

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



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Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

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

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Designation date

Site Reference Number

2. Date this sheet was completed/updated:

2011

3. Country:

United States

4. Name of the Ramsar site:

Cache River and Cypress Creek Wetlands Area

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:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

- i) the boundary has been delineated more accurately ; or
ii) the boundary has been extended ; or
iii) the boundary has been restricted**

and/or

If the site area has changed:

- i) the area has been measured more accurately ; or
ii) the area has been extended ; or
iii) the area has been reduced**

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site: At the time of dedication (1/11/94), land owned and managed by members of the Cache River Joint Venture Partners (Illinois Department of Natural Resources/IDNR, U.S. Fish and Wildlife Service/USFWS,

The Nature Conservancy/TNC, and Ducks Unlimited/DU; hereafter referred to as the JVP), totalled 14,164ha/34,985 acres (Cypress Creek National Wildlife Refuge, Cache River State Natural Area, Horseshoe Lake Conservation Area). In 1999, TNC purchased 1,082ha (2,673 acres) known as the Grassy Slough Preserve, and both the USFWS and the IDNR continue to purchase land within defined purchase boundaries as opportunity allows. As of 31 December 2006, public land owned by the Cache River JVP within the dedicated area totalled 20,050ha (46,525 acres). The USDA-Natural Resources Conservation Service became a signatory member of the JVP in 2006, which recognized the significant contributions of private agricultural lands to the character and sustainability of a large biological reserve. The NRCS has currently enrolled almost 4,049 hectares (10,000 acres) within the project area in the Wetland Reserve Program. In addition, the acquisition boundary for the Cache River SNA is currently being re-defined to include the riparian corridor along the Cache River northward to the area known as Cypress Pond. Cypress Pond is a 506ha (1,267 acre) state-owned (IDNR) natural area that occurs along the headwaters of the Cache River approximately 4 miles north of the existing property boundary of the Cache River project area. Public ownership of this area could add another 810 – 1,215ha (2000 – 3000 acres) to the publicly managed area and would provide a continuous corridor of riparian (aquatic, riverine, bottomland forest, forested swamp and upland buffer) habitat to the JVP project area. Concurrently, an acquisition boundary for Horseshoe Lake Conservation area is being developed to expand public ownership and conservation management in that sub-watershed to provide additional wetland habitat and assure the sustainability of critically imperiled natural communities and species at that site. It is anticipated that ongoing refinement and qualification of acquisition boundaries will encourage and enable coordinated management of thousands of acres of public and private land within the boundaries of the watershed. Flexibility inherent in “living” project boundaries that will include key portions of the floodplain of the Cache River as they are identified will enable landscape-scale hydrologic restoration that will assure the sustainability of essential natural communities and wetland-dependent species targeted for protection. At the time of this writing, acreage added outside of the current dedicated area is not being submitted as an expansion of the site boundary. The additional acreage should be considered as buffer. However, as large contiguous tracts are added and restoration and management of these areas restores ecological function, consideration will certainly be given to expanding the official Ramsar boundary to include this acreage.

The above mentioned changes reflect a dramatic improvement in ecological character subsequent to an increased emphasis on integrated management efforts designed to specifically enhance natural community structure and function. However, it is the synergistic evolution of resource management that accepts the role of every landowner within the watershed boundaries that will eventually result in unprecedented shifts in ecosystem health and viability. Large areas of public land managed specifically for the restoration, preservation and management of natural resources along with private land where degradation is managed through the implementation of Best Management Practices will create a true bioserve that is both viable and sustainable.

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 boundary of the Cache River and Cypress Creek Wetland Area was originally delineated as that which occurred within a 24,281ha (60,000 acre) purchase boundary/acquired area shared by the

USFWS (Cypress Creek National Wildlife Refuge), and the Illinois Department of Natural Resources (Cache River State Natural Area, Horseshoe Lake Conservation Area). The entire area occurs within the Cache River watershed. While this criterion continues to define the boundaries of the area that was recognised as a Ramsar Wetland, it is important to note that purchase boundaries for state macrosites are continually evaluated and updated to provide for the viability of natural communities and species being managed within a particular site. While management of these public lands is conducted independently according to resource needs sorted by both site and managing entity/owner, management within and between individual tracts is now coordinated to maximize ecological benefits throughout the entire complex. The current Joint Venture project area, which includes the purchase boundary and existing holdings of the JVP includes the previously established Ramsar Site boundaries. However, ongoing refinements to acquisition boundaries of both the Cache River State Natural Area and the Horseshoe Lake Conservation Area will help to more accurately delineate the actual extent of publicly owned lands that make up the core area and parts of the transitional area within the larger macrosite. In addition, the increased involvement of the USDA-NRCS (subsequent to their addition as a signatory member of the JVP), helps to assure the viability of the Cache River and Cypress Creek Wetlands area by establishing a working dialogue between public and private landowners. Together, public and private lands combine to form the core area, transitional zone and buffer that are essential components of a functional and sustainable biosphere reserve (bioreserve).

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
37 03' 45" - 37 23' 30"N; 88 52' 30" - 88 23' 30" W

9. General location:

The Cache River and Cypress Creek Wetlands Area is located in the midwestern United States in the southernmost part of the State of Illinois immediately north of the confluence of the Ohio and Mississippi Rivers. The area occurs in its entirety within the watershed of the Cache River and extends throughout most of Union, Johnson, Alexander, Pulaski, Massac and Pope Counties in extreme southern Illinois. The area is approximately 150 miles south of the City of St. Louis.

The project area occurs within Illinois U.S. Congressional Districts 12 and 19.

The entirety of the Cache River watershed occurs within the New Madrid Wetlands Project Area of the Lower Mississippi Valley Region established by the North American Waterfowl Management Plan (completed by the U.S. Fish and Wildlife Service in 1986).

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

Elevation ranges from **271.5 meters above msl** in the northernmost portion of the project area down to **85.4 meters above msl** in the southernmost extent where the Cache River drains into the Mississippi River.

11. Area: (in hectares): 24,281 ha

12. General overview of the site:

The Cache River and Cypress Creek Wetlands Area currently includes 17,505 hectares (43,237 acres) owned and managed by members of the Cache River Joint Venture Partnership (JVP). In addition, the USDA-Natural Resources Conservation Service became a signatory member of the JVP in 2006, which recognizes the significant contributions of private agricultural lands to the character and sustainability of a large bioreserve. The NRCS has currently enrolled almost 4,049 hectares

(10,000 acres) within the project area in the Wetland Reserve Program. This brings the land in public ownership or easement within the JVP project area to 22,554 hectares (55,708 acres).

The Cache River watershed lies at the “biological midpoint” of North America, being one of only 6 places in the U. S. where 4 or more major physiographic regions intersect. Floodplain forests in the basin contain a greater diversity of bottomland tree species than any other stream in Illinois, including individual bald cypress trees over 1,000 years old and 12 individual trees recorded as state champions. Researchers have cataloged 128 breeding songbird species, 49 species of mammals, 32 amphibian species, 43 reptile species, 84 freshwater fish species, 47 native mussel species, 34 crustacean species and more than 430 macroinvertebrate species within the confines of the project area. There are 62 areas within the Cache watershed recognised by the Illinois Nature Preserves Commission as important for their natural character, including 8 dedicated Nature Preserves and 60 Illinois Natural Area Inventory sites. Although the Cache River basin makes up only 1.5% of the land area in Illinois, it contains 23% of the remaining high-quality barrens habitat remaining in the state, 11.5% of the high-quality floodplain forest habitat, 91% of the high-quality forested swamp and 42% of the high quality shrub swamp.

13. Ramsar Criteria:

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

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

1. Criterion 1- Existence of a rare or unique example of a representative wetland within the appropriate ecoregion: Forested wetlands and forested swamps dominate the landscape within the Cache River and Cypress Creek Wetlands Area. The area is best known for its high quality examples of forested swamps that occurs in a 1,284ha, (3,171 acre) riparian corridor along the Lower Cache River. The larger area within which these swamps occur is best detailed by Gough (2006) as the Middle Cache Valley. It is approximately 15.63 km (9.25 miles) long and averages roughly 0.8km (one-half mile) wide. The entire area represents the northernmost extension of the Mississippi Embayment occurring within the Coastal Plain and the Mississippi River Alluvial Plain ecological regions. High quality examples of forested swamps dominated by bald cypress and water tupelo are rare throughout the Coastal Plain, but are especially rare this far north in the United States. Because of the inaccessibility and excessive flooding that typical of the area, much of these swamps have remained essentially undisturbed to the present day. Many individual trees in the Lower Cache River exceed 1,000 years in age. Although the Cache River Watershed covers only 1.5% of the land area in Illinois, it contains 91% of the remaining high-quality forested swamp and 42% of the high quality shrub swamp remaining in the state.
2. Criterion 2 – Does the wetland support vulnerable, threatened, endangered or critically endangered species or natural communities? The Illinois Natural Heritage database records 103 species considered critically imperiled (77 classified as Endangered, 26 as Threatened) in the Cache River watershed. This number represents approximately 20% of the plants and animals classified as such in the state of Illinois. Species included in this list include 41 Endangered and 7 Threatened plant species, 36 Endangered and 19 Threatened animal species. These numbers include 5 federally endangered animals (2 birds – bald eagle (*Haliaeetus leucocephalus*), least tern (*Sterna antillarum*); 2 mammals – gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*); 1 mussel – fat pocketbook (*Potamilus capax*).
3. Criterion 3 – Does the wetland support plant and/or animal species important for maintaining biological diversity within the ecoregion? Because of the areas physiographic location at the

