warbler	<i>Vermiforma pinus</i>	savanna
River Otter	<i>Lontra canadensis</i>	stream, riverine, wetlands
Bobcat	<i>Lynx rufus</i>	rocky bluffs
American Badger	<i>Taxidea taxus</i>	prairie, agricultural
Higgin's Eye Mussel	<i>Lampsilis higginsii</i> SE	stream
Purple Wartyback	<i>Cyclonaias tuberculata</i> ST	stream
Butterfly Mussel	<i>Ellipsaria lineolata</i> ST	stream
Spike	<i>Elliptio dilatata</i> ST	stream
Black Sandshell	<i>Ligumia recta</i> ST	stream
Iowa Amphipod	<i>Stygobromus iowae</i> SE	stream
Regal Fritillary	<i>Speyeria idalia</i> ST	sand prairie
Olympia Marblewing	<i>Euchloe olympia</i>	sand prairie

nb = birds which utilize area but have not been documented as breeding

Appendix B

Species
Allium canadense L.
Allium cernuum Roth
Anemone canadensis
Arabis glabra (L.) Bernhardt
Asclepias hirtella (Pennell) Woodson
Asclepias incarnata
Asclepias sullivantii Engelm.
Asclepias verticillata
Aster ericoides
Aster hesperius A.Gray
Aster laevis L.
Aster novae-angliae
Aster praealtus
Aster puniceus
Aster umbellatus
Astragalus canadensis L.
Baptisia lacta leucantha
Bidens coronata (L.) Britton
Calamagrostis canadensis
Camassia scilloides (Raf.) Cory
Carex bebbii
Carex bicknellii Britton
Carex brevior (Dewey) Mackenzie
Carex gravida Bailey
Carex meadii Dewey
Carex scoparia Schkuhr
Carex stricta
Carex trichocarpa Muhl.
Chamaecrista fasciculata
Chelone glabra L.
Cicuta maculata L.
Comandra umbellata
Coreopsis palmata
Dalea purpureum
Desmodium illinoense
Dodecatheon meadia L.
Echinacea pallida
Echinacea purpurea (L.) Moench
Eleocharis compressa Sullivant
Elymus canadensis
Equisetum laevigatum A.Braun
Eryngium yuccifolium Michx.

