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Lower Impounded Reach
Ecosystem Restoration – High Priority Subareas

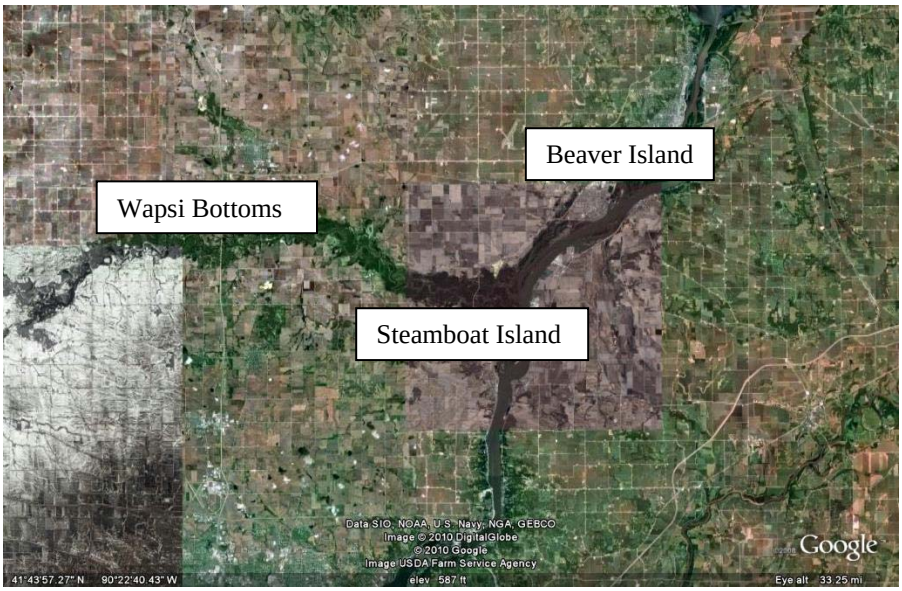
Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Pool 14

Pool 14 is the 29.2 mile segment of the Mississippi River extending upstream from Lock and Dam 14 near LeClaire, Iowa to Lock and Dam 13 at Fulton, Illinois. Backwater habitats have declined throughout the upper one-half of the pool, and that trend is expected to continue. Accelerated accumulation of sediment is a serious problem and has resulted in loss and deterioration of both backwater and channel habitats. Vegetation is generally very sparse, although emergent aquatics remain vigorous in the lower pool impounded area and within the Princeton Wildlife Area. The Pool contains one of the largest concentrations of, federally endangered, Higgins eye mussel (*Lampsilis higginsii*) on the Upper Mississippi River.

Resource issues identified by resource managers include:

- Fine sediments accumulation in backwaters and other floodplain locations
- Habitats critical to migratory birds must be maintained, especially aquatic food resources and woodlands.
- Coarse sediments, or bed load sediments, accumulate in side channels where they fill valuable habitats and restrict flow.
- Elevated water tables favor moisture tolerant forest species and limit site potential for species diversity.
- Watershed discharges into Pool 14 contribute to significant water quality and habitat problems which impact natural resources.
- Locks and dams 13 and 14 restrain fish passage between pools. The current Pool water management regime, especially the avoidance of seasonal low water, removes much potential for periodic regeneration of aquatic habitats.



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Beaver Island (Pool 14)

Beaver Island is a 2,500 acre island-backwater complex at Clinton, Iowa. Ecosystem restoration objectives for the subarea include:

- Restore shallow aquatic habitat in the upper reaches of rapidly accreting wetlands.
- Restore over-wintering habitat for centrarchids with dredging.
- Increase island elevation with dredged material to introduce and sustain mixed bottomland tree species.
- Reduce accelerated sediment accumulation in backwater lakes by diverting high flows with a low, deflection berm
- Restore secondary channel

Steamboat Island (Pool 14)

Steamboat Island is a 500 acre island adjacent to the Princeton Wildlife Management Area located about one mile upstream from Princeton, Iowa. Ecosystem restoration objectives for the subarea include:

- Protect, enhance, and restore aquatic and floodplain habitat for viable populations of fish, invertebrates, aquatic and semi-aquatic mammals, reptiles, amphibians, waterfowl, shorebirds, etc.
- Stabilize flows throughout the complex
- Restore sediment transport and deposition throughout the complex to a more “natural” condition
- minimize adverse effects of elevated water table on soil moisture conditions

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Wapsipinicon River Bottoms and Princeton Wildlife Management Area (Pool 14)

The Wapsi Bottoms is a diverse floodplain delta area with multiple channels and backwater overflow areas. The area provides important backwater habitat in a river reach that is dominated by channel habitat. Ecosystem restoration objectives for the subarea include:

- Continue water level management on Princeton Wildlife Management Area to ensure consistent availability of quality emergent aquatic and moist soil communities in Pool 14. Expand opportunities for similar water management on the Wildlife Area.
- Identify and pursue opportunities to enhance the diverse habitats at the mouth of the Wapsipinicon River. Advocate for floodplain restoration on the lower Wapsipinicon using programs as the Wetland Reserve Program.
- Maintain diversity within the forest community with intensive forest management.

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Pool 16

Pool 16 is about 25 miles in length from Rock Island, Illinois to Muscatine, Iowa. Fine sediments are accumulating at accelerated rats within backwaters and other floodplain areas due to high suspended sediment concentrations and the reduced sediments transport capability. High turbidity and grazing prevents colonization of aquatic plants. The confluence of the Rock River formed a large delta island complex. During the historic period, these channels, sloughs, and riparian land cover types have been altered, filled, and converted to agriculture, aggregate mining, urban development, and highway rights-of-way.

Adjacent to the Big Island area is an area referred to as the Milan Bottoms, which contains isolated floodplain lakes and remnant oak – hickory stands on a series of alluvial ridges parallel to the main channel. This area has been targeted for restoration under the Corps WRDA Section 1135 Program, and work has begun to restore historic hydrologic conditions.

Milan Bottoms (Pool 16)

Milan Bottoms is a 2,500 acre subarea at the confluence region of the Rock River near Rock Island, Illinois. The area is a diverse mix of floodplain forests, abandoned channels and backwater lakes that are all degraded by hydrologic alterations and excessive sedimentation. Ecosystem restoration objectives for the subarea include:

- Complete the 1135 project.
- Monitor habitat, flow and bathymetric characters within Blanchard Chute and establish a management objective of no deterioration of select characters. Construction or modification of various training structures will be used to maintain or improve select characters.

Andalusia Island (Pool 16)

Andalusia Island extends through much of Pool 16 below the Rock River. The subarea includes over 3,500 acres with several hundred acres of managed moist soil habitat rehabilitated as an early EMP project. Dredging Island interior channels and backwaters was another project feature, and there are further objectives for similar restoration work.

- Investigate seasonal flow regimes to reduce sediment input to Patterson Lake Complex
- Restore over-wintering habitat for contrarchids throughout backwaters.
- Improve site index for mixed bottomland trees by raising ground elevation with material removed to restore fish over-wintering habitat.
- Monitor habitat, flow and bathymetric characters within Sisco Chute and establish a management objective to maintain mussel bed.
- Restore moist soil and shallow aquatic communities with excavation of shallow ephemeral pools.
- Restore fish over-wintering site within adjacent backwaters
- Reduce sediment accumulation in backwater areas by diverting high flows with deflection berm constructed with shallow slopes to withstand erosion.

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Pool 17

Pool 17 is the 20.1 mile segment of the Mississippi River extending upstream from Lock and Dam 16 at Muscatine, Iowa to Dam 17 near New Boston, Illinois. Pool 17 is bounded by flood control levees throughout much of its length and large areas of the natural floodplain are located landward of levees. The pool is characterized by a series of islands created by glacial outwash exiting the Rock Island Gorge into the broad alluvial valley forming a unique outwash basin on the Iowa floodplain. Many of the islands are large, extending throughout the upper pool and diminishing downstream. Although the areal extent of aquatic habitats riverward of levees has changed little since impoundment, sedimentation induced by channel training has reduced bathymetric and structural diversity within side channels and backwaters, and backwaters have been lost. There are several chronic dredging sites that may be integrated into ecosystem restoration plans.

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Upper Pool 17

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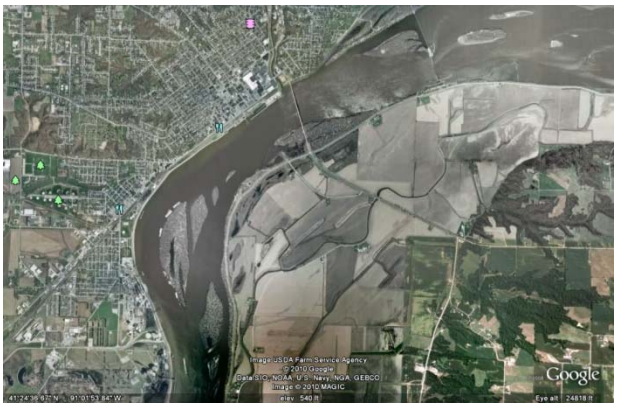

Upper Pool 17

Middle Pool 17

Monitor habitat, flow and bathymetric characters in side channels adjacent to M t RM 453 and establish a management objective of no deterioration of select characters. Construction or modification of various training structures will be used to maintain or improve select characters.

Eagle Fill

Michael Creek

Middle Pool 17
Several island and side channel complexes occur in Pool 17. Blanchard, Kilpeck, and Barkis Islands have been identified in Pool Plans and also as

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Eagle Fill Backwater

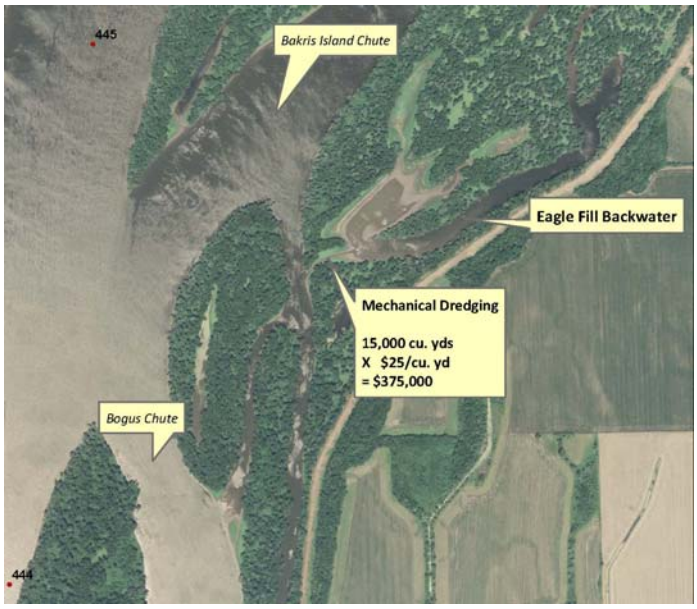
Eagle Fill is a 24 acre backwater located along the left descending bank (Mercer County, IL) in Pool 17 at RM 444.5. The single entrance to Eagle Fill is approximately 175 feet long by 70 feet wide. Excessive sedimentation within the entrance disconnects the backwater from the river except during high flows. However, the

majority of the backwater itself is in good condition with deep water that would provide critical spawning, rearing, and overwintering habitat for larval, juvenile, and adult fish.

Reconnecting Eagle Fill to the main channel by dredging approximately 15,000 yds^3 from the entrance would immediately provide approximately 14 acres of high quality fish habitat and meet the following (7) ecosystem restoration objectives for the UMRS Lower Impounded Reach and the five systemic ecosystem goals to the right:

- Modify contiguous backwater areas,
- Restore hydro-geomorphic processes that create, maintain, and improve bathymetric diversity,
- Increase topographic diversity,
- Restore a more natural hydrologic regime in the navigation pools,
- Reduce sediment loadings to the rivers and backwaters,
- Enhance water quality,
- Provide pathways for animal movements.

The remaining 10 acres of Eagle Fill is slightly degraded due to sedimentation, but could be dredged for increased depth or used for aquatic vegetation experimentation.



