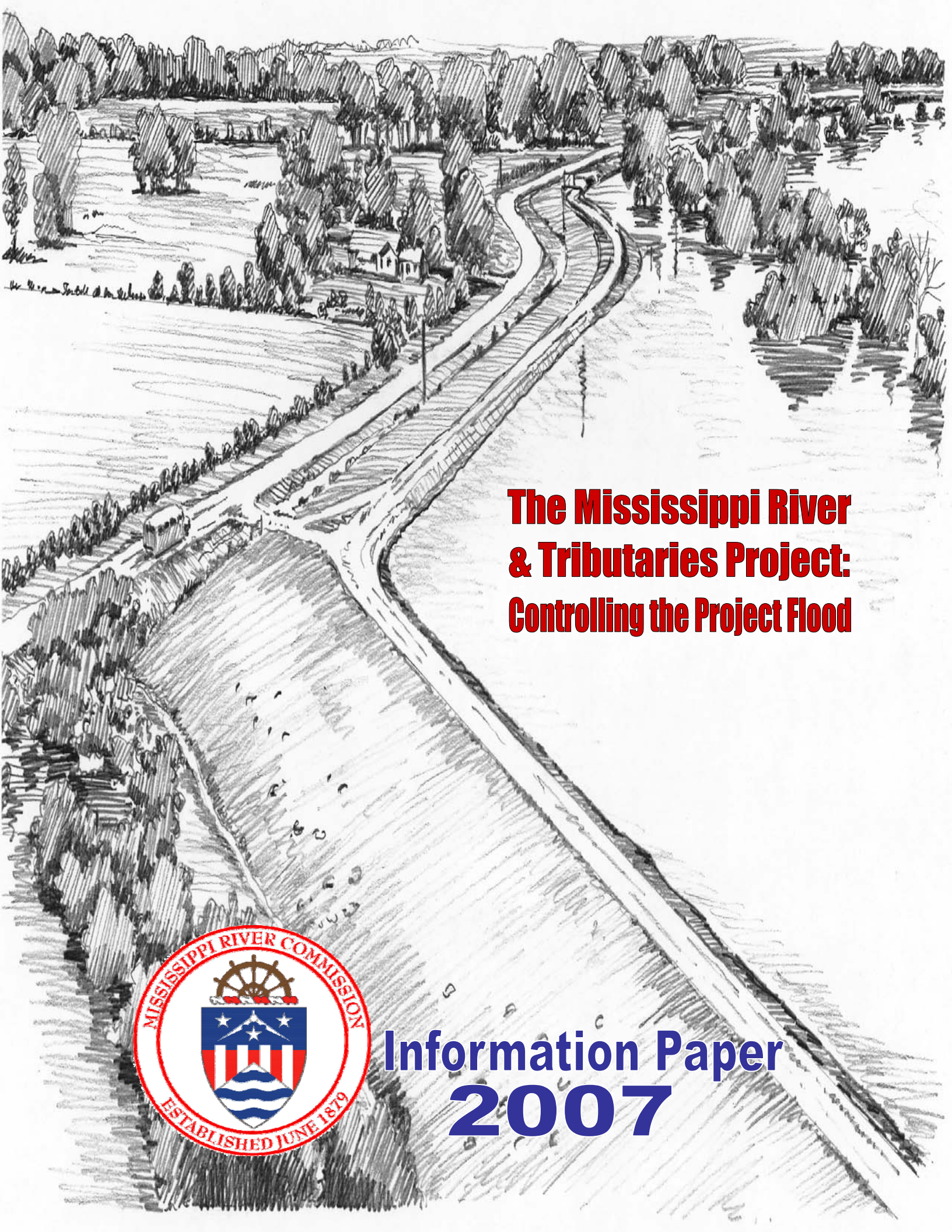

The Mississippi River & Tributaries Project:
Controlling the Project Flood

MISSISSIPPI RIVER COMMISSION
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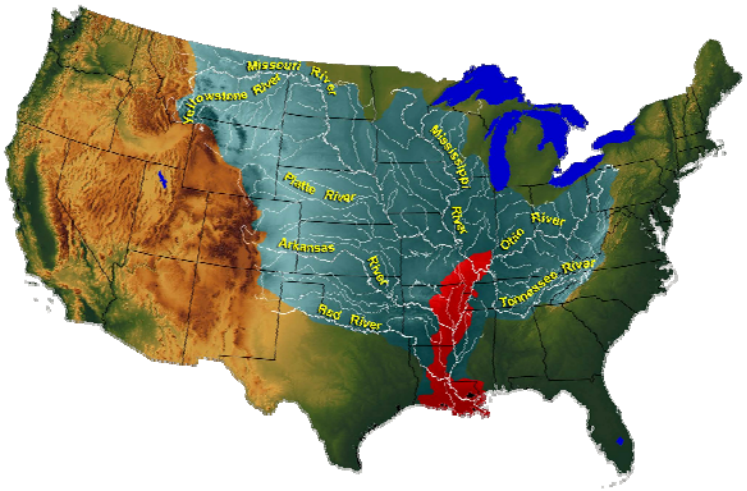
The Mississippi River & Tributaries Project

Controlling the Project Design Flood

Following the Great Mississippi River Flood of 1927, the nation galvanized in its support for a comprehensive and unified system of public works within the lower Mississippi Valley that would provide enhanced protection from floods, while maintaining a mutually compatible and efficient Mississippi River channel for navigation. Administered by the Mississippi River Commission under the supervision of the Office of the Chief of Engineers, the resultant Mississippi River and Tributaries (MR&T) project employs a variety of intensely managed engineering techniques, including an extensive levee system to prevent disastrous overflows on developed alluvial lands; floodways to safely divert excess flows past critical reaches so that the levee system will not be unduly stressed; channel improvements and stabilization features to protect the integrity of flood control measures and to ensure proper alignment and depth of the navigation channel; and tributary basin improvements, to include levees, reservoirs, and pumping stations, that maximize the benefits realized on the main stem by expanding flood protection coverage and improving drainage into adjacent areas within the alluvial valley.



Since its initiation, the MR&T project has brought an unprecedented degree of flood protection to over 4.5 million people living in the 35,000 square-mile project area within the lower Mississippi Valley. The nation has contributed $13 billion toward the planning, construction, operation, and maintenance of the project and, to date, the nation has received a 27 to 1 return on that investment, including $350 billion in flood damages prevented. Such astounding figures place the MR&T project among the most successful and cost-effective public works projects in the history of the United States.

The Project Design Flood

The success of the MR&T flood control program is rooted in a profound change in engineering policy the evolved after the 1927 flood. Prior to that tragic flood event, the control of floods on the lower Mississippi was attempted by building levees high enough to withstand the last great flood of record.