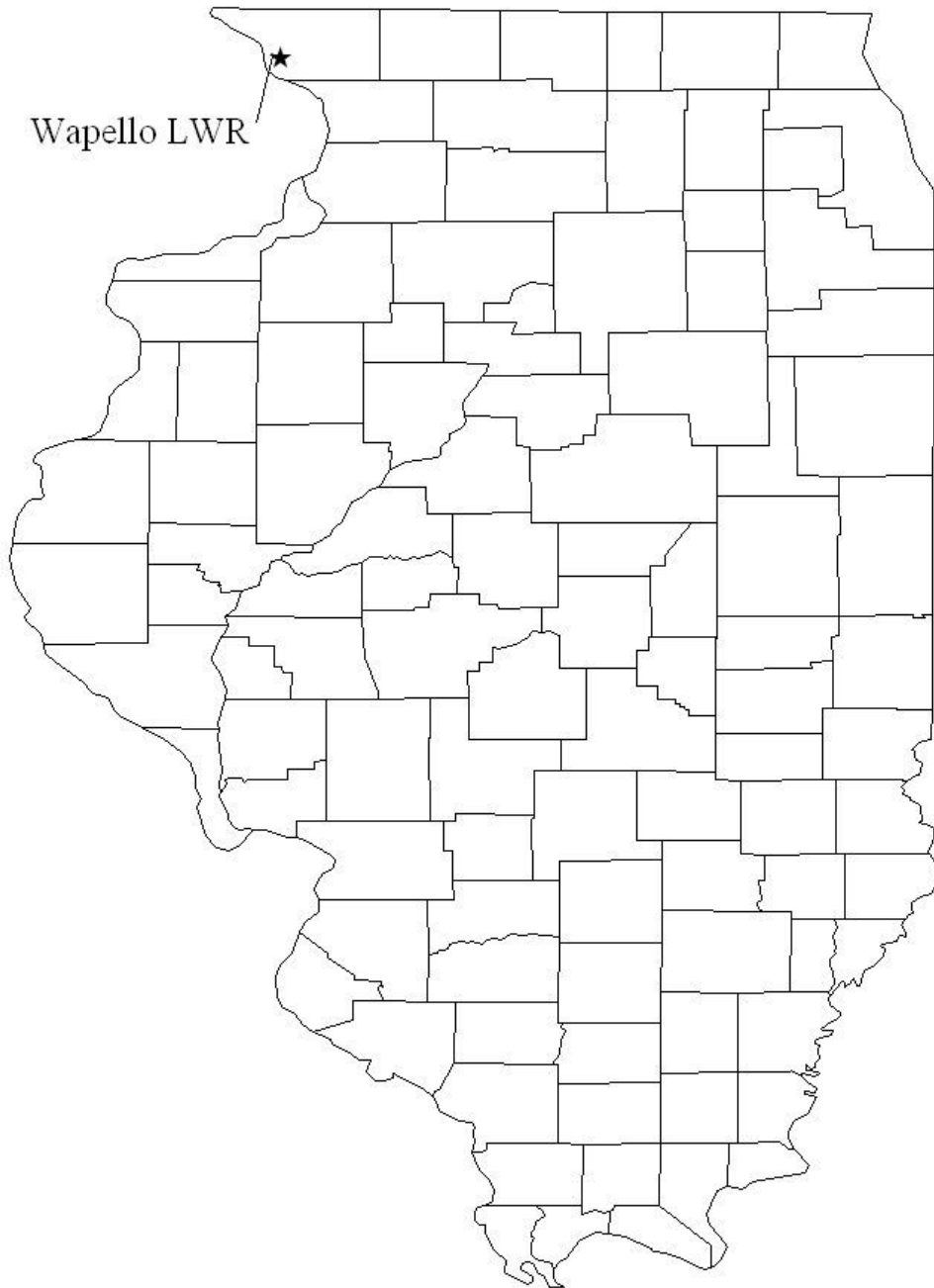
Eupatorium perfoliatum L.
Euphorbia corollata
Euthamia graminifolia (L.) Nuttall
Galium boreale L.
Galium obtusum Bigelow
Gaura biennis
Gentiana andrewsii Grisebach
Gentiana flavida
Gentiana puberulenta J.Pringle
Helenium autumnale
Helianthus mollis Lamarck
Helianthus pauciflorus
Helianthus tuberosus L.
Heliopsis helianthoides
Heracleum lanatum Michx.
Hierchloe odorata (L.) P.Beauv.
Hypericum pyramidatum
Hypoxis hirsuta
Iris virginica
Juncus torreyi Coville
Lespedeza capitata
Liatris pycnostachya Michx.
Lilium michiganense Farwell
Lithospermum canescens
Lobelia cardinalis L.
Lobelia siphilitica
Lycopus americanus
Lysimachia ciliata
Lysimachia quadriflora
Lythrum alatum Pursh
Mimulus ringens
Monarda fistulosa
Napaea dioica L.
Oxypolis rigidior (L.) Raf.
Parthenium integrifolium L.
Pedicularis lanceolata Michx.
Penstemon digitalis Nuttall
Phlox pilosa
Physostegia virginiana (L.) Bentham
Poa palustris L.
Polygala senega
Polytaenia nuttallii DC.
Potentilla arguta
Prenanthes racemosa Michx.
Pycnanthemum tenuifolium
Pycnanthemum virginianum

Ranunculus pensylvanicus L. f.
Ratibida pinnata
Rosa palustris Marshall
Rosa setigera Michx.
Rudbeckia hirta
Rudbeckia triloba L.
Schizachyrium scoparium
Scirpus atrovirens
Scirpus pendulus Muhl.
Senecio plattensis
Sisyrinchium albidum
Sisyrinchium campestre

