

EMP HRep Fact Sheets

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Proposed fact sheets submitted by EMP partners

Upper Mississippi River System Environmental Management Program**Fact Sheet****CLARENCE CANNON NATIONAL WILDLIFE REFUGE**
HABITAT ENHANCEMENT AND RESTORATIONPool 25, Missouri

Location: The Clarence Cannon NWR is located along the right bank of the Mississippi River between river miles 263.5 and 260.6. It is six miles north of Elsberry, Missouri and six miles south of Clarksville, Missouri. The refuge is partially bordered on the north by Ramsey Creek and on the south by Bryants Creek. The refuge is owned by the US Fish and Wildlife Service (FWS), and was established in 1964 for the management and benefit of migratory birds. The USFWS manages the refuge primarily for the benefit of many species of wetland birds including waterfowl, shorebirds, wading birds and water birds. Management is accomplished through intensive water and vegetative management programs requiring an extensive system of dikes, water control structures and pumping facilities. Additional management efforts aimed at bottomland forests and grasslands, benefit species of birds dependent on these important habitats.

Resource Problem: The wetlands, forests and grasslands along the Mississippi River provide habitat for over 230 species of birds along one of the most important migration corridors in North America. Along much of the river these habitats have been severely reduced or degraded due to the impacts of man. On the 3750 acre refuge, 2200 acres are managed as wetlands in fourteen impoundments. Optimum management of several of these impoundments and the potential development of new impoundments is limited by inadequate pumping capabilities and water control structures.

Forest resources on the refuge and along much of the river were severely impacted by the flood of 1993. Particularly hard hit were hard mast producing trees including pin oak and pecan. On the refuge up to 80 % of bottomland hardwoods in 220 acres of forests suffered mortality due to the flood. Historically, grasslands were a common and valuable component of flood plain wildlife habitat. This habitat type has suffered the greatest loss and only very small remnant tracts remain, mostly on public managed lands.

Many backwater sloughs have been cut off from the river by levees. Almost all of these areas have greatly deteriorated due to loss of depth from sedimentation. This has greatly reduced aquatic habitat diversity limiting important deep water areas for summer and wintering fish. On the refuge, the 35 acre Rayboum Slough is seasonally connected with the river via a water control structure. This slough similarly has loss depth due to sedimentation.

Management of this entire high quality and valuable wetland, forest and grassland complex is dependent on a perimeter levee which surrounds the refuge. This levee provides sufficient flood protection to allow habitat management programs to achieve the desired results. A 2 1/2 mile section of this levee borders the channelized portion of Bryants Creek. Channelized many decades ago, the bank of this creek is continually sloughing and is now threatening the integrity of the refuge levee.

Project: The proposed project includes 1) installation of six water control structures and five wells with two mobile power units, 2) tree planting of bottomland hardwood species on selected sites, including creation of a 70-acre greentree reservoir, 3) wet grassland restoration by planting prairie cordgrass plugs and associated species, 4) protection of main perimeter levee by shaping and stabilizing up to 2 ½ miles of the sloughing Bryants Creek bank line, and 5) create four 8' - 10' deep holes (approx. 1/4 acre each) in Raybourn Slough to provide overwintering/summer fisheries habitat.

Project Outputs: The components of this project would substantially protect and enhance the value of habitat management programs on the refuge. Wetland acres would be increased and improved providing additional benefits for large numbers of migrating waterfowl. The additional wells would allow targeted and timely management of specific wetland units for shorebirds. Forest and grassland birds would directly benefit from the restoration or enhancement of approximately 150 and 320 acres of these habitats, respectively. Fisheries resources will be benefitted by the diversity and deep water provided by the dredging in Raybourn Slough. The value and benefits of this entire complex of managed habitats will be ensured by stabilizing the Bryants Creek bank line.

Financial Data:

The entire project is located on lands owned and administered by the U.S. Fish and Wildlife Service.

Five wells - 12" with submersible pump heads; \$10,000 each

Two mobile diesel power units; approx 105 hp; \$12,000 each

Water control structures:

Hemphill Crossing (Crane Pond) - two 48" dia X 30' length CMPs with Waterman type screw gates: \$12,000
Would require realignment of 150' of existing access road across Crane Pond - \$15,000 (includes 20" wide concrete grout overflow)

Rabbit Ears Slough - two 30" dia X 30' length CMPs with Waterman type screw gates - \$8000
Would include renovating approximately 300' feet of existing low level dike - \$15,000

Bryants Creek Greentree Reservoir - one 48" dia X 30' length CMP with stoplog structure - \$6000; one 36" dia X 50' length CMP with Waterman type screwgate - \$5000

Upper Mississippi River System Environmental Management Program**Fact Sheet****OPEN RIVER SIDE CHANNELS RESTORATION--MISSOURI****MDOC PHASE 1 PROJECT****Mississippi River, Missouri**

Location: There are approximately 30 side channels remaining along the Middle Mississippi River (MMR) between Mel Price Locks and Dam and the confluence of the Ohio River. Side channels restorations along the Missouri side of the river are proposed to be accomplished in two separate phases, with six channels being restored in each phase. The Phase 1 channels and their specific river locations are: Establishment Chute (RM 132.5-130.0 R), Jones Chute (RM 98.3-94.9 R), Buffalo Island Chute (RM 26.3-24.5 R), Schenimann Chute (RM 62.5-57.0 R), Maple Island (RM 198.5-200.8 R). Figure 1 depicts the side channel areas.

Resource Problem: Side channels are a critical component of the Mississippi River, and those that remain in the MMR are in various stages of health. Most have been degraded by a variety of factors including: reduced flow, uniform bottom depths, lost connectivity to the river and adjacent wetlands, a loss of aquatic habitat structure, a loss of hard mast tree production, increased sedimentation, and a loss of overall habitat diversity. These degradational processes are anticipated to continue in the future, and will eliminate a critically important habitat component of the riverine ecosystem. Today river engineers and biologists have the expertise to describe, verify and modify side channel conditions prior to and following side channels restoration. The opportunity exists to apply this knowledge to the Phase 1 side channels. The existing conditions of each Phase 1 side channel and the proposed actions required for restoration is documented in the District's "Middle Mississippi River Side Channels Plan". That plan has been reviewed and approved by MVD, and a copy can be furnished reviewers of this fact sheet from the District Office (CEMVS-PM-N).

Project: Table 1 lists the tentatively proposed habitat restoration measures envisioned for the implementation of up to five Phase 1 side channels. Further adjustments to the proposed features will be

based on input from the EMP Habitat Needs Assessment (HNA), and hydraulic configurations of the side channels would be optimized using MVS micro-modeling methodology.

Project Outputs: Table 1 also lists the anticipated outputs derived from the project implemented features.

Financial Data: The costs for general design and P&S are estimated to be \$1,667,000 and construction costs are estimated to be \$8,333,000 for the Phase 1 side channels restoration. Annual OMRR cost is estimated to be \$50,000. The project would be constructed on privately owned lands adjacent to the side channels. In accordance with Section 906(e) of the 1986 Water Resources Development Act, the general design, construction, and OMRR costs would be shared 65 percent Federal / 35 percent non-federal. The non-Federal sponsor would be the Missouri Department of Conservation (MDOC).

Supplemental Data: MDOC has the right to use eminent domain; however, its long-term administrative policy has been to acquire real estate on a "willing sellers only" basis. Due to the relatively minor real estate requirements needed for side channels (site access and narrow riparian buffer strips) the state is confident that land requirements can be obtained for most locations on a willing sellers basis (either fee title or easements) using state appropriated funds. At this point, a strict interpretation of PCA language would typically curtail the project effort. However, in the interest of partnership building with the project sponsor, MVS is recommending an adaptive approach to lands acquisition for the Missouri side channels project. The project would be accomplished in two phases, with up to five side channels restored in each project phase. Each phase is based on the initial priorities established by the MMRSCP. The project does not require that all five side channels be actively modified. The number actually implemented would depend on the success of the sponsor in obtaining lands via a willing sellers approach. If the approach proves highly successful with most or all of the Phase 1 restorations being implemented--then approval to proceed with the Phase 2 work would be sought. This approach serves as a testing ground for the adequacy of the "willing sellers only" approach. If this format fails, the restorations would be placed on hold until such time as state administrative policy permits the use of eminent domain. For implementation purposes, each side channel restoration would be implemented as its associated real estate becomes available, and as fiscal funding conditions permit.

A 25-year project life is assumed for the side channels work, and no post-construction maintenance dredging is assumed. The project's economics justification via Incremental Cost Analysis (ICA) would take into account any declining habitat value resulting from subsequent river sedimentation effects.

Upper Mississippi River System Environmental Management Program

Fact Sheet

SALT LAKE/FORT CHARTRES SIDE CHANNEL RESTORATION

Mississippi River, Illinois

Location: The Salt Lake/Fort Chartres Side Channel is located along the Illinois bank of the Mississippi River between UMR RM 134 – 132. There are approximately 30 side channels remaining along the Middle Mississippi River (MMR) between Mel Price Locks and Dam UMR RM 200.8 and the confluence with the Ohio River at UMR RM 0.0. Side channel restorations along the Mississippi River are proposed to restore aquatic and wildlife habitat.

Resource Problem: Side channels are a critical component of the Mississippi River, and those that remain in the MMR are in various stages of degradation. Most have been degraded by a variety of factors including: reduced flow, uniform bottom depths, lost connectivity to the river and adjacent wetlands, a loss of aquatic habitat structure, a loss of hard mast tree production, increased sedimentation, and a loss of overall habitat diversity. These degradational processes are anticipated to continue in the future, and will eliminate a critically important habitat component of the riverine ecosystem. Today river engineers and biologists have the expertise to describe, verify and modify side channel conditions prior to and following side channel restoration. The opportunity exists to apply this knowledge to the side channels. The existing conditions of side channels and the proposed actions required for restoration are documented in the District's "Middle Mississippi River Side Channels Plan" (MMRSCP).

Project: The proposed restoration features will be based on input from the UMRS-EMP Habitat Needs Assessment (HNA) and the optimized hydraulic configuration of the side channel using MVS micro-modeling methodology. The project may include a variety of the following features:

- a. Placement of rock weirs.
- b. Alternating hard points (stone, wood or both) to increase sinusoidal flow patterns through side channel.
- c. Modify existing rock closure structures.
- d. Selective dredging to remove large sand deposits.
- e. Create ridges using side channel dredged material
- f. Creation of interior swales using natural hydraulic processes to move sediments.
- g. Improve secondary channels.
- h. Structural improvements or dredging.
- i. Dredging at channel's lower end to improve channel's connectivity with the open river.
- j. Potential expansion into a regional wetlands complex including other nearby side channel wetlands and wetland habitats (specific improvements to be based on micro modeling.
- k. Notch dikes within side channel to increase connectivity.

Project Outputs: The proposed project is anticipated to produce a variety of the following outputs:

- a. Reduced bedload and increased side channel flows.
- b. Increased depth diversity.
- c. Increased channel longevity.
- d. Improved aerated soil conditions for establishment of planted hardwood trees.
- e. Improved conditions for fish ingress/egress to side channel.
- f. Improved overall wetland habitat complex.
- g. Increase habitat diversity.
- h. Endangered species habitat improvement.

Financial Data: The estimated costs for the general design work and construction of the side channel project are \$2,000,000. The annual OMRR cost for the side channel is estimated to be \$10,000. In accordance with Section 906(e) of the 1986 Water Resources Development Act, the project's first costs would be 100% federal. If future analysis indicates a need for side channel restoration work related to adjoining lands, the additional first costs would be 65% federal and 35% non-federal. Cost sharing would be assigned on a feature by feature basis. Areas may be targeted by FWS for land acquisition, and if the area is acquired, FWS would become the primary sponsor.

Supplemental Data: Various assumptions are inherent to this proposal:

All high and medium priority side channels identified in the MMRSCP warrant restoration. Individual side channels may be proposed and worked simultaneously to one another for improved construction efficiency. Each side channel can best be "fast-tracked" by micro modeling, funding, and constructing each side channel independently. The Salt Lake/Fort Chartres Side Channel project will generate a PDA document, and the total estimated project costs are expected to be less than \$2 million and therefore can be approved at the Division level.

Studies started and to be conducted over the next few years will be used to determine the need for side channel restoration work for the benefit of endangered species. Thus, in the future there may be benefits of this work for endangered species, but the degree of benefit remains undetermined at this time.

The project may require the acquisition of a narrow buffer strip of land adjacent to the side channel. This buffer area is in private ownership. Lands would be acquired by the Illinois Department of Natural Resources (IDNR), except for endangered species related work (which has no sponsor), in which case the lands may be acquired by the St. Louis District. Project lands (if needed) will be acquired on a "willing seller" basis only. This is consistent with the policy of IDNR and the FWS. The sponsors are confident that this will not be a major impediment to the project's overall implementation. If side channel improvements prove successful, then consideration will be given to preparing fact sheets that combine multiple side channel projects into multiple Phase fact sheets.

A 25-year project life is assumed for the side channel work, and no post-construction maintenance dredging will occur. The project's economics justification via Incremental Cost Analysis (ICA) would take into account any declining habitat value resulting from subsequent river sedimentation effects.

PLACE MAP HERE

Upper Mississippi River System Environmental Management Program**Fact Sheet****GLADES WETLANDS HABITAT RESTORATION****Illinois River, Illinois**

Location: The Glades management area is located along the Illinois River's left bank between River Miles 13.3 and 15.3. It is just North of Rosedale, Illinois, and just south of confluence of Otter Creek with the Illinois River. The property is owned by the Corps and is managed through a cooperative agreement with the Illinois Department of Natural Resources (IDNR). IDNR manages the refuge for waterfowl through manipulation of water levels for moist-soil plant production, and by supplemental plantings to enhance and expand the forage base.

Resource Problem: Like most backwater areas along the Illinois River, siltation has degraded this site's wetlands habitat. Presently, this 300+ acres of wetland has filled with sediments until now the entire site is in a perched condition. To maintain the area as viable wetland habitat, water is seasonally pumped into the area from the Illinois River. The area is managed as a large moist soil unit, when river levels decline in summer drain tubes are opened to the River. Gravity flow will render the entire site dry if the river is at normal pool level. The existing water control structures are old and are of inadequate water transfer capacity.

Project: The proposed project includes: (1) removal of old water control structures, (2) installation of new water control structures, (3) installation of a spillway, (4) cleanout of drainage ditches, (5) creation of dugout areas, (6) placement of new interior levees with stop-log structures, and (7) raising existing site access road with pipes.