juncture of 4 ecological provinces (one of only 6 locations in the continental U.S. where this phenomenon occurs), a complex collection of ecological variables converge to create an area of incredible biological diversity. Within the Cache River and Cypress Creek Wetlands Area, forested swamps typically associated with southern ecosystems intrude northward into the Shawnee Hills where barrens and glades display vegetation typical of prairie habitat once dominant within the Interior Low Plateau. It is within this landscape context that biologists have documented short-eared owls (*Asio flammeus*), upland sandpipers, (*Bartramia longicauda*), western meadowlarks (*Sternella neglecta*), prairie falcons (*Falco mexicanus*), and northern harriers (*Circus cyaneus*), alongside Cinnamon teal (*Anas cyanoptera*), purple gallinules (*Porphyryla martinica*), common moorhens (*Gallinula chloropus*), least terns (*Sterna antillarum*), Mississippi kites (*Ictinia mississippiensis*), fish crows (*Corvus ossifragus*), scissor-tailed flycatchers (*Tyrannus forficatus*), and wood storks (*Mycteria Americana*). In the southernmost portions of this area, birdwatchers have reported even more rare, imperiled and uncommon species such as the anhinga (*Anhinga anhinga*), white ibis (*Eudocimus albus*), glossy ibis (*Plegadis falcinellus*), Swainson's hawk (*Buteo swainsoni*), and the magnificent frigatebird (*Fregata magnificens*). Brant (*Branta bernicla*), Ross' geese (*Chen rossii*), and Barnacle geese (*Branta leucopsis*), have also been reported from the project area. Perhaps most profoundly, W. Douglas Robinson (1996) reports the presence of the Swainson's Warbler (*Limothlypis swainsonii*), a songbird considered by many to be extirpated in the state of Illinois. Robinson and other ornithologists believe that habitat exists within the Cache River basin that may still support a breeding population of this bird. It is a certainty that few places in North America support the diversity and density of migratory waterfowl, wading birds and neotropical migratory songbirds as the Cache River and Cypress Creek Wetlands Area.

4. Criterion 4 – Does the wetland support plant and/or animal species at a critical stage of their life cycles or refuge during adverse conditions? Migratory waterfowl rely heavily on forested and herbaceous wetlands and flooded cropland within the watershed for feeding and resting areas during the fall and spring migrations. Over-wintering water-birds also rely on these habitat types. The Frank Bellrose Waterfowl Reserve and State Nature Preserves (Heron Pond-Little Black Slough, Section 8 Woods, Horseshoe Lake Island) offer sanctuary for ducks and geese in the fall during the hunting season. Biologists consider wetlands within the Cache River essential for the production of aquatic macroinvertebrates that are necessary for assuring the health of spring migrations of migratory waterfowl and shorebirds prior to their return to northern breeding habitats. Herons and egrets are also numerous in the watershed. Large rookeries of over 500 nests occur in swamp forests along the south part of the Cache River near the city of Mounds and at Little Black Slough.
5. Criterion 5 – Does the wetland regularly support 20,000 or more waterbirds? According to Mid-winter waterfowl census (aerial surveys) conducted annually since 1993, weather permitting (censuses conducted 1993, 1994, 1995, 1997, 1998, 2001, 2002, 2003, 2006) at the Cypress Creek National Wildlife Refuge, total waterfowl numbers ranged from 450 to 67,456 individuals. The mean for these counts is 27,609 birds. Researchers note that the exceptionally low number recorded in 1995 (450) was due to low temperatures and widespread heavy ice cover. The Christmas Bird Count (conducted annually during the second week in December since 1993) records waterfowl numbers ranging from 179 to 88,667, with an average count of 36,567 birds for the 13 year period.
6. Criterion 6 – Does the wetland regularly support 1% of the individuals in a population of 1 species of waterbirds? During the fall migration, 20% (136,000 individuals), of the world's population of canvasback ducks (*Aythya valisineria*) are reported to funnel through the Upper Mississippi River area of the Mississippi Flyway, of which the Cache River is a part. It is likely that most of this flock passes through the Cache River and Cypress Creek Wetlands Area during some part of the fall migration and again during the spring migration.

7. Criterion 7 – Does the wetland support a significant proportion of indigenous fish subspecies, species, families, life-history stages, species interactions, and/or populations that are representative of wetland benefits and/or values and subsequently contributes to global biodiversity? Eighty-four native species of fish have been collected from 77 locations scattered throughout the Cache River complex. Statewide, these species account for 44% of the fish documented in the entire state, including 4 species (13%) classified as Threatened or Endangered. The aquatic habitats found in the Cache River area combine to create one of the most biologically diverse areas in Illinois. State Endangered fishes in the region include the cypress minnow (*Hybognathus Haysi*) and bigeye shiner (*Notropis boops*). State Threatened species include the redspotted sunfish (*Lepomis miniatus*) and the bantam sunfish (*Lepomis symmetricus*). Other state Endangered aquatic species documented from the area include the oxbow crayfish (*Orconectes lancifer*).
8. Criterion 8 – Is the wetland 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 Upper segment of the Cache River empties into the Ohio River through the Post Creek Cutoff while the Lower Segment of the Cache River empties into the Mississippi River. These outlets provide for significant biological exchange between the Cache River and its' receiving waters. Flood events within the basin of the Cache River deliver nutrients, organic matter and aquatic macroinvertebrates essential for biological productivity throughout the river continuum. Input from the Cache River and similar tributaries contribute significantly to the productivity of both sport and commercial fisheries within these larger river systems. At the same time, non-game fishes, sport fish and commercial fish access the Cache River to spawn. While many of these fish remain in the Cache River, a great number once again enter the Ohio and Mississippi Rivers during flood events. This biological continuum is an essential component of a viable and sustainable aquatic riverine ecosystem.
9. Criterion 9 – Does the wetland support 1% of an individual species or subspecies of a wetland dependent non-avian species? One of the largest populations of the Illinois Chorus frog (*Pseudacris streckeri illinoensis*) occurs in southern Illinois within the Horseshoe Lake Project area. The entire geographic range of Illinois chorus frogs occurs within 8 counties in Illinois, 7 counties in Missouri, and one county in Arkansas. The Illinois chorus frog is considered so rare it is a former category 2 candidate for federal listing as a threatened species. Recent data indicates there are only 3 viable populations of Illinois chorus frogs in southern Illinois (Alexander, Madison and Monroe Counties) (Brandon and Ballard, 1998). This strongly suggests that a significant number (>1%) of Illinois chorus frogs occur within the project area.

15. Biogeography

a) biogeographic region:

The Cache River – Cypress Creek Wetlands Area occurs within the following Divisions within the Humid Temperate Domain that encompasses the eastern one-half of the United States. Several different ecoregional schemes are referenced to document primary regionalization schemes utilized by various resource agencies, individuals and groups involved with management of natural resources throughout North America. Each of the ecoregional units (Provinces, Natural Divisions, Ecoregions) documented encompasses all or part of the Cache River and Cypress Creek Wetlands Ramsar Site.

- Hot Continental Division

- Subtropical Division

b) **biogeographic regionalisation scheme** (include reference citation):

- Upper East Gulf Coastal Plain, Interior Low Plateau, Ozark Plateau and Mississippi River Alluvial Plain Ecoregions : Ecoregions of the Western Hemisphere – (The Nature Conservancy and NatureServe. 2003. The Upper East Coastal Plain: An Ecoregional Assessment); and (The Nature Conservancy. 2002. Conservation Planning in the Mississippi River Alluvial Plain, Ecoregion No. 42).
- Lower Mississippi Riverine Forest Province and the Eastern (Continental) Broadleaf Forest Province: Ecoregions of the United States. The U.S. Forest Service Hierarchical Framework of Ecological Units – 2 citations, (McNab H.W. and P.E. Avers. 1994. Ecological Subregions of the United States: Section Descriptions. WO-WSA-5. USDA-USFS, Ecosystem Management. Washington, D.C.) and (Bailey R.G. 1976. Ecoregions of the United States (map). U.S. Forest Service, Intermountain Region. Ogden, Utah, USA. Scale 1:7,500,000.).
- Ozark Hills, Shawnee Hills and Coastal Plain Natural Divisions: The Natural Divisions of Illinois (Schwegman, J.E. 1973. Comprehensive Plan for the Illinois Nature Preserves System, Part II: The Natural Divisions of Illinois. Illinois Nature Preserves Commission, One Natural Resources Way, Springfield, Illinois, 62702).

16. Physical features of the site:

Climate

The Lower Cache River and Cypress Creek Wetland Area is located in southern Illinois which occurs in the Humid Temperate Domain as defined by the U.S. Forest Service description of the ecoregions of the United States (Bailey, 1995). Land within this Domain is located in the middle latitudes (30 degrees to 60 degrees N.) Within this Domain, southern Illinois is located between 37° 15' N. latitude and 38° 15' N. latitude (from Fults in Monroe County eastward to Grayville on the Wabash River), and is governed by both warm tropical air masses and cold polar air masses. Because of these contrasting air masses, and the phenomenon of land heating and cooling more rapidly than waters of the ocean, pronounced seasons and strong annual cycles of temperature and precipitation develop in the remote interior of continents. Southern Illinois displays this continental type of climate.

