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PREFACE

Master plans for the Upper Mississippi River Nine-foot Channel Project were developed or updated in 1948, 1961 and 1977. The St. Louis District, Corps of Engineers, last updated the Corps Master Plan over two decades ago and since then, there have been many changes in public recreational perceptions and demands, in natural and man-made resources along the river, and in Federal roles in the project area. These changes have necessitated the preparation of a new master plan to serve as a meaningful guide for future Federal management of the Upper Mississippi, Illinois and Kaskaskia Rivers.

Towards that end, the St. Louis District has prepared this master plan for the rivers with significant cooperation from the Region 3 office of the U.S. Fish and Wildlife Service, the State of Missouri Department of Conservation and the State of Illinois Department of Natural Resources. Together these agencies manage approximately 48,000 acres of land, mostly along the Mississippi and Illinois Rivers. Because the Corps master plan has been cooperatively prepared, it has the combined support of the Federal and state agencies.

This master plan represents a revision and consolidation of three master plans and six project areas: Pool 24, Pool 25, Pool 26, Locks 27, Kaskaskia Lock and Dam, and the Cache River Diversion Channel. The plan includes a reclassification of some project lands, discussion of special concerns and special programs and planning considerations, identification of facility needs and cost, and management area descriptions and proposals. The revised land use classifications and related Corps, State and USFWS agreements will more effectively meet current and future public use demand for Federal lands while sustaining the inherent resource quality for fish and wildlife management and enhancement. The navigation mission will continue to be supported as a program of national importance. Interpretive programming will be used to leverage limited funding to enable project resources to be sustained. Public use of project lands and waters will be safely and efficiently accommodated, with minimal impact on river resources.

The cost of new facilities and rehabilitation or replacement costs are presented in Section X. Several additional studies are necessary to further define future direction, gather additional data and evaluate known cultural resources.

Section 1

INTRODUCTION

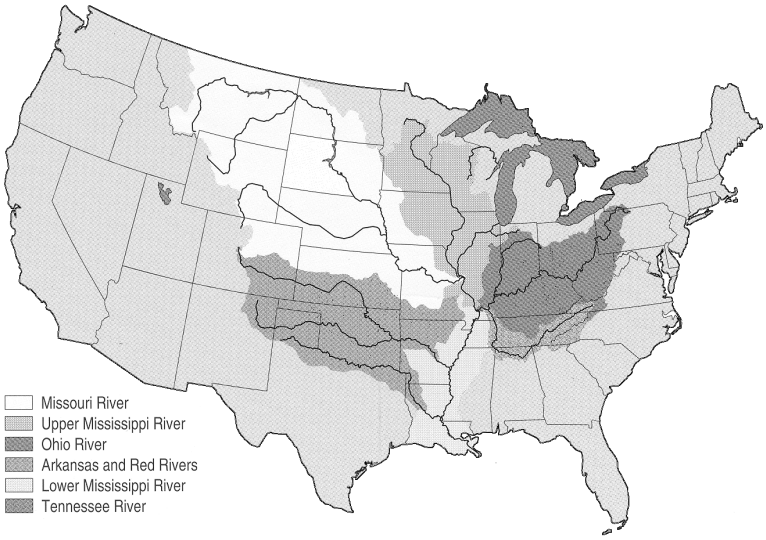
1.1. PROJECT ORIENTATION

The Mississippi River Basin

The Mississippi River is one of the world's major river systems in size, habitat diversity, and biological productivity. It is the longest and largest river in North America, flowing 2,256 miles from its source at Lake Itasca in the Minnesota North Woods, through the mid-continental United States, the Gulf of Mexico Coastal Plain, to its subtropical Louisiana Delta. "Mississippi" is an Ojibwa (Chippewa) Indian word meaning 'great river' or 'gathering of waters' – an appropriate name because the river basin, or watershed, extends from the Allegheny Mountains in the eastern United States to the Rocky Mountains, including all or parts of 31 states *(Figure 1 – 1)* and two Canadian provinces. The river basin measures 1,857,840 square miles, covering about 40 percent of the United States and about one-eighth of North America. Of the world's rivers, the Mississippi ranks third in length, third in watershed area, and seventh in average discharge.

The Mississippi River and its adjacent forests and wetlands provide important habitat for fish and wildlife and include the largest continuous system of wetland in North America. The river supports a diverse array of wetland, open-water, and floodplain habitats. Most of the river and its floodplain (defined as the adjacent, generally flat surface that is periodically inundated by floodwaters overflowing the river's natural banks) have been altered by human development. Much of the watershed is intensively cultivated, and many tributaries deliver substantial amounts of sediment, nutrients, and pesticides into the river. Pollutants also enter the river from metropolitan and industrial areas.

Figure 1 – 1
Mississippi River Basin



The Mississippi River is divided into three segments: the Headwaters, the Upper Mississippi River, and the Lower Mississippi River. The Headwaters is the reach from the source (Lake Itasca) downstream to St. Anthony Falls in Minneapolis, Minnesota, whereas the Upper Mississippi River extends from St. Anthony Falls downstream to the mouth of the Ohio River at Cairo, Illinois. The Lower Mississippi River flows from Cairo to Head-of-Passes in the Gulf of Mexico. The segment of the Upper Mississippi River extending from the mouth of the Missouri River (near St. Louis, Missouri) to the mouth of the Ohio River is often termed the Middle Mississippi River. For this report, it is referred to as the Unimpounded or Open River.

Location along the main channel of the river is denoted by river miles (RM), starting with RM 0.0 at Head-of-Passes in Louisiana and

proceeding 953.8 river miles upstream to the mouth of the Ohio River. Numbering of river miles starts at 0.0 again at the mouth of the Ohio and continues up the Mississippi to Lake Itasca.

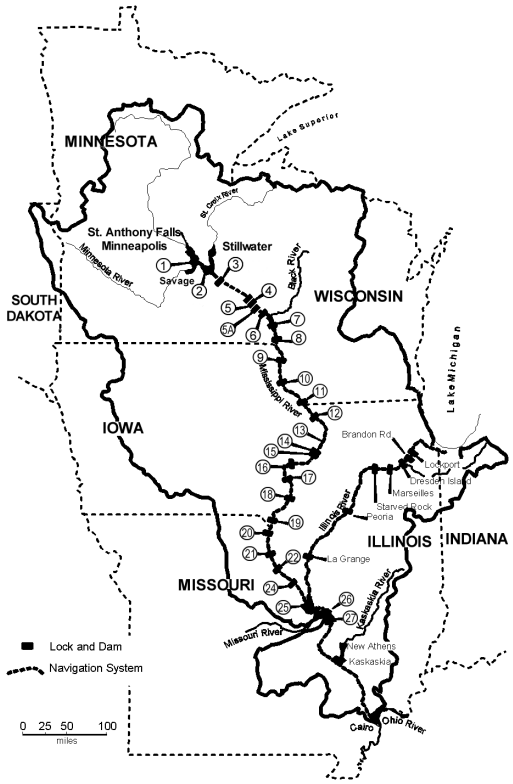
Commercially, the Mississippi is one of the world's most important rivers.

The Upper Mississippi River

The Upper Mississippi River System (UMRS), (*Figure 1 - 2*) includes all the commercially navigable waterways on the Mississippi River and tributaries above Cairo, Illinois, with the exception of the Missouri River and its tributaries. The St. Louis District Corps of Engineers is responsible for the southern portion of the UMRS between Saverton, Missouri, and Cairo, Illinois (300 river miles) and the lower 80 miles of the Illinois River. On this portion of the UMRS, the Rivers Project Office manages 47,641 acres of public operational lands and maintains navigation through a series of four locks and dams, numerous channel regulating structures and by managing dredging operations on 416 miles of navigable waterway. In addition to the primary navigation purpose, the pools behind the dams provide opportunities for a broad spectrum of outdoor recreation. Each pool area and the open river possess varied natural and recreation resources, often with high scenic, educational, scientific, environmental and cultural values. Protection and stewardship of these resources are the major challenges of the Corps and its partners.

Rivers Project Location

Figure 1-2
The Upper Mississippi River System



The Rivers Project is located on the Mississippi, Illinois, Kaskaskia and Cache Rivers in the vicinity of the city of St. Louis, Missouri, and includes land in both Missouri and Illinois. Between Saverton, Missouri, and Cairo, Illinois, the Mississippi River generally flows in a southeasterly direction. The Corps of Engineers, St. Louis District is responsible for navigation and resources management on the Mississippi River from the confluence with the Ohio River at River Mile (RM) 0.0 to RM 300.1 near Saverton, Missouri (*Figure 1 – 3*). The District's responsibility also includes the Illinois River from its confluence with the Mississippi at Grafton, Illinois, (RM 218) to immediately below LaGrange Lock and Dam (Illinois RM 79.8); the Kaskaskia River from its mouth on the Mississippi River (RM 117.5) to Fayetteville, Illinois (RM 57.2); and the Cache River Diversion Channel. On the lower 60 miles of the Missouri River, adjacent to St. Charles and St. Louis Counties, the St. Louis District is responsible for Clean Water Act regulatory matters and flood control.

Nine-Foot Navigation Channel

The Nine-Foot Navigation Channel Project was authorized by Congress in 1930 to provide navigation in the Upper Mississippi River above Cairo, Illinois. The Nine-Foot Channel Project within the St. Louis District is defined as the Illinois waterway downstream of the LaGrange Lock (lower 80 miles), and the Mississippi River from the confluence with the Ohio River to Lock and Dam 22 at Saverton, Missouri (301 miles).

The UMRS navigation projects have converted the Mississippi River (St. Louis to Minneapolis/St. Paul) into a series of pools at low and normal flow. Navigation dams, each consisting of a row of gates mounted

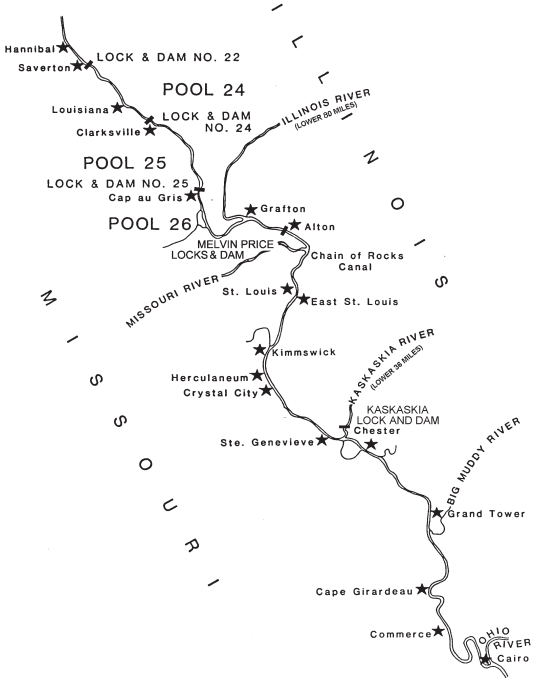
between piers over a low sill, are used to maintain sufficient water depth for navigation. During periods of high flow, the navigation gates are completely opened to allow passage of the flood flows.

There are two types of navigation improvements present in the St. Louis District. On the portion of the Mississippi River above Locks 27, impounded slack water navigation pools created and controlled by a system of locks and dams are herein referred to as the Pooled River. On the Middle Mississippi River, a combination of rock dikes, revetments and dredging are used to maintain navigable river conditions.

The UMRS provides a variety of functions: commercial transportation, recreation, environmental resources, and water supplies for domestic and industrial use. The Water Resources Development Act of 1986 declared the UMRS to be a nationally significant ecosystem and a nationally significant commercial navigation system.

Locks and Dam 26 near Alton, Illinois, was replaced during the late 1980s with the Melvin Price Locks and Dam. Lock and Dams 24 and 25 have undergone major rehabilitation. Other Corps districts in the UMRS include St. Paul and Rock Island. *Figure 1 – 4* shows the UMRS project on the Mississippi River and the districts that are responsible for maintaining them.

Figure 1-3



Kaskaskia River Navigation Project

The Kaskaskia River Navigation Project was authorized by Congress in 1962 under separate legislation (PL 87-874) from the Mississippi River Nine-Foot Channel Navigation Project. The project included construction of a lock and dam and maintenance of a nine-foot navigation channel from its mouth to Fayetteville, Illinois (36 miles), shortening the natural river distance from Fayetteville to the river mouth by approximately 14 miles.

Cache River Diversion Channel

The Cache River Diversion Channel Project was authorized by the Flood Control Act of 1938. The project included construction of a 5,260-foot diversion channel from the point where the former channel of the Cache River intersected the Mounds and Mound City Levee to the new outlet into the Mississippi River at RM 13. Three new railroad and highway bridges were also constructed. Land acquired for the project included 89.14 acres in fee simple and 3.63 acres in easements.

The project purpose was to divert the Cache River to avoid intersecting a Corps of Engineers Memphis District levee which provided protection for the Mound City area. Construction on the $2,837,100 project was initiated in June 1940, and was ready for use in December 1950.

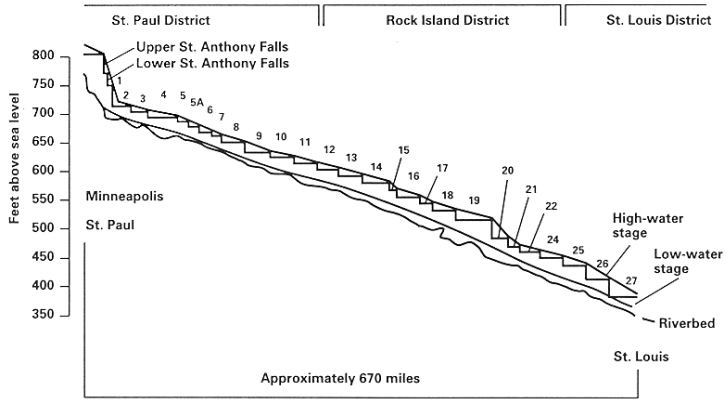
1.2. PROJECT PURPOSES

Navigation

The Nine-Foot Channel Navigation Project and attendant locks and dams were originally constructed for the sole purpose of providing sufficient water depth for river traffic during low flows in the Mississippi and Illinois Rivers. Before the Corps constructed the Nine-Foot Channel Navigation Project, the Mississippi River periodically had so little flow that navigation was impossible. It also caused many fish to be stranded, necessitating rescue by conservation agencies. Since the locks and dams have been built, flatwater pools have been created and the minimum water level has been raised. The St. Louis District dredges within the navigation pools as well as the open river to ensure navigable depths and widths are sufficiently maintained.

The Kaskaskia River Navigation Project was constructed primarily for the purpose of transporting coal out of the area, and secondarily as a way to move other barge transported materials into and away from the area.

Figure 1-4
Diagram of the descent of the Mississippi River



Recreation and Environmental Stewardship

The locks and dams now provide a series of slack-water pools throughout the year that attract thousands of people to fish, swim, boat, hunt and sightsee. Pleasure craft on the rivers abound every summer, and each fall finds many hunters on project lands and waters. Fish and wildlife are attracted to the off-channel areas that provide habitat for feeding, spawning and nesting.

Congress has authorized the Corps to develop recreational facilities and requires the consideration of fish and wildlife conservation at Corps water resource projects. The Flood Control Act of 1944, as amended, authorized the Corps to construct recreational developments at water resource projects. In 1958, the Fish and Wildlife Coordination Act (FWCA) stated that fish and wildlife conservation should receive consideration equal to that of other project purposes and should be coordinated with other features of water resource development. In accordance with these laws, environmental stewardship and recreation are now major features of the nine-foot channel navigation project for lands along the Mississippi and Illinois rivers. The intent of the Corps is to provide optimal sustained use and public enjoyment while protecting the project's natural resources. The Water Resources Development Acts of 1996 and 2000 authorized fish and wildlife conservation, habitat restoration and recreation as full project purposes for the Kaskaskia River Navigation Project.

The Corps operates and maintains recreation areas and provides basic stewardship of the natural resources on the project lands and waters. Federal, state, public and private institutions and individuals also provide recreation facilities and services and natural resources management in the public interest.

In cooperation with the United States Fish and Wildlife Service (USFWS), the Illinois Department of Natural Resources (IDNR), and the Missouri Department of Conservation (MDC), 32,329 acres are made available for

fish and wildlife management by General Plan (land use proposals) and Cooperative Agreements.

Under cooperative agreements, the USFWS on Designated Refuges, or appropriate states on General Plan Lands, will manage the resources for enhancement of fish and wildlife. The FWCA of 1958 also requires that planning and project development be coordinated with the USFWS.

Flood Damage Reduction

Flooding is a natural phenomenon of every river. Historically, floodwater enriched bottomlands and provided spawning habitats for native fish. The ecological value of maintaining connections between the river and its floodplain, and the flood-pulse advantage are some of the benefits of flooding.

However, human developments in the floodplains of the Midwest over the last three centuries have placed people and property at risk. Local and federal flood damage reduction projects, such as levee and drainage projects have been constructed to minimize the annual risk.

Historically, structural programs such as levees, floodwalls, drainage, and retention reservoir projects were primarily funded, built, and operated to reduce flood damages. In recent years, federal projects have included non-structural approaches as well.

Many states and local governments have also developed and carried out floodplain management efforts that both reduced flood damages and enhanced the natural functions of the floodplains. This mandate for holistic management of the floodplain will likely continue.

Other agency efforts, such as watershed projects built by the Natural Resource Conservation Service (NRCS), and land-use controls required by the National Flood Insurance Program (NFIP) and state floodplain management programs, have reduced flood damages throughout the basin as well.

Hydraulic investigations by the University of Iowa, and evaluations of the 1993 flood show that navigation dams cause slight, localized increases (less than one-half foot) in flood height just upstream of a dam. They do not cause increases in flood elevations for the entire UMRS. In the unimpounded Mississippi, the navigation channel has no locks and dams; the dikes and revetments which are in place cause little or no restrictions to flow.

A newly developed hydraulic computer model is used in the routine day-to-day regulation and forecasting for the Corps locks and dams on the Mississippi and Illinois Rivers. It provides a uniform, system-wide unsteady flow model of the Mississippi and Missouri River basins to analyze and predict system-wide impacts of various alternative actions during flood events.

Electric Generation/Hydropower

At the present time, no project dam is being considered for hydropower production.

1.3. APPLICABLE PROJECT AUTHORIZATIONS AND GUIDANCE

Public Laws

With the development of navigation structures and the purchase of project lands through the River and Harbor Acts, the opportunity for the multi-use purposes of project lands was soon recognized. Recreation interest was established by Congress in 1944 and in subsequent legislation. Interest in the fish and wildlife resources pre-dated the construction of the locks and dams with the passage of the Fish and Wildlife Coordination Act of 1934 and the Migratory Bird Treaty Act of 1918. The Forest Cover Act of 1960, the National Environmental Policy Act of 1969, the Endangered Species Act of 1973 and the Clean Water Act of 1977 provided a background for the protection, conservation and preservation of public lands. Cultural considerations on public lands were first addressed in the Archeological and Historic Preservation Act of 1960. These and other additional authorities are organized by project purpose below.

Navigation

Specific Projects

Upper Mississippi River – Modifications to the Mississippi River for navigation began in 1824 when the government authorized removal of snags, shoals and sandbars; excavation of rock at several rapids; and the closing off of meandering sloughs and side channels to maintain flow in the main channel. The first comprehensive modification of the river was authorized by the River and Harbor Act of 18 June 1878. A four and one half-foot channel was maintained from the mouth of the Mississippi River to St. Paul, Minnesota, by construction of dams at the headwaters of the Mississippi River. The dams served to impound water for low flow supplementation, bank revetments, closing dams, and longitudinal dikes. The increase to a six-foot channel was authorized by the River and Harbor Act of 2 March 1907. The additional depth was obtained primarily by the construction of rock and brush wing dams which were designed to constrict low water flows into a narrower channel. On 3 July 1930, Congress passed legislation (PL 71-520) authorizing a nine-foot channel project. The project consisted of a series of low-head navigation locks and dams to be constructed to provide a minimum nine-foot deep and 300-foot wide navigation channel on the Mississippi River from Alton, Illinois to Minneapolis, Minnesota. Later congressional actions provided for improvements to ensure consistent navigation around the Chain of Rocks section of the Mississippi River at Granite City, Illinois.

Illinois River – The River and Harbor Act of 3 July 1930 authorized the Corps to finish the 75 percent complete State of Illinois Nine-Foot Navigation Project on the Illinois River and assigned responsibility for facilities operation to the federal government. The St. Louis District is responsible for the lower 80-mile reach of the Illinois River from LaGrange Lock to Grafton, Illinois, which is the Illinois Waterway portion of the Melvin Price Locks and Dam pool.

Kaskaskia River – The Kaskaskia River Navigation Project was authorized by the 1962 River and Harbor Act to provide a navigation channel nine-feet deep and 225-feet wide on the lower 50.5 miles of the Kaskaskia River and tributaries. The project shortened the river between its mouth and Fayetteville, Illinois from 50.5 to 36 miles. Meanders were left as cut-offs, and much of the channel was excavated with flow partially regulated by a lock and dam near the river's mouth.

Applicable Legislation

The **River and Harbor Act of 1935** (PL 74-409), approved 30 August 1935, determined that non-navigable types of dams would be used for the Nine-Foot Channel Navigation Project. Non-navigable dams are those which will not pass vessels without the use of locks. It also identified the improvements that were to be made on the Illinois River, which included dredging and the construction of modern locks and dams at Peoria and La Grange and the removal of the earlier navigation structures at La Grange and Kampsville. The construction of Lock and Dam 26 on the Mississippi at Alton, Illinois made the Illinois River navigable from its mouth to RM 80.

The **River and Harbor Act of 1945** (PL 79-14), approved 2 March 1945, authorized the construction of Locks 27 and the Chain of Rocks Canal (59 Stat. 10).

The **River and Harbor Act of 3 July 1958** (PL 85-500) authorized the construction of Dam 27, a low-water, rock-filled dam, and other bank improvements to support navigation below old Locks and Dam 26.

The **River and Harbor Act of 1962** (PL 87-874), approved 23 October 1962, authorized the construction of the Kaskaskia River Navigation Project which includes the Kaskaskia Lock and Dam and channelization from the mouth of the river to Fayetteville, Illinois (76 Stat. 1173).

The **UMRS Comprehensive Plan** (Inland Waterways Revenue Act of 1978; Titles I & II) (PL 95-502) was approved 21 October 1978 (92 Stat. 1693).

Title I, Section 101 authorized the replacement of Locks and Dam 26 with a new dam and a single lock. Section 102 required the preparation of a comprehensive master plan of the UMRS and evaluation of the need for a second lock.

Title II - Established the Inland Waterways Revenue Act of 1978 to place a tax on fuel used in commercial transportation on inland waterways as well as a trust fund for navigational construction on inland waters.

The **Supplemental Appropriation Act of 1985** (PL 99-88), approved 15 August 1985, and the Water Resources Development Act (WRDA) of 1986 (PL 99-662), approved 17 November 1986, authorized the construction of a 600-foot by 110-foot auxiliary lock at Lock and Dam 26 (Replacement), now known as Melvin Price Locks and Dam.

The **Water Resources Development Act of 1996**, was approved 12 October 1996.

Section 415, Chain of Rocks Canal, Illinois, authorized completion of a limited re-evaluation of the authorized St. Louis Harbor Project to include evacuation of water collecting on the land side of the Chain of Rocks Canal, East Levee.

Recreation

Applicable Legislation

The **Flood Control Act of 1944** (PL 78-534) was approved 22 December 1944.

Section 4, as amended, authorized the Chief of Engineers to construct, operate and maintain public park and recreational facilities in reservoir areas. It also required that water areas of all such projects are open to boating, fishing, and other recreation and that ready access to such areas are maintained for general public use when in the public interest (48 Stat. 887).

The **Flood Control Act of 1946** (PL 79-526) was approved 24 July 1946.

Section 4 (60 Stat. 641) amended PL 78-534 to include authority to grant leases of lands in reservoir areas and licensing of lands to federal, state and local government agencies when in the public interest.

The **Flood Control Act of 1954** (PL 83-780) was approved 3 September 1954.

Section 209 amended the Flood Control Act of 1944. It authorized the Secretary to grant leases to federal, state or local government agencies without monetary considerations for use and occupation of land and water areas under the jurisdiction of the Department of the Army for park and recreation purposes when in the public interest (68 Stat 1256).

The **Flood Control Act of 1962** (PL 87-874) was approved 23 October 1962.

Section 207 amended Section 4 of the Flood Control Act of 1944, permitting recreational developments at non-reservoir projects (76 Stat. 1195).

The **Land and Water Conservation Fund Act of 1965** (PL 88-578), approved 1 September 1964, amended by PL 94-422. This act established a fund from which Congress can make appropriations for outdoor recreation. The fund derives revenue from entrance and user fees, sale of surplus federal property, and the federal motorboat fuel tax.

The **Federal Water Project Recreation Act of 1965** (PL 89-72), approved 9 July 1965 as amended, established recreation at federal water resource projects as a full project purpose. This act requires consideration of recreation opportunities and of fish and wildlife enhancement in planning water resources projects.

Section 9 limited the maximum allocation for recreation and fish and wildlife enhancement to 50 percent of the total project cost. This act further required beneficiaries to bear part of the costs of operating and maintaining recreation developments at federal water resources projects (79 Stat. 213).

Public Law 97-140, was approved December 29, 1981.

Section 6 imposed a moratorium through 30 December 1989 on enforced removal of certain private-use facilities from any Corps reservoir or lake project. Subsequently, by *Section 1134*, Public Law 99-662, the moratorium was extended indefinitely.

The **Water Resources Development Act of 1990** (PL 101-640) was approved 28 November 1990.

Section 102 (1) of the Water Resources Development Act of 1990 provided authorization for project related recreational development in the State of Illinois in conjunction with the Lock and Dam 26 Replacement Project (now Melvin Price Locks and Dam). As specified therein, the work includes site preparations and infrastructure for a marina and docking facilities, access roads and parking, a boat launching ramp, hiking trails and picnicking facilities. This authorization was furthered by WRDA 1992, which extended to “other non-federal interests” the opportunity to serve as the non-federal sponsor for recreation development in conjunction with the Melvin Price project. Subsequently, on 7 December 1992, the City of Alton submitted a letter of intent in this regard to the St. Louis District Engineer.

The **Water Resources Development Act of 1992**, (PL 102-580) was approved 31 October 1992.

Section 103 of the Water Resources Development Act of 1992, authorized the development of a Regional Visitor Center of at least 24,000 square feet at the Melvin Price Locks and Dam site. The purpose of the visitor center is to inform the public of the role of the U. S. Army Corps of Engineers in inland navigation along the Mississippi River and its tributaries. In addition, it includes the role of the Melvin Price Locks and Dam in inland navigation, the socioeconomic development of the surrounding area, and events of historical, archaeological, cultural, and natural significance in the area.

Section 225 authorized the Challenge Cost Sharing Program that permits the Secretary to develop and implement a program to accept contributions of funds, materials and services from non-federal public and private entities to be used in managing recreation facilities and natural resources.

The **Water Resources Development Act of 1996** (PL 104-303) was approved 12 October 1996.

Section 208 – RECREATION POLICY AND USER FEES directed the Secretary to put increased emphasis on recreation opportunities at Corps projects and specifies that recreation fees collected at Corps projects remain for use at the project where they are collected.

Section 322 – LOCKS AND DAM 26, ALTON, ILLINOIS AND MISSOURI modified the project to allow recreation development on contiguous non-project lands, including the Alton Commons.

Section 519 – RECREATION PARTNERSHIP INITIATIVE directed that, in general, the Secretary is to promote federal, non-federal, and private sector cooperation in creating public recreation opportunities at Corps projects.

The **Water Resources Development Act of 2000** was approved 11 December 2000.

Section 311 – KASKASKIA RIVER NAVIGATION PROJECT included recreation as a project purpose.

Fish and Wildlife

Fish and wildlife resources are maintained and protected in compliance with the following public laws:

Applicable Legislation

The **Fish and Wildlife Coordination Act (FWCA)** was enacted 10 March 1934, and amended 14 August 1946 (PL 76-732) and 12 August 1958 (PL 85-624).

The *FWCA 1946, Section 3* provided for the use of water resources projects for conservation, maintenance, and management of wildlife resources and wildlife habitat, to be administered by state agencies or the Secretary of the Interior. In accordance with this act, General Plans for the use of lands and waters of the navigation channel project for wildlife conservation and management were formulated and approved by the Secretary of the Army, the Secretary of the Interior, and the heads of pertinent state agencies.

The *FWCA of 1958* required that fish and wildlife conservation receive equal consideration with other project purposes and that they be coordinated with other features of water resource development programs. All planning and project development must be coordinated with the USFWS.

General Plans (land use maps) and Cooperative Agreements are the instruments used to establish a structured arrangement between the USFWS and Corps, and the USFWS and the states, for managing public lands.

The **Forest Conservation Act** (Reservoir Area–Forest Cover) (PL 86-717) (74 Stat. 817) was approved 6 September 1960. PL 86-717 and applicable implementing regulations declared the policy of the United States to provide that areas owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers shall provide for the protection and development of forest and other vegetative cover and the establishment and maintenance of other conservation measures. The basic Corps environmental stewardship mission is carried out by identifying and implementing management practices that insure the conservation, preservation and protection of resources for present and future generations. The Corps will continue to promote the establishment, maintenance, and protection of vegetative cover, to include forest cover, grasses and other herbaceous communities, in order to sustain the potential for forest production, to sustain wildlife populations, and to provide for basic erosion control during the life of the project. Corps natural resource management strategies are identified in this Project Master Plan and further detailed and specifically explained and scheduled in the Project Operational Management Plan (to be developed subsequent to the Master Plan). The development of plans or other vegetative management activities are fully coordinated with the USFWS. The USFWS provides their comments, and reviews the compatibility of proposed actions on the wildlife enhancement uses of the project. Under the terms of this agreement, the USFWS on Designated Refuge lands, or the appropriate states on General Plan/Coordination lands, will manage resources for enhancement of fish and wildlife.

The **Endangered Species Act (ESA) of 1973** (PL 93-205) (87 Stat. 884), amended by PL 95-632 and PL 97-3040, stated the policy of Congress that all federal departments and agencies must seek to conserve endangered and threatened species.

Section 7(a)(1) stated that all federal agencies shall, in consultation with and with the assistance of the USFWS, utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered species and threatened species.

Section 7(a)(2) required each federal agency to consult with the Secretary of the Interior to insure that authorized actions neither jeopardize the continued existence of any endangered or threatened species nor results in adverse modification of critical habitat. Unless previously completed and included in the project environmental impact statement, a biological assessment must identify any endangered species that, in the opinion of the USFWS, may be affected by the project. This requirement applies to all civil works studies, projects, or programs and includes the operation and maintenance of completed projects. A 1982 amendment made the act a more effective and efficient tool for the conservation of the species affected.

The **Water Resources Development Act of 1974** (PL 93-251) (88 Stat. 33) was approved 7 March 1974, and provided for 25 percent/75 percent cost-sharing between federal, state, and local governments to enhance fish and wildlife on project lands.

The **Fish and Wildlife Conservation Act of 1980** (PL 96-366), approved 16 September 1980, provided funds to states to conduct inventories and conservation plans for conservation of non-game wildlife. It also encouraged federal departments and agencies to use their statutory and administrative authority to conserve and promote conservation in accordance with this act.

The **Water Resources Development Act of 1986** (PL 99-662) was approved 17 October 1986. The Environmental Management Program, the second lock at Melvin Price Locks and Dam, and Navigation Impact Studies are the major activities authorized by this Act.

Section 1103 of the same law is cited as the *UMRS Management Act of 1986* and authorized a number of plans and actions for improving coordinated development and enhancement of the UMRS, due to its national significance as an ecosystem and commercial navigation system.

Section 906 provided that necessary mitigation measures for new projects be undertaken before or concurrently with project construction. It provided general authority to undertake mitigation measures for projects, whether completed, underway or not started. This includes acquisition of any needed related lands, excluding condemnation in connection with projects already completed or well underway. Under this section, mitigation costs shall be allocated to the project purposes and cost-shared accordingly. It required that feasibility reports contain a specific plan to mitigate fish and wildlife losses, unless a determination is made that there would be negligible adverse impact. Such plans shall provide that impacts on bottomland hardwood forests are mitigated in-kind to the extent possible.

Section 906 also provided that, for any project measures recommended to enhance fish and wildlife, costs will be entirely federal when the benefits have a national character and, where they do not, non-federal interests shall reimburse 25 percent of the costs. The non-federal share of operations, maintenance and rehabilitation costs will, in all cases, be 25 percent. To date, the Corps has not funded activities covered under Section 906.

The **Water Resources Development Act of 1996** (PL 104-303) was approved 12 October 1996.

Section 201 – COST SHARING FOR DREDGED MATERIAL DISPOSAL AREAS designated that land based and aquatic dredged material disposal (DMD) areas built for construction and O&M shall be considered a General Navigation Feature and cost shared in accordance with Title I of WRDA 1986.

Section 201 also provided that dredging funds must be considered on an equitable regional basis prior to constructing new DMD facilities. Use of private DMD facilities are permitted if least cost alternative. Non-federal interests may request amendment of Project Cooperation Agreements (PCA) executed before the date of enactment of this act. No increases to the non-federal interest's cost share are to result from this provision.

Section 204 – RESTORATION OF ENVIRONMENTAL QUALITY authorized small environmental restoration projects, either at the project site or off the project site, when it is found that the Corps project has contributed to the degradation of the environment. This section clarified that the $5 million limit is for the federal share of the project only and specifies that the non-federal cost share is 25 percent and that not more than 80 percent of the non-federal share may be in-kind. The section also defined water resources projects constructed by the Secretary to include projects constructed or funded jointly by the Corps and some other federal agency.

Section 206 – AQUATIC ECOSYSTEM RESTORATION authorized small aquatic ecosystem restoration projects ($5 million federal cost) to improve the quality of the environment, if they are in the public interest and cost effective; The projects are to be cost-shared 35 percent non-federal with 100 percent non-federal O&M. Under this section, there is a $25 million per year authorization of appropriations.

Section 207 – BENEFICIAL USES OF DREDGED MATERIALS directed that, in carrying out navigation projects, the Secretary may select a disposal method that is not the least-cost-option if the incremental costs are reasonable in relation to the environmental benefits, including creation of wetlands and shoreline erosion control.

Section 210 – COST SHARING FOR ENVIRONMENTAL PROJECTS amended Section 103 of WRDA 1986 by specifying that the non-federal share of environmental restoration and protection projects shall be 35 percent.

Section 212 – ENGINEERING AND ENVIRONMENTAL INNOVATIONS OF NATIONAL SIGNIFICANCE authorized the Secretary to undertake studies and prepare reports that may lead to work under current civil works authorities or to make recommendations for authorizations. This section authorized $1 million annually for fiscal years 1997-2000. The Corps may accept funds from other agencies, states, or non-federal interests.

Section 321 – KASKASKIA RIVER, ILLINOIS modified the navigation project to add fish and wildlife and habitat restoration as project purposes.

Environmental Stewardship

Applicable Legislation

The **National Environmental Policy Act (NEPA) of 1969** (PL 91-190) (83 Stat. 852), approved 1 January 1970, declared a national environmental policy for protection and enhancement of the environment and established a Council on Environmental Quality (CEQ). NEPA set forth the requirement for an environmental impact statement on any major federal action significantly affecting the quality of the human environment.

The **Forest Conservation (Reservoir Areas-Forest Cover) Act of 1960** (PL 86-717) (74 Stat. 817), approved 6 September 1960, required that projects be developed and maintained to encourage adequate forest resources. Forest management programs must be administered to increase the value of project lands for recreation and wildlife and to promote natural ecological conditions by following accepted conservation practices

The **Federal Water Pollution Control Act Amendments of 1961** (PL 87-88), approved 20 July 1961, provided for a more effective program of water pollution control. Amended by PL 92-500, Section 404, approved 18 October 1972, regulates the placement of dredged or fill material into jurisdictional waters.

The **Clean Water Act of 1977** (PL 95-217), approved 27 December 1977, amended the Federal Water Pollution Control Act and extends the appropriations authorization.

The **Farmland Protection Policy Act** (PL 97-98), approved 22 December 1981, minimized the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

The **Water Resources Development Act of 1986** (PL 99-662) was approved 17 October 1986

Section 1135 – PROJECT MODIFICATIONS FOR IMPROVEMENT OF ENVIRONMENT stated that the Corps, under the auspices of the Secretary, is authorized to review the operation of water resources projects constructed by the Secretary before the date of enactment of this Act to determine the need for modifications in the structures and

operations of the projects for the purpose of improving the quality of the environment in the public interest.

The Secretary is authorized to review the operation of water resources projects constructed by the Secretary to determine the need for modifications in the structures and operations of such projects for the purpose of improving the quality of the environment in the public interest.

The Secretary is authorized to carry out a program for the purpose of making such modifications in the structures and operations of water resources projects constructed by the Secretary which the Secretary determines are both feasible and consistent with the authorized project purposes, and will improve the equality of the environment in the public interest. The non-federal share of the cost of any modifications carried out under this section shall be 25 percent.

The Secretary shall coordinate any actions taken pursuant to this section with appropriate federal, state and local agencies.

Beginning in 1992 and every two years thereafter, the Secretary shall transmit to Congress a report on the results of reviews conducted under Subsection (a), and on the program conducted under Subsection (b). The report shall contain any recommendations of the Secretary concerning modifications and extension of the program.

An amount not to exceed $15,000,00 annually is authorized to be appropriated to carry out this section.

The **Water Resource Development Act of 1990** (PL 101-640) was approved 28 November 1990.

Section 306 stated that environmental protection was one of the primary considerations of the Corps in the planning, design, construction, operation, and maintenance of water resource projects.

Section 307 stated two goals for the Corps water resource development program: (1) An interim goal of no overall net loss of the nation's remaining wetlands base, as defined by acreage and function, and (2) a long-term goal to increase the quality and quantity of the nation's wetlands as defined by acreage and function.

Section 509 of the Water Resources Development Act of 1999 reauthorized the EMP program as a continuing authority type program. Section 514 authorized development of a project to enhance fish and wildlife habitat on the Missouri River and the middle Mississippi River.

Cultural and Historical Considerations.

A number of laws mandating the protection of cultural resources on public lands have been passed during the past 75 years. These laws and Executive Orders are summarized in Appendix A of the St. Louis District Cultural Resource Management Policy (April 1982). The following laws subsume, clarify, or supersede all previous cultural resources law:

The **Archaeological Resources Protection Act of 1979** (16 USC 470 et seq.) (PL 96-95), approved 31 October 1979, revised and updated the 1906 Antiquities Act. It protects archaeological resources and sites that are on public lands and Indian land, and fosters increased cooperation and exchange of information between governmental authorities, the professional community, and private individuals. The Act required and provided for permits to conduct scientific archeological excavations by qualified individuals and also specifies criminal acts and provides for criminal and civil penalties.

The **National Historic Preservation Act Amendments of 1980** to the National Historic Preservation Act of 1966, (PL 96-515) stated a policy of preserving, restoring, and maintaining cultural resources. It also required

that federal agencies take into account the effect of any undertaking on any site on or eligible for the *National Register of Historic Places*.

The **Archaeological and Historic Preservation Act** (Reservoir Salvage Act) (PL 86-523) (16 USC 469 et seq.), approved 27 June 1960 as amended, provided for the preservation of historical and archaeological data which might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any federal construction projects.

The **Native American Graves Protection and Repatriation Act** (PL 101-601) 16 November 1990, required museums and federal agencies to inventory human remains and associated funerary objects and to provide culturally affiliated tribes with the inventory of collection. The Act required repatriation, on request, to the culturally affiliated tribes and established a grant program within the Department of the Interior to assist tribes in repatriation and to assist museums in preparing the inventories and collections summaries.

1.4. POLICY CONSIDERATIONS

The following statements provide general guidance for the plan of development and future management arrangements.

Corps management activities will be directed towards fostering a balance between the economic, environmental, and recreational demands on the Upper Mississippi River within constraints of the authorized purposes of its navigation projects (navigation, recreation and fish and wildlife) and recognizing the multi-use, multi-purpose character of the resource as well as the national importance of the river for its ecological value.

A portion of the land parcels purchased by the federal government along the river are submerged (below normal pool levels) as a result of construction and operation of the navigation project. To the degree possible, these submerged lands will be treated in a manner consistent with adjacent land-use classification designations.

Private exclusive use, the use and occupancy, over an extended period of time of individually owned permanent structures, is prohibited at the navigational pools in this region, because the project resources are required for the benefit of the general public in the foreseeable future. Use and development of project lands will be in accordance with the MVD Regional Plan concerning Private Exclusive Use and Navigational Pool Projects.

Access to public lands will be maintained at existing locations until an Access Study is completed.

The Corps and USFWS recognize the need for jointly planned and fully coordinated actions on federal lands covered under the long term General Plan agreement. This Master Plan will lay the groundwork for further joint action. The resource plan (*Section 7 – Land and Water Area Management Plans*), in accordance with the Cooperative Agreement, promotes more efficient operation of the project.

Management programs established by the St. Louis District for lands and waters under its jurisdiction will be consistent with the following established environmental objectives for the Corps: (1) To preserve unique and important ecological, aesthetic, and cultural aspects of our national heritage; (2) to conserve and use wisely the natural resources of our Nation for the benefit of present and future generations; (3) to enhance, maintain, and restore the natural and constructed environment in terms of its productivity, variety, spaciousness, beauty, and other measures of quality; and (4) to create new opportunities for project visitors to use and enjoy their environment.

1.5. ENGINEERING REGULATIONS AND ENGINEERING PAMPHLETS

The following Corps engineering regulations (ERs) and pamphlets (EPs) govern activities on Rivers Project lands:

ER 405-1-12 - Real Estate Handbook (1985)

ER 1105-2-100, 28 December 1990 – Policy and Planning: Planning Guidance

This regulation describes the types of Army Civil Works planning programs and studies, the various purposes served by water resource projects, principle guidelines and procedures for formulating and evaluating water resource plans, and the Washington-level review process.

ER 1110-2-400, 1988 – Design of Recreation Sites, Areas, and Facilities

This regulation provides information and criteria related to planning and design of recreation facilities at water resource projects.

EM 1110-1-400, 31 July 1987 – Engineering and Design, Recreation Planning and Design Criteria

This regulation provides guidance compiled from experience and research for use in the planning and design of recreation areas, sites and facilities.

EM 1110-2-400, 31 May 1988 – Engineering and Design, Design of Recreation Sites, Areas and Facilities

This regulation establishes policy and guidance for the design of recreation sites, areas and facilities.

ER 1120-2-401, 14 August 1970 – Investigation, Planning and Development of Water Resources: Preservation and Enhancement of Fish and Wildlife Resources

This regulation prescribes policies and procedures for consideration of the preservation and enhancement of fish and wildlife resources in the planning and development of Corps water resource projects.

ER 1120-2-404, 14 August 1970 – Investigation, Planning and Development of Water Resources: Federal Participation in Recreational Development

This regulation provides guidance on federal participation and non-federal cooperation in the development of outdoor recreation and fish and wildlife enhancement at Corps water resource projects, plus guidance on the need and timing of assurances of non-federal cooperation in such features.

ER 1130-2-406, 31 October 1990 – Shoreline Management at Civil Works Projects

The purpose of this regulation is to provide policy and guidance on management of shorelines of Civil Works projects where 36 CFR Part 327 is applicable.

ER 1130-2-500, 27 December 1996 – Partners and Support (Work Management Policies)

This regulation establishes the policy for the management of operations and maintenance (O&M) activities of Corps personnel performing civil works functions related to navigation, dredging, environmental stewardship, and recreation services at water resource projects. Programs

described include Cooperating Associations, Volunteer, Contributions and Challenge Cost-sharing among others.

EP 1130-2-500, 27 December 1996 – Partners and Support (Work Management Guidance and Procedures)

This Operations and Maintenance (O&M) pamphlet establishes guidance and procedures for the management of activities at Corps water resource development projects and supplements ER 1130-2-500

ER 1130-2-530, 30 October 1996 – Flood Control Operations and Maintenance Policies

This regulation, in addition to ER 1130-2-500, established the policy for O&M of Corps flood control and related structures at civil works water resource projects and of Corps-built flood protection projects operated and maintained by non-federal sponsors.

ER 1130-2-540, 15 November 1996 – Environmental Stewardship Operations and Maintenance Policies

This regulation establishes the policy for the management of O&M activities of the Corps personnel performing civil works functions related to flood control, navigation, dredging, hydroelectric power generation, environmental stewardship, and recreation services at water resource, waterway, and other Corps projects.

EP 1130-2-540, 15 November 1996 – Environmental Stewardship Operations and Maintenance Guidance Procedures

This pamphlet establishes guidance for the management of environmental stewardship related O&M activities at Corps civil works water resource projects and supplements ER 1130-2-540, Environmental Stewardship Operations and Maintenance Policies.

ER 1130-2-550, 15 November 1996 –Recreation Operating and Maintenance Policies

This regulation establishes the policy for the management of recreation programs and activities, and for the operation and maintenance of Corps recreation facilities and related structures and civil works resource projects.

EP 1130-2-550, 15 November 1996 – Recreation Operations and Maintenance Guidance and Procedures

This pamphlet establishes guidance for the management of recreation programs and activities and for O&M of Corps recreation facilities and related structures, at civil works water resource projects and supplements ER 1130-2-510, Recreation Operations and Maintenance Policies.

ER 1165-2-27, 18 August 1989 – Establishment of Wetlands Areas in Connection with Dredging

This regulation provides guidance for the establishment of wetlands areas in connection with dredging required as part of water resource development projects.

ER 1165-2-28, 30 April 1980 –Corps of Engineers Participation in Improvements for Environmental Quality

This regulation provides guidance for including Environmental Quality (EQ) measures in Corps water resource development plans.

ER 1165-2-400, 9 August 1985 – Water Resource Policies and Authorities: Recreation Planning, Development and Management Policies

This regulation defines objectives and policies governing planning, development and management of outdoor recreational resources, plus enhancement of fish and wildlife at Corps water resource projects.

ER 200-2-3 Environmental Quality — Environmental Compliance Policies, 30 October 1996

This regulation established the policy for the management of environmental compliance related O&M activities at Corps civil works and military projects and facilities.

1.6. PURPOSE OF THE MASTER PLAN

There is currently no master planning type document that provides a regional conceptual plan for the management and development of Corps federal lands and waters under the jurisdiction of the St. Louis District Rivers Project Office.

The primary objective of this master plan is to publish a clear, practical and balanced plan that will guide future Corps and partner agencies land use decisions as well as public use development actions on the St. Louis District's portion of the UMRS. The intent of the Master Plan is to provide a guide for effective management of the federal lands natural and constructed resources while preserving habitat, accommodating public recreational demands and insuring continued river navigation.

1.7. SCOPE OF THE MASTER PLAN

Since 1977, there have been many changes in public recreation perceptions and demands, in natural and constructed resources along the river, and in federal roles in the project area. These changes have resulted in the recognition of the need to develop a comprehensive meaningful guide for the future management of the federal lands and waters of the Mississippi, Illinois and Kaskaskia Rivers within the St. Louis District. This Master Plan will incorporate all of the Rivers Project management areas and address current and future programmatic and management needs. It will also address the Corps and partner agency responsibilities on the open Mississippi River between Cairo, Illinois and Locks 27 as well as the fee title and operational easement lands along the lower 36 miles of the Kaskaskia River.

The general objectives, scope, and format of this document follows laws and guidelines as cited above (Sections 1.3 and 1.5). This master plan can not resolve many broad based and long-term problems associated with the UMRS. Examples of such problems include sedimentation, water quality issues, balancing the growth of commercial navigation with other needs, developments that are not on federal lands, and many others. However, the Corps will integrate the watershed perspective into opportunities and action within its authority to operate and maintain the UMRS. Opportunities will be explored and identified where joint-use watershed resource management efforts can be pursued to improve the efficiency and effectiveness of the Corps Civil Works Programs. Participation will be solicited from federal, state and local agencies, organizations, and the local communities to ensure that their interests are incorporated into the formulation and implementation of the effort. The Corps and other appropriate agencies may address these problems in separate future studies.

SECTION II

RIVERS PROJECT DESCRIPTION

2.1. GENERAL

Public Lands

Forty-eight thousand acres of public owned lands are administered by the St. Louis District for the navigation impoundments. These are primarily confined to the low-lying areas of the floodplain along the banks of the pools, and some of the islands. The USFWS, IDNR and MDC partner with the Corps to manage significant portions of these lands for conservation, maintenance and management of fish and wildlife under a General Plan and Cooperative Agreement with the Corps. Except for Kaskaskia Lock and Dam and the Cache River Diversion Channel, there are no Corps managed public lands on the open river below Locks 27.

Table 2 - 1 summarizes information for the five navigation projects and the open river.

Table 2 - 1
Principal Features of Navigation Pools 24, 25, 26, Locks 27 and Kaskaskia Lock and Dam

	Pool 24	Pool 25	Pool 26 and MPLD	Locks 27	Kaskaskia	Open Miss.River
Length of Pool (miles)	27.8	32	MS -40.7 IL-80.1	15.6	35.2	N.A.
River Mile Limits	301.2 - 273.4	273.4 - 241.4	241.4 - 200.7	200.7 - 185.1	.8 - 36.2	0-185
Max Regulated Pool Elevation (NGVD)	449	434	419		368	N.A.
Pool Surface Area (acres)	13,000	18,000	32,000	489 (Canal only)	1,309	N.A.
Land Owned by Corps (original purchase)	8,513	9,514	24,514	3,733	433	Cache River 89
Operational Easements			12	225	2,465	
Corps Flowage Easement	1,979	1,526	4,496	211	3,496	
Privately Owned Shoreline	18 (29%)	39.7 (58%)	204 (80%)			100%

Waters

The Mississippi River is a major source of surface water supplies for communities along the river. The average flow meets current demands and is expected to satisfy projected demands. Extensive groundwater supplies of high-yield sand and gravel aquifers underlie major parts of the region. The thickness of these layers varies from 70 to 100 feet. Industrial and municipal pumping accounts for most of the water withdrawals. Yields of 1,000 gallons per minute and over are common for individual wells.

The water resources serve many needs. Variations in precipitation, topography, regulation, flood control works and land use practices cause fluctuations in flow rate. Cumulative mean flow of the Mississippi more than triples between Grafton, Illinois (55,000 cubic feet per second) and Thebes, Illinois (190,400 cubic feet per second).

The Illinois River is a major source of surface and ground water supplies throughout its length. The average flow currently meets the surface water supply demands and it is expected to meet future demands as well. Above DePue, the river valley is narrow and only scattered sand and gravel deposits are present for development. Much of the water use from this portion of the river is through surface water withdrawals. Below DePue, extensive sand and gravel deposits occupy the bottomland portion of the waterway. Wells tapping these deposits range in depth from 30 feet to 165 feet with reported pumping rates up to and over 1,000 gallons per minute. Industrial, municipal and irrigation pumpage account for almost all of the water withdrawals from this portion of the river.

Shoreline

Shoreline areas and islands under federal fee ownership provide numerous recreational opportunities available on the navigation pools, rivers and islands. Many of the public-owned shoreline acres developed for public use are contiguous with a public road network from which access to the shoreline is feasible and economical. Other project shoreline lands with characteristics desirable for the development of public access cannot be utilized because of privately owned land that intervenes between the project shoreline and the public road system. In some cases, shoreline lands are so far removed from the existing public road network that the provision of access roads to the project lands would be costly to build, operate and maintain.

Some of the shoreline acres have only flowage easement rights purchased by the Government during the original acquisition, which restrict certain private use and development activities. Federal ownership of shoreline on the navigation pools varies between 20 percent (Pool 26) and 71 percent (Pool 24).

2.2. FACILITIES AND INFRASTRUCTURE

Navigation, flood control, recreation, environmental, interpretive, and administrative facilities and structures are summarized in the following paragraphs. More detailed descriptions of these functional areas are described in other sections.

Navigation Locks and Dams

Navigation Pool 24

Navigation Pool 24 extends from the dam at Clarksville, Missouri, (RM 273.4) 27.8 miles up the Mississippi River to Lock and Dam 22 at Saverton, Missouri. The dam is approximately 73 miles north of St. Louis, Missouri. Missouri Highway 79, Illinois Highway 96 and U.S. 54 provide access to the project area. The project is located in Pike and Ralls Counties in Missouri and Calhoun and Pike Counties in Illinois. The Salt River, which is the principal tributary, flows into the pool from the Missouri side about 11 miles north of the dam and drains approximately 2,900 square miles.

The Corps acquired 8,513 acres of land in fee for construction of Navigation Pool 24. Control of an additional 1,979 acres of land is provided via flowage easements. The Corps-owned lands covered by this plan lie only slightly above the maximum regulated pool elevation. These lands,

except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi River. Most of these lands are valuable as fish and wildlife habitat. They also offer valuable recreational opportunities for hunting and fishing.

The pool has a water surface area of approximately 13,000 acres at maximum regulated pool elevation 449.0 NGVD.

There are approximately 62 shoreline miles along the pool, of which 18 miles, approximately 29 percent, are privately owned. The remaining 44 miles, 71 percent, of the shoreline are in government ownership.

Navigation Pool 25

Navigation Pool 25 extends from the dam at Winfield, Missouri, (RM 241.4), 32 miles up the Mississippi River to Lock and Dam 24 at Clarksville, Missouri. The dam is approximately 45 miles north of St. Louis, Missouri. Missouri Highway 79 and Illinois Highway 100 provide access to the project area. The project is located in Pike and Lincoln Counties in Missouri, and Calhoun County in Illinois. The Sny River, which drains about 750 square miles, is the principal tributary. It flows into the pool from the Illinois side about 20 miles north of the dam.

The Corps acquired 9,514 acres of land in fee for construction of Navigation Pool 25. Control of an additional 1,526 acres of land is provided via flowage easements. These lands, except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi River. Most of these lands are valuable as fish and wildlife habitat as well as for recreational opportunities for hunting and fishing.

The pool has a water surface area of approximately 18,000 acres at maximum regulated pool elevation 434.0 NGVD.

There are approximately 68 shoreline miles along the pool, of which 39.7 miles, approximately 58 percent, are privately owned. The remaining 28.3 miles, or 42 percent, of the shoreline are in Government ownership.

Navigation Pool 26

Navigation Pool 26 extends from Melvin Price Locks and Dam (the replacement for Locks and Dam 26) two miles downstream from Alton, Illinois (RM 200.7), 40.7 miles up the Mississippi River to Lock and Dam 25 at Winfield, Missouri, and up the Illinois River from its mouth at Grafton, Illinois to the LaGrange Lock and Dam, 80.1 miles upstream. The Melvin Price Locks and Dam is approximately 17 miles north of St. Louis, Missouri. Interstates 70, 270 and 255; US 67 (Missouri); Missouri Highways 79 and 94, and Illinois Highways 3, 111, 140, 143, and 100 provide access to the project area. The project is located adjacent to the Mississippi and Illinois Rivers in St. Charles and Lincoln Counties in Missouri, and Madison, Jersey, Calhoun, Green, Pike and Scott counties in Illinois. The principal tributary on the Mississippi River section of the pool is the Cuivre River, which enters the river from the Missouri side about 38 miles north of the dam and drains an area of about 1,230 square miles. Macoupin Creek is the main tributary on the Illinois River segment of the pool. It enters the river from the Jersey County side about 23 miles north of Grafton, Illinois. Macoupin Creek has a drainage area of about 947 square miles.

During the 1930s, the Corps acquired 22,010 acres of land in fee for construction of Navigation Pool 26. During the 1970s and 1980s, 2,504 additional acres were acquired for the Melvin Price Locks and Dam, of which about 1,482 acres were for mitigation purposes. Mitigation lands consist of 621 acres at Horseshoe Lake in Madison County, Illinois, and 862 acres on Cuivre Island in St. Charles and Lincoln Counties, Missouri (RM 233-239). Control of an additional 4,496 acres of land is provided by

easement estates. The fee owned lands, except for a few fringe areas, are subject to inundation by normal overflows of the Mississippi and Illinois Rivers. These lands are valuable as fish and wildlife habitat as well as for recreational activities such as hunting, fishing, bird watching, hiking and photography.

Pool 26 has a water surface area of approximately 32,000 acres at maximum regulated pool elevation (419.0 feet) of which 25,900 acres are Mississippi River water and the remaining 6,100 acres are on the Illinois River.

There are approximately 260 shoreline miles along the Mississippi and Illinois Rivers, of which 204 miles, approximately 80 percent, are privately owned. The remaining 56 miles of the shoreline, approximately 20 percent, are in Corps fee ownership. Additional areas have flowage easement rights purchased by the Corps during the original acquisition, which restrict certain private use and development activities.

The dam consists of a 1,160-foot gated section and 2,000-foot overflow section. A 600-foot and 1,200-foot lock are located on the left bank.

Chain of Rocks Canal and Locks 27

The Chain of Rocks Canal was authorized by Act of Congress on 2 March 1945. The plan approved included a lateral canal on the left bank, or Illinois side, of the Mississippi River between RM 185.1 and RM 194.5 (above the mouth of the Ohio River) with a 1,200-foot main and a 600-foot auxiliary lock at the downstream end of the canal, approximately due west of Granite City, Illinois. Included as part of the Mississippi River Nine-Foot Channel Project, this project was designed to bypass a dangerous reach of the Mississippi River in which rock ledges, excessive velocities, and shallow navigation depths constituted hazards to navigation. Levees were constructed on each side of the canal, the west canal levee affording protection to the Chouteau Island Drainage and Levee District, and the east canal levee forming a component part of the riverfront levee system of the East Side Levee and Sanitary District which protects the valuable industrial area adjacent to East St. Louis, Illinois. Construction of the canal, levee and locks was essentially completed in February 1953 when the project was first opened to river traffic. The Corps project lands total 3,733 acres, which includes 3,453 acres purchased in fee and 280 acres that were transferred to the Corps for the purpose of the project from the Granite City Army Depot. Control of an additional 211 acres is provided by flowage easement estates.

Upon completion of the Chain of Rocks Canal and Locks 27, the problem of the rock ledge in the river at RM 190.3 on the Mississippi River was eliminated. However, occasional low flows resulted in less than nine-foot project depth over the lower concrete sills at the locks at Alton. To alleviate this problem, a low water rock-fill dam was constructed across the river. Dam construction started in fiscal year 1959. The dam is located at RM 190.3 and is built to an elevation which ensured a minimum of ten feet of water over the lower sills at Locks and Dam 26, thus eliminating the low flow navigation difficulties at that location. The project was placed in operation in November 1962 and is still required today for the Melvin Price Locks and Dam operation.

A Locks 27 harbor was authorized in WRDA 1986 to include two phases. The first phase was a 3,450-foot long, 210-foot wide harbor, approximately located at Chain of Rocks East Levee stations 193+00 to 227+00. After industrial development behind this harbor filled in, phase two would be built in the same dimensions as phase one from approximately 227+00 to 262+00, just downstream of Chouteau Slough. The total

project after two phases would be 6,900 feet long by 210 feet wide. A reevaluation report is currently being prepared addressing location and sizing of the harbor.

Kaskaskia River Navigation Project

The Kaskaskia River Navigation Project is located at Kaskaskia RM 0.8 on a reconstructed portion of the Kaskaskia River channel in Randolph County, Illinois approximately 20 miles north of Chester, Illinois. Channel improvements extend upstream through Monroe County to Fayetteville in St. Clair County, Illinois. Through channelization, the river distance between Fayetteville, Illinois and the confluence of the Kaskaskia River with the Mississippi River at Mississippi RM 118 has been effectively reduced from 50 to 36 miles. The project consists of a 600-foot lock, upper and lower floating guidewalls and a dam containing a movable section of two tainter gates. The dam site is bounded on the right bank by the Prairie du Rocher Levee District levee. The project's maximum regulated pool elevation is 368.0 NGVD. The project was placed in operation and pool was established on 10 July 1974.

Congress authorized the Kaskaskia River Navigation Project (PL 87-874) in 1962. With authorization of the project, coordination was initiated between the Corps and the sponsor of the project, the State of Illinois.

The resulting "Memorandum of Understanding between the U.S. Army Engineer District, St. Louis and the State of Illinois, Department of Public Works and Buildings" describes the project and outlines duties and responsibilities of the parties concerned and local cooperation required for completion.

Acreage acquired by the Corps for the project included 433 acres in fee-title, 2,465 acres in O&M easement and 3,496 acres in flowage easement. This land was acquired by the Illinois DOT and transferred to the Corps.

The State of Illinois owns approximately 17,000 acres adjacent to the navigation pool and therefore has complete control over the use and development of these lands. The State has formulated a plan of use for the lands known as the Kaskaskia State Fish and Wildlife Management Area lying along and adjacent to the project. The development of any private facilities on these lands will require permits from the State of Illinois, the St. Louis District and the Kaskaskia Regional Port District. Primary responsibility for management of these lands lies with IDOT. This department has furnished a substantial acreage of land to IDNR to be used for fish and wildlife management purposes, but subject to other developments as needed.

Under WRDA 1996, Section 321, the Kaskaskia River Navigation Project was modified to include fish and wildlife and habitat restoration as authorized project purposes. The St. Louis District will perform environmental stewardship work within the navigational servitude authority. A non-federal cost share partner is required for all habitat restoration work that may be pursued outside of the navigational servitude area.

The WRDA of 2000, Section 311, authorized recreation as a project purpose.

Summary

Table 2 - 2 summarizes the St. Louis District navigation facilities and infrastructure of the St. Louis District.

Table 2 — 2
Navigation Facilities and Infrastructure

River	Mississippi River				Kaskaskia
Navigation Project	24	25	Melvin Price	27	Kaskaskia
Number of Locks	1 RB*	1 RB*	2 LB*	2 LB*	1RB
Lock Dimension (ft.)	110x600	110x600	110x600 110x1200	110x1200 110x600	84x600
Dam Length (ft.)	1,340	1,296	1,160		130
Overflow Dike Length	2,000’	2,566’	2,000		
Gate (Number and width)	15 - 80’	14-60, 3-100’	9-110		2-60’
Gate Type	Tainter	Tainter, Roller	Tainter		Tainter
Guidewalls	2-600’	2-600’	4-900-1500’	2-600’	2
Year placed in Operation	1940	1939	1989 (2nd 1994)	1953/1962	1974

*RB = Right bank, LB=Left bank

Dredging and Dredged Material Uses

Dredging occurs in all the navigable rivers of the District. Two dredges are normally used to dredge various reaches of the river: the dustpan dredge (the *Potter*) is owned and operated by the Corps and a cutter head dredge is under contract to the District. The Corps maintains their dredge at the St. Louis District Service Base in St. Louis.

The St. Louis District coordinates with affected agencies regarding locations that may require dredging and the proposed disposal sites. When agency representatives recommend alternative disposal sites, all attempts are made to use them if feasible. Some of these are accepted wherever and whenever feasible. At other times it is not possible because of insufficient equipment capability, namely, a lack of enough pipeline to reach an alternate site or not enough pumping capacity to dispose dredge materials onshore. All dredged material disposal sites are coordinated with the natural resource agencies. Occasionally, emergency dredging takes place when the navigation channel is blocked.

When maintenance dredging occurs, excavated material is normally placed in the main channel border. When possible, beneficial use of dredged material occurs. The beneficial uses include beach creation for recreation, Least tern island habitat and sandy island habitat behind chevron dikes. Numerous river conditions are considered before placement of dredged material occurs including river stage; hydrologic, geomorphologic, and geometric properties of a particular reach of the river; volume of material to be dredged; capability of the equipment used; river structures in a reach such as dikes, revetments, and locks and dams; the volume of river traffic; and recommendations received from federal and state conservation and fish and wildlife agencies. Approximately 150 sites in the St. Louis District have been dredged at one time or another. Between 30 to 50 of these locations are dredged regularly. Some of these have to be dredged very infrequently, others annually, and some more than once during the navigation season. All dredging activities comply with applicable federal and state regulations. Approximately eighty million cubic yards of material are dredged annually within the St. Louis District.

Regulating Structures (Channel Maintenance)

Various types of regulating structures are used in the District's effort to maintain the navigation channel. There are approximately 800 dikes in the river and approximately 400 dikes in the pools, some of which are as old as 100 years. Dikes in the pools are generally below Ordinary High Water (OHW) except for approximately 40 that have been restored. Approximately 160 bendway weirs (low dikes angled upstream) are located in the open river. Four weirs were placed above L&D 24 in May 2000 to improve approach conditions. Relatively new structures known as chevron dikes have been placed at six locations in the pools. The Illinois and Kaskaskia Rivers do not have any Corps maintained regulating structures.

Navigation Pools

During the latter part of the 19th century, the currently pooled portion of the Mississippi River above the confluence with the Missouri River was wide and generally shallow, with numerous islands and emerging sandbars during periods of low flow.

Since 1824, the federal government has been involved in improving river conditions for navigation. Dikes made of wood and stone were used to confine the low flows to the main channel and temporarily increase stream velocities within the contracted reach, thereby increasing the stream's sediment transport capacity, thus deepening the navigation channel by scouring the riverbed. The sandbars between adjacent dikes soon became vegetated, with subsequent inundations depositing layers of finer-grained sediments such as silts and clays.

To alleviate the increased scouring action on the opposite bank due to the confinement of low flows, the lower portion of the riverbank was first usually protected with woven wooden mats placed against the bank and sunk with stone before the upper portion of the bank was revetted. Current methods to revet banklines utilize stone rip-rap. Stabilization of the riverbanks reduced the amount of lateral channel migration, thus reducing the number of new side channels that were being formed.

Prior to the establishment of Pools 24, 25 and 26, approximately 300 dikes and 65 miles of revetments were built. Due to their general deterioration and heavy ice-pack damage, a substantial portion of these structures was severely damaged or completely destroyed, thus significantly reducing their effectiveness.

The Open River

The unimpounded or open reach of river from the mouth of the Missouri River to the mouth of the Ohio River is also referred to as the Middle Mississippi River. This reach has characteristics which are a composite of those of the Upper Mississippi and the Missouri. From St. Louis to Grays Point, a distance of 134 river miles, the river flows between bluffs in an alluvial valley generally 4 to 5 miles wide. Its characteristics change in passing through the 7-mile long rock-bound gorge from Grays Point to Commerce, and again when it emerges into the wide delta-like valley of the lower Mississippi.

Environmentally Sound Navigation Structures

The St. Louis District has been cooperating with concerned agencies since 1969, in an effort to make the Nine-Foot Navigation Channel Project more compatible with aquatic and terrestrial habitats. This coordination process has resulted in the elimination of some proposed dikes, lowering the crown elevation on numerous other dikes, and construction of approximately 150 notched stone-fill dikes. Model and prototype studies indicate that not constructing some stone-fill dikes may eventually have an adverse impact upon the authorized channel dimensions

and may result in some increased dredging at some future date. A complete evaluation of notched dikes has been made as to their effectiveness for the enhancement of aquatic and terrestrial habitat. Other environmental enhancement features built into the project include stepped-up dikes, hard points and chevrons.

In 1989, the District introduced another channel improvement structure known as the bendway weir. Over 160 of these structures have been built between St. Louis, Missouri, and Cairo, Illinois. Submerged year-round, these structures add channel width in bends while stabilizing banklines on the outside of the bends thus significantly reducing maintenance dredging and barge accidents.

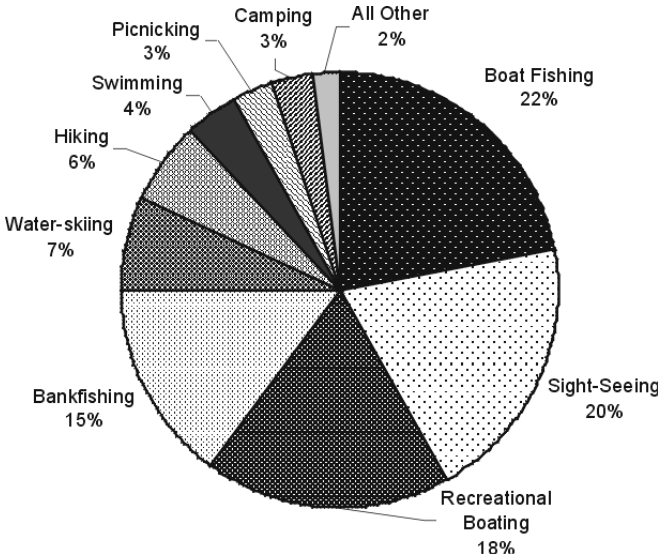
Flood Damage Reduction

Flood damage reduction is accomplished by use of levees, floodwalls and reservoirs. Levees are built and maintained by the federal government, local governments or the private sector. In the St. Louis District, there are 42 federal levees, 47 non-federal levees and numerous private levees. Levees are categorized by their height and ability to resist flood conditions. Floodwalls are built in the urban areas where there is not room for levee structures. Floodwalls protect the City of St. Louis and Cape Girardeau. Five flood control reservoirs are located on tributaries to the Mississippi River within the St. Louis District. These reservoirs retain large amounts of water during flood conditions to prevent flooding on the Middle and Lower Mississippi River.

Recreation

The St. Louis District has responsibility for four developed recreation areas; twenty-six access sites and six commercial concession marina leases. Twenty-four recreational cabin subdivision lease areas (377 recreational cottage leases are still active) dot the riverbanks. The States of Illinois and Missouri operate three recreation areas and twelve access areas on Corps owned land and the USFWS operates six access sites. The Rivers Project Office operates a regional visitor center at the Melvin Price Locks and Dam area and project visitor information centers at Locks 27, Kaskaskia Lock and Dam, Clarksville Office and at the Rivers Project Administration facility.

Figure 2-3
Recreation Area Use on the Mississippi, Illinois, and Lower Kaskaskia Rivers in the St. Louis District



The rivers of the St. Louis District are a major recreational resource for the people who live in the bi-state area. Recreational points of interest include a portion of the Great River Road from the National Great Rivers Museum to Eldred and the Village of Kampsville, Illinois. This stretch of road and river was recently designated a National Scenic Byway. Also included are the Mark Twain Refuge Complex, the Lewis and Clark State Historic Site, the Corps' Environmental Demonstration Area, the Multi-Agency Confluence Greenway (Mississippi and Missouri Rivers) and a regional bike trail system.

According to a 1995 study by the Waterways Experiment Station entitled Economic Impact of Recreation on the Upper Mississippi River System, recreational use of the area in the St. Louis District is varied. Fishing from a boat is the most popular (23 percent), followed closely by sightseeing (20 percent), and recreational boating (18 percent). Other popular uses are shown in *Figure 2 - 3*.

Environmental

Natural Resources

The Mississippi is one of the world's great rivers and one of its most complex ecosystems. It is a critical migration corridor for millions of birds and is essential to the ecological health of the North American continent. The river environment is home to an incredible array of fish, wildlife and plants. In turn, millions of people use and enjoy these diverse resources. The river, its floodplain, and its adjacent upland corridor are essential to the survival and dispersal of a great portion of the vertebrate species (particularly birds, amphibians, and fish) and aquatic invertebrate species that inhabit this continent. The Mississippi more than any other natural feature, is a globally recognized symbol of this nation.

The Mississippi River is the largest and longest river in North America. Its tributaries spread throughout the central United States, comprising a drainage basin encompassing 40 percent of the continental United States—an area totaling 1.9 million square miles. The drainage basin, the fourth largest in the world, is defined on the east by the Appalachian Mountains and on the west by the Rocky Mountains.

The bottomlands for the entire Mississippi make up the largest wetland area in the United States, and its bottomland hardwood forests are the most extensive in North America. More than half of the wetlands existing at the time of European colonization have been lost. The annual net loss of wetlands from the mid 1950s to the mid 1970s was mostly due to conversion to agriculture. In the following decade, there was a rapid decline in agricultural conversion and between 1982 and 1992, non-agricultural conversion accounted for over half of conversions. Wetland loss has been slowed considerably due to a governmental 'no net loss' policy.

More than 47 percent of the nation's duck population migrates along the river, and one-third of the freshwater fish species in North America live in the river. The river flows through eleven different eco-regions; this accounts for the great biological diversity of the river valley.

Since many of the characteristic birds of the river valley are migratory, the study area is of national and international significance. In addition, the Mississippi River and its tributary valleys form a natural route over which the non-migratory or semi-migratory species may expand their ranges. The river valley forms a wildlife corridor between the Gulf of Mexico and the Great Lakes Region. The mammalian species are generally representative of eastern (Alleghenian) types, with some influence of southern (Carolinian) and northern (Canadian) species.

Plant species in the river valley also enjoy conditions that are not generally associated with the geographic location of the river. Overlapping of eastern and western species and subspecies of plants as well as animals occurs in the river valley. In disturbed sites without previous growth where species of plants are beginning to grow, known as pioneer sites, found along sandbars, mud flats, and other open places of recent soil disturbances, the usual forest is dominated by black willow and cottonwood. In forested areas on the floodplain, silver maple, cottonwood, elm, hackberry, green ash, oaks, willows and box elder are the usual dominants.

Wildlife Habitat and Flyways

The wildlife habitats along the Mississippi River are important to a large number of migratory birds. Mature forested floodplain habitats in the Upper Mississippi, usually consisting of maples, cottonwoods and willows, are important to colonial-nesting birds such as herons, egrets

and double-crested cormorants. Farther south in the Lower Mississippi alluvial valley, bald cypress, gum, elm and various species of oaks provide important breeding, migration and winter habitat for numerous migratory birds. Neotropical migratory birds depend on these forests and brushy habitats for migration and breeding; studies have demonstrated the importance of this migration corridor to the species of migrants whose numbers are declining. The Mississippi River floodplain forest is also important to the bald eagle both for nesting and wintering habitat.

Most of the area within the floodplain of the river is wetland or converted wetland; this type of habitat is vital to many species of dabbling ducks for both migration and breeding. Both blue-winged teal and mallards nest on islands or in grasslands adjacent to the river, while wood ducks use tree cavities in the forests. Most importantly, the large, deep open pools of the river created by dams are vital to diving ducks, chiefly canvasback, redhead, lesser scaup and ring-necked ducks. Chief species using the Mississippi alluvial valley, which extends from southern Illinois to the coastal marshes of Louisiana, are the Mississippi valley and eastern prairie populations of Canada geese, snow geese, lesser white-fronted geese, and ducks such as gadwall, mallard, green-winged teal, American wigeon, American black duck, and northern pintail. Many other species of ducks use the river wetlands in lesser numbers.

Fisheries

The Mississippi River supports one of the most diverse fisheries in the world. One-third of all freshwater fish species in North America,195 species, live in the Mississippi River (Fremling et al. 1989). The diversity of the species generally increases from north to south. This diverse abundance of fish depends on many different aquatic habitat types including tailwaters, main channel, main channel border, side channel and backwater habitat.

In three of the four pools in the study area (Pool 24, Pool 25 and Pool 26), three aquatic zones occur. The upper end of each pool most closely mirrors the river's water level. In these areas, impoundment has had the least effect on the water levels. In this portion of the pools, marsh development is limited, and the pre-impoundment condition of deep sloughs and wooded islands are most common. As flows increase, the upper end of the pool becomes deeper until open river conditions exist. In the middle of each pool, impounded water is backed up over islands and floodplain wetland, spreading the river out over a large area. Water level remains relatively stable until open river conditions exist. Marsh development has occurred in the middle portion of the pools. Immediately above each dam (the lower pool), water was impounded to a depth that precluded most marsh development. At present, most of the lower pools' area is deep, open water except when flows increase and water level decreases. As noted for each zone of the pool, water levels change when pool operation is manipulated by use of a hinge point.

Upland erosion and the sedimentation in downstream areas are major causes of reduced water quality and habitat destruction in most mid-western rivers and streams. Sedimentation in the backwaters of the Upper Mississippi River is a significant environmental problem.

Impounding the river has slowed the river current and increased silt deposition. Impounding the river has created backwaters and side channel habitat which benefits species like the largemouth bass, bluegill, and crappie that prefer still water. Riverine and sediment-tolerant species like the channel catfish, buffalo, drum and sturgeon still predominate in areas with current such as the main channel and main channel border.

Interpretive Services/Educational Outreach

It is the intent of the Rivers Project Office to maintain an outreach and environmental interpretive effort consistent with Corps requirements. The Rivers Project Office will support environmental learning opportunities where feasible by collaborating closely with educational institutions and other partners.

The new administration building located along Riverlands Way Road on the Mississippi shore at the Melvin Price Locks and Dam includes a Type C Visitor Information Center. The Type C Visitors Information Center is limited to the placement of exhibits in existing buildings, or in new or rehabilitated administration buildings for the purpose of disseminating project information.

The 12,000 sq. foot Melvin Price Visitor Center, located on the Illinois Esplanade immediately adjacent to the new locks and dam, was authorized as a Type A regional visitor center. Developed with comments, support and guidance through a citizen's advisory group and peer review group, this facility will be used to tell the Corps story, the river story and the navigation story. The cultural, historical, ecological and biological responses will be interpreted at this major learning center. Visitors to the locks and dam will be able to view exhibits and tour the dam structure as well. Through partnering, a distance learning classroom has been established in the multi-purpose room for educational programming.

An access and tour control facility is located adjacent to the Rivers Project Administration building. It is a minimal facility that protects visitors from the inclement weather and serves as a meeting location for tours and interpretive programs.

Private Exclusive Use

Water and land areas at Corps projects are maintained for the benefit of the general public. After completion of the locks and dams in the late 30s, many cabin subdivisions were legally established on Corps lands along the rivers. This was an outgrowth of the Flood Control Act of 1944 that authorized recreation development at Corps water resources projects. Since the early 1960s, the permanent siting of floating cabins, cottages and non-transient mobile homes and trailers for private exclusive use on project lands has been discouraged. However, Section 6 of Public Law 97-140 established a moratorium until 31 December 1989 on enforced removal of certain existing private exclusive use type structures. Section 1134 of the WRDA 1986 (Public Law 99-662) extended the moratorium, indefinitely, for all such leased or permitted structures that existed on 17 November 1986 (date of the Act) if certain conditions (detailed in the Act) are met. Present policy stresses procedures for management of these private developments based on regional, project or site specific considerations in accordance with federal, state and local laws. These established procedures are applicable to all new, expanded or existing developments. A Mississippi Valley Division regional plan pertaining to private exclusive use is in effect for public lands and waters in the St. Louis District.

Administration

The main office for the Rivers Project is located at West Alton, Missouri. A sub-office is located in Clarksville, Missouri and project-specific administration and maintenance facilities are located at each navigation facility. The project manager and staff are responsible for all aspects of operations, maintenance and administration of all river navigation and water resource development projects and their natural, cultural, and recreational resources. The ranger staff is responsible for natural resource management, outdoor recreation, administering service contracts, health

and safety of visitors, visitor assistance, boundary surveys and marking, working with other federal and state and local agencies and informing the public of Corps activities. Navigation personnel assist in locking through of river vessels and maintenance of locks and dams structures. Maintenance workers and contract personnel are responsible for maintaining and servicing the hydraulic structure, painting, repair of facilities, and maintenance of trails and recreation facilities.

2.3. NATURAL RESOURCE MANAGEMENT PROGRAMS

Public Law 86-717 (Reservoir Areas-Forest Cover) and applicable implementing regulations declare the policy of the United States to provide that areas owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers shall provide for the protection and development of forest and other vegetative cover and the establishment and maintenance of other conservation measures on areas under Corps jurisdiction. The basic Corps environmental stewardship mission is carried out by identifying and implementing management practices which insure the conservation, preservation and protection of resources for present and future generations. The Corps will continue to promote the establishment, maintenance, and protection of vegetative cover, to include forest cover, grasses and other herbaceous communities in order to sustain the potential for forest production to sustain wildlife populations, and provide for basic erosion control during the life of the project. Corps natural resource management strategies are called out in this Project Master Plan and further detailed and specifically explained and scheduled in the Project Operational Management Plan to be developed subsequent to the Master Plan. The development of plans or other vegetative management activities are fully coordinated with the USFWS for input and review of compatibility of proposed actions with the wildlife enhancement uses of the project. Under the terms of this agreement, the USFWS on Designated Refuge lands or the appropriate states on General Plan/Coordination lands, will manage resources for enhancement for fish and wildlife.

The St. Louis District is ultimately accountable for the environmental stewardship of federal public lands acquired for the Mississippi River navigation system projects within its district boundaries.

Beyond stewardship, management of Corps lands includes attending to functions such as fire protection, safety, security, public protection, shoreline management and real estate management and disposal. Four recreation areas on the Mississippi River and its backwaters are maintained and operated by the Corps.

General Plan and Cooperative Agreement History

In addition to the Corps stewardship mandate promulgated by the Forest Cover Act, the USFWS, the IDNR and the MDC are authorized to manage 32,329 acres for fish and wildlife enhancement by a General Plan (land-use proposals) and Cooperative Agreement. General Plans and Cooperative Agreements were authorized in the Fish and Wildlife Coordination Act of 1934. The first cooperative agreement between Corps and USFWS was signed on 15 May 1945. Further amendments to the Fish and Wildlife Agreements caused the General Plans and Cooperative Agreements to be renegotiated. The 1954 Cooperative Agreement and the 1953 General Agreement and Public Land Order 939 made USFWS authority over Corps lands within the Refuge depend exclusively on the Cooperative Agreement. The 1954 Cooperative Agreement and the 1953 General Plans provided a unified system of administration over Corps lands, and other refuge lands were transferred to the Corps as part of the Nine-Foot Channel project. Additional cooperative agreements were negotiated between the states and the USFWS.

The 1961 General Plan and 1963 Cooperative Agreement further elaborated the rights and responsibilities of the Corps, USFWS and states to lands north of Cairo, Illinois, along the Mississippi River purchased by the Corps. It also provided the means for making minor adjustments at the district level in the lands transferred.

Recreation

Programs

Programs and activities related to outdoor recreation will have as their design the following mission statement:

Mission Statements

The U.S. Army Corps of Engineers is the steward of the lands and water at most federal water resources projects. Its Natural Resources Management mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other federal, state and local agencies as well as the private sector. Maintaining and improving this access to public lands is a high priority.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.

Program Objectives

- To provide a quality outdoor recreation experience which includes an accessible, safe and healthy environment for a diverse population of project visitors/users.
- To increase the level of self-sufficiency for the Corps recreation program.
- To provide outdoor recreation opportunities on Corps administered land and water on a sustained basis.
- To optimize the use of leveraged resources to maintain and provide quality public experiences at Corps water resources projects.
- To accomplish the program objectives, the Corps manages land and water resources in cooperation with other federal, state and local agencies, quasi-public organizations and the private sector supplemented by volunteers, contributions and challenge cost-sharing programs.

Project Master Plan and Operational Management Plans will be prepared in accordance with Chapter 3 of ER 1130-2-550.

Outdoor recreation and public use of project lands and water shall be on a ‘first-come-first-served’ basis.

Environmental Stewardship

The Corps is the steward of Rivers Project lands and waters. Its Natural Resources Management mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations. The environmental stewardship program objective is to manage the natural resources on Corps administered land and water in accordance with ecosystem management principles and to ensure their continued viability.

The USFWS, IDNR and MDC have extensive wildlife management programs on public lands managed by these agencies. New management programs on Corps land will be carefully coordinated with the existing programs so that the most good can be achieved.

The Corps is chartered through laws and regulations to manage public lands under its jurisdiction in such a manner which “conserves fish and wildlife,” “benefits wetlands,” and “provides a safe and healthy environment for visitors." The stewardship authorities afforded the Corps through the National Environmental Policy Act of 1969 (PL 91-190), the Water Resource Development Acts, the Forest Cover Act, and numerous engineering regulations within the agency, offer the natural resource managers several methods to accomplish their role.

Acting within existing authorities and consistent with the current master plan, the Riverlands Area Office and later the Rivers Project Office have been successful in initiating and advancing an environmental strategy for the future (known as Riverlands 2000). To date, a major environmental demonstration area has been completed and former agricultural leaseholds have been successfully reclaimed to native prairie and wetland habitats. An effort to resurvey and visibly mark the federal land boundaries is now underway. General operation and maintenance of federal recreation and concessionaire facilities have improved. Environmental Review Guide for Operations (ERGO) compliance is being achieved and phasing out of private exclusive use is being actively pursued and accomplished. Significant efforts have been made in raising public awareness of the Corps mission on the Mississippi River in a manner that is also striving to improve math and science literacy of students and create an interest in pursuing careers in science, technology, and civil service.

Interpretive Services and Educational Programs

The interpretive services and outreach efforts have created outputs and linkages with basin communities that are relevant and have served the entire project.

The Corps revised ER 1130-2-428 (now ER 1130-2-550), the Interpretive Services and Outreach Program (ISOP) Regulation in 1996. The strengthened ISOP program focuses on two major subject areas, environmental education and outreach. There are two main objectives of Environmental Education and Outreach: To foster both a local and global understanding of the interdependence of life on our planet, and to reduce management problems on public lands.

Important attributes in the ISOP program include achieving management objectives using interpretive techniques, communicating the Corps’ Civil Works and Military missions and accomplishments to the public, improving visitor safety, and enhancing the experiences and enjoyment of visitors to Corps projects. Outreach is a means of accomplishing these goals beyond the boundaries of Corps projects.

The Rivers Project ISOP strategy is to achieve the goals outlined in ER 1130-2-550 and to conduct these efforts in an efficient and effective manner at the field level so as to enhance understanding of both the Corps and the public's role and responsibilities. The Corps' ISOP has six goals:

- To achieve management objectives using interpretive techniques.
- To provide environmental education to foster voluntary stewardship of natural, cultural, and created resources.
- To incorporate the Corps Civil Works and military missions and accomplishments into interpretive programming.
- To improve visitor and employee safety using interpretive techniques.
- To use outreach techniques to accomplish ISOP goals, including interpreting Corps missions, promoting stewardship, saving lives, and solving management problems. As part of the interpretive process, encourage interest in math and science, including career interest.
- To enhance the visitors' experience and enjoyment by anticipating their needs and providing interpretive resources to meet those needs.

The Rivers Project Office has identified six objectives to accomplish the Interpretive Services and Outreach Program goals:

- To incorporate public land issues into formalized educational structures.
- To increase availability of public lands for use as outdoor classrooms.
- To foster a sense of proprietorship towards public lands by the general public.
- To demonstrate the Corps' ability to improve math and science literacy.
- To provide public assistance through community outreach to raise awareness of public lands management.
- To gain insight on the communities needs and concerns regarding the Rivers Project Office management of lands and waters.

The Rivers Project Office ISOP meets these goals and objectives through several forms of unique programming. Through educational programs, the Rivers Project Office develops curriculum, including the St. Louis School Partnership Program, the Careers in Science Program, the Rivers Curriculum Project and the U.S. Geological Survey Water Resources Project. School programs offered at the Rivers project include "*What is a Wetland*," "*Locks and Dams - Inland Waterway Navigation System*," "*Prairies of the Past,*" "*Eagles along the Mississippi*," and "*Habitat Habits*."

Visitor Assistance

Visitor assistance is a management program designed to protect natural resources and government property while assisting project visitors. Park rangers serve as a regulation enforcer with full citation authority of petty offenses contained in Title 36, Part 327. Available use-of-force options include visual presence, verbal persuasion and unarmed self-defense. States, counties and other political subdivisions retain the statutory authority and inherent responsibility to enforce appropriate state and

local laws. The Rivers Project Office contracts with appropriate local (county-city) law enforcement agencies to provide these necessary services on public lands.

2.4. PUBLIC USE

Major Activities

Within the Mississippi River corridor are many diverse recreational opportunities. The states manage 42 areas, including boat access areas, waterfowl management areas and recreation areas. These state managed areas are visited annually by one-half million people. The National Park Service administers the Jefferson National Expansion Memorial that averages 3.9 million annual visits. More than 50,000 visitors hunt, fish, bird watch, study nature or sightsee on the two national wildlife refuges managed by the USFWS and on private lands along the Mississippi, Illinois and Kaskaskia Rivers. The yearly average for recreational boats locked through the navigation projects from 1995 to 1999 is 6,331.

Table 2-4
Visits

	Total
1989	5,262,907
1990	5,292,600
1991	6,926,124
1992	4,285,718
1993	4,500,003
1994	8,123,345
1995	8,285,812
1996	4,614,203
1997	4,263,800
1998	4,001,100
1999	4,370,626

Visitation

Total visits at Pool 24, 25 and 26, for all types of recreation activity on the project was reported as approximately 4,370,626 in 1999 as shown in *Table 2* – 4. Visits, the number of persons who enter the project for recreational purposes, were recorded, beginning in 1989. Visitation tabulated by recreation day and broken down by pool is presented in *Table 2 – 5.*

Table 2 — 4
Visitation-Recreation Days

Year	**Total**	Pool 24	Pool 25	Pool 26	Pool 27	Kaskaskia
1961		384,000	822,000	2,746,000	*	*
1962		386,000	828,000	2,761,000		
1963		412,000	882,000	2,939,000		
1964		396,000	849,000	2,828,000		
1965		401,000	860,000	2,867,000		
1966		406,000	871,000	2,903,000		
1967		390,000	836,000	2,786,000		
1968		396,000	848,000	2,826,000		
1969		386,000	814,000	2,685,000		
1970		383,000	819,000	2,655,000		
1971		407,000	863,000	2,719,000		
1972		407,000	868,000	2,719,000		
1973		256,000	495,000	1,549,000		
1974		542,000	1,020,000	3,121,000		
1975		455,000	1,390,000	4,060,000		
1976		502,000	1,396,000	3,939,000		
1977-87	No Data Available					
1988		514,600	1,654,600	4,025,00	*	*

* Data for Pool 27 and Kaskaskia currently unavailable

SECTION III

RIVERS PROJECT MANAGEMENT STATUS

3.1. INTRODUCTION

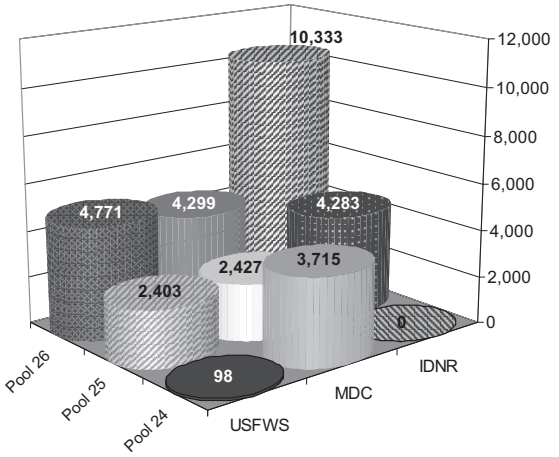
In 1988, the St. Louis District Corps of Engineers established a Riverlands Area Office to manage the resources on the federal lands and waters associated with Mississippi River Navigation Pools 24, 25, 26 and Locks 27. The establishment of the Rivers Project Office in 1994 expanded responsibility to include the Kaskaskia River Navigation Project and the Cache River Diversion Channel. Today, the Rivers Project Office recognizes and manages the multi-purpose use of these lands and waters. Overall, the Rivers Project Office manages 416 miles of navigation channels on the Mississippi, Illinois and Kaskaskia Rivers and provides environmental stewardship, recreation, interpretive services and visitor assistance for 47,641 acres of project lands and waters.

St. Louis District works closely with several other governmental agencies on the river to ensure sound management of the region's resources. These agencies were directly involved in the preparation of this master plan as well. In particular, the district works closest with the Illinois Department of Natural Resources, (IDNR), the Missouri Department of Conservation, (MDC) and the U. S. Fish and Wildlife Service (USFWS). This section presents information on the management of Corps lands as well as agency and interagency programs that pertain to the Mississippi, Illinois and Kaskaskia Rivers.

3.2. GENERAL PLAN AND COOPERATIVE AGREEMENTS

In cooperation with the USFWS, the IDNR, and MI 35,132 acres were made available for fish and wilc management by a General Plan and Coopera Agreement. The General Plan and Coopera Agreement are being revised by the Corps, USFWS a state agencies and the new total acreage is 32,329 displayed in *Figure 3 - 1*. Section 7 discusses th proposed changes. Authorized by the Fish and Wilc Coordination Act of 1934 and following amendme these agreements provided for federal and state coope tion in managing federal lands for wildlife resources a habitat.

Figure 3-5
General Plan Land



3.3. OTHER AGENCIES ROLES

Characterization of Existing System

Federal, state and regional agencies and authorities, through enabling legislation, regulatory powers, established precedents, agency experience, or developed programs, act individually or in various partnerships to manage water and related land resources of the Rivers Project region. Each of these agencies and authorities is briefly described with respect to its major activities in the Rivers Project Area and listed in *Table 3 – 2*.

The roles of federal and state agencies are currently in transition as interest in states' rights in water resources management, the role of the

Department of the Interior, and the future of the Water Resources Planning Act (PL 89-80) in federal water policy is being evaluated.

Federal Agencies

Federal agencies in water and related land resources management share authorities with governmental units at other levels. Many federal agencies, such as the U.S. Environmental Protection Agency, (EPA) establish policies or regulations to be implemented by others and fund development activity by others. There are two notable exceptions where direct water resource development authority and protection capabilities have been granted to allow individual and independent actions: the Corps and the USFWS (Department of the Interior). The U. S. Department of Agriculture, (USDA) through the Natural Resources Conservation Service (NRCS) is organized to provide close technical assistance through various programs to conserve and protect natural resources.

The following agency descriptions briefly present the basic water resources authority and interest intent of federal entities.

U.S. Army Corps of Engineers

This agency's activity is central to most of the system-wide planning and development in the St. Louis District. As part of its studies and projects, the Corps is involved in broad areas of navigation, flood control, recreation, fish and wildlife, and environmental protection features. Specific authorities include coordination, planning, design, construction, and operation activities. The areas owned in fee and easement under the jurisdiction of the Secretary of the Army and Corps of Engineers were acquired for the purpose of navigation. Subsequent public laws authorized recreation, fish and wildlife conservation and environmental stewardship. Coincidental uses of these property interests have been for public use and cultural resource conservation. The Corps environmental stewardship mission is reflected in management practices that insure the conservation, preservation and protection of resources for present and future generations. The establishment, maintenance, and protection of vegetative cover will sustain wildlife populations, and provide for basic erosion control during the life of the project. The Corps interprets and applies federal policy. The functional areas most directly affected are recreational boating, commercial navigation, flood damage reduction, dredging, and dredged material placement. Virtually all project resource management objectives may be affected by Corps activities.

Table 3-2
Agencies Involved in
Rivers Project Resource Management

Federal Departments/Agencies
U.S. Department of Defense: *U.S. Army Corps of Engineers*
U.S. Department of Agriculture: *Natural Resources Conservation Service*
U.S. Department of the Interior: *Bureau of Land Management, National Park Service, Fish and Wildlife Service U.S. Geological Survey*
U.S. Department of Transportation: *U.S. Coast Guard*
U.S. Environmental Protection Agency
Federal Emergency Management Agency
State Governments
Illinois Department of Natural Resources
Missouri Department of Conservation, Department of Natural Resources
Regional Entities
Upper Mississippi River Basin Association
Upper Mississippi River Conservation Committee
Regional Commerce & Growth Assoc. (RCGA)
Mississippi River Parkway Commission
Illinois River Coordinating Council
Alton Lake Heritage Parkway Advisory Commission

The Corps is structured with divisions and district offices to enable the agency to focus on specific regional needs. The St. Louis District is in the Mississippi Valley Division (MVD) with Division Headquarters at Vicksburg, Mississippi.

The Clean Water Act of 1977 amended PL 92-500 (the Federal Water Pollution Control Act Amendment of 1972). Under Section 404 of the amended act, the Corps has primary responsibility for issuing permits to discharge dredge or fill material into waters of the United States. Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable water of the United States unless recommended by the Corps. MVD districts to the north of St. Louis include St. Paul and Rock Island. To the south, there are Memphis, Vicksburg and New Orleans. The Kansas City District is in

the Northwest Division (NWD) and is responsible for the Missouri River.

Department of Agriculture

In the St. Louis District, the USDA pursues its programs through the NRCS, the Farm Service Agency, the Rural Utilities Services, the Rural Housing Service and Rural Business Cooperative Service. The Farm Service Agency administers the resource conservation programs such as the Conservation Reserve Program and the Environmental Quality Incentives Program. The NRCS conserves and protects resources by reducing soil erosion, improving soil and water quantity and quality, improving and conserving wetlands, enhancing fish and wildlife habitat, reducing upstream flooding, improving woodlands, providing hydrometeorological data for regulating reservoir storage and managing streamflow, and making available new and improved conservation plants for erosion reduction.

Department of the Interior

The mission of the Department of the Interior is to protect and provide access to the nation's natural and cultural heritage. The Department manages the nation's public lands and minerals, national parks and national wildlife refuges. It is responsible for migratory wildlife conservation; historic preservation; endangered species; mapping; and geological, hydrological, and biological science. Bureaus within the Department of Interior include the USFWS, National Park Service (NPS) United States Geological Survey (USGS) and Bureau of Land Management (BLM).

United States Fish and Wildlife Service

The USFWS is responsible for improving and maintaining fish and wildlife resources by proper management of wildlife and habitat. It also helps fulfill the public demand for recreational fishing while maintaining the nation's fisheries at a level and in a condition that will ensure their continued survival. Specific wildlife and fishery resources programs include the following:

- Migratory Birds: Wildlife refuge management for production, migration and wintering, law enforcement, game and bird population, and harvest surveys.
- Mammals and Non-Migratory Birds: Refuge management of resident species, law enforcement, and technical assistance.

The USFWS's mission is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefits on the American people. Within this framework, the USFWS strives to foster an environmental stewardship ethic based on ecological principles and scientific knowledge of wildlife and works within the states to improve the conservation and management of the nation's fish and wildlife resources. The USFWS provides national and international leadership in identifying, protecting and restoring endangered species of fish, wildlife, and plants.

Public use and information programs include preparing leaflets and brochures; operating environmental study areas on USFWS lands; operating visitor centers, self-guided nature trails, observation towers and display ponds; and accomodating hunting, fishing and wildlife photography.

The USFWS's federal aid programs apportion funds generated by excise taxes on sporting arms and fishing equipment to the states and territories for projects designed to conserve and enhance the nation's fish and wildlife resources.

The National Park Service

The National Park Service was established within the Department of the Interior on 25 August 1916.

The National Park Service is dedicated to conserving unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of present and future generation. The National Park Service also administers the following programs:

- The state portion of the Land and Water Conservation Fund,
- Nationwide Outdoor Recreation coordination and information and state comprehensive outdoor recreation planning,
- National Trails System, natural area programs, and
- *National Register of Historic Places*, national historic landmarks and historic preservation.

United States Geological Survey

The United States Geological Survey was established by the Organic Act of 3 March 1879. The USGS provides relevant, objective scientific studies and information used to help address issues and solve problems dealing with natural resources, natural hazards and the environmental effects on human and wildlife health. Among responsibilities of the USGS are:

- Investigating and assessing the nation's land, water, energy, biological and mineral resources.
- Providing information to resource managers in the Department of the Interior in a form that helps them to assess and manage the biological consequences of management practices.
- Establishing a National Geologic Mapping Program.

To attain these objectives, USGS prepares maps and digital and cartographic data; collects and interprets data on energy and mineral resources; conducts nationwide assessments of the quality, quantity and use of the nation's water resources; performs fundamental and applied research in the sciences and techniques involved; and publishes the results of its investigations through new maps, technical reports and publications, and fact sheets.

The Long Term Resource Monitoring (LTRM) Program is managed by the Biological Resources Division of the USGS, being established through the Environmental Management Program (EMP) authorized by WRDA 1986. LTRM data is important to the on-going UMR navigation study that is assessing the impacts of navigation on the river ecosystem.

Bureau of Land Management

The Bureau of Land Management was established on 16 July 1946, by the consolidation of the General Land Office (created in 1812) and the Grazing Service (formed in 1934). The BLM is responsible for subsurface resource management of 300 million acres where mineral rights are owned by the federal government.

The BLM is also responsible for the survey of federal lands and establishes and maintains public land records. It administers a program of payments in lieu of taxes based on the amount of federally owned lands in counties and other units of local government.

The BLM oversees and manages the development of energy and mineral leases and ensures compliance with applicable regulations governing the extraction of the resources. It has responsibility to issue rights-of-way, leases, and permits under its jurisdiction.

Department of Transportation

The Department of Transportation is concerned with highways, railroads, urban mass transit, airports and airways, and public safety on various transportation systems including waterways. Its role is primarily in setting policies for and funding of these systems. The Coast Guard, as one of the agencies in the Department, is directly involved in commercial and recreational boating safety, maintaining the aids to navigation, movement of hazardous material, oil pollution response, commercial vessel licensing and inspecting, and bridge administration. The Federal Highway Administration (FHWA) administers the National Scenic Byways program through the Intermodal and Statewide Highway Program and the State Scenic Byways Coordinator.

U.S. Environmental Protection Agency (EPA)

The Environmental Protection Agency authorities include general water quality management, drinking water safety, solid and hazardous waste disposal, toxic substance management, air quality control, and general environmental quality review. The EPA exercises its authorities primarily through the development of regulations, delegation of programs to state agencies, and funding of environmental quality control programs and projects. Significant EPA interests are those river project activities directly affecting water quality and water supplies. Issues of concern are related to standards setting, and point and non-point source pollution controls (including erosion control). It also includes activities affecting water quality, such as, wetlands; urban, forest, and agricultural land management; dredged materials placement; and transportation and water resource project review.

Federal Emergency Management Administration (FEMA)

The Federal Emergency Management Agency is the central agency within the federal government for emergency planning, preparedness, mitigation, response and recovery. Working closely with state and local governments the agency funds emergency programs, offers technical guidance and training, and deploys federal resources in times of catastrophic disaster. These coordinated activities ensure a broad-based program to protect life and property and provide recovery assistance after a disaster.

Agency programs include response to and recovery from major natural disasters and human-caused emergencies, emergency management planning, floodplain management, hazardous materials planning, dam safety, and multi-hazard planning. Other activities include off-site planning for emergencies at commercial nuclear power plants and the Army's chemical stock pile sites, emergency food and shelter funding for the homeless, plans to ensure the continuity of the federal government during national security emergencies, and federal response to the consequences of major terrorist incidents.

The Federal Insurance Administration (FIA) is also a part of FEMA and manages the National Flood Insurance Program.

Of special importance, the Mitigation Program provides for the development, coordination, and implementation of policies, plans and implementation of policies, plans, and programs to eliminate or reduce the long-term risk to life and property from natural hazards such as floods, earthquakes, hurricanes and dam failures. A goal of this activity is to encourage and foster mitigation strategies at the state and local levels.

State Government Agencies

The States of Missouri and Illinois have responsibilities and authorities in the broad functional areas. Few water resource projects can proceed without directly involving state agencies. State governments delegate or defer certain resource management and development responsibilities to local government and can play an essential middleman role in projects involving combined federal, state, and local resources or interests.

Illinois

The most prominent agency involved in water and related land resources management in the State of Illinois is the Department of Natural Resources (IDNR).

On areas outgranted to the State of Illinois by the Corps, the IDNR missions include environmental compliance, management of recreation and wildlife management areas, boundary maintenance, stream monitoring, biological data collection, erosion and sedimentation control, habitat protection and enhancement, the EMP program, trail development, water safety, visitor assistance and law enforcement, educational events, the Watchable Wildlife program, and the National Great Rivers Museum.

Missouri

The essential state-level authorities for managing Missouri water and related land resources are exercised by the Department of Natural Resources (MDNR) and the MDC.

The MDC is Missouri's equal to the IDNR carrying out much of the same responsibility, but is not involved with stream gauging data collection and the National Great Rivers Museum. The MDNR is involved with trail development, Clean Water Act compliance, stream data collection and archaeological and historic preservation compliance.

Regional entities

These entities are generally involved in programs or activities oriented to a portion of the Upper Mississippi River Region.

Upper Mississippi River Basin Association (UMRBA)

The association was formed by the Governors of the five states of the Upper Mississippi River Basin (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), following the dissolution of the Upper Mississippi River Basin Commission, a federal-state regional planning body. The UMRBA provides a regional interstate forum for the discussion, study, and evaluation of river-related issues of common concern to the states and serves as an advocate of the states' collective interests before Congress and the federal agencies.

Upper Mississippi River Conservation Committee

This Committee was organized in 1943 as a result of an interagency meeting held for the general purpose of "securing recognition of wildlife and recreational use of the river, together with navigation and other public uses, in proportion to the related public benefits."

The Committee was sponsored by the States of Minnesota, Wisconsin, Illinois, Iowa, and Missouri with the encouragement of the USFWS and the Corps. The primary objective of the Committee is to coordinate the resource management activities of the five states bordering the Upper Mississippi River.

The Committee has adopted the following four objectives as part of its constitution:

- Promote the preservation, development, and wise use of the natural and recreational resources of the Upper Mississippi River bordering the states of Minnesota, Wisconsin, Iowa, Illinois, and Missouri.
- Formulate policies, plans, and programs for carrying on cooperative surveys and studies for the above-stated purposes.
- Keep necessary records, and publish and distribute reports.
- Recommend to the governing state entities the furtherance of the objectives of the Upper Mississippi River Conservation Committee.