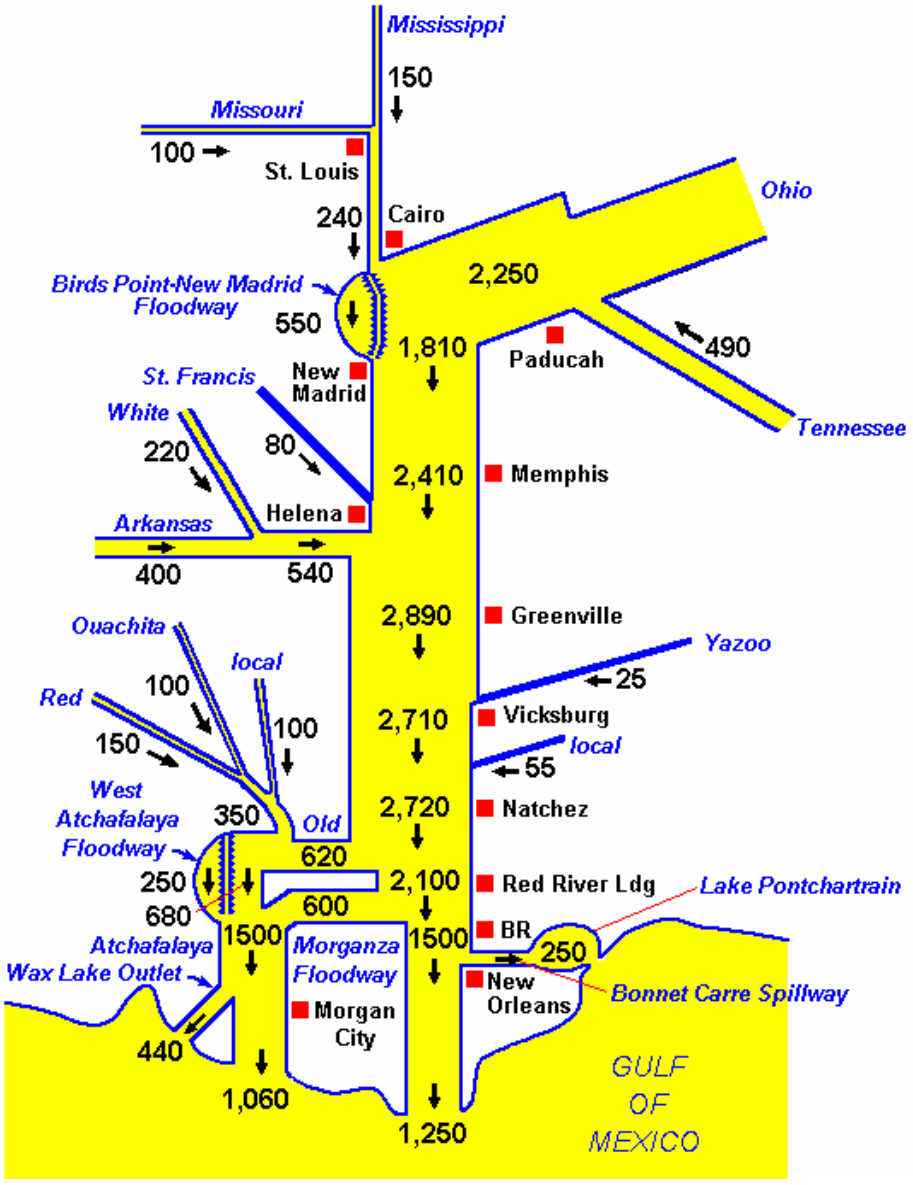
Controlling the Project Design Flood

Since the inception of the MR&T project in 1928, however, the comprehensive flood control program is designed to control the "project design flood."

The current project design flood, developed between 1954 and 1955 at the request of the Senate Committee on Public Works, resulted from a thorough and cooperative effort by the Weather Bureau, the U.S. Army Corps of Engineers, and the Mississippi River Commission that incorporated previously unavailable data regarding the sequence, severity, and distribution of past major storms and investigated 35 different hypothetical combinations of actual storms that produced significant amounts of precipitation and runoff.

The historical storms were arranged sequentially to mimic frontal movements and atmospheric situations consistent with those occurring naturally to determine the most feasible pattern capable of producing the greatest amount of runoff on the lower Mississippi River.

This included the consideration of storm transpositions, storm intensity adjustments, seasonal variations, and storm mechanics. In simpler terms, the project design storm series was developed from various combinations of actual storms and resultant floods—referred to as hypo floods—that had a reasonable probability of occurring from a meteorological viewpoint.



The Mississippi River & Tributaries Project

Controlling the Project Design Flood

The study revealed that Hypo-Flood 58A had the most probable chance of producing the greatest discharge on the lower Mississippi River from Cairo to the Gulf of Mexico. Three severe storms comprised hypo-flood 58A.

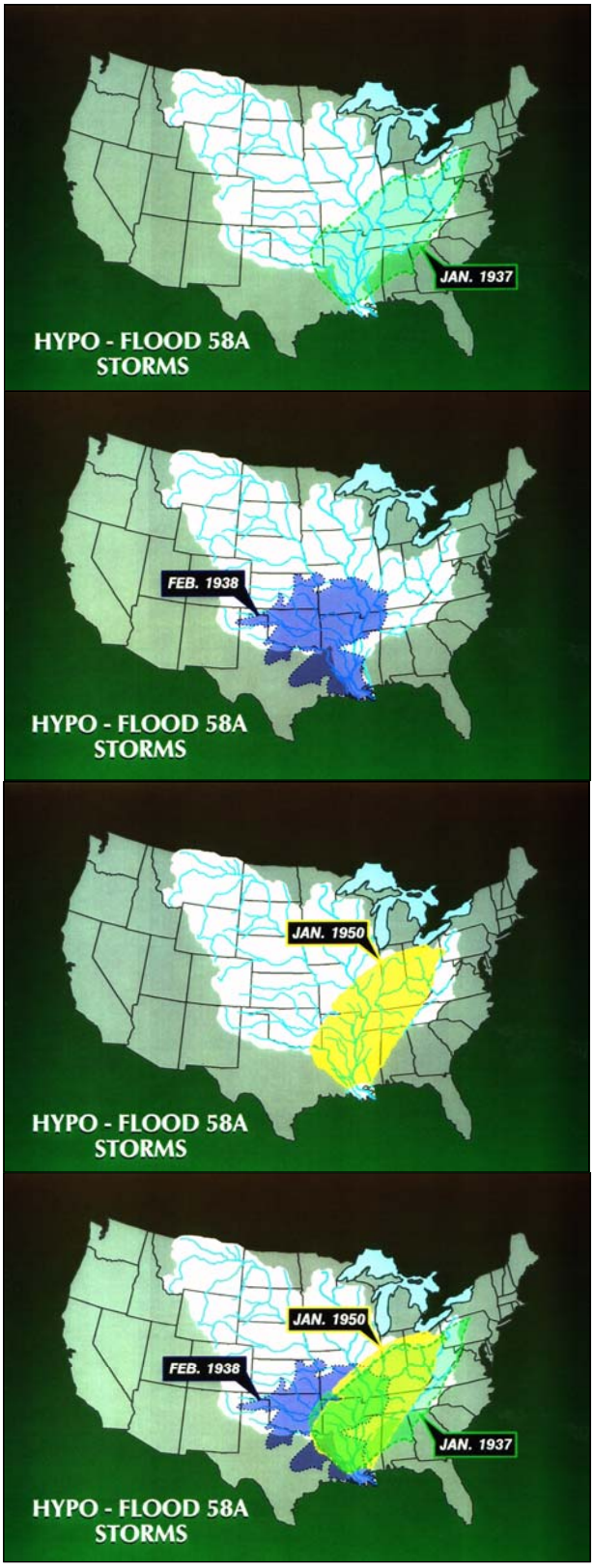
The first storm is the 1937 storm that struck the Ohio and lower Mississippi River basins, with runoff increased by 10 percent. It is followed three days later by the 1950 storm over the same general area. This storm is followed three days later by the 1938 storm, with its center transposed 90 miles to the north and the rainfall pattern rotated by 20 degrees to maximize its coverage over all the tributary basins on the lower Mississippi River.

To convert Hypo-Flood 58A into the project design flood, the Mississippi River Commission developed the flood flows that would occur from the three storms and routed them through the tributary systems under three conditions: unregulated by reservoirs; regulated by reservoirs in existence; and regulated by existing reservoirs, plus those proposed to be constructed in the near future. (1960 timeframe)

The flood flows were then routed down the Mississippi River to determine the peak discharges at key locations.

The Mississippi River Commission selected the 58A flood with near-future reservoirs condition, referred to as 58A-EN (existing or near completion), as the basis for the project flood flowline and adopted it as the project design flood in 1956.

The peak discharges for the revised project design flood, which has no assigned flood frequency, were 2,360,000 cfs at Cairo; 2,890,000 cfs at Arkansas City, and 3,030,000 cfs at the latitude of Red River Landing.



