

U.S. DEPARTMENT OF THE INTERIOR

U.S. FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ASSESSMENT

Final Draft

**For the 2013 Hunting Chapter
Of The
Visitor Services Plan
Two Rivers National Wildlife Refuge
Brussels, Illinois**

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**ENVIRONMENTAL ASSESSMENT
FOR
PROPOSED AMENDMENTS TO HUNTING CHAPTER
OF THE
VISITOR SERVICE PLAN
TWO RIVERS NATIONAL FISH AND WILDLIFE REFUGE**

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1.0 PURPOSE OF THE PROPOSED ACTION

The Two Rivers National Wildlife Refuge (Refuge) was established by Congress in 1958 to protect and enhance habitat for migratory birds. The stated purposes for Two Rivers NWR include:

- “... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds...”, 16 U.S.C. - 715d (Migratory Bird Conservation Act)
- “... shall be administered by [Secretary of the Interior] directly or in accordance with cooperative agreements and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon, ...“, 16 U.S.C. - 664 (Fish and Wildlife Coordination Act)
- “... suitable for- (1) incidental fish and wildlife oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ...”, 16 U.S.C. - 460k-1 (Refuge Recreation Act)
-

Other legislation that directs refuge management includes the National Wildlife Refuge System Administration Act (1966) as amended by the National Wildlife Refuge System Improvement Act (1997) 16 U.S.C. 668dd-668ee. (Refuge Administration Act). This defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established.

In 1997, Congress passed the landmark National Wildlife Refuge System Improvement Act, preparing the way for a renewed vision for the future of the refuge system where:

- Wildlife comes first
- Refuges are anchors for biodiversity and ecosystem-level conservation
- Lands and waters of the System are biologically healthy
- Refuge lands reflect national and international leadership in habitat management and wildlife conservation

The purpose of this Environmental Assessment (EA) is to evaluate alternatives for the purpose of the Hunting Chapter (Hunt Plan) of the Refuge’s Visitor Service Plan.

2.0 NEED FOR THE ACTION

The National Wildlife Refuge Improvement Act of 1997 (Improvement Act) directs refuges to provide six priority public uses when compatible with the purposes of the Refuge and the mission of the National Wildlife Refuge System (System). These priority uses include hunting, fishing, wildlife photography, wildlife observation, environmental education, and interpretation. The need for action, therefore, revolves around hunting as a priority use. Because hunting is one of six priority uses for the Refuge, the Hunting Chapter (Hunting Plan) seeks to balance all of these uses over time and space.

The refuge continues to grow and each new land addition may offer hunting opportunities. The Clarksville Island Division, located in Calhoun County, Illinois, will be open to hunting deer and turkey in the fall (archery only), and to firearm hunting for turkey in the spring. These limited hunting opportunities will provide for safety of refuge visitors, use by Bald Eagles for feeding, nesting and roosting throughout the year and persons on nearby land and water (city of Clarksville, Missouri and Lock and Dam 24). Changes to the Refuge's hunting program are published in the Federal Register and the Code of Federal Regulations (50 CFR 32.44) as needed.

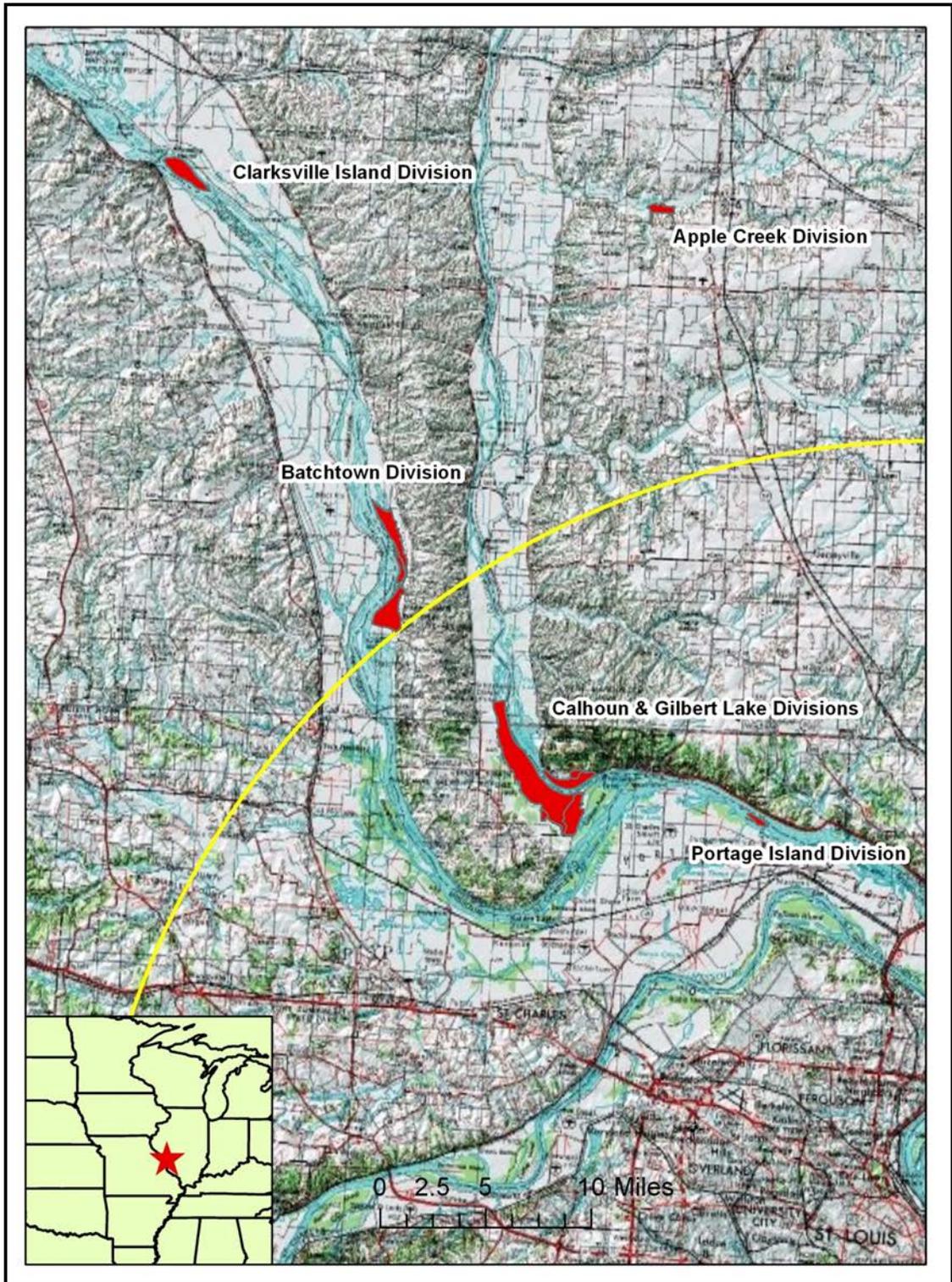
To initiate or expand hunting programs, the Service must publish in the Federal Register any proposed and final refuge-specific regulations pertaining to that use prior to implementing them. The regulations are only one element of a complete opening package, which is comprised of the following documents: hunting plan; compatibility determination; documentation pursuant to compliance with the National Environmental Policy Act of 1969, as amended (NEPA) and appropriate NEPA decision document; Endangered Species Act section 7 evaluation; copies of letters requesting State involvement and the results of the request; draft news release; outreach plan; and the draft refuge-specific regulations.

This Environmental Assessment serves as the NEPA document which analyzes the impacts of the hunting program at Two Rivers National Wildlife Refuge. The Hunting Plan presented in this document as the preferred alternative has been determined to be appropriate and compatible with the mission of the Refuge System and purposes for which the Refuge was established.

3.0 SCOPING AND PUBLIC PARTICIPATION

Previous to this Hunting Plan, the Refuge's hunting program had been developed in coordination with Illinois Department of Natural Resources (IDNR) regional and area managers as well as with other public land managers and law enforcement officers.

Figure 1. Two Rivers National Fish and Wildlife Refuge. (Dalrymple & Salas, 2011)



Primary hunting needs expressed by refuge partners and the public:

- Provide some type of hunting opportunity for the public.
- In areas of urban development and adjacent dense public use activities limit hunting opportunities to provide for the safety of adjacent property and non-hunting public uses. Hunting opportunities would be limited to archery only or shotgun. Prohibiting the use of single projectile shells provides for a safer public participation in the higher public use areas.

The Refuge will solicit public comments on the draft Hunting Plan and EA during a 30-day review and comment period beginning in June of 2013. The city of Clarksville, Missouri and Pleasant Hill, Illinois and Alton Wood River Sportsmen's Club were contacted for comment and the availability of the documents was announced via a public notice, to print and television media organizations whose coverage extends beyond the geographic limits of the Refuge. The availability of the draft Hunting Plan and EA was also announced on the Refuge website and Facebook page, as well as the Region 3 website. Public comments will be placed in the appendix.

4.0 PROPOSED ACTION AND THE ALTERNATIVES

One of the purposes of the Refuge is to provide wildlife-dependent recreation which includes the big six priority public uses. These big six uses include hunting, fishing, environmental education, interpretation, photography and wildlife observation (National Wildlife Refuge System Improvement Act 1997). Hunting is a valuable means to meet this purpose. Toward that end, the Refuge has drafted an updated Hunting Chapter (Hunting Plan) of its Visitor Service Plan. The Hunting Plan seeks to open some Service-owned lands to hunting and clarify refuge specific hunting regulations, locations, and opportunities. Proposed uses within this plan have been determined to be appropriate and compatible with goals of the Refuge System and purposes for which the Refuge was established.

The Service considered possible hunting program changes through three alternatives: (A) No Hunting, (B) Hunting Program Remains as it Currently Exists (No Action), (C) Expand Opportunity on Currently Hunted Refuge Lands, and Allow Limited Hunting of Deer and Turkey at Clarksville Island Division. (Preferred Alternative)

4.1 Considered But Not Developed

A potential alternative was considered but not carried forward for detailed analysis because it would not enable the Refuge to fulfill the purposes for which it was established.

4.1.1 Alternative A: No Hunting on the Refuge

A no hunting alternative would require existing hunting to cease on the Refuge.

The Improvement Act identifies hunting as one of six priority uses of lands within the Refuge System. To eliminate hunting on Refuge lands where it already has been determined to be compatible with Refuge purposes and the mission of the System would not meet the intent of the Improvement Act.

4.2 Alternatives Developed For Detailed Analysis

Two alternatives were carried forward for detailed analysis. Alternative B: Refuge Hunting Program Remains as it Currently Exists (No Action) and Alternative C: Expand Opportunity on Currently Hunted Refuge Lands, and Allow Limited Hunting of Deer and Turkey at Clarksville Island Division. (Preferred Alternative)

4.2.1 Alternative B: Hunting Program Remains as it Currently Exists (No Action). Under this Alternative, the parts of the Refuge that are open to hunting migratory game birds, upland game and big game species are consistent with the Illinois Department of Natural Resources (IDNR) regulations.

All game species hunted in Illinois would be allowed to be hunted on the Apple Creek Division.

All game species hunted in Illinois would be allowed to be hunted on a designated portion of the Calhoun Division, with the exception of migratory game birds (see Illinois Digest of Hunting and Trapping Regulations, www.dnr.illinois.gov).

No hunting would be allowed on the Clarksville Island Division because it is a new acquisition and not in the present hunting regulations.

Table 1 shows hunting activities proposed to be allowed on specific Refuge units under this alternative.

Table 1—Hunting activity allowed under Alternative B.

Refuge Unit	Migratory Game Birds	Upland Game: Turkey, small game and furbearer	Big Game: Deer
Calhoun (The designated area located East of Illinois River Road near Pohlman Slough Access)	No hunting	Hunting allowed State wide regulations	Hunting allowed State wide regs.
Gilbert Lake	No hunting	No hunting	No hunting
Portage Island	No hunting	No hunting	No hunting
Batchtown	No hunting	No hunting	No hunting
Apple Creek	Hunting allowed State wide regulations	Hunting allowed State wide regulations	Hunting allowed State wide regulations
Clarksville Island	No hunting	No hunting	No hunting

The current hunting program allows specific hunting activities on designated Divisions or a portion of the Division. This enables the Refuge to balance species needs and other recreational uses with hunting activities. Maps identifying pertinent landmarks and Refuge hunting areas are provided in Appendix B, as noted.

4.2.2 Alternative C: Expand Opportunity on Currently Hunted Refuge Lands, and Allow Limited Hunting of Deer and Turkey at Clarksville Island Division. (Preferred Alternative)

In this Alternative the Service is proposing to allow hunting of deer and turkey on Clarksville Island and limit the type of hunting methods. These limitations are due to the possible disturbance of wintering/nesting Bald Eagles and safety of visitors. All other hunted divisions (Apple Creek and Calhoun) will be conducted within the framework of State of Illinois seasons and regulations and State seasons and limits would apply.

This alternative will also allow for managed hunts when the need arises. Managed hunts are administered in conjunction with the Illinois Department of Natural Resources (IDNR) to achieve specific management goals while also providing additional hunting opportunities, often to specific user groups like youth or disabled hunters. Managed hunts will be open with Refuge specific authorization only in coordination with IDNR on managed hunt applications. They are conducted within the framework of the State seasons and regulations for the species proposed to be hunted. In administering managed hunts, the Refuge Manager will consider the biological effect of proposed hunting activities as well as the hunt's potential to conflict with concurrent non-hunting recreational activities.

Table 2 shows hunting activities proposed to be allowed on specific Refuge units under alternative C.

Table 2—Hunting activity allowed under Alternative C.