The existing 2-36" gated CMPs riverside water control drains would be replaced with two 42-inch gated drainage structures. Adjacent to these structures, a hardened spillway (100 feet long) would be constructed to handle the transfer of flood waters both rising and receding. The 4,000 foot ditch to these structures needs to be modified to handle the proposed capacity. Within the site's interior, a series of ditches (12,000 feet) would be modified to accommodate drainage and public use. Dugouts (4 acres total with a 10 foot cut) would be created at various locations throughout the site's interior. In the crop fields on the south end of the glades moist-soil units would be created. Low levees (6,000 feet total) would be constructed along the timbers edge that can be seasonally manipulated to provide feed and sanctuary for migratory waterfowl.

The moist soil units would have 4-36" CMP stop-log risers to control the level as required. The existing access road (400 feet long) would be raised and re-topped with gravel and would have a 1-36" gated CMP added under the road so the existing pump system can be utilized to flood the new moist soil units.

Project Outputs: The project proposal is to enhance the overall quality of the existing wetland by improving the ability to control water levels at the site. Also to expand the moist-soil production acres which would serve as feeding/resting areas for waterfowl. The improved drainage will provide the tools to institute the annual draw down in a timely fashion. This will improve the reliability factor for annual food production and expand the acres of feed and sanctuary available. The dugouts will trap the last of the drainage creating shallow feeding areas for large wading birds and early shorebird habitat as the areas evaporate. It is expected that the ability to improve the overall support value of the site's wildlife habitat will improve by about 20% to 25%.

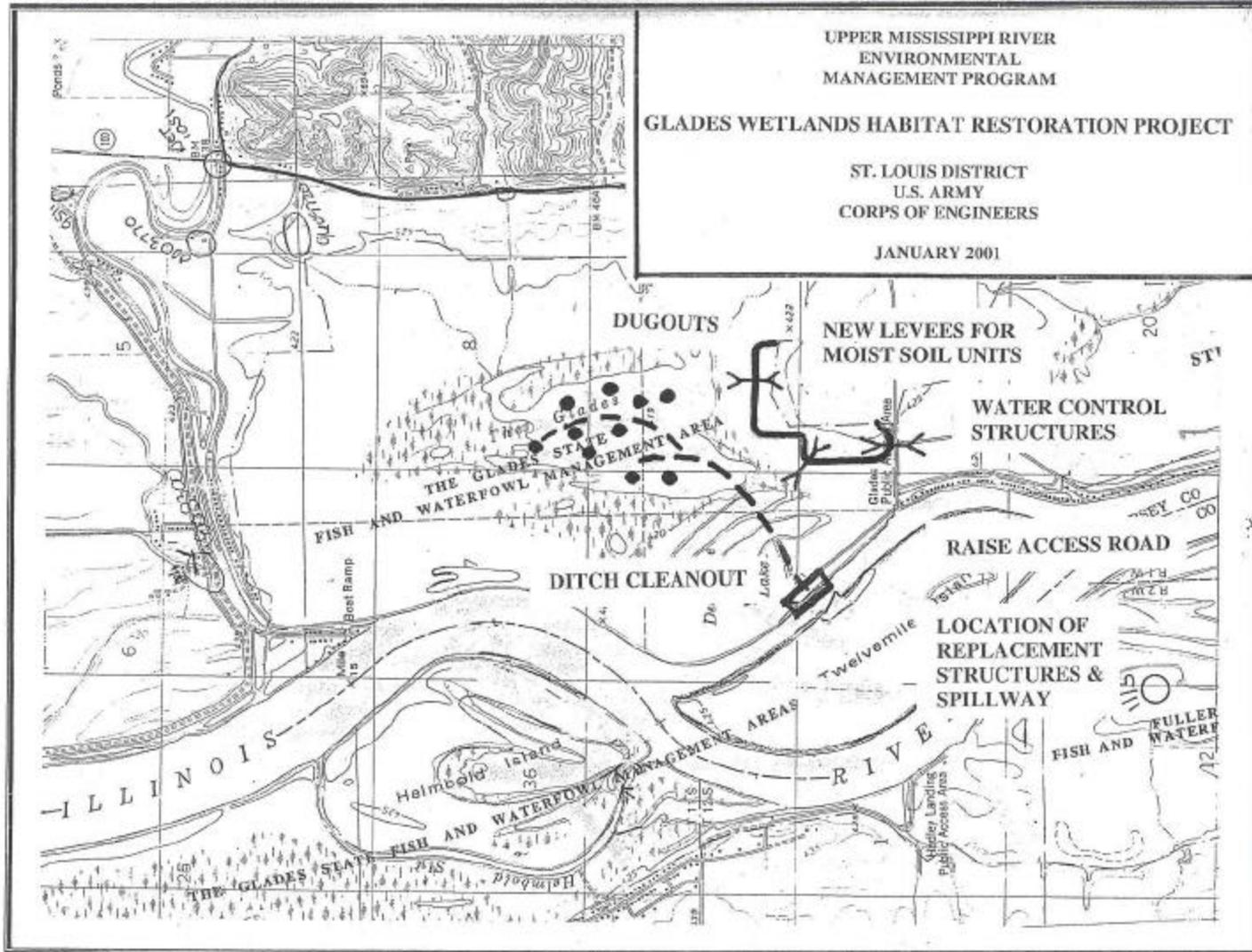
Financial Data: Total estimated base year costs for this project is \$1,473,692 (or \$1,768,430 fully funded). The estimated annual operations and maintenance cost is \$13,000. All of the project features are on Corps owned General Plan lands "managed as a national wildlife refuge. Under the provisions of Section 906 (e) of WRDA 1986, the projects first costs are 100 percent Federal. Annual operation and maintenance requirements will be satisfied through an agreement with the U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources.

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

GLADES WETLANDS HABITAT RESTORATION PROJECT

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001



Upper Mississippi River System Environmental Management Program**Fact Sheet****GODAR REFUGE WETLAND HABITAT RESTORATION****Illinois River, Illinois**

Location: Godar Refuge is located on the west bank of the Illinois River, in Calhoun County, between river miles 25 and 27 (Figure 1). The refuge lies along the bank of Dark Chute, a side channel formed by Hurricane Island to the north and Diamond Island to the south. The property is owned by the Corps and is managed through a cooperative agreement with the Illinois Department of Natural Resources (IDNR). IDNR manages the refuge for waterfowl through the manipulation of water levels for moist soil plant production, and supplemental plantings to enhance and expand the forage base.

Resource Problem: The number one pollutant in the Illinois River is silt. The river's sediment load continues to fill in backwaters and degrades the wetland habitats along the river system. A recent (1999) topographic survey map of the crop field adjacent to the actual wetland basin at Godar was compared to 1979 white-line topographical maps. While the actual contour lines looked very similar, the 1999 contours had increased by 2 feet. An archaeological investigation at Godar, that included soil core borings, supports the map finding of a 2+ feet of sediment deposits in the field. Presently the wetland basin is almost completely perched, of the 300 plus acre basin--perhaps 50 acres retains water when the river is at normal pool. A pump station installed at the site in 1981, has had to be repaired extensively, and it is basically too small to handle an expanded refuge area.

Project: The proposed project includes the construction of: (1) a riverside berm, (2) an interior berm and 36" stop-log structures, (3) drainage ditch cleaning, and (4) a pump and 48" CMPs (Figure 2).

A riverside berm would begin along the south bank of Michael Creek, and would run eastward to the river. From that location, it would run south along the bank to river mile 25.3. Much of the berm would be at the elevation of the existing high bank, with the rest of the berm being to "fill in the low spots". Clearing for the structure would be minimal. The berm would be constructed along the east side of an agricultural field that runs parallel to the river (i.e. 12,000 feet long, and 1,000 feet wide). Borrow material for the berm would be taken from the field itself.

A second berm would be constructed along the west side of the same agricultural field. This berm would be approximately 11,000 feet long and would include stop-log water control structures (4 - 36" CMPs gravity drains with riser pipes). There would be little or no clearing associated with this construction work, and the borrow material would once again come from the agricultural field. The construction of this berm would create the third and highest terrace in the refuge.

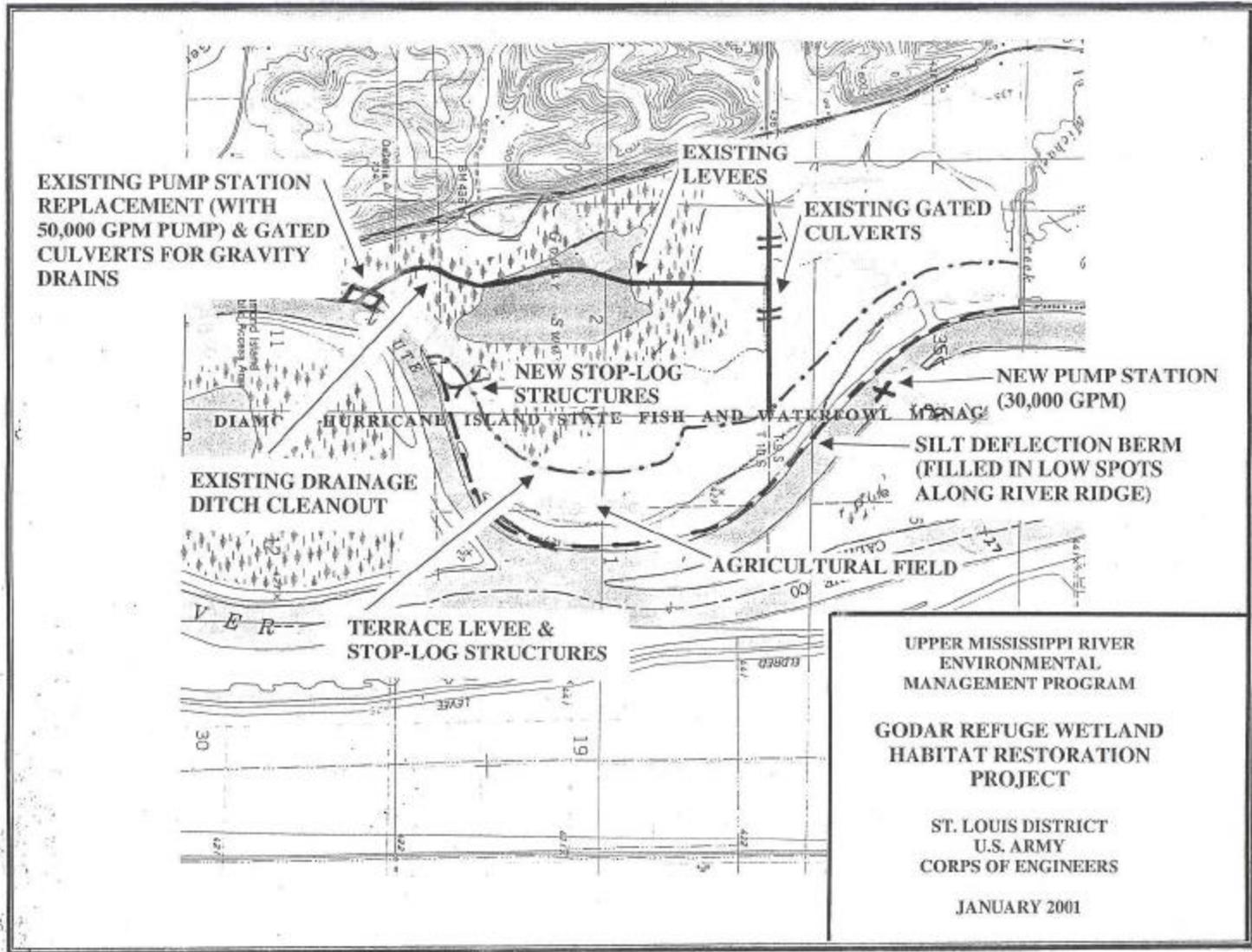
The final features would include the construction of a 30,000 GPM input pump, located near Dark Chute at river mile 26.7. A second pump station (50,000 GPM) would be constructed at the site of an existing two way pump station. An existing water supply ditch would be cleaned to accommodate the larger pumping capacity and 2-48" CMPs installed.

Project Outputs: The project would extend the life of the wetlands complex by directly reducing the annual sediment load entering the site. It would also add an additional 150+ acres of moist-soils habitat, a habitat with a documented use by over one hundred and sixty species of birds. The large concentrations of waterfowl utilizing this refuge during their migration would provide a readily available food source for

wintering Bald Eagles. During the summer, while the area is being dewatered, the site would attract large numbers of wading birds to feed on fish concentrated into shallow pools. The new pump systems would increase the reliability of producing the desirable moist-soils vegetation by an estimated 30%. The increased capacity would allow the site manager to meet his target dewatering schedule, and to obtain optimum plant growth and species diversity.

This proposed pump stations along with the stop-log structures, should be capable of meeting the sites water transfer requirements..

Financial Data: Total estimated base year costs for this project is \$2,141,438 (or \$2,569,726 fully funded). The estimated annual operations and maintenance cost is \$10,000. All of the project features are on Corps owned General Plan lands. These lands are "managed as a national wildlife refuge" by IDNR under a Cooperative Agreement with the U.S. Fish and Wildlife Service and the Corps of Engineers. Under the provisions of Section 906 (e) of WRDA 1986, the projects first costs are 100 percent Federal. OMRR costs are the responsibility of the project's sponsor, IDNR.



Upper Mississippi River System Environmental Management Program

Fact Sheet

JEFFERSON BARRACKS SIDE CHANNEL RESTORATION

Mississippi River, Illinois

Location: The Jefferson Barracks Side Channel is located along the Illinois bank of the Mississippi River between UMR RM 167.7 – 166.6. There are approximately 30 side channels remaining along the Middle Mississippi River (MMR) between Mel Price Locks and Dam UMR RM 200.8 and the confluence with the Ohio River at UMR RM 0.0. Side channel restorations along the Mississippi River are proposed to restore aquatic and wildlife habitat.

Resource Problem: Side channels are a critical component of the Mississippi River, and those that remain in the MMR are in various stages of degradation. Most have been degraded by a variety of factors including: reduced flow, uniform bottom depths, lost connectivity to the river and adjacent wetlands, a loss of aquatic habitat structure, a loss of hard mast tree production, increased sedimentation, and a loss of overall habitat diversity. These degradational processes are anticipated to continue in the future, and will eliminate a critically important habitat component of the riverine ecosystem. Today river engineers and biologists have the expertise to describe, verify and modify side channel conditions prior to and following side channel restoration. The opportunity exists to apply this knowledge to the side channels. The existing conditions of side channels and the proposed actions required for restoration are documented in the District's "Middle Mississippi River Side Channels Plan" (MMRSCP).

