

Final Supplemental Environmental Impact Statement
for the
Missouri River Fish and Wildlife Mitigation Project

U.S. Army Corps of Engineers

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**US Army Corps
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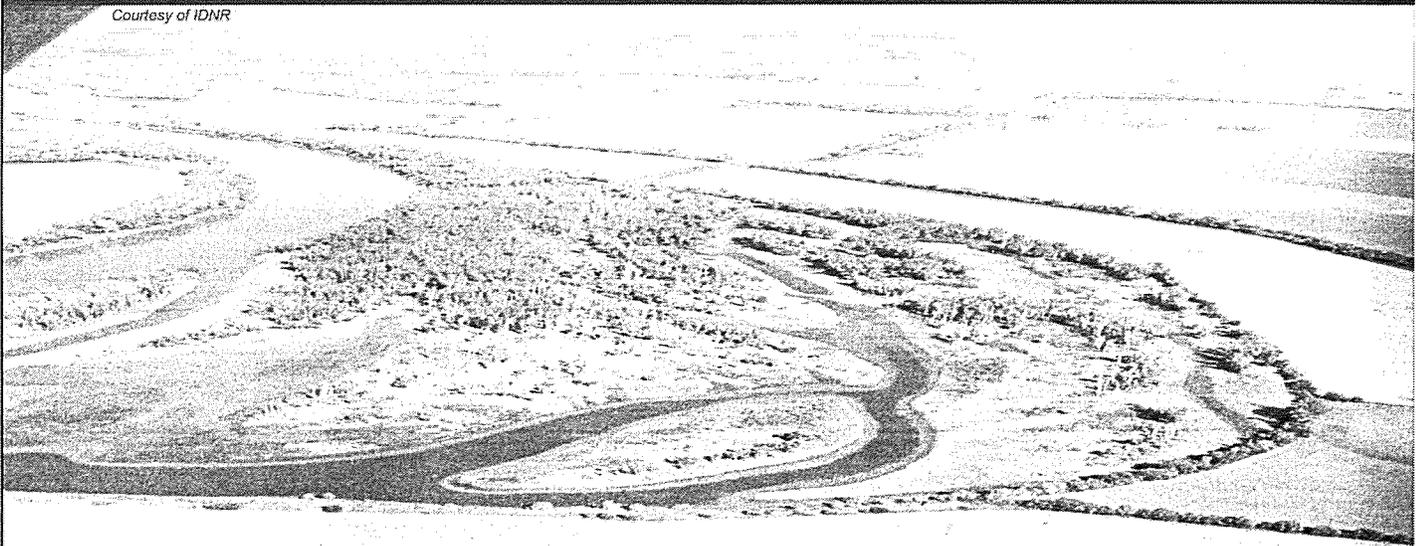
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CHAPTER 3

AFFECTED ENVIRONMENT

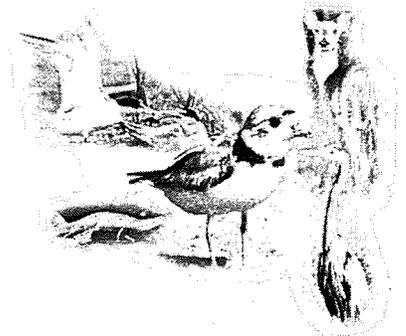
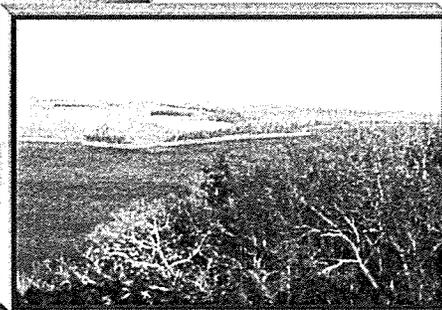
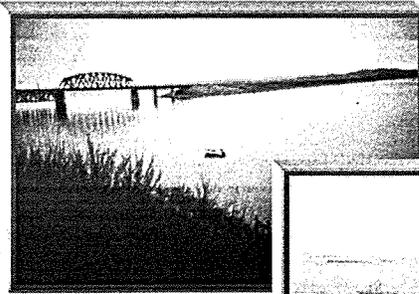
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MISSOURI RIVER FISH AND WILDLIFE MITIGATION PROJECT

