

# Upper Mississippi River Restoration Environmental Management Program



## Chapter 1





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# UPPER MISSISSIPPI RIVER RESTORATION ENVIRONMENTAL MANAGEMENT PROGRAM ENVIRONMENTAL DESIGN HANDBOOK

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## CHAPTER 1

### UPPER MISSISSIPPI RIVER RESTORATION ENVIRONMENTAL MANAGEMENT PROGRAM



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#### **Point of Contact for Chapter 1**

Kara N. Mitvalsky, P.E.  
U.S. Army Corps of Engineers, Rock Island District  
CEMVR-EC-DN  
Clock Tower Building, P.O. Box 2004  
Rock Island, IL 61204  
[Kara.N.Mitvalsky@usace.army.mil](mailto:Kara.N.Mitvalsky@usace.army.mil)  
309-794-5623



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**CHAPTER 1**

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**CHAPTER 1**

**UPPER MISSISSIPPI RIVER RESTORATION  
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**A. DEVELOPMENT**

Ecosystem Restoration is one of the primary missions of the Corps' Civil Works program. The purpose of ecosystem restoration activities is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. Initial congressional authorization of the UMRR-EMPP established a program which allowed for the planning, construction and evaluation of measures for fish and wildlife habitat rehabilitation and enhancement.

Ecosystem restoration efforts involve a comprehensive examination of the problems contributing to the system degradation, and the development of alternative means for their solution. The intent of restoration is to partially or fully reestablish the attributes of a naturalistic, functioning, and self-regulating system (Engineering Circular 1165). In order to understand how to restore the Upper Mississippi River System (UMRS), it is important to understand the changes that have been made to this system for hundreds of years.

Written documentation regarding the Mississippi River tends to coordinate with when European explorers first "discovered" the area, although Native Americans knew of the Mississippi River and inhabited its banks and surrounding areas well before European discovery. Several authors have pulled together information regarding exploration of this time. Some of the prominent explorers included Alonso Álvarez de Pineda, Hernando de Soto, René-Robert Cavelier, Sieur de La Salle, Father Jacques Marquette (or Pere Marquette), a French Jesuit missionary, and Joliet. Documentations from these explorations help to paint a picture of the pre-European settlement river. Lee Sandlin provides an image of the river before the first Europeans arrived:

*The Upper Mississippi River Valley was always a wild and unknown country. Above St. Anthony Falls in Minnesota, the track of the river meandered into vagueness: it wound through pristine forests, and vanished into unexplored valleys, and glinted among mazes of unnamed lakes. The river's ultimate source wasn't established as Lake Itasca in the far north until the 1830s, and the identification wasn't universally accepted for several decades after that – few people were willing to venture up-country to investigate. The pine forests there were trackless and spooky. The valleys were still strewn with monstrous fossils that had lain undisturbed for thousands of years: mammoths and saber-toothed tigers, dire wolves and a species of beaver that was the size of a grizzly bear – relics from the dawn world of the American wilderness, before the first humans arrived.*

*The current was a fast jog, nine or ten miles an hour in the deepest channels... The Mississippi had no waterfalls south of Minnesota, and only one stretch of dangerous white water, along the Iowa-Illinois border (it was successfully dredged by midcentury). ...There were countless islets and bluffs, feeder creeks and sloughs, marshes and cranebrakes receding into the blue depths of the valley; tributaries came rushing in through ravines; clouds skimmed so low they clipped the pines atop the ridges; drifts of mist floated off the hillsides and melted across the water. Whole*

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*days could go by without the voyageurs seeing anyone onshore...The landscape...was extraordinarily pristine. The most basic traces of human occupation were only sketchily drawn in the valley. There were no main roads or highways; there were barely any trails. There were no long fences or hedgerows marking out property lines. The countryside hadn't yet been pierced and plotted into an array of carpet scraps, the way it is now; forest and meadow and swamp and prairie still flowed into each other according to their own logic. The air was uncannily clear.*

By the 1800s, the Mississippi River was often used for the transportation of goods, but traveling upstream was difficult. The first steamboats entered the southern portion of the river in 1811. The first documented steamboat which traveled into the Upper Mississippi River was the "Western Engineer," a Corps vessel which was able to travel to Keokuk, IA in 1819. At this point, there were two hazardous rapids systems, one in Keokuk and one in Rock Island, which made steamboat traffic in the Upper Mississippi River difficult in low water. Mark Twain discussed the river during this time period in his book "Life on the Mississippi".