Project: The proposed restoration features will be based on input from the UMRS-EMP Habitat Needs Assessment (HNA) and the optimized hydraulic configuration of the side channel using MVS micro-modeling methodology. The project may include a variety of the following features:

- a. Modify existing rock closure structures.
- b. Creation of interior swales using natural hydraulic processes to move sediments.
- c. Structural improvements or dredging.
- d. Sediment deflection structure at upstream chute entrance.
- e. Selective placement of hard points (wood, rock, or both) to create scour holes.
- f. Notch dikes along island channel border to encourage island creation and substrate redistribution.

Project Outputs: The proposed project is anticipated to produce a variety of the following outputs:

- a. Reduced bedload and increased side channel flows.
- b. Increased depth diversity.
- c. Increased channel longevity.
- d. New secondary channel creation.
- e. Improved conditions for fish ingress/egress to side channel.
- f. Increase habitat diversity.

g. Endangered species habitat improvement.

Financial Data: The estimated costs for the general design work and construction of the side channel project are \$2,000,000. The annual OMRR cost for the side channel is estimated to be \$10,000. In accordance with Section 906(e) of the 1986 Water Resources Development Act, the project's first costs would be 100% federal. If future analysis indicates a need for side channel restoration work related to adjoining lands, the additional first costs would be 65% federal and 35% non-federal. Cost sharing would be assigned on a feature by feature basis.

Supplemental Data: Various assumptions are inherent to this proposal:

All high and medium priority side channels identified in the MMRSCP warrant restoration. Individual side channels may be proposed and worked simultaneously to one another for improved construction efficiency. Each side channel can best be "fast-tracked" by micro modeling, funding, and constructing each side channel independently. The Jefferson Barracks side channel project will generate a PDA document, and the total estimated project costs are expected to be less than \$2 million and therefore can be approved at the Division level.

Studies started and to be conducted over the next few years will be used to determine the need for side channel restoration work for the benefit of endangered species. Thus, in the future there may be benefits of this work for endangered species, but the degree of benefit remains undetermined at this time.

The project may require the acquisition of a narrow buffer strip of land adjacent to the side channel. This buffer area is in private ownership. Lands would be acquired by the Illinois Department of Natural Resources (IDNR), except for endangered species related work (which has no sponsor), in which case the lands may be acquired by the St. Louis District. Project lands (if needed) will be acquired on a "willing seller" basis only. This is consistent with the policy of IDNR and the FWS. The sponsors are confident that this will not be a major impediment to the project's overall implementation. If side channel improvements prove successful, then consideration will be given to preparing fact sheets that combine multiple side channel projects into multiple Phase fact sheets.

A 25-year project life is assumed for the side channel work, and no post-construction maintenance dredging will occur. The project's economics justification via Incremental Cost Analysis (ICA) would take into account any declining habitat value resulting from subsequent river sedimentation effects.

PLACE MAP HERE

Upper Mississippi River System Environmental Management Program**Fact Sheet****RESTORATION OF KASKASKIA RIVER OXBOWS****Kaskaskia River, Illinois**

Location: The proposed habitat restoration project involves selected oxbow lake locations adjacent to the Kaskaskia River Navigation Project (KRNP). The KRNP empties into the Mississippi River in southwestern Illinois near the City of Chester, and extends northward to the town of Fayetteville at River Mile 36. Twenty-six oxbows are located along the KRNP and are numerically designated as shown in Figure 1. The specific oxbows that are the subject of this fact sheet are lakes 8, 9, 10, 11 and 12 (see Figure 2) and are located between River Miles 25.5 and 29.0. The KRNP (opened for operation in 1974) has authorized purposes of navigation, recreation, and fish and wildlife. All lands adjacent to the river channel in the vicinity of lakes 8-12 are in state ownership. Those lands near the entrances of the oxbows are state owned and leased by the Corps.

Resource Problem: During KRNP construction, the upstream ends of the oxbows were plugged (to varying degrees) to prevent flow through them. Although the lower ends of the oxbows were initially left open to the river, they have since largely filled in with sediments. Today fish ingress/egress between the lakes and river is severely limited, impacting both the ecological and recreational value of these backwater areas. While plugging the upper ends of the oxbows has greatly increased the longevity of those lakes, it has also reduced water flows and decreased dissolved oxygen levels in the lakes during the summer season. To date, O&M funding for oxbows work has been limited.

Project: It is proposed that a micro-model be developed for lakes 8-12 to determine the optimal design configurations. The model would focus primarily on the need to reduce the impacts of river sedimentation on oxbows, but secondarily would also assess the potential for flow enhancement to the oxbows during the summer season. Conceptually, a typical oxbow restoration would consist of: (1) the placement of a sediment barrier at the oxbow's upper end with about 1,900 tons of rock, (2) structural provisions (if feasible) at the oxbow's upper end to allow for some water flow into the oxbow during the summer, (3) dredging (about 15,500 cy) to reopen the oxbow's downstream end, (4) the construction of sediment deflection devices (about 475 tons of rock) immediately upstream of the lower entrances, (5) adjustments to the existing easement agreements with the state to accommodate the proposed work, and (6) post-project monitoring for post-construction sediment deposition rates.

Project Outputs: The proposed project would greatly enhance the utility of approximately 200 acres of oxbow lakes for aquatic organisms. Dredging would restore fish ingress/egress between the lakes and river. To the extent that flows can be restored to the lakes, multiple ecological benefits will be achieved. The drift of zooplankton, macroinvertebrates and nutrients from further upstream would be improved. Physical processes such as channel scour and point bar formation would enhance the oxbow's morphometric diversity over time. Chemically, the oxbow would experience a mixing of the stream environment rather than the lake stratification which occurs now. All of these factors should benefit lotic adapted fishes and other organisms which have been impacted by the navigation project to date. It is estimated that the project would yield approximately 145 AAHUs for the aquatic habitat resource.

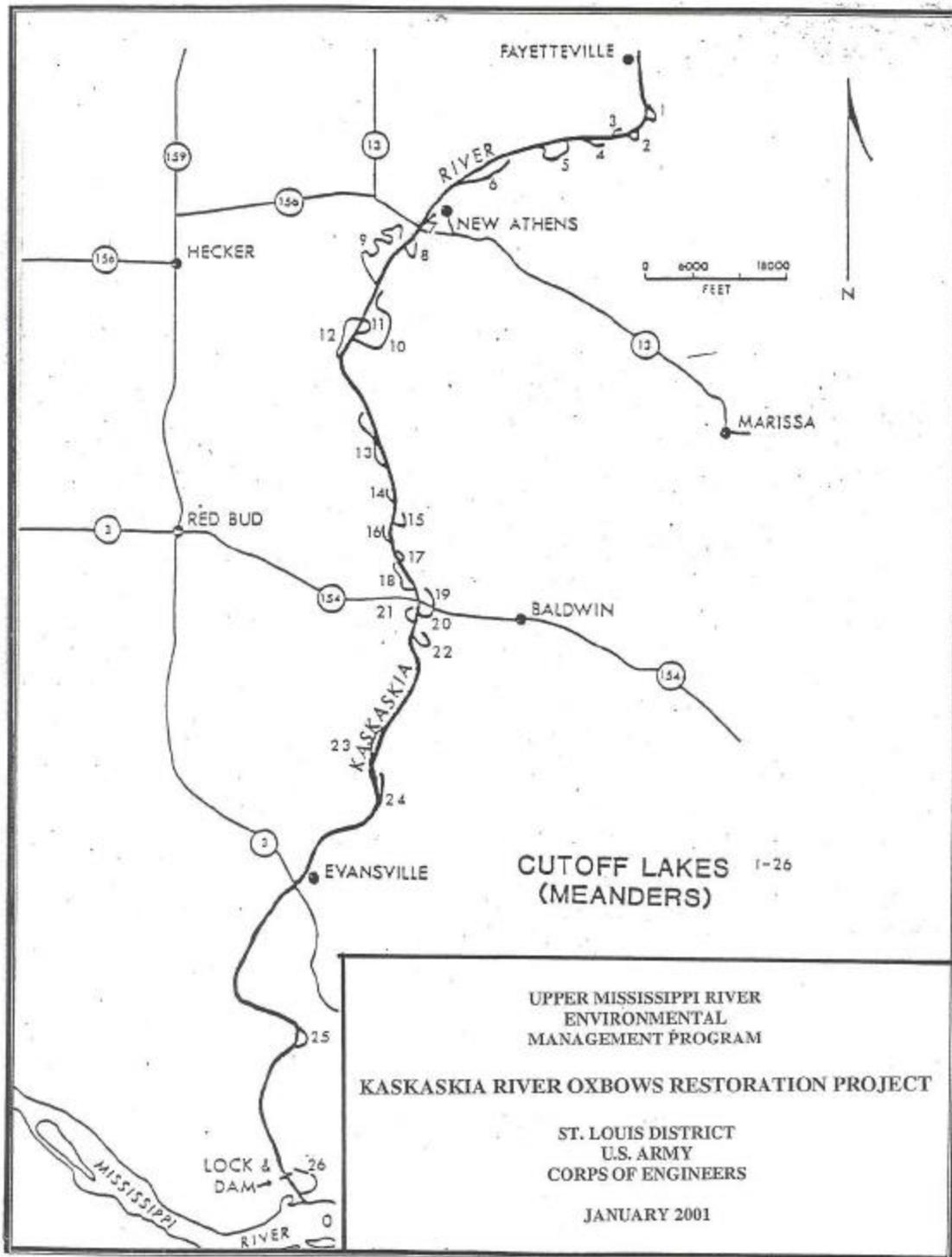
Although secondary to the above benefits, fishermen and other recreational users of the oxbow will have easier access to the lakes. Wildlife adapted to lotic environments (river otter, bald eagle, shoftshell turtle, etc.) would realize habitat gains. Environmental restoration projects of this sort have significant

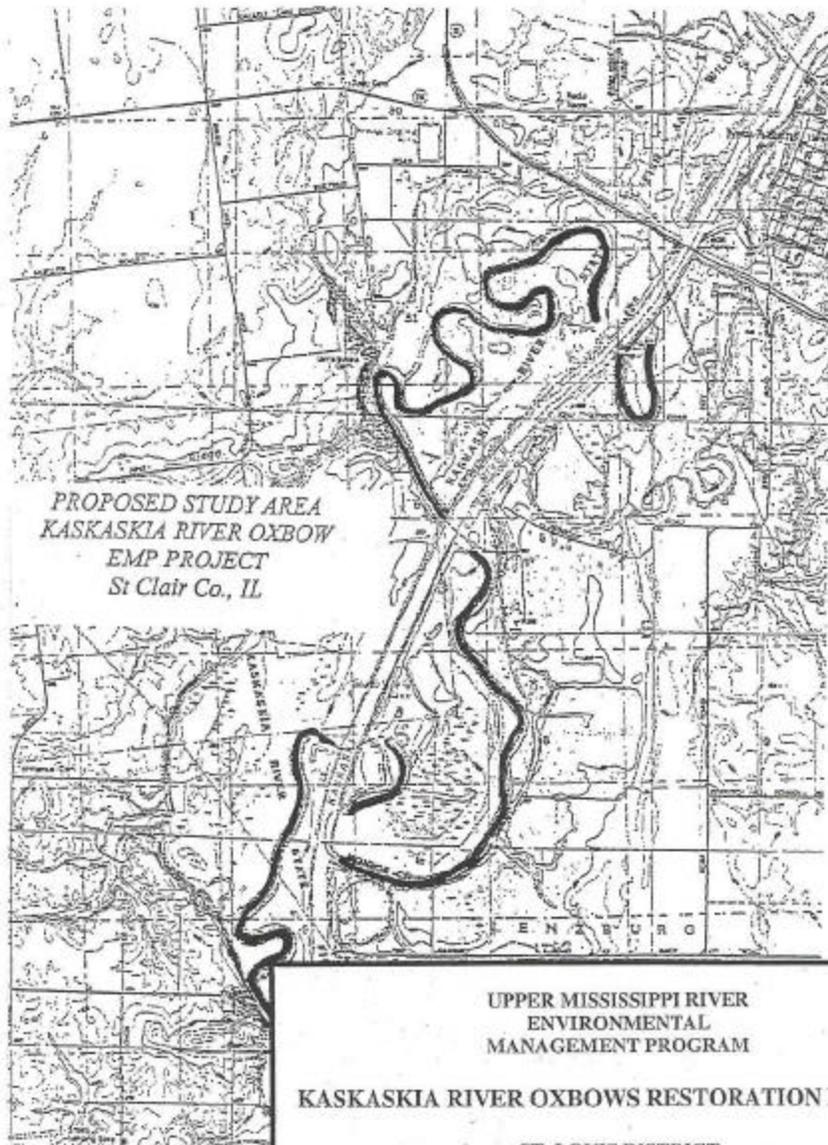
educational potential given appropriate signage and other interpretational amenities. From the public perspective, this project would meet goals of the newly formed Kaskaskia Watershed Association to enhance the river's natural values while preserving its economic utility. In short, re-meandering of the KRNP would help restore ecological and physical functions which have been impaired over the last quarter century.

Financial Data: Total estimated base year costs for this project is \$643,950 (or \$772,740 fully funded). The estimated annual operations and maintenance cost is \$750. No dredging is planned over the 25-year life of this project. O&M costs are approximated based on stone replacement for the upstream rock barriers and downstream deflection dikes. No dredging is planned during the life of the project, and structural components would be designed with an objective of minimal O&M requirements. These lands are state owned. Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 65 percent Federal and 35 percent non-federal. The state would seek in-kind credits (including LERRDs credits) for up to 80% of its 35% cost-share. OMRR costs are the responsibility of the project's sponsor, IDNR.

Supplemental Data:

This proposal is a top priority with IDNR. IDNR does not want to become involved in a KRNP--wide application if ultimately it will result in exorbitant O&M costs. For that reason, this project is somewhat experimental in nature. The proposal looks at a 20 percent portion of the oxbows, and coupled with intensive field monitoring, it would serve as a good indicator of future system-wide O&M costs. The state has had a long-term Congressman Costello has been very supportive of initiatives to open the river's oxbow lakes.





