

Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 Version

1. Name and address of the compiler of this form:

K. Douglas Blodgett
The Nature Conservancy
11304 North Prairie Road
Lewistown, IL 61542
PHONE 309-547-2730 x112
FAX 309-547-2731
EMAIL: dblodgett@tnc.org

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated: 2 August 2011

3. Country: USA

4. Name of the Ramsar site: The Emiquon Complex (comprised of the Chautauqua National Wildlife Refuge (CNWR), Emiquon National Wildlife Refuge (ENWR), and Emiquon Preserve (EP))

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update: Not Applicable

7. Map of site:

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a hard copy (required for inclusion of site in the Ramsar List): ;
ii) an electronic format (e.g. a JPEG or ArcView image) ;
iii) a GIS file providing geo-referenced site boundary vectors and attribute tables .

b) Describe briefly the type of boundary delineation applied: The Emiquon Complex boundary is composed of the ownership boundaries for three existing protected areas owned and managed by the US Fish and Wildlife Service (CNWR and ENWR) and The Nature Conservancy (EP).

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Centroid of the complex: **90°3'9.836"W 40°21'22.338"N**
Northeast corner of the complex: **89°56'39"W 40°23'55.3"N**
Southwest corner of the complex: **90°7'53.382"W 40°17'53.877"N**
Western-most point of the complex: **90°7'46.993"W 40°20'27.426"N**
Southern-most point of the complex: **90°5'16.736"W 40°17'49.94"N**

9. General location:

The Emiquon Complex is located in Fulton County (2010 population of 37,069) and Mason County (2010 population of 14,666) of Illinois (2010 population of 12,830,632) in the Midwest region of the United States. The complex is less than 2 kilometres (straight-line distance) N of Havana, IL (2010 population of 3301); 6 km SE of Lewistown, IL (2384); 55 km SW of Peoria, IL (115,007); 70 km NW of Springfield, IL (116,250); 190 km N of Saint Louis, MO (319,294); and 250 km SW of Chicago, IL (2,695,598). The Emiquon Complex is along either side of the Illinois River within the Upper Mississippi River System.

10. Elevation: (in metres: average and/or maximum & minimum)

Elevation of the site varies from a minimum of approximately 126 meters (412 feet) to a maximum of approximately 178 meters (585 feet) above mean sea level.

11. Area: (in hectares) Total for designation: A total of 5729 hectares (14,157 acres) comprised of the CNWR (1941 hectares), ENWR (1063 hectares), and EP (2724 hectares).

12. General overview of the site: The Emiquon Complex lies within the former natural floodplain of the Illinois River at the confluence of the Spoon River. This broad floodplain (4-10 km wide) was created by ancient drainages of the Mississippi and Ohio Rivers. As in other large-floodplain river systems, the dynamic relationship between the river and its floodplain creates a diversity of habitats including bottomland lakes, side channels, sloughs, marsh, bottomland hardwood forests, and wet, mesic and dry prairies. These in turn support correspondingly abundant and diverse animal populations, both terrestrial and aquatic. The Emiquon Complex and adjacent lands contribute to the Illinois River's natural diversity of both resident and migratory animal species. Not only does the complex contribute to a corridor that provides essential habitats for long-distance longitudinal migrants such as Neotropical song birds, North American waterfowl, and some fishes such as paddlefish (*Polyodon spathula*) and American eel (*Anguilla rostrata*), it also provides habitat and corridors for lateral migrants, especially amphibians and reptiles, that move laterally across the floodplain and adjacent lands to carry out their life requisites such as nesting, feeding, and wintering. In addition to providing habitat for animals, the complex contributes to important ecological processes including processing and cycling of nutrients, sediments, and energy; improving water quality; sequestering carbon; and normalizing hydrology. The complex also provides people opportunities for education, recreation, and compatible economic development.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site.

1 •	2 •	3 •	4 •	5 •	6 •	7	8 •	9
X	X	X	X	X	X	X	X	<input type="checkbox"/>

14. Justification for the application of each Criterion listed in 13 above:

Criterion 1: contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Historically, wetlands accounted for 23% of Illinois's land area, but approximately 90% of its original wetland acreage has been lost (Suloway and Hubbell 1994). The landscape-scale Emiquon Complex supports an interconnected mosaic of rivers, streams, and lakes with flood-pulsed wetlands and adjacent upland communities that represent the former habitat diversity of the natural floodplain of the Illinois River, a large-floodplain river ecosystem. Plant communities include bottomland hardwood forest and shrub-scrub; emergent, floating leaved and submersed aquatic plants; areas of seasonally inundated moist-soil plants; wet, mesic, and dry prairie; and upland forest and scrub-shrub. This complex is one of a handful of examples of functioning floodplain supporting this diversity of wetland and adjacent habitat types on the Illinois River.

Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

The complex provides wetland habitat vital for the federally-listed plant species Decurrent False Aster (*Boltonia decurrens*), a species endemic to the Illinois River floodplain and a short reach below its confluence with the Mississippi River. This threatened plant species has been found at the CNWR and EP as well as adjacent areas.

Other federally endangered species documented using the complex infrequently include migrating Least Tern (*Sterna antillarum*) and Piping Plover (*Charadrius melodus*).

The complex also supports nesting and wintering American Bald Eagle (*Haliaeetus leucocephalus*), a recently delisted species.

Illinois State threatened or endangered species documented on the complex include at least 23 bird, 3 fish, and 1 mammal species.

Criterion 3: supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region. The complex is part of the Illinois River Valley, the most important corridor of fish and wildlife habitat remaining in central Illinois and an integral part of the Mississippi River corridor. The complex is a key component of the Mississippi Flyway. The complex is located in the middle Illinois River, historically the most productive area of the river because of the abundance and diversity of floodplain habitats that support corresponding abundant and diverse plant and animal communities: the complex and adjacent lands support at least 87 species of fish, 23 freshwater mussels, 19 amphibians, 41 reptiles, 260 birds, and 28 mammals, many of which are state endangered, threatened, or rare.