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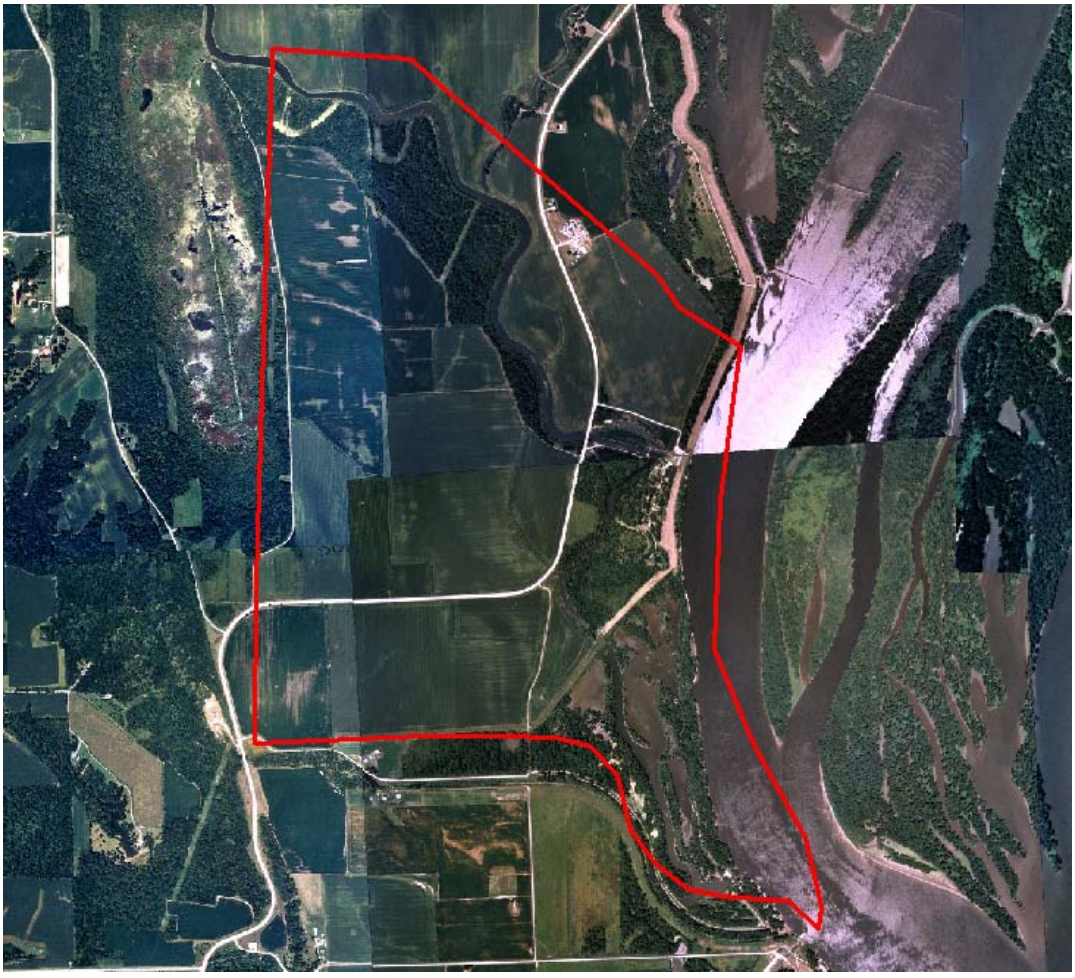
Michael Creek (Pool 17)

Michael Creek is an Iowa tributary in an ancient side channel surrounding the alluvial outwash basin. The entire basin is converted to leveed farmland and industry, the ecosystem restoration subarea includes the downstream confluence and backwaters. Near term restoration

opportunities in contiguous aquatic areas include backwater dredging and small scale drawdowns.



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Pool 18

Pool 18 is the 26.6 mile segment of the Mississippi River extending upstream from Lock and Dam 18 near Burlington, Iowa to Lock and Dam 17 above New Boston, Illinois. Much of the natural floodplain of Pool 18 is located landward of levees. The Iowa shoreline is bounded by levees except at the mouth of the Iowa River. The Iowa River contributed a huge sediment load in glacial periods, and is still a primary influence on the reach and contributes to several chronic channel maintenance dredging sites. Although the areal extent of aquatic habitats riverward of levees has changed little since impoundment, sedimentation induced by channel training has reduced bathymetric and structural diversity within side channels and backwaters, and backwaters have been lost. Island growth in the lower pool seems to be occurring in similar locations compared to pre-dam conditions. There are several chronic dredging sites that may be integrated into ecosystem restoration plans.

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Boston Bay (Pool 18)

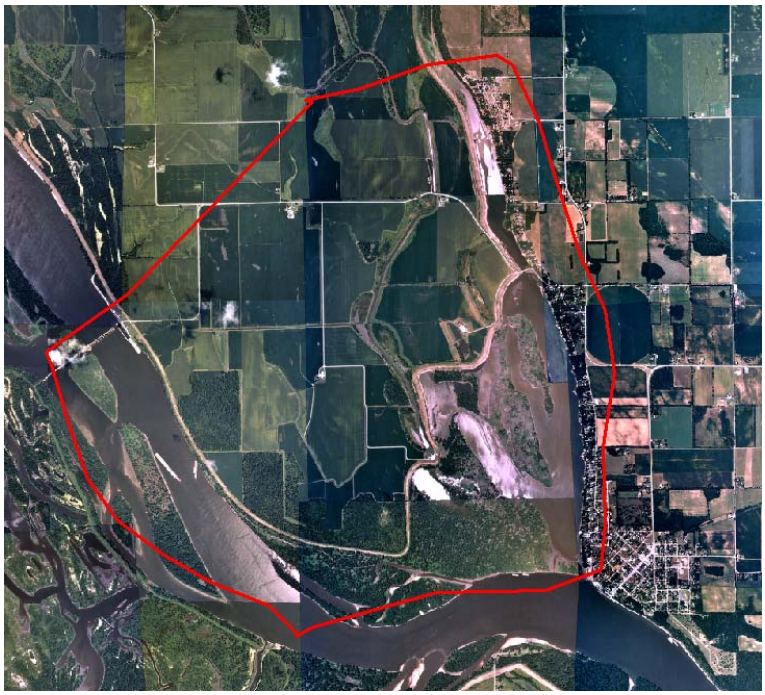
Boston bay is a 900 acre backwater lake near New Boston, Illinois. It is downstream from L&D17 and across the river from Lake Odessa. The lake was historically an important fish overwintering, migratory waterfowl stopover, and recreation area, but it is presently severely degraded by excessive sedimentation from Eliza Creek and the Bay Island Levee and Drainage District. Sedimentation and water level fluctuation are the primary limiting factors negatively affecting water quality, production of desirable aquatic vegetation, and bottomland forest diversity.

Protect, Enhance, and Restore Quality Habitat for All Native and Desirable Plant, Animal and Fish Species:

- restore seasonal aquatic refuge and access (i.e. overwintering)
- maintain seasonal dissolved oxygen levels greater than 5 mg/l annually
- restore submersed aquatic vegetation coverage to greater than 50 percent of bathymetric areas 0.1 to 1.0m deep annually (or 3 out 5 years)
- achieve desirable mast tree species canopy of 12 to 14 percent of total forest land class by target year 25

Enhance, Restore and Emulate a Sustainable Ecosystem (Natural Water Levels, Sediment Transport and Deposition Regime, and Distribution of Water Flows Across the Mississippi River Floodplain):

- achieve secchi disc depths of 30cm or better between June 1st and September 30th annually (or 3 out 5 years)
- achieve and maintain depths of 2m average in 5 percent of open water land class by target year 25
- maintain Boston Bay's complex connection to the main channel border throughout the annual hydrograph



A proposed EMP HREP includes re-routing drainage district discharge, managing creek inflow, riverward deflection berms, and dredging to

increase aquatic connectivity.

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Keithsburg Division Wildlife Refuge

The Keithsburg Division (Division) of Port Louisa National Wildlife Refuge is a 1,400-acre backwater complex near Keithsburg, Illinois between river miles 431 and 428. The refuge is bordered by the Edwards River to the north and Pope Creek to the south. It is separated from the Mississippi River by a three-mile-long levee which ties into two short sections of levee at the north and south ends. A spillway on the Edwards River levee at the north end and a spillway on the Mississippi River main levee at the south end allow floodwaters to flow into the division. A water control structure with two 36-inch screw gates is located at the south end of the main levee. The screw gates permit water levels to be lowered by gravity during the summer and to be raised in the fall when Mississippi River flows are high enough. The lower levee on Pope Creek was damaged during flooding in 1993 and never repaired. Lack of water control negatively impacts the bottomland forests by inhibiting regeneration and increasing mortality of mature trees. Levee repair and enhanced water control and fish habitat were scoped as an EMP HREP Fact Sheet.

Subarea objectives are:

- To enhance fish spawning, rearing and overwintering habitat; improve nutrient recycling; promote a more diverse aquatic invertebrate community; and enhance aquatic vegetation growth.
- To improve water circulation and water level management throughout the Division
- To provide decrease fish stress during summer drawdown periods.

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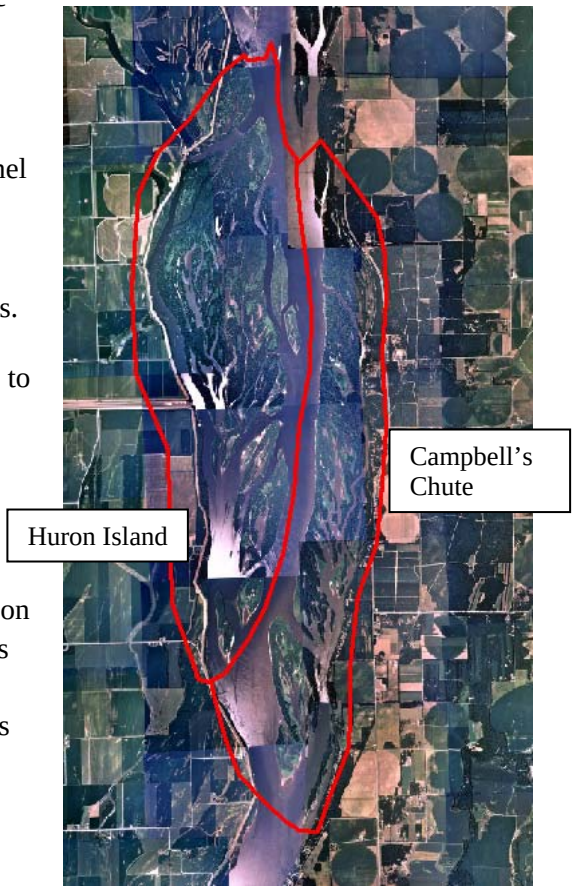
Huron-Johnson Island Complex

Huron Island is a large backwater-island complex in Iowa. The large side channel is persistent, but there is significant sedimentation, loss of depth, and loss of aquatic plants in the interior channels and backwaters.

Restoration objectives include:

- Maintain Huron Chute and the Johnson Island side channel using training structuresl.
- Reduce sediment accumulation in Huron Island backwaters.
- Restore bathymetric diversity in Huron Island backwaters.
- Manage forests to maintain a bottomland forest species using 'mound and swale' construction on Johnson Island to
- Provide fish over-wintering habitat.



Campbell's Chute/Benton Island Complex

Campbell's Chute is a long side channel and island complex on the Illinois bankline. There are two state parks and numerous cabins making the area attractive for many types of river recreation. The entire side channel and backwater complex is degraded by excessive sedimentation. Access is limited at controlled river stage.

Restoration objectives include:

- ✓ Maintain existing side channel quality using training structures.
- ✓ Divert high flows and suspended sediments with a deflection berm.
- ✓ Plant berm to select mixed bottomland tree species.
- ✓ Provide deep water and over-wintering fish habitats within Benton Island backwaters.