PROPOSED STUDY AREA
KASKASKIA RIVER OXBOW
EMP PROJECT
St Clair Co., IL

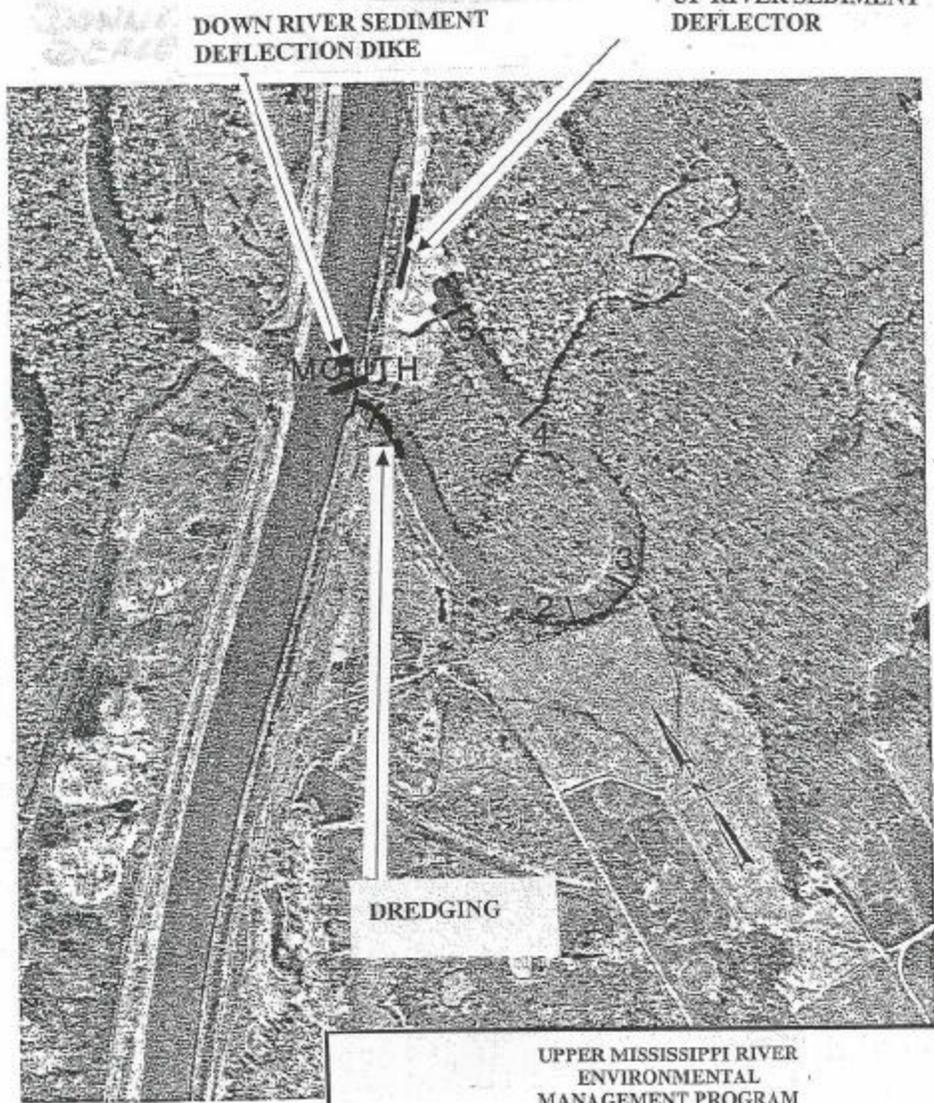
UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

KASKASKIA RIVER OXBOWS RESTORATION PROJECT

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001

SITE LOCATIONS



DOWN RIVER SEDIMENT DEFLECTION DIKE

UP RIVER SEDIMENT DEFLECTOR

MOUTH

DREDGING

**LAKE 8
TYPICAL SITE LOCATION
--FEATURES PLACEMENT**

**UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM**

KASKASKIA RIVER OXBOWS RESTORATION PROJECT

**ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS**

JANUARY 2001

Upper Mississippi River System Environmental Management Program**Fact Sheet****NORTON WOODS WETLANDS COMPLEX****Mississippi River, Pool 25, Missouri**

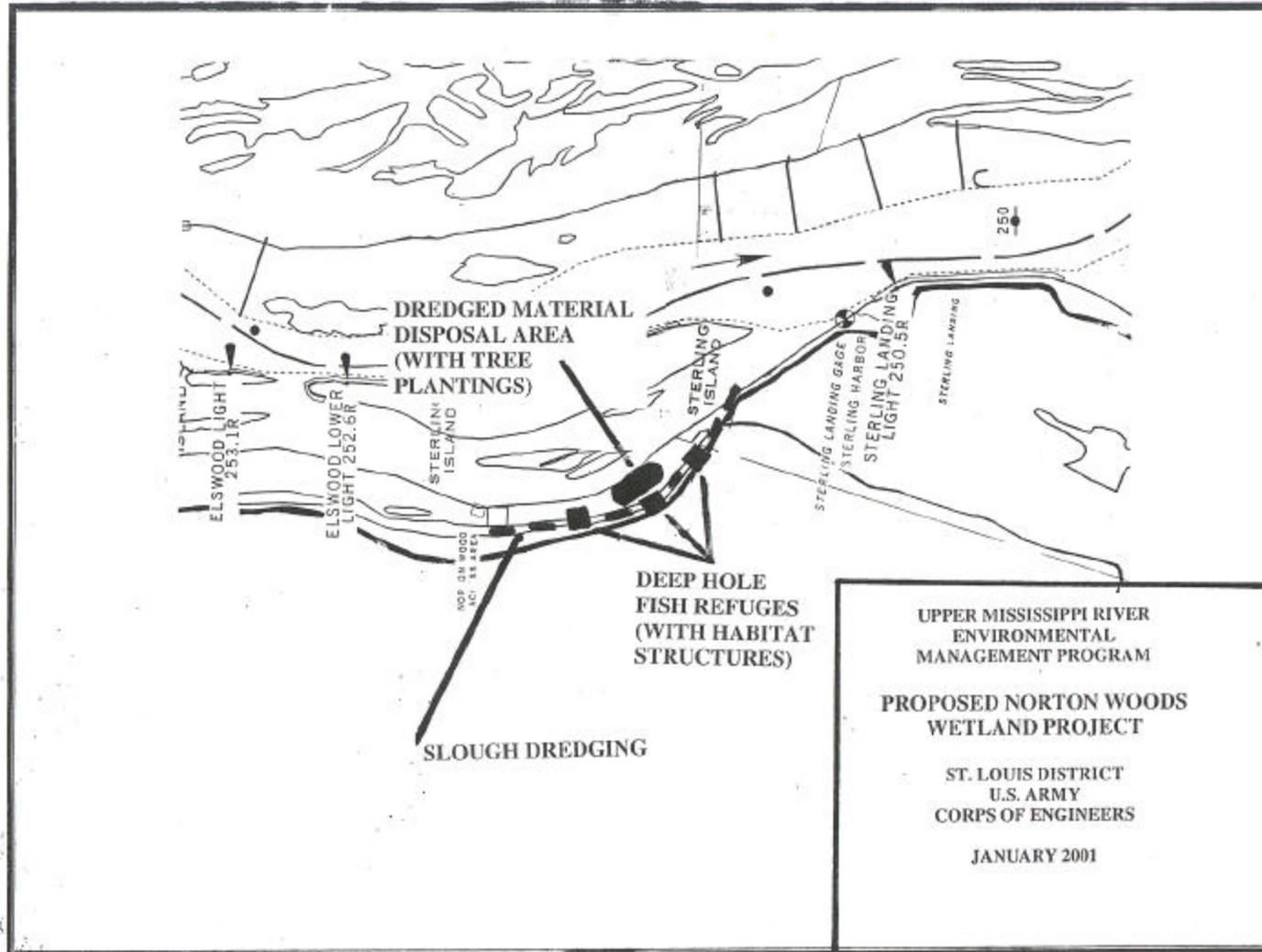
Location: The Norton Woods Wetlands Complex is located in Lincoln County, Missouri, adjacent to Mississippi River Pool 25, between River Miles 251.3 to 253.6. The complex encompasses approximately 350 acres of interior sloughs and wetlands. The property is owned by the Corps and managed through a cooperative agreement by the Missouri Department of Conservation (MDOC). The project addresses the habitat needs of the lower half of the management area.

Resource Problem: Sedimentation has significantly degraded habitat within this wetland complex, and has reduced connectivity to the Mississippi River at both the upper and lower ends of the complex. High quality wetlands habitat is in limited supply along the pooled portion of the Upper Mississippi River System within the St. Louis District.

Project: In the interior of the slough, two one-third acre areas would be dredged to a depth of 15 feet below flat pool to provide a summer/winter refuge for fish. Each deep pool will have habitat structures placed consisting of piles of anchored woody debris. The dredge material would be disposed of within the complex, and used to reclaim 3 acres of an overgrown agricultural field and to establish mast producing bottomland hardwoods.

Project Outputs: The deep holes dredged in the sloughs interior would provide spawning, nursery, and off-channel refuge habitat for fish, reptiles, and amphibians. The mast producing hardwoods would be an important food source for waterfowl and terrestrial wildlife.

Financial Data: Total estimated base year costs for this project is \$739,407 (or \$887,288 fully funded). The estimated annual operations and maintenance (O&M) cost is \$16,000. All of the project features are on Corps owned General Plan lands "managed as a refuge". Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 100 percent federal. OMR costs are the responsibility of the project's sponsor, Missouri Department of Conservation.



Upper Mississippi River System Environmental Management Program**Fact Sheet****PIASA/EAGLE'S NEST ISLANDS RESTORATION AND WETLAND DEVELOPMENT****Pool 26, Mississippi River, Illinois**

Location: Piasa and Eagle's Nest Islands are located in Mississippi River, Pool 26, between River Miles 208 and 211. Both islands are on the Illinois side of the main channel. The affected property is owned by the Corps, and is managed through a cooperative agreement with the Illinois Department of Natural Resources.

Resource Problem: The north end of the side channel, along the east bank of Piasa Island, is filling in at the north end. When the pool is on tilt, access to the side channel is only practical from the south, and there is no access into the island's drier interior wetlands.

Project: The project consists of: (1) a side channel closure dike, (2) a trail dike, (3) a series of wing dikes, and (4) interior wetlands dredging.

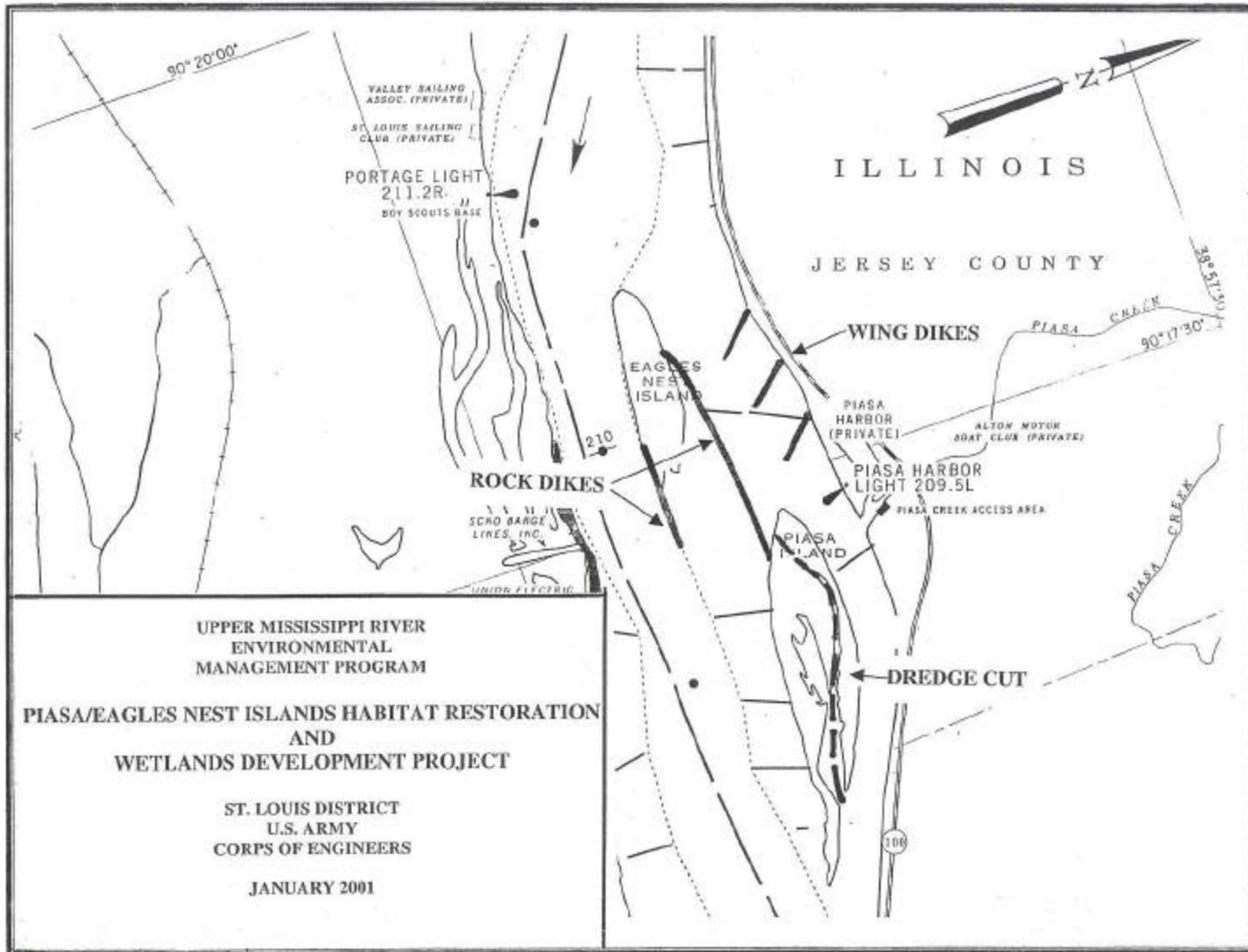
The project includes a rock dike (4,800 feet long) extending from the middle east side shoreline of Eagle's Nest Island, to a point 300 yards south of the northern tip of Piasa Island, along that island's west bank. The dikes would tie-in to Piasa Island downstream of the entrance to the island's old interior channel. Dike diverted river flows would help to reestablish an interior channel. Initially the depth of the interior channel would be restored via dredging. The project would be designed to utilize river forces in a manner that would negate the need for repeat dredging during the project's life.

In addition, an 1,800 foot rock trail dike would extend southward from the southwest corner of Eagle's Nest Island. Also, three 1,000 foot long wing dikes would be placed off the west bank of the river to concentrate flows into the Piasa Island side channel.