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

U.S. ARMY CORPS OF ENGINEERS
KANSAS CITY AND OMAHA DISTRICTS



Chapter 3

Affected Environment

3.1 PROJECT AREA AND REGIONAL SETTING

The modified Mitigation Project would occur on the reach of the Missouri River between Sioux City, Iowa and the mouth at St. Louis, Missouri. This segment of the Missouri River is usually described as the Lower Missouri River. The Lower Missouri River Valley, a 735-mile corridor below Sioux City encompasses an area of more than 2,180,000 acres; this is the general project area for the SEIS. Project activities could also occur on tributary floodplains. Specific analyses consider a defined Region of Influence (ROI) as the floodplain of the Lower Missouri River, or for some resources (e.g., socioeconomics) the 46 counties contiguous to the Lower Missouri River in Nebraska, Iowa, Kansas, and Missouri as shown on Figure 3.1-1.

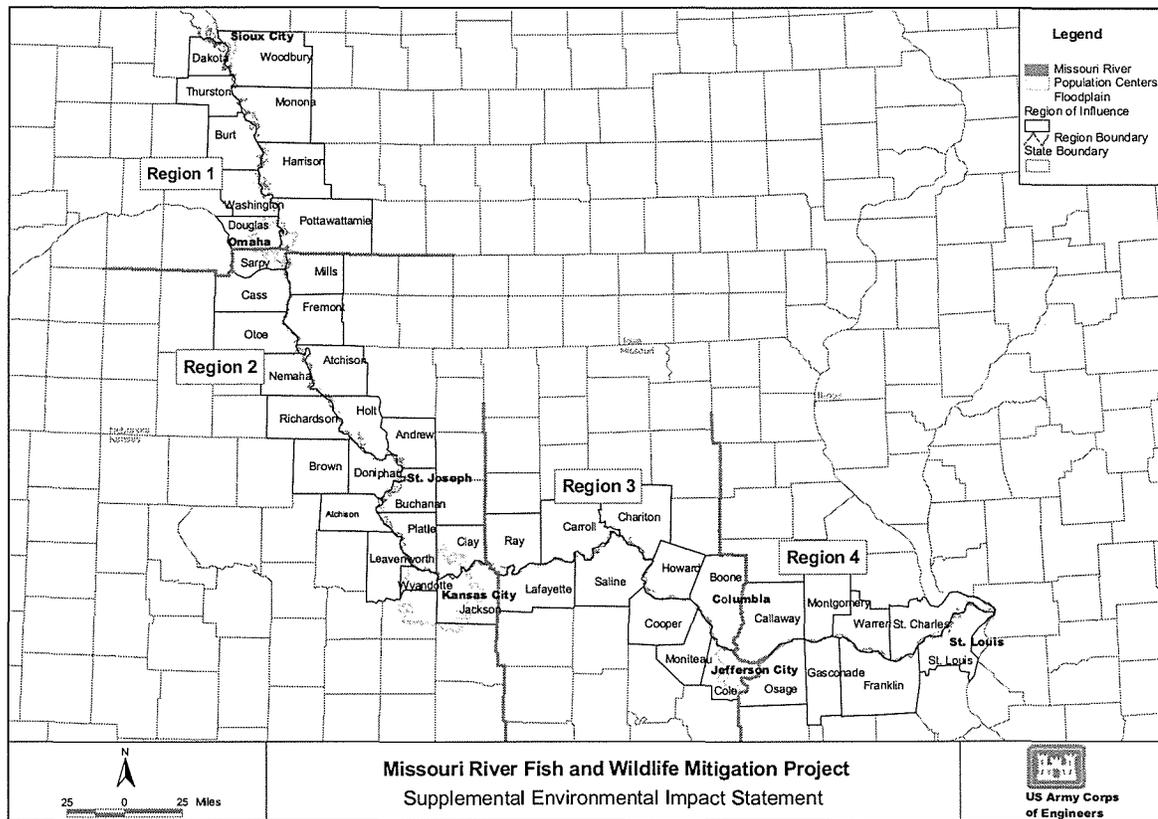
For purposes of description of existing environmental conditions and for evaluating potential impacts of certain natural and human environmental resources, the ROI

has been divided into four regions as follows:

- Region 1: Sioux City, Iowa to Omaha, Nebraska
- Region 2: Omaha, Nebraska to Kansas City, Missouri
- Region 3: Kansas City, Missouri to Jefferson City, Missouri
- Region 4: Jefferson City, Missouri to St. Louis, Missouri



**Figure 3.1-1
Region of Influence**



Counties included in the Regions are as follows:

Region 1:

- Iowa: Harrison, Monona, Pottawattamie and Woodbury
- Nebraska: Burt, Dakota, Douglas, Thurston and Washington

Region 2:

- Iowa: Fremont and Mills
- Kansas: Atchison, Brown, Doniphan, Leavenworth and Wyandotte
- Missouri: Andrew, Atchison, Buchanan, Clay, Holt, Jackson and Platte
- Nebraska: Cass, Nemaha, Otoe, Richardson and Sarpy

Region 3:

- Missouri: Boone, Carroll, Chariton, Cole, Cooper, Howard, Lafayette, Moniteau, Ray and Saline

Region 4:

- Missouri: Callaway, Franklin, Gasconade, Montgomery, Osage, St. Charles, St. Louis and Warren

The following subsections describe the physical and human environment of the ROI as well as the history and use of the Lower Missouri River. These subsections provide an introduction to the current

environment of the Lower Missouri River and describe the historical events that have changed that environment.

3.1.1 PHYSICAL ENVIRONMENT

The Missouri River Basin encompasses much of the Great Plains of the central United States and drains an area of approximately 530,000 square miles in ten states, namely: Montana, Wyoming, North Dakota, South Dakota, Minnesota, Iowa, Colorado, Nebraska, Kansas, and Missouri as shown on Figure 3.1-2. The Missouri River Basin extends eastward from the continental divide in Montana, Wyoming, and Colorado to the topographic divide of the Red River in North Dakota and South

Dakota, and the Mississippi Basin divide in Minnesota, Iowa, and Missouri. The Missouri River generally flows east and southeast, and most of the tributaries enter from the west or southwest.

The Lower Missouri River floodplain comprises approximately 2,180,000 acres. Of this, approximately 2,069,000 acres fall within the ROI for the modified Mitigation Project. Originally, the meandering Missouri River was characterized by a wide, unconstrained floodplain. The frequent changes in the channel resulted from the continuous processes of erosion and deposition. The dynamics of the Missouri River created the diverse wildlife habitats

**Figure 3.1-2
Missouri River Basin**



within the meander belt and formed a natural Missouri River floodplain ecosystem that included open shallow and deep water, sandbars, wetlands, willow thickets, and riparian woodlands.

The BSNP significantly changed the ecosystem of the Missouri River floodplain. Bank stabilization, channelization and construction of levees removed or eliminated most of the natural habitat. Present habitat is generally limited to deepwater, confined narrow strips of riparian woodlands and wetlands along river oxbows and other cutoff areas, and some isolated wetlands. The willow thicket is the most common remaining natural plant community. Exposed sandbars are very few. Agriculture has replaced diverse wildlife habitats as the dominant feature of the Missouri River floodplain. Recent conservation efforts (e.g., original Mitigation Project, Section 1135 projects, and various state agency and private projects) have restored some habitat acreage.

3.1.2 HUMAN ENVIRONMENT

The modified Mitigation Project ROI includes 46 counties in four states. The total population of the ROI counties was approximately 4,073,000 in 2000, nearly 32 percent of the population of the four states

(U.S. Bureau of Census, 2001a, 2001b, 2001c, 2001d). Of this total, approximately 239,800 live in the six Iowa counties, approximately 262,300 live in the five Kansas counties, 2,874,000 live in the 25 Missouri counties, and 697,000 live in the ten Nebraska counties.

The primary cities along the 735-mile corridor are Sioux City and Council Bluffs, Iowa, Omaha, Nebraska, Leavenworth and Kansas City, Kansas, and St. Joseph, Kansas City, Jefferson City, and St. Louis, Missouri. Some river towns became important railroad cities such as Omaha, St. Joseph, Kansas City, and St. Louis. Historically, the economy of the region has been primarily based on agriculture and agribusiness. Agricultural products and byproducts dominate the regional economy. Grains, beef cattle, and hogs are important farm products.