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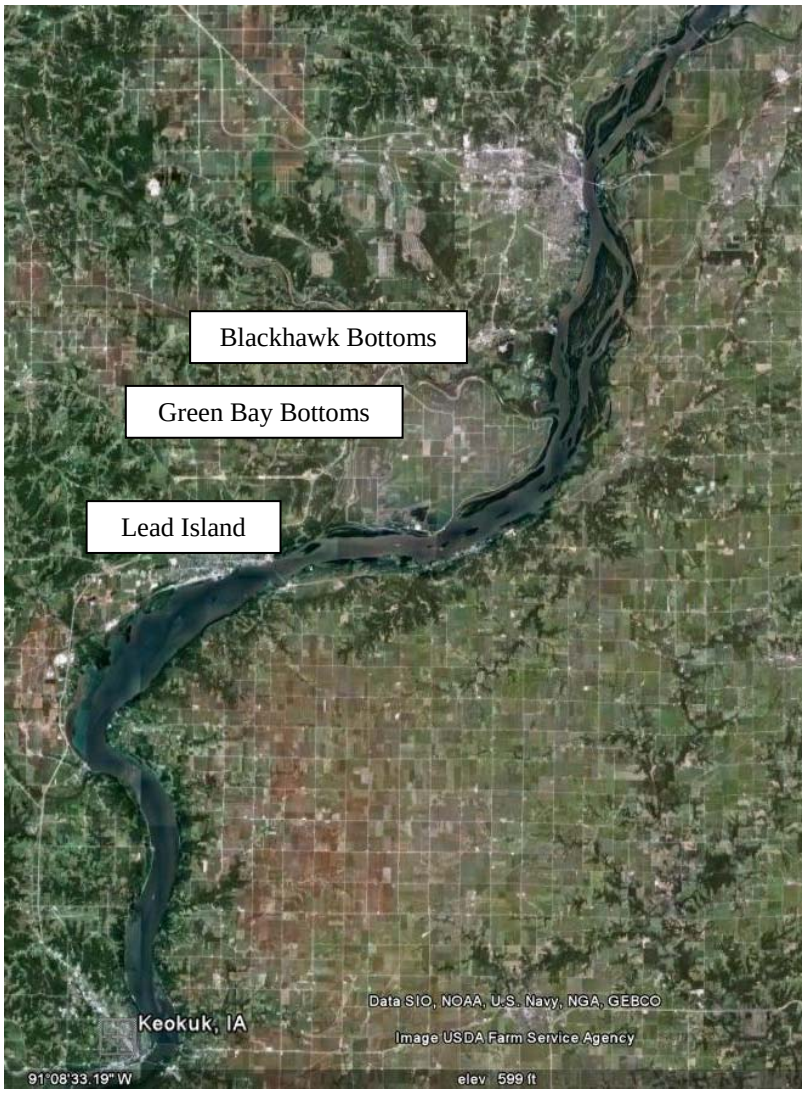
Pool 19

Pool 19 is the 46.3-mile segment of the Mississippi River extending upstream from Lock and Dam 19 at Keokuk, Iowa to Lock and Dam 18 near Burlington, Iowa. Significant floodplain areas restricted from the river include portions of three Drainage Districts adjacent to the upper pool (Illinois and Iowa), and the large Green Bay Levee and Drainage District No. 2 located below the mouth of Iowa's Skunk River. Pool 19 includes urban and industrial centers at Burlington, Fort Madison and Keokuk Iowa and smaller communities including Gulfport, Dallas City, Pontoosac, Niota and Nauvoo (Illinois), and Montrose (Iowa). Lock and Dam 19 was the first dam on the system in 1913, built to accommodate both navigation and hydropower production. The lift from the tailwater to Pool 19 is 38 feet which effectively precludes fish migration except through locks.

Braided island complexes characterize fifteen miles of the upper pool from Lock and Dam 18 downstream to the mouth of the Skunk River. Within that reach, backwater lakes are generally restricted to the Burlington Island complex, near the mouth of the Skunk River, and Prairie Slough. Backwaters on the interior of other upper pool islands are becoming increasingly isolated by sedimentation. The Green Bay levee narrows the floodplain and restricts backwater habitats within the ten mile reach above Ft. Madison. The impacts of deep impoundment, within a rather narrow floodplain, form the expanse of open water characteristic of the lower twenty miles of Pool 19. Excessive sedimentation at the dam created conditions for emergent vegetation in lower pool channel border areas that are now important waterfowl migratory stopovers.



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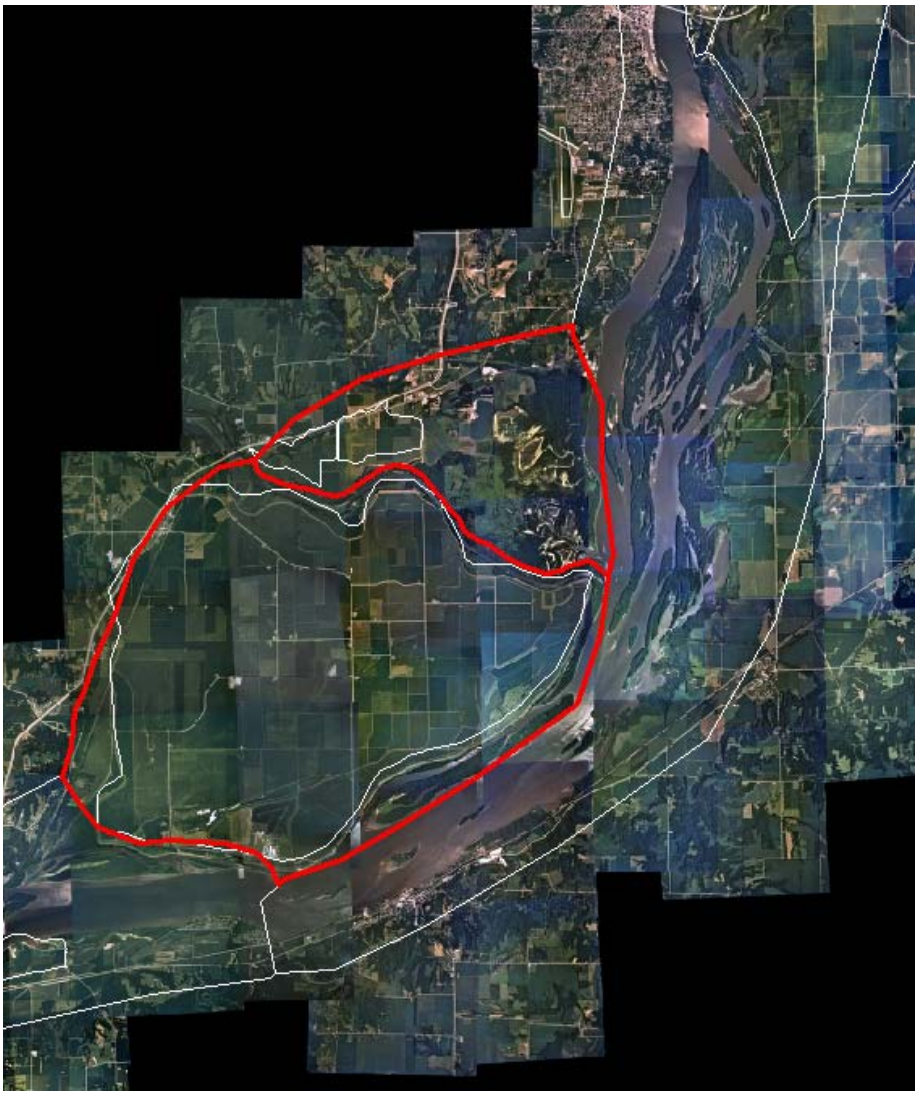
Blackhawk Bottoms and Green Bay Bottoms

This region of Pool 19 was formed by the confluence of the Skunk River. The floodplain upstream from the Skunk River is mostly connected to the Mississippi River and consists of degraded backwaters and wetlands. The objective in Blackhawk Bottoms is to convert remaining agriculture to natural habitat and restore existing backwaters and wetlands.

Green Bay Bottoms is a large agricultural area protected by flood control levees and interior drainage. Ecosystem restoration objectives range from large scale crop conversion, wetland restoration, and levee setbacks to small discrete private lands restorations within the existing uses.



Lead Island

Lead Island Chute is a 75 acre side channel located along the right descending bank (near Fort Madison, IA) in Pool 19 at RM 386. The downstream entrance to Lead Island Chute is severely degraded due to sedimentation from direct tributary inflow and disconnects the side channel from the main channel except during high flows. The remaining side channel provides excellent fish habitat with increased bathymetric diversity (depths 8-10 feet) and low water velocities.

Restoring connectivity to Lead Island Chute would immediately provide up to 75 acres of high quality fish habitat for spawning, rearing, and overwintering. Dredging approximately 135,000 yds^3 would meet the following (5) systemic ecosystem goals formulated during the UMR-IWW System Navigation Feasibility Study and PEIS and the seven UMRS Lower Impounded Reach ecosystem restoration objectives to the left:

- Improve water quality for all uses,
- Reduce erosion and sediment impacts,
- Restore natural hydrology,
- Increase backwater connectivity with main channel,
- Increase side channel, island, shoal, and sand bar habitat.

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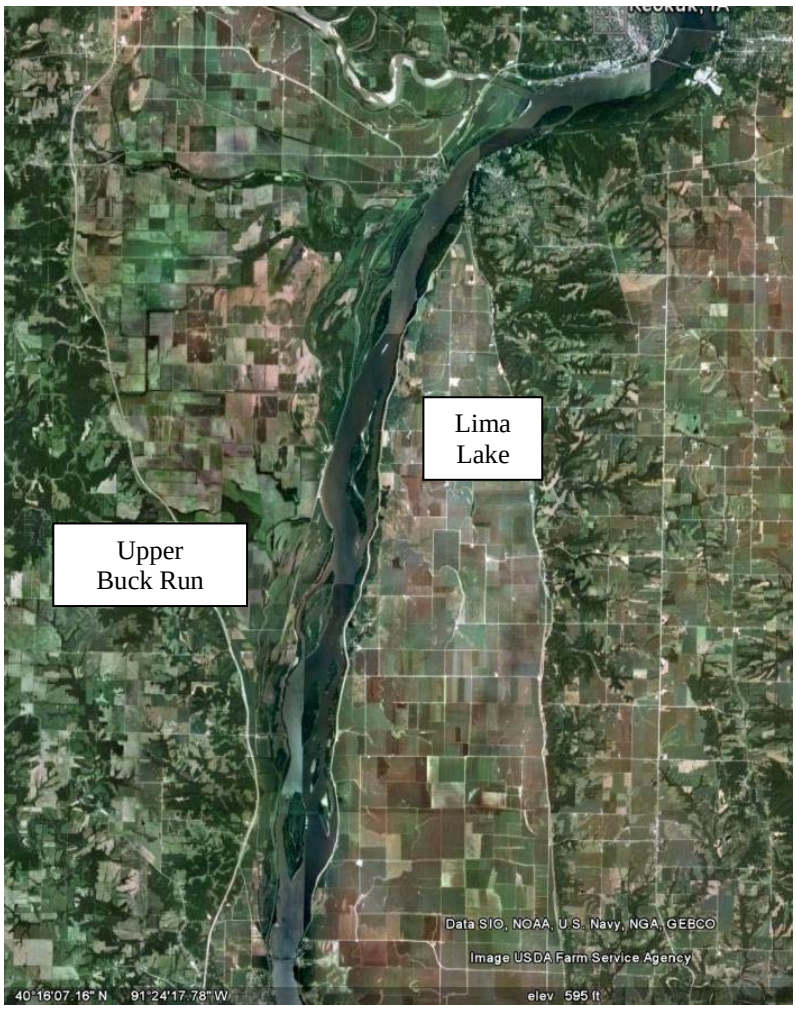
Pool 20

Pool 20 is the 21 mile segment of the Mississippi River extending upstream from Lock and Dam 20 at Canton, Missouri to Lock and Dam 19 at Keokuk, Iowa. Pool 20 is bounded by flood control levees for about 60% of its length, approximately 67% of the entire Pool 20 floodplain is protected by levees. The Des Moines River (Iowa), enters the pool about 3.5 miles downstream from Lock and Dam 19. A distinguishing character of Pool 20 is the low percentage of public lands, and the high percentage of agricultural land.