Refuge Unit	Migratory Game Birds	Upland Game: Turkey, small game and furbearer	Big Game: Deer
Calhoun (The designated area located East of Illinois River Road near Pohlman Slough Access)	Hunting allowed State wide regulations	Hunting allowed State wide regulations	Hunting allowed State wide regulations
Gilbert Lake	No hunting	No hunting	No hunting
Portage Island	No hunting	No hunting	No hunting
Batchtown	No hunting	No hunting	No hunting
Apple Creek	Hunting allowed State wide regulations	Hunting allowed State wide regulations	Hunting allowed State wide regulations
Clarksville Island	No hunting	No hunting except for Turkey, archery only in the fall/ state wide regs. in spring	Archery only

4.3 Elements Common to Developed Alternatives

Under Alternatives B and C, hunting on the Refuge will be consistent with State regulations such as: (1) hunting hours, (2) license requirements, (3) seasons, (4) possession rules and bag limits, (5) hunting equipment requirements, (6) blaze orange requirements and (7) hunter-education requirement.

Regulations pertaining to hunting on all National Wildlife Refuge System lands would remain in effect with both alternatives evaluated. These regulations are identified in Title 50 of the Code of Federal Regulations Section 32.2 and in the Refuge Hunting Plan associated with this document. Topics covered by these regulations include, but are not limited to, baiting, possession of alcohol, and use of nontoxic shot.

Refuge-specific regulations also would apply to both alternatives. These regulations are identified in Title 50 of the Code of Federal Regulations Section 32.44 and in the Refuge Hunting Plan associated with this document. Refuge-specific topics include, but are not limited to, Refuge hunting access hours, use of stands and boats, use of hunting dogs, and types of weapons and ammunition allowed for hunting.

4.4 Comparison of Developed Alternatives

Table 3 presents a Division by Division comparison of hunting activities allowed for the Alternatives.

Table 3 –Division by Division comparison of hunting activities allowed for Alternatives.

Division	Alternative B	Alternative C
Calhoun (hunted portion of the Division)	Restricted from hunting migratory game birds but open to all other Illinois hunting seasons and harvest methods.	Open to all Illinois hunting seasons and harvest methods.
Portage Island	No hunting	No hunting
Gilbert Lake	No hunting	No hunting
Batchtown	No hunting	No hunting
Apple Creek	Open to all Illinois hunting seasons and harvest methods.	Open to all Illinois hunting seasons and harvest methods.
Clarksville Island	No hunting	Hunting only for deer and turkey with restricted methods.

5.0 AFFECTED ENVIRONMENT

The Refuge is one of more than 560 refuges in the National Wildlife Refuge System (System). The mission of the System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish and wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (USFWS 1997). National Wildlife Refuges provide important habitat for native plants and many mammals, birds, fish, insects, amphibians, and reptiles. Refuges offer a wide variety of wildlife-dependent recreational opportunities and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 40 million visitors annually hunt, fish, observe and photograph wildlife, or participate in educational and interpretive activities on refuge. The National Wildlife Refuge System is the most comprehensive system in the world of lands and waters managed specifically for the protection of wildlife and wildlife habitat.

The current boundary of Two Rivers NWR encompasses 9,225 acres spanning 60 miles of the Mississippi River, and 9 miles of the Illinois River, the Refuge functions as an important link for migratory birds that rest, feed, and winter along the Mississippi Flyway. More than 300 different species of birds funnel through this important river juncture on their fall migration. Many areas are not owned by the Service but are administered through management agreements with the Army Corp of Engineers and IDNR. Presently, the Refuge under this hunt plan consists of six Divisions along the Mississippi and Illinois Rivers located north of St. Louis, Missouri. Refuge lands are interspersed among lands owned by state agencies, local governments, and private corporations and citizens.

Clarksville Island Division is an 870 acre island located on the east side of the Mississippi River just below Lock and Dam 24 in Calhoun County, Illinois. Apple Creek Division is a 270 acre tract located in an upland location along a small tributary of the Mississippi River (Apple Creek)

and consists mainly of upland and wetland forested habitat. The hunted portion of the Calhoun Division is located near the confluence of the Illinois and Mississippi Rivers and consists of riverine forested habitat that has been enhanced with planted hard mast producing tree species.

5.1 Landscape Setting

The landscape encompassing Two Rivers NWR was formed during the Pleistocene epoch, or Ice Age, as continental ice sheets advanced and retreated across northern Missouri and Illinois. The southern extent of glaciations roughly parallels the Missouri River in Missouri. When the climate warmed again, melt water from northern glacial ice created the present channel of the Illinois and Mississippi Rivers. Soils in the region have formed from wind deposited material that occurred during the ice sheet retreat (Heitmeyer & Westphall, 2007).

The most dramatic change to the region was construction of Lock and Dam 25 across the Mississippi River near Winfield, Missouri and Lock and Dam 26 at Alton, Illinois in late 1930s. After Lock and Dams were built, water levels in the Illinois River adjacent to Two Rivers were raised approximately 6 feet and stabilized. Prolonged flooding ultimately killed less water tolerant trees in floodplains and enlarged the bottomland lakes (Heitmeyer & Westphall, 2007).

Water levels were raised, due to Lock and Dam construction at the Calhoun, Gilbert Lake, Portage Island and Batchtown Division with very little water level change at Clarksville Island (tailwater section of pool). No water level change occurred at the Apple Creek Division due to location and distance from the Illinois River.

5.2 Natural Resources

5.2.1 Habitats

Clarksville Island Division (see Figure 2) currently consists of approximately 870 acres of bottomland forest habitat located in the Mississippi River. The island is subject to large seasonal variation in river flow and precipitation. These dynamic conditions result in a diversity of floodplain habitat, including sloughs, chutes, backwaters, sandbars, and seasonally-flooded bottomland forest. Populations and habitats are allowed to fluctuate within their natural range of variability, in response to biotic and abiotic influences. The division is comprised of a large island immediately downstream from Lock and Dam 24. The island provides roosting sites for a dense concentration of wintering bald eagles attracted to the ice-free tailwaters of the lock and dam.

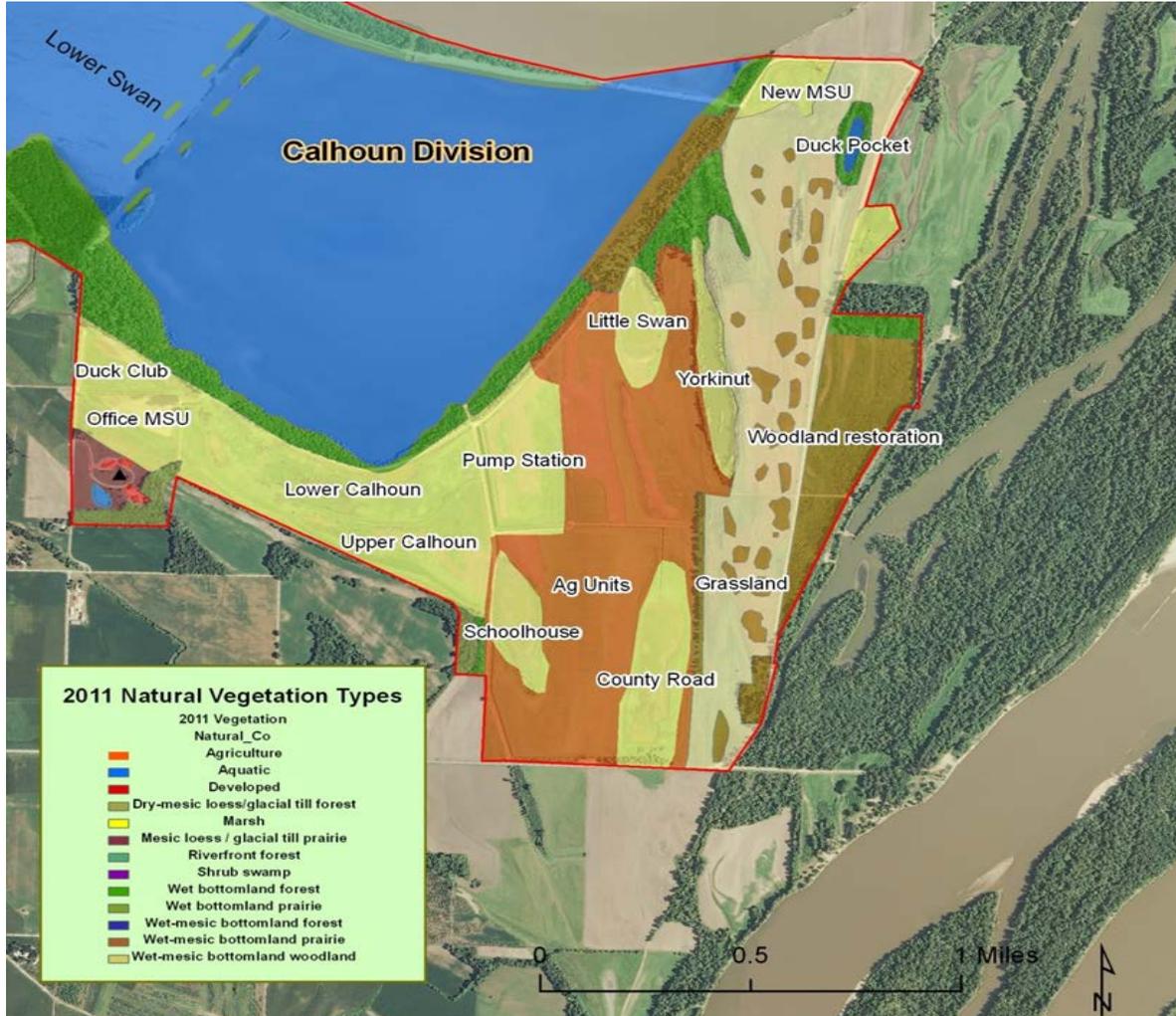
Figure 2. Clarksville Island Division. (Dalrymple & Salas, 2011)



Calhoun Division (see figure 3) is located just north of the confluence of the Mississippi and Illinois rivers in Calhoun County, Illinois, and stretches along the Illinois River from approximately River Mile 5 to River Mile 10. The 4,820-acre Division is comprised of the 2,300-acre Swan Lake, moist soil units, agricultural land, bottomland forests, savanna, grasslands, lakes, ponds, backwater sloughs, and Refuge headquarters.

Eight moist soil units totaling roughly 360 acres are managed for migratory birds (Figures 2-4). Approximately 270 acres of cropland are currently farmed by cooperative agreements on the Calhoun Division. Corn, soybeans, and winter wheat are planted rotationally through the units and prescribed fire is used to manage native grass plantations. Some native grass areas are undergoing restoration toward bottomland oak savanna/woodland. Refuge staff has planted approximately 137 acres of bottomland hardwood trees such as pecan, swamp white oak, bur oak, and pin oak starting in 2008.

Figure 3. Southern Portion of Calhoun Division. (Dalrymple & Salas, 2011)



The Apple Creek Division (see figure 4) is comprised of approximately 270 acres of shallow wetlands, upland/bottomland forests and retired agricultural fields. It is located in Greene County just northwest of Carrollton, Illinois, approximately one hour from the refuge headquarters. This division, established in 1992, differs from other divisions on the refuge in that it is not in a large river floodplain but on a small tributary called Apple Creek. The division has both bottomland and upland habitat. Several small areas impound water (behind the old agricultural levee) during high rainfall and overflow flood events and would be considered ephemeral wetland areas. The former agricultural field has reverted to scrub-shrub and bottomland hardwood vegetation.

Figure 4. Apple Creek Division. (Dalrymple & Salas, 2011)



5.2.2 Wildlife

More than 300 species of birds have been observed on Two Rivers NWR since its inception. Refuge lands are important for a variety of migratory birds, including waterfowl and neotropical migrants. There are more than 100 known species of butterflies and moths and more than 60 species of reptiles and amphibians occur on the refuge with some of the more common species including southern leopard frog and American toad. Snapping turtle, red-eared slider turtle, softshell turtle, and the northern water snake are a few of the reptiles that can be found living on the refuge. See Appendix F for a complete species list.

5.3 Threatened, Endangered, and Candidate Species

The Indiana bat (*Myotis sodalis*), decurrent false aster (*Boltonia decurrens*), Eastern prairie fringed orchid (*Platanthera leucophaea*), are federally endangered species listed for Calhoun and Greene Counties in Illinois. There is no documented roosting site or nurseries for bats but Indiana bats have been observed using habitat along and adjacent to the Mississippi River. Suitable habitat may/could exist for decurrent false aster and Eastern prairie fringed orchid but no known populations occur in the divisions open to hunting.

5.4 Cultural Resources

5.4.1 Archeology

Archeological sites are reported in every county in which refuge lands are located. Some loss of resources can occur as a result of erosion or other natural processes, or from

unauthorized collecting and vandalism. Collection and excavation of archeological material on refuge lands is permitted only when conducted in the public interest. The Regional Director regulates collection and excavation through the issuance of permits.

5.4.2 Historical Sites

The refuge has the potential to contain significant historical artifacts buried under the sediments along the Mississippi and Illinois River. Many artifacts are present at Native American campsites and where steamships wrecked on the hidden snags or shoals of the changing rivers. The amount of sediment carried by the river quickly buried and preserved these artifacts.

5.5 Economic Resources

The Refuge lies near a heavily populated urban area along with suburban and rural development areas. The St. Louis Metropolitan area is home to about 3 million people, and is the 18th largest metropolitan area in the country (US Census 2010). Socioeconomic conditions are wide ranging and reflect the dynamic nature of development occurring along the Mississippi and Illinois Rivers. The refuge lies primarily in areas dominated by agriculture.

5.6 Recreational Opportunities

With its mix of landscapes and geography, the Clarksville Island, Callhoun and Apple Creek Divisions have many opportunities for outdoor recreation. Illinois has many opportunities for outdoor recreation on its wide system of trails, campgrounds, state, federal and privately owned parks. Illinois provides all kinds of travel, whether scenic driving, biking, hiking or enjoying one of the many water bodies throughout the state including two of North America's greatest rivers, the Illinois and the Mississippi.

