



US Army Corps  
of Engineers ®

## Missouri River Bank Stabilization and Navigation Project, Fish and Wildlife Mitigation Project

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*View of the new Tadpole Island Chute project completed in FY06 at the Overton Bottoms South Mitigation site, Moniteau County, Missouri*

**Annual Implementation Report FY05 & FY06  
December 2006**

# **Annual Implementation Report FY05 & FY06**

## **December 2006**

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## INTRODUCTION

### AUTHORITY

This report presents the current status and future plans for implementation of the Missouri River Fish and Wildlife Mitigation Project, Iowa, Nebraska, Kansas, and Missouri, hereinafter referred to as the “Project”. Congress first authorized construction of the Project in Section 601(a) of the Water Resources Development Act of 1986 (Public Law 99-662). Section 334(a) of the Water Resources Development Act of 1999 (Public Law (106-53) modified the Project by increasing the amount of acreage to be acquired and/or mitigated. The total amount of land authorized for mitigation is currently 166,750 acres.

The current authorization is to mitigate for the losses attributed to construction of the Missouri River Bank Stabilization and Navigation Project (BSNP). The Project will acquire, develop and preserve native aquatic, wetland, and upland habitats on individual mitigation sites. The Project location is in and adjacent to the Missouri River from Sioux City, Iowa to the mouth near St. Louis, Missouri, a distance of 735 river miles.

### BACKGROUND

The original authorization for the Project was based upon a report of the US Army Corps of Engineers, Chief of Engineers, dated April 24, 1984, entitled “Missouri River Bank Stabilization and Navigation Project, Final Feasibility Report and Final EIS for the Fish and Wildlife Mitigation Plan”. The authority to prepare the Feasibility Report was the 1958 Fish and Wildlife Coordination Act (P.L. 85-624). The Final Feasibility Report described the fish and wildlife and habitat losses that have occurred due to the BSNP. Also described in the Report are various measures to mitigate for these losses and a recommended plan to mitigate, preserve, or develop 48,100 acres of habitat. During the public involvement process for the EIS and Feasibility Report for the Project, a policy of obtaining lands only from willing sellers was established.

Preconstruction Engineering and Design (PED) for the Project was initiated in December 1989. As a part of PED work, the Corps completed the “Missouri River Bank Stabilization and Navigation Fish and Wildlife Mitigation Reaffirmation Report, July 1990”. The purpose of the Reaffirmation Report was to confirm that the plan recommended in the 1984 Feasibility Report and Final EIS was still viable. PED was completed in September 1991 and the Project has been in a “Construction” status since that time. The Reaffirmation Report explains the various aspects of the Project such as the approval process, funding levels, costs, schedules, documentation and involvement of other State and Federal agencies.

The “Missouri River Fish and Wildlife Mitigation Project; Iowa, Nebraska, Kansas, and Missouri; Project Management Plan” (PMP) was completed by the Corps in November 1992. This PMP still guides the execution of the Project. The PMP determined that approximately 60 percent of the Project is within the Kansas City District (CENWK) and 40 percent within the Omaha District (CENWO). For ease of dealing with the affected states, CENWK is responsible for overall management of the Project as well as implementation on the individual sites located in Missouri and Kansas. CENWO is responsible for implementation on the individual sites located in Nebraska and Iowa. The PMP also required Annual Implementation Reports (such as this document) be created to track the progress, schedule, and costs through completion.

An additional portion of the Project Management Plan was dedicated to the establishment of roles and responsibilities for execution of the program in accordance with an Agency Coordination Team. Because the BSNP was constructed and maintained by Federal action, the Project is 100 percent Federally funded. However, even though there is not a cost share sponsor, Federal and State fish and wildlife agencies participate in the implementation of the Project. The agency participation is primarily through an Agency Coordination Team that was developed to formulate and decide upon the various acquisition sites and appropriate mitigation for the sites. The members of the Agency Coordination Team are the Iowa Department of Natural Resources, the Nebraska Game and Parks Commission, the Kansas Department of Wildlife and Parks, the Missouri Department of Conservation, the Environmental Protection Agency, and the U.S. Fish and Wildlife Service. Other agencies have also been invited to participate in team meetings.

"Real Estate Design Memorandum No. 1" was completed by CENWK in March 1990. This report was endorsed by the Corps of Engineers' Missouri River Division in July 1990, and approved by Corps of Engineers' Headquarters in May 1991. This report established the real estate requirements for the acquisition in fee or easement of 29,900 acres of privately owned lands and for any real estate requirements for development of 18,200 acres of existing public lands within the four affected States.

WRDA 99 expanded the amount of acres authorized for the Project from 48,100 acres to a new total of 166,750 acres. As directed in the authorization, the Corps of Engineers worked with the Agency Coordination Team to develop a cost estimate to implement the additional acres authorized by WRDA99. In December 2001, the Corps completed a document titled “Missouri River Mitigation Project, Missouri, Kansas, Iowa, and Nebraska, Report to Congress, in Compliance with the Water Resources Development Act of 1999”. This document presented a cost range for the modified Project from \$740 million (includes development of 7,000 acres of shallow water habitat) to \$1.33 billion (includes development of 20,000 acres of shallow water habitat). Also included was a ceiling of 6% of the total mitigation efforts to be expended on monitoring efforts.

In September 2002, the Corps published “Supplement No. 1 to Real Estate Design Memorandum No. 1”. This update included the new acres of the expanded mitigation program. This document stated that the acquisition of additional lands for the Project would not reflect a defined amount to be acquired between public or private acres. Also, this document assumed that the additional acres would be equally proportioned by state based on the amount of riverbank miles.

Since the expanded authorization of WRDA99 resulted in a significant change to the Project, from August 2001 to June 2003, the Corps of Engineers prepared a Supplemental Environmental Impact Statement (SEIS) for the Project. The draft SEIS was published in September 2002. The Final SEIS was published March 1, 2003. The Corps of Engineers issued their Record of Decision on June 12, 2003. This decision, along with the Final SEIS, reflects the programmatic plan for implementation of the current mitigation program.

## **REPORT PURPOSE AND FORMAT**

Programmatic updates of the Project Management Plan are accomplished through Annual Implementation Reports. This document is the twelfth such report. The purpose of the Annual Implementation Reports is to create an administrative record of mitigation efforts that have already occurred, communicate the status of the mitigation efforts that are underway, and outline a plan for continued mitigation in the future.

This report is divided into three main parts: Past Mitigation Efforts for FY06 and Prior, Planned Mitigation Efforts for FY07, and Future Mitigation Efforts FY08 to Completion. Within these three main parts, the four main elements of the Project (Real Estate, Habitat Development, Operation and Maintenance, and Monitoring) are detailed. Thus, this report is a programmatic effort to explain the past activities, current status, and future activities for the Project for both the Omaha and Kansas City Districts.



## PAST MITIGATION EFFORTS

### FUNDING (FY05 & FY06 and Prior)

From Fiscal Year (FY) 90 to FY91, the Project was in a PED phase. Corps of Engineers PED funding was used to fund the mitigation activities during this period. An amount of \$700,000 in GI funds was expended on the Project during this period.

Beginning in FY92, the Project has received Corps of Engineers Construction, General (CG) funds. At this point, the Project was considered to have moved into a construction phase. The CG funding for the Project is divided into broad categories: Land Acquisition; Planning, Engineering and Design; Habitat Development; Construction Management; O&M During Construction; and Monitoring costs. Table 1 and Table 2 give a breakdown of costs expended by category for FY05 and FY06 respectively. From FY92 through FY06, the Corps expended a total amount of \$132,792,000 in CG funds on the mitigation efforts. Table 3 gives a breakdown of costs expended by category over this 15 year period.

**TABLE 1**

### TOTAL COSTS DURING FY05

Cost	CENWK (1,000)	CENWO (1,000)	TOTAL (1,000)	% of Total Cost
Land Acquisition	\$439	\$378	\$817	7
Planning, Engineering, and Design	\$1,102	192	1,294	11
Habitat Development	\$4,243	3,473	7,716	67
Construction Management	\$496	259	755	7
O&M During Construction	\$73	110	183	2
Monitoring	\$427	348	775	6
<b>TOTAL</b>	<b>\$6,780</b>	<b>\$4,760</b>	<b>\$11,540</b>	<b>100</b>

**TABLE 2  
TOTAL COSTS DURING FY06**

<b>Cost</b>	<b>CENWK (1,000)</b>	<b>CENWO (1,000)</b>	<b>TOTAL (1,000)</b>	<b>% of Total Cost</b>
Land Acquisition	\$5,669	\$2,342	\$8,011	35
Planning, Engineering, and Design	2,385	261	2,646	12
Habitat Development	7,835	2,080	9,915	44
Construction Management	350	81	431	2
O&M During Construction	622	82	704	3
Monitoring	380	539	919	4
<b>TOTAL</b>	<b>\$17,241</b>	<b>\$5,385</b>	<b>\$22,626</b>	<b>100</b>

**TABLE 3  
TOTAL COSTS TO DATE  
(AS OF 30 SEP 06)**

<b>Cost</b>	<b>CENWK (1,000)</b>	<b>CENWO (1,000)</b>	<b>TOTAL (1,000)</b>	<b>% of Total Cost</b>
Land Acquisition	\$29,059	\$19,509	\$48,568	36
Planning, Engineering, and Design	\$13,695	5,781	19,476	15
Habitat Development	\$29,428	24,978	54,406	41
Construction Management	\$2,461	2,743	5,204	4
O&M During Construction	\$1,727	1,012	2,739	2
Monitoring (1)	\$1,379	1020	2,399	2
<b>TOTAL</b>	<b>\$77,749</b>	<b>\$55,043</b>	<b>\$132,792</b>	<b>100</b>

(1) Prior to FY03, monitoring was considered a very limited part of the therefore any funds expended on monitoring were provided using Design and Construction Management categories. In the future, monitoring funds will not exceed 6% of annual appropriations.

**REAL ESTATE (FY06 and Prior)**

Section 334(a) of the Water Resources Development Act of 1986 (WRDA86) and Section 334(a) of the Water Resources Development Act of 1999 (Public Law (106-53) authorized acquisition of 166,750 acres for the Project. In accordance with the Real Estate DM approved for the Project, the lands are acquired from willing sellers. There are four different acquisition types approved for the Project. The lands may be acquired in fee title from private landowners, in sloughing easements from private landowners, or in no cost fish and wildlife easements from government agencies on existing public lands. In FY06, the Corps obtained approval to utilize a Fish and Wildlife Restoration Easement for Shallow Water Habitat (SWH). This easement will allow the Corps to preserve, restore and create quality SWH adjacent to the Missouri River and adjacent to existing project areas on privately-owned lands not available for fee acquisition.

During the Feasibility effort for the Project, a breakdown of the originally authorized 48,100 acres was established. This was completed through coordination with the four affected States and the U.S. Fish and Wildlife Service. The original authorized acres were divided up between the States proportional to the amount of fish and wildlife losses attributed to each State. After WRDA99 expanded the authorization by 118,650 acres, the additional acres were also broken down during the effort to update the Supplemental Environmental Impact Statement for the Project. In the SEIS, affects of dividing the additional acres between the States proportionally to the amount of river bank miles was evaluated. The current distribution of lands authorized in both WRDA86 and WRDA99 is reflected in Table 4.

**TABLE 4  
TOTAL LANDS AUTHORIZED FOR PROJECT,  
DISTRIBUTION BY STATE,  
(AS OF 30 SEP 06)**

<b>State</b>	<b>Non-Public Lands Authorized WRDA86 (ac)</b>	<b>Existing Public Lands Authorized WRDA86 (ac)</b>	<b>All Lands Authorized WRDA99 (ac)</b>	<b>Total Authorized (ac)</b>
<b>Iowa</b>	7,200	2,400	14,125	23,725
<b>Nebraska</b>	7,150	50	19,452	26,652
<b>Kansas</b>	2,350	0	9,282	11,632
<b>Missouri</b>	13,200	15,750	75,791	104,741
<b>TOTAL</b>	<b>29,900</b>	<b>18,200</b>	<b>118,650</b>	<b>166,750</b>

Throughout the remainder of the Project, the Corps will be working with the Agency Coordination Team to track acquisitions. As the acquisitions progress over the life of the Project, changes to this distribution of the authorized acres may be necessary. Any changes will be approved by the Agency Coordination Team and presented annually in future Annual Implementation Reports.

The current process for acquiring lands begins with working with the Agency Coordination Team to identify sites that have potential for restoration. The Corps completes a survey of willing sellers (both public and private) near the areas with the most restoration potential. These planning efforts have led to the acquisition of lands at 38 individual sites to date. The 38 sites are located in all four affected States and are shown on the Location Maps included in this report as a part of Appendix 1.

As of 30 Sep 06, there have been 46,555 acres acquired for the Project. This consists of fee title acquired on 33,411 acres that was formerly private land and no cost easements and/or licenses on 13,144 acres of existing public land. A total of 28% of the authorized 166,750 acres has been acquired. As shown in Table 3, the Corps of Engineers has expended 36% of the funds received for the Project, or \$48,568,000 on Real Estate activities. Tables 5, 6, 7, and 8 reflect the acreage distribution by site for the States of Iowa, Nebraska, Kansas and Missouri, respectively. Table 9 is a summary of the entire acquisition program to date.

No lands were acquired in FY05 due to lack of funding; however, planning efforts continued with the emphasis of acquiring additional lands of FY06.

**TABLE 5  
LANDS ACQUIRED WITHIN STATE OF IOWA,  
DISTRIBUTION BY SITE  
(AS OF 30 SEP 06)**

Site	Location	Non-Public Lands Acquired (ac)	Public Lands Acquired (ac)	Total Acquired (ac)
Winnebago Bend	Woodbury County, RM 713 – 708, Left Bank	0	1,300 <sup>(1)</sup>	1,300
Blackbird Bend	Monona County, RM 697 – 694, Left Bank	223	799 <sup>(2)</sup>	1,022
Tieville-Decatur Bends <sup>(3)</sup>	Monona County, RM 698 – 686, Left Bank	94 <sup>(4)</sup>	964 <sup>(2)</sup>	1,058

**TABLE 5, Continued**

<b>Site</b>	<b>Location</b>	<b>Non-Public Lands Acquired (ac)</b>	<b>Public Lands Acquired (ac)</b>	<b>Total Acquired (ac)</b>
Louisville Bend	Monona County, RM 685 – 682, Left Bank	84	1,002 <sup>(2)</sup>	1,086
California Bend	Harrison County, RM 652 – 649, Left Bank	0	420 <sup>(2)</sup>	420
Noddleman Island	Mills County, RM 587 – 583, Left Bank	1,232	0	1,232
St. Mary’s Island	Mills County, RM 597 – 594, Left Bank	1,821	0	1,821
Auldon Bar	Harrison County, RM 580 – 577, Left Bank	588	0	588
Copeland Bend	Fremont County, RM 571 – 565, Left Bank	1,364	625 <sup>(2)</sup>	1,989
Lower Hamburg Bend <sup>(5)</sup>	Fremont County, RM 554 – 546, Left Bank	321	0	321
<b>TOTAL</b>		<b>5,727</b>	<b>5,110</b>	<b>10,837</b>

- (1) Reflects amount of lands mitigated on previously held Corps land.
- (2) No cost easement obtained from State of Iowa.
- (3) Only Iowa acres shown here (this site extends into Nebraska, see Table 6)
- (4) Includes 3 acres of channel improvement easement and 91 acres of fee title.
- (5) Only Iowa acres shown here (this site extends into Missouri, see Table 8)

**TABLE 6**  
**LANDS ACQUIRED WITHIN STATE OF NEBRASKA,**  
**DISTRIBUTION BY SITE**  
**(AS OF 30 SEP 06)**

Site	Location	Private Lands Acquired (ac)	Public Lands Acquired (ac)	Total Acquired (ac)
Tieville-Decatur Bends <sup>(1)</sup>	Burt County, RM 698 – 686, Left Bank	1,890	133 <sup>(2)</sup>	2,023
Tobacco Island	Cass County, RM 589 – 586, Right Bank	1,604	0	1,604
Hamburg Bend	Otoe County, RM 556 – 552, Right Bank	1,576	0	1,576
Kansas Bend	Nemaha County, RM 547 – 544, Right Bank	1,056	0	1,056
Nishnabotna <sup>(3)</sup>	Nemaha County, RM 545 – 537, Left Bank	2	0	2
Langdon Bend	Nemaha County, RM 532 – 528, Right Bank	1,308	0	1,308
Glovers Bend	Thurston County, RM 713 – 710, Right Bank	0	985 <sup>(4)</sup>	985
Hole in the Rock	Thurston County, RM 706, Right Bank	0	52 <sup>(4)</sup>	52
Van Horn Bend	Cass County, RM 577-575, Right Bank	534	0	534
<b>TOTAL</b>		<b>7,970</b>	<b>1,170</b>	<b>9,140</b>

- (1) Only Nebraska acres shown here (this site extends into Iowa, see Table 5)  
(2) No cost right of entry easement obtained from State of Nebraska.  
(3) Only Nebraska acres shown here (this site extends into Missouri, see Table 8)  
(4) No cost easement obtained on Tribal Land

**TABLE 7**  
**LANDS ACQUIRED WITHIN STATE OF KANSAS,**  
**DISTRIBUTION BY SITE**  
**(AS OF 30 SEP 06)**

Site	Location	Private Lands Acquired (ac)	Public Lands Acquired (ac)	Total Acquired (ac)
Benedictine Bottoms	Atchison County, RM 429 – 424, Right Bank	2,111	0	2,111
Elwood Bottoms	Doniphan County RM 448 – 445, Right Bank	799	0	799
<b>TOTAL</b>		<b>2,910</b>	<b>0</b>	<b>2,910</b>

**TABLE 8**  
**LANDS ACQUIRED WITHIN STATE OF MISSOURI,**  
**DISTRIBUTION BY SITE**  
**(AS OF 30 SEP 06)**

Site	Location	Private Lands Acquired (ac)	Public Lands Acquired (ac)	Total Acquired (ac)
Lower Hamburg Bend (1)	Atchison County, RM 554 – 546, Left Bank	2,265	0	2,265
Nishnabotna (2)	Atchison County, RM 545 – 537, Left Bank	2,434 (4)	0	2,434
Aspinwall Bend	Atchinson County RM 529 – 526, Left Bank	179	0	179
Deroin Bend	Atchison/Holt Counties, RM 520 – 517, Left Bank	0	1,082 (3)	1,082
Corning/Hemmies Bend	Holt County, RM 516 – 514, Left Bank	2003 (4)	0	2,003

**TABLE 8, Continued**

<b>Site</b>	<b>Location</b>	<b>Private Lands Acquired (ac)</b>	<b>Public Lands Acquired (ac)</b>	<b>Total Acquired (ac)</b>
Thurnau	Holt County, RM 512 – 508, Left Bank	1,372	0	1,372
Rush Bottom Bend	Holt County, RM 502 – 499, Left Bank	811	0	811
Wolf Creek Bend	Holt County, RM 482 – 477, Left Bank	967	0	967
Hare Wildlife Area	Holt, Andrew Counties, RM 466 – 464, Left Bank	657	0	657
Worthwine Island	Andrew County, RM 460 – 456, Left Bank	0	585 (3)	585
Weston Bend	Platte County, RM 404 - 403, Left Bank	0	12 (3)	12
Grand Pass	Saline County, RM 273 – 266, Right Bank	0	5 (3)	5
Cambridge Bend	Chariton County RM 232-230, Left Bank	168	0	168
Overton Bottoms - North	Cooper County, RM 188 – 185, Right Bank	1,355	332 (5)	1,687
Overton Bottoms - South	Cooper/Moniteau Counties, RM 185 – 178, Right Bank	3,697	0	3,697
Rocheport Cave	Boone County, RM 183, Left Bank	0	51 (3)	51
Eagle Bluffs	Boone County, RM 174 – 170, Left Bank	0	571 (3)	571
Tate Island	Callaway County, RM 113 – 110, Left Bank	422	0	422
Berger Bend	Franklin County, RM 93 - 90, Right Bank	474 (4)	0	474
Columbia Bottom	St. Louis County, RM 4 – 0, Right Bank	0	4,226 (3)	4,226
<b>TOTAL</b>		<b>16,804</b>	<b>6,864</b>	<b>23,668</b>

- (1) Only Missouri acres shown here (this site extends into Iowa, see Table 5).
- (2) Only Missouri acres shown here (this site extends into Nebraska, see Table 6).
- (3) No cost permanent easement obtained from State of Missouri.
- (4) Acreage includes lands that have existing NRCS-WRP easement.
- (5) No cost license obtained from USFWS.