St. Louis Regional Commerce and Growth Association (RCGA)

The St. Louis Regional Commerce and Growth Association (RCGA) is the Chamber of Commerce and economic development organization for the bi-state St. Louis region. Formed in 1973, RCGA is the result of the merger of three separate organizations; the Chamber of Commerce of Metropolitan St. Louis, the St. Louis Regional Industrial Development Corporation and the St. Louis Research Council.

The following entities also provide coordination, planning, and guidance for portions of the Upper Mississippi Region.

Mississippi River Parkway Commission

The membership of the Mississippi River Parkway Commission (MRPC) includes all states of the Mississippi River main stem, plus various other agencies and interest groups. The MRPC is primarily a tourism-driven organization. Its major mission is directed toward improving opportunities for tourism growth along the Mississippi River corridor from New Orleans to St. Paul.

Alton Lake Heritage Parkway Advisory Commission (ALHPAC)

The Alton Lake Heritage Parkway Commission was established by the General Assembly of the State of Illinois in 1991 to preserve or enhance the quality of the Alton Lake Heritage Parkway. The Parkway is located along the banks of the Mississippi River between the western city limits of Alton, Illinois and Pere Marquette State Park, excluding the City of Grafton. The Commission was mandated to develop a Corridor Management Plan for the Parkway and submit it to the Illinois General Assembly. The ten-member commission is made up of appointed representatives from the communities, townships and counties adjacent to the Parkway.

The Corridor Management Plan was submitted to IDOT and FHWA in December 1997. On 9 June 1998, the Meeting of the Great Rivers Scenic Byway was approved by FHWA in Washington D.C. The byway begins at the Melvin Price Locks and Dam Visitor Center in Alton and extends north along the Great River Road to the town of Eldred and the Village of Kampsville. The byway is 50 miles long.

The Corridor Management Plan was developed by a steering committee consisting of two representatives each from the Alton Lake Heritage Parkway Commission, Madison County, Jersey County, Green County and the Village of Kampsville. The Steering Committee worked for six months developing the Corridor Management Plan, holding public meetings and generating support for the project.

Great Rivers Land Trust

Great Rivers Land Trust is a local non-profit organization dedicated to preserving open spaces, scenic beauty, critical wildlife habitat, and the unique river landscape that is our special heritage. Great Rivers accomplishes this goal through a variety of conservation techniques including donations and acquisitions of key parcels of land.

Illinois River Coordinating Council

Governor Jim Edgar established the twelve-member Illinois River Coordinating Council to coordinate the restoration and management of the Illinois River Watershed. The Council acts to reduce soil erosion and sedimentation, improve water quality and enhance wildlife habitats. The Illinois River Coordinating Council evolved from an Integrated Management Plan that was developed by the Illinois River Strategy Team. The plan consisted of 34 recommendations to improve and restore the watershed. The job of the Coordinating Council is to address those recommendations. The council is chaired by the Lt. Governor and includes seven citizen members, five state agency representatives and ex-officio representatives of six federal agencies. Members are appointed by the governor and serve two-year terms.

Summary

The existing management authorities affecting the river consist of federal and state agencies, cities and counties, and other regional entities. The most geographically extensive efforts are those of the Corps and the USFWS. State management efforts of Missouri and Illinois are directed toward the natural resources of the river corridor. Some of the most effective activity is occurring through regional, local or voluntary efforts. Some examples of local activities are the Alton Lake Heritage Parkway Commission, and the riverfront development efforts of St. Louis, Missouri and Alton, Illinois.

3.4. OUTGRANTS ON PUBLIC LANDS

Table 3 - 3
Lands Leased to States

POOL	Description
Illinois Historic Preservation Agency	
27	Lewis and Clark Memorial Park
Illinois Department of Natural Resources	
26	Glades Access
26	Piasa Creek
26	Pohlman Lake Slough
26	Pere Marquette State Park
26	Royal Landing
26	Stump Lake
26	Michael's Landing
26	Godar Diamond Island
26	Hadley Landing
25	Village of Batchtown
25	Red's Landing
25	Titus Hollow
24	Pleasant Hill
24	Cincinnati Landing
Missouri Department of Conservation	
26	Dresser Island
25	Norton Woods

Outgrants of Corps land to agencies, organizations, businesses or individuals have been made for the purpose of providing access to recreation opportunities, marina services, and assisting riverine related industry. See Paragraphs 2.3 and 3.2 for discussion of General Plan lands and how they are managed.

Recreational Leases

Recreation opportunities in the form of accesses and parks have been developed by state or local governments. The Corps real estate instrument for public recreational areas is the park and recreation lease. *Table 3 - 3* presents recreation areas leased to the States of Illinois and Missouri. State recreation areas range from small access areas to large state parks. It is proposed to remove several areas from the IDNR park and recreation lease and include them as simply a minimal access within the General Plan lands or in Corps areas as stated in the management area descriptions in Section 7. For some areas, the park and recreation lease acreage may be reduced.

Commercial Concession Leases

Commercial concessions on public ground offer marina services for the public. Each marina concession is established with a commercial concession lease. *Table 3 – 4* (page 9) shows commercial concession and non-state recreational areas.

Miscellaneous Outgrants

Recreational Cottages

In 1944, Section 4 of the Flood Control Act authorized the Secretary of the Army to grant leases of lands at water resources development projects for such periods, and upon such terms and for such purposes as the Secretary may deem reasonable in the public interest. As a result of this, the government advertised certain sites along the Mississippi and Illinois Rivers to be developed as recreational cottage sites in the early 1950s. Within the St. Louis District, nearly 800 such leases were advertised and executed, the major intent of which was to provide recreational cottages only, not permanent residences.

In 1965, the St. Louis District ceased granting any new cottage sites leases on project lands in the navigation pools. This action was consistent with Corps policy of discouraging the public from constructing habitable structures in the floodplain.

In 1988, there were 764 privately owned recreational cottages on leased fee-owned lands in Pools 24, 25 and 26. The *MVD Regional Plan Concerning Private Exclusive Use at Navigational Pool Projects*, consistent with Corps policy and the Master Plan, established a prohibition on expansion of private exclusive use and a fair and equitable programmatic effort to phase out such use began. Today, 368 cottage leases remain as shown in *Table 3 – 5*. Of the original 23 subdivisions, only 13 remain with 5 or more active leases. Under existing law, the more well-built and maintained structures are expected to remain indefinitely.

Commercial Industrial Leases

The Rivers Project Office has eight existing commercial industrial leases totaling approximately 810.93 acres as shown in *Table 3 – 6*. The use of these leases range from docking and loading facilities to multi-purpose industrial development.

These lands have been leased to commercial entities for many years. As such, these lands have been effectively reduced to perpetual private exclusive use and are not available for other uses, nor are they available for general public use.

In addition, the Corps administrative procedures are often seen as cumbersome for the for-profit tenants. Lessees sometimes are required to duplicate forms, inspections and tests already requested by other licensing agencies. In some instances, Corps regulations are in conflict with more stringent ones required by agencies that directly regulate the specific activity.

For the above reasons, it is the policy of the Rivers Project Office and the St. Louis District to refrain from entering into any new industrial leases. Furthermore, the Corps plans to reduce or eliminate existing industrial leases through methods such as land exchange or disposal as best supports federal and public interests.

Table 3-4
Commercial Concessions and

POOL	Description
	Commercial Concessions
26	Alton Motorboat Club, Inc.
26	Club Sherwood Marina, Inc.
26	Western Boats and Motors, Inc.
24	Lighthouse Inn, Inc.
24	Two Rivers, Marina
	Non-State Public Park and Recreation Area
26	Alton Riverfront (City of Alton)
	Other Recreation
26	Boys and Girls Club of Alton

Table 3-5
Recreation Cottage Leases in the Project Areas

	Cabin Leases	Industrial Leases
Pool 24	51	3
Pool 25	7	
Pool 26	310	1
Pool 27		4
Kaskaskia		
Total	**368**	**8**

Table 3-6
Industrial Leases in the Project Area

POOL	Lessee	Acres
27	Tri-City Regional Port District	43.790
27	Tri-City Regional Port District	5.054
27	Tri-City Regional Port District	217.316
27	Continental Oil Company (Conoco)	2.260
26	AmerenUE	227.380
24	SSS Lumber, Inc.	6.820
24	Dyno-Nobel, Inc.	15.310
24	Holnam, Inc.	293.000
TOTAL		**810.930**

Easements

Flowage, operational and utility easements have been established for the Rivers Project. Twenty-four flowage easements were purchased for improvement of the river for navigational purposes. These easements provide the right to overflow, permanently or intermittently, to excavate and remove material, and to cut, remove and dispose of all timber and other natural or artificial obstructions which shall at any time and in any manner interfere with use of said land for navigation purposes. Seven operations easements were acquired to permit the use of certain lands for the operation of facilities, i.e., near Dam 27. Many utility easements including pipeline, telephone, electric, etc. are located throughout the project.

3.5. NAVIGATION INTERFACE

Federal interest in navigation is established by the Commerce Clause of the Constitution, and subsequent court decisions, defining the right to regulate navigation and improvement of the navigable waterways.

The navigable waters are important to the nation as a major means of commercial transportation and as a part of national defense.

Navigation operations interface with other project purposes in various ways. Manipulation of pool levels affects shoreline vegetation and recreation facilities such as marinas. An environmental pool management program (EPM) has been instituted to make pool level changes that enhance shoreline habitat when possible. Marinas located near the locks and dams may experience water level perturbations that require floating operations. Dredging to keep the main channel open for navigation can result in island creation. These islands can serve uses such as Least tern habitat or as a location for recreational day use. Recreational boating use on the pools is significant in the summer months although recreational boat use of the Mississippi locks is minimal while recreational lockages on the Kaskaskia River are high. Barges traveling the river require areas for temporary stops, i.e. fleeting areas. The industry is developing specially designed river buoys and land anchors for these fleeting areas.

Several programs associated with navigation have been developed for environmental restoration:

- The Avoid and Minimize (A&M) Program was implemented to reduce possible environmental impacts of increased river navigation traffic due to the addition of the second lock at Melvin Price Locks and Dam;
- Section 1135 of WRDA 1986 recognizes the potential of modifying existing Corps project structures or their operations for the purposes of providing environmental benefits in the public interest;
- Section 205, WRDA 1996 is a continuing authorities program (CAP) that makes money available for environmental dredging as part of O&M for federal navigation projects;
- Section 204, WRDA 1992 is another CAP that provides protection, restoration and creation of aquatic and wetland habitats; and
- The Environmental Management Program's Long Term Resource Monitoring Program provides useful data on the environmental health of the Upper and Middle Mississippi River.

Navigational Servitude

Navigational Servitude is defined by 33 CFR Ch. II, Part 329 as the "constitutional power given to the federal government to regulate

navigable waters" for the purposes of improving and regulating navigation. It includes submerged lands and water flowing over them and also pertains to all lands below the ordinary high water mark of a navigable river. Servitude is a concept of power, not of property and expresses the notion that the right of the public to use a waterway supersedes any claim of private ownership.

Locks and Dams

The Locks and Dams are operated by the Corps and regulated as described below. The Corps manages the projects to meet navigation needs in an environmentally responsible manner.

Dams were authorized on the Mississippi for the sole purpose of providing sufficient pool to allow navigation. This resulted in the creation of pools behind the dams and their exploitation for recreational activities. Dredging to maintain the navigation channel has resulted in the development of some islands for environmental and recreational purposes. Environmental restoration projects have been developed to mitigate for the impacts of navigation. The five navigation structures on the Mississippi and Kaskaskia Rivers have permitted the transport of over 200 million tons of cargo annually for the benefit of commerce and regional economic development. Many agencies, organizations and businesses are participating in the development and management of the Mississippi River.

Pool Regulation

The pools are regulated by means of 'control points.' These are points on which the pool level is tilted when the inflow increases above a certain amount. At the dam, the pool is fluctuated between regulated maximum and minimum elevations.

For example, the maximum and minimum regulated pool elevations at Dam 24 are 449.0 feet and 445.5 feet NGVD, respectively. The 'control point' is at Louisiana (RM 282.9), where the maximum and minimum regulated pool levels are elevations 449.5 and 448.8 feet NGVD respectively. As the inflow increases, the pool stage is lowered at the dam by gradually increasing the gate openings to maintain the level at Louisiana within the prescribed control limits until, at the dam, the pool is lowered to elevation 445.5 feet NGVD. As inflow continues to increase, the gates are opened further to pass the increased flow until the tailwater elevation equals pool elevation. When this occurs, at a flow of approximately 146,000 cubic feet per second (cfs), the gates are lifted entirely out of the water resulting in 'open river' conditions. After the crest has passed and the inflow decreases, the procedure is reversed; the gates are in operation again when the pool falls to elevation 445.5 feet NGVD. This elevation is held until the 'control point' returns to within the prescribed limits. Operating within the control point limits, 'maximum pool' elevation is regained when the flow is less than 75,000 cfs.

Table 2 – 1 (page 1) and Table 2 – 2 (page 6) in Section II summarize project and operational data for Navigation Pools 24, 25, 26, Locks 27 and Kaskaskia Lock and Dam.

Channel Maintenance

The UMRS within the St. Louis District is composed of commercially navigable portions of the Mississippi, Illinois and Kaskaskia Rivers. It is a major resource affecting both regional and national economies. In 1930, Congress authorized the Corps to maintain a nine-foot navigation channel. The channel and the locks and dams that were subsequently built to improve navigation between Saverton, Illinois, and Cairo Illinois, have made large scale waterborne commerce possible on the river. The St. Louis District coordinates with affected agencies regarding dredging

locations and proposed disposal sites. Agency representatives occasionally recommend alternative disposal sites.

See Paragraph 2.2 for further information on dredging operations.

Avoid and Minimize

In October 1992, the St. Louis District issued Design Memorandum 24 (DM 24), "Avoid and Minimize Measures." DM 24 was developed as a commitment made in the Record of Decision (signed in 1988) for the Melvin Price Locks and Dam Second Lock Environmental Impact Statement to avoid and minimize possible environmental impacts as a result of increased navigation traffic. The implementation program was funded from 1996 to 2002 through the Operation and Maintenance (O&M) budget.

The Avoid and Minimize Program is a cooperative effort among the conservation agencies of Illinois and Missouri, USFWS, River Industry Action Committee (RIAC), and the Corps. One of the current efforts of this group is to preserve and enhance through structural or other modifications the 23 side channels in the open river portion of the Mississippi River. These unique habitats are vital to the overall health of the aquatic communities of the river ecosystem.

Environmental Management Program

The Environmental Management Program was authorized by Congress in 1986 along with the second lock at Melvin Price Locks and Dam. Funding for this program was provided to evaluate the ecological health of the river and long-term monitoring of those conditions (LTRM), the navigation system impacts, and recreational use patterns and facilities. Additional purposes included developing a 50-year plan for the navigation system and expansion as justified, and to engineer and construct Habitat Restoration and Enhancement Projects (HREP). Many projects have been completed and are operational. See Paragraph 8.6 for more detail.

Other agencies and organizations involved:

Coast Guard

The Coast Guard is directly involved in the promotion of commercial and recreational boating safety, maintenance of the aids to navigation, movement of hazardous material, oil pollution response, commercial vessel licensing and inspection, and bridge administration.

Tri-City Regional Port District (TCRPD)

The Tri-City Regional Port District is the inland river port located within the Illinois portion of the St. Louis Metropolitan Area. The TCRPD, created by the Illinois legislature in 1959, has a prime directive to promote transportation, and industrial and commercial activities within its territory. The legislature created the TCRPD as a political subdivision of the state with necessary and attendant powers to accomplish its directive.

Kaskaskia Regional Port District (KRPD)

The Kaskaskia River Port District was created by the Illinois Legislature in 1965. This agency has the charge of promoting industrial uses along the waterway, plus identifying and assisting in development of specific sites. The KRPD is a political subdivision of the State of Illinois and is responsible for much of the rules, regulations and guidelines necessary for development to occur.

Fleeting

When barges are not in use for hauling commodities they are sometimes parked along the river shoreline. The temporary parking of barges along the river shoreline is known as fleeting. Fleeting areas are analogous to railroad yards where cars are temporarily stored and trains are assembled and disassembled. Fleeting occurs on private as well as public land. Fleeting on public land is regulated by the agency's shoreline management plan. Fleeting that occurs on private land is regulated by the Section 404 and Section 10 environmental laws. The St. Louis District Corps of Engineers will develop a shoreline management plan for the Mississippi and Illinois Rivers after the approval of this Master Plan.

SECTION IV

REGIONAL DESCRIPTION AND FACTORS INFLUENCING DEVELOPMENT

4.1. INTRODUCTION

General

This section provides an overview of the demographic, economic, recreational and environmental resources of the project area. The topics covered are population characteristics, distribution and trends, economic conditions, educational opportunities, transportation systems, climatic conditions, hydrological conditions, land-use, ecological resources, aesthetic qualities, geology and soil characteristics, archaeological and historical resources and recreation characteristics.

Zone of Influence

A 150-mile radius zone of influence (reference *Plate Z-1*) centered at Alton has been adopted for purposes of this Master Plan. This zone includes the large metropolitan complex of Greater St. Louis and most of southern and west central Illinois and east central and southeastern Missouri. With the population within the 150-mile zone estimated at 3.5 million, the area is generally typical and characteristic of the Midwest adjacent to the Mississippi Valley. The St. Louis Metropolitan Statistical Area (MSA) on both sides of the Mississippi River represents the significant concentration of both population and industry and is within the 50-mile primary zone of influence. The remainder of the 150-mile zone is primarily agricultural in nature with numerous small cities, towns and villages offering commodities and services. The area is well served by freight rail, road systems, truck lines and inland navigable rivers.

4.2. DEMOGRAPHICS-URBAN AND RURAL:

Summary of entire region

The Rivers Project Service area extends from Hannibal, Missouri, to Cairo, Illinois, on the Mississippi River; from La Grange, Illinois, to Grafton, Illinois, on the Illinois River; from Fayetteville, Illinois, to the Modoc, Illinois, area on the Kaskaskia River and from Augusta, Missouri, through North St. Louis County on the Missouri River. A total of 27 counties in Missouri and Illinois are within the Rivers Project service area corridors. The St. Louis Metropolitan Area, with twelve counties, is the population and economic hub of the region and has, by far, the most influence on the Rivers Project operations. The St. Louis area accounts for approximately 89 percent of the Rivers Project area population. The rural counties both upstream (six counties) and downstream (nine counties) of the St. Louis Metropolitan Area account for only 11 percent of the regions' population and are primarily agricultural areas that are either losing population or growing slowly at best. The Cape Girardeau, Missouri, area is the only significant and growing population center on the River Corridor outside of the St. Louis area.

Table 4-1

St. Louis MSA Facts-(1996 Data)

Population	2,562,500
Media market population	2,978, 000
U.S. population within 500 miles	33%
Number of households	960,000
Area (square miles)	6,397
Labor Force	1,362,800
Unemployment rate	4.5
High-tech work force	151,000
Total income	$66 billion
Retail Sales	$24 billion
Colleges and Universities	12
Cost of living index (U.S.=100)	98.7

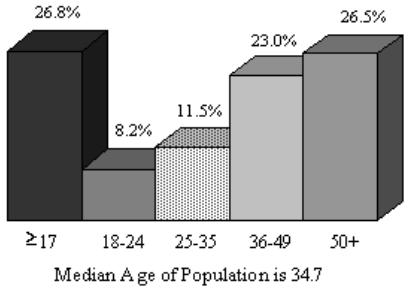
St. Louis Metropolitan Statistical Area (MSA) Populations

History and Trends.

The St. Louis MSA is a bi-state region comprising 12 counties, five in Illinois and seven in Missouri. It is the 18th most populous metropolitan area in the U.S. The St. Louis MSA has a stable, slow-growing population of approximately 2,562,500 as of 1996, an increase of almost 3 percent since the 1990 census.

Since 1930, the St. Louis MSA has gained more than a million people. The City of St. Louis' share of that total has decreased from 55 percent to about 14 percent. Typical of old cities, the city has experienced steady population losses during the 1980s and 1990s in virtually all major categories of population, housing, and economic activity. The average number of persons per household in the city fell from 2.5 to 2.35 during the 1980s, while one-person households increased from 36 percent in 1980 to 39.5 percent in 1990. The city slowed its loss to 6.7 percent for the first half of the 1980s, which may indicate a leveling off of population loss at 14 percent per decade. However, St. Louis is still among those cities losing proportionally the most population in the 1990s. Demographers for the State of Missouri currently estimate that the city's population in 2020 could be between approximately 223,000 and 277,000, depending on which trend variables are considered.

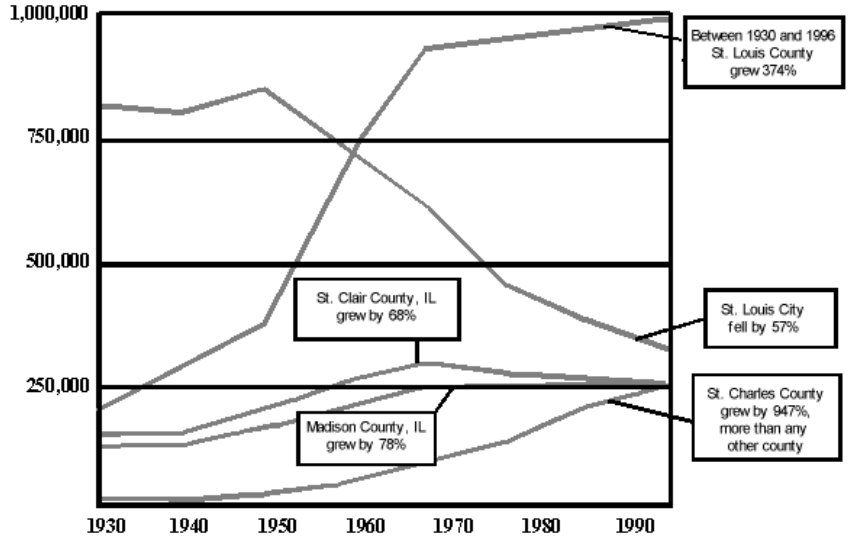
Table 4-2
Age Distribution-(1996 Data)



The outlying MSA counties in Missouri show significant, and at times spectacular, growth patterns which began in approximately 1970, with St. Charles County being one of the fastest growing counties in the United States with a growth rate of over 229 percent since 1970. Since 1990 alone, St. Charles County has grown an additional 30 percent. Warren and Lincoln Counties have also become increasingly urbanized, growing in population by 24.5 percent and 23 percent respectively.

The Illinois portion of the St. Louis MSA has approximately 600,000 inhabitants, or 24 percent of the total MSA. The five Illinois counties included in the St. Louis MSA are estimated to have gained 13,000 residents between 1990 and 1997, an increase of approximately 2.2 percent. Monroe County, with an estimated increase of 10.6 percent, is the fastest growing part of the MSA in Illinois.

Table 4-3
Comparative Population Growth, St. Louis MSA 1930-1996



Rivers Corridor Populations

Table 4 – 2 through *Table 4 - 10* provides population data for the Rivers Project Service Area. Existing populations, growth trends and population summaries for the 27 counties and more than 60 cities, towns and villages along the Rivers are documented.

Table 4–4
Population Change 1980-2000, St.. Louis Metropolitan Statistical Area (Population exceeding 2 Million)

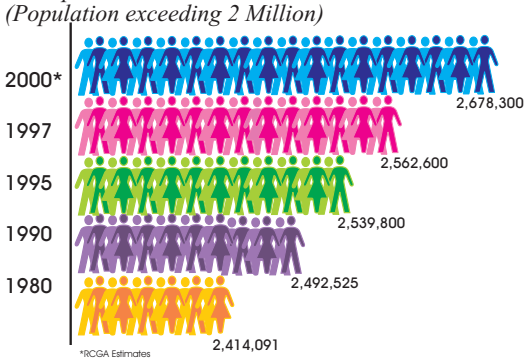


Table 4-5
St. Louis Population by County, 1997 Estimates

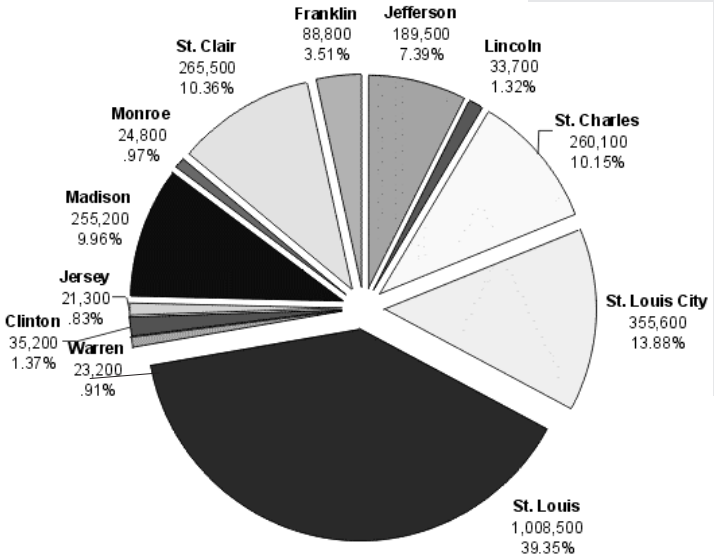


Table 4-6
1980 - 2000 River Corridor Population by County

RIVER(S) CORRIDOR COUNTY AND STATE	POOL(S) NO. OR OPEN RIVER(OR)	1980 CENSUS (000)	1990 CENSUS (000)	% OF TOTAL REGION POPULATION	% CHANGE 1980-1990	1995 CENSUS (000) (96,97,98)	% CHANGE 1990-1995	% TOTAL OF RIVER CORRIDOR POP.	2000 PROJECTED POP.
Ralls, MO	24	8.98	8.47	0.29	-5.7	8.9	5.1	0.31	6
Pike, MO	24,25	17.57	15.97	0.56	-9.1	16.17	1.3	0.56	—
Pike, IL	24 IL River (26)	18.87	17.59	0.62	-0.7	17.3	-0.2	0.60	17.22
Calhoun, IL	25 IL River (26)	5.89	5.32	0.18	-1.0	4.97	0.6	0.17	5.57
Scott, IL	IL River (26)	6.09	5.65	0.19	-0.8	5.64	-0.1	0.19	5.5
Greene, IL	IL River (26)	16.68	15.33	0.54	-0.8	15.65	-0.1	0.54	15.24
Jersey,IL (MSA)	26	20.6	20.54	0.73	-0.3	21.3	3.5	0.74	21.13
Lincoln, MO (MSA)	25,26	22.2	28.89	1.02	30.0	34.12	18.1	1.18	—
St.Charles, MO (MSA)	26, MO River	144.1	212.75	7.5	47.7	255.06	19.9	8.83	—
Madison, IL (MSA)	26,27	247.65	249.58	8.82	0.77	255.2	2.2	8.83	259.17
St.Louis, MO (MSA)	27, OR, MO River	974.17	993.51	35.15	2.0	1003.81	1.0	34.76	—
St.Louis City (MSA)	27, OR	452.8	396.80	14.04	-12.4	351.6	-11.4	12.17	—
Warren, MO (MSA)	MO River	14.9	19.53	0.69	31.1	22.87	17.1	0.79	—
Franklin, MO (MSA)	MO River	71.23	80.60	2.85	13.2	89.48	11.0	3.1	—
St.Clair, IL (MSA)	OR, Kaskaskia	267.74	263.30	9.3	-1.6	265.5	1.0	9.2	264.5
Clinton, IL (MSA)	Kaskaskia	32.79	34.00	1.12	3.5	35.2	0.4	1.2	36.43
Monroe, IL (MSA)	OR, Kaskaskia	20.2	22.40	0.79	9.8	24.8	10.6	0.86	27.8
Jefferson, MO (MSA)	OR	146.18	171.38	6.06	17.2	188.86	10.2	6.5	—
St.Genevieve, MO	OR	15.18	16.04	0.56	5.6	16.85	5.1	0.58	—
Randolph, IL	OR	35.55	34.61	1.22	-2.5	34.29	0.3	1.2	35.32
Perry, MO	OR	16.78	16.65	0.58	-0.8	17.43	4.7	0.60	—
Jackson, IL	OR	61.72	61.19	2.16	-0.1	61.19	-0.2	2.12	59.74
Cape Girardeau, MO	OR	58.84	61.63	2.18	4.8	65.72	6.6	2.27	—
Union, IL	OR	17.78	17.63	0.63	-0.1	17.99	-0.3	0.62	17.21
Scott, MO	OR	39.65	39.37	1.39	-0.7	40.24	2.2	1.39	—
Alexander, IL	OR	12.28	10.64	0.37	-1.4	10.36	-0.8	0.36	9.83
Pulaski, IL	Cache & Ohio Rivers	8.79	7.53	0.26	-1.5	7.40	-0.8	0.25	6.94
Total		2755.21	2826.90	~100%	+2.5	2879.00	+2.14	~100%	—

– Unavailable

Table4-7
Population and Percent Total Population by State

	MISSOURI	ILLINOIS
Upstream Rural	25,074 (.86%)	43,550 (1.5%)
St. Louis SMA	1,945,800 (67.37%)	602,000 (20.84%)
Downstream Rural	140,246 (4.8%)	131,233 (4.54%)
TOTAL	2,111,120 (73%)	776,783 (26.9%)
Total Both States	(2,887,903)	

Figure 4-8
Rivers Corridor Population Summary(1995 Data)

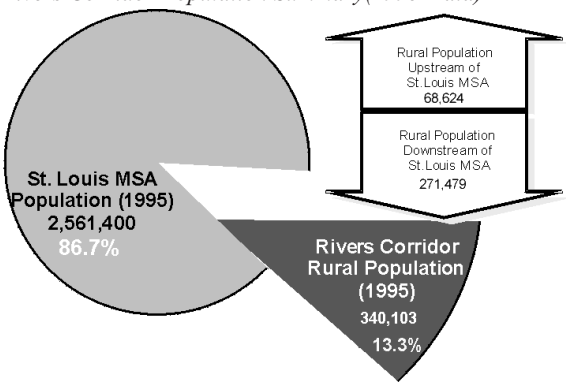


Figure 4–9
Rural Statistical Population by Counties

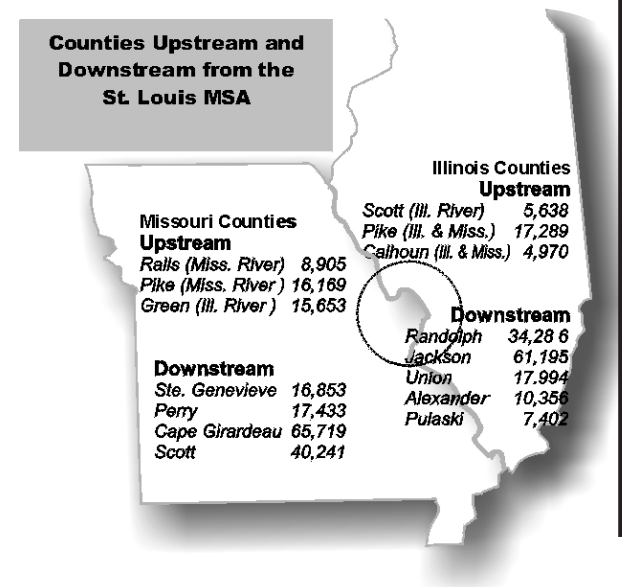


Table 4-10
Populations of Municipalities on the River Corridors

	1990	1996	% CHANGE
POOL 24			
Louisiana, MO	3,967	3,851	- 3.0
Clarksville, MO	480	493	+ 2.6
Pleasant Hill, IL	1,030	1,024	- 0.5
POOL 25			
Annada, MO	70	69	- 1.4
Elsberry, MO	1,898	2,159	+12.1
Foley, MO	209	202	+ 5.8
Winfield, MO	672	785	+14.4
Belleview, IL	–	–	–
Mozier, IL	–	–	–
Hamburg, IL	150	140	- 7.1
Batchtown, IL	225	212	- 6.1
POOL 26 Mississippi River			
Peruque, MO	–	–	–
Portage Des Sioux, MO	503	495	- 1.6
West Alton, MO	–	–	–
Chatauqua, IL	–	–	–
Elsah, IL	851	820	- 3.7
Alton, IL	33,064	31,562	- 4.75
East Alton, IL	7,063	6,779	- 4.2
POOL 26 Illinois River			
Meredosia, IL	1,134	1,086	- 4.4
Naples, IL	130	115	- 13.0
Valley City, IL	23	22	- 4.5
Florence, IL	45	46	+ 2.1
Montezuma, IL	–	–	–
Bedford, IL	–	–	–
Pearl, IL	177	174	- 1.7
Hillview, IL	271	278	+ 2.5
Kampsville, IL	399	380	- 5.0
Hardin, IL	1,071	1,021	- 4.9
Brussels, IL	125	115	- 8.7
Grafton, IL	918	890	- 3.15
POOL 27			
Wood River, IL	11,490	11,097	- 3.5
Hartford, IL	1,676	1,604	- 4.48
Granite City, IL	32,766	31,449	- 4.18
OPEN RIVER			
St. Louis, MO	396,685	351,565	- 12.8
East St. Louis, IL	40,944	38,595	- 6.1
Cahokia, IL	17,550	16,803	-4.4
Dupo, IL	3,164	3,088	-2.46
Valmeyer, IL	897	986	+9.0
Kimmswick, MO	135	136	+.7
Barnhart, MO	–	–	–
Pevely, MO	2,831	2,914	+2.8
Herculaneum, MO	2,263	2,368	+ 4.4
Festus, MO	8,105	8,353	+2.9
Crystal City, MO	4,088	3,973	-2.9

Populations of Municipalities on the River Corridors (Cont.)

Ste. Genevieve, MO	4,411	4,666	+5.46
St. Marys, MO	461	517	+ 10.8
Kaskaskia, IL	32	32	0
Prairie du Rocher, IL	602	574	-4.8
Chester, IL	8,204	7,970	-2.9
Perryville, MO	6,933	7,439	+6.8
Cape Giradeau, MO	34,475	35,438	+2.7
Scott City, MO	4,292	4,413	+2.7
Rockwood, IL	45	45	0
Gorham, IL	290	291	0
Grand Tower, IL	775	765	-1.2
E. Cape Giradeau, IL	451	425	-5.7
Thebes, IL	461	426	-7.5
Cairo, IL	4,846	4,496	-7.2
Kaskaskia River			
Evansville, IL	844	803	-4.8
New Athens, IL	2,010	1,974	+1.7
Fayetteville, IL	371	373	+1.0

– Unavailable

4.3. EDUCATIONAL INSTITUTIONS STATISTICS AND TRENDS

Introduction

Interpretive services, educational outreach and school partnerships with educational institutions are important missions for the Rivers Project Office.

The following summary of schools and universities throughout the Rivers Project Service Area is provided to assist in identifying the regional scope of opportunities for program development and execution.

St. Louis Metropolitan Area Educational Resources

Elementary and Secondary Schools

The Greater St. Louis region offers education to more than 480,000 elementary and secondary students. More than 25,000 high school students graduate each year in the St. Louis area, ready to enter college or become members of the area's work force.

One hundred fifteen public school districts from urban magnet schools to suburban systems educate more than 400,000 students

Over 300 private and parochial schools educate more than 80,000 students.

The St. Louis area's average ACT score of 22.9 is significantly higher than the national average of 20.8.

Figure 4–11
Educational Attainment of Persons Age 25 and Older

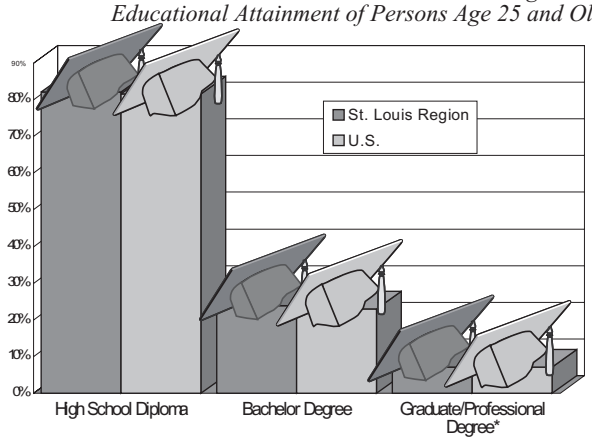
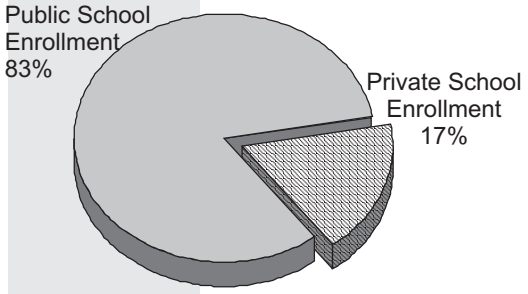


Figure 4–12
Comparison between Public and Private School

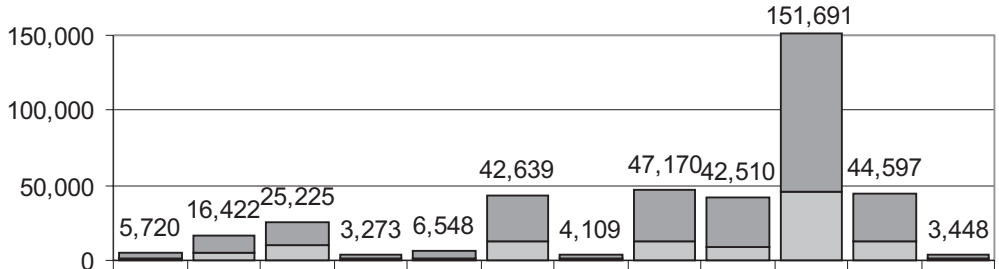


Higher Education

Approximately 120,000 students are enrolled in higher education through the twelve colleges and universities, eight community colleges and more than 50 vocational-technical schools in the Greater St. Louis area. More than 8,000 bachelors degrees and 5,000 associates degrees are earned each year.

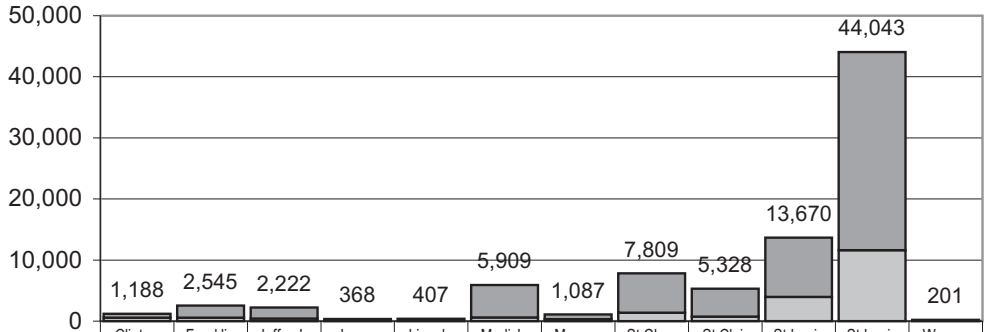
Washington University in St. Louis is among the top ranking major national universities. Saint Louis University and Webster University are among the area's other major private institutions of higher learning. The University of Missouri-St. Louis and Southern Illinois University at Edwardsville are the region's largest public universities.

Figure 4-13
Elementary and Secondary Public School Enrollment by County-St. Louis MSA



	Clinton County	Franklin County	Jeffers'n County	Jersey County	Lincoln County	Madis'n County	Monroe County	St.Clair County	St.Louis City	St.Louis County	St.Chas County	Warren County
Total	5,720	16,422	25,225	3,273	6,548	42,639	4,109	47,170	42,510	151,691	44,597	3,448
Elementary	4,313	11,520	15,226	2,205	4,685	29,498	2,791	33,867	33,176	106,517	31,918	2,481
Secondary	1,407	4,902	9,999	1,068	1,863	13,141	1,318	13,303	9,334	45,174	12,679	967

Figure 4-14
Elementary and Secondary Private School Enrollment by County - St. Louis MSA



	Clinton County	Franklin County	Jeffers'n County	Jersey County	Lincoln County	Madis'n County	Monroe County	St.Chas County	St.Clair County	St.Louis City	St.Louis County	Warren County
Total	1,188	2,545	2,222	368	407	5,909	1,087	7,809	5,328	13,670	44,043	201
Elementary	633	1,983	1,796	368	407	5,320	786	6,427	4,582	9,696	32,414	201
Secondary	555	562	426	0	0	589	301	1,382	746	3,974	11,629	0

Table 4-15
University and College Enrollment and Conferred Degrees

	Full Time	Part Time	Total	Bachelor Degrees
Missouri				
Fontbonne College	997	297	1,294	249
Harris-Stowe State College	759	964	1,723	137
Lindenwood University	2,664	227	2,891	442
Maryville University of St. Louis	1,242	1,464	2,706	611
Missouri Baptist College	751	1,672	2,423	127
University of Missouri-St. Louis	5,082	8,148	13,230	1,680
Saint Louis University	4,822	4,034	8,956	1,142
Washington University	5,059	985	6,044	1,370
Webster University	1,681	1,567	3,248	821
Illinois				
McKendree College	887	731	1,618	390
Principia College	546	19	565	113
Southern Illinois University-Edwardsville	8,769	4,278	13,047	1,369

Sources: State of Illinois Board of Higher Education; Board of Education's Fall Enrollment Survey, 11396.
State of Illinois Board of Higher Education; Higher Education Data Book, 1996.
Missouri Coordinating Board for Higher Education.

Table 4-16
Community and Two-Year College Enrollment and Conferred Degree

	Full Time	**Part Time**	**Total**	**Associate Degrees**
Missouri				
East Central College	1,153	1,896	3,049	233
Jefferson College	1,846	2,088	3,934	425
St. Charles County Community College	1,407	3,250	4,657	279
St. Louis Community College (3 branches)	8,443	18,014	26,457	1,935
Forest Park SLACC	1,611	4,664	6,275	471
Meramec SLACC	4,590	8,208	12,798	848
Florissant Valley SLACC	2,242	5,142	7,384	616
Illinois				
Southwestern Illinois College	3,923	10,000	13,923	1,243
Kaskaskia College	1,393	1,523	2,916	447
Lewis and Clark Community College	1,744	3,559	5,303	439
Metropolitan Community College	362	524	886	113

Sources: State of Illinois Board of Higher Education; Board of Education's Fall Enrollment Survey, 11396.
State of Illinois Board of Higher Education; Higher Education Data Book, 1996.
Missouri Coordinating Board for Higher Education.

Table 4–17
Total College Enrollment and Conferred Degrees

	Total Enrollment	**Part-Time Enrollment**	**Bachelors Degree**	**Associates Degree**
Universities and Colleges:	57,645	24,386	8,451	—
Two-Year/Community Colleges:	61,125	40,854	—	5,114

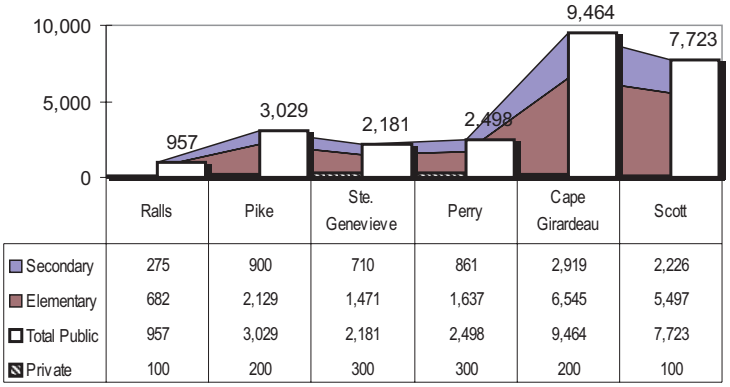
Table 4–18
Graduate and Professional School

GRADUATE SCHOOLS	PROFESSIONAL SCHOOLS
Missouri	**Missouri**
Fontbonne College	Logan College of Chiropractic
Lindenwood University	Saint Louis University School of Law
Maryville University	Saint Louis University School of Medicine
Saint Louis University	St. Louis College of Pharmacy
University of Missouri-St. Louis	University of Missouri-St. Louis School of Optometry
Washington University	Washington University School of Law
Webster University	Washington University School of Medicine
Illinois	**Illinois**
Southern Illinois University - Edwardsville	Southern Illinois University - Edwardsville School of Dental Medicine

Rural County School Statistics

The Missouri rural rivers corridor counties average 2,200 elementary and secondary students per county except for Cape Girardeau and Scott counties which average 8,600 elementary and secondary school students. Southeast Missouri State University is the only educational institution in the rural Missouri counties in the project area.

Figure 4-19
Enrollment by County - Missouri



The Illinois Rivers Corridor counties average 2,400 elementary schools and secondary students per county except for Jackson and Randolph Counties which average 7,200 elementary and secondary students. Jackson County is the only rural county with Significant Higher Education Institutions having both Southern Illinois University at Carbondale and John A. Logan Community College.

Figure 4-20
Enrollment by County - Illinois

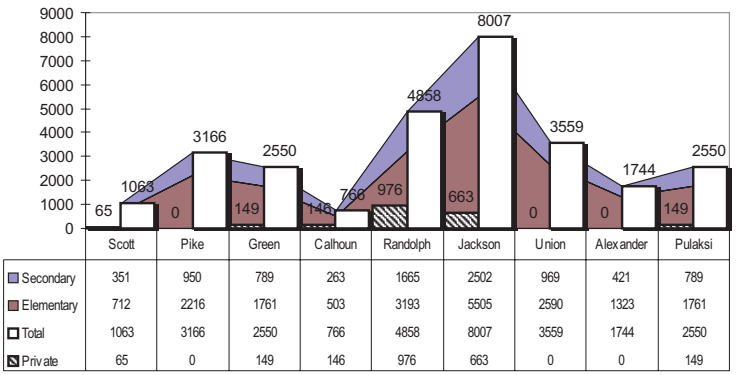


Table 4-21
Rural County Higher Education Institutions

	Full time	Part-time	Total	Under-graduate	Graduate
Illinois					
Southern Illinois University - Carbondale, Jackson County, IL	18,1666	4,085	22,251	17,939	4,312
John A. Logan Community College Carterville, Jackson County, IL	2,576	3,587	6,163		
Shawnee Community College Ullin, Pulaski County, IL	695	1,005	1,700		
Missouri					
Southeast Missouri State University Cape Girardeau County, MO	5,620	2,880	8,500	7,023	703

Source: Illinois Board of Higher Education, 1998. Missouri Coordinating Board fir Higher Education, 1998

4.4. REGIONAL TRANSPORTATION

St. Louis Transportation Resources

St. Louis MSA occupies a central location on the interstate highway system, the national rail system and the inland waterway system, making the region an important national freight and transportation hub.

Road Transportation

Highways Serving The Greater St. Louis Region:

Highway access in the region includes four interstate highways, I-44, I-55, I-64 and I-70, and four interstate linkages, I-255, I-170, I-270 and I-370, covering 325 miles of the MSA. There are also four federal highways and 34 state highways.

Some major transportation highway improvements recently built in the St. Louis area include the Highway 370 project in St. Charles County to relieve congestion at the Boone Bridge between St. Charles and St. Louis counties, and the Clark Bridge over the Mississippi River improving the connection between Alton, Illinois, and St. Louis and St. Charles Counties in Missouri. A new Mississippi River Bridge is now being designed to dramatically improve traffic flow between downtown St. Louis and Illinois and to facilitate future growth.

Public Transportation

MetroLink Light Rail System

Opened in 1994 to reduce commuter traffic congestion, MetroLink provides daily service to 37,000 riders, connecting Lambert Airport, to downtown St. Louis and East St. Louis Illinois. It is now expanding service to Mid-America Airport in Illinois. MetroLink served 12.9 million riders in 1996. More branch routes are being planned throughout the Metropolitan area.

Bus Service

Approximately six hundred active Bi-State and Madison County Transit buses driving 120 fixed routes serve much of the St. Louis area, providing 37.4 million rides a year, with an average daily passenger volume of 126,000.

Motor Freight Service

The St. Louis region has a large trucking industry. More than 8,000 trailers with 16,000 tons of capacity are based in the area. Approximately 200 active trucking firms operate regularly, with local, statewide, and national firms represented.

Railroads Serving St. Louis

St. Louis ranks second in the nation for railroad-related jobs and third in rail lines. Eleven major railroad companies and eight intermodal rail transfer terminals are located in the area. The major commodities passing through the region move primarily east to west. Rail freight in the region consists mainly of coal, farm products, food and transportation equipment.

Air Transportation

Nine dedicated freight airlines and twenty-five passenger airlines at Lambert-St. Louis International Airport in St. Louis County provide overnight/same day delivery of critical freight, such as seafood, postal mail, deliverable packages, and machinery parts. Over 63,000 tons of cargo annually pass through Lambert. The Lambert International Airport currently meets the commercial air transportation needs of the majority of the area. However, Mid-America Airport, a recently built commercial airport adjacent to Scott Air Force Base in Illinois, is a joint military-private commercial use airport which is only 20 miles from the river and downtown St. Louis. Its growth and impact on the region is expected to be significant in the future.

Table 4-22
St. Louis Port Summary Facts

Barge lines	Served by all major barge lines
Facilities	More than 100 docks and terminal facilities
Channel	9' guaranteed (2.7 meters), 12-15' operational
Channel width	300' (91.4 meters)
Season	Year-round

Table 4-23
Goods Passing Through the Port of Metropolitan St. Louis, 1995

Commodity	Thousands of Tons
Coal	10,727
Petroleum and Petroleum Products	4,703
Chemicals and Related Products	1,486
Crude Materials	2,511
Primary Manufactured Goods	2,729
Total Food and Farm Products	7,951
Manufactures Equipment, Machinery and Products	31
Total	30,138

Source: Waterborne Commerce of the United States, Calendar Year 1995; Part 2-Waterways and Harbors-Gulf Coast, Mississippi River System and Antilles; U.S. Army Corps of Engineers Water Resources Support Center.

Water Transportation

Historically, water transportation has been a key factor in the development of the economic strengths of the area.

The volume of commodities carried on the River has grown from about two million tons in 1940 to approximately 80 plus million tons in the 1990s, a 4000 percent increase. (See *Table 4-23 St. Louis District Locks and Dams Tonnage Statistics, Figure 4-24* and *Table 4-25*.) The Nine-Foot Navigation Channel Project, the development of large diesel tow-boats and the large capacity of barges has made this growth possible. Fleeting areas and terminals have been developed adjacent to the navigation channel to accommodate barges and facilitate the transfer of cargoes to other modes of transportation.

The navigation channel is used largely for conducting commerce by moving material and commodities to and from locations remote to this region of the Mississippi River. Petroleum products are shipped upstream from the Gulf Coast, primarily Texas and Louisiana. Coal is shipped in large quantities from Central and Southern Illinois and Western Kentucky. Grain is a principal downbound product earmarked largely for the export market. Scrap metal ranks second to grain in downbound tonnage.

Products delivered or picked up by barges in the region are building stone, lime, sand and gravel: grain and soybean products; steel products, pipe, wire and scrap metal; coal, fuel oil and asphalt; fertilizer products and vinyl acetate; and timber.

Inland Waterways and The St. Louis MSA

The Port of Metropolitan St. Louis plays a key role in meeting the bulk transportation needs of Greater St. Louis and the Midwest with a competitive advantage over other regions because of its central location on the U.S. Inland Waterways System.

St. Louis is the second largest inland port in the U.S. and the twenty fifth largest by tonnage among all U.S. ports.

Figure 4-24
St. Louis District Locks and Dams Tonnage Statistics

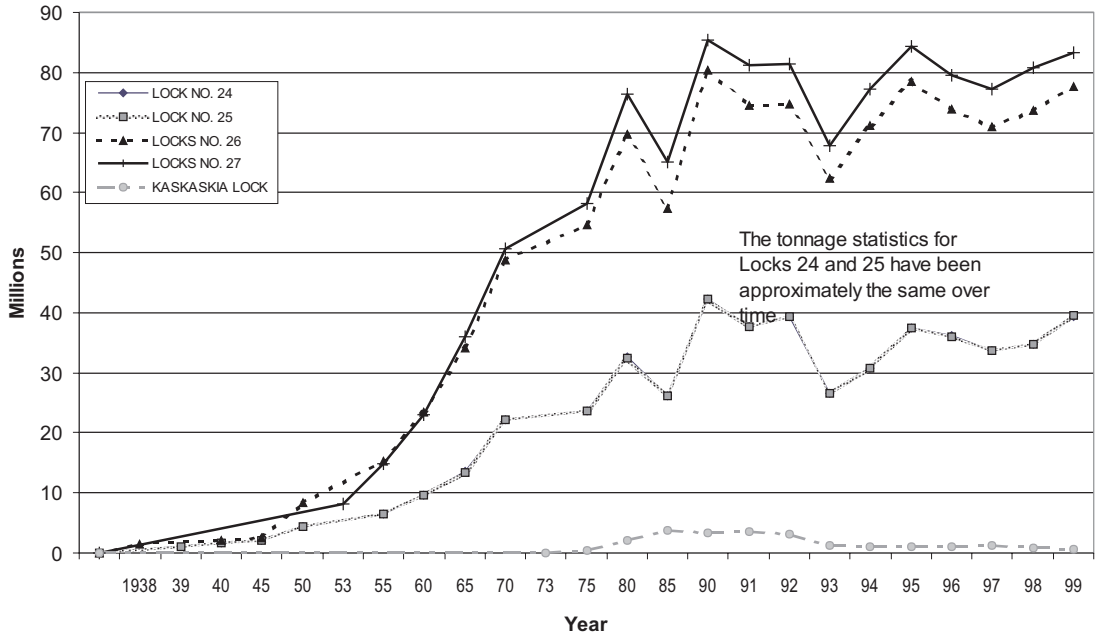


Figure 4- 25
St. Louis District Locks and Dams Total Tonnage

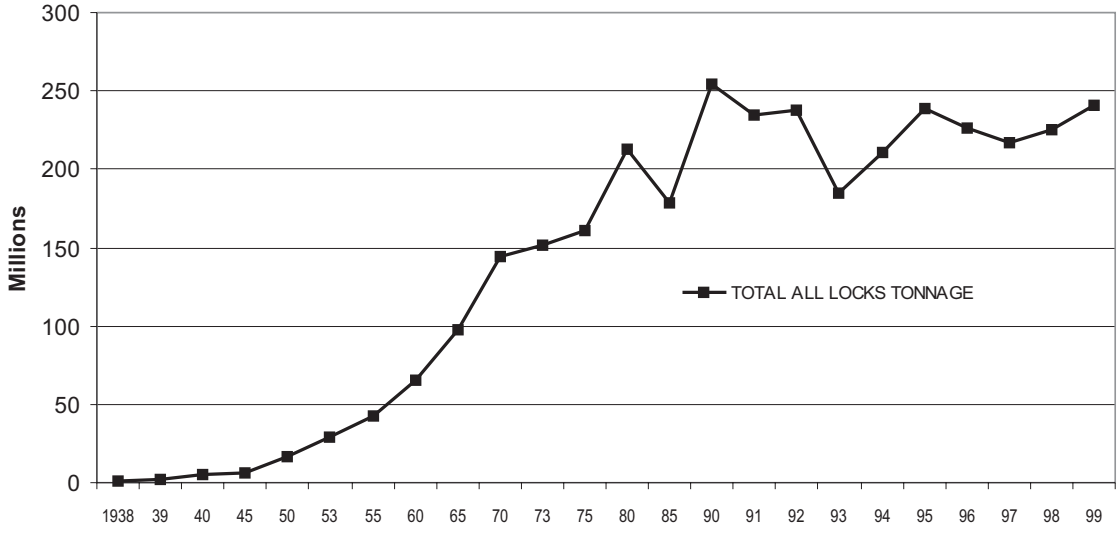


Table 4 - 26
St. Louis District Locks and Dams Tonnage Statistics

YEAR	LOCK NO. 24 (OPEN 3/12/40)		LOCK NO. 25 (OPEN 5/18/39)		LOCKS NO. 26 MEL PRICE (OPEN 5/1/38)		LOCKS NO. 27 (OPEN 2/7/53)		KASKASKIA LOCK (OPEN 11/8/73)		TOTAL ALL LOCKS	
	TONNAGE	LOCKAGES	TONNAGE	LOCKAGES	TONNAGE	LOCKAGES	TONNAGE	LOCKAGES	TONNAGE	LOCKAGES	TONNAGE	LOCKAGES
1938					1,369,459	2,487					1,369,459	2,487
1939			1,122,824	1,645							2,534,032	4,476
1940	1,578,624	1,719	1,570,167	2,188	2,125,264	3,626					5,274,055	7,533
1945	2,029,925	1,214	2,033,557	1,695	2,587,408	3,337					6,650,890	6,246
1950	4,305,665	2,260	4,323,837	2,571	8,275,790	4,792					16,905,292	9,623
1953							8,127,305	3,386			29,395,957	14,027
1955	6,505,230	3,001	6,530,038	2,974	15,193,756	6,396	14,783,744	5,452			43,012,768	17,823
1960	9,711,261	3,408	9,686,116	3,737	23,507,217	8,205	22,942,101	7,885			65,846,695	23,235
1965	13,521,270	3,585	13,425,723	4,287	34,211,388	10,439	35,926,212	8,884			97,084,593	27,195
1970	22,209,505	4,938	22,175,609	5,327	48,673,509	12,784	50,747,918	11,353			143,806,541	34,402
1973									47,550	141	151,447,434	32,156
1975	23,713,451	5,058	23,712,446	5,336	54,567,957	13,905	58,189,032	8.526	432,735	8.526	160,615,621	34,110
1980	32,731,049	6,601	32,519,470	6,770	69,614,362	16,130	76,394,103	12,608	2,030,840	12,608	213,289,824	44,087
1985	26,101,054	5,040	26,109,104	5,389	57,309,016	13,0500	65,137,963	9,368	3,776,482	9,368	178,433,619	36,040
1990	42,352,920	7,670	42,339,143	7,923	80,447,308	9,577	85,373,942	11,990	3,426,750	11,990	253,940,063	40,390
1991	37,595,771	6,897	37,758,657	7,394	74,515,995	9,054	81,233,688	10,954	3,654,175	10,954	234,758,286	38,019
1992	39,423,782	7,078	39,378,151	7,282	74,673,715	9,023	81,463,112	10,706	3,144,700	10,706	238,083,460	37,866
1993	26,581,272	4,657	26,560,658	4,687	62,343,108	7,101	67,796,856	7,953	1,164,300	7,953	184,446,194	25,694
1994	30,735,288	5,331	30,758,651	5,658	71,179,460	8,319	77,328,058	9,403	980,231	9,403	210,981,688	31,828
1995	37,540,528	6,537	37,432,909	6,654	78,420,608	10,488	84,423,520	9,387	1,134,804	9,387	238,952,369	35,634
1996	36,181,599	6,481	36,088,709	6,652	73,873,169	9,085	79,440,582	9,814	1,104,600	9,814	226,688,659	34,332
1997	33,614,330	5,835	33,638,634	6,132	70,871,839	8,140	77,168,006	8,860	1,171,000	8,860	216,463,809	31,748
1998	34,747,480	5,767	34,819,845	6,110	73,721,633	7,677	80,746,809	8,967	925,050	2,457	224,960,817	30,978
1999	39,296,994	6,503	39,536,830	6,777	77,580,836	8,740	83,378,714	9,215	583,183	8,860	240,376,557	33,294

The Port of Metropolitan St. Louis is the northernmost ice-free port on the Mississippi River remaining open throughout the year and provides a direct avenue to the Gulf of Mexico and other world markets. The Port of Metropolitan St. Louis is centrally located on the 25,000-mile U.S. Inland Waterway System connecting the markets and industrial centers located along the St. Lawrence Seaway, the Missouri, Ohio, Illinois and Tennessee rivers, the Gulf of Mexico and beyond to international markets. Intermodal transportation facilities provide industrial and agricultural users within Greater St. Louis cost effective competitively priced transportation access to and from the U.S. Inland Waterway System to world markets. Because of its location within the agricultural and industrial Midwest, the Port of St. Louis is the major shipper of grain, coal, petroleum products and chemicals. It provides dependable, efficient, environmentally sound, low-cost transportation particularly for the shippers of bulk commodities where rates and freight cost considerations are the critical ingredient in the competitiveness of their operations.

The Port of St. Louis spans 70 miles and includes six public Port Authorities and dozens of private independent company docks and wharves. Of the six Port Authorities within the Port of St. Louis, only three have active harbor operations. Tri-City Port District, the City of St. Louis Port Authority and the Kaskaskia Port District are the three operating ports. Jefferson County Port Authority, St. Louis County Port Authority and Southwest Regional Port Authority are primarily involved in economic development activities and do not have waterside operations.

The Port of Metropolitan St. Louis loads and unloads approximately 30 million tons of goods annually. Tri-City Port on the Chain of Rocks Canal typically moves the most tonnage from a single port location. The City of St. Louis Port Authority leases city-owned land to private companies along the port's 19-mile stretch of the Mississippi River. The Kaskaskia is the largest port in terms of geographic territory, which extends into three counties within Greater St. Louis, but does the least amount of business.

4.5. ROADWAY ACCESS TO PROJECT LANDS/WATERS

Rivers Project areas are accessible primarily by state and local roads. Traffic crossing the river in the upper pools of 24 and 25 is limited to the Highway 54 bridge in Louisiana, Missouri, and the Winfield Ferry located three miles east of Winfield, Missouri, off Highway N. Traffic crossing the river in Pool 26 is limited to the Golden Eagle Ferry in Calhoun County, Illinois, and the U.S. Highway 67 bridge in Alton, Illinois. Illinois River crossings on Pool 26 are provided by the Brussels Ferry near Grafton, the ferry at Kampsville, and the bridge at Hardin, Illinois. Traffic crossing the river in Pool 27 area is limited to U.S. Interstate 270 and the St. Louis traffic bridges, which include the McKinley, Eads, Martin Luther King and Popular Street bridges. On the Open River, bridge crossings occur on I-255 in South St. Louis County (Jefferson Barracks Bridge), Chester, Illinois and Cape Girardeau, Missouri.

Table 4-27
Highway Access by Pool

	In Illinois	In Missouri
Pool 27	State Highway 3	No Access
Pool 26	Highway 100 (National Scenic Byway)	U.S. Highway 67, and State Highway 94 and 79
Pool 25	State Highway 100	State Highway 79
Pool 24	State Highway 96 and U.S. Highway 54	State Highway 79 and U.S. Highway 54
Open River	State Highway 3	U.S. Highway 61 and Interstate 55
Kaskaskia River	State Highway 3, 13, 154 and 15	N/A

4.6. CLIMATE AND WEATHER

Overview

The project area is located at approximately Latitude 34E north and longitude 90E west. The topographic relief within the region has limited influence on climatic conditions.

Continental climatic conditions prevail in the project area because of its latitudinal and interior location. The area is temperate and in a transitional zone between the Humid Subtropical and the Humid Continental climate with a long summer. The growing season occurs from early April to late October and averages 215 days annually. The region has four distinct seasons without prolonged periods of extreme heat, or high humidity. From May to November, southerly warm moist air from the Gulf of Mexico predominates, while from December to April northwesterly cold air masses from Canada influence regional weather conditions. The area experiences wide day-to-day and seasonal fluctuations in temperature and precipitation averages. Years of significant drought in the region include the 1930s, 1954, 1964, 1976, and 1988.

Table 4 – 28
Climate Averages

Average Number of Days with the High above 90°	**42**
Average Number of Days with the Low below 0°	**4**
Average Number of Clear days	**140**
Average Annual Temperature	**55 °F**
Average Humidity Range -Summer	**50-60%**
Average Humidity Range -Winter	**60-75%**

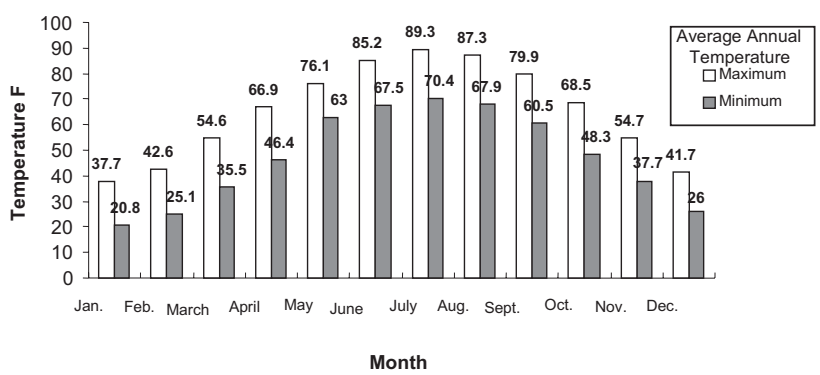
Weather Summary

The region experiences the changes of a four-season climate without the undue hardships of prolonged periods of extreme high or low temperatures. Winters are seldom severe.

Table 4–29
Temperature and Precipitation

Record Temperatures		
Low	-23°	Jan 1864
High	115°	July 1954
Average Monthly Precipitation Extremes		
Low	2"	Feb
High	4"	June
Normal Precipitation		
Rainfall per year:	37.51 inches	
Snowfall per year:	18 inches	

Figure 4-30
Average Temperatures



4.7. GEOLOGIC RESOURCES

General Description

The Mississippi River flows through three major landform regions. North of Crystal City, Missouri, is the Central Lowland Province. South of this city, the river enters the Ozark Plateau Province. Between Cape Girardeau, Missouri and Thebes, Illinois, the river flows into the Coastal Plain Province.

The drainage area of the Mississippi increases between Saverton, Missouri, and Cairo, Illinois, from 137,500 square miles to 921,000 square miles. This increase is due to the addition of seven major rivers and a narrow corridor of minor tributaries.

Rolling narrow ridgetops, moderate to steep valley slopes, and bluffs characterize the area. The floodplain of the Mississippi averages about

five miles in width from bluff to bluff. This alluvial valley is quite wide in three locations, at the confluence of the Missouri and Illinois Rivers with the Mississippi River, the American Bottoms in Madison and St. Clair Counties, Illinois, and at the reach near Cairo, Illinois which is in the Coastal Plain Province. The major tributaries have nearly level, broad floodplains, with extensive bottomlands.

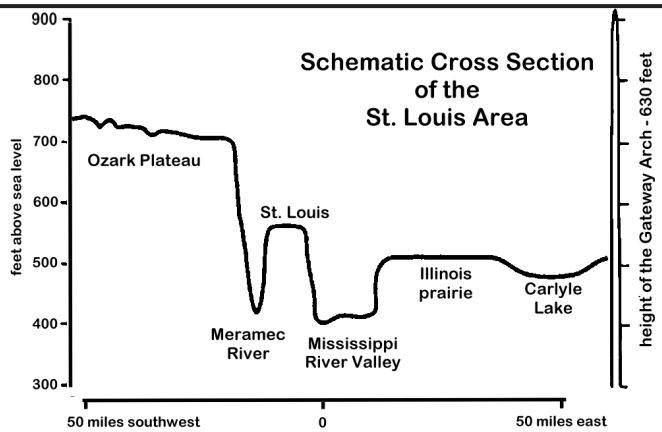
Major coal deposits are found in the region. In addition, lead, zinc, stone, sand, clay and crude oil are mined or quarried.

Physiography

The landform of the study area may be classified as to the regional variations of topography and geology. In the National Atlas (1970, Hammond, "Classes of Land-Surface Form"), the region is classified as an area of "Irregular Plains" with a typical relief of 300 to 600 feet and 50 to 80 percent of the surface gently sloping with 50 to 75 percent of the gentle slope on the divide between the stream valleys.

In the St. Louis region, east of the Mississippi River, lie the relatively flat and productive farmlands of Illinois that were once prairie. Crossing the Mississippi from Illinois to Missouri, the landscape changes abruptly. West of the Mississippi River and north of the Missouri River is a region dominated by rolling hills with mixed forest and farmland. Southwest of St. Louis is the rugged Ozark plateau that achieves elevations as high as 1,100 feet msl. The Missouri and Mississippi Rivers are at the northern and eastern extremes of this ancient mountain range. *Figure 4 – 31* illustrates the topographic diversity of this region.

Figure 4 – 31
Schematic Cross Section of the St. Louis Area



The bluffs along the floodplains are highly variable in local relief and slope. This variability is in direct relationship to the hardness of the bedrock in which the streams have incised their channels. The gentle slope of the upland surface is due to the mantle of unconsolidated glacial materials, drift and loess, which tends to subdue the profiles. The large alluvial valleys of the Mississippi River, in contrast, are relatively level with only minor differences in local relief.

Landforms in the U.S. have also been classified into physiographic regions which have a certain amount of homogeneity in terms of topography, rock units, and structure. The Fenneman (1938) Classification places most of the study area in the Central Lowland Province, a region which covers much of the Midwest. This province is subdivided into smaller units called sections. The United States Geological Survey's *Physical Divisions Map of the U.S.* (1946) places the unit of the study region east of the Mississippi River in the Till Plains Section consisting of young till plains with a few moraines and no lakes. The unit west of the

Mississippi is the Dissected Till Plains Section which is composed of submaturely to maturely dissected till plains.

Most of the area between the Mississippi and Illinois Rivers in Calhoun and Pike Counties, Illinois, and Lincoln, St. Charles, and Pike Counties, Missouri, are within the Lincoln Hills Section of the Ozark Plateaus Province.

The Lincoln Hills Section is an upland which is developed along the Lincoln fold, a secondary structure of the larger Ozark dome to the south. The Mississippi River cuts through this structure. Most of the section has not been glaciated, in contrast to areas to the east and west. The southern boundary in Calhoun County is along the Cap au Gris faulted flexure.

Structural Geology

The broad tectonic framework of the study area includes the Illinois Basin east of the study area and the Ozark dome to the south of the area. Important minor structures within the Rivers Project area are the Lincoln Fold and the Cap au Gris faulted flexure.

The Lincoln Fold forms part of a divide which separates the Illinois Basin to the east from the Forest City Basin to the west. The length of the fold in Missouri is approximately 165 miles and the width varies, but may measure as much as 15 miles. The Lincoln Fold is more than a simple anticline. The structure is a regional uplift with anticlines, domes, inclines, and faults superimposed on it. Detailed geologic history of the Lincoln Fold is not complete because a detailed geological survey has not been made. Available information indicates that possibly during the late Silurian or the early part of the Devonian period the Lincoln Fold began to develop. Continued development occurred as repeated stages of erosion and deposition took place during the Devonian and Mississippian time. At the end of the Mississippian period, rocks were stripped from the fold. The fold was then buried under Pennsylvanian deposits. The remainder of the fold's geologic history has been obscured by the removal of most of the Pennsylvanian rocks. Geologists assume that the area was not inundated by a marine environment again and that the fold has remained essentially unchanged since that time. The fold can be followed southward from the Iowa state line to its point of termination against the Cap au Gris Fault in Lincoln County, Missouri.

The Cap au Gris faulted flexture, which derives its name from Cap au Gris Landing just east of Winfield, Missouri, on the Mississippi River is located in west central Illinois and east central Missouri. The fault zone crosses the Mississippi River about one mile south of Cap au Gris, Missouri, and the Illinois River near Meppen, Illinois. The generally east-west trending fault is described as a narrow band of steeply dipping rocks and discontinuous faults. The throw along the fault is approximately 1,000 to 1,100 feet. On the north, the upthrown side of the fault beds gently dip downward into the fault. South of the fault zone, rocks of Upper Middle Paleozoic Age are steeply upturned. The Cap au Gris fault is probably a left lateral fault that has moved approximately 30 miles. Geologists believe that recent movement has not occurred along the fault zone because Pleistocene terraces crossing the fault have not been warped or displaced.

Historical Geology

There were four main events in the geologic history of the study area, which account for the bedrock distribution, structural features, and the surficial materials of the uplands and alluvial valleys.

Sedimentary rock units, some 4,000 to 5,000 feet thick, were deposited over Precambrian extrusive and intrusive igneous rocks by alternate

inundation and regression of semitropical or tropical seas. The marine phases were the most persistent.

During the Paleozoic Era, the area to the east of the Mississippi River began to subside. A spoon-shaped depression was formed which became the Illinois Basin. Thus, the rock which comes to the surface at Alton is several thousand feet under the surface in Central Illinois. Also, during the Paleozoic Era, the Ozark dome began to rise and the Lincoln Fold was formed.

Beginning during the Pleistocene Epoch or Ice Age, about one million years ago, great continental ice sheets moved into the mid-latitudes of the United States, and the Midwest was overrun by a series of glacial phases known as the Nebraskan, Kansan, Illinoian, and Wisconsinan glaciers. The last glacial phase, the Wisconsinan, receded approximately 12,000 years ago. These glaciers deposited drift on the uplands and filled the alluvial valleys with outwash.

During and after the Wisconsinian period, dry winds dominantly from the west, blew across exposed glacial outwash in the Mississippi, Illinois and Kaskaskia valleys. This lighter weight material was carried eastward and deposited loess on the upland part of the region. Loess is the parent material for most of the present soils on the upland part of the region.

During the Holocene Stage (recent), the upland surface has been eroded and modern soils created. The age of the surficial bedrock is Ordovician to Cretaceous and is overlain with a mantle of younger Pleistocene and Holocene drift and soils. In the alluvial valleys, some of the valley fill has been scoured away and subsequent river changes and flooding have created the present day floodplain morphology and alluvial soils.

Geomorphology

The present day geomorphology of the Upper Mississippi River valley is a result of water, wind and ice over time acting under gravitational forces to sculpt the river, floodplain and valley walls. During the last two hundred years human settlement and development in the river valley has further effected the morphology of the river and floodplain.

Four common morphological valley forms (or river categories) that have developed on the Upper Mississippi and present today are illustrated in *Figure 4 – 32.*

Kaskaskia River Basin Geology

Geologically, the Kaskaskia River Basin lies in the Illinois basin, a broad depression that covers most of Illinois and extends into portions of Kentucky and Indiana. The geologic features present in the area are products of complex depositional and erosional processes spanning millions of years.

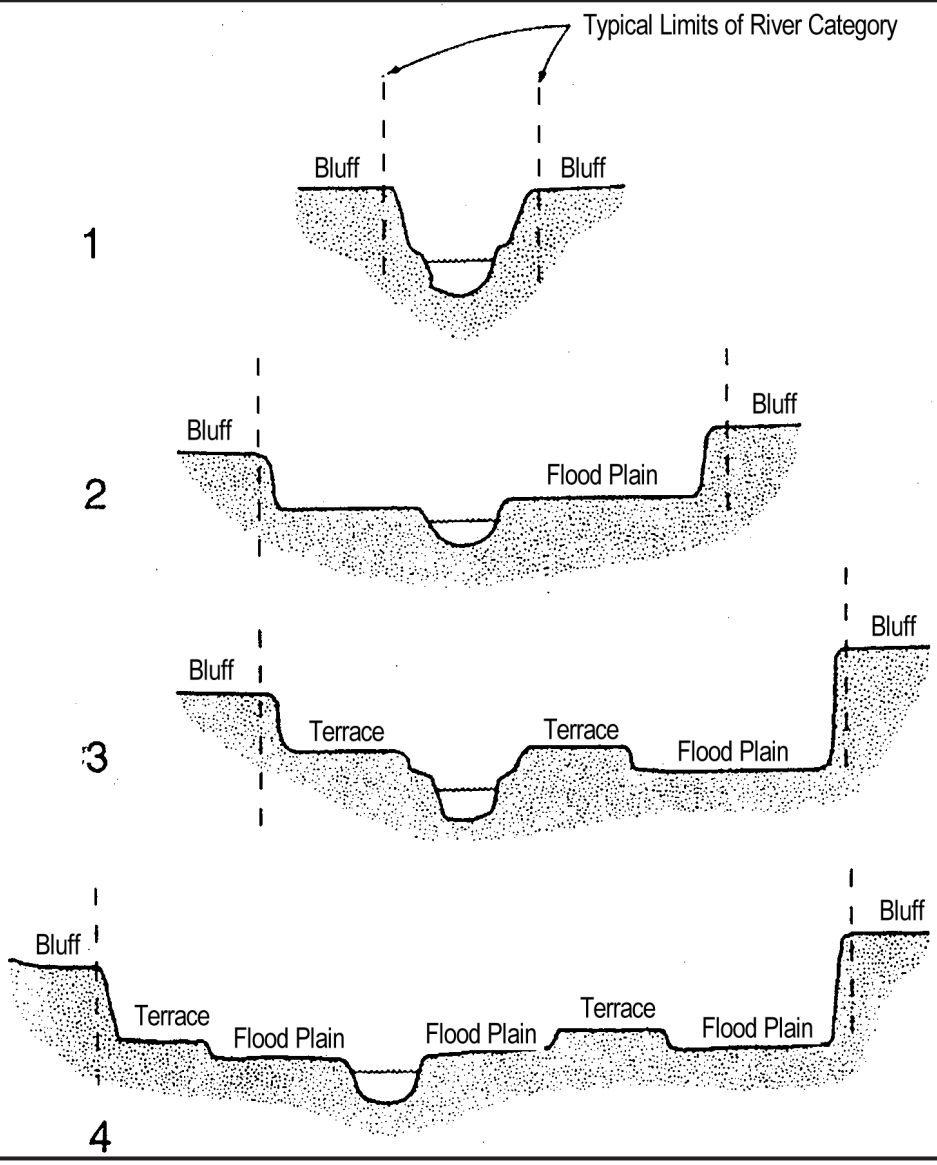
Much like the Mississippi valley, the underlying bedrock formations of the Kaskaskia River were deposited millions of years ago during the Paleozoic Era and were subjected to erosion and weathering during the late Mesozoic Era and the Tertiary Period. During the periods coinciding with the Ice Ages (Pleistocene Epoch), recurring continental glaciations deposited sediments which were altered by weathering and erosional processes. In recent times, the same processes shaped the features of the present topography and formed the modern soils.

As the Ice Age ended, molding of our present day landforms and soils began. The Kaskaskia River and tributaries began to downcut and created the modern floodplain, leaving elevated terraces of higher floodplains isolated from the river. Modern soils began to develop on the uplands, modified by differing vegetation and slopes and by weathering.

Flooding of the river and its tributaries covered the glacial fill with present day bottom land soils (Cahokia Alluvium).

Mineral Resources

Figure 4 – 32
Four Common River Categories in the Upper Mississippi River



While coal is the most important mineral resource in the project area, other resources present include natural gas, oil, sand, gravel, clay and limestone. Pockets of sand and gravel are found in nearly every county of the drainage basin. These deposits are mainly a result of deposits that were formed from glacial outwash. From various sedimentary rock formations come cement-making materials, crushed stone, agricultural limestone, brick-making clays and sands for molding and glass. Most of the mineral resources are obtained by strip-mining.

Sand and Gravel

Sand and gravel deposits occur in the floodplains of the Kaskaskia River and Mississippi River. Along the Mississippi River, these deposits are

found under 10 to 40 feet of silt and clay overburden. Sand and gravel occurs in terraces along both sides of the Kaskaskia Valley.

The material is commonly extracted by pit mining as the deposits have a thin overburden, or by removal from a river or lake by dredging. In many areas, deposits are so compacted that crushing is necessary to prepare the material for use.

In many places, deposits have been or are being exploited for local purposes and are sufficient to be a valuable resource for local use.

Limestone

Limestones are capable of producing numerous products including: portland cement, concrete aggregate, lime, rip-rap, building stone, filter beds and crushed stone. With demand for such products increasing steadily, limestone resources within the project area remain a viable industry (Yarbrough, et al., 1974). Most of the limestone in the project area is mined in open-pit quarries. However, underground mining is being used more frequently, where the mineable limestone is overlain by bedrock.

The counties of the project area use substantial amounts of agricultural limestone and limestone for construction. The limestone resources are particularly important in those counties bordering the Mississippi River where a large and well-distributed quarry industry exists. This area is capable of supplying the limestone needs of the region.

Clay and Shale

Clay and shale resources are widespread throughout the project area. Deposits are associated with glacial drift or located along streams inter-bedded with limestone and sandstone. Industrial uses for clays and shales include the manufacture of structural clay products, lightweight aggregate and portland cement.

Miscellaneous clay and shale resources are quite widespread and supplies appear adequate. Shortages, if they do occur, are of a local nature for specific use, probably due to lack of long-range planning to locate and protect strategically located deposits of common clays suitable for various construction use from urban encroachment.

Natural Gas

Since its discovery in Illinois during 1888, there has been little exploitation of natural gas. It has never been an important market commodity being mostly solution gas produced with oil. The main activity for natural gas in Illinois is storage for winter withdrawals.

Deposits of natural gas are usually found in the Cypress Sandstone. Depth for drilling has been from 300 feet to 4,500 feet, averaging around 2,500 feet. Currently there are several producing gas fields in St. Clair County.

Oil

The most common method in Illinois for recovering oil is waterflooding, where water is pumped into the well to force out the oil. Oil has been in production within the drainage system since the 1880s. Oil production reached its maximum during the early 1940s and has been continually declining except for a brief recovery period in the early 1960s.

Oil production is not significant in the project area.

Coal

Since the 1820s, coal has been mined in the region. St. Clair and Randolph counties have been major sources of coal for Illinois, both in

the past and today. These two counties are among the top coal producers in the State of Illinois.

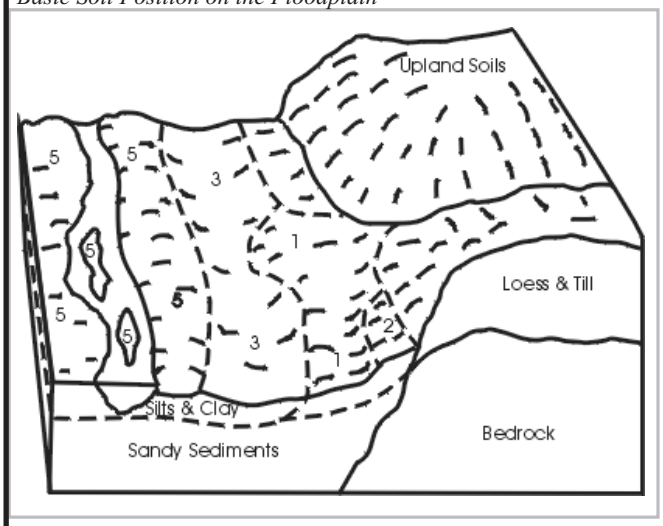
4.8. RIVER AREA SOILS

General Description

This section briefly describes some of the physical properties and land-use capabilities of the soils in the study area. *Table 4 – 33* shows the physiographic location of eight soil units occurring in the alluvial valleys of the study area.

1. Materials found at the foot of the bluffs consist of reworked loess, fragments of bedrock, and eroded glacial till from the uplands. Alluvial and colluvial materials may be deposited either as fans where tributary streams enter the main valley or as loose and incoherent deposits at the foot of the bluffs. The soil which develops on these deposits is usually coarse in texture, has good drainage, and is moist but not wet.

Table 4–33
Basic Soil Position on the Floodplain



2. Terraces, which are remnants of older, higher floodplains, are also found adjacent to the bluffs or may occur as isolated highs in the floodplain. These “high bottoms,” or “second bottoms” as they are sometimes referred to, may be remnants of Pleistocene sands and gravels which were deposited as glacial streams aggraded. Some terraces may be of more recent deposition. These usually consist of finer sediments that are not as well drained as the sandy Ice Age terraces.

3. Low areas, such as depressions, old water courses, and sloughs are also found on the floodplain. “Gumbo” is the common name for the soil found in these areas which is usually high in clay content and very wet.

4. Higher areas, such as natural levees, sand bars, and old islands may also be found in the alluvial valleys of the study area. The soils in these areas are composed mainly of sands and silts and are usually moist but not wet.

5. Islands and lowlands adjacent to the river are areas of recent deposition. The materials found in these locations are generally wet, but otherwise highly variable and may change their geographical extent and depth with each flood.

Some of the five basic floodplain positions have more than one soil unit representing a topographical unit. These additions reflect differences in soil texture and native vegetation. Soil units are derived by combining several soil series with similar characteristics. *Table 4 - 34* contains some of the properties and land-use capabilities of these soil units.

The fertile soils derived from the alluvial deposits are primarily composed of fine textured clays intermingled with fine sandy loams. Major difficulties with these soils are weed control, maintaining fertility, and drainage. Relatively fertile, dark, grayish-brown soils with silt loam surfaces have developed from loess overlying glacial tills on the gently sloping to rolling areas of the Illinois plains. Light-colored soils with silt loam surfaces have developed on the loessial deposits and the moderately to steeply sloping areas on the Missouri side. These soils are less fertile than those found in the floodplains and the Illinois plains.

Bottomland soils suitable for recreational development are limited due to flooding, poor drainage, and seasonal water tables. Recreational sites and improvements must be planned and designed with a firm understanding of the flood hazards and precautions to minimize damage and maintenance costs.

Erosion and Sediment

In the uplands adjacent to the river corridor, an estimated sixty-seven million tons of soil are dislodged annually. Agricultural sheet and rill erosion accounts for 85 percent of this dislodged soil. Twenty-nine percent of this dislodged soil is delivered to the Mississippi River and accounts for 17 percent of the average annual sediment yield at Alton, Illinois and 6 percent of the average annual sediment yield at Thebes, Illinois. Due to improved conservation practices in the basin over the past 25 years, some reduction in sediment discharge has occurred but the reduction has not yet reached acceptable levels.

Table 4 – 34
Summary of Project Area Soils Characteristics

Soil Unit	Landscape Position	Surface Texture	Rate of Surface Runoff	Depth to Water Table	Internal Drainage	Flood Hazard	Openland	Woodland	Suitability for Wildlife	Suitability for Recreation Uses[1)2)]	Slope Range (%)
I (Hapludalfa)	Uplands and terraces	Silt loam and fine, sandy loam	Slow to medium	As shallow as 3-4' in spring	Well-drained to moderately well-drained	No	Yes	Yes	Wetland	◆	0-18
II (Ochraqualfa)	Uplands, terraces, and outwash plains	Silt loam and loam spring	Slow to medium poorly drained	As shallow as 1-3' in spring	Somewhat poorly to poorly drained	No	Yes	Yes	No	Moderate to severe	<3
III (Albaqualfs)	Uplands and terraces	Silt loam ponded	Slow to 2' in spring	Less than poorly drained	Poorly to very poorly drained	No	Yes	Yes	Yes	Severe	<2
IV (Udifluvents)	Bottom lands	Silt loam	Slow	1-3' in spring	Well-drained and somewhat poorly drained	Yes	Yes	Yes	Yes	Moderate to severe	0-2
V (Fluvaquents)	Bottom lands	Silt loam	Slow	0-3' in spring	Poorly to somewhat poorly drained	Yes	Yes	Yes	○	Moderate to severe	<2
VI (Hapludolls)	Bottom lands	Silt loam	Slow	Fluctuates with adjacent streams	Moderately well-drained	Yes	Yes	Yes	Yes	Moderate to severe	<2
VII (Haplaquolls)	Bottom lands	Silty clay	Slow to ponded	0-2' in spring	Poorly to very poorly drained	Yes	Yes	Yes	No	Severe	0-2
VIII(Argiudolls)	Uplands and terraces	Silt loam and Silty clay loam	Slow to ponded	Less than 3' in spring	Poorly and somewhat poorly drained	No	Yes	Yes	Yes	Moderate to severe	0-3

1) Roads and picnicking.
2) Slight - minor limitations or limitations are easily overcome.
Moderate - limitations need to be recognized; but can be overcome with proper planning
Severe limitations are difficult to overcome and require careful planning
◆ Slight on gentle slopes to severe on steep slopes
○ Depends on drainage

Navigation-related control activities have retarded the natural migration of the river. The pools in the Upper River have inundated many of the previous river courses. In the open river, shifting of the channel has been minimized by regulating works (dikes and rip-rap) which have significantly reduced the caving of banks and levees. The alluvial riverbed, however, continues to erode and fill. Some tributaries to areas controlled by pools are aggrading in lower reaches. Estimated daily suspended sediment transport at St. Louis, Missouri, ranges from 28,000 tons to 7 million tons and averages 370,000 tons. Average annual sediment yields at selected gauging stations are presented in the following table.

Kaskaskia River Area Soils

Topographically, the study area consists of five surface forms, elongate ridges and hills of Illinois Age glacial drift, level uplands of till plain, erosional slopes, level terraces which are a lacustrine zone of

Table 4–35
Average Annual Sediment Yield at Gagging Stations

Station	Drainage Area (sq. mi.)	Sediment Yield (tons per sq. mi. per year)	Total Tons
Mississippi River at Keokuk, Iowa	119,000	79	9,401,000
North Fabius River at Monticello, MO	452	973	439,790
Mississippi River at Hannibal, MO	137,300	181	19,400,000
Salt River near Monroe City, MO	2,230	454	3,300,000
Missouri River at Hermann, MO	528,200	295	70,700,000

undetermined glacial age, and the present day floodplains of the Kaskaskia River and its major tributaries. Elevations in the region average between 350 to 500 feet above msl, with a majority of the area gently sloping. Most of the gentle slope is on the upland surfaces. With only isolated areas of hills and steep slopes, most of the land is or can be under cultivation.

There are nine types of soil associations predominant in the area along the Kaskaskia River Canal. Five of the associations form the majority of soil types occurring within project lands. The predominant soil association within the Kaskaskia River Navigation Project land belongs in the Darwin-Lawson-Wakeland-Belknap-Bonnie Association. This association is found in an almost continuous stretch along either side of the waterway from the mouth of the Kaskaskia River upstream to below Fayetteville. In general, the associations have moderate to severe limitations for most non-farm uses due to slow to moderated permeability and relatively poor drainage.

Many of the soils near the navigable channel have been modified by the construction of the navigation project and by the placement of excavated dredge material on the adjoining banks during channel maintenance activities.

4.9. RIVER HYDROLOGICAL CHARACTERISTICS

General Description

The St. Louis District is located on an important stretch of the Mississippi River where the river changes dramatically in size and character due to the confluences of the three major tributaries: The Illinois, the Missouri and the Ohio Rivers. These river confluences greatly enlarge and influence the nature of the Mississippi River.

The nature and path of the Mississippi River has changed over time. Before the Ice Age, the Mississippi River flowed into the Gulf of Mexico over a different path with a much smaller amount of water. Sediment deposited by melt water from the glaciers forced the river from a previous westerly direction towards its current path.

Much of the present-day Missouri and Ohio Rivers flowed eastward and northward into the Hudson Bay and the Gulf of St. Lawrence respectively. The descent of the Kansan ice sheets altered the drainage patterns of the Midwest. The Missouri and Ohio Rivers became ice-marginal streams which flowed along the leading edge of the glacier. This edge formed the lines of the two riverbeds as they are now situated which caused the rivers to flow into the Mississippi. During the period of glacial retreat the Mississippi discharged a much greater volume of water than in post glacial times. A glacier lake, which formed in southern Canada and Northern Minnesota, flowed southward for a time into the Mississippi. The Great Lakes also drained into the Mississippi through the Illinois River. The result of this massive runoff was to carve a wide

floodplain in the Mississippi Valley creating the third largest river basin in the world.

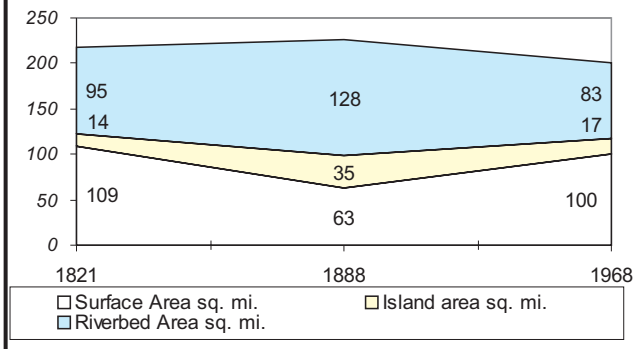
Currently, the Mississippi River basin is exceeded in size only by the Amazon and the Congo. It contains fourteen times the area of the Rhine basin. The river itself is almost 2,300 miles long and its more than fifty navigable tributaries furnish about 15,000 miles of navigable streams (and thousands of miles of un-navigable ones), traversing or bordering thirty-one states. The Mississippi River basin system watersheds drain approximately 1,858,000 square miles. All water between the Appalachian Mountains in the East and the Rocky Mountains in the West eventually flows into it. Over one-half of the population and 65 percent of the improved land in the United States are contained in the basin of the Mississippi.

The natural state of the Mississippi River is narrow and deep. In the early 1800s, forests of trees spread out across the rich alluvial bottomlands and lined the river's banks. The river was so narrow that settlers could stand on the bank at Cahokia and shout across to the settlement at St. Louis for a boat to come and ferry them across.

The Louisiana Purchase in 1803 marked the opening of the West. Settlements along the Mississippi like St. Louis began growing. In 1817, the first steamboat arrived in St. Louis, the Zebulon M. Pike. The population of St. Louis soared, and steamboat arrivals followed suit. From three arrivals in 1817 to more than 3,600 arrivals in 1858, steamboats had turned the Mississippi into a nationally significant transportation corridor.

The rich timber resources which lined the Mississippi's banks were used to build rapidly expanding settlements, cleared for agricultural purposes and used as fuel for the steamers boilers. As steamboats and settlements grew, great forests of timber were cleared.

Table 4–36
Open River: Geomorphic Changes



Source: Simons, et al. Geomorphology of the Middle Mississippi River. 1974.

As the timber vanished, the riverbanks became less stable and rapidly deteriorated. The river widened and the less stable banks crumbled and fell. Trees were thrust into the river impeding navigation. The tree snags, the shallowness of the channel and the congestion of river traffic combined to make navigation difficult and steamboat travel dangerous. Many lives and vessels were lost.

To correct the situation, Congress, in 1878, directed the Corps to create and maintain a safe and dependable navigation channel and return the river to its previous condition.

This effort was begun by stabilizing the river banks and designing navigation structures that worked in harmony with the natural laws of the river.

A variety of methods and navigational structures were employed. Riverbanks were stabilized, dredges removed sediment from the channel. Snag boats were used to clear downed trees, wrecked steamboats and other debris.

Today, the river closely resembles the dimensions it held in the early 1800s. Achieving this goal required the use of a variety of river structures which worked to guide the current, stabilize banks and encourage a narrowing of the river's width through a natural buildup of siltation. The process took many years.

Since the 1970s, the Corps and its partner agencies (USFWS, IDNR, MDC) have been evaluating the biological impact of the navigational structures on the river's ecosystem and making modifications to improve the biological productivity of the river.

Channel Diversions

The Mississippi River tends to meander as it flows downstream. This meandering creates havoc with the navigation channel which must be maintained at a nine-foot depth. This happens most often where side channels are already in existence. The river, having traveled for years on one side of a grove of trees or small sandbar begins to flow heavier on the other side of the land area. If allowed to continue, the current will eventually be diverted from the main channel which will fill with sediment. Ultimately a new channel is formed.

The river also tends to cut new channels in areas where it makes sharp turns. In places where the current hits a protruding river bank, it begins to wear down the exposed bank eventually forming a side channel and much later a main channel.

Erosion and Sedimentation

Banklines on both sides of the river are exposed to erosion. The bankline along the fast moving side of the river is exposed to the river's current, scouring and eroding the bank. The river bank running along the slow side of the river can also be exposed to a more gradual form of erosion. Wind, rain, the impact of humans and the river itself all contribute to the loss of bankline stability.

Each year the Mississippi carries an estimated 130 million tons of sediment to the Gulf of Mexico. That which doesn't reach the Gulf adds approximately 300 yards to the State of Louisiana each year. The rest is deposited in the river channel. How much and where sedimentation is deposited depends on the speed of the river and the size and placement of any objects impeding its flow.

Historically, the use of dikes to maintain a navigational channel and the resulting sediment build up assisted in narrowing the channel. Today, river engineering techniques are employed to allow river engineers to achieve navigation objectives without the build up of sediment through modification of the navigation structures. However, even without the use of dikes, sedimentation is a naturally occurring phenomenon and is primarily managed through the use of dredging.

The Annual River Hydrograph

The long term average annual hydrologic pattern on the UMRS is one of high river flows in the spring followed by a low summer flow followed by an increased flow in fall and a low flow in the winter. The Mississippi River at St. Louis which drains 97 percent on the UMRS watershed shows the highest mean discharges in April and May and the lowest discharge in December and January.

For the Mississippi River in the St. Louis District, historic average annual stage hydrographs are illustrated in *Figures 4–37, 4–38,* and *4–39*. Pool 25 Tailwater St. Louis and Cape Girardeau river gauge locations were selected to provide a geographic sampling of upper, middle and lower river hydrographic conditions in the district.

Open River

The open Middle Mississippi River is defined as the reach of river between the Missouri River and Ohio River confluences. Below St. Louis, the river shows a marked tendency to meander in the alluvial valley and is seldom found in the middle of the floodplain. From St. Louis, the river continues along the Missouri Bluff to St. Genevieve, then crosses the valley to Fort Gage, Illinois, flows adjacent to the Illinois bluffs for about 14 miles, and returns to the Missouri bluffs at Red Rock. It follows this bluff line to Cape Girardeau. Continuing past the natural flood outlet into the St. Francis Basin, the river flows through the 7-mile rocky gorge, Grays Point, to Commerce, Missouri. It then sweeps on through the lower wide alluvial valley (coastal plain), which is characteristic of the Lower Mississippi River.

Between St. Louis and Cairo, Illinois, bank full widths vary from 2,500 to 4,800 feet and low-water widths from 1,500 to 1,900 feet. The floodplain of the Middle Mississippi River is widest just north of St. Louis, where the distance is approximately 12 miles, and from St. Louis to Grays Point, approximately 135 river miles downstream, the alluvial plain has an average width of 4 to 5 miles. The 7-mile long Grays Point-Commerce Gorge is narrow with a minimum width of about one-half mile. Just below Commerce, Missouri, the bluffs diverge sharply and mark the beginning of the very wide delta region of the alluvial valley of the Lower Mississippi River. The Middle Mississippi River drops in elevation at an average of 0.57 foot-per-mile. The maximum observed slope, a fall of 2.0 foot-per-mile, during low water, occurs just below Chain of Rocks opposite north St. Louis. In the gorge between Grays Point and Commerce, the flood of 1844 had a mean fall of 1.7 foot-per-mile and at the low stage of 24 December 1904, a mean fall of 0.18 foot-per-mile. Even flatter low water slopes have been observed in the St. Louis Harbor.

Historical accounts indicate that, at about 1820, the Middle Mississippi River passed from its natural state into a state where human activity had a significant effect on the morphological processes.

European settlement, the advent of steam powered boats and the river current itself all contributed to excessive timber removal from the banklines creating deteriorating

Figure 4 – 37
Comparative Stage Hydrograph – Mississippi River at Cape Girardeau

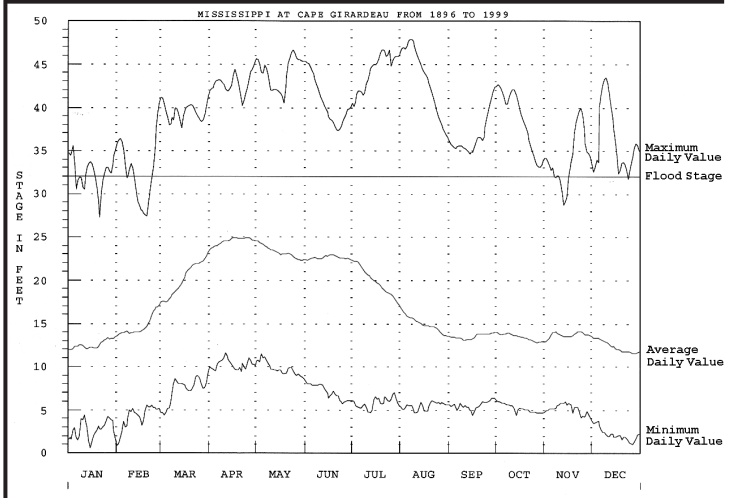


Figure 4 – 38
Comparative Stage Hydrograph – Mississippi River at St. Louis

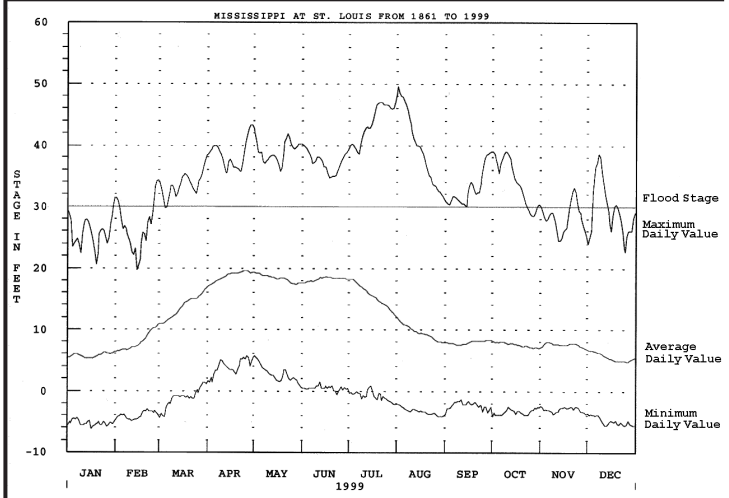
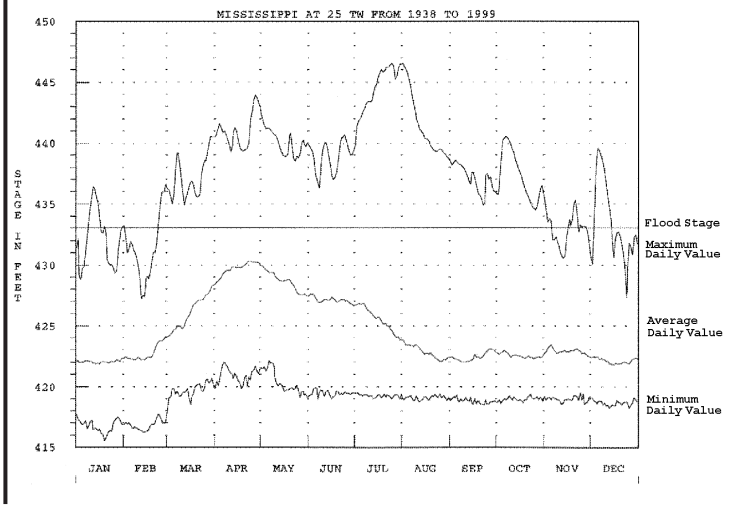


Figure 4 – 39
Comparative Stage Hydrograph – Mississippi River at Pool 25 Tailwater



and unstable riverbanks. As a result, the river width increased from an average of 3,600 feet in 1821 to an average 5,300 feet in 1888. In the 1880s, the Federal Government began the task of obtaining and maintaining a navigation channel. The average width of the Middle Mississippi River was changed from about 5,300 feet in the 1880s to an average width of 3,200 feet today, as compared to the 3,600 feet in the 1820s. River length has varied from a minimum of about 186 miles to a maximum of about 195 miles. The navigation project has greatly influenced these geomorphic changes.

Pooled River

Early in the twentieth century, it became apparent that the residents of the Upper Mississippi Valley could benefit from long haul, low-cost water transportation. However, nature did not provide the proper conditions for people to fully utilize the Upper Mississippi River. In the 1930s, Congress turned to the Corps to design and construct a series of Locks and Dams to provide a safe and dependable navigation channel.

Before the Corps built the lock and dam system on the Mississippi, navigation on the river was intermittent at best. During low-flow periods, the river had many shallow reaches which limited or curtailed water transportation on the Upper Mississippi River. The low river depths not only limited river navigation, but also limited recreational development.

Extensive work by the Corps since the 1930s has allowed for the integrated system which utilizes the resources of the Mississippi, the Illinois, and the Ohio Rivers for transportation. For over 60 years, this river transportation system has had the desired result of providing a safe and dependable navigation system and has also provided various other benefits as well.

The Corps has examined opportunities, within its current authority, to respond to recreational and environmental concerns. The Corps works closely with the USFWS and with state departments of conservation on habitat improvement projects within the river pools. The Corps also works closely with recreational interest groups to accommodate boating, fishing, hunting, nature study, sightseeing, etc.

The locks and dam system has been operated successfully for over 50 years. From St. Anthony Falls, Minnesota, to St. Louis, the Mississippi resembles a downward staircase with each of the steps represented by a navigation pool. The locks which accompany the dams allow river traffic to “step” from pool to pool. Regulation of the pool levels is a major responsibility of the Corps.

Navigation Pool Regulation

A dam, to the average person, is a huge solid structure used to block the flow in a river and form a lake. This conception is not true of navigation dams, such as those on the Upper Mississippi. These dams are not solid but are a series of concrete piers across the river with movable gates between the piers. A dam is formed when the gates are lowered, causing the water level upstream of the dam to rise and to form a slack-water pool which provides adequate navigation depth.