5.7 Climate

Two Rivers NWR climate is characterized by seasonal variations of hot, humid summers and cold winters. The average summer temperature is approximately 75° F and the average winter temperature is 31° F. Total annual precipitation in the confluence region is slightly over 37 inches. Precipitation generally is low in winter. The refuge annually receives an average of 19.8" of snow. In general, July is the warmest month with an average high temperature of 89° F while January is the coldest and driest month with lows averaging 21° F and only receiving 2.0" of precipitation. May is the wettest month with 3.9" of precipitation on average (www.weatherbase.com). Shallow waters in wetlands in the region typically are frozen from late November through mid-March; the first hard frosts and freezes usually occur in early to mid-October. Growing seasons average about 200 days annually.

Summer storms are relatively common and daily rain totals of more than 3-4 inches occur occasionally. Snow melt and increasing rain in early spring create local runoff into floodplain habitats. In addition to regular seasonal patterns of regional precipitation, the Illinois and Mississippi River Valley also has longer term patterns in annual precipitation and runoff that suggest peaks and lows that alternate on about a 20-year recurring interval.

Climate change is a concern that, depending on the accuracy of current assessments, could have major influences on the refuge. Like the rest of the world, much of the Midwest is already experiencing changes in temperature and precipitation. If these predictions are accurate, average

temperatures and precipitation could continue to increase, resulting in longer growing seasons and increased flooding.

5.8 Physical Features

The present location of the Illinois and Mississippi rivers and the geomorphic land forms in the confluence region reflect numerous channel changes and deposition/scouring events caused by fluvial dynamics and glacial events in the Quaternary period (Willman 1973, Simons et al. 1975). During pre-glacial times about 1 million years before the present (BP), the Iowa River occupied the current Mississippi River floodplain from about Muscatine, Iowa to Grafton, Illinois and the Mississippi River flowed south from Minnesota to Hennepin, Illinois where it then flowed through the current Illinois River valley. During the Kansas continental glaciation, much of the western drainage area of the current Upper Mississippi River watershed was diverted by ice through the current Illinois River valley and enlarged the valley greatly. Following the Kansas glaciations, the drainage reestablished a pre-glacial pattern with the ancient Mississippi River occupying the Illinois Valley and the ancestral Iowa River occupying the present Mississippi River Valley.

During the Illinoisan glaciations the glacial ice sheet advanced from the northeast and forced the ancient Mississippi River west; a lobe of ice advanced west and partly blocked the Mississippi Valley at St. Louis (Simons et al. 1975). This ice dam formed a large glacial lake in the current Mississippi/Illinois River confluence area and caused extensive deposition of alluvial material in the region. Following retreat of the Illinoisan ice during the Sangamonian interglacial period the Mississippi River reoccupied the Illinois Valley and the Iowa River again passed through the present Mississippi River Valley.

The final advance of the Wisconsin ice sheet through the northern half of Illinois forced the Mississippi River into its present valley. The Illinois River, now draining a much reduced area, occupied the valley formed by the ancient Mississippi River. By the end of the Wisconsin glaciations, the current drainage patterns of the Upper Mississippi and Illinois rivers were established.

Because the current Illinois River occupies the much wider former channel of the ancient Mississippi River below Hennepin, its discharge and river slope is much lower than the old channel capacity (Willman 1973). Consequently, this relatively low river discharge and velocity over a wide floodplain created a unique “braided” pattern of sediment deposition and river channel connectivity. This braided channel geomorphology created a labyrinth of channels, natural levees, point bar ridges and swales, and bottomland lakes where Two Rivers NWR is located.

Both Clarksville Island and Calhoun Division are located in a large river floodplain and is subject to the extreme water fluctuations associated with a big river system. Apple Creek Division is adjacent to a tributary of the Illinois River and is an upland/bottomland system and is also subject to flooding events but of short duration.

5.9 Vegetation

The Refuge supports a variety of riverine, forest, and wetland ecosystems. Many of the ecosystems (and the habitats they support) have been degraded, damaged, or destroyed as a result of the numerous impacts, most notably the installation of locks and dams up and down the Mississippi River. Despite these alterations, many of these impacted ecosystems have the potential to be restored through various management actions and specific projects. Other areas, including portions of the backwater wetlands and upland forests contain healthy and intact plant communities that will require a more protection-focused approach to management.

Community-types present at the refuge are greatly influenced by the River's hydrology and the topography of the adjacent terrestrial landscape. Figure 5 illustrates how the Refuge's natural communities vary based on the morphology of the River and its surrounding upland areas. The majority of the lands on Clarksville Island and Calhoun consist of floodplain forest. Floodplain forest along the middle Mississippi River are characterized by cottonwood (*Populus deltoids*), black willow (*Salix nigra*), silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), and box elder (*Acer negundo*) with an occasional northern pecan (*Carya illioensis*) located on ridges of the ridge and swale system developed on islands areas.

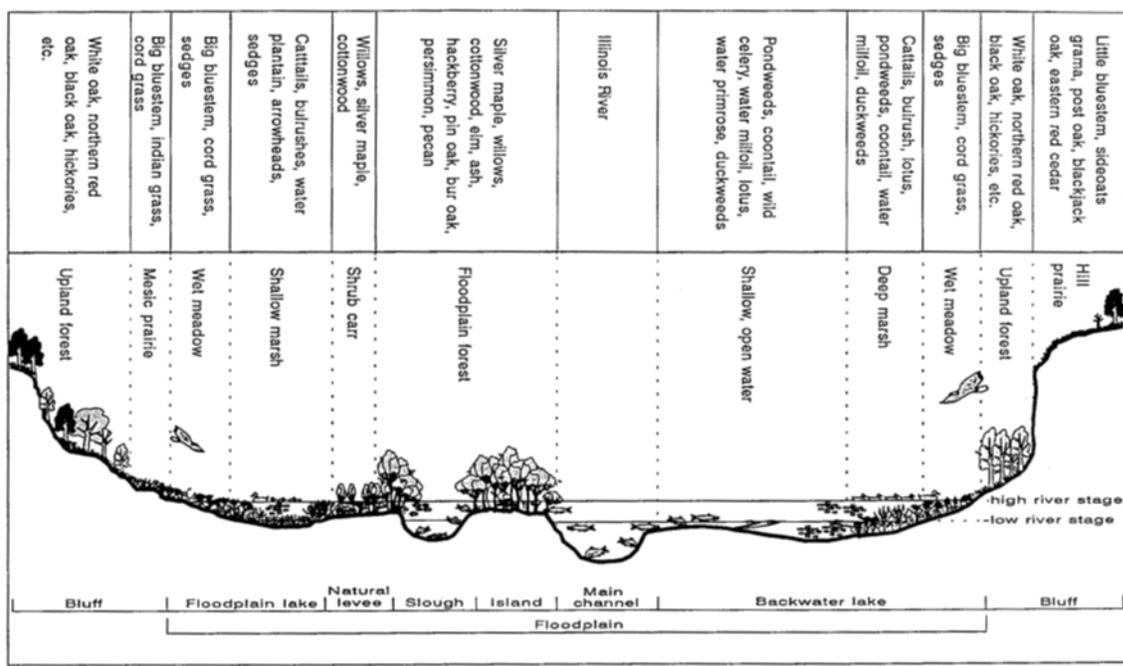


Figure 5. Cross-section of Habitat Types Typical in Mississippi and Illinois River Valleys (from Sparks 1993).

6.0 ENVIRONMENTAL CONSEQUENCES

This section evaluates the foreseeable environmental consequences of the alternatives described in Section 4.

6.1 Environmental Consequences of Alternative B: Hunting Program Remains as it Currently Exists (No Action).

Hunting program follows state regulations with refuge specific regulations. No hunting would be allowed on Clarksville Island.

6.1.1 Infrastructure

Providing hunting opportunities under this alternative will not adversely affect, temporarily or permanently, the Service's ability to meet land use goals on any of the units open to hunting.

No additional infrastructure is required to provide access at this time. Limited access by foot is available at Apple Creek Division and Calhoun Division is easily accessible by vehicle.

6.1.2 Natural Resources

6.1.2.1 Habitats

Impacts to Refuge soils and vegetation by hunters are minimal. Hunting is conducted on foot mostly by individuals or small groups. Typically hunter groups travel in dispersed patterns so soil compaction and vegetation trampling will be minimal. Other potential types of habitat damage specifically attributed to hunting activities, such as littering, are not significant. Refuge specific regulations prohibit the cutting of vegetation, and the use of screw-in steps on trees, and the use of campfires.

Populations of hunted species are not at levels that could cause habitat damage. Implementation of this alternative would not change overall impacts on habitat from wildlife. When populations are high, deer may damage habitat on the Refuge or on nearby public and private lands. Habitat damage on the Refuge and adjacent public lands appears to be localized. The refuge receives very few complaints of deer damage from adjacent landowners. Implementation of this alternative would not change overall impacts on habitat from deer.

6.1.2.2 Wildlife

Given the nature of these lands, disturbance of migratory birds, upland and big game, and resident wildlife will occur however the harvest of Refuge wildlife species will be in accordance with Federal regulations and Illinois state limits. Other wildlife not being harvested will be disturbed by hunters approaching an animal's site, and flushing or moving the wildlife as the animals try to avoid human contact. This disturbance will be minimal and temporary in nature.

Hunting may have temporary, localized impacts to populations of game and non-game species. Some individuals and small groups of animals will be disturbed as hunters move through occupied habitat or discharge firearms. Disturbed animals will relocate to avoid hunters or flush and expend more energy than if they had

remained at rest. Disturbance is not a long term threat to populations because the relocation is temporary and food is generally not a limiting factor. Most animals will be able to readily replace those energy reserves they use to escape from hunters.

Individual game animals will be removed from the population by hunter harvest. The impact of harvesting game animals is restricted through bag limits and season length set by the state of Illinois. These harvest limits are designed to meet population management objectives for game species set by the state, or by the flyway councils in the case of migratory birds.

Migratory Game Birds

Two Rivers NWR offers little opportunity for dove hunting. Weather is the single biggest influence on dove population numbers, and hunter numbers seem to coincide with those population numbers.

The harvest of waterfowl, shorebirds and waterbirds from Two Rivers NWR is estimated to range between 0-100 annually. This number is insignificant compared to the number of birds harvested on state wildlife managed areas. The number of birds harvested from the Refuge would have no cumulative impact on migratory waterfowl populations on a statewide or Mississippi Flyway scale.

Upland Game

Upland game includes small game, furbearers and turkey. Hunting these species is considered a compensatory form of mortality. It allows for a portion of upland game populations to be harvested annually because, if not taken by hunters, they would likely die prior to the next breeding season from other causes.

The number of upland game species harvested from the refuge is small and many areas flood extensively every year. Available habitat for quail on the refuge is not ideal (wet bottomland), but some quail are present. Annual harvest is estimated to be very low. Squirrels may be abundant during the fall but squirrel harvest from the refuge is estimated to be very few. Turkey hunting is allowed in the State of Illinois by permit in both the spring and fall seasons. Turkey populations fluctuate primarily based upon weather conditions during hatching and brooding seasons. Spring hunting of turkeys is not expected to affect turkey numbers as only male turkeys are harvested and seasons are set after the turkeys have had a chance to breed. Fall turkey harvest is low statewide.

Big Game

The white-tailed deer populations experience fluctuations due to naturally occurring environmental factors. Hunting is a highly regulated activity compared to non-hunting activities and generally takes place at specific locations, times, and seasons. These regulations reduce the impact to non-hunted species. Hunting is an appropriate wildlife management tool that can be used to manage harvestable game populations on the refuge. Some wildlife disturbance will occur during the

hunting season. When hunting is implemented impacts can occur to non-hunted wildlife populations using these areas.

Non-hunted Wildlife

Non-hunted wildlife include migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, and shrew; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting does not negatively impact their populations regionally.

Disturbance to non-hunted wildlife under this alternative is minimal. Small mammals such as voles and mice are generally nocturnal or secretive. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor of cold-blooded reptiles and amphibians also limits their activity during most of the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Some species of butterflies and moths are migratory and will not be present for most of the Refuge's hunting season. Resident invertebrates are not active during cold weather and would have few interactions with hunters during the hunting season. Impacts to these species due to habitat disturbance related to hunting are negligible at the local and flyway levels.

Non-hunted migratory birds include songbirds, wading birds, raptors, and woodpeckers. Disturbance to non-hunted migratory birds could have regional, local, and flyway effects. Regional and flyway effects would not be applicable to species that do not migrate such as most woodpeckers, and some songbirds including nuthatches, finches, and chickadees. Disturbance by hunting to non-hunted migratory birds should not have cumulative negative impacts since the hunting seasons would not coincide with the nesting season.

Migratory birds of prey (eagles, hawks, etc.) are on the Refuge during hunting season and disturbance to the daily wintering activities, such as feeding and resting, of residential birds may occur. Refuge users including hunters, during the spring turkey season would have negligible adverse impact to eagles raising young. Overall, hunting impacts to non-hunted species and their habitats and impacts to the biological diversity of the Refuge will be insignificant.

6.1.3 Threatened and Endangered Species

It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or endangered. The three federally listed threatened or endangered species that are known or suspected to occur on the refuge include the decurrent false aster, Eastern prairie fringed orchid, and Indiana bat. Two of these species (Indiana bat and decurrent false aster) are associated with riverine floodplain habitat. A

consultation pursuant to Section 7 of the Endangered Species Act was conducted as part of this EA and the Hunt Plan. A finding of “May Affect but Not Likely to Adversely Affect species/critical habitat” was determined for Indiana bat and decurrent false aster and “No Effect” for Eastern prairie fringed orchid. In addition, no impacts are anticipated for state listed species.