The average annual temperature of southern Illinois ranges from 58 to 60 degrees Fahrenheit. The average growing season of southern Illinois ranges from 185 to 200+ days annually. Average annual precipitation is about 44 inches, although yearly rainfall amounts vary from as low as 22 inches to as high as 74 inches. (Voigt and Mohlenbrock 1964).

It is important to remember that despite this relatively stable macroclimate, a distinct microclimate occurs at local areas which may contrast greatly with the former. Vegetation, topography, landform and exposed bedrock may all combine to dramatically affect climatic conditions at a particular site. Microclimatic weather variations play an important role in determining the location of plant range boundaries, and thus the distribution of plant assemblages which form the vegetative natural communities of Illinois.

Soils

Loess, outwash, and alluvium deposited during the Quaternary Period are the main soil parent materials in southern Illinois. Soils in this part of the state developed in a humid, temperate

climate under forest vegetation. Most forest soils are Alfisols. Alfisols are generally lighter colored and lower in organic matter content and base saturation than their prairie counterpart (Mollisols).

Some soils in southern Illinois are strongly developed because of greater effective age, or relative exposure to weathering during, as well as since the deposition of parent material. A warmer more humid climate in this part of the state also accelerated soil forming processes. Most soil associations in southern Illinois are poorly to well drained depending on slope, landscape position, and groundwater levels (Fehrenbacher et al. 1968).

Soils in southern Johnson, Massac, and Pulaski counties developed from a variety of parent materials. The bottomlands and floodplains developed from alluvium and lake bed sediments, while the upland soils developed from loess, and residuum from weathering bedrock. Soil fertility levels in southern Illinois range from very high to low.

Geology

Southern Illinois landforms are a product of erosional sculpturing of a basic framework of ancient rocks overlain in most places by a surficial blanket of more recent sedimentary deposits. All of the Midwest rests on a pile of layered rocks consisting of sandstone, shale, limestone, and dolomite. These beds of rock are not continuous, and each different rock stratum has a wide range of physical properties and compositions. The rock layers in southern Illinois have not been subject to catastrophic upheavals associated with mountain building. In fact, the layers (which can be seen in quarries or erosion gullies, or along bluff faces) seem to be nearly horizontal. These layers are in fact flexed in the form of broad basins and arches. Although the upper layers of rock have long since eroded from the tops of these arches, they still persist in the concave centers of the basins, which extend far below sea level.

Extreme southern Illinois lies within the Shawnee Hills Division and the Coastal Plain Division as described by Schwegman (1973). The Shawnee Hills is a continuous ridge extending east to west across the state from Battery Rock overlooking the Ohio River to Horseshoe Bluff overlooking the Mississippi Valley. This ridge rises westward into Randolph County where it eventually disappears into the Southern Till Plain. Physiographically, this ridge forms a cuesta, which is a long asymmetrical ridge with a steep slope on the southern face, and a long gentle backslope inclining to the north. Massive sandstone blocks support this cuesta, forming prominent bluffs and cliffs along the south-facing escarpment. The dominant cuesta is composed of Caseyville sandstones of Pennsylvanian age. These rocks are best exposed at such sites as Garden of the Gods, Drapers Bluff, and Ferne Clyffe, where massive sandstone blocks rise to form an impressive escarpment with many cliffs, knobs, and sheer rock faces. Deep road cuts along Interstate 57 and Interstate 24 area also good places to see sandstone layers of Pennsylvanian age (Harris et al. 1977).

South of this major east-west cuesta is a series of smaller parallel cuestas. These southeastward tailing ridges are part of the Lesser Shawnee Hills Section, which is underlain by rocks (primarily sandstone) of Mississippian Age.

South of the Shawnee Hills in extreme southern Illinois is the Coastal Plain Division, which includes the Cretaceous Hills Section and the Bottomlands Section (Schwegman 1973). The Bottomlands Section includes the floodplain of the Cache River and Bay Creek. This vast floodplain was carved out by the ancient Ohio River until it arrived at its' present day course during the late Pleistocene Epoch. Now these bottomlands resemble in physiognomy the great river bottomlands, yet they contain no large watercourse, and the vegetative natural communities display distinct southern affinities. The hills are formed from clays, sands, and gravels. Slopes are steep, erode easily and are subject to severe bank sloughing. Flat terraces and broad bottomlands extend up into hilly areas (Harris et al. 1977).

17. Physical features of the catchment area:

The entirety of the Cache River watershed lies outside of the influence of glaciation, due in large part to the obstacle presented by the east-west hills and bluffs that make up the Shawnee and Ozark

plateaus which border the Cache watershed on its' northern and western boundaries. Following is a brief description of the physiognomy of the different regions that make up the Cache River watershed.

The northern region of the Cache basin includes the Shawnee Hills Section of the Interior Low Plateau Province. Illinois Counties within this part of the watershed include most of Johnson, the eastern one-half of Union and the northern portions of Alexander, Pulaski and Massac. These bluffs and hills reach their peak elevations overlooking the Cache river floodplain and form a northward-tilting east-west division across southern Illinois. The topography is rugged, with steep ravines and numerous areas of exposed bedrock.

The western portion of Union and Alexander Counties are part of the Ozark Plateau, and is considered part of the Ozark Uplift of which most occurs in Missouri. This region is underlain by cherty limestone that is very resistant to erosion and weathering. As in the Shawnee Hills to the north, the Ozarks of Illinois exhibit rugged topography and very steep ravines. Unlike the large pavements and larger rocks and boulders typical of the Shawnee Hills, exposed bedrock in the Ozarks is typically loose gravel and cobble. Sandstone outcrops are not uncommon.

The Coastal Plain encompasses most of the Cache River and Cypress Creek Wetlands Area (Lower Cache Valley). It occurs in Massac, Pulaski and southern Alexander Counties. While mostly flat with little to mild relief, small knolls and low, gently rising ridges are not uncommon throughout the broad alluvial floodplain. This valley was once the bed of the Ohio River. In ancient times shallow oceans extended up the Gulf of Mexico to the base of the Shawnee Hills. Bedrock throughout the Coastal Plain is deeply buried by alluvial sediments. The presence of numerous deepwater aquatic natural communities (linear sloughs, depressional ponds, oxbow lakes, river swamps and lakes) strongly suggests physiognomic features that derive their character from seismic activity and are often referred to as "sunk lands" (Gough, 2005).

The entire floodplain of the Cache River occurs between the Shawnee Hills to the north and the Cretaceous Hills to the south. The valley is mostly buried in recently deposited alluvium. In places within the basin this alluvium is 180 feet deep. In the western half of the area these alluvial deposits are not nearly so thick and limestone bedrock of Mississippian origin outcrops along the southern border of the first terrace of the floodplain. Freshwater springs occasionally emerge at the base of these gravel hills.

Seven major soil Associations occur within the Cache basin (USDA-Soil Conservation Service, 1987):

- I. Darwin – Riley: Dark-colored floodplain soils of fine to moderately fine texture that are poorly drained and often underlain by sand. These soils are often flooded.
- II. Ginat – Weinbach - Sciotoville: Soils of low stream terraces in narrow bottomland sites. These soils are generally level to gently sloping, although short steep slopes do occur where terraces slope into the drainage basins. These soils are moderately well to poorly drained and slowly permeable, and lower terraces are subject to frequent flooding.
- III. Alvin – Roby – Clark: Gently sloping terraces derived chiefly from alluvial materials. Mostly characterized by a fine sandy loam underlain by sandy, silty and clayey substratum. These soils are generally poorly drained and subject to water and wind (sandier soils) erosion.
- IV. Bonnie – Belknap Association: These soils are quite diverse, being level to gently sloping and many are well drained although most are poorly drained. These soils are found throughout the Cache bottomlands and the floodplains of large tributary drainages. Most of these soils are light colored, acidic and loamy, being derived primarily from the weathered outwash from upland reaches of tributary basins. While flooding is typically of short duration where this association is found, rapid runoff does cause frequent flash-flooding and subsequently erosion can be severe.

- V. Alford – Goss: Deep, permeable and mostly weakly developed soils, some mixed with chert. These soils are typically associated with very steep ravines and narrow ridgetops capped with 20-30 feet of fine wind-blown loess underlain by cherty gravel. Often large areas of chert (sand, gravel and cobble) are exposed and erosion can be severe on cropland and pasture areas.
- VI. Hosmer – Zanesville: Gently sloping to moderately steep soils that are well drained, have a fragipan and formed in loess or weathered bedrock composed of sandstone and siltstone. These areas typically display narrow to broad ridgetops with steep, rocky slopes. Surface soils of silty clay or silt loam overlay a brittle compact fragipan.
- VII. Grantsburg – Zanesville: Upland soils similar to Hosmer-Zanesville Association except that here, sandstone bedrock greatly influences the profile development.

18. Hydrological values:

The Cache River valley trends east to west in extreme southern Illinois between the Ohio and Mississippi Rivers. While water within the valley certainly contributes locally to groundwater recharge, its influence is likely negligible at a landscape scale when compared to contributions from these large rivers. The Cache River basin does contribute significantly to floodwater storage and sediment detention. While runoff enters the valley rapidly (tributary slopes in the uplands average 457.2 centimeters per 1.6 kilometers/15 feet per mile), flow velocities through and out of the basin are greatly reduced. The gradient within the floodplain of the middle reaches of the Cache River seldom exceeds 30.48 centimeters per 1.6 kilometers (1 foot per mile) and in the area known as Buttonland Swamp this gradient decreases to an inch or less per mile for a length of nearly 10 miles. Floodwater collects in the Cache basin and is released only very slowly downstream to eventually empty into the Mississippi River. Portions of this water actually drain eastward through the Cache River Levee and empty into the Post Creek Cutoff and subsequently enter the Ohio River.