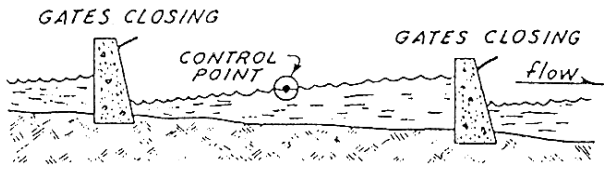
In order to operate the slack-water pool system, it was necessary for the federal government to acquire all real estate which would be inundated by the use of the dam gates. Much of this land is now serving the public for recreational and environmental purposes and is the focus of this Master Plan. Some land is owned outright and some is covered by “flowage easements” allowing artificial flooding of privately owned land (if necessary).

Operation of each dam makes control of the depth of water possible for commercial navigation purposes. Each dam is operated in response to the river flow conditions which exist. During normal operation, all gates are partially opened with water flowing beneath them. As the flow increases or decreases, the gate openings are increased or decreased accordingly.

Each pool within the St. Louis District has a control or “hinge point” located near the middle of each pool, with established maximum and minimum water levels. In Pool 26, this control point is located at Grafton, Illinois. In order to maintain a nine-foot depth throughout the pool, the water level must be maintained at or above the established minimum elevation at the control point.

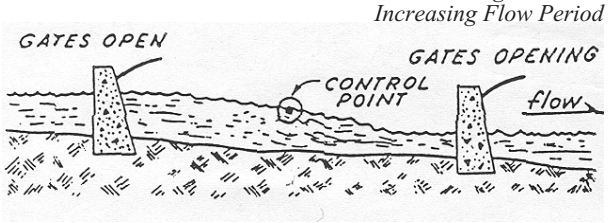
During full-pool periods, the water level behind the dam is nearly level and the dam is providing its maximum benefit. The dam is maintaining a higher pool level than would occur naturally. These increased levels make possible both commercial navigation and intensive recreation usage of the river.

Figure 4 – 40
Low Flow Periods



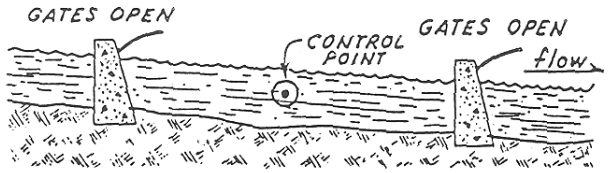
As the rate of flowing water increases, the water surface in the upper end of the pool rises. Therefore, the gates of the dam downstream are adjusted to pass the increased flow and to keep the elevation at the control point within its established limits. By this means, the river is held within prescribed boundaries along the entire length of the pool.

Figure 4 – 41
Increasing Flow Period



As the gates are opened, the water elevation at the dam falls and the water surface throughout the pool attains a slope. At that time, the water surface elevation upstream of the control point is higher than it is at full pool. The downstream reach is lower than it is at full pool, yet higher than it is in the natural condition. The level at the control point remains practically unchanged. This condition is known as pool drawdown.

Figure 4 – 42
High Flow Period



During drawdown, problems often occur for some river interest groups (particularly those located below the control point). Since flow rates within the river change, it is impossible to satisfy these interests at all times without causing flood damage to other areas of the river. Consistent with the basic purpose of the navigation projects, every effort is made to cooperate with all activities within the pools (including small boat harbors, recreation areas, agricultural interests, etc.)

After the high water passes and the flow decreases, it is necessary to reverse the procedure in order to keep the water surface at the control point at or above its established minimum level. The water surface in the upper part of the pool must not be permitted to drop to a point where the Nine-Foot Navigation Channel is threatened. Therefore, the gates of the downstream dam are lowered into the water and the gates are adjusted to maintain the established stage at the control point. In this way, the water level upstream of the dam is slowly raised until the pool reaches full pool levels throughout its length.

There are periods of the year, usually in the spring months, when the natural flow provides adequate depths for navigation without the use of the dam gates. During these high-flow periods, the dams have no control

over flooding. River levels throughout the length of the pool are near to, or are above, flood stage. At such times, the gates are lifted entirely out of the water (a situation known as “open-river conditions”), and the stages reached are the same as they would have been had the dams not been in existence.

In the early 1990s, the district began to use the seasonal drawdowns to stimulate wetland vegetation growth and improve river habitat conditions on the pools. Referred to as Environmental Pool Management (EPM), this practice was fully implemented in 1994 as a way to create thousands of acres of critical wetland vegetation for wildlife in the navigation pools, while still providing for the needs of navigation. Several factors contribute to a successful EPM year. First the pool must be drawn down 0.5-2.0 feet for approximately 30 days. This pool drawdown occurs during May 1 through July 30, with the May-June period being the most desirable for vegetative growth and seed production. Secondly, after the initial drawdown, the goal is to allow the pool to rise at a rate not greater than 0.2 foot per day.

EPM benefits the entire river ecosystem by simulating the pre-dam annual hydrograph (i.e. spring flood followed by summer low flow, followed by a small flood in late fall/early winter and winter low flow) which was mostly lost with dam operation. The growth of moist soil vegetation benefits fish and migratory waterfowl by providing attachment sites for food organisms (macroinvertebrates). It also benefits fishes by providing both protective cover for small fishes and ambush cover for predators.

EPM continues to be successful each year in providing a safe and dependable navigation channel and creation of thousands of acres of vegetation for wildlife and erosion control.

River Engineering Structures for Navigation

The Corps designs its river regulating structures for navigation in a manner that also improves river habitat diversity. Four primary habitats important to the river ecosystem that are enhanced through innovative design modifications of navigation structures include:

- Fast water: Water moving quickly, usually the current in the main river channel.
- Slow Water/Quiet Water: Water outside of the main river channel moving slower than the primary river current.
- Wetted Edge: Land which is constantly getting wet and then dry again as the river rises and falls. This area is in a continual state of change. This habitat is very important, as there is a constant exchange of nutrients from the land to the aquatic environment.
- Terrestrial: Land separated from the shore is especially important because it is away from humans and other predators.

Primary structural designs that provide for navigation as well as habitat diversity include:

- Notched Dikes
- Stepped-up Dikes
- Bank and Off Bankline Revetments
- Chevron Dikes
- Side channel Improvements
- Bendway Weirs

Notched Dikes

Rock dikes running perpendicular to the shore have long been used to guide the river and maintain the navigation channel. River engineers found that, simply by adding notches, the dikes continue to create navigation dimensions as well as support diverse habitats. The river is allowed to move in and out between the notches creating all four of the primary river habitats. Sediment buildup forms small sandbars between each of the dikes. A variety of notch locations, sizes and widths were studied to create the optimum design. The overall result, however, is the creation of diverse environments by making a small but significant design modification.

Figure A
Notched Dike Environment

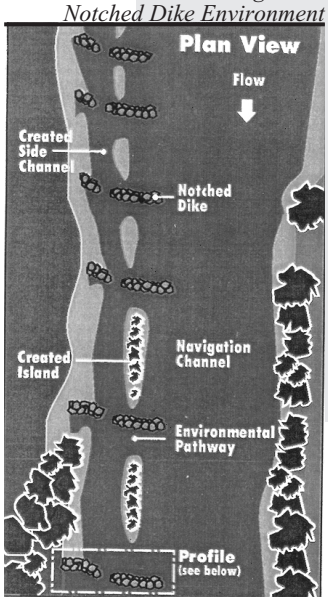
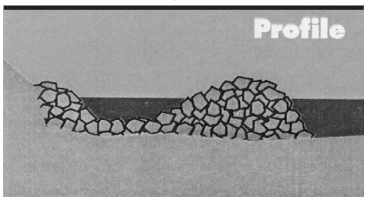


Figure B
Notched Dike Profile

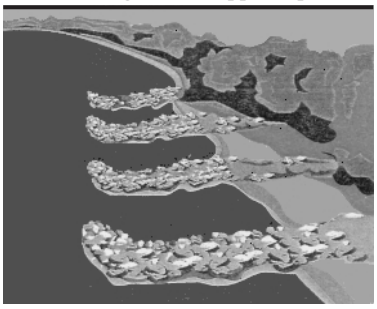


Stepped Up Dikes

Stepped-Up dike fields of various elevations are developed to provide an additional element of diversity. They counteract sediment deposition, thereby preventing the conversion of aquatic habitat into terrestrial habitat. In the stepped-up dike configuration, each dike in sequence rises two feet higher than the previous one. This approach utilizes the river's energy to change the sediment deposits as the water level rises and falls.

When the river's current hits the first dike it is propelled towards the main channel. As the river level rises, it moves over the first dike and hits the second dike, once again moving back into the main channel this process repeats as the river rises and falls. The river's current, moving over each submerged dike, allows the sediment buildup to be redistributed back into the main channel and carried downstream.

Figure C Stepped Up Dikes



Stepped Up Dikes

Figure D

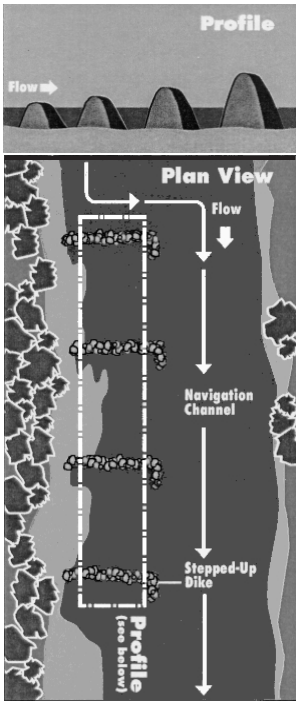


Figure E

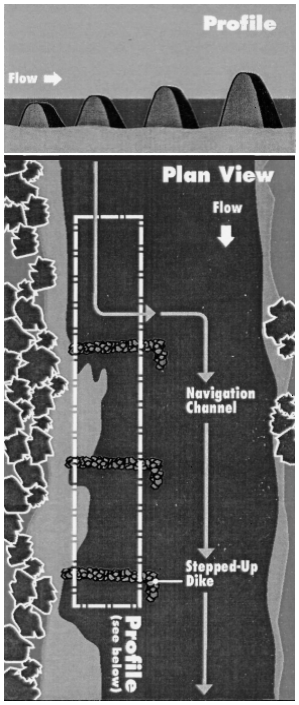


Figure F

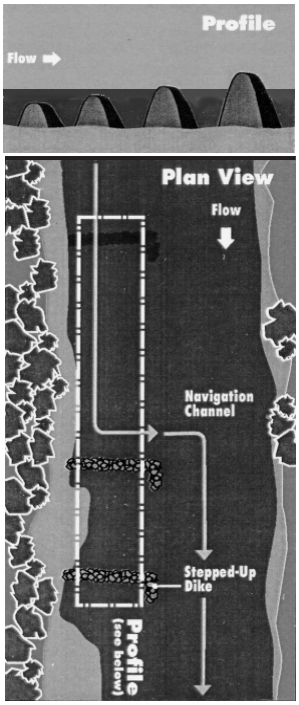


Figure G

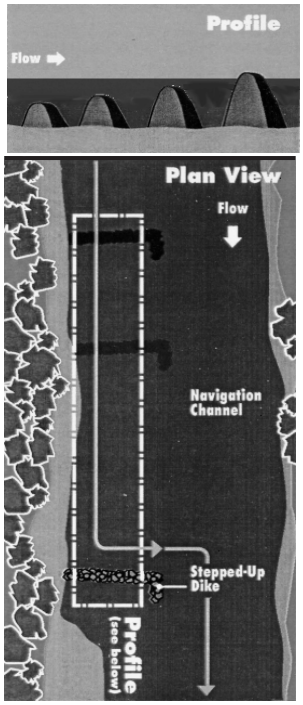
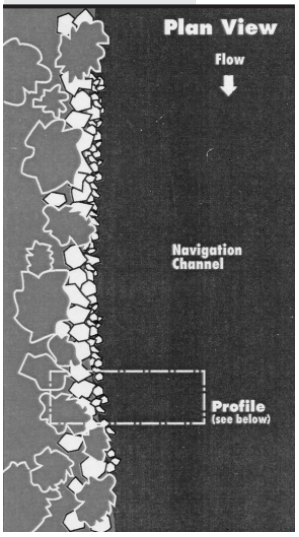
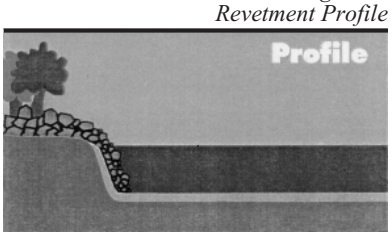


Figure I
Revetments in a Side Channel



Revetments

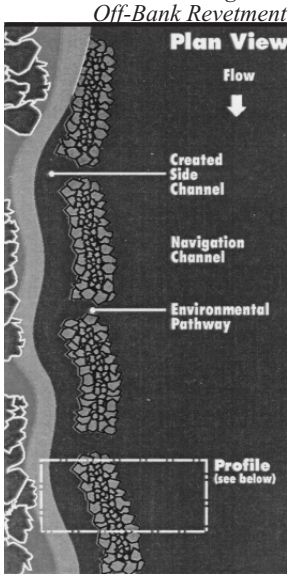
Figure H
Revetment Profile



Traditional methods of stabilizing eroding riverbanks through bankline revetments involve the removal of existing vegetation followed by grading the bank to form a stable slope on which to lay rock. The rock placed is relatively uniform with a maximum size of 400 pounds. The resulting environment is homogeneous and therefore does not provide as much diversity as the natural river banks.

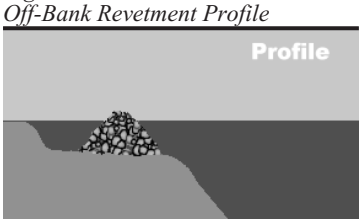
Current bankline revetment methods use a much more variable gradation of rock with a maximum size of 5,000 pounds. This change provides two important benefits. First, the larger maximum size rock provides greater bank stability. This removes the requirement to grade the bankline and remove all the vegetation. Now, trees and rock revetment can coexist. Second, the wider variation in rock size also creates greater habitat diversity and attracts more aquatic species than the natural caving bankline.

Figure J
Off-Bank Revetment



Off Bank Revetments

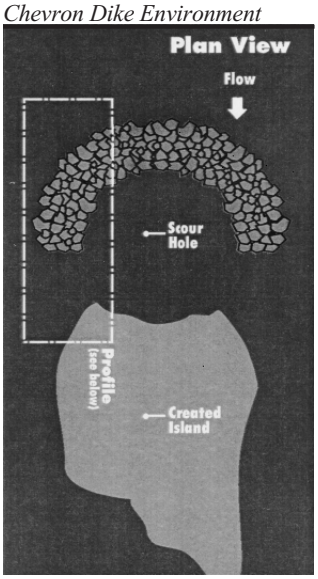
Figure K
Off-Bank Revetment Profile



In areas where the caving river bank is on the shallow side of the river, there is a greater flexibility to design alternative solutions.

By placing a parallel structure of stone off the bankline, erosion is reduced and diverse habitats are maintained. In some areas, the revetment is notched allowing fish to move between the fast water and the slow water easily. The areas between the revetments and the bank line are considered to be prime fishing locations by both commercial and recreational fisherman.

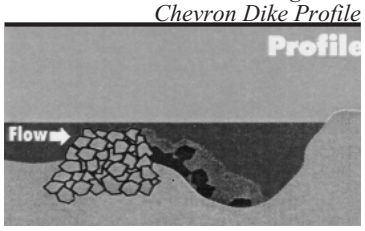
Figure L
Chevron Dike Environment



Chevron Dikes

A navigation structure called a chevron dike is used to improve river habitat and to create beneficial uses of dredge material. These structures are placed in the shallow side of the river channel pointing upstream. Their effect is to improve the river channel.

Figure M
Chevron Dike Profile

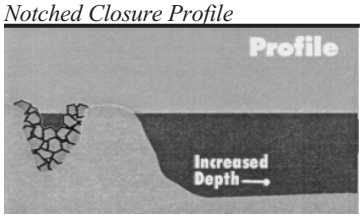


When dredging is needed to improve the main navigation channel, dredge sediment is deposited behind the chevron dike. These small islands encourage the development of all four primary river ecosystem habitats. In addition, various microorganisms cling to the underwater rock structures, providing a food source for fish.

Notched Closure Structures

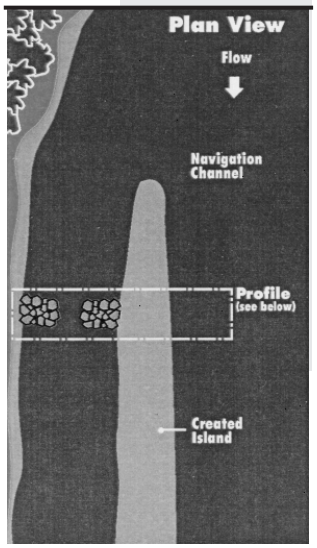
Side channels are not used for navigation, but are valuable environmental areas. Traditionally these side channels were closed with rock structures to divert the flow into the main channel. While improving navigation, this process tends to fill the side channels with sediment and convert aquatic habitat to terrestrial habitat.

Figure N
Notched Closure Profile



Notching a closure structure tends to keep the side channels from being filled with sedimentation. These structures form areas of deep water and shallow water creating a diversity of habitat, attracting different species of fish.

Figure O
Notched Closure in a Side Channel



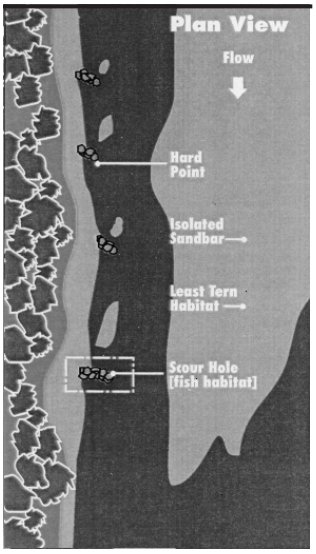
Hard Points in Side Channels

Hard points are very short rock dikes that are used to stabilize side channel river banks. These navigation structures extend from the riverbank into the river and do not cause a significant buildup of sediment. Their contribution to habitat improvement is the creation of scour holes under the hard points. These deep plunge holes attract catfish that flourish in this environment.

Bendway Weirs

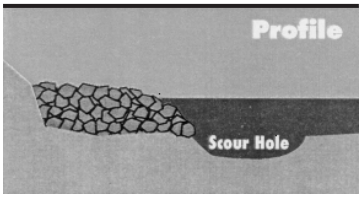
The Bendway weir is a low level, totally submerged rock structure that is positioned from the outside bankline of the riverbend, angled upstream towards the flow. These underwater structures extend directly into the navigation channel underneath passing tows. Their unique position and alignment alter the river's secondary currents in a manner which controls excessive channel deepening and reduces adjacent riverbank erosion on the outside bendway. Because excessive river depths are controlled, the opposite side of the riverbank is widened naturally. This results in a wider and safer navigation channel through the bend without the need for periodic maintenance dredging.

Figure P
Hard points in a Side Channel



Since 1994, studies have been conducted by the Corps, USFWS, IDNR and MDC to assess the impact of the bendway weirs on fish habitat. Data collected on fish populations and species composition on river bends with and without bendway weirs have generally shown increase in fish populations as much as five fold in the river bends containing bendway weirs.

Figure Q
Hard point Profile



Summary

Biological Studies on the various river navigation structures described above have found an increase in diversity and numbers of micro-invertebrates. To a lesser degree, fish communities are also found to have greater diversity. In addition, the larger problem of aquatic environment becoming terrestrial is reduced, the river channel is maintained, structures are basically self-maintained and biological diversity is increased.

Isolated sandbars created by the various navigational structures provide suitable nesting sites for the endangered Least tern. These sandbars are usually away from human encroachment which helps aid their development. In addition, the easy access from slow water to fast water is important for fisheries habitat.

Each structure is a piece of a giant jigsaw puzzle, having to "fit" exactly to create a safe and dependable navigation channel and at the same time, stimulate the rivers biological diversity.

Kaskaskia River Navigation Project

The Kaskaskia River originates in an area near Champaign, Illinois, and flows southwesterly for approximately 310 miles to its confluence with the Mississippi River, eight miles upstream from Chester, Illinois. It is the second longest river to be located entirely within the State of Illinois, the Illinois River being the largest drainage basin. The Kaskaskia River Basin is 175 miles in length and 33 miles in width, covering an area of approximately 5,840 square miles. The area included in this plan is limited to 3 of the 15 counties which are considered to be part of the drainage basin.

Official identification of the Kaskaskia River was made in 1768 when the river was surveyed and listed in the records of the Pennsylvania Historical Society (U.S. Corps of Engineers, St. Louis). Prior to this time, the river had been used by the resident Native American population and French traders and explorers. As development increased in the surrounding area during the late 1700s and early 1800s, efforts were made by the federal government and the State of Illinois to improve navigation on the Kaskaskia River by removing log jams and other navigation hazards. During this period, the river was used to ship wheat flour from Carlyle and New Athens to southern markets. In 1819, the State of Illinois declared the Kaskaskia River a navigable waterway. In the late 1800s, work was completed in creating a three-foot deep navigation channel.

During the late 1940s and early 1950s, planning studies were conducted by the Corps to determine the feasibility of providing a nine foot navigation channel on the lower Kaskaskia River in conjunction with the flood control reservoirs. In 1958, construction was begun on Carlyle Lake Reservoir and in 1966, one year prior to the completion of the reservoir, funds were appropriated for construction of navigation improvements on the Lower Kaskaskia River.

Dredging and Dredged Material Uses

When maintenance dredging occurs, excavated material is placed along the shore or between the channel and the bank. This material is almost always put back into the Mississippi River. Approximately 150 sites in the Rivers Project Area have been dredged at one time or another. River stage; hydrologic, geomorphologic, and geometric properties of a particular reach of the river; volume of material to be dredged; capability of the equipment used; river structures in a reach such as dikes, revetments, and locks and dams; the volume of river traffic; and recommendations received from federal and state conservation and fish and wildlife agencies are considered before locating a disposal site. Between 30 to 50 river locations are dredged regularly in the St. Louis District. Some locations are dredged very infrequently, others annually, and some more than once each year. All dredging activities comply with applicable federal and state regulations.

The St. Louis District coordinates with other pertinent agencies regarding locations which may require dredging and the proposed disposal sites. Yearly inspection trips are conducted with the Fish and Wildlife Work Group to discuss navigation and environmental issues on the river at which time dredge sites are evaluated and mutually agreed upon locations are identified. In addition, operations plans are developed for environmentally sensitive areas. Dredge and disposal locations identified after annual coordination meetings are coordinated prior to work using the internet, electronic mail, fax and telephone communications, with meetings conducted as needed.

The average annual amount of material dredged over the last 15 years is about seven million cubic yards. This material is temporarily resuspended during disposal. While sizeable, this amounts to only 7 percent of the suspended material passing St. Louis annually. Ninety-five percent of the material dredged in the St. Louis District is sand.

Whenever possible, material dredged to maintain the authorized navigation channel is used for beach nourishment and creation of sandbars and islands that are popular with recreational boaters. These newly created habitats may also become important fish and wildlife habitat.

Floods and Flood Damage Reduction

General Discussion

Since prehistoric times, the Mississippi, Missouri, Illinois and Kaskaskia Rivers have periodically topped their banks, flooding and shaping broad floodplains. Historic documentation of the effects of these floods abounds.

From Hannibal to Cairo, major floods have repeatedly washed over the floodplains within the St. Louis District. Perhaps the greatest flood in the nineteenth century came in 1844, before any levee system was in place. Flood water covered an area several miles wide from bluff to bluff and stood above the second story of houses in East St. Louis.

Floods in this century have caused extensive damage due to floodplain development.

Early flood control relied almost exclusively on levees, and throughout most of the 19th century, flood protection was a local option. A local organization, referred to as drainage or levee district, could tax local land owners to erect a barrier levee designed to keep high waters at bay.

The absence of a comprehensive levee system allowed the 1903 flood to disrupt commerce on the American Bottoms. Following this flood, the East Side Levee and Sanitary District, organized in 1908, began to encircle much of the urban and industrial district of the East Side of the metropolitan area with a levee system.

Between 1900 and 1930, Illinois River area residents built levees around over 140,000 acres of floodplain lands along the lower Illinois River. Along the Mississippi River, downstream from St. Louis, nearly 170,000 additional floodplain acres were lined with levees. These local efforts provided greater protection, and also encouraged more development of flood-prone lands.

One of the most devastating floods of all times occurred in 1927 and it motivated the federal government to undertake greater flood control programs. In all, the 1927 flood inundated over 16 million acres in seven states, causing more than $100 million in crop losses. More than 160,000 homes flooded, forcing over 350,000 people to seek refuge in Red Cross camps.

A primary charge of the Corps was improving navigation, but by the mid-nineteenth century pressure was building for the Corps to play a role in flood protection. Following recurring disastrous floods and pleas for help from residents in the affected areas, the federal government passed a series of Acts that made flood protection a responsibility of the federal government, and ultimately of the Corps.

Flood control became a major mission of the Corps in the mid-twentieth century. The Flood Control Act of 1936 called for a comprehensive system of levees, reservoirs to store excess precipitation, and channel improvements to speed water movement.

Major Mississippi River floods caused by excessive rainfall returned in 1944, 1945, 1947, 1951, 1973, 1993 and 1995. The 1993 flood was the historic flood of record and was notable for its duration. It exceeded the previous record (1973) by over six feet and remained over flood stage 148 days as compared to 77 days in 1973. The flood control system has provided the citizens of the valley a great deal of protection. To date flood damages prevented by the system of levees and reservoirs in the St. Louis District have exceeded $16 billion.

Today, the Corps oversees a vast engineering flood damage reduction system. The two main elements are levees and reservoirs. The St. Louis District flood control system includes approximately 100 levee systems protecting approximately 400,000 acres in the district, and five major reservoirs to reduce flood levels on the Rivers.

Levees

Levees are built to protect people, crops and transportation/utility, residential, industrial and business infrastructure from flooding. In the St. Louis District portion of the Mississippi River valley approximately 50 percent of the pooled river floodplain is protected by levees and about 80 percent of the open river floodplain is protected by levees. On the Illinois River, from Kampsville to LaGrange, approximately 80 percent of the floodplain is protected by levees.

There are three kinds of levees. They are described in *Table 4 – 43.*

Levees in the St. Louis District are identified in *Figure 4 – 44* through *Figure 4 – 47*.

Floodwalls

Floodwalls serve the same purpose as levees and are built when levees are not physically or economically feasible for a given area. They are high narrow concrete and steel structures, founded beneath the ground surface, with closures structures, or gates, that can be closed during floods. St. Louis, Missouri, and Cape Girardeau, Missouri, have riverfront floodwalls built by the St. Louis District.

Table 4 – 43 Comparison of Levee Characteristics

Federal Levees
Built by Corps of Engineers Made of a tightly compacted clay core with berms extending out at the base on both sides May stand on a base over 200 feet wide, with a crest 20 feet wide Size depends on the degree of protection required for adjacent property Federal agricultural levees built to withstand normal seasonal flooding and constructed with a height about 10 feet above flood stage Federal urban levees built to provide greater protection
Local or Non-federal Levees
Constructed by local agencies Often made of more permeable material capped with compacted clay Generally have steeper sides than federal levees
Private Levees
Construction specifications left to the builder Made of a wide variety of materials Generally the first to fail in a flood

Figure 4– 44
Mississippi River Levees – Alton to Clarksville Area

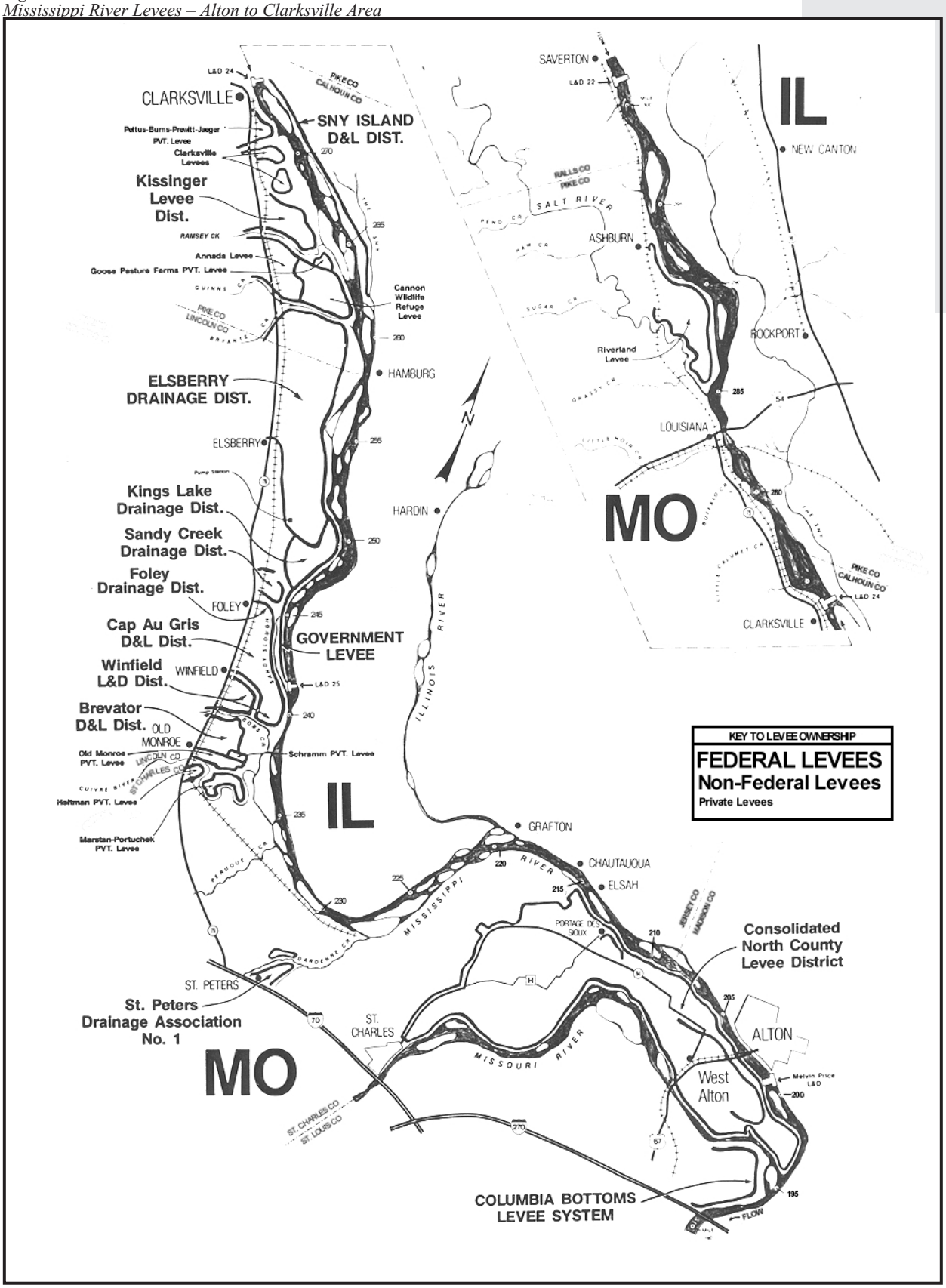


Figure 4– 45
Illinois River Levees – LaGrange to Grafton

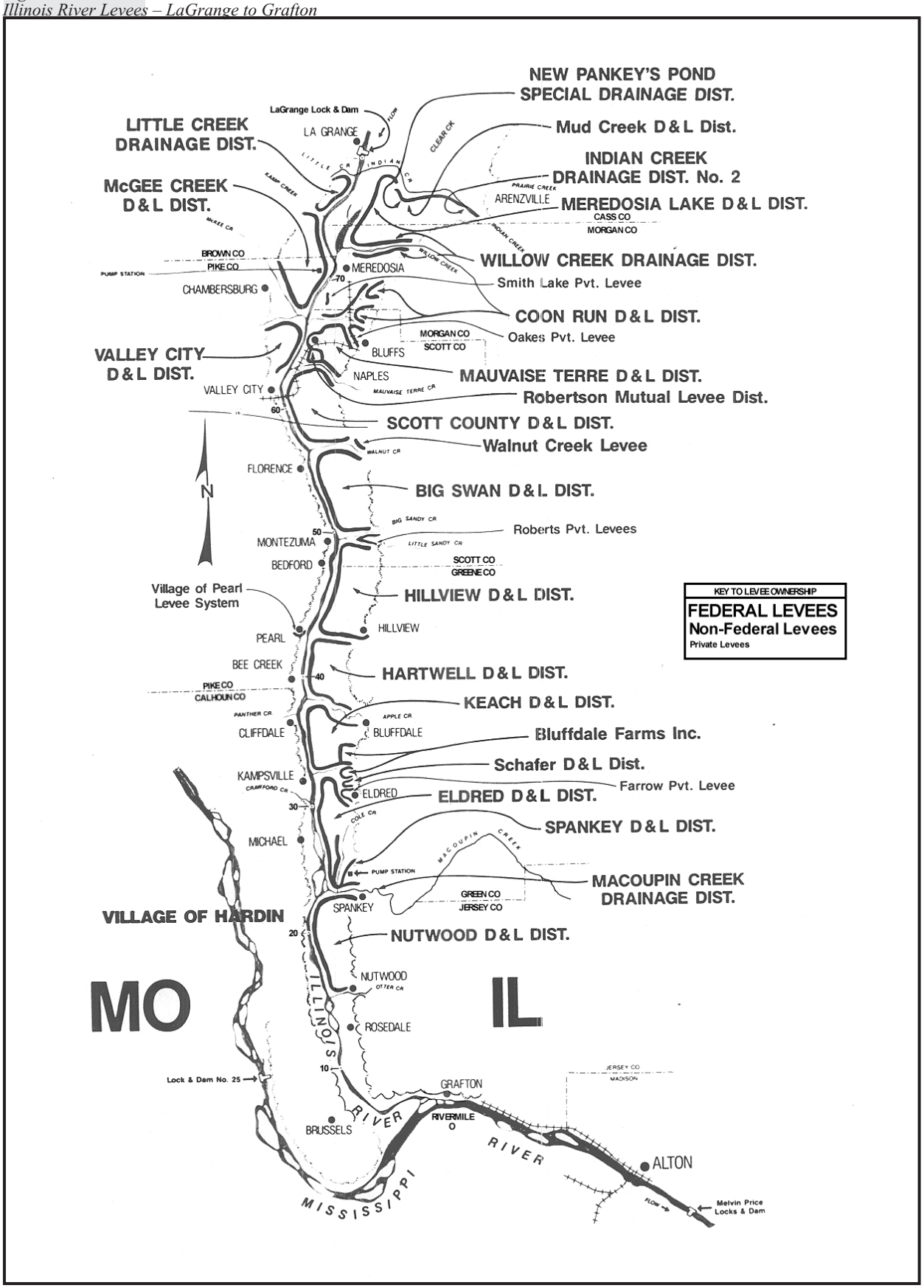


Figure 4– 46
Mississippi River Levees – St. Louis Area to Prairie Du Rocher Area

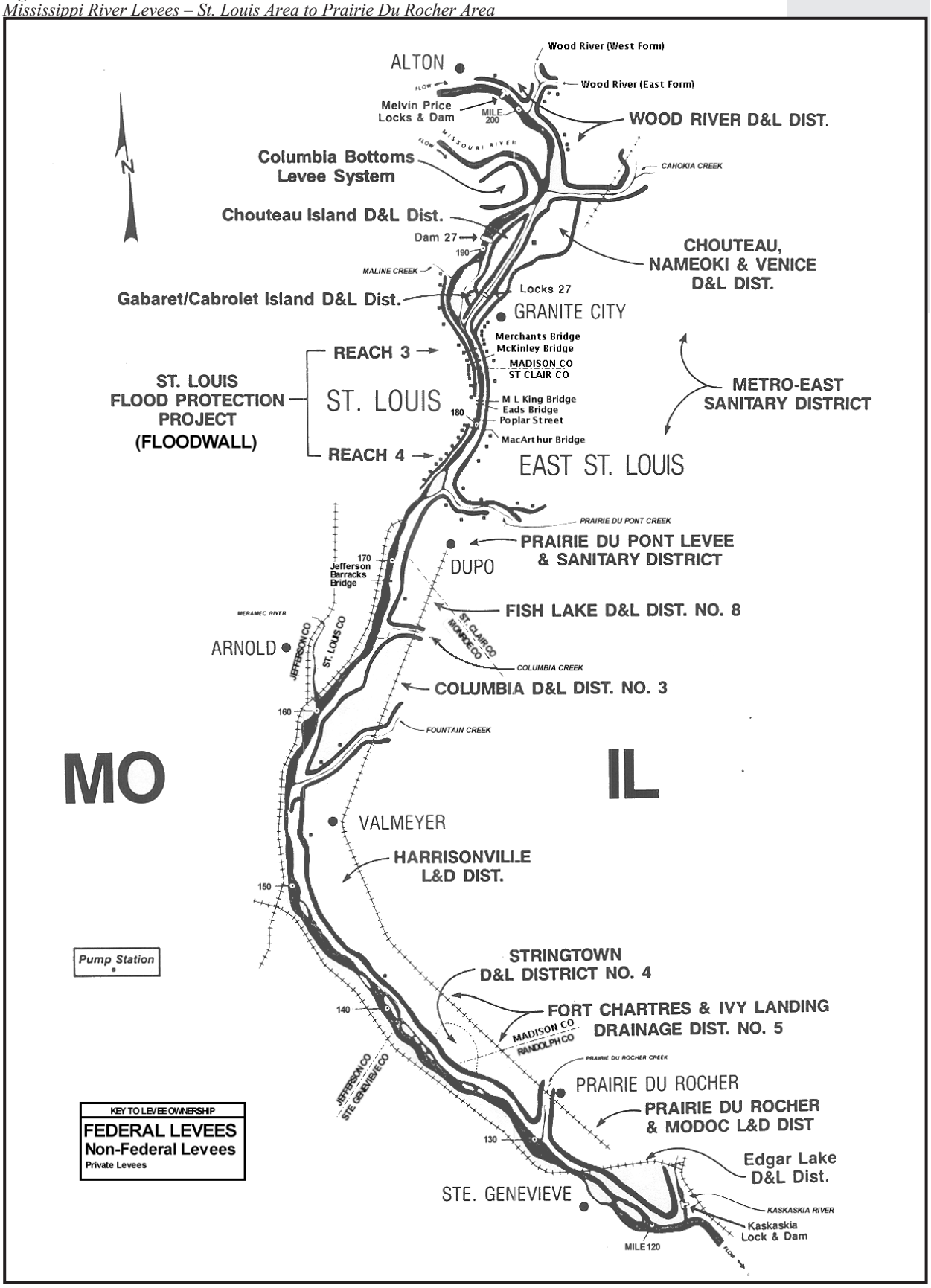
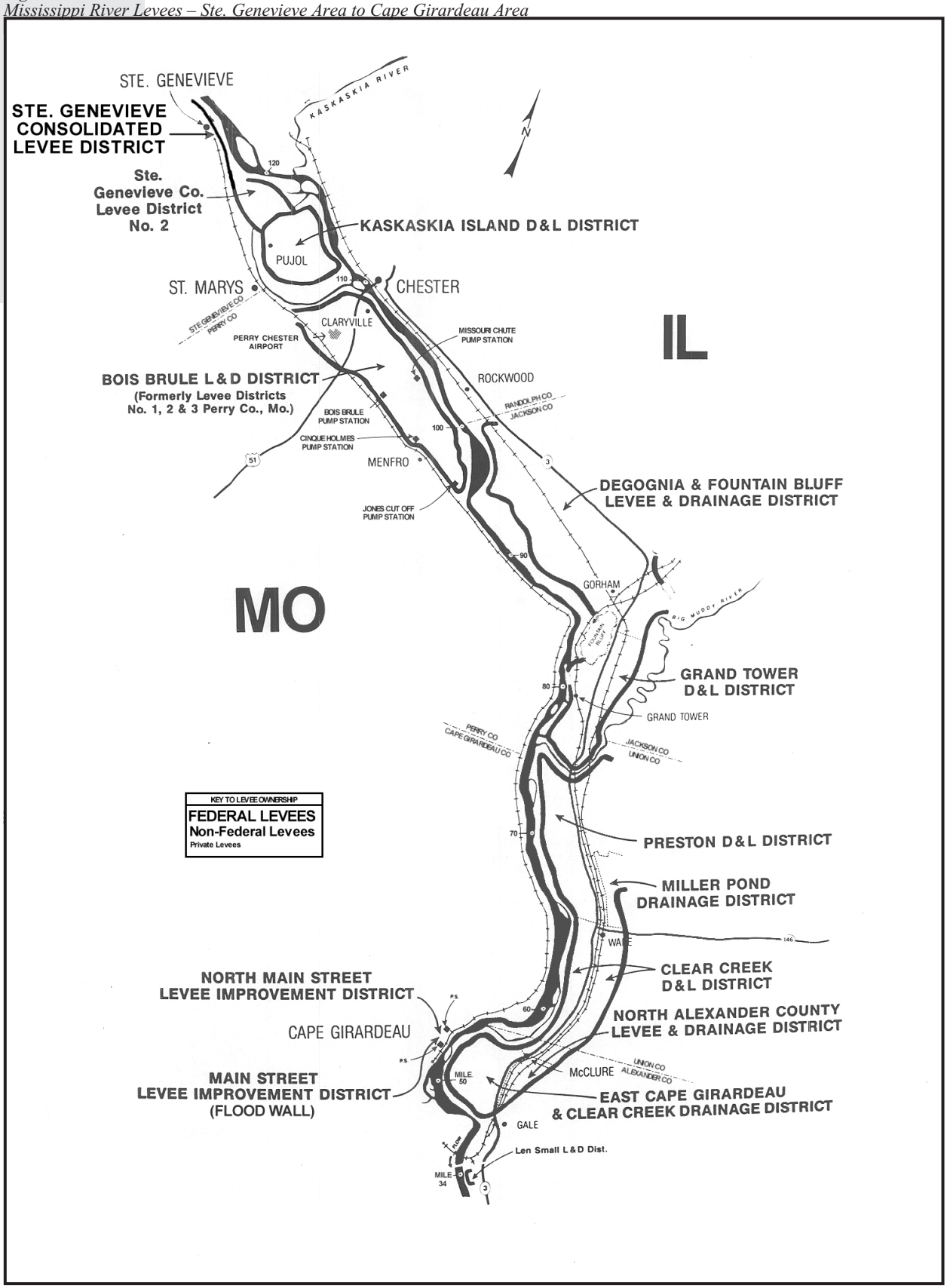


Figure 4– 47
Mississippi River Levees – Ste. Genevieve Area to Cape Girardeau Area



Flood Level Frequency Estimates

Based on historic data, flood level frequency estimates have been developed to determine flood protection project levels.

- A “50-year flood” has a 2 percent chance of occurring in any given year. Most agricultural levees are designed to withstand a flood of this magnitude.
- A “100-year flood” has a 1 percent chance of occurring in any given year. The Federal Emergency Management Agency requires 100-year flood protection for building in the floodplain.
- A “500-year flood” has a 0.2 percent chance of occurring in any given year. Five hundred-year flood protection is provided to some urban areas, such as St. Louis, East St. Louis, Wood River, Prairie Du Pont and Cape Girardeau.

Flood Control Reservoirs

The Corps has constructed a system of over 40 flood-control reservoirs in the entire Mississippi River Basin. The reservoirs store excess water during floods, and after the crest passes, the stored water can be released slowly.

Four major flood control reservoirs exist within the St. Louis District that affect the Rivers Project Service Area. They are:

- Mark Twain Lake on the Salt River, Missouri
- Lake Shelbyville on the Kaskaskia River, Illinois
- Carlyle Lake on the Kaskaskia River, Illinois
- Rend Lake on the Big Muddy River, Illinois

Initially authorized in 1936, this system of reservoirs became fully operational by the early 1980s. These giant holding basins can hold back vast quantities of water from the river systems and reduce flooding downstream.

In addition to flood control functions, other benefits provided by the reservoir system include:

- Hydro-electric power generation
- Drinking and irrigation water supply
- Water quality improvement
- Navigation control
- Recreation opportunities
- Fish and wildlife habitat improvement

The Great Flood of 1993

In the summer of 1993, very heavy and extensive rains in mid-June fell on the upper Midwest, eventually pushing the Mississippi River to a crest of 43 feet at St. Louis on 12 July, equaling the previous 1973 flood record. By mid-to late July, heavy rains in Iowa, North Dakota, Nebraska, Kansas, and Missouri caused record flooding on the Missouri River, setting a new record in St. Charles and pushing the Mississippi River to a record 49.47 feet at St. Louis on 1 August.

The flood of 1993 was one of the most damaging natural disasters to occur in the United States. Damage throughout the Midwest totaled $15 billion, 50 people died, hundreds of levees failed, and thousands of people were evacuated. In the St. Louis District, 12 of 42 federal levees

and 39 of 47 non-federal levees either failed or were overtopped. Of the federal levees that were overtopped, the crest of the river exceeded their design heights. For example, the Columbia, Illinois, levee that was overtopped was built to withstand a flood of 45.0 feet (as referenced to the St. Louis gage) and was overtopped when the Mississippi River at St. Louis exceeded 49.5 feet.

Flood damage prevented in the St. Louis District by the reservoirs and levees exceeded $5 billion in 1993.

By July 1997, the area's recovery from the flood was nearly complete, but concern over the cause of the flood and the likelihood of another remains. A series of federal, non-federal, and private levees continue to protect much of the developed and agricultural land along the Mississippi, Illinois and Missouri Rivers. Property has been restored or homeowners have been bought out and moved to avoid future damage.

4.10.LAND AND WATER USE CHARACTERISTICS

Introduction

General Description of Navigation Pools

The portion of the Mississippi River and floodplain in the St. Louis District is in a well-defined valley which was excavated by glacial activity. The present channel follows a winding course in a wide floodplain of alluvial terraces. The floodplain is bordered by high massive limestone bluffs of scenic beauty, rolling hills and hardwood forests. The distance between the valley walls varies. The landscape often shifts from the high limestone bluffs on one shoreline to broad floodplains on the other.

Mississippi River Navigational Pools

Pool 24 Land Use

In Pool 24, the river width varies greatly to a maximum width of approximately one-half mile at Louisiana, Missouri. The alluvial floodplain measures a maximum width, approximately seven miles, at the Salt River tributary on the Missouri side of the river. The average width of the alluvial plain of this pool is about five miles. The pool flows toward the west bluff, leaving a large floodplain on the Illinois side where extensive agriculture and small towns are protected by the levees.

Approximately 70 percent of the alluvial plain of Pool 24 is used for agriculture. The majority of the agriculture is cropland, but some pasture or grasslands exist. Agricultural activities probably could not be practiced in its present magnitude without the flood protection afforded by the existing levee systems.

Forest conditions occupy most of the remaining portion of the floodplain. Bottomland forests are found along the riverbanks, on the islands, along streams, around lakes and sloughs, and in low-lying areas. In general, forests exist in areas too wet to farm. The largest wooded area, a high-quality pin oak stand, now under stress from repeated flooding, is found on the southern half of the oval-shaped bottoms at the mouth of the Salt River and in managed by the MDC as the Ted Shanks Conservation Area.

Some lakes and wetlands occur on the floodplain in Pool 24. Lakes include the permanent water bodies that collect drainage, have restricted exits, or are land locked. Lakes frequently occur along the base of the levees on the riverward side. Many of these lakes are formed from borrow pits resulting from levee construction. Others occupy abandoned river meanders and side channels.

Ownership and management of public lands is significant in Pool 24. The USFWS operates the Delair Division of the Mark Twain National Wildlife Refuge. The Ted Shanks Conservation Area and the Upper Mississippi Conservation Area, managed by MDC, encompasses approximately 7,000 acres of lands and waters managed for fish and wildlife purposes. The MDC manages most of the Corps River Project lands and waters in Missouri for fish and wildlife purposes as authorized by the General Plan. The Corps conducts stewardship management on most of the federal lands acquired for Pool 24 on the Illinois side. Public access areas along this pool are developed and operated by either the Corps or the State of Missouri.

Small farming communities along the floodplain include the communities of Louisiana, Clarksville and Ashburn, Missouri, and Pleasant Hill, Rockport, New Canton, and Kinderhook, Illinois. The Missouri towns are located on the banks of the river, while the Illinois towns are several miles from the river usually along the edge of the floodplain. Louisiana, which had a 1995 population of 3,900, is the largest community.

State Highway 79 in Missouri and State Highway 96 in Illinois extend the length of Pool 24 on both sides. A rail line runs the length of the pool on the Missouri side as well. US Highway 54 and a railroad bridge cross the river at Louisiana, Missouri.

Industries in the area are primarily agriculture, cement, industrial chemicals, nurseries and retail services. Industrial land-use consists of four major barge terminals for the shipment of cement, sand, grain, and chemicals.

Pool 25 Land Use

The river in Pool 25 (reference *Plate L-25*) contains numerous islands and varies in width from 0.5 miles to 1.5 miles. Upstream from Lock and Dam 25, the floodplain, measured bluff to bluff, gradually widens from a width of 3.5 miles to 5.0 miles at Clarksville. The western (Missouri) portion of the floodplain is the widest side in the Pool 25 and is leveed almost the entire length. The eastern side of the alluvial plain is narrow and only the northern one-third is leveed.

Approximately 60 percent of the floodplain of Pool 25 is used for agriculture; most of the remaining 40 percent is in bottomland forest or other wetlands. The broad Missouri side of the floodplain comprises the bulk of the area's agriculture. A relatively small amount of agriculture is found on the narrow eastern floodplain in Illinois.

Forests occur along the riverbanks, on the numerous islands, along stream and riverside channels, and around lakes. Large areas of forest occur on the eastern floodplain, particularly in the areas from Batchtown to Hamburg, Illinois, in Calhoun County. Most of this land is in public ownership as a part of the navigation Pool 25 project and is jointly managed by the Corps, USFWS and IDNR. The riverbanks are forested nearly the entire length of Pool 25.

Public lands acquired for the navigation project are primarily confined to low-lying areas on the alluvial plain, adjacent to the river. Approximately 9,000 acres of Corps project lands and waters are managed by the USFWS in cooperation with the States of Illinois and Missouri. This includes the Batchtown Division of the Mark Twain National Wildlife Refuge. The areas managed by these agencies are for fish and wildlife purposes in accordance with the General Plan and Cooperative Agreement. In addition, some of the developed recreation accesses on project lands are leased to and operated by the States of Illinois and Missouri. The Corps also provides public access on Pool 25, primarily on the Missouri Side.

Urban development consists of the farming communities of Winfield, Foley, Elsberry, Annada, and Clarksville in Missouri, and Belleview, Pleasant Hill, Mosier, Hamburg and Batchtown in Illinois. Elsberry, which had a 1995 population of 2,200, is the largest community in the Pool 25 area.

A rail line parallels the river along the foot of the western bluff on the Missouri side of Pool 25. State Highway 79 borders the Pool on the Missouri side and Calhoun County roads and a portion of State Highway 96 borders the Pool on the Illinois side.

Pool 26 Land Use

In Pool 26 (reference *Plate L-26*) the floodplain widens to approximately 5.5 miles near O'Fallon, Missouri. The river is widest near Alton, Illinois, where it is just over one mile wide between vegetated banks. The width is due to the addition of the Illinois River, which measures about one-half mile across at the confluence of the two rivers at Grafton. In comparison, the floodplain produced by the joining of the Mississippi, Illinois, and Missouri Rivers, measures over twelve miles across from bluff to bluff.

In Pool 26, the alluvial floodplain and bordering uplands feature extensive forest and wetland areas. Major land-uses include recreation, agriculture, residential, commercial/industrial, transportation, extractive, and combined urban.

Approximately 60 percent of the alluvial plain of Pool 26 is used for agriculture. The main stem Mississippi portion of Pool 26 is not leveed except for the very lower end of the pool. Woodriver Levee District near Alton, Illinois, provides urban flood protection. Consolidated North Levee District is a large agricultural levee that provides protection from the Missouri River confluence area to the West Alton, Missouri area.

Forest conditions occupy most of the remaining portion of the floodplain. Bottomland forests are found along the riverbanks, on the islands, along streams, around lakes, and in low-lying areas. In general, forest exists in areas too wet to farm.

Lakes and wetlands are present on the floodplain and the Pool islands; however, many have been ditched and drained over the years primarily for agricultural use.

Public lands acquired for the navigation project are primarily confined to low-lying areas on the alluvial plain adjacent to the river and some of the islands in the river. Most of these lands are managed for recreation and stewardship.

In Pool 26, including the lower 15 miles of the Illinois River, there are approximately 18,000 acres of project lands and waters managed for fish and wildlife purposes by USFWS in cooperation with the States of Illinois and Missouri. This includes the Calhoun Division of the Mark Twain National Wildlife Refuge. These project lands were established in accordance with the General Plan with the Corps as authorized by the Fish and Wildlife Coordination Act.

Urban development on the floodplain consists of the Missouri farming communities of West Alton, Portage des Sioux, Orchard Farm, Old Monroe, and Winfield. Metropolitan areas partially on or adjacent to the floodplain in St. Charles County, Missouri, include St. Charles, St. Peters and O'Fallon. Communities on the Illinois side include Alton, East Alton, Godfrey, Elsah, Chautauqua, and Grafton. Numerous cabins and private and commercial marinas are located along the Missouri shoreline between Melvin Price Locks and Dam and the upper reaches of the pool near St. Charles, Missouri. The Illinois side of the river has only two marinas. Route 100 along the river is designated a national scenic byway and features bike trails, scenic views, and quaint towns that are popular with tourists.

Two rail lines, Missouri Highways 79 and 94, and several county roads parallel the pool on the west. The AmerenUE generating plant, located about two miles east of Portage des Sioux, Missouri, is the only commercial/industrial development. State Highway 143 and State Highway 100 (National Scenic Byway) follow the river on the Illinois shore.

Lower Illinois River Area Land Use

The Lower Illinois River portion of Pool 26 flows through an alluvial floodplain averaging 4 miles in width. The river width between vegetated banks is narrow, averaging about one-fourth mile across. This width is not constant where islands exist. The river widens to three-fourths mile across in several places.

Pool 26 influences the lower 80 miles of the Illinois River from Grafton, Illinois, to LaGrange, Illinois. Land use in the Illinois River floodplain, north of Nutwood, is approximately 80 percent agricultural, consisting primarily of cropland. The southern reach of the river from Kampsville downstream features a complex system of lakes, wetlands, and forest that are primarily navigation project acquired lands, and thus very little agriculture occurs on the floodplain.

Bottomland forests and lakes account for more than one-half of the floodplain area south of Nutwood. North of Nutwood, forest is found in narrow corridors along riverbanks, streams, and on the few islands. Large forested tracts occur around Meredosia Lake where the land is low-lying, tends to flood, and is risky to farm. Lakes and wetlands, like forests, are relatively scarce on the floodplain; relatively sizeable lakes and other wetlands occur only from Grafton to the Kampsville area and in the Meredosia area.

Pere Marquette State Park, the largest state park in Illinois, is located on the lower Illinois River, just upstream from Grafton. Numerous river and lake public access sites are located on project lands. Numerous cottage sites leased on project lands are also present.

Development along the Illinois River consists of regularly spaced and moderately sized farming communities and regional centers near the bluff and on the floodplain. Communities at the base of the bluffs include Grafton, Nutwood, Hardin, Spanky, Michael, Eldred, Kampsville, Bluffdale, Hillview, Pearl, Montezuma, Florence, Oxville, Valley City, Chambersburg, and LaGrange. Floodplain communities consist of Hardin, Naples, and Meredosia. Meredosia (pop. 1,100) and Hardin (pop. 1,000) are the largest communities on this reach of the Illinois River. Three rail lines serve the floodplain area. State Highway 100 follows the river from Grafton to Meredosia. River ferries exist near Grafton and Kampsville. River bridges are located in Hardin and near Florence, Valley City and Meredosia.

Pool 27 Land Use

The Corps operates and maintains approximately 3,400 acres of land acquired for the Locks 27 and Chain of Rocks Canal Project (reference *Plate L-27*). The locks and canal project was authorized by Congress in 1945 and construction was completed in 1953. The project is located entirely on the Illinois side of the river across the river from the City of St. Louis and adjacent to Granite City, Illinois.

The canal extends adjacent to the Mississippi River from RM 184 to RM 194.5. The locks facility includes one 1,200-foot main lock chamber and one 600-foot auxiliary lock chamber.

This project is part of the Nine-Foot Channel Project and was designed to bypass a dangerous reach of the Mississippi River in which rock ledges, excessive velocities, and shallow navigation depths constituted

hazards to navigation. Levees are located on each side of the canal, the west canal levee affording protection to the Chouteau Island Drainage and Levee District and the east canal levee forming a component part of the riverfront levee system of the East Side Levee and Sanitary District which protects the valuable industrial/residential urban areas on the floodplain in the Illinois Metropolitan area.

The east side of the canal includes the Tri-City Regional Port District. Granite City, the Melvin Price Support Center Army base and other industrial sites are immediately adjacent to project lands.

The west side of the canal includes Chouteau and Gaberet Islands which are primarily agricultural areas that are protected by levees and a large sanitary landfill. The “green space” afforded by the project is a popular area with residents from the surrounding Metropolitan area. A Madison County sponsored bike trail is developed on the east canal levee area and extends to the project visitor’s center at the locks site. The Corps provides public access sites on both sides of the canal and on the Mississippi shoreline for sightseeing and fishing. The State of Illinois operates a Lewis and Clark memorial on project lands on the upstream end of the project. A Lewis and Clark Museum and park is being developed on adjacent lands near the monument site.

Illinois State Highway 3 runs along the east side of the project area. The Interstate 270 Bridge crosses the Mississippi River and the canal over the project at RM 191.

Open River Land Use

The open river portion of the Mississippi River in the St. Louis District (reference *Plates L-01* and *L-02*) starts below Locks 27 in the St. Louis Metropolitan area (RM 183.2) and is also referred to as the Middle Mississippi River.

The open river generally divides the States of Illinois and Missouri, with isolated pockets of Illinois located adjacent to and contiguous with the state of Missouri and with isolated pockets of Missouri located adjacent to and contiguous with the state of Illinois. This is a result of the rivers’ propensity to meander and the choice of the 1839 thalweg (or river channel) to delineate the boundary between the states.

The development of the surrounding land can be generally characterized as rural and agrarian in nature with isolated areas of highly developed industrialized urban pockets. The largest of these is the St. Louis Metropolitan area and the second largest is the Cape Girardeau-Scott City area. The St. Louis area places a great deal of localized pressure on the Mississippi River due to intensive industrial and urban developments and subsequent pollution.

The deforestation and subsequent agricultural use of the surrounding lands has had and continues to have a dramatic impact on the river. Approximately 70 percent of the floodplain is in agricultural use. All of these areas are protected by a very extensive levee and drainage system. Erosion from the agricultural fields is the largest contributor to the silt and sediment carried by the river. Navigation, one of the first uses of the river by humans, continues to increase and to be of extreme importance. The increase in commercial navigation can be directly linked to industrial activities and agricultural development of the basin. After a well-organized commercial transportation system was in place, industrial development began to flourish and add to the increase in commercial navigation. The flood control levee and drainage system have had a dramatic effect by restricting annual flooding (frequency and severity) which, in turn, allows further development of the floodplain.

State Highway 3 in Illinois runs along the length of the Open River. U.S. Highway 61 and Interstate 55 run along the Missouri side. Bridge crossings occur between South County, Missouri and Columbia, Illinois (Jefferson Barracks) and at Chester, Illinois and Cape Girardeau, Missouri.

The Ohio, which doubles the volume of water in the Mississippi River, is the major tributary on the lower end of this stretch.

Other regionally important tributaries within the lower river of the St. Louis District include the Meramec River, Kaskaskia River, and the Big Muddy River with numerous smaller important rivers and creeks.

The major tributaries upstream of this stretch of the river include the Illinois and Missouri Rivers.

Kaskaskia River Land Use

The geographic location of the Kaskaskia River Navigation Project (KRNP) is on the edge of the St. Louis MSA. The area is primarily rural rolling farmland with forested areas primarily confined to area rivers, streams and other wetlands or steep hilly areas.

There are 36 miles of navigable waterways located in the KRNP located from the confluence of the Mississippi and Kaskaskia rivers north along the Kaskaskia to Fayetteville. Although the navigable portion of the river is short, the potential significance of these miles is heightened because the river flows into the Mississippi, thus providing access to all ports on the U.S. Inland Waterway System and to international deep water ports at Chicago and New Orleans. Therefore, shipment of goods and materials is not limited to KRNP lands or local markets but has the potential for reaching the entPire United States and the world.

The Kaskaskia Regional Port District provides a shipping facility and port on the project and promotes navigation and economic development on the waterway. Location of the Kaskaskia River Navigation Project is south of the most southern lock and dam facility on the Mississippi River

The St. Louis District Corps maintains a 9-foot deep, 225-foot wide channel in the Kaskaskia River during the ice-free season. A lock and dam facility is located on the Kaskaskia north of the confluence of the rivers to maintain the required channel depth on the Lower Kaskaskia. The facility is 600 feet in length and permits a tow of 5 to 6 barges to lock through at one time.

One large consumer, the Baldwin Power Plant, operated by Illinois Power Company, has a water supply contract to remove 36 mgd of water from the Kaskaskia River below Carlyle Reservoir. With one such large water user on the waterway, there is a problem in any additional industry requiring water consumption trying to locate in the area, as 36 mgd is only 4 mgd above the projected 100 year drought event, and most of the 4 mgd is utilized by the municipal water districts already in the area.

The majority of the land within the three counties surrounding the KRNP is classified as agricultural. The majority of farms in the area are classified as general farms since a variety of crops and livestock are raised on any one particular farm. Most of the land in each of the project area counties is in agriculture. St. Clair County has the lowest percentage of land in agriculture, 75 percent, due to its urbanization, while Monroe County has the highest of the three with over 90 percent of its land area in agriculture.

Major field crops produced in the three counties concerned are corn, wheat, and soybeans, followed by hay, oats, and barley.

The project area is accessed by State Highways 3, 154, 13 and 15. River bridge crossings are at Evansville, New Athens and Fayetteville. New Athens is the largest town (pop. 2,000) on the waterway.

Kaskaskia River Navigation Project Master Plan

In the 1970s, the State of Illinois prepared a Master Plan for the KRNP to address the current and future uses and management of the approximately 17,000 acres of acquired lands and waters and associated resources of the navigation project. The plan was approved in 1978 jointly by the key project partners, IDOT, the Corps, Kaskaskia Regional Port District and IDNR.

The outcome of the master planning process resulted in the identification of land use classifications for the project lands and waters. These classifications are listed in *Table 4–48*.

Lower Missouri River Land Use

The general development of the lands surrounding the lower Missouri

Table 4-48
Land Use Classifications – Kaskaskia River Navigation Project Master Plan

Land acquired by the Corps of Engineers	
Navigation Areas	
Fee	433 acres
O&M easement	2465 acres
Flowage easement.	5593 acres
Lands acquired by the State of Illinois	
Natural Areas	251 acres
Prime Industrial Areas	670 acres
Wildlife/Resource Management Areas	6297 acres
Low Density Recreation Areas	403 acres
Intensive Use Recreation Areas	222 acres
Multiple Use Management Areas	8674 acres
Total	**16,975 acres**

River in St. Charles and St. Louis Counties can be characterized as agricultural in nature, with the exception of the middle third of this reach. The middle third is a highly developed urbanized setting with subdivisions, factories, and commercial landings. The river is used for commercial navigation including gambling boats, tows, and tour boats, recreational boating, fishing, hunting, hiking the shoreline, bluffs and islands, and sight seeing. In addition, a portion of the Katy Trail courses along the river in St. Charles County.

St. Louis County continues to increase in population and St. Charles County ranks among the fastest growing counties in the United States. This continued population growth is placing tremendous pressure on the Missouri River floodplain. In both counties, the issue of green ways and green belts has surfaced as a major initiative to protect and enjoy the river. St. Charles County is better organized in this effort and appears to have the backing of the general public, business and the political establishment.

4.11.ECOLOGICAL RESOURCES

Introduction

The Rivers Project region is comprised of two primary biotic environments, the impounded slackwater navigation pools and the open or unimpounded river and their respective floodplains. Over the last 100 years—and more specifically within the last 50 years—logging,

agricultural and urban developments and the structures, facilities and maintenance activities used to facilitate navigation and to protect urban and agricultural areas from flooding, have significantly affected fish and wildlife habitats and the natural ecological processes of the rivers and their floodplains. While these human impacts continue today, much is being done to minimize on-going impacts and restore and sustain the rivers ecological health while continuing to reap its socio-economic benefits. This section provides an existing condition overview of the ecological resources associated with the rivers.

Large River and Floodplain Ecology Overview

Today's gently rolling agricultural landscape of the Upper Mississippi River basin is the result of intricate sculpting by massive glaciers during the Ice Ages. Blocks of ice scoured and filled the consolidated and semi-consolidated sedimentary bedrock of the valley, which consisted mostly of limestone, sandstone, and shale. Precambrian rocks underlie much of the present surface material, forming a basin in which many types of sediment occur.

A drier climatic period with strong winds followed the retreat of the glaciers, depositing fertile silt (loess) on top of the glacial drift that the sliding ice islands dropped as they melted. These silt deposits gave rise to the hilly prairies through which the Mississippi cuts its course. The river flows within a floodplain averaging from one to ten miles wide bordered by wooded hills and bluffs. In the Upper River, steep bluffs constrict the watercourse in many areas and the elevation drop from upstream to downstream is significant. Like many large rivers, the Mississippi's lower portion is prone to meander slowly and aimlessly through a broad and worn-down floodplain with little elevation drop. The streambed material is composed of reworked glacial deposits, modern sands, and gravel. In many areas, bedrock lies deep beneath the alluvial streambeds and the river drifts over as much as 200 feet of sand and gravel. In other areas, the bedrock is shallow and/or exposed.

The river molded the physiography and land forms which form the morphological setting for the ecosystem. Broad floodplains with gravel terraces, oxbow lakes, backwater areas, and periodically flooded bottom-land forests characterizes the valley ecosystem of this large alluvial river. The river affects and directs the dynamics of the ecosystem.

A river's floodpulse or natural river hydrograph, refers to the entire annual cycle of the water level, from low flow to flood crest and back to the low elevation (Junk et al. 1989). The annual flood pulse in the river valley controls the composition of the floral and faunal communities and recharges the floodplain with water, nutrients and sediments. In return, riparian communities donate nutrients to the river in the form of organic matter.

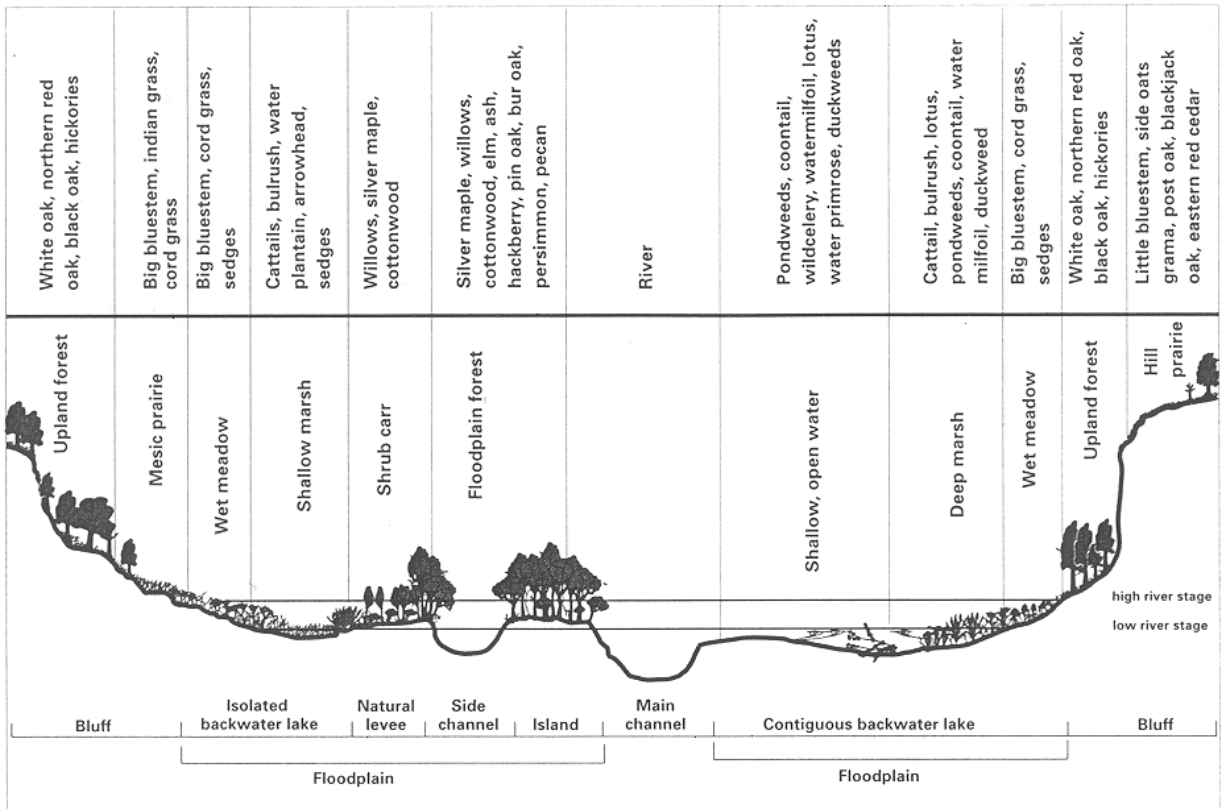
There may be more than one flood per year. During great floods, the floodplains do not merely store water, they become part of the flowing river itself, conveying water slowly downstream through the forests and Marshes. Over millennia, plant and animal species have adapted to exploit, tolerate or escape seasonal floodpulses. Exceptional great floods and droughts further create habitat and species diversity as well.

Riparian ecosystems are those natural associations of soil, flora, and fauna existing within the 100-year floodplain of a river and dependent for their survival on sufficiently high water tables and/or periodic flooding,

The riparian vegetational zones or types are directly related to elevations from the river, and to the frequency, duration, and depth of flooding.

Riparian communities are among the most diverse and productive on earth. Riparian ecosystems also provide habitat for animal species that

Figure 4 – 49
Hypothetical Floodplain Cross Section Illustrating the Habitat Types likely to occur on the Upper Mississippi River System



Source: John C. Nelson, Illinois Natural History Survey, Great Rivers Field Station, Alton, Illinois

use uplands; riparian zones depend on and fortify riverine environments. Therefore, they are inextricably linked to their neighboring ecosystems, and, because life on earth is one web of energy and matter exchanges, they are linked to all ecosystems.

The process of sediment deposition makes it possible for most riparian communities to include a primary succession component. The new soil is colonized by plants such as silver maple, cottonwood, willow, and, depending on location, other species that can survive in unstable substrates, stabilizing them for species characteristic of more mature seral, or successional, stages

Seedlings of cottonwood and willow need direct sunlight and are eventually shaded out by their parent trees. The closing of a cottonwood-willow canopy on the Mississippi River gives a competitive advantage to such species such as silver maple, green ash, river birch, box elder, mulberry, and elm. Underneath the forest canopy dense webs of poison ivy, trumpet vine, grape, bur cucumber, and wood nettle take the place of their shade-intolerant predecessors. On low, excessively moist sites, succession often stops at the silver maple or willow stage. In areas of the floodplain where sediment accumulation has raised the site, thus improving drainage and providing a drier, terrace with stable substrate, American elm, sycamore, white ash, hickory, pin oak, black walnut, river birch, box elder, bur oak, and pecan prevail. Here the understory may contain persimmon, red-osier dogwood, flowering dogwood, redbud, hackberry, black cherry, mulberry and tall paw-paw in an intermediate canopy that is usually absent in pioneer communities. The ground cover

typically contains such species as poison ivy, bur cucumber and wood nettle to name a few.

The fauna of the riparian ecosystem are also related to water levels and floodpulsing and to water surface area losses due to natural and human-induced sedimentation.

A wide variety of wildlife thrive in the unique ecological conditions of riverine forests and wetlands. Riparian ecosystems in their natural state provide many basic wildlife needs, such as early seral vegetation for foraging, water for drinking, and lush growth for hiding and nesting cover. Amphibians require a land-water interface to pass from larval to adult form. Aquatic furbearers, such as beavers, river otters, minks, and muskrats, require a healthy bank habitat to survive. Many unique floodplain habitat types harbor rare animal species that are highly dependent on one specific type of habitat. Bottomland hardwood forests, for example, provide irreplaceable habitat for gars, bowfins, and several turtle species that have changed little since prehistoric times.

There is also abundant and variable birdlife. Several species may be found at the extremes of their ranges, due to the mid-continental location, the climatic conditions of the sheltered valley, the merging of life zones, and overlapping species ranges.

In summary, the flood-adapted animals and plants, the seasonal floodpulses and infrequent great floods and droughts, the river and its channel, and the complex patchwork of floodplain habitats, together, constitute the dynamic and phenomenally productive river/floodplain ecosystem (Junk et al. 1989, Sparks 1995).

Major Habitat Descriptions

The Aquatic Environment

Aquatic habitat in the pooled portion of the Mississippi River has been defined and classified for the purpose of scientific study and fishery management (Sternberg, 1971). Six separate habitat types have been identified; these are: (1) main channel, (2) main channel border, (3) tailwaters, (4) side channels, (5) river lakes and ponds, and (6) sloughs. (See *Figure 4 - 50)* Approximately 100 species of fish and 30 mussel species are known to inhabit the project area waters.

Main Channel Habitat

The main channel habitat includes the 300-foot wide, 9-foot deep navigation channel and areas riverward of the ends of wing dikes. A current always exists, varying in velocity with water stages. Bottom type is usually a function of current. Sand predominates in the upper pools and sand over silt in the lower reaches. Rooted and floating vegetation is absent. Phytoplankton diversity is low. Of the six habitat types, the main channel supports the fewest number of fish and other aquatic organisms. Channel catfish, flathead catfish, sturgeon, drum, white bass, species of buffalo fish, paddlefish, shortnosed gars, mooneye, gizzard shad, and redhorse as well as some mussels are normally found in this habitat. Near the upper end of the pool, walleye and sauger are found.

Main Channel Border

The main channel border lies between the ends of wing dikes and the main river bank, islands or submerged parts of the old main river channel. The area may be thought of as being part of the main channel, but for fishery purposes is considered as separate habitat. Banks are frequently rip-rapped. Phytoplankton and zooplankton diversity is low and most concentrated near shoreline areas. Dredged material has been placed in some sections of this zone, sometimes covering wing dikes. The bottom is mostly sand in the upper sections of pools and silt in lower

reaches. Little or no aquatic rooted, floating or emergent vegetation is generally present, although efforts such as EPM are increasing vegetation in these areas. Mussel beds are often found in the main channel border. Channel catfish, white bass, carp, freshwater drum, paddlefish, sturgeon, flathead catfish, sauger and walleye are part of this habitat. Forage fish are generally abundant. This habitat accounts for approximately 25 percent of aquatic habitat types in the Rivers Project area.

Tailwater Habitat

The tailwater habitat includes the area immediately downstream of dams. Turbulence from the passage of water through the gates of the dam characterize the habitat. Bottom conditions are rocky and devoid of rooted or attached aquatic vegetation. This highly aerated water attracts an abundance of forage fish and such predatory species as walleye, sauger, white bass, and catfish. The downstream boundaries for defining the tailwater fishery habitat have been set a distance of one-half mile below the dam.

Side Channels

The side channels are off the main channel and main channel border and have a sustained current during normal river stages. These habitats vary in length from a few hundred yards to several miles, and in width as well as volume of flow. They are also sometimes called sloughs, running sloughs, chutes, cuts, cutoffs, and canals. Unless they are former main channel, the banks are usually unprotected. Undercut or eroded banks are common near their departure from the main channel. Closing structures or diversion dams are frequently present. The bottom type usually varies from sand at the upper reaches to silt in the lower. Rooted aquatic vegetation is absent in the swifter current, but may be common in shallower areas with silty bottoms. The habitat supports a diverse number of species such as channel catfish, sauger, drum, black bass, crappie, sunfish, carp, paddlefish, whitefish and buffalo spp. This diminishing habitat has been identified as one of the highest value fisheries in the study area.

River Lakes and Ponds

River lakes and ponds are expanses of shallow water, normally having little or no flow. These habitats may or may not be connected with other water bodies. Bottoms are composed of muck or silt. Heavy growths of aquatic vegetation are normally present. Bullheads, carp, crappie and bowfin are a few of the many species of fish generally associated with this habitat. This habitat is heavily used by aquatic furbearers and waterfowl and other aquatic dependent waterbirds.

Sloughs

Sloughs are similar to lake or pond habitat, except that they are relatively narrow branches or offshoots of other water bodies. They are characterized by their lack of current at normal water stages, muck bottoms, and abundance of submerged and emergent vegetation. Sloughs, and some of the ponds and smaller lakes in the floodplain, are representative of ecological succession taking place in the river bottoms. Catfish, buffalo, carp, and members of the sunfish family inhabit these areas. They are also heavily used by waterfowl, aquatic furbearers, reptiles and amphibians.

In general, backwater habitats, including river lakes, ponds, and sloughs, are characterized by having no current at normal water stage and muck bottoms. Sloughs generally have an abundance of aquatic vegetation. The species diversity and density of aquatic macrophytes, phytoplankton, zooplankton, benthic fauna, and fish are usually higher in backwater areas than in main channel habitats. These habitats are

critical for fish because they provide favorable spawning and nursery conditions which are scarce on the main channel areas.

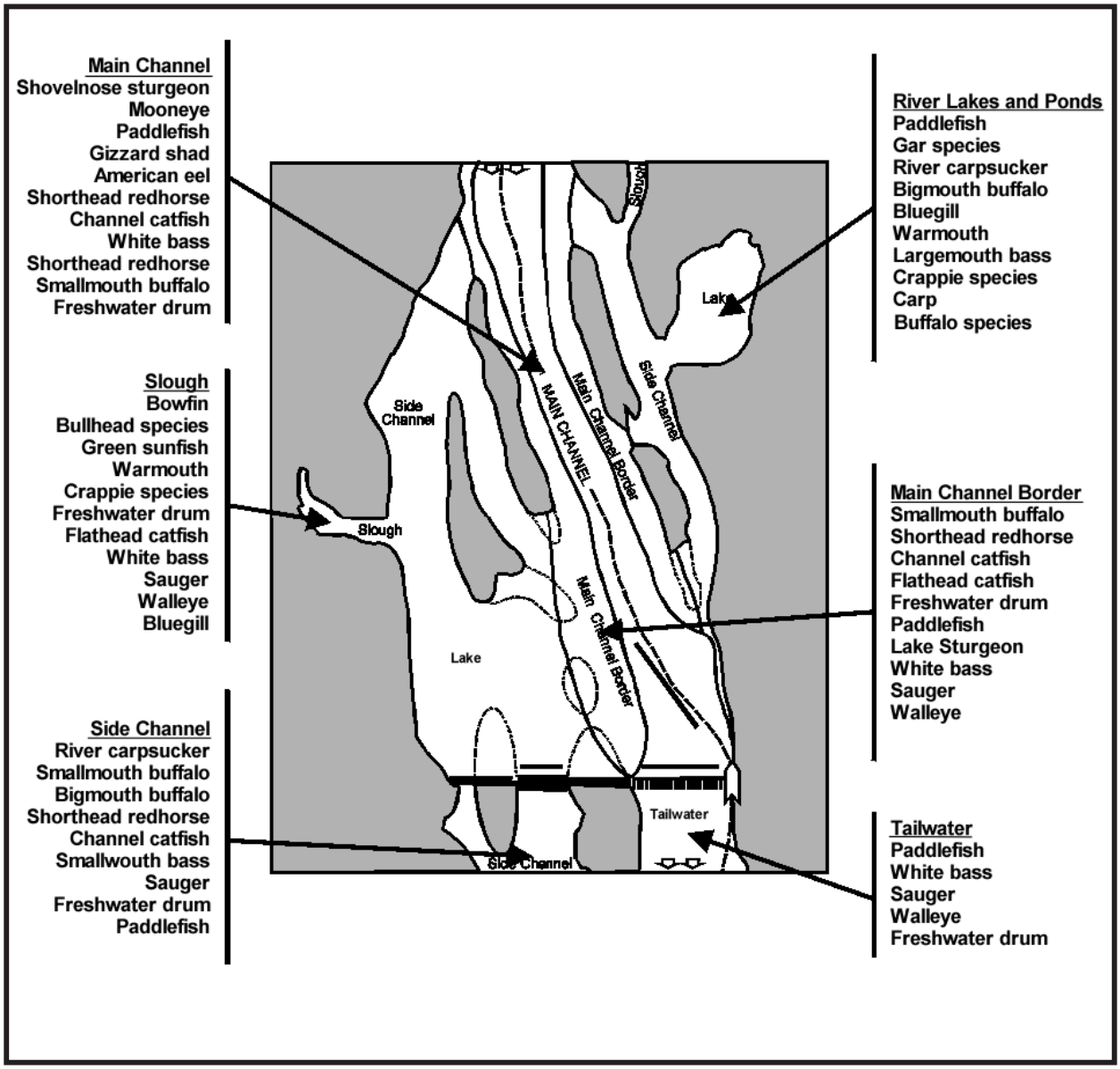
Open River

The Open River reach of the Mississippi River is lined with revetments, dikes and bendway weirs to provide the navigation channel. This reach is characterized by 23 existing side channels and other non-channel areas. These off-channel areas of high biological productivity constitute less than 5 percent of the total area today.

The open river differs substantially from the pooled segment of the river primarily because of: (1) higher currents, (2) greater water level fluctuations, (3) Increased turbidity and (4) different methods are used to maintain the navigation channel.

The open Mississippi River supports a diverse fish fauna. Over 100 species of fishes in the open river have been documented.

Table 4 – 50
Species of Fish Found in Specific Aquatic Habitats



Approximately 20 fish species may be classified as sport fish and 25 species are classified as commercial fish. Twenty species are cited as common to moderately common near the mouth of the Ohio River but relatively rare upstream from there. Eleven species are considered rare to extremely rare throughout the Open Mississippi River. The majority of the fish (Approximately 45 species) are of widespread or sporadic distribution with intermediate levels of abundance. In general, however, most species found in the open river are found in the pooled river. Unique open river species include sturgeon chub, sicklefin chub and pallid sturgeon.

Kaskaskia River

Approximately 100 species of fish are known to inhabit the Kaskaskia River and are evidence of the large number and variety of habitats along various portions of the river. Aquatic habitats along the channelized portion of the river include deep pools in the channel itself plus area off the main channel such as swamps, tributaries, and oxbows. These areas provide fish cover in the form of logs, exposed tree roots, fallen trees and sand-gravel riffles and pools. Conditions of the river itself are representative of a mid-western prairie stream, having a low stream gradient, turbid water, and a bottom of mud, clay, silt, or shifting sands (Yarbrough, et al, 1974).

Inhabitants of the channelized portion of the river include carp, crappie, bass, catfish, gizzard shad, and an occasional walleye.

The Terrestrial Environment

Bottomland forest cover is most typical habitat type of the riparian borders and islands of the Rivers. Scattered permanent, seasonal, and ephemeral wetlands are also found on the floodplain proper. Many of these habitats provide highly productive food and cover vegetation used by a variety of wildlife species. More than 400 species of vertebrate animals other than fish, have been recorded utilizing the river and floodplain related habitats. The species and sub-species are composed of approximately 50 mammals, 300 birds and 80 reptiles and amphibians.

The five major habitat types that occur on the floodplain are: (1) sand bars and mud flats, (2) open wetlands, (3) old fields, (4) agricultural fields, and (5) floodplain forests.

Sandbars and Mud Flats

Sandbars and mud flats are found along shores where receding water levels have left flat exposed areas. They are also found behind dikes where deposition results in sandbars, downstream of locks and dams, and in the river where deposition has resulted in semi-permanent or permanent islands. Vegetation cover is generally herbaceous consisting of annual grasses, composites, and sedges. Willow, cottonwood, sycamore, and silver maple seedlings may be found. This habitat is subject to frequent inundation which often limits vegetation. Sandbars and mud flats comprise a very important habitat. It provides food and resting areas for shore birds, several species of reptiles and amphibians and mammals such as opossum, raccoon, muskrat, beaver, mink, otter and deer.

Open Wetlands

Open wetland areas include drainage ditches, lakes, ponds, marshes, hydric prairies and sloughs found in the project area. Water levels fluctuate in these areas, causing the presence of water-tolerant vegetation. Abundant edge habitat is available because backwater areas characteristically interrupt other types of habitat. Vegetation cover is

primarily a herbaceous layer comprised of arrowheads, millets, smartweeds, lotus, rushes and other hydric and semi-aquatic plants; the drier backwater areas support grasses, sedges, and shrub and tree seedlings. Seasonal floods frequently control vegetation types and abundances. Mammals present include muskrat, mink, raccoon, white-tail deer, otter and beaver. More than 140 species of birds, predominantly waterfowl, swimming, diving, wading, and shore birds use this habitat. A large variety of amphibians and reptiles, including salamanders, toads, frogs, turtles and snakes, thrive in these areas as well.

Old Field and Disturbed Areas

Old Fields are generally abandoned, cultivated fields. Disturbed areas include similar habitats resulting from disruption including levees, roadsides, and other natural and constructed disturbances. The vegetation, such as weedy herbs, grasses, woody vines, shrubs, and tree saplings, is generally herbaceous. This habit is well-suited for small mammals, including eastern cottontail rabbit, skunk, opossum, fox squirrel, raccoon, and deer. Numerous birds, including several rare species, utilize the food and nesting resources of the old fields. Game birds include quail, ring-necked pheasant, woodcock, turkey and mourning dove. Reptiles and amphibians also use this habitat for food and cover.

Cultivated Fields

Cultivated fields have little vegetational diversity. They consist predominantly of corn, soybeans, or wheat on the floodplain. Mammals that utilize this habitat include mice, pocket gophers, woodchucks, Norway rats, coyotes, red foxes, deer and skunks. Numerous shore birds and waterfowl species forage in these areas.

Floodplain Forests

Common floodplain forests are a predominant habitat type in the river-associated ecosystem. They are generally confined to unprotected areas outside levees and to low and poorly drained areas behind levees. Bottomland forest associations often lack abundant ground cover, due to frequent flooding and deposition of alluvial material and debris. Therefore, small mammal ground dwellers are not encountered frequently in this habitat. Mammals found in the floodplain forest include opossum, fox squirrel, white-footed mouse, raccoon, coyote, gray squirrel, and white-tailed deer. Raccoon and deer prefer the edge habitat. More than 140 species of birds can potentially be found in the floodplain forest throughout the year. These areas are important for wood duck nesting. Numerous species of reptiles and amphibians also utilize floodplain forests.

Floodplain Forest Communities

Floodplain forest communities that occur within the Rivers Project Area are described briefly below:

Willow Community

Willow communities occur as narrow bands along river banks and sloughs. This important pioneering community also invades the sandy, frequently inundated ends of growing islands. Establishment of the willows increases deposition and extends sandy islands. Principal species are black willow (*Salix nigra*), sandbar willow (*Salix interior*), and rigid willow (*Salix rigida*). As these dense stands mature, they are generally replaced by cottonwood and silver maple.

Silver Maple-Cottonwood Community

This community is the most extensive community along the Mississippi River and often occurs on the landward side of the willow bands and along sloughs. Although less flood tolerant than the willow community, it can withstand annual flooding and develops best on an unprotected floodplain. Silver maple (*Acer saccharinum*) dominates (75 percent), with cottonwood (*Populus deltoides*) as a principal species. Also, found in this community are Elm, willow, pecan, box elder, and ash. Ground cover is sparse. Pin oak sometimes occurs as a co-dominant with silver maple; such stands are designated as Silver Maple-Cottonwood-Pin Oak Communities.

Silver Maple-Cottonwood-Pin Oak Community

This community is similar to the silver maple-cottonwood community; pin oak and silver maple are co-dominant. These forests are located primarily along the Mississippi River in areas bordering the silver maple-cottonwood community and the pin oak community.

Pin Oak Community

Pin oak forests are most common on the protected (usually leveed) floodplain, but may occur in areas regularly subject to flooding. Species diversity is good, probably reflecting the more mesic conditions, and dominance is shared by several species. Species include pin oak (*Quercus palustris*), silver maple, pecan, deciduous holly, sugarberry, ash, Elm, red mulberry, and many other species.

Oak-Hickory Community

The few small forested areas on Pleistocene river terraces, north of the confluence of the Illinois and Mississippi Rivers, consist of the Oak-Hickory Community. Species composition is not similar to the typical upland oak-hickory forests of the Midwest. Similar forests have not previously been described. Six species of oak and two species of hickory are found in this community; associated species include slippery elm, hawthorn, deciduous holly, and black walnut.

Cypress-Tupelo-Ash Community

The Cypress-Tupelo-Ash community is a rare plant association that occurs in remnant oxbow lakes only in deep southwestern Illinois and southeastern Missouri. The trees are adapted to grow inundated in shallow water throughout most or all of the growing season. The dominant species are bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), green ash (*Fraxinus pennsylvanicus*) and sweet gum (*Liquidambar styraciflua*).

Waterfowl and Other Migratory Birds

Waterfowl Management

The key purpose for the General Plan-Cooperative Agreement lands and waters addressed in this Master Plan is to sustain migratory bird populations. These lands and waters are also North American Waterfowl Management Plan (NAWMP) designated areas.

The Mississippi River is a migratory flight corridor for approximately 40 percent of all North American waterfowl and other migratory bird species. Common puddleducks using the flyway include mallard, wood ducks, green and blue-winged teal, pintail, gadwall, widgeon and shoveler. Common diving ducks include the lesser scaup, ringneck, bufflehead, goldeneye, canvasback, redhead and merganser. Canadian, snow and blue geese winter in the area as well. The importance of this area is highlighted by the NAWMP's designation of the Upper Mississippi

River as one of the waterfowl habitat areas of major concern in the U.S. Since 1970, trend analysis data shows a decreasing trend nationwide for waterfowl populations in general, and also specifically for mallards, the most abundant duck in the Mississippi flyway. The Upper Mississippi River is one of the most important areas for this species. The major factor attributed to this decline is deterioration of northern breeding grounds. However, habitat loss is also a concern in areas used by waterfowl for resting and feeding during migration and for wintering. Waterfowl are physically stressed during migration periods, and the effects of habitat loss and degradation or disease outbreaks in migration corridors is significant. Many areas, historically used by migrating waterfowl have been lost to agriculture, and other land and water uses and the quality of much of the remaining habitat has decreased substantially. The aim of the NAWMP is to ensure the preservation of enough high quality waterfowl habitat to sustain waterfowl populations at levels for a fall flight of more than 100 million ducks (i.e., the 1970 level). For the mallard, the goal is to return to 1970-1979 population levels (or approximately 15 million birds in the fall flight).

During the fall, moist soil plants provide a significant portion of the diet for many species of migrating and residential waterfowl in the region. These plants start from seed (artificially or naturally) on exposed mud flats during the summer, but must become subsequently inundated by 0.5 to 1.5 feet of water in the fall, which enables waterfowl to feed upon the seeds produced. Moist soil plants are especially sensitive to water levels during early growth when inundation can drown them. When water levels are dropped in the fall, as a result of navigation pool operations, the moist soil plants may be left stranded on mud flats. These plants then become inaccessible to waterfowl. To avoid this problem, many private hunting clubs and public agencies such as the Corps, USFWS, and state conservation agencies have built low levees adjacent to the pools to artificially control water levels to produce river conditions that are favorable for waterfowl use. These areas are not affected by normal fluctuations in river stage unless the levee is overtopped by flooding. Other important foods for migrating waterfowl include submerged aquatic plants, numerous species of aquatic invertebrates and fingernail clams (which are an important food source for diving ducks). Animal food sources are especially important to waterfowl during spring migration.

The spatial arrangement of project lands and their habitat conditions exert a strong influence on waterfowl numbers and distribution within the region. A large number of waterfowl use federal lands and waters administered by the Corps and the USFWS as wintering grounds or for resting and feeding during migration.

Pool 24 contains the USFWS Delair Refuge. MDC manages the Clarksville Refuge as well as Pharrs Island and Ted Shanks Conservation areas.

Pool 25 contains two federal refuges, Clarence Cannon adjacent to project lands in Missouri, and Batchtown Refuge on project lands and waters in Illinois. A number of Missouri and Illinois managed public hunting areas and private hunting areas also exist in Pool 25.

Pool 26 contains four federal refuges: USFWS managed Gilbert Lake Refuge; Calhoun (Swan Lake); Portage Islands and the Corps managed Ellis Bay Area. Godar Refuge, a state managed refuge is located on the Illinois River. Additionally, there are a number of Illinois and Missouri managed public hunting areas. There are also many well-managed private clubs that provide hunting opportunities and protect excellent waterfowl habitat that might otherwise be destroyed.

Table 4–51
Peak numbers of mallards 1948-1996

Year	Illinois River	Central Mississippi River
1948	1,617,575	181,405
1949	1,474,565	352,500
1950	1,403,425	157,245
1951	728,725	320,400
1952	1,029,075	463,200
1953	1,408,925	582,950
1954	1,362,600	600,300
1955	1,556,200	848,650
1956	1,200,495	612,350
1957	1,286,650	421,800
1958	663,720	421,850
1959	547,990	289,880
1960	593,420	470,850
1961	374,780	215,775
1962	538,150	274,850
1963	692,435	529,950
1964	507,900	822,300
1965	606,885	549,200
1966	853,970	339,625
1967	1,005,605	385,815
1968	564,550	595,075
1969	788,720	723,200
1970	944,690	717,050
1971	478,775	419,090
1972	577,830	333,045
1973	491,005	237,075
1974	415,535	288,365
1975	876,665	561,630
1976	676,105	513,630
1977	909,180	749,500
1978	1,252,800	1,080,265
1979	945,620	706,325
1980	413,235	260,645
1981	444,640	342,040
1982	326,325	278,990
1983	307,565	212,195
1984	259,465	155,510
1985	484,895	234,725
1986	328,930	193,270
1987	404,715	221,665
1988	344,735	171,470
1989	435,305	193,905
1990	272,775	229,370
1991	474,075	230,295
1992	246,605	171,225
1993	143,430	45,600
1994	590,650	175,300
1995	314,350	114,800
1996	159,320	114,225

Waterfowl Use

The numbers and distribution of waterfowl passing through the region each fall vary among years and are influenced by weather conditions on the staging areas to the north as well as locally and the food and water conditions on traditional migration areas. Years of the grand passages through the flyway are exceptions, but they do occur as they did in 1955, 1956, 1957 and 1995.

The ability to monitor populations and habitat conditions on the breeding, migration and wintering areas is essential to the management of the waterfowl resource. The numbers of ducks and wetlands inventoried on the northern breeding grounds in May are critical factors in determining hunting season regulations in the ensuing fall. Monitoring populations and their distribution within states is also important for identifying critical areas of waterfowl concentrations and the habitats that support them. The current loss of approximately 90 percent of the natural wetlands in Illinois and Missouri requires that intense and flexible management strategies be implemented to sustain the waterfowl resource.

Table 4-51 shows the peak number of mallards inventoried each fall in the Illinois and Central Mississippi River Regions.

Figure 4-52 shows the three-year moving average of the peak numbers of mallards aerially inventoried during fall in the Illinois River and the central Mississippi River regions, 1948-1996. A five-year moving average is the average of the peak number for a specific year and the two previous years and is used to minimize annual fluctuations and to emphasize long-term trends.

Table 4-53 shows the highest biweekly averages in fall and spring of the numbers for each species of waterfowl inventoried throughout Illinois and the percentage that this average represents of the sum of biweekly averages for a given species from September-April, 1972-1985.

Figure 4-52 – Fall Inventory, Mallards 1948-1996

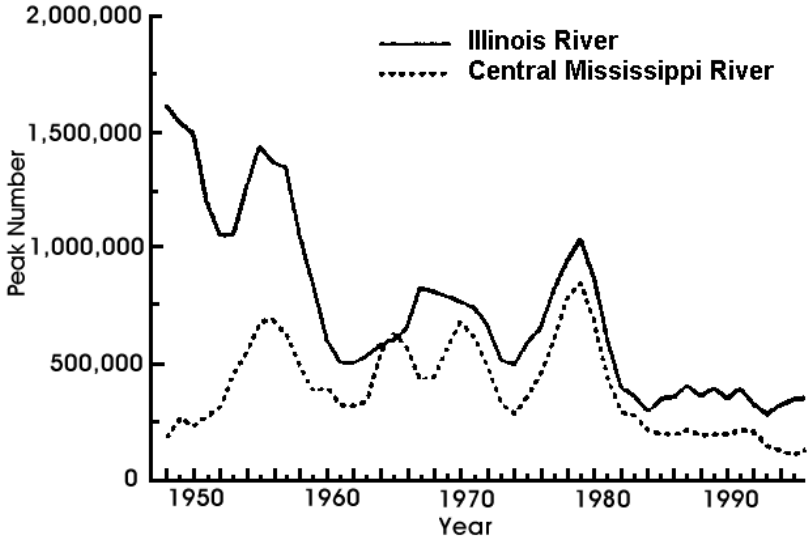


Table 4-53
Highest Biweekly Averages for Waterfowl 1972-1985

	FALL			SPRING		
Species	Highest average number	Biweekly period	Percent of entire period	Highest average number	Biweekly period	Percent of entire period
Mallard	1,129,386	11/10-11/23	20	486,759	03/14-03/27	9
American black duck	26,254	11/24-12/07	19	12,247	03/14-03/27	9
Northern pintall	75,082	10/27-11/09	22	59,235	03/14-03/27	17
Blue-winged teal	47,925	09/01-09/14	28	29,516	04/11-04/24	17
Green-winged teal	23,211	10/13-10/26	19	13,144	03/28-04/10	11
American widgeon	110,666	10/27-11/09	20	120,643	03/14-03/27	22
Gadwall	8,086	10/27-11/09	15	10,003	03/14-03/27	19
Northern shoveler	1,879	10/13-10/26	3	21,195	04/11-04/24	33
All dabbling ducks	1,290,776	11/10-11/23	18	735,672	03/14-03/27	11
Lesser scaup	230,011	10/27-11/09	20	273,934	03/14-03/27	23
Ring-necked duck	41,822	10/27-11/09	14	86,291	03/14-03/27	29
Canvasback	77,509	11/10-11/23	14	118,737	03/14-03/27	22
Redhead	5,937	11/10-11/23	9	17,907	03/14-03/27	28
Ruddy Duck	3,582	10/27-11/09	15	4,113	03/14-03/27	17
Common goldeneye	32,496	12/08-12/31	14	38,995	02/15-02/28	17
All diving ducks	337,459	10/27-11/09	14	356,085	03/14-03/27	23
Common merganser	11,957	12/08-12/31	16	10,713	02/15-02/28	15
All Ducks	1,623,964	11/10-11/23	17	1,282,742	03/14-03/27	14
Canada goose	55,409	12/08-12/31	7	161,478	02/15-02/28	19
Lesser snow goose	25,424	10/27-11/09	17	21,611	03/14-03/27	14
American coot	400,010	10/13-10/26	24	235,944	03/14-03/27	14

*Figure 4-54 – Average Numbers of Mallards **

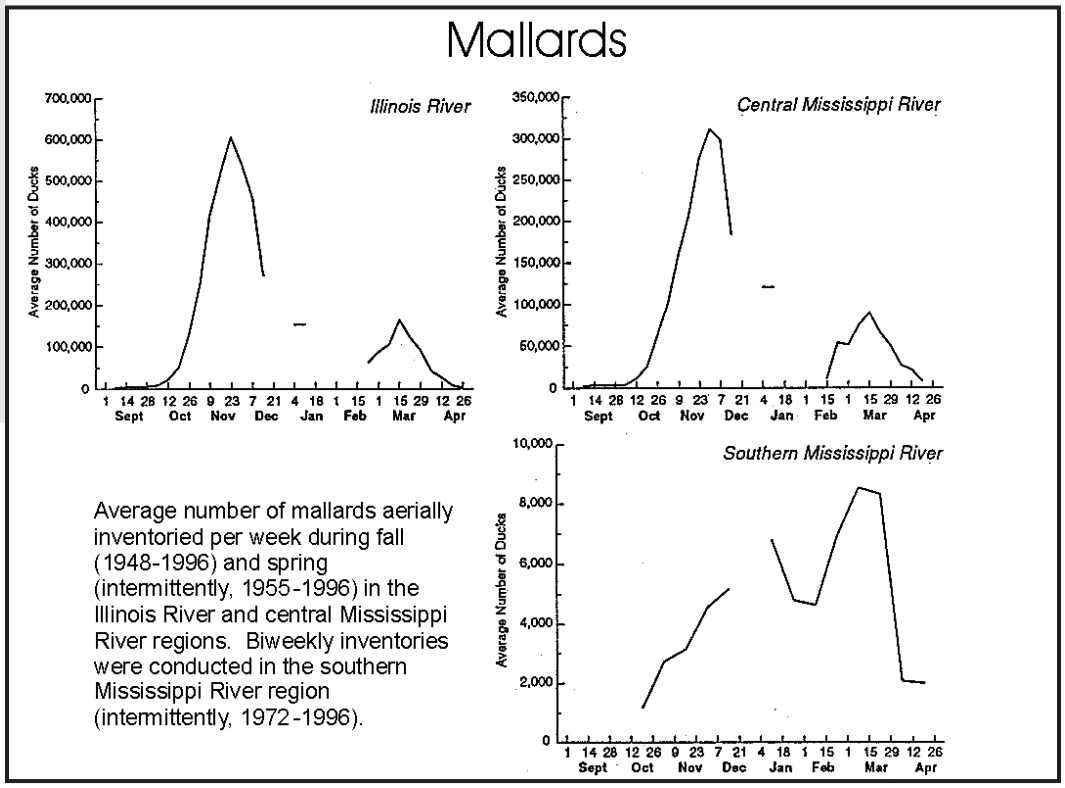


*Figure 4-55 – Average Number, All Ducks **

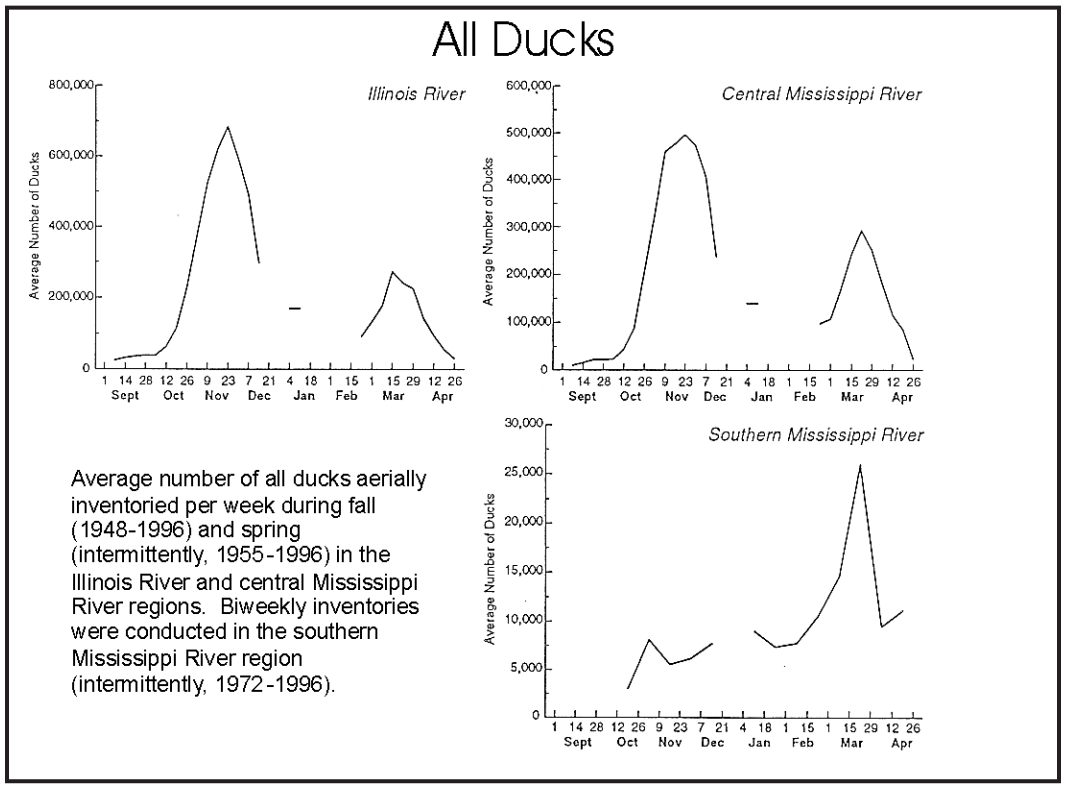
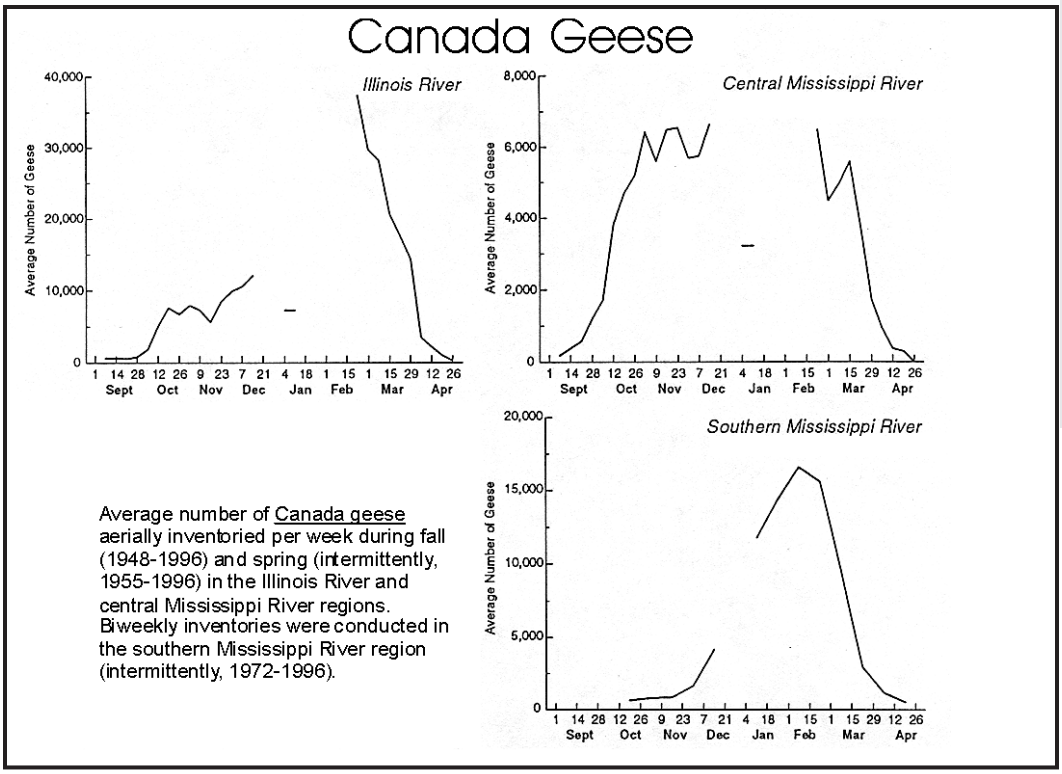


*Figure 4-56 – Average Number of Canada Geese **



* Source for Waterfowl Data: Havera, S.P. 1998. Waterfowl of Illinois: Status and Management. Illinois Natural History Survey Publication No. 22, Champaign, Illinois.