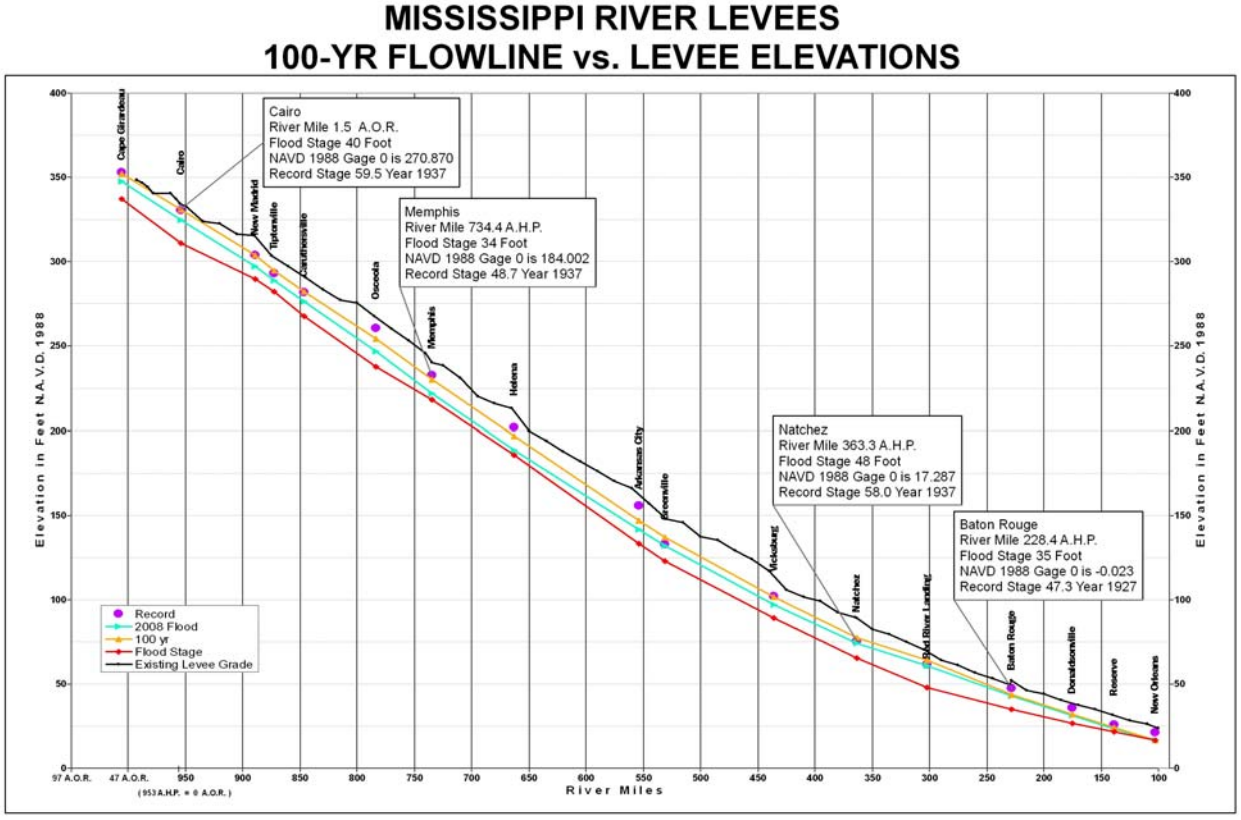
Controlling the Project Design Flood

Following the 1973 flood, the Mississippi River Commission once again reviewed the adequacy of the project design flood. The review concluded that the thorough approach used in 1954-55 was based on sound technology that was still reliable by current standards. The project design flood peak discharges remained unchanged. The current project design flood—regulated by reservoirs—is about 25 percent greater than the devastating 1927 flood.

Conveying the Project Design Flood

Levee System

Levees are the mainstay of the MR&T project flood-control plan. The system protects the vast expanse of the developed alluvial valley from periodic overflows of the Mississippi River. The main stem levee system begins at the head of the alluvial valley at Cape Girardeau, Missouri, and continues to Venice, Louisiana, approximately 10 miles above the Head of Passes near the Gulf of Mexico. The MR&T levee system includes 3,787 miles of authorized embankments and floodwalls. Of this number, nearly 2,216 miles are along the main stem Mississippi River and the remaining levees are backwater, tributary, and floodway levees. No project levee built to Mississippi River Commission standards has ever failed, despite significant floods in 1937, 1945, 1950, 1973, 1975, 1979, 1983, 1997, and 2008.



The Mississippi River & Tributaries Project

Controlling the Project Design Flood

The grade and section of the present levee system dwarfs by comparison those of the levee system overwhelmed during the 1927 flood. In addition to higher and wider levees, the MR&T levee system design incorporates technological breakthroughs from the science of soil mechanics that take into account the type, condition, and moisture content of material used in the construction of the levees.

The integrity of the current levee system is enhanced by advancements in the design, construction, installation, and maintenance of seepage control measures, to include landside berms, drainage trenches, drainage blankets and relief wells. More than 1,000 miles of articulated concrete mattress revetment also protect the levee system by preventing erosion.

In an effort to further guarantee the soundness of the levee system, levee districts and other local sponsors implement strict levee maintenance programs with their own labor and funds. Normal operations and maintenance activities conducted daily by local sponsors include mowing, clearing brush and trees, filling holes, restore rain washed areas, clearing drainage ditches, correcting drainage problems, and spraying chemical to control noxious and unwanted growth.

This effort is augmented through daily inspections by pasture tenants who depend on a sound and reliable levee system to protect their lives, homes, and property from destructive floods. Together these inspections are also used to identify any deficiencies and weak spots in the levee system so that immediate corrective actions can be taken. The addition of 15-foot wide, all-weather access roadways on top of the levee system aids federal personnel and local levee districts during the inspection process and during flood-fighting operations, when the level of intensity of daily inspection increases.

Controlling the Project Design Flood

Personnel from USACE Districts additionally ensure that maintenance requirements are met through annual inspections.

To maximize protection from floods, current levee grades provide for freeboard--the distance between the project design flood flowline and the top of the levee. The presently-authorized freeboard is a minimum of three feet above the project design flood on the Mississippi River levees below Cairo, Illinois, and two feet on the Atchafalaya basin floodway levees. Levee grades between Cape Girardeau and Cairo and along the south banks of the Arkansas and Red rivers provide for a 3-foot minimum freeboard over the maximum tributary flood meeting the maximum flood of record on the Mississippi River, with provisions to insure that the same flood meeting the project design flood will not overtop the levee. In the vicinity of New Orleans, Louisiana, project levees are authorized up to 5.7 feet of freeboard because of the increased danger to the urban areas from wave wash and storm surges that are common along coastal areas.

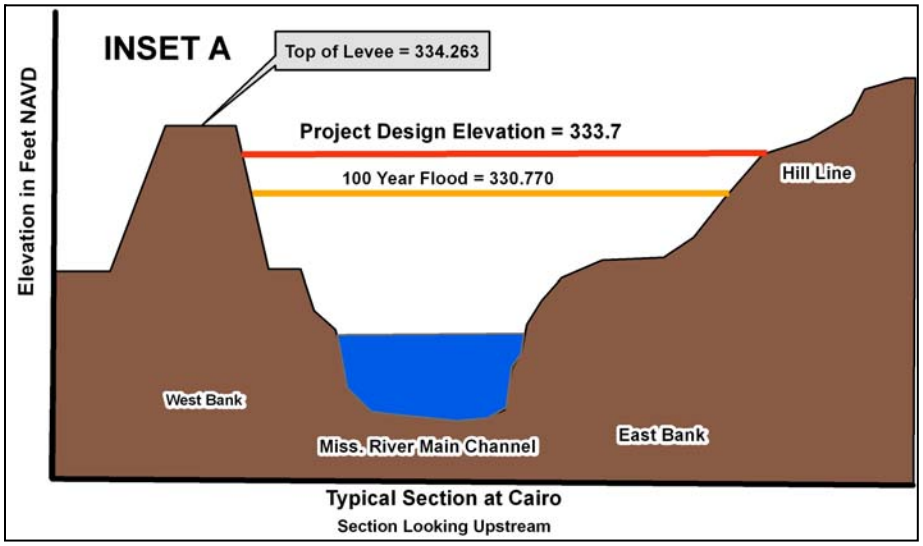
When flood stages begin to approach project design flood dimensions, additional project features are operated to control and convey potentially-damaging floodwaters to relieve stress on the levee system. A synopsis of how the MR&T project features in the northern, middle, and southern section of the project convey the project design flood follows.

Northern Section

The first key location on the flood control system is in the vicinity of Cairo. When the flood stage reaches a critical level at Cairo, the Birds Point-New Madrid floodway is placed into operation to prevent the project flood from exceeding the design elevation at and above Cairo and along east bank levee adjacent to the floodway. The floodway varies in width from about three to ten miles and has a length of nearly 36 miles.