Recent studies indicate that 1,858,238 metric tons of sediment is retained annually within the river basin. Of this total, 1,285,905 metric tons are retained within the sub-basins where they are being produced (USDA_SCS, 1987). This suggests that while 69% of the sediment produced in the basin remains essentially on-site, 572,334 metric tons are delivered into the river. This volume is slowly decreasing as restoration and management on public and private lands restores hydrologic processes and converts previously farmed wetland areas to native habitat (wetland and forest). Perhaps the greatest reduction in sediment budgets within the Cache River and its tributaries is due to the aggressive implementation of Best Management Practices on private farmland. Restoration of nearly 6,073 hectares (15,000 acres) of wetlands through the USDA – Wetland Reserve Program (permanent conservation easements) has been completed at various sites throughout the watershed. An additional 4,049 hectares (10,000 acres) of previously cropped wetlands have been restored on public lands owned by the JVP. This acreage is particularly significant because it was implemented entirely on previously cropped acreage. Another significant contribution to the diversity and viability of wetland dependent resources in the watershed involves the construction of 54 water retention structures (80.28ha/198.3a of open water wetland and aquatic habitat) in the Big Creek sub-watershed of the Cache River. Big Creek empties into the Lower Cache River at approximately the mid-point of the Cache River and Cypress Creek Wetland Area and has been identified by the Illinois State Water Survey (Demissie et al. 1990) as the largest contributor of silt to the Lower Cache River ecosystem. These impoundments intercept and control runoff of 6% of the watershed area, create 396 acre-feet of floodwater storage and intercept 24,285 metric tons (24,674 tons) of sediment annually. As part of the same project, 13 riffle weirs were constructed within the channel of Big Creek to stop channel incision and arrest lateral gullying and widening to reduce in-channel sources of sediment carried into the Lower Cache River during flood events (Union County SWCD, 2006). Additional stream bank and bed stabilization was accomplished in December of 2005 when 25 riffle weirs were installed in a 5-mile segment of the Upper Cache River. Complimentary to these efforts,

dredging of a 3,900 foot segment of the Lower Cache River was completed in September of 2005. This restoration was the first of an effort to restore deep water aquatic habitat throughout a 1,448,410 centimeter (47,520 foot) segment of the Lower Cache River. Research suggests that water depths in this river segment were once quite variable, but often very deep (up to 15 feet in deeper pools). Excessive sedimentation over the last 50 years has reduced this depth to several inches throughout the area during periods of seasonal low flow. Restoration of basin hydraulics, hydrology and associated ecological processes, natural communities and wildlife habitat throughout the watershed has created a functional and sustainable bioreserve. These efforts will continue to improve the quality, diversity and viability of natural and cultural resources within the watershed, contributing significantly to the health and wellbeing of all of the people, plants and animals that inhabit the region.

Since the establishment of the Cache River Joint Venture Partnership in 1991, approximately 729ha (18,000 acres) of wetlands have been created or restored throughout the watershed on both public and private lands. The Illinois State Water Survey (Demissie and Khan, 1993), reports that a 1% increase in wetland acreage within a drainage area should result in reductions in peak flow in relation to the amount of rainfall ranging from 2.6% to 3.7%. From these statistics we can expect a decrease in peak flows from the watershed ranging from 10.4% – 14.8%. This reduction should result in significant increases in effluent water quality and flood attenuation.

19. Wetland Types

a) presence:

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:

- a) Xf- freshwater, tree-dominated wetlands
- b) W- shrub-dominated wetlands
- c) Ts- seasonal/intermittent freshwater marshes/pools on inorganic soils
- d) Tp- permanent freshwater marshes/pools
- e) 4-seasonally flooded agricultural land
- f) 2- ponds
- g) Y- freshwater springs; oases

20. General ecological features:

- Forests at least 100 acres in size: the Cache River and Cypress Creek Wetlands contain approximately 12,146 hectares (30,000 acres) of terrestrial habitat. Over 10,121 hectares (25,000 acres) of this is forested. The Designated Wetland provides the largest relatively unfragmented forested habitat in Illinois outside of the Shawnee National Forest.
- Wetlands at least 50 acres in size or a complex of wetlands: The Designated Wetland contains an estimated 7,204 hectares (17,791), acres of wetland habitat, which includes forested swamps, shrub swamps, ponds, and aquatic habitat within the river channel. This habitat occurs throughout the riparian corridor of the Cache River. The highest quality remnants of these swamps occur within the Heron Pond-Little Black Slough Nature Preserve, Section 8 Woods Nature Preserve, and the proposed Cache River Land and Water Reserve. Of wetlands within the Reserve, the largest include Little Black Slough (1,244 hectares/3,073 acres), the Lower

Cache River Swamp (1,284 hectares/ 3,171 acres), and Horseshoe Lake (788 hectares/ 946 acres).

- Wildlife concentration areas: The relatively unfragmented corridor of upland forests, floodplain forests, and swamp forests protected within the Cache River and Cypress Creek Wetland Area provide habitat for numerous migratory songbirds. The site supports breeding populations of virtually all songbirds found in the Cache River Watershed. The only documented populations of American redstarts (10-15 pairs) and cerulean warblers (20-50 pairs) in the watershed occur within the designated site. The project area also provides essential habitat for migratory waterfowl and shorebirds. This includes over 100,000 ducks annually (up to 40,000 mallards), up to 200,000 Canada geese under certain weather conditions (severe winters), 150,000 snow/blue geese and 5000 white-fronted geese. A heron rookery occurs within Little Black Slough that contains over 1,000 nests (900 great blue heron, 100 great egret). Bald eagles are seen year round in the Reserve, and have nested successfully throughout the project area (8-13 active nests).
- Wetland restoration sites: Over 18,000 acres of wetlands have been restored within the Cache River watershed. This includes almost 15,000 acres restored on private lands through the USDA-WRP Program, the IDNR C2000 Program, the State Stewardship Grant Program funded by the Natural Areas Acquisition Fund and the USFWS Private Lands Program. Wetland restoration implemented on public land within the project area totals nearly 3000 acres. This amount is expected to increase annually until land acquisition goals for the Joint Venture Partnership project area are achieved.

Areas within the Cache River and Cypress Creek Wetlands Area contain the following high quality (Category I as defined by the Illinois Natural Area Inventory) natural communities: pond, swamp, wet floodplain forest, wet-mesic floodplain forest, mesic floodplain forest, mesic upland forest, dry-mesic upland forest, limestone glade, and sandstone cliff community. Numerous imperiled (threatened, endangered, rare, and uncommon) plants and animals occur within these high quality habitats. Eight Nature Preserves occur within the Cache River Basin (Heron Pond-Little Black Slough, Section 8 Woods, Cave Creek Glade, Chestnut Hills, Halesia, Horseshoe Lake Island, Mermet Swamp, Round Bluff), as well as two sites designated as National Natural Landmarks by the U.S. Park Service (Heron Pond, Buttonland Swamp).

The Cache River watershed is one of 30 sites in Illinois identified by the Illinois Department of Natural Resources as a Resource Rich Area. This basin contains over 20 unique plant communities, 128 species of native breeding birds, 49 species of mammals, 32 amphibian species, and 43 reptile species. Nearly three-fourths of the amphibian and reptile species that occur in Illinois can be found in this watershed. Aquatic species occurring within the Cache River and its tributaries include 84 species of freshwater fish (native and introduced), 47 native mussels, 34 species of crustaceans, and more than 430 species of freshwater macroinvertebrates (in addition to crustaceans and mussels).

21. Noteworthy flora:

The Cache River and Cypress Creek Wetlands Area are best known for the existence of nearly 2000 acres of relatively undisturbed southern deepwater swamps dominated by bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Many of the individual trees in these high quality natural communities exceed 500 years of age. A few very large cypress trees (including the current state champion) are estimated to be well over 1,000 years old. The Dedicated Area contains 11 trees documented to be the largest of their kind in the State of Illinois: Drummond's red maple (*Acer drummondii*), American hornbeam (*Carpinus caroliniana*), water hickory (*Carya aquatica*), green hawthorn (*Crataegus aquatica*), swamp privet (*Forestiera acuminata*), pumpkin ash (*Fraxinus tomentosa*), water locust (*Gleditsia aquatica*), water tupelo (*Nyssa aquatica*), water elm (*Planera aquatica*), cherrybark oak (*Quercus pagodaefolia*), bald cypress (*Taxodium distichum*). The State Champion water locust has also been

recognized by the American Forestry Association as a National Champion on its' National Register of Big Trees.

In a supplement to the Illinois Comprehensive Wildlife Conservation Plan (Minnis et al. 2006), rare plant species in need of conservation are described for all of Illinois. Species that occur within the Cache watershed include Virginia snakeroot (*Aristolochia serpentaria*, var. *hastata*), cypress knee sedge (*Carex decomposita*), reniform sedge (*Carex reniformis*), water hickory (*Carya aquatica*), Joors' panic grass (*Panicum joozii*), pink thoroughwort (*Eupatorium incarnatum*), water pennywort (*Hydrocotyl ranunculoides*), willow oak (*Quercus phellos*), Nuttalls' oak (*Quercus nuttallii*), American snowbell (*Styrax americana*), and powdery thalia (*Thalia dealbata*). All of these species are considered threatened, endangered, rare or imperiled in the state of Illinois.