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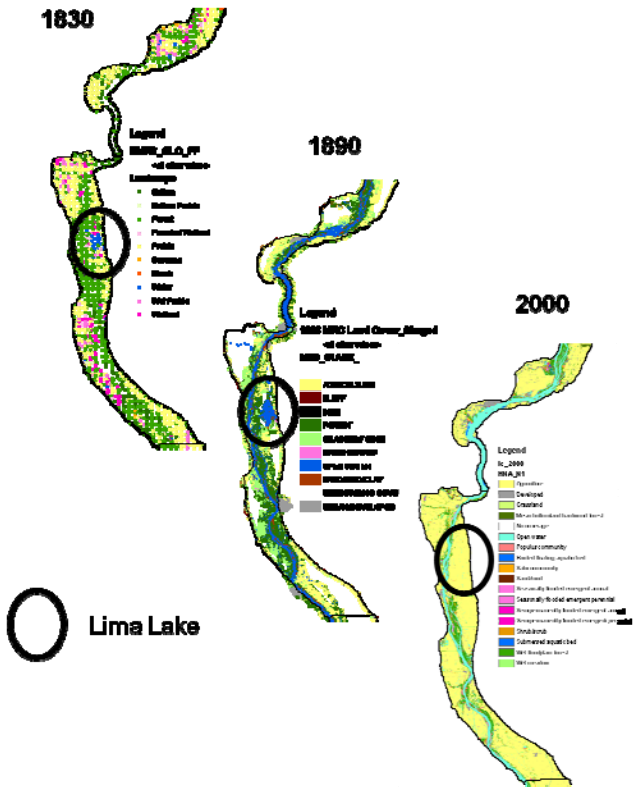
Lima Lake

Lima Lake is a historic floodplain lake formed by a large natural levee created by the glacial Des Moines River. Groundwater supported the lake which was a notable hunting and fishing resource. Flood control levees protect the site from overland flooding, and drainage and pump systems manage interior drainage and groundwater intrusion. Restoration objectives include restoration of forest, wet meadow, aquatic and prairie communities, including partial or full reconnection of the floodplain.



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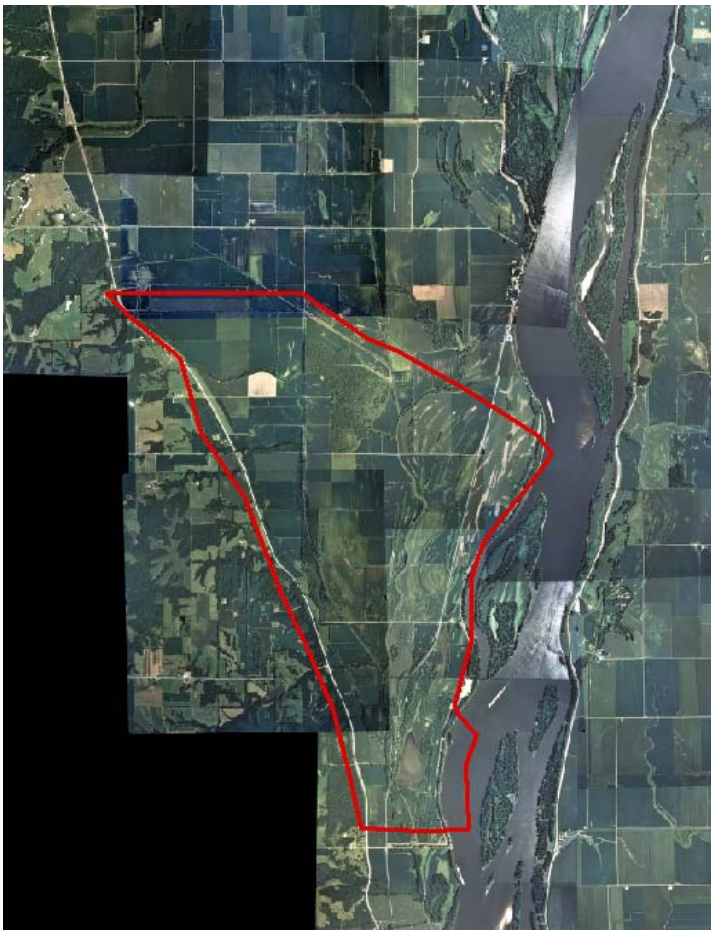
Upper Buck Run

Upper Buck Run is an area within the Gregory Levee and Drainage District. The area is characterized by multiple ancient channel meander scars that support wetlands interspersed in an agricultural landscape. There are also several tributary streams coming from the bluffs that increase wetland management potential. Restoration objectives for the subarea include increasing distribution and abundance of natural habitats and river-floodplain connectivity.



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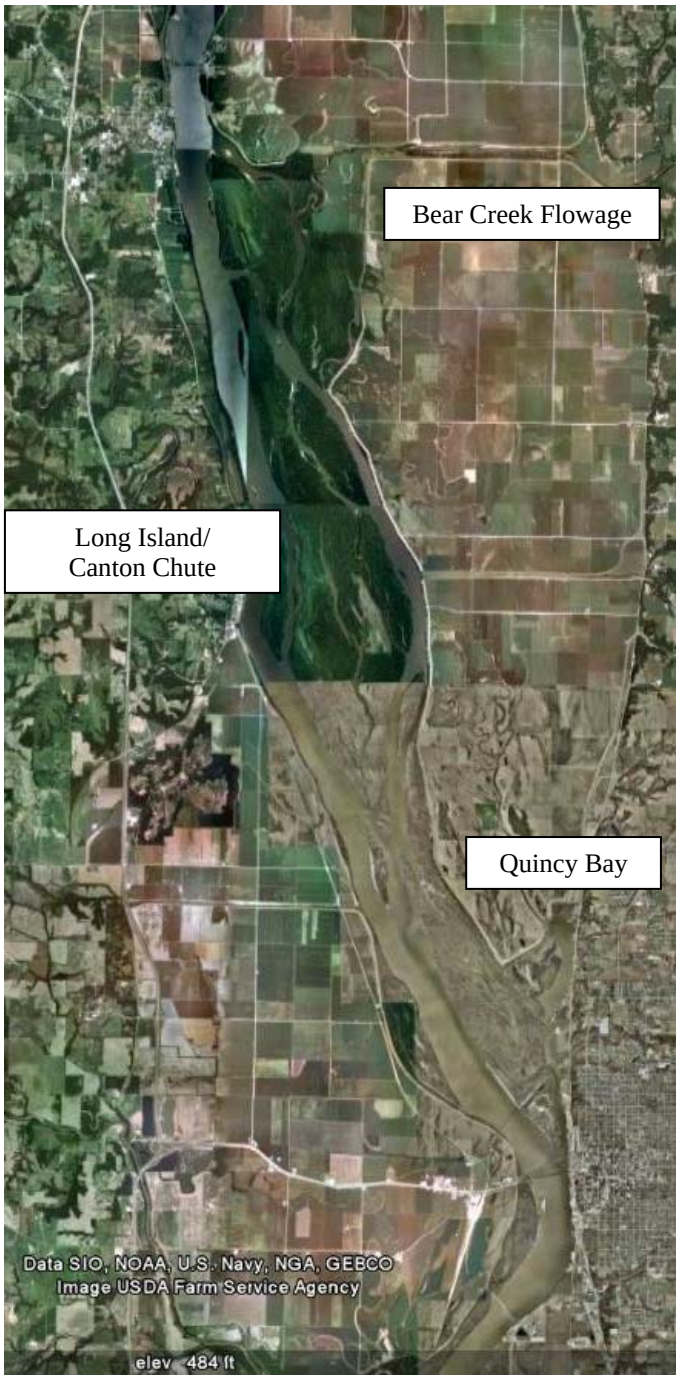
Pool 21

Pool 21 is the 18.3 mile segment of the Mississippi River extending upstream from Lock and Dam 21 at Quincy, Illinois to Lock and Dam 20 at Canton, Missouri. Pool 21 is bounded by flood control levees for approximately 60% of its length. Approximately 40,000 are protected in two large units of the Indian Graves L&DD in Illinois and the Union Township and Fabius L&DD in Missouri. Significant amounts of connected floodplain exist at Bear Creek and Quincy Bay, both in Illinois. The large Long Island complex is a dominant floodplain feature within the Pool. The floodplain behind levees is primarily privately-owned cropland, public land is mostly on the river between levees.



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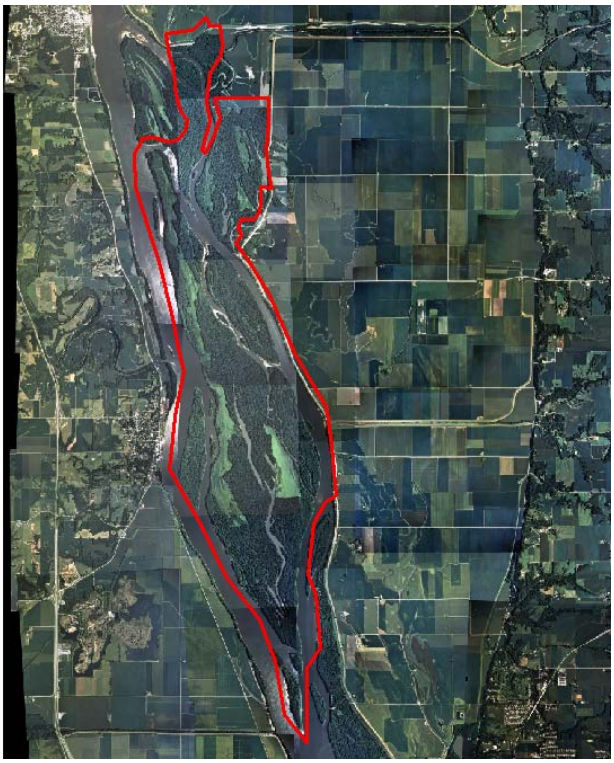
Bear Creek Flowage

Bear Creek is constrained between levee districts in Upper Pool 21. The channelized stream crosses the floodplain from the Illinois bluff to the river where it meanders through a short section of floodplain to Canton Chute. Restoration objectives include working with landowners to remove some of the constraints on the stream through buyout, easements, and levee setbacks.

Long Island and Canton Chute

The Long Island side channel complex is a dominant feature of Pool 21. The island includes channels, overflow channels, wetlands, and forests as well as the extensive Canton Chute side channel. The area is degraded by excessive sedimentation. Restoration objectives include:

- Create off-channel fish habitat,
- island and shoreline stabilization
- mast tree planting.
- Monitor project features



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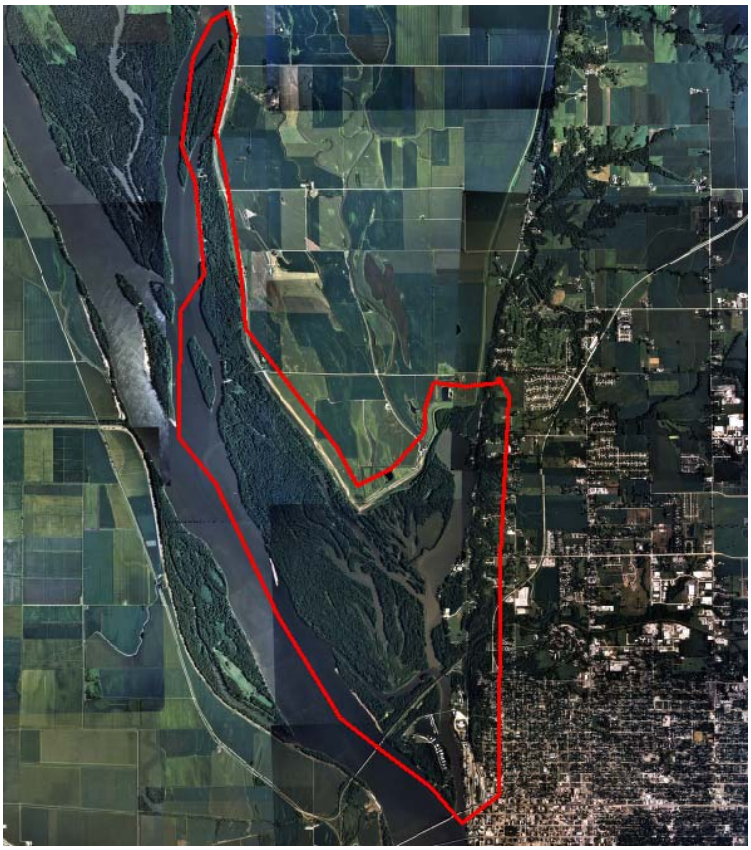
Quincy Bay

Quincy Bay is a significant backwater area near the city of Quincy Illinois. The Bay has been an important commercial and recreational resource for many years and has been affected by various channel maintenance and restoration projects. Inlets from the channel have been modified to manage flow through the area.

Restoration objectives include:

- Restore bathymetric diversity, including deep water, at select backwater locations.
- Determine causes and corrections for accelerated sedimentation within backwaters and complete corrective actions.
- Develop alternatives to improve flow through the complex while controlling sediment accumulation.