The floodway is designed to divert 550,000 cfs from the Mississippi River during the project flood and provides about seven feet of stage lowering in the vicinity of Cairo, with smaller reductions above Cairo and through the floodway reach.

The floodway has two fuseplug levees at its upper and lower end.



Controlling the Project Design Flood

The fuseplug sections are levees constructed to a lower height than the main stem levees. The floodway is activated when sections of the frontline levee naturally overtop or are artificially crevassed. The floodway requires timely operation to ensure its design effect during a flood approaching the project flood magnitude. For this reason, the plan of operation involves the placing and detonation of explosives at the required crevasse locations.

The operation of any floodway within the MR&T project is directed by the president of the Mississippi River Commission after consultation with the Chief of Engineers. The Birds Point-New Madrid Floodway, completed in 1933, has only been operated during the 1937 flood.

There are two major reservoirs—Kentucky and Barkley lakes—on the Tennessee and Cumberland rivers that are not features of the MR&T project, but are authorized through the 1944 Flood Control Act to reduce flood stages on the Mississippi River in the vicinity of and downriver from Cairo.

Because of the close proximity of the reservoirs to the Birds Point-New Madrid floodway, their regulation has a major predictable impact on the operation of the floodway. The impacts of these reservoirs were accounted for in the development of the MR&T project design flood.

The 1944 Flood Control Act directs the Tennessee Valley Authority (TVA) to regulate the release of water from the Tennessee River into the Ohio River in accordance with instructions from the Corps of Engineers. Objectives developed by the Corps of Engineers Lakes and Rivers Division for the Kentucky-Barkley reservoir outflows have priorities to safeguard the Mississippi River levee system, to reduce the frequency of use of the Birds Point-New Madrid Floodway and to reduce the frequency and magnitude of flooding of lands along the lower Ohio and Mississippi rivers which are unprotected by levees.

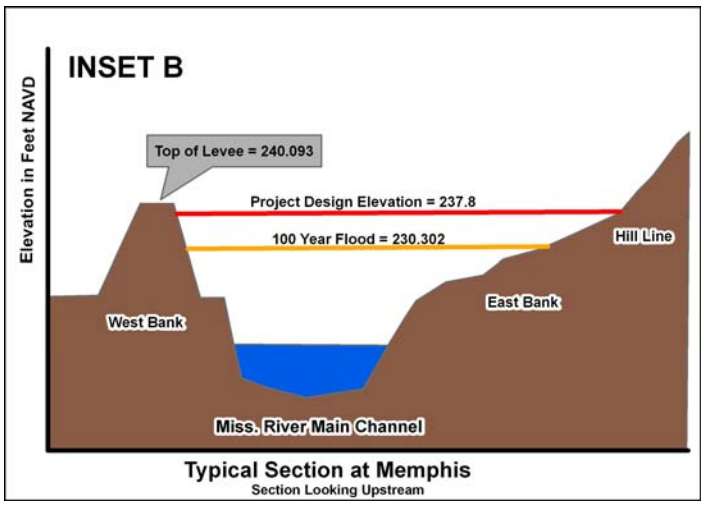
The Mississippi River & Tributaries Project

Controlling the Project Design Flood

When flood control within the Mississippi Valley and/or the MR&T project is threatened, the Mississippi River Commission president and the Great Lakes and Ohio River Division commander—a position that also serves as a member of the Mississippi River Commission—work together to regulate releases from Barkley and Kentucky lakes with the concurrence of the general manager of the Tennessee Valley Authority to accomplish these objectives.

<u>Middle Section</u>

Between the lower end of the Birds Point-New Madrid floodway and the Old River Control Complex, the project design flood is confined by levees on the west bank and levees and a high bluff on the east bank.

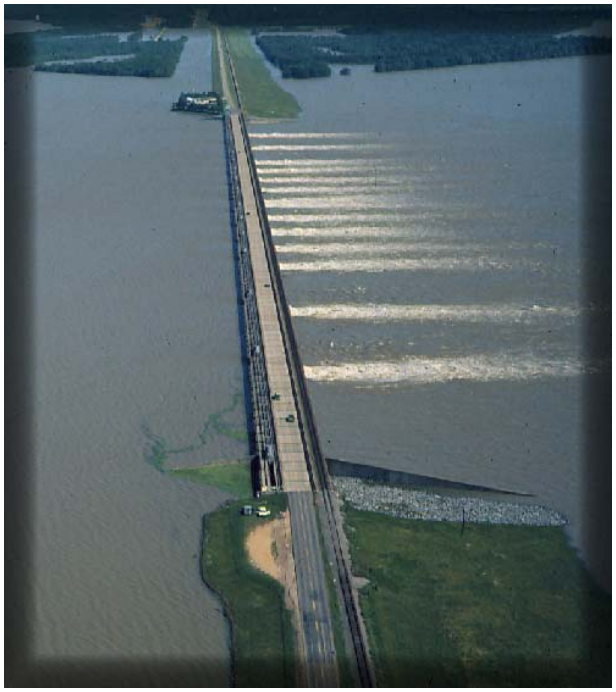


The confinement of the project design flood in this stretch of the river was made possible by a comprehensive dredging program conducted between 1932 and 1942 that greatly improved the carrying capacity of the channel and lowered the project flood flow line. The levee system in this segment of the project is supplemented by four backwater areas located at the mouths of the St. Francis, White, Yazoo, and Red rivers. Significant portions of the upper sections of these backwater areas are protected by main stem levees from overflows of the Mississippi River. The lower portions of these areas serve as natural storage areas during floods approaching the project flood design. The backwater areas are placed into operation by overtopping at a time sufficient to reduce project flood peak stages. When flood stages on the Mississippi River or its tributaries subside, floodwaters from within the backwater areas evacuated through floodgates.

The next key location on the flood control system is the Old River Control Complex at the head of the Atchafalaya River basin. The control complex was constructed to prevent the Atchafalaya from capturing the Mississippi River.

Controlling the Project Design Flood

The complex is designed to maintain the 1950 flow distribution between the Mississippi River and the Atchafalaya River of 70 percent to 30 percent, respectively. Three separate structures comprise the Old River Control Complex. The low sill structure and the auxiliary structure remain operable at all river stages, but the overbank structure is only operated during flood stages. During project flood conditions, the Old River Control Complex is designed to divert 620,000 cfs from the Mississippi River to the Atchafalaya River.



Approximately 30 miles downstream from Old River, the MR&T flood control plan provides for a major diversion of floodwaters from the Mississippi River to the Atchafalaya basin through the Morganza Floodway.

Governed by a 3,900-foot long and a 125-bay intake structure, the floodway is designed to divert 600,000 cfs from the Mississippi River during the project design flood. The Morganza Floodway is operated when the Mississippi River flows below Morganza are projected to exceed 1,500,000 cfs, thereby assuring that flows between Morganza and Bonnet Carré remain at or below 1,500,000 cfs. The Morganza Floodway, completed in 1953, has only been operated during the 1973 flood.

The West Atchafalaya Floodway extends along the west side of the Atchafalaya River. The floodway contains an 8-mile long fuseplug section of levee at the head of the floodway. The floodway is designed to divert 250,000 cfs and is placed into operation when the fuseplug section is crevassed or when the west bank Atchafalaya River levee is overtopped.

The West Atchafalaya Floodway would be the last feature of the flood control system to be used under the project design flood. It has not been operated to date.