**TABLE 9**  
**SUMMARY OF ALL LANDS ACQUIRED**  
**(AS OF 30 SEP 06)**

<b>State</b>	<b>Non-Public Lands Acquired (ac)</b>	<b>Public Lands Acquired (ac)</b>	<b>Total Lands Acquired (ac)</b>	<b>Authorized Amount (ac)</b>	<b>Percentage of Authorized Amount (%)</b>
Iowa	5,727	5,110	10,837	23,725	46
Nebraska	7,970	1,170	9,140	26,652	34
Kansas	2,910	0	2,910	11,632	25
Missouri	16,804	6,864	23,668	104,741	23
<b>TOTAL</b>	<b>33,411</b>	<b>13,144</b>	<b>46,555</b>	<b>166,750</b>	<b>28</b>

**Shallow Water Habitat Development**

Information on the current status concerning the development and construction of Shallow Water Habitat (SWH) for 2006 and past years can be found at the Omaha District Webpage for the Missouri River Recovery Program and Related Information at, (<https://www.nwo.usace.army.mil/html/pm-c/PMCBiOp.htm>), in a report titled:

2006 ANNUAL REPORT  
 BIOLOGICAL OPINION ON THE  
 OPERATION OF THE MISSOURI RIVER MAIN STEM SYSTEM,  
 MISSOURI RIVER BANK STABILIZATION AND NAVIGATION PROJECT,  
 AND OPERATION OF THE KANSAS RIVER RESERVOIR SYSTEM

## **HABITAT DEVELOPMENT (FY06 and Prior)**

### **Habitat Development Goals**

In accordance with the existing Project Management Plan, the Preferred Alternative of the Supplemental Environmental Impact Statement and other documents created during the course of this Project, habitat goals have been developed. The Project will preserve existing or restore lost and degraded natural habitats along the Missouri River. The natural habitats consist of riverine, wetland and upland habitats that support native species of vegetation for fish and wildlife within the floodplain. The Project will preserve and restore riverine habitats including diversity within the main river channel, side channels and chutes, backwater areas, sandbars, and islands. The Project will also preserve and restore wetland habitats such as scour holes and emergent, scrub-shrub, and forested wetlands. And, the Project will preserve and restore terrestrial floodplain habitats such as grasslands, scrub-shrub, forested, and mixed open lands. In summary, the habitat development goals implemented to date can be stated as follows:

- Create native and diverse habitats
- Preserve and improve riverine habitats and processes
- Preserve and restore wetland habitats
- Preserve and restore upland terrestrial habitats
- Create opportunities to reconnect the floodplain to the river
- Create areas that will require mostly passive management

To date, the Project has not focused on one species type. Rather, habitat diversity placing appropriate mixes of each habitat type on individual sites is a Project goal. Additionally, a mix of fully mature, early successional, and newly planted vegetation has been encouraged. Because of the flood prone nature of these lands, extensive capital improvements have been avoided. Modest developments that feature low or moderate management have been encouraged. The infrastructure constructed has been limited to that needed to support habitat development, encourage fish and wildlife use, and ensure long term habitat success. This has included berms, water control structures, pumps, and other features that require only low management levels. Where possible, damaged levees have not been rebuilt. Several existing interior levees have been altered or removed so flood waters can regain access to the flood plain and exert some of their historic influence in creating and shaping riverine resource communities. Dike structures in the river channel have been altered so that river flows create shallow areas along the bank line. Terrestrial areas have been reshaped to diversify the landscape. Native vegetation has been planted in areas that will support them.

The Project has strived for passive, self-sustaining mitigation sites. Reforestation activities have assumed the passive character of natural succession. Grasslands will be encouraged to regenerate with only minor land management such as burning. The natural force of the river has been used as much as possible to reshape areas in the dike fields and carve out side channels and chutes. Assured water for managed wetland areas has been limited to the growing season and migratory periods as much as possible. Early successional vegetation as well as areas for open land has been incorporated on suitable sites.

## Habitat Development Status

Habitat development or preservation to date has been undertaken at 38 sites. As shown in Table 3, the Corps of Engineers has expended 41% of the funds received for the Project, or \$54,406,000, on habitat development activities. The development has been accomplished primarily through three types of construction. Several developments have been completed by Corps of Engineers in-house work forces. Many native plantings, small water control projects, and minor construction have been completed by partner land management agencies such as Missouri Department of Conservation or US Fish and Wildlife Service. Larger developments have been completed through construction contracts.

Development of riverine aquatic habitat has been accomplished at numerous mitigation sites. This effort has emphasized development of side channels and chutes and completing within-river improvements. This was accomplished primarily by dike notching, river structure modifications, bank sloughing, excavation, and dredging. Through 30 Sep 06, river structure modifications have been made at 18 mitigation sites, and side channels have been preserved, re-opened, or work has been started, at 21 mitigation sites.

Through 30 Sep 06, wetland habitats have been created or work has been started, at 16 mitigation sites. Development of this terrestrial aquatic habitat has been accomplished by construction of low dikes, berms, wells, pumps, water delivery systems, and drainage control structures.

Through 30 Sep 06, native forest and prairie grassland habitats have been planted at 15 mitigation sites. Development of upland terrestrial habitat such as bottomland forest and prairie grassland habitats has been a key to the restoration of the ecosystem of the Missouri River. Upland habitat supports food plot establishment, nesting cover, insect production, and a whole array of necessary biological functions to keep the ecosystem alive and functioning. Development of upland habitat has been dependent upon the type of existing land use and management objectives. The terrestrial habitat development to date has included vegetative plantings, water control, and land grading.

As of 30 Sep 06, reconnecting floodplain habitats to the river have been completed, or work started, at 19 mitigation sites. Several mitigation sites had levees that were close to the river channel. In some cases, the levee was moved landward from the Missouri River. At some locations, such as Overton North, an existing levee was breached in several places to allow high flows to inundate terrestrial habitats and provide valuable organic matter to the river's water. At many locations, side channels have been developed to encourage high flows to spread out across the floodplain.

Table 10 displays the different types of development activities that have been undertaken at the 38 different mitigation sites established to date. These developments have been coordinated with the Agency Coordination Team to assure appropriate mitigation efforts have been implemented.

**TABLE 10  
HABITAT DEVELOPMENT ACTIVITIES BY SITE  
(AS OF 30 SEP 06)**

<b>Site Name</b>	<b>River Structure Mod</b>	<b>Side Channel/ Backwater</b>	<b>Floodplain Reconnection</b>	<b>Water Control/ Wetland</b>	<b>Plantings</b>	<b>Other</b>	<b>Undeveloped</b>
Winnebago Bend, IA	X	X	X	X			
Blackbird Bend, IA							X
Tieville-Decatur Bends, IA/NE		X	X	X			
Louisville Bend, IA		X	X	X			
California Bend, IA	X	X	X				
Tobacco Island, NE	X	X	X		X		
Glovers Bend, NE	X	X	X				
Hole in the Rock, NE		X	X				
Van Horn Bend, NE							X
Noddleman Island, IA				X			
Auldon Bar, IA							X
St. Mary's Island, IA				X	X		
Copeland Bend, IA				X			
Hamburg Bend, NE	X	X	X	X			
Lower Hamburg Bend, IA/MO	X	X	X	X	X		
Kansas Bend, NE		X	X				
Nishnabotna, NE/MO				X	X		
Aspinwall Bend, MO							X
Langdon Bend, NE	X	X	X				
Deroin Bend, MO		X	X	X	X		

**TABLE 10, Continued**

Site Name	River Structure Mod	Side Channel/ Backwater	Floodplain Reconnection	Water Control/ Wetland	Plantings	Other	Undeveloped
Corning/Hemmies Bend, MO				X	X		
Thurnau, MO	X	X	X	X	X		
Rush Bottom Bend, MO	X	X	X		X		
Wolf Creek Bend, MO	X				X		
Hare Wildlife Area, MO	X				X		
Worthwine Island, MO	X	X	X				
Elwood Bottoms, KS							X
Benedictine Bottoms, KS	X			X	X		
Weston Bend, MO	X						
Grand Pass, MO	X	X					
Cambridge Bend, MO							X
Overton Bottoms – North, MO	X	X	X		X		
Overton Bottoms – South, MO	X	X	X	X	X		
Rocheport Cave, MO						X	
Eagle Bluffs, MO	X	X	X	X			
Tate Island, MO		X					
Berger Bend, MO					X		
Columbia Bottom, MO		X	X	X	X		
<b>Number of Sites = 38 Total</b>	<b>18</b>	<b>21</b>	<b>19</b>	<b>16</b>	<b>15</b>	<b>1</b>	<b>6</b>

**Existing Habitat Assessment**

There have been 46,555 acres of land acquired at 38 different mitigation sites to date. As discussed above, the Project has completed many habitat developments that have lead to changes in the land covers and land use of the associated lands. During FY 05 and 06, the Corps of Engineers continued efforts to assess the existing habitats to establish a baseline condition from which long-range habitat changes can be measured. The information is being captured in a GIS database.

The habitat assessment is utilizing standardized, national classification systems to define the different habitat types that exist on the Project lands. Aquatic and wetland habitats are classified using the National Wetland Inventory (NWI) and the upland habitats are classified using the National Land Cover Data (NLCD) classification system. The combined classification system is explained in Table 11 below.

**TABLE 11  
PROJECT HABITAT CLASSIFICATION SYSTEM**

<b>Habitat Type</b>	<b>Description</b>
Aquatic	In Channel
Aquatic	Side Channel
Aquatic	Backwater
Aquatic	Scour/Blew Holes
Aquatic	Tributary streams
Wetland	Emergent Wetlands
Wetland	Scrub-shrub Wetlands
Wetland	Forested Wetlands
Upland	Barren
Upland	Grassland
Upland	Shrubland

**TABLE 11, Continued**

<b>Habitat Type</b>	<b>Description</b>
Upland	Forest
Upland	Cropland and Levees
Upland	Orchards and Vineyards
Upland	Developed

The assessment of the existing wetland and upland habitats has been completed for all the mitigation sites, with the exception of the newly acquired sites at Cambridge Bend, Aspinwall Bend, Elwood Bottoms, Glovers Bend, Hole in the Rock and Van Horn Bend. The amounts of the different habitats on the mitigation sites for each State are displayed in Table 12. Additional sites will continue to be completed during FY07 as they are acquired. Updated amounts of habitats for all mitigation sites will be listed in future Annual Implementation Reports. The annual update of habitat changes will be able to be seen by comparing the annual reports. The Corps is also preparing an overall report or document to track all the habitat assessment information contained in the GIS database for the Mitigation Project. This report will contain information on each mitigation site specifically related to habitat conditions at the time of purchase, specific time-frame baseline conditions, and future desired conditions. This report will be titled the Annual GIS Mitigation Report and will be available as a future appendix to this report or will be referenced on the Mitigation webpage.

Location maps for all of the mitigation sites can be found in Appendix 1. Additionally, detailed descriptions of each mitigation site with photos and maps, etc. have been placed in Information Papers for each site. The information papers are included in Appendix 2 to this report.

### **Shallow Water Habitat Development**

Information on the current status concerning the development and construction of Shallow Water Habitat (SWH) for 2006 and past years can be found at the Omaha District Webpage for the Missouri River Recovery Program and Related Information at, (<https://www.nwo.usace.army.mil/html/pm-c/PMCBiOp.htm>), in a report titled:

2006 ANNUAL REPORT  
BIOLOGICAL OPINION ON THE  
OPERATION OF THE MISSOURI RIVER MAIN STEM SYSTEM,  
MISSOURI RIVER BANK STABILIZATION AND NAVIGATION PROJECT,  
AND OPERATION OF THE KANSAS RIVER RESERVOIR SYSTEM

**TABLE 12**  
**ACREAGE AMOUNT OF HABITATS**  
**DISTRIBUTION BY STATE (2)**  
**(AS OF 30 SEP 06)**

Habitat	IOWA	NEBRASKA	KANSAS	MISSOURI	TOTAL
In Channel	(1)	(1)	(1)	(1)	(1)
Side Channel	0	117.2	0	315.5	432.7
Backwater	405	74.9	0	16.5	496.4
Scour/Blew Holes	40.0	6.5	2.1	96.6	145.2
Tributary streams	0.2	0	6.9	28.6	35.7
Emergent Wetlands	710.2	565.9	520.9	1228	3025
Scrub-shrub Wetlands	24.9	190.5	0	652.2	867.6
Forested Wetlands	12.5	582.8	0	957.8	1553.1
Barren	33.6	86.6	0	141.6	261.8
Grassland	2183	2562	695.3	4664	10,104.3
Shrubland	385.5	349.1	761.2	921	2416.8
Forest	2849	1254	35.4	5379	9517.4
Cropland and Levees	3575	1547	95.7	7421	12,638.7
Orchards and Vineyards	0	0	0	0	0
Developed	80.7	36.7	1.1	68	186.5
<b>TOTAL (2)</b>	10299	7373	2119	21890	41,681

(1) The amount of riverine habitat within the main river channel has yet to be estimated.

(2)The total acreage of habitats may not equal the amount of real estate acquired for the state. The real estate acquired is based upon legal description at the time the land was acquired. The habitat assessment acres may include portions of the river, etc. that would not match the real estate acquired. Does not include the newly acquired sites of Cambridge Bend, Aspinwall Bend, Elwood Bottoms, Glovers Bend, Hole in the Rock and Van Horn Bend.

## **OPERATION AND MAINTENANCE (FY06 and Prior)**

There are two types of Operation and Maintenance (O&M) activities for the Project. The first is “O&M During Construction (O&MDC)”. O&MDC begins immediately after sites are acquired. O&MDC activities include basic land management, vegetative plantings, weed control, etc. These activities are typically performed while additional studies, designs, and/or construction are being completed. Sometimes O&MDC may extend several years while additional funds are appropriated to purchase adjacent lands or develop habitats. There are currently 21 sites in O&M During Construction status. Funding for sites that require O&MDC are provided from Construction, General (CG) type funds. CG funds are accounted for against Project funding. The work is usually performed by Corps of Engineers in-house work crews or by the land management agency that has entered into a Cooperative Agreement/Sole Source Contract with the Corps to manage the site for fish and wildlife purposes. Any revenues that are raised from leasing the site will offset the O&MDC costs. If funds are needed by an agency other than the Corps of Engineers for O&MDC, the funds are requested and approved from the Corps on an annual basis via an Annual Management Plan/Sole Source Contract process. Requests are usually made in the summer for work planned for the following fiscal year (Oct through Sep). As shown in Table 3, the Corps of Engineers has expended 2% of the funds received for the Project, or \$2,739,000, on O&MDC activities.

The second type of O&M is long term Operation and Maintenance that is on going for the life of the Project. Sites are considered to be in an O&M phase once constructed features have been completed and are accepted as complete by all parties. Sites can also be considered in an O&M phase when areas have been planted and are in a healthy growing condition. The constructed features and habitat areas must be operated and maintained to assure that maximum habitat value is achieved. Therefore, O&M funds are provided for this purpose. O&M type funds are not a part of CG funding and do not count against the Project costs. There are currently 11 sites utilizing long-term O&M funds. On a typical site, long-term O&M requirements are estimated initially during the design phase. An O&M manual is then developed during the construction phase with the party responsible for administering the O&M at the particular site. An O&M manual will define the entity that will do the maintenance, the degree of Corps responsibility, schedule and procedure requirements, etc. After construction of features or habitats at a site, a cooperative agreement will be executed between the Corps and the party responsible for administering the O&M. The cooperative agreement will document the long-term O&M responsibilities. Similar to O&M During Construction funds, if funds are needed by an agency other than the Corps of Engineers for long term O&M, the funds are requested and approved from the Corps on an annual basis via an Annual Management Plan/Sole Source Contract process.

To date, the Corps has funded 100 percent of the O&M of the mitigation features and habitat lands developed under this Project, whether the sites are in O&M During Construction or long term O&M status. For mitigation that has occurred on properties not owned by the Corps, O&M will only be conducted on those portions of the property in which mitigation occurred and only for those features that were constructed by the Project. In most instances, the funds are forwarded to the land managing agency for the work to be accomplished by their work force.

As of 30 Sep 06, there were 38 mitigation sites that have been established. Of the total number of sites, 6 have not had any O&M performed on them to date. There are 21 sites that are undergoing short-term land management and habitat development using O&M During Construction funds. Also, there are 11 sites which have had habitat developed or preserved and are now considered to be in a long term O&M phase. A summary of the O&M Activities that has taken place to date at all mitigation sites is described in Table 13, below.

**TABLE 13**  
**OPERATION AND MAINTENANCE ACTIVITIES BY SITE**  
**(AS OF 30 SEP 06)**

Site	Fund Type	Description of O&M	Responsible Party
Winnebago Bend, IA	O&M	Maintain all structures, pumps, fences, signs and roadways. Provide land management, habitat preservation and law enforcement.	IDNR
Blackbird Bend, IA	--	None (to be started in FY07)	COE
Tieville-Decatur Bends, IA - NE	CG	Maintain all structures, pumps, fences, signs and roadways. Provide land management, habitat preservation and law enforcement.	COE
Louisville Bend, IA	O&M	Maintain all structures, pumps, fences, signs and roadways. Provide land management, habitat preservation and law enforcement.	IDNR
California Bend, IA	O&M	Maintain all structures, fences, signs and roadways. Provide land management, habitat preservation and law enforcement.	IDNR
Tobacco Island, NE	CG	Basic land management, inspection of chute development.	NGPC
Glovers Bend, NE	CG	Basic land management, inspection of chute development and backwater.	COE
Hole in the Rock, NE	CG	Basic land management, inspection of backwater development.	COE
Van Horn Bend, NE	--	None (to be started in FY07)	COE
Noddleman Island, IA	CG	Provide land management, habitat preservation, and law enforcement.	IDNR
Auldon Bar, IA	CG	Provide land management, habitat preservation, and law enforcement.	IDNR
St. Mary's Island, IA	--	None (to be started in FY08)	COE

**Table 13, Continued**

<b>Site</b>	<b>Fund Type</b>	<b>Description of O&amp;M</b>	<b>Responsible Party</b>
Copeland Bend, IA	CG	Provide land management, habitat preservation, and law enforcement.	IDNR
Hamburg Bend, NE	O&M	Maintain structures, fences, signs and roadways. Provide land management, habitat preservation and law enforcement.	NGPC
Lower Hamburg, IA/MO	CG	Land management, tree and grass planting, existing habitat preservation, water control, weed control, controlled burning, food plots.	MDC/IDNR
Kansas Bend, NE	CG	Basic land management, inspection of chute development and backwater.	COE
Nishnabotna, NE/MO	CG	Land management, existing habitat preservation, vegetative plantings, water control, weed control, food plots	MDC
Aspinwall Bend, MO	--	None (to be started in FY07)	COE
Langdon Bend, NE	O&M	Maintain all structures, pumps, fences, signs and roadways. Provide land management, habitat preservation, and law enforcement.	NGPC
Deroin Bend, MO	O&M	Tree plantings, access road improvement, controlled burning, weed control.	MDC
Corning/Hemmies Bend, MO	CG	Land management, weed control, vegetative plantings, water control, food plots.	MDC
Thurnau, MO	CG	Land management, weed control, vegetative plantings, water control, food plots.	MDC
Rush Bottom Bend, MO	CG	Land management, weed control, vegetative plantings, food plots.	MDC
Wolf Creek Bend, MO	CG	Land management, weed control, vegetative plantings, food plots.	MDC
Hare Wildlife Area, MO	CG	Land management, weed control, vegetative plantings, food plots.	MDC

**TABLE 13, Continued**

Site	Fund Type	Description of O&M	Responsible Party
Worthwine Island, MO	CG	Land management, weed control, food plots, access road improvement, surveillance of constructed chute.	MDC
Elwood Bottoms, KS	--	None (to be started in FY07)	COE
Benedictine Bottoms, KS	O&M	Wetland management, infiltration control, tree planting, weed control, pumping, controlled burning.	KDWP
Weston Bend, MO	CG	River structure maintenance and surveillance.	COE
Grand Pass, MO	O&M	River structure maintenance and surveillance	COE
Cambridge Bend, MO	--	None (to be started in FY07)	COE
Overton Bottoms North, MO	CG/O&M	Native grass and tree plantings, weed control, surveillance of constructed chute, signage.	USFWS
Overton Bottoms South, MO	CG/O&M	Basic land management, wetland habitat development, weed control, food plots.	MDC
Rocheport Cave, MO	CG	Gate maintenance, debris removal, access road maintenance	MDC
Eagle Bluffs, MO	O&M	Management of wetland pool elevations, water control structures, weed control, mowing, food plots.	MDC
Tate Island, MO	O&M	Habitat preservation, signage	MDC
Berger Bend, MO	CG	Habitat preservation, weed control, vegetative plantings, and food plots.	COE
Columbia Bottom, MO	CG	Land management, weed control, vegetative plantings, water control, pumping, food plots.	MDC

CG = O&M During construction paid for with "Construction, General" funding, O&M = Long term O&M paid for out of COE O&M funding (not a project cost), COE = Corps of Engineers, MDC = Missouri Department of Conservation, KDWP = Kansas Department of Wildlife and Parks, IDNR = Iowa Department of Natural Resources, NGPC = Nebraska Game and Parks Commission, USFWS = U.S. Fish and Wildlife Service.