Criterion 4: supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

The diversity of wetland habitats within the complex provides essential habitats for a wide variety of different life stages of a multitude of animal species, both aquatic and terrestrial. Examples include resting and feeding areas for migrating birds; nesting, brooding, and feeding areas for resident birds; and spawning, nursery, feeding, resting, and wintering areas for amphibians, reptiles, and fishes.

The complex provides necessary aquatic and terrestrial habitat to support Mississippi Flyway bird populations during spring and fall migration. It provides a haven for migratory birds, supporting roughly 45% of the waterfowl using the Illinois segment of the Mississippi Flyway and nearly 70% of the waterfowl that use the Illinois River corridor (USFWS 2004). Aerial census data collected by the Illinois Natural History Survey (INHS) indicate that from 1989-1999, CNWR alone supplied an average of 4,364,533 annual waterfowl use days with a peak of 13,411,544 use days in 1994 (INHS unpublished data). From 2000-2010, the Emiquon Complex provided an annual average of 2,812,728 fall duck use days or 22.8% of the total fall duck use days for the entire Illinois River Valley (INHS unpublished data). Fall 2010 waterfowl surveys at EP alone indicated the abundance (use-days) of Blue-winged Teal (*Anas discors*), American Green-Winged Teal (*Anas carolinensis*), and Gadwall (*Anas strepera*) were the highest ever recorded for a single location in the Illinois River valley and Northern Pintail (*Anas acuta*) were the third highest in the valley since inventories began in 1948 (Hine et al 2011).

The CNWR has been designated as an Illinois River Valley Partnership "Model Project," an "Important Bird Area" in the American Bird Conservancy's United States Important Bird Areas program and is included in the Western Hemisphere Shorebird Reserve Network.

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds. The complex supports hundreds of thousands of migratory birds, especially waterfowl, as they stop to rest and feed during the spring and fall migration along the Illinois River. Recent (2000-2010) waterfowl surveys conducted by the Illinois Natural History Survey documented an average fall peak abundance of 71,450 ducks on the complex (Hine et al 2011) with historic peaks at CNWR as great as 1,500,000 Mallard (*Anas platyrhynchos*) and Black Duck (*Anas rubribes*) alone in 1944 (Havera 1999).

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird. Since the initiation of restoration of EP in 2007, peak one-day fall populations of American Coot (*Fulica americana*) on the complex have averaged 67,166 (Hine et al 2010; Hine et al 2011) or 2.2% of the North American population of approximately 3,000,000 individuals according to the Birds of North America (Brisbin et al 2011) and 1.1% of the 2009 global population estimate of 6,000,000 (Birdlife International 2011).

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity. Over 100 fish species including the primitive Paddlefish (*Polyodon spathula*) and Lake Sturgeon (*Acipenser fulvescens*) have been documented in the complex or the adjacent Illinois River. The complex provides the diversity of aquatic habitats needed by a wide range of fishes and life stages (eggs, larvae, juveniles and adults) to carry out life requisites including spawning, development of young, feeding, and wintering.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend. The complex provides the diversity of aquatic habitats and high primary and secondary productivity needed by a wide range of fishes and life stages to carry out life requisites including spawning, development of young, feeding, and wintering. Of special note is the abundance of aquatic vegetation at the complex which is relatively rare along the Illinois River; aquatic plant beds provide essential spawning and nesting habitat for some species that are relatively rare in the Illinois River (e.g., Bowfin [*Amia calva*] and Grass Pickerel [*Esox americanus vermiculatus*]) as well as high-quality nursery and refuge habitats for a multitude of species. Another limiting factor for many fish species and life stages is access to quality wintering areas with deeper water, low/no flows, and acceptable dissolved oxygen levels; the complex provides numerous interconnected areas with good wintering habitat for many such fish species and life stages.

Primary and secondary productivity from the complex is transported to the river providing abundant and high quality food for riverine fishes as well as macroinvertebrates such as mussels.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

a) biogeographic region: The complex is located in the Central Tallgrass Prairie Ecoregion (ecoregion), which encompasses 286,111 square kilometres (110,500 square miles) extending from eastern Nebraska and northeastern Kansas east to northwestern Indiana. It comprises the eastern lobe of the Prairie Parkland Province and one ecoregion section (Central Dissected Till Plains) as delineated by Bailey et al. (1994). The ecoregion is characterized by flat, gently rolling topography with steep bluffs bordering major river valleys, three of which traverse the region: the Mississippi, Missouri, and Illinois (USFWS 2004).

b) biogeographic regionalisation scheme (include reference citation): Ecological Subregions have been delineated by the United States Department of Agriculture Forest Service for use as bioregion boundaries. A hierarchical structure of the national framework of ecological units was originally established in 1993 by the United States Department of Agriculture Forest Service (Cleland et al. 1997; Cleland et al. 2005; McNab et al. 2007).

Cleland, D.T.; Avers, P.E.; McNab, W.H.; Jensen, M.E.; Bailey, R.G.; King, T.; Russell, W.E. 1997. National hierarchical framework of ecological units. In: Boyce, M.S.; Haney, A., eds. *Ecosystem Description of Ecological Subregions: Sections of the Conterminous United States* management: applications for sustainable forest and wildlife resources. New Haven, CT: Yale University Press: 181-200.

Cleland, D.T.; Freeouf, J.A.; Keys, Jr. J.E.; Nowacki, G.J.; Carpenter, C.A.; McNab, W.H. 2005. Ecological subregions: sections and subsections of the conterminous United States [1:3,500,000] [CD-ROM]. Washington, DC: US Department of Agriculture, Forest Service.

McNab, W.H., Cleland, D.T., Freeouf, J.A., Keyes, J.E., Nowacki, G.J., & Carpenter, C.A. January 2007. "Description of Ecological Subregions: Sections of the Conterminous United States". United States Department of Agriculture, Forest Service General Technical Report WO-76B.