Project Outputs: The placement of the dike from Eagle's Nest to Piasa Island would direct more flow into the island's side channel. With the addition of the wing dikes extending from the east bank of the river, there would be an increased concentration of flow into the side channel. Scour holes would develop at the tip of the wing dikes, and would serve to maintain the access to the side channel from the north. This would restore and maintain the side channel habitat through the island. Initially, dredging would be employed to reduce the interior's sediments accumulation.

Between the two islands, there is a large shallow flat. The placement of the dike should accelerate deposition in this area. Past experience has shown that during high flow events the overtopping of the dike would create a plunge pool behind the dike. Associated with this pool the water would scour an escape channel back to the river channel. The dike extending south of the south tip of Eagle's Nest Island would cause deposition to occur to east of the dike. A scour hole could be expected to develop on the tip of the dike. As deposition causes the area behind the dike to accrete the hinge point management of pool 26 would periodically expose these areas. The de-watering will allow the germination of moist soil and other wetland plants creating herbaceous wetland habitat.

Financial Data: Total estimated base year costs for this project is \$ \$1,730,282 (or \$2,076,338 fully funded). The estimated annual operations and maintenance cost is \$18,000. All of the project features are on Corps owned General Plan lands. Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 100 percent Federal and the OMRR costs are the responsibility of the project's sponsor, IDNR.



UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

**PIASA/EAGLES NEST ISLANDS HABITAT RESTORATION
AND
WETLANDS DEVELOPMENT PROJECT**

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001

Upper Mississippi River System Environmental Management Program**Fact Sheet****POOL 24 ISLANDS****Mississippi River, Missouri**

Location: The proposed project includes Gilbert, Blackbird, North Fritz and South Fritz Islands. These islands are located in Pike County, Missouri along Mississippi River Pool 24 between River Miles 286 and 299.5. These islands are owned by the Corps, and managed through a cooperative agreement by the Missouri Department of Conservation (MDOC).

Resource Problem: A lack of woodland species diversity, and a significant decline in seasonal wetlands abundance and diversity, has adversely affected terrestrial wetland habitat on the islands in Pool 24. In addition, sedimentation in former side channels (chutes) has reduced depth diversity. These factors combine to adversely affect waterfowl, shore birds, furbearers and fisheries resources along this reach of the Mississippi River.

Project: : In general, the project includes: (1) rock closures for sediment/erosion control, (2) dredging chutes and creating deep holes, (3) tree piles placed in deep holes, (4) hard point structures, (5) disposal berms, (6) tree plantings, (7) a water control structure, (8) potholes, and (9) rock protection. More specifically, the project consists of:

Installing a closing structure at the upstream end of accreted chutes located on east side of Gilbert, south part of Blackbird, and the north end of the South Fritz slough to reduce influx of heavy sediments.

Improve fisheries habitat by dredging 5.5 miles of accreted chutes for a width of 50 feet and to a depth of 8' below flat pool (or 6' dredge cut assuming 2' of existing water). An additional 4.5 acres of deep water habitat will be created in these chutes by dredging to approximately 15 feet deep (or a 13 foot sediment cut) for a total of 95,000 CY of dredging. These deep pools will be located at selected locations throughout the side channel areas. Dredged material will be discharged adjacent to the side channels on areas cleared for this purpose, with the dredged material smoothed and established to hard-mast forest. Each deep pool will have habitat structures placed consisting of piles of anchored woody debris.

Create additional fisheries habitat in Gilbert Chute by constructing a series of small chevrons or non-rooted hard points (5 structures) to create depth and flow diversity.

Addition of two rock structures in Gilbert Chute—one is the creation of a “bull-nose” type structure at the head of a small island in the chute to reduce island erosion presently occurring, the second will raise the elevation of an existing closing structure to protect another small island from eroding.

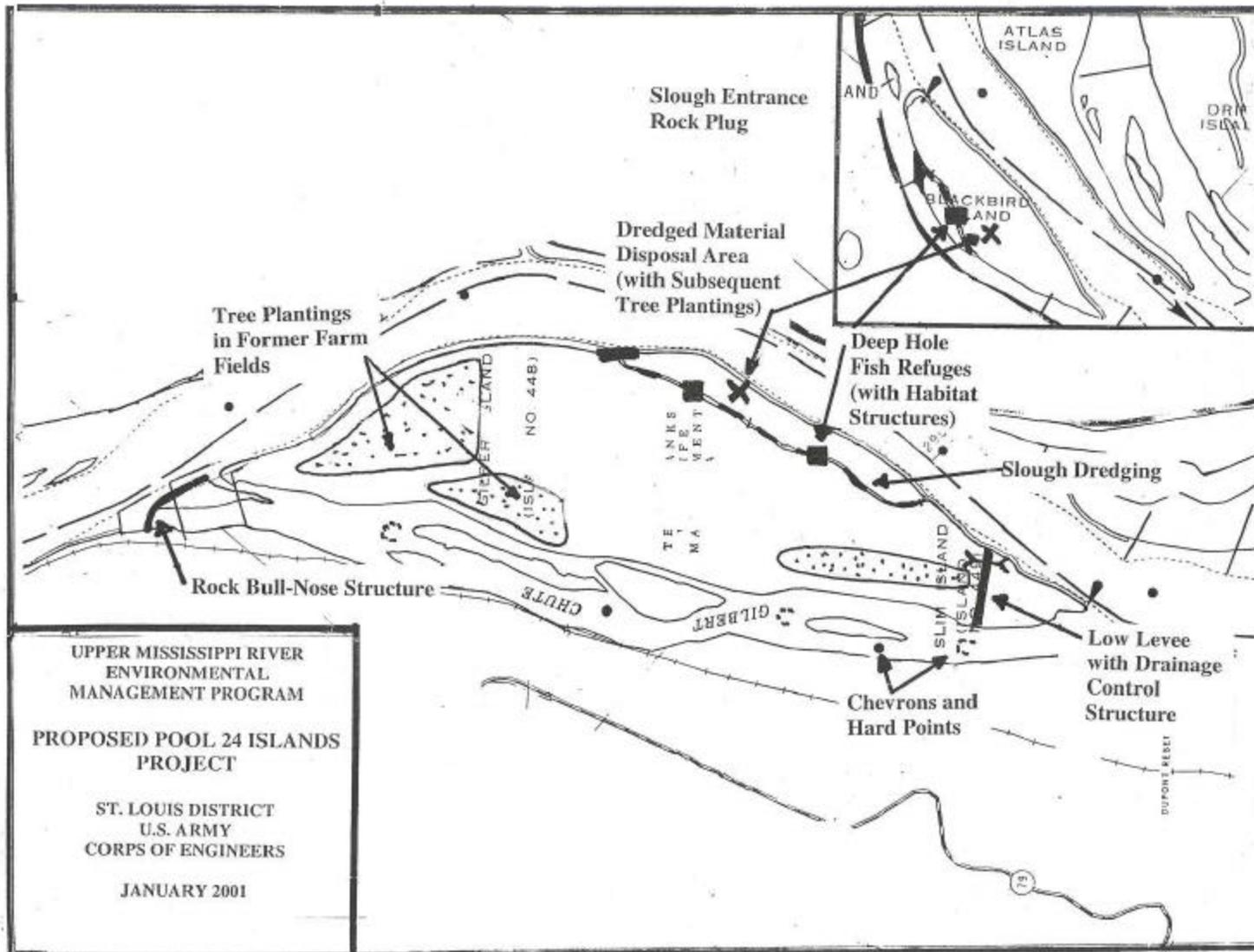
Planting container-grown hard mast trees on approximately 190 acres of abandoned crop fields, dredge spoil sites, and converting another 400 acres of existing timber to hard-mast woodland at yet to be identified locations on all four islands. Elevation of planted sites will be a minimum of 454 NGVD. These tree plantings are to be established on raised berms. In at least three locations on Gilbert Island, mounds of at least one-half acre in size, and constructed a minimum of two feet high (or above elevation 455 NGVD, whichever is higher) will be planted to hard-mast trees.

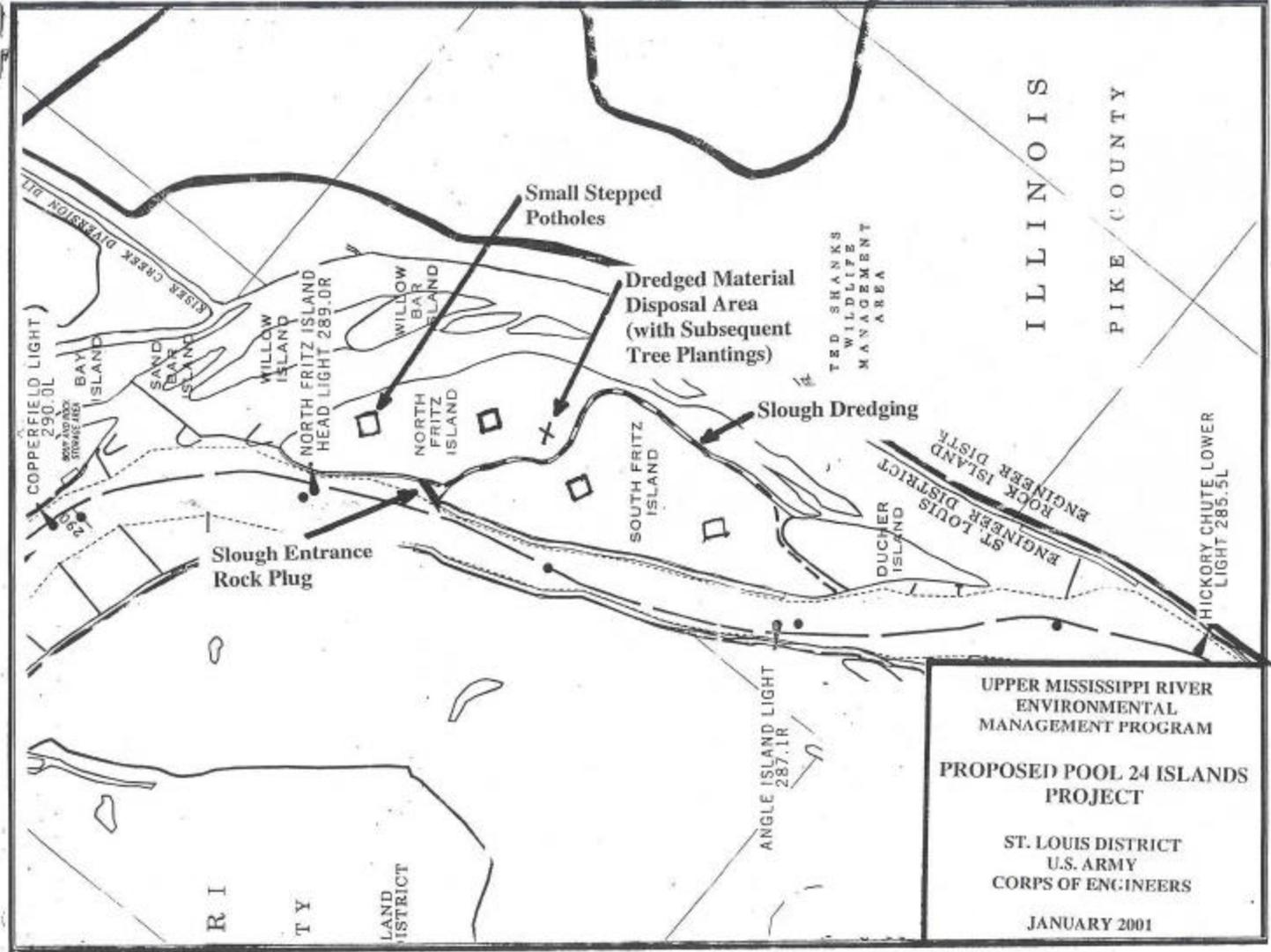
On Gilbert Island, a low profile berm (300 feet long, 3 feet high) with a drainage control structure (36" combination sluice-gate/stop-log structure) to allow opportunistic wetlands flooding adjacent to R.M. 294.5 R.

On North and South Fritz Islands, three to five 0.5 acre potholes each constructed in a contoured "stair step" fashion from shallow to deep water. This configuration would provide increased wetlands habitat diversity. The design is similar to that developed for the Cottonwood EMP project.

Project Outputs: Completion of this project would greatly enhance woodland plant diversity, providing a significant source of high energy food for a host of wildlife species. It would improve spawning, feeding, and overwintering habitat for a myriad of river fishes and aquatic habitat for reptiles and amphibians. It would increase wetland habitat diversity, and reduce detrimental island erosion and sedimentation.

Financial Data: Total estimated base year costs for this project is \$6,866,146 (or \$8,239,375 fully funded). The estimated annual operations and maintenance cost is \$10,000. All of the project features are on Corps owned General Plan lands "managed as a refuge". Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 100 percent federal. OMRR costs are the responsibility of the project's sponsor, MDOC.





ILLINOIS
PIKE COUNTY

TED SHANKS
WILDLIFE
MANAGEMENT
AREA

COPPERFIELD LIGHT
290.0L

BAY ISLAND

SAND BAR ISLAND

WILLOW ISLAND

NORTH FRITZ ISLAND
HEAD LIGHT 289.0R

WILLOW BAR ISLAND

NORTH FRITZ ISLAND

SOUTH FRITZ ISLAND

ANGLE ISLAND LIGHT
287.1R

DUCHER ISLAND

ST. LOUIS ENGINEER DISTRICT

ROCK ISLAND ENGINEER DISTRICT

HICKORY CHUTE LOWER LIGHT 285.5L

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

PROPOSED POOL 24 ISLANDS
PROJECT

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001

R I T Y
LAND DISTRICT

Slough Entrance
Rock Plug

Small Stepped
Potholes

Dredged Material
Disposal Area
(with Subsequent
Tree Plantings)

Slough Dredging

Upper Mississippi River System Environmental Management Program**Fact Sheet****RED'S LANDING WETLANDS ENHANCEMENT****Mississippi River, Illinois**

Location: Red's Landing is located in Calhoun County, Illinois along the left bank (east bank) of Mississippi River Pool 25 between River Miles 252 and 255.5. The property is owned by the Corps and is managed through a cooperative agreement with the Illinois Department of Natural Resources (IDNR). The area consists of a patchwork of habitat types including sloughs, backwater lakes, bottomland forest and agricultural fields. Low density recreation at the site includes facilities to accommodate hunters, fishermen, and wildlife observers.