## **MONITORING AND EVALUATION (FY06 and Prior)**

Because many of the mitigation features of the Project will be constructed as opposed to created naturally over time, it is important to complete monitoring and evaluation (M&E). By monitoring the mitigation sites and collecting basic habitat data, the Corps and the Agency Coordination Team can determine whether the mitigation sites are performing as expected.

However, the Project is a construction effort intended to purchase lands and convert them into fish and wildlife habitats. The Project is not intended to complete studies or research programs. Therefore, funding for M&E has been limited prior to FY03. However, the Cost Report to Congress allowed for 6% of the total amount appropriated to be utilized for monitoring efforts.

As of 30 Sep 06, M&E activities have begun to increase across several levels of the project. As shown in Table 3, the Corps of Engineers has expended approx. 2% of the funds received for the Project, or \$2,399,000, on monitoring activities. This includes periodic inspections of completed habitats. In the past, some site specific data has been collected such as a three-year fisheries study performed under contract with the State of Nebraska, limited funding of efforts at Benedictine Bottoms through the Benedictine University, pallid sturgeon micro model studies with the St. Louis District, USFWS studies on songbirds and turtles at the Overton North site, physical monitoring of the Overton North chute, aerial photography, benthic fish population assessments within the Missouri River and a chute monitoring project studying several constructed and natural chutes.

Big river ecosystem restoration/preservation/mitigation is a relatively new science with very few case histories to draw experience from. Most of the changes to the Missouri River aquatic and terrestrial ecosystems occurred coincident with the Corps extensive bank-stabilization and channelization activities initiated in 1912. By 1937, only seventeen percent of the bottomland timber remained and, by 1958, eighty percent of the floodplain was cultivated. Most of the Missouri River ecosystem has been highly altered for over seventy-five years. Because of this program's significant financial investment, it is important to learn how constructed mitigation sites are performing and apply adaptive management, as needed, on existing and future sites. This information will help determine the program's level of success and provide a basis for future adaptive management. By monitoring the mitigation sites and collecting basic habitat data, the Agency Coordination Team can determine whether the mitigation sites are performing as expected. Utilizing information obtained through the monitoring of sites will enable decision makers to recommend improvements to existing sites and make more informed decisions about planning and design of future sites.

### **Monitoring Strategy**

The Agency Coordination Team (ACT) for the Mitigation Program established a Monitoring and Evaluation (M&E) Committee in 2004 to draft a formal plan to direct future M&E activities. The goal of this monitoring and evaluation (M&E) program is to understand the physical and biological responses to Mitigation Project actions within an adaptive management context. Specific objectives are as follows:

- Track location, habitat type, and physical characteristics of each mitigation site
- Quantify habitat use and population responses of key species
- Recommend program adaptations based on new information
- Gain understanding of the physical and biological responses through time
- Formalize information transfer among all to communicate lessons-learned and increase the effectiveness of project actions.

As documented in the M&E Plan, a three tiered M&E program is being utilized. Tier 1 includes gathering data on the physical aspects of the mitigation sites, tier 2 includes documenting the project's biologic response, and tier 3 activities include focused research to test a specific hypothesis. The M&E committee is to meet annually to review all on-going monitoring activities and decide on future activities based on available appropriations. Tier 2 and 3 monitoring proposals are to be provided to the M&E committee for review and approval. Technical subcommittees established by the M&E committee for specific faunal groups will be responsible for and coordinate quality control for Tier 2 and Tier 3 M&E activities. These subcommittees are responsible for developing standardized protocols for Tier 2 monitoring including standard operating procedures for the selection and use of sampling gear, selecting sampling locations/river segments, sampling strategies and experimental design, and the collection of micro-habitat characteristic data.

### ***Tier 1***

Tier 1 data is limited to physical data on mitigation sites. These data include habitat delineations, cross sections, hydrographs, etc. Habitats are classified using the National Wetland Inventory (NWI) and the National Land Cover Data (NLCD) classification system. Aquatic and wetland habitats are classified using the NWI and all upland habitats will be classified using the NLCD system. The existing baseline habitat conditions will be documented for each mitigation site to establish the baseline habitats that existed prior to acquisition by the mitigation project. This data will be established and maintained by the Corps of Engineers as a GIS land cover data layer. Tier 1 efforts will be performed by the COE or its contractors. In general, the baseline condition will be documented during site-specific design activities and NEPA compliance. Design funds will be used to complete initial Tier 1 activities and document the baseline conditions. Tier 1 activities will be updated periodically (using monitoring funds) to document changes over time. Tier 1 habitat data will be summarized and presented in the Mitigation Program Annual Implementation Report.

### ***Tier 2***

Tier 2 activities utilize standardized protocol, as approved by the M&E committee, to monitor the biologic response at select mitigation sites. The committee has established native riverine fish species as being the highest priority for monitoring followed by birds, reptiles, and amphibians. This monitoring may also track changes in both quality and quantity of a species' preferred habitat. Tier 2 activities may characterize the habitat in greater detail using the NWI and NLCD systems, as appropriate. This additional data on habitat will be added to the GIS land

cover data layer maintained by the Corps of Engineers. These monitoring activities will be completed by the mitigation site's land managing agency and funded through the site's annual management plan. Each land managing agency will decide how to conduct these activities (i.e. in-house labor, contract, academic institution, etc). Monitoring results will be reported in annual progress reports and final reports. Tier 2 monitoring data will also be summarized and presented in the Mitigation Program Annual Implementation Report. The M&E committee will meet annually to review all on-going monitoring activities and decide on future activities based on available appropriations.

### ***Tier 3***

Specific research activities are included in Tier 3 activities and will test a specific hypothesis relevant to the mitigation program. These activities may include more rigorous research techniques and sampling protocol. As with Tier 2 monitoring, these research projects will be completed by the mitigation site's land managing agency and funded through the site's annual management plan. For Tier 3 research, the land managing agency will also decide how to conduct these activities (i.e. in-house labor, contract, academic institution, etc). Research results will be reported in annual progress reports and final reports. Tier 3 research will receive lower priority for funding than Tier 1 or Tier 2 monitoring activities.

### **Monitoring Update**

Tier 1 habitat delineations, based on September 2004 aerial photography, have been completed and field truthed on existing mitigation sites. The results of these habitat delineations are presented in Table 12. The baseline conditions, at time of purchase, will now be delineated using appropriate aerial photography and the net change in habitat quantity documented and reported in future annual implementation reports.

The biological and physical monitoring of 13 constructed chutes/backwaters was initiated in FY05 as a Tier 2 M&E project. This monitoring and evaluation effort is being conducted by the Nebraska Game and Parks Commission, Iowa Department of Natural Resources, Missouri Department of Conservation, the U. S. Fish and Wildlife Service, and the U. S. Geological Survey. Proposed field sampling protocol was field tested and refined as needed in FY05 and field sampling was initiated in FY06. This monitoring of the constructed chutes/backwaters will include three field seasons and include both annual and final reports. Initial annual progress reports are scheduled to be submitted to the M&E Committee in April of 2007.

## PLANNED MITIGATION EFFORTS FOR FY07

### FUNDING (FY07)

As of the writing of this Annual Implementation Report, a final FY07 budget for the Project has not been approved. The Federal government started FY07 operating under a continuing resolution authority while Congress completed FY07 appropriations. Therefore, the information in this section of the report is assumed. Actual FY07 funding amounts will be reflected in the next Annual Implementation Report and tracked during FY07 at the quarterly Agency Coordination Team meetings for the Project.

Beginning in FY05 and continuing again through FY06, the Mitigation Project's budget became a subset of an overall Missouri River Recovery Program budget. The Missouri River Recovery Program extended the area in which efforts could be completed to include the area upstream of Sioux City, IA to Fort Peck, MT., in the footprint of existing authorized projects. The Corps' focus has directed most of the funds on endangered species, meeting the requirements of the 2003 Biological Opinion, and the preferred alternative for the Missouri River Master Manual. The President's Budget included \$85M for the Recovery Program in FY07. The House Budget included \$51M, and the Senate Budget included \$54M for the Program in FY07. The Corps is expecting in overall recovery budget similar to FY06, which would be \$54M for the FY07 funding. This would include approximately \$23M for the existing Mitigation Project authorization, plus \$31M for additional efforts that are currently needed to meet ESA, Bi-Op, and/or Master Manual requirements.

Therefore, the FY07 budget is uncertain. Based upon the above, the Corps has assembled a preliminary budget for FY07. This is displayed in Table 14. The budget assumes an amount of \$23,000,000 will be appropriated for the existing authorized Mitigation Project purposes.

**TABLE 14  
ESTIMATED FUNDING FOR FY07**

<b>Task</b>	<b>CENWK (1,000)</b>	<b>CENWO (1,000)</b>	<b>TOTAL (1,000)</b>	<b>% of Appropriated Amount (1,000)</b>
Land Acquisition	\$5,000	\$5,000	\$10,000	44
Planning, Engineering, and Design	1,500	1,000	2,500	11
Habitat Development (Construction)	6,100	2,500	8,600	37
Construction Management	300	100	400	2
O&M During Construction	400	100	500	2
Monitoring and Evaluation	500	500	1,000	4
<b>TOTAL</b>	<b>\$13,800</b>	<b>\$9,200</b>	<b>\$23,000</b>	<b>100</b>

**REAL ESTATE (FY07)**

As of September 30, 2006, there remains a total of 120,195 acres of lands authorized for acquisition. These acres are authorized in all four states. Therefore, if funds are appropriated for the Project and the authorization does not change for FY07, the Corps estimates spending 44% of the amount of mitigation funds appropriated on Real Estate activities, or 20% of the overall Recovery Program's appropriation. The goal for FY07 is to acquire 4,000 new acres for the Mitigation Project.

During FY07, the Corps will undertake several efforts to purchase additional land from private willing sellers. Willing seller efforts will continue in all four States. Current ownership information will be updated and many landowners will be contacted to inquire if they are willing to sell their property. An amount of \$10,000,000 is estimated to be available in FY07 for real estate activities (pending final appropriation).

In Iowa, letters were sent to nearly all private landowners owning land along the river during FY03. Follow-up with these owners will continue during FY07. In addition to the willing seller effort, the Corps will be focused on acquiring lands in several specific areas in FY07. Additional non-public lands are being sought at Copeland Bend to compliment the lands that are already owned there. Additional efforts will be undertaken to obtain additional lands at Auldon Bar, Noddleman Island, Upper Dakota Bend, Council Bend, Tyson Bend, and Blackbird Bend.

In Nebraska, letters were sent to nearly all private landowners owning land along the river during FY03. Follow-up with these owners will continue during FY07. In addition to the willing seller effort, the Corps will be attempting additional site-specific acquisitions at Van Horn Bend, Tobacco Island, Omadi Bend, Plattsmouth Bend, Bullard Bend and Lower Argo Bend.

In Kansas, the Corps will continue to pursue willing sellers. The Corps and the Kansas Department of Wildlife and Parks have identified several areas where there is good restoration potential. The restoration potential for Kansas' lands along the Missouri River was placed in a GIS database in FY06. The Corps has sent willing seller questionnaires to several owners and follow up on this will continue in FY07. Additional opportunities to expand the area at Elwood Bottoms will be pursued. New acquisitions will be pursued in Doniphan and Atchison Counties during FY07. The Corps will also meet regularly with KDWP and the NRCS to keep informed on progress of acquisition efforts.

In Missouri, the Corps will continue to work with the Missouri Department of Conservation and the US Fish and Wildlife Service to coordinate willing seller efforts. A GIS database has been developed that identifies the restoration potential of all lands along the river within Missouri. The Corps will continue to utilize the help of a contractor to identify landowners in the areas that show the most potential for restoration. Focused efforts will be placed on acquiring lands at Tammerlane Bend, Westin Bend, Bryan Island, Cora Island, DeWitt Bend and Confluence State Park. Additional acquisitions adjacent to the existing sites at Aspinwall Bend, Cambridge Bend, Hare Wildlife Area, Corning, Nishnabotna, and Lower Hamburg sites will be pursued. Additionally, the Corps will continue working with US Bureau of Prisons to assess the Federal prison farmland on the Missouri side of the river opposite Leavenworth, KS.

During FY07, the Corps will also focus on obtaining strips of land along the bank of the Missouri River. This would be for the specific purpose of completing structural modifications to the existing bank protection and navigation dikes. The changes will encourage the river to widen and create more shallow water habitat in the dike fields. In FY03, the Corps obtained approval to utilize "sloughing" easements. This type of real estate interest allows the Corps to erode portions of the bank while the current landowner maintains ownership. In FY06, the Corps obtained approval to utilize a Fish and Wildlife Restoration Easement for Shallow Water Habitat (SWH). This easement will allow the Corps to preserve, restore and create quality SWH adjacent to the Missouri River and adjacent to existing project areas on privately-owned lands not available for fee acquisition. During FY07, the areas immediately adjacent to the river that are needed to improve riverine diversity will be sought in either fee title, sloughing easement or SWH easement from both private and public owners.

## **HABITAT DEVELOPMENT (FY07)**

In FY07, an amount of \$11,100,000 is estimated to be available for habitat development (pending final appropriation). This includes \$2,500,000 for engineering and management activities and \$8,600,000 for construction. The following is a summary of major habitat development activities to be completed by site during FY07.

**Blackbird-Tieville-Decatur Bends, IA/NE** - The Corps is working on Plans and Specs and preparation of an EA for construction of a long side channel at this mitigation site. The construction may start this FY and continue through FY08.

**Tyson Bend, IA** – The Corps is working on obtaining the final real estate needed for this site. Also the Corps is working on Plans and Specs and preparation of an EA for construction of a backwater enhancement and side channel at this proposed mitigation site. The construction may start this FY and continue through FY08.

**Hole in the Rock, NE** - A construction contract for excavation of several backwaters at this site was awarded in FY06. This habitat development will continue through FY07.

**Tobacco Island, NE** – The Corps is working on Plans and Specs and preparation of an EA for construction of modifications to a side channel at this mitigation site. The Corps will finish fencing the boundary at this site during FY07.

**Council Bend, IA** – A construction contract for development of a side channel at this site was awarded in FY06. This habitat development will continue through FY07.

**Lower Hamburg Bend, MO** – The Corps has contracted the Plans and Specs and preparation of an EA/ Project Implementation Report (PIR) for construction of a side channel at the Barney Bend location in this mitigation site. The construction may start this FY and continue through FY08.

**Kansas Bend, NE** – The Corps and NGPC will work on a detailed design for wetland construction at this site. This effort was started in FY06 and will continue through FY07.

**Nishnabotna, NE/MO** – The Corps will do a detailed design of levee breaching, and water control structures at this site. Additionally, MDC will continue to plant native grasses and trees through the Annual Management Plan process.

**Langdon Bend, NE** – – The Corps and NGPC will work on a detailed design for wetland construction at this site. This effort was started in FY06 and will continue through FY07.

**Corning, MO** – The Corps will do a detailed design of berm construction and water control structures at this site. The Corps will be working with MDC and NRCS to continue to plant native vegetation and develop opportunistic wetlands in FY07 at this site. The NRCS is planning on constructing their WRP wetland development plan in FY07.

**Thurnau, MO** – A construction contract for development of a side channel/back water/tributary delta (Tarkio River Delta) at this site was awarded in FY06. This habitat development will continue through FY07. Additionally, MDC will continue to plant native grasses and trees on the lands already owned at this area.

**Rush Bottom Bend, MO** – A construction contract for development of a side channel at this site was awarded in FY06. This habitat development will continue through FY07. Additionally, MDC will continue to plant native grasses and trees on the lands already owned at this area.

**Wolf Creek Bend, MO** - The Corps will contract the preparation of an EA/ Project Implementation Report (PIR) for the overall site development plan and construction of a side channel at this mitigation site. The construction may start this FY and continue through FY08.

**Hare Wildlife Area, MO** - The Corps will contract the preparation of an EA/ Project Implementation Report (PIR) for the overall site development plan at this mitigation site.

**Overton Bottoms South, MO** – The new levee set back was made operational and turned over to the Overton-Woolridge levee district for O&M in FY06. The Corps will breach the old levee at several locations utilizing in-house Corps construction crews. The Corps will do a detailed design of water diversion from a drainage ditch, berm construction and water control structures at this site.

**Eagle Bluffs, MO** – The Corps will obtain a no cost easement for some additional 200 acres from MDC at this site. A construction contract for development of a wetland (McBaine Wetland) at this site was awarded in FY06. This habitat development will continue through FY07. The Corps will obtain a long-term agreement with MDC and the City of Columbia to provide a water conveyance system to the wetland to provide a reliable, high quantity source of water for the wetland.

## **OPERATION AND MAINTENANCE (FY07)**

In FY07, an amount of \$500,000 of Construction, General (CG) funds is estimated to be available for O&M During Construction (pending final appropriation). The following is a summary of how the CG funds will be spent in FY05.

At sites that have not been placed in a long-term O&M status, O&M During Construction funds will be provided for basic land management, habitat preservation, tree plantings, weed control, and signage. Pending available funds, O&M During Construction will occur at the following mitigation sites in FY07: Tieville-Decatur Bends, IA/NE; Tobacco Island, NE; Glovers Bend, NE; Hole in the Rock, NE; Noddleman Island, IA; Auldon Bar, IA; Copeland Bend, IA; Lower Hamburg, IA/MO; Kansas Bend, NE; Nishnabotna, MO; Corning, MO; Thurnau, MO; Rush Bottom Bend, MO; Wolf Creek Bend, MO; Hare Wildlife Area, MO; Worthwine Island, MO; Westin Bend, MO; Overton Bottoms North, MO; Rocheport Cave, MO; Overton Bottoms South, MO; and Berger Bend, MO. Also, O&M During Construction is anticipated to begin during FY07 at Blackbird Bend, IA; Van Horn Bend, NE; Aspinwall Bend, MO; Elwood Bottoms, KS; and Cambridge Bend, MO sites.

For those sites that have at least partially been placed in an “Operations” status, long-term O&M funds (not counting against the Project cost) will be used to maintain completed features. The types of work included are maintaining constructed structures, pumps, fences, signs and roadways. Also covered are land management activities such as habitat preservation, wetland and infiltration control, and weed control. Pending available funds, long-term O&M will continue during FY07 at the following mitigation sites: Winnebago Bend, IA; Louisville Bend, IA; California Bend, IA; Hamburg Bend, NE; Langdon Bend, NE; Deroin Bend, MO; Benedictine Bottoms, KS; Grand Pass, MO; Overton Bottoms North, MO; Overton Bottoms South, MO; Eagle Bluffs, MO; and Tate Island, MO. Also, long term O&M is anticipated to begin at Columbia Bottom, MO.

### **MONITORING AND EVALUATION (FY07)**

In FY07, an amount of \$1,000,000 of Construction, General (CG) funds is estimated to be available for Monitoring and Evaluation (pending final appropriation). This amount is 4% of the estimated \$23M annual appropriation for FY07. In FY07, M&E funds will be spent on periodic and/or annual inspections at the mitigation sites that have been placed in an Operation phase. Some site-specific data will be collected to support baseline and constructed conditions for shallow water habitat development.

The Corps will complete assessment of existing habitats at the mitigation sites obtained to date. The baseline conditions, at time of purchase, for previously acquired mitigation sites will now be delineated using appropriate aerial photography and the net change in habitat quantity documented and reported in future annual implementation reports.

The biological and physical monitoring of 13 constructed chutes/backwaters initiated in FY05 will continue in FY07 to include the second full field season. This monitoring of the constructed chutes/backwaters will include three field seasons and include both annual and final reports. Initial annual progress reports are scheduled to be submitted to the M&E Committee in April of 2007.

**FUTURE MITIGATION EFFORTS,  
FY08 TO COMPLETION**

**FUNDING (FY08 to completion)**

In accordance with the requirements of WRDA99, the Corps of Engineers worked with the Agency Coordination Team to develop a Cost Report to Congress. The Cost Report estimated the amount of funds needed to complete mitigation of the additional 118,650 acres authorized by WRDA99. The cost to complete the Project was estimated to be \$740 million (includes 7,000 acres of shallow water habitat) to \$1.33 billion dollars (includes 20,000 acres of shallow water habitat). These costs were at October 2001 price levels.

It is important to note that all future funding for the mitigation efforts is subject to annual appropriation. Also, due to increasing pressures to focus mitigation efforts on maximizing riverine diversity, the Corps has created budgets based upon constructing the higher goal of 20,000 additional acres of shallow water habitat. Therefore, when seeking annual appropriations in FY08 through completion, the Corps will request funding to meet the higher, \$1.33 billion, total cost. The cost information from the Report to Congress is displayed in Table 15 below.