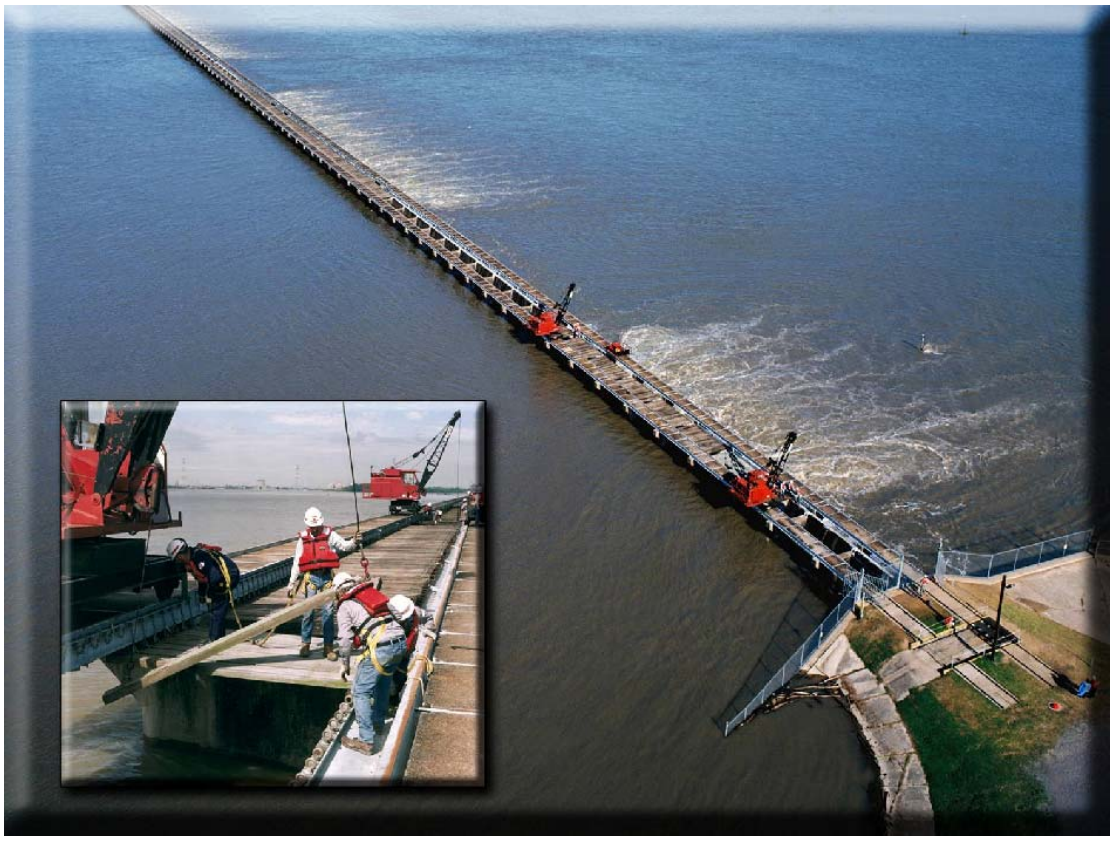
Controlling the Project Design Flood

The Atchafalaya River, the Morganza floodway, and the West Atchafalaya floodway converge at the lower end of the Atchafalaya River levees to form the Atchafalaya basin floodway. This floodway is designed to carry 1,500,000 cfs or nearly one-half of the project flood discharge of 3,000,000 cfs at the latitude of Old River. The floodway is confined on either side by levees to a point below the latitude of Morgan City, Louisiana, whereby 1,200,000 cfs is conveyed to the Gulf of Mexico by the Atchafalaya River and the remaining 300,000 cfs is passed to the Gulf through the Wax Lake outlet.

Southern Section

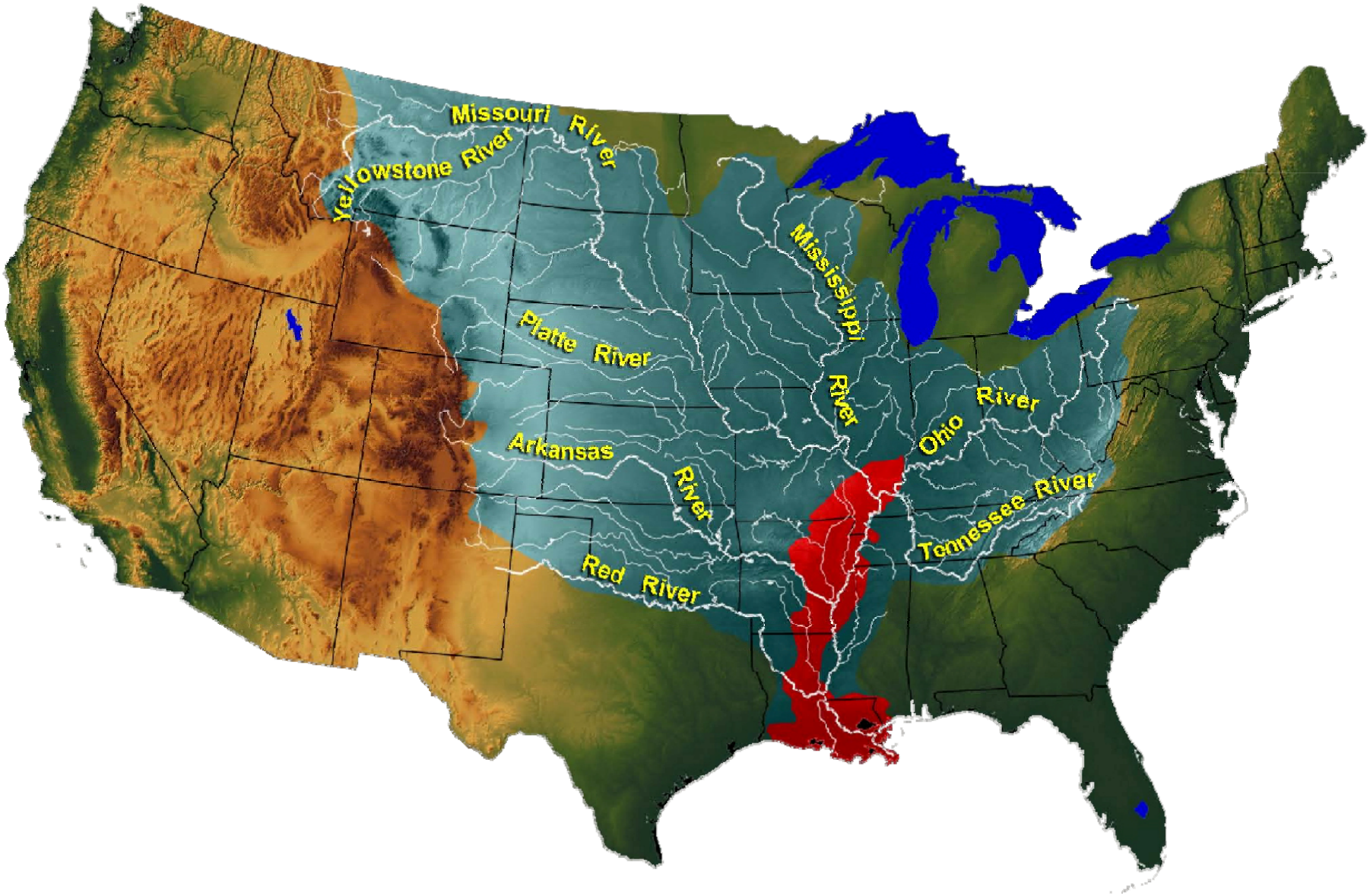
The flood control system provides protection against the remaining 1,500,000 cfs in the Mississippi River below the Morganza floodway. The next key location in the system is the Bonnet Carré Floodway, located approximately 30 miles above New Orleans, Louisiana. The 7,200-foot long spillway structure is governed by 350 intake bays and connects to a 5.7-mile long floodway that empties into Lake Pontchartrain.

The floodway is designed to divert up to 250,000 cfs from the Mississippi River, thereby insuring a peak discharge flow under project flood conditions at New Orleans not to exceed 1,250,00 cfs. Since its completion in 1932, the Bonnet Carré Floodway has been operated 9 times—1937, 1945, 1950, 1973, 1975, 1979, 1983, 1997, and 2008.