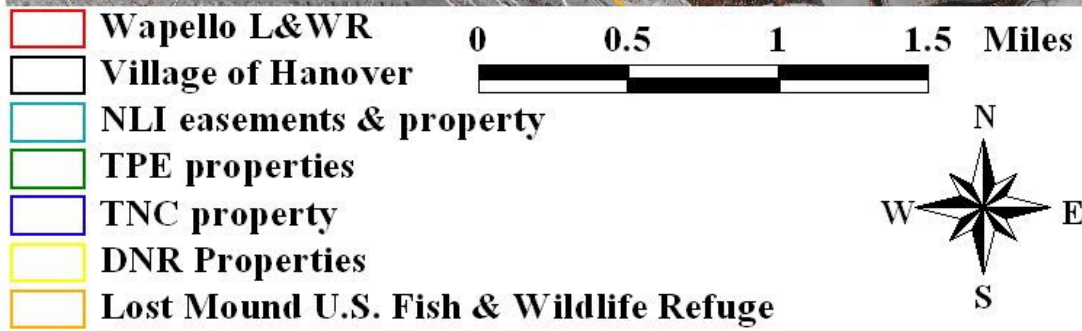
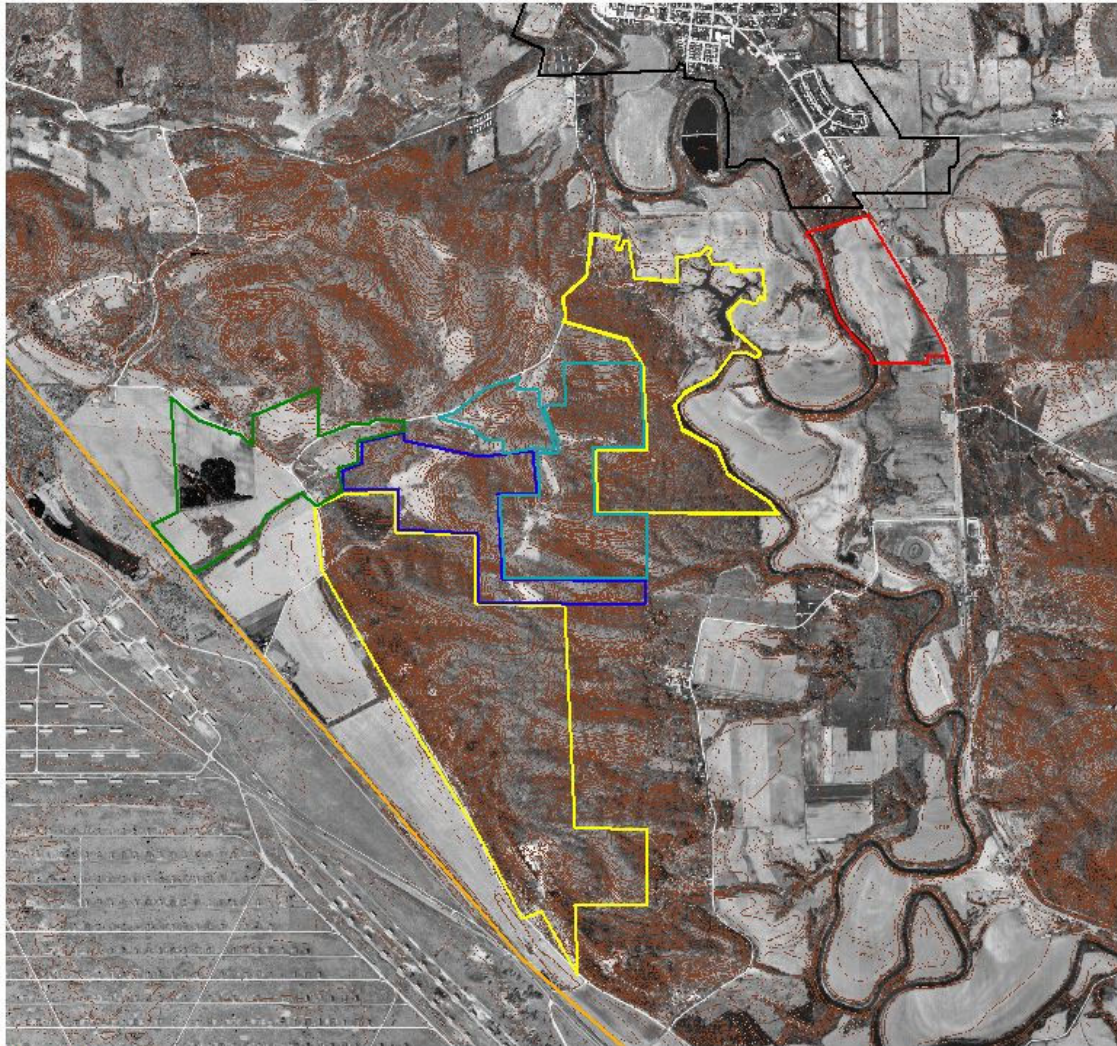
Solidago missouriensis fasciculata Holz