**TABLE 15**

**ESTIMATED COSTS FROM REPORT TO CONGRESS**

Task	CENWK (1,000,000)	CENWO (1,000,000)	TOTAL (1,000,000)	% of Total Cost
Land Acquisition	\$230	\$120	\$350	26
Planning, Engineering, and Design	110	70	180	14
Habitat Development (Construction)	350	270	620	46
Construction Management	30	20	50	4
O&M During Construction	30	20	50	4
Monitoring and Evaluation	50	30	80	6
<b>TOTAL</b>	<b>\$800</b>	<b>\$530</b>	<b>\$1,330</b>	<b>100</b>

The life of the Project is currently anticipated to last until the year 2042. After inflation is applied, the cost to implement the Project with 20,000 additional shallow water habitat acres is estimated to be \$3.1 billion. The Corps has input this funding stream into the budgetary data for the Project. The budgetary data for the next 5 years and the remainder to completion is displayed in Table 16, below.

**TABLE 16  
CURRENT BUDGET FY08 TO COMPLETION**

<b>District</b>	<b>FY08 (1,000)</b>	<b>FY09 (1,000)</b>	<b>FY10 (1,000)</b>	<b>FY11 (1,000)</b>	<b>FY12 (1,000)</b>	<b>FY13 – FY42 (1,000)</b>
Omaha	10,000	15,000	18,000	20,000	23,000	971,380
Kansas City	20,000	22,500	26,000	30,000	32,000	1,639,392
<b>TOTAL</b>	<b>30,000</b>	<b>37,500</b>	<b>44,000</b>	<b>50,000</b>	<b>55,000</b>	<b>2,610,772</b>

The budget data in Table 16 is subject to change. For instance, while the Corps may request at least \$30,000,000 in funding in FY08, Congress may only appropriate a portion of that. Therefore, this table will be updated annually and changes will be reflected in future Annual Implementation reports.

Also, please note that the figures above do not include any additional costs attributed to the Missouri River Recovery Program. For instance, during FY07 an additional \$30M is proposed to cover ESA, Bi-Op compliance, and Master Manual requirements. This amount is not included in the long range cost estimate shown in Table 16 for the Project. If FY07 appropriation and/or authorization language proposals are approved, then the budgetary information above will need to be adjusted to reflect changes in funding and total costs.

**REAL ESTATE (FY08 to completion)**

In June 2003, the SEIS process was completed. With the NEPA documentation complete, the Corps is now able to acquire the additional acres authorized by WRDA99. There are 120,195 acres remaining to be acquired for the Project. If the acquisition program is successful in meeting the FY07 goal of 4,000 acres, then there will be approximately 116,195 acres remaining to be acquired from FY08 to completion.

There are currently 38 mitigation sites established which amount to 46,555 acres in lands. This is an average of 1,225 acres per site. Using this average, the Corps will need to establish approx. 95 new sites from FY08 to completion.

Authority to purchase additional lands is available in all four states. It is anticipated that the concerted effort to inform the public of the Project and the update of the willing seller surveys will produce additional willing sellers over time. Also, during FY08 to completion, the Corps will continue to work with the Agency Coordination Team to identify existing public lands in which mitigation efforts can be implemented.

As willing sellers, both private and public, come forward, acquisitions of their properties will be of top priority. During the next 5 to 10 years, real estate acquisitions will take priority over all other Project activities. If funds are provided, it is estimated that the acquisition effort will last for at least 25 years before enough willing sellers are found. In order to meet the authorized amount of lands to mitigate, an average of 4,650 acres of land will need to be acquired per year from FY08 to FY32.

### **HABITAT DEVELOPMENT (FY08 to completion)**

Provided that annual appropriations continue from FY08 to completion of the Project, the Corps anticipates that an additional 95 sites will be established. Since the Project is estimated to last until FY42, habitat must be developed on approximately three mitigation sites per year to complete the mitigation efforts. From FY08 to completion, modification of existing river structures and excavation of side channels and backwater areas will continue to be a priority for habitat development. Additional opportunities for reconnecting the floodplain with the river will be undertaken at all possible locations. Set back and breaching of existing levees will be undertaken. Vegetative plantings and other land management practices to develop native habitats to terrestrial areas will also continue. Also, the Corps will continue to strive for passive, self-sustaining habitat designs for all habitat types.

### **OPERATION AND MAINTENANCE (FY08 to completion)**

If funds are provided from FY08 to completion of the Project, the Corps of Engineers will be establishing many new mitigation sites. As is current practice, the States will be asked to provide annual management plans in order to receive Federal funds for maintenance of constructed features of the Project. O&M of the mitigation sites will remain 100% Federal funded.

It was estimated in the Cost Report to Congress that the O&M requirements would incrementally increase over time to reach an amount estimated to be \$5 million per year by the time the Project is fully constructed. This amount was estimated based on only passive, self-sustaining habitat areas being constructed by the Project.

## **MONITORING AND EVALUATION (FY08 to completion)**

The SEIS calls for a detailed Monitoring and Evaluation (M&E) effort to be funded by the Project. The M&E effort will be used to support adaptive management of established mitigation sites. Participation of the Agency Coordination Team is considered essential to understanding and agreeing upon adaptive management needed to keep established mitigation sites healthy and productive.

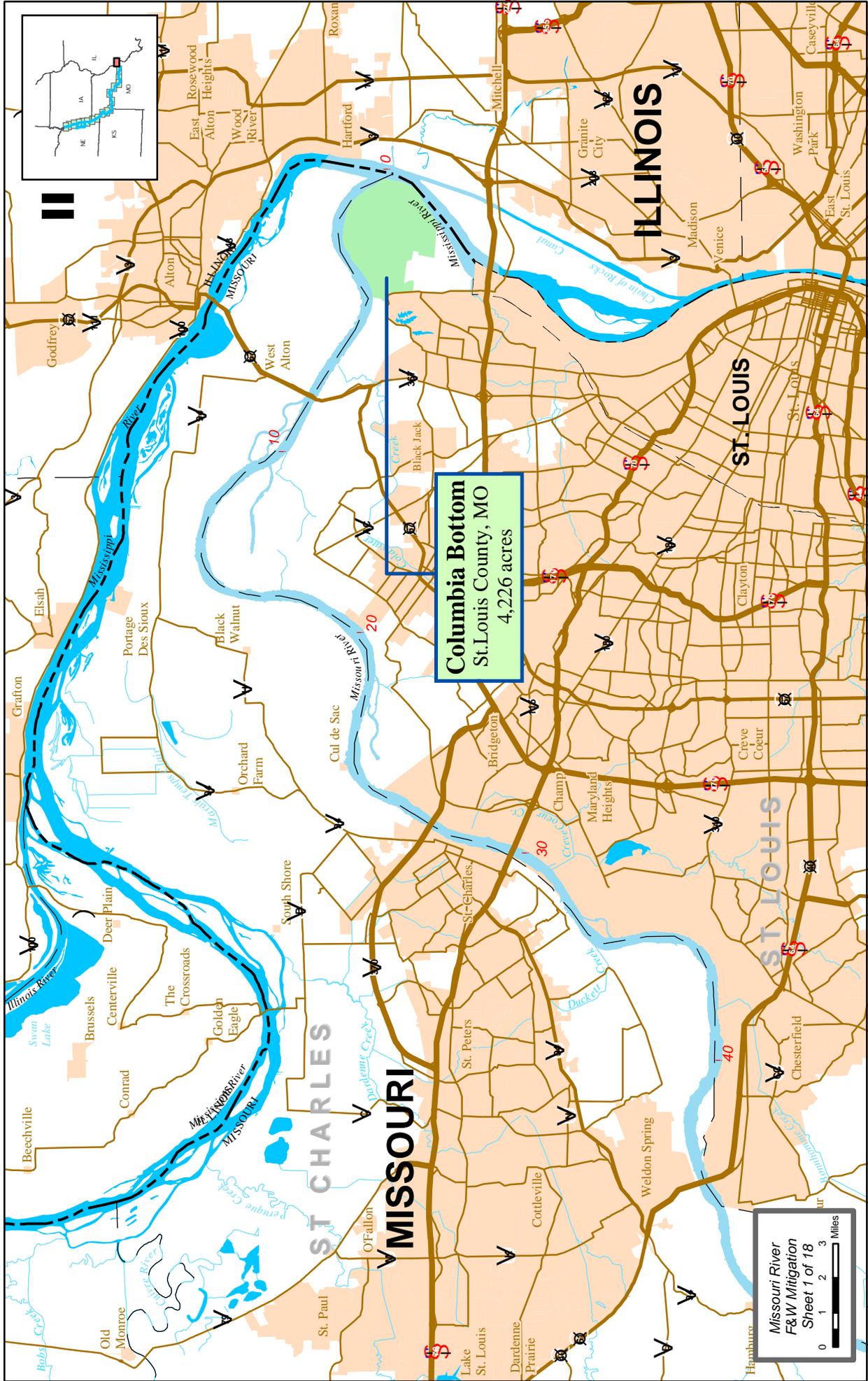
If funds are provided in FY08 to completion, M&E efforts will continue to be based on the entire Missouri River floodplain ecosystem. No one species will be concentrated upon. Rather, a holistic approach must be taken to assure that a portion of the form and function of the river is restored. It was estimated in the Cost Report to Congress that an amount of 6% of the total funds appropriated will be needed to fund M&E activities.

During the planning and design phase of new mitigation sites, the Corps will establish habitat baselines for the sites. Some baseline data may be collected on biologic use of the area. Once habitat development takes place on the site, the Corps will work with the land manager for the individual sites to determine appropriate monitoring efforts needed to be taken to see that the mitigation site is performing as designed. On typical sites, monitoring will be limited to measuring the physical changes of the habitats over time. On selected sites, monitoring of biologic response, such as fish or bird usage will be measured. Monitoring results will be collected at some sites on an annual basis and less frequently at others. Results of monitoring efforts will be posted to the Project website and summarized in future Annual Implementation Reports.



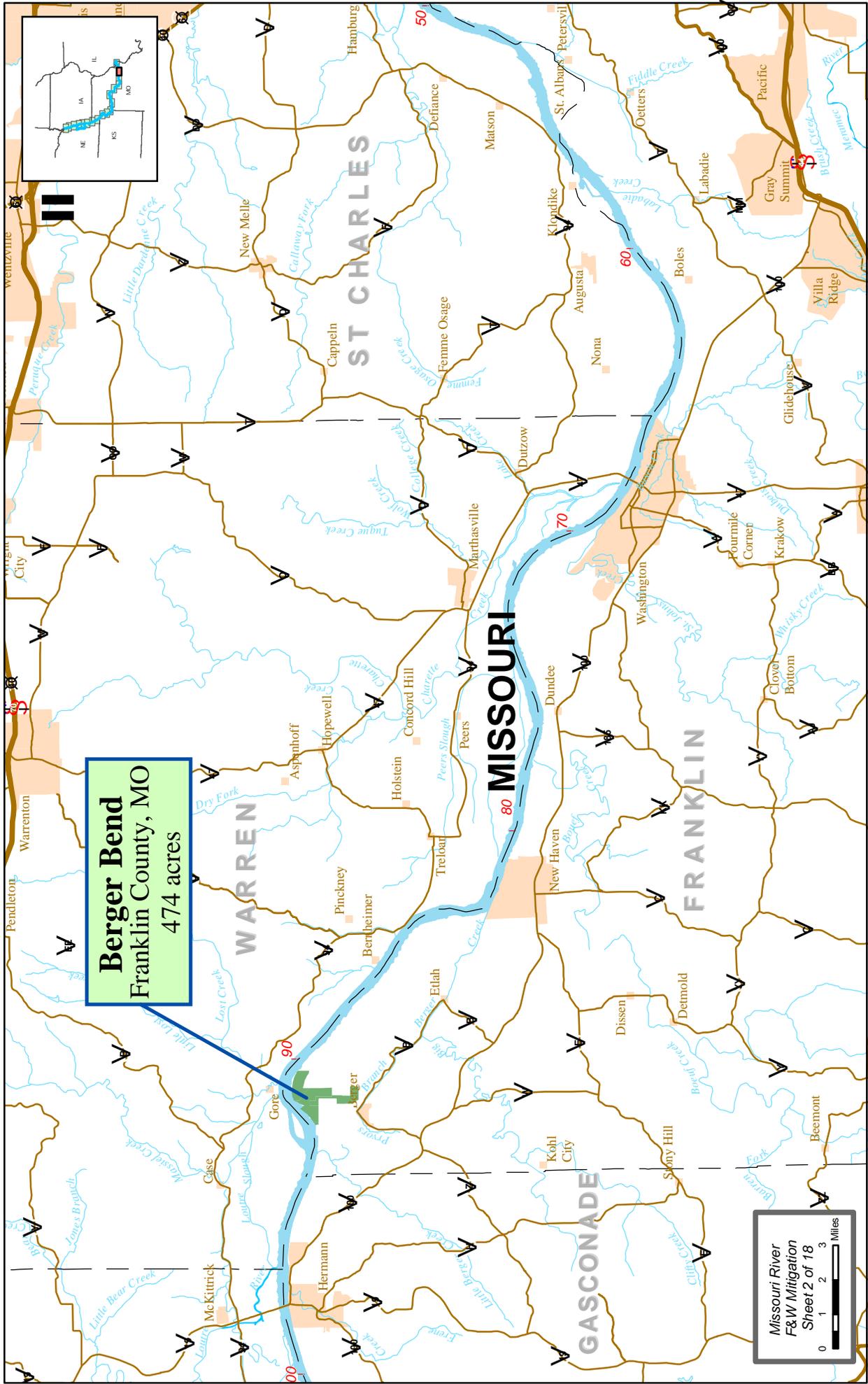
**APPENDIX 1**  
**SITE LOCATION MAPS**





**Columbia Bottom**  
St. Louis County, MO  
4,226 acres

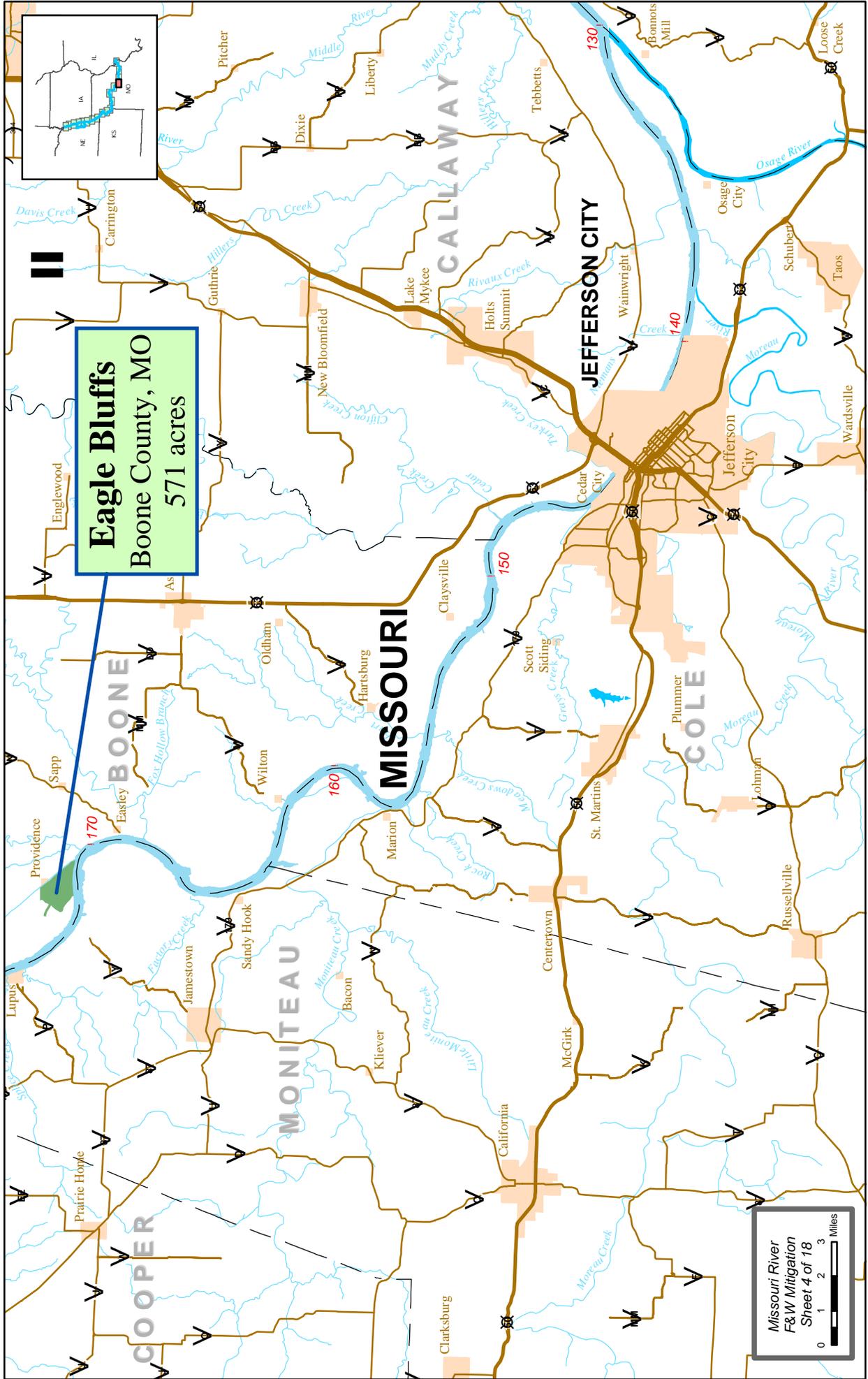
Missouri River  
F&W Mitigation  
Sheet 1 of 18  
0 1 2 3 Miles



**Berger Bend**  
Franklin County, MO  
474 acres

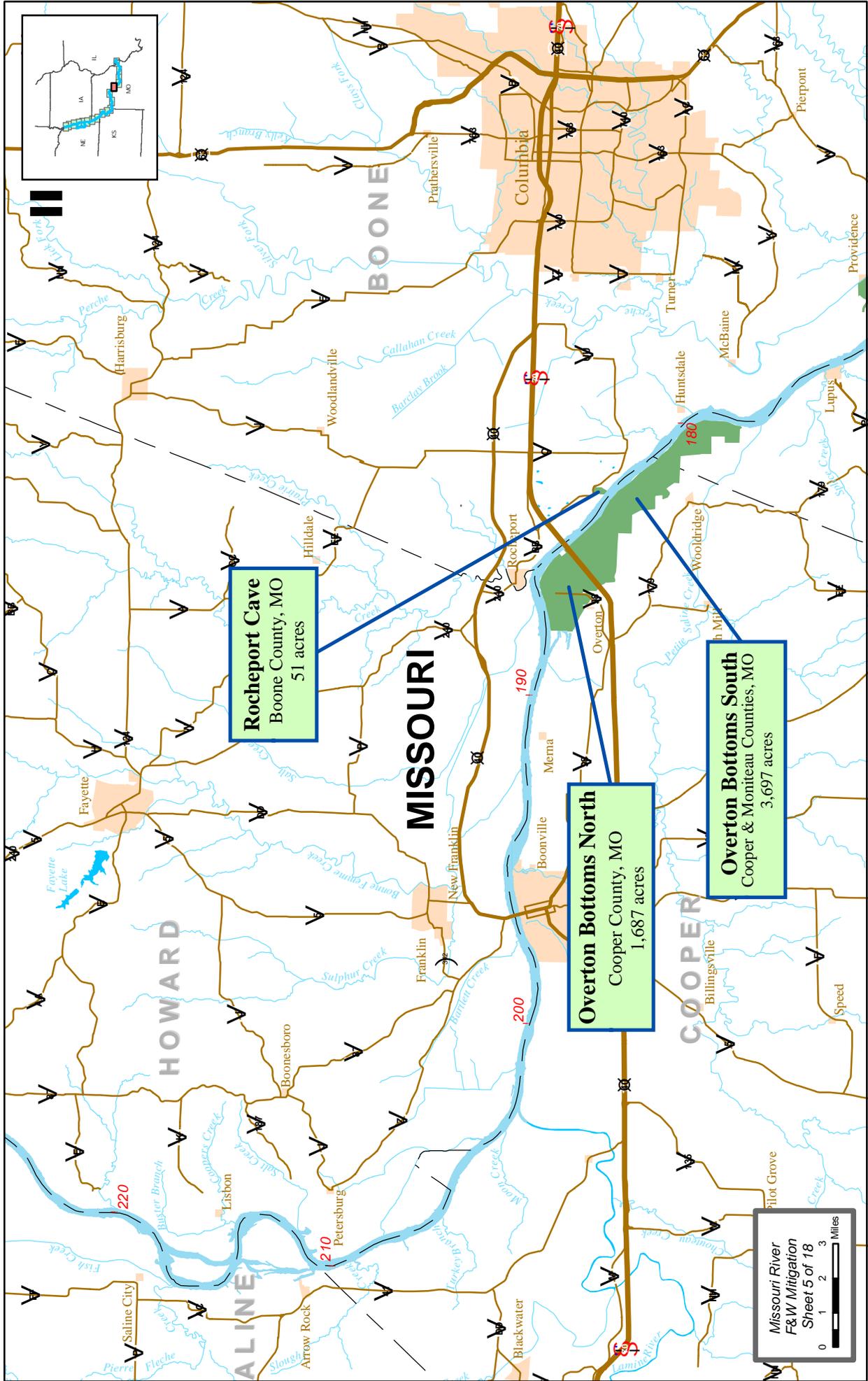
Missouri River  
F&W Mitigation  
Sheet 2 of 18  
0 1 2 3  
Miles