16. Physical features of the site: At the coarsest scale, morphology of the Emiquon Complex reach of the Illinois Valley is a direct result of late Wisconsin deglacial events in northeast Illinois. At a slightly finer scale, Emiquon is dominated by several flood basins of large and intermediate size on a low terrace and the floodplain, both of which were established largely by late Wisconsin deglacial and Holocene fluvial events. The flood basin landscape, once established, was modified through time by tributary stream activity, tributary alluvial fan development, and Illinois River flooding. Consequently, new landforms became superimposed on the general flood basin landscape. At the same time, development of the valley margin landscape, consisting of alluvial fans, colluvial fans, colluvial slopes, and loessial slopes, was an important factor in shaping the Emiquon landscape. Progradation of alluvial fans and colluvial slopes, and tributary stream extension and avulsion altered the geometry and limits of some of the flood basins, as well as flood basin drainage patterns in some cases. The flood basin and alluvial fan landscapes subsequently have been modified further during historic time to facilitate transportation and agricultural activities. The net result is a mosaic of landforms that suggests a very dynamic history of landscape evolution (Hajic 2006).

Water supplied to the complex primarily comes from direct precipitation and flows from the Illinois River, Quiver Creek, and Spoon River, with less significant inputs from several smaller tributary streams and groundwater. Nearly a century ago, much of the complex was isolated from the Illinois River and these tributaries by a series of levees (earthen berms or dikes) that facilitated draining of the wetlands and conversion to agriculture. These levees still exist and are maintained and used as important tools for managing water levels, flows, and the unnatural hydrology of the Illinois River; invasive species; and sediment.

The climate pattern is typical of many continental locations in that there are wide temperature fluctuations. The average high temperatures in the summer are approximately 26-32° Celsius (80s Fahrenheit) with average lows in the 16-21° C range (60s F). Winter highs are generally 0-4° (30s F) with lows in the -12° to -6° range (teens F). Temperature extremes range from about -30° (-20s F) to 38° (over 100 F). Average annual precipitation for the complex is 88 centimeters with over 50 percent normally falling from April through August. Snowfall normally accounts for less than 10 percent of the total precipitation. There is an average of 5 months without frost (USFWS 2004).

17. Physical features of the catchment area: While the Emiquon Complex is usually identified as former natural floodplain of the Illinois River, several smaller rivers and streams flow into or through the complex before their confluence with the Illinois. As a result, different areas of the Emiquon Complex are differentially impacted by surface flows to and from the Illinois River, Spoon River, Quiver Creek, and the several smaller tributaries. The influences these rivers and streams have on different areas of the complex have also been modified by numerous constructed levees and management of water control structures.

The Illinois River flows 439 kilometers (273 miles) from the junction of the Des Plaines River and Kankakee River south of Joliet, Illinois, to Grafton, Illinois, where it joins the Mississippi River which flows south to the Gulf of Mexico. By river, the Emiquon Complex is approximately 232 kilometers (144 river miles) downriver from the beginning of the Illinois River and 193 kilometers (120 miles) upriver from the Mississippi River. The portion of the Illinois River catchment upriver of the complex is approximately 47,394 square kilometers (18,300 square kilometers). The catchment of the Illinois River above Emiquon is mainly dominated by row-crop agriculture with additional influences from urban areas such as Chicago and Peoria. The approximate catchment of Spoon River is 4804 square kilometers (1855 square miles) and of Quiver Creek is 676 square kilometers (260 square miles); both are dominated by row-crop agriculture.

18. Hydrological values: Modelling by the Illinois State Water Survey indicates the leveed portions of the Emiquon Complex could have significant effects on reducing unnaturally high water levels of 50-year floods. Depending on the management of water control structures, these wetlands also can be efficient sediment traps and be important for cycling and managing nutrients and pollutants, improving water quality of the Illinois River.

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • TP TS • U • Va • Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

Areal extent (hectares) of Ramsar wetland types at the Emiquon Complex

	Chautauqua NWR	Emiquon NWR	Emiquon Preserve	Total Emiquon Complex	Complex and surrounding area
TS	1,009	534	867	2,411	2,925
TP	267		954	1,221	1,634
NON-Wetland	115	219	571	905	3,174
XF	525	265	67	857	1,663
O		0	263	263	280
M	25	32	2	59	643
9		13	-	13	17
Totals	1,941	1,063	2,724	5,729	10,336

20. General ecological features: A major force that contributes to the presence, richness, abundance and interactions of the major biota in river-floodplain systems is the flood pulse (Junk, Bayley & Sparks 1989). This is a highly dynamic ecosystem in which cycles of seasonal flooding provide reset mechanisms which deposit sediments and build new banks and beaches. These functions which cause disturbance and recovery are important reset mechanisms to a healthy river system. Just as a prairie is sustained by natural fires, a river system and associated plants and animals depend upon the periodic advance and recession of flood waters across their floodplain (USFWS 2004).

Moist soil plants, such as the federally-listed endangered plant Decurrent False Aster, rely on the exposure of freshly-deposited mud flats for regeneration (Schwegman & Nyboer 1985; USFWS 2004). Submerged aquatic vegetation provides essential habitat for many fish, is an essential food source for many mammal and bird species, and supports invertebrates.

Historically, flood cycles associated with the Illinois River were characterized by two peaks: a major one in spring and a smaller one in fall. The construction of levees, channels, locks and dams has altered the natural structure and function of the river floodplain relationship. The seasonal hydrologic fluctuations that normally provide the vehicle for transfer between the floodplain and the river have been modified. Vast floodplain areas have been virtually excluded from the river system through dike and levee construction (USFWS 2004).

The Illinois River was once among the most biologically productive rivers in the United States River and is still home to more than 100 fish species (USFWS 2004). As recently as the 1950s, the waters of the Illinois River and its associated tributaries were counted as among the great inland commercial and sport fisheries.