*In the space of one hundred and seventy-six years the Lower Mississippi has shortened itself two hundred and forty-two miles. That is an average of a trifle over one mile and a third per year. Therefore, any calm person, who is not blind or idiotic, can see that in the Old Oolitic Silurian Period, just a million years ago next November, the Lower Mississippi River was upwards of one million three hundred thousand miles long, and stuck out over the Gulf of Mexico like a fishing-rod. And by the same token any person can see that seven hundred and forty-two years from now the Lower Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen. There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.*

## **B. LEGISLATION**

Some of the first major modifications made by the Federal government to the Mississippi River began in the 1800s to improve river navigation. Some of the more important milestones follow:

- 1824: The Rivers and Harbors Act of 1824 appropriated funds to remove sandbars, snags and other obstacles in the Mississippi River and was administered by the U.S. Army Corps of Engineers.
- 1824: The General Survey Act of 1824 authorized the president to have surveys made of
- Routes for roads and canals "of national importance, in a commercial or military point of view, or necessary for the transportation of public mail." This was assigned responsibility to the Corps.
- 1829: The Corps recommended that the Rock Island Rapids be improved by widening and straightening the channel.
- 1878: Congress authorized a 4 ½ foot low water channel from St. Louis, MO to St. Paul, MN. This depth was to be achieved primarily by a series of wing and closing dams which would narrow, and thus deepen, the navigation channel.



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- 1879: The Mississippi River Commission was created to undertake flood control planning on the lower Mississippi.

By the early 1900s, the tremendous log and lumber rafting industry was nearing its end as the white pine forests of Wisconsin and Minnesota were depleted. Barges were more frequently used to transport goods, but these navigation systems needed more depth than the current 4 ½ foot channel. John Barry, in his book “Rising Tide”, noted:

*To control the Mississippi River – not simply to find a modus vivendi with it, but to control it, to dictate to it, to make it conform – is a mighty task. It requires more than confidence; it requires hubris. It was the perfect task for the nineteenth century. This was the century of iron and steel, certainty and progress, and the belief that physical laws as solid and rigid as iron and steel governed nature, possibly even man’s nature, and that man had only to discover these laws to truly rule the world. It was the century of Euclidean geometry, linear logic, magnificent accomplishments, and brilliant mechanics. It was the century of the engineer.*

By 1907, in the Rivers and Harbor Act Congress authorized a 6-foot channel from St. Louis, MO to St. Paul, MN. The 6-foot channel involved dredging, 2,000 new wing dams, and two new locks.

Following several major floods (1912, 1913, and 1927) Congress passed several pieces of legislation to further control the river. President Theodore Roosevelt, who established the Inland Waterways Commission at the time of the 6 foot channel, stated, “*It is not possible to properly frame so large a plan as this for the control of our rivers without taking account of the orderly development of other natural resource.*”

- 1927 River and Harbor Act authorized a Board of Engineers to survey the Mississippi between St. Louis, MO and Minneapolis, MN for a possible 9-foot channel.
- 1928: Flood Control Act of 1928 (70th United States Congress, Sess. 1. Ch. 596, enacted May 15, 1928) authorized the U.S. Army Corps of Engineers to design and construct projects for the control of floods on the Mississippi River and its tributaries.
- 1930: the Rivers and Harbor Act of July 3, 1930, authorized the nine foot channel and appropriated funds and provided for a uniform lock size of 110 by 600 feet.
- 1936: The Flood Control Act of 1936, Pub.L. 74-738, (FCA 1936) was an Act of the United States Congress signed into law by President Franklin Delano Roosevelt on 22 June 1936:

*The Flood Control Act of 1936 established an enormous commitment by the federal government to protect people and property on approximately 100 million acres [400,000 km<sup>2</sup>]. The only limitations on federal flood control projects were that the economic benefits had to exceed the costs, and local interests had to meet the ABC requirements for local projects. Since 1936, Congress has authorized the Corps of Engineers to construct hundreds of miles of levees, flood walls, and channel improvements and approximately 375 major reservoirs. These remarkable engineering projects today comprise one of the largest single additions to the nation’s physical plant - rivaled only by the highway system. They have saved billions of dollars in property damage and protected hundreds of thousands of people from anxiety, injury, and death. They stand today as one of the more significant marks of our technical skill and humane spirit.*

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By the 1970s, the Federal government was passing many environmental laws and regulations. As outlined in Rachel Carson's book, "Silent Spring":