6.1.4 Cultural Resources

Hunting is not expected to cause ground disturbance thus will have no effect on any historic properties.

6.1.5 Social and Economic Impacts

Hunting activities on the Refuge can affect the local or regional economy in two ways. First, the Refuge spends monies for staff and resources to manage refuge lands. Second, visitors engaging in hunting activities provided by the Refuge generate economic activity for local businesses.

6.1.6 Recreational Opportunities

All lands proposed to be hunted with this Alternative presently are open to public hunting. On most refuge lands conflicts between recreational user groups are minimal and are expected to remain so.

6.1.7 Cumulative Impacts

The implementation of this alternative has no significant cumulative impacts on the wildlife populations, either hunted or non-hunted species, the natural environment, cultural resources, social and economic resources, or recreational opportunities. This determination is based on an analysis of potential environmental impacts of hunting on the Refuge together with other projects and actions.

6.1.7.1 Infrastructure

No infrastructure, on the Refuge or off the Refuge, will be modified solely to accommodate the Refuge’s hunting program. Implementing a hunting program as described in this alternative will have minimal direct or indirect impacts on public or private infrastructure.

6.1.7.2 Natural Resources-

6.1.7.2.1 Habitats

As presented earlier, the effects will not be significant when added to other expected activities. The Refuge Act identified the purposes for which the Refuge was established (Section 1.0). Because habitats are not managed to favor hunted species over other species and are managed to maintain healthy populations of all species, the implementation of this alternative does not result in significant direct, indirect, or cumulative effects to habitats at any scale due to hunting activities.

6.1.7.2.2 Wildlife

National Wildlife Refuges, including Two Rivers NWR, conduct hunting programs within the framework of State and Federal regulations. Hunter activity and harvest will not cause a significant cumulative effect locally, regionally, or nationally on species hunted.

Waterfowl populations throughout the United States are managed through an administrative process known as flyways. The Refuge is located in the Mississippi Flyway. In North America, the process for establishing waterfowl hunting regulations is conducted annually. In the United States, the process involves a number of scheduled meetings (Flyway Study Committees, Flyway Councils, Service Regulations Committee, etc.) in which information regarding the status of waterfowl populations and their habitats is presented to individuals within the agencies responsible for setting hunting regulations. In addition, public hearings are held and the proposed regulations are published in the Federal Register to allow public comment.

Annual waterfowl assessments are based upon the distribution, abundance, and flight corridors of migratory birds. An Annual Waterfowl Population Status Report is produced each year and includes the most current breeding population and production information available for waterfowl in North America. The Report is a cooperative effort by the Service, the Canadian Wildlife Service, various state and provincial conservation agencies, and private conservation organizations. An Annual Adaptive Harvest Management Report (AHM) provides the most current data, analyses, and decision making protocols. These reports are intended to aid the development of waterfowl harvest regulations in the United States for each hunting season. In Illinois, IDNR selects season dates, bag limits, shooting hours, and other options using guidance in these reports. Their selections can be more restrictive, but cannot be more liberal than the AHM allows. Thus, the level of hunting opportunity afforded each State increases or decreases each year in accordance with the annual status of waterfowl populations.

Each National Wildlife Refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Frameworks published annually in the Service's regulations on Migratory Bird Hunting. Season dates and bag limits for National Wildlife Refuges open to hunting are never longer or larger than the State regulations.

Migratory Birds

In the Mississippi Flyway 7,647,000 ducks were harvested in 2010-2011 (Andy Raedeke, pers. Comm. 2012). The number of birds harvested from the refuge has no cumulative impact on migratory bird populations on a statewide or Mississippi Flyway scale.

Other migratory birds that could be hunted on the refuge include mourning dove, common moorhen, coot, rails, common snipe, and woodcock. The number of birds harvested from Two Rivers NWR would have no cumulative impact on migratory bird populations on a statewide or Mississippi Flyway scale.

Upland Game

The number of upland game species harvested from the refuge has no cumulative impact on populations on a statewide scale.

Big Game

White-tailed deer in the vicinity of the Refuge move freely across property boundaries. In the vicinity of the Refuge deer population densities are relatively close to target densities. Hunting on the Refuge contributes to overall population management goals; a desirable cumulative effect. Deer harvest on the refuge has no effect on local or statewide deer populations.

Non- hunted Wildlife

Non-hunted wildlife include migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, and shrew; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting does not effectively impact their populations regionally.

Migratory birds of prey (eagles, hawks, etc.) are on the Refuge during hunting season and disturbance to the daily wintering activities, such as feeding and resting, of residential birds may occur. Overall, hunting impacts to non-hunted species and their habitats and impacts to the biological diversity of the Refuge will be insignificant.

6.1.7.3 Threatened and Endangered Species

There will be no cumulative impacts from the hunting program on Threatened and Endangered species. A consultation pursuant to Section 7 of the Endangered Species Act was conducted as part of this EA and the updated Hunt Plan. A finding of “May Affect but Not Likely to Adversely Affect species/critical habitat” was determined for Indiana bat and decurrent false aster and “No Effect” for Eastern prairie fringed orchid. In addition, no impacts are anticipated for state listed species.

6.1.7.4 Cultural Resources

Refuge hunting activities do not affect cultural resources under this alternative so there will be no cumulative impacts to such resources.

6.1.7.5 Social and Economic Resources

Increased economic activity is associated under this alternative. This economic activity, while important to the communities near the Refuge (Section 6.1.5), is minor.

6.1.7.6 Recreational Opportunities

A hunting program implemented under this Alternative will not provide an increased opportunity for hunting on the refuge. In a regional or statewide context, hunting on the Refuge provides only a small percentage of hunting opportunities.

6.2 Environmental Consequences of Alternative C: Expand Opportunity on Currently Hunted Refuge Lands, and Allow Limited Hunting of Deer and Turkey at Clarksville Island Division. (Preferred Alternative)

Hunting Program under this Alternative expands hunting on the Calhoun Division to include migratory birds, and allows limited hunting on the recently acquired Clarksville Island.

6.2.1 Infrastructure

Providing hunting opportunities under this alternative will not adversely affect, temporarily or permanently, the Service's ability to meet land use goals on any of the units open to hunting.

No additional infrastructure is required to provide access at this time. Limited access by foot is available at Apple Creek Division, Calhoun Division can be accessed by vehicle, and Clarksville Island Division is accessible by boat.

6.2.2 Natural Resources

6.2.2.1 Habitats

The selection of this alternative would not have significant adverse effects on the quality of wildlife habitat or the natural environment. The amount of habitat by type would not change from the current situation. Some minor trampling of vegetation from hunters using areas other than established trails is expected. The selection of this alternative would have no adverse effects on the quality of wintering Bald Eagles habitat when using trees for feeding and roost perches on Clarksville Island.

Access to Clarksville Island Division is typically by boat. This method of access presents no significant adverse impacts to Refuge lands.

Impacts to Refuge soils and vegetation by hunters are minimal. Hunting is conducted on foot by individuals or small groups. Typically hunter groups travel in dispersed patterns so soil compaction and vegetation trampling will be minimal. Refuge specific regulations prohibit the cutting of vegetation, and the use of screw-in steps on trees, and the use of campfires. Other potential types of

habitat damage specifically attributed to hunting activities, such as littering, are not significant.

Because habitats are not managed to favor hunted species over other species and are managed to maintain healthy populations of all species, the implementation of this alternative does not result in significant direct, indirect, or cumulative effects to habitats at any scale due to hunting activities.

6.2.2.2 Wildlife

The location of Clarksville Island Division below Lock and Dam 24 provides exceptional foraging conditions for wintering Bald eagles. This habitat type is not available on a variety of other local public or private lands. The selection of this alternative would have no adverse effects on the quality of wintering Bald Eagles.

Expanding hunting on the Calhoun Division to include migratory birds will cause minimal and temporary disturbance to upland game, big game, and other resident wildlife.

Some individuals and small groups of animals will be disturbed as hunters move through occupied habitat or discharge firearms. Disturbed animals will relocate to avoid hunters or flush and expend more energy than if they had remained at rest. Disturbance is not a long term threat to populations because the relocation is temporary and food is generally not a limiting factor on the refuge. Most animals will be able to readily replace those energy reserves they use to escape from hunters.

Individual game animals will be removed from the population by hunter harvest. The impact of harvesting game animals is restricted through bag limits and season length set by the state of Illinois. These harvest limits are designed to meet population management objectives for game species set by the state.

Migratory Game Birds

In the Mississippi Flyway 7,647,000 ducks were harvested in 2010-2011 (Andy Raedeke, pers. Comm. 2012). The number of birds harvested from the refuge has no cumulative impact on migratory bird populations on a statewide or Mississippi Flyway scale.

Other migratory birds that could be hunted on the refuge include common moorhen, coot, rails, common snipe, and woodcock. The number of birds harvested from Two Rivers NWR would have no cumulative impact on migratory bird populations on a statewide or Mississippi Flyway scale thus opening the Calhoun Division hunted portion to hunting of migratory birds will have no added adverse cumulative effect.

No hunting of migratory Birds will be allowed at Clarksville Island Division to reduce possible disturbance of wintering Bald Eagles and disturbance of recreational activities of bird watchers.

Upland Game

Upland game includes small game, furbearers and turkey. Hunting these species is considered a compensatory form of mortality. It allows for a portion of upland game populations to be harvested annually because, if not taken by hunters, they would likely die prior to the next breeding season from other causes.

The number of upland game species harvested from the refuge is small and many areas flood extensively every year. Available habitat for quail on the refuge is not ideal (wet bottomland), but some quail are present. Annual harvest is estimated to be very low. Squirrels may be abundant during the fall but squirrel harvest from the refuge is estimated to be very few.

Turkey hunting is allowed in the State of Illinois by permit in both the spring and fall seasons. Turkey populations fluctuate primarily based upon weather conditions during hatching and brooding seasons. Spring hunting of turkeys is not expected to affect turkey numbers as only male turkeys are harvested and seasons are set after the turkeys have had a chance to breed. Fall turkey harvest is low statewide.

The number of upland game species harvested from the refuge would have no impact on populations on a statewide scale.

No upland game hunting is allowed under this alternative on the Clarksville Island Division except for turkey to reduce disturbance of wintering/nesting Bald Eagles.

Big Game

The white-tailed deer populations experience fluctuations due to naturally occurring environmental factors. Hunting is a highly regulated activity compared to non-hunting activities and generally takes place at specific locations, times, and seasons. These regulations reduce the impact to non-hunted species. Hunting is an appropriate wildlife management tool that can be used to manage harvestable game populations on the refuge. Some wildlife disturbance will occur during the hunting season. When hunting is implemented impacts can occur to non-hunted wildlife populations using these areas.

Deer harvest on the refuge has no effect on local or statewide deer populations.

The use of archery only method for hunting deer on the Clarksville Island Division will reduce the potential for disturbance to wintering Bald Eagles and would have no adverse effects on the quality of wintering Bald eagle habitat when using trees for feeding and roost perches.

For general hunting activities, the refuge has not required, and is not proposing to require, hunters to register to hunt on refuge lands, or to report wildlife taken on the refuge separately from the State tele-check system. Hunter activity on the refuge is monitored through law enforcement and other staff contacts with hunters in the field.

Non- hunted Wildlife

Disturbance to non-hunted wildlife under this alternative is minimal. Small mammals such as voles and mice are generally nocturnal or secretive. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor of cold-blooded reptiles and amphibians also limits their activity during most of the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Some species of butterflies and moths are migratory and will not be present for most of the Refuge's hunting season. Resident invertebrates are not active during cold weather and would have few interactions with hunters during the hunting season.

Non-hunted migratory birds include songbirds, wading birds, raptors, and woodpeckers. Disturbance by hunting to non-hunted migratory birds should not have cumulative negative impacts and disturbance to the daily wintering activities, such as feeding and resting would probably be similar to that caused by non-consumptive users. Because turkey hunting is of relatively short duration in the spring, any disturbance to non-hunted species would be minimal. Other disturbance to these species by hunters afield would be temporary in nature.

Migratory birds of prey (eagles, hawks, etc.) are on the Refuge during hunting season and disturbance to the daily wintering activities, such as feeding and resting, of residential birds may occur. A 330 foot buffer area around each eagle nest will be maintained during the breeding season, closed to all refuge users including hunters, during the spring turkey season so there would be negligible adverse impact to eagles raising young at that time. Overall, hunting impacts to non-hunted species and their habitats and impacts to the biological diversity of the Refuge will be insignificant with limited hunting allowed on the Clarksville Island Division.

6.2.3 Threatened and Endangered Species

It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or endangered. The three federally listed threatened or endangered species that are known or suspected to occur on the refuge include the decurrent false aster, Eastern prairie fringed orchid, and Indiana bat. All of these species are associated with riverine or floodplain habitat except the orchid. A consultation pursuant to Section 7 of the Endangered Species Act was conducted as part of this EA and Hunt Plan. A finding of "May Affect but Not Likely to Adversely Affect species/critical habitat" was determined for Indiana bat and decurrent false aster and "No

Effect” for Eastern prairie fringed orchid. No impacts are anticipated for state listed species.

6.2.4 Cultural Resources

Hunting under this alternative is not expected to cause ground disturbance or disturbance to standing structures and will have no effect on any historic properties.

6.2.5 Social and Economic Impacts

Hunting activities on the Refuge can affect the local or regional economy in two ways. First, the Refuge spends monies for staff and resources to manage refuge lands. Second, visitors engaging in hunting activities provided by the Refuge generate economic activity for local businesses.