Worlds 3rd Largest Watershed

Drainage basin for 41% of the United States



Revised:
Oct. 30 2007

The Mississippi River & Tributaries Project: The Floodway Battle

The Mississippi River & Tributaries (MR&T) project was authorized by the 1928 Flood Control Act. Following the devastating 1927 flood, the nation was galvanized in its support for a comprehensive and unified system of public works within the lower Mississippi Valley that would provide enhanced protection from floods while maintaining a mutually compatible and efficient Mississippi River channel for navigation. Administered by the Mississippi River Commission under the supervision of the Office of the Chief of Engineers, the resultant MR&T project employs a variety of engineering techniques, including an extensive levee system to prevent disastrous overflows on developed alluvial lands; floodways to safely divert excess flows past critical reaches so that the levee system will not be unduly stressed; channel improvements and stabilization features to protect the integrity of flood control measures and to ensure proper alignment and depth of the navigation channel; and tributary basin improvements, to include levees, headwater reservoirs, and pumping stations, that maximize the benefits realized on the main stem by expanding flood protection coverage and improving drainage into adjacent areas within the alluvial valley.

Since its initiation, the MR&T program has brought an unprecedented degree of flood protection to the approximate 4 million people living in the 35,000 square-mile project area within the lower Mississippi Valley. The nation has contributed nearly $13 billion toward the planning, construction, operation, and maintenance of the project. To date the nation has received a 24 to 1 return on that investment, including $306 billion in flood damages prevented, and waterborne commerce on the Mississippi River has increased from 30 million tons in 1940 to nearly 500 million tons today. Such astounding figures place the MR&T project among the most successful and cost-effective public works projects in the history of the United States.

The success of the MR&T flood control program can be traced to a change in engineering policy following the 1927 flood. Prior to that tragic flood event, the control of floods on the lower Mississippi was attempted by building levees high enough to withstand the last great flood of record. Since the inception of the MR&T project in 1928, however, floodways and other engineering techniques supplement the levee system in controlling the project design flood—the maximum flood with a reasonable chance of occurring. *(For more information detailing how the MR&T project conveys the project design flood, please see "Mississippi River & Tributaries Project: Understanding the Project Design Flood.)*

The Floodway Battle

The 1927 flood demonstrated that the confined channel along the Mississippi River did not have the capacity to pass great floods without a considerable increase in the height of the levee system. The original MR&T project adopted by the 1928 Flood Control Act provided for five floodways that were intended to safely divert excess floodwaters past critical reaches in the levee system to prevent the project design flood from exceeding levee design elevations. The five floodways were the Birds Point-New Madrid floodway in southeast Missouri, the Boeuf floodway through the Boeuf basin in southeast Arkansas and northeast Louisiana, the East and

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West Atchafalaya floodways paralleling the Atchafalaya River, and the Bonnet Carré floodway located 30 miles upriver from New Orleans.

The inclusion of floodways into the MR&T flood control plan certainly represented a marked and necessary turnaround in the engineering policy practiced prior to the 1927 flood. The 1927 had forced that change, but even in the wake of that devastating flood a controversy emerged over the reality of actually implementing the floodways. Many residents in the alluvial valley were ill-prepared for that reality, which assured that private land once protected by levees would now be subject to inundation to benefit private landowners elsewhere in the valley. Opposition to the floodways precipitated a crisis early in the evolution of the MR&T project that almost led to a return to the pre-1927 flood control policy.

Resistance to the floodways centered on real estate issues. Section 4 of the 1928 Flood Control Act obligated the federal government to compensate landowners within the floodways who would be subjected "to additional destructive floodwaters that will pass by reason of diversion" from the Mississippi River. In November 1928, President Calvin Coolidge approved the federal acquisition of land and flowage rights within the Bonnet Carré floodway. Three weeks later, he did the same for the Birds Point-New Madrid floodway. In January 1929, Coolidge, just days away from the end of his presidency, authorized the acquisition of rights-of-way for levees and the initiation of levee construction in the Boeuf floodway and the East and West Atchafalaya floodways. Conspicuously absent from those instructions was the acquisition of flowage rights. Landowners from within the floodways protested angrily, but Coolidge did not relent to their demands. The president defended his stance by arguing that the Boeuf and Atchafalaya basin floodways were natural floodways and would not be subjected to additional floodwaters because they would be receiving the same level of protection as before.

In May 1929, a dozen senators and congressmen from the lower Mississippi Valley sent a brief to the new president, Herbert Hoover, stressing that the intent of Section 4 of the 1928 Flood Control Act was to acquire flowage rights within all of the floodways. The delegation requested an executive and congressional interpretation of the 1928 act and called for a temporary cessation of all work in the Boeuf and Atchafalaya floodways until the issue of compensation was resolved. Hoover sought input from his attorney general and was informed that the MR&T project was already fixed by law. The project was not subject to executive change and could only be changed through congressional legislation.

Again this backdrop, a landowner from within the Boeuf floodway, R. Foster Kincaid, filed a lawsuit in the Federal Court of Western Louisiana seeking to halt the awarding of contracts for the construction of containment levees within the floodway. A similar application for an injunction in the Birds Point-New Madrid floodway had been filed and denied in the Federal District Court of Missouri, but in that instance, the acquisition of flowage rights had already been approved. On August 29, 1929, the Federal Court of Western Louisiana ruled that Kincaid's case

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had merit and scheduled further hearings. In mid-December, the court ruled in favor of Kincaid by issuing an injunction restraining the federal government from any work on the floodway until the federal government had acquired the land or flowage rights through either purchase or condemnation. While the Kincaid case only involved the Boeuf floodway, the ruling could also apply to the Atchafalaya floodways, where an additional lawsuit had been filed. This second lawsuit prompted the Corps of Engineers and the Mississippi River Commission not to award the contracts for the construction of the Atchafalaya guide levees.

The United States Supreme Court seemingly settled the issue in February 1932 and dismissed the injunction issued by the lower court. But in reality the issue was not fully resolved. The Supreme Court had ruled that the enactment of the 1928 act involved the intentional taking of the complaint's land. While the Fifth Amendment did not entitle the complainant to be paid in advance, Kincaid and other landowners could file for just compensation under existing laws. To this end, the federal government adopted the stance that if the guide levees within the Boeuf and Atchafalaya floodways were not constructed, then the federal government held no liability toward compensation for flowage rights.

In the midst of the Kincaid case, Hoover had acted. His attorney general had ruled that the president could not change or modify the project, but Hoover could delay its implementation as requested by the Mississippi Valley congressional delegation. In October, Hoover announced his decision to delay further action in the Boeuf and Atchafalaya floodways until the Mississippi River Commission and the Corps of Engineers could review the project and work with Congress to make modifications. In doing so, the president signaled his support to return to the pre-1927 policy of containing the last great flood of record by substituting protection from the 1927 flood for protection from the project design flood.

By the close of 1932, the MR&T project was in a precarious position from the viewpoint of a systematic flood control system capable of passing the project design flood. At the Birds Point–New Madrid floodway, work on the set back levee commenced in October 1929 and was nearly complete, as was all work in connection with the construction of the drainage ditches and appurtenant structures necessary to carry the drainage intercepted by the set back levee. The 11-mile section of fuseplug levee had not been degraded to the necessary height to trigger natural crevassing because the government had not yet reached agreement to purchase flowage rights with all landowners within the floodway, but for all intents and purpose the floodway was operational. Near the extreme southern end of the MR&T project, the Bonnet Carré floodway was also operational. Work on the 350-bay spillway also began in October 1929, and all concrete work was finished by early February 1931. Construction of the nearly 6-mile long guide levees that defined the floodway boundaries ran concurrent with the concrete work on the spillway. By late summer 1932 the guide levees reached their final elevation. In between those two features flowed nearly 900 miles of Mississippi River with levees as the sole means of protection from the project design flood.

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Much work had been done on improving the levee system since the 1927. The Mississippi River Commission and the Corps of Engineers had succeeded in repairing and strengthening hundreds of miles of the weakest and lowest levee sections. Several hundred more miles of levee had been raised to the higher and stronger grade provided for in the original MR&T project. Still, the fuseplug levees at the entrance to the Boeuf and Atchafalaya floodways remained at their pre-1927 flood grade and section. A significant flood would overtop and crevasse the fuseplugs as intended leading to the operation of the floodways. The absence of guide levees within the proposed floodways left no way to contain any diversion if the fuseplug levees functioned as designed.