*The history of life on earth has been a history of interaction between living things and their surroundings. To a large extent, the physical form and habits of the earth's vegetation and animal life have been molded by the environment. Considering the whole span of earthly time, the opposite effect, in which life actually modifies its surroundings, as been relatively slight. Only within the moment of time represented by the present century has one species – man – acquired significant power to alter the nature of our world.*

In the 1970s, a proposal to replace Lock and Dam 26 near Alton, IL, and increase its navigation capacity, sparked considerable debate and litigation regarding its environmental impacts. As outlined by John Madson:

*You will hear it called "The Great Sewer," the intestinal tract of America's midsection, fit only for commercial traffic and waste disposal. There is something to that, but the larger truth is that great stretches of the Mississippi are lovely corridors of wildness that still honor the original landscapes in what otherwise is a blank monotony of corn, soybeans and cotton. It is a pity that we have profaned and strictured parts of the River, spoiling so much of it for ourselves, but from the River's point of view that is all transitory. Even the great channel dams are only petty, fleeting little restraints. A few miles from where I am writing this, the crumbling Lock and Dam 26 is being replaced by a vast new edifice costing hundreds of millions and which, in the next half-tick of the Mississippi's ancient clock, will, in turn, crumble. No dam can survive such a river's displeasure indefinitely, and it is not the River's pleasure to be blocked and bound. In spite of our contempt for the integrity of great rivers, the Mississippi will shrug off our abuse and move on.*

In 1978, Congress authorized construction of a new dam with a single, 1,200-foot lock and directed the Upper Mississippi River Basin Commission to conduct studies and make recommendations related to further navigation capacity expansion and its ecological impacts.

The Commission presented its findings and recommendations in a landmark document, the Upper Mississippi River Basin Commission, *Comprehensive Master Plan for the Management of the Upper Mississippi River System*, in January 1982. The Master Plan recommended that Congress authorize: a second lock, 600 feet in length, at Lock and Dam 26; a habitat rehabilitation and enhancement program; a long term resource monitoring program; a computerized inventory and analysis system; recreation projects; and a study of the economic impacts of recreation. In addition, the Commission proposed actions to reduce erosion rates, increase the capacity of other locks through non-structural and minor structural measures, monitor traffic movements, continue dredged material placement practices, promote beneficial uses of dredged material, and coordinate State water resources management activities.

The Comprehensive Plan provided an outline for what is today referred to as the UMRR-EMP. Prior to passage of the 1986 WRDA, Congress used the 1985 Supplemental Appropriations Act (Public Law 99-88) to initiate a number of water projects by directing that the Corps of Engineers proceed with construction and providing the funds necessary to do so. Among the 41 projects advanced in this way was environmental management along the Upper Mississippi River Basin. The conference committee

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report accompanying the 1985 supplemental appropriations measure also set forth the basic framework for the UMRR-EMP. In the absence of more elaborate statutory provisions, the conferees directed that funds equal to those provided for advanced engineering and design of the second lock be used for initial activities related to programs for long term resource monitoring, habitat rehabilitation and enhancement, recreation improvements and studies, traffic monitoring, and computerized inventory and analysis.

**C. AUTHORIZATION FOR THE UMRR-EMP**

The 1986, the WRDA (Public Law 99-662), Section 1103 authorized both construction of a second lock at Locks and Dam 26 and a variety of environmental initiatives on the Upper Mississippi River. This section was entitled the Upper Mississippi River Management Act of 1986. It is the statutory basis for the UMRR-EMP, though the law does not confer that name upon the UMRR-EMP. The effect of using this national legislation, the first program in the Nation to combine ecosystem restoration with scientific monitoring and research efforts on a large river system, as a vehicle to authorize the Upper Mississippi River programs was twofold: first, the authority for implementing all the Upper Mississippi River program elements was vested in the Corps; secondly, cost-sharing for UMRR-EMP habitat projects was mandated.

The UMRR-EMP has served the Nation for over 25 years on the UMRS. As of April 2012, the UMRR-EMP has received and applied a total of \$422,925,000 which has supported broad ranging efforts to restore aquatic habitats, acquire systemic data, and monitor and research the UMRS. These efforts have improved the quality of aquatic habitat and associated floodplain habitats, benefiting fish, waterfowl, shorebirds, mammals, amphibians, reptiles, neo-tropical migrant birds, and many species of plants. In addition to providing important benefits on the UMRS, the UMRR-EMP serves as a model for other aquatic ecosystem efforts nationally and internationally and remains viable and relevant. It has matured and adapted to changing conditions and new scientific insights and continues to be an efficient and effective means of ensuring that the UMRS remains both a nationally significant ecosystem and nationally significant commercial navigation system.

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