Resource Problem: When the Corps purchased the land for the Upper Mississippi River navigation system, they leased portions of it back to the private sector. One such area was Gilead Slough, which was subsequently managed primarily as a hunting and fishing club, and was known as the Gilead Club. Over the years the club members constructed dikes and installed water control devices. They used these facilities to manipulate water levels to create moist soil plant production areas that attracted additional numbers of waterfowl to the area during the hunting season.

The flood of 1993 destroyed most of the club member's cabins and much of the water control system. The club dropped its long standing lease with Corps. Since Gilead is just north of Red's Landing, it was subsequently offered by the Corps to IDNR for management. Today, the old Gilead Club levees and structures provide the water level control for the Red's Landing area. However the degraded condition of these systems allows water levels to get lower than what is needed for good fish and waterfowl habitat. Each year IDNR has to take heavy equipment into the old club and make patches to hold water.

On the northern end of the site, the silt load coming in during floods filled many of the old sloughs and backwaters. This siltation led to the loss of most of the wetland acres by being so shallow that they would dry out in summer and remain dry until the next flood event, allowing woody encroachment to take over the once open water and herbaceous wetlands.

Project: The proposed project are as follows:

Old Gilead Lease Property-- (1) raise existing east end levee, (2) replace old water control structure, (3) raise west end levee and construct an overflow spillway, and (4) tree plantings.

Red's Landing Property-- (5) agricultural field landside berm, (6) landside berm stop-log structures, (6) agricultural field riverside berm, (7) riverside berm overflow spillway, (8) discharge channel stilling basin and gated structure, and (9) tree plantings.

On the old Gilead lease property, the project would raise the east end berm 3 feet for a distance of 3,000 feet. The old control structure would be replaced with a 10-foot wide stop-log structure capable of providing fish and boat passage. The remaining portion of the berm would be raised one foot (450 cy) and covered with rip rap (750 cy) to serve as an overflow spillway during flood events. Most tree plantings (37 Ac) would occur at select locations. The nursery stock would be of the Root Pruned Method (RPM) variety which yields trees capable of producing acorns within six years time. The stock would be planted on artificially created ridges on a twenty by twenty spacing. The area between the ridges can produce moist

soil vegetation until the tree canopies close blocking the sunlight. As the trees mature and produce a food source more of the moist soil area will be converted to forest cover.

On the north end of the agricultural field, a berm 8,000 feet long (21,300 cy) would be constructed along the timbers edge with 4-36" CMPs with stop-log risers placed in the low spots. The river's natural ridge would provide for much of the fields riverside berm. Low spots along the natural berm would be filled (890 cy) to bring the riverside berm to a uniform average elevation of 3 feet. The riverside berm would be equipped with an overflow section (750 cy of rock) towards the downstream end, thereby allowing for over-topping by flood events. The levee around the pump discharge channel would be raised to create a stilling basin (1,789 cy earth) with 1-36" and 1-42" gated CMP structures between the basin and the new terrace. The new compartment would be flooded with the same pump system that is presently in place. Tree plantings (20 Ac) would occur at selected areas using the above described system of planting.

Project Outputs: The repairs to the old club lease water control system would assure that water levels can be maintained to provide fish and waterfowl habitat. The stop-log structure would improve fish access from the river during lower water levels than is possible now. The areas where the club members had their cabins, and where there were some small agricultural fields would be planted to bottomland hardwoods. This would add to the already good turkey and deer habitat of this area.

The flooded field would be managed to produce moist-soil plants with portions of the area planted to 5 gallon size nursery stock hardwoods. Red's Landing has a large Heron rookery, these birds are already benefiting from managed water levels that provide reliable feeding areas. Furbearer's have responded favorably, recently there have been several sightings of River Otters in the north end of the area. While habitat restoration is the primary purpose of this project, the flooded field would offer as a secondary by-product--an expanded waterfowl hunting opportunity.

Financial Data: Total estimated base year costs for this project is \$754,144 (or \$904,973 fully funded). The estimated annual operations and maintenance cost is \$4,600. All of the project features are on Corps owned General Plan lands. Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the project's first costs are 100 percent Federal, and the OMR costs are the responsibility of the project's sponsor, IDNR.

Supplemental Data

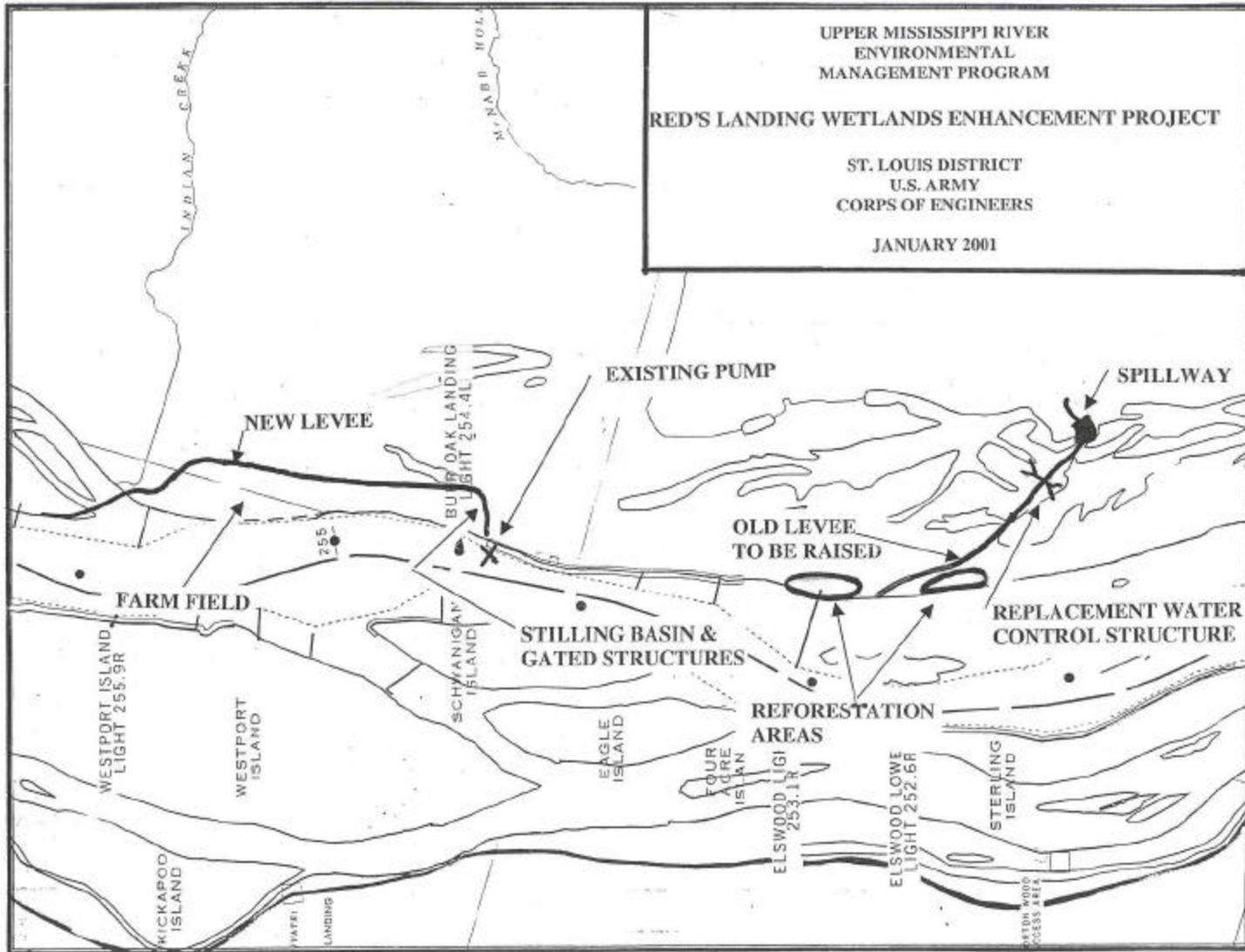
In 1995 and 1996 a group known as Partners for Wetlands developed a grant proposal to develop the north end of Red's Landing as a green tree reservoir. Funding was obtained from the IDNR Duck Stamp Funds, Ducks Unlimited - Marsh Fund, COE, US F & W, North American Wetland Conservation Funds and Migratory Waterfowlers Inc.. The IDNR Heavy Equipment Crew (HEC) constructed a low dike to allow for water retention, dug ditches and installed water control devices. A two way 22,000 GPM pump station was installed by a contractor. The green tree areas have been designated for walk in waterfowl hunting, and are gaining in popularity. The ability to once again have reliable water levels have benefited the site with a marked change in plant community and use of the area by wetland species.

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

RED'S LANDING WETLANDS ENHANCEMENT PROJECT

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001



NOTE: RECOMMEND PUTTING FACT SHEET ON HOLD UNTIL IDNR LANDS TRANSACTION COMPLETED

Upper Mississippi River System Environmental Management Program

Fact Sheet

RIP RAP LANDING HABITAT RESTORATION

Mississippi River, Illinois

Location: Rip Rap Landing is located in Calhoun County, Illinois. It lies along the eastside (left bank) of Mississippi River Pool 25 between River Miles 264 and 267. The 1,100 acre existing site is owned and managed by the Illinois Department of Natural Resources (IDNR). IDNR anticipates that in June 2001 it will have an additional 860 acres of property acquired with matching federal funds under the NRCS Wetlands Reserve Program (WRP). This fact sheet addresses the entire 1,960 acres. The DPR work would not be initiated until the state has concluded its lands acquisition.

Resource Problem:

The existing 10,000 gpm pump system is inadequate to meet IDNR's water management needs for Rip Rap Landing. Without supplemental river water, Waverly Lake and other interior ponds go dry each year. An opportunity exists to upgrade the site's water transfer capability. Water depths along the lower Sny have been reduced to about 2 feet, with little to no hydrologic connection with the backwater lakes adjacent to this segment of channel. Except during major flood events, most of the sedimentation along the lower Sny is hillside rather than river borne.

Project: The project includes: (1) a larger pumping plant, (2) Sny ditch excavation, (3) uplands sediment traps, and (4) improved gated water control structures.

The project would approximately double to 20,000 gpm the sites pumping capability. About 20,000 feet of the lower Sny ditch would be dredged to create a bottom width of 20 feet and a total water depth at normal pool of 8 feet. Dredging the old Sny channel would also be compatible with IDNR's broader watershed planning objectives.

Project Outputs: The proposed project offers the opportunity to restore 200 acres of seasonal wetland habitats. The increased pumping capacity would assure an ability to provide long-term high quality wetlands habitat.

The dredging of the lower Sny channel would create deepwater overwintering habitat for fish, and would connect that channel to a series of backwater lakes to enhance opportunities for fish spawning and rearing. Additionally, hydraulic connections to backwaters could potentially allow for the manipulation of water levels to enhance the establishment of submersed aquatic communities. Dredging the old Sny channel would also be compatible with IDNR's broader watershed planning objectives.

Financial Data: Total estimated base year costs for this project is \$\$ 2,089,758 (or \$2,507,710 fully funded). The estimated annual operations and maintenance cost is \$9,300. All of the project features are on state owned lands. Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 65 percent Federal and 35 percent non-federal. The state is seeking LERRDs

credits towards its 35 percent cost-share of the project for the site's 200 acres affected by this project. OMRR costs are the responsibility of the project's sponsor, IDNR.

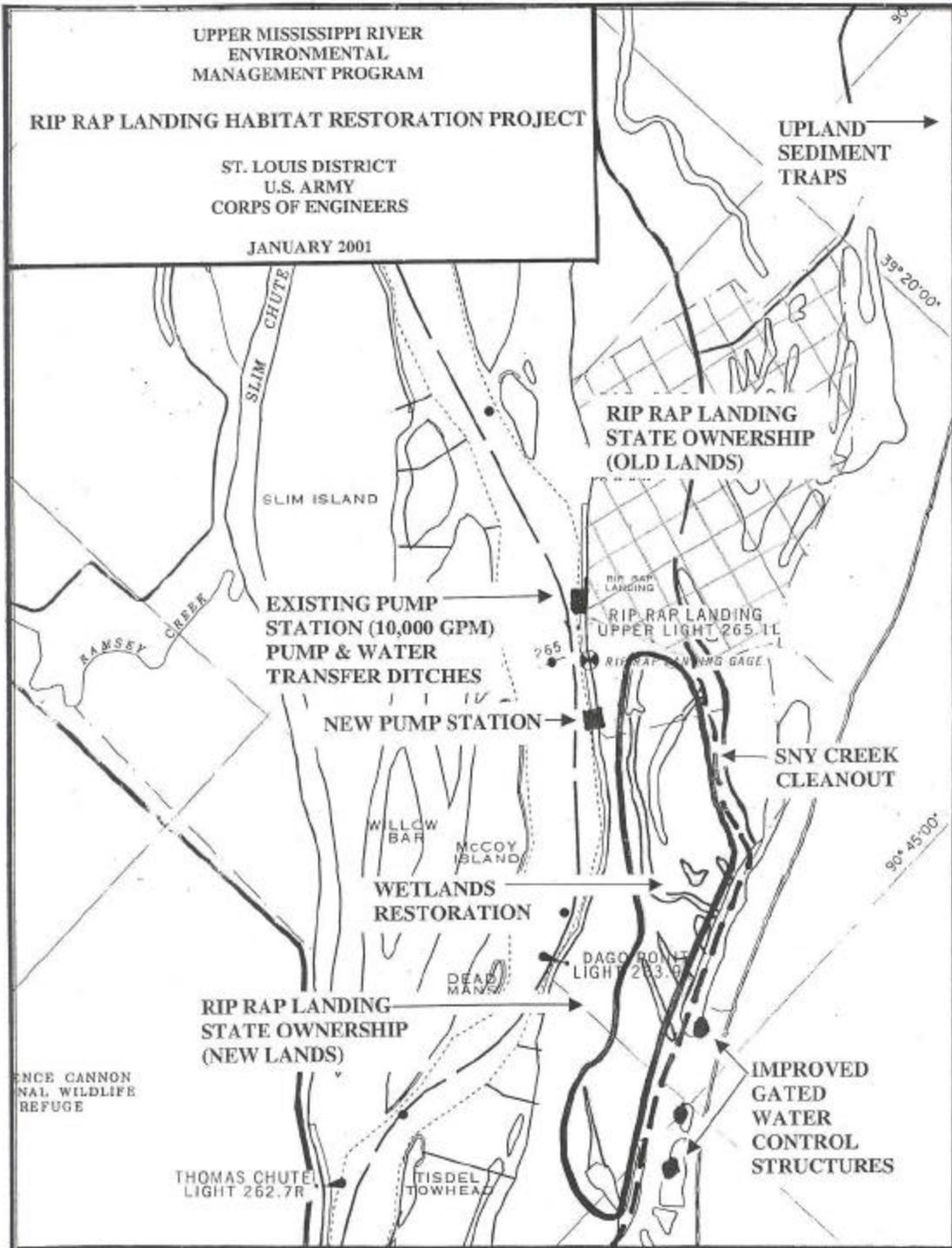
Supplemental Data: Rip Rap Landing and its vicinity has been a focal point of other recent planning efforts. These efforts include a watershed protection study, and a now defunct Section 1135 project study (which has since been moved into the Upper Mississippi River Navigation Study as a potential mitigation project). The state's expanded lands acquisition at Rip Rap Landing might indirectly contribute to land requirements associated with the implementation of any future modified Environmental Pool Management initiatives. Such a proposal may soon be studied as part a potential mitigation project proposal under the UMR Navigation Study. During the preparation of the DPR, a letter would be obtained from NRCS reflecting the compatibility of the WRP lands with the proposed EMP features.