Geographical Definitions for Waterfowl Survey Data

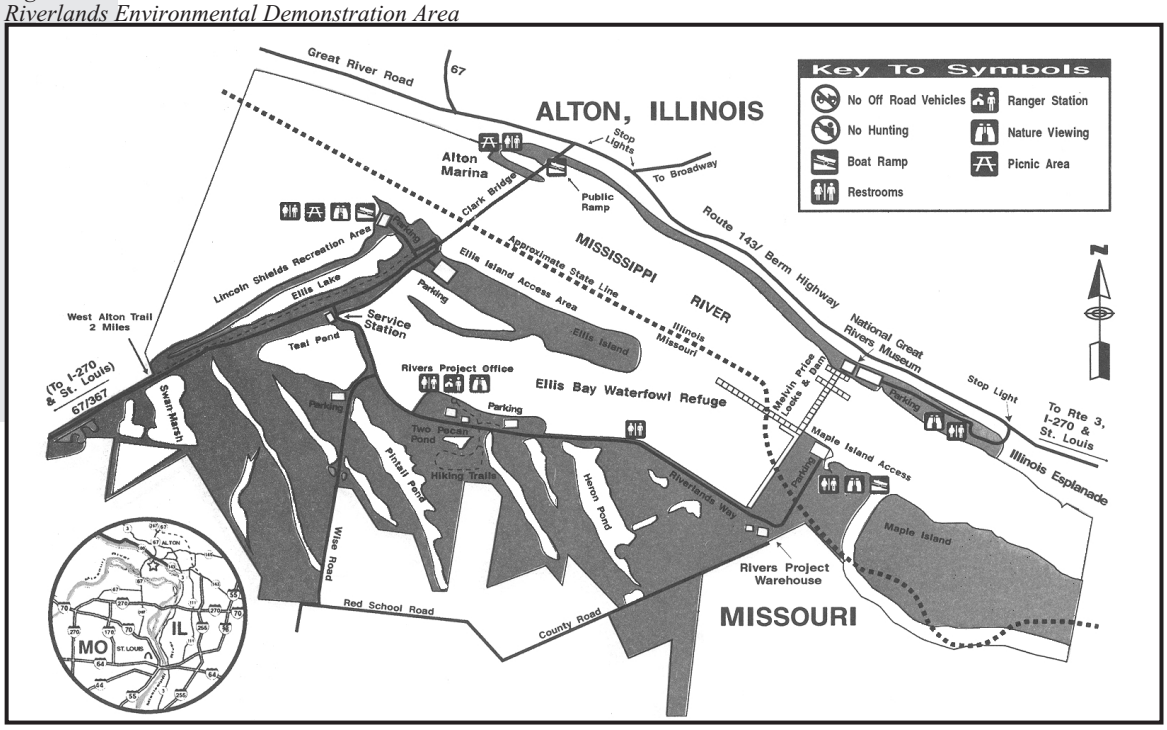
Tables 4–51 and 4–53, Figure 4–52, and Figures 4–54 through *4–56* refer to the following geographical areas:

1. Illinois River. Flyway from Spring Valley to Meredosia, Illinois.

2. Central Mississippi. From Keokuk, Iowa to Alton, Illinois on the Mississippi and from Kampsville to Grafton, Illinois, on the Illinois River.

3. Southern Mississippi. From St. Louis, Missouri, to Cairo, Illinois.

Figure 4 - 57
Riverlands Environmental Demonstration Area



Other Migratory Birds

The diversity and abundance of migratory birds throughout the Rivers Project region is of national and international significance and many natural resource management activities along the river corridor are dedicated to protecting and sustaining these species.

A general discussion on the diversity and abundance of migratory birds other than waterfowl in the Rivers Project region is well-documented at the Riverlands Environmental Demonstration Area. The following paragraphs summarize species use of this area.

Figure 4 – 58
Seasonal Distribution of Shorebird Species at the Riverlands EDA (near St. Louis)

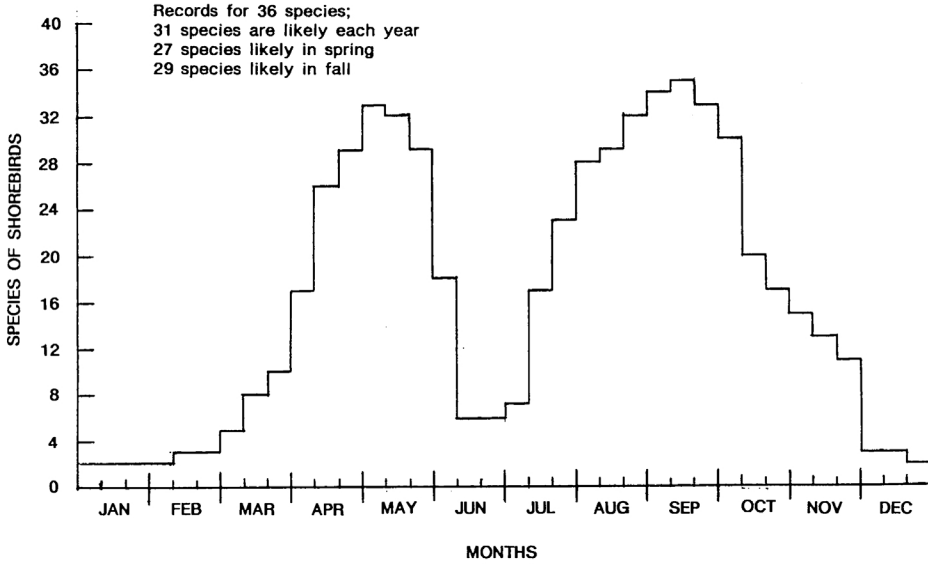
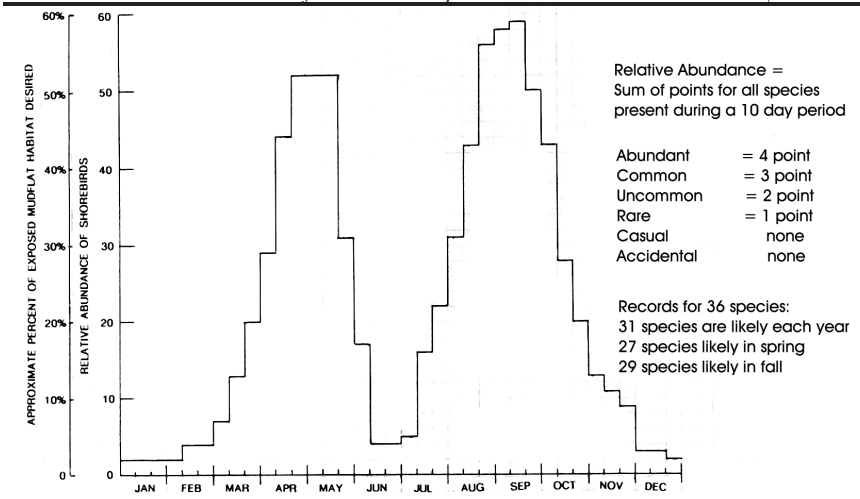


Figure 4 – 59
Seasonal Relative Abundance of Shorebird Populations at the Riverlands EDA (near St. Louis)



The Rivers Project Environmental Demonstration Area (EDA), a wildlife refuge, adjacent to the Melvin Price Locks and Dam near West Alton, Missouri, is one of the best Mississippi floodplain locations for observing species from all main groups of water-related migratory birds (waterfowl, wading birds, shorebirds, marsh birds, gulls, terns, birds of prey, etc.) A map of the EDA is shown in *Figure 4 – 57*.

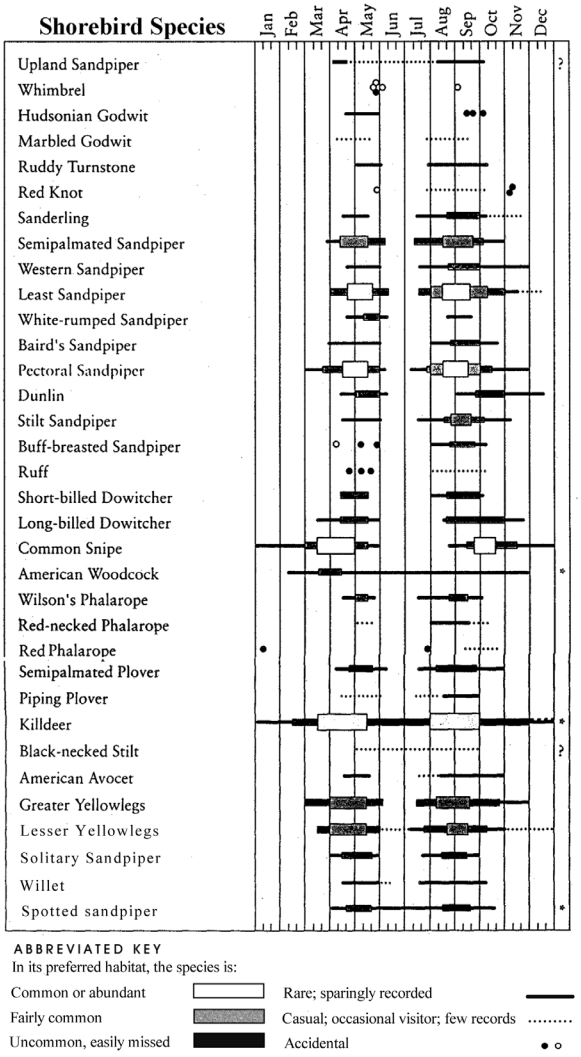
Seasonal habitat changes due to climate and water level fluctuations attract a wide variety of species throughout the year. Water levels on the Mississippi River change with natural floodpulsing, through Environmental Pool Management adjustments at Melvin Price Locks and Dam or though seasonal gravity flow water level manipulations by Riverland Rangers on the EDA Prairie–March restoration area to optimize habitat conditions.

Loons, grebe and waterfowl (including over 20 species of ducks) occur during migration. Many birds stop on Ellis Bay, Teal Pond or farther out in the river channel. Surface-feeding ducks fly in and out of the marsh slough in the prairie. Double-crested Cormorants are found in large numbers in spring, late summer, and fall.

Over 30 species of shorebirds are prevalent during fall and spring migration when water levels are low enough to produce mudflats; Wise Road marsh usually yields the greatest variety. Two Pecan Pond and Heron Pond (shown in *Figure 4 – 57*) are also productive.

Shorebirds can be viewed all along the shore of Ellis Bay and the slough at Ellis Island if mud edges along the shore are exposed. Migratory shorebirds generally arrive beginning in August, peak in September, but continue to drift through as late as November on their way to wintering grounds in the

Figure 4 – 60
Shorebirds in the Mid-Eastern Missouri Area



southern U.S., Central or South America. They pass through the area again from March through May on their way to their northern nesting grounds. Managing habitat for shorebirds entails adjusting water levels to provide suitable mudflats which they use for resting and feeding on macroinvertebrates during their migration periods.

The Missouri Audubon Society has done considerable research and documentation of shorebirds at the EDA. Their findings on species diversity, distribution and abundance are shown in *Tables 4 – 58* through *4 – 60*.

Pied-billed grebes nest in Teal Pond. King rail, Virginia rail, sora and common moorhead have been seen in the spring on the potholes on Ellis Island. All of the regular herons and egrets, including the snowy egret, are commonly found.

A variety of gulls are observed. Ring-billed gulls, usually the most common species, are present almost year round, but herring gulls will sometimes supplant the ring-bills entirely during winter cold snaps. Other gull species seen here include Franklin's and Bonaparte's (both regular migrants), Thayer's and glaucous (both scarce but regular in winter) and several rarer species such as great black-backed, lesser black-backed and Little gulls. The first Ross' gull to be seen in Missouri occurred on the EDA in late 1991 and early 1992. Migrant terns are seen primarily on Ellis Bay with Foster's, Caspian, and black tern the most regular species. A few jaegers have also been spotted.

The EDA is probably the closest and most accessible place from St. Louis to see large numbers of Bald eagles during the winter months. Other common winter raptors are northern harrier and red-tailed hawks. Rough-legged hawks appear sporadically, and short eared owls can be seen flying over the prairie area, usually after sundown. During migration osprey and peregrine falcons are seen. Neotropical migrants travel through the surrounding floodplain forests from late August to late October.

Perching Birds are less obvious, but many species are noted. Horned larks are common along the access road, sometimes accompanied by Lapland longspurs in winter. All swallows, especially Tree, are seen during migration. Fish crows are best observed in spring. Sedge wrens are common in prairie grasses in August, and common yellowthroat, dickcissel and grasshopper sparrows are breeding species on the EDA.

Threatened and Endangered Species

Introduction

The 1973 Endangered Species Act states that all federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the Act. The purposes of the Endangered Species Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide a program for the conservation of such federally listed species.

The USFWS and the National Marine Fisheries Service (NMFS) are the lead agencies mandated by Congress to administer and enforce the law. It is the policy of the Corps that all project lands and waters will be managed in a manner which assists in the overall conservation of federally-listed endangered and threatened species, and the ecosystems upon which they depend. Species which are candidates for listing will also be given consideration. Conservation methods and procedures will be utilized which will enable the inventory and protection of these species of special concern and their habitat, as well as the participation in their recovery.

"Special Status Species" include any species which is listed or proposed for listing, as threatened or endangered by the USFWS or NMFS, under the provisions of the Endangered Species Act; any species covered by the Migratory Bird Treaty; any species designated by the USFWS as a "candidate" or "listing" species or "sensitive" species; any species which is listed and protected by state statute in a category implying potential endangerment of extinction.

Special status species and/or their critical habitats that occur on water resources development projects shall be protected and/or conserved in accordance with the Endangered Species Act, as amended, and with existing statutes. Endangered Species Recovery Plans prepared by the USFWS and/or NMFS shall be followed to protect and conserve federally listed species or their critical habitat on Corps administered lands and waters. Corps personnel will cooperate in the management of state-listed and protected species where feasible.

Illinois and Missouri Rare, Threatened, and Endangered Species

Introduction

The States of Illinois and Missouri have all developed lists of species that they consider scarce within their respective states, Illinois designates species on the list as either "Endangered" or "Threatened" while Missouri designates their species as "Endangered" or "Rare". At a state level, a species is considered "endangered" if the species is threatened with extinction throughout all, or a significant portion of, its range within the state. A species is considered "threatened" or "rare" if it is likely to become endangered within the foreseeable future throughout all, or a significant portion of, its range within the state. These designations have similar definitions as the federal definitions, except that the status is at a state level. Many of the state-listed species are common over a much larger geographical area and are considered rare within a particular state because the area lies on the periphery of the species range and have smaller populations. There are some species, however, where the population decline occurs over the entire range of the species.

In addition to the endangered, threatened and rare designations, each state has another category they list species in called "Special Concern" (or "Watch List" for Missouri), which is an advisory category. Special concern species are those species that are not rare, threatened, or endangered, but are extremely uncommon in an area or have unique or highly specific habitat requirements and deserve careful monitoring of its status. Species on the periphery of their range, that are not listed as endangered or threatened, may be included in this category along with those species that were once listed as endangered or threatened but now have increasing protected, or stable populations. In addition, the states include a category called "Extirpated". These species formerly occurred as a regular breeding species, but no longer reproduce within the state. Extirpated species still occur somewhere within their natural range but outside the listed state.

State Species Lists

The State of Illinois lists 30 fish, 25 freshwater mussel, 24 invertebrate, 9 mammal, 42 bird, 18 reptile and amphibian, and 363 plant species as endangered or threatened. Missouri lists 52 fish, 24 freshwater mussel, 62 invertebrate, 11 mammal, 29 bird, 28 reptile and amphibian, and 374plant species as endangered, rare, or watch list. The State Natural Heritage programs manage standardized information on endangered plants, animals and ecological communities.

The following lists of fish, mussels and other invertebrates, mammals, reptiles and amphibians, birds and plants that were determined to be

potentially occurring within the floodplain or spending a portion of their life within the river or adjacent habitats.

Table 4–61
State Listed Endangered or Threatened Fish

Name		IL	MO
ASCIPENSERIDAE			
Lake Sturgeon	*Acipenser fulvescens*	Endangered	Endangered
Pallid Sturgeon	*Scaphirhynchus albus*		Endangered
HIODONTIDAE			
Mooneye	*Hiodon tergisus*		Rare
CLUPEIDAE			
Alabama Shad Anadromous	*Alosa alabamae*		Rare
CYPRINIDAE			
Sturgeon Chub	*Macrhybopsis gelida*		Rare
Sicklefin Chub	*Macrhybopsis meeki*		Rare
Pallid Shiner	*Notropsis amnis*	Endangered	
CATASTOMIDAE			
River Redhorse	*Moxostoma carinatum*	Threatened	
Greater Redhorse	Moxostoma valenciennesi	Endangered	

Table 4 – 62
State Listed Rae, Endangered or Threatened Mammals

NAME	SCIENTIFIC NAME	IL	MO
River Otter	*Lutra canadensis*	Endangered	
Bobcat	*Lynx rufus*	Threatened	
Long-Tailed Weasel	*Mustela frenata*		Rare
Gray Bat	*Myotis grisescens*	Endangered	Endangered
Indiana Bat	*Myotis sodalis*	Endangered	
Plains Pocket Mouse	*Perognathus flavescens*		Rare
Plains Spotted Skunk	*Spilogale putorius interrupts*		Endangered
Swamp Rabbit	*Sylvilagus aquaticus*		Rare

Table 4–63
State Listed Mussels

NAME	SCIENTIFIC NAME	IL	MO
Slippershell Mussel	*Alasmidonta viridis*	Endangered	
Rock-Pocketbook Mussel	*Arcidens confragosus*		Rare
Spectacle Case Mussel	*Cumbeilandia monodonta*	Endangered	
Butterfly Mussel	*Ellipsatia lineolata*	Threatened	
Elephant-Ear Mussel	*Elliptio crassidens crassidens*		Endangered
Spike Mussel	*Elliptio dilatata*	Threatened	
Snuffbox Mussel	*Epioblasma triquetra*		Rare
Ebonyshell Mussel	*Fusconaia ebena*	Threatened	Endangered
Pink Mucket	*Lampsilis aorta*		Endangered
Higgins Eye Mussel	*Lampsilis higginsii*	Endangered	Endangered
Scaleshell Mussel	*Leptodea leptodon*		Rare
Sheepnose Mussel	*Plethobasus cyphyus*	Endangered	Rare
Fat Pocketbook Mussel	*Potamilus capax*	Endangered	Endangered

Table 4–64
Other Invertebrates

NAME	SCIENTIFIC NAME	IL	MO
Arogos Skipper	*Atrytone arogos*	Endangered	
Marbled Underwing Moth	*Catocala marmorata*		Rare
Cobweb Skipper	*Hesperia metea*	Threatened	
Ottoe Skipper Butterfly	*Hesperia ottoe*	Threatened	
Elfin Skimmer	*Nannothemis bella*	Threatened	
Rattlesnake-Master Borer Moth	*Papaipema eryngii*	Endangered	

Table 4 – 65
State Listed Rare, Endangered or Threatened Reptiles and Amphibians

NAME	SCIENTIFIC NAME	IL	MO
Spotted Turtle	*Clemmys guttata*	Endangered	
Kirtland's Snake	*Clonophis kirtlandii*	Threatened	
Timber Rattlesnake	*Crotalus horridus*	Threatened	
Western Chicken Turtle	*Deirochelys reticularia miaria*		Endangered
Great Plains Rat Snake	*Elaphe guttata emoryi*	Threatened	
Western Fox Snake	*Elaphe vulpina vulpina*		Endangered
Blanding's Turtle	*Emydoidea blandingii*		Endangered
Four-Toed Salamander	*Hemidactylium scutatum*		Rare
Western Hognose Snake	*Heterodon nasicus*	Threatened	
Dusty Hognose Snake	*Heterodon nasicus gloydi*		Rare
Illinois Mud Turtle	*Kinostemon flavescens*	Endangered	Endangered
Illinois Chorus Frog	*Pseudacris streckei illinoensis*	Threatened	Rare
Wood Frog	*Rana sylvatica*		
Eastern Spadefoot	*Scaphiopus holbrookii holbrookii*		Rare
Eastern Massasauga	*Sistrurus catenatus catenatus*	Endangered	Endangered

Table 4 – 67
State Listed Rare, Endangered or Threatened Birds

NAME	SCIENTIFIC NAME	IL	MO
Cooper's Hawk	*Accipiter cooperii*	Endangered	Rare
Sharp-Shinned Hawk	*Accipiter striatus*	Endangered	Rare
American Bittern	*Botaurus lentiginosus*	Endangered	Endangered
Red-Shouldered Hawk	*Buteo lineatus*	Endangered	
Great Egret	*Casmerodius albus*	Threatened	Rare
Veery	*Catharus fuscescens*	Threatened	
Brown Creeper	*Certhia americans*	Threatened	
Black tern	*Chlidonias niger*	Endangered	
Northern Harrier	*Circus cyaneus*	Endangered	
Little Blue Heron	*Egretta caerulea*	Endangered	Rare
Snowy Egret	*Egretta thula*	Endangered	Endangered
Peregrine Falcon	*Falco peregrinus*	Endangered	
Common Moorhen	*Gallinula chloropus*	Threatened	Rare
Sandhill Crane	*Grus canadensis*	Endangered	
Bald Eagle	*Haliaeetus leucocephalus*	Endangered	Endangered
Mississippi Kite	*Ictinia mississippiensis*	Endangered	Rare
Least Bittern	*Ixobrychus exiles*	Endangered	

Table 4-66
State Listed Rare, Endangered or Threatened Plants

NAME	SCIENTIFIC NAME	Known Distribution	Range Where Threatened or Endangered	IL	MO	FED
Spurge	*Euphorbia geyeri*	Throughout	Entire	E	E	-
Dotted Monardo	*Monarda punctata var Occidentalis*	Throughout	Entire	-	R	-
Black-seeded Mountain Rice	*Oryzopsis racemosa*	Throughout	Entire	-	U	-
Polvpremum	*Polypremum procumbens*	Throughout	Entire	-	E	-
Large-toothed -Aspen	*Populus grandidentata*	Throughout	Entire	-	U	-
Quaking Aspen	*Populus tremuloides var tremuloides*	Throughout	Entire	-	U	-
Rose Turtlehead	*Chelone oblique var speciosa*	Throughout	Entire	-	R	-
Southern Aster	*Arpaludsus subsp hemisphericus*	Throughout	Entire	-	R	-
Amethyst Shooting Star	*Dodecatheon radicatum*	Throughout	Entire	-	-	-
Alkali Yellowtops	*Flaveria campestris*	Throughout	Entire	-	E	-
Pineweed	*Lechea racemulosa*	Throughout	Entire	-	U	-
Red-berried Elder	*Sambucus pubens*	Throughout	Entire	-	R	-
Wild Sasaparilla	*Aralia nudicaulis*	Throughout	Entire	-	R	-
Small Spike Brush	*Eleochares parvula var auachaeta*	Throughout	Entire	-	R	-
Ditch Grass	*Ruppia maritime var rostrata*	Throughout	Entire	-	E	-
Strawberry Blight	*Chenopodium capitatum*	Throughout	Entire	E	R	-
Prairie White Fringed Orchid	*Habenaria 1euGophaea*	Throughout	Entire	-	R	-
False Aster	*Boltonia asteroides var decurrens*	Throughout	Entire	-	R	-
Cut-leaved Grape Fern	*Botrychium dissectum var dissectum*	Throughout	Entire	-	R	-
Shining Clubmoss	*Lycopodium lucidulum var lucidulum*	Throughout	Entire	-	R	-
Adder s Tongue	*Ophioglossum*	Throughout	Entire	-	R	-
Prickly Groundberry	*Rubus missouricus*	Throughout	Entire	-	E	-
False Mermaid	*Floerkea proserpinacoides*	Throughout	Entire	-	E	-
Arrow Arum	*Peltandra virginica*	Throughout	Entire	-	R	-

Federal Threatened and Endangered Species

Nine species (plant and animal) in the project area are designated as either Endangered, Threatened and Proposed under the authority of the 1973 Federal Endangered Species Act. These species are listed in the table below.

Table 4– 68
Federal Endangered, Threatened and Proposed Species

Species Common Name	Scientific Name	Distribution	Status
Decurrent false aster	*Boltonia decurrens*	Throughout	Threatened
Higgins' eye pearly mussel	*Lampsilis higginsii*	Throughout	Endangered
Pallid sturgeon	*Scaphirynncus albus*	Throughout	Endangered
Sturgeon chub	*Macrhybopsis gelida*	Open river	Candidate
Sicklefin chub	*Macrhybopsis meeki*	Open river	Candidate
Bald eagle	*Haliaetus leucfocephalus*	Throughout	Threatened
Interior least tern	*Sterna antillarum*	Throughout	Endangered
Indiana bat	*Myotis sedalis*	Throughout	Endangered
Fat Pocketbook mussel	*Proptera capax*	Throughout	Endangered

Study Opportunities

In addition to rare and endangered species, several species and habitats are of scientific interest due to their spatial distribution. The resource provides and excellent opportunity for study of migratory waterfowl, rare and endangered species, relict populations and habitats, and species at the borders of their ranges. Areas peripheral to the project region provide study opportunities such as the unique hill prairie communities in Illinois.

4.12. ARCHAEOLOGICAL AND HISTORIC RESOURCES

Mississippi and Illinois Rivers

Prehistoric Overview

Four major prehistoric cultural periods are recognized in the Upper Mississippi River Valley. Each succeeding period exhibits increased cultural sophistication. Twelve thousand years ago, small bands of Paleo Indians, also known as Big-Game Hunters, lived in small and temporary camps along the margins of retreating glaciers. Archaeological evidence of this period is sparse, limited primarily to surface finds of projectile points.

The next cultural era, the Archaic period, lasted from 8000 BC to 1000 BC. Analysis of remains from this period indicate that the culture developed a settlement and subsistence pattern adapted to a forest environment. Hunting and food collecting depended on forest resources. The people were more sedentary than the Paleo Indians. Mound building began towards the end this period. The Eastern Archaic culture is considered by some to be the first indigenous New World cultural development.

A clear distinction between the Eastern Archaic cultural period and the subsequent Woodland culture, 1000 BC to 1400 AD, does not exist. The Woodland peoples lived in semi-permanent settlements, practiced horticulture, made pottery, and built numerous mortuary mounds.

The Mississippian culture, 800 AD to 1500 AD, overlaps the Woodland period. Intensive horticulture, large population centers, and religious cults associated with crop and human fertility are noteworthy elements of the Mississippian culture. The Cahokia Mounds city and culture, near present day Collinsville, Illinois, originated, prospered and ultimately

disappeared during this period. European settlement in the region began during the later part of this period.

The Cahokia Mounds World Heritage Site is the largest Mississippian site as well as archaeological site in North America. At its zenith, around 800 years ago, the site covered more than five square miles and contained more than 120 temple mounds. The base of Monks Mound, the largest surviving mound at the site, is larger than the pyramid of Cheops in Egypt. Around 1200 AD, Cahokia is estimated to have contained between 10,000 and 20,000 residents. The site was supported by a number of smaller mound complexes.

Historical Overview

The region's prehistoric and historic development is primarily linked to the river floodplain and adjacent uplands. The rivers provided water, fish and wildlife, and trade-route corridors for prehistoric peoples and early explorers. In addition, people used the river corridors for settlement, trade, and political boundaries for pioneers and settlers. Present uses of the river and their floodplains consist of industrial activities, commercial fishing, navigation, recreation, and educational opportunities. Numerous historic locations through-out the area represent the various river-oriented historical phases.

Father Jacques Marquette and Louis Joliet were the first Europeans to record explorations in the region. A large stone cross, located on Route 100 near Grafton, Illinois commemorates this event as the first entrance of European explorers into Illinois. They traveled with Native American guides in canoes, and repeatedly encountered Native American groups camped along the Mississippi River. The legendary Piasa monsters, painted on bluffs between Alton and Grafton, Illinois, were first recorded by Marquette.

Lewis and Clark left on their historic exploration from Wood River in 1804. Today, several memorials and markers commemorate this event. The Mississippi River became increasingly important for trade and transportation as settlers from the east began to converge on the Mississippi Valley following the return of the explorers in 1806. The well-known frontiersman, Daniel Boone, and Zebulon Pike, the explorer, influenced settlement of the area. Pike County, Missouri, is named for Zebulon Pike, and several historic sites in western St. Charles County are associated with the Boone family. Trade, agriculture, and migration to the area continued to increase in the 19th century. European immigrants, particularly German and Irish, settled here. In the 1840s, great numbers of farmer immigrants traveled into the region by wagon and boat. Ferries were established at several river crossings, and St. Louis became a center for navigation, trade, industry, education, and politics throughout the nineteenth century.

During the 18th and early 19th century, a thriving fur trade was the dominant commercial activity on the Mississippi, Illinois and Missouri Rivers. Canoes and dugouts were vessels of choice for the fur trade. River craft were designed with minimum draw to avoid the problems of changes in river depth, shifting sandbars, rapids, and hidden snags. Keelboats, flatboats, Mackinaws, and pirogues were used in conjunction with the canoes and dugouts during the later part of the period.

The arrival of the steamboat at St. Louis in 1817 began the colorful steamboat era that peaked in the "Golden Age of the Steamboat," 1840-1860. The small river towns became agricultural trade centers and steamboat landings.

The first federal efforts to improve navigation on the Mississippi River were carried out from 1878 to 1907. A four and one-half foot channel was

engineered by dredging, contraction of the river by closure of chutes, revetment work, reservoirs, and wing dams that directed the flow of water into narrow channels. The channel was subsequently deepened to six feet, and in the 1930s, the modern diesel towboat began to replace the paddlewheelers.

With the development of locks and dams, and the nine-foot channel in the 1930s, river commerce on the Upper Mississippi became more economical than land traffic. Welded steel barges and powerful diesel towboats were introduced in the 1940s to transport coal, raw materials, manufactured goods, grains and raw materials used in food processing.

Archaeological Resources in the Project Area

In Missouri and Illinois, the greatest concentrations of archaeological sites are found in the river corridors which are the most fertile and accessible areas. The Mississippi River Valley and its tributaries constitutes an area of great archaeological potential, based on a large number of physiographic and ecological features. Following the adoption of horticulture around 1,600 years ago, the region experienced a significant population increase.

Professional surveys conducted along the Mississippi, Illinois and Kaskaskia Rivers has identified thousands of prehistoric archaeological sites. Evidence of prehistoric cemeteries, burial mounds, temporary camps, farmsteads and village sites are found in significant numbers throughout the project area.

More than 8,000 prehistoric and historic sites are known to exist in the Rivers Project area, including more than 65 archaeological and historic districts on the *National Register of Historic Places*. Major concentrations of archaeological sites have been identified near three types of land features: (1) the confluences of the Mississippi with major tributaries such as the Illinois, Salt, Missouri, Meramec and Kaskaskia Rivers; (2) sand ridges and terraces in the Mississippi floodplain; and (3) blufftops and their slopes.

Since the early 1970s, with the passage of NEPA, full-time archaeological research has been conducted in the project area. During this period researchers have uncovered literally thousands of archaeological sites with the location of thousands of others presently unknown. All sites are believed to have originated during the previous 13,000 years.

Thousands of studies and reports exist in academic and agency files which document the existing state of knowledge of cultural resources in the project area. All Project development and management plans have to be sensitive to the fragility of these cultural resources and should incorporate measures to protect and conserve them.

Historical Properties Legislation and Corps Compliance

Selected laws and executive orders relating to archaeological resources include:

- 1906 - Antiquities Act (16 U.S.C. 433)
- 1935 - Historic Sites Act (16 U.S.C. 461-467)
- 1960 - Reservoir Salvage Act (PL 86-523)
- 1966 - Historic Preservation Act (PL 80-915)
- 1971 - Executive Order 11593
- 1978 - American Indian Religious Freedom Act (AIRFA) (42 U.S.C. 1996)

- 1979 - Archaeological Resources Protection Act (ARPA) (16 U.S.C. 370)
- 1980 - National Historic Preservation Act, (16 U.S.C. 469-470) [Amended the 1966 Historic Preservation Act]
- 1990 - Native American Graves Protection and Repatriation Act (25 U.S.C. 3001-3013)

In accordance with these authorities, archaeological investigations are undertaken for projects that have the potential of disturbing the ground surface.

The operation and maintenance of navigation on the rivers creates a number of potential concerns in preserving cultural resources. These concerns pertain to development induced by the presence of the waterway, and to channel maintenance activities.

Continued transformation of existing private shoreline land uses to industrial uses can be expected. Exact locations for development cannot be predicted, but any substantial land-use change may affect unknown cultural resources. Prior to developing shorelines, a 404 and/or Section 10 permit from the Corps must be obtained. The Corps can require an archaeological survey to be performed by the applicant as a prerequisite to obtain a permit in areas where ground disturbance has the potential to damage significant archaeological remains.

Channel maintenance activities such as dredging and bank stabilization operations also have the potential of damaging important archaeological sites. Dredging operations rarely utilize land disposal areas, and therefore rarely require cultural resource compliance concerns. However, the construction of dikes and placement of riprap along the shoreline can adversely affect cultural resources. An established procedure is in place to perform archaeological surveys in areas prior to construction. If sites are located, appropriate testing, evaluation, and compliance procedures will be followed before construction will occur.

In general, historical, archaeological, architectural or other cultural artifacts, relicts, remains of objects, inadvertently discovered in the course of routine management, surveillance or development of public lands will not be disturbed or removed. The Corps District Engineer or his or her representative will be immediately notified to ascertain the appropriate protection and compliance requirements. Proposed management of development activities that may impact historic or pre-historic cultural resources on Cooperative Agreement lands requires that the managing agency (USFWS, IDNR or MDC) conduct appropriate compliance actions and/or procedures in consultation with the Corps and the State Historic Preservation Officer (SHPO) to ensure proper compliance and/or approvals prior to implementation.

On public lands leased (outgranted) for recreation of industrial purposes, the lessee is responsible for achieving cultural resource compliance as specified by the SHPO prior to implementing any proposed development.

4.13. RECREATION

General Description

The Mississippi, Illinois and Kaskaskia River segments in the St. Louis District provides major opportunities for water based recreation in the region. Natural vegetation, variable topography, accessibility to water and the proximity of the river to a large population are significant features that enhance its attractiveness for recreational purposes. The demand for outdoor recreation is continually increasing. Some popular forms of outdoor recreational activities are bicycling, bird watching, camping, fishing, hiking, hunting, power boating, sailing, sightseeing, swimming, and water skiing (See *Table 4 – 69*.)

River Recreation Use Characteristics– Mississippi and Illinois Rivers

Recreational use intensity is a function of the available physical resources, access, management, and proximity of population centers. The recreational resource is dependent on the physical, biological and water quality characteristics of any given segment of the system. These characteristics will determine, to a large extent, the types of recreational activities occurring within any given reach. This relationship will not hold true, however, when access is limited or where high urban concentrations are the major factor in determining recreational use intensity and density.

High public demands for use of these resources in selected reaches of the UMRS (particularly in urban areas) are expected to intensify. Much of the System's shoreline is presently privately owned and large sections of the rivers are paralleled by railroad tracks, impeding access. Furthermore, the majority of public lands along the Rivers are managed for fish and wildlife purposes which may be incompatible with some recreational uses.

Towns and metropolitan areas exert a high demand on the recreational resource. The St. Louis metropolitan area continues to project deficiencies in the availability of access for water-based recreation. This high demand produces intensive use of the resource, especially during weekends and holidays. Conflicts between river users periodically occur during high activity periods, primarily in Pool 26. Major motorboating, sailing, water-skiing and jet-skiing activity occurs in the navigation channel and the main channel border. Major hunting and fishing activity occurs along the main channel border, side channels and backwaters. Camping, picnicking, hiking and nature studies occur primarily on islands, sandbars and along the shoreline.

The expanse of water created by the locks and dams of the navigation project provide additional opportunities for recreation use and enjoyment of the Upper Mississippi River System corridor. Conflicts periodically exist between recreation use and maintenance of the channel and commercial navigation use. Portions of the navigation pools have very shallow areas and stump fields. While these areas provide good fish nursery and waterfowl areas, they are hazards to the boater unfamiliar with the river. Channel structures, such as dikes and dams, used to help maintain the navigation channel, also present a hazard to the novice or inexperienced boater.

Beaches created with dredged material and by natural deposition receive intensive public use. These beaches are used for camping, swimming, sunbathing, picnicking and partying. They form base locations for water skiing, hunting and fishing groups and provide important destination points for recreation visits.

Table4 – 69
Estimated Ranking of the Top Recreational Activities Pursued in Illinois (SCORP 1994)

1. Pleasure Walking*
2. Pleasure Driving/ Sightseeing*
3. Picnicking*
4. Observing Wildlife /Birdwatching*
5. Swimming – Pool
6. Bicycling*
7. Fishing*
8. Swimming – Other*
9. Softball – Baseball
10. Running/Jogging*
11. Motorboating*
12. Golf
13. Hiking*
14. Outdoor Basketball
15. Tennis
16. Tent Camping*
17. Water Skiing*
18. ORV / ATV Use
19. Canoeing*
20. Horseback Riding*
21. Vehicle Camping
22. Rock/Fossil Collecting*
23. Hunting*
24. Sailing*
25. Soccer
26. Snowmobiling
27. Cross Country Skiing*
28. Ice Fishing*
29. Trapping*

*Activities that are accommodated on Rivers Project Public Lands and Waters

Public access to Navigation Pools 24 - 27 is generally limited to the 47,641 acres of dispersed federally owned shoreline lands, located predominantly in the lower reaches of the pools. The Corps, the USFWS, the IDNR and the MDC manage most of the public access areas and facilities adjacent to the navigation pools. There are also numerous commercial marinas offering river access and other recreational services, most which are on privately owned shoreline lands.

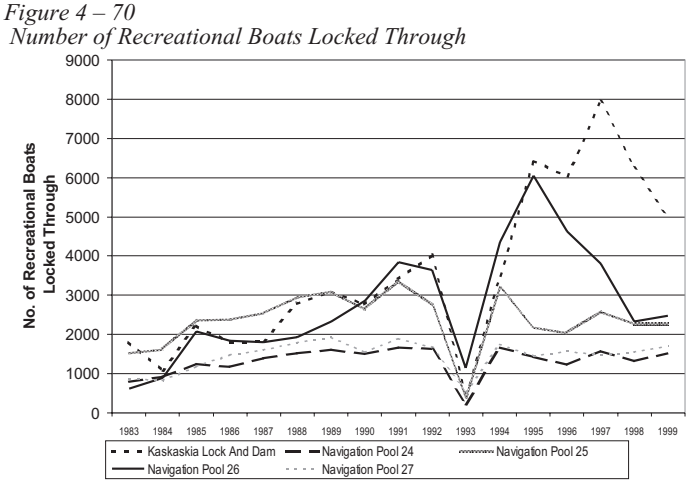
Opportunities for public access in the open river reach is limited due to private ownership of the shoreline and intervening lands between the highways, railroad tracks, and the river. The most visual identification with the river downstream of St. Louis occurs at bridge crossings and at river communities.

Most of the public land that is available in this reach is located in state parks, state conservation areas, USFWS refuges and Forest Service lands. Roadside parks, points of interest, and city parks comprise a minor amount of the total acreage. Fuel stops for recreational boaters along this reach are very limited, forcing most boaters to carry extra fuel and provisions.

Table 4-71
Total Annual Number of Recreation Boats Locked Through

Year	Lock & Dam 24	Lock & Dam 25	Locks & Dam 26	Locks 27	Kaskaskia Lock And Dam
1983	803	1,535	625	875	1,804
1984	922	1,628	897	820	1,066
1985	1,250	2,365	2,069	1,179	2,231
1986	1,192	2,384	1,833	1,480	1,798
1987	1,407	2,555	1,810	1,600	1,813
1988	1,528	2,947	1,940	1,793	2,792
1989	1,624	3,097	2,330	1,925	3,094
1990	1,507	2,634	2,855	1,550	2,770
1991	1,673	3,372	3,839	1,900	3,400
1992	1,633	2,746	3,650	1,650	4,018
1993	227	394	1,141	555	398
1994	1,681	3,186	4,360	1,750	3,497
1995	1,432	2,178	6,050	1,460	6,424
1996	1,233	2,043	4,620	1,574	6,039
1997	1,577	2,596	3,816	1,484	7,941
1998	1,333	2,271	2,323	1,544	6,251
1999	1,537	2,275	2,480	1,692	4,999

Figure 4 – 70
Number of Recreational Boats Locked Through



Regardless of the constraints on the use of the river and related land resources, the existing recreational resources and the cooperative efforts among governmental agencies and private enterprise combine to provide numerous opportunities to experience the diversity of the river's recreational, natural, cultural, and historic values.

Some specific examples of areas with high recreation potentials are:

- The confluences with major tributaries – the Illinois, the Missouri, the Meramec and the Kaskaskia Rivers;
- Major islands;

- Scenic bluff or river hills areas, e.g. Alton to Grafton Bluffs, Fountain Bluff, and Grand Tower in Illinois and the river hills at Clarksville and Louisiana in Missouri;
- The Pere Marquette State Park area along the Lower Illinois River; and
- The Melvin Price Locks and Dam and Alton Riverfront area.

None of the federal or state agencies dealing with outdoor recreation have more than a partial authority for planning and management of the recreational resources. Coordination of planning for public recreational purposes needs to be improved. A standardized system of collecting recreation use data for the river corridor is non-existent, which impedes the coordination of activities for enhanced recreation opportunities.

Recreational boating use patterns and levels of use for each segment of the Rivers Project Service Area can be realized in relative terms by analyzing Recreational Boat Lockage statistics in the St. Louis District (*Figure 4– 70*, Table 4– 71, *Table 4 – 76*, and *Figure 4 – 75*.)

A study on the types of recreational boats, projections on boater uses and impacts of recreational boating on the Mississippi and Illinois Rivers is currently being prepared as part of an on-going comprehensive Upper Mississippi and Illinois River Navigation Study being conducted by the Corps. *Figure 4 – 72*, *Table 4 – 73*, and *Figure 4 – 74* are from this Draft Study and provide a brief summary on the types and sizes of recreational boats utilizing the river in the St. Louis region and existing and projected boat use of the pools in the St. Louis District.

Kaskaskia River Navigation Project

The Kaskaskia River Navigation Project land and water offers a variety of recreational resources. The channelized portion of the river is used heavily for motor boating along with other water-oriented pursuits such as water-skiing, fishing and swimming. The oxbow portions of the river provide a good environment for fishing, hunting and nature studies. The smaller tributaries of the Kaskaskia (Nine Mile, Little Plum, Doza, Silver, Camp, Horse and Richland Creeks) have the potential for providing a suitable canoeing waters.

The IDNR managed Kaskaskia River State Fish and Wildlife Area (KRFWA) is one of the largest state-owned and managed sites in Illinois. Located 35 miles southeast of St. Louis, Missouri, the area comprises more than 20,000 acres of lands and waters and extends along the Kaskaskia River Navigation Project in St. Clair, Monroe, and Randolph counties. IDOT acquired the lands along the river and IDNR manages it for fish, wildlife and

Figure 4-72
Boat Observations on the Upper Mississippi River System
Summer 1996 (Grafton, Il)

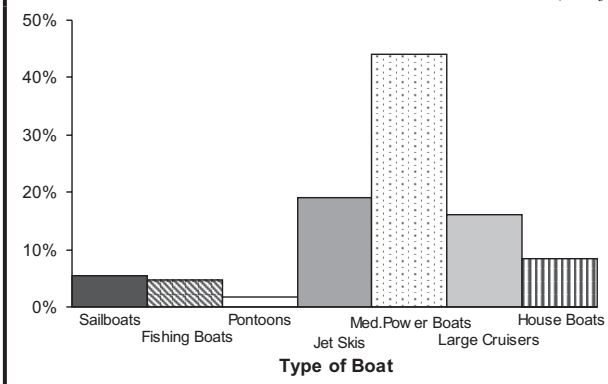


Figure 4 – 73
Distribution of Boats by Length

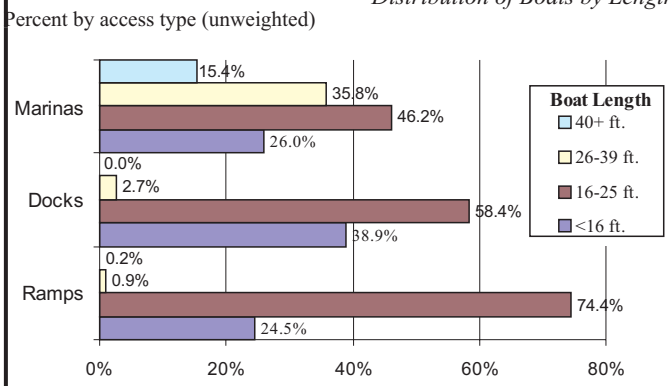
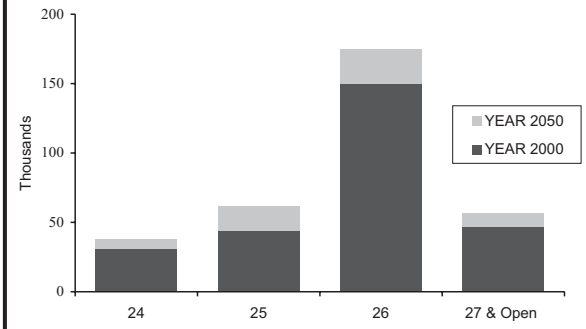


Figure 4 – 74
Boating Use Projections (Unconstrained) in the St. Louis District



other recreational activities. Approximately 16,000 acres of public lands and 2,200 acres of Kaskaskia River channel and backwater areas are managed for recreation and environmental stewardship.

Baldwin Lake, a 2,018-acre reservoir built by Illinois Power Company, is managed as part of KRFWA. This lake serves as a source of cooling water in operating a nearby electric generating station. Baldwin Lake is open to the public for fishing and is a major part of the waterfowl refuge of the area.

Figure 4 - 75
Commercial and Recreational Lockages 1996

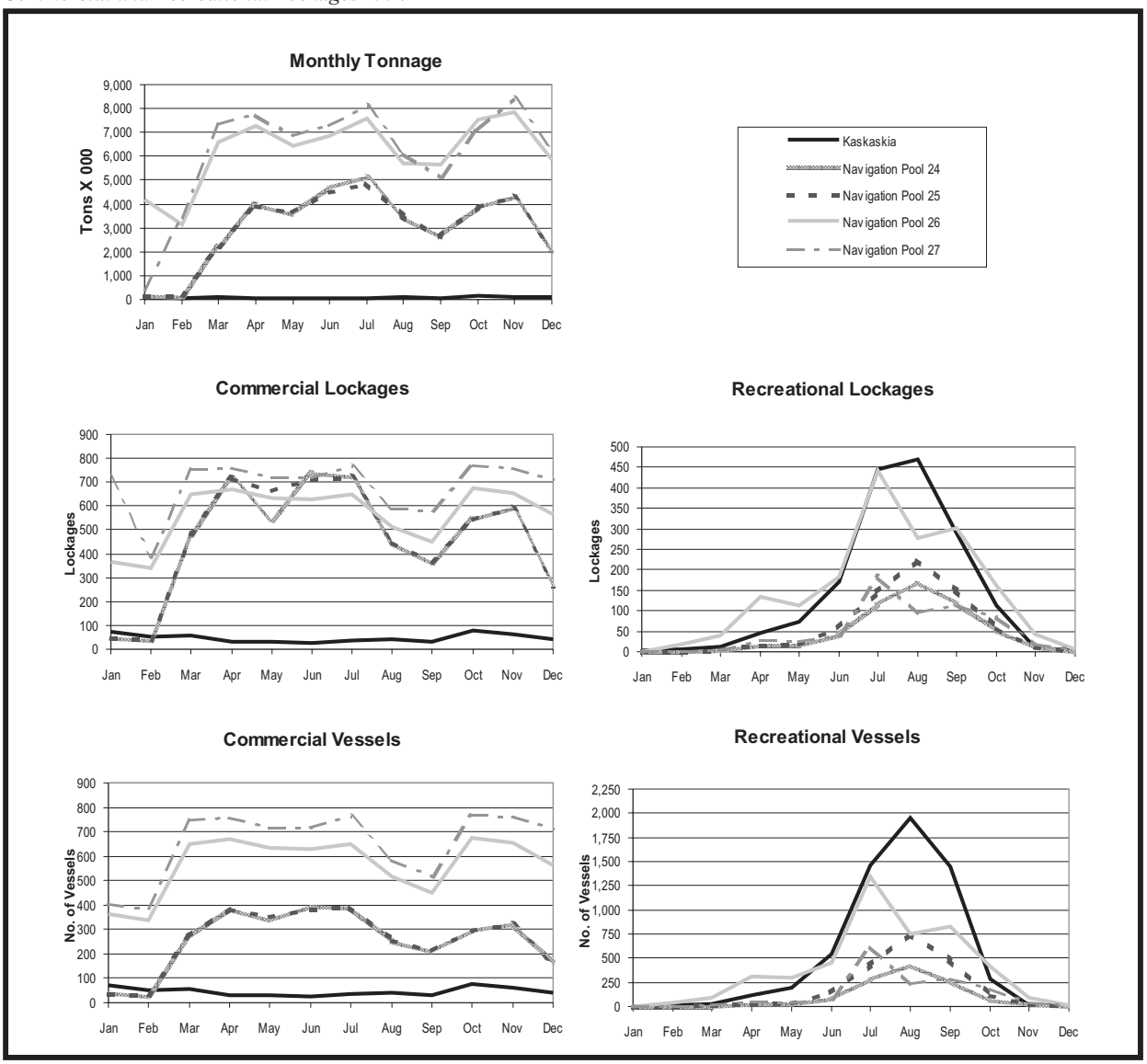


Table 4 – 76
1996 Monthly Commercial Tonnage and Commercial and Recreational lockages and Vessels (Upbound and Downbound Combined.)

1. Monthly Tonnage
2. Commercial Lockages
3. Recreational Lockages
4. Number of Commercial Vessels
5. Number of Recreational Vessels

Month		Kaskaskia	Navigation Pool 24	Navigation Pool 25	Navigation Pool 26	Navigation Pool 27
Jan	1	107,600	156,327	156,327	4,172,850	419,007
	2	71	47	47	365	725
	3	2	0	2	0	0
	4	71	41	36	364	404
	5	4	0	6	0	0
Feb	1	78,400	114,920	130,920	3,137,093	3,404,526
	2	51	37	38	339	382
	3	6	0	0	17	0
	4	51	28	29	339	382
	5	12	0	0	42	1
Mar	1	116,800	2,176,361	2,180,241	6,569,562	7,321,766
	2	58	477	483	650	754
	3	11	3	6	40	2
	4	58	267	270	650	748
	5	23	5	13	86	7
Apr	1	75,200	3,997,624	3,950,559	7,296,618	7,736,976
	2	31	719	717	671	759
	3	46	16	14	134	28
	4	31	386	386	671	759
	5	113	25	29	309	57
May	1	75,200	3,575,510	3,672,737	6,437,758	6,851,658
	2	29	539	667	633	716
	3	72	15	17	113	24
	4	29	336	351	633	716
	5	194	26	40	299	43
Jun	1	65,600	4,718,365	4,498,012	6,856,185	7,267,960
	2	27	736	710	627	719
	3	171	41	59	184	40
	4	26	395	382	627	718
	5	539	81	147	450	80
Jul	1	64,000	5,140,026	5,195,542	7,568,660	8,134,417
	2	39	721	723	649	763
	3	446	115	146	442	183
	4	37	390	390	649	762
	5	1,459	279	430	1350	625
Aug	1	96,200	3,465,349	3,502,984	5,689,489	6,125,702
	2	42	445	449	515	584
	3	468	170	224	278	95
	4	41	250	254	515	584
	5	1,948	430	755	745	238
Sep	1	76,800	2,592,310	2,611,565	5,649,651	5,119,862
	2	29	360	364	450	582
	3	291	118	150	303	113
	4	29	210	213	450	516
	5	1,442	264	484	823	290
Oct	1	140,800	3,865,554	3,871,520	7,553,286	7,142,312
	2	77	545	546	676	768
	3	113	53	57	163	86
	4	77	297	298	676	768
	5	279	68	111	412	183

Table 4 – 59 (continued)

1. Monthly Tonnage
2. Commercial Lockages
3. Recreational Lockages
4. Number of Commercial Vessels
5. Number of Recreational Vessels

Month		Kaskaskia	Navigation Pool 24	Navigation Pool 25	Navigation Pool 26	Navigation Pool 27
Nov	1	113,600	4,308,747	4,307,892	7,827,281	8,435,991
	2	64	593	591	653	761
	3	9	12	13	43	19
	4	62	324	322	653	761
	5	18	23	27	91	40
Dec	1	99,200	2,067,506	2,017,410	5,883,576	6,216,890
	2	43	271	269	563	711
	3	4	1	0	6	5
	4	43	164	161	563	711
	5	8	2	1	13	10
Cumulative for 1996	1	1,134,600	36,181,599	36,088,706	73,873,169	79,440,582
	2	563	5,590	5,604	6,814	8,543
	3	1,639	544	688	1,723	595
	4	557	3,088	3,092	6,813	7,845
	5	6,039	1,233	2,043	4,620	1,574

The public lands along the river includes an extensive mixed bottomland forest comprised of pecan, soft maple, burr oak, pin oak, shellbark hickory, and willow. Many cultivated and fallow fields, native grass patches, brushy areas, and other “open” areas are interspersed with the stands of mature bottomland timber. Due to this great diversity of habitats, good wildlife populations exist in the area and hunting and nature study are popular uses of the KRFWA.

Approximately 14,000 acres are available for hunting of forest game, small upland game and waterfowl. Hunter check stations are maintained in the area and access is primarily from the boat ramps and parking lots.

Fishing is the most popular activity on the Kaskaskia River, with its 36 miles of channelized river, plus additional oxbows, creeks, and floodplain lakes. Channel catfish and flathead catfish, largemouth bass, crappie, bluegill, carp and freshwater drum are the most sought after sport fish.

Boat launch ramps are provided on the Kaskaskia River at Fayetteville, New Athens, on Highway 154 west of Baldwin, and at Evansville.

Weekends and holidays throughout the summer receive the most recreational boat use, and congestion and boater safety is a serious concern.

Primitive camping and picnicking is permitted on lands adjacent to the river and developed picnicking areas are located at Ballwin Lake.

A 12-mile trail system exists and is used by hunters, hikers, birdwatchers and other outdoor enthusiasts.

Greenways and Urban Recreation

The St. Louis region was founded and developed around the confluence of five rivers: the Mississippi, Missouri, Meramec, Illinois and Kaskaskia. Over the last 100 years, many river communities in the region have disregarded their riverfront areas as areas of growth. That has changed, however, particularly since the late 1980s as cities are rediscovering their riverfronts for economic and quality of life purposes as leisure time and recreation demand continues to grow. These river corridors are excellent areas to develop Greenways.

Greenway corridors (linear open spaces connecting recreational, cultural, and natural areas) are traditionally recognized for their environmental protection, recreation value and aesthetic appearance. Often, trails and bikeways are the center or core of a greenway and usually represent the first use, with additional acreage added to solve environmental problems or to enhance the aesthetic qualities, natural habitat and recreation opportunities.

Greenway users typically think of biking, hiking, canoeing or fishing, but there are other benefits. By forestalling floodplain development, greenways reduce the damage caused by flooding. They provide natural filters that help trap and break down pollutants. They also provide places for plants and animals to live and travel through. Trees along greenways can shield unsightly land use, repair past land abuses or act as barriers from the sound of traffic on highways. These linear corridors can link parks, natural reserves, cultural features and historic sites so that people can enjoy the synergistic effect of these links.

Since the early 1990s, a concerted multi-partnered initiative to develop a St. Louis regional greenway and trail system has been developing. The centerpiece of the many cooperating greenway projects in the region is the Confluence Greenway, a large complex or mosaic of independent, yet coordinated greenway projects.

The Confluence Greenway is planned as a perpetually sustainable, 40-mile riverside recreation and conservation area on both banks of the Mississippi, extending from the Gateway Arch in downtown St. Louis to the confluence with the Missouri and Illinois Rivers. The Confluence Greenway will provide parks and trails with unprecedented access to the riverfront and will provide opportunities for walking, biking, fishing, birdwatching, river watching and other recreational activities. This unique resource will help to stimulate regional economic growth and present educational opportunities. Many components of the Confluence Greenway are either complete and operational or under various stages of planning and development. (*Figure 4 - 77,* page *78*)

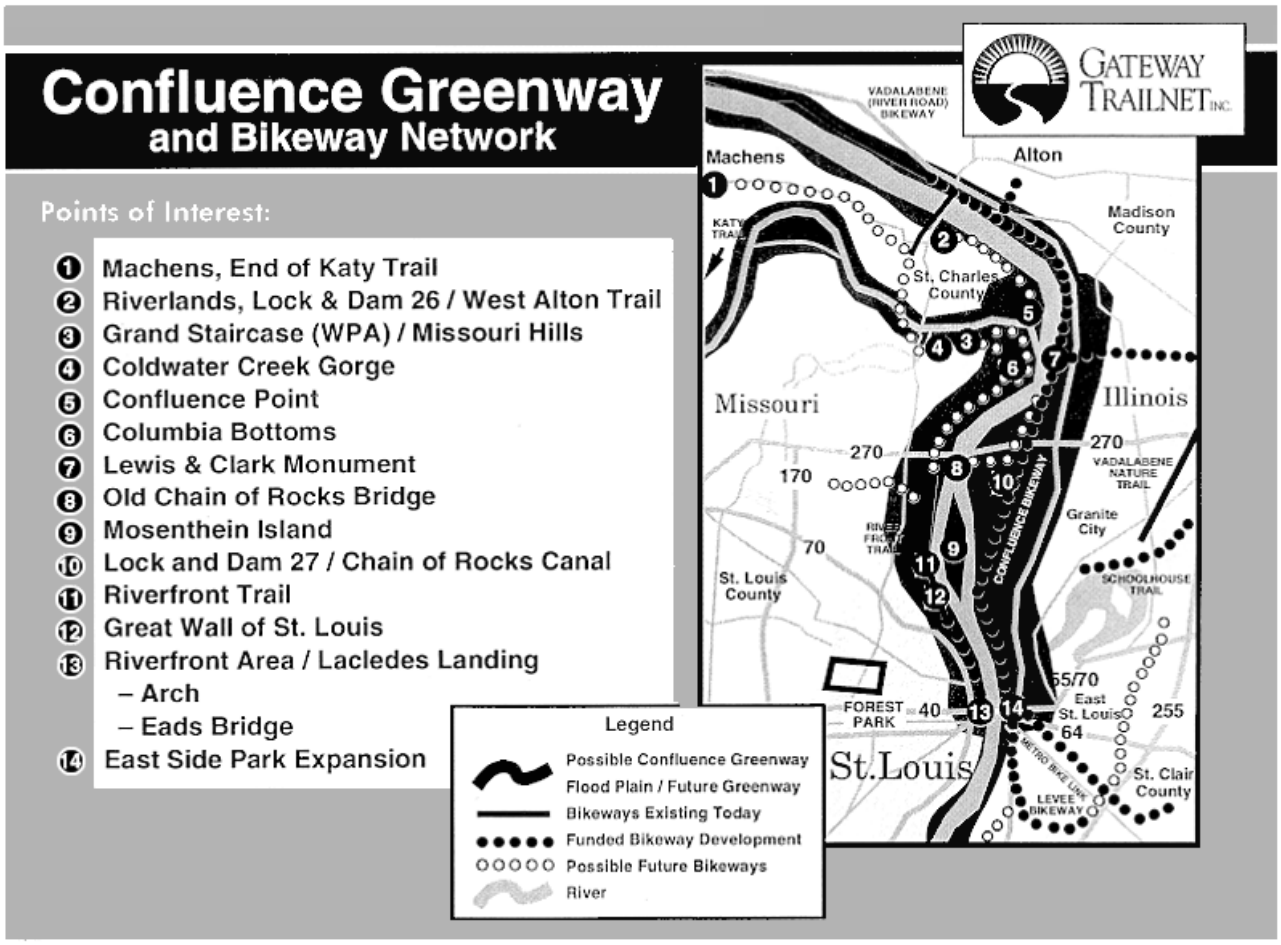
Greenway and trail corridor projects in the region include:

- The Katy Trail, a 200-mile trail that parallels the Missouri River through the region and is part of the coast-to-coast American Discovery Trail.
- The Old Chain of Rocks Bridge, Gateway Trailnet has led the funding and renovation effort for this historic (Route 66) River Bridge as a bicycle and pedestrian crossing that connects with trails on both sides of the Mississippi River.
- The Confluence Bikeway, a 24-mile trail from Alton to Locks 27 that connects with the Chain of Rocks Bridge Bike/Hike Crossing to the Missouri Trails as well as wetlands along the Mississippi River.
- The Riverfront Trail, a 12-mile trail in Missouri from the Gateway Arch north to the Chain of Rocks Bridge Crossing.
- The Levee Trail, an 11-miles along the Illinois levees from the Eads Bridge through Cahokia and on toward Belleville.
- Grant's Trail, a six-mile trail and greenway near Grant's Farm and the Ulysses S. Grant National Historic Site.
- Meeting of the Great Rivers National Scenic Byway which includes the 30-mile Vadalabene Bikeway and adjacent viewsheds being preserved by the Great Rivers Land Trust.

- Columbia Bottoms, a large 4,300 floodplain previously owned by the City of St. Louis transferred to the MDC as part of a large greenway along the river in 1997.
- The Meramec River Greenway, a twenty-year old effort to protect the green corridor and its adjacent floodplains along the Meramec River.
- The River Des Peres, winding through south St Louis. The flood of 1993 destroyed many homes along this corridor and those properties are being returned to open green spaces.
- The Limestone Bluffline, a scenic corridor from Alton to Chester on the American Bottoms along the rivers bluffs.

Plans to protect additional greenways in the region are being pursued through partnering by various federal, state, county and municipal agencies and non-profit organizations such as the St. Louis based trail advocacy group, Trailnet. The St. Louis District is involved in several of these greenway efforts associated with existing Corps projects and lands and waters.

Figure 4 – 77
Confluence Greenway and Bikeway Networks in the Project Area



Marina Developments

Private and commercially owned and operated marinas located on private lands are listed in *Table 4 – 78*. Pool 26, because of its location in the metropolitan area, has the greatest number of large marinas in the

bi-state region. Boating is a principle recreational activity on Pool 26. Sailing is more popular near the Alton area where the river pool is wide and deep rather than on the upstream end of the pool where the lake has a five mile per hour current and, with the exception of the channel, is shallow. Most boaters on Pool 26 are from the St. Louis Metropolitan area.

There are 26 full service marinas on Pool 26 which collectively provide more than 3,000 wet boat slips. These marinas range in size from as few as 40 slips to as many as 300 slips.

Houseboats and larger cruisers are the most common boats using the marinas and, consequently, several of the marinas on the pool have covered docks, lifts, storage yards and repair facilities necessary for larger boats. The predominance of the large boats and cruisers on Pool 26 is not evident on other lakes and rivers in the region with the exception of the Lake of the Ozarks.

Development of additional marina facilities both on and in the vicinity of Pool 26 is expected to occur in the future.

Only a few leased marina services are located on public lands. These areas are listed on *Table 4 – 79*. All marinas and boat clubs identified in *Tables 4 - 78* and *4 - 79* are also identified on the appropriate Management Area plates.

Table 4 – 78
Private Marinas in the Rivers Project area

Map ID Number	Marina or Other Facility Name	State, County, City	River Mile and Bank	No. of Boat Slips	Other Services and Features
POOL 24					
24-2	Louisiana Boat Club	MO, Pike, Louisiana	283 R	N/A	Launching
24-3	Clarksville Boat Club	MO, Pike, Clarksville	273.2 R	N/A	Launching
POOL 25					
25-1	Timberlake Marina	MO, Lincoln, Elsberry	257.7 R	50 Slips	40 Camping sites 11 Cabins
25-2	Pirys Marina	MO, Lincoln, Winfield	241.5 R	N/A	Launching
25-3	Port of Winfield	MO, Lincoln, Winfield	240.2 R	N/A	Launching
POOL 26					
26-1	Johns Boat Harbor	MO, St. Charles	231.5 R	100 Slips	
26-2	Two Branch Marina	MO, St. Charles	231.3 R	–	
25-3	Riverside Harbor	MO, St. Charles	227.0 R	–	
25-4	Gooses Landing	MO, St. Charles	226.5 R	–	
26-5	South Shore Marina	MO, St. Charles, Kampville	226.0 R	80 Slips	
26-6	Yacht Club of St. Louis	MO, St. Charles	225.2 R	200 Slips	
26-7	Lake Center Marina	MO, St. Charles,	224.4 R	272 Slips	
26-8	Heartland Marina	MO, St. Charles,	223.0 R	–	
26-9	Woodland Marina	MO, St. Charles, St. Charles	222.2 R	300 Slips	
26-10	North Shore Yacht Club	MO, St. Charles, St. Charles	222.0 Rat Hinge Point	185 Slips	
26-11	Viking Boat Harbor	MO, St. Charles,	221.7 R	–	
26-12	Anchor Marine	MO, St. Charles	221.5 R	110 Slips	
26-13	Duck Club Yacht Club	MO, St. Charles	221.0 R	114 Slips	
26-15	Hideaway Harbor	MO, St. Charles, Portage Des Sioux	214.0 R	60 Slips	
26-16	Venetian Harbor	MO, St. Charles, Portage Des Sioux	213.0 R	160 Slips	
26-17	Sioux Yacht Club	MO, St. Charles, Portage Des Sioux	212.8 R	–	

Table 4 – 78 (continued)

26-18	Palisades Yacht Club	MO, St. Charles, Portage Des Sioux	212.3 R	200 Slips	
26-19	My River Home Boat Harbor Inc.	MO, St. Charles, Portage Des Sioux	212.4 R	195 Slips	
26-20	Valley Sailing Association	MO, St. Charles	211.5	–	
26-21	St. Louis Sailing Club	MO, St. Charles	211.6	–	
26-24	Harbor Point Yacht Club	MO, St. Charles, West Alton	204.5 R	226 Slips	
26-25	Pilot House Yacht Club	MO, St. Charles, West Alton	204.2 R	225 Slips	
OPEN MISSISSIPPI RIVER					
O-1	Hoppies Marina	MO, Jefferson, Kimmswick	158.5 R	–	
O-2	Plattin Rock Boat Club	MO, Jefferson, Crystal City	149.8 R	N/A	Launching
O-2	Marina De Gabouri	MO, Ste. Genevieve, Ste. Genevieve	122.5 R	–	Restaurant, Fuel, Shipstore
LOWER KASKASKIA RIVER					
K-1	Kaskaskia River Marina	IL, St. Clair, New Athens	28.2 L	50 Slips	27 Campsites, Shipstore, Restaurant, Boat Services

– Information Not Available
N/A Not Applicable at this Site

Table 4 – 79
Commercial Concession Recreational Marina and Boat Club Developments on Public Lands

Map ID Number	Marina or Other Facility Name	State, County, City	River Mile and Bank	No. of Boat Slips	Other Services and Features
POOL 24					
24-1	Two Rivers Marina	IL, Pike,	283.0 L	125 Slips	
POOL 25					
25-4	Calhoun Sportsman Club	IL, Calhoun, Batchtown	242.0 L	N/A	Launching and Mooring
POOL 26 (Including Illinois River)					
26-14	Sherwood Harbor	MO, St. Charles,	219.0 R	112 Slips	
26-22	Alton Boat Club	IL, Jersey,	209.5 L	80 Slips	Upper Piasa Creek
26-23	Piasa Harbor	IL, Jersey,	209.5 L	216 Slips	
26-26	The Alton Marina	IL, Madison,	202.0 L	182 Slips	

N/A Not Applicable at this Site

Recreational Uses and Economic Significance on the UMRS

The value of the Upper Mississippi River System (UMRS) as a nationally significant resource is widely recognized. The system is vital in supporting ecological systems, commercial navigation and a wide variety of recreational activities.

In order to learn more about the types and economic significance of recreational use of the UMRS, Congress authorized a study in 1986 (Public Law 99-88) to measure the economic importance of recreation in the UMRS. The study was fully completed and published in April 1995.

In summary, the study estimates that throughout the UMRS over 12 million daily visits by recreationists took place during the study year. These visits resulted in direct and secondary expenditures of over $1.2 billion that helped maintain over 18,000 jobs.

Other study findings of relevance to the Rivers Project area are as follows:

- More than 2.3 million recreational party trips to the UMRS were made to developed areas, sightseeing/visitor center areas, marinas and permitted docks during the study period. These trips equate to over 12 million daily visits.

- Boating, fishing and sightseeing were the most popular activities. Half of all visitors boated.
- Over 60 percent of the people made their trips to developed public recreation areas, with the remaining trips being made to marinas, primarily on private lands (26 percent), sightseeing/visitor center areas (7 percent) and permitted docks (4 percent).
- Residents of counties that border the UMRS accounted for the majority of the trips, ranging from two-thirds to three-fourths for all types of access. Single day trips were predominant (around 75 percent) when compared with trips that included overnight stays. Average party sizes were larger for trips to permitted docks and marinas.
- Visitors spent over $190 million on items consumed on trips during the study year. Spending on durable items amounted to over $150 million during the study year. The average spending per visitor per day for items consumed on trips was $15.84. Most of this spending was for food, gas, lodging, and boating expenses.
- Patterns in spending were evident. The most influential factors were distance traveled, length of trips (daily or overnight), and use or non-use of boats. These patterns can be used in future studies in the UMRS.
- Spending on durable items used on trips, such as boats and fishing gear, averaged $12.54 per visitor per day. Most of this spending was on boating equipment, camping vehicles, and fishing gear.
- Visitors to marinas spent more, on average, than visitors to other areas. The value of all boats in marinas was approximately $600 million.

Recreational activities in the 76 counties bordering the UMRS during the study year resulted in direct and secondary expenditures of $400 million that helped maintain 7,200 jobs. Service industries, retailers, manufactures and finance and insurance providers were affected most.

One-third of all spending in the 76 corridor counties was made by nonresidents, representing “new dollars” to the region.

Table 4 – 81
Recreational Use of the Upper Mississippi River System by Access

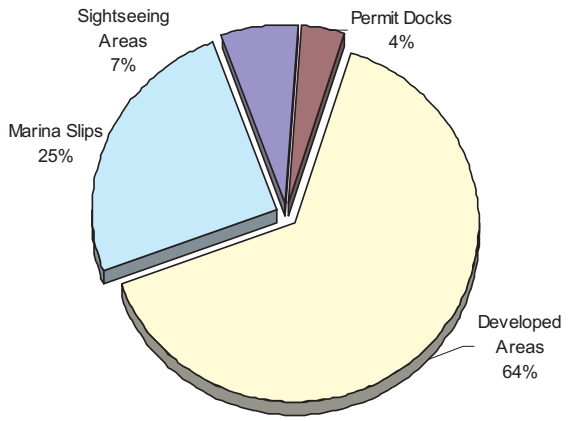


Figure 4-82
Summary of Recreational Activities For Entire UMRS

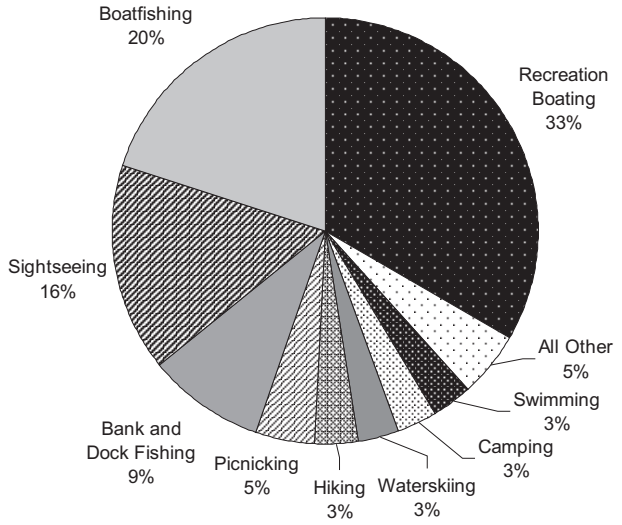
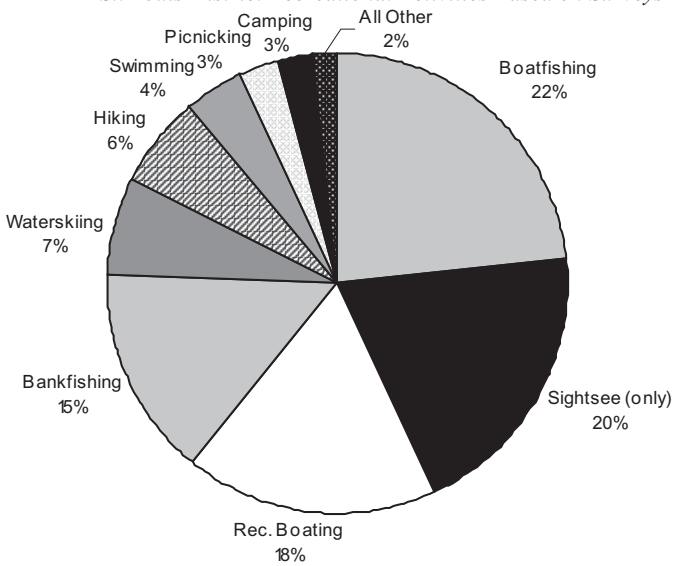


Figure 4-83
St. Louis District Recreational Activities Based on Surveys



SECTION V

PARTNERSHIPS AND COORDINATION

5.1. INTRODUCTION

No one agency has over control or oversight of stewardship activities on the public lands and waters along the Upper Mississippi River. Responsibility for natural resource and recreation management falls to several agencies who own or have jurisdiction over these public lands and waters.

Increasingly, competition for the use of these lands and waters and their natural resources can create conflicts and concerns among stakeholders. The need to coordinate a cooperative approach to protect and sustain these resources is compelling. Many opportunities exist to increase the effectiveness of federal programs through collaboration among agencies and to facilitate the process of of partnering between government and non-government organizations.

To sustain healthy and productive public lands and waters with the most efficient approach requires that individuals and organizations recognize their unique ability to contribute to commonly held goals. The key to progress is building on the strengths of each sector, achieving goals collectively that could not be reasonably achieved individually. Given the inter-jurisdictional nature of the Mississippi River corridor, partnering opportunities exist and can promote the leveraging of limited financial and human resources. Partnering and the identification of of innovative approaches to deliver justified levels of service, defuse polarization among interest groups and lead to a common understanding and appreciation of individual roles, priorities and responsibilities.

To the extend practicable, this Master Plan and a proactive approach to partnering will position the Rivers Project to aggressively leverage project financial and human resources in order to identify and satisfy customer expectations, project and sustain natural and cultural resources and recreational infrastructure, and programmatically bring Corps management efforts and outputs up to a justified level of service.

Paragraphs 5.2 through 5.7 provides an overview of some of the key long term partnerships the Rivers Project Office is involved with relative to mission accomplishment.

Memorandums of Agreement, Legislative Authorities for Partnering and Coordination, or both are established to define partnering arrangements with other agencies or organizations. These partnerships have become vital in providing the levels of service that users of river related resources demand. Selected partnerships are identified in the following tables by business area or activity.

5.2. ENVIRONMENTAL STEWARDSHIP PLANNING, MANAGEMENT, TECHNICAL AND REGULATORY PARTNERSHIPS/COORDINATION

Table 5-1

Activity	Federal Agency	State Agency*	Local Agency*	Other Organizations**
National Environmental Policy Act (NEPA)	USFWS, EPA	IDNR, MDC		
Endangered Species Act (ESA)	USFWS	IDNR, MDC		
Clean Water Act (CWA) Section 404/10 Compliance (Assessment, Delineation, Mitigation and Enforcement)	USFWS, EPA, NRCS	IDNR, MDNR, IEPA		
Fish and Wildlife Coordination Act	USFWS	IDNR, MDC		
General Plan and Cooperative Agreement	USFWS	IDNR, MDC		
Operational Management Plans	USFWS	IDNR, MDC		
Boundary Survey and Certification and Monumentation	USFWS, BLM	IDNR, MDC		
Stream Gauging Data Collection	USGS	IDNR, MDNR		
Biological Data Collection	USGS-LTRM, USFWS	IDNR, MDC		UMRCC
Erosion and Sedimentation Control	NRCS, USGS, USFWS	IDNR, MDC MDNR		
Habitat Protection and Enhancement	USFWS, NRCS	MDC, IDNR		Partners for Wetlands UMRCC
Archeological and Historic Preservation Compliance	NPS USFWS	IHPA, MDNR: State Historic Preservation Officers (SHPOs)		
Environmental Management Program (EMP) Habitat Rehabilitation and Enhancement Projects (HREP)	USFWS, USGS, NRCS	IDNR, MDC		
EMP Long Term Resource Monitoring Program (LTRM)	USGS, USFWS	IDNR, MDC		

5.3. NAVIGATION RELATED PARTNERSHIPS

Table 5-2

Activity	Federal Agency	State Agency	Local Agency	Organization *
Avoid and Minimize Effects of Navigation Program	USFWS, USGS, USCG	MDC, IDNR		River Industry Action Committee
Navigation Channel Maintenance and Dredging	USFWS	MDC, IDNR		

* Acronyms in this table are defined on Table 5-5
** Includes General Public

5.4. RECREATION/INTERPRETIVE SERVICES AND OUTREACH PROGRAMS (ISOP) AND SAFETY PARTNERSHIPS

Table 5 - 3

Activity	Federal Agency	State Agency	Local Agency	Organization *
Misc. Recreation Facilities / Accesses and Related Services	USFWS	IDNR, MDC	City of Alton	Existing Commercial Concession Lessees
Greenways, Trail Development, National Trails Program and Transportation Equity Act for the 21st Century	NPS, FHA	IDNR, MDC, MDNR, IDOT, MDOT	Madison Co. Transit	Trailnet, Inc. Greenway Network, Lewis & Clark Society
Meeting of the Great Rivers National Scenic Byway	FHA	IDOT		Great Rivers Land Trust Alton Parkway Heritage Commission
Water Safety and Public Safety	USCG, USFWS	IDNR, MDC, MWP		
Visitor Assistance and Law Enforcement	USFWS	IDNR, MDC, MWP	County Law Enforcement Agencies	
Special Events (Education/ Outreach)	USFWS, EPA, USCG, USGS	IDNR, MDC	Too numerous to list	
National Great Rivers Museum	USFWS, EPA, USGS, USCG	IDNR, IDCCA	LCCC	Meeting of the Rivers Foundation
Watchable Wildlife Program	USFWS	IDNR, MDC		Audubon Society Nature Conservancy
Environmental Demonstration Area Development and Programs	USFWS	MDC		Missouri Botanical Garden, WGNSS

* Acronyms in this table are defined on Table 5-5
** Includes General Public

5.5. FLOOD DAMAGE REDUCTION RELATED PARTNERSHIPS

Table 5 - 4

Activity	Federal Agency	State Agency	Local Agency	Organization *
Floodplain Use and Floodway Recovery	FEMA	IEMA, IDNR, MDNR, MOEMA		
Levees, floodwalls and Drainage Systems	FEMA	IEMA, MOEMA	Federally sponsored Levee and Drainage Districts	

* Acronyms in this table are defined on Table 5-5
** Includes General Public

Table 5-5
Key to Agency Acronyms in Rivers Project Partnership Tables

	Federal Agencies
BLM	Bureau of Land Management
FHA	Federal Highway Administration
EPA	Environmental Protection Agency
NRCS	Natural Resource Conservation Service
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
NPS	National Park Service
NMFS	National Marine Fisheries Services
	Illinois Agencies
IDNR	Illinois Department of Natural Resources
IHPA	Illinois Historic Preservation Agency
IDCCA	Illinois Department of Commerce and Community Affairs (Tourism)
IEPA	Illinois Environmental Protection Agency
IDOT	Illinois Department of Transportation
IEMA	Illinois Emergency Management Agency
	Missouri Agencies
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MDOT	Missouri Department of Transportation
MWP	Missouri Water Patrol
MDT	Missouri Department of Tourism
MOEMA	Missouri Emergency Management Agency
	Other Acronyms
SHPO	State Historic Preservation Officer
LTRM	Long Term Resource Monitoring
EMP	Environmental Management Program
HREP	Habitat Rehabilitation and Enhancement Project
NEPA	National Environmental Policy Act
ESA	Endangered Species Act
CWA 404	Clean Water Act-Section 404
RHA 10	Rivers and Harbors Act-Section 10
FWCA	Fish and Wildlife Coordination Act
TEA21	Transportation Equity Act for the 21st Century
UMRCC	Upper Mississippi River Conservation Committee
WGNSS	Webster Groves Nature Study Society
LCCC	Lewis and Clark Community College

5.6. PARTNERSHIPS/COORDINATION WITH PUBLIC AND PRIVATE SCHOOLS

Educational partnerships have been developed to address key issues relative to the natural resources of the Mississippi River watersheds.

The Rivers Project, working in collaboration with many educational institutions and other agencies and organizations, participates in the development and presentation of in-context hands-on curriculum. Interpretive programs and school curriculum have been developed by the Project staff centered around river themes to support needs identified by area educators.

Through its educational facilities and public lands and waters, the Rivers Project serves as a living laboratory, linking students with real life learning experiences in the fields of science and technology, to emphasize and improve math and science literacy of students in the U.S.

Further descriptions of Educational Programs are contained in Paragraph 8.11.

Table 5– 6

Selected Educational institutions, Agencies and Organizations with working partnerships with Rivers Project

• St. Louis School Partnership Program • Focus St. Louis • St. Louis City School District • Madison County, IL School Districts • Macoupin County, IL School Districts • Jersey County, IL, School Districts • Calhoun County, IL School Districts • St. Louis County, MO School Districts • St. Charles County, MO School Districts • Special School District • Cooperating School District • Southern Illinois University, Edwardsville • Southern Illinois University, Carbondale • Principia College • St. Louis University • Lindenwood University • Lewis and Clark Community College • University of Missouri, St. Louis • Eastern Illinois University	• Southern Illinois Higher Education Consortium • Regional Consortium for Education and Technology • Environmental Education Association of Illinois • River Curriculum Project • Academy of Science of St. Louis • Center for International Studies • St. Louis EdNet • St. Louis Experimental Education Center • Network for Educational Development • Academic Council for Riverlands Education (ACRE) • St. Louis Museum Collaborative • Missouri Botanical Gardens • World Bird Sanctuary • USFWS • MDC • IDNR • USGS • NPS • EPA	• USCG • Illinois Ecowatch • Audubon Society • Webster Groves Nature Study Society • Earthways Environmental Discovery & Education Center • Missouri Coalition for Education in the Outdoors • International Education Consortium • Illinois Natural History Survey • Kampsville Archaeological Museum • Meeting of the Rivers Foundation • Citizen Advisory Group, National Great Rivers Museum • National Great Rivers Museum Peer Review Group • Society of Wetlands Scientists • Girl Scouts of Greater St. Louis • Boy Scouts of Greater St. Louis • StreamTeach • Americorp • Professional Partners • Civic Progress

5.7. AGENCY, ORGANIZATION AND PUBLIC INVOLVEMENT AND COORDINATION ON MASTER PLAN DEVELOPMENT

Introduction

Corps Master Plan guidance is contained in ER 1130-2-550, Recreation Operations and Maintenance Policies, and EP 1130-2-550, Recreation and Maintenance Guidance and Procedures. Public involvement and extensive coordination within the Corps of Engineers and with other affected agencies and organizations is a critical feature required in developing or updating a Project Master Plan.

The Rivers Project Master Plan development process was divided into five phases as illustrated in *Figure 5-6*. Public involvement and coordination with other organizations has been a key element in every phase of the master plan development.

The Master Plan process was initiated during the spring of 1992. Numerous coordination and input meetings were held with other agencies, special interest groups and the general public to identify River issues and resource objectives to guide master plan development.

River issues and resource objectives are defined as follows:

River Issues

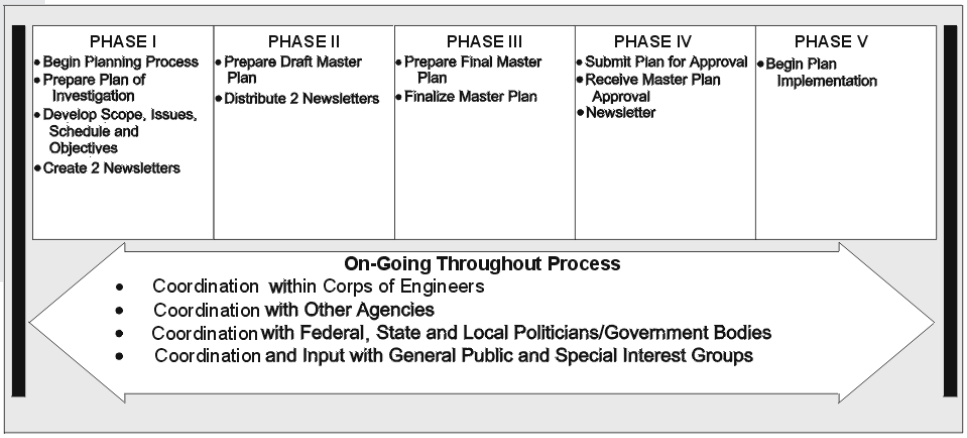
Any problems, concerns, and/or needs that could affect, or are affecting, the stewardship and management potential of the lands and waters under the jurisdiction of the Corps' Rivers Project Area Management Office.

Resource Objectives

Clearly written statements that respond to identified issues and that specify the desirable and attainable options for resource development and/or management for the lands and waters under the jurisdiction of the

Corps' Rivers Project Area Management Office. These objectives must be consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities and expressed public desires.

Figure 5-7
Rivers Project Master Plan Phases



Public Involvement Meetings Summary

A total of fifteen workshops were conducted during the spring and summer of 1992 with applicable federal, state and local agencies, special interest groups and the general public. Input was focused on identifying issues and objectives related to Mississippi River natural resources management, environmental protection, recreation, navigation and tourism. Workshops were held in Pleasant Hill, Illinois; Hardin, Illinois; Louisiana, Missouri; Winfield, Missouri; Alton, Illinois; Grafton, Illinois; St. Charles, Missouri; and St. Louis, Missouri. Written comments were received as well. From 1993 until early 1997, the master plan process was temporarily halted due to the Great Floods of 1993 and 1995 and the subsequent priorities required to complete flood recovery efforts. The process was re-initiated during 1996 and preparation and key agency coordination (USFWS, IDNR and MDC) on draft master plan development got underway.

Two more public involvement meetings were conducted during July 1997 (one in Clarksville, Missouri; one in Grafton, Illinois.) The purpose of these open house meetings was to informally meet with concerned individuals and groups to discuss the master plan process, status and schedule, explain the temporary suspension of the process, receive additional comments on river issues and resource objectives, solicit input on potential river access changes, and answer Rivers Project management related questions.

The Draft Master Rivers Project Master Plan was completed in May 1999.

Three public workshops were conducted during June 1999 at Clarksville, Missouri, Alton, Illinois, and Redbud, Illinois, to solicit comments on the Draft Plan. Written comments on the plan were received through August 1999. Key agency partner meetings were held during the summer of 1999 to make plan revisions as well.

Based on this Draft Plan review and comment phase, the plan was again revised, finalized and submitted for approval to the St. Louis District Corps of Engineers Commander (District Engineer) in early 2001.

A mailing list of approximately 1,500 contacts was developed during the master planning process. Informational Master Plan newsletters were prepared and sent out during each major phase of the process. The Draft

and Final Master Plans were placed on the St. Louis District Internet homepage for review purposes. Federal, state and local political office holders with jurisdiction within the Rivers Project Service Area were kept informed and given opportunities to comment throughout the master planning process.

Corps Coordination and Involvement

Table 5 - 8
St. Louis District Corps of Engineers Participants

Master Plan Coordination and Input from Corps Offices
St. Louis District Corps of Engineers participants:
Project Management Division ● Master Planning ● Environmental Analysis ● Navigation and Environmental Projects
Construction and Operations Division ● Technical Operations ● Rivers Project Office ● Regulatory Functions
Engineering Division ● Hydraulics and Hydrologic Engineering ● Geodesy, Cartography and Photogrammetry ● Design Engineering ● Geotechnical Engineering ● Cost Estimating
Real Estate Division ● Management and Disposal

Other Federal, State and Local Government and Private Special Interest Participants

A partial listing of federal, state and local governments, private special interest organizations and quasi-government entities that were requested to provide input during the Master Plan development processes are listed in *Tables 5-9* through *5-15* to illustrate the scope and diversity of interests associated with the Rivers.

Table 5 – 9
Federal and State Agencies Participating in Master Plan Development

Federal
U.S. Fish and Wildlife Service – Region III ● Mark Twain National Wildlife Refuge ● Ecological Services Division
U.S. Environmental Protection Agency ● Region V ● Region VII
U.S. Coast Guard – 2nd District
Natural Resources Conservation Service (NRCS) ● Illinois ● Missouri
U.S. Geological Survey ● Environmental Management Technical Center for Long Term Resource Monitoring
State
● Illinois Department of Natural Resources – Land Management and Education, Wildlife, Fisheries, Natural History Survey, Natural Heritage and Water Resources ● Illinois Historic Preservation Agency ● Illinois Department of Transportation, District 8 ● Missouri Department of Conservation ● Missouri Department of Natural Resources ● Missouri Highways and Transportation Department

Table 5 – 10
Selected Municipalities

Mayor, Alton, IL	Mayor, Wood River, IL
Mayor, East Alton, IL	Mayor, Batchtown, IL
Mayor, Brussels, IL	Mayor, Clarksville, MO
Mayor, Elsberry, MO	Mayor, Foley, MO
Mayor, Godfrey, IL	Mayor, Grafton, IL
Mayor, Granite City, IL	Mayor, Hardin, IL
Mayor, Hartford, IL	Mayor, Kampsville, IL
Mayor, Louisiana, MO	Mayor, Meredosia, IL
Mayor, Pleasant Hill, IL	Mayor, St. Charles, MO
Mayor, St. Louis, MO	Mayor, Winfield, MO
Mayor, New Athens, IL	Mayor, Annada, MO
Mayor, Evansville, IL	Mayor, New Canton, IL
Mayor, Fayetteville, IL	Mayor, Madison, IL

Table5 -11
Selected Counties

County Board, Pike Co., MO	County Board, Madison County., IL
County Board, St. Charles Co., MO	County Chair, Green Co., IL
County Executive, St. Louis Co., MO	County Board, Pike Co., IL
County Commission, Lincoln Co., MO	County Board, St. Clair Co., IL
County Chair, Calhoun Co., IL	County Commission, Monroe Co., IL
County Board, Jersey Co., IL	County Board, Randolph Co., IL

Table5 -12
Selected Environmental/Conservation Special Interest Organizations

Alliance for a Livable World	Mississippi River Basin Alliance
Alton Heritage Parkway Commission	Missouri Botanical Garden
American Heritage Rivers	Missouri Coalition for the Environment
American Rivers	Missouri Conservation Commission
Audubon Society	Missouri Native Plant Society
Center for Biodiversity	Missouri/Illinois Trail Coalition
Coalition for the Environment	Nature Institute
Ducks Unlimited	North American Bluebird Society
Earth Ways	Open Space Council
Gateway Green Alliance	Partners for Wetlands
Great Rivers Land Trust	Quail Unlimited
Greenpeace	Sierra Club, Madison, WS
Greenspace Foundation	Sierra Club Ozark Chapter
Greenway Network	Sierra Club Piasa Chapter
Hunters Alliance	Soil & Water Conservation Society
Illinois Environmental Council	Southwest Illinois Conservation &
Illinois Pollution Control Board	Development Inc.
Illinois Rivers Project / SIU	The Nature Conservancy
Illinois Sierra Club/Grassroots Inst.	Webster Groves Nature Study Society
Illinois Wildlife Federation	Wild Turkey Federation
Izaac Walton League	World Bird Sanctuary
Ladue Garden Club	Upper Mississippi River Basin Assn.
Madison County Conservation Alliance	Upper Mississippi River Conservation
McKnight Foundation	Committee (UMRCC)
Migratory Waterfowl	

Table 5-13
Selected Recreation Related Special Interest Organizations

Alta Villa Improvement Assoc.	Lake Center Marina
Alton – Wood River Sportsman Club	Midwest Bass Assoc.
Alton Marina	Midwest Trail Riders Assoc.
Alton Motor Boat Club	Migratory Waterfowl Hunters
Anchor Marine of St. Louis	Mississippi River Corridor Commission
Batchtown Sportsman Club	Palisades Yacht Club and Marine
Black Hawk Valley Hunting Preserve	Piasa Harbor Marina
Brickhouse Slough Subdivision	Raging Rivers Water Park
Calhoun Sportsman Club	Sherwood Harbor Marina
Clarksville Boat Club	Southshore Marina
Disabled American Veterans	The Alton Marina
Duck Club Yacht Club	Timberlake Marina
Fisherman's Ambassadors Assoc.	TRAILNET Inc.
Flyway Hunting Club	Two Rivers Marina
Horseback Trail Riders	Venetian Harbor
Illinois Bass Anglers Assoc.	Viking Boat Harbor
John's Boat Harbor	Western Boats & Motors (Piasa Harbor)
Kaskaskia River Boat Club	Woodland Marina
Kaskaskia River Marina	

Table 5-14
Selected Industry/Commercial Special Interest Organizations

AmerenUE – Portage Des Sioux	Kaskaskia River Stakeholders
American Boat Co.	Mid-America River Coalition
American Waterways Operators Assoc.	(MARC-2000)
Amoco Oil Co.	Mississippi Lime Co.
Azcon Scrap Metal	Mississippi River Transportation
Con Agra	National Maintenance & Repair Inc.
Conoco Oil Co.	Norman Brothers Inc.
Consolidated Grain & Barge Co.	Olin Corporation
Continental Oil	Ory Brothers Marine Service
Gateway FS, Inc.	Pool 24 Tug Service Inc.
Holnam Advisory Committee	River Industry Action Comm. – RIAC
Holnam Cement Co.	S&S Lumber, Inc.
Illinois Farm Bureau	Shell Oil Co.
Illinois River Carriers Assoc.	St. Louis County Port Authority
Inland River Service Inc.	St. Louis Fleeters Assoc.
Inman Marine	St. Louis RCGA, Transportation
IRECO Inc.	Tri-City Port District
Kaskaskia River Port District	

Table 5-15
Selected Tourism/Visitor Services Special Interest Organizations

Alton Belle Casino	Illinois Department of Commerce &
Alton Chamber of Commerce and	Community Affairs
Visitors and Convention Bureau	Lewis and Clark Society
Alton Growth Association	Lower Kaskaskia River Basin Coalition
Alton Historical Society	Meeting of the Rivers Foundation
Belle of Grafton Cruises	Midwest Outdoorsman
Bi-State Development agency	Mississippi River Parkway Commission
Bluff City Tours Inc.	Missouri Bureau of Tourism
Cassen Brothers Bait Shop	North Shore Yacht Club
Chamber of Commerce, Tri-City Area	PRIDE Inc.
Clarksville Chamber of Commerce	Raging Rivers Water Park
Main Street Clarksville	Riverbend Growth Association
Gateway Riverboat Cruises	Southwestern Illinois Tourism
Great River Road Alliance	St. Charles Chamber of Commerce
Greater Alton Twin Rivers Convention	St. Charles Convention & Visitors
Bureau	Bureau
Hagers River Lodge	St. Louis Bicycle Touring Society
Harbor Point Development Co.	St. Louis Convention & Visitors Bureau
Historic Clarksville, Inc.	St. Louis RCGA
Illinois Bureau of Tourism	Tara Point Inn Bed & Break fast
Kampsville Archaeological Museum	

SECTION VI

PLANNING ISSUES AND MANAGEMENT OBJECTIVES

6.1. PROJECT GOAL

The goal of the Rivers Project Master Plan is to provide the Rivers Project area with a master planning document that will authorize and/or facilitate existing and future management activities for the benefit and protection of all natural and constructed resources under Rivers Project Office jurisdiction. Sustainable plans within a river basin-wide context responsive to customer and partner needs will be developed to improve:

- Visitor Services
- Recreational Opportunities
- Biological Diversity/Resource Stewardship
- Environmental Engineering Activities
- Environmental Education Programs
- Economic Development

6.2. RIVERS ISSUES AND RESOURCE MANAGEMENT OBJECTIVES DEVELOPMENT

The process used to develop planning issues and management objectives for the Master Plan is described in Paragraph 5.7 — Agency and Public Involvement and Coordination on Master Plan Development. Public workshops were held during August and September 1992, and again during July 1997 to gather information concerning river issues and resource management objectives for the Master Plan. River planning issues are identified in Paragraph 6.3 and are listed from most important to least important, based on prioritization exercises from these workshops. Some of these issues are outside of Corps authority but are still documented because of their importance to the public and the overall health of the rivers. Resource use management objectives are identified in Paragraph 6.4 and are listed in random order and are within the existing authorities of the Corps River Project Office.

6.3. PLANNING ISSUES

Recreational Issues

There is a need to:

- Evaluate and implement a plan of action to satisfy demand for improved public access to, and on, Corps-managed public lands and water for walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.
- Evaluate and implement a plan of action to to satisfy demand for traditional public recreation facilities (campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy day harbors, interpretive signs/exhibits, and parking lots).

- Measure current public visitation levels and evaluate impacts from Overuse and crowding on recreational use and environmental quality. Implement a plan of action to reduce any identified impacts.
- Evaluate and implement a plan of action to improve recreational use zoning and regulations for both consumptive and non-consumptive activities, such as hunting, trapping, fishing, camping, boating (including mooring), bird watching (nature study).
- Evaluate and implement a plan of action for recreational use zoning and regulations for designated quiet water or no-wake areas with more emphasis on natural resource protection, quality recreational opportunities and public safety concerns.
- Provide additional minimum public health and safety support facilities and services such as sanitary toilets, drinking water, trash collection, law enforcement, directional-regulatory signage and vehicle parking and turnarounds.
- Consider the physical and biological changes/impacts known to be associated with commercial navigation and recreational use of waterways for all water based management activities and plans.
- Resolve conflicts between navigation craft and recreation boats to improve public safety.
- Provide barrier-free access and facilities required by law for disabled persons on public lands.
- Evaluate demand for marina facilities on public lands and waters.
- Evaluate established private exclusive use of public lands through out-grants to determine impacts on public access to these areas.

Natural Resource Management Issues

There is a need to:

- Adjust navigation pool regulation plan to optimize habitat conditions.
- Enhance conservation and protection of fish and wildlife resources, including endangered species.
- Pursue long-term holistic planning strategies that consider all impacts of decisions and actions on the river floodplain and watershed. (i.e. get away from the “Band-Aid” approach to solving resource problems.)
- Develop expanded sedimentation control/management strategies for the preservation of wetlands along the rivers.
- Establish an interagency agreement to address upland erosion problems that are negatively impacting the rivers.
- Manage the river in a manner as close to a “natural system” as possible (i.e., the way the river historically functioned prior to “human induced” changes.)
- Optimize resources, labor and funds for protection and restoration of habitats.
- Restore and protect the diversity of native riparian habitats on both open and forested public lands to assist with flood control, filtering of pollution, sediment reduction, improvement of fish and wildlife habitat, protection of endangered species and to offset dramatic basin wide losses of wetland habitat.
- Improve forest management along the river.

- Minimize activities which disturb the scenic beauty or aesthetics of the river.
- Eliminate and/or minimize negative natural resource use impacts.
- Improve planning and coordination for selecting dredge disposal sites.

Environmental Compliance Issues

There is a need to:

- Improve the river's water quality to sustain healthy fish and wildlife populations, habitat conditions, recreation opportunities, and avoid negative affects to public water supply.
- Stop trash dumping and other littering that is occurring on public lands and waters that create aesthetic, health and safety problems.
- Maintain an overall quality environment on and along the river corridor.
- Give equal consideration to economic, environmental and social impacts associated with all plans.
- Control erosion to reduce sedimentation at the source(i.e. adjacent uplands and tributary watersheds.)
- Improve cooperation between city, state and federal agencies to resolve and mitigate environmental problems.
- Identify both point and non-point sources of water quality problems.
- Identify and protect unique or sensitive habitat areas and culturally significant sites.
- Stop unauthorized uses of public lands, such as agricultural trespass, timber theft, unpermitted docks and other structures, clearing of vegetation, unauthorized roadways, off-road vehicle (ORV) use, trash dumping, poaching, and placement of advertising signs that create negative environmental impacts.
- Assess and manage all human activities on Corps managed lands and waters along the river and on the floodplain.
- Resolve increasing tension/conflicts between economic and environmental interests and activities.
- Protect and/or restore unstable, disappearing or deteriorating riparian habitat on the river corridor.
- Further study the impacts of rapid pool on fish and wildlife and research and develop alternative solutions.
- Upgrade existing public use facilities that do not meet required minimum health and safety standards.
- Evaluate existing, and future public use needs to develop strategies to avoid resource degradation, as well as visitor saturation and carrying capacity problems, on public lands and waters with a view towards sustaining or increasing current levels of recreation/open space opportunities.
- Increase agency budgets to address environmental problems.
- Evaluate traditional motor vehicle access roads and trails leading to or on public lands.

- Continue to monitor and evaluate the impacts on riverine aquatic habitat by the various regulatory works structures (dikes, etc.) that are constructed to maintain the navigation channel.

Visitor Information and Education Issues

There is a need to:

- Develop a conceptual plan and model of the entire river basin for the 21st Century
- Provide more opportunities for communication between agencies, special interest groups and the general public.
- Implement more educational and research programs on the river. Topics should include water quality, history, culture, safety, recreation, nature and ecology.
- Expand public environmental education programs and facilities throughout the entire project area to enlist the public's awareness and support to enhance and protect the natural resources of the Mississippi River Valley.
- Expand current facilitation of public lands as outdoor classroom settings for schools to stimulate student interest and increase aptitude in the natural, physical and social sciences.
- Establish a network among local, state and federal conservation agencies concerning exchange of river-related information for public education and management purposes.
- Establish uniform, clearly written fishing, hunting and boating regulations throughout this state/federal multi-jurisdictional area.
- More effectively inform recreational users about special concerns and regulations regarding the use of public lands and waters.
- Increase public awareness that special use permits or other authorizations are required for bass tournaments and other organized special events and commercial activities on public lands.
- Establish a well coordinated program for collecting, analyzing and reporting data concerning boating accidents and other mishaps on public lands and waters.
- Inform the visiting public and adjacent landowners about navigational servitude, as related to public recreational use of waters.