22. Noteworthy fauna:

Preservation, restoration and management within the Cache River and Cypress Creek Wetland Area gives special consideration to bottomland hardwood forest and swamp forest natural communities. Particular emphasis is placed on management for migratory waterfowl and shorebirds, and neotropical migratory songbirds, especially those listed as endangered, threatened, rare or imperiled.

Avian species that reflect the quality and character of bottomland forest, swamp forest and riparian aquatic habitat include the yellow-crowned night heron (*Nycticorax violacea*), black-crowned night heron (*Nycticorax nycticorax*), little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), prothonotary warbler (*Protonotaria citrea*), and cerulean warbler (*Dendroica cerulea*). Yellow- and black-crowned night herons are secretive birds of forested swamps and oxbow lakes, as are the more social little blue herons and snowy egrets. All of these wading birds have declined greatly in numbers throughout their range which is directly attributable to degradation of both quality and quantity of suitable wetland habitat. Prothonotary and cerulean warblers nest in bottomland forests and forested swamps throughout the project area. While cerulean warblers (an Illinois threatened species), are less frequently encountered both birds are experiencing dramatic decreases in overall population. Prothonotary warblers have been dubbed the signature songbird of the Cache River Wetlands. Long-term studies of the life history of this bird are helping to answer many questions about the quality of habitat in the basin. Answers to these questions are one tool used by resource managers to guide restoration efforts and assess their success.

A profound contributor to the character and diversity of wildlife species found in the Cache watershed is a function of geographic location. The project area occurs at a position in North America where 4 physiographic Provinces converge. The resultant blending of soils, climate and topography invites a collision of species with very different habitat requirements that are seldom seen together at one location. Illustrative of this phenomenon, biologists have documented grassland species such as short-eared owls, upland sandpipers, western meadowlarks, prairie falcons and northern harriers alongside wetland species such as Cinnamon teal, purple gallinules, common moorhens, least terns, Mississippi kites, fish crows, scissor-tailed flycatchers and wood storks. In the southernmost portions of this area, birdwatchers have reported even more rare, imperiled and uncommon species such as the anhinga, white ibis, glossy ibis, Swainson's hawk, and the magnificent frigatebird. Brant, Ross' geese and Barnacle geese have also been reported from the project area. Perhaps most profoundly, W. Douglas Robinson (1996) reports the presence of the Swainson's Warbler, a songbird considered by many to be extirpated in the state of Illinois.

Mammal species of interest to resource managers as a reflection of wetland ecosystem health include the river otter (*Lutra canadensis*), marsh rice rat (*Oryzomys palustris*), gray bat (*Myotis grisescens*), and Indiana bat (*Myotis sodalis*). The river otter was once considered extirpated from Illinois. However, habitat restoration and reintroductions have resulted in a full recovery of this species. Marsh rice rats are animals of freshwater marshes, thriving in shallow wetlands dominated by herbaceous vegetation.

Both Indiana and gray bats are listed as Federally Endangered. These bats prefer to feed adjacent to streams and rivers, selecting forested areas where the canopy is fairly open.

Fish species that reflect habitat character and quality within the Cache floodplain include the cypress minnow (*Hybognathus bayeri*), taillight shiner (*Notropis maculatus*), redspotted sunfish (*Lepomis miniatus*), and bantam sunfish (*Lepomis symmetricus*). These species thrive in well-vegetated bottomland lakes, sloughs and swamps. While their presence is questionable at this time, a resurgence of populations within the project area would be a dramatic measure of restoration success.

Reptiles and amphibians are also prevalent indicators of wetland quality and character throughout the world. The Cache River and Cypress Creek wetlands are no exception. While common in cypress swamps found throughout the Coastal Plain south of Illinois to the Gulf of Mexico, the cottonmouth (*Agkistrodon piscivorus*) reaches the northernmost extension of its range within the project area. Similarly, the bird-voiced tree frog (*Hyla avivoca*) and green tree frog (*Hyla cinerea*) are very common in the watershed, which represents the northernmost extension of their range.

The hellbender (*Cryptobranchus alleganiensis*), Mississippi green watersnake (*Nerodia cyclopion*), southern water snake (*Nerodia fasciata*), and the alligator snapping turtle (*Macrolemys teminckii*) are considered extirpated from the Cache River watershed, but were likely present prior to human disturbance. While scientific evidence suggests these animals were never abundant in the Cache River and its tributaries, they were present and viable populations were associated with exceptional water quality and undisturbed stream and swamp forest natural communities. Habitat loss and degradation, and water pollution, particularly suspended sediment, were largely responsible for their disappearance. For this reason, reappearance of these animals in Cache River basin would be a dramatic reflection of restoration success.

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

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?

If Yes, tick the box and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland: The Cache River and Cypress Creek Wetlands Area (Cache Site) represents one of North America's most representative biosphere reserves (bioreserves
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

- a) within the Ramsar site: The current Dedicated Wetland Area (Cache River and Cypress Creek Wetlands) encompasses 20,050ha (46,525 acres) and includes all lands within the purchase boundaries of the signatory members of the Cache River Joint Venture Partnership that are owned and managed by the state of Illinois (Illinois Department of Natural Resources), the federal government (U.S. Fish and Wildlife Service), and The Nature Conservancy.
- in the surrounding area: Lands adjacent to the Dedicated Wetland (Cache River and Cypress Creek Wetlands Area) are predominantly in private ownership.

25. Current land (including water) use: within the Ramsar site:

- USFWS-Cypress Creek NWR: Land-1,609ha (3,975a)/water-97ha (240a)/wetland-4,715ha (11,645a)/Total acreage-6,421ha, (15,860a).
- Illinois Department of Natural Resources-Cache River State Natural Area: Land-4,437ha, (10,959a)/water, *includes wetland area*-1,374ha, (3,395a)/Total acreage-5,811ha, (14,354a).
- Illinois Department of Natural Resources-Horseshoe Lake Wildlife Area: Land-4,734ha, (11,692a)/ water, *includes wetland area*-788ha, (1,946a)/Total acreage-6,736ha, (13,638a).
- The Nature Conservancy-Grassy Slough Preserve: Land-853ha, (2,108a)/ water, *includes wetland area*-229ha, (565a)/Total acreage-1,082ha, (2,673a).

b) in the surroundings/catchment: Following is a breakdown of land use (by County) within the Counties in Illinois that include parts of the Cache River and Cypress Creek Wetlands project area.

- Alexander County: cropland-36.3%, forest/woodland-31.5%, wetland-14.5%, grassland-8.1%, open water-7.5%, other-2.0%
- Johnson County: cropland-17.0%, forest/woodland-37.7, wetland-6.4%, grassland-35.2%, open water-2.1%, other-1.7%
- Pulaski County: cropland-46.2%, forest/woodland-14.4%, wetland-9.6%, grassland-25.2%, open water-2.3%, other-2.2%
- Union County: cropland-20.4%, forest/woodland-40.7%, wetland-6.5%, grassland-28.2%, open water-2.9%, other-1.3%

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: *See below for disturbance relating to all land within the project area. ****see below***

a) in the surrounding area:* See below for disturbance relating to all land within the project area. ****see below***

*** BACKGROUND INFORMATION**

Within the Cache River watershed there exists a great wealth of natural resources, all of which enrich the lives of an even more diverse assemblage of people and interests. Understanding the value of these resources (both locally and globally), a multitude of concerned conservationists joined forces a few years ago to protect the finest remaining natural communities throughout this watershed. Today, this effort has gone beyond protecting what is left. It is an attempt to restore the Cache River floodplain structure and function to a level of productivity which will sustain social, agricultural and ecological resources indefinitely. This work primarily involves restoration of bottomland hardwood forests, creation of wetland habitat for migratory waterfowl and shorebirds, reduction of sediment loads and runoff from agricultural lands, and the restoration of hydrologic processes which will assure a self sustaining riparian ecosystem. There exists nowhere in North America a protection/restoration effort which aspires to accomplish so much on such a diverse landscape.

Because of the quality and character of the regions' natural resources, and the scale and complexity of this endeavor, a partnership was formed bringing together the most prominent conservation organizations in Illinois. Today, the Illinois Department of Natural Resources, The Nature Conservancy, the U.S. Fish and Wildlife Service, the USDA-Natural Resources Conservation Service and Ducks Unlimited have united to form the nucleus of the Cache River Joint Venture Partnership (JVP). Other prominent contributors to this effort include the U.S. Army Corps of Engineers (COE), students and scientists from Southern Illinois University, a collection of local farmers and conservation professionals who banded together to form the Cache River Watershed Resource Planning Committee, the Citizens Committee to Save the Cache River, the Friends of the Cache River Watershed and numerous other organizations and individuals representing a diverse collection of backgrounds and interests.

The foremost characteristic common to all among this group of conservation minded entities is a commitment to tackle some very tough issues. The fact that such a wide variety of interests have come together at all acknowledges there are serious ecological problems within the Cache River Watershed, and that these problems affect more than just farmers or conservationists. This unity also reflects the value of, and threat to, the resources involved. The functional integrity of the entire drainage network has degraded, and threatens to eliminate the natural character and productivity of one of this Country's most significant wetland resources. Because of the complexity of environmental and socioeconomic factors involved, the cost of watershed scale restoration, and the local and global implications of such an effort, this project would not be possible without federal and private sector approval and assistance. The involvement of multiple stakeholders brings with it the expertise, funding and technical support which will be required to implement significant changes on the landscape.