In January 1932, the Mississippi River Commission received congressional approval to launch an experimental program designed to increase the carrying capacity of the channel and lower the flood line on the Mississippi River between the mouth of the Arkansas River and Old River. The program was based largely on cutting off numerous river bends and using corrective dredging techniques to improve the alignment of the channel and increase its velocity to scour the river bed deeper and increase the cross section of the channel. Within three years, the commission had facilitated eight cutoffs. While none of the cutoffs and related corrective dredging measures had fully developed, actual observations on the river corroborated the findings of model experiments conducted at the Water Experiments Station—the experiential program was succeeding in increasing the carrying capacity of the channel.

In 1935, the Mississippi River Commission recommended several sweeping modification to the MR&T project that were intended to settle the floodway dispute. First the commission proposed eliminating the 1,320,000-acre Boeuf floodway and replacing it with a smaller 820,000-acre floodway farther to the south and east through the Tensas River basin. The proposed floodway, known as the Eudora floodway, would extend five miles west of the Mississippi River and then southward from Eudora, Arkansas, along the eastern edge of Macon Ridge to the Red River backwater area. With the increased capacity of the channel to carry more floodwaters brought about by the channel realignment program, the commission indicated that the Eudora floodway, though 500,000 acres smaller than the Boeuf floodway, would provide the necessary overflow relief under project flood conditions.

The Mississippi River Commission also addressed the Atchafalaya floodways. The commission was fully aware that the fuseplug levees at the entrance to both the east and west floodways would be overtopped under project flood conditions. It was likely, though, that floods of lower magnitude would only overtop one fuseplug. Which fuseplug, depended on chance. To remove this uncertainty, the commission recommended replacing the East Atchafalaya floodway with the smaller Morganza floodway, which was to be equipped with a controlled intake structure directly on the Mississippi River. The benefits of the substitution were threefold. First, with the intake structure directly on the Mississippi River, the floodway would assure the integrity of the levee system from Old River to the Bonnet Carré floodway. Second, with the head of the proposed floodway stretching from Smithland to Morganza, more than 100 square miles of valuable

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farmland in Point Coupee Parish that was to fall within the East Atchafalaya floodway would now be protected from the project design flood. Third, the Morganza floodway, combined with the increased carrying capacity of the Atchafalaya River and the newly proposed Wax Lake outlet, might improve conditions in the Red River backwater area to the point that the use of the West Atchafalaya would become less likely in the future.

In 1936, Congressed passed the Overton Act, thus authorizing the proposed modifications of the Mississippi River Commission. But there was a catch. The act contained a provision that precluded the construction of either the Morganza or Eudora floodways until 75 percent of the necessary land rights in both floodways had been acquired by the federal government. With the proposed modifications, landowners from within the Atchafalaya floodways had come to view diversion through the basin as a necessary evil and pushed for the completion of the floodways. By linking the fate of the floodways, Congress intended to encourage landowners within the Eudora floodway to accept a similar fate. Instead the exact opposite occurred as Eudora floodway landowners were just as vehement in their opposition to the floodway as Boeuf floodway landowners had been. The lack of progress in acquiring the necessary land rights in the Eudora floodway was preventing the construction in the Morganza floodway.

The 1937 flood proved to be another turning point on the floodway issue. The flood surpassed the previous high water marks on the Mississippi River between the mouths of the Ohio and Arkansas rivers, and prompted the first ever operation of the Birds Point-New Madrid floodway on January 25. As the flood crest rolled passed Memphis, news of the unprecedented stages spurned predictions that the intended fuseplug levees along the Boeuf, Tensas, and Atchafalaya basins would be overtopped and the areas, whether intended or not, would function as floodways only with no guide levees to contain the diversions. This speculation only worsened when the Bonnet Carré floodway was placed into operation for the first time on January 28.

The predictions never materialized into facts. The cutoff and corrective dredging efforts had dramatically increased the carrying capacity of the channel between the Arkansas River and Old River. For rising stages above 45 feet on the Arkansas City gage, the discharge of the 1937 flood approached 700,000 cfs in excess of that the 1929 flood—an increase of 50 percent—but was carried at the same stage. The 1937 flood may have surpassed the previous high water marks above the mouth of the Arkansas River, but the flood fell short of the project design flood between the Arkansas River and Old River. For this reason, the Mississippi River Commission remained convinced that the Eudora and Morganza floodways acted as a necessary insurance policies to protect the integrity of the levee system during the project design flood.

Through the 1938 Flood Control Act, Congress again sought to settle the floodway issue. The act divorced the land rights acquisition processes of the Eudora and Morganza floodways. Under the law, construction of the Morganza floodway could begin without delay upon the federal government's acquisition of the requisite flowage rights and easements. The law also authorized the federal government to enter into condemnation proceedings in either floodway if landowners refused to sell. To placate Eudora floodway landowners, the legislation provided for a

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controlling masonry weir and allowed the construction of a fuseplug levee behind the weir to prevent overflow into the floodway if it should be determined by the Chief of Engineers that the flood could be safely confined by the levee system. To further pacify them, the law provided for the improvement and raising of the fuseplug levee from the pre-1927 grade and section to the 1914 grade and 1928 section.

Despite the concessions in the 1938 act, the Eudora floodway remained an unacceptable option to the landowners within the floodway. They viewed their situation as having to bear the brunt of major floods to spare their neighbors on the east bank of the Mississippi River in the Yazoo Delta from the same fate. West bank interests within the Eudora floodway had moved passed the issue of just compensation in favor of the outright elimination of the floodway and the restoration of levee protection equal to that on both banks of the Mississippi River. This push, in turn, sparked opposition from east bank interests. Under the MR&T project east-bank interests in Mississippi at that time enjoyed a 3-foot levee height superiority over the west bank because the fuseplug levees at the entrance of the Eudora floodway remained at their pre-1927 flood heights. Those along the east bank argued that the Eudora floodway was a natural outlet to the Gulf through the Tensas basin; the Yazoo basin was not. When historic floods 1897, 1913, and 1927 overwhelmed the levee system protecting the Yazoo front, the floodwaters coursed southward only to reenter the Mississippi River near Vicksburg. The levee height superiority enjoyed by the Mississippi interests assured that any diversion of potential floodwaters in excess of the channel's capacity would take place on the west bank of the river through the planned floodway.

During the summer of 1941, the Mississippi River Commission again proposed modifications to the project. Based largely on those recommendations, Congress crafted legislation that provided for the abandonment of the Eudora floodway and raising west bank levees one foot above the project flood flow line, while raising east bank levees three-feet above the same elevation. There was a serious downside to this plan in that confining the project flood between levees meant that an additional 700,000 cfs would not be diverted through the Eudora floodway and would remain in the main channel, causing higher stages of 5-6 feet on the Mississippi River on the Vicksburg gage and the inundation of an addition 247,000 acres within the Yazoo backwater area. As a concession for the increased backwater flooding in the Yazoo basin caused by the abandonment of the Eudora floodway and the raise in levee heights along the Mississippi, the compromise legislation provided for added protection from backwater and headwater flooding in the Yazoo backwater area through a combination of levees, drainage culverts and pumping stations. *(For more information on the historical context of the Yazoo pumps authorization, please see "Mississippi River & Tributaries Project: Authorization of Yazoo Backwater Improvements.")*

Equipped with these promises, the east bank interests in Mississippi conceded the abandonment of the Eudora floodway and agreed to protect the Yazoo backwater area with a system of levees, floodgates, and pumping plants with a total capacity of 14,000 cubic feet per second. The compromise became law by its inclusion in the 1941 Flood Control Act. The battle over the floodways had ended, but the legacy of the 1941 compromise remains incomplete. The Yazoo

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backwater pumping plants that were so crucial in the final abandonment of the Eudora floodway have yet to be realized. The constructing of the pumps is currently facing strong opposition from environmental interests.

Sources

Charles A. Camillo and Matthew T. Pearcy. *Upon Their Shoulders: A history of the Mississippi River Commission from its inception through the advent of the modern Mississippi River and Tributaries Project*, Mississippi River Commission, 2004.

Norman R. Moore. *Improvement of the Lower Mississippi River and Tributaries, 1931-1972*, Mississippi River Commission, 1972.

Martin Reuss. Designing the Bayous: The Control of Water in the Atchafalaya Basin, 1800-1995. Office of History, U.S. Army Corps of Engineers, 1998.