Shoreline Management Issues

There is a need to:

- Establish a plan to regulate private exclusive uses structures, such as boat docks, ramps and landings on public-owned shoreline and waters (i.e. primarily at cabin lease subdivisions) to maximize public access on public lands and waters and minimize shoreline/habitat degradation.
- Evaluate the impacts of commercial navigation craft fleeting on public land shoreline areas in terms of public use, shoreline stability, habitat conditions and sedimentation, and establish a sustainable plan to regulate fleeting.
- Note and consider in all management plans and actions that the majority of the shoreline on the pools is in private ownership, providing ample unrestricted opportunity for private development thus increasing public pressure and demand for recreational use of

the existing public shoreline areas and increasing the value of these areas for open space, public access and protected habitat.

- Control flooding or flood proof developed areas. Pursue the removal of unnecessary structures on the floodplain
- Manage privately owned and permitted waterfowl blinds as temporary structures on public waters and shoreline areas and conduct compliance inspections annually as required by permit and federal regulation.

Navigation Management Issues

There is a need to:

- Maintain the reliability and integrity of the inland waterways transportation system.
- Reevaluate navigation operation and maintenance practices to minimize negative environmental affects.
- Reevaluate dredged material disposal practices to maximize beneficial uses of this material for fish and wildlife habitat, recreation site stabilization and ensure it is being performed in a manner that minimizes negative impacts to the resource.
- Evaluate and develop a plan of action to regulate barge fleeting areas on federally-owned shoreline areas.
- Better communicate to partners and to the public the justification for the current dredging effort to maintain the navigation channel.
- Improve communications about existing navigation pool water level regulation requirements and methodology to the public.

Economic Impacts Issues

There is a need to:

- Resolve conflicts between economic and environmental issues in all management plans and activities.
- Evaluate the type and extent of additional commercial/industrial development that might be sustained on public lands.
- Evaluate the extent to which the Corps is competing with the private sector by offering fleeting areas, marinas, other commercial services or private exclusive use activities.
- Work with river communities to promote eco-tourism and recreational use of the river to favorably impact socioeconomic conditions along the river.

General Management Issues

There is a need to:

- Evaluate and minimize safety concerns when planning and implementing all activities.
- Establish a multi-agency overview or steering committee to address river related concerns in the region.
- Resurvey and maintain the public lands boundary to ensure it is clearly marked and known in all areas.

Historic Resources Management Issues

There is a need to:

- Create a mechanism to increase the coordination of river development and the protection of both the natural and historic resources.
- Conduct a systematic inventory of historic resources.
- Conduct a study/assessment of erosion rates and their effect on significant historic sites. This study should also include a proposed program of shoreline stabilization to protect important sites.
- Increase attention to the educational value of the waterways historical resources and the 10,000 year history of importance they have played in the region.
- Maintain full compliance with the National Historic Preservation Act, Sections 106 and 110, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and relevant Illinois and Missouri Historic Resources Acts on federal public lands along the waterways.

6.4. RESOURCE USE MANAGEMENT OBJECTIVES

Nine major resource use objectives, applicable to the Rivers project as a whole are presented below. These objectives were established based on public and agency input and are formulated so as to provide general guidance and direction to the overall management and development of the Rivers Project resources.

General Administration and Management

- Ensure that quality administration and management of all project lands, waters and other associated constructed and natural resources are consistent and thorough.
- Seek to continually increase efficiency, cost effectiveness and innovation in projects while keeping public use and enjoyment a goal of achievement.
- Ensure that all project activities address safety concerns.
- Ensure that all project administration and management decisions and actions adhere to all applicable laws, regulations, policies, and agreements.
- Develop consistent coordination and partnership efforts, both internally and with other applicable federal, state and local government agencies, private organizations and individuals.
- Implement all actions and plans in a manner compatible with authorized project purposes and all applicable social and environmental and safety factors, to ensure maximum benefits. Compromise will be considered when appropriate to minimize conflicts in project uses and developments.
- Identify facilities for rehabilitation or replacement.
- Provide efficient support facilities for public health and safety.
- Provide accessible facilities.
- Maintain a strong public education program.
- Provide sound environmental stewardship of public lands and waters.

- Maintain the integrity of the operational structures (i.e., the locks and dams and the navigation channel).
- Accommodate hydropower if feasible and compatible with other project purposes.

Recreation Related Objectives

Quality Recreational Experiences

- Seek to increase the quality of visitor's experience by maintaining and developing purposeful, functional recreation facilities and services that meet the needs of visitors, while maintaining the aesthetic and ecological integrity of public lands and waters.
- Improve and maintain the quality of all recreational areas.
- Maintain as a top priority rehabilitation efforts designed to stop environmental degradation and facility deterioration.
- Provide visitors with diverse recreational opportunities.

Facilities Management

- Evaluate and provide facilities that meet the needs of the visitors to the project.
- Maintain, develop and/or modify cost effective facilities in order to meet the changing and diverse use patterns of visitors.
- Provide visitors with the necessary facilities or services to support a diverse range of recreational activities, such as boating, picnicking, swimming, hunting, fishing, sight-seeing, wildlife viewing and environmental education.

Barrier-Free Access

- Increase outdoor recreational opportunities for disabled visitors by providing barrier free access by building, modifying and redesigning areas to promote accessibility and remove architectural barriers.
- Develop and modify facilities to increase recreational opportunities for disabled visitors while protecting environmental quality. Inspections of existing recreational areas have shown the need for increased opportunities for this user group.

Public Access, Trails and Greenways

- Conduct comprehensive project-wide evaluation of public access to public lands and waters and correct deficiencies in a manner that is responsive to public and agency needs while protecting and enhancing ecological values of the Rivers Project service area.
- Expand partnerships with others to pursue additional trail and greenway initiatives.

User Conflicts

- Identify and assess all possible alternatives to resolve any determined conflicts between navigation and recreational boats as well as other project uses.

Natural Resource Management Objectives

Administration and Management

Using a system or watershed approach, ensure that quality administration and management of project lands, waters, and other associated and natural resources is consistent and thorough. While continuing to achieve goals of sound, sustainable stewardship and safe, enjoyable public use; find effective ways to increase efficiency and cost effective management and administration. All project administrative and management decisions/actions will adhere to all applicable laws regulations, policies, and agreements. Consistent coordination, both internally and with other applicable federal, state and local government agencies, private organizations and individuals, will be maintained. All actions and/or plans will be implemented in a manner compatible with authorized project purposes and applicable social, economic and environmental factors, to insure minimum conflicts in project uses and development.

Management Philosophy

- Recognize the Mississippi River and its tributaries not only as a nationally significant transportation corridor, but also as a Congressionally-mandated national environmental treasure (WRDA 1986). To this end, the concepts of watershed sustainability will be strictly adhered to and promoted in all management decisions and actions.

Protection of Natural Resources

- Encourage the use of all project lands for public enjoyment by both consumptive and non-consumptive users while guarding against over-utilization of the resources of the riparian habitat corridors and ensuring diverse and sustainable fish and wildlife populations and their habitats.
- Provide fire, insect, disease and exotic species control through preventive and corrective measures.
- Evaluate public use on project lands and determine corrective actions when potential overuse or other conflicts on project lands develop.

Forest Habitats

- Forests will be managed for ecological integrity, erosion control, water quality protection and wildlife habitat values.
- Concentrate efforts on inventory, reforestation and protection of bottomland forests, which are quickly disappearing from both Illinois and Missouri. Remaining tracts of bottomland forest show major quality deficiencies. The floodplain forest provides high quality wildlife habitats, recreation and scenic values.

Wetlands

- Reclaim, protect, restore, and maintain high-quality wetland habitats for all fish and wildlife wetland species.

Soils

- Base all land management activities on soil types and their land use capabilities.
- Prevent soil erosion.
- Maintain appropriate conservation practices on all agricultural areas, such as no till farming, filter strips, and waterway protection, as recommended by the NRCS.

- Implement conservation measures designed to prevent soil loss, such as conversion to permanent vegetative cover, water drainage control, stream bank protection, where problems exist.

Environmental Compliance Objectives

Water Quality

- Seek to improve the general water quality of the river system in cooperation with the USFWS, IDNR, MDC, NRCS and EPA, and the MDNR and Illinois EPA.
- Strive to eliminate the need for contaminated fish and water warnings within the Rivers Project service area.
- Aggressively seek ways to work with the NRCS and other relevant agencies to reduce erosion along the river corridor, which will, in turn, reduce the silt and chemical load of the river.
- Work with our industrial partners and the EPA to find ways to reduce pollution.
- Work with local units of government to find ways to improve sewage and sanitation standards for public and private developments along the river corridor.

Rare and Endangered Species

- Complete inventories and identify existing populations of federal and state endangered and threatened plant and animal species and develop and implement recovery actions in cooperation with the USFWS and state agencies.
- Aggressively seek and/or develop management techniques and strategies where populations of endangered species exist to enhance these populations while permitting other compatible management activities to occur.

Unique or Endangered Habitats

- Inventory navigation pool lands and waters to identify and protect unique or endangered habitats in cooperation with the USFWS and state agencies.
- Implement techniques to protect and maintain unique or endangered habitats wherever they are found. (Examples of habitats types of concern are limestone bluffs, hill prairies, unique bottomland forest communities, deep backwater fisheries, fresh water springs and fens.)

Environmentally Sound Public Use Areas

- Provide a quality experience for visitors and enhance ecological integrity by continually monitoring, maintaining and improving the aesthetic and environmental quality of project resources.
- Monitor site deterioration and take actions through the ERGO process to prevent or rehabilitate areas before site impacts have any negative affects on visitor's experiences, public health and safety, or the environment.
- Develop recreational facilities and opportunities using environmental protection and enhancement techniques.
- Use aesthetic site designs, site impact hardening, vegetative buffers, natural landscaping and other practices to accomplish this objective.

Outgrants quotidian

- Phase out private exclusive use recreational cottages, and certain commercial services that could be provided on private lands and waters. Only outgrants that produce high recreational outputs and that are compatible with the Rivers Project Missions should be pursued in the future.
- Conduct periodic inspections of outgrants to ensure full environmental, safety, and administrative compliance with all applicable leases, licenses, permits, regulations and federal, state and local laws. Changes in existing uses of outgranted areas may be warranted when the general public's needs are not being met, and the land is needed for higher public purposes.

General Compliance

- Ensure that all activities, developments and other management actions comply with National Environmental Policy Act requirements.
- Ensure all activities occurring on federal public lands in the floodplain fully comply with federal, state and local laws, regulations, ordinances and other environmental protection requirements.

Visitor Information and Education Objectives

Visitor Interpretive and Outreach Services

- Develop an expanded Interpretive Services Outreach Program to provide effective and efficient distribution of Rivers Project-related information. Provide information concerning facilities and services, rules and regulations, land and water safety. Also provide information regarding Corps missions and responsibilities, navigation, river history, recreation, environmental stewardship programs and projects, etc.
- Maximize and expand non-personal services, such as visitor centers, overlooks, bulletin boards, brochures, news media and cooperating association outlets.
- Increase personal services, such as Ranger conducted interpretive programs and tours.
- Develop partnered special events, cooperating association programs, school partnerships, and distance learning.
- Ensure that all program initiatives provide project information, enhance the quality experience for the public and promote awareness and understanding of the river basin environment and the importance of sustaining its future.

Environmental Education

- Develop and expand curriculum, "hands-on" activities and educational programs that can be certified by the Illinois and Missouri State Boards of Education for the purpose of involving students, teachers and other organized groups in appropriate outdoor and classroom educational activities.
- Provide facilities and outdoor classrooms on public lands that will accommodate school groups and other organizations on a regular, dependable basis.
- Focus educational curriculum on the Mississippi River Valley history, culture, ecosystems, and other environmental science topics; water/recreation safety awareness; and protection and sustainment of the natural resources of the Mississippi River Basin.

Information Access

- Establish an electronic network and other mechanisms among local, state and federal agencies and organizations to share information on river related activities throughout the basin and make the information available to the public throughout the river basin, the nation and the world.

Shoreline Management Objectives

Environmental Stability

- Develop a Shoreline Management Plan outlining regulations and permitted activities on public owned shoreline areas that promote environmental stability.

Public lands on the river pools encompasses only a portion of the shoreline areas on the Mississippi and lower Illinois Rivers. Pressures for development and environmental protection are extreme and usually conflicting. Through extensive interagency coordination, public involvement, and Corps regulation and guidance, a shoreline management plan will be developed, implemented and enforced to ensure reasonable and orderly development or use of shoreline areas and protection for sensitive areas.

Private Exclusive Use

- Continue phasing out existing private exclusive use of shoreline areas, concurrent with Corps and national policies, to ensure equal public access to public lands and waters and to protect ecologically sensitive areas.

Permanently placed private cottages with boat docks, ramps, landings, duck blinds and mooring (fleeting areas on public lands/shoreline areas) restrict general public access and use in these areas and in some cases degrade shoreline stability, threaten habitat and increase sedimentation.

Land Use Classification

- Use the project land use classification plan to guide management for all public lands as required by federal regulation and this approved Master Plan.
- Solicit full public and interagency participation to ensure a relevant, well-balanced land use classification plan.

Navigation Management Objectives

Navigational Compatibility with Other Project Concerns

- Promote facilities, conditions, O&M activities and best management practices required to ensure efficient commercial navigation in a manner that avoids or minimizes negative impacts to environmental and recreation concerns.

Economic Impacts Objectives

Regional Economic Growth

- Contribute to and develop partnerships with agencies, groups, and individuals with the common goal of quality river region eco-tourism and sustainable economic development with effective environmental protection.

Historic Resources Management Objectives

Cultural Resources Management Plan

- Work closely with the MDNR, Illinois Historic Preservation Agency and other applicable agencies and organizations to identify historic properties and develop a management plan for historic properties that is in full compliance with all pertinent federal and state laws and regulations.

SECTION VII

LAND AND WATER MANAGEMENT AREA PLANS

7.1. INTRODUCTION

The Project Master Plan provides guidance for the orderly development, use and management of project resources. Resource planning takes into consideration authorized project purposes, public desires, regional needs, and opportunities and constraints that influence development and management. All proposed development is designed to be compatible with the project's natural and cultural resources. Project planning and land classification deals with several factors: seasonal flooding, soils, ecological conditions, existing and projected recreation demand, state and local participation and interest, and applicable laws, regulations and policies.

Each area description includes a listing of existing facilities, and proposed and future actions. Proposed actions are intended to be completed within ten years or by the next scheduled update. Future actions include alternatives that are generally being considered for development after ten years. Costs for proposed actions are included in Section X.

7.2. SELECTED LAND AND WATER USE POLICIES

Shoreline Management

The following excerpt is taken from the Corps regulation on Shoreline Management (ER 1130-2-406) dated 31 Oct 1990:

> "It is the policy of the Chief of Engineers, Corps, to protect and manage shorelines of all civil works water resource development projects under Corps jurisdiction in a manner which will promote the safe and healthful use of these shorelines by the public while maintaining environmental safeguards to ensure a quality resource for use by the public. The objectives of all management actions will be to achieve a balance between permitted private uses and resource protection for general public use. Public pedestrian access to and exit from these shorelines shall be preserved.
>
> It is the policy that private exclusive use will not be permitted on new water resource projects where no private facilities existed as of 13 December 1974, the date of the original Shoreline Management implementing regulation (ER-1130-2-406).
>
> Preserving the natural environment is essential to the proper maintenance and management of wildlife habitat, aesthetic quality of water resource projects, and shoreline erosion control. Therefore, no shoreline use permits for vegetation modification activities, such as clearing or mowing, which would imply exclusive use of public land or otherwise deny full use of public land or water to the general public, will be issued at St. Louis District projects. The only exceptions at Rivers Project may be a 100-foot buffer from a housing structure for fire protection and for mowing roadways and levee berms."

St. Louis District Interim Policy

A Shoreline Management Plan, as required by 36 CFR Part 327.30, Shoreline Management on Civil Works Projects, has not been developed for those portions of the Mississippi and Illinois Rivers under the jurisdiction of the St. Louis District. Until such a time a plan is developed and approved, the following policy, dated September 4, 1990, will govern private exclusive use of the shoreline:

- Existing and new shoreline facilities for Cabin Lease holders will be covered under the lease instrument.
- No new facilities will be approved, permitted or constructed until a new Shoreline Management Plan has been developed and approved for the Mississippi and Illinois Rivers.
- All existing facilities, including cabin lease holdings, will be grandfathered until a Shoreline Management Plan has been developed and approved.

Off Road Vehicles and Seaplane Use

The operation of off-road vehicles on Corps land will be in accordance with the policies, procedures and criteria set forth in ER 1130-2-550, Chapter 10; EP 1130-2-550, Chapter 10 and Executive Order 11644. In addition, ER 1130-2-550, Chapter 11 and EP 1130-2-550, Chapter 11 set forth rules and regulations governing seaplane operations at civil works projects.

Forest Resources

All lands in government fee ownership are being managed to maintain their forest resources for recreation, wildlife and scenic values. The Land and Water Use Plan plates show these lands as Recreation and Recreation Low-Density, Vegetative Management and Wildlife Management. The OMP for each compartment describes the general practices and techniques that are used to conduct a program for developing the forest resources of the River Project, such as tree planting and vegetation manipulation, to support management objectives. When necessary, timber will be harvested to achieve other management objectives such as wildlife habitat improvement. Forest management is a secondary purpose for areas zoned for recreation or low-density recreation. The OMPs detail specific objectives and management practices.

Agricultural Use

Portions of those lands managed by other agencies have been placed under a Sharecrop agricultural program. The plan contains provisions for agriculture as a corollary use to obtain food for wildlife, to prevent encroachment of undesirable vegetation and to provide succession control.

7.3. LAND ALLOCATIONS AND LAND USE CLASSIFICATIONS

Land Allocation

All lands will be allocated in accordance with the authorized purposes for which they were or are to be acquired. Land will be allocated into one of the following categories:

Operations

- Lands acquired in accordance with the authorizing documents for operation of the project, including flood control, hydropower, navigation, water supply, etc.

In many cases, the majority of lands (rim lands, etc.) on Corps projects will be allocated to project operations.

Recreation

- Separable lands acquired in accordance with authorizing documents for public recreation only.

None exist at Rivers Project.

Fish and Wildlife

- Separable land acquired in accordance with authorizing documents for fish and wildlife management

Mitigation

- Land acquired or designated in accordance with authorizing documents to offset losses associated with development of the project

Land Use Classification

Allocated project lands are further classified to provide for development and resource management consistent with authorized project purposes and the provisions of the National Environmental Policy Act (EPA) and other federal laws. The classification process refines the land allocations to fully utilize project lands and must consider public desires, legislative authority, regional and project specific resource requirements and suitability. Land allocation takes precedent over any of the following classification categories. Agricultural or grazing use of project land is not a land classification but may be an interim or corollary use to meet management objectives. Land shall be classified into one of the following categories:

Project Operations

- Lands required for operations structures, operations centers, offices, maintenance compounds and other areas that are used solely for project operations

Recreation

- Land developed for intensive recreational activities by the visiting public, including developed recreation areas and areas for concession, resort, and quasi-public development

Mitigation

- Land acquired or designated specifically for mitigation only

Land classified in this category should be evaluated for consideration for lease or license to the Department of the Interior or the state.

Environment Sensitive Areas

- Areas where scientific, ecological, cultural or aesthetic features have been identified.

The identification of these areas on the map must be supported by narrative explaining the rationale for the classification. These areas, normally within one of the other classification categories, must be considered by management to ensure the sensitive areas are not adversely impacted. Normally, limited or no development of public use is contemplated for land in this classification. No agricultural or grazing uses are permitted on this land.

Multiple Resource Management

- Lands managed for one or more of, but not limited to, these activities to the extent that they are compatible with the primary allocation(s)

The activities should be fully explained in the narrative portion of the master plan.

Recreation Low Density

Low density recreation activities such as fishing, hiking, primitive camping, wildlife observation, hunting, or similar low-density recreational activities

Wildlife Management General

Fish and wildlife management activities

Lands in this sub-category shall be evaluated for consideration for lease or license to the Department of the Interior or the state.

Vegetative Management

Management activities for the protection and development of forest and vegetative cover.

Inactive and/or Future Recreation Areas

Planned or temporarily closed recreation areas. These lands will be classified as multiple resource management in the interim.

Easement Lands

All lands for which the Corps holds an easement interest but not a fee title. Planned use and management of easement lands will be in strict accordance with the terms and conditions of the easement estate acquired for the project.

Industrial Leases

Originally zoned operational, these lands include lands under lease to private industry that require access to river transportation.

7.4. MANAGEMENT AREA DESCRIPTIONS, ZONING AND PLANS BY POOL, COMPARTMENTS AND UNITS

POOL 27 Compartment 1

Chain of Rocks Canal Management Area

UNIT 1 - American Bottoms

Chain of Rocks Canal Area
Corps of Engineers
Operations (27-O-1)
Madison County, IL
River Mile 183.2 – 195.0L
Acres 2,421
Plates 27-2, 27-1, S-1

General Description: The **Chain of Rocks Canal Area** includes a total of 13 areas, which are described as follows:

(1) The **Locks 27 Area** is located approximately one mile above the mouth of the Chain of Rocks Canal. Locks 27 is the last navigation lock on the Mississippi River and was authorized as part of the modifications to the existing Mississippi River Nine-Foot Navigation Channel project. The modifications provided for an eight-mile long canal to bypass the Chain of Rocks Reach along the northeastern boundary of St. Louis and St. Louis County, Missouri, between RM 184 and RM 194.5. The Chain of Rocks Reach is a series of rock ledges, which extend from the east bank under the river channel and act as a hazard to river navigation. Locks 27 and the Chain of Rocks Canal provide for navigation around the natural rock barriers, which during low water have a fall of 11 feet. Construction began on the Chain of Rocks Canal project in 1946 and the locks were opened to river traffic on 7 February 1953. Facilities include one 110-foot by 1,200-foot main lock and one 110-foot by 600-foot auxiliary lock.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

(2) The **Locks 27 Administration Area** is located adjacent to Locks 27 and is managed to provide facilities necessary for the operation and maintenance of Locks 27. Facilities include an access road, parking lot, administration building and control house, maintenance building, generator building and other appurtenant facilities, including radio towers and fuel tanks.

Proposed Development: Proposed development includes an additional maintenance building, removal of radio towers and temporary storage facilities, relocation of one set of fuel tanks, and installation of additional perimeter fencing.

Future Development: No future development is planned.

(3) The **Locks 27 Access Area** is located adjacent to the Locks 27 Administration Complex and is managed for public access purposes. Facilities include an access road, parking lot, waterborne comfort stations, visitor overlook, and the Floyd Wade Memorial Visitor Center.

Proposed Development: Restore and convert the existing waterborne comfort station and visitor overlook to the standards required by the Americans with Disabilities Act (ADA); provide a public access walkway to the visitor center and overlook, and expand the “Type C” visitor center into old lock control room.

Future Development: No future development is planned.

(4) The **Chain of Rocks Canal Area** is located immediately downstream of the confluence of the Missouri and Mississippi Rivers below the Melvin Price Locks and Dam. The eight-mile canal is managed as a navigation structure to provide a navigation bypass of the obstructive Chain of Rocks reach of the Mississippi River. Facilities include the canal, shoreline revetment and appurtenant facilities. The canal is eight miles in length with a bottom width of 300 feet at elevation 378.0 NGVD.

Proposed Development: Includes expansion of the existing Tri-City Regional Port District Harbor/St. Louis Harbor development (by others).

Future Development: No future development is planned.

(5) The **East Chain of Rocks Canal Levee Area** is located along the east side of the Chain of Rocks Canal. The East and West Chain of Rocks Levees were authorized by the River and Harbor Act of 2 March 1945. These levees were required as modifications to the existing levee systems due to the construction of the canal. The levee is managed both as a flood reduction and navigation structure. The nine-mile levee provides the navigation channel of the Chain of Rocks Canal and a 500-year flood protection for the agricultural, industrial and residential areas bordering the canal. It is an integral part of the Alton to Gale Levee System with crown elevation of 442.5 NGVD. Facilities include the Chain of Rocks Canal levee and associated relief wells, piezometers, drainage ditches and pipes, gated culverts, and levee road. The levee is dredged sand fill with one foot of topsoil to support ground cover. It has a 20-foot crown width and IV on 4H side slopes to a canal side berm elevation of 421.5 NGVD.

Proposed Development: Includes expansion of the existing Tri-City Regional Port District Harbor/St. Louis Harbor development, and facilities necessary for the East Chain of Rocks Levee Final Repairs.

Future Development: No future development is planned.

(6) The **East Levee Road Area** is located on the centerline of the East Chain of Rocks Levee crown. The road is managed for operations service access and as a public viewing facility of the Chain of Rocks Canal project. Its roadway is a 20-foot wide and 6-mile long crushed stone surface road connecting the public Metro East Sanitary District Levee Road on the north and the public Nameoki Township Bauer Road to the south. The roadway has five connecting spurs with controlled access gates, which include three spurs to the public Venice Township Chouteau Place Road, one spur to the public Venice Township Old Rock Road, and one spur to the public Nameoki Township Bauer Road. Facilities also include three trilateration stations and a viewing facility.

Proposed Development: Madison County Transit Authority has proposed developing a segment of the Confluence Bikeway that will interconnect bus transfer nodes, park and ride lots, population centers and major employment centers for all but the most northern portion of the roadway. Bike trail and interpretive facilities will be developed to provide a connection with the confluence bikeway. Three trilateration stations will be rehabilitated. The viewing facility will be moved to the West Levee Access.

Future Development: No future development is planned.

(7) The **West Chain of Rocks Canal Levee Area** is located on the west side of the Chain of Rocks Canal and is managed as both a navigation and flood reduction control structure. The eight-mile levee maintains the navigation channel of the Chain of Rocks Canal and the eastern line of

flood protection for the agricultural areas of Chouteau Island and the Gabaret Island Drainage and Levee Districts. Project facilities include the levee and associated piezometers, drainage ditches, dredge pipes, and levee road. The six mile levee is dredged sand fill with one foot of topsoil to support ground cover and has a crown elevation of 439.5 NGVD. It has a 14-foot crown width and IV on 4H side slopes to a canal-side berm elevation of 421.5.

Proposed Development: The West Levee Access will be established (see # 11) in this area as a replacement for the East Levee Road viewing facility and the Earth Day Access.

Future Development: No future development is planned.

(8) The **West Levee Road Area** is located on the crown of the West Chain of Rocks Canal Levee. The road is managed for operations service access to the project. The roadway is 14-foot wide 6-mile long crushed stone surface road connecting to the public Old US 66/Chain of Rocks Road. The roadway has two connecting spurs; one spur to a public township road to the south, and one spur a public township road to the north. Facilities include two access control gates connecting to north and south service access roads and three trilateration stations.

Proposed Development: Proposed development includes permanent closure of the levee road and granting of private road rights-of-way to cut-off landowners from the entrance spur and proposed West Levee Access Area to the intersections of public roads. The roadway entrance spur connecting to Old US 66/Chain of Rocks Road will serve as the entrance road to the proposed West Levee Access Area and will be provided with bike lanes to connect the linking bike trails over the Old US 66/Chain of Rocks Road bridge. Three trilateration stations will be rehabilitated and the north service access road will be relocated.

Future Development: No future development is planned.

(9) The **Tri-City Regional Port District Area** is located on 266.16 acres adjacent to the Chain of Rocks Canal immediately upstream of Locks 27. The facilities are managed as an inland river port requiring a multimodal interface of rail, trucking and water transportation for commercial and industrial purposes under long term industrial leases with Tri-City Regional Port District. The lease areas include a variety of industries and facilities including liquid and bulk products, steel terminals, a steel processing plant; rail, truck, terminal and fleeting operations, and immediate environs.

Proposed Development: Proposed development by the Port District includes harbor and inter-modal complex expansion. In addition, federally authorized construction of an additional pump station will occur at this location in conjunction with the Chain of Rocks Canal (Design Deficiency) Project.

Future Development: No future development is planned.

(10) The **Chouteau, Nameoki and Venice (CN&V) Pump Station Area** is located adjacent and riverside to the East Chain of Rocks Levee and a portion of the Old Chouteau Slough that serves as an interior storm water retention area. The pump station and immediate environs are managed for flood reduction purposes under a long-term easement with the Chouteau, Nameoki and Venice Drainage and Levee District. Facilities include the pump station and appurtenances.

Proposed Development: Includes construction of an additional pump station at this location in conjunction with the federally authorized Chain of Rocks Canal (Design Deficiency) Project.

Future Development: No future development is planned.

(11) The **Earth Day Access Area** is located landside of the East Chain of Rocks Canal Levee and is managed for public access purposes. Facilities include a parking lot with perimeter rock, entrance roadway, and a two-lane access control gate.

Proposed Development: The Earth Day Access Area facilities will be removed during the East Chain of Rocks Canal Levee Final Repairs and be relocated to the new **West Levee Access Area** along with East Levee Road access facilities. The West Levee Access will be located adjacent to the Chain of Rocks Canal at the intersection of the West Canal Levee Road entrance spur and roadways at the West Chain of Rocks Levee flood frequency elevation. The area is anticipated to be popular with bicyclists and tourists to view the Chain of Rocks Canal project and will replace and consolidate the Earth Day Access Area facilities and the East Levee Road viewing facility. The Old US 66/Chain of Rocks Road is proposed to include a bike trail linking the Old US 66 Bridge bike trail, Dam 27 Access Area and the Confluence Bikeway. A parking lot and two access control gates will be relocated from the Earth Day Access. New proposed facilities will include a guardrail, security lighting, comfort station, refuse receptacles and bike lanes.

Future Development: No future development is planned.

(12) The **Canal Access Area** is located at the northern end of the canal's eastern shoreline and is managed for public access purposes. Facilities include a parking lot with a waterside guardrail, shoreline revetment, an entrance roadway, and an access control gate.

Proposed Development: A single-lane boat ramp harbor and maneuvering area immediately downstream of the parking lot are proposed for operational and safety purposes. These facilities, including expanded parking and security lights, will provide emergency and operations boat access to the Mississippi and Missouri Rivers. No boat access to the Mississippi and Missouri Rivers exist on the Illinois shoreline of the Mississippi River between Melvin Price Locks and Dam and Locks 27. Incidental public use of the river access will be allowed.

Future Development: No future development is planned.

(13) The **Continental Oil Dock Area** is located on 2.26 acres immediately downstream of the Lewis and Clark Memorial Park Access Area and the Cahokia Diversion Canal. This facility is managed as a barge loading facility for petroleum products under a long term industrial lease and easement with Conoco, Inc. Facilities include a petroleum products pipeline, access roadway and control gate, and a docking facilities for loading and unloading petroleum products.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

South Sub-Levees Area
Operational Easement (27-E-1)
Corps of Engineers
Madison County, IL
River Mile 186.5-190.5 L131.70
Acres: 131.7
Plates: 27-2, 27-1

General Description: The **South Sub-Levees Area** is an operations easement located landside of the Chain of Rocks Canal along the now abandoned pre-project East St. Louis and Chouteau, Nameoki, and

Venice mainline levees. The area is managed for flood reduction operations under perpetual easement to control underseepage of the East Chain of Rocks Levee and impound relief well underseepage and interior drainage waters in two isolated ponding areas. Facilities include the levees, gated culverts, service roadway, and access control gates and guardrail.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

North Sub-Levees Area
Operational Easement (27-E-2)
Corps of Engineers
Madison County, IL
River Mile 192.0-194.3 L64.60
Acres: 64.6
Plate 27-2

General Description: The **North Sub-Levees Area** is an operations easement located landside of the Chain of Rocks Canal along the now abandoned pre-project Chouteau, Nameoki, and Venice mainline levee. The area is managed for flood reduction operations under perpetual easement to control underseepage of the East Chain of Rocks Levee and impound relief well underseepage and interior drainage waters in two isolated ponding areas. Facilities include the levees, gated culverts, service roadway, and access control gates and guardrail.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Chouteau Slough Area
Vegetative Management (27-MR-V-1)
Corps of Engineers
Madison County, IL
River Mile 191-192.5L
Acres: 119
Plate 27-2

General Description: The **Chouteau Slough Area** is located landside of the East Chain of Rocks Canal Levee. The area is managed to restore permanent vegetative cover for native plant community restoration and wildlife habitat and consists of old fields, riparian bottomland forest remnants, and disturbed areas that provide habitat for resident, migratory, and endangered and threatened species habitats. The majority of the old fields has been replanted with bottomland forest species or have undergone natural succession. Other old fields have been kept clear by mowing and burning for future conversion to prairie habitats. The area offers excellent educational opportunities to the public as a riparian habitats restoration demonstration area.

The natural hydrology has been altered by the Alton to Gale Levee System with groundwater levels near 405.0 NGVD. The natural resources have been altered by agricultural clearing, levee, ditch and road construction; however, the natural ridge and swale topography and soils have not been altered. Natural succession during seepage inundation caused by the flood of 1993 has naturally restored native wetland plant communities in the lower swale elevations.

The area is primarily managed to sustain and restore natural riparian forest, prairie and wetland communities through natural succession and

restoration plantings, silviculture techniques, succession control and native plant introduction for old fields.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

American Bottoms Restoration Area
Vegetative Management (27-MR-V-2)
Corps of Engineers
Madison County, IL
River Mile 193.0-194.3L
Acres: 239
Plate 27-2

General Description: The **American Bottoms Restoration Area** is located landside of the East Chain of Rocks Canal Levee. The area is managed to restore permanent vegetative cover for native plant community restoration and wildlife habitat. This area consists of diverse prairie-marsh and riparian bottomland forest communities that provide habitat for resident, migratory, and endangered and threatened species. The area offers excellent educational opportunities regarding the significance of environmental management and restoration. The natural hydrology has been altered by the Alton to Gale Levee System with groundwater levels near 405.0 NGVD. The natural resources have been altered by agricultural clearing, levee, ditch and road construction; however, the natural ridge and swale topography and soils have not been altered. In 1990, 10 acres of native bottomland hardwood trees were planted during an Earth Day event in an open field adjacent to the East Chain of Rocks Levee. In 1990 and 1991, 320 acres of native flood tolerant warm season grasses and forbs were planted in the old agricultural lands to restore a native plant community and wildlife habitat to the area. Natural succession during seepage inundation due to the ‘93 flood has naturally restored native wetland plant communities in the lower swale elevations. The area is managed to control succession and restore native plant communities through prescribed burning, disturbance, and forage plantings for firebreaks.

Proposed Development: Proposed development includes interpretive trails and signage, a road and an environmental habitat restoration project. The environmental restoration project will be designed to restore natural floodplain hydrology to the area by impoundment of spring and fall flood pulses to sustain natural wetland plant communities. The project will serve as an important mid-migration waterfowl habitat area and wood duck rearing habitat area. Project features will include environmental restoration of bottomland hardwood forest habitat and pre-project hydrology by placement of low earthen dikes, water control structures, and gravity or siphon flow inlets from the Chain of Rocks Canal.

Proposed Development: No future development is planned.

Lewis and Clark Forest Area
Vegetative Management (27-MR-V-3)
Corps of Engineers
Madison County, IL
River Mile 194.3-195.3L
Acres: 173
Plate 27-2

General Description:The **Lewis and Clark Forest Area** is located riverside of the East Chain of Rocks Canal Levee, and landside of the Chain of Rocks Canal immediately downstream from the Cahokia

Diversion Canal in the alluvial floodplain. The area is managed to sustain the existing riparian forest components while limiting development. This area consists of a mixture of a natural riparian bottomland forest and herbaceous wetland communities providing habitat for resident, migratory, and endangered and threatened species. It includes the largest unbroken tract (162 acres) of high-quality floodplain forest surrounded by developments. This area offers excellent educational and research opportunities for studies of natural riparian bottomland forest communities.

The natural hydrology of these lands has not been altered and it is frequently flooded during all but minor flood events. The natural resources have been altered by project and pre-project levee construction including abandoned levees and borrow pits, right-of-way clearing, agricultural grazing, and off-road vehicle damage. The natural ridge and swale topography and soils have not been altered. The area is managed to sustain the existing riparian forest components, limit development, protect existing hydrology and restore disturbed lands through protection, restoration and preservation.

Proposed Development: A kiosk and trail connection to the off-project development of the Lewis and Clark Historical Site Interpretive Center located landside of the East Chain of Rocks Canal Levee is proposed.

Future Development: No future development is planned.

American Bottoms Ecologic Area
Ecologically Sensitive (27-ES-1)
Corps of Engineers
Madison County, IL
River Mile 193.0-194.0L
Acres: 40
Plate 27-2

General Description: The **American Bottoms Ecological Area** is located east of the American Bottoms Restoration Area. The area is managed to protect, sustain, and preserve the existing remnant bottomland hardwood native plant community. This area includes one of the best known pre-settlement remnant forest communities of the historic American Bottoms and offers unique educational and research opportunities that would demonstrate the significance of ecological preservation management.

The natural hydrology of these lands has been altered by the Alton to Gale Levee System with groundwater levels near 405.0 NGVD. The natural resources have been altered by agricultural grazing, clearing and public road construction. The natural ridge and swale topography and soils have not been altered. Management plans call for limiting future development to protect the existing hydrology.

Proposed Development: No proposed development is planned.

Proposed Development: No future development is planned.

Lewis and Clark Memorial Park Access Area
Low Density Recreation (27-MR-L-1)
Illinois Historic Preservation Agency
Madison County, IL
River Mile 195.0L
Acres: 2
Plate 27-2, S-3

General Description: The **Lewis and Clark Memorial Park Access Area** is located adjacent to the Chain of Rocks Canal shoreline at its northernmost point. This area is managed for public access purposes under a long-term park and recreation lease with the Illinois Historic Preservation Agency. A monument was erected at the confluence of the Missouri and Mississippi rivers to memorialize the Lewis and Clark Expedition encampment, Camp DuBois. The monument is a circular reinforced concrete structure with engraved plaques commemorating each state along the expedition. Facilities include a memorial monument, asphalt parking lot and entrance roadway, and riverside revetment.

Proposed Development: A trail connection to the adjacent off-project development of the Lewis and Clark State Historic Site Interpretive Center located landside of the East Chain of Rocks Canal Levee, and an off-project controlled access gate limiting the area for day use only are proposed.

Future Development: No future development is planned.

UNIT 2 Chouteau and Gabaret Island

Dam 27 Area
Operations (27-O-2)
Corps of Engineers
Madison County, IL
River Mile 190.3L
Acres: 15
Plate 27-2, S-2

General Description: The **Dam 27 Area** includes Dam 27, and the Dam 27 Access.

Dam 27 is located immediately below the Old US 66 Mississippi River Bridge (Chain of Rocks Bridge) on the Mississippi River. The dam is managed as a navigation structure to ensure adequate river depth at low water over the lower miter sill at the old Lock and Dam 26 by creation of a slack water pool created by the dam during low flow periods. The dam is a 3,100-foot structure and consists of rock fill, sheet pile and cutoff wall sections.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

The **Dam 27 Access** is located adjacent to the Mississippi River shoreline and the Dam 27 Illinois abutment. The area is managed for public access purposes and is popular for bank fishing, sightseeing, and bald eagle viewing. The vista provides excellent viewing of the historic Old US 66 Bridge, two historic St. Louis waterworks intake structures, Dam 27, and the Chain of Rocks reach of the Mississippi River. Facilities include a crushed stone parking lot with waterside and southern parking lot barrier guardrail, shoreline revetment, a crushed stone entrance roadway, and two access control gates.

Proposed Development: An off-site bike trail will be developed linking the Old US 66 Bridge, the Chain of Rocks Road, the Confluence Bikeway and the new West Levee Access Area to this area. New proposed facilities will include flood-proof security lighting, refuse receptacles, and a concrete ADA compliant ramp for recreational fishing access to the Dam 27 abutment cells. Minimum facility portable toilets are also proposed due to public use of the area that cannot be redirected.

Future Development: No future development is planned.

Dam 27 South Revetment Area
Operational Easement (27-E-3)
Corps of Engineers
Madison County, IL
River Mile 189.9 - 190.3L
Acres 1.92
Plate 27-2

General Description: The **Dam 27 South Revetment Area** is an operations easement located along shoreline immediately downstream of the Dam 27 Access area. The area is managed for navigation purposes under perpetual easement to control bank erosion as a result of the Dam 27 project. The shoreline is revetted in this area.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Dam 27 North Revetment Area
Operational Easement (27-E-4)
Corps of Engineers
Madison County, IL
River Mile 190.3 - 191.3L
Acres: 8.60
Plate 27-2

General Description: The **Dam 27 North Revetment Area** is an operations easement located adjacent to the Mississippi River shoreline immediately upstream of Dam 27 Access Area. The area is managed for navigation purposes under perpetual easement to control bank erosion as a result of the Dam 27 project. The shoreline is revetted in this area.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

North Chouteau Island Area
Vegetative Management (27-MR-V-4)
Corps of Engineers
Madison County, MO
River Miles 193.2 – 194.0 L
Acres: 102
Plate 27-2

General Description: The **North Chouteau Island Area** is located west of the West Chain of Rocks Canal Levee in the Mississippi River alluvial floodplain. This area consists primarily of a riparian forest community providing habitat for resident, migratory, and endangered and threatened species. The natural hydrology has not been altered, with the exception of a small portion of the area within the Chouteau Island Levee District. Levee and project construction has altered the natural resources. The area is primarily managed to sustain natural riparian forest community through protection.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

South Chouteau Island Area
Vegetative Management (27-MR-V-5)
Corps of Engineers
Madison County, IL
River Miles 191.1 – 191.8 L
Acres: 82
Plate 27-2

General Description: The **South Chouteau Island Area** is located south of Interstate 270 and west of the West Chain of Rocks Canal Levee in the alluvial floodplain. A mixture of successional and mature growth riparian forest and herbaceous wetland communities provide limited wildlife habitats. The natural hydrology has been altered with the Chouteau Island Levee District, and is not flooded except during major flood events. Levee and public road construction together with both borrow and disposal sites have altered the natural resources. The area is primarily managed to sustain and protect the existing mature riparian forest. Disturbed areas management activities include succession control and annual forage plantings.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Gabaret Chute Area
Vegetative Management (27-MR-V-6)
Corps of Engineers
Madison County, IL
River Miles 189.0 – 189.7 L
Acres: 133
Plate 27-1

General Description: The **Gabaret Chute Area** is located west of the West Chain of Rocks Canal Levee in the alluvial floodplain on the southernmost end of Chouteau Island and includes the remaining portion of Gabaret Chute; a once biologically productive side channel of the Mississippi River now converted to a semi-permanent marsh. A mixture of old fields, riparian forest and herbaceous wetland communities provides habitat for resident, migratory, endangered, and threatened species.

The natural hydrology has not been altered with the exception of sedimentation of Gabaret Chute, and is frequently flooded during all but minor flood events. Agricultural clearing and levee and public road construction have altered the natural resources.

The area is primarily managed to sustain and restore natural riparian forest communities through natural succession and restoration plantings. Old field management is accomplished through silviculture techniques, succession control and native plant introduction. Forage plantings for wild turkey habitat are accomplished through partnership agreements.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

South Gabaret Island Area
Vegetative Management (27-MR-V-7)
Corps of Engineers
Madison County, IL
River Miles 184.3 – 185.5L
Acres: 182
Plate 27-1

General Description: The **South Gabaret Island Area** is located west of the West Chain of Rocks Canal Levee in the southernmost portion of Gabaret Island. A mixture of old fields, riparian forest and herbaceous wetland communities provide habitat for resident, migratory, endangered, and threatened species.

The natural hydrology has not been altered, with the exception of one old field within the Gabaret Island Levee District, and is frequently flooded during all but minor flood events.

Agricultural clearing, and levee and public road construction have altered the natural resources. The area is primarily managed to sustain and restore natural riparian forest communities through natural succession and restoration plantings.

Old field management is accomplished through silviculture techniques, succession control and native plant introduction. Forage plantings for wild turkey habitat are accomplished through partnership agreements.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Potential Development That May Affect Future Management Plans for all Compartment 1, Unit 2 Management Areas

In 1999, an effort to develop a multi-partnered Chouteau Island Recreation Area concept plan was initiated. This effort, if realized, will expand upon and complement the existing bi-state Confluence Greenway Development project in the area and include or affect portions of the Corps managed public lands on the west side of the Chain of Rocks Canal.

Key partners in this plan may include the State of Illinois (IDNR), the City of Madison, Illinois., (Corps has approved requested annexation of the area), Madison County Transit Authority, TRAILNET, Inc., the Corps and other unspecified private organizations and/or public agencies.

The scope of the concept plan includes willing seller acquisition of the Chouteau, Gabaret and Mosenthein Islands complex comprising almost 6,000 acres of private land.

Potential developments identified for this area include bike/hike/equestrian trails, ORV area, camping (primarily for recreational vehicles), picnic areas, habitat restoration projects (wetlands, prairie, forest) outdoor education facilities/areas, golf course, amphitheater, Route 66 and Mississippi River Interpretive Center, Sports Complex and necessary roads, parking, utilities, etc.

Potential plan features that may occur on Corps managed public lands include:

- Hike/Bike Trails
- Equestrian Trails
- Habitat restoration projects
- Picnic areas
- Outdoor education facilities/areas

Current land use in the area is primarily agricultural with some bottomland forests, wetlands and flood control structures (i.e. levees). Federal lands in the area are dedicated to flood damage reduction, operation of the Chain of Rocks Canal and Locks 27 for commercial navigation purposes, habitat management and public use. A large area of private land on Chouteau Island is used as a sanitary landfill. Waste Management, Inc. operates the Chain of Rocks Recycling and Disposal facility at this location. The facility is expected to be closed in October of 2000 and will be capped and converted for recreation-related use in the concept plan.

The proposed Chouteau Island Recreation Development Concept Plan is a tentative long-term effort. The plan will be developed in phases and will require numerous and extensive partnering arrangements, funding sources and operation and maintenance obligations. If the Corps is involved in cost sharing any of this project, a sponsor and Congressional authorization would be required. When plans are finalized for implementation, a supplement to the Master Plan may be required to address those portions and features of the development that may occur on federal lands. This supplement, if required, will need to be approved prior to any formal commitment for development.

POOL 26 Compartment 2

Riverbend Management Area

UNIT 1 Environmental Demonstration Area

Spur Dike Area
Operations (26-O-2)
Corps of Engineers
St. Charles County, MO
River Mile 200.6 – 203.0 R
Acres: 120
Plates 26-1, 27-2, 26-MEL

General Description: The **Spur Dike Area** includes a total of eight areas which are described below. The area includes land in both the States of Illinois and Missouri. These lands are closed to hunting and trapping for public and navigation safety as well as for endangered species and migratory waterfowl sanctuary purposes in association with the Melvin Price Locks and Dam waterfowl refuge.

(1) The **Melvin Price Locks and Dam Overflow Dike Area** is located at RM 200.8 R and is designed to span the area between the abutment closure cells at Pier D-11 and the Spur Dike/Missouri Access Road. Consisting of a 2,000-foot structure of compacted clay embankment and seepage berm with rip rap and soil cement protected slopes, concrete roadway and a sheet pile cut off wall, the dike provides a navigation pool above Mel Price Locks and Dam. Facilities include an 18-foot wide concrete service access roadway and a vehicle turnaround. The undeveloped area consists of disturbed and filled clays, sands and dredge spoil from construction of the Melvin Price Locks and Dam and a few remaining large trees.

Proposed Development: Provide safety barriers for public access and project security.

Future Development: No future development is planned.

(2) The **Maple Island Access Area** is located adjacent to the Melvin Price Locks and Dam tailwater on the Missouri side of the river channel. The facilities are managed for public access and operations purposes and offers recreational opportunities for touring, wildlife viewing, shoreline fishing, and boat access. The vista offers excellent viewing of bald eagles, migrating waterfowl, and the Melvin Price Locks and Dam. Facilities include a parking lot with waterside guardrail, shoreline revetment, a rock fill deflection dike, an entrance roadway, a concrete service boat ramp, removable vault toilets, a control barrier, refuse receptacles and solar powered security lighting. The IDNR and the MDC have agreed to reciprocate state fishing regulations in this area.

Proposed Development: New facilities include bike lanes and a rehabilitated concrete ramp for public safety and low water access. A cost-share partner is being sought for bike lane development.

Future Development: No future development is planned.

(3) The **Melvin Price Locks and Dam Spur Dike Area** (RM 200.6203.5 R) runs from the overflow dike approximately two miles upstream to the abandoned railroad embankment north of US67. The structure is managed as a navigation pool spur dike and flood control structure and provides limited public access and recreational opportunities for shoreline fishing. The portion of the dike between US67 and the abandoned railroad embankment is known as the Spur Dike Extension.

Consisting of a 12,672-foot clay and sand filled embankment with a top elevation 430.0 NGVD and a 40-foot crown width, the dike provides minimum navigation pool and is the eastern line of flood protection for the Consolidated North County Levee District. Side slopes are IV on 3H and IV on 4H with landside clay filled seepage berms from 0 to 330-foot widths. The revetment consists of Ellis Bay and Teal Pond riverside revetment to elevation 425.0 NGVD. The gravity drains consist of one upstream gravity drain, bottom elevation 416.5 NGVD, and one downstream gravity drain, bottom elevation 410.0 NGVD, each with twin 60-inch corrugated metal drainage pipes and manually operated sluice gates, and associated drainage ditches.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

(4) The **Missouri Access Road Area** (Riverlands Way) is located on the spur dike from US 67 to the Maple Island Access Road. The road is managed for public access to Maple Island, Ellis Bay, Teal Pond and the Rivers Project Office and provides operations service access to Melvin Price Locks and Dam, Rivers Project Office and the Rivers Project storage complex. The roadway vista offers excellent viewing of bald eagles and waterfowl in the Prairie Marsh Restoration and Ellis Bay Aquatic Areas. The roadway is a 40-foot wide, a 2-mile asphaltic concrete road with two 12-foot vehicle lanes and two 8-foot bike lanes. The roadway has two connecting spurs: one spur to US 67 to the west and one spur to St. Charles County Wise Road to the south. An access control gate and trilateration station are located at the intersection of Riverlands Way and Wise Road.

Proposed Development: Place revetment on roadside facing Ellis Bay to reduce flood repair and maintenance costs. The trilateration station will be rehabilitated.

Future Development: No future development is planned.

(5) The **Rivers Project Storage Complex Area** is located at the Missouri abutment of the Overflow Dike. The complex will be managed as a project storage facility for project equipment, vehicles, parts and supplies. Facilities include a warehouse, security fencing and lighting, a crushed stone parking lot for the warehouse and asphalted vehicle compounds. The old resident office has been demolished.

Proposed Development: The area will be converted to a day use area that will include a wildlife overlook, picnic tables, grills, visitor parking area and trail head to the EDA. These projects may be funded through a Challenge Cost-Share Agreement.

Future Development: Relocating the vehicle compound to the warehouse may be an option after a study is completed.

(6) The **Rivers Project Administration Building Area** is located on the Missouri Access Road and includes administration office facilities and a visitor information center. Facilities include an office building, asphalt parking lot, asphaltic concrete entrance road, well house, and appurtenances.

This facility serves as the primary contact point for visitors to the Riverlands Area. A portion of the facility is designated as a Type C Visitor Information Center that includes disabled accessible public restrooms, an information desk, drinking water and open space at the adjacent Access and Tour Control Facility (Environmental Learning Center).

Proposed Development: Prepare a separate DM to request approval for an expanded Type C Visitor Information Center as an addition to the

Rivers Project Office building. Landscape the Rivers Project Office grounds.

Future Development: No future development is planned.

(7) The public **Access and Tour Control Facility (ATCF) Area** is a temporary facility located adjacent to the Rivers Project Administration Building used to carry out interpretation and educational programming. No formal exhibits are located in the facility due to funding and limited available space. The facility is managed as a visitor access and tour control facility. Facilities include a one-room building and adjacent perimeter and connecting sidewalks to the Rivers Project office parking lot.

Proposed Development: The ATCF will be removed when the proposed Type C Visitor Information Center expansion is implemented. The viewing platform and concrete walk will remain intact.

Future Development: No future development is planned.

(8) The **Teal Pond Access Area** is located adjacent to the Teal Pond shoreline and Prairie-Marsh Restoration Area on the Teal Pond Impoundment Levee. The facilities are managed for public access and operations purposes and offer recreational opportunities for touring, wildlife viewing, shoreline fishing, and boat access. The vista offers excellent viewing of waterfowl during migration in the Teal Pond Aquatic Area. Facilities include a crushed stone parking lot with a guardrail, shoreline revetment, three rip rap and crushed stone fishing dikes, a crushed stone entrance roadway, crushed stone service boat ramp, and access control gate. The boat ramp to the Teal Pond Aquatic Area is closed to public boat access during refuge seasons in association with the Melvin Price Locks and Dam waterfowl refuge.

Proposed Development: Construct an ADA compliant fishing pier that was approved in Supplement 3, DM No. 3. Provide refuse receptacles and security lighting.

Future Development: None planned.

Ellis Bay Access Area
Low Density Recreation (26-MR-L-1)
Corps of Engineers
St. Charles County, MO
River Mile 201.5 - 202.3
Acres: 44
Plates 26-1, 26-MEL

General Description: The **Ellis Bay Access Area** area is located between the Ellis Bay Aquatic Area and the Missouri Access Road on the Spur Dike and surrounds the Rivers Project Office. The area is open to public access and is popular for fishing, sight seeing, picnicking and bird watching. The area vista offers excellent viewing of waterbirds and bald eagles in the Ellis Bay Aquatic Area. These lands are closed to hunting and trapping for public and navigation safety as well as for endangered species and migratory waterfowl sanctuary purposes in association with the Melvin Price Locks and Dam waterfowl refuge.

Constructed and elevated with fill material left over from Melvin Price Locks and Dam construction, this was originally planned as a recreation cost-share development site with the State of Missouri, but the MDNR terminated the agreement in 1987.

Facilities include a 20-car asphalt parking lot, a two-lane asphalt entrance roadway, a crushed stone trailhead, two bulletin boards, vault

comfort station, two access control gates, a kiosk, a concrete pedestrian trail, and a Watchable Wildlife viewing platform. A picnic shelter and seven picnic sites were approved for installation immediately adjacent to the comfort station in Supplement 4, DM No. 3 (Pool 26 Master Plan).

Proposed Development: Three additional picnic sites will be installed near the comfort station. An interpretive trail and trailhead shelter will be installed from the trailhead to the existing concrete walkway, and connect to the Prairie Marsh Restoration Area interpretive trails. Security lighting, and refuse receptacles will be installed for public heath and safety.

Future Development: No future development is planned.

Lincoln-Shields Recreation Area
Recreation (26-R-3)
Corps of Engineers
St. Charles County, MO
River Mile 201.5 - 203.1R
Acres: 167
Plates 26-1, 26-MEL, S-5

General Description: The **Lincoln Shields Recreation Area** includes the **Alton Bay, Ellis Lake** and **Ellis Island Access Areas**. The area is closed to hunting and trapping for public safety. The three access areas are described below.

(1) The **Alton Bay Access Area** is located adjacent to the Mississippi River shoreline and Old Locks and Dam 26 Missouri Abutment. Recreational opportunities at this public access include touring, wildlife viewing, shoreline fishing, picnicking, and boat and bike trail access. The area offers excellent viewing of bald eagles and waterfowl during migration as well as the Alton waterfront, and the Clark Bridge. Two piers, 35 and 36, of the old Locks and Dam 26 were left in place on the Missouri Abutment in this area, and have been converted to a visitor overlook. Facilities include an asphalt parking lot, waterside shoreline revetment, an asphalt entrance roadway, a connecting bike trail link, a handicapped accessible vault toilet, a visitor overlook constructed on Piers 26 and 27 of the old Lock and Dam 26; ten picnic tables, concrete pads and grills; two concrete boat ramps, and two access control gates.

Historical accounts indicate that this site, formerly known as the Tow Head (circa 1840) was the scene of an anticipated duel between Abraham Lincoln and James Shields in 1842. The duel was called off at the last minute by mutual agreement of the participants.

During the Civil War, a group of tents and a wooden shanty on the Tow Head comprised the first hospital for patients of zymotic disease (smallpox, variola, measles, etc.) from the military prison at Alton about one quarter mile west of the old (removed) Clark Highway Bridge.

Initially, only prisoners were treated at the island facility; Federal troops with smallpox and other zymotic diseases were treated in regimental hospitals in downtown Alton. All patients who died of zymotic disease, whether Federal or Confederate soldiers, guard, or civilian prisoners, were buried on the Tow Head after August 1863. Those who died of zymotic disease on the mainland were transported across the river for burial on the Tow Head in the vicinity of the hospital; prisoners with non-zymotic diseases were buried somewhere on the Missouri mainland. It is estimated that burials on the Tow Head total approximately 440.

Close to the end of the war, the Tow Head facility was flooded and a new hospital was constructed on the northwest corner of Ellis Island. However, there is no evidence of burials on Ellis Island.

A monument commemorating the civil war soldiers who died or were buried on the Tow Head was approved for installation in this area by Supplement 4 to DM #3 (Pool 26 Master Plan).

Proposed Development: Proposals include construction of high and low water boat ramp extensions and shoreline sidewalks to ADA standards, installation of boat ramp courtesy docks, replacing the picnic shelter, security lighting, additional park benches, additional picnic tables and grills, interpretive signage, and rehabilitation of the visitor overlook to include lead paint removal and ADA accessibility. An interpretive prospective will be completed for the area to improve visitor usage.

Future Development: No future development is planned.

(2) The **Ellis Lake Access Area** is located adjacent to the Mississippi River and Ellis Lake shorelines. Public and operational access is from US 67 to the east. Recreational opportunities in the area include sight-seeing, wildlife viewing, shoreline fishing, boat and bike trail access. The area offers excellent viewing of bald eagles and waterfowl during migration. Facilities include a crushed stone parking lot, bike trail bollards, a crushed stone entrance roadway, one access control gate, a gabion pedestrian lake trail, an asphalt service road/bike trail, a crushed stone bike trail, two bulletin boards, crushed stone service boat ramp, and three park benches.

Proposed Development: Relocate and expand the parking lot and boat ramp to reduce maintenance costs. Install security lighting, portable toilets, and refuse receptacles.

Future Development: No future development is planned.

(3) The **Ellis Island Access Area** is located adjacent to the Mississippi River and Ellis Bay shorelines and is managed for public access purposes and offers recreational opportunities for touring, wildlife viewing, shoreline fishing, and pedestrian trail access. Visitors are plentiful when Bald eagles are present and waterfowl are migrating. Facilities include a crushed stone parking lot with waterside guardrail, shoreline revetment, a crushed stone entrance roadway and service roadway, and one access control gate. The area is restricted to developed trails access during refuge seasons in association with the Melvin Price Locks and Dam Waterfowl Refuge.

Proposed Development: Proposals include pedestrian trails, dikes and water control structures for wetland restoration and expansion, asphaltic concrete overlay of parking lot, security lighting, refuse receptacles and minmum facility portable toilets.

Future Development: No future development is planned.

Prairie-Marsh Restoration Area
Vegetative Management (26-MR-V-1)
Corps of Engineers
St. Charles County, MO
River Miles 200.5 R – 203.0 R
Acres: 1,112
Plate 26-1, 27-2, 26-MEL

General Description: The **Prairie Marsh Restoration Area** is located landside and south of the Melvin Price Locks and Dam Spur Dike in the alluvial floodplain. The area consists of a diverse prairie-marsh community and provides resident plant and animal populations, migratory waterbird habitats, and protection of endangered and threatened species. The natural hydrology of these lands has been altered by the Melvin Price Locks and Dam and the Spur Dike with groundwater levels near 419.0 NGVD. Agricultural clearing, farmstead and public road construction have altered the natural resources.

These lands were purchased for project construction requirements and damages due to raised groundwater levels (seepage lands). These seepage lands were identified by the Soil Conservation Service to be measurably reduced for agricultural production where the groundwater table was anticipated to be less than three feet from the surface during the growing season. The Melvin Price navigation pool raised groundwater and surface water levels approximately 16 feet for 2 additional miles of navigation pool along the Spur Dike. These raised water levels created approximately 300 acres of freshwater marshes dispersed throughout the area. The marshes range in size from 70 acres in size to small potholes and flooded drainage ditches with an average water depth of 18 inches. Water management of the marshes is accomplished by gravity flow with gated and stop-log water control structures utilizing the navigation pool as the water source and the tailwater area for drainage.

Letter report authority was granted in April 1989 to establish permanent vegetation on these lands. Prairie grasses and forbs establishment plantings, debris clearing, site renovations, drainage ditches and water control structures were completed in December 1989. A mature prairie plant complex was established in the 1992 growing season. The flood of 1993 inundated the established prairie during the peak growing season of August and September and destroyed approximately 90 percent of the new established prairie vegetation. Surviving prairie plants were limited to those flood tolerant species that were inundated less than 60 days in duration during the growing season. Without a long-term established soil seed bank source, re-establishment prairie planting began after the flood of 1995 again inundated the entire area.

The area is managed to provide, establish and protect permanent vegetative cover for native plant community restoration and wildlife habitat. In addition, some of the potentials noted for the area include public educational opportunities that demonstrate the significance of environmental management, public access opportunities with pedestrian trail access, and educational and research opportunities of wetland and marsh habitats. The permanent and semi-permanent marsh habitats will be managed for shorebird and dabbling duck habitats by gravity flow water management. Prairie and wetland habitats will be managed by prescribed burning, disturbance, and forage plantings. Select forest management will include fire resistant native tree plantings for screening and habitat aesthetics. Facilities include crushed stone and unimproved service roads, pedestrian access trails and trail heads, drainage ditches and stop-log and gated water control structures. The area is closed to all

public use during refuge seasons, restricted to developed trails access during non-refuge seasons, and closed to hunting, trapping and fishing in association with the Melvin Price Locks and Dam Waterfowl Refuge.

Proposed Development: Expand existing interpretive trails and trailheads, and opportunisticly expand existing wetlands and marsh habitats.

Future Development: No future development is planned.

Ellis Bay and Teal Pond Aquatic Habitat Areas Vegetative Management (26-MR-V-2) Corps of Engineers St. Charles County, MO/Madison County, IL River Mile 200.8R-203.0R Acres: 545 Plates 26-1, 26-MEL

General Description: The **Ellis Bay Aquatic Area** is located along and adjacent to the Ellis Bay Area, Ellis Island Area, Spur Dike Area and Overflow Area. The area provides habitat for waterfowl, shorebirds and fisheries and during non-refuge periods provides a quiet water recreation area.

This backwater area has a hydrologic connection to the Mississippi River through the old Alton Slough side channel that was originally cut off with the construction of the abandoned railroad and highway embankments immediately upstream. The area has been impounded and is regulated with the navigation pool since 1991 due to the creation of an additional two miles of navigation pool associated with the Melvin Price Locks and Dam. Average water depths are approximately five feet, a combination of the deeper remnant slough channel and submerged islands of less than two feet scattered throughout the area. This type of backwater river environment has been lost within our major river systems due to sedimentation and these losses continue to be a major concern of river managers. The greatest factor to enable this area's prime habitat is its position in relation to the main river channel during periods of high flow and heavy silt laden waters whereby large deposits of silt are avoided.

The area is managed for limited and experimental submersed aquatic plantings, invertebrate introduction, creation and succession control of shorebird habitat dredged sand islands, and restricted public boat access. In addition to the opportunity to view water birds, the area's exceptional water quality offers educational and research possibilities for backwater habitat studies. The area is closed to boats during refuge seasons, restricted to no-wake boating during non-refuge seasons, and closed to hunting and trapping in accordance with the operation of the Melvin Price Locks and Dam Waterfowl Refuge.

Proposed Development: A dredge spoil island for the endangered least tern habitat is proposed.

Future Development: No future development is planned.

The **Teal Pond Aquatic Area** is located within the perimeters of US 67, Missouri Access Road and Spur Dike embankments adjacent to the Teal Pond Access Area. The area provides waterfowl habitat, recreational fisheries and its exceptional water quality offers educational and research opportunities for deepwater lake habitat studies. There is no surface hydrologic connection to the Mississippi River, only groundwater interaction that creates a clear water inland lake, protected from flooding by the Spur Dike.

Groundwater impounded the area as a result of the creation of the additional two miles of navigation pool associated with the Melvin Price Locks and Dam. Floods inundated the area in 1993 and 1995 when the Spur Dike was overtopped. The area's exceptional water clarity and quality initially produced a diverse and unique group of submergent aquatic plant growth including threadleaf pondweed, burhead, and northern/southern jointed spikerush. Water level fluctuations are directly tied to groundwater elevations and fluctuate usually no more than 1 to 2 feet in any year. Average water depth is approximately 4 feet with some holes up to 8 feet deep, for over-wintering fish habitats. Some constructed submerged and emergent islands are scattered throughout the area. This lake environment is unique within the river floodplain and offers opportunities to research and study lost submersed aquatic plant environments of major concern to river managers.

The area is managed for waterfowl refuge habitat, fisheries habitat, and limited public access purposes. Limited and experimental succession control of the lake bottom for spontaneous generation of existing submersed aquatic plant seedbanks, first evidenced during impoundment in 1991, is proposed. The area is closed to public boating during refuge seasons, restricted to trolling motor boating during non-refuge seasons, and closed to hunting and trapping for public safety and in accordance with the operation of the Melvin Price Locks and Dam Waterfowl Refuge.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Maple Island Ecologic Area
Ecologically Sensitive (26-ES-1)
Corps of Engineers
St. Charles County, MO
River Mile 197.7R-200.7R
Acres: 454
Plates 27-2, 26-MEL

General Description: The **Maple Island Ecological Area** is located along the Missouri side of the navigation channel immediately downstream of the Melvin Price Locks and Dam. Public access is from the Mississippi River only, except during low flood river periods when the head island can be accessed by land at the Maple Island Access Area. The area is managed as a natural area for ecological and environmental conservation purposes, consisting of four separate natural islands within Illinois and Missouri. It provides excellent bald eagle day roost habitat with mature cottonwood trees bordering the shoreline. The riparian forest complex offers excellent opportunities for education and research. It is composed of cottonwood, maple and willow trees and wet meadows on the highest elevations.

Management includes protection and limited succession management of the open succession fields to conserve the area as a natural area for ecological and environmental resources. The area is closed to public use during refuge season for migratory birds and due to status as an endangered species sanctuary. It is closed to hunting and trapping in accordance with the operation of the Melvin Price Locks and Dam Waterfowl Refuge.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

UNIT 2 Illinois Esplanade

Melvin Price Locks and Dam Area
Operations (26-O-1)
Corps of Engineers
Madison County, IL
River Mile 200.8- 202.4L
Acres: 190
Plates 26-1, 27-2, 26-MEL, S-4

General Description: The **Melvin Price Locks and Dam Area** includes the **Melvin Price Locks and Dam and Administration Complex Areas** and the **Wood River Levee Area**. The City of Alton has requested annexation of the area. The area is closed to hunting and trapping for public safety and in accordance with the operation of the Melvin Price Locks and Dam Waterfowl Refuge. All three areas are described below:

(1) The **Melvin Price Locks and Dam Area** is located approximately 2 miles downstream from the decommissioned Locks and Dam 26. The 1,200 foot lock and dam was authorized by Public Law 95-502, Title I - Replacement of Locks and Dam No. 26, Upper Mississippi River System Comprehensive Master Plan, 21 October 1978. Public Law 99-88, supplemental Appropriations Act for 1985, 15 August 1985, authorized the addition of a 600-foot auxiliary lock. Melvin Price Locks and Dam was designed and constructed as a replacement for Locks and Dam No. 26 as part of the Mississippi River Nine-Foot Navigation Project. The locks and dam provide that portion of the continuous Mississippi Nine-Foot Navigation Project to Lock and Dam 25 on the Mississippi River, and LaGrange Lock and Dam on the Illinois River. Facilities include one 110-foot by 1,200-foot main lock, one 110-foot by 600-foot auxiliary lock, and dam with nine tainter gates. Public access is provided on top of the Illinois side of the structure and to a visitor outlook inside the auxiliary control house that overlooks the 1,200 foot lock chamber.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

(2) The **Melvin Price Locks and Dam Administration Complex Area** is located immediately adjacent to the Illinois abutment of the Melvin Price Locks and Dam. The complex will be managed to provide facilities for the operation and maintenance of Melvin Price Locks and Dam. Facilities include an asphalt access road, asphalt parking lot, administration and maintenance building, generator building, and appurtenant facilities including fuel tanks.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

(3) The **Wood River Levee Area** is located landside and adjacent to the Illinois Esplanade Recreation Area and along the Mississippi River Illinois shoreline and is managed for public access, flood reduction, and operations purposes. The levee portion is under long term easement with the Alton-Wood River Levee and Drainage District. Facilities include the levee, a crushed stone service access roadway, and access control gate and guardrail. Four trilateration stations are located in this area.

Proposed Development: The Madison County Transit Authority will develop all the levee roadway portions of the Confluence Bikeway that will interconnect bus transfer nodes, park and ride lots, and population centers. Four trilateration stations will be rehabilitated.

Future Development: No future development is planned.

Illinois Route 143 Intersection Area
Operational Easement (26-E-1)
Corps of Engineers
Madison County, IL
River Mile 200.4- 200.7 L
Acres: 8
Plate 27-2

General Description: The **Illinois Route 143 Traffic Light Area** is an operational easement located at the intersection of the Illinois Esplanade Recreation Area entrance road and Illinois Route 143. The area is managed under perpetual easement for the construction, operation and maintenance of a traffic control signal. Facilities include the traffic signal, Illinois Esplanade entrance road spur, and the Alton Wood River Levee and Drainage Pump District pump station entrance road spur.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Visitor Center and Illinois Esplanade Recreation Area
Recreation (26-R-1)
Corps of Engineers
Madison County, IL
River Mile 199.9 - 200.6
Acres: 43
Plate 27-2, S-4

General Description: The **Visitor Center** and **Illinois Esplanade Recreation Area** are located adjacent to the Melvin Price Locks and Dam tailwater on the Illinois shoreline. Access to the area is from Illinois Route 143 to the north. The area is managed as a recreation area and for educational activities. It is very popular for fishing, sightseeing, picnicking, and bird watching including viewing migrating bald eagles.

The **National Great Rivers Museum** is a Regional (Type A) Visitor Center located adjacent to the Melvin Price Locks and Dam Illinois abutment. The Visitor Center and surrounding area is managed as a recreation area and as an educational facility. Area facilities include the visitor center building and a surrounding outdoor plaza.

Management includes park grounds and facilities operation and maintenance, visitor assistance and interpretive educational services. The area is closed to hunting and fishing for public safety.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

The **Illinois Esplanade Recreation Area** is located immediately downstream of the National Great Rivers Museum along the Melvin Price Locks and Dam tailwater. Touring, wildlife viewing, picnicking, bank fishing and educational activities are popular uses of the site. Area facilities include asphalt parking lots, shoreline revetment, a two-lane asphalt entrance roadway, an access control gate, a picnic shelter, a waterborne comfort station, visitor overlook, interpretive trails, and a boat landing and docking facilities.

Management responsibilities include facilities operation and maintenance, visitor assistance and interpretive education services.

Proposed Development: Proposed development includes installation of a concrete service boat ramp at the downstream end of the site to

provide for emergency operations and rescue access and bike/hike trail connections. It is also proposed to widen the entrance road and pave the bus landings parking area.

Future Development: No future development is planned.

Alton Riverfront Recreation Area
Recreation (26-R-2)
City of Alton
Madison County, IL
River Mile 202.5-203 L
Acres: 20
Plate 26-1, S-6

General Description: The **Alton Riverfront Recreation Area** is located on Corps leased land and the City of Alton commons area along the Mississippi River Illinois shoreline immediately upstream of the US 67 Clark Bridge and is managed for public access purposes. This urban area includes the City of Alton Marina and Riverfront Park.

Public access is from Henry Street in Alton. The Corps 19.96 acre area is managed for public access purposes in conjunction with the City of Alton Marina/Riverfront District Master Plan under long-term park and recreation lease with the City of Alton. Existing facilities include a river walk, boat slips, a floating convenience store/administration building, fuel dock and restrooms, access roadways and parking lots, a boat ramp, restroom, picnic shelter, playground, bicycle trail, and surrounding park area. The area is closed to hunting and trapping for public safety.

Proposed Development: Proposed development includes additional parking lots and roadways, an extension of the riverwalk, a pedestrian plaza, a picnic area and landscaping. These items, totaling almost $9,000,000 will be cost-shared by the Corps, pending approval of DM 25 for the Melvin Price Locks and Dam project.

Future Development: No future development is planned.

UNIT 3 Horseshoe Lake

Horseshoe Lake Mitigation Area
Mitigation (26-M-1)
Illinois Department of Natural Resources
Madison County, IL
Acres: 621
Plate 26-HS

General Description: The **Horseshoe Lake Mitigation Area** is located three miles east of Locks 27 at Horseshoe Lake, Illinois and includes a part of the Horseshoe Lake State Recreation Area. The area is managed exclusively for mitigation of lost terrestrial habitat and wildlife protection due to construction of the Melvin Price Locks and Dam. The area is managed for fish and wildlife enhancement purposes under a long-term license with the IDNR. The mitigation requirements are the sole responsibility of the Corps.

Archeological investigations of the area have resulted in the identification of significant, dense and widespread historic resources. Due to the unique nature, large number of sites, and the relationship of these sites with the World Heritage Site of Cahokia Mounds, these archaeological remains will be collectively listed as the Horseshoe Lake Archaeological District with the U.S. Department of the Interiors *National Register of Historic Places*. The area is managed to be compatible with the long-term archaeological management goals of the Horseshoe Lake Archaeological District.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

POOL 26 Compartment 3

Lower Alton Lake Management Area

UNIT 1 Missouri Bottoms

West Alton Conservation Area
Wildlife Management (26-MR-W-1)
Missouri Department of Conservation
St. Charles County, MO
River Mile 203.0 - 204.5 R
Acres: 1050
Plate 26-1

General Description: The **West Alton Conservation Area** is located on the right descending bank of the Mississippi River, approximately 2miles upstream from the Melvin Price Locks and Dam. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. The State of Missouri allows waterfowl hunting blinds at the West Alton site, but no water control or enhancement management program is presently being implemented. Siltation has so severely degraded this area that few waterfowl hunting blind sites are accessible for public use.

Infrastructure supporting access to the area is provided by the Alton Lake Access (L-2) and Ellis Lake Access which are managed by the Corps. No infrastructure, other than 15 blind sites, are contained within this area.

Proposed Development: No proposed actions are being considered in this plan if environmental pool management continues to be implemented by the Corps.

However, in lieu of EPM continuing, other development at this site may feature a low-profile earthen dike with a water-control structure to impound approximately 400 acres. A gravity-flow system utilizing stop-logs would probably be used. This structure would be large enough to allow small-boat access through the dike for fishing. A suitable alternative may be to utilize a deep well with a submerged pumping system. Dike and water-control structures will vary depending on physical requirements. Prior to development, a detailed site analysis will be necessary to determine biological and economic feasibility. A portion of the impoundment adjacent to the southeastern shore could be established as a refuge for dabbling ducks and diving ducks with the remainder open to public hunting. Fishing and hunting access is available from Old Highway 94. Public access to the area should be upgraded when the West Alton area is rehabilitated.

Future Development: No future development is planned.

West Alton Levee Area
Operations (26-O-3)
Corps of Engineers
St. Charles County, MO
River Mile 204.2
Acres: 3
Plate 26-1

General Description: The **West Alton Levee Area** is located west from the intersection of Highway 94 to the government boundary and intersecting with the Consolidated North County Levee. The levee is managed as a flood control structure; the southern line of flood

protection for the Consolidated North County Levee District. The dike consists of a clay filler embankment, top elevation near 432.0 NGVD with a 10-foot crown width with 1V on 3H side slopes. Facilities include a flap gate gravity culvert and an access control gate. The area is open to hunting and trapping in cooperation with MDC.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Dresser Island Conservation Area
Wildlife Management (26-MR-W-2)
Missouri Department of Conservation
St. Charles County, MO
River Mile 205.5 - 209.0 R
Acres: 1,259
Plate 26-1

General Description: The **Dresser Island Conservation Area** is managed for fish and wildlife management purposes under a General Plan and Cooperative Agreements. Brickhouse Slough separates the 950-acre island from the 309-acre Missouri shore portions of this management area. Historically, Dresser Island was a prime wetland/backwater area used extensively by migratory waterfowl, wintering bald eagles and other wetland wildlife species. The wetlands also provided important spawning and nursery areas for river fishes.

Over the years, sediment has partially filled the interior wetlands. Brickhouse Slough has been filled with sediment to such an extent that flows can pass only at high pool stages. Interior water levels can not be controlled due to the lack of a core in the rock closing structures. This has hampered attempts to manage habitat for wildlife.

An Environmental Management Program Habitat Rehabilitation and Enhancement Project (EMP-HREP) was completed on Dresser Island in 1991. The EMP project was designed to rehabilitate the once-prime wetland/backwater habitat by construction of a low profile levee along the entire riverside and enclosure of the lower one-half of the island shoreline facing Brickhouse Slough in order to control deposition of silt during the more frequent flood events. It also included installation of five gated drainage structures to allow control of the water levels on the interior wetlands independent of river stages. Preliminary results indicate that the desired water temperature control is being achieved. In addition, interior water levels were maintained independent of river stage, with only a 1-foot variance, which will allow for the development of moist-soil plant production during future growing seasons.

Proposed Development: Increase the flow of warm water from the Portage Des Sioux Power Plant (Ameren-UE) located immediately upstream from the area into the Dresser EMP-HREP project to improve water control capabilities for wetland wildlife enhancement and overwintering habitat for fish and waterfowl.

Reforest 10-15 percent of the forested areas on the island to hard-mast-producing tree species. Install a pump station to improve control of water levels on the interior wetlands. Dredge the interior wetlands to increase overwintering, spawning and brood fisheries habitat. Control encroaching undesirable woody vegetation on the open wetlands. Seal existing EMP-funded rock causeway and closure structures to increase water control capability. Construct a larger canal (20-foot wide) to connect Brickhouse Slough with the interior wetlands to allow access by boat.

Future Development: No future development is planned.

The **Dresser Island Access** provides access to Brickhouse Slough, Dresser Island, and the river. The area has been managed by MDC for public access under a long-term park and recreation lease. Two one-lane launching ramps provide very limited access for small boats. One is located upstream of a causeway water control structure and the other downstream. Development at this area is limited to the two one-lane gravel boat launching ramps and a small parking lot for approximately 15 cars and trailers.

Proposed Development: This lease will be relinquished and the lease area and facilities will be included within the Dresser Island Conservation Area. Two existing ramps will be consolidated into one and located upstream of causeway. A gravel ramp will be rehabilitated and concrete surfaced. Minimal dredging will be conducted around the boat ramp location to improve accessibility and public safety.

Future Development: Hard surface existing parking lot and entrance road.

Alton Lake Access Area and Recreational Cottages
Recreation - Low Density (26-MR-L-2)
Corps of Engineers
St. Charles County, MO
River Mile 204.1- 204.5
Acres: 13
Plate 26-1

General Description: The **Alton Lake Access Area** is located adjacent to the Alton Lake backwater and Mississippi River shoreline. The area is managed for public and private access purposes and includes the 13.33-acre **Alton Lake Recreational Cottages Subdivision**, platted with forty-nine lots, and adjacent shoreline. One lot, 1.62 acres, at the termination of Old Hwy 94, is managed for public access purposes. Facilities include a crushed stone boat ramp, parking lot and boat ramp. The boat ramp and channel are silted in and are only usable by small shallow draft boats during maximum regulated pool stages. Ten lots, totaling 1.93 acres, are excluded from public access under private recreation leases to cabin owners. Thirty-eight lots, totaling 9.78 acres, are undeveloped and provide public access to the old Alton Lake backwater and Mississippi River shorelines. The area is closed to hunting and trapping for public safety.

Proposed Development: No proposed development is planned.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Alta Villa/Spatterdock Lake Access Area and Brickhouse Slough Recreational Cottages Low Density Recreation (26-MR-L-3) Corps of Engineers St. Charles County, MO River Mile 205.4-207.2 R Acres: 39 Plate 26-1

General Description: The **Alta Villa/Spatterdock Lake Access Area** is located adjacent to the Spatterdock Lake and Brickhouse Slough shorelines. The area is managed for public and private access purposes and includes the 33.74 acre **Brickhouse Slough Recreational Cottages Subdivision**, platted with 125 lots, a 5.70-acre adjoining land parcel, and adjacent shoreline. Two lots, totaling 0.64 acres, and the 5.70-acre adjoining land parcel are managed for public access purposes. This area is the former Alta Villa commercial concession area. The lease was terminated and the access is being minimally maintained until a course of action is determined by a proposed access study. In the meantime, a Recreation Area Modernization Program (RAMP) proposal has been submitted for the development of day use recreation facilities for this site. Facilities include two crushed stone parking lots, a crushed stone entrance roadway and boat ramp, and a concrete boat ramp. Seventy-three lots, totaling 16.27 acres, are excluded from public access under private recreation leases to cottage owners. Fifty lots, totaling 16.84 acres, are undeveloped and provide access to the Brickhouse Slough and Spatterdock Lake shorelines. The area is closed to hunting and trapping for public safety.

Proposed Development: A RAMP proposal to develop this area has been submitted for approval. This proposal supports the following actions: demolition of existing facilities and removal of vegetation including flood debris, dredging of the boat channel and use of the material to raise the area, replacement of the boat ramp with a two-lane ramp and an ADA compliant loading ramp.

The proposal also covers the relocation of the county road to include bike lanes and the development of a partnership with the county, the state, and Gateway Parks and Trail 2004, to extend bike lanes from the Corps boundary to Hwy 94.

Other actions supported in the RAMP proposal are the establishment of ditch and drainage, protection of the shoreline, creation of an asphalt roadway to the boat ramp and parking lots, creation of an upper area 30-car parking lot with room for expansion and a lower area 30-car/trailer parking lot with room for expansion for another 10-car/trailer parking lot.

Additional site amenities will include security lighting, an ADA compliant vault toilet, ADA compliant sidewalks, a picnic area with grills, picnic tables with hardened surfaces, tree establishment, turf establishment, an ADA compliant bank fishing area with handrails, installation of control gates, ballards, guardrails, posts and cable and signage.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations for the Spatterdock Lake Area.

Ameren - Union Electric
Portage Des Sioux Power Plant Area
Industrial (26-X-1)
Corps of Engineers
St. Charles County, MO
River Mile 209.0-209.8 R
Acres: 354
Plate 26-1

General Description: The **Ameren-Union Electric Portage Des Sioux Power Plant Area** is located along the Mississippi River immediately upstream of Dresser Island. This area includes a 332.1 acre facility managed as a coal fired electric generating plant and terminal and staging area under a long-term industrial/commercial lease. A 21.45 acre operations easement has also been granted to AmerenUE. The facility requires a multi-modal interface of rail, trucking and water transportation. Facilities in the lease and easement areas include channels and a water intake and outlet structure, as well as a fleeting area for barges located along the shoreline. The area is closed to hunting and trapping for public safety.

Proposed Development: No proposed development is planned.

Future Development: Investigate the possibility of reducing the acreage of the industrial lease to the minimum amount needed for AmerenUE operations to obtain more open public lands. The reduced acreage could be incorporated within the Dresser Island Conservation and Mile 210 Areas. A possible way to implement this initiative would be a land exchange between the Corps and AmerenUE.

UNIT 2 Piasa

Piasa Creek Vegetative Management Area
Wildlife Management (26-MR-V-3)
Corps of Engineers
Jersey County, IL
River Mile 209.0 209.4 L
Acres: 24
Plate 26-1

General Description: The **Piasa Creek Vegetative Management Area** bottomland forest is located east of the Piasa Creek Recreation Area and will be managed for vegetative management purposes. The area is closed to hunting.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Piasa Creek Recreation Area
Recreation (26-R-4)
Illinois Department of Natural Resources
Jersey County, IL
River Mile 209.0 - 209.4 L
Acres: 12
Plate 26-1, S-7

General Description: The **Piasa Creek Recreation Area** is managed for public recreation purposes under a long-term park and recreation lease with the IDNR. The area lies between Alton and Grafton along the Great Rivers National Scenic Byway (Route 100). The area was improved in 1991 as a cost share project under the Federal Aid in Fish Restoration funding authority. The improvements have made the site ADA compliant. Prior to the Alton Riverfront Marina development this was the most heavily used recreational boater access on the Illinois side of Pool 26. The site still reaches capacity on most weekends during the summer months.

Existing facilities at this area include an entrance road, a paved parking lot for 200 cars with trailers, a four lane concrete boat ramp, floating docks, four picnic sites, a vault toilet building, dusk to dawn security lights and a two-story concession building.

Proposed Development: When the last concession sub-lease expired, a new lease was being considered by IDNR. However, during the 1993 and 1995 floods, the facility sustained considerable damage. It is no longer considered cost effective to refurbish the facility and operate a concession. The IDNR proposes to demolish the structure and clean up the site.

Future Development: No future development is planned.

Piasa Harbor Area
Recreation (26-R-5)
Corps of Engineers
Jersey County, IL
River Mile 209.4 - 210.0 L
Acres: 55
Plate 26-1

General Description: The **Piasa Harbor Area** is located along the Mississippi River shorelines at the mouth of Piasa Creek and the Great Rivers National Scenic Byway, (Route 100). The area is managed for commercial concession purposes under long-term lease with **Western Boats and Motors, Inc**. The area is popular for boating, fishing, sight-seeing, and access to waterfowl hunting. Facilities include wet slips, a dry storage area, boat store/administration/showroom building, fuel dock, restrooms, boat service and repair facility, access roadways and parking lots, and a boat ramp. The area is closed to hunting and trapping for public safety.

Proposed Development: Proposed developments by others include water and electrical distribution systems, site lighting, landscaping, a bath house, a wastewater treatment system plant, and overnight accommodation facilities.

Future Development: No future development is planned.

Lockhaven Harbor Area
Recreation (26-R-6)
Corps of Engineers
Jersey County, IL
River Mile 209.4 L
Acres: 7
Plate 26-1

General Description: The **Lockhaven Harbor Area** is located adjacent to the Piasa Creek shoreline immediately upstream of the Highway 100 Piasa Creek Bridge. This area is managed for commercial concession purposes under a long-term commercial concession lease with the **Alton Motor Boat Club, Inc**. The area is very popular for boating, fishing, and as access to waterfowl hunting. Facilities include wet slips, dry storage area, convenience store/administration building, fuel dock and restrooms, boat service and repair facility, access roadways and parking lot, boat ramp, and immediate environs. The area is closed to hunting and trapping for public safety.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Piasa Creek Ecologic Area
Environmental Sensitive (26-ES-2)
Corps of Engineers
Jersey County, IL
River Mile 209.4 L
Acres: 123
Plate 26-1

General Description: The **Piasa Creek Ecologic Area** is located adjacent to the Piasa Creek shoreline in the Mississippi River alluvial floodplain. This area consists of both riparian and upland forest communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology has been altered due to the regulated navigation pool. The natural resources have been altered by project hydrology. The area is open to regulated hunting and trapping in cooperation with the IDNR. The area is managed to limit development, and sustain and restore the natural riparian forest communities through protection and natural succession.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Upper Piasa Creek Access Area
and Recreational Cottages
Low Density Recreation (26- MR-L-5)
Corps of Engineers
Jersey County, IL
River Mile 209.4 L
Acres: 9
Plate 26-1

General Description: The **Upper Piasa Creek Access Area** is located adjacent to the Piasa Creek eastern shoreline. Public access is from Piasa Creek only. The area is managed for public and private access purposes and includes the 8.97-acre **Upper Piasa Creek Recreational Cottages Subdivision**, platted with twenty-two lots, and adjacent shoreline. Two lots, totaling 1.07 acres, are excluded from public access under private recreation lease to cottage owners. Twenty lots, totaling 7.90 acres, are undeveloped and provide public access to the Piasa Creek shoreline for fishing and wildlife viewing. The area is closed to hunting and trapping for public safety.

Proposed Development: No proposed development is planned.

Future Development: A minimum facility landing along the western shoreline is needed for public safety and operations. Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Lower Piasa Creek Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-6)
Corps of Engineers
Jersey County, IL
River Mile 209.4 L
Acres: 3.21
Plate 26-1

General Description: The **Lower Piasa Creek Access Area** is located adjacent to the Piasa Creek eastern shoreline. The area is managed for public and private access purposes and includes the 3.21-acre historic **Lower Piasa Creek Recreational Cottages Subdivision,** platted with 11 lots, and adjacent shoreline. No public access facilities are developed at this time. Ten lots, totaling 2.99 acres, are excluded from public access under private recreation lease to cottage owners. One lot, 0.22 acres, is undeveloped and provides public access to the Piasa Creek shoreline for fishing and wildlife viewing. The area is closed to hunting and trapping for public safety.

Proposed Development: A minimum facility turnaround at the end of the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Mill Creek Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-7)
Corps of Engineers
Jersey County, IL
River Mile 209.4 L
Acres: 15.83
Plate 26-1

General Description: The **Mill Creek Access Area** is located adjacent to the Piasa Creek western and Mill Creek southern shorelines. The area is managed for public and private access purposes and includes the 5.69-acre **Mill Creek Recreational Cottages Subdivision** platted with 37 lots, a single 10.14 adjacent tract, and adjacent shoreline. No public access facilities are developed at this time. Twenty-three lots, totaling 3.41 acres, and a single tract of 10.14 acres are excluded from public access under private recreation lease to cottage owners and the Catholic Children's Home, Inc. Fourteen lots totaling 2.28 acres are undeveloped and provide public access to the Piasa and Mill Creek shorelines for fishing and wildlife viewing. The area is closed to hunting and trapping for public safety.

Proposed Development: A minimum facility turnaround at the end of the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Piasa Island Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-4)
Corps of Engineers
Jersey County, IL
River Mile 209.2 L
Acres: 11.04
Plate 26-1

General Description: The **Piasa Island Access Area** is located adjacent to the northern shoreline of Piasa Island in the Mississippi River. The area is managed for public and private access purposes and includes the 11.44-acre **Piasa Island Recreation Cottages Subdivision**, platted with 35 lots and adjacent shoreline. No public access facilities are developed at this time. Eight lots, totaling 1.59 acres, are excluded from public access under private recreation leases to cottage owners. Twenty-seven lots, totaling 9.45 acres, are undeveloped and provide public access to the Mississippi River shoreline. The area is closed to hunting and trapping for public safety.

Proposed Development: No proposed development is planned.

Future Development: A minimum facility landing along the northern shoreline is proposed for public safety and operations. Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Piasa Island Area
Vegetative Management (26-MR-V-4)
Corps of Engineers
Jersey County, IL
River Mile 208.0 - 209.7 L
Acres: 173
Plate 26-1

General Description: The **Piasa Island Area** is located on Piasa Island near the mouth of Piasa Creek on the Mississippi River. This area consists primarily of a riparian forest community providing habitat for resident, migratory, endangered and threatened species. The natural hydrology and natural resources have been altered in association with the regulated navigational pool.

Management includes protection and vegetative management practices to sustain and restore the natural riparian forest communities. The area is open to regulated hunting and trapping in cooperation with the IDNR.

Proposed Development: No proposed development is planned.

Future Development: Due to habitat degradation concerns, a habitat enhancement project will be pursued under the EMP program.

Eagles Nest Island Area
Vegetative Management (26-MR-V-5)
Corps of Engineers
Jersey County, IL
River Mile 209.7 - 210.7 L
Acres: 120
Plate 26-1

General Description: The **Eagles Nest Island Area** is located on Eagles Nest Island in the Mississippi River alluvial floodplain. This area consists primarily of natural riparian forest communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology and natural resources have been altered in association with the regulated navigation pool.

Management includes protection and vegetative management practices to sustain and restore the natural riparian forest communities. The area is open to regulated hunting and trapping in cooperation with the IDNR

Proposed Development: No proposed development is planned.

Future Development: Due to habitat degradation concerns, a habitat enhancement project will be pursued under the EMP program.

Mile 210 Area
Vegetative Management (26-MR-V-6)
Corps of Engineers
St. Charles County, MO
River Mile 209.9 - 211.0 R
Acres: 250
Plate 26-1

General Description: The **Mile 210 Area** is located on the right bank of the Mississippi River alluvial floodplain. This area consists primarily of natural riparian forest communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology has been altered in association with the regulated navigation pool. The natural resources have been altered by project hydrology. The area includes created wetlands constructed as part of the adjacent Consolidated North County Levee District construction.

Management includes protection and vegetative management practices to sustain and restore the natural riparian forest communities and water control management of the constructed wetlands. The area is open to regulated hunting and trapping in cooperation with MDC.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

UNIT 3 Portage

Portage Islands Group Refuge
Mark Twain Refuge Complex
Wildlife Management (26-MR-W-3)
U.S. Fish and Wildlife Service
St. Charles County, MO
River Mile 212.8R-214 R
Acres: 133
Plate 26-2

General Description: The **Portage Islands Group Refuge** is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. The Portage Islands Group consists of three islands, totaling 232 acres, located in the Mississippi River between RM 213 and RM 214 near Portage Des Sioux, Missouri. Since construction of Lock and Dam 26, the two islands on the upper end of the group have been reduced by almost 90 percent by erosion. One island has eroded to the point that it is now two islands of approximately two acres each. The largest island is becoming more vulnerable to the rivers current. There are several small sloughs and an open backwater on the large island.

During the 1993 flood, the islands were completely covered by the swollen waters of the Mississippi River from March through late September. Strong river currents and deep waters eroded the upstream end of the largest island, killing many hardwoods and further eroding the banks.

Eagles use the island primarily from December through March, with the birds using the island perimeter trees for resting and perching. In the past, a pair of bald eagles nested on the upstream end of Slim Island, about a mile upstream from the Portage Island Group.

Waterfowl use is difficult to document due to the distance and inaccessibility of the island group. The habitat does favor the nesting of wood ducks and some use by other puddle ducks. Great blue herons and great egrets are commonly seen feeding along the perimeter of the island. Both species nest in rookeries on the islands just upstream of the island group. The Portage Island Group is used extensively by wintering gull and tern species for feeding and resting.

Public use of Portage Island Group is limited to boat access only. During the summer months, the area receives high visitation by weekend boaters using the island beaches for picnicking and sunbathing. There are no facilities or infrastructure developed on the island group.

Proposed Development: Due to erosion/sedimentation action causing habitat degradation and loss of island mass it is proposed to study and develop a structural solution. A possibility includes a bullnose rock dike and/or chevron, to promote stabilization of the islands and sediment accretion that would develop shorebird habitat and restore structural diversity of the island group. It is also proposed to evaluate potential modifications to existing wing dams in the island group vicinity to enhance habitat.

EMP Projects that are in place, such as Pharrs Island in Pool 25 and Stag Island in Pool 24, have similar functions/purposes to those needed at Portage. Potential authorization/funding sources may be EMP or A&M.

Future Development: No future development is planned.

Mile 215 Conservation Area
Wildlife Management (26-MR-W-4)
Missouri Department of Conservation
St. Charles County, MO
River Mile 214.6 - 215.9 R
Acres: 294
Plate 26-2

General Description: The **Mile 215 Conservation Area** is located on the right bank of the Mississippi River approximately two miles upstream from the town of Portage Des Sioux. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. The Mile 215 Area is primarily a moist soil/wetland habitat area. Resource potential and hunting opportunities could be enhanced by a habitat improvement program. Public access in the area is limited and needs to be addressed. Detailed site analysis and survey information are required to assess the feasibility of developing any wildlife management enhancements for this area. No facilities or infrastructure have been developed in this area.

Proposed Development: An access road right-of-way must be obtained and developed to legally enter this area from land. Preparation of a Real Estate Design Memorandum by the Corps will be required to initiate this or the MDC could accomplish it themselves. A gravel parking lot would be required. No other actions are being considered in this plan if EPM continues to be implemented by the Corps.

Future Development: Deepen selected backwater slough areas to a depth of 8 to 10 feet by dredging to restore suitable slackwater habitat for overwintering fish and enhance resting and roosting habitat for wetland migratory birds.

Slim Island Area
Ecologically Sensitive (26-ES-3)
Corps of Engineers
St. Charles County, MO
River Mile 215.0 - 216.1 R
Acres: 43
Plate 26-2

General Description: The **Slim Island Area** is located on Slim Island in the Mississippi River alluvial floodplain. This area consists of primarily natural riparian forest communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology has been altered in association with the regulated navigation pool. The natural resources have been altered by project hydrology.

Management includes methods to sustain and restore the natural riparian forest communities and historic bald eagle nest sites, such as natural succession and protection. The area is closed to public access during the refuge seasons for endangered species sanctuary purposes and open to regulated hunting and trapping during non-refuge seasons in cooperation with the MDC.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

POOL 26 Compartment 4

Upper Alton Lake Management Area

UNIT 1 Confluence Islands

Sherwood Harbor Area
Recreation (26-R-7)
Corps of Engineers
St. Charles County, MO
River Mile 219.1 R
Acres: 11
Plate 26-2, S-8

General Description: The **Sherwood Harbor Area** is located adjacent to the Mississippi River and Sherwood Lake shorelines immediately upstream of the old Grafton Ferry location. This area is managed for commercial concession purposes under a long-term lease with Club Sherwood Marina, Inc. The area is popular for boating and fishing. Facilities include wet slips, dry storage area, convenience store/administration building, fuel dock, portable restrooms, boat service and repair facility, access roadways and parking lots, a boat ramp, and immediate environs. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Sherwood Lake Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-8)
Corps of Engineers
St. Charles County, MO
River Mile 218.5 - 219.5R
Acres: 52.38
Plate 26-2

General Description: The **Sherwood Lake Access Area** is located adjacent to the Sherwood Lake and the Mississippi River southern shorelines. The area is managed for public and private access purposes and includes the **Sherwood Recreation Cottages Subdivision**, platted with 54 lots, a single adjacent tract, and adjacent shoreline. No public access facilities are developed at this time. Two lots are utilized by the Club Sherwood Marina commercial concession leasehold. Twenty-six lots, totaling 10.53 acres, are excluded from public access under private recreation leases to cottage owners. Twenty-six lots totaling 9.35 acres, and a single 32.50-acre tract to the south are undeveloped and provide excellent public access to the Sherwood Lake and Mississippi River shorelines. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround at the end of the road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety and project operations.

Perry Island Area
Vegetative Management (26-MR-V-7)
Corps of Engineers
St. Charles County, MO
River Mile 218.5 - 221.0 R
Acres: 282
Plate 26-2

General Description: The **Perry Island Area** is located on Perry Island and adjacent shorelines in the Mississippi River alluvial floodplain. This area consists of primarily natural riparian forest and succession communities providing resident, migratory, endangered, and threatened species habitats. The natural hydrology has been altered in association with the regulated navigation pool, while the natural resources have been altered by agricultural trespass and project hydrology. The area is managed to sustain and restore the natural riparian forest communities and historic bald-eagle nest sites. The area is open to regulated hunting and trapping in cooperation with the MDC.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Mason Island and Island 526 Conservation Area
Wildlife Management (26-MR-W-5)
Missouri Department of Conservation
St. Charles County, MO
River Mile 218.2 - 220.5 R
Acres: 344
Plate 26-2

General Description: The **Mason Island and Island 526 Conservation Area** is located at the confluence of the Mississippi (RM 220) and Illinois Rivers. The 280-acre Mason Island and adjacent 64-acre Island No. 526 comprise this management area. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. No facilities or infrastructure have been developed.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Island No. 525 Area
Ecologically Sensitive (26-ES-4)
Illinois Department of Natural Resources
Calhoun County, IL
River Mile 219.5 - 220.0 L
Illinois River Mile 1.5 - 2.1 R
Acres: 59
Plate 26-2

General Description: The **Island 525 Area** is located at the confluence of the Illinois and Mississippi Rivers, on the Illinois side of the navigation channel. The island is covered by bottomland forest and is the location of a large heron rookery. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. There are no facilities on the island.

The IDNR conducts annual surveys to locate heron rookeries, and to determine the health of previously identified rookeries. The area is periodically checked to prevent any disturbances to the rookeries.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

UNIT 2 Golden Eagle

Dardenne and Bolter Islands Conservation Area
Wildlife Management (26-MR-W-6)
Missouri Department of Conservation
St. Charles County, MO
River Mile 224.5-228.0
Acres: 1,352
Plate 26-3

General Description: The **Dardenne and Bolter Islands Conservation Area** is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. **Bolter Island** is located between RM 224.5 and RM 226. Sedimentation has greatly diminished the quality and quantity of interior wetlands on this 562-acre island, which has now become heavily forested through natural succession.

Dardenne Island is located between RM 226 and RM 228. Due to sedimentation, the interior wetland/sloughs on the lower half of this 790-acre island have largely disappeared. No facilities or infrastructure exist on the islands.

Proposed Development: EMP projects have been proposed for Dardenne and Bolter Islands. On the 790 acre Dardenne Island, restoration of an estimated 320 acres of wetland habitat could be accomplished by constructing dikes and flow control structures, installing deep wells to manipulate water levels during migration periods, deepening portions of the interior wetlands, and selective small-scale clearing of less desirable hardwood timber. On the 562-acre Bolter Island, a 160-acre wetland restoration would consist of a low levee with drainage control structures, deepening portions of the interior wetlands, and selective small-scale clearing of less desirable hardwood timber.

It is also proposed to raise approximately 200 acres of former agricultural lease fields 12 to 18 inches with dredge fill and incorporate this material with the existing soils to a depth of 12 to 18 inches. This area can then be planted with hard-mast-producing tree species. Possible dredge fill could come from either the Bolter-Iowa Islands Navigation Channel dredging area or a closer adjacent site.

Future Development: Remove accumulating sediment in the managed wetland complex on Dardenne Island. Evaluate feasibility of developing public river access on the Missouri shore in the Dardenne Island - Apple Island vicinity. This stretch of the river on the Missouri bank is currently without any public river access.

Oriole Island Area
Vegetative Management (26-MR-V-8)
Corps of Engineers
St. Charles County, MO
River Mile 228.4 - 229.0 R
Acres: 68
Plate 26-3

General Description: The **Oriole Island Area** is located on Oriole Island. Public access is from the Mississippi River only. The area is currently managed for wildlife habitat purposes except for a 0.75-acre roadway and river ferry landing site managed for operation of the Golden Eagle Ferry under a long-term easement with the Calhoun-St. Charles Ferry Company, Inc. This area consists of primarily natural riparian forest communities providing habitat for resident, migratory, and endangered and threatened species. The natural hydrology and natural resources

have been altered in association with the regulated navigation pool. The area is closed to hunting and trapping for public safety due to its close proximity to the Golden Eagle Ferry Landing.

The area is managed to sustain and restore the natural riparian forest communities.

Proposed Development: This area was formerly under a General Plan and Cooperative Agreement with the Missouri Department of Conservation and will now be included within this direct-managed Corps area. No proposed development is planned.

Future Development: In response to public concerns expressed about lack of public river access in this section of the river in Missouri, the area will be evaluated as a potential cost-shared or leased pubic access development for use by the general public.

In the absence of an acceptable river access proposal for this area, potential minimum facility needs will be evaluated for public health and safety, and operational needs.

UNIT 3 Cuivre Island

Cuivre Island Mitigation Area
Mitigation (26-M-2)
Missouri Department of Conservation
St. Charles County/Lincoln County, MO
River Mile 235.5R-238.0 R
Acres: 862
Plate 26-4

General Description: The **Cuivre Island Mitigation Area** is located on Cuivre Island in the Mississippi alluvial floodplain. The area is managed exclusively for mitigation of lost terrestrial wildlife habitat and wildlife protection due to construction of the Melvin Price Locks and Dam under a long term Fish and Wildlife License with the MDC. The mitigation requirements are the sole responsibility of the Corps. The area consists of one tract with a mixture of riparian forests and old fields. The natural hydrology had been negligibly altered by the Locks and Dam system. The natural resources have been altered significantly by agricultural clearing in the past. This mitigation area is managed along with other adjacent MDC lands as the Cuivre Island Conservation Area.

The project area consists of the 1,342-acre Cuivre Island, the western bank of the Mississippi River adjacent to the island, Cuivre Slough, and Turkey Island-Phelans Island Chute. Turkey Island Chute and approximately 100 mainland acres of Cuivre River wetland are included.

Sedimentation is a primary problem in this upper reach of Pool 26. The chutes, sloughs, backwater areas and wetlands have declined in size, depth and quality. An EMP-HREP project to alleviate these problems included removal of an existing closure structure, construction of new gated drains, cleaning out of some drainage ditches and installation of wells. This project was cost-share funded under the EMP program and construction was completed in 1999.

Other features of the EMP project included clearing of high elevation sites and reforesting to hard-mast-producing trees. Existing facilities include sluice, gated and/or stop-log water control structures at seven sites and three wells to provide for water level management.

The EMP project also included deepening the slough between Cuivre Island and Turkey Island (Turkey Slough) by an experimental towboat prop wash method.

Proposed Development: Reforest all former agricultural lease fields (120 acres) to a diverse composition of bottomland hardwoods that produce hard-mast and fruit. Connect all existing sloughs through further ditching to accommodate drainage for wetland management. Construct hard points in Cuivre slough to create scour holes to restore fisheries habitat and remove sediments.