21. Noteworthy flora: Hooded Arrowhead (*Sagittaria calycinus*) provides food for migrating waterfowl. Cottonwood trees (*Populus deltoides*) provide perching and nesting sites for the formerly threatened Bald Eagle and nesting by herons and egrets (*Ardea*). Floating aquatic plants such as the American Lotus (*Nelumbo lutea*) and White Pond Lilly (*Nymphaea tuberosa*) as well as submersed aquatic vegetation such as Coontail (*Ceratophyllum demersum*), Bushy Pondweed (*Najas guadalupensis*), Spotted Pondweed (*Potamogeton pulcher*), Longleaf Pondweed (*Potamogeton nodosus*), Sago Pondweed (*Potamogeton pectinatus*) and Small Pondweed (*Potamogeton pusillus*) support a robust aquatic macroinvertebrate community and provide foraging and nursery areas for a variety of native fishes and water birds.

Invasive submersed aquatic vegetation on the complex includes Eurasian Water Milfoil (*Myriophyllum spicatum*) and Curly Leafed Pond Weed (*Potamogeton crispus*). Invasive terrestrial plants within the complex include Reed Canary Grass (*Phalaris arundinacea*), Garlic Mustard (*Alliaria petiolata*), Bush Honeysuckle (*Lonicera maackii*), Purple Loosestrife (*Lythrum salicaria*) and Johnsongrass (*Sorghum halepense*).

22. Noteworthy fauna: The formerly federally threatened Bald Eagle is relatively common on the complex, both resident nesting birds and more abundant wintering birds with a peak one-day population of 167 wintering eagles on EP alone (Hine et al 2010). Trumpeter Swan (*Cygnus buccinator*), Tundra Swan (*Cygnus columbianus*), Sora (*Porzana carolina*), Yellow Rail (*Coturnicops noveboracensis*), Horned Grebe (*Podiceps auritus*), American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), and American White Pelican (*Pelecanus erythrorhynchos*) have all been documented on the complex. Rare fishes such Redspotted Sunfish (*Lepomis miniatus*) and Starhead Topminnow (*Fundulus dispar*) and prehistoric fishes including Bowfin (*Amia calva*), Paddlefish (*Polyodon spathula*) and Spotted Gar (*Lepisosteus oculatus*) are found within the Emiquon Complex.

The Illinois River once supported 49 species of freshwater mussels and the highest mussel abundance per mile of any stream or river on the continent. Backwater areas such as the Emiquon Complex flowed high quality food to the riverine mussel communities and provided essential habitats for many life stages of fishes that serve as hosts for mussel glochidia. Native mussel species that occur within the complex include the Flat Floater (*Anodonta suborbiculata*) and the Common Floater (*Anodonta grandis*) with more diverse mussel populations in the adjacent river.

Significant exotic and/or invasive animal species within the complex include Mute Swan (*Cygnus olor*), Cattle Egret (*Bubulcus ibis*), Starling (*Sturnus vulgaris*), Eurasian Tree Sparrow (*Passer montanus*), European House Sparrow (*Passer domesticus*), Asiatic Clam (*Corbicula fluminea*), Zebra Mussel (*Dreissena polymorpha*), Goldfish (*Carassius auratus*), Grass Carp (*Ctenopharyngodon idella*), Common Carp (*Cyprinus carpio*), Bighead Carp (*Hypophthalmichthys nobilis*), and Silver Carp (*Hypophthalmichthys molitrix*).

23. Social and cultural values: Historic and current social and cultural values of the Emiquon Complex are numerous and varied. People have been here for millennia, but their role in the ecosystem and impact on the landscape has changed substantially. From Native American hunter/gatherers adapting to seasonal and spatial variation in resources to contemporary school children learning about wetland restoration, the importance of this place is still being realized.

Cultural values: Within and immediately adjacent to the complex, hundreds of archaeological sites have been documented that chronicle landscape and human history. The considerable substance of archaeological research in the region is articulated at Dickson Mounds Museum, a 5760-square-meter (62,000-square foot) educational facility located on a bluff overlooking the Emiquon Complex.

It is this landscape that so similarly shaped Native American and Euro-American cultures in the region. The rich biota of terrestrial and aquatic habitats attracted Native Americans for more than 10,000 years and Euro-Americans for the past three centuries. The Emiquon Complex has long been a source of subsistence resources. By the end of the 19th century, commercial fishing, harvesting mussels, and market hunting of waterfowl, began to rise in importance. Many factors contributed to habitat degradation and loss, which adversely impacted the ecosystem and the subsistence/commercial resource potential, but this trend was reversed by the establishment of the CNWR in 1936 and now accentuated by the wetland restoration embodied by ENWR (established in 1993) and EP (established in 2000).

Social Values: Today, the success of the Emiquon Complex creates new opportunities in the form of education, recreation, tourism, and economic development, in addition to scientific research and the advancement of restoration ecology and management. The formation of the Emiquon Partnership, consisting of The Nature Conservancy, US Fish and Wildlife Service, Illinois State Museum—Dickson Mounds, and the University of Illinois—Springfield and its several affiliates, has created a synergy felt throughout the region and beyond. Among the accomplishments of the partnership to date:

- Fostering a variety of scientific research from archaeology to zoology, and many topics in between, that inform us about landscape and human history and myriad dimensions of the dynamics of the ecosystem and restoration ecology and management.
- Development and on-going implementation of an education plan that includes K through grey curriculum and a variety of opportunities for the public to learn about nature, human and landscape history, and the value and challenges of restoration. The plan draws on both traditional and non-traditional pedagogy and promotes in particular hands-on, minds-on field experiences for students of all ages and museum exhibits for close-up consideration of relevant topics. The recent release of a website, Experience Emiquon (experienceemiquon.com), provides a means of articulating the full breadth and depth of this enterprise to a world-wide audience.
- The on-going formulation and implementation of a recreation plan that provides opportunities ranging from quiet exploration by canoe/kayak to fishing and waterfowl hunting in restricted areas while securing substantial portions of the wetland/terrestrial landscape for the essentially unfettered dynamic of the ecosystem. The construction of EP wetland and lakeside observatories and associated infrastructure—completed in 2011, they include a variety of educational exhibits inviting visitors to take a close-up look at the re-birth and renewal of wetlands and the remarkable power of Nature to heal.
- The investment in education and recreation naturally promotes tourism and in turn economic development. Chautauqua/Emiquon and Dickson Mounds Museum are prominent attractions on the Illinois River Road National Scenic Byway. Whereas CNWR and Dickson Mounds Museum have long attracted the public to the region, the addition of the EP and ENWR has been a powerful impetus that has elevated the public prominence of this place.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No.