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL
MANAGEMENT PROGRAM

RIP RAP LANDING HABITAT RESTORATION PROJECT

ST. LOUIS DISTRICT
U.S. ARMY
CORPS OF ENGINEERS

JANUARY 2001



Upper Mississippi River System Environmental Management Program**Fact Sheet****TED SHANKS CONSERVATION AREA REHABILITATION****Pool 24, Mississippi River, Missouri**

Location: The Ted Shanks Conservation Area (TSCA) is located in Pool 25 of the Mississippi River. The portion of the TSCA included in this EMP project is that section along the Missouri bank extending between River Miles 284 to 291. Township 55N, Range 2W, and all or part of sections 22, 23, 25, 26, 27, 34, 35, 36; and T54N, R2W, and parts of sections 1 and 2. The TSCA is managed by the Missouri Department of Conservation (MDOC).

Resource Problem: Terrestrial wetland habitat at this 2,000 acre site has been degraded by the 1993 flood and long-term sedimentation. Primary problems to be addressed by this project include: habitat loss caused by the invasion of reed canary grass (an aggressive cool-season grass), the loss of bottomland hardwoods and their associated lack of regeneration; lack of aquatic habitat diversity, especially over-wintering and summer habitat; hydrologic changes associated with elevated ground water levels; and an overall general loss of wetlands diversity.

Project:***Features:***

- Control of reed canary grass invasion on approximately 870 acres.
- Promote hardwood regeneration by planting trees on 320 acres.
- Clear woody debris from 870 site acres.
- Improve fisheries habitat by constructing 5 acres of thermal refuges at appropriate sites by dredging to a depth of at least nine feet, increasing water depth diversity at on 5 acres at a location along the Salt River's left bank 1 mile upstream of that river's mouth), and by installing 10 woody structures.
- Improve water control and wetlands habitat management by installing 6 miles of interior levees with 7 to 10-36" gated RCPs, install 5-72" RCPs through the south end exterior levee at the end of 3- Mile Ditch, and provide two 10,000 GPM portable pump units.
- An overflow structure would be installed to protect the exterior levee from erosional effects during major floods. The structures design would accomplished in a manner that would minimize the loss of flood protection to the site's interior. The tentative estimate is that the structure would be 3,000' in length.
- Conversion of a portion of the formerly wooded area to promote 270 acres of annual herbaceous wetland, and 280 acres of emergent marsh. This will allow a greater diversity of wetland habitats to be provided, facilitate control of reed canary grass, and recognizes that elevated ground water levels compromise the ability to

restore a diverse bottomland hardwood system.

Phased Construction:

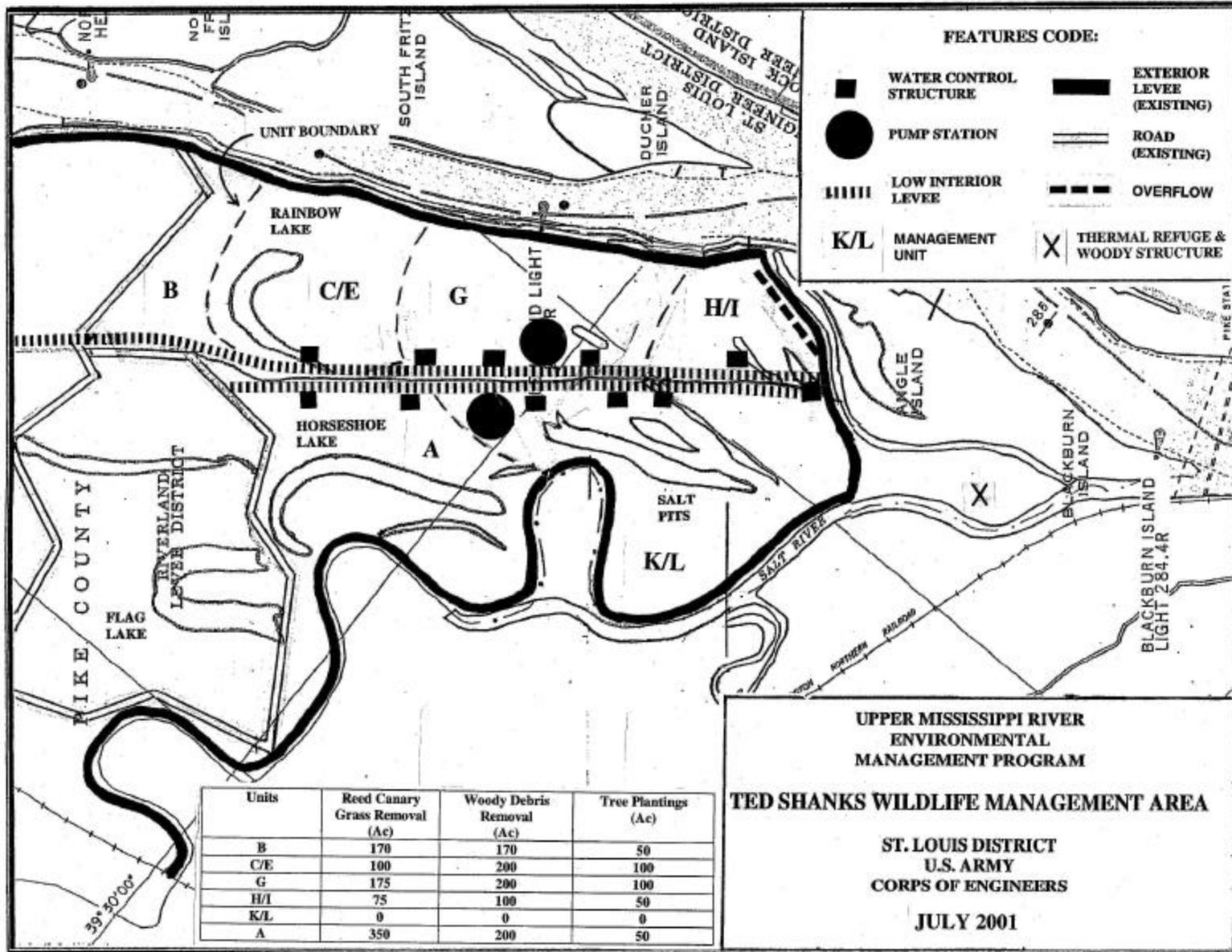
Due to its large size and costs, this project will be constructed in five phases. Implementation would occur over a five year period (one phase per year). A tentative breakout of the phases is as follows: Phase 1--tree clearing, Phase 2 --overflow structure, Phase 3--exterior water control structure, Phase 4-- interior levee embankment, associated interior water control structures, and central drainage ditch dredging, Phase 5--all remaining work items.

Value Engineering (VE) Analysis:

A VE analysis will be conducted early on in the study in an attempt to find innovative ways to reduce the total cost of the project without sacrificing key project objectives.

Project Outputs: The restoration and rehabilitation of these wetland and aquatic habitats would provide resting, feeding, nesting, breeding, and weather and predator-escape cover for many forms of migrating water birds and resident wetland wildlife. It will improve aquatic habitat for fishes and reptiles/amphibians, improve woody and herbaceous plant diversity, and improve water management capabilities.

Financial Data: The total estimated base year cost for this project is currently \$14,523,591 (or \$17,428,309 fully funded). The tentatively estimated allocations (in base year dollars) are: \$3.3 million for Phase 1, \$3.4 million for Phase 2 construction, \$2.8 million for Phase 3, \$3.5 million for Phase 4, and \$1.5 million for Phase 5. Both the sponsor and the District are committed to substantially lowering the costs of this project, and to revisit the construction sequence during the preparation of the DPR. The estimated annual operations and maintenance cost is \$72,618. All of the project features are located on Corps owned General Plan lands managed as a refuge. Accordingly, under the provisions of Section 906(e) of WRDA 1986, as amended, the projects first costs are 100 percent Federal. OMRR costs are the responsibility of MDOC as the project's sponsor.



UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETPOOLS 25 AND 26 WETLAND HABITAT REHABILITATION
POOLS 25 AND 26, MISSOURI

LOCATION: The four islands that comprise this project are located between miles 224 and 261 along the right (western) bank of Mississippi River Pools 25 and 26.

RESOURCE PROBLEM: The chutes, sloughs and wetlands on the interior of islands in Pools 25 and 26 have been severely degraded by sedimentation.

PROPOSED PROJECT:

- Mosier Island. An estimated 70-80 acres of chute, slough and wetland would be rehabilitated on this 425 acre island by constructing a low profile levee and flow control structures.

- Westport Island. 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. The pump would be moved to serve the several islands in this project.

- Dardenne Island. Proposed improvements on this 790 acre island would include a low levee and drainage control structure, deepening portions of the interior wetlands, and selective clearing of less desirable hardwood timber.

- Bolter's Island. The project would restore 160 acres of wetland habitat on this 562 acre island. Improvements would consist of a low levee with drainage control structures, deepening portions of the interior wetlands, and selective small-scale clearing.

PROJECT OUTPUTS: Restoring and rehabilitating these wetland and aquatic habitats would provide breeding, nesting, feeding, and predator-escape habitats for many forms of waterfowl, mammals, and reptiles and would furnish productive fish spawning and nursery areas. Wintering bald eagles and migrating shorebirds would be expected to increase usage of the improved wetland habitat.

FINANCIAL DATA: Costs for general design are estimated at \$85,000, and construction costs are estimated at \$1,010,000. Annual OMRR costs are estimated at \$12,000. The islands are included in certain lands acquired for the navigation project that were identified in a General Plan and made available to the States, through Cooperative Agreements between the Corps of Engineers and the Department of Interior (DOI), and between the DOI and each State. These lands were made available "for use in the conservation and management of wildlife resources thereof, and its habitat thereon, in connection with the national migratory bird program". The Cooperative Agreements stipulate that the areas shall be maintained "in accordance with an annual management program...submitted to the Service." Under Section 906(e) of the 1986 Water Resources Development Act, this portion of the project area is "managed as a national wildlife refuge" and qualifies for 100 percent Federal funding of general design and construction. OMRR costs would be shared 75 percent federal/25 percent non Federal. The non Federal sponsor would be the Missouri Department of Conservation.

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETOSBORNE SIDE CHANNEL REHABILITATION
MISSISSIPPI RIVER, ILLINOIS

LOCATION: The Osborne side channel, located at river miles 145-146, is one of only 23 such channels that remain along the 202 miles of open, channelized river below St. Louis, Missouri.

RESOURCE PROBLEM: Without action, these side channels will continue to fill with sediment and eventually accrete to the mainland, thus eliminating a critically important habitat component of the riverine ecosystem.

PROPOSED PROJECT: The proposed work would proceed in three phases:

Phase 1: - Four dikes presently located in the side channel would be removed except for portions that would remain to serve as erosion control "hardpoints". Part of the sediment would be removed, either by dredging or, preferably, by altering an upstream dike to allow the side channel to capture sufficient flow for scour to occur.

Phase 2: - Hydrographic surveys would determine if sufficient flow has been established to transport the sediment and degrade the side channel.

Phase 3: - After the side channel has been restored, redeposition of sediment would be controlled by constructing a closing structure with previously stockpiled rock, designed to prevent frequent inflow by silt bearing floodwater.

PROJECT OUTPUTS: The project would restore aquatic habitat by removing part of the sediment accumulation and retarding further sedimentation. The resulting slackwater would provide a sheltered nursery for fishes and resting/feeding sites for migratory waterfowl, bald eagles, and other wetland species.

FINANCIAL DATA: Costs for general design are estimated at \$85,000, and construction costs are estimated at \$615,000 for the three phases. Annual OMRR cost are estimated at \$6,000. The project would be constructed on navigation project lands owned by the Corps of Engineers. In accordance with Section 906(e) of the 1986 Water Resources Development Act, general design, construction, and OMRR costs would be shared 75 percent Federal/25 percent Non-Federal. The non-Federal sponsor would be the Illinois Department of Conservation.

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETALTON POOL SIDE CHANNELS
ILLINOIS RIVER (Mississippi River Backwater)

LOCATION: The lower 80 mile reach of the Illinois River is influenced by backwater from the Alton Pool (Pool 26). The areas of concern are adjacent to the following islands: Wilson's, Meredosia, Big Blue, McEver's, Buckhorn, Wing, Spar, Fisher, Twin, Willow, Crater, Hurricane, Diamond, Mortland and Twelve Mile.

RESOURCE PROBLEM: The side channels within this reach afford a protected riverine habitat conducive to the feeding, spawning and resting of fish. The channel banks are largely unprotected, however, and erosion with resulting sediment deposition has damaged the fish habitat.

PROPOSED PROJECT: The project would provide for installation/construction of various erosion control measures in each of the listed side channels. The measures could include rock-filled gabions, cribbing, tree retards, short lengths of stone dike and riprap. Installations would concentrate on the areas that are experiencing the most severe erosion problems and those that lack sufficient fish habitat structure.

PROJECT OUTPUTS: The project would improve the fisheries resource in the side channels by retarding erosion and providing habitat diversity.

FINANCIAL DATA: The appropriate cost sharing for general design, construction and O&M would be 75 percent Federal and 25 percent non-Federal. Federal costs are estimated to be \$169,000 for general design and \$525,000 for construction. The non-Federal sponsor would be the Illinois Department of Conservation.

9 May 1988

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETPOOL 25 ISLAND
POOL 25, MISSISSIPPI RIVER, MISSOURI

LOCATION: The proposed project would be located in the vicinity of river mile 249.5 in Pool 25 of the Mississippi River, in Lincoln County, Missouri.