The Joint Venture Partners believe the restoration of a significant portion of the structure and function of the Cache River floodplain will result in dramatic environmental and socioeconomic benefits for the entire watershed. Public interest in these natural features is obvious given the amount of land within the watershed already in public ownership (20,050ha /46,525a).

CACHE RIVER HYDROLOGY-HISTORY AND CHANGES

The primary biological, geomorphic, and hydrologic processes responsible for the natural character of any watershed are landform, substrate characteristics, and vegetative cover. These components of the land influence the behavior of water (runoff, storage, discharge), which falls as precipitation and fills our wetlands, lakes, ponds, streams, rivers, and groundwater aquifers. Water is the lifeblood of a river and its floodplain, and the timing, duration, and depth of flooding are responsible for the formation of all wetland communities receiving such floodwater. When this hydrologic regime is altered, it begins a natural sequence of ecological reactions which eventually affect all components of the land within the boundaries of the floodplain.

Prior to human disturbance, the structure and function of natural communities within the Cache River Watershed were in a state of dynamic equilibrium. Precipitation fell upon a landscape dominated by forest and was released very slowly into a watery environment within a floodplain which was often described by early settlers as lakes, ponds, and swamps. The water which eventually found its way into the Cache River floodplain was most likely free of sediments in all but the most severe flood events. This relatively sediment-free water was stored and further filtered by the extensive forested swamps bordering the river. Decaying organic matter in these swamps released humic acids which turned the water the color of strong tea, often called blackwater. Eventually this water, rich in dissolved organic material, not suspended sediment, was released into the Cache River, which flowed sluggishly southward within a channel of tortuous meanders before emptying into the Ohio River.

This was the landscape which greeted early settlers, who in 1905 described the drainage as poor, and 101,215ha (250,000 acres) as wet and worthless for farming. Flooding was a great liability to those attempting to live and farm within the boundaries of the floodplain, and was blamed for the destruction of roads and crops. Even in the absence of flooding, the stagnant waters of the swamp

were considered injurious to the health of the local inhabitants. Because of these and other objectionable qualities displayed by wetlands, drainage has been a high priority for farmers, economic developers, and land speculators within the Cache River valley for the last 100 years.

During the early part of this century, much of the Cache River and many of its tributaries were channelized to facilitate quicker drainage. Perhaps the most environmentally devastating drainage project was the construction of the Post Creek Cutoff. This ditch essentially divided the Cache into two separate rivers. At the same time, forested land in the upper parts of the watershed was also being cleared, converted to agriculture, and/or developed. The end result has been increased runoff, which often exceeds the capacity of even the most channelized portions of the drainage system to remove efficiently. With this increase in runoff has also come a decrease in water quality, primarily due to the presence of eroded sediments entering the water column. At the same time, much of the marginal land in the floodplain was being cleared, converting forested wetlands to agricultural production. This greatly diminished the acreage of floodplain available to receive, store, filter, and slowly release excess water during even minor flood events.

Because of these human-caused disturbances (Post Creek Cutoff, increased runoff/erosion, loss of floodplain), the Cache River winds its way through an environment of extremes. In the summer, the swamps are deprived of water, often going completely dry, while during the rainy season, flooding is often excessive, resulting in millions of dollars in damage to public lands, crops, roads, bridges, and buildings.

THE POST CREEK CUTOFF

The Post Creek Cutoff (excavated in 1915) has instigated severe hydrologic alterations to the flow regime of the Cache Watershed. This drainage ditch was originally constructed as a channel with a bottom width of 30 feet, 1 to 1 side slopes, and an average depth of 10 feet. Channel incision and lateral gullying began to deepen and widen this ditch the instant water coursed through this shorter, quicker route to the Ohio River. Now instead of one river, the Cache is divided into two separate riparian systems, the Upper Cache River, which drains through the Post Creek Cutoff into the Ohio River, and the Lower Cache River which courses southward to empty through a drainage canal into the Mississippi River.

All of this ditching and channelization has resulted in the elimination of more than 32 miles of the Lower Cache River in the vicinity of the Post Creek Cutoff. No longer filtered by the extensive wetlands which once surrounded a channel of tortuous meanders, silt-laden water now drains rapidly from the Upper Cache, down the Cutoff, and into the Ohio River. It does so with more than enough velocity to scour sediments from the stream bed causing a fluvial process known as channel incision. A second and more damaging process which always follows close on the heels of this deepening of the stream channel is lateral gullying, which is simply the widening of the stream.

The physical shaping of the stream bed profile caused by channel incision and lateral gullying is part of a powerful geomorphic process known as headward gully migration. It begins where the original stream bed meets the new, steeper ditch. As water pours over this point, sediment is eroded away, and the nick point progresses upstream. Each new bout of incision created by a high flow precipitation event is followed by a period of lateral gullying and channel widening. This process will continue until the river reaches a stable configuration with three established geomorphic zones, a low flow channel, a bankfull channel, and a floodplain. This is a natural process in which river form and fluvial processes evolve simultaneously, and operate through mutual adjustments towards self stabilization. If this process is allowed to progress unchecked through the Cache River (channel incision and lateral gullying/widening in the Upper Cache River, sediment deposition in the Lower Cache River), the finest remaining swamps and floodplain forests in this watershed will eventually be left high and dry.

INCREASED RUNOFF AND EROSION

Since early in the 1800's, humans have had a dramatic effect on the character of the land in the Cache River Watershed. Prior to the arrival of the first settlers, vast unbroken acres of forest dominated the area. Throughout the Lower Cache River the channel was mostly open water, but it was choked in many places with aquatic vegetation, driftwood, and organic debris. This channel contained a mosaic of deep and shallow water environments, and flow during most of the year was scarcely detectable. The wetlands adjacent to this channel were, and still are, home to some of the oldest living things east of the Mississippi River. Cypress trees exceeding 1,000 years of age still dwell in this diverse system of shallow to deep swamps which contain water year round in all but the most severe drought events. These forested swamps and wetlands historically were, and still are relatively open, containing scattered large trees (baldcypress, water tupelo) which likely became established during a prolonged period of drought. These wetlands originally dominated the ecotone between the drier forests on the floodplain and the deep water aquatic systems found in the river channel, sloughs and oxbow lakes. Despite all the water, floodplain forests dominated the landscape. This boreal landscape was almost infinite in its diversity of species and physiognomy, and was for the most part in a state of equilibrium with the environment. Collections of organisms with similar habitat requirements formed natural communities, each with a host of plants and animals uniquely adapted to the narrow range of conditions found in each community. All of these forests greatly influenced the behavior of water in the Cache River valley.

Forests, because they increase the area from which evaporation can occur, and because they transpire enormous amounts of water, reduce the total volume that finds its way into the drainage system. Forests also reduce immediate runoff and within the floodplain tend to maintain moist soil. This water holding capacity results in more steady stream flows. Today, 37 percent of the watershed is in row crops. With the removal of forests throughout the Cache River watershed, rainwater is delivered to the river system much more quickly. This requires the river, its tributaries, and wetlands to accommodate a greater volume of water in a much shorter amount of time. Simply stated, too much water is getting there too fast. When this happens, a host of fluvial processes are set in motion as the river attempts to accommodate increased flow volume and velocity (discharge).

The first step in restoring hydrologic processes which will perpetuate the Cache River and its collection of unique natural communities is simple. Put the forest back, at least as much of it as we can. This is especially important within the floodplain and along riparian corridors throughout the Cache River and its tributaries. In the upper parts of the watershed where considerable acreage has been cleared, much of which is not likely to be reforested, other options must be considered.

Although forest is the ideal way to regulate runoff and delivery of water to the drainage network, much of the area within the Cache Watershed is likely to remain in agricultural production. Because of this conversion of forest to open land, tributary streams (like Big Creek), have incised and widened to accommodate increased discharge. During flood events, these tributaries transport large volumes of sediment into the Cache River and its wetlands. Restoration of hydrologic processes in the headwaters and tributary reaches of the Cache River will require structural modifications to reduce peak flows and improve water quality. Large impoundments would best accomplish such large scale hydrologic restoration and could provide considerable recreational opportunities and economic benefit to the area. An alternative to this would be strategically located small impoundments (farm ponds and wetlands), but these would likely be more effective if implemented in conjunction with several larger lakes/ponds. It is important to remember that these in-stream and off-channel impoundments should be designed to alter hydrology, not treat polluted waters. Although such impoundments could improve the quality of water delivered to the Cache River, this should be considered an incidental benefit. Realizing sediment erosion and deposition are of utmost ecological consequence, these problems are best dealt with on-site, rather than accommodating sediment supply through in-channel storage.

LOSS OF RIPARIAN FLOODPLAIN AND WETLANDS

During the first decades of this century, a large percentage of the floodplain in the Cache River watershed was drained and converted to agricultural production. This resulted in four major

physical changes: (1) loss of stream length, (2) loss of in-stream habitat diversity, (3) loss of vegetation in the riparian zone, and (4) loss of riparian floodplain and wetlands. The first and most important restoration measure adjacent to streams subjected to channelization (channels deepened and straightened) is to set aside land along the stream channel to act as a buffer strip between the land and the running water. This land is called the floodplain, and is composed of a diverse mosaic of deep water aquatic habitats, wetlands, and floodplain forests.