6.2.6 Recreational Opportunities

Under this alternative, impacts to other wildlife-dependent priority recreational uses on the Refuge are expected to be minimal. Non-consumptive uses are generally highest in spring, early summer and fall when the heat and humidity are tolerable. The majority of hunting opportunities take place in fall and winter. The archery only method will help provide safety from firearm projectiles to both anglers, hunters, non-hunting visitors and adjacent property users. This limitation for the Clarksville Island Division will help reduce conflicts between hunters and other user groups. However, some impacts to users may occur. Visitors using the refuge during hunting seasons and residents using adjacent recreational facilities may encounter hunters on the refuge. The quality of the visitor experience, including hunters’ experiences, would not be significantly altered under this alternative.

6.2.7 Cumulative impacts

The implementation of this alternative has no significant cumulative impacts on the wildlife populations, either hunted or non-hunted species, the natural environment, cultural resources, social and economic resources, or recreational opportunities. This determination is based on an analysis of potential environmental impacts of hunting on the Refuge together with other projects and actions.

6.2.7.1 Infrastructure

No infrastructure, on the Refuge or off the Refuge, will be modified solely to accommodate the Refuge’s hunting program. Implementing a hunting program as described in this alternative will have minimal direct or indirect impacts on public or private infrastructure. Therefore, there will be negligible cumulative impacts to infrastructure at the local, regional, or national level due to administering the hunting program as described in this alternative.

6.2.7.2 Natural Resources

6.2.7.2.1 Habitats

A hunting program implemented under this Alternative will have minor positive effects on the vegetation by slightly reducing the number of deer

on refuge land. However, such effects are insignificant, when compared to the remainder of the population within a particular county or the state-wide populations for deer.

The Refuge Act identified the purposes for which the Refuge was established (Section 1.0). The Service conducts habitat management actions that favor healthy and functional ecological communities on Refuge lands. This approach benefits all wildlife species, including species traditionally hunted. Because habitats are not managed to favor hunted species over other species and are managed to maintain healthy populations of all species, the implementation of this alternative does not result in significant direct, indirect, or cumulative effects to habitats at any scale due to hunting activities.

6.2.7.2.2 Wildlife

National Wildlife Refuges, including Two Rivers NWR, conduct hunting programs within the framework of State and Federal regulations. The proposed Refuge hunting program rules will be more restrictive than, hunting regulations throughout the State of Illinois. The Refuge consistently coordinates with the State about the hunting program. As a result, hunting on Clarksville Island Division and expanding hunting on Calhoun Division will have minor effects on wildlife species in Illinois. This alternative will increase the hunting opportunity for hunters using archery and firearms compared to the current situation. These slight increases in hunter activity and harvest will not cause a significant cumulative effect locally, regionally, or nationally.

Migratory Game Birds

The number of birds harvested from Two Rivers NWR would have no cumulative impact on migratory bird populations on a statewide or Mississippi Flyway scale thus expanding the Calhoun Division hunted portion to hunting of migratory birds will have no added adverse cumulative effect.

Upland Game

The number of upland game species harvested from the refuge has no cumulative impact on populations on a statewide scale.

There is no adverse impact to the statewide turkey population due to either hunting or non-hunting factors. Hunting turkey on Refuge lands will not result in any factors changing in a manner that results in cumulative impacts.

Big Game

White-tailed deer harvest on the Clarksville Island Division will be minimal due to the archery only hunting method rule. This strategy would

be put in place to provide for increased hunter and visitor safety, and to minimize disturbance to wintering Bald Eagles.

White-tailed deer hunting on the Refuge contributes to overall population management goals; a desirable cumulative effect. Deer harvest on the refuge has no effect on local or statewide deer populations.

Non- hunted Wildlife

Non-hunted wildlife include non-hunted migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, and shrew; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory butterflies and moths, these species have very limited home ranges and hunting does not effectively impact their populations regionally.

Disturbance to non-hunted wildlife under this alternative is minimal. Small mammals such as voles and mice are generally nocturnal or secretive. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor of cold-blooded reptiles and amphibians also limits their activity during most of the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Some species of butterflies and moths are migratory and will not be present for most of the Refuge's hunting season. Resident invertebrates are not active during cold weather and would have few interactions with hunters during the hunting season. Impacts to these species due to habitat disturbance related to hunting are negligible at the local and flyway levels.

Direct impacts to non-hunted non-migratory birds such as most woodpeckers and some songbirds including nuthatches, and chickadees are negligible. Secondary impacts to this group of species are also minimal and do not appreciably reduce their numbers at the population level. Disturbance by hunting to non-hunted migratory birds would not have substantial negative secondary impacts because the majority of hunting does not coincide with the nesting season except in the case of spring turkey hunting. Because spring turkey hunting is of relatively short duration any disturbance to non-hunted species would be minimal. Other disturbance to these species by hunters afield would be temporary in nature.

Migratory birds of prey (eagles, hawks, etc.) are on the Refuge during hunting season but disturbance is minimal. Disturbance to the daily wintering activities, such as feeding and resting, of residential birds might occur but are insignificant because such interactions are infrequent and of

short duration when they do occur with archery hunters. A 330 foot buffer area around each eagle nest will be maintained during the breeding season, closed to all refuge users including hunters, during the spring turkey season so there would be negligible adverse impact to eagles raising young at that time. Overall, hunting impacts to non-hunted species and their habitats and impacts to the biological diversity of the Refuge will be insignificant thus no cumulative impacts.

6.2.7.3 Threatened and Endangered Species

No impacts are anticipated for federal or state listed species.

6.2.7.4 Cultural Resources

Refuge hunting activities do not affect cultural resources under this alternative so there will be no cumulative impacts to such resources.

6.2.7.5 Social and Economic Resources

Hunting activities on the Refuge can affect the local or regional economy in two ways. First, the Refuge spends monies for staff and resources to manage refuge lands. Second, visitors engaging in hunting activities provided by the Refuge generate economic activity for local businesses.

6.2.7.6 Recreational Opportunities

A hunting program implemented under this Alternative will provide recreational opportunities for Refuge visitors. In a regional or statewide context, hunting on the Refuge provides only a small portion of regional hunting opportunities.

The Refuge's presence in the vicinity of communities increases the quality of life for some area residents in a variety of ways. It provides an opportunity for year round outdoor recreation such as bird watching, hiking, connection to cultural heritage, and access to open space. Even though hunting is a highly visible public use and is the focus of this EA, it accounts for less than 10% of the public use of Refuge units. Refuge hunting activities under this Alternative do not produce significant cumulative effects.

6.3 Summary of Environmental Consequences by Alternative

A summary of environmental consequences by alternative are presented in Table 4.

Table 4 Comparison of Environmental Consequences by Alternative

Resource Effected	Alternative B: Hunting Program Remains as it Currently Exists (No Action)	Alternative C: Expand Opportunity on Currently Hunted Refuge Lands, and Allow Limited Hunting of Deer and Turkey at Clarksville Island Division (Preferred)
Compatible with the goals of the Refuge	Yes	Yes
Habitat	Minimal effect such as trampling of vegetation in off-trail areas.	Minimal effect such as trampling of vegetation in off-trail areas.
Migratory Game Birds	No effect on the flyway scale.	No effect on the flyway scale.
Upland Game	Populations fluctuate in response to natural cycles. Minimal effect. Compensatory form of mortality.	Populations fluctuate in response to natural cycles. Minimal effect. Compensatory form of mortality.
Big Game	Contributes to state population management goals.	Increases contribution to state and refuge population management goals.
Non-Hunted Wildlife	No buffer around Bald eagle nest areas	Regulations limit impact to wintering Bald eagles resulting in minimal effects and a 330 foot buffer around Bald eagle nests limits effects to breeding season habitat.
Threatened and Endangered Species	“May Affect but Not Likely to Adversely Affect species/critical habitat” was determined for Indiana bat and decurrent false aster and “No Effect” for Eastern prairie fringed orchid.	“May Affect but Not Likely to Adversely Affect species/critical habitat” was determined for Indiana bat and decurrent false aster and “No Effect” for Eastern prairie fringed orchid.
Historic and Cultural Resources	No effects.	No effects.
Recreational Opportunities	No Change	Hunting recreational opportunities will increase. Minimal wintering Bald eagle watching disturbance. Provides for simultaneous hunting and non-hunting activities resulting in minimal conflict between user groups.
Meets the needs of partners and desires of the public	No	Yes

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The following individuals cooperated in the preparation of this document:

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8.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED

A news release was sent to the following to announce the availability of the document for review:

Agencies

Illinois Department of Natural Resources
U.S. Army Corps of Engineers

Organizations

Audubon Center at Riverlands
St. Louis Audubon Society
Great Rivers Audubon Society
Alton Regional Visitor and Convention Bureau
Migratory Waterfowl Hunters, Inc.
Alton-Wood River Sportsmans Club
The Nature Institute
City of Clarksville, MO
City of Pleasant Hill, IL

Print Newspaper

The Alton Telegraph
Calhoun News Herald
Jersey County Journal
St. Louis Post Dispatch

Online Media

Riverbender.com

TV News

KMOV Channel 4
KTVI Channel 2

Radio

WBGZ-1570

9.0 APPROVALS

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APPENDIX A – REFERENCES

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APPENDIX B – MAPS

APPLE CREEK DIVISION

The following map is the hunting area boundary for the Apple Creek Division. This map is also the boundary for the Apple Creek Division.

Apple Creek Division. (Dalrymple & Salas, 2011)



CALHOUN DIVISION

The following map has the hunting area boundary for the Calhoun Division. This designated area is only a portion of the Calhoun Division east of the Illinois River Road (highway to the Brussels ferry). The remainder of the Calhoun Division is not open to hunting.

Area Open to Hunting on the Southern Portion of Calhoun Division
(Loges, Brian 2013, Hunting Area Map)



CLARKSVILLE ISLAND DIVISION

The following map is the hunting area boundary for the Clarksville Island Division. This map is also the boundary for the Clarksville Island Division.

Clarksville Island Division. (Dalrymple & Salas, 2011)



APPENDIX C- CONSULTATION AND COORDINATION WITH OTHERS

We have been in regular consultation with the Illinois Department of Natural Resources on wildlife management and hunting issues. State partners were invited to comment on the draft Hunting Plan, draft EA, and draft Compatibility Determination (CD) for hunting. In addition presentations were made to Migratory Waterfowl Hunters, Inc. and the Alton Wood River Sportsmans Club. These organizations were encouraged to make suggestions during the development of the plan and invited to make comments on the draft plan.

APPENDIX D – RESPONSE TO COMMENTS ON THE HUNTING PLAN, ENVIRONMENTAL ASSESSMENT AND COMPATIBILITY DETERMINATION

The Service solicited public comments for the draft 2013 Hunting Chapter of the Visitor Services Plan for Two Rivers National Wildlife Refuge, its supporting draft Environmental Assessment (EA), and Compatibility Determination for hunting. A 30-day review period began June 11, 2013 and ended July 11, 2013. Copies of the documents were posted on the Refuge website and were available upon request from the Refuge office in Brussels, Illinois. A news release announcing the availability of the document for review was sent to numerous local media outlets, conservation organizations, and State and local officials.

APPENDIX E – POLICY COMPLIANCE AND SUPPORTING DOCUMENTATION

It is the policy of the Service to protect and preserve all native species of fish, amphibians, reptiles, birds, mammals, invertebrates, and plants, including their habitats, which are designated threatened or endangered. The three federally listed threatened or endangered species that are known or suspected to occur on the refuge include the decurrent false aster, Eastern prairie fringed orchid, and Indiana bat. All of these species are associated with riverine or floodplain habitat except the orchid. A consultation pursuant to Section 7 of the Endangered Species Act was conducted as part of this EA and Hunt Plan. A finding of “May Affect but Not Likely to Adversely Affect species/critical habitat” was determined for Indiana bat and decurrent false aster and “No Effect” for Eastern prairie fringed orchid. No impacts are anticipated for state listed species.

APPENDIX F – LIST OF SPECIES FOUND AT TWO RIVERS NWR

Common plants on Two Rivers National Wildlife Refuge. Data modified from Galatowitsch and McAdams 1994. (Heitmeyer and Westphall)

Common Name	Scientific Name and Guild
American bindweed	<i>Convolvulus arvensis</i> V
American elm	<i>Ulmus americana</i> SFT
American germander	<i>Teucrium canadense</i> MF
Aquatic liverwort	<i>Riccia fluitans</i> FA
Arrow arum	<i>Peltandra virginica</i> (L.) schott & Endl. EP
Arrow-leaved violet	<i>Viola sagittata</i> Ait. MF
Asiatic dayflower	<i>Commelina communis</i> TAF
Awned cyperus	<i>Cyperus squarrosus</i> SAG
Bald spikerush	<i>Eleocharis erythropoda</i> Steud. MG
Barnyard grass	<i>Echinochloa crusgalli</i> (L.) Beauv. SAG
Basswood	<i>Tilia americana</i> BHT
Bead grass	<i>Paspalum fluitans</i> (Elliott) Kunth. MG
Begg's sedge	<i>Carex bebbii</i> Olney MG
Bellwort	<i>Uvularia grandiflora</i> J.E. Smith SE
Bicknell's sedge	<i>Carex bicknellii</i> Britt. MG
Biennial gaura	<i>Gaura biennis</i> D. TAF
Big bluestem	<i>Andropogon gerardii</i> Vitman FTSS
Bigleaf pondweed	<i>Potamogeton amplifolius</i> Tuckerm. RSA
Bitternut hickory	<i>Cary cordiformis</i> (Wang.) K. Koch BHT
Bittersweet	<i>Solanum dulcamara</i> MF
Black cherry	<i>Prunus serotina</i> Ehrh. BHT
Black locust	<i>Robinia pseudo-acacia</i> BHT
Black mustard	<i>Brassica nigra</i> TAF
Black nightshade	<i>Solanum nigrum</i> TAF
Black raspberry	<i>Rubus occidentalis</i> WS
Black walnut	<i>Juglans nigra</i> BHT
Black willow	<i>Salix nigra</i> Marsh. FTPT
Black-eyed susan	<i>Rudbeckia hirta</i> MF
Blood polygala	<i>Polygala sanguinea</i> TAF
Bloodroot	<i>Sanguinaria canadensis</i> SE
Blue flag	<i>ris virginica</i> L. var. <i>shrevei</i> (Small) E. Anders. EP
Blue vervain	<i>Verbena hastata</i> MF
Blue-joint	<i>Calamagrostis canadensis</i> (Michx.) Nutt. MG
Blunt broom sedge	<i>Carex tribuloides</i> Wahl. MG
Bluntleaf bedstraw	<i>Galium obtusum</i> bigel. MF
Boneset	<i>Eupatorium perfoliatum</i> MF
Bottlebrush sedge	<i>Carex hystericina</i> Muhl. MG
Bottomland aster	<i>Aster ontarionis</i> Wieg. FTSS
Box elder	<i>Acer negundo</i> FTPT
Bristly greenbrier	<i>Smilax hispida</i> Muhl. V