U.S. Congress. House of Representatives. *Laws of the United States Relating to the Improvement of Rivers and Harbors*, Flood Control Acts of 1928, 1936, 1941 and Overton Act of 1936.

_____. *Flood Control in the Mississippi Valley*, 70th Cong.,1st sess., 8 December 1927, Document no. 90.

_____. Committee on Flood Control. *Opinion of the Attorney General in Regard to Certain Provisions of the Mississippi Flood Control Act of May 15, 1928*, 71st Cong., 1st sess., July 19, 1929, Committee Document no. 2

_____. Committee on Flood Control. *Comprehensive Flood Control plan for Oho and Lower Mississippi Rivers*, 75th Cong., 1st sess., 1937, Committee Document no. 1.

_____. Committee on Flood Control. *Flood Control on the Lower Mississippi River*, 77th Cong., 1st sess., 1941, House Document no. 359.

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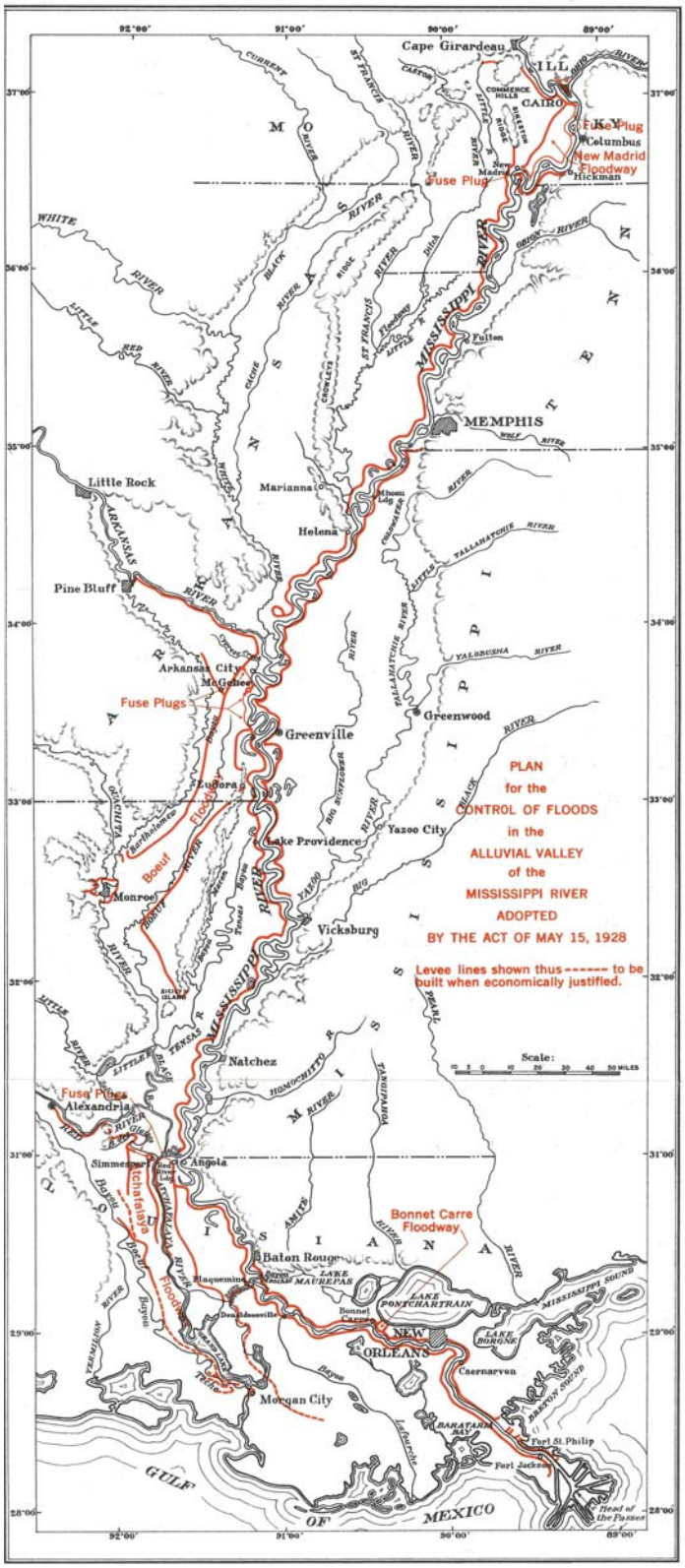
The Mississippi River & Tributaries Project: The Floodway Battle



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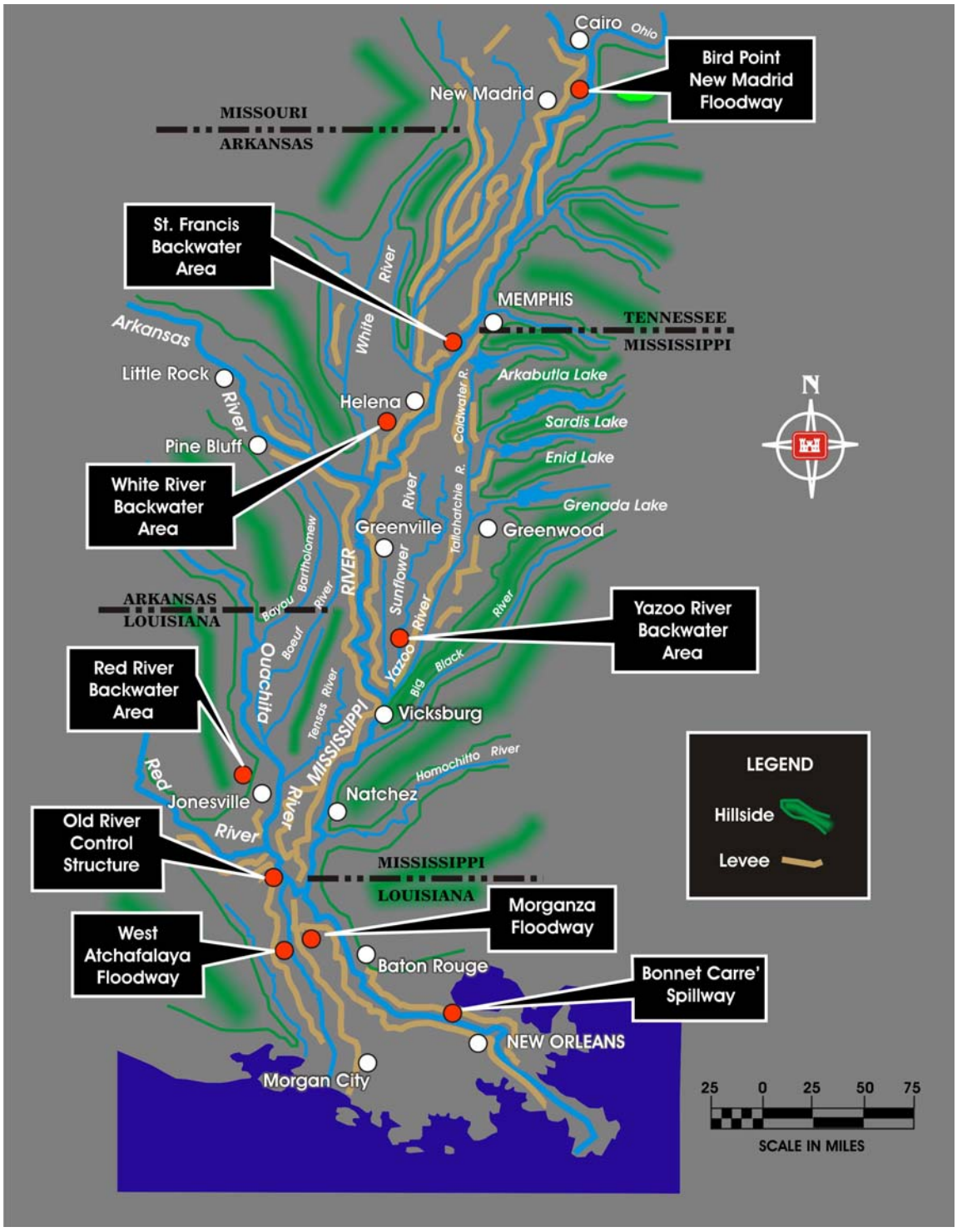

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