**Eagle Bluffs**  
Boone County, MO  
571 acres

Missouri River  
F&W Mitigation  
Sheet 4 of 18  
0 1 2 3 Miles



**Rocheport Cave**  
Boone County, MO  
51 acres

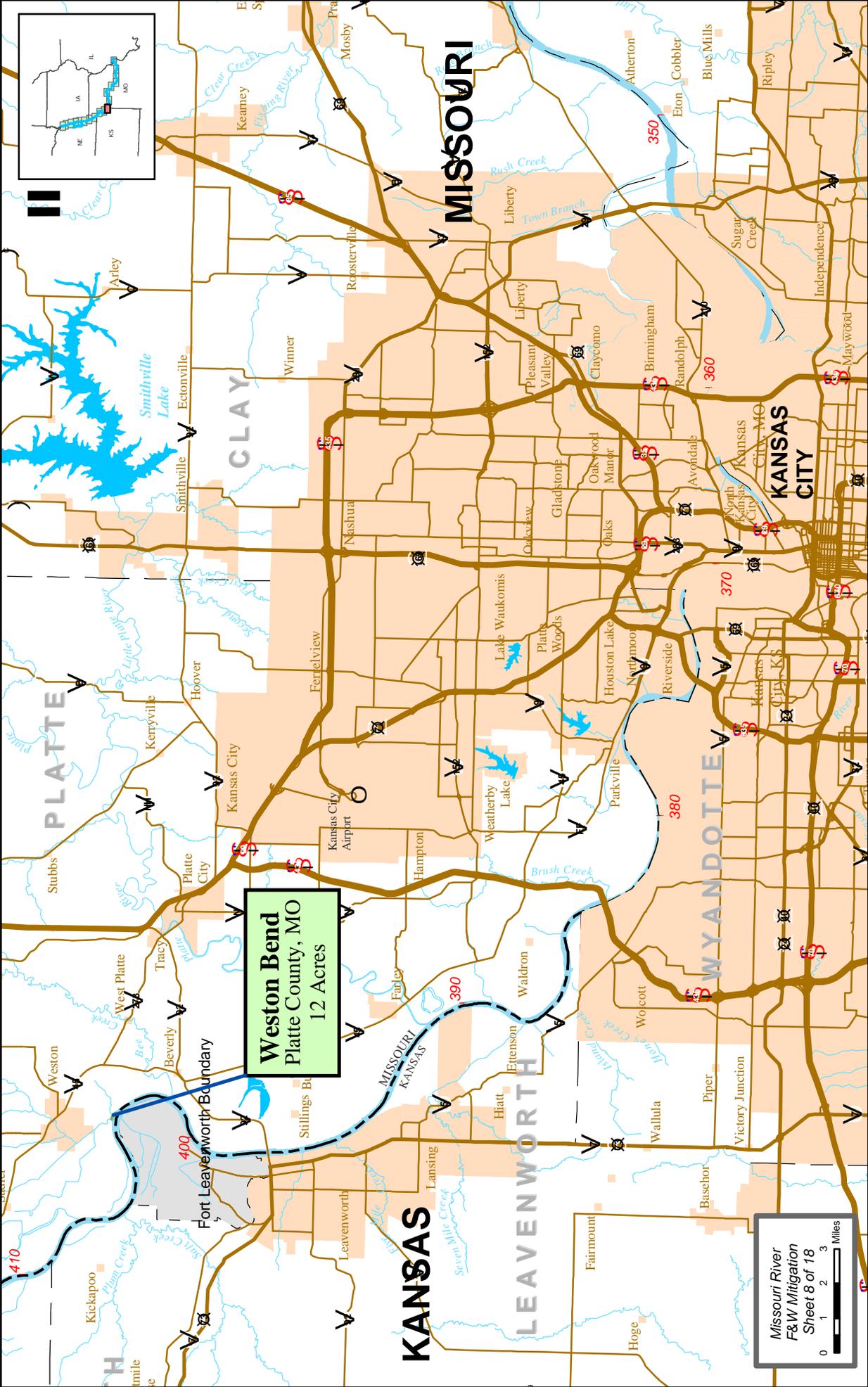
**Overton Bottoms North**  
Cooper County, MO  
1,687 acres

**Overton Bottoms South**  
Cooper & Moniteau Counties, MO  
3,697 acres

Missouri River  
F&W Mitigation  
Sheet 5 of 18  
0 1 2 3  
Miles

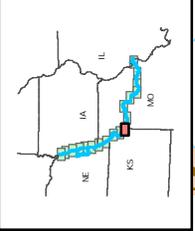


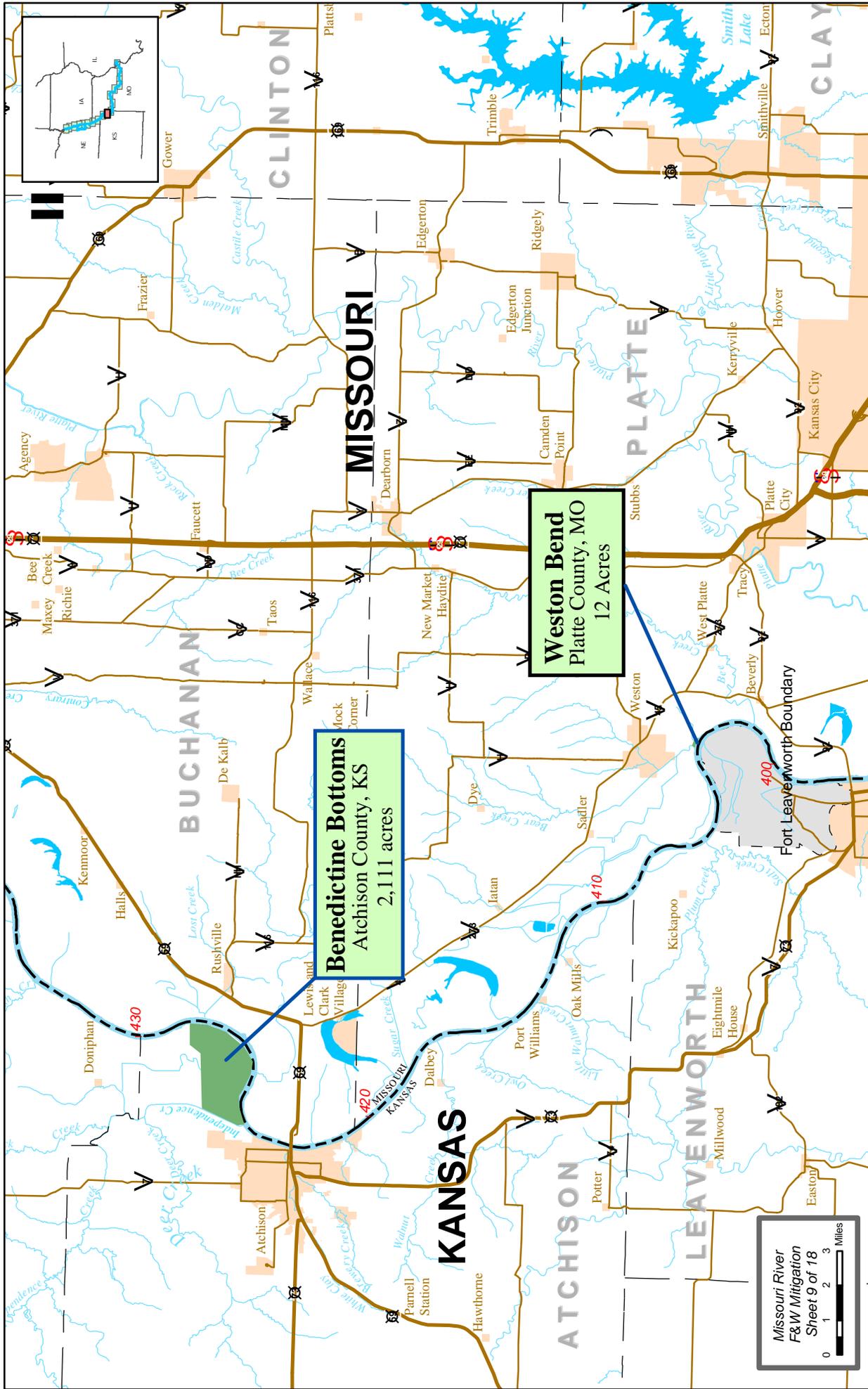




**Weston Bend**  
Platte County, MO  
12 Acres

Missouri River  
F&W Mitigation  
Sheet 8 of 18  
0 1 2 3  
Miles

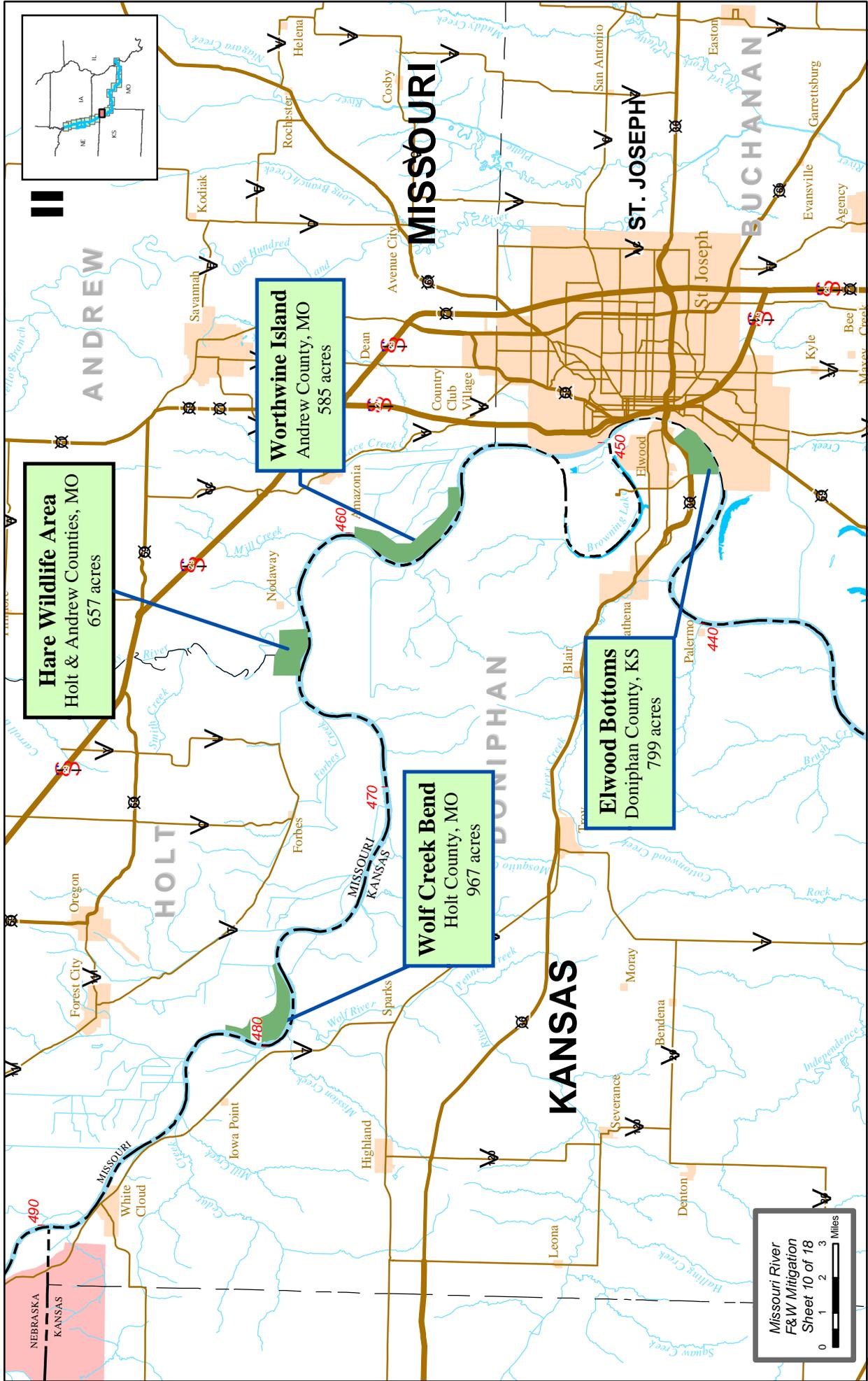


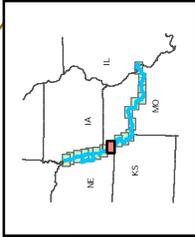
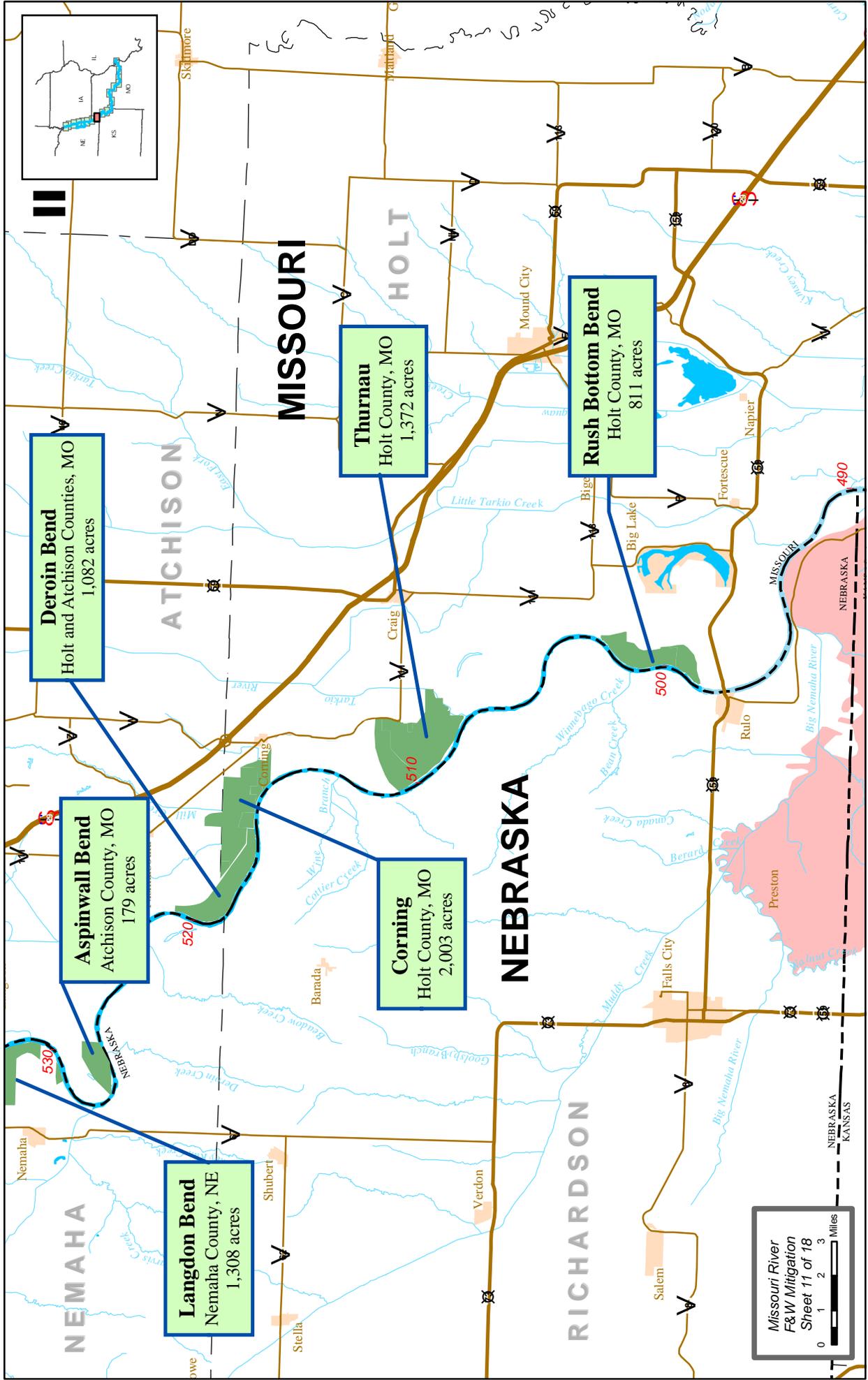