Common Name	Scientific Name and Guild
Broad-leaved arrowhead	<i>Sagittaria latifolia</i> Willd. EP
Bulbet-bladder fern	<i>Cystopteris bulbifera</i> (L.) Bernh. AWF
Bull thistle	<i>Cirsium vulgare</i> (Savi) Tenore. TAF
Bur marigold	<i>Echinodorus Corddifolius</i> (L.) Griseb. EP
Burhead	<i>Sparganium americanum</i> Nutt. EP
Bushy knotweed	<i>Polygonum ramosissimum</i> Michx. SAF
Butternut	<i>Juglans cinerea</i> BHT
Buttonbush	<i>Spermacoce glabra</i> Michx. MF
Canada goldenrod	<i>Solidago canadensis</i> MF
Canada thistle	<i>Cirsium arvense</i> (L.) Scop. MF
Canada tick-trefoil	<i>Desmodium canadense</i> (L.) DC. MF
Cardinal flower	<i>Lobelia cardinalis</i> AWF
Carpetweed	<i>Mollugo verticillata</i> TAF
Catchfly grass	<i>Leersia lenticularis</i> Michx. MG
Cattail sedge	<i>Carex typhina</i> Michx. MG
Chickweed	<i>Cerastium vulgatum</i> MF
Choke-cherry	<i>Prunus virginiana</i> FIPT
Cinnamon fern	<i>Osmunda cinnamonea</i> MF
Clammy ground cherry	<i>Physalis heterophylla</i> Nees. AWF
Clasping dogbane	<i>Apocynum sibiricum</i> Jacq. FTSS
Climbing milkweed	<i>Amphelamus albidus</i> (Nutt.) Britton FTSS
Common blackberry	<i>Rubus allegheniensis</i> Porter. WS
Common buckthorn	<i>Rhamnus cathartica</i> WS
Common burreed	<i>Sparganium eurycarpum</i> Engelm. EP
Common cattail	<i>Typha latifolia</i> EP
Common chickweed	<i>Stellaria media</i> (L.) Cyrillo TAF
Common cocklebur	<i>Xanthium strumarium</i> TAF
Common plantain	<i>Plantago major</i> MF
Common poison ivy	<i>Toxicodendron radicans</i> ssp. <i>Negundo</i> (Greene) Gillis V
Common purslane	<i>Portulaca oleracea</i> MF
Common ragweed	<i>Ambrosia artemisiifolia</i> TAF
Coontail	<i>Ceratophyllum demersum</i> USA
Cottonwood	<i>Populus deltoides</i> Marsh. FTPT
Crab grass	<i>Digitaria sanguinalis</i> (L.) Scop. MG
Creeping burhead	<i>Echinodorus berteroi</i> (Sprengel) Fassett SAF
Crown vetch	<i>Coronilla varia</i>
Curl+A70y dock	<i>Rumex crispus</i> MF
Curly-leaved pondweed	<i>Potamogeton crispus</i> RSA
Cursed crowfoot	<i>Ranunculus scleratus</i> SAF
Daisy fleabane	<i>Erigeron annuus</i> (L.) Pers. TAF
Dandelion	<i>Taraxacum officinale</i> Weber. MF
Deer-tongue grass	<i>Panicum clandestinum</i> TAG
Devil's beggarticks	<i>Bidens frondosa</i> SAF
Dock	<i>umex salicifolius</i> J. A. Weinm. MF
Duckweed	<i>Lemna</i> sp. FA

Common Name	Scientific Name and Guild
Early meadow rue	<i>Thalictrum dioicum</i> SE
Early wild rose	<i>Rosa blanda</i> Ait. WS
Eastern serviceberry	<i>Amelanchier canadensis</i> (L.) Medikus FTSS
Elderberry	<i>Sambucus canadensis</i> WS
Evening primrose	<i>Oenothera biennis</i> MF
Fall panic grass	<i>Panicum dichotomiflorum</i> Michx. TAG
False buckwheat	<i>Polygonum scandens</i> MF
Field mint	<i>Mentha arvensis</i> MF
Flat-stem pondweed	<i>Potamogeton zosteriformis</i> Fern. RSA
Flatstem spikerush	<i>Eleocharis compressa</i> Sullivant MG
Fleabane	<i>Erigeron philadelphicus</i> MF
Floating pondweed	<i>Potamogeton natans</i> RSA
Floating primrose willow	<i>Lidwigia peploides</i> (HBK) Raven MF
Flowering dogwood	<i>Cornus florida</i> WS
Fog fruit	<i>Phyla lanceolata</i> Michx. (Green) MF
Fox sedge	<i>Carex vulpinoidea</i> Michx. MG
Foxtail sedge	<i>Carex alopecoidea</i> tuckerm. MG
Garlic mustard	<i>Alliaria petiolata</i>
Giant foxtail	<i>Setaria faberi</i> Herrm. TAG
Gooseberry	<i>Ribes hirtellum</i> Michx. WS
Grape fern	<i>Botrychium dissectum</i> Sprengel var. <i>obliquum</i> Clute AWF
Grass-leaved arrowhead	<i>Sagittaria graminea</i> Michx. EP
Gray's sedge	<i>Carex grayi</i> Carey. WG
Great ragweed	<i>Ambrosia trifida</i> TAF
Greater duckweed	<i>Spirodela polyrhiza</i> (L.) Schleiden FA
Green ash	<i>Fraxinum pennsylvanica</i> Marsh. FTPT
Green dragon	<i>Arisaema dracontium</i> (L.) Schott. FTSS
Green foxtail	<i>Setaria viridis</i> (L.) Beauv. TAG
Ground ivy	<i>Glechoma hederacea</i> MF
Hackberry	<i>Celtis occidentalis</i> SFT
Hart Wright's sedge	<i>Carex hyalinolepis</i> Steud. MG
Hazelnut	<i>Corylus americana</i> Walter. WS
Honey locust	<i>Gleditsia triancanthos</i> SFT
Honeysuckle	<i>Lonicera x bella</i> Zabel. WS
Horseweed	<i>Conyza canadensis</i> (L.) Cronq. TAF
Illinois pondweed	<i>Potamogeton illinoensis</i> Morong RSA
Indian grass	<i>Sorghastrum nutans</i> (L.) Nash MG
Indian hemp	<i>Apocynum cannabinum</i> FTSS
Joe-pye-weed	<i>Eupatorium maculatum</i> MF
Joint rush	<i>Juncus nodosus</i> MG
Lady's thumb	<i>Polygonum persicaria</i> SAF
Leafy pondweed	<i>Potamogeton foliosus</i> Raf. RSA
Leafy spurge	<i>Euphorbia esula</i>
Lizard's tail	<i>Saururus cernuus</i> SAF
Low cyperus	<i>Cyperus diandrus</i> Torr. SAG

Common Name	Scientific Name and Guild
Marsh elder	<i>Iva annua</i> TAF
Marsh spikerush	<i>Eleocharis palustris</i> (L.) Roem. & Schultes MG
May apple	<i>Podophyllum peltatum</i> SE
Meadow sedge	<i>Carex granularis</i> Muhl. Ex Willd. MG
Milfoil	<i>Myriophyllum heterophyllum</i> Michx. RSA
Missouri ironweed	<i>Vernonia missurica</i> Rat: MF
Mist flower	<i>Eupatorium coelestinum</i> AWF
Mockernut hickory	<i>Carya tomentosa</i> Nutt. BHT
Moneywort	<i>Lysimachia nummularia</i> AWF
Mud plantain	<i>Heterantheria limosa</i> (Sw.) Willd. MF
Narrow-leaved cattail	<i>Typha augustifolia</i> EP
Needle spikerush	<i>Eleocharis acicularis</i> (L.) Roem. & Schultes MG
Nodding smartweed	<i>Polygonum lapathifolium</i> SAF
Nutsedge	<i>Cyperus esculentus</i> MG
Partridge pea	<i>Chamaecrista fasciculata</i> Michx. TAF
Pecan	<i>Carya illinoensis</i> (Wang.) K. Koch BHT
Persimmon	<i>Diospyros virginiana</i> FIPT
Pin oak	<i>Quercus palustris</i> Muench. BHT
Pinkweed	<i>Polygonum pennsylvanicum</i> SAF
Prairie cord grass	<i>Spartina pectinata</i> Link. MG
Prairie milkweed	<i>Asclepias hirtella</i> (Pennell) Woodson FTSS
Prairie three-awn	<i>Aristida oligantha</i> Michx. FTSS
Quillwort	<i>Isoetes melanpoda</i> Gay and Dur. RSA
Red maple	<i>Acer rubrum</i> SFT
Red top	<i>Agrostis gigantea</i> Roth. MG
Red-rooted sedge	<i>Cyperus erythrorhizos</i> Muhl. SAG
Reed canary grass	<i>Phalaris arundinacea</i> MG
Rice cutgrass	<i>Leersia oryzoides</i> (L.) Sw. MG
River birch	<i>Betula nigra</i> FTSS
River bulrush	<i>Scirpus fluviatilis</i> Torr. & Gray EP
Riverbank grape	<i>Vitis riparia</i> Michx. V
Rough-leaved dogwood	<i>Cornus drummondii</i> Meyer FTSS
Sago pondweed	<i>Potamogeton pectinatus</i> RSA
Sandbar willow	<i>Salix interior</i> Rowlee FTSS
Sassafras	<i>Sassafras albidum</i> (Nutt.) Nees. WS
Shagbark hickory	<i>Carya ovata</i> (Mill.) K. Koch. BHT
Shellbark hickory	<i>Carya laciniosa</i> (Michx.) Loud. BHT
Silver maple	<i>Acer saccharinum</i> FTPT
Soft rush	<i>Juncus effusus</i> MG
Spanish needles	<i>Bidens bipinnata</i> FTSS
Spatter dock	<i>Nuphar advena</i> Aiton FP
Spikerush	<i>Eleocharis ovata</i> (Roth) R. & S. SAG
Spurge	<i>Euphorbia humistrata</i> (Engelm.) MF
Square-stemmed spikerush	<i>Eleocharis quadrangulata</i> (Michx.) Roem. & Schultes EP
Stick-tight	<i>Bidens cernua</i> FTSS

Common Name	Scientific Name and Guild
Summer grape	<i>Vitis aestivalis</i> var. <i>argentina</i> V
Swamp barnyard grass	<i>Echinochloa walteri</i> (Pursh) Heller SAG
Swamp buttercup	<i>Ranunculus hispidus</i> Michx. MF
Swamp dock	<i>Rumex verticillatus</i> MF
Swamp milkweed	<i>Asclepias incarnata</i> FTSS
Swamp privet	<i>Forestiera acuminata</i> (Michx.) Poiret. FTSS
Swamp white oak	<i>Quercus bicolor</i> Willd. BHT
Sweet flag	<i>Acorus calamus</i> EP
Switchgrass	<i>Panicum virgatum</i> MG
Sycamore	<i>Platanus occidentalis</i> SFT
Tall beggars tick	<i>Bidens vulgata</i> Greene. SAF
Toothcup	<i>Ammania coccinea</i> Rottb. SAF
Virginia creeper	<i>Parthenocissus quinquefolia</i> (L.) Planch V
Virginiana wild rye	<i>Elymus virginicus</i> MG
Water dock	<i>Rumex orbiculatus</i> Gray MF
Water lily	<i>Nymphaea odorata</i> Aiton FP
Water lotus	<i>Nelumbo lutea</i> (Willd.) Pers. FP
Water meal	<i>Wolffia papulifera</i> Thompson FA
Water pepper	<i>Polygonum hydropiper</i> SAF
Water primrose	<i>Ludwigia polycarpa</i> Short & Peter MF
Water smartweed	<i>Polygonum punctatum</i> Ell. MF
Water smartweed	<i>Polygonum aviculare</i> TAF
Water starwort	<i>Callitriche heterophylla</i> Pursh. RSA
Water weed	<i>Elodea nuttallii</i> (Planch.) St. John RSA
Wedge grass	<i>Sphenopholis obtusata</i> (Michx.) scribn. SAG
White snake root	<i>Eupatorium rugosum</i> Houttuyn. AWF
Wild garlic	<i>Allium canadense</i> MF
Wild geranium	<i>Geranium maculatum</i> SE
Wild ginger	<i>Asarium canadense</i> FTSS
Wild oats	<i>Chasmanthium latifolium</i> (Michx.) Yates. WG
Wild water pepper	<i>Polygonum hydropiperoides</i> Michx. MF
Wild yellow lily	<i>Lilium canadense</i> MF
Wood anemone	<i>Anemone quinquefolia</i> FTSS
Wood nettle	<i>Laportea canadensis</i> (L.) Wedd. AWF
Wood-sorrel	<i>Oxalis stricta</i> MF
Yellow foxtail	<i>Setaria glauca</i> (L.) P. Beauv. TAG

Aquatic guilds: EP = emergent perennials; RSA = rooted submersed aquatics; USA = unrooted; submersed aquatics; FP = floating perennials; FA = floating annuals. Semi-aquatic and terrestrial herbaceous guilds: SE = spring ephemerals; AWF = autumnal woodland forbs; WG = woodland; graminoids; V = vines; MF = meadow forbs; MG = meadow graminoids; SAF = Semi-aquatic annual; forbs; SAG = semi-aquatic annual grasses; TAF = terrestrial annual forbs; TAG = terrestrial annual; grasses. Wood plant guilds: FTPT = flood-tolerant pioneering trees; FIPT = flood-intolerant pioneering; trees; SFT = softwood floodplain trees; BHT = bottomland hardwood trees; FTSP = flood-tolerant; pioneering shrubs; FTSS = flood-tolerant stable shrubs; WS = woodland shrubs.