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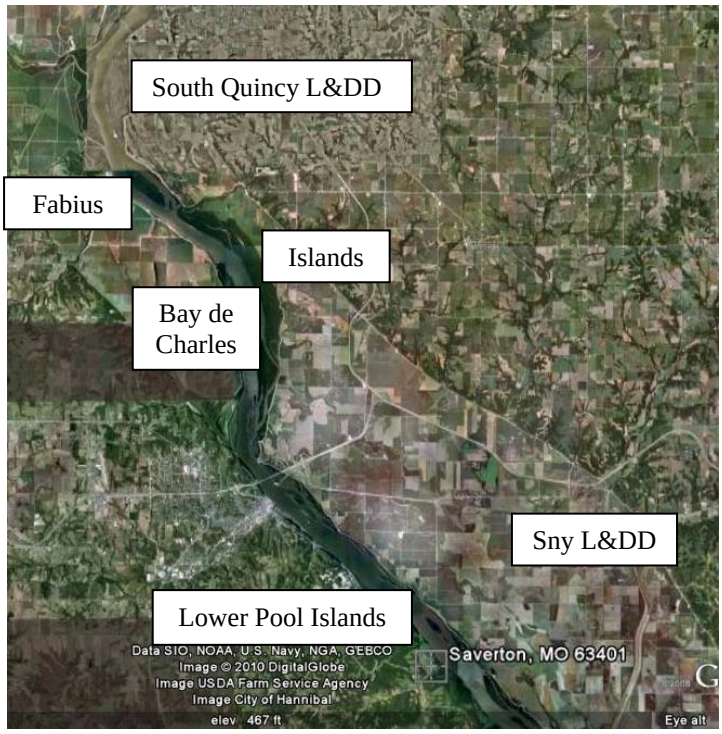
Pool 22

Pool 22 is the 24.7 mile segment of the Mississippi River extending upstream from Lock and Dam 22 at Saverton, Missouri to Lock and Dam 21 at Quincy, Illinois. Pool 22 is bounded by flood control levees for over 90% of its length in Illinois where the Sny Island L&DD incorporates more than 100,000 acres is four separate units in Pools 22 - 25. The lower eleven miles of the Missouri shoreline is bounded by bluffs. Larger tributaries entering the pool include the Fabius and North Rivers (Missouri). There is little public land in the reach



Resource Problems and Issues.

1. Fine sediments accumulate within backwaters and other floodplain sites. High turbidity levels limit aquatic vegetation. Pool 22 is predicted to lose nearly 100% of its functional backwaters by 2050 (HNA, 2000).
2. Coarse sediments, or bed load sediments, accumulate in side channels, deep off-channel areas and portions of the main channel. Disposal of channel maintenance dredged material is an increasing problem. Pool 22 is predicted to lose near 40% of its functional side channels by 2050 (HNA, 2000).
3. River processes and associated habitats are restricted from 77% of the natural floodplain adjacent to Pool 22 by levees and associated agricultural, urban and industrial land uses.
4. Elevated water tables and sustained high flows favor moisture tolerant forest species, and limit site potential for forest diversity.
5. Watershed discharges into Pool 22 contribute to water quality and habitat problems which impact natural resources.
6. Exotic species adversely affect endemic species through competition, predation and displacement.
7. River processes and habitats on floodplain lands located riverward of levees are limited
8. Specific fish and wildlife habitat concerns include the quality and extent of secondary channel, contiguous backwater and isolated backwater habitats, and improving natural resource management on floodplain sites within the pool.

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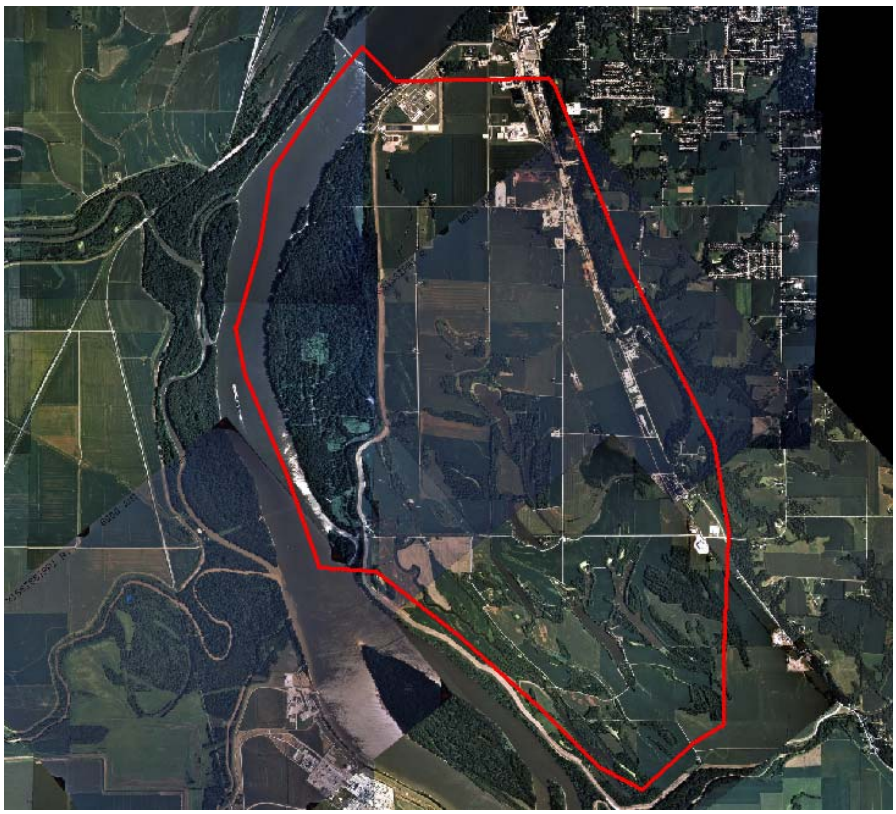
Ward Island/South Quincy Levee and Drainage District



The South Quincy Levee and Drainage District contains many forest and wetland patches that make it attractive for ecosystem restoration. The subarea supports agriculture, industry, and natural resource benefits.

Restoration objectives include:

- Modify channel training structures in the adjacent main channel border area to reduce sediment accumulation within wing dam fields.
- Restore flow through Texas Chute. Deepening the upper end of the side channel and modifying the wing dam on the left descending bank (LDB) at river mile (RM) 324 is suggested.
- Restore depth diversity in Texas Chute with construction of digger dikes designed to create scour holes.
- Develop or promote land management alternatives and incentives available to landowners in the South Quincy Drainage and Levee District to restore floodplain habitats. Examples include restoration or enhancement of floodplain habitats including forest communities and wet meadows, or partial or full reconnection of the floodplain.

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Rock Island District

Lower Impounded Reach
Ecosystem Restoration – High Priority Subareas

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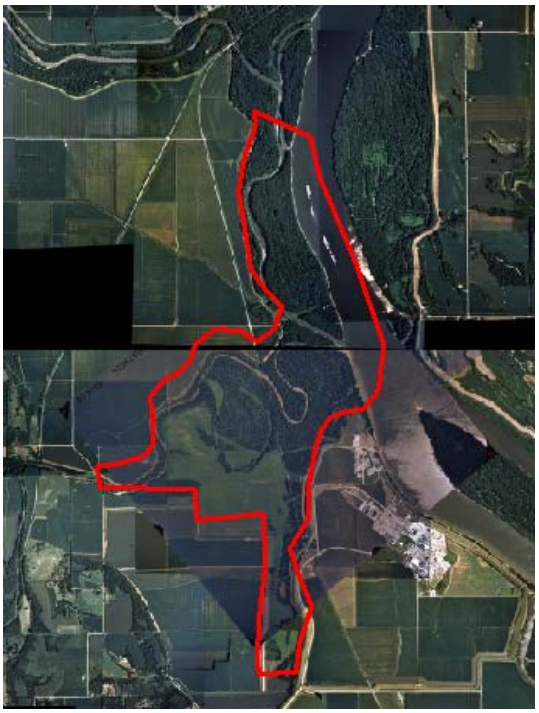
Orton Fabius Complex
The Orton Fabius Complex is a tributary delta of the Fabius and North Rivers in Missouri. The North River confluence is unleveed, but therefore, highly impacted by sedimentation.

Restoration objectives include:

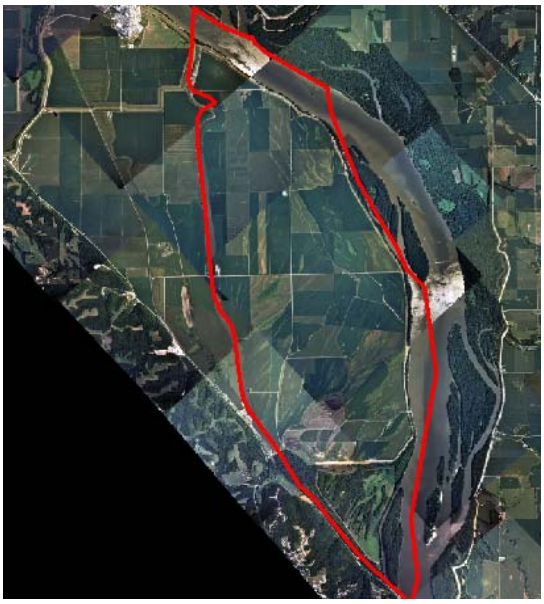
- Improve flows within the Orton Island side channel with appropriate modifications to upstream wing dikes and the side channel closing structure.
- Improve depth diversity in the Orton Island side channel with construction of digger dikes.
- Develop or promote natural resource management alternatives and incentives available to the owners of natural floodplain areas.
- Promote expanded beneficial use of channel maintenance dredged material, including habitat projects such as elevation lifts to facilitate reforestation.



Bay de Charles/Bay Island Complex:
The Bay de Charles/Bay Island Complex includes several islands, side channels, and a wetland complex at the downstream end. The leveed area is attractive for ecosystem restoration because the abundant meander scars indicate potential for high plant species diversity.

Restoration objectives include:

- ✓ Develop or promote riparian management alternatives for landowners.
- ✓ Manage Ziegler Island forest resources to encourage forest diversity and maintain hard mast species.
- ✓ Modify main channel training structures adjacent to Ziegler Island and those located upstream on the right descending bank to improve depth diversity.
- ✓ Modify the closing structure in the Ziegler Island side channel to improve flows through the side channel.
- ✓ Excavate sediment from select channels to provide deep thermal refuges for fish.



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Beebe/Schaffer/Armstrong/Turtle Islands

The chain of islands on the Illinois bankline provide the limited off-channel aquatic habitat in levee constricted upper Pool 22 reach. Side channels are degraded by sedimentation, several are converting to terrestrial habitat.

Restoration objectives include:

- Improve lotic habitats with a combination of structural modifications and new construction designed to restore side channels, increase flows or improve bathymetric diversity.
- Utilize channel maintenance dredged material to create wetland habitat habitats on main channel border areas.
- Intensively manage forest resources to encourage forest diversity and maintain a special emphasis on hard mast species.

Sny Bottoms

The Sny Island L&DD is a very significant agricultural area, but it also has remnant wetlands and channels. The subarea is not an attractive for large-scale conversion from agriculture, but the remnant habitats offer small restoration patches in marginal agricultural areas, wetlands, lakes, and streams.

Restoration objectives include:

- Develop or promote natural resource management alternatives and incentives available to the owners of natural floodplain areas. Areas of emphasis in the Sny Bottoms may include forest communities, riparian zones, wetland habitats, wet meadows, blue holes, detention ponds, and ditches.

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Lower Pool 22 Channel Border
Lower Pool 22 is a uniform straight reach with few islands and little aquatic structure. The reach is also a chronic channel maintenance site that provides sand for beneficial use for island construction. The subarea is a good location to coordinate ecosystem restoration and channel maintenance objectives.

Restoration objectives include:

- Modify channel training structures to increase flow and improve bathymetric diversity within the main channel and select side channels.
- Excavate deep off-channel habitat for fish at select backwater or island sites.
- Create islands with channel maintenance dredged material.