3.1.3 MISSOURI RIVER HISTORY AND USE

The Missouri River is a product of the glacial period, carrying glacial melt water and runoff from the Rocky Mountains across the plains. The present Missouri River was largely developed following the Wisconsin glaciation, the last of four glacial advances. Since before European horses arrived on the Great Plains around 1700,

the Missouri River was important in providing natural resources such as fish, water, wood, and willows. Its riparian habitat also provided game necessary for Native American subsistence.

Early French trappers used the Missouri River for transportation in trading with the Native American tribes in the 1700s. Transportation and availability of natural resources (e.g., furs from wildlife) characterized the early importance of the Missouri River. Following the Louisiana Purchase in 1803 and the Lewis and Clark Corps of Discovery Expedition from 1804-1806, the Missouri River grew in importance as a resource to the United States. In the following decades, more than 20 trading and military posts were constructed along the Missouri River to facilitate early commerce, navigation, and settlement. Keelboats supplanted canoes as the means to transport supplies up the river and bring furs down the river from the posts. Expanded utilization of resources involved mining and a requirement to move larger amounts of materials along rivers. Steamboat use increased as mining operations for silver, mercury, and gold developed in the 1800s. However, the swift and ever changing currents and snags made navigation hazardous, resulting in

hundreds of steamboats being sunk on the Lower Missouri River. As early as 1829, the first efforts to improve navigation on the Missouri River were done by removing snags that presented a hazard to navigation. As the desire for westward expansion and the demand for increased transportation of goods to the new settlements grew, railroads were built and by 1900 rail transportation had overtaken steamboat use. Barge shipment began in the early 1900s on the Lower Missouri River. Refer to Section 3.8, Cultural Resources, for additional discussion of historic use of the Missouri River.

However, the U.S. Congress recognized a continuing need for river navigation and commerce to move large quantities of raw and manufactured materials and set forth a plan of improvement for the Missouri River that was authorized by RHA of 1912, 1925, 1927, and 1945 (see Section 1.1). Generally, management of the river reflected societal values and needs of the time.

Transportation of freight commodities (not including sand and gravel) between Sioux City and St. Louis grew through about 1980. The last two decades has seen a decline to levels less than was transported

in 1960 (Corps, 1998a). The reach of the Missouri River between Sioux City and Omaha has accounted for approximately ten percent of the Missouri River origin and destination freight tonnage. The reach between Omaha and Kansas City has accounted for approximately 40 percent and the Kansas City to St. Louis reach has accounted for approximately 50 percent (Corps, 1998a). Present navigation occurs during the normal ice-free months of April through November.

3.2 WATER RESOURCES

3.2.1 MISSOURI RIVER HYDROLOGY

The hydrology of the Lower Missouri River, below Gavins Point Dam, has been greatly changed from its natural state by the BSNP. Numerous Congressional authorizations (RHA of 1912, 1925, 1927, and 1945) directed the Corps to undertake numerous projects collectively known as the BSNP. The intent of the BSNP was to maintain a nine-foot deep by 300-foot wide navigation channel between Sioux City and the mouth at St. Louis and to prevent general migration of the channel across the floodplain. Channelization and stabilization of the banks has been accomplished by an intricate system of dikes and revetments. These structures were designed to provide

a continuous navigation channel without using locks and dams. Description of the hydrology of the Missouri River south of Gavins Point Dam is incorporated by reference per 40 CFR 1502.21 from the Master Manual (Corps, 2001). The following text is a brief summary of some key hydrology information from the Master Manual.

Releases from Gavins Point Dam generally fall in three categories: navigation, flood evacuation, and non-navigation releases. During the navigation season (typically April through November), releases are generally 25 to 35 thousand cubic feet per second (kcfs). During December through March, non-navigation releases are typically in the 10 to 20 kcfs range. In wet years, releases are higher to evacuate flood control storage space in upstream reservoirs. During drought periods, minimum non-navigation releases have been approximately 8 kcfs to protect downstream water supply intakes.

Streambank erosion occurs throughout the study area; the rate of erosion has diminished since 1980 due to armoring of the riverbed. Armoring is a process where some of the silt and sand has eroded downstream and the cobbles and gravel become more compact. Coarse material