Appendix E. Amphibians and reptiles known or likely to occur on Two Rivers National Wildlife Refuge (from U. S. Fish and Wildlife Service 2004).

<u>Common Name</u>	<u>Scientific Name</u>
<i>Frogs and Toads</i>	
Frog	<i>Acris crepitans</i>
American Toad	<i>Bufo americanus</i>
Woodhouse Toad	<i>Bufo woodhousii</i>
Cope's Gray Treefrog	<i>Hyla chrysoscelis</i>
Gray Treefrog	<i>Hyla versicolor</i>
Spring Peeper	<i>Pseudacris crucifer</i>
Illinois Chorus Frog	<i>Pseudacris streckeri</i>
Western Chorus Frog	<i>Pseudacris triseriata</i>
Northern Crawfish Frog	<i>Rana areolata</i>
Bullfrog	<i>Rana catesbeiana</i>
Green Frog	<i>Rana clamitans</i>
Pickerel Frog	<i>Rana palustris</i>
Southern Leopard Frog	<i>Rana sphenoccephala</i>
Wood Frog	<i>Rana sylvatica</i>
<i>Salamanders</i>	
Smallmouth Salamander	<i>Ambystoma texanum</i>
Eastern Tiger Salamander	<i>Ambystoma tigrinum</i>
Longtail Salamander	<i>Eurycea longicauda</i>
Four-toed Salamander	<i>Hemidactylium scutatum</i>
Mudpuppy	<i>Necturus maculosus</i>
Central Newt	<i>Notophthalmus viridescens</i>
Slimy Salamander	<i>Plethodon glutinosus</i>
Lesser Siren	<i>Siren intermedia</i>
<i>Lizards</i>	
Six-lined Racerunner	<i>Cnemidophorus sexlineatus</i>
Five-lined Skink	<i>Eumeces fasciatus</i>
Broadhead Skink	<i>Eumeces laticeps</i>
Slender Glass Lizard	<i>Ophisaurus attenuatus</i>
Ground Skink	<i>Scincella lateralis</i>
Fence Lizard	<i>Sceloporus undulatus</i>
<i>Snakes</i>	
Copperhead	<i>Agkistrodon contortrix</i>
Western Worm Snake	<i>Carphophis amoenus</i>
Kirtland's Snake	<i>Clonophis kirtlandi</i>
Blue Racer	<i>Coluber constrictor</i>
Ringneck Snake	<i>Diadophis punctatus</i>
Great Plains Rat Snake	<i>Elaphe guttata</i>

Common Name	Scientific Name
Black Rat Snake	<i>Elaphe obsoleta</i>
Fox Snake	<i>Elaphe vulpina</i>
Eastern Hognose Snake	<i>Heterodon platirhinos</i>
Prairie Kingsnake	<i>Lampropeltis calligaster</i>
Speckled Kingsnake	<i>Lampropeltis getula</i>
Milk Snake	<i>Lampropeltis triangulum</i>
Yellowbelly Water Snake	<i>Nerodia erythrogaster</i>
Diamondback Water Snake	<i>Nerodia rhombifer</i>
Northern Water Snake	<i>Nerodia sipedon</i>
Rough Green Snake	<i>Ophedrys aestivus</i>
Bullsnake	<i>Pituophis melanoleucus</i>
Graham's Crayfish Snake	<i>Regina grahamii</i>
Brown Snake	<i>Storeria dekayi</i>
Northern Red-bellied Snake	<i>Storeria occipitomaculata</i>
Western Ribbon Snake	<i>Thamnophis proximus</i>
Plains Garter Snake	<i>Thamnophis radix</i>
Eastern Garter Snake	<i>Thamnophis sirtalis</i>
Lined Snake	<i>Tropidoclonion lineatum</i>
Smooth Earth Snake	<i>Virginia valeriae</i>

Turtles

Smooth Softshell Turtle	<i>Apalone mutica</i>
Spiny Softshell Turtle	<i>Apalone spinifera</i>
Snapping Turtle	<i>Chelydra serpentina</i>
Painted Turtle	<i>Chysemys picta</i>
Map Turtle	<i>Graptemys geographica</i>
False Map Turtle	<i>Graptemys pseudogeographica</i>
Mississippi Mud Turtle	<i>Kinosternum subrubrum</i>
Alligator Snapping Turtle	<i>Macrolemys temminckii</i>
River Cooter	<i>Pseudemys concinna</i>
Stinkpot	<i>Sternotherus odoratus</i>
Eastern Box Turtle	<i>Terrapene carolina</i>
Ornate Box Turtle	<i>Terrapene ornata</i>
Red-eared Slider	<i>Trachemys scripta</i>

Appendix E. Fishes known or likely to occur on Two Rivers National Wildlife Refuge (from U. S. Fish and Wildlife Service 2004).

Common Name	Scientific Name
<i>Bass Family</i>	
White Bass	<i>Morone chrysops</i>
Yellow Bass	<i>Morone mississippiensis</i>

Common Name	Scientific Name
<i>Bowfin Family</i>	
Bowfin	<i>Amia calva</i>
<i>Catfish Family</i>	
Black Bullhead	<i>Ameiurus melas</i>
Yellow Bullhead	<i>Ameiurus natalis</i>
Brown Bullhead	<i>Ameiurus nebulosus</i>
Blue Catfish	<i>Ictalurus furcatus</i>
Channel Catfish	<i>Ictalurus punctatus</i>
Freckled Madtom	<i>Noturus nocturnus</i>
Tadpole Madtom	<i>Noturus gyrinus</i>
Stonecat	<i>Noturus flavus</i>
Flathead Catfish	<i>Pylodictis olivaris</i>
<i>Drums</i>	
Freshwater Drum	<i>Aplodinotus grunniens</i>
<i>Eels</i>	
American Eel	<i>Arguilla rostrata</i>
<i>Gar</i>	
Spotted Gar	<i>Lepisosteus oculatus</i>
Longnose Gar	<i>Lepisosteus osseus</i>
Shortnose Gar	<i>Lepisosteus platostomus</i>
<i>Herring Family</i>	
Skipjack Herring	<i>Alosa chrysochloris</i>
Gizzard Shad	<i>Dorosoma cepedianum</i>
<i>Killifish Family</i>	
Starhead Topminnow	<i>Fundulus dispar</i>
Blackstripe Topminnow	<i>Fundulus notatus</i>
<i>Lampreys</i>	
Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>
Silver Lamprey	<i>Ichthyomyzon unicuspis</i>
<i>Minnows</i>	
Goldfish	<i>Carassius auratus</i>
Grass Carp	<i>Ctenopharyngodon idella</i>
Red Shiner	<i>Cyprinella lutrensis</i>
Common Carp	<i>Cyprinus carpio</i>
Western Silvery Minnow	<i>Hybognathus argyritis</i>
Mississippi Silvery Minnow	<i>Hybognathus nuchalis</i>
Plains Minnow	<i>Hybognathus placitus</i>

Common Name	Scientific Name
Bighead Carp	<i>Hypophthalmichthys nobilis</i>
Silver Carp	<i>Hypophthalmichthys molitrix</i>
Speckled Chub	<i>Macrhybopsis aestivalis</i>
Sicklefin Chub	<i>Macrhybopsis meeki</i>
Silver Chub	<i>Macrhybopsis storeriana</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
Emerald Shiner	<i>Notropis atherinoides</i>
River Shiner	<i>Notropis blennioides</i>
Ghost Shiner	<i>Notropis buchanaui</i>
Spottail Shiner	<i>Notropis hudsonius</i>
Silverband Shiner	<i>Notropis shumardi</i>
Pugnose Minnow	<i>Opsopoeodus emiliae</i>
Suckermouth Minnow	<i>Phenacobius mirabilis</i>
Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>
Bluntnose Minnow	<i>Pimephales notatus</i>
Bullhead Minnow	<i>Pimephales vigilax</i>
Fathead Minnow	<i>Pimephales promelas</i>
Flathead Chub	<i>Platygobio gracilis</i>
Creek Chub	<i>Semotilus atromaculatus</i>
 <i>Mooneye Family</i>	
Goldeye	<i>Hiodon alosoides</i>
Mooneye	<i>Hiodon tergisus</i>
 <i>Mosquitofish</i>	
Western Mosquitofish	<i>Gambusia affinis</i>
 <i>Mudminnows</i>	
Central Mudminnow	<i>Umbra limi</i>
 <i>Paddlefish</i>	
Paddlefish	<i>Polyodon spathula</i>
 <i>Perch Family</i>	
Mud Darter	<i>Etheostoma asprigene</i>
Bluntnose Darter	<i>Etheostoma chlorosomum</i>
Johnny Darter	<i>Etheostoma nigrum</i>
Yellow Perch	<i>Perca flavescens</i>
Logperch	<i>Percina caprodes</i>
Slenderhead Darter	<i>Percina phoxocephala</i>
River Darter	<i>Percina shumardi</i>
Sauger	<i>Stizostedion canadense</i>
Walleye	<i>Stizostedion vitreum</i>

Common Name	Scientific Name
<i>Silversides</i>	
Brook Silverside	<i>Labidesthes sicculus</i>
<i>Sturgeons</i>	
Lake Sturgeon	<i>Acipenser fulvescens</i>
Shovelnose Sturgeon	<i>Scaphirhynchus platyrhynchus</i>
<i>Suckers</i>	
Highfin Carpsucker	<i>Carpiodes velifer</i>
River Carpsucker	<i>Carpiodes carpio</i>
Quillback	<i>Carpiodes cyprinus</i>
White Sucker	<i>Catostomus commersoni</i>
Blue Sucker	<i>Cycleptus elongatus</i>
Smallmouth Buffalo	<i>Ictiobus bubalus</i>
Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>
Black Buffalo	<i>Ictiobus niger</i>
Golden Redhorse	<i>Moxostoma erythrurum</i>
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
<i>Sunfish Family</i>	
Rock Bass	<i>Ambloplites rupestris</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Warmouth	<i>Lepomis gulosus</i>
Orange-spotted Sunfish	<i>Lepomis humilis</i>
Bluegill	<i>Lepomis macrochirus</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Largemouth Bass	<i>Micropterus salmoides</i>
White Crappie	<i>Pomoxis annularis</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>
<i>Trout-perch</i>	
Trout-perch	<i>Percopsis omiscomaycus</i>

Appendix E. Mammals known or likely to occur on Two Rivers National Wildlife Refuge (from U. S. Fish and Wildlife Service 2004).

Common Name	Scientific Name
<i>Bats</i>	
Big Brown Bat	<i>Eptesicus fuscus</i>
Silver-haired Bat	<i>Lasiurus noctivagans</i>
Red Bat	<i>Lasiurus borealis</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Gray Bat	<i>Myotis grisescens</i>
Little Brown Bat	<i>Myotis lucifugus</i>
Indiana Bat	<i>Myotis sodalis</i>

Common Name	Scientific Name
Eastern Pipistrel	<i>Pipistrellus subflavus</i>
<i>Carnivores</i>	
Coyote	<i>Canis latrans</i>
River Otter	<i>Lutra canadensis</i>
Bobcat	<i>Lynx rufus</i>
Striped Skunk	<i>Mephitis mephitis</i>
Long-tailed Weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
Raccoon	<i>Procyon lotor</i>
Badger	<i>Taxidea taxus</i>
Gray Fox	<i>Urocyon cinereoargenteus</i>
Red Fox	<i>Vulpes fulva</i>
<i>Hooved Animals</i>	
White-tailed Deer	<i>Odocoileus virginianus</i>
<i>Insectivores</i>	
Short-tailed Shrew	<i>Blarina brevicauda</i>
Least Shrew	<i>Cryptotis parva</i>
Eastern Mole	<i>Scalopus aquaticus</i>
<i>Marsupials</i>	
Virginia Opossum	<i>Didelphis marsupialis</i>
<i>Rabbits</i>	
Eastern Cottontail	<i>Sylvilagus floridanus</i>
<i>Rodents</i>	
Beaver	<i>Castor canadensis</i>
Plains Pocket Gopher	<i>Geomys bursarius</i>
Southern Flying Squirrel	<i>Glaucomys volans</i>
Prairie Vole	<i>Microtus ochrogastor</i>
Pine Vole	<i>Microtus pinetorum</i>
Woodchuck	<i>Marmota monax</i>
House Mouse	<i>Mus musculus</i>
Muskrat	<i>Ondatra zibethicus</i>
White-footed Mouse	<i>Peromyscus leucopus</i>
Deer Mouse	<i>Peromyscus maniculatus</i>
Norway Rat	<i>Rattus norvegicus</i>
Western Harvest Mouse	<i>Reithrodontomy megalotis</i>
Eastern Fox Squirrel	<i>Sciurus niger</i>
Eastern Gray Squirrel	<i>Sciurus carolinensus</i>
Franklin's Ground Squirrel	<i>Spermophilis franklinii</i>
Thirteen-lined Ground Squirrel	<i>Spermophilus tridecemlineatus</i>

<u>Common Name</u>	<u>Scientific Name</u>
Southern Bog Lemming	<i>Synaptomys cooperi</i>
Eastern Chipmunk	<i>Tamias striatus</i>
Meadow Jumping Mouse	<i>Zapus hudsonius</i>

Appendix E. Common birds on Two Rivers National Wildlife Refuge Birds known or likely to occur (from U. S. Fish and Wildlife Service 2004).