RESOURCE PROBLEM: The lack of shallow water habitat with submergent/emergent aquatic plants has adversely affected waterfowl, furbearer and fisheries resources along this reach of the Mississippi River.

PROPOSED PROJECT: The proposed project involves construction of a low-profile island of approximately 200 acres using dredged material derived from the channel maintenance program. (The Definite Project Report will address whether cost savings to the channel maintenance program would justify an allocation of the costs of this project). Bank protection material would be placed on the island shoreline to reduce scour and erosion.

PROJECT OUTPUTS: The approximate 200 acres of shallow water wetland/backwater habitat created by the project would provide benefits to both Missouri and Illinois in the form of habitat improvements for migratory waterfowl, eagles, shore birds and other wetland wildlife species. Fisheries would also benefit by the additional spawning/nursery area that would result from the project.

FINANCIAL DATA: Costs for general design are estimated at \$35,000, and construction costs are estimated at \$234,000. Annual OMRR costs are estimated at \$3,000. The project would be constructed on navigation project lands owned by the Corps of Engineers. In accordance with Section 906(e) of the 1986 Water Resources Development Act, general design, construction and OMRR costs would be shared 75 percent Federal/25 percent non-Federal. The non-Federal sponsor would be the Missouri Department of Conservation.

12 June 1989

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETLEAST TERN HABITAT REHABILITATION
MISSISSIPPI RIVER, MISSOURI

LOCATION: The project area includes two locations on the open river reach of the Mississippi River below St. Louis, Missouri. One location is near Establishment Island (at approximate river mile 131.0) and the other location is near Gills Point (at approximate river mile 83.5).

RESOURCE PROBLEM: The Federally listed endangered interior least tern (*Sterna antillarum*) historically nested throughout the Upper Mississippi River. Channel modifications for commercial navigation have eliminated most sand bar islands used as nesting habitat by this tern. Only one colony is now documented for the Upper Mississippi River (River Mile 26). Existing sand bars are either too low (subject to water inundation) or they adjoin the mainland (subject to mammalian predation). Nesting habitat is viewed as limiting for this species, and its future survival may depend on the availability of higher elevation sand bar islands separated from the mainland.

PROPOSED PROJECT: The project at river mile 131.0 would consist of constructing a chevron or U-shaped dike to induce deposition for the formation of an island. To assure that the island is detached from the mainland, navigation project dikes in the vicinity would be notched. The project at river mile 83.5 would be constructed using a series of sloping, short hard-point dikes to enhance water flowage, and thus promoting separation of the island from the mainland.

PROJECT OUTPUT: The goal of the project is to provide habitat for a Federally listed endangered species. Two 40-acre sand islands of optimal elevation, separated from the mainland, would be formed to serve as nesting habitat for terns. Future management efforts by the Missouri Department of Conservation (vegetation control and least tern decoys) would contribute to the success of the effort.

FINANCIAL DATA: Costs for general design are estimated at \$40,000, and construction costs are estimated at \$200,000. Annual OM&R costs are estimated at \$3,000. Because the project is designed to benefit species that have been listed as threatened or endangered by the Secretary of the Interior, according to Section 906(e) of the 1986 Water Resources Development Act, general design and construction costs would be 100 percent Federal. The non-Federal sponsor would be the Missouri Department of Conservation.

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETSANDY CHUTE HABITAT REHABILITATION
POOLS 25 AND 26, MISSISSIPPI RIVER, MISSOURI

LOCATION: The project would be located on the right bank of the Mississippi River between River Miles 241.3 to 245.0. The upper three miles of Sandy Chute is within Pool 25, but a levee now separates the upstream end of the chute from the Mississippi River. The downstream end of Sandy Chute is immediately below Lock and Dam 25 in Pool 26.

RESOURCE PROBLEM: The shallow water in this "dead end" chute has been identified as a spawning and nursery area. Since flow through the chute has been blocked by the levee, sedimentation and low dissolved oxygen levels have greatly degraded the area.

PROPOSED PROJECT: Proposed rehabilitation includes restoring flow through the chute by constructing a water-control structure in the levee at the upstream end and dredging the lower reaches. The differences in elevation between the Mississippi River (Pool 25) and Sandy Chute (Pool 26) provide sufficient head to establish a flow which would result in a flushing action.

PROJECT OUTPUT: The goal of the project is to increase the dissolved oxygen content of the water in the chute and to reduce sediment accumulations. The project would revitalize approximately 200 acres of aquatic habitat.

FINANCIAL DATA: Costs for general design are estimated at \$60,000, and construction costs are estimated at \$270,000. Annual OM&R costs are estimated at \$5,000. Portions of the project area (60 percent or 120 acres) were included in certain lands acquired for the navigation project that were identified in a General Plan and made available to the States, through Cooperative Agreements between the Corps of Engineers and the Department of the Interior (DOI), and between the DOI and each State. These lands were made available "for use in the conservation and management of wildlife resources thereof, and its habitat thereon, in connection with the national migratory bird program." The Cooperative Agreements stipulate that the areas shall be maintained "in accordance with an annual management program . . . submitted to the Service." Under Section 906(e) of the 1986 Water Resources Development Act, this portion of the project area is "managed as a national wildlife refuge" and qualifies for 100 percent Federal funding of general design and construction. Other portions (40 percent or 80 acres) are not on "lands managed as a national wildlife refuge". In accordance with Section 906(e), general design and construction costs on those lands, and all OM&R costs, would be shared 75 percent Federal/25 percent non-Federal. The non-Federal sponsor would be the Missouri Department of Conservation.

12 June 1989

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETSTONE DIKE ALTERATIONS
MISSISSIPPI RIVER, MISSOURI AND ILLINOIS

LOCATION: The stone dikes to be altered under this project are located at various sites along both the open and pooled sections of the Mississippi River within the St. Louis District.

RESOURCE PROBLEM: For years, conservation interests have noted that the stone dikes, constructed to promote channel maintenance, have caused a homogeneous pattern of sediment deposition that has limited the quality of the aquatic habitat (particularly within main channel border areas). Past dike notching efforts by the St. Louis District have demonstrated that these dikes can be modified (without affecting navigation) to create a more diverse depositional pattern. It has also been demonstrated that these physically more diverse dike areas have resulted in quantitative increases in fish productivity.

PROPOSED PROJECT: The project would consist of altering existing dikes (via notching or removal) to permit sufficient flow at higher river stages to result in a more diverse depositional pattern. The sites selected for this project would represent areas where the biological need for habitat alteration is the greatest and where notching of existing dikes offers the greatest opportunity for success. The proposed project could comprise the first stage of a larger, more comprehensive UMR project. Some twenty-five structures would be altered during this first stage.

PROJECT OUTPUT: The goal of this project is to rehabilitate the aquatic habitat by increasing the diversity and thus the productivity of that habitat. It is anticipated that the beneficial effects of this program could enhance as much as ten percent of the total aquatic habitat of the affected river reaches.

FINANCIAL DATA: General design costs are estimated at \$300,000, and construction costs are estimated at \$2,000,000. Annual OM&R costs are expected to be zero because as navigation structures, navigation project O&M funds would be used to maintain their physical integrity, and it is not expected that any management activities would be required to maintain fish and wildlife values. The project would be constructed on navigation project lands owned by the U.S. Army Corps of Engineers. In accordance with Section 906(e) of the 1986 Water Resources Development Act, general design, construction, and OM&R costs would be shared 75 percent Federal/25 percent non-Federal. The non-Federal sponsors would be the Illinois Department of Conservation and the Missouri Department of Conservation.

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETANGLE/BLACKBURN ISLAND COMPLEX
POOL 24, MISSOURI

LOCATION: The Angle and Blackburn Island Complex encompasses approximately 575 acres and is located in Pike County, Missouri, on the Mississippi River in Pool 24 between river miles 284.5 to 286.4. The site is on lands managed by the Missouri Department of Conservation under a cooperative agreement with the U.S. Fish and Wildlife Service.

RESOURCE PROBLEM: Sedimentation has significantly degraded wetlands habitat in Deadman Chute which flows behind Angle and Blackburn Islands. The upper end of the chute is no longer connected to the river. Interior wetland habitat on the complex has deteriorated both qualitatively and quantitatively due to sedimentation.

PROPOSED PROJECT: The proposed project will construct a ditch 600 feet long from the upper end of Deadman Chute to within 100 feet of the river channel. A portable pumping station will be considered to feed the ditch and Deadman Chute as needed. The high bank will be brought up to uniform grade over depressions scattered around the riverward perimeter of the Angle/Blackburn Islands to maximize acreage available for green tree wetland management. Four deep holes (approximately 8'x50'x100') will be dredged in the lower 4,000 feet of Deadman Chute to provide a summer/winter refuge for fish. The dredge materials will be disposed of within the island complex. A flow control structure will be constructed on the lower end of Deadman Chute to provide water level management capability.

PROJECT OUTPUTS: The project will assure 1/2 acre of deep holes for productive spawning, nursery, and off-channel refuge habitat for fish in Deadman Chute. An estimated 500 acres of productive, green tree wetland habitat would be created for the benefit of wetland wildlife species, particularly waterfowl.

FINANCIAL DATA: Costs for general design are estimated at \$190,000 and construction costs are estimated at \$506,000. Annual operation, maintenance, and repair costs (OM&R) are estimated at \$4,600. The project would be located on lands acquired for the navigation project that were identified in a General Plan and made available to the States through Cooperative Agreements between the Corps of Engineers and the Department of Interior (DOI), and between the DOI and each State. The Cooperative Agreements stipulate that the areas shall be maintained "in accordance with an annual management program . . . submitted to the Service." Under Section 906(e) of the 1986 Water Resources Development Act, the project area is "managed as a national wildlife refuge" and qualifies for 100 percent Federal funding of general design and construction. Operation, maintenance, repair and rehabilitation costs would be shared 75 percent Federal/25 percent non-Federal. The non-Federal sponsor would be the Missouri Department of Conservation.

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEETBALDWIN BACKWATER PROTECTION
KASKASKIA RIVER, ILLINOIS

LOCATION: The project is located west of Baldwin, Illinois on the east bank of the Kaskaskia River channel where the railroad and Route 154 cross the river channel. The side channel extends north of the railroad and south of Route 154 and is open to the river channel on both ends. The site is located in the Kaskaskia River Fish and Wildlife Area which consists of 20,200 acres of river floodplain on the lower 36 miles of the Kaskaskia River.

RESOURCE PROBLEM: The once continuous forest corridor is now segmented with altered drainage patterns due to the navigation project. Due to sedimentation, many backwater areas are in danger of being cutoff and becoming oxbow lakes rather than remaining as productive backwater spawning areas connected to the navigated river channel.

PROPOSED PROJECT: The proposed project will provide structures to eliminate sediment buildup at the upstream and downstream end. A new opening to the river will be constructed at the upstream end parallel to the existing railroad. The existing opening would be allowed to close up naturally. Flow control structures (vanes) will be constructed at the new upstream opening and at the existing downstream opening to control sediment buildup. A nursery pond of approximately 10 acres will be constructed at an existing borrow area and will be ditched, possibly with a gravity drain, to drain into the channel.

PROJECT OUTPUTS: The project will protect and reverse the loss of backwater due to siltation and protect the natural riverine habitat along the Kaskaskia River for waterfowl, fish, and furbearers.

FINANCIAL DATA: Project elements would be constructed on Kaskaskia River Fish and Wildlife Area lands owned by the State of Illinois and on lands under the Operational Easement of the U.S. Army Corps of Engineers. General design, construction, and OM & R costs would be shared 75% federal and 25% non-federal. The non-federal sponsor will be the Illinois Department of Conservation. The general design cost is estimated at \$ 210,000. Construction cost is estimated at \$ 1,320,000. Annual operation and maintenance costs are estimated at \$ 900.

STATUS: Project approval requested.

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Upper Mississippi River System Environmental Management Program**Fact Sheet****WEST ALTON TRACT ENHANCEMENT****Pool 26, Mississippi River, Missouri**

Location: The project is located on the right bank of the Mississippi River between River Mile 203 and 204. The complex encompasses approximately 480 acres of backwater/wetlands habitat. The property is owned by the Corps and is managed through a cooperative agreement with the Missouri Department of Conservation (MDOC).

Resource Problem: A lack of shallow water habitat containing submergent and emergent macrophytes has adversely affected the waterfowl and furbearer resources along this portion of the Mississippi River. Sedimentation within this and other off-channel areas of Pool 26 have lead to a loss of desirable fisheries habitat (e.g. fish summer and winter thermal refuge habitat).

Project: The proposed project includes: woody debris placement, bay sediments dredging and disposal, installation of fish barriers, dredging deepwater holes, and installing wooden crib habitat structures.

Woody debris (potentially obtained from Pools 25/26 EMP-HREP related tree clearing) would be placed on an existing submerged rock structure located along the east margin of the West Alton bay. Upon this foundation, would be placed material dredged from the interior of West Alton Bay. The construction of this "outer bank island" would reduce wind and wave action within West Alton Bay and, over time, would become vegetated with woody species such as *Salix spp.* Reduced wind and wave action within West Alton Bay are expected to be favorable for the establishment of emergent aquatics (*Typha spp.*, *Sagittaria spp.*, and *Eleocharis spp.*) by seed, tuber, or water level manipulation. This project would create diverse zones for plant germination throughout the growing season by dredging sediments within the tract and by placing this material in a linear fashion 12 to 15 inches deep, and at a width ranging from 12 to 15 feet. To exclude herbivorous fish from entering these areas, fine mesh fencing should be placed around each site. To restore diminished thermal fish refugia in off-channel sites, four 100' x 300' holes ranging from 9 to 15 feet deep should be dredged within West Alton Bay, and to create fish and invertebrate habitat-wooden "cribs" would be installed 5-ft under the water's surface in each of the dredged holes.

Project Outputs: By restoring and rehabilitating physical and biotic habitat within West Alton Bay, it is anticipated that desirable breeding, nesting, nursery, and deep water habitat would be available for a number of species including waterfowl, shore birds, mammals, and fish. With the establishment of the "outer barrier island" wind and wave action would be reduced, thus improving water quality conditions that support aquatic plant growth.

Financial Data: Total estimated base year costs for this project is \$ 1,331,904 (or \$1,598,285 fully funded). The estimated annual operations and maintenance cost is \$7,500. All of the project features are on Corps owned General Plan lands "managed as a refuge". Accordingly, under the provisions of Section 906 (e) of WRDA 1986, as amended, the projects first costs are 100 percent federal. OMRR costs are the responsibility of the project's sponsor, MDOC.