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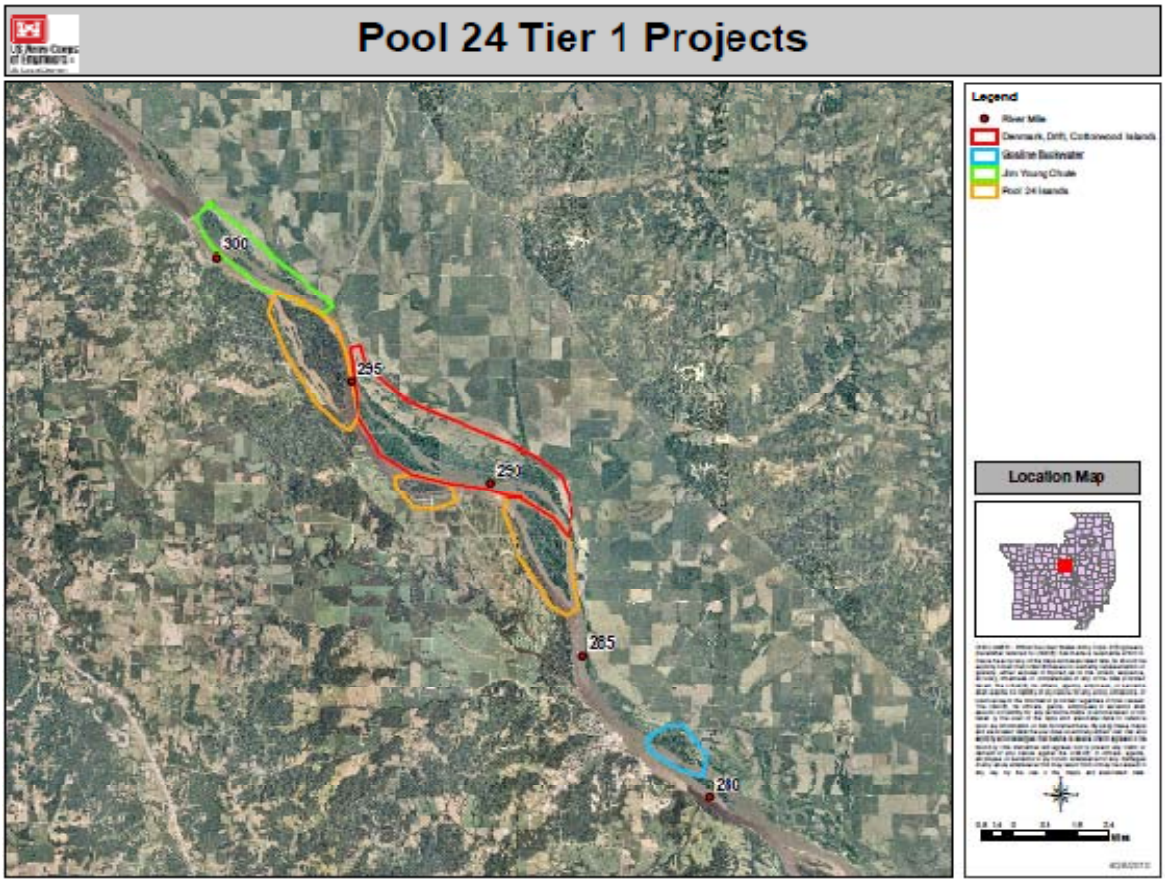
Pool 24

Pool 24 is the 28 mile segment of the Mississippi River extending upstream from Lock and Dam 24 at Clarksville, Missouri (RM273) to Saverton, Missouri (RM301). The river lies close to the Missouri bluff through most of the pool. The Illinois floodplain is dominated by the Sny Island Levee and Drainage District which isolates the river from the floodplain. Aquatic habitats are degraded by excessive sedimentation and cumulative effects of impoundment. Aquatic plants are rare and have not occurred in contiguous aquatic habitats since the extended drought from about 1988 – 1990. River forests, wetlands, and aquatic areas are important in the agriculturally dominated region.



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Ecosystem Restoration – High Priority Subareas

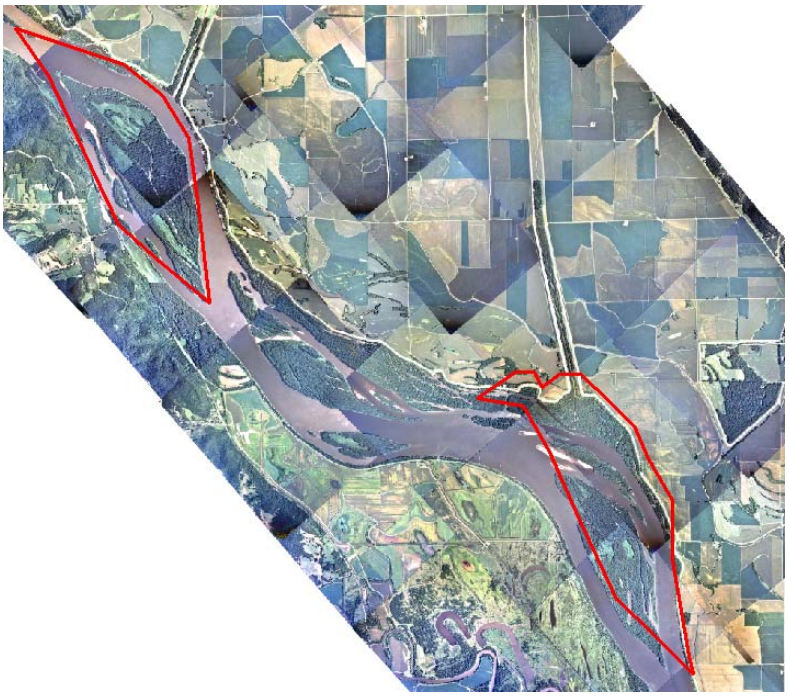
Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Pool 24 Islands

The proposed project includes Gilbert, Blackbird, North Fritz, and South Fritz Islands in Pike and Ralls counties, Missouri. The islands are in Upper Mississippi River Pool 24 between river miles 286 and 300 near Ashburn, MO. Land cover on the four islands is predominantly floodplain forest with interspersed former agriculture fields and degraded interior side channels. Without restoration, side channel conditions will continue to deteriorate, erosion will continue, and bottomland hardwood establishment will be impaired. These factors combine to adversely affect waterfowl, shore birds, furbearers, fisheries, and other wildlife resources along this reach of the Mississippi River.

Subarea objectives include:

- Restore, enhance, and protect terrestrial and aquatic habitat to benefit fisheries, aquatic invertebrates, and floodplain communities.
- Restore and enhance secondary channel depth, flow, and water quality by removing sediment through dredging and installing chevrons or other structures.
- Improve floodplain forest diversity by establishing bottomland hardwoods in former agriculture fields and open areas.
- Reduce island erosion and preserve and enhance habitat by placement of rock structures.



Gilbert Island

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Ecosystem Restoration – High Priority Subareas

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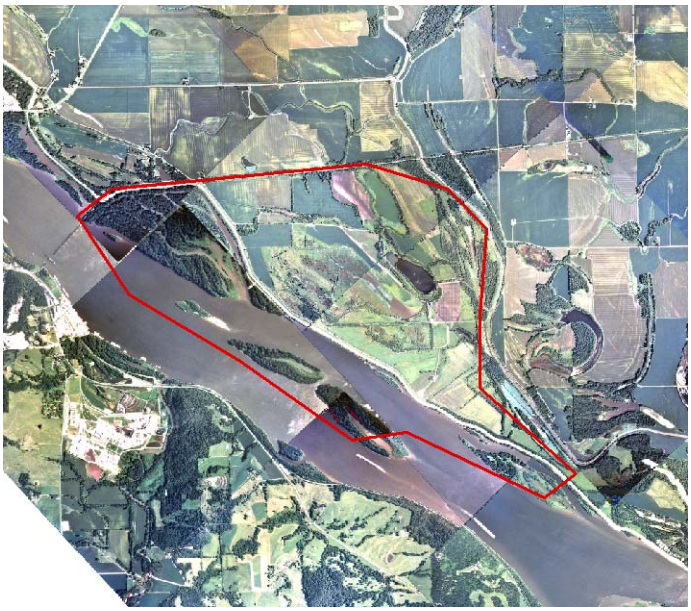
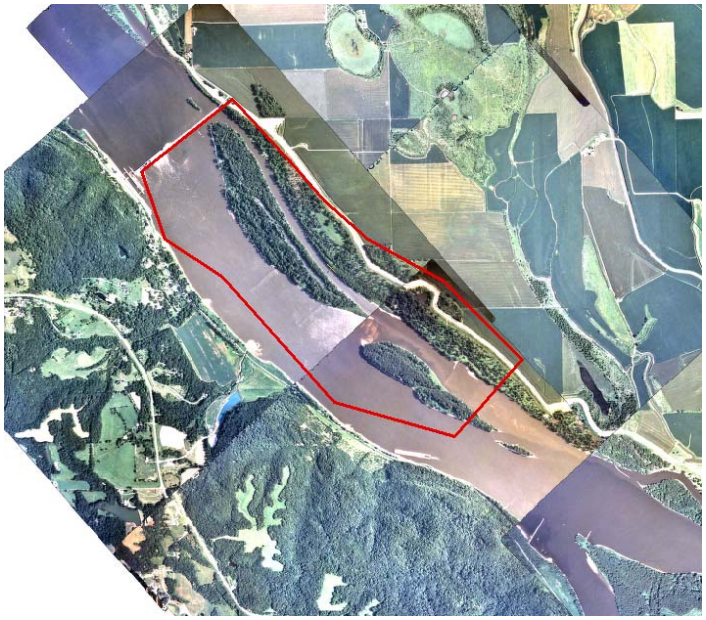
Gosline Backwater – RM 280-282L.

This area is a small but unique backwater with many sloughs and wetland areas. The area historically had good depth diversity and supported good aquatic plant communities. The area has silted in and through placement of structures/dredging could be restored to provide better habitat. The area also has the potential to support some sandbar island habitat that would provide benefits to fish, amphibians and sandbar nesting birds.



Jim Young Chute (Cottel/Taylor Island Complex) – RM 297-300L

The chute of this small island complex is suffering from high sedimentation rates, sand deposits and portions of it have become extremely shallow. The chute would benefit from increased flow and improved bathymetric diversity. Selective dredging and modification of training structures are potential measures that could be used to improve depth and habitat diversity for aquatic species.



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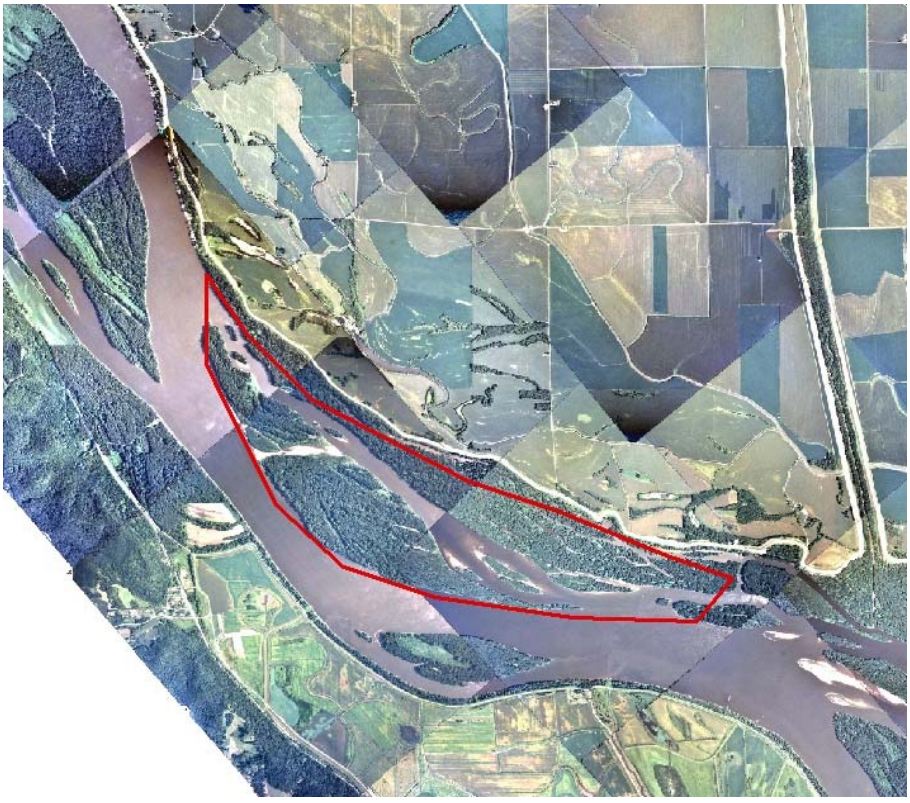
Lower Impounded Reach
Ecosystem Restoration – High Priority Subareas

Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Denmark, Drift Cottonwood Islands – RM 295-289L.