Given the ecological importance of reconnecting the Upper and Lower Cache Rivers, a primary concern is how the lower stretch of the river can accommodate the additional water which will be allowed to access the floodplain. In order to achieve the greatest benefit from this reconnection, we must give serious consideration to land acquisition and easements which will enable us to direct this increased volume of water over as much of the floodplain as possible. Increased drainage capacity at the Karnak Levee (twin pipes) and at the West Swamp Structure will also help to minimize flood peaks and subsequent damage to natural communities and agricultural/urban land. In addition to simple flood abatement, floodplain restoration will improve water quality, create habitat for wetland wildlife (especially waterfowl and shorebirds), improve fish habitat, and help to reduce forest fragmentation. Key parcels within the boundaries of the project need to be identified and acquired. It is also important for the Joint Venture Partners to work closely with private landowners to ensure conservation management of lands within the watershed remaining in private ownership.

KEY CONSIDERATIONS IN WATERSHED RESTORATION

An important aspect to all our restoration efforts is scale. The restoration of the Cache River Bioserve by necessity involves all land within the watershed. The Cache River Watershed includes all lands drained by the Cache River and its tributaries, and covers an area of 472, 800 acres (739 square miles). It includes land in Union, Johnson, Alexander, Pulaski, Massac, and a small portion of Pope County in southern Illinois. Restoration of an area this size is an enormous undertaking and is one of the most ambitious conservation efforts in North America.

An essential component to successful manipulation of river hydrology is an understanding of the mechanisms controlling floodplain structure and function, and the variables at work within these mechanisms. These mechanisms are (1) precipitation, (2) runoff, (3) storage, and (4) discharge. Variables at work within the drainage pathways formed by these mechanisms include width, depth, slope, velocity, flow resistance, sediment size, sediment load, and stream discharge. The complex interplay between these variables makes predicting the outcome of even the most insignificant hydrologic manipulations nearly impossible. For this reason, landscape scale hydrologic restoration must be done in phases, each phase consisting of four stages: research, recommendations, implementation, and monitoring.

Another important concept in riparian restoration is that the river is a continuum, and modifications to any part of the system are likely to cause a progression of changes from the headwaters to the mouth. Because of this phenomenon, hydrologic restoration must be initiated in the headwaters and progress downstream through the system. In this way, we can avoid implementing counterproductive restoration measures. Reconnection of the Upper and Lower Cache Rivers is also a key component if the Cache River continuum is to be restored.

Finally, the restoration of an area of this size must unite a diversity of interests. For the Cache River Bioserve to be successful, everyone involved in the effort must contribute. Farmers, area residents, hunters, fishermen, conservationists, naturalists, birdwatchers, tourists, and a host of other people living within this watershed will all be affected in some way. Even members of the Joint Venture Partnership have their own specific goals, and strategies to achieve these goals. The following is a list of the mission statements of the Joint Venture Partners to illustrate the diversity of interests involved.

>The U.S. Fish and Wildlife Service: The mission of the National Wildlife Refuge system is to administer a national network of lands and waters for the conservation, management,

and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

(purpose statement specific to Cypress Creek NWR): To protect, restore, and manage bottomland hardwood forests and wetlands in support of the North American Waterfowl Management Plan; provide resting, feeding, nesting, and wintering habitat for waterfowl and other birds; protect threatened and endangered species and their habitats; increase public opportunities for outdoor recreation and environmental education that are compatible with the preceding purposes; and, protect Buttonland Swamp, a National Natural Landmark.

>The Nature Conservancy: To protect and restore the naturally-functioning, dynamic ecosystem of the Cache River Wetlands to provide largely self-sustaining habitats for all its native plants and animals, while encouraging environmentally sound economic growth in the five-county region.

>Illinois Department of Natural Resources: To preserve, protect, and enhance the natural resources while providing the opportunity for quality outdoor recreation. Critical habitat is managed to preserve and protect endangered, threatened, and rare plants and animals.

>Ducks Unlimited: To fulfill the annual life cycle needs of North American Waterfowl by protecting, enhancing, and restoring and managing important wetlands and associated uplands.

>USDA-Natural Resources Conservation Service: Helping people help the land.

Combining the efforts of all these forward-looking, conservation-minded entities ensures diversity on the landscape. Such diversity is an essential component of a functional, productive, and self-sustaining environment.

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

- U.S. Dept. of the Interior-National Park Service: National Natural Landmarks (Lower Cache River-Buttonland Swamp and Heron Pond).
- U.S. Dept. of the Interior-USFWS: Federal Reserve (Frank Bellrose Waterfowl Reserve)
- U.S. Dept. of the Interior-USFWS: National Wildlife Refuge (Cypress Creek National Wildlife Refuge)
- U.S. Important Bird Areas Program-American Bird Conservancy, U.S. Partner, BirdLife International-Partners in Flight Program (Important Bird Area – Little Black Slough)
- U.S. Important Bird Areas Program-American Bird Conservancy, U.S. Partner, BirdLife International-Partners in Flight Program (Important Bird Area – Lower Cache river Complex)

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

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

c) Does an officially approved management plan exist; and is it being implemented?: Yes (*see below)

- Lower Cache River Preservation Plan (1984): Prepared for The Nature Conservancy by M.D. Hutchison, Field Representative for the Natural Land Institute (Natural Land Institute, 320 South Third Street, Rockford, Illinois 61108).

- Master Plan: Little Black Slough Unit including Heron Pond-Little Black Slough Nature Preserve (INAI #1059), Cache River State Natural Area, Johnson County, Illinois (1995). Prepared for the Illinois Department of Conservation and the Illinois Nature Preserves Commission by K. Andrew West and William F. Reynolds.
- Master Plan: Lower Cache River State Natural Area, Pulaski and Johnson Counties (1988). Prepared for the Illinois Department of Natural Resources and the Illinois Nature Preserves Commission by K. Andrew West and M.D. Hutchison.
- Cypress Creek National Wildlife Refuge: Comprehensive Management Plan (1996). Prepared for the U. S. Department of the Interior – U.S. Fish and Wildlife Service by Booker Associates, Inc.

*While these officially recognized management plans continue to guide overall preservation, restoration, management and associated land acquisition within the JVP project area, they are considered “living” documents and are subject to refinements as dictated by resource needs. Reflecting this, the Illinois Department of Natural Resources primarily through the Nature Preserves Commission and the Natural Heritage Program periodically complete updated management schedules for all designated Nature Preserves and Land and Water Reserves. Likewise, the Cypress Creek National Wildlife Refuge summarizes and updates their ongoing efforts in Annual Narrative Reports and Management Plans.

b) Describe any other current management practices:

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

- Partial Reconnection of the Upper and Lower Segments of the Cache River: If the Cache River is ever going to reach a dynamic self-perpetuating equilibrium, some degree of hydrologic and hydraulic reconnection will be required. There are three major geomorphic zones which develop throughout the watershed of any perennial river. Furthest upstream are the headwaters, which is a zone of erosion of sediment. Headwaters eventually drain into a midwater reach where flow velocities decrease somewhat, creating a zone of sediment storage and transport. Eventually, water coursing through the river empties into a tailwater area where sediments are deposited in deltas and into receiving waters. The natural communities adapted to specific environmental conditions associated with each of these zones are dependent on the unique hydrologic processes present within each river segment. This does not mean that without reconnection the natural communities throughout this watershed cannot be preserved, but preservation efforts conducted in the absence of partial reconnection of the river segments will need to be modified to deal with two rivers, each with its own unique hydrologic conditions. Reconnection would have the most dramatic impact during periods of base flow. By directing water from the Upper Cache River into the Lower Cache River, slackwater conditions currently prevalent in the Lower Cache River during seasonal periods of low flow would be eliminated. Although this flow would not be sufficient to scour and transport sediments already in the swamps, existing flows are also incapable of this process. It is certain that reintroducing perennial flow would greatly enhance water chemistry, especially as is related to dissolved oxygen and trophic levels. This alternative also provides a degree of hydraulic and biological continuity between the two river segments. Perhaps the most important aspect of reconnection is the restoration of the hydrologic and geomorphic processes which are responsible for the physical character and stability of the river channel (bank and bed) and subsequently adjacent wetland habitats.

Partial reconnection of the Upper and Lower segments of the Cache River will require implementation of 3 in-channel structures (reconnection structure, and water control structures at the east and west extent of the project area). These structures will physically connect the river

segments, control influent and effluent water volume through the system and provide for floodwater attenuation.

- Dredging to restore deepwater aquatic habitat: Restoration of channel depth and heterogeneity is considered an essential component of natural community restoration by the JVP. Dredging to restore deepwater habitat will reestablish an essential component of the riparian ecosystem nearly eliminated from this part of the basin, and set the stage for meaningful partial reconnection of the upper and lower segments of the Cache River. Partial restoration of the natural flow regime of the Cache River will assure continuous flow throughout the year, flushing organic matter and nutrients through the system and maintaining dissolved oxygen concentrations at levels that will sustain aquatic life. Aquatic habitat and water quality associated with permanent deep water and continuous flow will provide benefits throughout the river continuum and will help to assure the long-term viability of all the natural communities and species which make the Cache River one of the nations most significant natural resources.

Sediment transport and deposition is a function of stream power, and is associated with linear channel geometry only in how this geometry affects flow characteristics. Understanding this, the relationship between sediment transport and subsequent deposition rates suggests that amounts retained within the affected area will be reduced. A narrower linear channel will increase what power the water has during flow events by forcing the water into a confined space. This will improve sediment transport within the stream channel, which will help to move sediments through the system.