24. Land tenure/ownership:

a) within the Ramsar site: Land ownership within the complex is divided between the US Fish and Wildlife Service (52%) and The Nature Conservancy (48%). The CNWR was established in 1936 when the US Biological Survey (now the US Fish and Wildlife Service) acquired the Chautauqua Drainage and Levee District that had been abandoned in 1927; since then, it has been one of the most important areas in the Illinois River valley for migratory birds, especially waterfowl and shorebirds. The Service established ENWR in 1993. The Nature Conservancy purchased EP in 2000 and began restoration in 2007.

b) in the surrounding area: Land ownership in the surrounding area is divided between state and private land holdings. Immediately adjacent to the complex is the state-owned Dickson Mounds Museum and private residential and agricultural land. Within a 15-km (roughly 10-mile) radius of the complex there exist both state and private land holdings. State land holdings consist of wildlife areas such as Spring Lake State Fish and Wildlife Area and Sand Ridge State Forest. Private land holdings primarily consist of agricultural, residential, light commercial, and relatively small urban areas (primarily Havana, Lewistown, Forest City, and Manito).

25. Current land (including water) use:

a) within the Ramsar site: Conservation is the priority within the Emiquon Complex with management focused on restoring and maintaining high-quality natural habitats and ecological processes that support the abundant and diverse

native fish and wildlife communities. A variety of spatial and temporal restrictions on public access provide sanctuary areas for fish and wildlife. Human uses within portions of the complex include hiking, boating, wildlife viewing and photography, and hunting. The Emiquon Complex is also used extensively by researchers and educators.

b) in the surroundings/catchment: The Emiquon Complex is situated within Mason and Fulton Counties. Much of the surrounding area is agricultural land used primarily for growing corn and soybeans. The surrounding catchment is small and dominated by agricultural land. It is part of the Illinois River watershed.

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

Much of the land within the Emiquon Complex was isolated from the river by constructed earthen berms or levees in the early 1900s for conversion to agriculture. With the conversion of these lands from agriculture back to floodplain wetlands, these levees are being maintained as they provide an important tool for helping manage many potential negative impacts associated with the Illinois River (e.g., invasive species, altered hydrology, heavy sediment load, and other pollutants). More recently constructed water control structures in these levees allow for ecological processes including the managed flow of water and organisms between the river and the restored wetlands in the former natural floodplain of the complex. Planning is underway to install such structures in levees that currently do not have them.

Areas of the complex that are not protected by levees have been subjected to high sedimentation rates, pollution, altered hydrology, and invasive species associated with the Illinois River.

Dramatic changes in the hydrology of the Illinois River including more frequent and greater magnitude floods and elimination of natural low water periods threaten natural wetland habitats within the complex. However, water level management via levees and water control structures effectively abates these threats on leveed lands.

Invasive Species: Major invasive animal species within the complex and in the surrounding area include Asiatic Clam (*Corbicula fluminea*), Zebra Mussel (*Dreissena polymorpha*), Grass Carp (*Ctenopharyngodon idella*), Common Carp (*Cyprinus carpio*), Bighead Carp (*Hypophthalmichthys nobilis*), and Silver Carp (*Hypophthalmichthys molitrix*). Invasive plant species include Eurasian Water Milfoil (*Myriophyllum spicatum*), Curly Leafed Pond Weed (*Potamogeton crispus*), Reed Canary Grass (*Phalaris arundinacea*), Garlic Mustard (*Alliaria petiolata*), Bush Honeysuckle (*Lonicera maackii*), Multiflora rose (*Rosa multiflora*), Purple Loosestrife (*Lythrum salicaria*), and Johnsongrass (*Sorghum halepense*).

b) in the surrounding area:

Habitat Loss: Approximately 90% of original wetland acreage has been lost in Illinois (Suloway & Hubbell 1994). Such wetlands contribute habitat and key ecological processes that sustain a diversity and abundance of native animal and plant communities.

Hydrology: The hydrology of the Illinois River has been dramatically altered by a combination of factors throughout the basin including loss of wetlands and associated water storage, poorly managed stormwater in both rural and urban environments, and channelized streams. As a result, more water gets to the river more quickly, and floods are more pronounced. In addition to more frequent and severe spring floods, the frequency of significant flooding at other times of the year is increasing. Frequent flooding during the growing season is especially detrimental to wetland plant communities. Modern navigation dams constructed on the Illinois River in the 1930s to facilitate commercial barge traffic eliminated seasonal low water levels that had been important for natural conditioning of wetland sediments by drying, consolidation, and aeration; without such conditioning, aquatic sediments are easily resuspended by wind- or boat-generated waves, reducing water transparency and light penetration needed by aquatic plants. Such unconsolidated sediments also provide poor anchorage for rooted plants, allowing them to be pulled from the bottom by waves.

Climate Change: With the combination of climate change causing greater extremes in weather patterns and modification of rivers for navigation and land use purposes, intensification and devastation of flooding and runoff will likely increase. However on most complex lands, levees and water control structures will be used to manage most of the negative impacts.

Sediment Dynamics: Sediment dynamics along the Illinois River have been dramatically modified due to land use changes and the construction of levees, channels, navigation dams, and seasonal hydrologic fluctuations that normally provide the vehicle for transfer between the floodplain and the river have been altered. Lands remaining connected to the river have been subjected to extremely high sedimentation rates and associated habitat degradation. However, those vast floodplain areas that have been virtually excluded from the river system by constructed levees have been protected from extreme sedimentation which can be managed with appropriate water control capabilities.