Future Development: Maintain interior wetlands as needed by dredging to increase longevity of valuable wetland habitat. Reforest another 10 percent of existing forested habitat to hard-mast-producing bottomland hardwoods. Dredge Turkey Slough to a depth of 12 feet approximately one-half mile in length for overwintering fisheries habitat.

Cuivre Island Access Road Area
Operations Easement (26-E-2)
Corps of Engineers
Lincoln County, MO
River Mile 238.0 R
Acres: 4
Plate 26-4

General Description: The **Cuivre Island Access Road Area** is located on the western shore of Cuivre Slough. A public road provides access to the area. The area is managed for operations access under perpetual easement to assure land-based access to the island. No facilities are developed at this time.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

POOL 26 Compartment 5

Illinois & Mississippi Confluence Area

UNIT 1 Calhoun Point

Calhoun Point Wildlife Management Area
Wildlife Management (26-MR-W-7)
Illinois Department of Natural Resources
Calhoun County, IL
River Mile 219.5 - 223.4
Illinois River Miles 2.1 - 5.0 R
Acres: 2,057
Plates 26-2, 26-3, 26-CON

General Description: The **Calhoun Point Wildlife Management Area** is located at the confluence of the Mississippi and Illinois Rivers and is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. This site contains 416 acres of inter-connected lakes and sloughs, 1,466 acres of bottomland forest and 175 acres of agricultural fields.

The 1993 flood devastated the timber resources at Calhoun Point; the mortality rate is estimated to be between 70 percent and 80 percent. Management activities at the site include planting of crops through a lease tenant agreement that provides a food base for resident and migratory species. The largest agricultural field has three pit blinds available for public goose hunting. There is a series of terrace levees within this agricultural field that are flooded annually to enhance waterfowl use and improve harvest opportunity. Annually, in June or July, the 400-plus acres of lakes and sloughs are drained to river levels and then pumps are used to de-water until approximately 75 percent of the lake bottoms are exposed. The exposed substrate promotes moist soil plant production. In the fall, water is pumped into the lakes, flooding the developing plants, making them available for migratory birds and enhancing public boat access.

Facilities include earthen dikes, service access roads, two pump sites (one for discharge and one for input) and several gated tube water control structures.

Calhoun Point Wildlife Management Area was proposed as a Habitat Rehabilitation and Enhancement Project (HREP) under the Environmental Management Program (EMP). A Definitive Project Report (DPR) for the HREP is approved and funding is available for construction in 2001. The objectives of the HREP are to reduce the siltation of the site, compartmentalize the various water areas for optimum management ability and install pumps and water control structures to optimize and assure water level control. The project also includes some dredging to reestablish deep-water fisheries habitat and improve water movement between the various compartments.

Proposed Development: The Silver Lake Access, Pohlman Slough Access, and Royal Landing Access will be managed as part of this area. Pohlman Slough and Royal Landing access areas have been historically managed by IDNR under a long-term park and recreation lease. These areas will be removed from the lease and the areas and facilities will be included within this area.

Future Development: No future development is planned.

The **Pohlman Slough Access Area** provides boat access to Pohlman Slough and Royal Lake. The site is principally utilized for hunting, boat

fishing and bank fishing. This access also serves as the parking and access point to three field pits, which are available for public goose hunting. Facilities include an access road, a one-lane concrete boat ramp to Pohlman Slough, a crushed stone parking lot at this ramp, a one-lane crushed stone boat ramp and parking lot at Royal Lake, and four vault toilets, two at each parking lot.

Proposed Development: Previously mowed acres will be planted with mast trees.

Future Development: Future development includes reforestation of most of the former lease area.

The **Royal Landing Access Area** provides boat access to the Mississippi River. Adjacent to the site is a dredge material placement site, which is heavily utilized as a beach. The sand dunes east of this area also contain an endangered plant: the salt meadow grass. Facilities at this site include an access road, a 40 car and trailer crushed stone parking lot, and a one-lane concrete boat ramp.

Proposed Development: In recent years, river channel training structures have been constructed upstream of this location to reduce the amount of maintenance dredging in this section of the river. These structures are expected to eventually render the boat ramp at Royal Landing useless, due to deposition from the river. It is proposed that this access be relocated to a more suitable location.

Future Development: It is proposed to demolish all facilities and vehicular access at the original site once the access can be relocated to a more suitable location.

The **Silver Lake Access Area** provides access to several small lakes and sloughs in the southeast portion of the management area. Fishing and hunting are the principal uses of the area. The site is a minimally developed. Existing facilities include an access road which is leased from adjacent private property owners, a 30-car and trailer crushed stone parking lot, a hunter check station, a one-lane concrete boat ramp, a 40-car crushed stone gravel parking lot, and a vault toilet.

Proposed Development: Before 1993, the access road to this location was owned by private individuals, who leased a right-of-way to the IDNR. A total of 17 acres was in private ownership, with many cabin sites on the premises. Since the 1993 flood, many of the cabins were destroyed or unsalvageable and FEMA has since acquired the entire 17 acres. The property is now cleared of all remaining structures and deeded to Calhoun County. It is proposed that the St. Louis District secure this property for addition to the Calhoun Point Wildlife Management Area (WMA) to be managed by the IDNR. Existing access conditions at the site are eroding and in poor physical shape due to years of inundation by flood waters and provide inadequate vehicle circulation. It is proposed that, if management of the area can be secured from Calhoun County, the old check station be demolished, a loop road be developed and a new portable check station be constructed that can be removed annually to preventing flood damage.

Future Development: No future development is planned.

Deer Plain Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-9)
Corps of Engineers
Calhoun County, IL
Illinois River Mile 3.2 - 4.4 R
Acres: 33.57
Plate 26-2

General Description: The **Deer Plain Access Area** is located adjacent to the Pohlman Slough western and Illinois River southern shorelines. The area is managed for public and private access purposes and includes the **Deer Plain Recreational Cottages Subdivision**, platted with 129 lots, and adjacent shorelines. No public access area is developed at this time. Thirty-five lots, totaling 9.41 acres, are excluded from public access under private recreation leases to cottage owners. Ninety-four lots, totaling 24.16 acres, are undeveloped and provide excellent public access to the Pohlman Slough and Illinois River shorelines. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public access road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health, safety and project operations.

UNIT 2 Four Islands

Iowa/Enterprise Islands Area
Vegetative Management (26-MR-V-9)
Corps of Engineers
Calhoun County, IL
River Mile 221.7 - 225.0 R
Acres: 520
Plate 26-3

General Description: The **Iowa/Enterprise Islands Area** includes Iowa, Enterprise, 521, and 518 Islands in the Mississippi River alluvial floodplain. This area primarily consists of natural riparian forest and succession communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology has been altered in association with the regulated navigation pool and the natural resources have been altered by agricultural and project hydrology and channel maintenance.

Management includes protection and natural succession to sustain and restore the natural riparian forest communities. The area is open to regulated hunting and trapping in cooperation with MDC.

Proposed Development: This area was formerly under a General Plan and Cooperative Agreement with the IDNR and will be included within this direct managed Corps area. No proposed development is planned.

Future Development: No future development is planned.

POOL 26 Compartment 6

Lower Illinois River Management Area

UNIT 1 Swan Lake Refuge

Calhoun Division Refuge (Includes Swan Lake)
Mark Twain Refuge Complex
Wildlife Management (26-MR-W-8)
U.S. Fish and Wildlife Service
Calhoun County, IL
Illinois River Mile 5.0-10.5 R
Acres: 3,983
Plates 26-5, 26-3

General Description: The **Calhoun Division Refuge** of Mark Twain Refuge Complex is located along the Lower Illinois River. Total acreage for the Calhoun Division is 4,833. Of this, about 850 acres are USFWS fee title owned lands.

The Calhoun Division is located a few miles north of the confluence of the Mississippi and Illinois rivers in Calhoun County, Illinois, and is approximately 20 air miles north of St. Louis, MO. The Division consists of agricultural lands and buffer strips, forest, moist soil units, lakes, ponds, sloughs, and established grasslands. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. The **Swan Lake Access** and **Blooms Landing Access** are included within this area.

Management activities have long centered on moist soil units and croplands. Limited grass seedlings and bottomland hardwood tree plantings have taken place in the past 10 years, which have added to the diversity of the corridor.

Wetlands of the Calhoun Division consist of narrow, shallow sloughs (some of which are managed as moist soil units) on the floodplain between the Illinois and Mississippi Rivers; constructed moist soil units with varying degrees of water control potential; and Swan Lake, which was greatly enlarged when construction of Lock & Dam 26 on the Mississippi River elevated water levels and flooded pre-existing sloughs. The 2,600-acre Swan Lake provides a resting and feeding area for ducks (mostly dabblers), geese and other water birds.

Swan Lake also provides valuable backwater habitat for a large variety of riverine fishes. Recently, it has been determined to be a very important post-spawning feeding and resting habitat for paddlefish.

Silt deposition from upland erosion and flooding is a chronic problem, slowly filling in the lake.

The Refuge currently manages seven moist soil units and wetlands, totaling 213 acres, which, during normal years, provide food to migratory birds. Water is pumped from Swan Lake through a network of feeder ditches to the units.

The moist soil units have varying degrees of water management capability. Each unit is managed for the production of natural vegetation beneficial to waterfowl and other migratory birds using standard moist soil management techniques. Vegetation produced in these units may include wild millet, pigweed, pinkweed and nutsedges.

Yorkinut, Schoolhouse Lake and Duck Pocket are shallow, natural sloughs associated with the Illinois River. All have limited, or no, water

management capabilities and are primarily dependent on spring flooding or precipitation to fill them.

About 1,000 acres of forest lands exist on the Division. They are composed of early successional tree species occupying narrow riparian zones, which border Swan Lake and the Illinois River. Species are predominantly silver maple, green ash, box elder, eastern cottonwood and black willow. Wildlife use is typical of this plant community; white-tailed deer are regularly seen and several furbearers are present. Larger trees bordering Swan Lake and the Illinois River provide perches for wintering bald eagles. Wild turkeys are regularly seen within the narrow belt of trees surrounding Swan Lake.

Currently, only minimal management of these habitats takes place on either USFWS or Corps owned lands.

The cropland program on Calhoun Division is conducted under cooperative agreement with local farmers. Approximately 560 acres of land are managed to produce crops for wildlife purposes, primarily on Service fee title land.

A 25-acre area of native prairie grasses and forbs, planted around the Visitor Center/Office is well established. Three grasses contribute most of the biomass: big bluestem, switchgrass and Indiangrass. Forbs present include bush-clover *(Lespedeza spp.)*, lead-plant (*Amorpha canescens*), tick trefoil (*Desmodium spp.*) and compass-plant (*Silphium laciniatum*). Prescribed burning is accomplished on a rotational schedule to remove litter and to discourage invading woody species. Several species of migrating sparrows exist in the tall grasses of the prairie and white-tailed deer, bobwhite quail and mallards are commonly observed.

Numerous ditches, low level dikes, gated culverts and stop log structures are maintained throughout the refuge to service the moist soil and agricultural compartments. One sheet pile diesel pump station is used to flood many of the moist soil units from Swan Lake waters.

A UMRS-EMP-HREP is constructed at Swan Lake to improve habitat management capabilities. Project infrastructure includes eight miles of sediment deflection dike between Swan Lake and the Illinois River. A large stop-log structure with service bridge is installed at the lower end of the lake to allow water transfer between the Illinois River and the lake. One permanently-installed 30,000 GPM concrete diesel pump station is in the middle section of the Lake as well as a stop log structure. The lake has been compartmentalized into two units through the construction of a cross dike using dredge fill material. A series of islands were constructed in both lake units to reduce wind fetch and provide habitat diversity.

The USFWS Management Office and Maintenance Complex is located on the western side of Lower Swan Lake on USFWS property.

Proposed Development: The USFWS will conduct extensive testing and monitoring of HREP project performance and effectiveness, and make any necessary adjustments to optimize habitat conditions. One or more overlooks will be installed at key location(s) on the Division for Watchable Wildlife purposes.

Future Development: Expand moist soil and other wetland management areas. Conduct moist soil field leveling work to compensate for sedimentation losses and improve water delivery. Expand fishing opportunities.

The **Swan Lake Access Area** includes a 12-foot wide boat ramp, a 1,200-foot long crushed stone entrance road, and a 5 car parking lot along the west shore of lower Swan Lake constructed as part of the

Swan Lake HREP. The area was developed as mitigation for closing off lake access via the Illinois River. The ramp is open to the public year round, except during peak fall migration (October 15 – December 15) and during floods.

Proposed Development: A handicapped-accessible recreational fishing pier is proposed for this site by USFWS. Concept plans include expanding the vehicle/trailer parking, adding interpretive and environmental education panels, adding an ADA compliant transfer dock by the boat ramp, and a bank fishing platform.

The **Blooms Landing Access Area** includes a 12-foot wide boat ramp, 1,250-foot long crushed stone entrance road, and a 5 car parking lot along the west shore of Swan Lake constructed as part of the Swan Lake HREP. The area was developed as mitigation for closing off access via the Illinois River. The ramp is open to the public year round, except during peak fall migration (October 15 - December 15) and during floods.

Proposed Development: A handicapped-accessible recreational fishing pier, interpretive panels, and other public use improvements are proposed for this site by the USFWS. Concept plans include expanding the vehicle/trailer parking, adding interpretive and environmental education panels, adding an ADA compliant transfer dock by the boat ramp, and a bank fishing platform.

Future Development: No future development is planned.

UNIT 2 Gilbert Lake Refuge

Gilbert Lake Division Refuge
Mark Twain Refuge Complex
Wildlife Management (26-MR-W-9)
U. S. Fish and Wildlife Service
Jersey County, IL
Illinois River Miles 4.0 – 7.0 L
Acres: 655
Plate 26-5

General Description: The **Gilbert Lake Division Refuge** is located along the Illinois River, left bank, between RM 4 and RM 7. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. Approximately 735 acres in size, it consists of 655 acres of cooperative agreement lands and 80 acres of land leased by the USFWS from the State of Illinois.

The wetlands of this refuge consist primarily of Gilbert Lake and bottomland forests. These areas are currently managed for migratory bird habitat and preserving the bottomland hardwood ecosystem. Gilbert Lake is a shallow, abandoned channel of the Illinois River, approximately 250 acres in size. Past management practices have relied on pumping to de-water the lake for growing moist soil plants in the spring, and to recharge the area to make this food source available for migrating birds in the fall. However, silt deposition in the lake and feeder ditch has dramatically decreased management operations.

Annual flooding, particularly through the 1990s, has significantly contributed to the demise of Gilbert Lake by silt deposition. No areas are currently managed as moist soil units. Some of the agricultural units on the Division are high enough to escape all but the most serious floods.

Approximately 250 acres of bottomland forests on the Division are dominated by mature silver maple, cottonwood and sycamore. Mast producing trees include pin oak, pecan, green ash and walnut. A variety of lowland shrubs and woody vines also are present.

Division Woodlands are still affected by the flood of 1993 and subsequent floods. Mortality rates among bottomland hardwood species such as oak, hackberry, box elder, sycamore and elm have been averaging 45 percent to 50 percent. Pecan, silver maple and cottonwood have fared better.

Wildlife use of these deciduous woodlands is typical of the Midwest. White-tailed deer are regularly seen and several furbearers are present. Large cottonwood trees bordering the Illinois River provide excellent perches for wintering bald eagles. Eagle numbers are larger than would be expected due to the operation of the Brussels Ferry adjacent to the refuge, which churns up the water stunning fish and preventing a hard ice cover. An active eagle nest is also present on the Division.

Much of the original cropland maintained for wildlife purposes on the Division has been withdrawn from the Cooperative Farming Program because of the need to protect the Duncan Farm Archaeological Site. Annual tilling had encouraged archaeological violations. Most of the retired acreage is seeded to native warm-season grasses to discourage vandalism and looting.

The re-established prairie may be used by mallards for nesting, due to its proximity to Gilbert Lake. Deer beds are common. A variety of migrating sparrows and other upland birds and mammals also take advantage of

the grassland habitat. Maintenance burning on a 3-year cycle is done to discourage tree encroachment and maintain prairie grass productivity.

Boltonia decurrens, a federally listed threatened plant species is found at Gilbert Lake and is being studied and protected.

Public use on the Gilbert Lake Division consists primarily of sport fishing, hiking and wildlife observation (mostly birding). The only vehicle access is along the overlook, parallel to Route 100. From this area, the prairie may be viewed and waterfowl, turkey and deer may be seen. The 3-mile service road that runs between the Illinois River and Gilbert Lake is closed to public vehicle access, and is designated as a hiking trail. Bank fishing is the most popular activity at Gilbert Lake, particularly in the early summer. The lake normally receives consistent fishing pressure on the east end where access is easiest, since the area is closed to vehicles. Bullhead, drum, carp and an occasional catfish constitute the bulk of the catch. Boats are not allowed, except from the river when the flood overtops the levee.

Existing facilities/infrastructure includes three miles of gated service road that also serves as a water control levee, a permanently installed electric water pumping station, and one gated water control structure.

After the flood of 1993, the roadway and spillway underwent major rehabilitation and repair. Some limited dredging near the proposed pump location was also done at that time.

Proposed Development: Chronic lack of adequate water control has severely limited management capability at the site. The existing pump system will be replaced. Moist soil management areas will be developed where feasible.

A service road through the Pere Marquette State Park lease area will remain gated, but walk-in public access to the refuge will be permitted from this location.

Future Development: No future development is planned.

The **Gilbert Lake Access Area** is not currently developed.

Proposed Development: The Pere Marquette State Park access area has been historically managed by IDNR under a long-term park and recreation lease. No development has occurred on this lease area. This area will be removed from the lease except for one acre and the areas and facilities will be included within the Gilbert Lake Division Refuge.

It is proposed to provide a public access parking lot and/or turnaround off of State Highway 100 onto the refuge. Currently no parking area exists and public users must park along the highway adjacent to the refuge. This is not a safe and workable situation.

Future Development: No future development is planned.

Pere Marquette State Access Area
Recreation (26-R-8)
Illinois Department of Natural Resources
Jersey County, IL
Illinois River Mile 6.9
Acres: 1
Plate 26-5

General Description: This one acre area is located at Illinois RM 6.9 and was formerly used as a Pere Marquette State Park Access Area. The area is managed for public access purposes under long term park and recreation lease. The site is located on the north tip of the Gilbert Lake Division of the Mark Twain Refuge managed by the USFWS.

Proposed Development: It is proposed that this lease be reduced to one acre and the acreage included in the Gilbert Lake Refuge under Cooperative Agreement to the USFWS.

Future Development: No future development is planned.

UNIT 3 Stump Lake

Stump Lake Wildlife Management Area
Wildlife Management Area (26-MR-W-10)
Illinois Department of Natural Resources
Jersey County, IL
Illinois River Miles 7.4 – 13.0
Acres: 2,958
Plate 26-5

General Description: The **Stump Lake Wildlife Management Area** is part of a total managed acreage of 3,580, of which 2,958 acres are owned by the Corps and 622 acres are owned by the IDNR. This site contains 1,181 acres of water, 413 acres in agricultural fields, 100 acres of borrow areas and levee and 1,886 acres of bottomland forest. The water acreage is made up of six different lakes: Upper Stump, Lower Stump, Long Lake, Flat Lake, Deep Lake and Fowler Lake. The site is very popular for fishing, hunting and wildlife observation, with access from Long Lake, Dabbs Road and from Pere Marquette Harbor parking lot. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. Two former adjacent commercial concession park and recreation lease areas have been interim managed and maintained by the Corps.

A major Stump Lake EMP-HREP was completed in 1998. The project features include a perimeter levee to deflect river borne silt, a series of interior levees to compartmentalize the various water bodies, installation and construction of gated tube and stop log water control structures, dredging to improve fisheries habitat and a large two-way pump station for optimum water control capabilities. The success of the silt deflection dike is visually obvious. Areas on the riverside of the levee are rapidly accreting while the interior elevations are remaining almost static. The ability to stabilize water levels and improve water clarity has already proven to be the correct combination. In 1996, macrophytes returned to Lower Stump Lake and, in 1997, the same success was noted in Upper Stump Lake and portions of Flat Lake. The reestablishment of the macrophyte communities are a major objective for the project and represent the return of a habitat type which has been extirpated from many Illinois River backwaters for decades

The bottomland forest at this site is diverse. On the north end of the WMA, there are still good numbers of mast trees with evidence of regeneration. Typically, the east side, which is furthest from the river, contains the best species composition. On the south end, the majority of the timber stand is comprised of silver maple, ash and willow.

Management activities, with the completion of the HREP, are conducted by compartment and response of the biotic communities from manipulation of the abiotic elements. The return of the macrophyte communities to Upper and Lower Stump Lakes will dictate a modification of the drawdowns. Flat Lake which received the dredge spoil for Long Lake will be intensively de-watered and managed for moist soil plants until such time the substrate can be solidified and is able to promote a return of the macrophytes. Fowler Lake will be treated the same as Flat Lake, while Long Lake and Deep Lake will be held to full pool, to benefit the fisheries resource.

An integral part of the management efforts at Stump Lake, is the Crull Refuge. The refuge is approximately 130 acres, which include 40 acres of flooded green timber, 65 acres of flooded crops and 25 acres of small grains and green forage.

Existing facilities at the Stump Lake WMA include a perimeter levee for silt deflection and summer flood protection, interior earthen dikes for compartmentalizing the various water bodies, a 53,000 GPM two-way pump station, numerous gated tube water control structures, a concrete fish passage structure and two concrete stoplog/boat passage structures. Public access facilities are provided at Long Lake and Dabbs Road Access Areas and from Pere Marquette Harbor parking lot. These access areas are discussed individually below.

Proposed Development: The former Stump Lake Landing Strip and Deep Lake Access park and recreation leases were not renewed. The Stump Lake access area has been historically managed by IDNR under a long-term park and recreation lease. The Stump Lake Access Area will be removed from the lease, and this area, the former commercial concession lease areas, and former park and recreation leased areas and their facilities will be included within the Stump Lake WMA.

The completion of the HREP at Stump Lake WMA has left many acres of borrow pits from dike construction. It is proposed to install water control structures on the borrow pits. The objective is to manage for moist soil plants in the pits and develop an additional 50 plus acres of managed herbaceous wetlands.

Much of the land around Dabbs Road is in agricultural production. It is proposed to construct a low level dike and install a water control structure in the agricultural fields. The dike will extend far enough to capture flow from two waterways, making a seasonal wetland approximately 10 acres in size.

During construction of the HREP, the slash piles from the clearing operations were covered with dirt. This was to anchor the slash during times of high water. It is proposed to plant pin oaks on the mounds, in an effort to enhance the dwindling populations of mast trees in the bottomland forest.

There is an abandoned agricultural field north of the Dabbs Road project. It is proposed to excavate the low portion of the field creating a seasonal wetland. The spoil materials will be deposited in ridges on the higher ground. These ridges would then be planted to mast trees.

Future Development: It is proposed to investigate expanding the Crull Refuge. This would include the construction of low level dikes around some of the existing agricultural fields and incorporating water control and pumping ability.

The **Dabbs Road Access Area** provides boat access to Lower Stump Lake, and foot traffic to the AT&T underground cable levee which divides Stump Lake into upper and lower compartments. Prior to the EMP habitat project at the Stump Lake WMA, Dabbs road served as the main boat access to lower Stump Lake. The completion of the project has provided for access from Long Lake via a water control structure between the two. The boat access is generally used for hunting and fishing. However, the AT&T levee is very popular for bank fishing and wildlife observation.

This site is minimally developed. Existing facilities include an access road, a gravel parking lot for 30 cars with trailers, a one-lane concrete boat ramp and two vault toilets.

Proposed Development: There are no further developments planned for this location.

Future Development: No future development is planned.

The **Stump Lake Access Area** is also commonly known as Long Lake Access Area and is accessible from Route 100. The area is the main

access point for the Stump Lake WMA. The site is heavily used for boating, bank fishing and waterfowl hunting. The access road lies parallel to the Crull Impoundment which serves as a waterfowl refuge. This makes it a popular stop for wildlife observation, as well.

Existing facilities include an access road, an asphalt surface parking lot for 70 cars with trailers, a one-lane concrete boat ramp providing access to Long Lake, a gravel parking lot for 12 cars, a one-lane gravel ramp for access to Fowler Lake, a hunter check station, a concrete block vault toilet and a gravel overflow parking lot on the old Long Lake Tavern lease property.

Proposed Development: Due to the EMP improvements on the Stump Lake WMA, use of this access is increasing and there is a need for expanded parking area. It is proposed to maintain the old tavern parking lot as a gravel overflow parking facility.

Future Development: No future development is planned.

Powerline Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-10)
Corps of Engineers
Jersey County, IL
Illinois River Miles 10.2 - 11.8 L
Acres: 17.99
Plate 26-5

General Description: The **Powerline Access Area** is located adjacent to the Illinois River eastern shoreline. The area is managed for public and private access purposes and offers recreational opportunities for wildlife viewing and shoreline fishing. This area includes the Powerline Recreational Cottages Subdivision, platted with eighty lots, and adjacent shorelines. No public access facilities are developed at this time. Forty-five lots, totaling 10.17 acres, are excluded from public access under private recreation leases to cottage owners. Thirty-six lots, totaling 7.82 acres, are undeveloped and provide public access to the Illinois River shoreline. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Coon Creek Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-11)
Corps of Engineers
Jersey County, IL
Illinois River Miles 11.8 - 12.6 L
Acres: 48.83

Plate 26-5

General Description: The **Coon Creek Access Area** is located adjacent to the Illinois River eastern shoreline. The area is managed for public and private access purposes and offers recreational opportunities for wildlife viewing and shoreline fishing. This area includes the 48.83 acre Coon Creek Recreational Cottages Subdivision, platted with 129 lots, and adjacent shorelines. No facilities are developed at the time. Sixty-three lots, totaling 21.31 acres, are undeveloped and provide public access to the Illinois River shoreline. Sixty-six lots totaling 27.52 acres

are excluded from public access under private lease. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

UNIT 4 Fuller Lake

Fuller Lake Wildlife Management Area
Wildlife Management (26-MR-W-11)
Illinois Department of Natural Resources
Calhoun County, IL
Illinois River Miles 10.8 - 13.0
Acres: 1,067
Plates 26-5, 26-6

General Description: The **Fuller Lake Wildlife Management Area** contains 347 acres of water, 160 acres of agricultural land and 560 acres of bottomland forest. The water acreage is made up of three water bodies; Upper Swan Lake, Fuller Lake and Beaver Pond. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. Phase One of the Swan Lake EMP-HREP included construction of a silt defection dike around the Fuller Lake area and a two-way pump station for Fuller Lake. The deflection levees success is apparent. It is visually obvious that the rate of accretion is much higher on the river side of the levee, than on the interior. The Fuller Lake Access is included within this area.

Management activities include the planting of crops to provide food and cover for both resident and migratory species. This includes several acres of sunflower and small grains, which are then manipulated for dove hunting. Annually in June or July, the 347 acres of water is gravity drained to river levels and then pumps are used to de-water until approximately 75 percent of the lake bottoms are exposed. The exposed substrate promotes moist soil plant production. In some years, aerial seeding of Japanese Millet provides additional food resources. In the fall, water is pumped into the lakes, flooding the developing plants, making them available for migratory birds and accommodating public boat access.

Infrastructure at this area includes earthen dikes, service access roads, gated tube water control structures and a pump station.

Proposed Development:

The south boundary of this area adjoins the Swan Lake Refuge, managed by USFWS. The shared line runs parallel with the power line right of way, while approximately 300 yards north is the main water control levee for the Fuller Lake complex. There is no physical access to this portion of the water, from the north. Therefore, it is proposed that the boundary line be moved to the earthen levee, and jurisdiction of the 21 acres south of the levee be transferred to USFWS for management.

Construction of the EMP silt deflection dike created three borrow areas. These borrows pits have approximately six inches of water in them when the lake is pumped full. The installation of a stop log structure in each of the borrow pits will allow an increase in water depth and surface acres through pumping. It is proposed to plant small grains in the borrow pits and pump an additional 18 inches of water into them. These areas will provide wetland habitat and serve as rest areas for waterfowl.

It is proposed to remove the Hadley Landing Access from the park and recreation lease and include in the Fuller Lake WMA as described below.

Future Development: Annually dense stands of milo and pearl millet are strip-planted along the site entrance road and on the river side of the deflection levee. These plantings serve as filter strips to accumulate silt when the river is flooding. The filter strip plantings along the largest agricultural field increase the accretion along the riverbank, creating a

natural swale, between the ridge and the deflection levee. The natural swale will be managed as a seasonal wetland in the future.

The **Fuller Lake Access Area** provides boat access to Fuller Lake WMA The site is used primarily for hunting and fishing with some limited bank fishing in the river near the parking lot. Existing facilities at this site include a one-lane concrete boat ramp and a gravel parking lot for approximately 30 cars with trailers. This access is a minimally developed access with no future development plans.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

The **Hadley Landing Access Area** is located adjacent to the Illinois River shoreline. The public access area is managed for public access purposes and offers recreation opportunities for wildlife watching, shoreline fishing and boat access. Facilities include a crushed stone parking lot and entrance roadway, and a concrete boat ramp.

Proposed Development: The Hadley Landing access area has been historically managed by IDNR under a long-term park and recreation lease. This area will be removed from the lease and the area and facilities will be included within the Fuller Lake WMA and maintained by the IDNR.

Future Development: No future development is planned.

UNIT 5 The Glades

The Glades Wildlife Management Area, Twelve Mile Island and Hembold Island Wildlife Management (26-MR-W-12) Illinois Department of Natural Resources Jersey County, IL Illinois River Mile 12.4 - 16.3 Acres: 2,099 Plate 26-5

General Description: The 1,591-acre **Glades Wildlife Management Area**, contains 328 acres of water, 65 acres in agricultural lease and 1,198 acres of bottomland forest. The area is bisected by the Illinois River. Twelve Mile Island is 223 acres in size and contains a 6-acre lake and 217 acres of bottomland forest. Hembold Island is 285 acres and includes a 28 acre bottomland/lake area. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreements.

Twelve Mile Island is accessible by boat only. Twelve Mile Island has a small earthen levee, a gated culvert water control structure and a pump site, where a 12,000 GPM portable pump is utilized for fall pumping. The island is principally used for hunting and the six-acre lake has two blind sites. The bottomland forest mix is diverse but silver maple and cottonwood mix are dominant, typical of the younger successional forest stands along the river. The six-acre lake is perched and goes dry when the river is at pool level for extended periods. Management activities at the site include pumping Twelve Mile Island each fall to create seasonal wetland habitat.

The 328-acre lake at the Glades WMA is also perched. The site is primarily used for hunting, with some fishing activity during periods of floods. The bottomland forest is a cottonwood/silver maple composition, with a few mast trees in the mix. The lake is interspersed with islands of button bush and large areas of a monoculture of marsh smartweed. At the Glades, the lake is drained annually in June or July to promote moist soil plant production. Some years the exposed lake bottom is aerially seeded with Japanese Millet to enhance food plant production. Annually, the areas of marsh smartweed are treated chemically and/or mechanically, to promote annual plant communities. Each fall the lake is refilled providing excellent herbaceous wetland habitat. An agricultural lease tenant program also provides wildlife food for resident and migratory species.

Infrastructure at the Glades includes a 25,000 GPM pump, portable power unit and fuel tank, gated tube water control structures, service roads, boat access channels and drainage ditches. Public use facilities are identified in the access area descriptions for Compartment 6. This area has been identified as a future EMP project.

Proposed Development: It is proposed to create a concrete surfaced spillway at the existing Glades WMA drainage structure as an EMP funded project.

Remove the Glades Access from the park and recreation lease and include in the Glades WMA

Future Development: Future development may include an EMP project.

The **Glades Access Area** provides boat access to Twelve Mile Island area and the Glades WMA. It is popular for hunting, boating and bank fishing and wildlife observation. Existing facilities at this location include

an access road, two-lane concrete boat ramp for access to the Twelve Mile Island WMA, a gravel parking lot at the river ramp for 30 cars with trailers, a one-lane concrete boat ramp for access to the Glades WMA, a gravel parking lot at the Glades ramp for 45 cars, a hunter check station, two vault toilets, two water control structures and a 25,000 GPM pump station with distribution system to provide water control on the Glades WMA and Stump Lake WMA

Proposed Development: The Glades access area has been historically managed by IDNR under a long-term park and recreation lease. This area will be removed from the lease and the area and facilities will be included within the Glades WMA.

Future Development: No future development is planned.

Otter Creek Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-12)
Corps of Engineers
Jersey County, IL
Illinois River Mile 14.9 - 15.1 L
Acres: 11.41
Plate 26-5

General Description: The **Otter Creek Access Area** is located adjacent to the Illinois River left bank. The area is managed for public and private access purposes and offers recreational opportunities for wildlife viewing and shoreline fishing. The area includes the **Otter Creek Recreational Cottages Subdivision**, platted with 33 lots, and adjacent shorelines. Sixteen lots, 5.32 acres, are excluded from public access under private recreation leases to cottage owners. Seven lots, totaling 6.09 acres, are undeveloped and provide public access to the Illinois River shoreline. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public access road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

POOL 26 Compartment 7

Upper Illinois River Management Area

UNIT 1 - Mortland Island Complex

Mortland Island Area
Vegetative Management (26-MR-V-10)
Corps of Engineers
Calhoun County, IL
Illinois River Mile 17.8 - 19.8 R
Acres: 413
Plate 26-6

General Description: The **Mortland Island Area** is located on Mortland Island in the Illinois River alluvial floodplain. This area consists of primarily natural riparian forest communities providing habitat for resident, migratory, endangered, and threatened species. The natural hydrology has been altered in association with the regulated navigation pool and the natural resources have been altered by agriculture and project hydrology.

Management includes protection to sustain and restore the natural riparian forest communities. The area is open to hunting and trapping in cooperation with the IDNR.

Proposed Development: This area, formerly included in the General Plan and Cooperative Agreement with the IDNR, is proposed to be included within this direct managed Corps area.

Future Development: No future development is planned.

UNIT 2 Godar Diamond Hurricane Complex

Godar-Diamond-Hurricane Island Wildlife Management Area
Wildlife Management (26-MR-W-13)
Illinois Department of Natural Resources
Calhoun County, IL
Illinois River Mile 23.0-28.3 – R
Acres: 2051
Diamond Island: 658,
Hurricane Island: 397,
Godar Refuge: 996
Plates 26-6, 26-7

General Description: The **Godar–Diamond–Hurricane Island Wildlife Management Area** complex consists of three wildlife management areas including Diamond Island, Hurricane Island and Godar Refuge. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreements.

Diamond Island is a 658-acre area, which contains 292 acres of water, 40 acres in agricultural fields and 326 acres of bottomland forest. The 292-acre lake has filled with sediment to the point that the site is perched. Management of the site includes providing small grain and row crop food production, for resident and migratory wildlife, on the 40 acres of agricultural land. The 292-acre lake is intensively managed for moist soil plant production for the benefit of migratory species that utilize this habitat type, and provide quality waterfowl hunting opportunity. Existing facilities at Diamond Island include earthen dikes, a 34,000 GPM, two-way pump station (one pump for discharge and one for filling the lake) with portable power unit and fuel tank, a gated tube water control structure and a boat pullover.

Hurricane Island is 397 acres in size, which contains 59 acres of water, 18 acres in agricultural fields and 320 acres of bottomland forest. This lake basin has suffered the same fate as Diamond Island, from sedimentation. The management objectives are the same as those for Diamond Island. Hurricane Island facilities include a 9,000 GPM one-way pump station with portable power unit and fuel tank for filling the lake, a gated tube water control structure and a boat pullover.

The Godar Refuge is 996 acres, comprised of 327 acres of water, 208 acres of agricultural field, approximately 300 acres of bottomland forest and approximately 161 acres woody encroachment, which is predominantly willow. The management objective is to produce waterfowl food through row crops, small grains and moist soil plants coupled with optimum water control. Improvements including construction of a contour levee, optimizing water level management capabilities, controlling the willow encroachment zone and maximizing waterfowl use of the food resources. No hunting is allowed in this refuge zone. Existing facilities at the Godar Refuge include earthen levees, a 30,000 GPM two-way, hydraulic pump station with portable power unit and fuel tank, a two ton stationery jib crane for pump removal, six gated tube water control structures and a pump site to facilitate pumping above the contour terrace levee. This area has been identified as a future EMP project.

Proposed Development: It is proposed to develop an EMP project to expand habitat management capability at Godar Refuge through construction of an earthen levee in the 280-acre agricultural levee. The levee will be constructed along the timber edge, allowing the flooding of approximately 100 acres of waterfowl food between the levee and the naturally accreted river ridge. Included in this development will be stop

log over-flow structures, a pump station with portable power unit and fuel tank and interconnected drainage ditches.

Remove the Godar-Diamond Access from the park and recreation lease and include in the Godar-Diamond WMA

Future Development: Future development for this area may include an EMP project.

The **Godar-Diamond Access Area** offers boat access to the Illinois River. The site is a popular access for hunting, fishing and summer time recreational boating. The shade afforded by the large cottonwood, maple and pecan trees make this area popular for bank fishing.

Existing facilities at this site include an access road, gravel parking lot for 75 cars with trailers, hunter check station, two-lane concrete boat ramp, a concrete block vault toilet, dusk to dawn security lights and two-way pump station to provide water control on Godar Refuge.

Proposed Development: The Godar-Diamond Access area has been historically managed by IDNR under a long-term park and recreation lease. This area will be removed from the lease and the area and facilities will be included within the Godar Diamond Hurricane Island WMA

Future Development: No future development is planned.

UNIT 3 Kampsville

Michael Wildlife Management Area (Tarpey Bottoms)
Wildlife Management (26-MR-W-14)
Illinois Department of Natural Resources
Calhoun County, IL
Illinois River Mile 27.0 - 28.8
Acres: 101
Plate 26-7

General Description: The **Michael Wildlife Management Area** contains 101 acres, of which 75 acres are water, 10 acres agricultural fields and 16 acres bottomland forest. This site shares the same management objective as Diamond and Hurricane Islands. Facilities at Michael Bottoms include an 8,000 GPM one-way pump station, with portable power unit and fuel tank and a stoplog overflow water control structure. The area is managed for fish and wildlife enhancement purposes by the IDNR, under a General Plan and Cooperative Agreement.

Proposed Development: Remove the Michael Landing Access from the park and recreation lease and include in the Michael WMA

Future Development: No future development is planned.

The **Michael Landing Access Area** offers boat access to the Illinois River. The site is a popular access for hunting, fishing and summer time recreational boating.

Existing facilities at this site include an access road, 20 car and trailer crushed stone parking lot, single-lane concrete boat ramp, and a dusk to dawn security light.

Proposed Development: The Michael Landing Access Area has been historically managed by IDNR under a long-term park and recreation lease. This area will be removed from the lease and the area and facilities will be included within the Michael Wildlife Management Area.

Future Development: No future development is planned.

Willow Island Area
Vegetative Management (26-MR-V-11)
Corps of Engineers
Calhoun and Green Counties, IL
Illinois River Mile 28.8 - 31.2 R/L
Acres 247
Plate 26-7

General Description: The **Willow Island Area** includes Willow and Crater Islands and adjacent shoreline lands in the Illinois River alluvial floodplain. This area was formerly under a General Plan and Cooperative Agreement with the Illinois Department of Natural Resources and is now included within this direct managed Corps area. The area consists of primarily natural riparian forest and succession communities and old fields providing habitat for resident migratory, endangered and threatened species. The natural hydrology and natural resources have been altered in association with the regulated navigational pool. Management includes protection to sustain and restore the natural riparian forest communities and wetlands restoration. The area is open to hunting in cooperation with the IDNR.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Michael Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-13)
Corps of Engineers
Calhoun County, IL
Illinois River Mile 27.4
Acres: 6.23
Plate 26-7

General Description: The Corps' **Michael Access Area** is located on the right bank of the Illinois River. The area is managed for public and private access purposes and offers recreational opportunities for wildlife viewing and shoreline fishing. This area includes the **Michael Landing Recreational Cottages Subdivision**, platted with 28 lots, and adjacent shorelines. Fifteen lots totaling 3.39 acres are excluded from public access under private recreation lease to cottage owners. Thirteen lots totaling 2.84 acres are undeveloped and provide public access to the Illinois River shoreline. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: No proposed development is planned.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Kampsville Lock and Dam Access Area
Low Density Recreation (26-MR-L-14)
Corps of Engineers
Calhoun and Green Counties, IL
Illinois River Mile 31.2 - 31.6 R & L
Acres: 28
Plate 26-7

General Description: The **Kampsville Lock and Dam Access Area** is located on the Illinois River left and right banks. The area is managed for pubic access purposes and offers recreational opportunities for wildlife viewing, shoreline fishing and historic properties interpretation. The area includes the Kampsville Lock and Dam abutment site. The site will be evaluated for its historical significance and possible inclusion on the *National Register of Historic Places*. No public access is developed at this time. The area is closed to hunting for public safety.

Proposed Development: Developments including a crushed stone access road, self guided historic and archeological interpretive trail, waterborne comfort station, potable water, boat access, security lighting, picnic tables and grills are proposed and could be developed in partnership with the City of Kampville.

Future Development: No future development is planned.

Craters Landing Access Area and Recreational Cottages
Low Density Recreation (26-MR-L-15)
Corps of Engineers
Calhoun County, IL
Illinois River Mile 28.9 - 29.2 R
Acres: 3.36
Plate 26-7

General Description: The **Crater Landing Access Area** is located adjacent to the Illinois River left bank. The area is managed for public and private access purposes and offers recreational opportunities for wildlife viewing and shoreline fishing. This area includes the Craters Landing Recreational Cottages Subdivision, platted with fourteen lots, and adjacent shorelines. Two lots, totaling 0.45 acres, are excluded from public access under private recreation leases to cottage owners. Twelve lots, totaling 2.91 acres, are undeveloped and provide excellent public access to the Illinois River shoreline. No public access facilities are developed at this time. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

POOL 25Compartment 8

Illinois Management Area

UNIT 1 Lower Pool 25

Batchtown Wildlife Management Area
Wildlife Management (25-MR-W-1)
Illinois Department of Natural Resources
Calhoun County, IL
Mississippi River Mile 242.0 - 246.0 L
Acres: 2,540
Plate 25-1

General Description: The IDNR's **Batchtown Wildlife Management Area** lies immediately above Lock and Dam 25 and is bordered on the north by the USFWS Batchtown Refuge. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement and is heavily used for waterfowl hunting (eighty blind sites). It is a popular fishing area when water levels approach full pool.

When impounded in 1940, the area was a large open water bay. Years of sediment deposition have filled over 30 percent of the open water converting it to terrestrial habitat. Today, the area is represented by a series of scoured side channels on the north, flowing toward the bluff, which meet and flow past Cockrell Hollow Access Area. The accreted ridges are in various stages of succession, from herbaceous in the south to forested in the north. The lower half still retains an open water bay, which is gradually being lost due to sedimentation.

Batchtown has a rich waterfowl history, well known and used by waterfowl hunters from the 1940s through the 1970s. Since then, a steadily declining pattern in harvest, hunter use and habitats has occurred. There are multiple reasons for this decline. Pool 25 is one of the three pools on this end of the system that are managed by a hinge point water control method. When flows begin to increase, the down stream gates are adjusted to maintain a given water level at the hinge point that is located mid-pool. What this means to Batchtown is that the normal high/low wetland hydrology is reversed at the site. In addition, increased runoff in the upstream watershed, fluctuating pool levels, numerous flood events and extended durations of high flows have been detrimental to the Batchtown WMA

An EMP-HREP is being developed for the Batchtown WMA In addition, Pool 25 is one of three pools where a multi-agency planning team is studying an ecosystem approach to management of the pool. In conjunction with this effort, the St. Louis District Corps is evaluating our environmental pool management program. The program centers on providing a minimum 24-inch drawdown at the dam, for a period of at least 30 days, during the early summer. This manipulation of levels exposes the substrate, allowing the germination of natural food producing plants valued as waterfowl feed. Pool 25 is also the subject of an 1135 Study, investigating the potential for changing pool management from hinge point to a choice of hinge point or dam point for environmental enhancement purposes.

When river flows increase in the fall/winter, the pool can go on tilt, effectively de-watering the Batchtown WMA Because of this, there are times when the WMA is inaccessible and hunters are stranded in the harbor at Cockrell Hollow. There is no state managed boat access area for the Batchtown WMA

Proposed Development: The Batchtown EMP - HREP project began construction in 1999 with completion anticipated in 2002. Project features include the construction of a perimeter dike, various stop-log and gated water control structures, pump station and dredging for water control and fish overwintering habitat. The overall objective is to reduce the amount of silt entering the area and to provide water level management capabilities independent of the river pool.

Turner Island is scheduled to receive pumping capabilities for improved management. The USFWS will transfer management of the Lower Pool and Turner Island of the Batchtown Refuge to IDNR.

Future Development: Future development for this area is not considered in this plan.

The **Titus Hollow Access Area** previously provided access to the Batchtown WMA and public hunting area. It included a boat harbor, boat ramp and boat access channel to the WMA Hillside erosion from the Turner Branch has filled the boat harbor and access channel to the Batchtown WMA Today the area functions only as an access for hunters seeking deer, turkey and squirrel. Existing facilities include an access road and unimproved 10 car parking lot which will be maintained for forest game hunting and wildlife observation access.

Proposed Development: The Titus Hollow Access Area has been historically managed by IDNR under a long-term park and recreation lease, but will be removed from the lease and the area and facilities will be included within the Batchtown Wildlife Management Area.

Future Development: No future development is planned.

Cockrell Hollow Access Area and Recreational Cottages
Low Density Recreation (25-MR-L-1)
Corps of Engineers
Calhoun County, IL
River Mile 242 L
Acres: 11.14
Plate 25-1

General Description: The **Cockrell Hollow Access Area** is located on the left bank and is managed for public and private access purposes and offers recreational opportunities for wildlife viewing, hunting and shoreline fishing. This area includes the 2.64 acre Cockrell Hollow Recreational Cottages Subdivision, platted with six lots and adjacent shoreline. Three lots, totaling .64 acres, are excluded from public access under private recreation lease to cottage owners. Three lots, totaling 2.0 acres, are undeveloped and provide public access to the Mississippi River shorelines. No public access facilities are developed at this time. Eight and one-half acres are leased to the Village of Batchtown under a long-term park and recreation lease primarily for hunting and commercial fishing to the river and the Batchtown WMA. The chute leading to the river is silting in and access is not usable during tilt/low pool. Facilities include a 10 car and trailer crushed stone parking lot, boat tie-downs during waterfowl season only, one crushed stone single-lane boat ramp, one security light and seasonal portable toilets. A trilateration station for monitoring Lock and Dam 25 structural movement is located along the shoreline. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: Lease area rehabilitation includes construction of three new gravel parking areas and a gravel roadway, seal coat surfacing of the access road, construction of a new concrete boat ramp, improvement to security lighting, removal of silt from the harbor through

dredging, construction of silt deflection berms, construction of shoreline protection, the installation of native trees and construction of uniform boat tie-downs.

The Village of Batchtown, through a boat access grant from IDNR, will be performing rehabilitation to the lease area.

The tri-lateration station will be rehabilitated by the Corps.

Future Development: Additional minimum facility developments for public health and safety, and project operations will be evaluated.

UNIT 2 Middle Pool 25

Batchtown Refuge
Wildlife Management (25-MR-W-2)
U.S. Fish and Wildlife Service
Mark Twain Refuge Complex Batchtown Division
Calhoun County, IL
River Mile 246.0 - 252.0 L
Acres: 2,403 (before proposed changes)
Plate 25-1

General Description: The **Batchtown Refuge** is composed of timbered islands, narrow sloughs and backwaters, managed moist soil units and small agriculture areas. The area is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. Most of the unit is subject to annual flooding due to ground surface elevations from 430 to 437 NGVD. The area provides a strategically located waterfowl sanctuary amidst other Pool 25 units that are heavily used for waterfowl hunting. The Refuge is open to fishing, wildlife observation, photography, and conservation education purposes each year from December 16 through October 14. The area is closed to all public uses from October 15 through December 15 to preserve the sanctuary benefits to migratory birds during fall migration and hunting season. The **Gilead Access**, **Prairie Pond Access**, and **Mississippi River Access** are included within this area. The area is currently separated into four management units: Upper Pool, Middle Pool, Lower Pool, and Turner Island.

Prior to navigation system impoundment of the Middle Pool, existing floodplain depressions were known as Prairie Pond, Black Lake, Watson Lake and Metz Lake. Since the impoundment, this agriculturally developed area was subject to water level fluctuations resulting from Pool 25 water level management and would either flood or be too low depending on pool levels. In 1963, the USFWS constructed a low levee around the unit that was usually overtopped annually, but held water above the river during periods of low pool levels. At the time of construction, the unit's maximum water surface area was about 547 acres. Most of this area was 2 inches or less in depth except for the above mentioned ponds that created deeper water and year-round fisheries habitat. A reversible pumping station was installed that permits inflow or outflow at the rate of 20,000 GPM, enabling water management that cannot be accomplished with gravity flow. Sedimentation has been the largest management problem associated with the unit and has resulted in the loss of water depths and encroachment of woody vegetation.

At the end of Turner Road, the USFWS has maintained a public river access boat ramp for decades on the left bank known as the Mississippi River Access. The area includes a ten foot wide concrete boat ramp, a 5,600 square foot gravel parking lot, and a 7,400' long gravel entrance road (10 wide). The ramp is open to the public year round, except during floods. Additional use restrictions apply to the access road during the peak fall migration (Oct 15 - Dec 15). Previously, the road and ramp were closed each year from October 15 to December 15. Due to the loss of other boat ramps in the area from sedimentation and periodic pool level fluctuations, river access was quite limited. During the fall seasons of 1997 and 1998, the refuge permitted the access road and boat ramp to remain open the entire year. The effect on the sanctuary and habitat utilization within the Lower and Middle Pools was deemed negligible by the refuge staff. The area is to be transferred to the IDNR for operation and maintenance and to serve as a year 'round access area to the Batchtown Wildlife Management Area. The Prairie Pond Access Area and other

accesses into the Lower, Middle and Upper Pool units remain closed during the fall season.

The Upper Pool unit is a series of small islands and associated backwaters north of the Middle Pool and south of the Gilead area. Since this unit is open to the river, water levels in the Upper Pool are controlled by navigation pool regulation. At pool level 434, 417 acres are inundated; at elevation 432, approximately 266 acres are covered with water. The loss of structural diversity is a habitat problem associated with this unit, as well as many other backwater areas within the navigation pools. Erosion has reduced the size of some islands, while sedimentation has reduced the depth of some sloughs, resulting in less variation of habitat structure within the unit.

The Lower Pool area is located between the Middle Pool unit and the IDNR-managed Batchtown WMA The area is partially protected on the north by the Turner Road levee but is open to the river on the south end along with the state-managed unit. During high water events the river flows into the Middle Pool over spillways located along the levee and passes into the Lower Pool unit through a spillway in the Turner Road levee. This scouring action has maintained several deeper holes in the sloughs within the Lower Pool. The majority of the unit contains bottomland forest habitat. The unit also contains two agriculture areas, which are not protected from flooding by levees, but are high enough to have remained viable over the years for either high-risk farming or native vegetation restoration. Turner Creek passes through the farm units at the east end of the Lower Pool unit. The sedimentation rates associated with this tributary are very high. This problem has been identified along with a sediment trap prescription in the Batchtown EMP-HREP project, which may require the use of the adjacent agricultural lands in the unit.

The Turner Island unit was identified on the General Plan maps as a USFWS area. However, the USFWS has never conducted management activities on the unit. The area has been designated for the IDNR managed hunting blind allocation since the program started. Habitat improvements have been made by the IDNR over the years, and more are planned through the construction of the Batchtown EMP-HREP. Turner Island will be managed by the IDNR.

Proposed Development: It is proposed to transfer Lower Pool, Turner Island, and north portion of Reds Landing Unit, currently designated USFWS, and the Mississippi River Access to the IDNR. This transfer is proposed subject to the following provisions: the Lower Pool area remains a state managed waterfowl sanctuary; the boundary line between the state and federally managed areas be the center line of the Turner Road; and primary maintenance responsibility for the road from the government boundary to its terminus be with the IDNR, with assistance from the USFWS and/or Corps if flood events or other circumstances require a shared response.

It is also proposed to transfer the former Gilead Hunt Club lease area to the USFWS. The Gilead Hunt Club lease was located on the left bank at RM 250.5.

Due to the proposed boundary adjustments contained in this plan and Environmental Management Program project features, the unit, which has previously been referred to as the Middle Pool, will hereafter be called the Prairie Pond Impoundment. The Refuge unit north of the Prairie Pond Impoundment has been referred to as the Upper Pool, but will now be called the Maple Island unit.

Development of the unit will be consistent with the provisions of the EMP project, such as dredging for fisheries benefits, improved water control

capability, and upland treatments for sedimentation. Small crop fields that lack land-based access except across private property, will be converted to forested wetlands.

The Gilead Access Area as described below will be managed as part of the Batchtown Refuge.

Future Development: No future development is planned.

The **Gilead Access Area**, the former Raphael Behren commercial concession, is located adjacent to the Village of Gilead, Illinois and is within the Batchtown Refuge Maple Island Unit having been interim managed and maintained by the Corps of Engineers. The area is managed for public access purposes for fishing, hunting and wildlife observation. The access area is closed from 15 October through 15 December annually for purpose of providing wildlife sanctuary during waterfowl hunting season.

Proposed Development: A public road easement for this access will be requested through the Real Estate Division.

Future Development: No future development is planned.

The **Prairie Pond Access Area** is within the Batchtown Refuge - Prairie Pond Impoundment. A 10-foot wide gravel boat ramp and 5,000 square foot gravel parking lot provide access to Prairie Pond and the Middle Pool areas of the Batchtown Division. The area is managed for public access purposes for fishing, hunting and wildlife observation. The access area is closed from 15 October through 15 December annually for the purpose of providing wildlife sanctuary during waterfowl hunting season.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

UNIT 3 Upper Pool 25

Reds Landing Wildlife Management Area
Wildlife Management (25-MR-W-3)
Illinois Department of Natural Resources
Calhoun County, IL
River Mile 253- 256.5 L
Acres: 1,460
Plate 25-2

General Description: The **Reds Landing Wildlife Management Area** is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement and offers recreational opportunities including boating, fishing, hunting and wildlife observation. The site consists of small backwater lakes and sloughs, agricultural fields and bottomland forest. The bottomland forest at this site is more diverse and indicative of the forest composition prior to impoundment. There is still a good mix of mast producing hardwoods such as pin oak, swamp white oak, hickory and pecan. The overall productivity of this site is evident from the presence of a large Heron rookery and active Bald Eagle nest. A partnering effort with the Corps, Ducks Unlimited, Migratory Waterfowl Hunters Inc., USFWS-North American Wetlands Conservation Fund, IDNR-Heavy Equipment Crew and Partners for Wetlands, funded the construction of facilities to develop a flooded green tree area. The area provides water control for the north end of the site, which had been lost as viable wetland habitat due to siltation. The area is designated for walk-in waterfowl hunting. Historically, much of the north portion of the Reds Landing Wildlife Management Area was part of the Mark Twain Refuge Complex. The USFWS has now zoned this area as a huntable refuge, which allows public hunting managed by the IDNR.

Existing facilities include water control structures (both stop log and screw gate type), earthen dikes, two 22,000 GPM pumps (one for flooding and one for discharge), a portable fuel tank and power plant for pump support.

Proposed Development: Proposed actions include the excavation of some shallow ditches to connect some of the smaller sloughs in the flooded timber area. These ditches will improve water control and encourage the development of moist soil plants. In addition, the de-watering capability will allow the substrate to become firm, facilitating succession control against woody encroachment.

Reds Landing Access will be removed from the park and recreation lease and included within the Reds Landing WMA

Future Development: No future development is planned.

The **Reds Landing Access Area** offers boat access to both the Mississippi River and interior sloughs. The area is popular for fishing, hunting and wildlife observation as well. This also serves as the parking area for the walk-in waterfowl hunting area. Existing facilities include an access road and parking area for 40 cars, another gravel parking area for 30 cars, a two-lane concrete boat ramp for access to the river, a single-lane, concrete boat ramp for access to Sand Slough, a concrete block vault toilet and water control structures.

Proposed Development: The Reds Landing Access Area has been historically managed by IDNR under a long-term park and recreation lease. This area will be removed from the lease and the area and facilities will be included within the Reds Landing WMA

Future Development: No future development is planned.

Rip Rap Landing/Dog Island Wildlife Management Area
Wildlife Management (25-MR-W-4)
Illinois Department of Natural Resources
Calhoun County, IL
River Mile 260.8L-262.5L
Acres: 283
Plate 25-3

General Description: **Dog Island** is located at RM 262, at the mouth of the old Sny Creek and its 283 acres are owned by the Corps. It is managed by the IDNR under a General Plan and Cooperative Agreement for fish and wildlife enhancement purposes as part of their **Rip Rap Landing** area. The island is not actively managed at this time; however, it is available for public hunting. The island is entirely forested; the forest consists primarily of silver maple, cottonwood and willow.

Rip Rap Landing is a 1,232-acre IDNR management unit consisting of 203 acres of water; 80 acres of agricultural fields; 90 acres of open land (retired agricultural fields) and 859 acres of bottomland forest. The water acreage includes the 125-acre Waverly Lake, four smaller ponds of various sizes and old side channels with forested banks. The site offers boat access to both the upper reaches of Pool 25 and to Waverly Lake and is also a popular boat access to the Mississippi River for hunting, fishing and recreational boating.

The bottomland forest is more representative of the diverse bottomland hardwood forests, which were present prior to impoundment by the navigation dams. Due to the quality of this forest community, the northwest portion of the site is designated a State of Illinois Natural Area.

Management activities include planting of row crops and small grain crops through a lease/tenant program. The natural hydrologic cycle reduces the various water bodies throughout the summer, allowing moist soil vegetation to establish. In the fall, a permanently installed pump station at the river is utilized to refill the interior lakes and ponds, creating ideal wetland habitats.

Existing facilities at Rip-Rap Landing WMA include two concrete and one gravel boat ramp, two gravel parking lots, a one-way 10,000 GPM pump station with portable power unit and fuel tank, several gated tube water control structures and two stop-log over flow structures, gravel access roads, and three 600 GPM wells with electric pumps and water transfer ditches.

Proposed Development: The 1993 flood deposited large quantities of sand on privately owned land between IDNR Lands and the Corps-owned Dog Island area. The IDNR is negotiating with the landowner to acquire this parcel and thus connect the Rip-Rap WMA lands with the Dog Island WMA lands as one continuous unit.

Future Development: Pending successful land acquisition negotiations, the IDNR will develop a management plan that addresses management of the entire area.

POOL 25 Compartment 9

Pool 25 Missouri Management Area

UNIT 1 Lower Pool 25

Lock and Dam 25 Area
Operations (25-O-1)
Corps of Engineers
Lincoln County, MO/Calhoun County, IL
River Mile 241.4
Acres: 159
Plate 25-1, S-9

General Description: The **Lock and Dam 25 Area** includes the lock and dam structure, storage and maintenance areas, project office, overflow spillway, visitor overlook and the Winfield Access.

The Lock and Dam 25 Area and Winfield Access provide excellent viewing of the American bald eagle, great blue heron, migrating and overwintering waterfowl, migrating American white pelican and other Watchable Wildlife. This area is adjacent to a Nature Conservancy Eagle Sanctuary. Through partnering with the Nature Conservancy, these Corps' areas are being maintained as eagle sanctuaries and Watchable Wildlife areas. The area is closed to hunting.

The lock and dam has been going through major rehabilitation since 1994 that includes replacement of the Sandy Slough access bridge, the lock gates, and the lock culvert valves; rehabilitation of the lock electrical system and operating equipment, the Illinois abutment, and the auxiliary lock closure area; and installation of a new lock dewatering system. The storage and maintenance buildings are being consolidated into one new storage building for efficiency of operations.

The **Winfield Access Area** is located adjacent to Lock and Dam 25, and includes Bradley Island and Sandy Slough. Public access to the area is from State Highway N and County Road 957. The area is managed for public access purposes and offers recreational opportunities for picnicking, bank fishing, walking, sightseeing and bird watching. An eagle viewing tower, constructed in cooperation with Nature Conservancy, Ameren-UE and the Corps, offers viewing of bald eagles. The overlook adjacent to the lock and dam administration building is used for educational programming and close-up viewing of the locking through of tows and barges.

Winfield Access facilities include a security gate, a pedestrian walkway access along the entrance road bridge to the parking lot, two overlooks for educational and interpretive activities, a nature trail, twelve picnic sites, a waterborne comfort station, a chip and seal and crushed stone parking lot, two benches, a vehicular bridge, an accessible walkway and an information board.

Proposed Development: Maintain the lower picnic area as eagle sanctuary during November through March. Upgrade the nature trail to improve visitor safety and make ADA complaint. Asphalt overlay the chip and seal roadway and parking lot. Replace the comfort station with an ADA compliant comfort station and partner-supported picnic shelter. Develop a Watchable Wildlife plan to include signage of sites and a trail along Sandy Slough.

An interpretive prospectus and a design memorandum will be prepared to obtain approval to rehabilitate the former maintenance building into a Class C Visitor Center.

Future Development: Future developments include a plan to obtain an easement from Lincoln County for operation and maintenance of County Road 957 from Hwy N to the Corps boundary to meet operational needs of the area

Lock 25 Spur Dike Area
Operations (25-O-2)
Corps of Engineers
Lincoln County, MO/Calhoun County, IL
River Mile 241.6 246 R
Acres: 392
Plate 25-1

General Description: The **Lock 25 Spur Dike Area** is located adjacent to Lock and Dam 25, which starts at RM 241.5 and continues five miles upstream from the lock on the Missouri shore. The spur dike maintains the navigation pool and provides flood protection along with the Cap Au Gris secondary levee located behind it. The spur dike consists of compacted earthen fill with riverside revetment protection. The crest of the spur dike embankment is at 444.0 NGVD. Trilateration stations are located around the lock and dam to monitor the movement of the structure. A crushed stone service road on the levee crown provides non-vehicular public access and offers an excellent view of the river. The area is used for walking, running, horseback riding, eagle viewing, bank fishing and biking. On the riverside of the spur dike from RM 245.3 to RM 245.8, there are eight privately owned boat docks. A Shoreline Management Plan, as required by 36 CFR Part 327.30, Shoreline Management on Civil Works Projects has not been developed for those portions of the Mississippi and Illinois Rivers under the jurisdiction of the St. Louis District. An interim district policy allows that all existing facilities will be grandfathered until a Shoreline Management Plan has been developed and approved. These boat docks are allowed through Special Use Permits, which are evaluated every five years for compliance. In the absence of a Shoreline Management Plan for the Rivers Project Public Lands, this private exclusive use is allowed to continue.

Existing facilities include one trilateration station, four access control barriers, five miles of crushed stone service road, eight private boat docks and five miles of revetment on the riverside slope of the spur dike.

Proposed Development: The spur dike service access will be designated as a bike and hiking trail with appropriate signage to allow for safe bicycle and pedestrian access. The private boat docks will be removed as they become vacant, in accordance with the interim Shoreline Management Policy. The wooden trilateration station structure will be replaced with a galvanized metal structure to allow for wildlife viewing.

Wood duck and mallard nesting structures will be placed along the landside of the levee. Coordination is on-going with the Nature Conservancy and the MDC to develop and maintain elevated viewing and a Watchable Wildlife program. The MDC has proposed enhancement for the Sandy Chute area to improve fish habitat to include restoring flow through the chute by constructing a water-control structure through the spur dike at the upstream end at approximately RM 245.0, and dredging the lower reaches of the chute. A tailwater fishery effect would be created in the vicinity of the upstream water structure.

Future Development: Pursue Partnerships with the Nature Conservancy and MDC and other agency and private sector partners to provide a quality Watchable Wildlife area and bike trail.

Foley Access Area and Recreational Cottages
Low Density Recreation (25-MR-L-2)
Corps of Engineers
Lincoln County, MO
River Mile 245.0 R
Acres: 28
Plate 25-1

General Description: The **Foley Access Area** is located on the riverside of the Lock and Dam 25 Spur Dike. The area is managed for public and private access purposes and provides recreational opportunities for fishing, hunting, boating, sightseeing, bird watching and bank fishing. Facilities include a crushed stone parking lot and a single lane boat ramp. This boat ramp is only accessible by small boats (16-foot or less) and is subject to seasonal flooding. This area is closed to hunting due to public safety concerns.

A submerged navigation structure is across the opening of the chute at the downstream end of the access. This structure prevents the siltation in the chute from being deposited in the main channel. The structure is causing reduced flow, and sedimentation problems within the chute that are detrimental to the fisheries and boat access. This chronic siltation problem restricts boat access to the river during low pool elevations.

The **Foley Recreational Cottages Subdivision** is platted with two lots. One lot, 0.13 acres, is excluded from public access under private recreation lease to the cottage owner. One lot, 0.9 acres, is undeveloped and provides walk-in public access. No public access facilities are developed at this area.

Proposed Development: Relocation of this boat ramp and parking lot is proposed to allow for year-round use. This would reduce annual operation maintenance costs associated with silt removal from the boat ramp, channel and parking lot. Due to the increased use of the Lock 25 spur dike for walking, bicycling, horseback riding, hunting and fishing it is proposed to build a 20-car gravel surface parking lot landside of the spur dike adjacent to the entrance road for the area.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

UNIT 2 Middle Pool 25

Stag Islands Group Conservation Area
Wildlife Management (25-MR-W-5)
Missouri Department of Conservation
Lincoln County, MO
River Miles 245.7 - 249.5R
Acres: 295
Plate 25-1

General Description: This conservation area is located in Lincoln County, Missouri in the lower quarter of Pool 25, between RM 249.5 and RM 247.7. The 486-acre project area consists of a complex of six islands and surrounding off-channel aquatic habitats located on the inside bend of the river managed under a General Plan and Cooperative Agreement. The six islands (Ross, Stag, Little Stag, Hausgen, Jim Crow, Keeton) are mainly forested and lie low with respect to the river. Aquatic areas include main channel border, side channel, chute, main channel, and island slough habitats.

Sedimentation has eliminated or significantly degraded productive off-channel backwater habitats in Pool 25, that are valuable spawning, rearing, and overwintering areas for riverine fish. Suitable slackwater habitat for migratory waterfowl, especially diving ducks, is also in short supply. Aquatic habitats within the study area have little structure. Sediment plugs that have formed over time in the opening of two sloughs on Stag Island prevent optimal moist soil plant production in these areas rendering the Pool 25 water level manipulations for habitat improvement (EPM) ineffective in this area.

No public access facilities or infrastructure are developed in this area, but access is available at the Norton Woods and Hurricane accesses.

A UMRS-EMP-HREP project was completed in 1999. The project features a 1,300-foot long emergent stone dike extending from the Missouri shoreline to the upstream tip of Ross and Stag Islands crossing the upper end of the side channel and upper chute. It has a crown elevation of 438 feet NGVD, or four feet above normal pool (434 feet NGVD.) and creates about 127 acres of slackwater habitat from the 99-acre side channel and 28-acre upper chute. The dike is expected to reduce sediment and turbidity, improve water clarity, and allow the accumulation of woody debris as well as establishment of some submergent aquatic vegetation in the protected area. This slackwater area is useful as spawning, rearing, and overwintering habitat for many riverine fishes, and as resting and feeding habitat for migrating diving ducks. The dike is designed to retard the accumulation of sediments in sloughs on Stag Island, and delay the encroachment of woody vegetation in these productive units.

Proposed Development: Deepen two backwater slough areas on Stag Island for fisheries habitat. Create deep water habitat on both sides of Little Stag Island by dredging and filling the existing sandbar developing adjacent to Little Stag. Extend the existing sandbar to the upstream tip of Hausgen Island to create a mosaic of slackwater habitat for fisheries and waterfowl and maintain a diverse wetland complex that would otherwise convert to terrestrial forest cover.

Future Development: A long-term goal for area is to convert this island complex to a waterfowl refuge.

Hurricane Access Area
Low Density Recreation (25-MR-L-3)
Corps of Engineers
Lincoln County, MO
River Miles 251.0/251.5 R
Acres: 3

Plate 25-1

General Description: The **Hurricane Access Area** is located at RM 251.5, riverside of Elsberry Drainage District Levee. The **R&J Landing Access** is located at RM 251.0, riverside of the Elsberry Drainage District Levee and is adjacent to the B. K. Leach Wildlife Management Area. R&J Landing was a commercial concession recreational lease with a campground, boat ramp, parking area, small store and comfort station. The lease was relinquished and the area was turned back to the Corps in November 1997.

Proposed Development: **Hurricane Access** will be relocated to R&J Landing to provide a safer river access. The area will be named Hurricane Access. For public safety, the area is closed to hunting.

The area includes a single lane concrete boat ramp, a crushed stone parking lot and a concrete bridge over the slough. The area is not flood protected and is frequently flooded during all but minor flood events. The area will be closed from 1 October through the end of waterfowl season for refuge purposes in cooperation with the MDC B. K. Leach WMA

It is proposed that the one-lane boat ramp be replaced and the parking area be enlarged to accommodate larger boats. Shoreline revetment will be placed around the boat ramp to protect the integrity of the shoreline. Five primitive campsites will be maintained with a grill, table and designated area.

Future Development: No future development is planned.

Sterling Harbor Area
Vegetative Management (25-MR-V-1)
Corps of Engineers
Lincoln County, MO
River Mile 250.5
Acres: 3
Plate 25-1

General Description: The **Sterling Harbor Area** is located at RM 250.5, riverside of the Elsberry Drainage District Levee and adjacent to the MDC B.K. Leach Wildlife Management Area. This area was a commercial concession recreational lease that was relinquished to the Corps in 1994. The area is not flood protected and is frequently flooded; however, the shoreline is revetted. Management of the area will be consistent with the adjacent MDC's B.K. Leach Wildlife Management Area. The area is open to hunting in cooperation with the MDC. The area is being minimally maintained until a proposed access study is completed.

Proposed Development: The completion of forest inventories is proposed.

Future Development: No future development is planned.

UNIT 3 Upper Pool 25

Norton Woods Conservation Area
(Pool 25 Islands Group – Sterling, Westport, Mosier)
Wildlife Management (25-MR-W-6)
Missouri Department of Conservation
Lincoln County, MO
River Miles 251.0- 261.0 R
Acres: 2,132
Plates 25-2, 25-1

General Description: The Pool 25 Islands Conservation Area is located on the right bank of the Mississippi River. Sterling, Kickapoo, Eagle, Schwanigan, Four-acre, Mosier and Westport Islands are included within this management area complex. The area is managed for fish and wildlife enhancement and contains a diversity of forest, backwater slough, and interior open wetland habitats.

Westport Island is approximately 1,133 acres in size and is located near the right bank at RM 256. This large island contains an extensive system of interior backwaters and diverse lowland habitats with excellent potential for waterfowl management enhancements. **Sterling, Kickapoo, Eagle, Mosier and Schwanigan Islands** are primarily forested with some small open slough areas rapidly succeeding to forest due to sedimentation. No active management or infrastructure currently exists on these islands ..

Access for fishing and hunting is provided by the Norton Woods access area

Proposed Development: Schwanigan, Eagle, and Sterling Islands will be allowed to continue their development through natural succession. The Norton Woods shoreline forested areas will also continue to be allowed to develop through natural succession. The backwater slough areas will be managed for fish spawning and nursery habitat due to its connection to the river and midpoint location on the Navigation Pool.

Under the authority of the UMRS-EMP-HREP it is proposed to put a rock closure structure between the upstream tip of Schwanigan Island across the side channel and connect with the lower third of Westport Island. This will provide a deep backwater habitat for over wintering fish and slackwater habitat for resting, feeding, and roosting wetland migratory birds. In addition, the EMP project would improve the natural diversity of Westport and Kickapoo Island by enhancing wetlands, restoring a more diverse forest community and reconnecting some sloughs to the river. The project would use the natural variations in the river flow to provide wetland benefits within the Westport Island Natural Area. On the 425 acre Mosier Island, an estimated 70-80 acres of chutes, sloughs and wetlands would be rehabilitated island by constructing a low profile levee and flow control structures.

The lower third of Westport Island is a designated Natural Area by the MDC and is zoned as an Environmental Sensitive Area. It is proposed to construct a low-level levee and gated water control structure(s) across the slough complex just upstream from the natural area on Westport Island. Another water control structure and levee will be constructed on the upper end of the Island across the Island slough complex. These structures will be utilized to manage the Islands wetlands for wildlife. The project would restore wetland habitat on some 270 acres of this 625 acre island. The improvement would consist of three low profile levees with drains and stop-log structures. A five acre portion of the chute/slough area would be excavated to a ten foot depth to maintain a fishery

resource throughout the year. Portable (barge mounted) pumping facilities would control interior water levels and would be moved to serve the other islands. Wells will be installed to enhance water control. All existing former Agricultural Leases will be reforested to hard-mast-producing bottomland hardwoods.

On Kickapoo Island, it is proposed to manage the interior open wetlands using gated water control structures and replant former agricultural lease to hard-mast-producing tree species. A well will be installed to enhance water control.

The boat ramp and vault toilets will be rehabilitated.

Future Development: Maintain management of proposed infrastructure and habitat on the Schwanigan Chute through dredging as required to maintain a minimum 8-foot depth in selected locations for enhanced fisheries habitat.

Norton Woods Access Area
Recreation (25-R-1)
Missouri Department of Conservation
Lincoln County, MO
River Mile 252.0 R
Acres: 19
Plate 25-2

General Description: The **Norton Woods Access Area** is used for hunting, fishing, boating, camping and wildlife observation.

Existing facilities include a crushed stone entrance road from M Highway, a crushed stone parking lot, a crushed stone two-lane ramp and two vault comfort stations.

Proposed Development: Proposed development by MDC will include upgrading the existing boat ramp and resurfacing the road with asphalt and parking area with concrete. Ramp improvements will include a turnaround and a restructured two-lane concrete ramp. Car/trailer parking will be angled pull-through stalls. Primitive camping, with 13 gravel pads, will be located near the road and parking area. Support facilities will include replacement of the vault toilets. Camping facilities will be low-cost and maintenance free and will provide multi-use of the access area.

Future Development: Pave road from M Highway to site. Elevate parking lot and access road one foot to improve accessibility.

Hausgen Access Area and Recreational Cottages
Low Density Recreation (25-MR-L-4)
Corps of Engineers
Lincoln County, MO
River Mile 252.5 R
Acres: 10
Plate 25-1

General Description: The **Hausgen Access Area** is located adjacent to the Norton Woods Access. The area is managed for public and private access and includes the **Hausgen Recreational Cottages Subdivision**, platted with six lots, and adjacent shorelines.. Four lots, totaling 1.28 acres, are excluded from public access under private recreation lease to cottage owners. Two lots, totaling 8.72 acres, are undeveloped and provide public access to the river. No public access facilities are

developed at this time. For safety purposes, the area is closed to hunting and trapping.

Proposed Development: No proposed development is planned.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations. A minimum facility landing along the western shoreline would enhance public safety and operations.

L-40 Access Area and Recreational Cottages
Low Density Recreation (25-MR-L-5)
Corps of Engineers
Lincoln County, MO
River Mile 251.5 R
Acres: 10
Plate 25-2

General Description: The **L-40 Access Area** is located adjacent to Norton Woods Access Area. The area is managed for public and private access purposes and includes the **L-40 Recreational Cottages Subdivision**, platted with 13 lots, and adjacent shorelines. No public access facilities are developed at this time. Two lots, totaling 0.68 acre, are excluded from public access under private recreation lease to cottage owners. Eleven lots, totaling 9.32 acres, are undeveloped and provide public access to the river.

Proposed Development: A minimum facility turnaround on the public road is proposed for public safety.

Future Development: Additional minimum facility developments, i.e., shoreline landing will be evaluated for public health and safety, and project operations.

POOL 24 Compartment 10

Pool 24 Illinois Management Area

UNIT 1 (IL) Lower Pool 24

Lower Pool Illinois Lands / Islands
Vegetative Management (24-MR-V-1)
Corps of Engineers
Pike County, IL
River Miles 272.8 – 283.3L
Acres: 893
Plates 24-2, 24-1

General Description: Lands forming a narrow strip on the left bank from the dam to RM 283.3 and Mosier, Cash, Crider and Gosline Islands are managed for protection and development of forest and vegetative cover as well as wetland restoration. The only exception is shoreline land between RM 278 and RM 280.5 that will be managed by USFWS. The Sny Levee and Drainage District manages the federal levee that is constructed on these lands extending parallel to the river which includes about three miles of revetted river shoreline. The Corps will provide basic stewardship services on the remaining lands.

Proposed Development: The islands and shoreline lands described above were historically managed by USFWS. They will be removed from the General Plan and Cooperative Agreement lands and managed by the Corps.

Future Development: No future development is planned.

Lower Pool Illinois Lands/Islands
Wildlife Management (24-MR-W-1)
U.S. Fish and Wildlife Service
Pike County, IL
River Miles 277.8 – 280.5 L
Acres: 98
Plate 24-2, 24-1

General Description: These lands on the left bank between RM 278 and 280.5 are managed for protection and development of forest and vegetative cover and for wetland restoration. These lands provide a public lands buffers for the adjacent Delair Division of the Mark Twain Refuge Complex and are included in the General Plan and Cooperative Agreement. The Sny Levee and Drainage District manages the federal levee that is constructed on these lands extending parallel to the river.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Gosline Access Area and FI-10 Recreational Cottages
Low Density Recreation (24-MR-L-1)
Corps of Engineers
Pike County, IL
River Miles 280.0 – 280.5
Acres:4
Plate 24-2

General Description: The **Gosline Access Area** and FI-10 recreational cottages are located on the riverside of the Sny Federal Levee and adjacent to the USFWS Mark Twain Refuge Complex, Delair Division.

This area is managed for public access and provides recreational opportunities for boating, fishing, camping, sightseeing. The IDNR manages waterfowl hunting blinds in backwaters adjacent to the access. Facilities include a crushed stone parking lot with single lane boat ramp and four primitive camping sites. The siltation from seasonal flooding is causing decreased access to the river.

The **FI-10 Recreational Cottage Lease** is located adjacent to the Delair Division of the Mark Twain Refuge Complex and the Gosline Access Area. The area is managed for public and private access purposes and includes the 2.0-acre **FI-10 Recreation Cottage** lot. No public access is developed at this time. One lot, 2.0 acres, is excluded from public access under private recreation lease to the cottage owner. For public safety, the area is closed to hunting and trapping.

Proposed Development: Gosline developments include widening of the parking lot/boat ramp, installation of designated primitive camping and refuse receptacles to improve public health and safety conditions. At FI-10, a minimum facility turnaround on the access road is proposed for public safety.The boat ramp channel to the river will be dredged.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations at FI-10.

UNIT 2 Upper Pool 24

Two Rivers Recreation Area
Recreation (24-R-2)
Corps of Engineers
Pike County, IL
River Mile 283.3
Acres: 244

Plate 24-2, S-11

General Description: The **Two Rivers Recreation Area** is located on the Illinois shore, directly across the river from Louisiana, Missouri and is managed by the Corps for public access purposes. The area is used for fishing, boating, sightseeing, bird watching, fishing tournaments, swimming, and general day use activities at the marina and restaurant area. The area also provides excellent viewing of the over-wintering bald eagles. Portions of the area are not flood protected and are frequently flooded during all but minor flood events. For public safety, the area is closed to hunting and trapping.

The 1.5 acre Two Rivers South Access facilities include a crushed stone parking lot and entrance road, concrete boat ramp, and courtesy dock. The boat channel to the river is silting-in, reducing the width of the navigable channel from the river to the boat ramp to a narrow single lane. The past use of this area has been for small draft boats while the current average recreational boat ranges from 20 feet to greater than 40 feet in length. The boat ramp and parking area are inadequate for the current demand of recreational boating use.

TDJ, Inc. manages the 233 acre **Two Rivers Marina** under a Corps commercial concession lease. Facilities include wet slips, dry storage area, convenience store/administration building, fuel dock, restroom and shower facility, boat service and repair facility, swimming pool, picnic shelter, service boat ramp, access roadways, parking lots, hiking/walking trail, and full hookup campsites. The marina facilities sit on approximately 10.0 acres and the remainder of the area is forested.

Lighthouse Inn, Incorporated, manages the **Lighthouse Restaurant** located on one acre. The area is managed for commercial concession purposes under a long-term commercial concession lease. Facilities include restaurant, bar, asphalt parking lot, and handicap accessible ramp and outdoor patio.

Proposed Development: Rehabilitate and pave the boat ramp to accommodate larger boats. This will include silt removal, placement of shoreline protection, and repositioning the courtesy dock. Also, pave the upper and lower portions of the parking lot and dredge the boat channel from the boat ramp to the river.

The Two Rivers Marina lessee will continue to perform general operation and maintenance on docks, buildings, walkways and vegetation.

Future Development: Monitor the recreational usage at Two Rivers South Access to evaluate possible expansion of parking lot.

Upper Pool Illinois Lands/Islands Area
Vegetative Management (24-MR-V-2)
Corps of Engineers
Pike County, IL
River Miles 283.5 – 296.8 L
Acres: 1716
Plate 24-2

General Description: These lands include Illinois shoreline lands between RM 283.5 and 296.8 and associated Mississippi River islands: Cottonwood, Willow and Willow Bar. Shoreline lands vary from 200 feet to 2000 feet wide, forming a strip along the Illinois shoreline and consist of bottomland hardwoods and backwater sloughs with small ponds dispersed throughout the area. Due to limited public roadways only a portion of these lands are accessible by vehicle while other lands are accessible from the river or walk-in access. This area is unique due to its diversity of habitats and natural vegetation characteristics that are beneficial to wildlife.

Several public access areas and recreational cottage sites are dispersed throughout this area. Area is open to hunting and trapping in cooperation with the IDNR.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

Two Rivers North Access Area
Low Density Recreation (24-MR-L-2)
Corps of Engineers
Pike County, IL
River Mile 284.0
Acres: 5
Plate 24-2

General Description: The **Two Rivers North Access Area** (formerly known as Pike Station under IDNR management) is managed for public access purposes and is popular for fishing, boating, sightseeing, hiking, hunting and primitive camping. Facilities include a concrete two-lane boat ramp, chip and seal parking lot, chip and seal entrance road, sandy shoreline and native grasses. The boat ramp has deteriorated and is only usable by small fishing boats. The area is not flood protected and is frequently flooded during all but minor flood events. For public safety, the area is closed to hunting and trapping. This relinquished area will be minimally maintained until a project-wide access study is completed

Proposed Development: The shoreline will be maintained to protect the parking lot and for use as a day use area with picnic tables and grills. A challenge cost-share partnership will be pursued with the township to improve access to the area.

Future Development: No future development is planned.

Willow North and South Access Area
Low Density Recreation (24-MR-L-3)
Corps of Engineers
Pike County, IL
Willow South - River Mile 287.8 L
Willow North - River Mile 288.3 L
Acres: 8
Plate 24-2

General Description: The **Willow South Access Area** and **Willow North Access Area**, located just downstream of Willow Island, are managed for public access purposes and provides recreational opportunities for fishing, boating, and sightseeing. The Willow South access area includes a crushed stone entrance road, crushed stone parking lot and concrete boat ramp. The Willow North access area includes a crushed stone entrance road, crushed stone parking lot and crushed stone boat ramp. For public safety, the area is closed to hunting and trapping.

The boat ramps at both locations have deteriorated and are only usable during normal or above normal river conditions. The channel from the river to the Willow North boat ramp is silting in and does not allow boat access to the river.

Proposed Development: Public use patterns in the Turkey Lake Access indicate that there is a demand for improved river access. It is proposed to close the Willow South Access area and relocate the concrete boat ramp and crushed stone parking lot to the Turkey Lake Access area to provide public access to the river. The Willow South Access facilities will be removed and the area will be reforested and reclassified as Vegetative Management. It is proposed to replace the gravel boat ramp at Willow North with a concrete boat ramp and increase the parking lot. Periodic dredging of the channel from the boat ramp to the river will allow for access during all pool elevations.

Future Development: This area will be included in an access study to evaluate future public use developments for primitive camping, biking and hiking opportunities.

Murphy's Bay Access Area and Recreational Cottage
Low Density Recreation (24-MR-L-4)
Corps of Engineers
Pike County, IL
River Mile 290.0
Acres: 0.38
Plate 24-2

General Description: The **Murphy's Bay Access Area** is located adjacent to private land and the Sny Drainage and Levee District. The area is managed for public and private access purposes and includes the 0.38-acre **Murphy's Bay Recreational Cottage Subdivision**, plated with one lot. No public access facilities are developed at this time. The lot is excluded from public access under private recreation lease to cabin owner. For public safety, the area is closed to hunting and trapping.

Proposed Development: A minimum facility turnaround on the public road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Turkey Lake Access Area and Recreational Cottages
Low Density Recreation (24-MR-L-5)
Corps of Engineers
Pike County, IL
River Mile 289.8 L
Acres: 6.81
Plate 24-2

General Description: The **Turkey Lake Access Area** is located adjacent to private land and the Sny Drainage and Levee District. The area is managed for public and private access purposes and includes the 6.81-acre **Turkey Lake Recreational Cottages Subdivision**, plated with twenty-six lots, and adjacent shoreline. Eight lots, totaling 2.24 acres, are excluded from public access under private recreation lease to cottage owners. Eighteen lots, totaling 4.57 acres, are undeveloped and provide public access to the river. No public access facilities are developed at this time. For public safety, the area is closed to hunting and trapping.

Proposed Development: Public use patterns in the Turkey Lake Access indicate that there is a demand for improved river access. It is proposed to close the Willow South Access and relocate the concrete boat ramp and crushed stone parking lot to the Turkey Lake Access (RM 289.8) to provide public access to the river for boats up to 25 feet in length. A minimum facility turnaround on the access road is proposed for public safety.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Cincinnati Landing Access Area and Recreational Cottages
Low Density Recreation (24-MR-L-6)
Corps of Engineers
Pike County, IL
River Mile 295.0 L
Acres: 29.02
Plate 24-3

General Description: The **Cincinnati Landing Access Area** is located adjacent to private land and the Sny Drainage and Levee District. The area is managed for public and private access purposes and includes the 29.02-acre **Cincinnati Landing Recreational Cottage Subdivision**, plated with seventy-one lots and adjacent shoreline. Thirty-nine lots, totaling 19.33 acres, are excluded from public access under private recreation leases to cabin owners. Thirty-two lots, totaling 9.69 acres, are undeveloped and provide public access to the river. Three acres are developed as Cincinnati Landing Access Area. The area is open to the public and popular for fishing, boating, sightseeing, bank fishing and as a barge crew change area. The area includes a crushed stone parking lot with single lane concrete boat ramp and crushed stone entrance road. The area is not flood protected and is frequently flooded during all but minor flood events. At low elevations, the boat ramp is unusable due to the inadequate length of the ramp. The area has a stand of native prairie switch grass dispersed throughout the area.

Proposed Development: The IDNR's proposal to relinquish the lease to the Corps of Engineers will be evaluated in an access study subsequent to approval of this master plan. The boat ramp and parking lot will be minimally maintained. Native switch grasses in this area will be protected.

Future Development: The need for additional minimum facility developments for public health and safety, and project operations will be evaluated in an access study to be completed at a later date.

POOL 24 Compartment 11

Pool 24 Missouri Management Area

UNIT 1 (MO) Lower Pool 24

Lock and Dam 24 Area Operations (24-O-1)
Corps of Engineers
Pike County, MO/Calhoun County, IL
River Mile 273.4
Acres: 125
Plate 24-1, S-10

General Description: The **Lock and Dam 24 Area** includes the lock and dam and administration complex that includes the storage area, maintenance area, administration office, trilateration stations, overflow spillway, visitor restrooms, visitor overlook and Pleasant Hill Access. The Lock and Dam 24 structure at Clarksville, Pike County, Missouri, and Calhoun County, Illinois, is located at RM 273.4. The structure consists of 110-foot by 600-foot lock located adjacent to the right bank (Missouri side) and a 1,340 foot long gated dam, extending across the river to an overflow dike. There are three chutes dividing Maxi Island below the spillway that provide a flushing effect for the overflow dike where debris and silt are taken across the dike and deposited down stream. This island also provides habitat for deer, turkey, eagles, bats, and numerous small game. The area is closed to hunting.

The lock and dam structure will be receiving Major Rehabilitation and Major Maintenance in the future. The work includes auxiliary lock closure structure removal, miter gate replacement, rehabilitation of concrete on lock walls, bendway weir replacement, upper stream guide cell replacement, and repairs to dam gates. Also scheduled is the relocation and rehabilitation of the visitor overlook to include the addition of phones and a viewing platform, a sheltered viewing area and universal access; the enlargement of visitor parking, and rehabilitation of an existing entrance road with asphalt overlay.

Proposed Development: It is proposed to remove the Pleasant Hill Access from the IDNR park and recreation lease and incorporate it into this operations area as described below.

Two wooden trilateration station structures in this area will be replaced with galvanized metal structures that will also serve as elevated Watchable Wildlife viewing platforms.

Future Development: No future development is planned.

Pleasant Hill Access Area, is located upstream of Lock and Dam 24 and the overflow spillway and runs riverside of the Sny Levee system. The area is managed for public access purposes and offers recreational opportunities for fishing, boating, sightseeing, camping, hunting and bank fishing. The access and turnaround are part of the project operations of the Lock and Dam 24 overflow spillway and storage area. The access is maintained for operational service access and as a minimum public facility. A trilateration station is located on top of the Sny Levee just downstream from the entrance road and is used to monitor the movement of the lock and dam on an annual basis. The area includes a crushed stone single lane boat ramp, crushed stone parking lots, crushed stone turnaround located at the control barrier to the overflow spillway, a one mile crushed stone entrance road, a control barrier, three primitive campsites and a trilateration station. The boat ramp is only accessible by small boats (16-foot or less) and due to normal pool

conditions and siltation, the boat ramp is only accessible six months of the year.

Proposed Development: Two wooden trilateration station structures in this area will be replaced with galvanized metal structures that will also serve as elevated Watchable Wildlife viewing platforms. The boat ramp channel will be dredged. This relinquished lease area will be minimally maintained by the Corps until a project-wide access study is completed.

Future Development: Additional minimum facility developments will be evaluated for the Pleasant Hill Access Area for public health and safety, and project operations.

Clarksville Riverfront Area
Recreation (24-R-1)
Corps of Engineers
Pike County, MO
River Mile 273.4 L
Acres: 8.5
Plate 24-1, S-10

General Description: The **Clarksville Riverfront Area** is located at RM 273.4 L adjacent to Lock and Dam 24 and the City of Clarksville. The area is managed for public access purposes. Access to the area is from the public Highway 79 and Front Street. The area is open to public access and is popular for fishing, sightseeing, walking, eagle viewing and picnicking. The area includes a chip and seal walking trail, gazebo, a concrete-and-stone flood monument, a crushed stone walk, a ramp for visitor loading and unloading during special events, bank anchors, shoreline revetment, asphalt parking lots, a concrete emergency boat ramp, an information kiosk and security lighting along the road to the lock and dam. The area is closed to hunting due to public safety concerns

The Burlington Northern Railroad track is located parallel to the access area. The gazebo was constructed by the Clompton High School Industrial Arts class and is popular for weddings and other special events. The City of Clarksville provides a public recreation facility on the city owned land adjacent to the downstream side of the Corps owned land. The Clarksville Boat Club is located on this land and provides a boat ramp, docks and parking. The City lands contain picnic shelters, a comfort station, a parking lot and playgrounds and provide access to water and electricity.

Proposed Development: It is proposed to install underground electricity and water to the gazebo for special events, replace and/or rehabilitate landscaping at the site, overlay asphalt on service road and parking lots, place benches along trail and shoreline for viewing, and install Great Flood of 1993 elevation marker on flood monument.

Future Development: No future development is planned.

Clarksville Refuge Area
Wildlife Management (24-MR-W-2)
Missouri Department of Conservation
Pike County, MO
River Miles 274.6 – 276.2 R
Acres: 346
Plate 24-1

General Description: The **Clarksville Refuge Area** is managed by the MDC for fish and wildlife enhancement purposes. Silo Access is located immediately upstream of this site and the Holnam, Inc. industrial lease land (barge loading facility) is located immediately downstream. The first

wetland rehabilitation project in Missouri under PL 99-88, EMP-HREP authority was constructed here.

A 20-year exceedence flood frequency levee was constructed with two 48-inch diameter drains with screw gates placed at the southern end of the area. A portable 16-inch pump and motor system is used to control interior water levels when the pool is below the desired elevation needed. The levee, gated culverts and pumps have been used to exclude sediment-laden waters and to control water levels independent of river stage. These conditions have encouraged plant production that has drawn increasing numbers of waterfowl to the area. Documentation has shown that the project has contributed to an increase in the overall habitat suitability indices. Project outputs have included increased food production, increased longevity of the wetlands, and an overall major increase in migratory waterfowl use of the area. Based on seven years of operation, the project appears to be very successful.

Proposed Development: Develop an observation tower and blind for nature photography and undisturbed waterfowl viewing by the public. An access trail from the Silo Park Access Area will be developed through partnering.

Dredge out the drainage channel to maintain water control functions. Continue to manage the area as a waterfowl refuge through the year.

Future Development: Develop an electric powered deep well to reduce O&M costs and improve water management control.

Pharrs Island Conservation Area
Wildlife Management (24-MR-W-3)
Missouri Department of Conservation
Pike County, MO
River Miles 275.3 – 277.2R
Acres: 441
Plate 24-1

General Description: The project area includes Pharrs Island, Island No. 461 and lands on the right bank above Pharrs Island and waters that are presently managed for fish and wildlife purposes by MDC. Lock and Dam 24 at Clarksville, Missouri, is located 2.6 miles downstream of the island. Access to the Missouri shore across from Pharrs Island is provided by Highway 79 and the Silo Park Access Area. The Pharrs Island Conservation Area includes an EMP-HREP project constructed in 1992. Existing infrastructure includes a bullnose rock dike 6,750-foot. long, crown elevation (453 NGVD) 4 feet above normal pool that was constructed with Grade A stone.

Six fish attractors were placed inside the Island complex and held in place with 1500 lb. concrete anchors (2-3, 40-60-foot long trees were anchored to the bottom in 8 feet of water). The area also has 15-20 hunting blind sites. MDC will monitor sediment and fish usage if Environmental Pool Management continues to be implemented by the Corps.

Proposed Development: No proposed development is planned.

Future Development: Dredge the interior sloughs to provide more deep water habitat for overwintering fish. Maintain bullnose rock dike and monitor sedimentation rates and fish use of the large rock habitat.

Silo Access Area
Low Density Recreation (24-MR-L-7)
Corps of Engineers
Pike County, IL
River Mile 276.0
Acres: 6
Plate 24-1

General Description: The **Silo Access Area** is located immediately upstream and adjacent to the Clarksville Refuge. Formerly known as Silo Park, a concession service lease, the area is now managed for public access purposes and offers recreational opportunities for fishing, boating, hunting, bird watching, sight-seeing and camping. After the 1993 flood, the leased area was relinquished to the Corps, but the area is still required to access the Clarksville Refuge and Pharrs Island for management purposes. The area includes a double lane concrete boat ramp, a crushed stone service access road, crushed stone parking lot and primitive camping sites. The boat ramp has deteriorated and is unstable during normal and low river conditions due to siltation problems and its limited length. The area is closed to hunting due to public safety concerns.

Proposed Development: Rehabilitate the concrete boat ramp to provide service access, provide shoreline protection and maintain primitive camping sites. Work in partnership with the MDC and the City of Clarksville to develop wildlife viewing blind and hiking trail from Silo parking lot to Clarksville Refuge. This proposed development is contingent on a justification procedure that determines public need for area, while not increasing O&M costs.

Future Development: No future development is planned.

Buffalo Island Area
Vegetative Management (24-MR-V-3)
Corps of Engineers
Pike County, MO
River Mile 281.0
Acres: 49
Plate 24-2

General Description: The **Buffalo Island Area** is located between the Dyno-Nobel Industrial Lease and the SSS Lumber Industrial Lease. The area is undeveloped and is currently managed for wildlife habitat purposes primarily consisting of natural riparian forest communities providing habitat for resident, migratory, and endangered and threatened species. The natural hydrology has been altered in association with the regulated navigation pool. Management of this area includes protection and restoration of the natural riparian forest communities. The area is open to hunting in cooperation with the MDC.

Proposed Developments: No proposed development is planned.

Future Development: Remove the sunken barges on upper portion of island.

Holnam Area
Industrial (24-X-1)
Corps of Engineers
Pike County, MO
River Mile 274.3
Acres: 293
Plate 24-2

General Description: The **Holnam Area** is adjacent to the Clarksville Refuge and is managed under a long-term industrial lease to Holnam, Inc. as an industrial site and inland river port for a clinker generating plant requiring a multi-modal interface of rail, trucking and water transportation. A 123.12 acre tract of land currently leased by Holnam Inc., a cement manufacturing facility has been an Industrial Lease for decades. The public lands are located approximately one and one-half miles north of Clarksville, Missouri between State Highway 79 and the Mississippi River (River Mile 274.5). Amenities of this tract include access to the Mississippi River, Highway 79 and the Burlington Northern Railroad. The area provides no public access to the river. For public safety, the area is closed to hunting and trapping.

Section 578(a) of WRDA 1999, Land Conveyance, Pike County, Missouri, directed the Corps to complete a land exchange within two years with Holnam, Inc. The land acquired by the Corps will replace wildlife habitat that has been gradually lost over the years due to the industrial nature of the lessee's development. While the wildlife habitat being replaced is not the same type lost due to development, it is beneficial to the value of the existing Clarksville Refuge, that is comprised of federal property acquired for the navigation project. The conveyance would also eliminate any unnecessary conflict between private entrepreneurial economic development and public land management, and offset the loss of ecosystem values.

Holnam, Inc. has constructed several permanent industrial improvements located in this lease, including a 150 foot by 800 foot barge slip with several stationary barges used for off loading area and several permanent operational buildings. A railroad spur provides rail access from the main railroad line. As such, it has acquired the appearance of private industrialized lands as opposed to publicly held lands. When making normal management decisions on land use, Holnam Inc., must submit to government review, slowing the process and sometimes resulting in significant changes in their plans. In addition, some management practices necessary to keep Holnam, Inc. viable are in direct conflict with Corps Lands Management Directives.

Contained within the Holnam site is an intermittent creek, which flows through the property and empties into the downstream portion of the Clarksville Refuge. Securing this property will enable the district to concentrate on management techniques that will conserve the wildlife habitat of the area, improve the vegetative complex which will result in improved water quality by reducing sediment and pollution entering the Clarksville Refuge.

Proposed Development: An operational management plan for the newly acquired lands will be completed in accordance with the general natural resource management objectives stated in this master plan.

Future Development: No future development is planned.

Dyno-Nobel Area
Industrial (24-X-2)
Corps of Engineers
Pike County, MO
River Mile 281.0
Acres: 15
Plate 24-2

General Description: The **Dyno-Nobel Area** is located on the south end of Buffalo Island and managed under a long-term industrial lease to Dyno-Nobel, Inc. The area is managed as a barge off-loading site with elevated pipelines going to the plant across state Highway 79. SSS Lumber, Inc. has requested a lease transfer of all the facility. The Corps is evaluating the request. The area is not flood protected and is frequently flooded during major flood events. There is no public access to the area. Existing facilities include two pipelines, elevated platform, a crushed stone roadway and coffer cells. For public safety, the area is closed to hunting and trapping.

Proposed Development: No proposed development is planned.

Future Development: No future development is planned.

SSS Lumber Area
Industrial (24-X-3)
Corps of Engineers
Pike County, MO
River Mile 281.5
Acres: 7
Plate 24-2

General Description: The area is located on the right bank above Buffalo Island. Facilities include silos, truck loading/unloading facility, barge loading/unloading facility, crushed stone service roads and equipment shops. For public safety, the area is closed to hunting and trapping.

Section 348(g), WRDA 2000, Land Conveyance, directs the Corps to complete a land exchange within two years with SSS Lumber, Inc. The land acquired by the Corps will replace wildlife habitat that has been gradually lost over the years due to the industrial nature of the lessee's development. While the wildlife habitat being replaced is not the same type lost due to development, it is beneficial to the value of the existing Clarksville Refuge. The land conveyance would also eliminate any unnecessary conflict between private economic development and public land management, and offset the loss of ecosystem values.

Proposed Development: An operational management plan for the newly acquired lands will be completed in accordance with the general natural resource management objectives stated in this master plan.

Future Development: No future development is planned.

UNIT 2 (MO) Upper Pool 24

MIS-19 Access Area and MIS-19 Recreational Cottage
Low Density Recreation (24-MR-L-8)
Corps of Engineers
Pike County, MO
River Mile 289.0
Acres: 0.9
Plate 24-2

General Description: The **MIS-19 Access Area** is located on North Fritz Island and is only accessible by boat. The area is managed for public and private access purposes and includes the **MIS-19 Recreational Cottage** lot. No public access facilities are developed at this time. One lot, 0.9 acres, is excluded from public access under private recreation lease to cottage owner.

Proposed Development: No proposed development is planned.

Future Development: Additional minimum facility developments will be evaluated for public health and safety, and project operations.

Ted Shanks Conservation Area
Wildlife Management (24-MR-W-4)
Missouri Department of Conservation
Pike County, MO
River Miles 284-294 R
Acres: 2,878
Plates 24-3, 24-2

General Description: The **Ted Shanks Conservation Area** is approximately 6,705 acres in size, of which 3,827 acres is owned by MDC and 2,878 is licensed from the Corps. It is located near Ashburn, Missouri, and lies at the confluence of the Mississippi and Salt Rivers. The area is comprised of 3,080 acres of woodland including 2,990 acres of riverine bottomland hardwoods, 600-800 acres of cropland, 2,150-2,350 acres of marshes and sloughs and 300 acres of old fields with the remainder as roads, levees, etc. The MDC first began purchase of the area in 1970.

Development of Shanks began in 1974 and was completed in 1983. The area was developed as an intensive-management wetland complex. There are two pump stations: Goose Pond has two 20-inch pumps with 50-hp diesel power units capable of pumping 11,000 GPM, and Long Lake has two 36-inch pumps with 175-hp diesel power units delivering 23,000 GPM. There are 45 water control structures, 35 miles of levees, and 19 management units. In addition, there is an 8,090 square foot office/passive visitor center and 7,098 square foot maintenance shop on the area. Other public use developments include a concrete boat ramp on Horseshoe Lake, a concrete boat ramp on the Salt River, 16 miles of graveled roads that are open to the public and numerous parking lots.

The Shanks Area is managed to provide a diversity of wetland habitats throughout the year. To accomplish management objectives on the open land, approximately 300 acres are managed as emergent wetlands, 960 acres are managed as moist-soil (annual, herbaceous plants) wetlands, and 600 acres are row-cropped by permit to farmers. Row crops are used to provide high energy food, primarily for migrating waterfowl, and also to set back plant succession on units managed as moist soil wetlands. To improve habitat during migration periods, water will be pumped onto 1,500-1,700 acres of herbaceous wetlands, 600-800 acres of cropland, 2000 acres of woodlands and 575 acres of sloughs and oxbows.

More intensive woodland management is proposed to encourage the regeneration of desirable trees lost primarily in the 1993 flood.

Proposed Development: A Section 206 habitat restoration project has been proposed that would consist of planting 420 acres of open land to approximately 14,700 trees, in an area of relatively higher ground elevations. The planting would provide a contiguous block of timber that would likely have a high rate of survival due to higher/drier conditions and would restore 420 acres of forested wetland ecosystem structure and functions lost as a result of impacts from the 1993 and 1995 floods.

A second Section 206 project would convert approximately 330 acres of formerly wooded wetlands into herbaceous wetlands – primarily to allow for the control of tremendous reed canary grass invasion. The addition of levees will allow improved wetland management on very large units. Reed canary grass invasion will be controlled by spraying or mechanical disturbance.

A proposed EMP project for Corps lands includes partially clearing 190 acres that includes some live overstory pin oak and pecan. In addition the project entails spraying for reed canary grass, clearing 680 acres of reed canary grass for a herbaceous wetland, installation of levees, installation of a pump station, dredging of deep holes for improved fisheries habitat, and improvement of a dewatering unit.

Future Development: Loss of trees had been noted in the woodland portions of Shanks even prior to 1993. Since these woodlands are located on some of the lowest elevations, it is planned to re-establish a hardwood forest complex comprised largely of oak and pecan on some 300 acres of the existing open lands with higher elevations. Coupled with existing oak regeneration in adjacent wooded units, over 800 acres of good bottomland hardwood habitat will be available in the future.

The 1993 flood developed conditions for the spread of reed canary grass over much of the area. It is planned to reduce this invasion in the management units, and to replace the reed canary grass on the levees with native plants.