<u>Common Name</u>	<u>Scientific Name</u>
<i>Grebes</i>	
Horned Grebe	<i>Podiceps auritus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
<i>Cormorants</i>	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
<i>Pelicans</i>	
American White Pelican	<i>Pelecanus erythrorhynchos</i>
<i>Hérons, Egrets, and Bitterns</i>	
Least Bittern	<i>Ixobrychus exilis</i>
American Bittern	<i>Botaurus lentiginosus</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Yellow-crowned Night-Heron	<i>Nycticorax violaceus</i>
Little Blue Heron	<i>Egretta caerulea</i>
Green Heron	<i>Butorides striatus</i>
Cattle Egret	<i>Bubulcus ibis</i>
Great Egret	<i>Casmerodius albus</i>
Snowy Egret	<i>Egretta thula</i>
Great Blue Heron	<i>Ardea herodias</i>
<i>Swans, Geese, and Ducks</i>	
Tundra Swan	<i>Cygnus columbianus</i>
Greater White-fronted Goose	<i>Anser albifrons</i>
Snow Goose	<i>Chen caerulescens</i>
Canada Goose	<i>Branta canadensis</i>
Wood Duck	<i>Aix sponsa</i>
Mallard	<i>Anas platyrhynchos</i>
Duck, American Black	<i>Anas rubripes</i>
Gadwall	<i>Anas strepera</i>
Green-winged Teal	<i>Anas crecca</i>
American Wigeon	<i>Anas americana</i>
Northern Pintail	<i>Anas acuta</i>
Northern Shoveler	<i>Anas clypeata</i>
Blue-winged Teal	<i>Anas discors</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>

Common Name	Scientific Name
Redhead	<i>Aythya americana</i>
Lesser Scaup	<i>Aythya affinis</i>
Greater Scaup	<i>Aythya marila</i>
Ring-necked Duck	<i>Aythya collaris</i>
Canvasback	<i>Aythya valisineria</i>
Bufflehead	<i>Bucephala albeola</i>
Common Goldeneye	<i>Bucephala clangula</i>
Long-tailed Duck	<i>Clangula hyemalis</i>
Common Merganser	<i>Mergus merganser</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
<i>Vultures</i>	<i>Cathartidae</i>
Turkey Vulture	<i>Cathartes aura</i>
<i>Hawks, Kites and Eagles</i>	
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Northern Goshawk	<i>Accipiter gentilis</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Broad-winged Hawk	<i>Buteo platypterus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Red-tailed Hawk	<i>Buteo Jamaicensis</i>
Rough-legged Hawk	<i>Buteo lagopus</i>
Northern Harrier	<i>Circus cyaneus</i>
Mississippi Kite	<i>Ictinia mississippiensis</i>
Osprey	<i>Panion haliaetus</i>
<i>Falcons</i>	
Merlin	<i>Falco columbarius</i>
Peregrine Falcon	<i>Falco peregrinus</i>
American Kestrel	<i>Falco sparverius</i>
<i>Pheasants, Grouse, and Quail</i>	
Northern Bobwhite	<i>Colinus virginianus</i>
Wild Turkey	<i>Meleagris gallopavo</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
<i>Rails and Coots</i>	
King Rail	<i>Rallus elegans</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Yellow Rail	<i>Colurnicops noveboracensis</i>
Common Moorhen	<i>Gallinula chloropus</i>
American Coot	<i>Fulica americana</i>

Common Name	Scientific Name
<i>Cranes</i>	
Sandhill Crane	<i>Grus canadensis</i>
<i>Plovers</i>	
Killdeer	<i>Charadrius vociferus</i>
Piping Plover	<i>Charadrius melodus</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
American Golden-Plover	<i>Pluvialis dominica</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>
<i>Avocets and Stilts</i>	
American Avocet	<i>Recurvirostra americana</i>
<i>Sandpipers and Allies</i>	
Willet	<i>Catoptophorus semipalatus</i>
Greater Yellowlegs	<i>Tinga melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Solitary Sandpiper	<i>Tringa solitaria</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
Sanderling	<i>Calidris alba</i>
Dunlin	<i>Calidris alpina</i>
Baird's Sandpiper	<i>Calidris bairdii</i>
White-rumped Sandpiper	<i>Calidris fuscicollis</i>
Stilt Sandpiper	<i>Calidris himantopus</i>
Western Sandpiper	<i>Calidris mauri</i>
Pectoral Sandpiper	<i>Calidris melanotos</i>
Least Sandpiper	<i>Calidris minutilla</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Short-billed Dowitcher	<i>Limnodromus griseus</i>
Common Snipe	<i>Gallinago gallinago</i>
American Woodcock	<i>Scolopax minor</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>
<i>Gulls and Terns</i>	
Herring Gull	<i>Larus argentatus</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Glaucous Gull	<i>Larus hyperboreus</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Franklin's Gull	<i>Larus pipixcan</i>
Thayer's Gull	<i>Larus thayeri</i>
Black Tern	<i>Chlidonias niger</i>

Common Name	Scientific Name
Caspian Tern	<i>Sterna caspia</i>
Common Tern	<i>Sterna hirundo</i>
Forster's Tern	<i>Sterna forsteri</i>
<i>Doves</i>	
Mourning Dove	<i>Zenaida macroura</i>
Rock Dove	<i>Columba livia</i>
<i>Cuckoos</i>	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
<i>Owls</i>	
Barn Owl	<i>Tyto alba</i>
Short-eared Owl	<i>Asio flammeus</i>
Long-eared Owl	<i>Asio otus</i>
Great Horned Owl	<i>Bubo virginianus</i>
Eastern Screech-Owl	<i>Otus asio</i>
Barred Owl	<i>Strix varia</i>
<i>Cuckoos</i>	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>
<i>Nightjars</i>	
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
Common Nighthawk	<i>Chordeiles minor</i>
<i>Swifts</i>	
Chimney Swift	<i>Chaetura vauxi</i>
<i>Hummingbirds</i>	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>
<i>Kingfishers</i>	
Belted Kingfisher	<i>Ceryle alcyon</i>
<i>Woodpeckers</i>	
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Northern Flicker	<i>Colaptes auratus</i>
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>

Common Name	Scientific Name
Pileated Woodpecker	<i>Dryocopus pileatus</i>
<i>Tyrant Flycatchers</i>	
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Olive-sided Flycatcher	<i>Contopus borealis</i>
Eastern Wood-Pewee	<i>Contopus virens</i>
Eastern Phoebe	<i>Sayornis phoebe</i>
Alder Flycatcher	<i>Empidonax alnorum</i>
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>
Least Flycatcher	<i>Empidonax minimus</i>
Willow Flycatcher	<i>Empidonax traillii</i>
Acadian Flycatcher	<i>Empidonax virescens</i>
<i>Shrikes</i>	
Loggerhead Shrike	<i>Lanius ludovicianus</i>
<i>Vireos</i>	
Bell's Vireo	<i>Vireo bellii</i>
Yellow-throated Vireo	<i>Vireo flavifrons</i>
Warbling Vireo	<i>Vireo gilvus</i>
White-eyed Vireo	<i>Vireo griseus</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Philadelphia Vireo	<i>Vireo philadelphicus</i>
Blue-headed Vireo	<i>Vireo solitarius</i>
<i>Crows and Jays</i>	
American Crow	<i>Corvus brachyrhynchos</i>
Fish Crow	<i>Corvus ossifragus</i>
Blue Jay	<i>Cyanocitta cristata</i>
<i>Larks</i>	
Horned Lark	<i>Eremophila alpestris</i>
<i>Swallows</i>	
Barn Swallow	<i>Hirundo rustica</i>
Cliff Swallow	<i>Hirundo pyrrhonota</i>
Bank Swallow	<i>Riparia riparia</i>
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Purple Martin	<i>Progne subis</i>
<i>Chickadees and Titmice</i>	
Black-capped Chickadee	<i>Parus atricapillus</i>
Carolina Chickadee	<i>Parus carolinensis</i>

Common Name	Scientific Name
Tufted Titmouse	<i>Parus bicolor</i>
<i>Nuthatches</i>	
White-breasted Nuthatch	<i>Sitta carolinensis</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
<i>Creepers</i>	
Brown Creeper	<i>Certhia americana</i>
<i>Wrens</i>	
Marsh Wren	<i>Cistothorus palustris</i>
Sedge Wren	<i>Cistothorus platensis</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
House Wren	<i>Troglodytes aedon</i>
Winter Wren	<i>Troglodytes troglodytes</i>
<i>Kinglets</i>	
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Golden-crowned Kinglet	<i>Regulus satrapa</i>
<i>Gnatcatchers</i>	
Blue-gray Gnatcatcher	<i>Plioptila caerulea</i>
<i>Thrushes and Allies</i>	
Veery	<i>Catharus fuscescens</i>
Hermit Thrush	<i>Catharus guttatus</i>
Gray-cheeked Thrush	<i>Catharus minimus</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Wood Thrush	<i>Hylocichla mustelina</i>
Eastern Bluebird	<i>Sialia sialis</i>
American Robin	<i>Turdus migratorius</i>
<i>Gnatcatchers</i>	
Blue-gray Gnatcatcher	<i>Plioptila caerulea</i>
<i>Mockingbirds and Thrashers</i>	
Gray Catbird	<i>Dumetella carolinensis</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Brown Thrasher	<i>Toxostoma rufum</i>
<i>Starlings</i>	
European Starling	<i>Strunus vulgaris</i>

Common Name	Scientific Name
<i>Waxwings</i>	
Cedar Waxwing	<i>Bombycilla cedrorum</i>
<i>Pipits</i>	
American Pipit	<i>Anthus rubescens</i>
<i>Wood Warblers</i>	
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Bay-breasted Warbler	<i>Dendroica castanea</i>
Cerulean Warbler	<i>Dendroica cerulea</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Yellow-throated Warbler	<i>Dendroica dominica</i>
Blackburnian Warbler	<i>Dendroica fusca</i>
Magnolia Warbler	<i>Dendroica magnolia</i>
Palm Warbler	<i>Dendroica palmarum</i>
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
Yellow Warbler	<i>Dendroica petechia</i>
Pine Warbler	<i>Dendroica pinus</i>
Blackpoll Warbler	<i>Dendroica striata</i>
Cape May Warbler	<i>Dendroica tigrina</i>
Black-throated Green Warbler	<i>Dendroica virens</i>
Worm-eating Warbler	<i>Helmitheros vermivorous</i>
Black-and-white Warbler	<i>Mniotilta varia</i>
Connecticut Warbler	<i>Oporornis agilis</i>
Kentucky Warbler	<i>Oporornis formosus</i>
Mourning Warbler	<i>Oporornis philadelphia</i>
Prothonotary Warbler	<i>Protonotaria citrea</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>
Tennessee Warbler	<i>Vermivora peregrina</i>
Blue-winged Warbler	<i>Vermivora pius</i>
Nashville Warbler	<i>Vermivora ruficapilla</i>
Canada Warbler	<i>Wilsonia canadensis</i>
Hooded Warbler	<i>Wilsonia citrina</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Yellow-breasted Chat	<i>Icteria virens</i>
Northern Parula	<i>Parula americana</i>
Ovenbird	<i>Seiurus aruocapillus</i>
Louisiana Waterthrush	<i>Seiurus motacilla</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
American Redstart	<i>Setophaga ruticilla</i>

Common Name	Scientific Name
<i>Tanagers</i>	
Scarlet Tanager	<i>Piranga olivacea</i>
Summer Tanager	<i>Piranga rubra</i>
<i>Cardinals and Allies</i>	
Northern Cardinal	<i>Cardinalis cardinalis</i>
Indigo Bunting	<i>Passerina cyanea</i>
Snow Bunting	<i>Plectrophenax nivalis</i>
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Dickcissel	<i>Spiza americana</i>
<i>Sparrows and Allies</i>	
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Le Conte's Sparrow	<i>Ammodramus leconteii</i>
Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Lark Sparrow	<i>Chondestes grammacus</i>
Swamp Sparrow	<i>Melospiza georgiana</i>
Lincoln's Sparrow	<i>Melospiza lincolni</i>
Song Sparrow	<i>Melospiza melodia</i>
American Tree Sparrow	<i>Spizella arborea</i>
Clay-colored Sparrow	<i>Spizella pallida</i>
Chipping Sparrow	<i>Spizella passerina</i>
Field Sparrow	<i>Spizella pusilla</i>
Fox Sparrow	<i>Passerella iliaca</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Eastern Towhee	<i>Pipilo erythrophthalmus</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
White-throated Sparrow	<i>Zonotrichia albicollis</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Harris' Sparrow	<i>Zonotrichia querula</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Lapland Longspur	<i>Calcarius lapponicus</i>
<i>Blackbirds and Allies</i>	
Bobolink	<i>Dolichonyx oryzivorus</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Rusty Blackbird	<i>Euphagus carolinus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Common Grackle	<i>Quiscalus quiscula</i>
Baltimore Oriole	<i>Icterus galbula</i>
Orchard Oriole	<i>Icterus spurius</i>

Common Name	Scientific Name
<i>Finches</i>	
Pine Siskin	<i>Carduelis pinus</i>
American Goldfinch	<i>Carduelis tristis</i>
Purple Finch	<i>Carpodacus purpureus</i>
House Finch	<i>Carpodacus mexicanus</i>
Evening Grosbeak	<i>Coccothraustes verpertinus</i>
 <i>Old World Sparrows</i>	
House Sparrow	<i>Passer domesticus</i>
Eurasian Tree Sparrow	<i>Passer montanus</i>