**Benedictine Bottoms**  
Atchison County, KS  
2,111 acres

**Weston Bend**  
Platte County, MO  
12 Acres

Missouri River  
F&W Mitigation  
Sheet 9 of 18



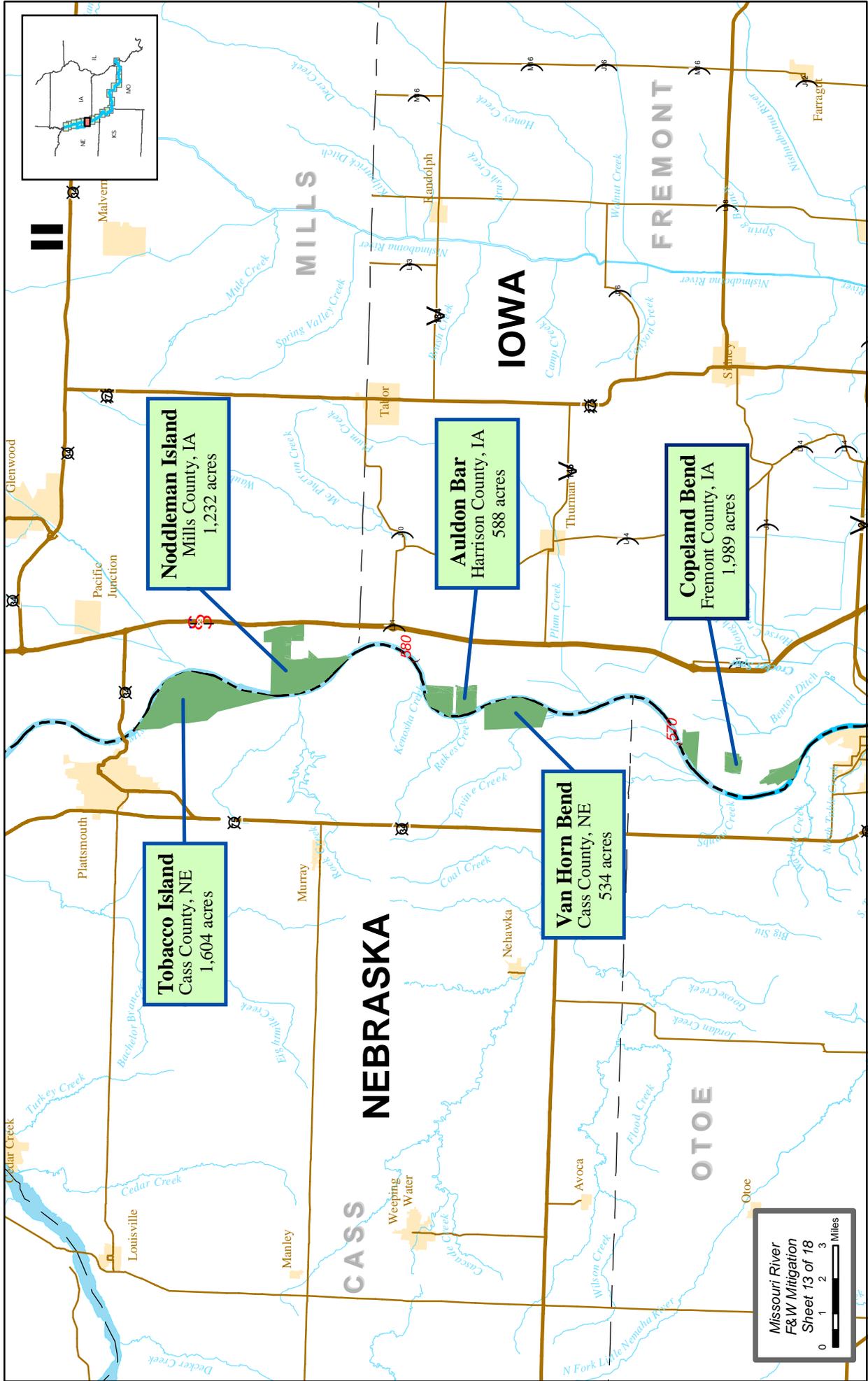


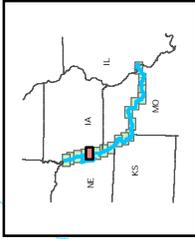
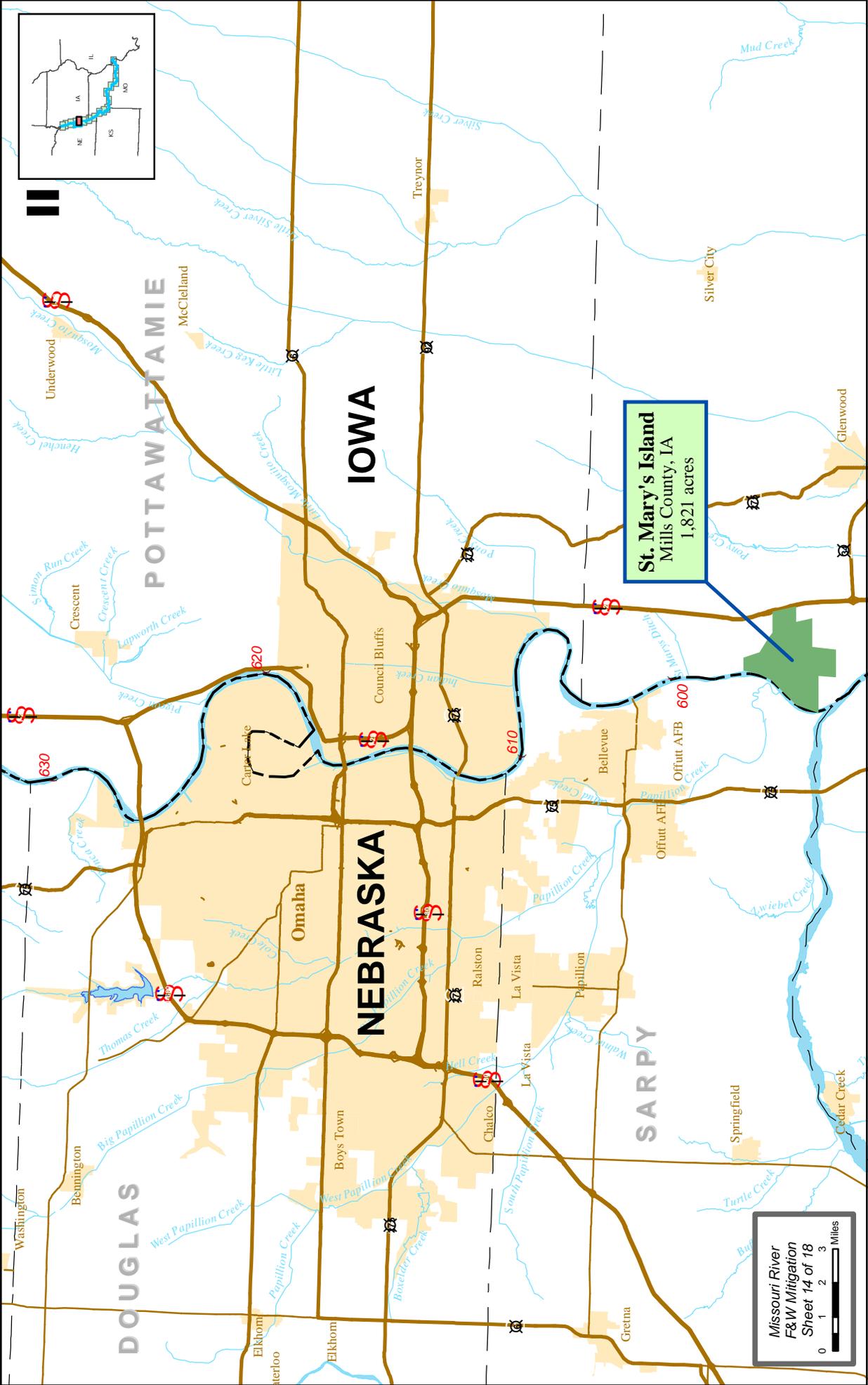
II

Missouri River  
F&W Mitigation  
Sheet 11 of 18

0 1 2 3 Miles



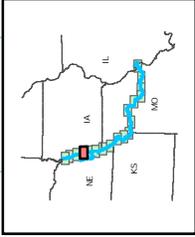
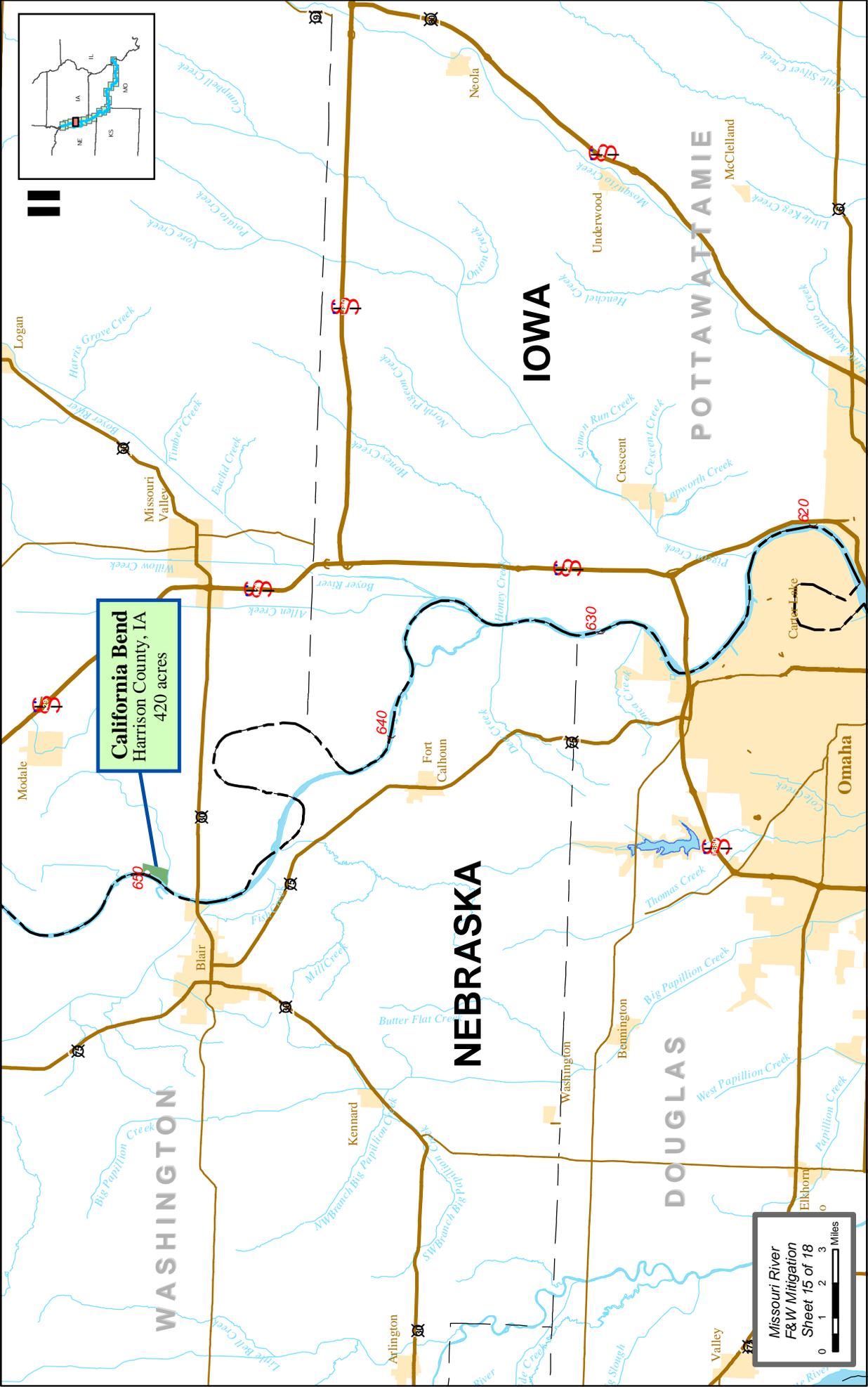




II

**St. Mary's Island**  
 Mills County, IA  
 1,821 acres

Missouri River  
 F&W Mitigation  
 Sheet 14 of 18  
 0 1 2 3 Miles

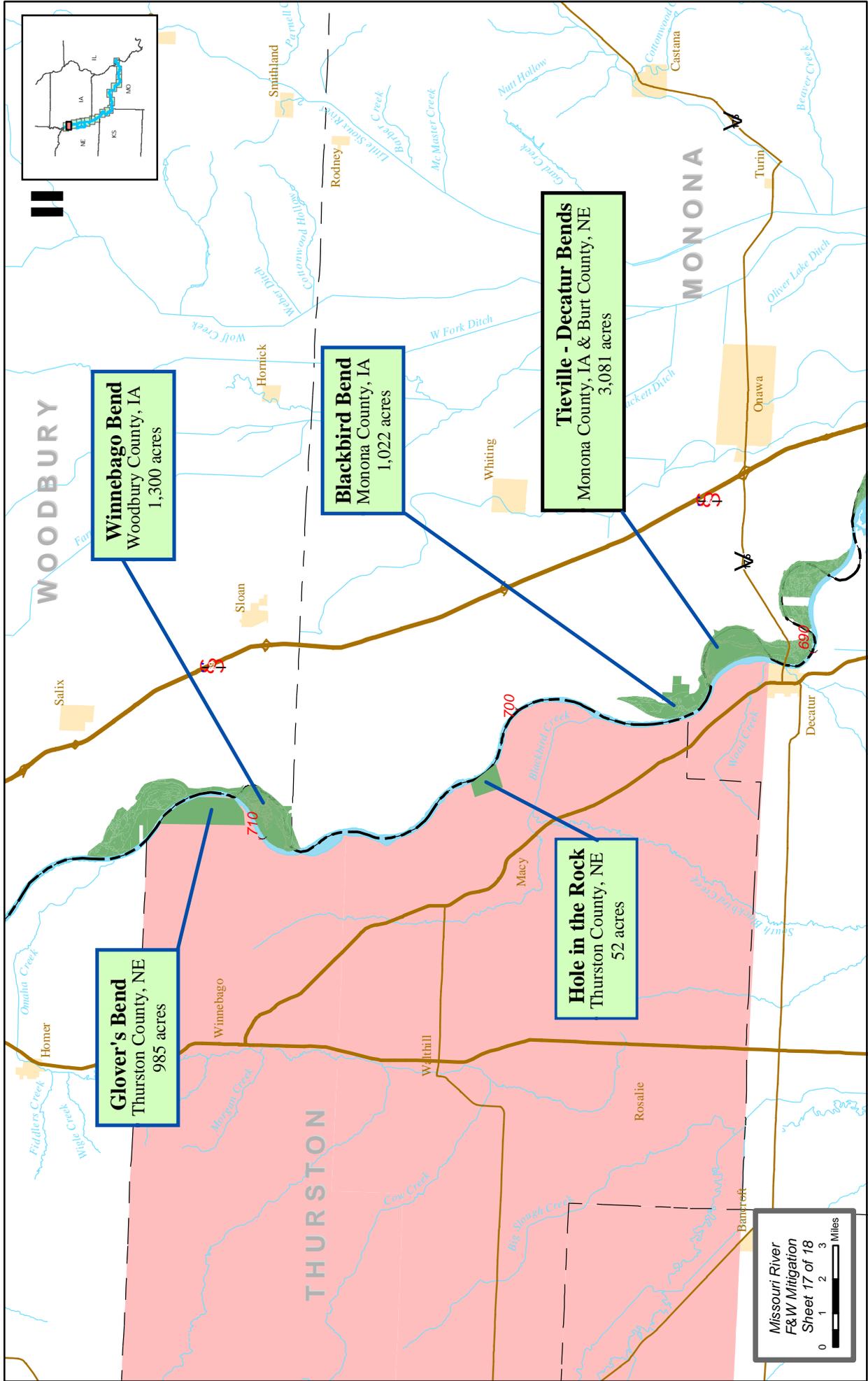


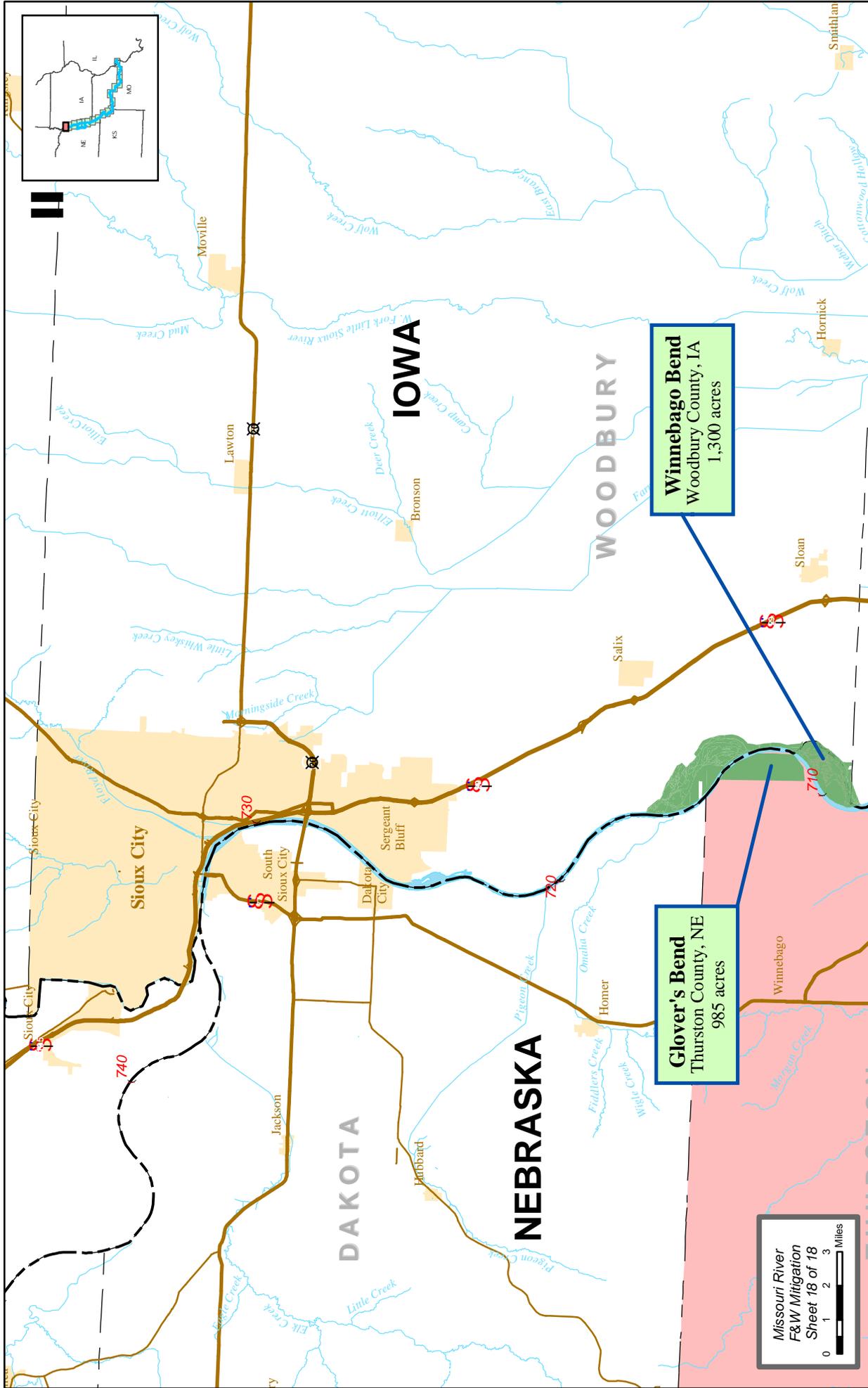
**California Bend**  
Harrison County, IA  
420 acres

Missouri River  
F&W Mitigation  
Sheet 15 of 18

0 1 2 3 Miles







**Winnebago Bend**  
Woodbury County, IA  
1,300 acres

**Glover's Bend**  
Thurston County, NE  
985 acres

Missouri River  
F&W Mitigation  
Sheet 18 of 18  
0 1 2 3 Miles

**APPENDIX 2**  
**DETAILED SITE DESCRIPTIONS/INFORMATION PAPERS**





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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Columbia Bottom, MO



*Aerial view of the wooded island and chute, 2004*

### Contact

Don Meier, Site Project Manager  
Email: donald.h.meier@usace.army.mil  
Phone: 816-389-3121

### Location

2.5 miles north of the I-270 Riverview Drive exit, in north St. Louis County, Missouri at the Columbia Bottom Conservation Area (CBCA).

### Description

The CBCA is existing public land owned and operated by the Missouri Department of Conservation (MDC). CBCA is approximately 4,226 acres in size. The site is on the right descending bank of the Missouri River, at the confluence with the Mississippi River.

The land at the Columbia Bottom mitigation site was previously farmed. The area is being improved so that wetlands, native grasses, and bottomland hardwood forest habitats can be restored to the area. Due to the size of the site, the mitigation is taking place in three phases.

Phase I has been completed. Phase I consisted of setback of an existing agricultural levee. The setback moved an existing levee approximately 800 feet from the Mississippi River bank to create additional land on the riverside of the levee. The setback allows floodwaters to spread out onto the floodplain creating excellent feeding areas for fish. The additional land on the riverside of the levee will be planted with bottomland hardwood habitat.

Phase II of the mitigation project is now complete. This work included development of approx. 800 acres of wetlands by construction of 15 low dikes, a pump station, and a water delivery system. Phase II has allowed development of high quality migratory waterfowl habitat. Construction of Phase II was completed in the fall of 2006. A dedication ceremony for the site is scheduled for April 11, 2007.

Phase III is also underway. This work includes native vegetative plantings which converts existing cultivated areas to forest and grassland habitats. MDC manages the site. The area is available to the public for a variety of outdoor activities including bird watching, hiking and fishing.



*View of completed pump station, 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Berger Bend, MO



*At the left of this photo is the bank line of the Berger Bend mitigation site, May 2004*

### Contact

Dave Hibbs, Project Biologist  
Email: [david.r.hibbs@usace.army.mil](mailto:david.r.hibbs@usace.army.mil)  
Phone: 816-389-3136

### Location

6 miles east of Hermann in Franklin County,  
Missouri.

### Description

The Berger Bend mitigation site is approximately 474 acres in size. The area is adjacent to the right descending bank of the Missouri River at river miles 93 to 90.

The lands at the Berger Bend mitigation site were purchased by the Corps of Engineers from willing sellers from 1995 through 1998. The lands were in cultivation, but were heavily damaged by sands carried by the 1993 flood. The lands include approximately 60 acres of land that is enrolled in the NRCS Wetland Reserve Program.

Since the time of purchase, the Corps has been leasing portions of the land for agricultural production. This practice has allowed the area to remain open while additional surrounding areas were acquired. Unfortunately, additional willing sellers have not come forward at this site.

In 2004, the lands began to be fully removed from agricultural production. The formerly cultivated areas will be planted with native trees. The area also has valuable scour hole and forested wetland habitats outside the existing levee that are being maintained by the Corps.

### Current Status

The Berger Bend area will be turned over to the Missouri Department of Conservation once boundary surveys are completed so that they may manage the lands. The mitigation site is now open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*View of Berger Bend area, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Tate Island, MO



*1995 aerial photo of Tate Island mitigation site  
(USGS image from Microsoft TerraServer)*

### Contact

Glenn Covington, Project Biologist  
Email: [William.g.covington@usace.army.mil](mailto:William.g.covington@usace.army.mil)  
Phone: 816-389-3141

### Location

Two miles east of the city of Portland, in Callaway and Montgomery Counties, Missouri.

### Description

This mitigation site is 422 acres in size. It is located at river miles 113 to 110 on the left descending bank of the Missouri river near the Morrison Bend. The site contains 4 islands separated by a braided side channel.

Tate Island was purchased from a private willing seller in 1998. The site has no existing structures, roads, or buildings. The island has seen little historic use and therefore is relatively undisturbed native habitat. The site contains excellent shallow water, island sandbar complex, and bottomland hardwood areas.

The islands are made up of forested and scrub-shrub wetlands. The dominant tree species is the Cottonwood. Entering the side channel from the

landside are Tavern and Little Tavern Creeks. This interaction of the side channels with the tributary creeks makes this mitigation site a unique area along the river.

### Current Status

No construction is planned for the site at this time, however opportunities to complete shoreline and/or within river improvements to increase and diversify the riverine habitats at this site may be undertaken in the future. The Corps of Engineers will continue to maintain and operate the river dikes at this location to keep the braided side channels open and active. Land management of the site is being performed by the Missouri Department of Conservation.



*Aerial view at timbered islands, May 04*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Eagle Bluffs, MO



*View of the Sapp Tract wetland development Oct 06*

### Contact

David Hibbs, Project Biologist

Email: [David.R.Hibbs@usace.army.mil](mailto:David.R.Hibbs@usace.army.mil)

Phone: 816-389-3136

### Location

6 miles southwest of Columbia in Boone County, Missouri at the Eagle Bluffs Conservation Area (EBCA).

### Description

The EBCA is existing public lands owned and operated by the Missouri Department of Conservation (MDC). It is approximately 4,269 acres in size. The area is bounded by the Missouri River to the west and south and Perche Creek to the East. The EBCA is currently managed for the benefit of a variety of game and non-game species. Habitat components of the EBCA include seasonally flooded wetlands, riparian woodlands, and river-bluff forest.

