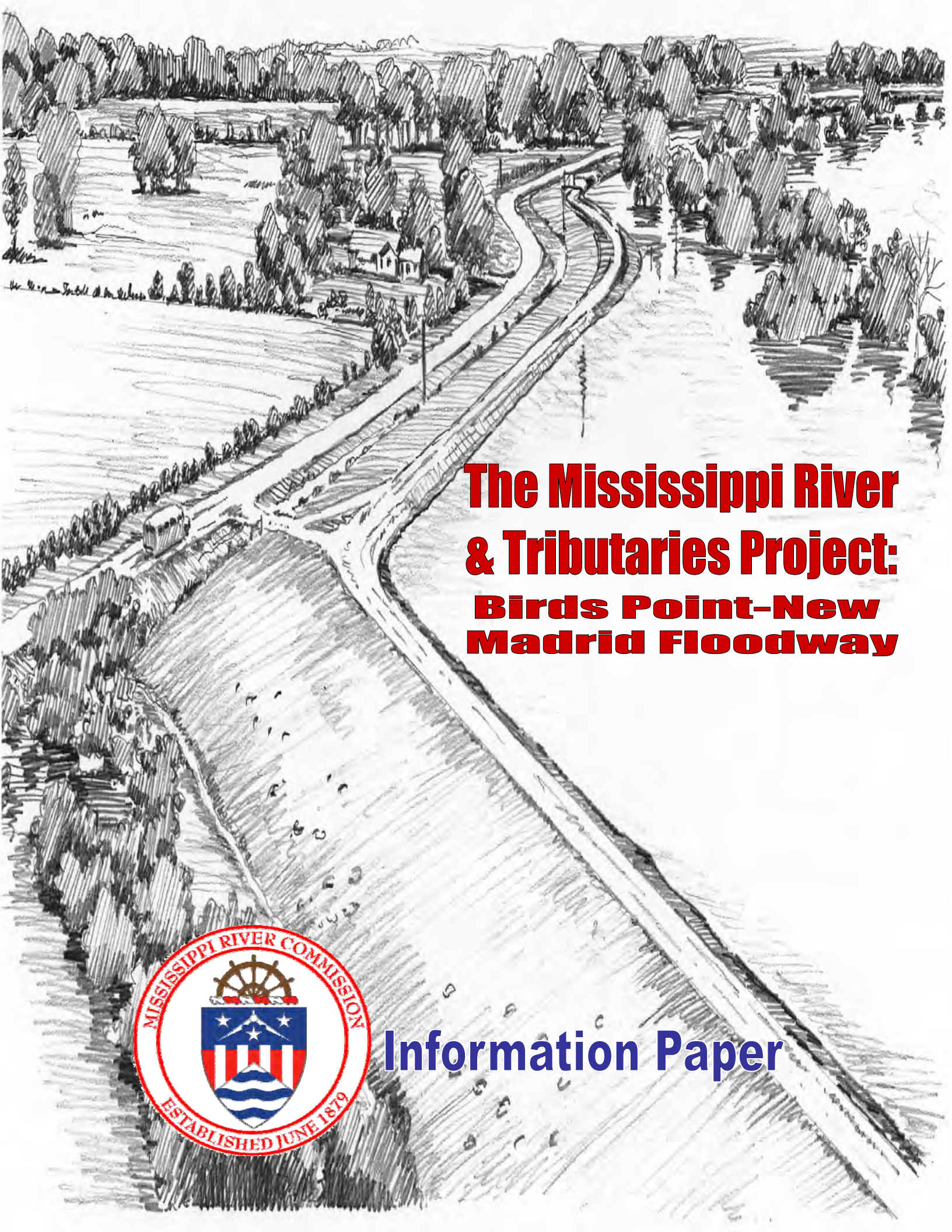


The Mississippi River & Tributaries Project:

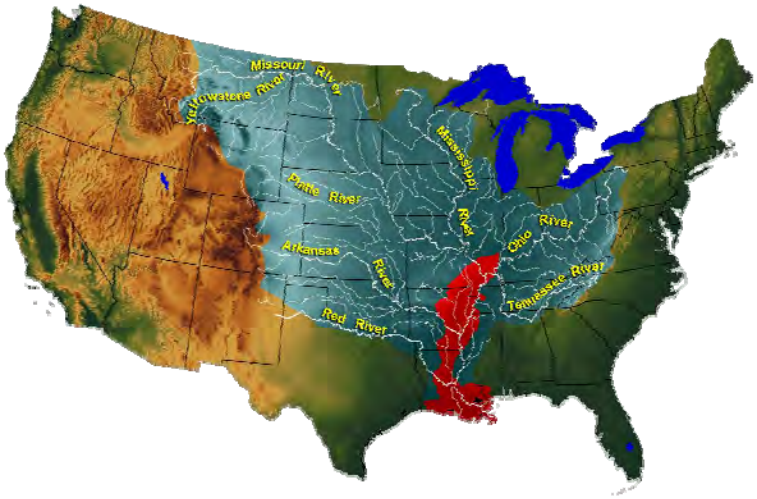
Birds Point–New Madrid Floodway

MISSISSIPPI RIVER COMMISSION
ESTABLISHED JUNE 1879

Information Paper

Birds Point-New Madrid Floodway

The Mississippi River & Tributaries (MR&T) project was authorized by the 1928 Flood Control Act. Following the devastating 1927 flood, the nation galvanized 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 to ease stress on the levee system; 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.



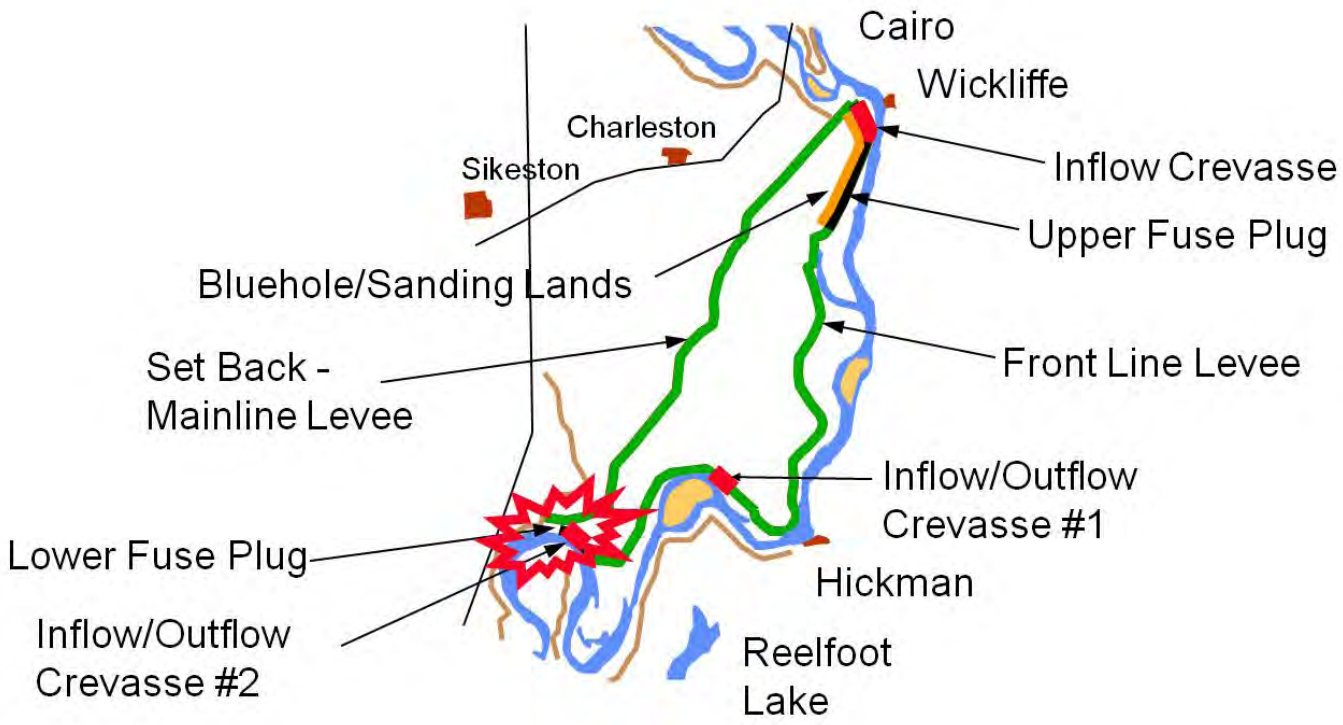
Since its initiation, the MR&T program has brought an unprecedented degree of flood protection to approximately 4 million people living in the 35,000 square -mile project area. The nation has contributed nearly $13.6 billion toward the planning, construction, operation, and maintenance of the project. To date the nation has received a 27 to 1 return on that investment, including $370.3 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.

