

# Mississippi River and Tributaries Project

## MISSISSIPPI RIVER

Without question America's greatest river, the Mississippi, has made major contributions to the physical and economic growth of the nation. It is a navigation artery of great importance to the nation's transportation system, carrying an every-growing commerce. Coursing through the heart of America, it supplies water for the cities and industries that have located along its banks. More and more the Mississippi's importance is emphasized as America continues to grow. This great river is, truly, one of the nation's outstanding assets. Uncontrolled, it would be just as great a liability.

The Mississippi River has always been a threat to the security of the valley through which it flows. Garcilaso de la Vega, in his history of the expedition begun by DeSoto, described the first recorded flood of the Mississippi as severe and of prolonged duration, beginning about March 10, 1543, and cresting about 40 days later. By the end of May the river had returned to its banks, having been in flood for about 80 days.

Since that time, explorers, traders, farmers, men of commerce, and engineers have known -- sometimes too well -- the Mississippi in flood.

## THE MISSISSIPPI DRAINAGE BASIN

The Mississippi River has the third largest drainage basin in the world, exceeded in size only by the watersheds of the Amazon and Congo rivers. It drains 41 percent of the 48 contiguous states of the United States. The basin covers more than 1,245,000 square miles, includes all or parts of 31 states and two Canadian provinces, and roughly resembles a funnel which has its spout at the Gulf of Mexico. Waters from as far east as New York and as far west as Montana contribute to flows in the lower river.



The lower alluvial valley of the Mississippi River is a relatively flat plain of about 35,000 square miles bordering on the river which would be overflowed during time of high water if it were not for man-made protective works. This valley begins just below Cape Girardeau, Missouri, is roughly 600 miles in length, varies in width from 25 to 125 miles, and includes parts of seven states -- Missouri, Illinois, Tennessee, Kentucky, Arkansas, Mississippi, and Louisiana.

Floods of 1849 and 1850, which caused widespread damage in the Mississippi River Valley, revealed the national interest in controlling the mighty river.

By the year 1879, the need for improvement of the Mississippi River had become widely recognized. The necessity for coordination of engineering operations through a centralized organization had finally been accepted.

Accordingly, in that year, the Congress established the Mississippi River Commission and assigned it the duties . . . "to take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River, improve and give safety and ease to navigation thereof, prevent destructive floods, promote and facilitate commerce, trade, and the postal service."

The Commission was to consist of three officers of the Corps of Engineers, one of whom would be President; one member from the U.S. Coast and Geodetic Survey; and three civilians, two of whom would be civil engineers. All appointments would be nominated by the President of the United States, subject to confirmation by the Senate.

In 1882, three years after establishment of the Commission, one of the most disastrous floods ever known devastated the entire delta area. The losses were appalling. During that flood there were hundreds of crevasses, and the outlook for a permanent solution to flooding in the Mississippi Valley was disheartening.

Major floods again occurred in 1912, 1913, and 1927. The flood of 1927 was the most disastrous in the history of the lower Mississippi Valley. An area of about 26,000 square miles was inundated. Levees were breached, and cities, towns, and farms were laid waste. Crops were destroyed, and industries and transportation paralyzed. Property damage amounted to \$347 million – this would be equivalent to \$10 billion at 1998 prices. Over 200 lives were lost, and over 600,000 people displaced. Out of it grew the Flood Control Act of 1928, which committed the Federal Government to a definite program of flood control. This legislation authorized the Mississippi River and Tributaries (MR&T) Project, the nation's first comprehensive flood control and navigation act.

## The Project Flood

The flood control plan is designed to control the "project flood." It is a flood larger than the record flood of 1927. At Cairo, the project flood is estimated at 2,360,000 cubic feet per second (cfs). The project flood is 11 percent greater than the flood of 1927 at the mouth of the Arkansas River and 29 percent greater at the latitude of Red River Landing, amounting to 3,030,000 cfs at that location, about 60 miles below Natchez, Mississippi.

## Description of Plan

The four major elements of the Mississippi River and Tributaries Project are: *levees* for containing flood flows; *floodways* for the passage of excess flows past critical reaches of the Mississippi; *channel improvement and stabilization* for stabilizing the channel in order to provide an efficient navigation alignment, increase the flood-carrying capacity of the river, and for protection of the levee system; and *tributary basin improvements* for major drainage and for flood control, such as dams and reservoirs, pumping plants, auxiliary channels, and the like.



## Main Stem Levees

The Mississippi River levees are designed to protect the alluvial valley against the project flood by confining flow to the leveed channel, except where it enters the natural backwater areas or is diverted purposely into the floodway areas.

The main stem levee system, comprised of levees, floodwalls, and various control structures, is 2,216 miles long. Some 1,610 miles lie along the Mississippi River itself and 606 miles lie along the south banks of the Arkansas and Red rivers and in the Atchafalaya Basin.

The levees are constructed by the Federal Government and are maintained by local interests, except for Government assistance as necessary during major floods. Periodic inspections of maintenance are made by personnel from the U.S. Army Corps of Engineers and from local levee and drainage districts as it is essential that the levees be maintained in good condition for their proper functioning in the flood control plan.