Pollutants: The major potential pollutants include pesticides, herbicides or fertilizers from agriculture runoff in the catchment of the complex and the Illinois River and municipal and industrial pollutants associated with the river.

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site: Parts of the complex have been designated as an "Important Bird Area" and accepted into the "Western Hemisphere Shorebird Reserve Network" (USFWS 2004). All lands in the CNWR and ENWR are designated and protected as part of the federal refuge system.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate): One of the IUCN categories listed for protected areas currently applies (IV. Habitat/Species Management Area), though no formal designations have been made:

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

CNWR and ENWR are part of the Illinois River National Fish and Wildlife Refuges; the Comprehensive Conservation Plan and Environmental Assessment for the Illinois River National Wildlife and Fish Refuges (15 year plan) was approved in 2004 and is being implemented.

An adaptive management plan for EP is being implemented based on the document Key Attributes and Indicators for Illinois River Conservation Targets at The Nature Conservancy's Emiquon Preserve (The Nature Conservancy 2006).

d) Describe any other current management practices:

Habitat management of the Emiquon Complex consists of a combination of active and passive management. Management seeks to mimic natural processes where possible in this highly modified ecosystem. Such actions include managing water levels by gravity flow and pumping, prescribed burning, and chemical and mechanical control of invasive plant species. Due to the loss of much of the historical riparian, wetland and upland habitats, management intensity must be increased to meet fish and wildlife needs within the areas remaining to support them. Reconnection of habitats to the river is an important part of management, but must be highly regulated (USFWS 2004). Fish stocking is used to maintain a diverse native fishery. Existing forest, prairie and wetland plant communities are augmented by plantings.

28. Conservation measures proposed but not yet implemented: Planning is underway for construction of additional water control structures in levees and increased pumping capacity to better manage water levels, river connectivity, and the supported plant and animal communities.

29. Current scientific research and facilities: For well over a century, scientists have been drawn to the complex by the phenomenal natural abundance and diversity of the area. North America's first inland field station for aquatic research was established by Stephen A. Forbes in 1894 on the bank of the Illinois River adjacent to the complex. Currently the Illinois Natural History Survey operates two field stations in the area: Forbes Biological Station on CNWR and Illinois River Biological Station adjacent to the complex in Havana. In 2008, the University of Illinois Springfield opened the Therkildsen Field Station at Emiquon on the complex. The adjacent Dickson Mounds Museum has been a center for archaeological research for nearly a century. The headquarters for the USFWS's Illinois River Refuges is located on the CNWR and the Conservancy's Illinois River Program maintains office and associated facilities on EP. Collectively, these facilities provide resident and visiting scientists and students with laboratory, office, living, meeting, and equipment storage and maintenance space.

Currently a dozen organizations/agencies/universities are engaged in scientific efforts at the complex including monitoring and research on water quality, microbial ecology, phytoplankton, zooplankton, macroinvertebrates, migratory and resident birds, fish, mammals, wetland and upland vegetation, human use, and archaeology. Much of the on-going research is being used to provide feedback for adaptive management of the complex. Additionally, research results and lessons learned are being shared with partners and others to influence floodplain restoration and management elsewhere. Recent international visitors to Emiquon include students, scientists, and agency administrators from France, China, Brazil, Japan, and India.

An Emiquon Science Symposium attracts up to 130 participants annually. Emiquon has been the focus of special symposia/sessions at recent state and regional conferences/meetings including the Governor's Conference on Management of the Illinois River, Midwest Fish and Wildlife Conference, Joint Annual Meeting of the Illinois Chapter of the

American Fisheries Society and the Illinois Lake Management Association, and Annual Meeting of the Midwest/Great Lakes Chapter of the Society for Ecological Restoration (which included a field trip to the Emiquon Complex).

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

The Dickson Mounds Museum functions as a visitor center for the complex, with an additional three strategically placed educational kiosks and six interpretive panels that provide visitors an understanding of the history and management of the complex and the plant and animal communities present. The complex includes multiple "waypoints" of the Illinois River Road National Scenic Byway and is promoted through efforts of the Byway including brochures and a web site: <http://www.illinoisriverroad.org/index.cfm>

The complex has six walking trails totalling 15 kilometres (9.5 miles) and two driving loops totalling 14.5 kilometres (9 miles) that provide visitors opportunities to view a diversity of wetland habitats and the correspondingly diverse and abundant wildlife they support. In 2011, over \$2 million of new visitor use infrastructure (walking trail, boat/canoe/kayak launches, board walks, and interpretive materials) was completed.

Education and interpretive plans were completed for Emiquon in 2006 and 2007, and the complex is used for primary, secondary, college/university, and general public education. Through partnerships with the Dickson Mounds Museum and the University of Illinois Springfield's Therkildsen Field Station, a variety of special education programs and lectures are provided for the public. Frequent press releases inform the public of special events at the complex. A variety of information including research and conferences at or near the Emiquon Complex, news, history, events and recreation can be viewed at the web site: <http://www.experienceemiquon.com/>

31. Current recreation and tourism:

A variety of recreational activities are allowed on portions of the complex including wildlife viewing (especially birding) and photography, boating, fishing, hiking, and hunting. Annual visitor use of the complex was estimated at 34,000 in 2009 and is increasing. The section of the Illinois River Road National Scenic Byway that traverses the complex averages 3350 vehicles per day.

32. Jurisdiction: CNWR and ENWR are owned by the United States Federal Government and managed by the US Fish and Wildlife Service. EP is owned and managed by The Nature Conservancy.