Birds Point-New Madrid Floodway

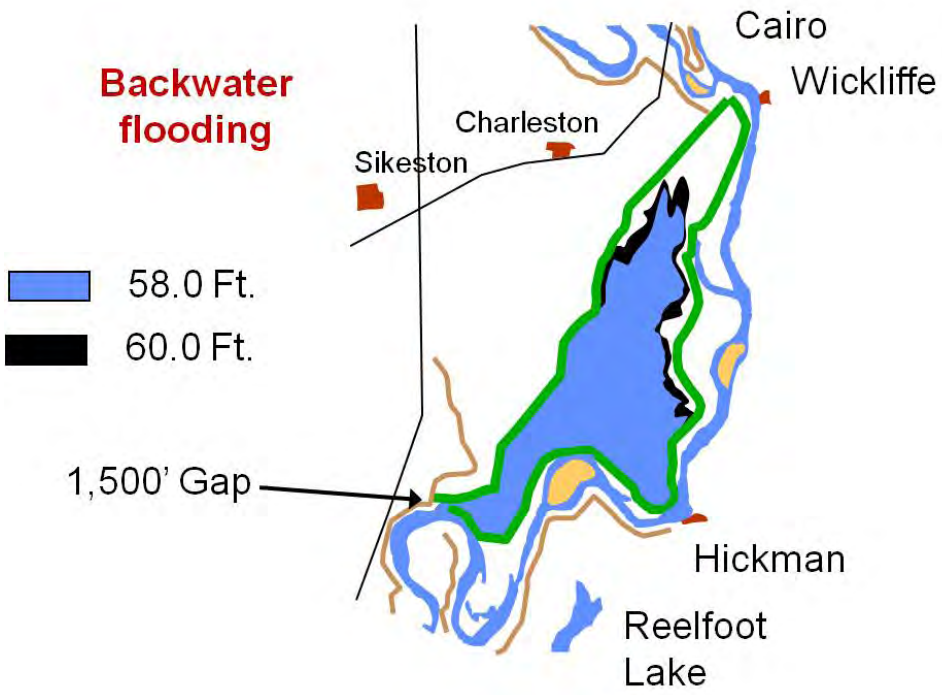
The success of the MR&T flood control program can be traced to a change in engineering policy following the 1927 flood. Prior to that tragic flood event, the control of floods on the lower Mississippi was attempted by building levees high enough to withstand the last great flood of record. Since the inception of the MR&T project, floodways and other engineering techniques supplement the levee system in controlling the project design flood—the maximum flood with a reasonable chance of occurring.

Birds Point-New Madrid Floodway

The Birds Point-New Madrid floodway reduces flood stages and prevents the project flood from exceeding the design elevation on the Mississippi River at and above Cairo, Illinois, and along the east bank levee opposite the floodway. The boundary of the three-to-ten mile wide floodway is defined by the 56-mile long frontline MR&T levee between Birds Point, Missouri, and New Madrid, Missouri, on the east and the 36-mile long setback levee on the west. The frontline and setback levees end without connecting near New Madrid, leaving a 1,500-foot gap that serves as an outlet for interior drainage. This gap also permits backwater flooding in the lower portion of the floodway. The area within the floodway comprises a little more than 130,000 acres.



The floodway is designed to divert 550,000 cfs from the Mississippi River during the project flood and provides an estimated seven feet of stage lowering in the vicinity of Cairo, with



smaller reductions above Cairo and through the floodway reach. The frontline levee has two fuseplug levee sections—an 11-mile section at the upper end and a 5-mile section at the lower end—that are constructed to a lower height than adjacent sections. Under the current operating plan developed in 1986, the floodway is activated when sections of the frontline levee naturally overtop or are artificially crevassed. The floodway requires a timely operation to insure it performs as designed during a flood approaching the project flood magnitude. In addition to natural overtopping, the plan of operation involves the placing and detonation of explosives at critical locations. The operation of the floodway is directed by the president of the Mississippi River Commission after consultation with the Chief of Engineers. *(For more information on how the floodway and other features of the MR&T project convey the project design flood, please see, "Mississippi River & Tributaries Project: Controlling the Project Flood.")*