KASKASKIA RIVER NAVIGATION POOL Compartment 12

UNIT 1 Kaskaskia Lock and Dam Lands – These lands are now being managed by the Carlyle Lake project office.

Sections 1-4 in this plan present Kaskaskia River Navigation Project information in detail. Pleas refer to those sections for more information regarding project authorizations, project purposes, project descriptions and history, land use, environmental stewardship and habitat descriptions.

Introduction:

Congress authorized the Kaskaskia River Navigation Project (KRNP) in 1962 under separate legislation (PL 87-874) from the Mississippi River Nine-Foot Channel Navigation Project. The project included construction of a lock and dam and maintenance of a nine-foot navigation channel from its mouth, upstream to Fayetteville, Illinois (36 miles), that shortened the natural river distance from Fayetteville to the river mouth by approximately 14 miles. The Corps purchased 433 acres in fee title, 2,465 acres for operational easements and 3,496 acres in flowage easements. This land was acquired by the IDOT and transferred to the Corps.

The Kaskaskia River Navigation Project was initially constructed for the purpose of transporting coal out of the area and secondarily as a way to move other barge-transported materials into and away from the area. Now, the prime cargo includes grain, steel, and farming chemicals. WRDA of 1996 authorized fish and wildlife conservation and habitat restoration as a full project purpose. Later, WRDA 2000 authorized recreation as a full project purpose.

The Kaskaskia River Navigation Project was operated as a separate lock and dam project until it was included under the management of the Rivers Project in 1988. As of 2000, the project was combined with the Carlyle Lake project office.

The State of Illinois owns approximately 17,000 acres adjacent to the navigation pool and therefore has complete control over the use and development of these lands. Primary responsibility for the management of these lands lies with the IDNR. Known as the Kaskaskia State Fish and Wildlife Management Area, these lands are managed for fish and wildlife management purposes, and economic development. The development of any facilities on these lands requires permits from the State of Illinois, the St. Louis District Corps of Engineers and the Kaskaskia Regional Port District.

The Kaskaskia Regional Port District provides shipping facilities and ports on the project and promotes navigation and economic development on the waterway. The St. Louis District maintains a 9-foot deep, 225-foot wide channel in the Kaskaskia River during the ice-free season. The lock and dam facility maintains the required channel depth on the Lower Kaskaskia by dredging.

The Kaskaskia River Navigation Project land and water offers a variety of recreational resources. The channelized portion of the river is used heavily for motor boating along with other water-oriented pursuits such as water-skiing, fishing and swimming. The oxbow portions of the river provide a good environment for fishing, hunting and nature studies. The smaller tributaries of the Kaskaskia (Nine Mile, Little Plum, Doza, Silver, Camp, Horse and Richland Creeks) have the potential for providing

suitable canoeing waters. Fishing is the most popular activity on the Kaskaskia River with its 36 miles of channelized river plus additional oxbows, creeks, and floodplain lakes.

The existing project features including access sites, a marina, and river industry locations are shown on the plates. Boat launch ramps are provided on the Kaskaskia River at Fayetteville, New Athens, on Highway 154 west of Baldwin, at Evansville and at the Lock and Dam. Proposed navigational fleeting areas are also shown.

Weekends and holidays throughout the summer, the project experiences the most recreational boat use, and congestion and boater safety are a serious concern. The number of recreational vessels gives an indication of the volume of water-related recreational use. From 1995 to 1999, the average number of recreational vessels per year was 6,331. That was almost three times the five-year average number of recreational vessels at any St. Louis District Mississippi River navigation project (2,276) for the same time period. The recreational capacity of the project and how to best manage current use need to be addressed in any future plan.

A reconnaissance level 216 study is currently being prepared to identify problems and opportunities related to the recent authorization of fish and wildlife, habitat restoration and recreation as full project purposes. The conclusion of this study is expected to produce recommendations for project improvements, many of which may require cost-share sponsors to implement. As a result of this study, the State of Illinois and Corps Master Plans for the KRNP will most likely require updating in order to accurately reflect and authorize new developments or activities related to the new multi-purpose project designations.

A recreational public access plan is being developed as well. The access plan study will evaluate the demand and determine priorities for recreational facilities development including the number and locations of accesses to be maintained or developed. It may result in the State and Corps Master Plans being updated. Proposals based on this study may also include day-use recreation facilities such as shelters, potable water, picnic tables and grills, vault toilets, trails and comfort stations where justified. Approval to fund, build and O&M the required facilities will be obtained through the appropriate Master Plan and OMP prior to implementation.

In 2000, the Kaskaskia Watershed including the KRNP was selected as a pilot project in the Federal Lakes Recreation Demonstration Laboratory Project. This program's purpose is to remove barriers placed in the way of efficient operations through removal of encumbrances established by agency policy and regulations except those established by law. It may result in greater participation in recreational development by the Corps and its partners.

Two major problems facing the project include the siltation of the channel between New Athens and Fayetteville and the head cutting or erosion of the bottom and riverbank that has occurred between Fayetteville and 14 miles upriver. Head cutting has occurred due to increased river speed and slope as a result of the shortening of the channel to create the project. It is causing erosion, siltation of the channel between Fayetteville and New Athens, and damage to the bottomland hardwood forest. Reestablishment of the channel between New Athens and Fayetteville is necessary to allow development of a grain terminal at Fayetteville by the Port District and four farm cooperatives.

Structures needed to correct the head cutting problem will be located above Fayetteville in an area outside the original project limits. A Design Deficiency Study was approved by MVD. When complete it will be

forwarded to Headquarters for review and approval. If approved, funds will be requested through the Construction General appropriation.

The cost to reestablish the channel between New Athens and Fayetteville is estimated at five million dollars. Currently, there are no Operation and Maintenance funds for the work. Should dredging occur prior to stopping the head cutting, the current grade control structure at Fayetteville will be monitored to assure another round of head cutting does not start up river at Fayetteville. If any problems are detected, emergency repairs will be made to the present grade control structure.

The St. Louis District will perform environmental stewardship work within the operations easement and navigational servitude authority. A non-federal cost-share partner is required for all habitat restoration work that may be pursued. The opening of remnant side channels (meanders) that were cut off by the project's construction is one of the actions proposed to improve aquatic habitat.

Kaskaskia River Project
Kaskaskia Lock Operations Area (K-O-1)
Corps of Engineers
Randolph County, IL
River Mile 0.8 R
Acres: 101
Plate K-1, S-12

General Description: This area lies both upstream and downstream of the Lock on the right descending bank. Lands within this area lie low in the floodplain and are inundated on a routine basis. The western boundary of the area is formed by a mainline flood protection levee (Prairie DuRocher and Modoc Levee District) while the eastern boundary of this area is approximately at the centerline of the navigation channel.

The area is comprised of developed land with a small (2-3 acre) bottomland forest component at the furthest upstream end. The area contains the Kaskaskia Lock, a Visitor Information Center at the lock, maintenance facilities, entrance road, trilateration stations, and service access areas upstream and downstream of the lock that are required for operations purposes. The operations service access downstream of the lock contains a boat ramp and turnaround offering direct access to the navigation channel, the downstream portion of the lock structure and the confluence with the Mississippi River.

This area is managed to directly provide for and support the navigation mission of the Corps. The lock is operated continuously. This structure and all others support structures are routinely maintained with major maintenance scheduled as indicated by periodic inspection. The entrance road and parking lot are maintained as required and resurfaced, at a minimum, every 10 years.

As the public visits the lock, they are directed to the Visitor Information Center where current brochures and passive displays are available. Lock and dam tours are offered to increase public satisfaction. In addition, the public is invited to use the non-restricted areas for fishing and boating on the main channel, bank fishing, bird watching, sightseeing, and picnicking. The downstream service access is also available for public use; however, it is restricted at certain times in order to conduct maintenance activities associated with the operation of the lock and dam.

Proposed Development: Proposed development will be addressed in the recreational plan. Any facilities needed in the interim will be handled through a supplement to this plan or in the Operational Management Plan.

The frequent flooding has led to the establishment of non-native grasses that require a significant amount of work to maintain in an aesthetically pleasing condition. Parts of these areas will be converted to native flood tolerant grasses and forbs.

***Future Development**:* Challenge Cost-share agreements, or any other type of recognized cost-share agreements will be considered in order to provide amenities for the public. These could consist of expanded parking facilities, picnic shelters, vault-type restroom facilities, nature trails, nesting boxes, etc. All additional facilities of this type would have to be designed to withstand flooding or to be removable.

Kaskaskia River Project
Kaskaskia Dam and Disposal Area (K-O-2)
Corps of Engineers
Randolph County, IL River Mile 0.8
Acres: 161
Plate K-1

General Description: This area lies both upstream and downstream of the Lock on the left descending bank. Lands within this area lie low in the floodplain and are inundated on a routine basis. The west boundary of the area is approximately at the centerline of the navigation channel, the southern boundary at the downstream dredge containment levee, and the northern boundary at the old channel cut off. The eastern boundary follows the federal ownership line, which bisects the dredge disposal containment area.

The area is comprised of developed and non-developed lands and contains the dam and tainter gates, the old river channel cut off, a portion of the old river channel, and the dredge disposal containment area for the lower navigation channel and lower lock locations. Service access to the area is mainly by boat. A primitive dirt trail, which crosses private land, can be used to gain vehicular access to the dredge disposal site during favorable weather conditions.

This area is managed to directly provide for and support the navigation mission of the Corps. The dam, which sustains the appropriate water level for the navigation pool, is operated continuously. The old river channel cut off also serves to maintain the navigation pool by preventing the normal flows from entering the old river channel. In addition, this structure also acts as a spillway during flooding and allows excess flows to enter the old river channel bypassing the dam. Both of these structures are routinely maintained with major maintenance scheduled as indicated by periodic inspection. The navigation channel is maintained through dredging as indicated by hydrologic surveys. The dredge material is placed in the dredge disposal containment area. The dredge disposal containment area is maintained on a routine basis. At a minimum, heavy equipment is brought into the containment area every 4 years in order to remove woody growth, which reduces capacity and otherwise limits the usefulness of the containment area. The levees surrounding the containment area are critical and have had some structural type problems. In order to rectify these problems, the lower end of the levee will be monitored and rebuilt as the situation warrants. The dredge containment area is managed in cooperation with the Kaskaskia River Port District.

Although the access to the area is limited to boating and hiking, the public does visit the area. Popular pursuits include fishing and boating on the main channel, bank fishing, fishing and boating in the old river channel, sight seeing, bird watching, mushroom gathering, and hunting

in accordance with state regulations. Portions of this area may be restricted at times due to maintenance or operational type activities.

Proposed Development: Proposed development will be addressed in the recreational plan. Any facilities needed in the interim will be handled through a supplement to the Master Plan or in the Operational Management Plan.

Future Development: If a real estate easement can be obtained, the existing dirt access trail will be improved to a rock surface and maintained. Challenge cost-share agreements or other suitable cost-share type agreements will be considered to add amenities for the public along this service road. Such amenities may include parking lots, hiking trails, boat launching areas, etc. All additional facilities will be designed to withstand flooding.

Kaskaskia River Project
West Confluence
Vegetation Management Area (K-V-1)
Corps of Engineers
Randolph County, IL
River Mile 0.0 R
Acres: 77
Plate K-1

General Description: This area is located downstream of the lock. It includes the west side of the confluence of the Kaskaskia River and the Mississippi River. The lands within this area lie low within the floodplain and are subject to frequent inundation. Both the Mississippi and the Kaskaskia Rivers play major roles in the hydrologic regime of this area. The land area is heavily forested with the primary species being cottonwood, maple and ash. The area contains approximately 3 acres of abandoned agricultural fields, which are fast returning to forested bottomland through natural succession. The topography is characteristic of a bottomland forest with an extensive well developed ridge and swale component. Some of the depressed areas hold water through mid-June without the necessity of significant rainfall. A service access trail is located along the Kaskaskia River bank and extends to the Mississippi River.

The public does visit the area. Main pursuits include fishing and boating on the Kaskaskia and Mississippi Rivers, bank fishing, bird watching, sight seeing, mushroom gathering, hiking, seasonal permitted primitive camping, and hunting.

Proposed Development: This area is managed to provide a healthy bottomland forest and to supply a diversity of high quality wildlife habitat. Additional management goals are to supply adequate ground cover in order to curtail the erosive effects of both rivers, to improve water quality by limiting sedimentation and to sustain adequate aquatic habitats. The forest will be maintained through planting and selective harvesting as indicated by inventory and routine inspection. The 1993 flood caused extensive mortality of the mature trees, particularly of the mature cottonwoods and the scattered pecan trees along the ridges. Plantings will seek to reinforce the mast producing species while maintaining adequate stocking densities of major bottomland species. The service trail will be maintained and repaired as required and the primitive camping will be consolidated to a designated area. Nesting structures will be placed and monitored under a volunteer agreement.

Future Development: The standing water component of the bottomland habitat will be increased through the use of passive water control

structures and reopening some of the interior drains to reconnect the naturally occurring low areas to the river. Seedlings/saplings of desirable mast producing species will be individually planted in appropriate areas to increase and improve habitat diversity.

As the public use increases, the Corps will entertain Challenge Cost Share Agreements, or other suitable agreements to provide amenities. Such amenities could include a designated group camp area, designated hardened primitive campsites, improved parking areas, hiking trails, etc. All additional facilities will be designed to withstand flooding.

Kaskaskia River Project
Old River Confluence
Vegetation Management Area (K-V-2)
Corps of Engineers
Randolph County, IL
River Mile 0.0 L
Acres: 23
Plate K-1

General Description: This area is located downstream of the dam. It includes the east side of the confluence of the Kaskaskia and Mississippi Rivers and the mouth of the old Kaskaskia River Channel. The lands within this area lie low within the floodplain and are subject to frequent inundation. Both the Mississippi and Kaskaskia Rivers play major roles in the hydrologic regime of this area. The land area is heavily forested with the primary species being cottonwood, maple and ash. The topography is indicative of a bottomland delta type forest with minor ridge and swale development.

The public does visit the area. Main pursuits include fishing and boating on the Mississippi and Kaskaskia Rivers, bank fishing, fishing and boating in the old Kaskaskia River channel, bird watching, sight seeing, and hiking.

Proposed Development: This area is managed to provide a healthy bottomland forest and to supply a diversity of high quality wildlife habitat. Additional management goals are to supply adequate ground cover in order to curtail the erosive effects of both rivers, to improve water quality by limiting sedimentation and to sustain adequate aquatic habitats. The forest will be maintained through natural regeneration, which is supplemented with planting as indicated by forest inventory and routine inspection. In order to maintain adequate aquatic habitat, the silt plug at the mouth of the old river channel will be removed. This will promote free exchange of water with the river and will provide over wintering and nursery habitat for fish.

Future Development: No further development contemplated at this time.

Kaskaskia River Project
Old River North Cut Off
Vegetation Management Area (K-V-3)
Corps of Engineers
River Mile: 1.0 L
Acres: 71
Plate K-1

General Description: This area is located upstream of the dam on the left descending bank. The extreme northern portion of the old channel cutoff is included within this area. The lands within this area lie low within the floodplain and are subject to frequent inundation. The area is heavily

forested with willow, cottonwood, and maple being the primary species. The area does contain approximately 10 acres of abandoned agricultural fields, which are fast returning to forested bottomland through natural succession. The topography is typical of a bottomland forest with ridge and swale characteristics intermingled with a portion of remnant river channel and sloughs. The sloughs have been exaggerated by the raising of the navigation pool and have resulted in increased wet and semi-emergent habitat. Primary access to the area is by boat, however, a dirt trail can be used at certain times of the year to access this area. The trail crosses private land prior to accessing government land.

The public does visit the area. Main pursuits include fishing and boating in the remnant channel and sloughs, bank fishing, hiking and hunting.

Proposed Development: This area is managed to provide a healthy bottomland forest and to supply a diversity of high quality wildlife habitat. Additional management goals are to supply adequate ground cover to limit the erosive effects of the Kaskaskia River at flood stage, to supply adequate stability to the northern end of the old channel cut off to maintain navigation pool, to improve water quality by limiting sedimentation, and to sustain high quality aquatic habitats in the main river channel, the remnant channel area and associated sloughs. The forest will be maintained through natural regeneration, which is supplemented with plantings as indicated by forest inventory. A portion of the area will be maintained in old field habitat. This is accomplished by succession mowing and/or selective timber harvest (patch cuts). In order to maintain the aquatic habitat, a silt plug will be removed at the mouth of the slough complex. This will promote free exchange of water and provide of over wintering and nursery habitat for fish.

Future Development: Before any development of this area could occur, it will be necessary to obtain an access easement for the dirt trail. Challenge cost-share agreements or other suitable cost-share type agreements will be entertained to add amenities for the public along this service road. Such amenities may include parking lots, hiking trails, display boards, etc. All additional facilities will be designed to withstand flooding.

UNIT 2 Operations Easement Lands

Kaskaskia River Project
Operations Easement Area
Vegetative Management (K-E-1)
Corps of Engineers/
Illinois Department of Natural Resources
Randolph, Monroe, and St. Clair Counties, IL
River Miles 1.2 to 55.9
Acres: 2,465
Plates K-1 – K-4

General Description: This area contains the navigation canal, which shortened the distance from Fayetteville to the river mouth by 14.3 miles. As the canal was built, 26 of the river bends were sliced off leaving remnant channel segments. Most of these original channel meanders were closed off on the upstream end in order to minimize sediment introduction. The lower ends were left open, thus creating a significant backwater system. The lower ends of the remnant channels are experiencing significant siltation, causing the backwaters to become isolated from the river system. The lands associated with this area lie low within the floodplain and are inundated on a routine basis.

The public does visit the area. Main pursuits include fishing, boating, hunting, picnicking, and bird watching.

Proposed Development: This area is managed to support the navigation mission, sustain and improve aquatic habitats, to provide a healthy bottomland forest and to supply a diversity of high quality wildlife habitat. Additional management goals are to supply adequate ground cover in order to curtail erosion and to improve water quality by limiting sedimentation. The forest will be maintained through natural regeneration, planting and selective harvesting as indicated by inventory and routine inspection. The 1993 flood caused extensive mortality of the mature trees, particularly of the mature maples and scattered mast producing trees. In order to reconnect the backwater areas, the sedimentation at the mouths of the remnant channels will be addressed. These silt plugs will be removed. Various engineering solutions will be investigated and, if warranted, appropriate river regulation structures will be placed in order to limit future sediment deposition in these critical areas. Baseline inventories, in cooperation with IDNR, will be accomplished and maintained for the aquatic, wildlife and vegetative resources of the area. Management will be based on a Habitat Needs Assessment, which is founded on the inventory data. Designated dredge disposal sites will be subject to periodic site disturbance in order to assure continued availability. This activity will be in accordance with specific management goals developed in cooperation with IDNR.

Future Development: The Lower Kaskaskia River Stakeholders, Inc. will function as the major stimulus for future development of this area. Depending upon their recommendations and the partnerships that would result from implementation, the Corps will actively pursue opportunities under the various CAP authorities (1135, 204, 206, Section 14, etc), Challenge Cost Share agreements, volunteer agreements, and Memoranda of Agreement and Memoranda of Understanding.

Kaskaskia River Project
Kaskaskia River Flowage Easement Area (K-E-2)
Corps of Engineers
Randolph, Monroe, and St. Clair Counties, IL
River Mile
Acres: 3,496
Plates K-1 – K4

General Description: These lands and waters are located immediately adjacent to the navigation channel described in the Operation Easement Area and other backwaters and tributaries of the Kaskaskia River. The lands lay low within the floodplain and are indicative of primary to secondary bottomland sites. The forest areas are typical bottomland with maple, ash, and cottonwood being the primary species with mast producers increasing in numbers in the secondary bottoms. The area also contains open agricultural fields, developed industrial areas operated by the Kaskaskia River Port District (KRPD) and other businesses, and recreational development consisting of boat ramps, boat docks, cottage sites, camp grounds, and day use areas operated primarily by the IDNR.

The area is heavily used by the public. Pursuits include boating, sight-seeing, fishing, hunting, bird watching, camping, and picnicking.

The IDNR manages the area under the precepts of multiple use. Wildlife management techniques include agricultural leasing, food plots and water level manipulations on created wetland areas. In addition, the IDNR manages the fishery through adjusting open seasons and creel limits on selected species and provides campgrounds, picnic areas, boat ramps and parking lots for the visiting public.

Proposed Development: Currently the only authority the Corps has in this area is to occasionally flood the area during times of high water. There is a possibility, through the various CAPS programs, for joint projects with IDNR to assist in the environmental restoration of selected backwater areas.

Future Development: No future development is planned.

OPEN MISSISSIPPI RIVER (From St. Louis, MO to Cairo IL.) Compartment 13

General Description: The Open Mississippi River includes the river channel itself and floodplain lands and waters from the St. Louis area to the southern jurisdictional boundary of the St. Louis District Corps of Engineers at the confluence of the Ohio River at Cairo, Illinois. The Corps does not administer any federally owned public lands along this section of the Mississippi River other than the Kaskaskia River Navigation Project and the Cache River Diversion. The Corps' sole authority in this reach is to develop and manage the Nine-Foot Navigation Channel through construction, operation and maintenance of regulating works and through dredging. However, in accomplishing this mission, opportunities are often identified to achieve environmental stewardship benefits and, in some cases, recreational benefits on the river incidental to or as a product of work conducted to operate and maintain sound commercial navigation conditions on the river. Section IV of this plan describes some of the environmental and recreation improvements that can be realized through the construction, operation and maintenance of regulating works and through dredging.

A fairly new and innovative approach currently underway for maintenance of the navigation project is the Thompson Bend Riparian Corridor Project. The purpose of this project, located between RM 9 and RM 28 on the right descending bank, is to provide for bank stabilization, control overbank scour and reduce overbank flows that could cause side draft currents or result in a bendway cut-off. The centerpiece of this project is the establishment and maintenance of a tree screen along the top bank of the river. When complete, the tree screen will be 300 feet wide and approximately 11 miles long. In addition, some areas which were previously planted are included in this project. This results in a total project size of approximately 530 acres, to be reforested and maintained by the St. Louis District. This land is in the process of being acquired by the St. Louis District through purchasing restrictive easement from the individual landowners. The primary purpose of this planting is to control flows and abate erosive effects. As such , the characteristics of the majority of the tree species selected concentrate on water tolerance and fast growth. Secondary benefits are to increase the number of acres of bottomland forest, to increase the diversity of the ecosystem and to secure the maximum wildlife habitat value consistent with the primary purpose of the project. In order to promote the secondary benefits, were appropriate, tree species are selected which supply greater wildlife benefit, are water tolerant and are species historically associated with the Mississippi River bottomland forests. The Rivers Project Office will be responsible for establishment and maintenance of the acres.

This project is a cooperative effort between the Corps, Levee District #3 and the local landowners.

Proposed Development: Continue to implement an innovative river engineering program that is well-coordinated and supported by agency partners and to operate and maintain the navigation channel in full compliance with all applicable federal environmental laws.

Future Developments: Request approval and funding to develop environmental restoration projects through partnering and utilizing appropriate Continuing Authority programs, the Environmental Management Program or other authorized programs. Further discussion in contained in subsection 9.21, Open River Issues.

CACHE RIVER DIVERSION CHANNEL
Compartment 14

Cache River Diversion Channel Project
Operations (C-O-1)
Corps of Engineers
Pulaski and Alexander Counties, IL
River Mile 13.0
Acres: 93
Plate O-2

General Description: The Cache River Diversion Channel is an 89.14 diversion channel with 3.63 acre easement area located at RM 13.0. The project was authorized by the Flood Control Act of 28 June 1938. The project provided for construction of a diversion channel from the point where former channel of Cache River intersected the Mounds and Mound City Levee to the new outlet into the Mississippi River. Construction of the project was initiated in June 1940, and the project was ready for beneficial use in December 1950. Two railroad and one highway bridge was constructed. The Cypress Creek National Wildlife Refuge managed by the USFWS and the Cache River State Natural Area managed by the IDNR borders the upper portion of the diversion channel. The Cache River Diversion Channel is 5,260 feet in length and 400 feet in width. The diversion channel slopes are covered with concrete and the mouth of the channel has rip rap protection. Operational maintenance of the area has not been accomplished during the past ten years.

Proposed Development: Proposed development includes reestablishment of boundary line, removal of siltation and vegetation along the channel. Minor repairs to shoreline protection needed.

Future Development: There are no proposals at this time.

7.5. LAND USE CLASSIFICATION SUMMARY

The acreage in the following tables was based upon lease acreage, real estate tract information and digital mapping. Erosion and accretion along the Mississippi River shoreline has changed the acreage managed and therefore does not correspond to the totals for the acreage that was originally purchased as shown in *Table 2 – 1 on page 2 – 1*.

Recreation Areas include Corps recreation areas, marinas and state recreation areas.

Table 7 – 2
Land Use Classification Summary Pools 24 - 27, and Kaskaskia Navigation Project

Land Use Classification	No. of Areas	Acres
Project Operations Areas	11	3,508
Recreation Areas	11	588
Wildlife Management Areas (GP Lands)	24	32,329
Vegetative Management Areas	25	7,616
Low Density Recreation Areas	29	461
Environmentally Sensitive Areas	5	719
Industrial Lease Areas	8	937
Mitigation Areas	2	1,483
Total Management Areas	**115**	**47,641**

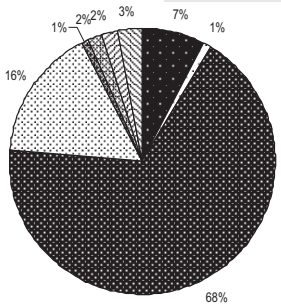


Table 7 – 3
Pool 24 Land Use Classification Summary

Land Use Classification	No. of Areas	Acres
Project Operations Area	1	125
Recreation Areas	2	253
Wildlife Management Areas (GP Lands)	4	3,813
Vegetative Management Areas	3	2,658
Low Density Recreation Areas	8	60
Industrial Lease Areas	3	315
Total Management Areas	**21**	**7,224**

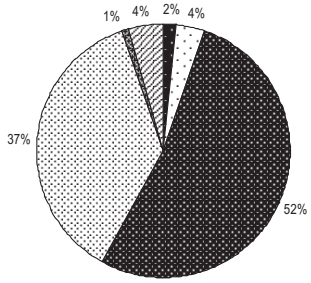
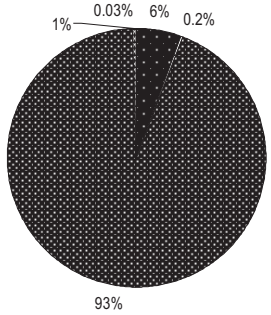


Table 7 – 4
Pool 25 Land Use Classification Summary

Land Use Classification	No. of Areas	Acres
Project Operations Areas	2	551
Recreation Areas	1	19
Wildlife Management Areas (GP Lands)	6	9,113
Vegetative Management Areas	1	3
Low Density Recreation Areas	5	62
Total Management Areas	**15**	**9,748**



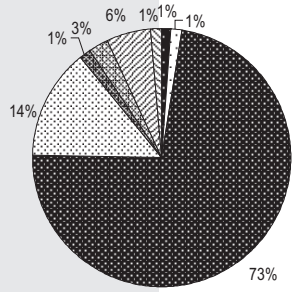


Table 7 – 8
Pool 26 Land Use Classification Summary

Land Use Classification	No. of Areas	Acres
Project Operations Areas	3	313
Recreation Areas	8	316
Wildlife Management Areas (GP Lands)	14	19,403
Vegetative Management Areas	11	3,754
Low Density Recreation Areas	15	337
Environmentally Sensitive Areas	4	679
Mitigation Areas	2	1,483
Industrial Lease Areas	1	354
Total Management Areas	**58**	**26,639**

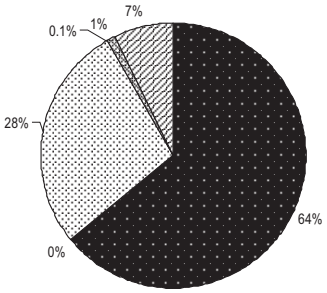


Table 7 – 5
Pool 27 Land Use Classification Summary

Land Use Classification	No. of Areas	Acres
Project Operations Areas	2	2,436
Recreation Areas	0	0
Wildlife Management Areas (GP Lands)	0	0
Vegetative Management Areas	7	1,030
Low Density Recreation Areas	1	2
Environmentally Sensitive Areas	1	40
Industrial Leases	4	*(268*)*
Total Management Areas	**15**	**3,508**

*These acres included in Operations

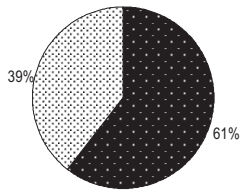


Table 7 – 6
Kaskaskia Navigation Project Land Use Classification Summary

Land Use Classification	No. of Areas	Acres
Project Operations Areas	2	262
Vegetative Management Areas	3	171
Total Management Areas	**5**	**433**

Table 7 – 7
Cache River Diversion Channel

Land Use Classification	No. of Areas	Acres
Project Operations Areas	1	89
Total Management Areas	**1**	**89**

7.6. RIVERS PROJECT FLOWAGE EASEMENTS

Throughout the Rivers Project Area, flowage easements have been acquired for improvement of the river for navigational purposes. These easements provide the right to overflow, permanently or intermittently, to excavate and remove material, and to cut, remove and dispose of all timber and other natural or artificial obstructions which shall at any time and in any manner interfere with the use of said land for navigation purposes. There are no government owned facilities on these easement areas.

All easements are inspected every five years for compliance with easement conditions and any minor operation and maintenance requirements are evaluated and/or implemented at that time.

The following table summarizes the acres of flowage easements within the Rivers Project Service Area

Project Area	Acres
Navigation Pool 24	1,979
Navigation Pool 25	1,526
Navigation Pool 26 (Melvin Price Locks and Dam)	4,496
Chain of Rocks - Locks 27	221
Kaskaskia navigation Project	3,496
Open River	

7.7. FACILITY AND INFRASTRUCTURE DESIGN CRITERIA

General Discussion

This section deals with design criteria applied in the site planning proposals.

The Corps recognizes from experience that site characteristics have to be considered in an area in its ability to support proposed development. Site characteristics are the beginning point for making physical development decisions. Further design phases will require topographic surveys and localized borings to understand fully the site characteristics and provide the information needed for good design and sound construction.

Recreational sites are adjacent to the main channel, backwater sloughs, and lakes within the River flood plain. New recreation sites have not been added to the project. Development is limited to enhancement of existing areas and their facilities. All existing development and proposed improvements are subject to flooding.

Numerous fish and wildlife management areas operated by the USFWS, IDNR or MDC on Corps-administered General Plans lands exist throughout the Rivers Project. Several Vegetative Management areas are also operated and maintained by the Corps for environmental stewardship purposes.

Basic design considerations for the proposed development at the Rivers Projects are discussed in the following paragraphs.

These guidelines are presented in order to avoid confusion, eliminate duplication of design effort, and to provide a general guide to design, construction, and implementation of the facilities proposed. Design guidance is also addressed by EM-1110-1-400, EM 1110-2-410, ER 1165-2-400, ER/EP 1130-2-550 and ER/EP 1130-2-540.

The guidance provided herein addresses the concern for functional use, creative design, environmental harmony, and economical construction and operation. The following design parameters provide for the health, safety, security, and accommodation of visitors in all aspects of development.

Recreation

All proposed and future site facilities at the Rivers Project should be compatible with existing natural and constructed features and a detailed analysis completed prior to design implementation.

Generally, development of areas along the River should be sited in a manner to minimize disturbance of the natural site features. However, certain site features such as soil characteristics and frequent flooding can present serious constraints to optimum facility development. Prior to preparation of detailed facility designs, a preliminary analysis and surveys should be made of site-specific conditions.

Buildings

The architectural character and design of/future project buildings should be in accordance with the following criteria:

- All buildings should be designed and sited to blend with the natural surroundings.
- The design and materials, as well as the architectural details of future structures, should be standardized throughout the recreational areas. Initial construction, structural revisions of existing facilities, and future structures should match existing structures insofar as practical.
- All buildings should be designed to withstand heavy public usage, vandalism, and flooding.
- The design and construction of all buildings and facilities should allow use by people with physical disabilities.

Utilities

Water systems, sewage collection, and electrical distribution should be given special consideration during the planning stage and throughout the design, construction, and operating stages of all buildings, facilities and areas in order to provide a healthy, safe and secure environment for the public and natural resources. All federal and state utility codes will be met and maintained.

Parking

Parking areas are proposed where needed to support public recreation use. Adequate parking spaces provided to satisfy projected demands during peak recreation periods. In developed, heavily used recreation areas, parking area should be paved with asphalt over a crushed gravel base, graded so that direct runoff will occur, and curbed or lined to control vehicle use. Screening may be required to reduce visual impact.

Parking spaces for vehicles with trailers should be pull-through type, 10 feet wide and 42 feet long. Turning radii for car-trailer parking should be a minimum of 15 feet. However, the angle of the parking and ultimate alignment may vary to suite existing conditions.

Parking and access to restrooms should be designed in accordance with Uniform Federal Accessibility Standards (49 FR 31528) to allow equal access to, and utilization of facilities by all visitors. Approximately 5 percent or parking spaces should accommodate people in wheelchair or with other disabilities.

Boat Launching Ramps

The design of boat launching ramps is determined by many factors: the size and characteristics of the boats, trailers and vehicles; the topography and physical conditions such as soil type, River level fluctuations, currents, relation to the navigation channel or structures, and prevailing winds; as well as safety features and provisions for people with physical disabilities.

Concrete ramps will be surfaced with 6 inches reinforced concrete over an aggregate base. Launching lanes will be 12 feet wide and striped for efficient use. Parking will be provided at a rate of 15-20 spaces per lane.

Ramps should serve for launching boats into annual high and low water conditions, if feasible. Many existing launching facilities require upgrading to reflect safety and unrestrictive access guidelines.

Roads

Road design within the project should provide functional auto circulation that is minimally disruptive to other project activities. Project ecology should be preserved as much as possible with only minor earth grading or cut-and-fill operations required.

Developed Recreation Area roads will be designed according to the parameters established in EM 1110-2-410

Developed area roads should be constructed of asphalt paving on an aggregate base with transverse slopes used to drain the surface. Underdrains should be installed where curbs are present or where needed for proper drainage, otherwise collector trenches on the low sides of the roads will be utilized to collect runoff water and transport it to disposal areas.

Specification of roadways should comply with American Association of State Highway Testing Officials (AASHTO) standards.

Many of the rural roads on public lands along the River are gravel surfaced. Road widths to safely accommodate, two lanes of traffic with necessary drainage features or structures will be maintained. Fresh gravel will be applied to roads as needed or roads with heavy use will be chipped and sealed or receive some other hardened (bituminous) surface application.

Picnic Areas

The design of picnic areas should provide for public use while protecting the natural resources at the chosen site. Picnic sites should be located in a manner to provide a diverse user experience while minimizing undesirable elements or conflicting activities. Support facilities such as roads, parking, water, and sanitation should be provided in a manner that will serve the requirements of the public, but not detract from the natural features that make the site inviting. Individual picnic units will consist of one table and one grill. Individual trash receptacles have been replaced in favor of garbage dumpsters located at the edge of parking areas. Group shelters may be provided to protect the visiting public from inclement weather or where tree cover is minimal and to provide an assembly area for visitor group activities such as picnics, meetings, and/or interpretive programs. Group shelters should be made accessible to people with physical disabilities and sized to accommodate 4-12 six-person picnic tables with adequate space between tables. Approximately 10 percent of all picnic tables should be available to accommodate the physically disabled.

Trails

There is demand for three kinds of trails at Rivers Project:

- Walking/Hiking
- Equestrian, and
- Bicycle.

Bicycling

Bicycle trails, while much in demand, are normally fairly expensive usually requiring participation/provision of a non-federal entity. As interest is bicycling is sustained and grows, local interests should be encouraged to provide appropriate facilities through partnering in areas that could be provided through a lease or license or other arrangement. It should be noted, however, that the increased use of all terrain “mountain bikes” provides a less expensive option for construction of bike trails.

Walking/Hiking

These kinds of trails should be constructed of compacted or otherwise stabilized soil to a width of 42 inches. They should generally be primitive in character, although adequate drainage ditches and culverts should be provided to assure a dry surface as frequently as possible. When slopes become excessive, steps of treated wood timbers should be used.

Walks and trails for people with disabilities have considerably more stringent requirements. In most cases, at least bituminous pavement should be provided to a minimum width of four feet or optimally five feet. Running slopes should not exceed five percent and cross slopes should not exceed two percent. A level rest area should be provided every 200 feet. Curbs should be provided at all drop-offs and should be augmented by railings where a drop-off will be more than 30 inches.

Equestrian

All equestrian trails should have under- brush cleared to a width of six feet with an overhead clearance of eight feet. Proper drainage and other measures to prevent erosion and/or to promote harmless collection of silt should be provided

Signs

All signage throughout the project should be consistent and uniform. Where feasible, federal recreation and international symbols should be used. The sizes, configuration and placement of signs should conform to the latest approved version of USACE Sign Standards Manual (EP 310-1-6, a. and b.)

Minimum Facilities

Minimum facilities are those minimum cost facilities or minimal project modifications or developments that serve other purposes and are necessary for public health and safety. Under Section 3(a) (2) of PL 89-72, these minimum facilities are in the national interest and may be provided by the Corps at existing public access locations in the absence of a non-federal sponsor. These facilities may only serve incidental recreation or fish and wildlife benefits where these benefits are not vendible, are not predominantly local, and are strictly inherent to the Rivers Project lands or waters. Examples of minimum facilities are turnarounds at roadends, guardrails, gates, barriers, vault toilets, trash receptacles, service boat access, etc.

Public use patterns may indicate that certain minimum facilities be provided for public health and safety if access by the public cannot be directed to other safe locations or otherwise controlled. These types of minimum facilities exist or will be provided with existing routine authorized operations and maintenance activities and are not required to be included in the management area descriptions of this Master Plan. Significant minimum facility developments such as operational or emergency boat launching facilities are included with the management area descriptions under proposed development.

Environmental Stewardship

Fish and wildlife enhancement and vegetative management activities are a primary focus on the majority of public land and water acres administered by the Rivers Project office.

The USFWS, the IDNR and the MDC are responsible for providing fish and wildlife enhancements on most of the Rivers Project lands though the General Plan and Cooperative Agreements with the Corps. The Rivers Project office provides environmental stewardship activities on public lands and waters in areas classified as vegetative management. In general, many of the best habitat areas on the River have been selected for USFWS and state management. The Corps managed Vegetative Management areas primary include the remaining peripheral and/or small isolated parcels of public lands and waters.

Site selection for fish and wildlife enhancement measures are based on physical characteristics and potential for habitat improvement, primarily through vegetation manipulations, water control and shoreline and floodplain erosion and sedimentation control.

Numerous structural and non-structural management techniques are employed to provide habitat enhancements. Planning to develop and implement habitat management techniques generally requires detailed habitat evaluations and inventories, topographic surveys, water depth soundings and hydraulic analysis.

Many of the fish and wildlife enhancement activities conducted by the natural resource management agencies on Rivers Project administered lands and waters requires the construction and operation and maintenance of facilities and infrastructure designed to manipulate water levels on the back water lakes, sloughs and other floodplain habitats to optimize conditions for migratory birds and other wetland wildlife.

Low-level containment dikes, ditches for conveying water, concrete or CMP gravity drain, culverts or pipes with either sluice, stoplog of sliding gates and permanently installed or portable water pumping systems are the primary facilities and infrastructure used to manage water for habitat enhancement.

The primary function of these wildlife management area facilities and infrastructure is to allow the wildlife manager to have limited water control capability independent of normal river stage fluctuations to drawdown or remove water from a management unit during the growing season to allow natural germination and growth of native food plants valuable to migratory birds, of to artificially plant and grow desirable wildlife food plants. During the early fall, these vegetated areas are then flooded with shallow water to provide accessible and optimum feeding and resting areas for migratory birds during the fall migration. Water control facilities and infrastructure can be or are also used to enhance fish spawning and rearing, for aquatic vegetation enhancement and to promote viable and accessible aquatic invertebrate populations utilized by many fish and wildlife species for food.

Since the early 1990s, many new water control facilities and infrastructures, as well as other types of habitat infrastructures, such as specialized rock dikes and revetments, islands, dredged channels, and fish spawning and rearing structures, have been constructed on Rivers Project administered lands and waters through the Environmental Management Program authority and funding.

Design Criteria and Design Typicals for fish and wildlife management facilities and infrastructure are best described in the Definite Project

Reports (DPR) prepared for each of the Environmental Management Program - Habitat Rehabilitation and Enhancement Projects (EMP-HREP) completed in the St. Louis District to date. Subsection 8.5 of this Master Plan provides a listing of EMP-HREPs completed or under development in the district.

7.8. RECREATIONAL BOATING USE OF THE NAVIGATION CHANNEL AND LOCKS AND DAMS

A number of recreational-boat access points have been built and are maintained at frequent intervals along the rivers. Visitors use the access points and the Mississippi River at their own risk. Navigation aids are placed in the River to assist boaters. The River is frequently patrolled by Federal and state authorities. Civil law enforcement authorities have jurisdiction for rescue and recovery operations.

Several small-boat navigation aids are available to individual boaters and these can be separated into two general categories: rules and regulations, and visual aids.

Rules and Regulations

All recreational boat operators should familiarize themselves with the following:

The rules for passing vessels, fog signals, and lights. This information is available in a publication entitled “Pilot Rules for the Rivers Whose Waters Flow into the Gulf of Mexico.” Copies of this publication may be obtained from the Office of the Commander, Second Coast Guard District.

“Regulations to Govern the Use, Administration, and Navigation of the Ohio River, Mississippi River above Cairo, Illinois, and Their Tributaries.” This document may be secured from Lockmasters and from the District Engineer.

Boating regulations may be secured from the Office of the Commander, Second Coast Guard District, the IDNR or the Missouri State Water Patrol.

“Locking Through” pamphlets provide the details and step-by-step requirements for passing through a lock. These pamphlets are available from Rivers Project offices and Locks and Dams.

Visual Aids

Markers are aids to commercial navigation watercraft and consist of post lights, lighted buoys, buoys, and markers established along the River channels and banks. Recreational boaters should understand and observe these aids as well.

Buoys of different sizes, shapes, and colors are provided as aids. Red nun buoys, conical in shape, are located on the left edge of the navigation channel proceeding downstream. Black can buoys, cylindrical in shape, are located on the right edge of the navigation channel proceeding downstream. Striped buoys indicate junctions or obstructions; the top band is red or black, indicating the preferred channel to the right or left, respectively. All buoys should be given berth of at least 50 feet. Special-purpose buoys can be studied from a publication that will be listed later.

Charts are also published for the convenience and guidance of small-goat operators and can be secured from the District Engineer. Details shown on these charts are:

Channels

The navigation channel of the River is established at a minimum width of 300 feet, with additional width in the bends. In the channel, a minimum depth of nine feet is maintained. Outside the channel, stable depths are not maintained and may be expected to change from time to time. Boat operators are advised to use caution when operating outside the limits of the regularly designated navigation channel.

Hazards

The navigation charts indicate only the known underwater hazards. Boat operators should be continually on the alert for hazards of this type because it is impossible to chart hazards such as water-logged timber and similar objects.

Locks and Dams

The locks and dams shown on the charts are navigational structures. They are not intended, and do not serve any function as flood-control structures.

Small-boat owners are privileged to receive lockage services free of charge. Precedence at locks as established by law is:

- First priority – Government-owned vessels
- Second priority – Commercial craft
- Third priority – Pleasure craft

The Lockmaster has absolute authority over all functions at locks and dams. The public will follow his instructions in all matters while within his jurisdiction.

Safety

A definite hazard to small boats exists immediately upstream and downstream of each dam. On the upstream side of the dam, a strong undertow exist. On the down stream side of the dam, turbulent water exist. Large danger signs are painted on each of the structures to warn boat operators about the anger areas.

Fishing

For fishing purposes, vessels are not permitted mooring to any part of the lock and dam structure. Mooring is permitted only while locking through or while awaiting lockage.

U.S. Coast Guard Jurisdiction

The U.S. Coast Guard has jurisdiction over aids to navigation, safety on the River, and the inspection of craft.

The Coast Guard offers inspection service free of charge to recreational boat owners. Boat owners should acquaint themselves with the Coast Guard rules and regulations on the rivers.

Any menace to navigation or a marine casualty should be reported immediately to the Office of the Commander, U.S. Coast Guard.

7.9. PLAN IMPLEMENTATION – STRATEGIES AND POTENTIAL FUNDING AUTHORITIES

Introduction

The means of accomplishing a development program is equally important as the plan itself. Current national priorities limit development and renovation options more than they were in the past. There is considerably more emphasis, therefore, on the provision of recreation opportunities solely by local interests. A need exists for the proposals contained in this master plan, and-it is expected to become greater in the future. It should also be recognized that changing priorities could drastically affect the manner and schedule for implementing this master plan. Hopefully this master plan will have continuing utility despite any changing priorities that may affect its implementation.

Implementation Alternatives

There are several implementation methods or authorities currently available for development at the Rivers Project. They are:

Operations and Maintenance (O&M) Funds

The use of regular O&M General Funds is restricted to existing Corps managed facilities and areas that require labor and/or materials for routine operation or are in need of maintenance, repair, renovation, reconstruction, replacement or consolidation.

Avoid and Minimize

In the Record of Decision for the Melvin Price Locks and Dam, Second Lock, the Corps established a program designed to avoid or minimize possible environmental impacts of increased navigation traffic due to the second lock. The Corps, U.S. Coast Guard and the towing industry are responsible for implementation in coordination with the USFWS and Illinois and Missouri conservation agencies. Corps O&M funds are programmed to implement identified and approved measures.

Development Solely by State or Local Interests Through Outgrants

As in the past, state and local governmental entities with all or part of a project in their jurisdiction may obtain use, under a lease or license, of an area for approved recreational development. In such cases, all development costs are the sole responsibility of the local sponsor and operation, maintenance, and major replacements costs must be borne by them also.

Development by Concessionaire

Another project development and funding method that can be used involves the implementation of some of the plans proposed in this Master Plan by a concessionaire. Only activities for which there is a viable commercial market are generally eligible. For developments undertaken in this manner, operation, maintenance, and major replacements are also provided by the concessionaire.

Use of Special Recreation User Fee (SRUF) Revenues

Special recreation user fee revenues which are rebated to the District are available annually to accomplish a fairly wide range of actions. Essentially, these funds may be used to decrease project operation and maintenance costs and/or to increase user fee revenues, but only in existing recreation areas. Means of achieving these goals may generally include renovation, consolidation, separation of day-use and overnight

areas, addition of facilities or features thereof, and payment of operation and maintenance costs including those for fee collection and other improvements on a case by case basis. According to October 1984 guidance on the use of SRUF funds, they may also be applied to the provision of barrier-free access for people with physical disabilities. Under this implementation method, operation, maintenance, and major replacement responsibilities would remain with the Corps or, with changed local conditions, could conceivably be assumed by an outgrantee.

Challenge Cost-Share and Contributors

The challenge cost-sharing and contributions program provides opportunities for non-federal public agencies and private organizations and individuals to contribute to and participate in the operation and management of recreation facilities and natural resources at Corps water resource development projects. Facilities constructed can not add to federal operations and maintenance costs.

Volunteer Program

The Corps may accept the services of volunteers and provide for their incidental expenses to carry out any activity of the Corps except policy making or law/regulatory enforcement as authorized under PL 98-63. A volunteer is not an employee of the Corps except for the purposes of Chapter 171 of Title 28 of the USC, relating to tort claims, and Chapter 81 of Title 5 of the USC, relating to compensation for work injuries. Voluntary service is official government business, having some value to the Corps, conducted by volunteers under the direction of a paid Corps staff member.

Volunteers provide diverse and significant contributions to many of the Rivers Project Environmental Stewardship, Recreation and Interpretive Service programs annually worth thousands of dollars.

Recreation Cost Sharing (Construction General [CG] Funds)

The use of CG funds for recreational development is possible as a part of a much larger navigation or flood control project. Funds available are limited to a maximum of 10 percent of total project cost and are contingent upon a cost-sharing agreement with a non-federal public entity (city, county or state) to provide 50 percent of the costs of recreational development and 100 percent of the operational and maintenance cost.

This Master Plan does not contain any cost sharing proposals, but may in the future serve as a basis for initiating such actions. Any program proposals will be based on a letter of intent provided by the non-federal sponsor and shall include estimated cost of the proposed development; cost to be borne by cost sharing sponsor; method of repayment the cost sharing sponsor will use to match federal funds; and understanding of cost sharing sponsor regarding assumption of operation and maintenance.

There are two exceptions to this policy. These exceptions permit the construction, operation and maintenance of new facilities without cost sharing.

One exception is the authority for upgrading sanitary facilities in existing Corps managed recreation areas to meet urgent sanitation needs in accordance with provisions of applicable state and federal laws. The second exception involves the use of Special Recreation User Fee (SRUF) funds. These funds are authorized for expenditure on additional facility improvements, renovation and/or consolidation of recreation areas

as long as it lowers recreation area operation and maintenance (O&M) costs and/or increases user fee revenues.

Environmental Management Program (EMP)

Section 1103 of WRDA 1986authorized this multi-element program to restore and balance the resources of the UMRS. A key component of the long-term program includes development and funding for Habitat Rehabilitation and Enhancement projects.

This program was reauthorized by WRDA 99 Section 509.

St. Louis, Rock Island and St. Paul Districts receive approximately $12-15 million in CG funds annually to design and construct habitat projects on UMRS public lands through sponsorship and cost sharing with the appropriate states and/or the USFWS. The agency partners sponsoring the various habitat enhancement projects are also responsible for O&M once they are completed.

Continuing Authorities Program (CAP)

The Corps undertakes studies of water and related resources problems and opportunities as directed or authorized by Congress. These Congressional authorizations are contained in public laws, and in resolutions of either the House Public Works and Transportation Committee or the Senate Environment and Public Works Committee. Study authorizations can be unique, study-specific authorities, or they can be standing program authorities, usually called continuing authorities, under which specific studies and projects may be done. These studies are done at the discretion of the Secretary of the Army of the Chief of Engineers and focus on whether a federal project responding to the problems and opportunities of concern should be recommended.

Some of the Continuing Authorities relevant to the Rivers Project environmental Stewardship mission and potentially desirable to use include:

- **Section 206 WRDA 1996 - Aquatic Ecosystems Restoration**

This CAP authorizes small aquatic eco-system restoration projects up to $5 million in federal cost per project if it is in the public interest and cost effective. The project must be cost-shared (35 percent) with a non-federal sponsor, who is responsible for 100 percent of O&M as well.

- **Section 205, WRDA 1996, Environmental Dredging**

This CAP authorizes an annual appropriation available for environmental dredging as part of the O&M for federal navigation projects. Corps districts must apply for and be selected to receive the limited dollars available for this program.

- **Section 1135, WRDA 1986 - Project Modifications for Improvement of the Environment**

This CAP is intended for modifying structures and/or operations of existing Corps constructed projects for environmental enhancement purposes, consistent with project purposes. Federal cost per project is limited to $5 million and a non-federal sponsor must cost-share (25 percent) design and construction and take 100 percent responsibility for O&M.

- **Section 204, WRDA 1992 - Ecosystem Restoration Projects in Connection with Dredging**

Work under this CAP provides for protection, restoration and creation of aquatic and wetland habitats in connection with construction and maintenance dredging of an authorized project. The federal study limit is $5,000

and there is no established federal project cost limit. This CAP must be cost -shared (25 percent) with a non-federal sponsor.

Section 22, Planning Assistance to States (PAS)

Section 22 of WRDA 1974 authorizes the Corps to assist states in preparing plans for the development, utilization and conservation of water and related resources of drainage basins within the state.

Requests from states arise from local identification of problems.

Typical studies are general in detail and do not include design for project construction. The program can encompass many types of studies including:

- Ecosystem restoration
- Water supply
- Water quality
- Water conservation
- Hydropower development
- Flood control
- Erosion and navigation

State allotments are limited to $300,000 annually but generally are between $10,000 - $25,000.

Section 216 - Flood Control Act of 1970 – Completed Project Review.

Section 216 authorizes review and report to Congress of the operation of completed project when found advisable due to significantly changed physical or economic conditions.

The recommendations of the report may advise modifying structures or their operation, and improvements for the quality of the environment in the overall public interest.

Section 514, WRDA 1999 – Missouri and Middle Mississippi Rivers Enhancement Project.

Section 514 authorizes development of a plan for the Missouri River and the Mississippi River, from the mouth of the Missouri River to the mouth of the Ohio River, to implement protection and enhancement of fish and wildlife habitat. Implementation requires a non-federal cost share sponsor (35 percent) and 100 percent non-federal operation and maintenance responsibility.

SECTION VIII

SPECIAL PROGRAM AND PLANNING CONSIDERATIONS

8.1. INTRODUCTION

A diverse range of management plans and programs are employed by the Rivers Project to effectively do the job mandated by the federal government. While many programs and planning requirements are not necessarily failing to meet plan or program objectives at this time, they all need further work to improve, accomplish and sustain them.

Successful implementation of these programs and plans will ensure efficient project operation and maintenance, improve the management of the Rivers Project service area for commercial, recreational and stewardship purposes and increase public satisfaction.

8.2. PARTNERING STRATEGIES AND BASIN-WIDE COORDINATION AND PLANNING

The operational lands and waters of the Rivers Project are situated in an inter-jurisdictional corridor and project service area crossing state and local political boundaries involving two states, twenty-seven counties and seven Congressional Districts.

Although large blocks of project lands and waters provide significant opportunity for management and protection, the ownership pattern of project fee title lands is very fragmented. This fragmentation drives the need to craft resource objectives that fit well with a broader, watershed based regional planning framework.

It is important to recognize that the overall natural resource base of the project area has been altered by human activity, but that much of the pre-project natural values persist and are ecologically important to sustaining the overall resource value of the system. Although wetland losses have been dramatic, the riparian corridor still functions as a globally important migration corridor.

From a planning perspective, regional resource management objectives have not been clearly defined, and yet a number of regional resource issues are well documented. Heavy sedimentation loads, riverbank and sheet erosion, and the presence of streambed contaminants warrant consideration of measurable efforts to improve water quality. Losses of native habitats and losses in diversity of plant and animal communities are well known and create the need to look thoughtfully for opportunities to protect existing habitats, enrich degraded habitats, and replace, where feasible, lost habitats. Relative to public use and enjoyment of these public resources minimal safe access has not yet been fully addressed. Development of recreational infrastructure in the floodplain must be approached prudently. A clear emphasis on sustaining an appropriate measure of access to unencumbered public open space is consistent with broadly held views. Adequate ramping facilities to provide dependable boat access, pedestrian access to public shorelines, and public trails and greenway development create operationally feasible recreational outputs that are both desirable and needed.

Addressing these regional resource and recreation issues will require collaboration among governmental agencies and non-governmental

organizations to effect outcomes that are logically pursued given the inter-jurisdictional nature of the project area and the mixture of private and public ownership.

Successful stewardship of project resources can only be effected as part of a larger successful programmed effort to plan for the whole corridor. Insuring that our management activities are “system compatible” and make a “value added” and relevant contribution to the overall resource needs and issues of the basin (region). This necessitates regular and thoughtful collaboration with a diverse array of basin interests and organizations. This collaboration also creates the opportunity to leverage project resources toward mission attainment through partnerships with organizations with similar goals and objectives for the resource. Within authority, this plan and future planning efforts will strive to align itself with well thought out system approaches to management of the watershed.

8.3. COOPERATIVE AGREEMENTS WITH USFWS, IDNR AND MDC

In 1934, Congress directed federal agencies, including the Corps, to allow the Bureau of Fisheries and Bureau of Biological Services opportunity “to make such uses of the impounded waters [that result from federal activity] for fish–culture stations and migratory-bird resting and nesting areas as are not inconsistent with the primary use of the waters and/or the constitutional rights of the States.”

In 1938 congress included in the general grant of authorization for Corps navigation improvement activities the requirement that the Corps give “due regard to wildlife conservation” in pursuit of its activities.

The executive orders reserving Corps lands for use as a National Wildlife Refuge described in broad strokes the relative rights over the lands by the Corps and the USFWS. Because the rights were so broadly defined, conflicts between the agencies resulted from the exercise of the rights each agency believed it had.

By the 1940s both the USFWS and the Corps recognized that a more structured arrangement between the agencies was necessary to facilitate the transfer and administration of Corps-owned lands within the Refuge.

To clarify the relation of each agency to the federally-owned lands, late in 1941 the Corps and USFWS began to plan for the cooperative use of the lands by classifying the lands and preparing a written agreement. The Corps and USFWS successfully concluded negotiations with the signing of the first cooperative agreement on 15 May 1945.

Soon after the completion of negotiations for the first cooperative agreement, calls came from within the USFWS to obtain further control of the disposition and use of Corps lands. In 1946 and again in 1948, amendments to the Fish and Wildlife Coordination Act gave impetus to the drive to renegotiate the terms of the cooperative agreements.

Negotiations for a new cooperative agreement began in 1950. The first conference between the Corps, USFWS, and the states to negotiate general plans was held in St. Louis, Missouri, on 17 and 18 October 1950. By December 1953, the General Plans had been completely executed. Signing of the Cooperative Agreement between the USFWS and the Corps was completed on 21 January 1954. Additional cooperative agreements were negotiated between the states and the USFWS. The final action taken to place all transferred lands under the authority of the 1954 Cooperative Agreement was accomplished on 19 February 1954, by the publishing of Public Land Order 936.

The 1954 Cooperative Agreement and the 1953 General Plans provided a unified system of administration over Corps lands. The new

agreements appeared to clarify the rights and responsibilities of the parties involved.

One of the objectives of the 1958 General Plan revision negotiations was to provide for a system whereby minor changes in the land categories covering transferred lands could be made without requiring the signatures of the Secretaries of the Army and Interior. Provisions made in the General Plans allowed that “minor adjustments may be made in the boundaries … by mutual agreement” between the District Engineer, Regional Director, Biological Survey of Fish and Wildlife and the appropriate state official. The new provision was intended to facilitate proper management at the field level.

The 1961 General Plans and 1963 Cooperative Agreement further elaborated the rights and responsibilities of the Corps, USFWS and States to lands purchased by the Corps north of Cairo, Illinois along the Mississippi River. It also provided the means for making minor adjustments at the field level in the lands transferred.

In 1966 the National Wildlife Refuge System was created by Congress with the intent of controlling the disposal of lands within the Refuge System and clarifying the authority of the Secretary of the Interior over these lands. The National Wildlife Refuge System Act (NWRSA) did not explicitly include lands acquired through cooperative agreement or address whether the provisions of cooperative agreements remained valid after the passage of the NWRSA. Hence, prior to 1975, it was not clear that land acquired under cooperative agreement were within the National Refuge System.

In 1976, the NWRSA was amended by what became known as the Game Range Amendments. These amendments provided that suitable lands acquired through cooperative agreement were part of the National Wildlife Refuge System, but could be disposed of in accordance with the terms of the cooperative agreement. Thus, lands acquired through cooperative agreement, whether entered into before or after 1 January 1975, are part of the National Wildlife Refuge System under the terms for management and disposal as contained in the agreement.

Public Law 86-717 and applicable implementing regulations declare the policy of the United States that areas owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers shall provide for the protection and development of forest or other vegetative cover and the establishment and maintenance of other conservation measures on areas under jurisdiction. Nothing in this agreement relieves the Corps of this responsibility. The basic Corps stewardship mission is carried out by identifying and implementing management practices, which insure the conservation, preservation, and protection of resources for present and future generations. The Corps will promote the establishment, maintenance, and protection of vegetative cover, to include forest, grasses, and other herbaceous communities in order to sustain the potential for forest production, sustain wildlife populations, and provide for basic erosion control during the life of the project. Under the Cooperative Agreement, the USFWS, on Designated Refuges, or appropriate states, on General Plans Lands will manage the resources for enhancement of fish and wildlife.

The Corps further has the responsibility and will undertake to survey, mark, and maintain the project fee title boundary. Corps natural resource management strategies are called out in the Project Master Plan and further detailed and specifically explained in the Project Operational Management Plan. The development of plans or other vegetative management activities will be fully coordinated with the Service for input and review of compatibility of proposed actions on the wildlife enhancement uses of the project. The Service will identify habitat goals and

objectives in the Refuge comprehensive Conservation Plan to provide guidance to the Corps in this partnership effort. Revenue from sale of any timber in conjunction with the Forest Cover Act program is credited to the Corps.

Proposed changes to the General Plan are included in this Master Plan. Subsequent updates to the General Plan and Cooperative Agreement will comply with ER 405-1-12 that states that Department of the Army "Licenses" are necessary to cover lands managed by state agencies for migratory birds and resident wildlife.

8.4. GENERAL ENVIRONMENTAL COMPLIANCE REQUIREMENTS

Proposed actions, operational activities and maintenance activities must comply with all applicable environmental laws and regulations. Among these are the National Environmental Policy Act (NEPA), Endangered Species Act (ESA); Fish and Wildlife Coordination Act; the National Historic Preservation Act; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); Section 10 of the Rivers and Harbors Act; Sections 401 and 404 of the Clean Water Act; the Clean Air Act; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); the various rule and regulations covering the work place as promulgated through OSHA; and the Federal Facilities Compliance Act (FFCA). This list is by no means complete, however, it does cover the main environmental laws governing Corps activities.

Many of these laws are overlapping, that is to say that by complying with one law you will be directed to other related laws. In some cases, compliance with two or more laws may take place at the same time with minimal outlay of additional time and effort. Under NEPA, for example, in the course of gathering public comment and preparing the necessary documents, it is very easy to initiate compliance activities for the Endangered Species Act and the Fish and Wildlife Coordination Act at the same time. In relation to NEPA documentation, actions directed at replacing or rehabilitating existing facilities or adding new facilities in developed areas are categorically exempt from NEPA. On the other hand, actions which will have a substantial environmental effect will require the preparation and circulation of an Environmental Assessment. Examples of these would be expansion of a recreation area, designation of a fleeting area where none existed before, and placement of new water control structures for wildlife habitat restoration.

The Corps audits its operations and work place through a process called ERGO (Environmental Review of Government Operations). This is a comprehensive internal inspection of our facilities and our management practices aimed at assuring compliance with all applicable laws and regulations. These inspections result in an ERGO Assessment report that details deficiencies found and lists actions necessary to achieve compliance. This audit is applicable not only to Corps operated and maintained facilities and lands, but also to those that are operated and maintained through outgrant (lease, license, easement, etc.). Real Estate Division will review the final report for these areas and will transmit the findings to the appropriate representative for development of a Corrective Action Plan. Those ERGO reports that pertain to Corps operated facilities and lands will be approved by the Chief of CON-OPS and forwarded to the Rivers Project Operations Manager for creation of a Corrective Action Plan. The Rivers Project Manager, through data call and subsequent to inspection, assures that the required corrective actions have been completed in a proper and timely fashion. These ERGO inspections are also performed on the lease areas and the same type of report is

given to the lessee. It is the responsibility of the lessee to take the necessary corrective actions. Again, the Rivers Project Manager assures that the proper actions have been completed. The formal ERGO inspection is performed every 5 years with an internal audit accomplished on an annual basis.

Any Corps maintenance activities performed on or near the water must comply with the same regulatory permit process as the general public or private enterprise requiring the proper Section 404 permit and Section 10 permit, if applicable, from the St. Louis District Corps of Engineers Regulatory Division. In addition, if applicable, the Corps must secure the proper Section 401 Water Quality Certification from EPA. If Corps maintenance activities involve burning, such as prescribed burning of prairies, a clean air permit must be obtained first from the appropriate county or state.

The main problems that Rivers Project facilities are facing today is the extensive past use of lead paint and asbestos insulation. As these problems are identified and verified, they are scheduled for remediation as funds permit.

8.5. ENVIRONMENTAL MANAGEMENT PROGRAM

Upper Mississippi River System Environmental Management Program

Environmental Projects and Operations, Maintenance, Repair and Rehabilitation Agreements

In WRDA 1986, (PL 99-662), Congress clearly recognized the uniqueness of the UMRS by declaring it to be “a nationally significant ecosystem and a nationally significant commercial navigation system.”

Section 1103 of the WRDA 1986 included provisions authorizing both construction of a second lock at Locks and Dam 26 and a variety of environmental initiatives designed to protect, restore and balance the resources on the Upper Mississippi River.

This provision, the Upper Mississippi River Management Act of 1986 is the statutory basis for the Environmental Management Program (EMP) and authorized its major programmatic elements (*Table 8-2*).

The original 1986 EMP authorization and subsequent amendment in 1990 and 1992 authorized the program through the year 2002. Section 509 of WRDA 1999 further reauthorized the program and extended it indefinitely with status and evaluation reports to be submitted to Congress every six years for consideration of the programs future.

This program is carried out through a partnership formed between the USFWS, the Corps, and the States of Minnesota, Wisconsin, Illinois and Missouri. Since the original designation of these partnerships, LTRM has become part of the USGS, and NRCS has been added.

All EMP habitat projects within the St. Louis District involve the MDC or IDNR and USFWS as the proponent and partner for each individual project. On each project an Operations, Maintenance, Repair and Rehabilitation Agreement is negotiated with the USFWS and the non-federal partners. Within the context of this agreement, the partner stipulates how the project will be operated and maintained and pledges resources to this end. Also covered in the agreement is the partners level of commitment to repair costs. Beyond this level, rehabilitation is initiated and this is the responsibility of the Rivers Project Office of the Corps.

Table 8-3 provides a listing of EMP habitat projects operational, under construction or planned within the St. Louis District.

Table 8 – 2
EMP Element Summary

	Element	Description	Lead Agency	Cost Sharing
1	Habitat Projects	Planning, design, construction and monitoring of projects to rehabilitate or enhance fish and wildlife habitat. Examples include side channel modifications, island creation, water level and flow control and dredging.	Corps	Construction costs are 65% federal/35% non-federal, except for projects on lands managed as a national refuge, which are 100% federal.
2a	LTRM	Standardized monitoring of water quality, fisheries, vegetation and other river resources. Related research activities in support of partner agencies' river management roles. Administered as integrated program with computerized inventory and analysis system.	USGS	100% federally funded
2b	Computerized Inventory and Analysis System	Integration, analysis, and storage of data for the LTRM element. Extensive capabilities to perform spatial and statistical analysis and to provide access to data. Administered as integrated program with long term resource monitoring.	USGS	100% federally funded
3	Recreation Projects	Authorization to construct river-based recreation projects. No funds have been allocated to construct recreation projects to date.	Corps	Construction costs are 50% federal/50% non-federal Operations and maintenance costs are 100% non-federal
4	Economic Impacts of Recreation Study	Assessment of economic impacts of recreation expenditures on the UMRS. Study completed in 1993.	Corps	No cost-share provisions
5	Traffic monitoring	Monitor traffic movements to determine need for capacity expansion of navigation system. Authority has not been used since FY 1990. Further analysis of system' capacity needs is being done under Corps' navigation feasibility study	Corps	No cost-sharing provisions

Table 8-3
Habitat Projects Operational, Under Construction or Planned Within the St. Louis District

Name	Partner	Year Complete or Scheduled for Completion
COMPLETED:		
Clarksville Refuge EMP Project	MDC	1991
Pharrs Island	MDC	1993
Dresser Island	MDC	1994
Stump Lake	IDNR	1998
Stag Island	MDC	1999
UNDER CONSTRUCTION:		
Swan and Fuller Lakes	IDNR/USFWS	2000
Cuivre Island	MDC	2000
Batchtown	IDNR	2003
Calhoun Point	IDNR	2003
PROPOSED:		
Pool 25 & 26	MDC	1999 Initiated Planning
Schenimann Chute	MDC	1999 Initiated Planning

A recent initiative established under UMRS-EMP authority is the Habitat Needs Assessment (HNA).

The Habitat Needs Assessment was officially noted in the *Report to Congress, An Evaluation of the Upper Mississippi River System, Environmental Management Program*, U.S. Army Corps of Engineers, Rock Island District, December 1997. The following quote establishes the baseline for the assessment:

> "A habitat needs assessment should be completed to establish a technically sound, consensus-based management framework or 'blue print' for the restoration, protection and enhancement of the UMR ecosystem. This assessment would begin to identify, at system, pool, and reach levels, long term habitat requirements. It would also serve to refine the focus of future monitoring and research activities."

The HNA is an undertaking which helps guide the process of planning and designing habitat rehabilitation and enhancement projects (HREP). It will also serve to assist in determining the type data the LTRM should collect in the future. The HNA is not to provide all the answers for EMP project selection in the future but rather to be a tool to be utilized by EMP professionals who will make project selections in the future.

The EMP is a unique multi-partnered program dedicated to the study and restoration of the natural resources of the UMRS.

8.6. NORTH AMERICAN WATERFOWL MANAGEMENT PLAN (NAWMP)

In 1986, the United States and Canada signed the North American Waterfowl Management Plan as an outgrowth of concerns over the dramatic loss of wetlands and declines in, waterfowl populations. The NAWMP identifies habitat loss and degradation as the major factors limiting waterfowl populations in North America. To address these problems, the NAWMP is a strategic plan that presents a framework for protecting, restoring, creating, and enhancing critical waterfowl habitat in the United States and Canada. The overall goal of the NAWMP is to restore continental waterfowl populations the levels that existed in the 1970s. This goal is to be achieved primarily through the strategies of protections, restoration, and enhancement of wetlands and their associated habitats throughout the United States and Canada.

The North American Waterfowl Management Plan recognizes that a diversity of other wetland-dependent wildlife species will also benefit from implementation of the plan. In addition significant wetland values, including water quality, ground-water recharge, flood control, and recreational opportunities, will be realized. Under the plan, broad strategies are outlined to reverse the widespread destruction of wetland habitats and waterfowl species are utilized as key indicators of the health of wetland environments.

The recommended strategy for implementation of the plan is to formulate a partnership within a joint venture area. This partnership is to be made up of representatives from governments, private organizations and individuals who are to cooperate in the planning, funding, and implementation of projects to conserve and enhance wetland habitat within their joint venture area. The St. Louis District is a member of the Partners for Wetlands group within the Upper Mississippi River and Great Lakes Region Joint Venture Area. To date, one habitat project has been completed at Reds Landing in Pool 25, and several others are being proposed or planned including the Big Bend Road Rest Area (Horseshoe Lake, Illinois) and the American Bottoms Restoration and Protection Project along Pool 27. Meetings of this group are regularly scheduled in

order to explore new opportunities, update on going proposals, and to evaluate the performance of completed projects.

8.7. SHORELINE MANAGEMENT PLAN

It is the policy of the Chief of Engineers to protect and manage shorelines of all Civil Works water resource development projects under Corps jurisdiction in the manner which will promote the safe and healthful use of these shorelines by the public. This policy also includes maintaining environmental safeguards to ensure a quality resource for use by the public. The objectives of all management actions will be to achieve a balance between permitted private uses and resource protection for general public use. Public pedestrian access to these shorelines shall be preserved. For projects or portions of projects where federal real estate interest is limited to easement title only, management actions will be appropriate within the limits of the estate acquired.

Section 7.2 provides a brief overview of the Corps Shoreline Management Policy and the requirements for a shoreline management plan at all Corps projects where private exclusive use and alterations to shoreline areas exist on federally owned lands and water.

Types of shoreline related uses that are regulated include: recreational cottages and docks and mooring sites, boat ramps, concessioned marinas and harbors, other recreational shoreline developments, hunting blinds, mowing and vegetation alterations, ferry landings, industrial development and fleeting-mooring of commercial navigation tows and barges.

The majority of the shoreline areas on the Navigation Pools are in private ownership. There are numerous competing and conflicting shoreline uses associated with these privately owned shoreline areas. Due to the importance of the rivers for recreation, commercial navigation, water supply, industrial ports and facilities and fish and wildlife habitats, there has been and will continue to be demand for shoreline uses. Given the limited amount of federally owned shoreline areas managed by the Corps, care will be taken to safeguard remaining underdeveloped public open space.

As stated in Section 7.2 a comprehensive Shoreline Management Plan has <u>not</u> been prepared yet for the Rivers Project. An interim policy was developed and approved by the District Engineer in 1990. The interim policy is being used to guide project management until a detailed plan can be formulated and approved. This policy is documented in Section 7.2.

The Shoreline Management Plan for the Rivers Project will be developed as part of the Rivers Project Operational Management Plans. This process will not be initiated until after completion and approval of the Rivers Project Master Plan.

From 1983 to 1985, a shoreline fleeting study was conducted in an effort to identify private commercial navigation fleeting zones on the Mississippi River portion of Pool 26 only. The public was involved in formulating this fleeting plan. A final plan was submitted to Lower Mississippi Valley Division (LMVD) in 1985 for approval. However, this plan was never formally approved. This fleeting data will be reviewed as a part of the effort to arrive at a comprehensive Shoreline Management Plan for public shorelines administered by the Corps.

The scope and format of the Shoreline Management Plan will consist of a map showing the shoreline, associated uses, related rules and regulations, a discussion of what areas, if any, are available for restricted development or closed to specific activities and facilities, how to apply for

permits and other information pertinent to the Corps management of the shoreline. The plan will be prepared in sufficient detail to ensure that it is clear to the public what uses will or will not be allowed on the shoreline of the project and why. A process will be developed and presented in the Shoreline Management Plan that prescribes a procedure for review of activities requested but not specifically addressed by the Shoreline Management Plan. Extensive public involvement will be required to develop the plan.

Shoreline Allocation Classifications required by regulation that could be potentially designated on public owned shoreline areas include:

Limited Development Areas

Limited Development areas are the areas in which private facilities and/or activities may be considered and permitted.

Public Recreation Areas

Public recreation areas are those areas designated for commercial concessionaire facilities, federal, state or other similar public use.

Protected Shoreline Areas

Protected shoreline areas are those areas designated to maintain or restore aesthetic, fish and wildlife, cultural or other environmental values.

Prohibited Access Areas

Prohibited access areas are those in which public access is not allowed or is restricted for health, safety or security reasons.

All shoreline use allocations are to compliment, not contradict, the Project Master Plan.

Currently approval authority for the Shoreline Management Plan rests with the Mississippi Valley Division Commander.

8.8. HISTORIC PROPERTIES MANAGEMENT PLAN

Policy directing the protection and management of project cultural resources is contained in ER 1130-2-540. Guidance for the management of collecting, preserving and curating project archeological and historical materials and establishment of a Historic Preservation Program for construction, operations and maintenance activities is contained in EP 1130-2-540. There are also numerous laws that mandate the protection of cultural resources (See 4.01 and 1.03.a.(5)).

Artifacts and site materials are the tangible cultural resource base of an area, and are significant to public use development in two major ways. First, the Corps is explicitly responsible for the protection, preservation and enhancement of cultural resources located within the project jurisdictional and impact area. Second, cultural resources are a resource with development potential. Attending to the first responsibility is often the first step toward realizing the development potential of the project cultural resource base.

Prior to any project public use development, cultural resource investigation, including review of documents, sites surveys and test excavations are completed to locate the resources and to assess their significance to present and future generations. These cultural materials can be evaluated for their suitability for incorporation into interpretive facilities such as self-guided trails, educational displays, and reconstructed buildings and sites.

The abundance and diversity of cultural materials, and the fact that some may be appropriately developed while others must be preserved and

protected, are considerations which are addressed in a Historic Properties Management Plan (HPMP). This plan also includes both short and long-term policies and procedures needed to accomplish the objectives of preservation and enhancement of the resources. Within the region there are prehistoric and historic materials which have the potential to contribute to our understanding of regional and local cultural history.

Policies and Actions.

Some general policies emphasized in the HPMP include:

- Encourage open space land use in order to protect significant archeological resources.
- Provide adequate identification, evaluation, and site planning to preserve these resources.
- Preserve historic structures and cultural landscapes in their present condition if that condition allows for satisfactory protection, maintenance, use and interpretation.

In order to comply with applicable laws and regulations, a comprehensive inventory of potential properties eligible for the inclusion in the *National Register of Historic Places* as well as a complete inventory of all project historic resources is needed to provide an adequate database for future resource management. A complete inventory of project and corridor archeological sites is a priority. Other studies needed include an archeological overview and assessment, ethnographic overview and assessment, a scope of collection statement and a historic resource study. The purpose of these documents is to provide a complete inventory of project historic resources and facilitate the development of sound project management guidance in the approved HPMP.

Native American Graves Protection and Repatriation Act

In 1990, the Native American Graves Protection and Repatriation Act (NAGPRA) was signed into law (PL101-601) and became the most sweeping law regarding the treatment and disposition of Native American human remains and certain kinds of artifacts. NAGPRA acknowledges the right of Native Americans to claim certain types of artifacts if Native Americans (individuals or group) can demonstrate direct lineal descendancy or cultural affiliation with the material in question. This legislation addresses both ethnographic and archaeological materials and includes human remains, funerary objects, objects of cultural patrimony, and sacred objects. The law builds on previous legislation such as the National Historic Preservation Act, as amended, and the Archaeological Resources Protection Act, as amended, and seeks to create a more comprehensive dialogue between Native American and those agencies/institutions that (1) hold or control the materials outlined above and (2) receive federal funding. These institutions, including the Corps, which were required to complete a Summary by November 1993, and an Inventory by November 1995, of all collections that may contain the specific cultural remains and items mentioned above. Written Summaries and Inventories have been provided to all relevant Native American groups (e.g., tribes who lived at any time in the state from which a burial or object was obtained) or lineal descendants. Additionally, NAGPRA provides procedures for the intentional excavation and inadvertent discovery of Native American human remains and funerary objects subsequent to 1990.

The Corps is responsible for the management of archaeological and historic resources that are removed from Corps managed federal properties or affected by Corps actions. As mandated by NAGPRA the Corps is

required to ensure that human remains, as well as funerary objects, sacred objects, and objects of cultural patrimony, are inventoried or described. Consultation with potential cultural affiliated Native American tribes also is required under NAGPRA and is considered a priority in the St. Louis District. The St. Louis District is now completing all inventories required for collections generated prior to 1990. Additionally, the St. Louis District has prepared guidelines for handling human remains removed or disturbed during intentional excavations or inadvertent discoveries.

8.9. PROJECT BOUNDARY RESURVEY PLAN

Project boundary monumentation and a clear, positive delineation of boundary lines on the ground is essential to protect the integrity and resources of the project. Corps surveyors during project acquisition completed the original project boundary surveys. A compliance evaluation of the project boundary in the late 1980s found much of the original project boundary monumentation was unidentifiable or indefensible and a boundary resurvey was initiated in 1991.

By 2005, all project land boundaries are scheduled to be resurveyed, monumented and approved by the U. S. Department of Interior, Bureau of Land Management (BLM). Through surveying, most of the original boundary has been recovered and re-monumented. All boundary lines are surveyed and monumented in accordance with BLM and Corps standards.

After each segment of the re-surveyed boundary line is approved, these boundary lines are immediately delineated with posts and signs, and trespass and encroachments are recorded and resolved. Maintenance of project boundary lines includes surveillance, and replacement and repair of monuments, posts and signs. Resolution of existing and future trespass and encroachment will continue in accordance with operational management plans and ER 405-1-12.

Riparian boundary surveys due to accretions, relictions, or eruptions of riparian lands effecting project ownership will be prioritized and accomplished after priority land surveys are completed.

Project lands and riparian boundaries indicated on the mapping plates of this Master Plan do not necessarily represent legal surveyed boundaries, but rather show general ownership boundaries using the most accurate geospatial data available at the time. Legal project boundary information is available at the Rivers Project office.

8.10. INTERPRETIVE SERVICES AND OUTREACH PROGRAM

Corps and Interpretive Services and Outreach

The Corps is chartered to manage public lands under its jurisdiction and is mandated by ER 1130-2-550, Recreation Operations and Maintenance Polices and Guidelines, to develop an Interpretive Services and Outreach Program (ISOP) at each project it operates. The overall goal is to increase environmental awareness and improve math and science literacy. The ISOP includes public relations, marketing, publications, tourism, environmental education, and visitor center management.

The Corps defines interpretive services as communication and education processes provided to internal and external audiences, which support the accomplishment of Corps missions, tell the Corps story, and reveal the meanings of, and relationships between, natural, cultural, and created environments and their features. Freeman Tilden, who is known as the “Father of Interpretation”, defines interpretation as an educational activity which aims to reveal meanings and relationships through the use of

original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information.

The Corps defines outreach activities as communication efforts involving interpretive programs that reach diverse populations such as students, teachers, organized groups such as Girl Scouts, Boy Scouts, 4-H and the general public beyond the physical boundaries of Corps projects and facilities.

The National Environmental Policy Act encourages federal agencies to "enrich the understanding of the ecological systems and natural resources important to the Nation." By virtue of the land and water resources under its administration, the Corps has a responsibility to take an active part in the process of creating a more knowledgeable public and educating the next generation about environmental matters. This is central to sustaining project resources particularly where visitor use levels are significant and present a challenge to resource protection.

The Corps recognizes that the ISOP is an important tool to achieve success in fulfilling the Corps stewardship missions. The value of outreach is to not only obtain the public's understanding of the resources managed, but to incorporate Corps customers as partners in managing resources. Community outreach provides environmental education to foster voluntary stewardship of natural, cultural, and created resources. It is a tool to encourage students to pursue careers in mathematics and science. A relevant interpretive services and outreach program can enhance the visitor's experience and enjoyment by anticipating their needs and providing interpretive resources to meet those needs. The Corps' interpretive services and outreach program can empower the public with facts.

Other important attributes of the ISOP include achieving management objectives using interpretive techniques, communicating the Corps' Civil Works and Military missions and accomplishments to the public, decreasing visitor and team member injuries and enhancing the experience and enjoyment of visitors to Corps projects. A secondary attribute of the ISOP is the delivery of a message in a manner that educates and stimulates to achieve math and science literacy.

Rivers Project Interpretive Services & Outreach Program Overview:

The Rivers Project ISOP strives to achieve the goals outlined in ER 1130-2-550, conducting these efforts in an efficient and effective manner at the field level so as to enhance understanding of both the Corps and the public's roles and responsibilities. The Rivers Project implements a comprehensive Interpretive Services and Outreach Program.

Goals and Objectives

The overall goal of the Rivers Project ISOP is to enhance the visitors understanding and appreciation of public lands and waters, instilling visitors with a sense of proprietorship and promoting environmental stewardship in order to preserve the natural and cultural resources of the region for future generations.

Goals

- Forge innovative partnerships throughout the region which provide new opportunities to cooperate with others to provide improved customer service and operational efficiency.
- Use ISOP programming to achieve success in fulfilling a stewardship mission.

- Use the ISOP to create 21st Century classrooms, using Corps facilities and civil works projects and programs, linking students with real life learning experiences in the fields of science and technology.

- Create a proactive and dynamic public affairs program serving the entire Rivers Project.
- Enhance the public's understanding of the Corps' mission for water resource development.
- Develop public appreciation for project resources.
- Aid project personnel in accomplishing management objectives.
- Reduce overall project operations and maintenance costs.

Interpretive Objectives

Visitors should be able to:

- Articulate what the river means to them.
- Identify at least one way the river directly affects their life.
- Identify at least two major river issues and how those issues affect river sustainability.
- Explain how a system of locks and dams functions.
- Identify predominant navigation features encountered along the river.
- Name at least two commodities commonly transported through the locks and dam.
- Identify the Corps' role in water resource management.
- Use the abundance of information that the Corps develops to provide relevant curriculum for schools.

Additionally, visitors to the locks and darn will be exposed to the following and should be able to display some understanding of:

- Native life and dependence on the prehistoric river
- Historic uses of the river
- Contemporary uses of the river
- Developing sustainability in the Mississippi watershed
- Other agencies involved on the river
- Ecology of large river systems
- Life forms and life zones
- River as a migration corridor
- River art and literature

Visitor Services Objectives

The development of visitor services for information and recreation purposes should facilitate a safe, expedient, and enjoyable experience in relation to the project resources and the river. To achieve this end, visitor services should:

- Provide necessary directional information to enable visitors to easily find the project facilities

- Provide visitors adequate information to correctly anticipate the magnitude and nature of the experience
- Provide clear directions throughout the project area to minimize the need for direction giving by site personnel
- Provide suitable and adequate resting areas for visitors walking to and from observation areas
- Provide facilities that will enhance the visitor's experience such as picnic areas and observation areas
- Provide the stimulus for cooperation with local communities to develop strong linkages between them and the Corps,
- Encourage partnerships and sponsorships that will promote the interpretation of river values and a sense of proprietorship by local communities
- Assist visitors with an understanding of other tourism facilities and attractions in the area
- Provide a setting for schools to safely utilize project lands and facilities for environmental education

Themes

Natural History of the River

- The Mississippi River watershed and how it functions
- The river's formation
- The river's name
- Physical characteristics of the river
- Geography of the river and its tributaries
- The ecology and natural history of the river
- Natural/geological/hydrological features
- A comparison of then and now
- Life zones and life forms
- Ten major rivers of the world

Cultural History of the River

- Aboriginal life on the river
- Early exploration of the river basin
- Boatmen of the fur trade and settlement eras
- Legends and lore of early river travel and trade
- Steamboat life
- Women on the river
- Life on today's river
- Commerce on the river
- Life in the floodplain
- Sustainable development
- Recreation on the river

How the River Works

- Operation of locks and dams

- Maintenance of navigation channels
- Channel navigation
- Equipment on the waterway - the evolution of low-water navigation
- Prehistoric river use
- Historical river use
- Today's river use
- Construction of Melvin Price Locks and Dam
- Legislation and Authorization
- Nine-foot navigation project and opening the waterway
- Recreation on upper river pools
- Water safety
- Flood pulsing, flood control, and levee process

Sustaining the System - Functions and Values in Balance

- Resource management on the Mississippi and sustainability
- Working within natural constraints of the system
- Life along the river
- People working to clean up the river
- Getting connected with the river - developing personal values

Namesake and the Corps of Engineers

- Melvin Price
- Corps history and mission
- The St. Louis District

Melvin Price Locks and Dam and the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

Melvin Price Locks and Dam

The Melvin Price Locks and Dam is located on the Upper Mississippi River at RM 200.78, near Alton, Illinois. Visitor facilities include a Regional Visitor Center (National Great Rivers Museum) and a 38-acre park. The 38-acre park (Illinois Esplanade) includes a pavilion, picnic area, and public restrooms. Currently tours of Melvin Price Locks and Dam are conducted year-round, weather permitting. Unescorted visitation has been approved and will be effective once the visitor access facilities are completed and the regional visitor center is operational.

National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

The National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam, will be an important new educational resource for the Midwest. The Regional Visitor Center will be unique in its primary focus on the Mississippi River and will provide the opportunity to teach the public to respect this invaluable natural resource and help sustain it in the future. Serving as a destination point, the Regional Visitor Center will stimulate local economy, generating tourism, and providing educational and recreational opportunities to hundreds of thousands of visitors each year.

When the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam, opens, it will represent a major tourism

attraction for the Midwest. Visitation to the regional visitor center is anticipated to be 250,000 per year initially and is expected to be balanced among school groups, the local community, and tourists. Visitation to the site is a reflection of the magnitude of the project, its location on the Great River Road (now a designated National Scenic Byway), its position in the middle of the Mississippi River, and its location in or proximity to the Greater St. Louis Metropolitan region. The Regional Visitor Center at Melvin Price Locks and Dam is the only facility in the area and the only one of three existing facilities in the nation to concentrate on the Mississippi River.

The Meeting of the Rivers Foundation suggested the naming of the Regional Visitor Center at Melvin Price Locks and Dam. The title, National Great Rivers Museum, was subsequently approved at he District and Division levels. The name ties back to the designation of the Meeting of the Rivers Scenic Byway, a 50-mile stretch of the Great River Road, anchored at the National Great Rivers Museum, passing the confluence of the Mississippi and Illinois Rivers, and on to Kampsville, Illinois.

Authorization and Development

On 21 October 1978, PL 95-502 authorized the Melvin Price Project, substantially in accordance with the recommendation of the Chief of Engineers in his report dated 31 July 1976. In the report, the Chief of Engineers recommended that the project include "...a major visitor center…" thus committing through legislation, construction of a visitor center as part of the project. Congress authorized in the Water Resource Development Act of 1992, a Regional Visitor Center of at least 24,000 square-feet, to be constructed at the Melvin Price Locks and Dam. The justification materials submitted in support of the Fiscal Year 1995 Civil Works budget of the US Army Corps of Engineers stated that the Corps would initiate construction of a 6,000 square-feet visitor center. A letter from Dr. John Zirschky, Acting Assistant Secretary of the Army (for Civil Works) to the Honorable J. Bennett Johnson, Chair of the Subcommittee on Energy and Water Development changed the scope for the visitor center from 6,000 square-feet to 12,000 square-feet. Funds for the construction were appropriated in 1995 and construction began of the Regional Visitor Center at Melvin Price Locks and Dam in April 1997.

A citizens advisory committee was formed to assist the architectural and interpretive development of the Regional Visitor Center at Melvin Price Locks and Dam. A peer review group of museum directors were brought together to guide the Corps and the community in the design of the regional visitor center. The community challenged the Corps to build a facility comparable to those in the St. Louis museum market. A feasibility study was conducted to evaluate the potential for raising public and private donations to fund the exhibits. A capital development goal of $5.3 million was determined through the feasibility study.

Partnership Development at the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

The inter-jurisdictional nature of the river, along with existing partnership, lends itself to opportunities for developing partnerships specific to the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam. A Challenge Cost-Share Agreement was signed with the Meeting of the Rivers Foundation to raise $3.2 million for the design, fabrication, installations, and endowment for the exhibits. Once complete, the exhibits should be re-evaluated for relevance annually and upgraded on and five-year basis.

Federal and state partners have been approached to participate in the Regional Visitor Center at Melvin Price Locks and Dam. Agreements

have been developed with the USFWS, USGS, and the EPA. Through a grant for Southern Illinois Higher Education Consortium and in partnership with Lewis and Clark Community College, a Distance Learning/Video-Conferencing Center has been developed.

Operational Plan for the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

The National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam, will serve as the primary visitor contact point for the project. The regional visitor center is located adjacent to the Melvin Price Locks and Dam and sits on a 38-acre park adjacent to the Mississippi River. It includes an information desk, ADA compliant restrooms, telephones, drinking fountains, multi-purpose room, main exhibit hall, theater, and museum shop. Hours of operation will be daily, 9:00 a.m. to 5:00 p.m. Labor Day to Memorial Day, and daily 8:00 a.m. to 8:00 p.m. Memorial Day to Labor Day.

Storyline for the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

Millions of visitors each year travel to the Mississippi River to recreate and learn about its history and impact on our nation. With the Mississippi River and Melvin Price Locks and Dam providing the framework, the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam, will provide a unique opportunity to tell the river's story in a comprehensive, meaningful, and relevant way. The regional visitor center will be dedicated to telling the story of the Mississippi River, its history, culture, ecology, socio-economic significance and evolving role as a transportation corridor. Through a series of exhibits and presentations the following themes will be examined:

- The significance of the Mississippi River for a global perspective as one of the ten great watersheds of the world.
- The natural forces that create and shape large rivers, including geologic development, and plant and animal life.
- Human interaction with the river, including early aboriginals, explorers and fur traders, settlement of the west, and the development of farming and water-borne commerce.
- The cultural legacy of the river and how it has inspired artist, writers, and musicians.
- The continuing influence of the river on our lives, including the impact of historic and recent floods, and contemporary efforts to sustain this great national treasure.

In addition to the exhibitions, the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam, will also:

- Serve as the center of a campus of living laboratories where visitors, teachers, and students will have the opportunity to explore and learn in a classroom where real world applications of engineering and technology are clearly explained and interactive curricula provide exciting ways to learn about math and science.
- Provide a center for Distance Learning utilizing technologies such as the internet and video-conferencing to offer educational opportunities to students and the public at other locations, as well as providing educational opportunities for local schools, enhancing the visitors experience, and expanding employee training opportunities.
- Provide a theater where visitors will be able to experience the river through innovative audio visual techniques.

- Provide a gallery for rotating or traveling exhibits and relevant topics.
- House a research institute which will facilitate discussions between state and local agencies and private industry on topical issues relevant to the river, and house a library of related materials.
- Offer new recreational activities through 38-acres of open space and a connecting bike trail.

The Distance Learning Classroom at the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

Physically, the distance-learning classroom is located within the multi-purpose room of the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam. Equipped with high-end video-conferencing equipment, the classroom can connect with virtually any video-conferencing room in the world, providing broadcast quality audio-visual interaction. Some of the equipment included in the distance-learning classroom includes, a document camera, VCR, computer, facsimile, participant and presenter cameras. There also exists the possibility to expand with a remote camera system.

Video-conferencing capabilities are provided for the Distance Learning Classroom, through a partnership and Challenge Cost-Share Agreement with Lewis and Clark Community College and Southern Illinois Higher Education Consortium. Discussion of a distance learning partnership with Lewis and Clark Community College began in the early 1990s, and in July 1998, a Challenge Cost-Share Agreement for $100,000 worth of equipment and in-kind services was approved and implemented.

The Distance-Learning Classroom at the regional visitor center marks a great milestone, and the first of its kind to be established outside of formal education institutes by South Illinois Higher Education Consortium. Greatly enhancing program capabilities, the distance-learning classroom answers the call for more non-traditional education experience and the need to open the doors of federal agencies and facilities. While many Corps offices have video-conferencing capabilities, this marks the first video-conferencing/distance learning classroom to be installed at a Corps filed office for the primary purpose of education.

Distance learning will enhance outreach programs by connecting people with resources. Planning and developing programming for distance learning is on going. Collaboration with partners is essential. Some of examples of existing distance learning collaborations include, Cooperating School Districts (a collaborative effort to share technology and resources with Missouri K-12 schools), St. Louis EdNet (a consortium of higher education institutes, K-12 schools, educational television providers, cultural institutes and government agencies, which are enabling the expansion of exciting educational opportunities by bringing the classroom to the student), Edwardsville School District, Southern Illinois University at Edwardsville, Rockwood School District and Jersey County Community School District.

To further enhance the education experience and diminish the traditional classroom walls, there are plans for the addition of a remote camera system to the distance learning equipment. By incorporating a remote camera system, programming will be greatly enhanced, creating a real-time, virtual experience of being at a remote site without leaving the classroom. With a push of a button the classroom can be instantly carried away to the Environmental Demonstration Are to see live footage of the wetlands and prairie restoration area, or to Ellis Bay Wildlife Refuge to view the rare trumpeter swan or the majestic American bald eagles.

The distance-learning classroom is part of the Distance Learning Center, which strives on breaking down the barriers of the physical classroom and provide quality educational experiences between the learner and the resource. As part of the Distance Learning Center, there are plans for computer-based learning stations, which will be equipped with access to research databases, libraries, and the Internet. The visitor's experience can be enhanced with interactive multi-media courseware with education modules and wetlands, hydrology of large river systems, and migratory birds of the Mississippi Valley.

The Distance Learning Center with video-conferencing capabilities will also afford other education opportunities such as professional development training for educators and water resource professionals. The Corps and other agencies, organized groups and the general public can also benefit from video-conferencing for meetings and training which otherwise would be avoided or limited due to time constraints and travel costs.

Cooperating Associations for National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam

A cooperative agreement was established between the Riverlands Area Office and the Riverlands Association in 1991, one of the first cooperating associations within the Corps. The Riverlands Association terminated their agreement with the Corps after five years, at the time of its renewal. A new cooperative agreement has been established between the Rivers Project and Meeting of the Rivers Foundation. This agreement is to support visitor services throughout the project area, and in particular to the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam.

Rivers Project and the Meeting of the Rivers Foundation mutually recognize the nationally significant benefits of a comprehensive interpretive program on the river for the perpetuation of national pride and preservation of river heritage. The foundation has as its primary purpose to support and benefit the acquisition, maintenance, and replacement of exhibits at the National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam. Through a cooperative agreement, the foundation also intends to assist the Corps in its presentation to the public of the natural, cultural, historical, economic, environmental, recreational, and constructed features of the Rivers Project area through programs, exhibits and materials. As part of its charitable, educational, and auxiliary general purposes, the association intends to assist the Corps in natural resource management programs, activities, and interpretive functions to benefit and educate the general public.

The Meeting of the Rivers Foundation, through a cooperative agreement, will also accomplish the following:

- Provide educational and interpretive services that support the mission of the Corps and/or the project. This includes assisting, planning, designing, implementing and conducting interpretive and educational programs, activities and exhibits.
- Produce and make available to visitors by sale or free distribution, suitable interpretive and educational literature and aids to increase the visitors understanding and appreciation for the natural history, cultural, historical and constructed features of the Rivers Project area and the Corps of Engineers.
- Acquire specimens and/or objects pertaining to the history, cultures, environment or recreational activities of the Rivers Project area for the purpose of adding them to the exhibits or programs at the

National Great Rivers Museum, Regional Visitor Center at Melvin Price Locks and Dam.

- Assist in the development and improvement of interpretive devices, and educational materials including signs, exhibits, materials, and audio-visual aids.
- Assist in sponsorship and coordination of professional workshops, training opportunities and special events.
- Assist in all practical ways the interpretive, educational and community programs of the Corps and the Rivers Project area for the benefit of the American people.

Rivers Project Visitor Information Center and Access and Tour Control Facility

The Rivers Project Visitor Information Center is considered a Class C Visitor Information Center, and includes ADA compliant public restrooms, information desk, drinking fountain, and open space. This facility is located within the Rivers Project Office Administrative Building and serves as the prime visitor contact point for those visitors to the Rivers Project Office in West Alton. It is open daily from 8:00 a.m. to 4:00 p.m. year-round.

The Access and Tour Control Facility (ATCF) Environmental Learning Facility was originally authorized by letter report in 1992 and then re-approved in Supplement No. 4, Design Memorandum No. 3. The facility is located adjacent to the Rivers Project Office Administration building. The facility consists of a one-room building and adjacent perimeter and connecting sidewalks to the Rivers Project Office parking lot. The facility is used primarily to conduct interpretive and educational programs. No formal exhibits are located in the facility due to minimal available space. The facility is not adequately climate controlled and not large enough to accommodate large school groups or bus tours.

Public partners encourage the Corps to expand the Class C Visitor Information Center to incorporate the ATCF into the Rivers Project Office Administration Building. The Class C Visitor Information Center is over-utilized in its current capacity. The conference room of the Rivers Project Office Administration Building is currently being used as visitation space. Visitation trends are consistently increasing for the Rivers Project, along with tourism increases to the entire region. Funding will be requested to upgrade the Class C Visitor Information Center.

John Madson Memorial Library at Rivers Project Office

The John Madson Memorial Library, located in the Rivers Project Office Administrative Building, is an excellent resource for environmental learning. The library is dedicated to John Madson, a local nature writer. Madson wrote many books and magazine articles, including published work in Smithsonian, Audubon, and National Geographic magazines. As part of the library's collection, it contains books and reference materials donated to the Rivers Project by John Madson's wife, Dycie Madson. Also, educators can take advantage of the many publications on wetlands, nature guides, and habitats, along with engineering and navigation publications. A herbarium is available to give a hand-on look at the plants from the Environmental Demonstration Area, including prairie grasses and forbs, and endangered species. Video resources on habitat, wetlands, migratory birds, eagles and more, are available for viewing on-site or can be checked out from the library for classroom presentations.

Riverlands Environmental Demonstration Area

The Riverlands Environmental Demonstration Area (EDA) is a native prairie and marsh restoration project, located on the Missouri shore adjacent to the Melvin Price Locks and Dam, along Riverlands Way in West Alton, Missouri. The prairie provides a cost-effective "biological" method of controlling weeds that are not native to this area and provides habitat for wildlife and plant populations. Long-term management goals include nesting and protection of habitat. Environmentally, the EDA exemplifies a balanced management approach between sustaining the river as a nationally significant transportation corridor and recognizing the environmental attributes of the area. The project utilizes the rivers continuing influence through water control management to create a bottomland wet prairie and marsh, akin to that which existed prior to settlement of the area.

The educational programming conducted in the EDA allows for hands-on learning activities, focusing on wetland and prairie habitats and wildlife management. Nature trails provide the public with the chance for a closer look at the natural landscape of bottomland prairie and wetlands within an urban environment. The EDA offers visitors the opportunity to view large numbers of resident and migratory waterfowl and shorebirds, as well as other wildlife that live in the wetlands.

Floyd Wade Memorial Visitor Center at Locks 27

The Floyd Wade Visitor Center is a Class C Visitor Information Center, located at Locks 27 in Granite City, Illinois. The facility is universally accessible but does not include restroom facilities. The visitor overlook located adjacent to the facility is not ADA compliant. The visitor center provides the opportunity to show how the lock operates and explain the concept of the Nine-Foot Navigation Project. The visitor center offers the opportunity to tie together the interpretive information presented at various locations along the Chain of Rocks Canal.

Kaskaskia Lock and Dam Class C Visitor Information Center

A Class C Visitor Information Center is located at Kaskaskia Lock and Dam, where information on the project and brochures are dispersed. This facility is not staffed, and tours of the Lock and Dam are conducted on an impromptu basis depending on the personnel on duty and the opportunity to make time available within their normal duties to interact with the visiting public. The approved OMP for this facility includes an evaluation of the design and placement of displays with a staged refurbishment to be completed by FY02. Developing a Cooperating Association will also be evaluated.

Lock & Dam 24

Lock and Dam 24 is located on the Upper Mississippi River at RM 273.4, adjacent to Clarksville, Missouri. In the past, tours have been conducted at this facility on weekends and holidays form Memorial Day thru Labor Day. Group tours have been made available by reservation through the Rivers Project ISOP. Visitor facilities include an overlook, which is not universally accessible.

Lock & Dam 25

Lock and Dam 25 is located on the Upper Mississippi River at RM 241.4, adjacent to Winfield, Missouri. In the past, tours have been conducted at this facility on weekends and holidays from Memorial Day thru Labor Day. Group tours have been made available by reservation through the Rivers Project ISOP. Visitor facilities include parking, picnic area, public restrooms, walking trail and Watchable wildlife viewing platform (provided by the Nature Conservatory) and a lock chamber visitor overlook.

Educational Resources and Curriculum Development

The Rivers Project, working in collaboration with the educational institutions participates in the development and presentation of in context hands-on curriculum that expose students and teachers to real life applications of science and technology employed in its day to day mission activities. These programs provide much needed opportunities to expose area students to new collateral learning experiences in the sciences and to insure equitable education opportunities and high levels of educational achievement for all students. The Rivers Project, through its ISOP, has built a reputation with regional, school administrators as an organization interested in the future of the children in the communities in the project region. Rivers Project is a natural to formulate a well structured, and measurable education outreach program.

Educational objectives include:

- Present programs designed to augment public school education in mathematics and the natural and physical sciences.
- Develop curriculum materials for all grade levels to support in-class presentations by water resource professionals that examine the relevance of science, math, and technology to the real world around them and to lay the foundation for careers in science and technology.
- Develop curriculum that supports the development of team skills and critical and creative thinking skills.
- Collaborate with other governmental agencies and professional associations/societies on outreach projects involving common goals and objectives. Co-produce instructional materials.
- Develop a compendium of resources available to support outreach efforts keyed to local or geographical areas, e.g., local science centers, museums, libraries, resource people, books, films, activity kits, etc.

The Rivers Project Office through its ISOP, has and continues to develop networks, form alliances and enter into partnerships with the purpose of working together to educate students, teachers and private citizens on the importance of promoting responsible and progressive stewardship of public lands and waters.

The result is a living science laboratory that excites and motivates people of all ages to better understand and take responsibility for the environment. The Rivers Project has identified numerous opportunities for community involvement and partnership education.

The Academic Resource Council for Riverlands Education (ACRE) was established to assist the River Projects in establishing formal relationships with the academic and scientific communities. ACRE members include leaders from local, regional and national sectors of education, science, business and government fields. These members assist in the early development of educational programming and services offered by the Riverlands Area Office.

A unique partnership with St. Louis City and County School Districts is the St. Louis School Partnership Program, which integrates culturally diverse city and county students to experience together the various cultural, historical, and natural education opportunities that exist in the St. Louis region, outside the formal classroom. Funded through provisions of the St. Louis Desegregation Plan, the program exposes teachers and students to the “learning content’ of cultural institutions including the St. Louis Zoo, the Art Museum, the Missouri Botanical Garden, Cahokia

Mounds and the Corps' Rivers Project Area. The program also gives the Corps the opportunity to reach urban minority children already interested in science and promote their awareness of career opportunities within the Corps. Corps participation is anchored by three curriculum packages entitled, *What is a Wetland*, *River Engineering: Locks and Dam*, and *Zebra Mussels: The Alien Invader*. The curriculum packages developed for School Partnership have come at the request of educators to provide relevant learning tools to meet core standards.

By working closely with the St. Louis School District, other educational opportunities have arisen. One such program, *Professional Partners*, is a challenging program which places teachers in special assignments with agency and business partners. Through the Professional Partners program, the Rivers Project has hosted several teachers to work with the ISOP staff to develop relevant curriculum. The teachers pilot test this curriculum in the classroom and within the "outdoor classroom" of the Riverlands Area.