Spartina pectinata Link
Spiraea alba DuRoi
Sporobolus heterolepis
Teucrium canadense
Tradescantia ohioensis
Triosteum perfoliatum L.
Verbena hastata
Veronicastrum virginicum
Zizea aurea

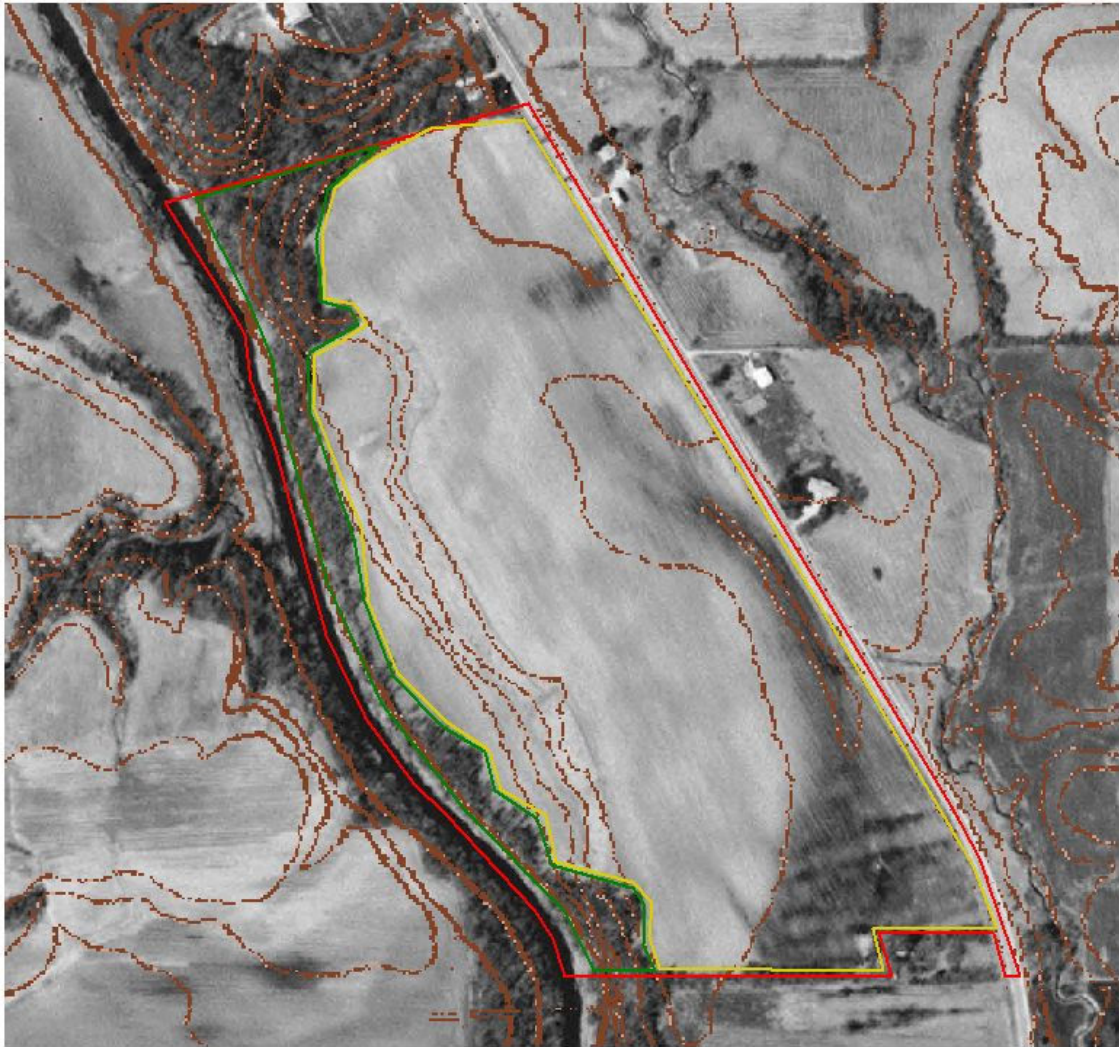
State of Illinois



Wapello Land & Water Reserve



Wapello Land & Water Reserve



-  Upland Forest
-  Short Grass Mesic Prairie
-  Wapello L&WR

Tract 26 North, Range 2 East, Section 15