The chute and side channels of this island complex are suffering from high sedimentation rates and sand deposits. The side channel behind Drift Island has become extremely narrow and shallow. These off-channel areas would benefit from increase flow and improved bathymetric diversity. This area has numerous training structures and revetment. Selective dredging and modification of training structures are potential measures that could be used to improve depth and habitat diversity for aquatic species.



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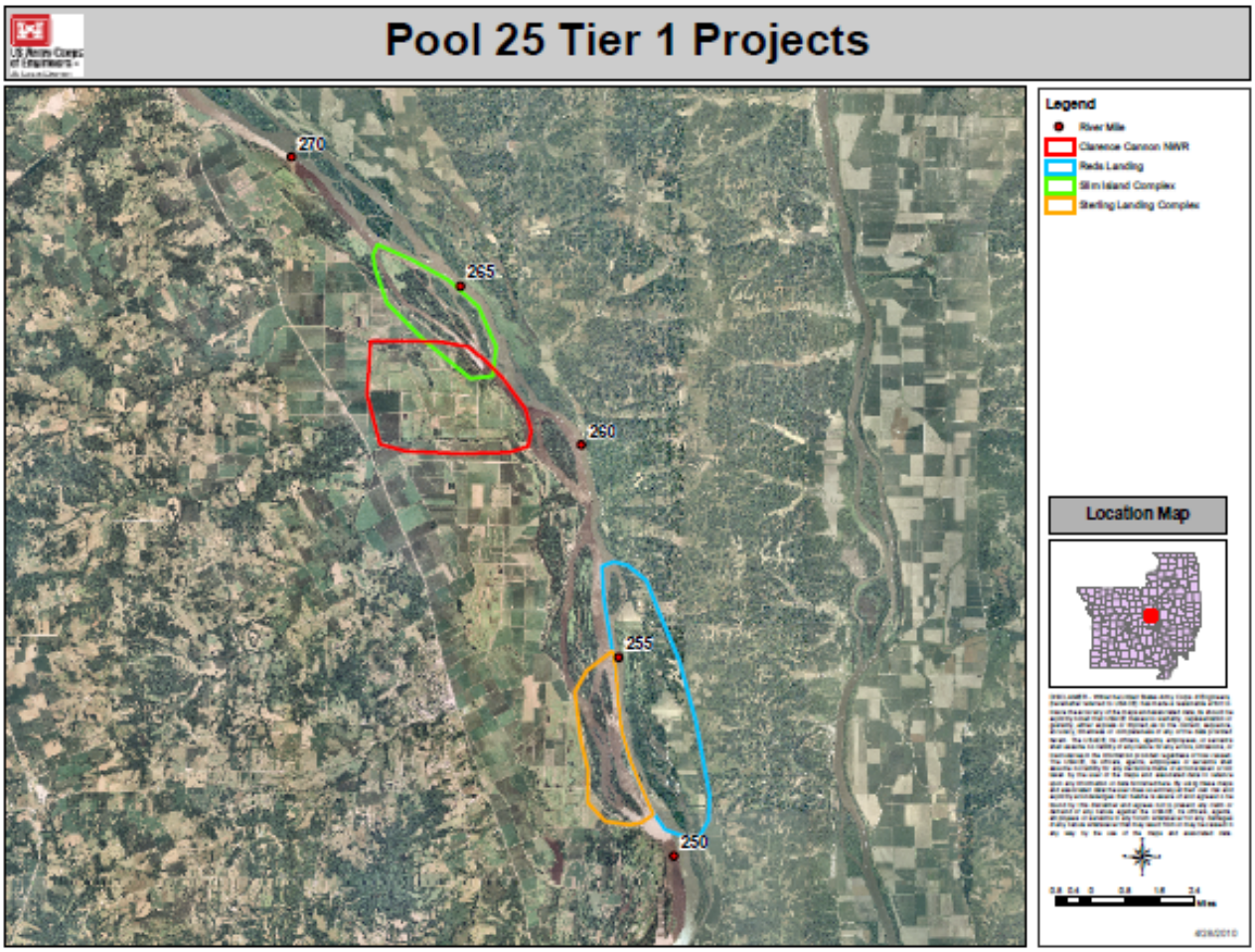
Lower Impounded Reach
Ecosystem Restoration – High Priority Subareas

Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Pool 25

Pool 25 is the 32 mile segment of the Mississippi River extending upstream from Lock and Dam 25 at Winfield, Missouri (RM 241) to Lock and Dam 24 at Clarksville, Missouri (RM273). The river crosses from the Missouri bluff to the Illinois bluff. Agriculture is prevalent on the Illinois floodplain in the upper pool and in Missouri in the middle and lower pool. Aquatic habitats include many island complexes with side channels and interior backwaters. Aquatic habitats are degraded by excessive sedimentation and cumulative effects of impoundment. Aquatic plants are rare and have not occurred in contiguous aquatic habitats since the extended drought from about 1988 – 1990.



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Ecosystem Restoration – High Priority Subareas

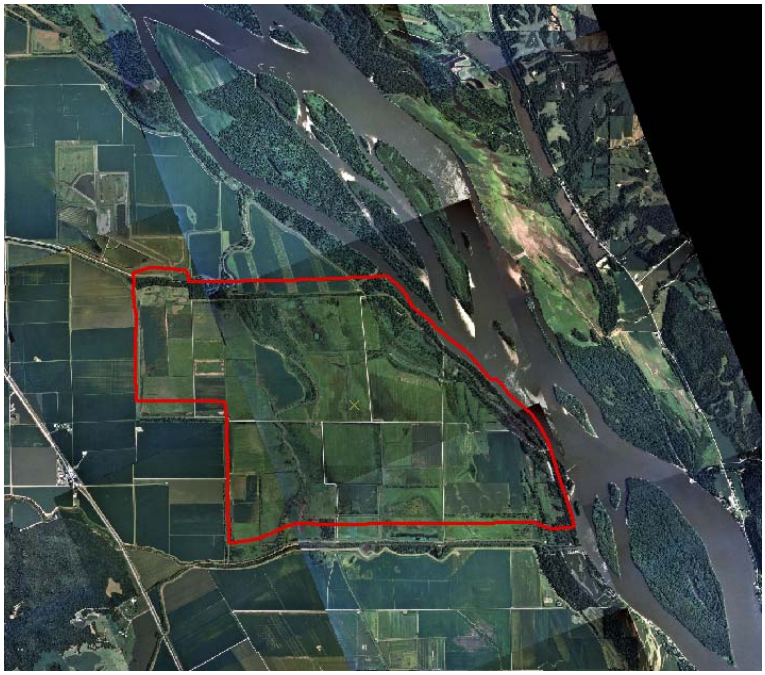
Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Clarence Cannon NWR

The 3,750 acre refuge includes 2200 acres managed as wetlands in 14 impoundments. Forest resources on the refuge and along much of the river were severely impacted by the flood of 1993. 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. Grasslands 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. Optimum management of impoundments and the potential development of new impoundments is limited by inadequate pumping capabilities and water control structures. External to managed units, the 35 acre Raybourn Slough, which is seasonally connected with the river, has loss depth due to sedimentation.

Subarea objectives include:

- Installation of six water control structures and five wells with two mobile power units,
- Tree planting of bottomland hardwood species, and creation of a 70-acre greentree reservoir,
- Wet grassland restoration by planting prairie cordgrass plugs,
- Shaping & stabilizing up to 2 square miles of the sloughing Bryants Creek bank line,
- Create four 8ft-10ft deep holes in Raybourn Slough to provide fisheries habitat.



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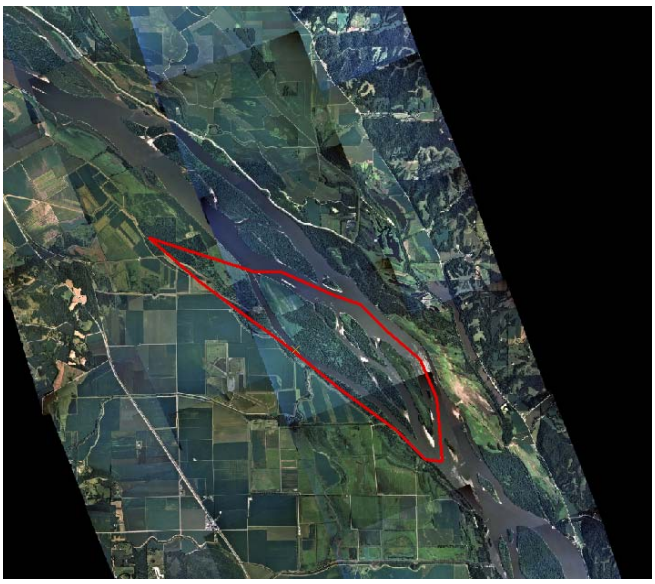
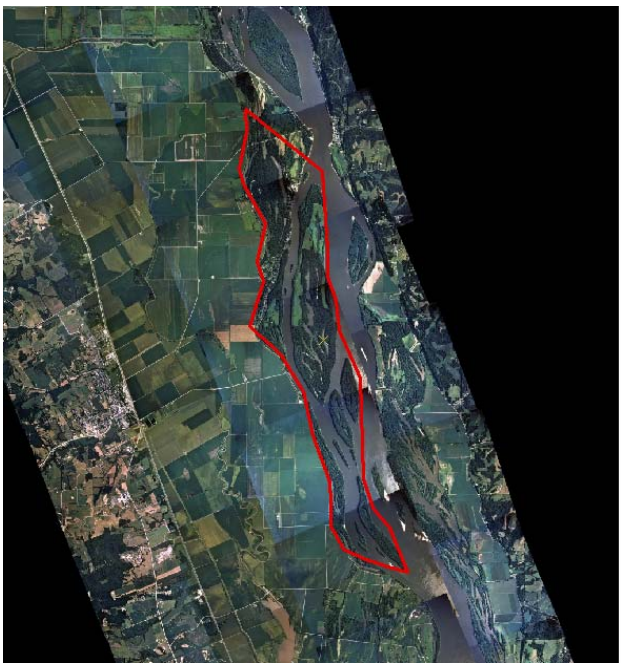
Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Slim Island Complex (Grimes, Willow Bar, McCoy) – RM 263-267R.

This is an island complex with a braided channel component. The area is suffering from high levels of sedimentation. The chute and channels would be surveyed for opportunities to improve bathymetric diversity and off-channel aquatic habitat. This area has numerous training structures that would be evaluated for their role to sediment deposition rates and locations. Improved bathymetric diversity and deep holes are needed in this area for thermal refuge for aquatic species. Selective dredging and modification of training structures are potential measures that could be used to improve depth and habitat diversity for aquatic species.



Sterling Landing Complex (Schwanigan, Eagle, Sterling, Maple, Norton Woods) – RM 250-253R. This area is a unique island complex with good side channel and backwater restoration potential. The area is suffering from high levels of sedimentation. The chute and channels should be surveyed for opportunities to improve bathymetric diversity and off-channel aquatic habitat. This area has numerous training structures that should be evaluated for their role to sediment deposition rates and locations.



The Pool 25 Islands Conservation Area (MDC) is located within the potential project footprint. Sterling, Kickapoo, Eagle, Schwanigan, Four-acre, Mosier and Westport Islands are included within the MDC management area complex. The area is managed for fish and wildlife enhancement and contains a diversity of forest, backwater slough, and interior open wetland habitats. **Sterling, Kickapoo, Eagle, Mosier and Schwanigan Islands** are primarily forested with some small open slough areas rapidly succeeding to forest due to sedimentation. No active management or infrastructure currently exists on these islands. Access for fishing and hunting is provided by the Norton Woods access area.

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Reds Landing – Wetland/Floodplain – RM 252-256L.

The **Reds Landing Wildlife Management Area** (1460 acres) is managed for fish and wildlife enhancement purposes under a General Plan and Cooperative Agreement. The site consists of small backwater lakes and sloughs, agricultural fields and bottomland forest. The bottomland forest at this site is more diverse and indicative of the forest composition prior to impoundment. There is still a good mix of mast producing hardwoods such as pin oak, swamp white oak, hickory and pecan. The site includes a large Heron rookery and active bald eagle nest. A partnering effort with the Corps, Ducks Unlimited, Migratory Waterfowl Hunters Inc., USFWS-North American Wetlands Conservation Fund, IDNR-Heavy Equipment Crew and Partners for Wetlands, funded the construction of facilities to develop a flooded green tree area. The area provides water control for the north end of the site, which had been lost as viable wetland habitat due to siltation. Existing facilities include water control structures (both stop log and screw gate type), earthen dikes, two 22,000 GPM pumps (one for flooding and one for discharge), a portable fuel tank and power plant for pump support.