The *Careers in Science* program is a collaborative program which was developed by Rivers Project ISOP staff and members of the Professional Partners. This summer internship for high school students is a semi-independent study program which allows students to get the "behind the scenes" look at science related careers. The program is sponsored by the St. Louis School Partnership Program with several contributing partners including the Rivers Project, the Missouri Botanical Garden, the St. Louis Zoo, Lewis and Clark Community College, Monsanto and others to provide hands-on learning opportunities. Several areas of curriculum concentration are covered for all students: native plant communities, land management decision making, public information, resource management and wildlife management.

The Rivers Project Office forged a partnership through a Memorandum of Agreement (MOA) with the USGS to advance their Water Resource Development Education Program. The program, a series of water related posters and curriculum has been pilot tested within the Rivers Project Area due to its diverse populations of urban, rural, and minority students. Teachers workshops prepare the instructors for the new curriculum and its activities. Hands-on water related activities can be introduced in the classroom or using the field site of Riverlands.

An MOA is also established between the Corps and the USFWS to support the ISOP through staff programming and exhibit development at the National Great Rivers Museum and other interpretive facilities. A USFWS interpreter works at the Rivers Project Office and cooperates with the Corps staff to provide interpretive services, assist with special events and help to develop educational materials.

The Rivers Project ISOP participates in developing curriculum for environmental and water resource issues for the Illinois State Board of Education, through its Education Service Centers. Students use kits, called M.A.S.H. kits (*Math and Science Hands-on*), which consist of an array of materials including books, videos, maps, and objects on an array of topics related to the river and the surrounding land. Students study the materials in the kit in the classroom prior to their field site visit for more hands-on study.

The Riverlands Environmental Demonstration Area is a field site test location for many educators and students involved in the Illinois Rivers Project, which is a nationwide data base of river study issues. Water quality sampling is conducted at Corps facilities, and studied by students. Their results are compared to nationwide water quality standards. Relevant water issues are studied by students through this program.

Rivers Project joined the St. Louis EdNet, a consortium of higher-education institutions, K-12 schools, educational television providers in the St. Louis region and cultural institutions to provide equal access to educational and cultural programming. This programming is conducted through the establishment of two- way, interactive telecommunications systems linking area educational and cultural institutions. The National Great Rivers Museum at the Melvin Price Locks and Dam is equipped with a Distance Learning Classroom to provide this type of educational networking.

Through the Rivers Project ISOP a variety of education programs are offered. *What is a Wetland?*, *Locks and Dam - Inland Waterway Navigation System*, *Prairies of the Past,* and *Eagles Along the Mississippi* are just a few of the interpretive/educational programs offered at Rivers Project. Education programming is supplemented with teacher workshops and training. *Project Wild*, *Project Aquatic*, and *Project Wet* are supplemental K-12 education programs emphasizing environmental education. These curriculums may be used to teach most major subject areas across the curriculum, but are particularly well-suited to science. The Rivers Project staff conduct training programs in these supplemental curriculums for educators, scout leaders, and interpretive staff members. One-day workshops are held at the Riverlands Environmental Learning Center, and using the Environmental Demonstration Area as a “living classroom”.

Through the ISOP, the Rivers Project office incorporates public land issues into formalized educational structures, increases the availability of public lands for use as “outdoor classrooms” and fosters a sense of proprietorship towards public lands by the general public. The Rivers Project ISOP demonstrates the Corps’ ability to improve math and science literacy and to enhance the visitors’ experience and enjoyment by anticipating their needs and providing interpretive resources to meet those needs.

Watchable Wildlife Program

The Watchable Wildlife Program is a cooperative, nationwide effort to help meet a growing national interest in wildlife and the outdoors. The program provides opportunities for the public to enjoy wildlife on public and private lands; contribute to local economic development; promote learning about wildlife and habitat needs; and enhance active public support for resource conservation. The program’s main feature is an established nationwide network of quality viewing areas complemented by a companion series of state wildlife viewing guides known as the Watchable Wildlife Series. An annual conference is held and a quarterly newsletter, Nature Network, is published. Universal brown signs with a white binocular logo direct the public to viewing locations.

The Corps supports and participates in the National Watchable Wildlife Program. The goals of the program fit well with the stewardship mission of the Corps. The Watchable Wildlife Program at the Rivers Project encompasses a wide range of activities, facilities, and means by which the public is accommodated. Current program components consist of environmental education programming, bulletin boards, brochures, special events, viewing platforms, access points, utilization of tri-lateration stations as viewing platforms, signage, and trails. Partnerships have and will continue as a means to carry this program forward. The Rivers Project currently cooperates with the USFWS, St. Louis Audubon, Great River Audubon, Webster Groves Nature Study Society, and local organizations such as the Boy Scouts. A viewing platform, constructed by volunteers, and supplied by the USFWS is located within the Riverlands Environmental Demonstration Area to enhance wildlife

viewing opportunities. Information kiosks and signage are also in place to enhance education and outreach.

A Watchable Wildlife bulletin and exhibit series is being developed in cooperation with the USFWS and other partners for use throughout the Rivers Project service area. This series serves as a learning tool on Riverland habitats and wildlife viewing opportunities.

Special events centered on the Watchable Wildlife initiative are conducted at the Riverlands and include the *Masters of the Sky* and *Wings of Spring* events, both focusing on the Mississippi Migration Corridor.

Opportunities to participate in others special events and to create new and improved events will continue to be identified and evaluated. Special events are an effective tool to promote the Watchable Wildlife program.

Future goals include establishment of other partnerships and continued use of volunteers. Through current and future collaborations better informational resources will be created, facilities expanded or added, exhibits developed, and services increased. Watchable Wildlife program functions will be expanded. Based on demand, opportunities to improve wildlife viewing in the Kaskaskia River basin will be examined. Partnerships and private cooperative agreements will be the primary means by which this will be accomplished.

The location of Rivers Project public lands, waters, and facilities in proximity to the St. Louis Metropolitan area and the number of high quality viewing sites for popular species result in high visitation to our areas. Resource managers acting as responsible stewards must carefully balance public demand with the carrying capacity of the resource. Current staff and facilities do not meet the needs of the visitors. In the urban setting of Pool 26 in particular, the number of visitors can overwhelm staff and facilities during peak migration periods and when unusual sitings of particular wildlife species occur. Partnerships and cooperative agreements will continue to be explored and used as a means to meet growing public demands and to utilize this program as a long term method to reduce overall operation and maintenance costs.

8.11. UPPER MISSISSIPPI RIVER AND ILLINOIS RIVER WATERWAY SYSTEM NAVIGATION STUDY

Mississippi River and Illinois Waterway Navigation Study

The Upper Mississippi River-Illinois Waterway System Navigation (Feasibility) Study addresses capital investment planning for the Upper Mississippi River-Illinois Waterway System (UMR-IWS) for the years 2000-2050. The study is to present recommendations for a safe, cost-efficient, environmentally sensitive waterway system for the first half of the 21st century.

This study will establish a prioritization schedule for evaluating sites where improvements are needed, leading to a “System” Congressional Authorization for construction while also maintaining the social and environmental qualities of the river system. The system navigation feasibility study is to be accomplished by executing the Initial Project Management Plan (IPMP). The IPMP outlines combining individual plans for Engineering, Economics, Environmental, and Public Involvement that are associated with improvements and additions to the system.

The following is a brief description of each of the plans:

The Engineering Plan

The Engineering Plan is based on four objectives:

- Baseline (maintaining the current conditions)
- Maintaining and enhancing current capacities
- Small-scale additions to capacity
- Large-scale additions to capacity

The Economic Plan

This plan analyzes the beneficial contributions to National Economic Development associated with the UMR-IWS. It will review the criteria of the cost savings of waterway transportation, the costs of delays at locks, recreational and fleeting analyses, the potential for accidents and hazardous spills, employment benefits and emissions and fuel use.

The Environmental Plan

This plan identifies environmental analyses and coordination. It addresses the project in terms of the environmental statutes, applicable executive orders, regulations, and other federal planning requirements with which the Corps must comply. It reviews environmental resources, threatened and endangered species, water quality, recreational resources, fisheries, mussels and other macro-invertebrates, waterfowl, aquatic and terrestrial macrophytes and historic properties on the UMR-IWS. It is to consider system-wide impacts of capacity increases, while also assessing in preliminary fashion potential construction effects of improvement projects.

The Public Involvement Plan

This plan identifies ways to educate and listen to the public. It also identifies ways to involve the public in the decision-making process.

The study area comprises all of the Illinois Waterway plus that segment of the Mississippi River from the confluence of the Illinois Waterway, (RM 218.0) to Upper St. Anthony Falls Lock in Minneapolis-St. Paul, Minnesota, (RM 854.0). the UMR-IWS study area contains 37 lock sites and over 360 terminals.

8.12.AVOID AND MINIMIZE PROGRAM

Overview

The term “Avoid and Minimize” (A&M) appears in the Council of Environmental Quality Guidelines for implementation of the National Environmental Policy Act of 1969. The Corps also uses the term in regulations in reference to mitigation. Mitigation includes: 1) avoiding the impact altogether by not taking a certain action or part of an action; 2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; ….. avoiding and minimizing environmental impacts is the first level of mitigation in planning and developing Corps projects”. In the Draft Fish and Wildlife Coordination Report for the Second Lock-Melvin Price Locks and Dam, federal and state natural resource agencies recommended over seventy A&M items to be investigated. After conversations with Corps staff, a second draft of the Coordination Report was issued and the recommended items were reduced to around twenty. The Corps accepted the items and agreed to study them.

In October 1992, the St. Louis District issued DM No. 24, “Avoid and Minimize Measures”. The document was developed from the commitment made in the Record of Decision (1988) attached to the Melvin Price Locks and Dam EIS for the second lock. St. Louis District set aside O&M

funds from 1989 to 1995 to implement some elements recommended and approved by the DM. Implementation of measures in this part of the program was released in the 1995 Progress Report. In fiscal year 1996, the Avoid and Minimize Program (A&M) was funded and the planned major implementation began. The planning and implementation team consists of staff from the St. Louis District, USFWS–Ecological Services Division, IDNR, River Industry Action Committee (RIAC), MDC and the USGS Long Term Resource Monitoring Station (LTRM/MDC) at Cape Girardeau, Missouri. Each group contributes staff time to plan and attend coordination meetings, collect data as a part of a monitoring program, and participate in studies at the river micro-model facility operated by the St. Louis District.

All the partners agree that minimum studies will be conducted, paper work kept to a minimum and only physical and biological monitoring of the measures will take place. Where navigation structures are to be constructed, planning, engineering, design and some physical modeling will be conducted. Both before, and after, physical and biological conditions are to be observed and monitored to test the effectiveness of the measure. The approval of the A&M DM allows the engineers and biologists to try “experiments” which may or may not work. A&M is an action program which uses common sense, field, laboratory and library research and then puts the measure on the ground. The team has the experience and by mixing the biological and engineering design arts, A&M projects make the river a more diverse ecosystem. For example, there is consensus that the river environment would be better if the tows could stay in the channel and not nose into the bank for mooring purposes when waiting to lock through. The river industry agreed that they could save fuel and locking time if they could do so. Thus, through the efforts of the A&M team, mooring buoys and bank anchor systems are being placed in the river that are acceptable from an environmental, industry and operational efficiency viewpoint.

Physical and biological monitoring of A&M measures is essential to the success of the program. For example, experimental chevron dikes placed in Pool 24 have been monitored for macro-invertebrates and effects. What has been observed is that the addition of rock in a sandy point bar environment has improved the aquatic environment considerably. Dredging of the point bar has decreased, as more water is forced into the thalweg, the rock has attracted aquatic life forms, a threaded backwater environment has been created, and the chevron configuration has performed as the engineering model had predicted.

Another initiative of the A&M program is to address the aquatic diversity of the remaining side channels in the open river between the Missouri and Ohio Rivers. In 1996 and 97, through the A&M program, closure structures on two side channels have been modified as per the design by the A&M partnership. Biological monitoring of the project’s effects is ongoing.

Two endangered species are of concern in the open river in the District. The Least tern, a sandbar nesting species and the Pallid sturgeon, a species of which little is known. The Pallid sturgeon is thought to be found around navigation training structures as are other similar fish species. Under the A&M program, a bullnose dike is being designed to hold dredge material to create an island with the correct elevation for the Least tern. In addition, training structures are being designed to isolate some of the existing sandbars from the mainland for the Least tern. A&M partners assist in the design of these structures and are monitoring nesting success. The Corps and the USFWS are working together to monitor the Pallid sturgeon and its’ relationship to navigation training structures. A number of Pallid sturgeon have been released from the Blind Pony Hatchery (MDC) and each was fitted with a transmitter.

Location surveys are being conducted in the river to determine the areas and habitats utilized by the fish.

Environmentally sound thalweg disposal of dredge material is yet another A&M effort. Dredging of a river crossing and placing the material in a downstream deep area is being experimented with as a feasible alternative to side casting. Prior to dredging, biological monitoring consisting of a hydro-acoustic survey and a mussel brail sweep through the deeper portion of the channel is done. From this information decisions are be made as to whether to utilize the thalweg method of dredge material placement. Another channel sweep is conducted after the dredging is complete to determine the success of the method. After a high hydrohraph occurs another channel sweep is done to find out if the material moved and if anything unusual occurred.

Through the cooperative partnerships and projects of the A&M program, smarter economic and ecologic management of the navigation project is being realized.

8.13. FACILITIES MAINTENANCE, REHABILITATION AND REPLACEMENT PLAN

The majority of the Rivers Project recreation facilities were constructed in the early 1960s and most have now exceeded their service life. Age of facilities, combined with increasing demands from visitors, have resulted in facility conditions in which routine maintenance is not sufficient. These facilities now require either major rehabilitation or complete replacement in order to remain operational. An extensive inventory and analysis has been conducted of all facilities and structures as part of the effort to develop a ten year maintenance, rehabilitation and replacement plan, known as the Backlogged Maintenance Plan. The plan recommends necessary maintenance, rehabilitation and replacement items for the next ten years. Analyzing conditions of existing facilities and evaluating public use trends are done in an effort to reduce project operation and maintenance costs and better serve project visitors. The backlogged maintenance plan is periodically being re-prioritized to realistically look at ways to achieve a basic level of service required to keep facilities operating at a safe and functional standard.

SECTION IX

SPECIAL CONCERNS

9.1. INTRODUCTION

This section addresses areas of Rivers Project programs and projects that are considered to be of particular concern and which require special attention.

Inability to effectively address and resolve these concerns will result in continued inefficiencies, lack of legal and regulatory compliance in some cases, and a failure to respond to public needs and concerns.

9.2. ACCESS TO PUBLIC LANDS AND WATERS

Access to project lands is difficult in many areas due to the lack of a project road system, patterns of private land ownership, remote locations, extensive levee systems and road jurisdiction and maintenance problems.

Access to Rivers Project lands and waters can be grouped into four categories. A brief discussion of problems associated with each type of access and proposed solutions are listed below:

Service Access

Numerous tracts of public land (excluding islands) are currently inaccessible or only seasonally accessible by land. Vehicle access by project personnel to public lands is critical for resource management and protection activities and safety. Acquisition in fee or easement right-of-ways are necessary in several areas around the project.

Public Access

Most roads providing access to existing project public use areas are currently substandard in design, construction and maintenance. Public safety concerns and environmental degradation at these sites have increased as a result. There is a need to verify which governmental entities are responsible for which roads that provide primary or secondary access to public lands (federal, state, city, county or township), and to arrive at a mutually acceptable maintenance standard that insures continued public accessibility and safety.

Existing Unauthorized Accesses

Over the years, numerous unauthorized roads and vehicle accesses have been developed on public lands throughout the project area. These illegal accesses are used by the public mainly for recreational purposes. However, destruction of real property, trash dumping and reduced public safety are some of the negative impacts of unauthorized and unregulated vehicle access on public lands. Title 36 Code of Federal Regulations prohibits unauthorized off road vehicle (ORV) operation on federal lands.

Efforts to resolve these problems will likely result in closing some of the unauthorized accesses and authorizing and maintaining others for legitimate public use. Public islands, which are only accessible by boat, also need to be evaluated to determine public use patterns and needs.

Boater Access

The existing boat accesses along the Rivers Project Area generally occupy the most suitable areas for river access. However, there are some existing access points that are becoming silted in and use is severely limited. Equitable distribution of boat accesses is an issue with many boaters. In some areas, there are many accesses available, in other areas, there are none. Many shoreline areas, including some where access facilities are needed, present severe obstacles to the development of additional accesses. Some accesses could be relocated just upstream or downstream to provide better access year round.

Seasonal high-water and flooding are also factors which prohibits adequate access in some areas. Many boat ramps and parking areas are not usable during normal flood pulses. Only a limited number of private accesses are usable during these periods as well.

New and improved boat access facilities need to be designed, distributed and managed to protect the natural resources and meet increasing public demand.

Rivers Project Comprehensive Public Access Plan

To systematically and objectively resolve concerns associated with public access to and on Rivers Project managed public lands and waters, it is proposed to develop a Comprehensive Public Access Action Plan. This effort will require extensive public involvement and interagency and partner coordination and support.

Development and approval of this plan will provide a strategy to resolve public and agency access concerns and improve project operational efficiency.

This plan will be a supplement to the Rivers Project Master Plan and be reflected and further detailed in the Rivers Project Operational Management Plan for implementation. A Primitive Camping and Shoreline Management Plan will be developed during this planning process as well.

9.3. UNIVERSAL ACCESS COMPLIANCE

Design of older recreational facilities did not address the needs of disabled and elderly visitors. The Corps has committed itself to take a look at the older recreational facilities to provide a quality outdoor recreation experience which includes an accessible, safe and healthful environment for a diverse population. All designs shall provide for equal access to and utilization of facilities by all visitors. Standards for the design of universally accessible facilities are presented in Uniform Federal Accessibility Standards. The standards are to be applied during design, construction and alteration to building and facilities. There are however, certain situations when these provisions are not required:

- At certain overlooks such as observation towers or decks that are only accessible by steep trails or a series of stairways.
- Within a common recreational area when at least one comfort station is already accessible.
- At campsites within a campground where an appropriate number of accessible sites are already included.
- At primitive camping sites.
- At certain hiking, walking and nature trails.

All existing recreational facilities will be evaluated for rehabilitation to meet the Uniform Federal Accessibility Standards/American Disabilities Act Standards as funds are available.

9.4. PRIMITIVE CAMPING

In accordance with Title 36 Rules and Regulations, camping on public lands is only permitted at sites or areas designated by the District Engineer. Designation of camping sites on project lands can make camping safe and sanitary for visitors and impacts to the natural resources can be minimized. Controlled and maintained camping areas will also encourage safe and manageable use of project lands. Currently there are no designated camping areas on Corps managed lands.

Traditionally, visitors have used any project lands along the Mississippi and Illinois Rivers for primitive camping sites for lack of more suitable managed areas. The majority of camping takes place on secluded areas such as islands and sandbars. To access these areas, campers boat in from public launch facilities. People often camp at or adjacent to public accesses and cottage areas, often over-crowding the area or engaging in activities inconsistent with its intended use. Historically, conflicts have arisen between compliant visitors such as cottage owners, people hunting, fishing, boating, etc., and visitors camping in non-camping areas.

Camping sites can be designated and managed to reduce these conflicts. Opportunities are present throughout the project to use current low-density recreation lands as camping areas. Coordination with other government agencies and public input will provide a list of optimum sites that can be managed for this use. Where private exclusive use at cottage areas has been reduced, public lands traditionally used for cottage sites could be designated as camping areas. Many of these cottage sites currently have suitable public roads that can serve as accesses, and their locations are typically on or near the shoreline.

Throughout the project area, many potential camping sites exist that will provide the visiting public with optimum camping opportunities. The identification and management of these sites will reduce user conflicts, negative impacts to the natural resources, and can provide safe camping opportunities, while providing the visiting public with a more enjoyable recreation experience.

Site locations, access, and primitive camping regulations will be addressed in a Rivers Project Public Use Access Action Plan as outlined in Section 9.2 Access to Public Lands and Waters, as well as the Shoreline Management Plan that is scheduled for development.

9.5. RECREATIONAL USE SURVEYS AND VISITATION ANALYSIS

Throughout the life of the project, visitation data collection and analysis has been very sporadic and poor at best. While visitation is clearly very high at the Rivers Project, the lack of visitor survey information prohibits a sound identification of visitor use and trends, recreational needs, public use facility needs and an analysis of efficiency of operation. Comprehensive visitor use surveys are useful in providing the realistic data necessary to make management decisions.

It is the policy of the Corps of Engineers that:

- Recreation use surveys shall be conducted at water resource projects in order to maintain and report accurate visitation and public use information.

- Recreation use surveys shall be conducted and analyzed in accordance with the Visitor Estimating and Reporting System (VERS). This is the official and only authorized reporting procedure that is used for computing visitation at Natural Resource Management Systems (NRMS) projects. VERS is comprised of four microcomputer based programs designed to estimate and report recreation use on Corps projects.

The estimates used by VERS to compute visitation are based on recreation use surveys conducted at recreation areas where car counters are used to monitor vehicular traffic. The goal of conducting recreation use surveys is to develop visitation estimates which are consistent, reliable and credible for all Corps projects.

The priorities for Visitation Surveys and analysis at the Rivers Project are:

- To document visitation and visitor activities associated primarily with Corps recreation areas under Rivers Project jurisdiction.
- To document visitation and activities with as many non-Corps Recreation providers as possible within the Rivers Project Service Area.
- To survey and assess facility needs; document non-traditional uses and special user groups; to assess levels and types of dispersed visitors as well as visitors who originate from areas adjacent to but contiguous with the Rivers Project Service area.

Once collected and analyzed, it is believed that this data will useful in guiding future operation and management efficiencies, recreation and environmental program successes and increased visitor satisfaction.

9.6. BACKLOG MAINTENANCE AND MAJOR REHABILITATION OF RECREATION INFRASTRUCTURE

Over the years, Rivers Project Natural Resource Management Program budget constraints have caused continued deferred maintenance to recreation infrastructure and facilities. Without needed attention, further degradation of the environment and recreation standards, customer dissatisfaction and possible closure of facilities and structures for public health and safety concerns will continue. Minimal maintenance is not sufficient to ensure many structures and facilities are safe and serviceable. Deferred maintenance has caused a significant backlog of maintenance and has reached a point where replacement is becoming necessary. The recreation infrastructure along the river is not generally highly developed because of its location on the floodplain and susceptibility to frequent flood pulses. A justified level of service appropriate to sustain the recreation infrastructure and facilities in a safe and healthful condition will only be achieved with a commitment of additional funds to insure base program requirements are met.

9.7. PUBLIC SAFETY CONCERNS

Ensuring visitor safety is one of the highest priorities on Rivers Project public lands. Public lands provide opportunities for many activities ranging from boating on the river to strolling along trails in natural areas. Due to the diverse amount of activities, and the river and floodplains' natural and constructed features, many different potential hazards exist. Recognizing and minimizing risks associated with these hazards presents a formidable challenge.

Project safety plans are developed to monitor hazards and ensure public safety. Included are plans to remove the hazards if possible, to identify hazards with proper signs, to ensure that facilities are maintained, and to educate the public about potential hazards through programming, staff presence, public service announcements, and partnering.

Many natural features, public facilities, and structures built and maintained by the Corps or leaseholders, require safety controls and hazard abatement. All facilities and areas are inspected on a regular schedule to ensure structural safety. However, hazards still exist. Rangers patrol public lands to assist visitors and enforce Title 36 Rules and Regulations to reduce hazards that occur from misuse. In areas of high visitation, it becomes difficult to put enough patrol rangers in the field to ensure a safe recreational environment. As an aid to ranger patrols, coordination with other federal, state, and local agencies provides an opportunity to leverage resources to ensure that these areas receive the effective and efficient patrols. To maintain public safety, cooperative law enforcement agreements have been executed to provide personnel and resources to assist visitors and aid rangers during high use times in high use zones. Currently agreements are in place with St. Charles County, Missouri, and Madison County, Illinois. Agreements with Pike County, Illinois; City of Madison, Illinois; and City of Alton, Illinois are also needed and will be initiated when and if funding becomes available. However, as usage rises or additional problems are documented, additional agreements with other counties will be negotiated to assist with patrols on public lands.

The river supports a large, diverse group of activities and users. Some of these activities include commercial navigation, recreational boating, hunting, fishing, wildlife viewing and sight seeing. Industrial uses occur in some same areas as heavy recreational use. Industrial activities include port areas, power plants, factories, treatment facilities, and a wide array of other activities. Along with the wide range of uses on the river and the potential for user conflicts that compromise safety, there are also the hazards created naturally by the river including undertows, fast currents, snags, changing water levels, and under water obstructions.

With all of the activities the river provides, it is important to pay special attention to user safety and monitor it to ensure that hazards and hazardous use are kept to a minimum. Coordination with other agencies in managing the river for user safety is essential. The river falls under many jurisdictions of federal, state, and local agencies. The USCG holds primary responsibility for navigational safety on the river including channel boundaries, identifying hazards, and enforcement of maritime regulations. However, many other agencies have a responsibility to maintain a safe and healthful environment and help enforce safety rules and regulations. Traditionally, these agencies have lacked a structured approach to facilitate working together as a functioning unit that is both effective and efficient. Steps have recently been taken towards organizing all agencies involved with management and enforcement on the river into a functioning water safety council. There is continuing pressure for this council to improve coordination among the many agencies and groups and methods to ensure the safety of the public when they are visiting the Mississippi River and its tributaries. This council is comprised of individuals with various expertise and responsibilities, representatives of federal, state, and local agencies and private sector businesses with an interest in a safe recreational environment. The council is addressing all aspects of water safety by focusing on public education and awareness, regulatory patrols and enforcement, search and rescue, and emergency management. The council has also been active in providing inter-agency cross training to improve the effectiveness of agencies within the council. Needs are being identified to

enable the Corps to re-examine its presence on the river and adjust its water safety focus accordingly through increased visitor assistance patrols, education programs, and community awareness.

On both public lands and waters, safety is of utmost importance. A diverse amount of activities and conditions can create hazards for project visitors. Timely maintenance, coordination, visitor assistance, signage, and educational programming must be increased to ensure safety for the visiting public.

9.8. PUBLIC CONFUSION ABOUT INTER-JURISDICTIONAL MANAGEMENT

The Corps maintains primary administrative authority over all fee title lands and waters acquired for construction and operation of the Mississippi River Project. The Corps has the responsibility and authority to manage the natural resources on Corps fee title lands, which includes forest, fish and wildlife, water, aesthetic and vegetative resources of the project. The majority of lands acquired for the Nine–Foot Navigation Project are managed by the Department of Interior USFWS, for fish and wildlife management purposes under a General Plan and Cooperative Agreement and are known as General Plan lands.

The Cooperative Agreement, signed 14 February 1963, described a General Plan between the Bureau of Sport Fisheries and Wildlife (now the USFWS) and the Corps for management of General Plan lands, in accordance with the Fish and Wildlife Coordination Act. There are approximately 50,000 acres of the General Plan lands included under this Agreement, which were released to the States of Iowa, Illinois and Missouri for fish and wildlife management. The USFWS administers separate Cooperative Agreements with each of the States, subject to the provisions of the USFWS/Corps Agreement. All three of these Agreements are older than the current USFWS/Corps Agreement and need to be updated.

Over the years there have been numerous points of confusion involving these interagency relationships, mainly as a result of subsequent legislation and policy changes within the involved agencies. Elements in the Agreement which were included for secondary economic use considerations have at times conflicted with other agency goals. Overall, antiquated language contained in the document does not convey the mutually desired outcome for river corridor management, which is shared by each partner agency. The primary purpose of areas released by the Secretary of the Army remains the navigation project. The Coordination Act permits the Corps to make “adequate provision consistent with the primary purposes of such impoundment, diversion, or control, shall be made for the use thereof...for conservation, maintenance and management of wildlife resources thereof...in accordance with general plans...for administration...by the Secretary of the Interior...in such manner as he may deem advisable...” Navigation purpose primacy is not subject to negotiation between the agencies. However, there are within the Agreement many elements that are discretionary under the law.

Aside from updating interagency agreements to better reflect current conditions, and management to address confusion among federal and state managing partners, there needs to be concerted inter-jurisdictional effort undertaken to better inform the public. Increased public information programming, informational brochures, site bulletins, and special events are various venues for conveying an accurate message concerning the overlapping and separate roles each agency plays in the management of public lands and waters that make up the Nine-Foot Navigation Project. Increased attention to proper identification of project boundary lines through adequate well maintained signage, well maintained directional

signage at public access points, and well maintained bulletin boards with information addressing rules and policies governing public usage are each important and needs attention. Increasing the regularity of public forums beyond those designed to generate public comment during planning efforts would also be useful.

9.9. PRIVATE EXCLUSIVE USE

Engineering Pamphlet 1130-2-540 defines Private Exclusive Use as the use or occupancy of individually owned permanent structures for human habitation sited on pubic land and water areas at Corps civil works projects. Any action at a Corps project that precludes use of the land and waters by the general public is considered to be “private exclusive”. Lesser forms of private use, such as individual houseboats, private boat docks and piers, fencing, signing, landscaping, etc., are excluded from this definition, since they are the subject of concern under the Corps’ shoreline management program.

In 1944, Section 4 of the Flood Control Act, (later amended by PL 99-662, 17 November 1986) authorized the Secretary of the Army to grant leases of lands at water resources development projects for such periods, and upon such terms, and for such purposes as he may deem reasonable in the public interest. As a result of this the Government advertised certain sites along the Mississippi and Illinois Rivers to be developed as recreational cottage sites in the early 1950s. Within the St. Louis District, nearly 800 such leases were advertised and executed, the major intent of which was to provide recreational cottages only, not permanent residences.

In 1965, the St. Louis District ceased granting any new cottage site leases on project lands in the navigation pools to be consistent with Corps policy of discouraging the public from constructing habitable structures in the floodplain. To provide a reasonable phase-out period with minimum inconvenience to current lease holders, the Chief of Engineers established the policy that, when existing cottage and residential site leases expired, they would be extended to 30 November 1988, provided the land was not needed for priority use and the lessee continued to comply with the terms and conditions of the lease. Subsequently, Public Law 97-140 established a moratorium until 31 December 1989 on enforced removal of certain existing private exclusive use type structures, which had been previously authorized or permitted on project areas under the jurisdiction of the Corps. Ultimately, Public Law 99-662 instructed the Corps to continue in effect any lease or assignment thereof until such time as such lease was either terminated by the leaseholder, terminated by the Corps for substantial lease violations, or the property covered by the lease was determined needed for immediate use for public park purposes or other higher public use or for navigation or flood control.

In 1988, there were 764 privately owned recreational cottages on leased fee-owned lands on pools 24, 25, and 26. The Corps’ Regional Plan, consistent with Corps policy and the Master Plan established a prohibition on future private exclusive use and a programmatic effort to phase out such use began. As of 2000, 368 cottage leases remain. Of the original 23 subdivisions, only 13 remain with 5 or more active leases.

The Regional Plan for the Upper Mississippi and Illinois Rivers project lands and waters administered by the St. Louis District was revised to comply with requirements of Section 1134 of PL 99-662. The Regional plan was developed to determine whether private exclusive use

Table 9 – 1
Breakout of Cabins by County

COUNTY	SUBDIVISIONS	CABINS
St. Charles, MO	3	94
Lincoln, MO	3	7
Jersey, IL	7	161
Calhoun, IL	4	55
Pike, IL	6	51
TOTAL	**23**	**368**

would be prohibited in the UMR region and to formulate a program to phase out private exclusive use structures on project lands. The revised Regional Plan was approved 1 December 1988 by the Mississippi River Valley Division. The plan prohibits private exclusive use on navigational pools 24, 25, and 26 because the project resources are required for the benefit of the general public. This plan is in consonance with prohibiting private exclusive use on other navigational pools on the Upper Mississippi River administered by the Rock Island and St. Paul Districts.

Following the 1993 flood, 220 cottages were abandoned, destroyed, and/or revoked for non-compliance. Following lease termination, acreage previously leased was re-zoned vegetative management and will remain as such to reduce impacts to potentially sensitive areas. However, recognizing that most of the subdivisions enjoy adequate public road access and given their river front location some vacated lots will be assessed for their potential to serve as public access points to the river in accordance with project authorities. In all instances, thoughtful consideration will be given to selection of sites to be utilized as vegetative areas or recreation areas insuring that minimal impact to lands and to operational expenditures is accomplished.

In the future it will be the continued policy to phase out private exclusive use on public lands. Efforts will be made to include cabin leases in new initiatives that discourage floodplain development and encourage those individuals to utilize private lands outside of the floodplain. This continued momentum to phase out private exclusive use will inevitably lead to the reduction of these privately held cabin structures on public land that dot the banks of the Mississippi and Illinois Rivers.

9.10. INDUSTRIAL LEASES

The Rivers Project Office has eight existing industrial leases totaling approximately 811 acres. The uses of these leases range from docking and loading facilities to multipurpose industrial development.

These lands have been leased to commercial entities for many years. As such, these lands have been effectively reduced to perpetual private exclusive use and are not available for other uses nor are they available to the general public. Public funds are spent to administer these leases, however, they are not available to the general public.

Corps administrative procedures are often seen as cumbersome for for-profit tenants. Leaseholders are sometimes required to duplicate forms, inspections, and tests already requested by other licensing agencies. In some instances, Corps regulations are superceded by more stringent ones required by agencies that directly regulate the specific activity, and this can cause confusion for lessees.

For the above reasons, it is the policy of the Rivers Project Office and the St. Louis District to refrain from entering into any new industrial leases. Furthermore, the Rivers Project will endeavor to reduce or eliminate existing industrial leases through methods such as land exchange or sale of land as best supports federal and public interests.

9.11. DRAINAGE CONFLICTS WITH ADJACENT PRIVATE LANDS

In a number of recorded instances the drainage of water from adjacent landowners is being impeded or hampered in its passage across Corps administered Project lands toward the river by natural obstructions and sediment buildup. Separate cases have been documented in Calhoun and Madison Counties, in Illinois and in St. Charles County, Missouri. Numerous inquiries have been made by adjacent landowners in attempt to address the problem.

Over many years sediment has built up in off channel areas throughout the impounded portion of the project. During high water events water backs up into the lower reaches of natural and constructed drainage outlets. Sediment transported into these drainage outlets during these events has significantly decreased their drainage capacity. This problem is confounded by obstructions such as beaver dams, deadfalls, and flood debris that over time are partially or completely blocking outlets. The drainage area of these outlets typically encompass significant upland areas with considerable relief. During heavy spring rains it is common for water to back up off project lands and onto private agricultural lands and stand there for days at a time preventing or delaying spring and fall planting and in many instances resulting in significant crop losses.

In most cases local attempts to remove these obstructions or regularly perform ditch maintenance has failed due to complications encountered in securing permission to perform necessary work on project lands. Over time many of these drainage outlets have become unserviceable. When water reaches the project boundary it simply spreads out across a wide indeterminate flowage area finally reaching the river.

Heavy maintenance is required to return these outlets to their original capacity. However, destruction of habitat often is a consequence and comes into conflict with stewardship objectives for which the Corps, USFWS, and states are chartered to pursue.

9.12. FLOODING AND FLOOD DAMAGE REDUCTION AND FLOODPLAIN DEVELOPMENT

The Mississippi and Illinois Rivers fluctuate throughout each year, depending on rainfall, snow melt, drought and water control operations. Often the rivers reach flood stage, commonly from 1 time to 4 times per year. During these periods, public use of many of the river's existing recreation facilities including boat ramps, parking lots, courtesy docks and day use facilities is severely restricted or closed entirely. With the loss of these recreational facilities for an extended time, a significant negative impact may be experienced. Future design/siting of access infrastructures that are rehabilitated or replaced needs to better address water level constraints to minimize impacts to use.

The Mississippi River has an extensive system of flood control levees in place. These levees are a combination of private and federally sponsored. The levees vary in the levels of protection they provide. They range from the low end which offer protection from a 10-year flood event, to the top end urban type levee which offer protection from a 500-year flood event, and any level of protection in between. Almost all of the Rivers Project access areas and facilities are located within the floodplain and outside of the protection of levees.

The rehabilitation and replacement of outdated facilities will look at innovative ways to modify/enhance traditional structure design to eliminate high operation and maintenance costs. When looking at the

rehabilitation of facilities, the main concern will be to eliminate the high costs for maintenance due to seasonal high river stages.

9.13. SHORELINE PROTECTION NEEDS

Within the Rivers Project, only a portion of the shoreline in each navigation pool is federally owned in fee title and managed by the Corps. The bulk of these lands extend from the 'hinge point' downstream to the locks and dam for each navigational pool. Traditional uses of the shoreline are varied and concentrated. In almost all cases, the uses compete with one another for the shoreline and in extreme cases they are exclusive. Some of the uses include river access (roads, parking lots, boat ramps), recreation activities (picnicking, primitive camping, fishing, hunting, water skiing, swimming), intense recreational development (marinas, campgrounds, parks, lodges, casinos), aesthetics (Great River Road, sight seeing, eagle viewing) industrial development (docking, loading facilities), navigation support facilities (fleeting, waiting, dry dock), and wildlife (refuges, nesting areas). Placement of waterfowl blinds along public shorelines for recreational purposes is regulated. Each state administers a lottery system for allocation of these blinds. Numerous private docks also exist that were permitted in the past on a case-by-case basis.

In order to resolve conflicts and to protect the shoreline, the Rivers Project Office will develop a Shoreline Management Plan in the near future. This plan will be developed in accordance with pertinent Corps policy and regulations as outlined in Section 8.08 of this plan. All planning efforts will involve significant public, special interest, and other federal and state agency input. Public input workshops and meetings will be held throughout this process to ensure an acceptable plan is developed.

9.14. EROSION, SEDIMENTATION AND WATER QUALITY CONCERNS

Erosion And Sediment Management Strategies

The management of erosion and sedimentation in the UMR watershed will remain a major environmental issue for many years to come because of the magnitude of the problem and the size of the watershed. It is widely acknowledged that erosion and sedimentation is the number one environmental problem in the watershed. However, there is no comprehensive management plan to deal with the problem. There have been numerous activities by various state and federal agencies to control erosion in different parts of the watershed over the years. However, these activities are not coordinated and well documented. Monitoring of erosion, sediment transport and sedimentation are scarce and intermittent making it difficult to evaluate the effect of different activities and the trend in the overall problem. The need for a coordinated and comprehensive approach to deal with the problem of erosion and sedimentation is well known. However, at this point there is no such plan and it will require significant effort by federal and state agencies to come up with a comprehensive plan.

A comprehensive erosion and sedimentation management plan should consist of several management alternatives appropriate to the specific problems. Because of the size of the watershed and the different causes of erosion, many different types of erosion control measures have to be implemented. Similarly different sediment management alternatives have to be developed for different river and backwater areas depending on the source of sediment and the planned use of the area. The different

management strategies can be grouped into two main categories: erosion control and sediment management.

Erosion Control

For the UMR watershed, there are three major types of erosion that contribute significant amounts of sediment. These are watershed erosion, streambank erosion, and bluff erosion. The relative significance of these three major sources cannot be accurately quantified based on available data. Depending on the location along the River, any one of the three sources could be the primary source of sediment to an area.

Watershed Erosion

Watershed erosion is used here to refer to erosion in the watershed primarily consisting of sheet, rill, and gully erosion in agricultural and non-agricultural areas. However, since more than 80 percent of the watershed is used for agriculture, erosion due to agricultural practices contributes the bulk of watershed erosion. Erosion from construction sites could also contribute significant amounts of sediment. Section 402 of the Clean Water Act now requires land disturbance permits for any construction site greater than 5 acres. This process requires an erosion control plan.

With respect to watershed erosion it is well known that most of the erosion takes place within a small portion of the watershed defined as critical erosion areas that generate significant amounts of sediment. It is therefore important that these areas are identified throughout the watershed so that limited resources could be allocated where they can be most effective.

In most of the watershed, erosion control activities are carried out by the Department of Agriculture through the NRCS. For example, a major initiative in Illinois to control erosion from agricultural lands is known as “T by 2000.” The goal of this initiative is to reduce erosion in Illinois to tolerable soil loss limits (‘T’) by the year 2000. ‘T’ is defined as the maximum average soil loss in tons per acre per year that can be tolerated by the soil and still sustain production into the future. The full realization of the “T by 2000” program through state and federal funding will go a long way in controlling erosion and sedimentation problems in the Illinois River basin and positively impact the Mississippi River as well.

Streambank Erosion

Most streams experience some form of bank erosion. In cases where vegetation has been removed from streambanks leaving them unprotected, bank erosion is excessive. Many channelization projects and river crossing structures such as bridges tend to increase the streambank erosion potential. There have been some studies which attempted to quantify the percent of a stream’s sediment load that originates from bank erosion. Percentages ranging from 20 to 80 have been reported by different investigators. The actual value will depend on the local conditions of a particular stream. Streambank erosion is believed to be a major contributor of sediment in streams in the UMR basin. Placement of rip rap on highly erodible banks is one method used to prevent this. However, there is no basin wide program to control streambank erosion. Realizing the significance of the problem and the fact that sedimentation problems will not be solved unless control of excessive streambank erosion occurs there is a need for a comprehensive streambank erosion control program. The program needs to identify major streambank erosion areas throughout the watershed and quantify the problem. There is a need to know how many miles of stream channels in the river basin are eroding at a significant rate. Along with identification of the erosion sites, the types of streambank failures and the suspected causes need to be documented. This is important because all streambank erosions are

not of the same type and they are not initiated by the same cause. Once the locations, types and causes of streambank erosion in the basin have been identified, then the appropriate bank stabilization techniques can be recommended.

Bluff Erosion

Because of its geological formation, the UMR valley is much larger than the present day River. The width of the River valley ranges from a mile to nearly ten miles. The edge of this large valley with relief from 100 to 300 feet is defined as the bluff area. The slope of the bluff areas is extremely steep reaching up to 30 percent resulting in excessive erosion. There is also significant amounts of land dislodging or washing along the steep slopes. Small streams draining the bluff areas generally carry significantly higher amounts of sediment than streams in other settings. The cumulative significance of the bluff areas as sediment sources become important when one considers the total length of the valley. Two erosion control studies have been completed and erosion control measures are being implemented by the NRCS in conjunction with the Swan Lake and Batchtown EMP projects.

After the identification of the major causes of erosion in bluff and hillside areas, there is a need for developing bluff erosion-control strategies.

Sediment Management

The major issues related to sediment management in the UMR Basin can be grouped into four main problem areas: sedimentation in backwater lakes and side channels, sediment in the navigation channel, a decline in suspended sediment loads in the unimpounded open river reaches, and sediment quality. The areas most significantly affected by sedimentation are the backwater lakes, many of which have, on the average, lost approximately 70 percent of their capacity to sedimentation to date. Their physical characteristics and ecological and habitat values are continuously changing. If appropriate rehabilitation projects are not implemented these important habitats and recreational areas could be lost forever. It is important that these backwater lakes are managed to provide essential habitat diversity and connectivity to the main channel.

Sedimentation in the navigation channel is not as environmentally degrading as that of the backwater lakes. The higher flow velocities in the navigation channel tend to keep the sediment moving in the channel except at shallow areas or crossings. Some deposition can occur at or downstream of the mouth of tributary streams that carry coarse sediment into the navigation channel.

A second major difference between the sedimentation problem in backwater lakes and the navigation channel is the existence of the Nine–Foot Navigation Channel. The majority of the material dredged for channel maintenance is clean sands. Therefore the sedimentation problem in the navigation channel is being managed by the Corps. Currently, the Corps is also implementing sediment management technique through the Dike and Revetment Program with input from the Avoid and Minimize team. Through these efforts, dredging has been reduced significantly in the last 30 years. The Corps continually evaluates alternatives for sediment management and is attempting to balance the impact of these alternatives to the dredging operations and do what least impacts the environment on a site by site basis.

Every dredge and disposal location in the St. Louis District is fully coordinated with the state and federal environmental agencies. These agencies comment and approve all of the dredging that takes place on a case by case basis prior to dredging being performed. In addition, the other agencies put together dredging guidelines that outlines both site specific

and general rules to help enhance habitat using dredge disposal. These guidelines have been used to enhance habitat by the construction of islands, moist soil units, disposal into chevrons, and much more. Limited dredging authorities, facility capability and funds often restrict ideal dredge disposal techniques for environmental purposes.

Sedimentation in Backwater Areas

Studies have documented that sedimentation in backwater lakes has accelerated in the last 50 years. Many backwater lakes have lost over half of their storage capacity and some of them have completely filled in with sediment. It is therefore essential that appropriate management strategies are developed to manage the sediment in some of the backwater lakes if these lakes are to be retained and used for fishing, recreation, and fish and wildlife habitat. Future soil erosion control measures in the upland watershed will not remove all the sediment that has already accumulated in the lake over the years. If appropriate sediment management is not developed and implemented, all the bottomland backwater areas will eventually fill-in with sediment and transform to mudflats and herbaceous marshes even under the most optimistic soil erosion rates.

To save some of these deepwater habitats from elimination, the following actions are being implemented:

- Identify the most important and valuable lakes.
- Conduct sedimentation surveys of these lakes.
- Develop techniques to control sediment inflow from the river.
- Develop techniques to control sediment inflow from local tributaries.
- Develop appropriate sediment removal techniques.
- Develop appropriate sediment disposal techniques including the creation of islands.
- Develop shoreline management technology, especially wetland restoration, as a component of an overall lake management plan.
- Work closely with NRCS to solve problems on targeted areas.

Sedimentation in the Main Channel

As mentioned earlier there is also a sedimentation problem at crossings in the navigation channel. The problem is not as severe as those found in the backwater lakes. The Corps is required to maintain the navigation channel at nine-foot depth or deeper at all times and accomplish this by routinely dredging problem areas. Dredge disposal is closely coordinated with state and federal environmental agencies to get the most environmentally sound, least cost disposal alternative. Currently, exact aquatic impacts are still unknown, but through the Avoid and Minimize (A&M) program and efforts of the district, environmental monitoring is taking place in areas prioritized by the A&M team. In addition, sediment management techniques like the use of chevron dikes and off bankline revetment have been proven to both benefit navigation and increase habitat. The Corps is evaluating alternative techniques to reduce the amount and frequency of dredging.

Sediment Quality

Whenever there is potential for dredging sediment, there is the necessity and legal requirement to evaluate the quality of the sediment. Fine grained sediment can potentially be contaminated by various pollutants. The contamination amount can vary from place to place. The Inland Testing Manual provides guidelines for dealing with contaminants associated with fine grained sediment.

Since the passing of the Clean Water Acts and the implementation of the Conservation Reserve Programs in the Farm Bill, the presence of contaminants associated with fine grained sediments has been greatly reduced.

The first step to evaluate dredged material is to perform grain size analysis. When grain size analysis indicates the presence of fine grain material the Inland Testing Manual should be followed. The final step is to obtain State 401 Water Quality Certification for the desired disposal. When an area has a high frequency of dredging, alternatives to dredging and beneficial uses of dredged material should be evaluated.

If the samples taken are greater than 20 percent fine grained material, it must be analyzed for contaminants. The only areas requiring frequent dredging that have been found to contain particle size greater than 20 percent fines are around the Chain of Rocks Canal and Melvin Price Locks and Dam. In both cases, these areas are within the guidelines for contaminant levels. The district is currently investigating ways to reduce the amount of sedimentation that forms in these areas. The St. Louis District channel maintenance program does not have a contaminated sediment problem. The nature of channel maintenance dredging is to remove sediment that is transient and that is deposited during high flow events. Most of the dredging that takes place is in areas that are dredged on a periodic basis. Therefore it is very rare that pre-project material is being disturbed. The contamination and material classification is well documented. In order for the district to comply with water quality certification, a yearly report is produced showing sample results for all of the dredged and disposal locations performed in the previous year. Pooled reaches in side channels may also have fined grained material. If this material is removed, contamination levels will need to be evaluated.

Water Quality Concerns

Non-Point Source Pollution

The major sources of pollution to the Mississippi River within the St. Louis District can be categorized as non-point sources.

Run off from agricultural fields and feed lots are of great concern and are possibly the most difficult to control. Agricultural field run off introduces a tremendous amount of sediment into the river system. Along the river banks and particularly on the islands, accretion depths of three feet or more are not uncommon. While not overly destructive, this accretion is an indicator of the amount of sediment carried by the river. This sediment eventually settles to the bottom and significantly adds to the dredging requirement for maintenance of the navigation channel. This sediment also increases the turbidity of the river and limits the production of aquatic vegetation and reduces habitat values. The run off from the feed lots adds additional nitrates and other nutrients to the system. This effects dissolved oxygen and other water quality parameters which in turn effect the aquatic habitat and other uses of the water.

Agricultural field run off also introduces agricultural chemicals into the system. Some of these chemicals settle out and are incorporated into the bottom substrate. Other chemicals join the water column and course down the Mississippi to the Gulf of Mexico. These are the primary cause of the hypoxia phenomenon, the so called “Dead Zone”, in the Gulf of Mexico. This Dead Zone is increasing in size and is the object of intense study.

The agricultural run off is a difficult problem to solve. The source of the problem is off project lands, which traditionally have been excluded from consideration by the Corps. However, the scope of the problem is compelling and has to be accounted for. It requires close coordination and cooperation with MDC, IDNR, MDNR, IEPA, NRCS, USFWS, private

and corporate land owners, and the Corps of Engineers in order to effectively address the problem system wide. A joint Memorandum of Agreement, which outlines a plan of action, could be negotiated and signed by all agencies. However, given the inter-jurisdictional nature of the issue, any plan of action will require a multi-state public/private buy-in to be successfully effected.

Erosion of the streambanks and islands is a natural process within the river system. Due to human development within the floodplain over the last 200 years, the erosion process has accelerated, increasing the sediment load of the river and the turbidity of the water. Over the last 50 years, the NRCS, the Corps and other agency partners have been working to reduce these processes to tolerable levels. Some success in sediment reduction has become apparent, particularly in the past 25 years but more effort is needed to further control this problem.

In rural settings, septic system run off used to be a significant problem. With improved systems, more stringent local and state regulations, and improved enforcement, this problem is being corrected and significant improvement has been achieved. By continuing to enforce current legislation and government actions and with continued improvement in technology, this problem should be significantly reduced within the near future.

Point Source Pollution

Point source pollution discharges are not as great a problem as they were thirty years ago. The development of the National Pollution Discharge Elimination System (NPDES) was a major advancement. The Clean Water Acts created the NPDES permit system which regulated industrial and municipal discharges. This did not totally eliminate point source problems but did greatly reduce the impacts to the quality of the water and sediment within the river system.

Environmental Spills

Many potential sources of spills exist throughout the river system, including highway and railroad crossings, pipelines, municipal and industrial plants, barge traffic, and terminals. Potential spill sources are discussed in detail in the Upper Mississippi River Spill Response Plan and Resource Manual (UMRBA 1991). In addition, it describes resources available for responding to a spill. Hazardous material with the highest bulk movement and thus highest probability for a spill are chemicals, chemical products, fertilizer, petroleum products and coke petroleum pitches (USACE 1988a).

9.15. KASKASKIA RIVER NAVIGATION PROJECT CHANNEL REMNANTS

The Kaskaskia Navigation project authorized, in addition to the lock and dam, the construction and maintenance of a 36 mile long navigation canal. The canal shortened the distance from Fayetteville to the river mouth by 14.3 miles (from Kaskaskia RM 50.5 to Kaskaskia RM 36.2). As the canal was built, 26 of the original river meanders were cut off leaving remnant channel segments. Since the old river channel has been cut off, the mouth of the river is now part of a straight navigation canal. As with most systems, the meandering characteristics would eventually reappear without bank stabilization practices.

Most of the original meanders were closed off on the upstream end to minimize sediment introduction. The lower ends of these remnant channel segments are experiencing significant sedimentation effectively isolating these areas. These are valuable fishery habitats supplying the majority of quality over wintering and spawning areas within the

navigation project. In order to rectify the environmental degradation, these silt plugs will be removed in order to restore connectivity of the remnant channel with the navigation channel. This will be accomplished as part of the Corps' operation and maintenance responsibility. During this process, the Corps will investigate the use of structural methods which may offer practical assistance in reducing the rate of sedimentation at the mouths of selected remnant channel segments. The challenge is to acquire and maintain adequate resources in order to carry out this important habitat restoration/maintenance work.

9.16. REGIONAL HABITAT LOSSES

Historical Overview

Before Euro-American settlement, many portions of the floodplain along the Upper Mississippi River (UMR) were comprised of vast marsh, prairie and forested wetlands (Finiels 1797). The presettlement bottomland forests were diverse in age structure and high in species richness because the Mississippi River and its tributaries meandered freely within the floodplain environment.

Bottomland hardwood forests, bottomland wet prairies and other wetland habitats along the Upper Mississippi River have been drastically reduced in acreage during the nineteenth and twentieth centuries. Conversion to agricultural land, timber harvesting, and river modifications for flood prevention and navigation and urban development are the primary factors that have caused habitat changes. Navigation structures and flood prevention levees have altered the fluvial geomorphic dynamics of the river and floodplain system.

The Open River

In 1927, Congress authorized the development of a navigation channel nine-feet deep and 300-feet wide between the mouth of the Missouri River near St. Louis, Missouri, to the Ohio River, near Cairo, Illinois. The Nine-Foot Channel Project resulted in much more extensive flow-constriction and bank stabilization structures. This portion of the UMR is approximately 195-miles long and is referred to as the "open river" or "middle river" because locks and dams are not used along this stretch of river to maintain the navigation channel.

During the 1990s, the USGS - EMTC (Yin, Nelson, Lubinski) studied bottomland forest changes along the UMRS. According to the General Land Office (GLO) records analyzed for the southernmost portion of the UMR near Cape Girardeau, Missouri, the 1809 presettlement floodplain landscape was dominated by forests (71.4 percent) with open water and prairie-marsh habitats occurring in the remaining areas. In 1809, GLO surveyors recorded 19 tree taxa along the Mississippi River as witness trees. Cottonwood (*Populus deltoides* Marshall) and sycamore (*Platanus occidental* L.) were the two most dominant species of these taxa. Farther away from the river in that portion of the floodplain which today is shielded by the mainline levee, GLO surveyors recorded a total of 31 tree taxa. Of these taxa, elm (*Ulmus* L.), sweetgum *(Liquidambar styraciflua* L.), and ash (*Fraxinus pennsylvanica* Marshall, *F.* spp.) were the most dominant species. Close associates included hickories (*Carya* spp), white oak (*Quercus alba* L.), American beech (*Fagus grandifolia* Ehrh), and yellow poplar (*Liriodendron tulipifera* L.).

From 1809 to 1989, the forested landscape decreased to 18.9 percent in the Cape Girardeau area floodplain. Agricultural lands increased from non-existent in 1809, to 62 percent of the landscape in 1989.

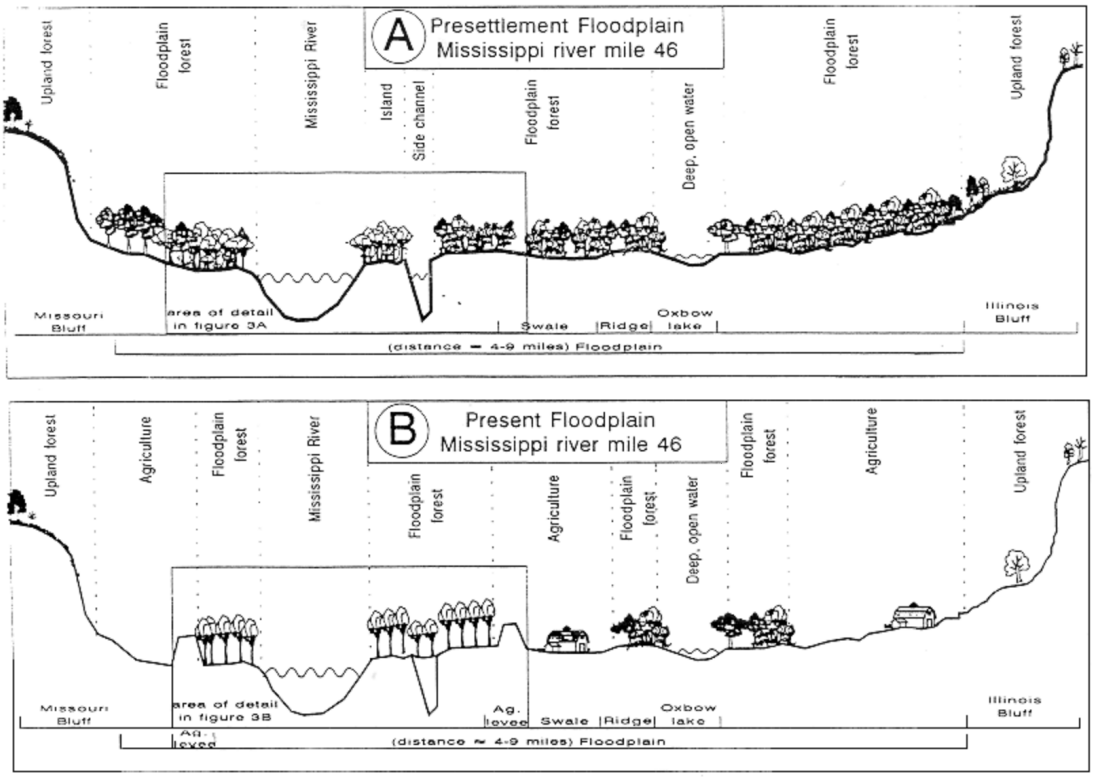
Today federal levees and navigation structures have changed the character of the Mississippi River and its hydrologic regime at the open

river reach. Because floodwaters are restricted to a much narrower area between levees, intensity and duration of flooding are aggregated, but upstream reservoirs have counteracted this effect. Elevated floodwaters are now more likely to overtop tree root crowns and remain so for an extended period of time. As a result, tree growth may be adversely affected and some less flood-tolerant tree species may disappear (Johnson, et al. 1974). Within levee districts, moisture and nutrients are no longer replenished by periodic overbank flows and less moisture may be available from the underground water table when the river flow is low.

A 1993 survey at the open river reach near Cape Girardeau, Missouri, indicates that changes in forest composition and structure since presettlement are related to agricultural practices, logging, urban development and changes in hydrology resulting from navigation structures and the Federal levees. The number of species encountered has decreased on both sides of the levees. Adjacent to the Mississippi River and between levees, species such as oak (*Quercus* spp.), American beech, walnut (*Juglans* spp.), pecan, and hickory have disappeared and the abundance of cottonwood and sycamore, two pioneer species that require newly formed and somewhat sandy substrates for regeneration, have also decreased significantly.

Willow and silver maple have replaced cottonwoods and sycamores as the dominant species. Sediments which rapidly accumulate in the fields between wing dams have narrowed the river channel. These newly formed sites usually are quickly invaded by willow, which is soon replaced by silver maple. Outside the mainline levee and within the levee districts, tree species typical of pioneer and transitional forests such as cottonwood, sycamore, elm and hackberry have decreased since presettlement. Pin oak has become the most dominate species because

Figure 9 – 2 Cross section of the Open River Floodplain at RM 46. In the presettlement era (Part A), the floodplain was covered with bottomland hardwood forests. Presently (Part B), levees and dikes restrict river meandering and most of the bottomland hardwood forests have been cleared for agriculture



the floodplain has been drained for agriculture and flooding has been significantly reduced; pin oak prefers the resulting drier site conditions.

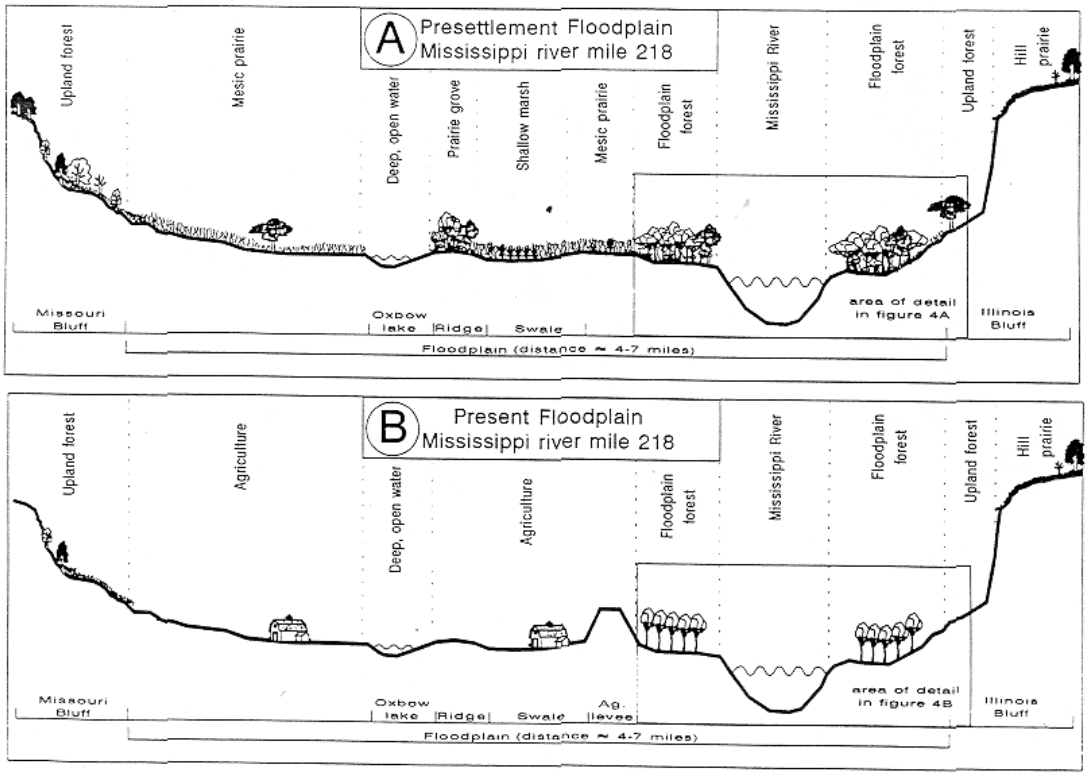
The Pooled River

In 1930, Congress authorized the extension of the nine-foot channel between St. Louis, Missouri, and St. Paul, Minnesota. During the 1930s, a series of 27 locks and dams were constructed for this purpose. Each dam impounds water during the low river flows to maintain a minimum nine-foot deep navigation channel. This portion of the UMR is approximately 652 miles long and is referred to as the “impounded” or “pooled river.”

In the impounded river near St. Louis, Missouri, prairies dominated the presettlement floodplain landscape. Forests were restricted to areas along the riverbanks, tributary systems, and isolated groves surrounded by floodplain prairies.

In the early 1990s, the Illinois Natural History Survey (Nelson, Redmond and Sparks) conducted a study on historical changes in floodplain vegetation in the Calhoun Point area of Navigation Pool 26 on the Mississippi. Government Land Office (GLO) survey records were used to reconstruct the presettlement floodplain landscape at the confluence of the Illinois and Mississippi Rivers at Calhoun Point. Presettlement prairie and forest land covers were determined by digitizing GLO plat maps using a computerized geographic information system (GIS). A case history of land cover change was determined by comparing this presettlement map to GIS land cover maps for 1903, 1935, and 1975. Data from witness trees and current forest samples were used to compare presettlement and present day forest composition and structure. Results indicate that approximately 56 percent of the presettlement floodplain was forested, while 41 percent was prairie and

Figure 9 – 3 Cross section of the Pooled River Floodplain at RM 218. In the presettlement era (Part A), the floodplain was dominated by prairie wetlands. Presently (Part B), agriculture has replaced the prairies but many of the floodplain forests still remain, although less diverse in structure and number of species.



open wetlands. The presettlement forests were generally open (86.8 stems/ha) and consisted of several dominant tree species.

General Land Office (GLO) surveyors at the confluence of the Illinois and Mississippi Rivers in 1817 recorded 18 taxa of witness trees. These forests were dominated by hackberry, pecan (*Carya illinoisensis* [Wangenl] K. Koch), elm, willow (*Salix* spp.) and close associates including silver maple (*Acer saccarinum* L.), pin oak (*Quercus palustris* Muenchh), and ash.

In contrast, the present forest is more dense (489 stems/he) and is dominated by silver maples (*Acer saccharinum* L.). Early settlement had little effect on the spatial distribution of forest cover, but river impoundment in 1939 reduced forests to approximately 35 percent of the floodplain. Prairies were converted to agriculture during the middle 1800s and now occupy only 6 percent of the floodplain.

The rivers flood regime has been altered due to human needs and development over the years. Forests species now bordering the river in impounded reaches must be well adapted to higher soil moisture content throughout the growing season. Silver maples and willows are well adapted to the modified conditions and have therefore become the most abundant species on the floodplain. It is quite possible that our future forests may be entirely dominated by silver maples because this species is best adapted to modified conditions, especially high soil moisture content and increased flood disturbances.

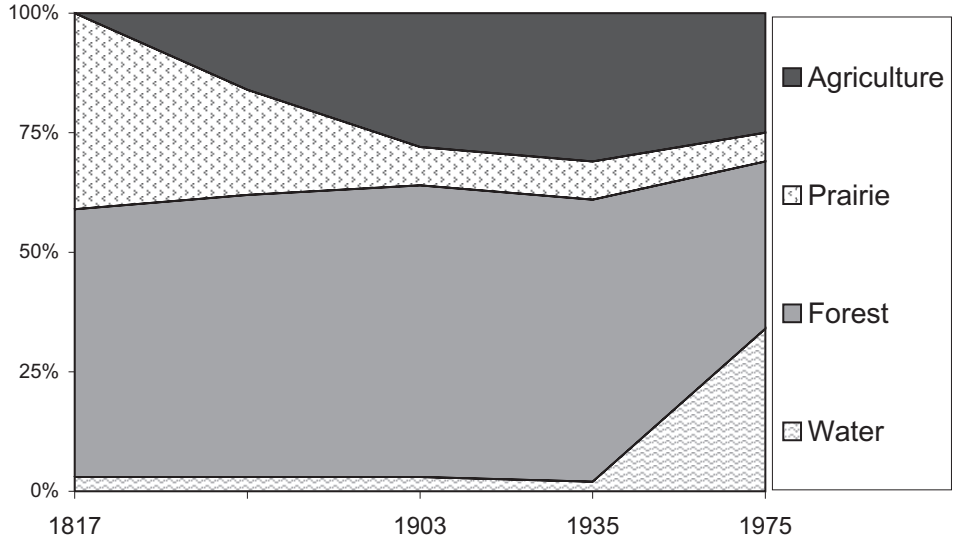
Agricultural and urban development and poor timber harvesting practices are the primary causes for rapidly diminishing forests throughout most of the UMR floodplain. A recent study revealed that by 1989, forests occupied only ~14 percent of the total area from bluff to bluff in the UMR floodplain (Laustrup and Lowenberg 1994) The percentage of forested areas is highest in Navigation Pools 2 to 13 (18.2 percent), intermediate in Pools 14 to 27 (13.6 percent) and lowest in the open river reach (12.4 percent).

Agriculture had nearly eliminated the prairies by 1891, while forests were less affected.

Field notes of GLO office surveyors from 1817 and plat maps based on the same GLO surveys indicate that the Pool 26 floodplain was

Figure 9 – 4

The Percent Distribution of Several Types of Land Cover Types in 1817, 1903, 1935 and 1975 on Navigational Pool 26



approximately 63 percent prairie wetlands with forests bordering the riverbank and tributary streams.

In summary, a significant loss of open native prairies, wetlands and bottomland forest cover, and less diversity within the remaining forests and in newer successional forests, are critical habitat problems on the UMRS.

Tree Mortality in the Upper Mississippi River Floodplain Following the Flood of 1993

Periodic seasonal flooding is a critical factor influencing forest composition, productivity, and distribution within large river-floodplain ecosystems. Forest communities of large river floodplains are established corresponding to the degree of species adaptation to flood regimes. The distribution patterns of individual plant species or plant communities on the floodplain are considered a reflection of flood gradient. The most flood-tolerant species and communities are found in areas least subject to periodic inundations. Forest succession along this flood gradient is strongly influences by the long-term flow regime or average flood pattern, as well as unusual hydrologic events such as extreme droughts and floods that are not seasonal or predictable (Wistendahl 1958; Lindsey et al. 1961; Johnson et al. 1976; Johnson 1974).

Few experts predicted that the 1993 flood in the Upper Mississippi River System would have long-lasting effects on floodplain forests until the real magnitude of those effects became evident after many trees failed to leaf out in the spring of 1994. During 1994, seven reaches of the UMRS floodplain were investigated to assess post-flood tree mortality. The seven river reaches were Navigation Pools 4, 8, 13, 17, 22 and 26, and an open river reach near Cape Girardeau, Missouri.

An unusual wet weather pattern persisted over the Upper Midwestern United States in 1993, causing record flooding throughout much of the basin (Parrett et al. 1993; Wahl et al. 1993). The flood was unusual in terms of its timing and duration. Above normal river stages persisted throughout most of the 1993 growing season in the UMRS. At St. Louis, Missouri, river water reached floodstage on June 26 and remained above floodstage until mid August. Study results reveal the highest mortality rates and impacts occurred in the Rivers Project Service area.

From the UMRS headwaters (Pool 4) downriver (Pool 26), mortality rates increased progressively, from 1.1 percent to 37.2 percent for trees and from 1.8 percent to 80.1 percent for saplings. Further downriver, in the open river reach, mortality rates were similar to those in Pool 26 with 32.2 percent of mature trees dead and 77.2 percent of saplings dead. Overall mortality rates varied among species and were negatively correlated with tree diameter and positively correlated with flood duration and flood amplitude. The impacts of the 1993 flood, as evidenced in subsequent years, demonstrate that extreme flooding in a single growing season is enough to constitute a severe disturbance to the river-floodplain ecosystem lasting many years.

Tree Mortality and Species

On Pool 22, just upstream of the St. Louis District boundary, a total of 529 trees of 16 species was sampled. The forest was dominated by silver maple. Dead trees belonged to 10 species; boxelder, silver maple, sugarberry (*Celtis laevegata L.*), hackberry, green ash, white mulberry. Eastern cottonwood, pin oak, American elm, and slippery elm. Based on percent mortality rates, hackberry, white mulberry, and sugarberry were less tolerant of flooding; silver maple and slippery elm were moderately tolerant; and black willow, sycamore (*Platanus occidentalis L.*), eastern

cottonwood, and American elm were more tolerant. In Pool 26, a total of 712 trees of 22 species was sampled. Silver maple was the dominant species, with American elm and hackberry as co-dominant species. Dead trees belonged to 10 species, including box elder, silver maple, hackberry, hawthorn (*Crataegus spp. L.*), persimmon (*Diospyros virginiana L.*), green ash, white mulberry, eastern cottonwood, pin oak, and American elm. Based on percent mortality rates, hackberry was less tolerant to flooding; box elder and eastern cottonwood were moderately tolerant; and pecan, silver maple, hawthorn, green ash, and American elm were more tolerant.

In the open river, the magnitude of flood impact was similar to that in Pool 26. Here, a total of 590 trees of 14 species was sampled. Silver maple, black willow and box elder were the three dominant species of the forest. Dead trees belonged to 10 species; box elder, silver maple , hackberry, green ash, white mulberry, sycamore, eastern cottonwood, sandbar willow (*Salix exigua Nutt.*), black willow and slippery elm. Based on percent mortality rate, hackberry and white mulberry were less tolerant to flooding; boxelder, silver maple, sycamore, and sandbar willow were moderately tolerant; and black willow and slippery elm were more tolerant.

Sapling Mortality and Species

In Pool 22, just upstream of the St. Louis District boundary, a total of 436 saplings of 12 species was sampled. Dead saplings belonged to 11 species: boxelder, silver maple, sugarberry, dogwood (*Cornu* spp. *L.*), hawthorn, swamp privet (*Forestiera acuminata Michx.*), green ash, white mulberry, American elm, and slippery elm. In Pool 26, a total of 694 saplings of 22 species was sampled. Dead saplings belonged to 11 species; boxelder, silver maple, hackberry, dogwood, hawthorn, persimmon, swamp privet, green ash, pin oak, sandbar willow, and American basswood (*Tilia americana L.*), In the open river, a total of 545 saplings was sampled. Dead saplings belonged to 12 species, which were boxelder, silver maple, hackberry, sugarberry, dogwood, swamp privet, green ash, white mulberry, sycamore, sandbar willow, black willow and slippery elm.

Future Approaches

It is a great challenge to river biologists and managers to sustain multiple uses and at the same time protect the ecological integrity of the UMR. Preserving and restoring forests and other habitats on the UMR floodplain will require a continuous effort. As a part of this effort, it is important to study presettlement floodplain ecosystems as well as the qualitative changes of the existing habitats such as natural regeneration, diversity and productivity. Future research efforts need to quantify the relationships between hydrologic regimes (including flood timing, frequency, intensity and duration) natural regeneration, and growth, composition and species survival rates in floodplain habitats. Experimentation and on-site documentation of the reaction of trees to water table and water table fluctuations remain an open field for investigation (Bedinger 1978). Habitat simulation models may be developed to synthesize field data and to predict the effects of different river regulation schemes. (Bedinger 1978). Restoring habitat diversity through ecologically sound methods of regulating river flow, coupled with artificial regeneration of some species, should be set as the short-term goal.

A long-term management strategy should take a watershed approach that integrates forest management with the management of water, navigation, and land use. (Sparks et al. 1990, Sparks 1995, Gore and Shields 1995). The Rivers Project Office will use available data and the Forest Cover Act authorities to pursue forest recovery efforts.

9.17.FOREST MANAGEMENT

The Forest Cover Act of 1960 (Public Law 86-717) provides the Corps a statutory mandate for multiple use forest management and other vegetative cover management such as wetlands and grasslands on project lands and waters. Forest habitat management will be applied to develop, maintain, protect, and/or improve vegetation conditions for timber, fish, wildlife, soils, recreation, water quality and other beneficial uses. Section 9.16, Regional Habitat Losses documents some of the primary floodplain/riparian forest concerns in the Rivers Project area.

As an agency entrusted with stewardship of public lands, a key management objective is to promote and maintain a healthy, diverse forest resource which will produce and support a variety of sustainable benefits such as wildlife and fish habitat, public outdoor recreation opportunities, scenic values, pest control and watershed protection.

Wherever the opportunity exists to sustain diverse and appropriate conditions in support of these benefits, proper management techniques will be applied.

Section 2 of the Forest Cover Act provides authority for the Corps to manage project lands and waters for any or all conservation purposes, including fish and wildlife conservation. The Corps will conduct fish and wildlife management activities which seek to maintain populations of targeted wildlife species through the manipulation and management of habitat. The Corps will coordinate and conduct its program in conjunction with other federal, state and local agencies having fish and wildlife management responsibilities using a variety of techniques.

Key objectives identified to respond to forest management needs consistent with Forest Cover Act provisions on Rivers Project lands are:

- Improve and maintain the aesthetic qualities of the resource for recreation.
- Promote age and species diversity of the forest on a long-term basis through various silvicultural practices to recover healthy riparian plant and animal communities.
- Improve the quality of the forest resource as wildlife habitat in accordance with USFWS, State and Corps wildlife management objectives.
- Protect and, where appropriate, rehabilitate wetlands and preserve environmentally sensitive areas, particularly unique or regionally important terrestrial and aquatic habitats.
- Prescribe forest management activities which advance regional ecological priorities.
- Enhance effective working collaborations with other federal, state and local agencies and with all other interested parties.
- Encourage a cooperative exchange of management philosophies, techniques and information with other natural resource management professionals and academia.
- Implement an inventory and monitoring program which will provide data on the long and short term effect of forest management practices on the environment.
- Work within the Corps to effect close collaboration with the Rock Island District and St. Paul District to insure a complimentary program that is responsive to forest management needs identified for the UMRS floodplain.

9.18. LACK OF LEVEL ONE AND LEVEL TWO INVENTORIES

The Corps stewardship responsibility is to manage, conserve, and protect this natural resource for sustained use by future generations. Natural Resource inventories are required on project lands and waters to provide quantitative and qualitative data for use in determining resource management needs. There are two types of inventories: Level One and Level Two.

The Level One inventories are general in nature and are conducted to provide baseline information. Inventories are conducted in sufficient detail to determine general plant and animal composition, acreage of dominant vegetative types, soil types, land use capabilities, and the presence of special status species and their critical habitat occurring on project lands and waters. A Level One inventory shall be accomplished using available information from a variety of sources, such as USGS maps (LTRM), county soil surveys, USFWS information, aerial photography, Corps real estate maps, project planning and design memorandums, and state DNR resource information.

The Level Two inventories are prepared in support of the resource objectives and/or land use classifications and are generally more detailed or specific. These inventories are required for the effective development, execution and evaluation of specific natural resources management prescriptions.

Previous efforts to adequately fund inventories have fallen short. Consequently, the Rivers Project Office has not conducted Level One and Two inventories for forest habitat, prairie habitat, wetland habitat, aquatic habitat and endangered species. Completion of these inventories has been elevated as a funding priority of the Rivers Project Office as they are critically needed to protect and sustain habitats, fish, wildlife and endangered species and other stewardship opportunities.

9.19. HISTORIC RESOURCES PROTECTION NEEDS

In Missouri and Illinois, the greatest concentrations of archaeological sites are found in the river corridors, which are the most fertile and accessible areas. The Illinois and Mississippi River valleys are major areas to find prehistoric remains.

The river floodplain constitutes an area of great archaeological potential based on a large number of physiographic and ecological features. These non–renewable and non-replaceable sites occur from the bluffline to the shoreline and are distributed throughout the floodplain. On frequently flooded portions of the floodplain, cultural materials are often found out of context due to the frequent disturbance caused by flooding and erosion. As a result, the value of the information gained from these sites is often diminished. Regardless, development and management plans have to be sensitive to the fragility of these cultural resources and should incorporate measures to protect and conserve them.

The river valley is rich in historic sites, buildings of architectural interest, old river towns, and seasonal cultural events as well. Most river towns, which once served as steamboat landings, still retain historic aspects of their association with the rivers.

The operation and maintenance of a navigation project creates a number of indirect problems in preserving cultural resources. These problems pertain to secondary development induced by the presence of the waterway, and to channel maintenance activities. Any substantial land–use change may affect unknown cultural resources.

Dredging operations have the potential to bury unknown archaeological sites. The construction of dikes and placement of riprap along the shoreline can adversely affect cultural resources. If sites are located, appropriate testing, evaluation, and compliance procedures will be followed before construction will occur. Erosion also represents a problem in managing archaeological and historical resources.

A historic properties management plan is required and is being prepared to enhance identification, evaluation, and management of these resources. In part, the plan is designed to address and provide for solutions to this resource management challenge.

Pursuant to various federal legislation, particularly the National Historic Preservation Act of 1966 as amended, the St. Louis District Rivers Project office will implement a program to identify, evaluate, and manage archaeological sites on operational lands within the project area. Data synthesis will be completed which summarizes all known archaeological information, including descriptions of each site, and identifies existing gaps in our knowledge about the River's archaeology. Components of future investigations shall include: (1) Landform sediment analysis to predict locations of burial archaeological sites (2) Bank erosion analysis to identify locations subject to destruction (3) Comprehensive archaeological surveys of the ground surface and (4) Shipwreck inventories and surveys.

9.20. ENDANGERED SPECIES PROTECTION AND RECOVERY

Policy for the administration and management of project natural resource activities is contained in ER 1130-2-540. Guidance for the administration and management of environmental stewardship and natural resource management activities is contained in EP 1130-2-540.

General

The Endangered Species Act (ESA) mandates the project to utilize its authority to carry out programs for the survival, conservation and recovery of federally listed endangered (E) and threatened (T) species, including participation in the implementation of endangered species recovery plan efforts. The following federally listed endangered and threatened species are known to occur on project lands and waters and have existing recovery plans:

Project lands and waters will be managed in a manner, which will assist in the overall survival, conservation and recovery of Special Status species known to occur on project lands. Special Status species include endangered and threatened listed and proposed for listing species by the USFWS under the provisions of the Endangered Species Act, candidate and sensitive species designated by the USFWS, species designated under the Migratory Bird Treaty Act, and potential endangered or extinct species protected by state statute. Detailed, level 2, inventories will include information conducted at frequencies necessary to determine presence, abundance and significant changes of existing population levels, the presence of new populations, type of occurrence and critical habitat of Special Status species. Inventory measures and procedures will be utilized which will enable the protection of these Special Status species and their habitat, and participation in their recovery. Recovery plans will be reviewed and assessments made of potential project natural resource management actions identified in each recovery plan, including a determination of reasonableness for each action and incorporation into operational management plans. Level 2 inventories and recovery plans reviews will be conducted in association with the preparation of operational management plans that are scheduled to be completed by 2005.

The project is assisting in the recovery of the Bald eagle, Peregrine falcon, Interior least tern, Pallid sturgeon, Fat pocketbook and Higgins' eye pearly mussels, and Decurrent false aster.

ESA Section 7 Consultation Covering Operation and Maintenance of the Nine-Foot Navigation Channel

The Mississippi Valley Division and Region 3 of the USFWS entered into formal Section 7 Consultation under the Endangered Species Act in April 1998. This consultation was concluded in August 2000. The consultation was based on the operation and maintenance of the Nine-Foot Navigation Channel effect on the river.

The consultation resulted in the following Biological Opinion for the St. Louis District:

- Adverse affect resulting in Incidental Take with no significant Reasonable and Prudent Measures (RPM) statement for Decurrent false aster, Bald eagle, and Indiana bat (predicated on increasing ongoing management efforts.)
- Adverse affect resulting in Incidental Take with a RPM statement for the Least tern.
- Jeopardy decision with a Reasonable and Prudent Actions (RPA) statement and Incidental Take with a RPM statement for the Pallid sturgeon.

Implementation of the Biological Opinion covers a fifty-year time frame; however, the decisions for the Least tern and Pallid sturgeon include much shorter and definite time frames for specified actions.

Table 9-5
Federally Listed Endangered and Threatened Species on Project Lands and Waters

Gray bat	*(Myotis grisescens)* - E
Indiana bat	*(Myotis sodalis)* - E
Bald eagle	*(Haliiaeetus leucocephalus)* - T
Interior least tern	*(Sterna antillarum)* - E
Peregrine falcon	*(Falco peregrinus anatum)* - E
Pallid sturgeon	*(Scaphirynchus albus)* - E
Fat pocketbook pearly mussel	*(Potamilus capax)* - E
Higgins' eye pearly mussel	*(Lampsilis higginsi)* - E
Decurrent false aster	*(Boltonia decurrens)* - T
Sicklefin Chub	*(Macrhybopsis meeki)* - Candidate
Sturgeon Chub	*(Macrhybopsis gelida)* - Candidate

9.21. OPEN RIVER ISSUES

Introduction

The Mississippi River Nine-Foot Navigation Channel Project is a project with a single purpose: navigation. This single purpose authorization provides no clearly defined mandate to manage the Mississippi River as a system and to address all of the resources and uses of the river. This limited authority is further restrictive on the Open River because the Corps does not own or operate fee title lands and waters for the Nine-Foot Navigation project as it does on the pooled portion of the river. As the Corps pursues its channel maintenance activities on the open river, opportunities to benefit wildlife or the vegetative community are often noted and, in some cases, habitat improvements are realized through innovative engineering techniques used to improve and maintain the navigation channel. However, with limited authority, many opportunities are generally not pursued except as required by the NEPA, FWCA and the ESA.

Habitat degradation concerns

The overall biological health of the open river is a concern. The main channel, main channel border, side channel and terrestrial riparian corridor habitat types are is varying degrees of distress. Rehabilitation and protection efforts are needed in many locations. At least three

endangered species, one threatened species and two candidate species are known to be present in the open river area.

The degradation and loss of side channels habitat is of particular concern within the open Mississippi River. These habitats not only supply important nursery and over-wintering areas, they are an extremely important carbon energy generator for the entire river system. Due to the aquatic habitat losses, it is important to conserve and rehabilitate existing side channels in a manner that is compatible with, or complementary to channel improvement and maintenance activities.

Since the late 1960s, an interagency team composed of Corps, USFWS, IDNR and MDC personnel have worked together to develop consensus on dredging activities and placement of river regulating works for navigation purposes. The scope of the team was generally confined to input on basic navigation channel O&M activities. Since the early 1990s, the scope of this team, now known as the River Resources Action Team, has expanded. A system-wide view of navigation and environmental concerns are now addressed with emphasis on non-traditional, innovative and environmentally sustainable methods for managing the river for navigation. This team identifies and, through the use of navigation O&M practices, various cost sharing authorities and partnering strategies, attempts to catalyze into action opportunities to protect, restore and enhance environmental conditions on the river in a manner that is harmonious with navigation purposes.

Open River Side Channel Inventory and Restoration Priority Ratings

Through field investigations and evaluations, the restoration potential of the existing major side channels are grouped by priority: High, Medium, Low, Further Investigation, and Monitor. This is a preliminary ranking system and the side channel/areas within each ranking category are not prioritized.

High Priority (needs attention now and good value for effort):

- Salt Lake Chute (RM 139.0 - 136.0 L)
- Fort Chartes Chute (RM 134.3 - 132.2 L)
- Establishment Chute (132.5 - 130.0 R)
- Jones Chute (RM 98.3 - 94.9 R)
- Crawford Chute (RM 73.9 - 71.5 L)
- Buffalo Island Chute (RM 26.3 - 24.5 R)
- Area between RM 98.2 and 73.8 (no side channels, islands or off-channel habitats).
- Marquette Chute - plans and specs ready, awaiting construction (RM 51.0 - 47.0 L)
- Schenimann Chute - Plans and specs ready, awaiting construction (RM 62.5 - 57.0 R)

Medium Priority (existing conditions not critical and good value for effort)

- Maple Island (RM 198.5 - 200.8 R)
- Mosenthein/Cabaret/Chouteau side channel (RM 185.1 - 189.0 L)
- Atwood Chute (RM 161.5 - 160.8 L)
- Calico Island Chute (RM 148.2 - 147.1 L)
- Osborne Chute (RM 146.3 - 144.1 L)

- Picayune Chute (RM 60.8 - 54.7 L)
- Liberty Chute (RM 103.0 - 100.0 L)

Low Priority (area in relatively good shape and little or no action required):

- Moro Chute (RM 122.6 - 120.0 L)
- Beaver Island/Horse Island and adjacent channels (RM 117.9 R)

Further investigation (observe different water conditions, ownership, etc):

- Arsenal/Cahokia Chute (RM 176 L)
- Beard/Carroll J. B. Chute (RM 167.7 - 166.5 L)
- Chute (RM 105.2 - 104.4 R)
- Billings/Powers Island (RM 31.2 - 35.6 R)
- Thompson Chute (RM 15.7 R)
- Sister Chute (RM 14.4 - 11.9 R)
- Boston Bar Chute (RM 10.2 - 7.6 L)
- Angelo Chute (RM 5.2 - 1.3 L)
- Area at RM 24.5 - 21.8 L)
- Brown's Bar (RM 24.5 - 21.8 L)

Monitor (initial work completed and need to confirm reaction of side channel):

- Santa Fe Chute (RM 40.4 - 35.0 L)
- Chute/Island (RM 31.0 - 29.0 L)

Realizing implementation of the habitat restoration needs on the open river will most likely require use of numerous authorities, approvals, funding mechanisms and partners over a number of years. It is unlikely that all features within a side channel will be built using just one authority. It is also probable that not every action will be completed within a side channel prior to moving on to other side channels. In essence, the requirements for any given side channel may be funded using different authorities for each feature and may be staged over several years. It is also possible that individual features within a side channel plan would be built solely under the authority of our partner agencies/organizations and be totally funded by them. Therefore, any comprehensive open river habitat restoration effort should be considered a series of projects with numerous implementation processes, partners and inter-jurisdictional responsibilities.

9.22. INTER-JURISDICTIONAL WATERSHED AND ECOSYSTEM PLANNING NEEDS

Overview

The natural resources and recreational opportunities available within the Rivers Project Service Area is fairly representative of those found throughout the Mississippi-Illinois-Kaskaskia River basin systems. These watershed systems offer unique sets of values, natural beauty and biological productivity which is worthy of conservation, management and interpretation. The diversity and extent of the land and water areas provide a valuable resource for fish and wildlife habitat, recreation, and scenery. The social and economic benefits of the rivers for humans is of extreme importance as well. The federally owned lands and waters

managed by the Corps and other agency partners provide the nearest river oriented recreation areas for people in the St. Louis Metropolitan area and many other regional communities.

The wetlands associated with the rivers are the most extensive in the region and are critical for the survival of hundreds of species of fish, wildlife and waterfowl. These areas must be protected wherever possible from development that would detract from their existing and potential values.

This is the challenge faced by the numerous management and regulatory agencies, the scientific communities and the many concerned private organizations and individuals throughout the region.

Today there still lacks a sound mechanism on the river that ensures the many concerned entities work together and coordinate activities for the general welfare of the public and the natural resource. Plans and actions are fragmented and focused generally on specific segments of the river watersheds, not on the entire basin. For example, this Master Plan can only address the river areas and issues within the jurisdictional boundaries of the St. Louis District from primarily an operations and maintenance viewpoint, on lands for which the Corps has administrative responsibility for management. Past basin-wide efforts have still not solidified primarily due to institutional and economic barriers that inhibit total support and achievement of watershed level objectives and goals.

While attempts at watershed planning have achieved only limited successes to date, this effort should not be abandoned, but should be accelerated. Scientific and economic knowledge and technology today further reinforce the need to manage our rivers on the watershed level utilizing ecosystem management principles and sustainable development practices. It is not controversial to say that there needs to be biologically and economically viable rivers in the next century. The need is well understood. How to do it is still being defined and established. Only through development of some kind of comprehensive regional watershed or basin plan that is acceptable and implementable can we truly sustain the health of our large river watersheds.

Watershed Planning Strategy

Because of the size of the river's watershed and the complexity and number of environmental, social and economic issues that would be addressed in a comprehensive management plan, it is logical to group issues into major categories. For the Upper Mississippi River (UMR) basin, the most appropriate categories may correspond to the physical characteristics of the basin and the nature of the issues. Discussion of the issues, and management strategies may be facilitated more efficiently if the issues were organized as follows:

- River Channel Issues
- Riparian Zone Issues
- Watershed Issues
- Institutional Issues

River Channel Issues

The main river channel issues are those that are related to the condition and management of the main river channel of the UMR. The major factor in the management of the main river channel are of course the requirements for navigation and its environmental impacts. Therefore the important issues may include the following:

- River regulation for navigation
- Navigation impacts (Commercial and Recreational)
- Sedimentation and dredging
- Water quality
- Accidental spills of hazardous materials

Riparian Zone Issues

The riparian issues are those that deal primarily with the backwater and floodplain habitats of the UMR valley. Because of the size of the UMR valley and the importance of the aquatic and terrestrial habitats there are a number of issues that are especially relevant. These issues include the following:

- Backwater lakes and side channels
- Vegetative cover
- Flood pulse and floodplain management
- Levees
- Wetlands
- Stream bank and bluff erosion
- Sedimentation
- Water quality
- Sediment quality
- Recreation
- Public Lands
- Wildlife Usage
- Refuges

Watershed Issues

Issues that are more pertinent with respect to the large watershed outside of the river channel and the valley would be addressed under watershed issues. These issues may include:

- Floodplain Development
- Agriculture
- Urban development
- Watershed erosion types and sources
- Point and Non-point source pollution
- River corridor management
- Inter-jurisdictional responsibilities
- Greenway development

Institutional Issues

A comprehensive management plan for the watershed has to include guidelines on how the recommendations will be implemented. Two very important issues would be how the plan proposals would be financed and which agencies or organizations will be responsible for implementation. Because of the number of issues and the size of potential projects, many federal, state, and local agencies and private organizations will have to be involved. Therefore the mechanism for coordination and cooperation of the different agencies will be one of the most important issues that has to be dealt with in a comprehensive management plan. Implementation of most of the recommendations of a comprehensive management plan for a basin the size of the UMR will require significant financial outlay, which is unlikely to be available under existing programs. Therefore, new authorizations and funding mechanisms have to be developed and proposed as well.

SECTION X

COST ESTIMATES

10.1. INTRODUCTION

General

The following tables show preliminary unit costs for Corps and partner agency development of proposed new actions and replacement/rehabilitation of facilities at the Rivers Project as described in Subsection 7.4 Management Area Descriptions. During actual detailed design of each element, variations in types and quantities of materials, modifications of facilities, inflationary trends, and results from additional engineering tests will undoubtedly occur. Costs were prepared by Engineering Division Cost Estimating Branch, St. Louis District. In addition, preliminary cost estimates to develop and complete other O&M management plans are included at the end of the section.

The proposed conceptual recreation plans described in Section 7.4 and cost estimated in this section, require further analysis related to need, carrying capacity, facility locations, O&M efficiency and cost-sharing partnering requirements prior to implementation. All conceptual cost estimates (Recreation and Environmental Stewardship related) will require further development prior to implementation to include: appropriate budget process approvals, study and design requirements, special authority designations and/or formal partnering and cost-sharing agreements. All Operations and Maintenance, and Repair and Rehabilitation agreements or requirements, will be established and approved (per legislation, regulation, policy, imposed budget restrictions, etc.) for all proposed activities prior to implementation.

Summary of Costs

Cost estimates for the proposed new actions and proposed replacement facilities are identified in the following tables.

SECTION XI

IMPLEMENTATION OF THE MASTER PLAN:

OPERATIONAL MANAGEMENT PLANS

11.1. INTRODUCTION

Master Plans and Operational Management Plans are developed and implemented with a view to their working in tandem. The Master Plan covers all resources of the project including, but not limited to, fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and out-granted lands, easements and project waters (submerged lands held in fee).

This Master Plan focuses on three primary components:

- Regional and ecosystem needs
- Project resource capabilities and suitabilities
- Expressed public interests and desires

The Master Plan ensures that environmental mandates and considerations are incorporated and that the economy and quality shall be given equal attention in the development of public facilities and support infrastructure. Usually, every ten years, the master plan is reviewed and updated and can be supplemented at any time when it becomes appropriate or necessary to do so. Based on an approved Master Plan, the Rivers Project develops and implements an Operational Management Plan (OMP) to achieve the objectives stated in the Master Plan.

The Master Plan serves as the planning document that establishes the authority to act and the OMP is the implementation or action document that lays out the actual work, task schedules, costs and funding strategies for realization of the goals and direction set forth in the Master Plan.

Within the OMP, objectives and implementation strategies are established for each major area of emphasis: natural resource management, and park and recreation management.

The OMP, under separate cover, details objectives and strategies to implement programs within the environmental stewardship, recreation and flood damage reduction business areas conceptually addressed in the Master Plan. Public access, environmental compliance, interpretation and outreach, recreation safety, shoreline management, habitat management, fire protection and fish and wildlife management, endangered species protection and facilities/infrastructure operations and maintenance are some of the major programs addressed in the OMP. During development or revision of OMPs, emphasis is given to achieving environmental mandates and other ecological imperatives of a national, regional or ecosystem nature. Emphasis is also given to achieving economy in planning, designing, constructing and managing natural and recreational resources, facilities/infrastructure and other services.

Concepts are refined into actual work items with schedules and cost estimates for completion.

OMP management strategies must be consistent with authorized project purposes and approved resource use objectives and land use classifications established in the project Master Plan.

The OMP is dynamic in nature and includes funding, staffing and schedules required to implement management activities and strategies for the entire project. Approval for the OMP and all subsequent updates rests with the District Commander. Portions of the OMP (funding, staffing, equipment needs) are updated each year resulting in a set of work plans that are approved annually by the District Commander. All approved work is based on consistency with the OMP and are contingent on the availability of funds

For outgranted areas, the OMP will include the outgrantees' management plans for the area and information on how the outgranted areas management supports the overall management objectives of the project.

Cooperation and input from partners supporting management objectives and interested customers, organizations and the general public is encouraged during formulation and updating of the OMP.

Management Areas addressed in the OMP are organized into compartments consistent with the project Master Plan.

Key topics addressed under the main business areas (Environmental Stewardship Management, Recreation Management and Flood Damage Reduction) are listed as follows:

Environmental Stewardship

- Long Term Objectives of Resource Management
- Compartment Descriptions
- Topography (slope, aspect, general soil type, etc.)
- Aquatic Resources (type, temperature, turbidity, etc.)
- Vegetation (species, size, density, etc.)
- Fish and Wildlife (species)
- Special Considerations or Problems (protected or rare/unique habitat, rare and endangered species, national emphasis programs (e.g., Watchable Wildlife North American Waterfowl Management Program and Neotropical Migratory Birds, etc.), pollution, forest fire control)
- Management Objectives (for each compartment)
- Implementation Plan (for each compartment)
- Management Techniques (to meet objectives)
- Five-Year Schedule (of management techniques to be applied)
- Annual Staffing and Equipment needs
- Annual Costs
- Coordination (with other elements/agencies/the public)

Recreation Management

- Safety (employee, contractor, and visitor)
- Security

- Visitor Assistance
- Shoreline Management
- Private Exclusive Use (existing approved regional plan may be inserted as is)
- Outgrants
- Maintenance
- Recreation Use Fee Program
- Interpretation
- Cultural Resources
- Project Sign Management Plan
- Special Programs
- Cooperation (with other agencies and/or special interest groups)
- Five-Year Program (for park management)
- Priority List (of annual programs with staffing and funding requirements)

Flood Damage Reduction

- Develop inventories and prescriptions for operation and maintenance of all federally owned and operated flood damage reduction infrastructure located on lands and waters managed by the Rivers Project Office.

11.2. RIVERS PROJECT OMP DEVELOPMENT

The Rivers Project OMP will be organized and developed by Pool or Reach, Compartment, and Unit as outlined below. On outgranted areas, detailed management plans will be prepared and approved by the managing agency. The Corps will review, approve and provide administrative oversight for those management plans.

Pool 27

Compartment 1 – Chain of Rock Canal Management Area

- UNIT I - American Bottoms
- UNIT 2 - Chouteau and Gabaret Island

POOL 26

Compartment 2 - Riverbend Management Area

- UNIT 1 - Environmental Demonstration Area
- UNIT 2 - Illinois Esplanade
- UNIT 3 - Horseshoe Lake

POOL 26

Compartment 3 - Lower Alton Lake Management Area

- UNIT 1 - Missouri Bottoms
- UNIT 2 - Piasa
- UNIT 3 - Portage

POOL 26

Compartment 4 - Upper Alton Lake Management Area

- UNIT 1 - Confluence Inlands
- UNIT 2 - Golden Eagle
- UNIT 3 - Cuivre Island

POOL 26

Compartment 5 - Illinois & Mississippi Confluence Area

- UNIT 1 - Calhoun Point
- UNIT 2 - Four Islands

POOL 26

Compartment 6 - Lower Illinois River Management Area

- UNIT 1 -Swan Lake Refuge
- UNIT 2 - Gilbert Lake Refuge
- UNIT 3 - Stump Lake
- UNIT 4 - Fuller Lake
- UNIT 5 - The Glades

POOL 26

Compartment 7 - Upper Illinois River Management Area

- UNIT 1 - Mortland Island Complex
- UNIT 2 - Godar - Diamond - Hurricane Complex
- UNIT 3 - Kampsville

POOL 25

Compartment 8 - Illinois Management Area

- UNIT 1 - Lower Pool 25
- UNIT 2 - Middle Pool 25
- UNIT 3 - Upper Pool 25

POOL 25

Compartment 9 - Missouri Management Area

- UNIT 1 - Lower Pool 25
- UNIT 2 - Middle Pool 25
- UNIT 3 - Upper Pool 25

POOL 24

Compartment 10 - Illinois Management Area

- UNIT 1 (IL) - Lower Pool 24
- UNIT 2 (IL) - Upper Pool 24

POOL 24

Compartment 11 - Missouri Management Area

- UNIT 1 (MO) - Lower Pool 24
- UNIT 2 (MO) – Upper Pool 24

KASKASKIA RIVER NAVIGATION POOL

Compartment 12

- UNIT 1 - Kaskaskia Lock and Dam Lands

OPEN MISSISSIPPI RIVER

Compartment 13

CACHE RIVER DIVERSION CHANNEL

Compartment 14

LOWER MISSOURI RIVER

Compartment 15

11.3. COORDINATION AND SCHEDULE

Development of a project wide OMP will begin soon after approval of the Master Plan. It is anticipated that development of the OMP will occur in phases, as funding and staffing are available with a target completion date of the entire OMP by FY 2005.

Work descriptions and scheduling for each of the management compartments will be coordinated closely with the USFWS, MDC and IDNR.

Significant coordination was undertaken between the Corps and USFWS during the preparation of this Master Plan and the USFWS - Mark Twain National Wildlife Refuge Comprehensive Conservation Plan to maximize opportunities for collaboration that ensure that Corps and USFWS efforts are compatible and result in seamless management strategies and outputs that benefit both the river's resources and the human beneficiaries of those resources while meeting congressionally authorized mandates.

OMPs for four areas under Rivers Project jurisdiction were prepared and approved prior to the FY2001 Master Plan approval due to special immediate needs that required appropriate planning document (i.e. the OMP) formulation and approval in order to proceed. The Carlyle Lake Management Office now manages the Kaskaskia River Navigation Project.

The four areas with approved OMP level documentation are:

Pool 27 - Compartment 1

- Units 1 and 2

Pool 26 - Compartment 3

- Unit 3 (Horseshoe Lake) only

Pool 26 – Compartment 4,

- Unit 3 (Cuivre Island) only

Kaskaskia River Navigation Project – Compartment 12,

- Units 1 and 2

SECTION XII

CONCLUSIONS, RECOMMENDATIONS AND APPROVAL

12.1. GENERAL BACKGROUND

The Rivers Project makes important contributions to regional and national inland navigation, recreation, fish and wildlife habitat, environmental education, and tourism. The Rivers Project resources and management activities provide quality opportunities for education, hunting, fishing, sightseeing, boating and other activities for people throughout the Midwest. The Upper Mississippi River is recognized as a national treasure for its natural resources as well as its importance to the commerce of the nation. Providing for public use, establishing sound ecological treatment for 47,641 acres of public lands and instilling an appreciation for this national treasure is the intended outcome of this plan.

Wildlife and archaeological, historical, and aesthetic resources are also important in the project area. The St. Louis District will strive to use its capabilities and professional expertise to preserve and make project resources available for a broad and varied range of compatible uses.

The combining of five water resource projects and the open river, between St. Louis and Cairo, into one comprehensive Master Plan has enabled the project to function in a regional context. Many agencies, organizations and the public have been brought together to provide input to this plan. Alteration of the Master Plan may be necessary as conditions change. Updating of this plan will be scheduled when deemed necessary.

12.2. RECOMMENDATIONS

It is recommended that this Master Plan be approved as a guide for the use, management and enrichment of the ecological, cultural and aesthetic resources of the Rivers Project, while developing new approaches for sustaining safe and healthful recreational facilities, and preserving and recognizing ecological values.

This Master Plan recommends a broad range of resource objectives, and management and development concepts. Those recommendations can be summarized as follows:

- Fish and wildlife habitat enrichment
- Safe public access
- Cooperative planning and local participation
- Monitoring and performance evaluation
- Operational management strategies
- Efficient management through changes to the General Plan and Cooperative Agreement

Fulfillment of fish and wildlife habitat development strategies will be possible only if ongoing programs such as EMP, Section 206 and

Section 1135, and Avoid and Minimize and other environmental improvement authorities are supported.

Recreation surveys and an access study will guide development and management of recreation facilities in accordance with Corps guidelines and partner support.

Project operational and management strategies will be implemented in the OMP after approval of this Master Plan.

Amending the General Plan and Cooperative Agreement to reflect the proposed changes as a result of this plan will ensure more effective management through closer partnering arrangements and leveraging of resources among participating agencies.

Continue cooperative planning and participation with other organizations and agencies in land use planning efforts.

Conducting additional studies to monitor and evaluate project resources, management activities, and project objectives will insure the best identification, evaluation, analysis, and management of project resources. In particular the following studies or reports are recommended:

- Level I and II Inventories
- Public Access and Primitive Camping Analysis
- Shoreline Management Plan
- Historic Properties Management Plan – It is important that an ongoing monitoring and protection program be maintained for all project lands and work activities.
- Visitor Use Surveys – Collection of visitor use data is a continuing project responsibility, to assist in evaluating existing project use, determining the adequacy of existing facilities, identifying future facilities requirements, justifying funding, and estimating budgets.
- Avoid and Minimize Measures
- Endangered and Sensitive Species Protection and Recovery

12.3. CONCLUSION

The formulation of a viable plan for development and management of the Rivers Project has required extensive interaction and involvement of the general public as well as federal, state, and local offices; appraisal of natural and cultural resources of the project and examination of various environmental, economic and political considerations. This plan will guide use, development, and management of the project in a manner optimizing public benefits within resource potentials and the authorized functions of the project into the 21st Century.

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