In 2000, MDC granted the Corps of Engineers a permanent easement to the lower 571 acres at EBCA, known as the Sapp Tract. The Corps worked with MDC to design and construct two new wetland cells to compliment the other wetlands at the site. The wetland pools were constructed in 2001 to 2002. They feature “fish friendly” water control structures specifically constructed to allow fish to enter the wetland areas during high spring flows. While in the wetland cells, the fish can feed and spawn and then safely return to the river. The wetland cells have been turned over to MDC for their management. In 2004, the Corps completed modifications to the river structures along the banks at the EBCA to improve shallow water habitat, riverine diversity.

### Current Status

The Corps is currently working with MDC on another tract to develop managed wetlands within EBCA. This will be the McBaine tract and will include two wetland cells totaling about 200 acres in size. Construction is planned for 2007. EBCA is available to the public for a variety of outdoor activities including bird watching, fishing, hiking, and hunting when in season.



*View of the future McBaine Wetland site, Oct 06*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Rocheport Cave, MO



*View of the cave gate at the Rocheport Cave mitigation site.*

### Contact

Glenn Covington, Project Biologist  
Email: [William.G.Covington@usace.army.mil](mailto:William.G.Covington@usace.army.mil)  
Phone: 816-389-3141

### Location

20 miles southwest of Columbia in Boone County, Missouri

### Description

This site is located up a side drainage on the left descending bank at Missouri River mile 183. In 1996, the Missouri Department of Conservation (MDC) purchased the opening of this cave and 51 surrounding acres to enhance hibernation, nursery and migratory habitat for the federally endangered Indiana and Grey bats. The endangered Grey bat traditionally used this cave, created by erosive forces of Sinking Creek, as both a wintering hibernation spot and day roost site from which it left to forage over the adjacent Missouri River floodplain.

Recognizing that restricting visitors' access to the cave's interior is paramount to preserving the bats, various proposals to restrict access to the interior of the cave were considered. The most viable option for increased bat use while allowing limited public access to the scenic area was constructing a metal gate across the entrance to the cave.

A joint project was undertaken with MDC, Corps and the American Cave Association to construct the project in the summer of 2002. The cave gate was constructed to allow safe passage of the bats through a 'window' at the top of the gate while restricting any human trespass into the cave's interior.

### Current Status

During the summer of 2004, a large rainfall washed large logs and debris through sinking creek. The debris stacked up against the gate with such force that the gate sustained considerable damage. While the gate in its current condition still functions to prevent human access, repairs are needed. These repairs will be undertaken in 2007. Until the repairs are made, the area will remain closed to the public.



*View of the metal gate being constructed across the entrance to Rocheport Cave.*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Overton Bottoms South, MO



*Example of the some of the bankline changes for increased riverine habitat, May 2004*

### Contact

Bob Dimmit, Site Project Manager  
Email: [robert.g.dimmit@usace.army.mil](mailto:robert.g.dimmit@usace.army.mil)  
Phone: 816-389-3468

### Location

14 miles West of Columbia in Cooper and Moniteau Counties, Missouri.

### Description

The Overton Bottoms South (OBS) mitigation site is located on the right descending bank of the Missouri River at river miles 185 to 178. Located directly to the north of OBS is the Overton North mitigation site.

The OBS site consists of 3,697 acres of land purchased from private willing sellers by the Corps of Engineers from 1994 through 2006. The lands were primarily used for cultivation, but the site did contain approximately 500 acres of bottomland forest that is being preserved along the river corridor.

In 2002 to 2003, the Corps constructed a set back levee at OBS. The new levee is approximately 1000 feet landward (away from the river's edge) from the existing levee. The existing levee will be breached in 2007, allowing high water to cross out over the increased floodplain at this site. Borrow areas for the new levee were excavated so that opportunistic wetlands will form. Also, extensive river bank modifications have been completed by the Corps at OBS. The riverine diversity will improve shallow water habitats for native big river fishes and shore birds.

### Current Status

The construction of the Tadpole Island chute project was completed in 2006 and will continue to develop over time. The shallow water habitat improvements will continue to erode and form over the next few more years. The area has been turned over to the Missouri Department of Conservation (MDC) for operation and management of the constructed features. Additional interior drainage modifications are currently being studied to allow for additional wetland development. The area is open to the public for a variety of outdoor activities including bird watching, hiking, fishing, and hunting when in season.



*Tadpole Island Chute Project, Oct 2006.*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Overton Bottoms North, MO



*Outlet of the Overton North chute, Oct 2006.*

### Contact

Bob Dimmit, Site Project Manager  
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Phone: 816-389-3468

### Location

14 miles West of Columbia in Cooper County,  
Missouri.

### Description

The Overton Bottoms North (OBN) mitigation site is located on the right descending bank of the Missouri River at river miles 188 to 185. The site is bounded on the south by Interstate 70. Located directly across the interstate is the Overton South mitigation site, and across the river is the Diana Bend Conservation Area.

The OBN site consists of 1,687 acres of land purchased from private willing sellers by both the Corps of Engineers and US Fish and Wildlife Service (USFWS). With implementation of the mitigation at this site, former agricultural lands have been taken out of production and native grasses and trees have been planted.

In 2001, the Corps constructed a chute at the OBN site. The chute was approximately 40 feet wide and only passed flows during high river stages. In 2003, the Corps widened the chute to 70 feet and deepened the entire length so that the chute now has water all year long. Also at this site, the Corps modified the dike structures in 2003-2004 within the Missouri River to create shallow water habitat opportunities for native big river fishes.

### Current Status

The OBN mitigation site has been turned over to the USFWS to manage as part of the Big Muddy National Wildlife Refuge. The USFWS has implemented low maintenance operation plans for the area and plans to let the land recover to pre-agricultural conditions on its own. The Corps and USFWS will continue monitoring the chute and other habitats at the site to assure their development. OBN is available to the public for a variety of outdoor activities including hiking, fishing, bird watching, and hunting when in season.



*Shallow water riverine habitat within the dike field along the banks of the mitigation site, Oct 2006.*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Cambridge Bend, MO



*Open lands and riparian timber recently purchased at the Cambridge Bend mitigation site, Oct 2006*

The lands at the Cambridge Bend mitigation site were purchased by the Corps of Engineers from a private willing seller in 2006. The lands have been in cultivation for an extended period. Because the lands were very recently purchased, they will continue to be farmed in the short term while additional acquisition and mitigation plans are made.

### Current Status

In 2007, the Corps hopes to turn over the lands at this site to the Missouri Department of Conservation so that they may perform short term management on the area while environmental assessments and designs on the lands can be completed.

### Contact

Karl Mueller, Real Estate Leader  
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Phone: 816-389-3764

### Location

4 miles west of Glasgow in Chariton County, Missouri.

The Cambridge Bend mitigation site is currently approximately 168 acres in size. The area is adjacent to the left descending bank of the Missouri River at river miles 232 to 230. The site is riverward of Federal Levee Unit, Chariton River Main Stem Levee.



*Open lands and riparian timber recently purchased at the Cambridge Bend mitigation site, Oct 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Grand Pass, MO



*Looking downstream at the restored chute*

### Contact

Glenn Covington, Project Biologist  
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Phone: 816-389-3141

### Location

7 miles northwest of Marshall in Saline County, Missouri at the Grand Pass Conservation Area (GPCA).

### Description

GPCA is existing public land owned and operated by the Missouri Department of Conservation (MDC). GPCA is approximately 5,100 acres in size. The area is adjacent to the right descending bank of the Missouri River at river miles 273 to 266.

Along the banks of the GPCA, the Corps of Engineers has installed numerous river structures and miles of revetments. This work included a closure structure near river mile 271 that was installed to keep flows out of a small chute that was located there. In 1991, the Corps of Engineers

worked with MDC on re-opening this chute. The closure structure was modified and the filled in chute was excavated and dredged so that the river flow could return to the chute. In addition to re-opening the chute, the Corps installed brush piles and rock hard points to increase the diversity within the chute. The restored chute is now approximately 50 feet wide and the restoration has returned approximately 35 acres of riverine and forested wetland habitats to the area. In 2004, the Corps completed modifications to the river structures along the banks at the GPCA to improve shallow water habitat, riverine diversity.

### Current Status

MDC operates and manages the lands at GPCA around the restored chute. The Corps maintains the river structures at this location to assure the side channel and bank notches continue to provide shallow and slow moving water for native big river fishes. The GPCA is open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



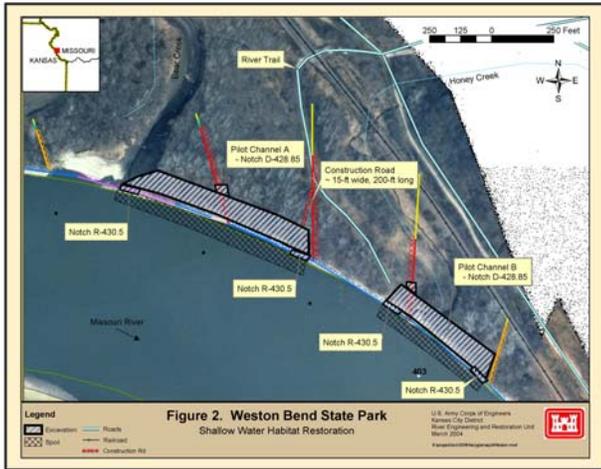
*View of shallow water habitat created by restoration of the Grand Pass chute and bank notches, Oct 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Weston Bend, MO



*Diagram of the work completed at the Weston Bend State Park in July, 2004*

### Contact

Mike Chapman, Civil Engineer  
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Phone: 816-389-3310

### Location

One mile south of Weston, in Platte County, Missouri.

### Description

This mitigation site is located within the Missouri River along the bank of the Weston Bend State Park. Two pilot channels were constructed in the existing river structures in the spring of 2004. These modifications were completed to increase the diversity of the riverine habitat at this location for a wide variety of fish, including the endangered pallid sturgeon. The increase in shoreline will also benefit native shore birds and amphibians.

The mitigation work at Weston Bend created approximately 5 acres of riverine habitat but will vary over time, hopefully growing to a full 12-acre site. It is located at river mile 403 on the left descending bank of the Missouri River.

### Current Status

The Weston Bend State Park is owned and operated by the Missouri Department of Natural Resources (MDNR). MDNR maintains the park features at the site. The Corps will maintain the river structures at this location to assure adequate flows remain in the main river channel while the riverine habitat forms. Meanwhile, the site is available to the public for a variety of outdoor activities including picnicking, site seeing, bird and wildlife watching.



*Shallow water riverine habitat; revetment and bank notches, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Worthwine Island, MO



*Restored side channel (downstream) and bank notches at the Worthwine Island mitigation site, Oct 2006*

### Contact

Chance Bitner, Site Project Engineer  
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Phone: 816-389-3482

### Location

6 miles Northwest of St. Joseph in Andrew County, Missouri, on the left descending bank of the Missouri River, at river miles 460 to 456.

### Description

This mitigation site is located at the Worthwine Island Conservation Area (WICA), 585 acres of existing public land owned and operated by the Missouri Department of Conservation (MDC). The area is adjacent to Federal Levee Unit No. L-476. A side channel at the Worthwine Island site was closed during construction of the Missouri River Bank Stabilization and Navigation Project.

During 2005 and 2006, the Corps of Engineers restored flow through the side channel by constructing a 75-foot wide pilot channel. The project was designed and constructed to allow the river to scour out the historic chute to a full 200-foot width over time, creating approximately 45 acres of high quality riverine habitat. The spoil material excavated from the pilot channel was used to create a stability berm on the land side of the adjacent Federal levee. In 2004 and 2005, the Corps completed modifications to the river structures (bank notches) along the banks at the WICA to improve shallow water habitat, riverine diversity.

MDC operates and manages the lands at WICA around the restored chute. The Corps maintains the river structures at this location to assure the side channel and bank notches continue to provide shallow and slow moving water for native big river fishes. The WICA is open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*Restored side channel (upstream) and bank notches at the Worthwine Island mitigation site, Oct 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Jim and Olivia Hare Wildlife Area, MO



*Riverine habitat created in 2004/2005 by modifying existing river structures along the banks, Oct. 2006*

### Contact

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Phone: 816-389-3136

### Location

Two miles west of Nodaway, Missouri, river miles 466 to 464 at the Dallas Bends of the Missouri River.

### Description

This mitigation site is 657 acres in size. The site was purchased from willing sellers in 2003. The site is in the river bottom adjacent to the Missouri Department of Conservation's (MDC) Monkey Mountain Conservation Area.

The river bottom at this site has been in agricultural production for many years. Through Cooperative Agreement with MDC, the lands are being slowly converted to grassland and bottom land forest habitats. The site will make a great compliment to the adjacent Monkey Mountain Conservation Area, allowing wildlife to move from the upland woods down across the river bottom to the Missouri River.

In 2004 and 2005, the Corps of Engineers completed several modifications to the existing river structures along the banks of this site. The modifications eroded some of the bank, allowing the river to widen in this area. The resulting shallow, slow moving water provides more diversity within the river for big river native fishes. The Corps, MDC and US Fish and Wildlife Service will be completing a Project Implementation Report for the site during 2007. An Environmental Assessment of the site will then be performed followed by additional projects needed to convert the area to fish and wildlife habitats.

### Current Status

Conversion of the lands to native land covers is underway. Access to the site is limited due to an adjacent railroad separating the site from the Monkey Mountain CA. MDC has constructed a parking lot in the northwest corner of the area between the railroad and county road to assure safe access for the general public. The site is open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*Riverine habitat created in 2004/2005 by modifying existing river structures along the banks, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Wolf Creek Bend, MO



*Riverine habitat created (in progress) by modifying existing river structures along the banks, Oct. 2006*

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### Location

6 miles south of Oregon in Holt County, Missouri.

### Description

The Wolf Creek Bend mitigation site is approximately 967 acres in size. The area is adjacent to the left descending bank of the Missouri River at river miles 482 to 477. Federal Levee Unit No. L-497 is located on the north, landward side of the site. At the downstream end, the site joins the existing Payne's landing river access owned by the Missouri Department of Conservation. According to maps, it is also believed that Lewis and Clark camped on the area on July 9, 1804.

The lands at the Wolf Creek Bend mitigation site were purchased by the Corps of Engineers from private willing sellers in 2004 and 2006. Although outside of the flood protection, the lands have been in cultivation for an extended period. Because the lands were very recently purchased, they will continue to be farmed in the short term. The Corps, MDC and US Fish and Wildlife Service will be completing a Project Implementation Report for the site during 2007. An Environmental Assessment of the site will then be performed followed by additional projects needed to convert the area to fish and wildlife habitats. In 2006, the Corps completed modifications to the river structures (bank and revetment notches) along the banks at this mitigation site to improve shallow water habitat, riverine diversity.

### Current Status

The area has been turned over to the Missouri Department of Conservation so that they may perform short term management on the area while environmental assessments and designs on the lands can be completed. The site is open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*Riverine habitat created by modifying existing river structures along the banks, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Rush Bottom Bend, MO



*Looking north along the constructed chute alignment at the Rush Bottom Bend site, Oct 2006*

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### Location

8 miles west of Mound City in Holt County, Missouri.

### Description

The Rush Bottom Bend mitigation site is currently 811 acres in size. The lands are adjacent to the left descending bank of the Missouri River at river miles 502 to 499. The Corps of Engineers purchased the lands at the mitigation site from willing sellers in 1996 through 1999.

The Rush Bottom Bend lands have been turned over to the Missouri Department of Conservation (MDC) for management and operations. Through the annual management plan process, MDC has planted native grasses and trees.

In the Fall of 2006, the Corps began a new side channel construction project on the site. The Rush Bottom Bend chute will be approximately 1.4 miles long at completion and will eventually erode to a maximum of 200 feet wide, creating approximately 33 acres of high quality riverine habitat. The riverine diversity will improve shallow water habitats for native big river fishes and shore birds. Through a Cooperative Agreement with MDC, the remaining lands are being slowly converted to grassland, wetland and bottom land forest habitats. Several fields will be left in agricultural production to serve as food plots and rotated with fallow fields to serve as early successional herbaceous tracts.

### Current Status

The chute construction project should continue through the summer of 2007. The area has been turned over to the Missouri Department of Conservation (MDC) for operation and management, as well as long term habitat development. The area is open to the public for a variety of uses including bird watching, hiking, fishing and hunting when in season.



*Looking south along the constructed chute alignment at the Rush Bottom Bend site, Oct 2006*



# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Thurnau, MO



*View of Thurnau site as it lies adjacent to the Tarkio River, May 2004*

### Contact

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Phone: 816-389-3136

### Location

3 miles west of Craig in Holt County, Missouri.

### Description

The Thurnau mitigation site is currently 1,372 acres in size. The lands are on the left descending bank of the Missouri River at river miles 512 to 508. The Corps of Engineers purchased the lands at the Thurnau mitigation site from willing sellers in 1999 through 2001.

The Corps lands are adjacent to 400 acres at the Thurnau Conservation Area that is owned and operated by the Missouri Department of Conservation (MDC). The properties are adjacent to the mouth of the Tarkio River. The Corps lands have been turned over to the MDC for management

while additional acquisitions are attempted to round out the site. The Corps also is attempting to obtain permanent easement to the MDC lands.

Through a Cooperative Agreement with MDC, native grasses and trees have been planted on the site, the remaining lands are being slowly converted to grassland, wetland and bottom land forest habitats. Several fields will be left in agricultural production to serve as food plots and rotated with fallow fields to serve as early successional herbaceous tracts.

In the Fall of 2006, the Corps began a new side channel construction project on the site, known as the Tarkio River Delta project, in the area of the photo to the left. The delta project will include 2 side channels between the Missouri River and mouth of the Tarkio River of various lengths, creating a diversity of high quality riverine habitat. The riverine diversity will improve shallow water habitats for native big river fishes and shore birds. The project will also result in breaching an existing levee to allow flows to spread out over the area during high river stages creating opportunistic wetland areas.

### Current Status

The delta construction project should continue through the summer of 2007. A ground water well pump will be installed to supplement water and management options to an existing river oxbow in the northeast area of the site. The area has been turned over to MDC for operation and management, as well as long term habitat development. The area is open to the public for a variety of uses including bird watching, hiking, and hunting when in season.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Corning, MO



*View of riparian habitat at the Corning mitigation site, May 2005*

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Phone: 816-389-3136

### Location

3 miles west of Corning in Holt County, Missouri.

### Description

The Corning mitigation site is currently 2,003 acres in size. The lands are adjacent to the left descending bank of the Missouri River at river miles 516 to 514.

The Corps of Engineers purchased the lands at the Corning mitigation site from willing sellers from 2000 through 2006. The lands include approximately 740 acres that is enrolled in the Natural Resources Conservation Service (NRCS) Wetland Reserve Program. The lands are adjacent to the Deroin Bend mitigation site, but located on the land side of Federal Levee L-519.

The Corps lands have been turned over to the Missouri Department of Conservation (MDC) for operations and management while additional acquisitions are attempted to round out the site. Through a Cooperative Agreement with MDC, the lands are being slowly converted to grassland, wetland and bottom land forest habitats. Several fields will be left in agricultural production to serve as food plots and rotated with fallow fields to serve as early successional herbaceous tracts.

### Current Status

The NRCS plans to develop wetland areas on the WRP lands, which should be completed during the first part of 2007. In addition, the Corps has planned to construct a wetland area by modifying a drainage slough, shown below, with low berms and water control structures. A ground water well pump will be installed to supplement water and management options. The area is open to the public for a variety of uses including bird watching, hiking, and hunting when in season.



*View of drainage slough through Corning mitigation site, May 2005*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Deroin Bend, MO



*Looking upstream at the restored side channel at the Deroin Bend mitigation site, Oct. 2006*

### Contact

John Skelton, Operations

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Phone: 816-389-3968

### Location

7 miles northwest of Corning in Atchison and Holt Counties, Missouri.

### Description

The Deroin Bend mitigation site is located on 1,082 acres of land owned and operated by the Missouri Department of Conservation (MDC). The area is adjacent to the left descending bank of the Missouri River at river miles 520 to 516. Federal Levee Unit No. L-536 is located on the eastern, landward side of the site. The site is also adjacent to the Corning mitigation site. Directly across the Missouri River is the Indian Cave Nebraska State Park.

The side channel at Deroin Bend was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). The

mitigation at this site includes restoration of a 3 mile-long channel and creation of additional shallow water habitat in backwater areas.

Construction of the side channel was completed in December 2001. A flow through side channel and numerous water control structures were constructed using a 70-foot pilot width. The channel will be allowed to erode and expand over time. The channel is now approximately 120 feet across and will provide excellent shallow water habitat for a variety of fish. Numerous native hardwood trees were also planted at the site.

### Current Status

MDC manages the terrestrial habitats at the site, while the Corps of Engineers maintains the side channel to assure its' development and maintain adequate flows in the main river channel. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.



*Aerial view of the Deroin Bend site, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Aspinwall Bend, MO



*Open lands and timber recently purchased at the Aspinwall Bend mitigation site.*

### Contact

Karl Mueller, Real Estate Leader

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Phone: 816-389-3764

### Location

4 miles southwest of Langdon in Atchison County, Missouri.