33. Management authority:

Lee Albright, Refuge Manager
US Fish and Wildlife Service
Illinois River National Wildlife and Fish Refuges
19031 East County Road 2110
Havana, Illinois 62644
PHONE 309-535-2290
EMAIL Lee_Albright@fws.gov

K. Douglas Blodgett, Director of River Conservation
The Nature Conservancy
11304 North Prairie Road
Lewistown, IL 61542
PHONE 309-547-2730
FAX 309-547-2731
EMAIL: dblodgett@tnc.org

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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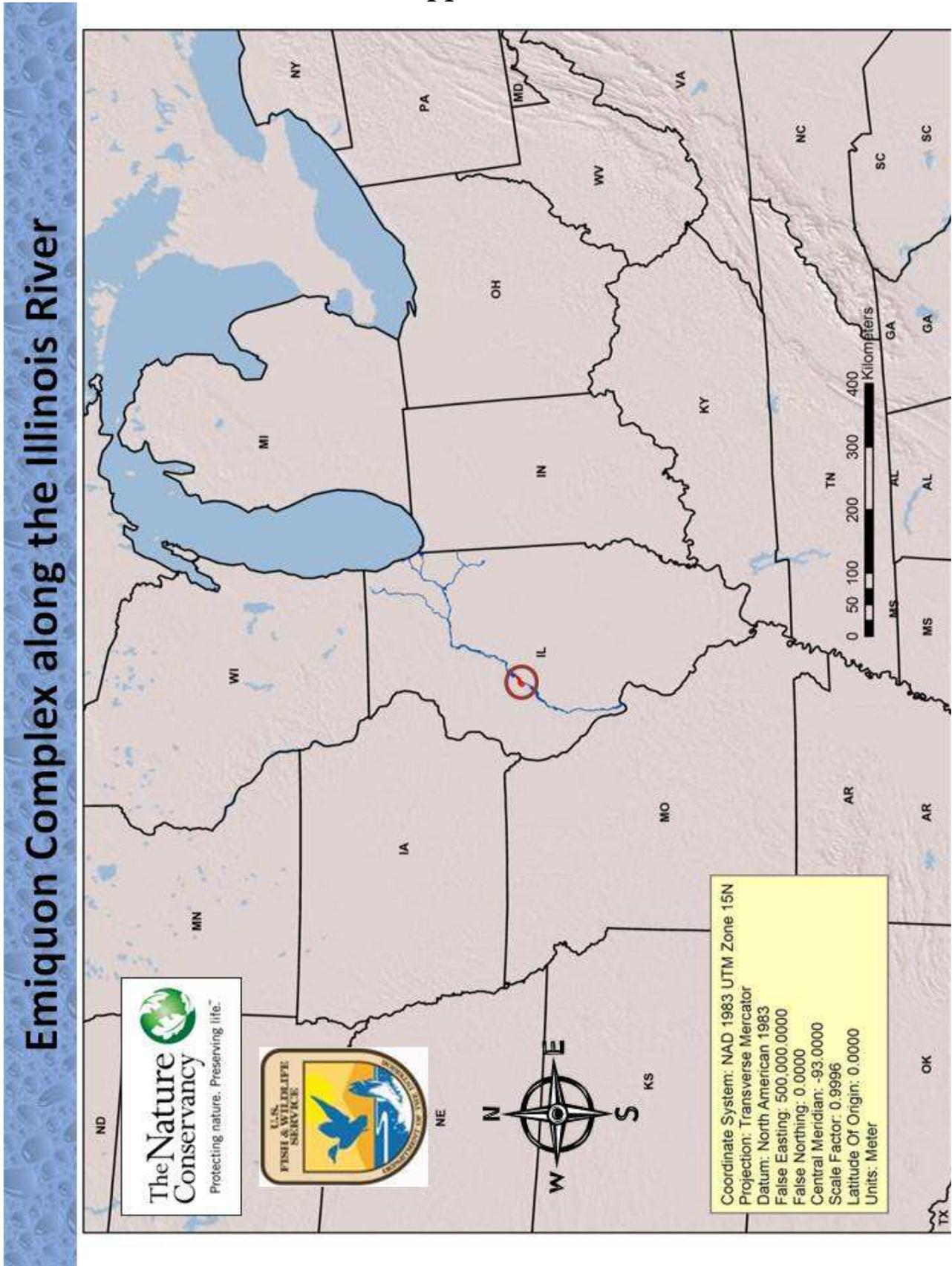
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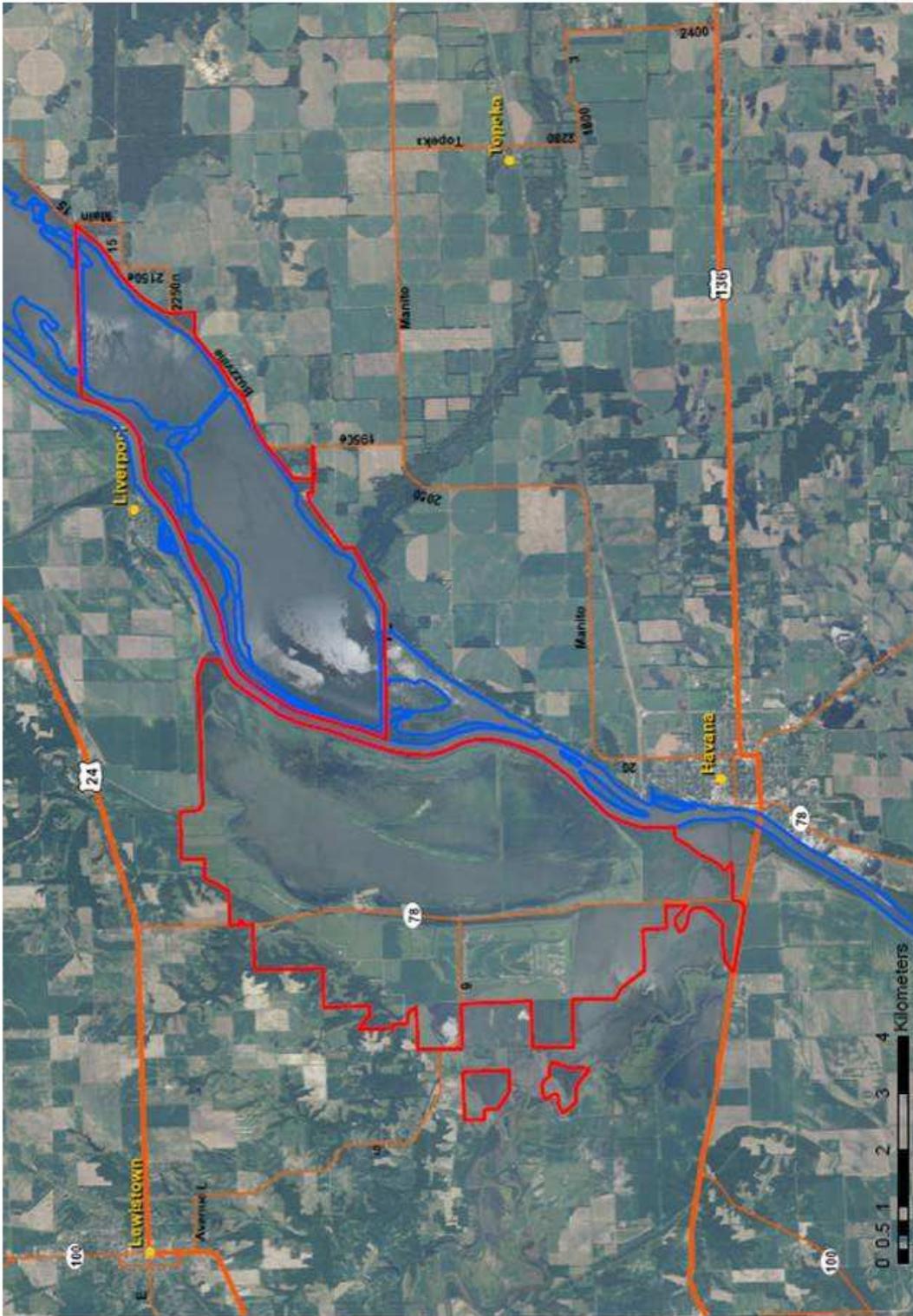
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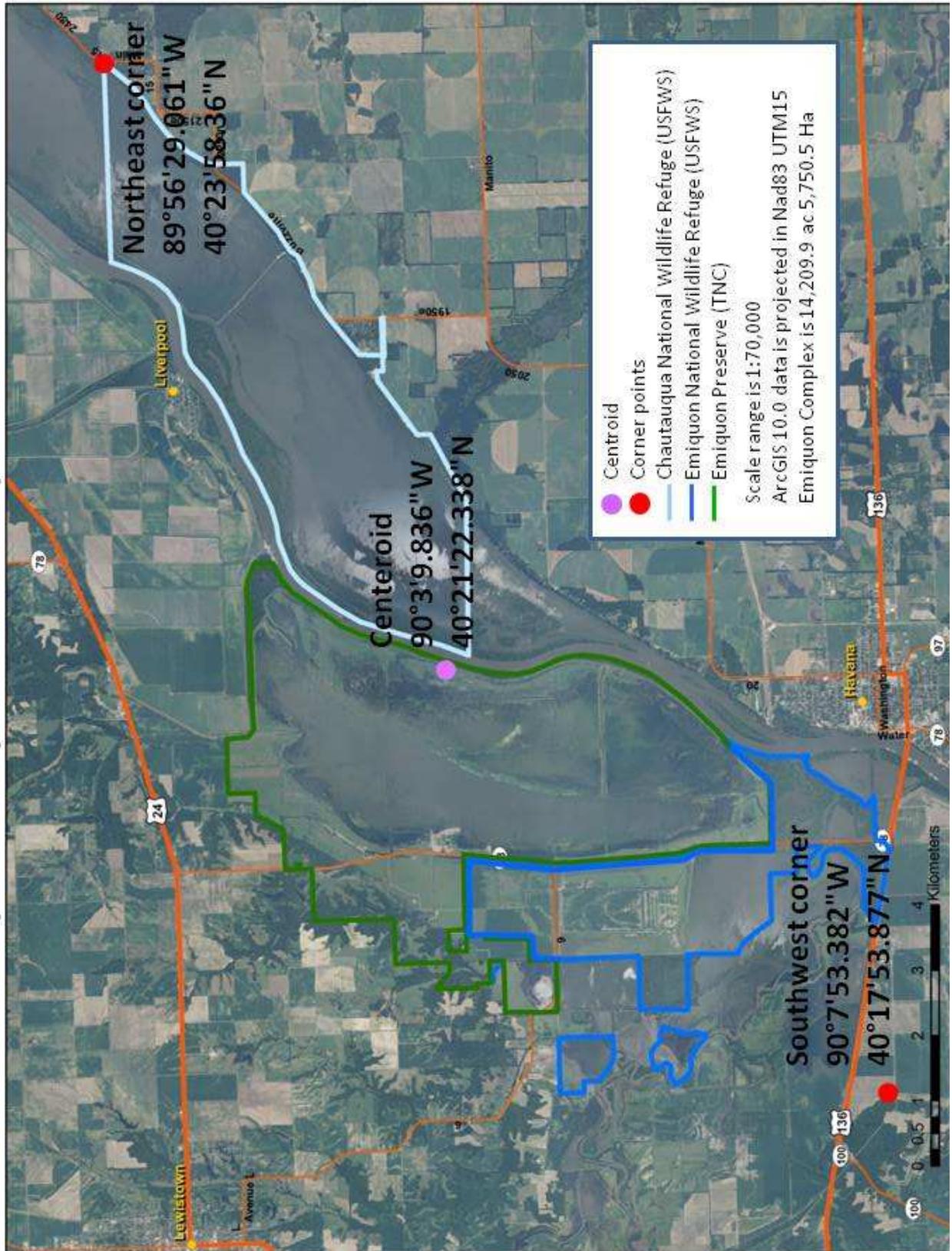
Appendix



Emiquon Complex Proposed Designated Lands



Emiquon Complex Ownership Boundaries



Emiquon Complex Habitat Types