The goal is to create and maintain both hydraulic continuity **and** biological continuity. Restoration of a continuous linear channel would be the first step in recreating a low-flow thalweg (deepest point in an established low flow channel) similar to that which existed in the Lower Cache River prior to human disturbance. This channel would also greatly improve biological exchange throughout riparian swamps and wetlands within the project area through direct physical linkage.

Reestablishment of a relatively natural low flow channel (thalweg) should remain the first priority of dredging to accomplish river channel restoration. Additional widening (by dredging) may be conducted as funding is acquired, but great care will need to be taken to avoid over-widening the river channel and encouraging dramatically increased deposition rates. The restoration of off-channel wetlands, oxbows, and scour-pools should be considered essential, but separate from river channel restoration.

Dissolved oxygen (DO) would continue to be a limiting factor in these restored (deeper and wider) aquatic habitats as flow would be dramatically decreased and subsequently water exchange could be insufficient to provide for continuous recharge. DO levels would be maximized in a relatively narrow channel that maximizes flow velocities, especially during base flow conditions.

29. Current scientific research and facilities:

- Annual Statewide Illinois Spring Bird Count: This annual bird census was initiated in 1972 with the goal of monitoring bird populations throughout the state during the peak of the Spring migration. Participants are asked to document, (1)all individuals of every bird species encountered that day; (2)the number of hours spent making those observations, and; (3)the number of miles walked or driven while making those observations.
- Annual Christmas Bird Count-Cypress Creek Area: This census is sponsored by the Audubon Society and is the longest running ornithological database of its kind (106 consecutive years after the 2006 count). Counts are conducted in 62 count circles (15 miles in diameter) scattered throughout Illinois. Participants identify and enumerate each bird seen within the circle during

the 1-day event . Christmas Bird Counts are conducted 1 day each year from 20 December through 5 January, with the specific date determined by the sites geographic location within the state.

- Neotropical Migratory Songbird Research – Cache River: This research was initiated in 1988 by Dr. Scott Robinson of the Illinois Natural History Survey and has been continued by Dr. Jeffrey Hoover , also employed by the Survey. These are typically long-term studies requiring extensive fieldwork, large field crews and expansive study areas. The purpose of these studies has been to determine species composition, abundance and reproductive success, and; form and test hypotheses about how the birds may be influenced habitat quality and quantity. Contact: Dr. Jeffrey Hoover, University of Illinois, 1901 South First Street, Suite A, South Research Park, Champaign, IL 61820-4706, phone: 352-392-1721.
- Illinois and Mississippi River Valley Waterfowl Surveys: These surveys are generally conducted weekly from early September through the first week in January. Southern Illinois surveys are flown weekly from late October through the first week in March. Information about these surveys may be obtained from the following web address:
<http://dnr.state.il.us/waterfowl/surveys.htm>.
- Cache River Wetlands Frog and Toad Survey: This annual survey was initiated in 1995 to; (1)collect baseline data regarding the distribution and current breeding status of anuran species, and; (2)assess the reliability and precision of frog and toad monitoring protocols through volunteer participation. For information about these surveys contact: Elizabeth O. Jones, Assistant Refuge Manager, Cache River Wetlands Joint Venture Partnership Office, 139 Rustic Campus Drive, Ullin, IL 62992, phone-618-634-2231, fax-618-634-9656.
- Illinois Natural History Survey: The INHS has completed and continues to conduct research on species and natural communities throughout the state of Illinois. For information about archived and current research projects contact: Illinois Natural History Survey, 1816 South Oak Street, Champaign IL 61820, phone-217/333-6880, fax-217/333-4949, web-
<http://www.inhs.uiuc.edu>.
- Illinois State Water Survey: The ISWS has completed and continues to conduct research on water related issues throughout the state of Illinois. For information about archived and current research projects contact: Illinois State Water Survey, Derek Winstanley-Chief, 2204 Griffith Drive, Champaign IL 61820-7495, phone-217/244-5459, fax-217/333-4983, web-
<http://www.sws.uiuc.edu>.

In addition to the above-mentioned scientific information, a wealth of research on a diversity of resource related topics has been and continues to be conducted within the Cache River Basin by Universities and associated students and scientists throughout the midwestern United States. While such information is too lengthy to be listed here, information about specific subjects/projects can be obtained by contacting the Cache River Wetlands Joint Venture Partnership Office, 139 Rustic Campus Drive, Ullin, IL 62992, phone-618-634-2231, fax-618-634-9656.

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

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

- Henry N. Barkhausen Cache River Wetlands Center (the Wetland Center): This facility is open Wednesday through Sunday from 9:00am to 4:00pm. It is owned and operated by the Illinois Department of Natural Resources with generous support from Cypress Creek National Wildlife Refuge and The Nature Conservancy. The Wetland Center includes 2000 square feet of interactive exhibits and artifacts, and an audio-video room where visitors can view a full-screen film documenting the project areas' rich natural and cultural history. Highlighting the interactive displays are a large diorama and video touch-screens that allow intimate viewing and provide

detailed information about the interesting plants, animals and natural processes that are important parts of the project area.

- Cache River Wetlands: Programs and Activities (an annual publication of the Cache River Wetlands Joint Venture Partnership: This annual publication provided by the JVP provides a detailed schedule and description of numerous educational programs, guided tours, field trips, hikes, presentations and many other interpretive and educational programs. For a brochure or additional information call the Henry N. Barkhausen Cache River Wetlands Center at (618) 657-2064.

31. Current recreation and tourism:

Cache River and Cypress Creek Wetlands Area hosts a diversity of recreational opportunities and tourist attractions.

Consumptive and non-consumptive recreational activities within the project area include hunting (waterfowl and upland game), fishing (sport and commercial), hiking, bird-watching, picnicking, and camping. Camping is allowed at several nearby state sites (State Parks, Conservation and Wildlife Areas) and private campgrounds near the JVP project area (camping is not permitted within the National Wildlife Refuge and State Natural Area). The estimated annual attendance for the Cache River State Natural Area (Fiscal Year 2006) was 139,285 visitors. The estimated 5-year trend projects attendance ranging from 67,000 – 140,000. While no accurate estimates for attendance at Cypress Creek National Wildlife Refuge or Horseshoe Lake Conservation Area exist, estimates place visitation at these sites at least equivalent for those listed above for the Cache River SNA. Projected annual attendance for the Henry N. Barkhausen Cache River Wetlands Visitor Center has been estimated at 200,000 visits. The following bullet-points list details about specific outdoor activities within the Cache River Area

- Camping at State-owned Sites: Since 1986 campers have spent an average of 23,000 camping-days annually at sites in the Cache River Area.
- Boating: Registered watercraft numbers in the Counties where the Cache River and Cypress Creek Wetlands occur have risen from 3,609 in 1988 to 4,300 in 1994.
- Fishing: In 1994, 6,000 Illinois residents purchased fishing licenses in the Counties where the Cache River and Cypress Creek Wetlands occur. Out-of-State license sales totalled 1,465.
- Hunting: In 1994, 2.1% of Illinois 338,500 hunting licenses were purchased in the Counties where the Cache River and Cypress Creek Wetlands occur. Out-of-State license sales accounted for 11% of the statewide total.

Estimates indicate that visitation at Illinois Department of Natural Resources sites in the Cache River area over a four year period (1992-1996) averaged 1,313,991 local individuals and 1,052,506 non-local visitors. Total visitor expenditures for this group were estimated at \$5.13 per visitor per day for local visitors and \$9.75 for non-local visitors. Based on these and other outdoor recreation-based criteria, area parks/natural areas and conservation areas add \$14.87 million in monetary input to the southern Illinois economy.

32. Jurisdiction:

The entire project area occurs in the State of Illinois in the United States of America, within Congressional Districts 12 and 19, Representative Districts 115 and 118, and Senatorial District 59. Below are the Governmental agencies, and private organizations directly responsible for management of all lands within the Cache River Wetlands Joint Venture Partnership, within which occurs the Cache River and Cypress Creek Wetlands Area recognized by UNESCO as a Ramsar Wetland of International Importance.

- State of Illinois, Illinois Department of Natural Resources-Office of Resource Conservation
- Federal Government, U.S. Department of the Interior, U.S. Fish and Wildlife Service – Cypress Creek National Wildlife Refuge
- The Nature Conservancy – Illinois Chapter
- Federal Government, U.S. Forest Service, U.S. Department of Agriculture – Natural Resources Conservation Service

33. Management authority:

- U.S. Fish and Wildlife Service – Cypress Creek National Wildlife Refuge
0137 Rustic Campus Drive
Ullin, Illinois 62992
Refuge Manager: Dennis Sharp
Phone: 618-634-2231
- Cache River State Natural Area
930 Sunflower Lane
Belknap, Illinois 62908
Site Superintendent Jim Waycuilis
Phone: 618-634-9678
- Horseshoe Lake Conservation Area
P.O. Box 85
Miller City, Illinois 62962
Site Superintendent: Joey Thurston
Phone: 618-776-5689
- The Nature Conservancy – Southern Illinois Field Office
0139 Rustic Campus Drive
Ullin, Illinois 62992
Southern Illinois Project Director: Mike Baltz
Phone: 618-634-2524
- The USDA Natural Resources Conservation Service
502 Comfort Drive, Suite D
Marion, Illinois 62959
State Conservationist: Troy Daniell
Phone: 618-993-5396

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

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