The Aspinwall Bend mitigation site is currently approximately 179 acres in size. The area is adjacent to the left descending bank of the Missouri River at river miles 527 to 526. Federal Levee Unit No. L-550 is located through the site. The site is in close proximity to the existing Hoot Owl Bend River Access owned by the Missouri Department of Conservation (MDC).

The lands at the Aspinwall Bend mitigation site were purchased by the Corps of Engineers from a private willing seller in 2006. The lands have been in cultivation for an extended period. Because the lands were very recently purchased, they will continue to be farmed in the short term while additional acquisition and mitigation plans are made.

### Current Status

In 2007, the Corps hopes to turn over the lands at this site to the Missouri Department of Conservation so that they may perform short term management on the area while environmental assessments and designs on the lands can be completed.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Nishnabotna, MO and NE



*Mouth of Nishnabotna River and the mitigation lands on the upper area, May 2004*

### Contact

Dave Hibbs, Project Biologist

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Phone: 816-389-3136

### Location

6 miles northwest of Rock Port, in Atchison County, Missouri and Nemaha County Nebraska.

### Description

The Nishnabotna mitigation site is approximately 2,434 acres in size. The area is adjacent to the left descending bank of the Missouri River at river miles 545 to 537. Federal Levee Unit No. L-550 is located on the eastern, landward side of the site. The site consists of two separate areas with private lands in between the upper and lower areas. The Nishnabotna River flows through the upper area. Also, directly across the Missouri River is the Kansas Bend mitigation site. The lower area includes approximately 1,100 acres that are enrolled in the Natural Resources Conservation Service (NRCS) Wetland Reserve Program. The NRCS completed wetland development activities on the site prior to being purchased by the Corps.

The lands at the Nishnabotna mitigation site were purchased by the Corps of Engineers from willing sellers from 1998 to 2006. The site has been turned over to the Missouri Department of Conservation (MDC) for operations and management while additional lands are acquired in the area. Through a Cooperative Agreement with MDC, the lands are being slowly converted to grassland, wetland and bottom land forest habitats. Several fields will be left in agricultural production to serve as food plots and rotated with fallow fields to serve as early successional herbaceous tracts.

### Current Status

The Corps plans to modify the existing structures along the bank of the river to improve aquatic diversity in the river. Additionally, the Corps will be breaching an old farm levee on the upper area to allow flows to spread out over the area during high river stages in either the Nishnabotna or Missouri Rivers, creating opportunistic wetlands. The Corps will continue attempts to purchase land between the upper and lower areas. Meanwhile, the area is open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*Aerial view of lower area, May 2004*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Lower Hamburg Bend, MO and IA



*View of the new side channel, July 2005*

### Contact

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### Location

6 miles southwest of Hamburg Iowa, in Atchison County, Missouri and Fremont County, Iowa

### Description

The Lower Hamburg Bend mitigation site is approximately 2,586 acres in size. The area is adjacent to the left descending bank of the Missouri River at river miles 554 to 546. Federal Levee Unit No. L-575 is located on the eastern, landward side of the site. Another mitigation site is located just upstream and across the river at Hamburg Bend in Nebraska.

The lands at the Lower Hamburg Bend mitigation site were purchased by the Corps of Engineers from willing sellers from 1995 through 1998. The lands were in cultivation, but contained several meander scars that indicated the former location of side channels across the area. Historically, these side channels were closed off entirely by rock dike structures installed by the Corps to restrict the Missouri River flows to the main channel.

In 2003 and 2004, the Corps modified the existing closure structure at the upper end of this site. A 75-foot wide pilot channel and new control structures were installed. Over time, the Corps will monitor and maintain the flows through the restored side channel to assure that it will erode to a full 200-foot width. The side channel work was completed in September 2004. The Corps will manage the flows into the side channel to assure that the navigation channel is not affected. In addition to the side channel, native hardwood trees and grasses were planted on the formerly farmed areas.

### Current Status

Another side channel project is currently being planned for the lower part of the mitigation site, known as the Barney Bend Chute. The planning, EA and design will be completed in 2007. The lands that are within Missouri and Iowa have been turned over to the Missouri Department of Conservation (MDC) and Iowa Department of Natural Resources (IDNR), respectively, so that they may manage the fish and wildlife resources. The mitigation site is now open to the public for a variety of uses including fishing, bird watching, hiking, and hunting.



*View of the lower part of Lower Hamburg Bend, where a new side channel is proposed, Oct 2006.*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Benedictine Bottoms, KS



*Emergent wetland habitat in early winter, 2001*

### Contact

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Phone: 816-389-3141

### Location

Two miles northwest of Atchison, Kansas, river miles 429 to 424 at the Rushville Bend of the Missouri River.

### Description

This mitigation site is 2,111 acres in size. The site was purchased from willing sellers in 1993 and 1994. Design of the mitigation features at this site were coordinated with the Kansas Department of Wildlife and Parks, the Kansas State Extension and Forestry and the US Fish and Wildlife Service. The project features 550 acres of native upland habitat, 750 acres of native grassland habitat, and 450 acres of wetland habitat.

Construction of the project was completed in 1998. The native upland habitat was created by planting more than 175,000 tree and shrub seedlings. The grasslands were created by planting a mixture of big

bluestem, Indian, eastern gama and switch grasses along with wildflowers and legumes. The wetland prairie habitat will provide valuable nesting, resting and escape cover as well as a source of food.

The wetlands were built using low-profile earthen berms, three wells and distribution piping, and water control structures. The wetland cells are operated as seasonal marshes that contain shallow water for migratory waterfowl.

### Current Status

In 2003 and 2006, a binder material was mixed and compacted in the wetland areas to aid water retention at the site. In 2004 and 2005 the Corps of Engineers made modifications to the river dike structures along the banks to enhance the riverine diversity in the Missouri River and at the mouth of Independence Creek. The site has been turned over to the KDWP for management. The site is available to the public for a variety of activities including fishing, bird watching, hiking, and hunting (by special permit).



*Late summer view of open riparian habitat, Benedictine Bottoms mitigation site, 2004*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Elwood Bottoms, KS



*Existing habitat, river side of levee in winter, 2006*

### Contact

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Phone: 816-389-3136

### Location

One mile south of Elwood, Kansas, river miles 448 to 445 on the right bank of the Missouri River.

### Description

This mitigation site is currently 799 acres in size. The site was purchased from willing sellers in 2006. Federal Levee Unit No. R-471-460 is located within the mitigation site. Design of the mitigation features at this site will be coordinated with the Kansas Department of Wildlife and Parks (KDWP), City of Elwood and the US Fish and Wildlife Service. The project features will contain grassland and forest habitat, as well as increased aquatic riverine and opportunistic wetland habitat.

Because the lands were very recently purchased, they will continue to be farmed in the short term while additional acquisition and mitigation plans are made.

### Current Status

In 2007, the Corps plans to turn over the lands at this site to the KDWP so that they may perform short term management on the area while environmental assessments and designs on the lands can be completed. The site will be available to the public for a variety of activities including fishing, bird watching, hiking, and hunting.



*View of recently purchased land at Elwood Bottoms mitigation site, 2006*



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# Information Paper

**Missouri River Fish and Wildlife Mitigation Project**  
**Van Horn Bend, NE**

## **Contact**

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Phone: 402-221-4605

## **Location**

6 miles east of Union, Cass County,  
Nebraska.

## **Description**

The Van Horn Bend site is located on 534 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the right descending bank of the Missouri River, at river mile 576.

Development will take place after studies have been made as to the best habitat for the site.

The operation and management of the site has yet to be determined. This area is not yet open to the public and when it is no motor vehicles will be allowed on the site, but public foot access will be available. This site will be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

## **Current Status**

We are currently planning possible site development.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Hole in the Rock, NE



the Omaha Tribe, for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### **Current Status**

Construction is complete at this site.

*Hole in the Rock under construction*

### **Contact**

Mike Barnes, Project Manager  
Email: [micheal.j.barnes@usace.army.mil](mailto:micheal.j.barnes@usace.army.mil)  
Phone: 402-221-4605

### **Location**

6 miles east of Macy, Thurston County,  
Nebraska.

### **Description**

The Hole in the Rock site is located on 52 acres of the Omaha Reservation. The area is adjacent to the right descending bank of the Missouri River, at river mile 706.

Construction at this site consisted of a backwater area connected to the Missouri River.

The Omaha Nation has assumed operation and management of the site. No motor vehicles are allowed on the site, but public foot access is available. This site can be used, with permission of



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Glover's Bend, NE



*Glover's Bend inlet under construction*

The Winnebago Nation has assumed operation and management of the site. This site can be used, with permission of the Winnebago Tribe, for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### **Current Status**

Construction at the site is complete.

### **Contact**

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Phone: 402-221-4605

### **Location**

10 miles east of Winnebago, Thurston County,  
Nebraska.

### **Description**

The Glover's Bend site is located on 985 acres of Winnebago Reservation. The area is adjacent to the right descending bank of the Missouri River, between river miles 711 and 713.5.

Construction at this site consisted of reopening a side channel connecting it at both ends to the Missouri River. Backwater areas were also constructed and connected to the downstream end of the side channel.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Langdon Bend



*Aerial view of Langdon Bend Mitigation Site*

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Phone: 402-221-4605

### Location

3 miles south of Brownville, Nebraska in Nemaha County.

### Description

The Langdon Bend site is located on 1,308 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the right descending bank of the Missouri River, at river miles 520 and 532.

The chute at Langdon Bend was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). Construction of the BSNP cut off the side channel across Langdon Bend. The main project element for the mitigation at this site is a backwater/shallow water area. The old channel could not be opened to the river at the upstream end of the site due to its proximity to the Cooper Nuclear Power Plant.

Restoration of this area is complete. The work included a 10-foot bottom width pilot channel and backwater area. The channel is connected to the river at the outlet, but the channel stops before meeting the river at the upstream end. Flow into this area will occur by water backing up the channel and overland flow during high water times.

The Nebraska Game & Parks Department has assumed operation and management of the constructed features. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

This project was completed in 2000. It has been operational since that time and continues to function as planned providing shallow water and flood plain terrestrial habitat. A public access road and parking lot have been completed. We are also working on a design for wetlands on the west side of the levee.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Kansas Bend



*Aerial view of the Kansas Bend mitigation site*

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### Location

3 miles east of Peru, Nemaha County, Nebraska.

### Description

The Kansas Bend site is located on 1,056 acres of former agricultural land purchased by the Corps of Engineers. This site is separated into two areas by privately own farmland. The area is adjacent to the right descending bank of the Missouri River, at river miles 544 and 547.

Several side channels at Kansas Bend were closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). Construction of the BSNP used dikes and revetments to cut off the side channels across the bend in the Missouri River. The main project

element for the mitigation at this site will be reopening two side channels to the river.

Two side channels at this site are being constructed with only a 10-foot bottom width. Through adaptive management and the natural forces of the river, the channels are expected to erode and expand over time to a full 200-foot design width. The upper channel at this site will be 7,200 feet long while the lower channel will be similar, but only 5,580 feet long.

The Nebraska Game & Parks Department will assume operation and management of the constructed features when it is completed. No motor vehicles are allowed on the site, but public foot access is available. This site will be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

This site was completed in December 2004.



*View of a side channel on the Kansas Bend Mitigation Site, Oct. 2006*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Hamburg Bend, NE



*Looking North across braided side channels of the Hamburg Bend Mitigation Site*

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### Location

8 miles southeast of Nebraska City, Otoe County, Nebraska.

### Description

The Hamburg Bend site is located on 1,576 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the right descending bank of the Missouri River, at river miles 552 and 556.

The side channels at Hamburg Bend were closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). The construction allowed land at this bend to accrete. The area became agricultural lands, but was low lying and subject to frequent flooding.

The main project elements for the mitigation at this site are construction of a flow-through side channel and several backwater areas. The side channel was constructed using a 10-foot bottom width pilot channel, which has been allowed to erode and expand over time. The mitigation site includes several backwater areas, which were dredged to their current configuration.

The channel is connected to the river at both ends. The channel and backwater areas provide critical shallow water habitat for numerous fish species. The increase in the numbers and variety of fish at this location shows that excellent aquatic habitat has been created at this site. In addition, terrestrial species are also increasing in this area.

The Nebraska Game & Parks Department has assumed operation and management of the constructed features. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

Restoration of this area was completed in 1996. It has been operational since that time and continues to function as planned providing shallow water and terrestrial flood plain habitats.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Tobacco Island



*Inlet to the new side channel at Tobacco Island*

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### Location

2 miles southeast of Plattsmouth, Cass County,  
Nebraska.

### Description

The Tobacco Island mitigation site is located on 1,604 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the right descending bank of the Missouri River, at river miles 586 and 589.

The side channel at Tobacco Island was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). Construction of the BSNP cut off the side channel across Tobacco Island. The main project element for the mitigation at this site is a flow-through channel that is connected to the river at both ends.

The work includes a 3-mile long, 10-foot bottom width pilot channel that will widen over time.

The Nebraska Game & Parks Department has assumed operation and management of the constructed features. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

Restoration of this area was completed in December 2001. It has been operational since that time and continues to function as planned providing critical shallow water/sandbar complex habitat.



*Looking along the new channel at the Tobacco Island Mitigation site*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Copeland Bend, IA

### Current Status

We are currently negotiating for additional lands at this site.

### Contact

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Phone: 402-221-4605

### Location

9 miles northwest of Hamburg, Fremont County,  
Iowa.

### Description

The Copeland Bend site is located on 1,364 acres of former agricultural land purchased by the Corps of Engineers and 625 acres of land owned by the State of Iowa, for a total of 1,989 acres at the Mitigation Site. The area is adjacent to the left descending bank of the Missouri River, at river miles 571 and 565.

Since we have obtained only a part of this site development has been limited. We have produced some depressional wetlands on the protected side of the levee. Additional development will take place as more land is acquired and studies have been made as to the best habitat for the site.

The Iowa Department of natural Resources has assumed operation and management of the site. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Auldon Bar Bend, IA

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Phone: 402-221-4605

### Location

6 miles southwest of Tabor, Fremont County,  
Iowa.

### Description

The Auldon Bar Bend site is located on 588 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the left descending bank of the Missouri River, at river miles 579 and 577.

Since we have obtained only a part of this site development has been limited. Some depressional wetlands have been proposed at this site.

Additional development will take place as more land is acquired and studies have been made as to the best habitat for the site.

The Iowa Department of natural Resources has assumed operation and management of the site. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

We are currently negotiating for additional lands at this site.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project St. Mary's Island Bend, IA



foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### **Current Status**

We are currently planning development.

*Area before development. Changes will begin soon.*

### **Contact**

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Phone: 402-221-4605

### **Location**

6 miles west of Glenwood, Mills County,  
Iowa.

### **Description**

The St. Mary's Island Bend site is located on 1,821 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the left descending bank of the Missouri River, at river miles 597.5 and 595.

We have just obtained this site and development is being planned. This site will be mostly terrestrial habitat due to its proximity to Offutt AFB.

The Iowa Department of natural Resources has assumed operation and management of the site. No motor vehicles are allowed on the site, but public



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Noddleman Island Bend, IA

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Phone: 402-221-4605

### Location

4 miles southwest of Pacific Junction, Mills County,  
Iowa.

### Description

The Noddleman Island Bend site is located on 1,232 acres of former agricultural land purchased by the Corps of Engineers. The area is adjacent to the left descending bank of the Missouri River, at river miles 587 and 583.

Since we have obtained only a part of this site development has been limited. Some depressional wetlands have been proposed at this site.

Additional development will take place as more land is acquired and studies have been made as to the best habitat for the site.

The Iowa Department of Natural Resources has assumed operation and management of the site. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

We are currently negotiating for additional lands at this site.



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project California Bend, IA



*Aerial view of the restored side channel and backwater areas at the California Bend site*

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### Location

5 miles southwest of Modale in Harrison County, Iowa.

### Description

The mitigation site at California Bend is located on 420 acres owned and managed by the Iowa Department of Natural Resources. The area is adjacent to the left descending bank of the Missouri River at river miles 649 to 652.

The side channel at California Bend was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). The main project element for the mitigation at this site is reopening the mile-long channel and creation of additional shallow water habitat in backwater areas.

Restoration of this area was completed in 1999. A flow through side channel was constructed using a 10-foot bottom width pilot channel which has been allowed to erode and expand over time. The side channel is now approximately 50 feet across and provides excellent shallow water habitat for a variety of fish. There are also some created backwater areas. This site also contains excellent terrestrial and wetland habitats.

### Current Status

The Iowa Department of Natural Resources has assumed operation and management of the constructed features. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.



*Looking downstream across the side channel and wetland habitat on the left overbank*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Louisville Bend, IA



*Backwater area at the Louisville Bend site*

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Phone: 402-221-4605

### Location

3 miles west of Blencoe, Monona County, Iowa.

### Description

The Louisville Bend site is located on 1,086 acres of land owned and operated by the Iowa Department of Natural Resources. The area is adjacent to the left descending bank of the Missouri River, at river miles 682 and 685.

The chute at Louisville Bend was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project (BSNP). Construction of the BSNP used dikes and revetments to cut off the side channel across bend in the Missouri River. The main project elements for the mitigation at this site is re-establishing the open water and floodplain habitat at this site.

In order to reconnect the land with the river, controlled openings were constructed at the inlet and outlet of the closed chute. Because the

constructed side channel is at a higher elevation than the adjacent river, a pump was also installed at the inlet to pump in water during periods of low river flows. Water in the constructed chute is maintained by the regulating the outlet.

Restoration of this area was completed in 1995. This site contains 270 acres of open water and is managed as a waterfowl attraction area. The Iowa Department of Natural Resources is continuing operation and management of the constructed features. No motor vehicles are allowed on the site, but public foot access is available. This site can be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

This project was completed in 1995. It has been operational since that time and continues to function as planned providing 270 acres of valuable shallow water fish and waterfowl habitat.



*Aerial view of the backwater areas and vegetation re-establishing at the Louisville Bend site.*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Blackbird-Tieville-Decatur Bends, IA and NE



*View of oxbow lake at the Tieville-Decatur mitigation site*

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Phone: 402-221-4605

### Location

8 miles west of Onowa, Iowa. The project is located on the east bank of the river in Monona County, Iowa and Thurston and Burt Counties in Nebraska.

### Description

The Blackbird-Tieville-Decatur Bends project will be constructed on three adjacent river bends. The project contains 4,103 acres that have been obtained from willing sellers and public interests. The lands were formerly in agricultural production. The area is adjacent to the left descending bank of the Missouri River, at river miles 698 to 686.

Historically, these bends contained side channels which spread the river across the flood plain. The side channels were closed in conjunction with the Missouri River Bank Stabilization and Navigation

Project (BSNP). Construction of the BSNP cut off the side channels and allowed the land to accrete in this area. The main project element for mitigation at this site will be expanding the wetland prairie habitat at the site and construction of several backwater areas. Pumps will be used to pump water from the Missouri River to maintain a waterfowl area on part of the site.

The Nebraska Game & Parks Department and the Iowa Department of Natural Resources will assume joint operation and management of the constructed features when it is completed. No motor vehicles are allowed on the site, but public foot access is available. This site will be used for a variety of outdoor activities including fishing, bird watching, hiking and hunting when in season.

### Current Status

The construction on two of the bends is complete and is open to the public. The Corps is working to acquire additional land adjacent to this site, just to the north on the Blackbird Bend. If these acquisitions are successful, this project could expand into the newly acquired areas.



*View of the backwater area at the Tieville-Decatur mitigation site*



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# Information Paper

## Missouri River Fish and Wildlife Mitigation Project Winnebago Bend, IA



*View of the backwater area created in the restored side channel at the Winnebago Bend site*

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Phone: 402-221-4605

### Location

8 miles west of Slone, Iowa in Woodbury County.

### Description

The Winnebago Bend site is located on 1,300 acres of land owned by the Corps of Engineers and operated by the Iowa Department of Natural Resources. The area is adjacent to the left descending bank of the Missouri River, at river miles 708 and 713.

An old side channel that existed at Winnebago Bend was closed in conjunction with the Missouri River Bank Stabilization and Navigation Project. The main project element for the mitigation at this site was reconnecting the side channel to the river. This has created a mitigation site that includes diverse shallow water and terrestrial flood plain habitats.

Habitat development at the site included construction of controlled openings at the inlet and outlet of the side channel. During periods of high flow, the Missouri River flows naturally through the side channel. During lower river stages, water in the side channel is supplied by a constructed pump system at the inlet. The pump was necessary due to the lower river level in relation to the bank. Water is pumped in as needed and the outflow is regulated to maintain the water surface elevation.

### Current Status

Restoration of this area was completed in 2001. The mitigation features have been turned over to the Iowa Department of Natural Resources for its operation and management. The mitigation site is open to the public for a variety of outdoor activities including fishing, bird watching, hiking, and hunting when in season. No motor vehicles are allowed on the site, but public foot access is available.



*Aerial view of the restored side channel and terrestrial habitats, Winnebago Bend mitigation site*



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