Subarea objectives include:

- excavation of shallow ditches to connect smaller sloughs in the flooded timber area,
- encourage development of moist soil plants,
- Stabilize sediment,
- control against woody encroachment.

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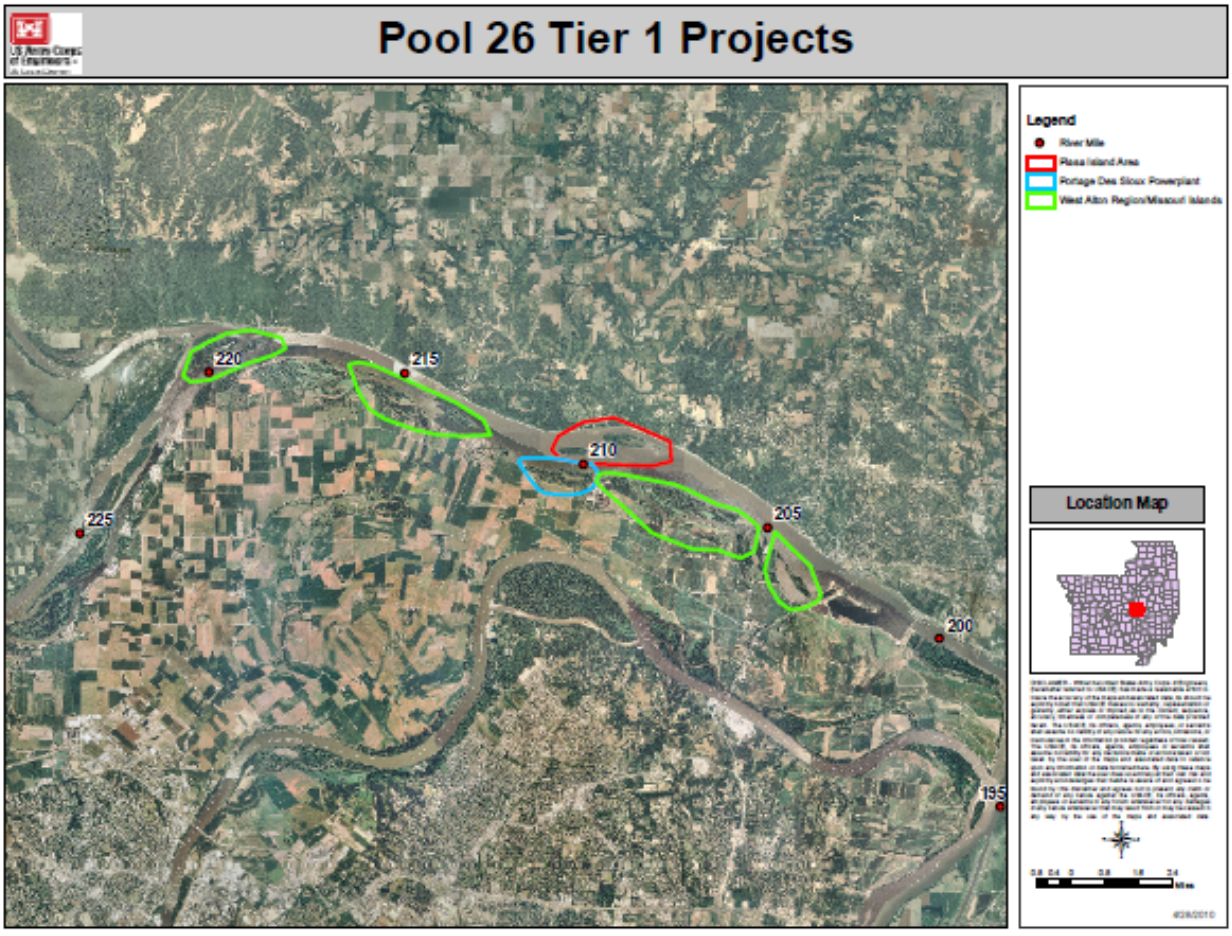
Pool 26

Pool 26 is the 41 mile segment of the Mississippi River extending upstream from the Melvin Price Lock and Dam 26 at Alton, Illinois (RM 200) to Lock and Dam 25 at Winfield, Missouri (RM241). The river runs along the Illinois bluff, agriculture is prevalent on the entire Missouri. Aquatic habitats consist of several island complexes with side channels and interior backwaters. Aquatic habitats are degraded by excessive sedimentation and cumulative effects of impoundment. Aquatic plants are rare and have not occurred in contiguous aquatic habitats since the extended drought from about 1988 – 1990.



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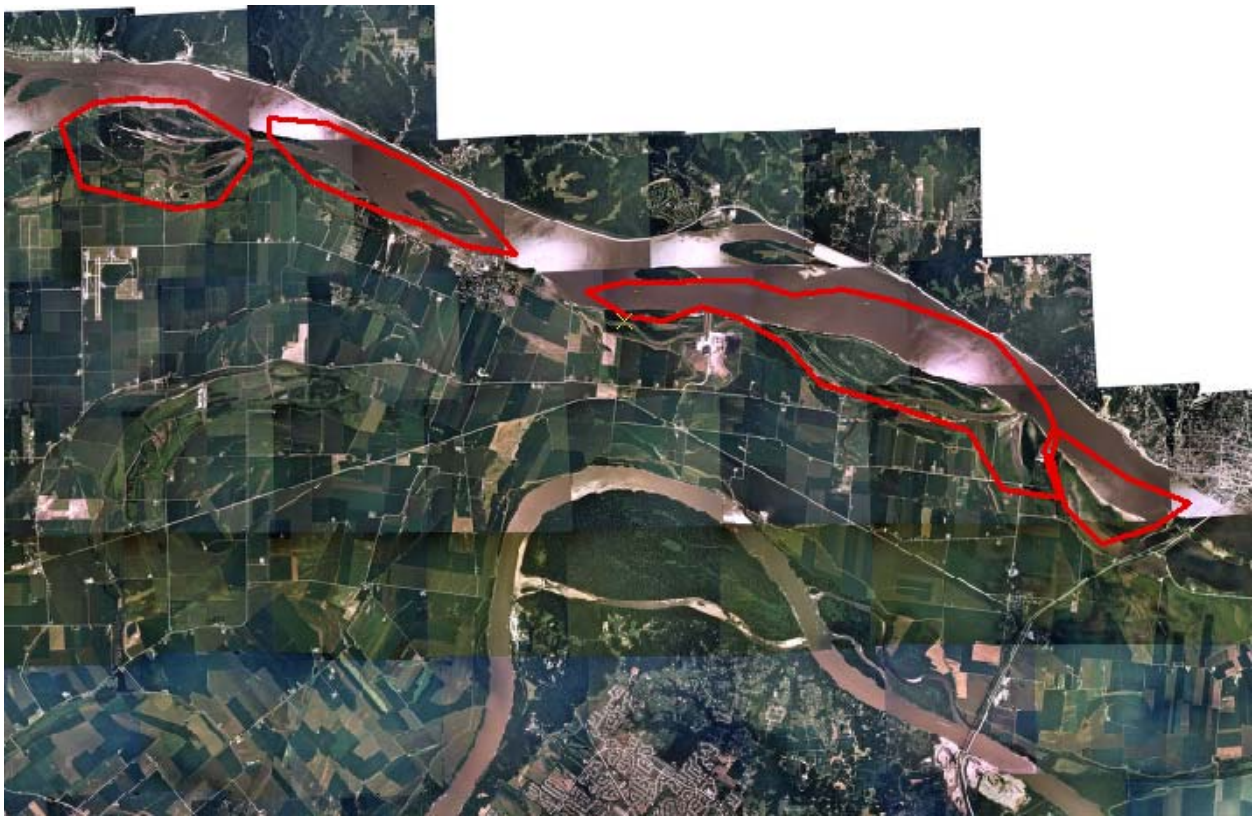
Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

West Alton Region/Missouri Islands (potential EMP)

- Brickhouse Slough – RM 204-207R. Backwater, dredge or scour structure (like Stag Island).
- Mason Island complex (Island 526) – RM 219-220L. Island/Chute
- Luesse Lake – RM 215 tract. Backwaters, connected backwater needs deep holes
- Portage Island – RM 213-214R. Dredge and scour structures on the island
- Alton Slough – RM 201-203. Dredge, chevrons, island creation.

These off-channel islands previously supported abundant aquatic plants and could possibly by restored aquatic plant communities that are rare in Pool 26. 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 led to a loss of desirable fisheries habitat. This project has the ability to provide high habitat benefits with mostly passive management that requires little O&M. There are potential fish, shorebird, waterfowl, and mussel habitat improvements.



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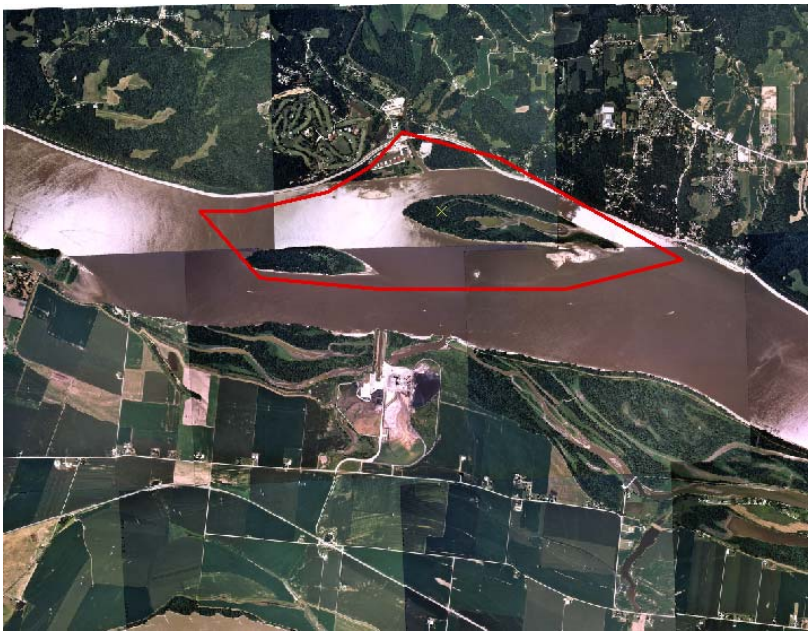
Piasa Island Area (includes Eagles Nest island) (potential EMP)



The Piasa Island side channel once supported a strong fishery but has silted in. A potential project would include dredging to provide depth in the side channel and Piasa Island backwater. The project would provide positive habitat benefits for fish and waterfowl. The area has strong local support and would benefit from an EPA case study watershed sediment reduction project currently ongoing in the Piasa Creek watershed.

The side channel, along the north bank of Piasa Island, is filling in. When the pool is on tilt, access to the side channel is only practical from the east, and there is no access into the island's interior wetlands. The placement of the dikes at the tail end of Eagle's Nest Island would prevent the majority of flow from exiting between the two islands thus directing more flow into the lower part of the side channel. The historical dike that blocks the side channel would be notched. This would restore and maintain the side channel habitat along the islands. Dredging would be employed to enhance the interior backwater's depth. This dredge material would be deposited behind the three proposed chevrons. This material along with the deposition that occurs below the chevron plunge pool would create island/shallow water habitat. The hinge point management of Pool 26 would periodically expose the shallow water areas around the chevron islands. This dewatering will promote the germination of moist soil and other wetland plants creating herbaceous wetland habitat. Finally, the dikes along the riverside of Piasa Island would be notched to promote flow between the island and the chevron islands.

PROJECT FEATURES: 1) Two rock trail dikes extending from the tail end of Eagle's Nest Island 2) four dredge cuts in the interior backwater 3) three chevrons 4) notch 5 dikes to 5) create three dredge material islands/sand bars. 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, Illinois Department of Natural Resources, IDNR.

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Upper Mississippi River System - Navigation and Ecosystem Sustainability Program

Upper Portage Des Sioux Powerplant – RM 210-211R.

This area is a forested block with about 3.5 linear miles of backwater. It is typical of many backwaters where sedimentation has created a layer of flocculent sediment and a water depth of 1-2 feet. Dredging and possible structures on the upstream end along with forest improvements would improve habitat for fish, forest birds, waterfowl and others. Aquatic vegetation restoration is also a strong possibility as it supported aquatics pre 1993. This could be a fairly passively managed site with little O&M after construction.