Levee at Carrollton Bend

## Floodways

From Cairo to New Madrid, Missouri, the east bank bluffs and the levee as originally built on the west bank left only a narrow channel through which the river could flow at flood stage. To protect communities along the Mississippi and Ohio rivers and to reduce the flood heights to which the controlling levees on the Missouri side would otherwise be subjected, the project provides for a setback levee about 5 miles west of the riverfront levee through this reach. The strip between this setback levee and the levee adjacent to the river forms what is known as the Birds Point-New Madrid Floodway, operated only at extremely high stages. Water enters the floodway through lower levee sections or "fuse plugs" in the old front levee below Cairo and reenters the main river just above New Madrid. The floodway was operated in 1937 and was of material aid in reducing flood heights at and above Cairo.

At the latitude of Red River Landing, the project flood is estimated at 3,000,000 cfs. The project provides for dividing this great quantity of water, with 1,500,000 cfs of the flow continuing down the main river channel, the remaining 1,500,000 cfs being diverted to the Atchafalaya River via the Morganza and West Atchafalaya floodways, and the Old River Control Structures.



Morganza Control Structures open, May 1973

Of the 1,500,000 cfs flowing down the main channel below Morganza Floodway, 250,000 cfs are to be diverted to Lake Pontchartrain and the Gulf through the Bonnet Carré Spillway, located about 25 miles above New Orleans. The remaining 1,250,000 cfs will continue down the river to the Gulf.

That portion of the flow diverted from the main channel near Old River is carried by the Atchafalaya River, the Morganza Floodway, and the West Atchafalaya Floodway. The Morganza and the West Atchafalaya floodways follow down on opposite sides of the Atchafalaya River until the end of the levee system along the Atchafalaya River is reached; there they merge into a single broad floodway that passes the flow to the Gulf through two outlets, Wax Lake and Berwick Bay. In major floods, the Morganza would be the first of these two floodways to be used, with water entering it through a control structure just above Morganza.

### Channel Improvement and Stabilization

Stabilization and protection of the riverbanks are important to the flood control and navigation plan, serving to protect flood control features and to ensure the desired alignment of the river's navigation channel. This is accomplished by:

- **Cutoffs** -- to shorten the river and reduce flood heights.



- **Revetment** -- to stop the river's meandering.



- **Dikes** -- to direct the flow.

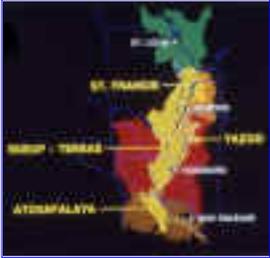


- **Improvement dredging** -- to realign the channel.



## Principal Tributary Basin Improvements

The Flood Control Act of 1928 authorized work that would give the various basins protection against Mississippi River floods only, although the tributary streams within the basins caused frequent flood damage that could not be prevented by the main stem Mississippi River protective works. Later amendments to this act have authorized work that provides alleviation of the tributary flood problems.



There are four major drainage basins in the lower Mississippi River Valley Project: St. Francis in east Arkansas; Yazoo in northwest Mississippi; Tensas in northeast Louisiana; and Atchafalaya in south Louisiana. There are five flood control reservoirs in the tributary basin improvement plan: Wappapello Lake in the St Francis Basin, and four lakes -- Arkabutla, Sardis, Enid, and Grenada -- in the Yazoo Basin.

## Old River Control

One of the most important modifications to the project was made in 1954 when Congress authorized the feature for the control of flow at Old River to prevent the capture of the Mississippi by the Atchafalaya River.

The first two features completed were the low-sill and overbank structures, the former to pass low and medium flows from the Mississippi to the Atchafalaya River in a controlled manner, and the latter to pass flood flows to the Atchafalaya in conformance with the flood control plan. Inflow and outflow channels were constructed connecting the low-sill structure with the Mississippi and Red-Atchafalaya rivers. A third facility -- called the Auxiliary Structure -- was placed in service late in 1986.

### Old River Control Structures



As the closure of Old River would cut off an important shallow-draft navigation artery, a navigation lock was constructed just south of the junction of the Old and Mississippi rivers. This navigation lock is one of the most modern in the nation's inland waterway system. Channels were dredged connecting the lock to the Mississippi and Old rivers, and this feature was opened to navigation in 1963.

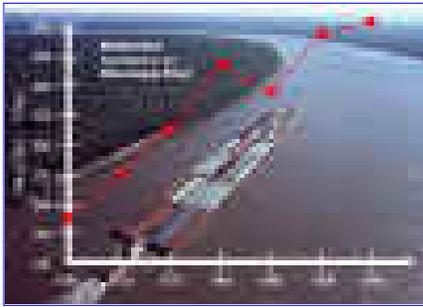
## NAVIGATION

No river has played a greater part in the development and expansion of America than the Mississippi. In 1705 the first cargo was floated down the river from the Indian country around the Wabash, now the states of Indiana and Ohio. This was a load of 15,000 bear and deer hides brought downstream for shipment to France.

Invention of the steamboat brought about a revolution in river commerce. The first steamboat to travel the Mississippi was the "New Orleans."

The Mississippi River is the main stem of a network of inland navigable waterways which form a system of about 12,350 miles in length, not including the Gulf Intracoastal Waterway of 1,173 miles.

Waterborne commerce on the Mississippi rose from 30 million tons in 1940 to over 500 million tons in 1996.



This heavy commercial traffic includes grains, coal and coke, petroleum products, sand and gravel, salt, sulphur and chemicals, and building materials among others. In addition, many pleasure craft from all parts of the country now use the Mississippi for vacation and travel.