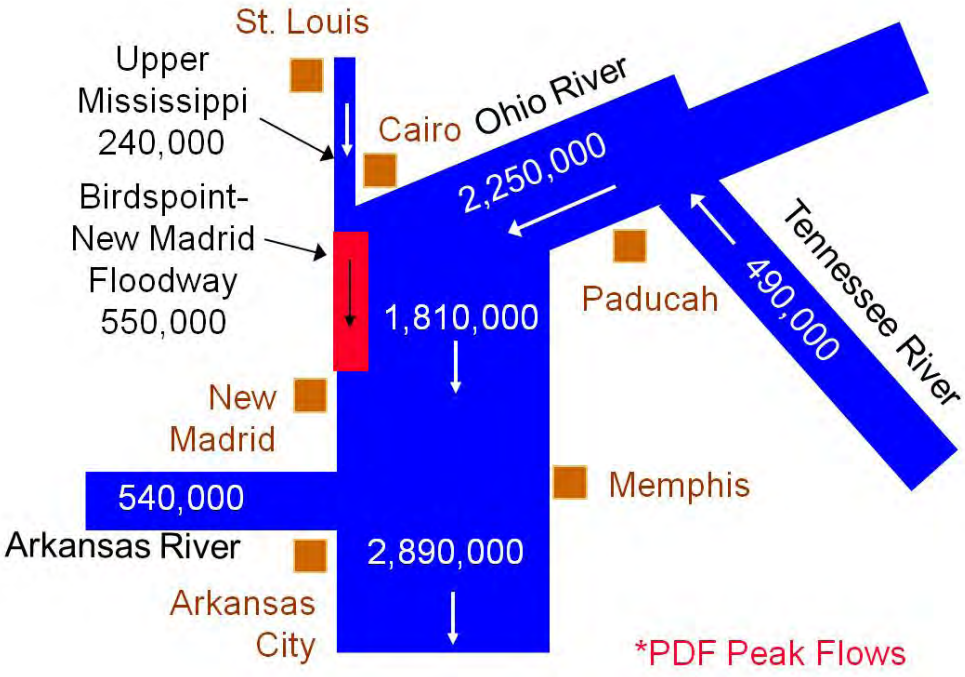
Early Floodway Opposition

The Birds Point-New Madrid floodway proved controversial prior to the final enactment of the 1928 Flood Control Act. In June 1927, President Calvin Coolidge instructed the Mississippi River Commission and the Corps of Engineers to develop comprehensive plans for protecting the alluvial valley from Mississippi River floods. On September 28, the Commission submitted a plan to Maj. Gen. Edgar Jadwin, the Chief of Engineers. The Commission plan, with an estimated cost of a then staggering $872 million, recommended the inclusion of four floodways into the general plan, but those floodways were all situated below the mouth of the Arkansas River. From Cape Girardeau, Missouri, to the mouth of the Arkansas River, the Commission recommended stronger and higher levees that would be set back from the existing levee system at places where the confined channel was too narrow to handle the maximum probable flood. To provide protection for Cairo, at that time a lavish and bustling river town with a population exceeding 15,000, the Commission recommended raising the level of levee protection to 70.4 feet on the Cairo gage.

Birds Point-New Madrid Floodway

Jadwin rejected the Commission's report largely because of the costs involved and submitted his own plan. One of the more noticeable engineering differences in Jadwin's plan was the Birds Point-New Madrid floodway, which the Chief of Engineered believed was less expensive and less dangerous than the Commission recommendation for higher and stronger levees. The floodway was to be created by building a setback levee 3-10 miles west of the existing mainline Mississippi River levee. Eleven miles of the mainline levee were to be lowered or degraded by 3.5 feet to correspond with a stage of 55 feet on the Cairo gage. The degraded sections of levee represented the dreaded fuseplug levee. Under project flood conditions, the levee would overtop and crevasse, thereby putting the floodway into operation.

A review of the transcripts of the hearings held by the House Committee on Flood Control reveals that many residents from within the alluvial valley favored the Mississippi River Commission plan over the Jadwin plan. Obviously, interests in southeast Missouri who owned land within Jadwin's proposed Birds Point-New Madrid floodway were among those who favored the Commission plan.



The call for floodways marked a necessary turnaround in the engineering policy practiced prior to the 1927 flood. The flood had forced that change, but even in the wake of its widespread devastation a controversy emerged over the reality of actually implementing the floodways. Residents within the floodways were ill-prepared for that reality, which assured that private land once protected by levees would now be subject to inundation to reduce flood stages elsewhere in the valley. Under the Jadwin plan, the Birds Point-New Madrid floodway was designed to do just that. Opposition to that floodway was best expressed by Missouri congressman Dewey Short when he proclaimed to the House Committee on Flood Control that his constituents "do not want to see southeast Missouri made the dumping ground to protect Cairo, much as we love Cairo."

Legal Opposition

The 1928 Flood Control Act adopted the engineering features of the Jadwin plan. Section 4 of the legislation obligated the federal government to compensate landowners within all of the MR&T project floodways who would be subjected "to additional destructive floodwaters that will pass by reason of diversion" from the Mississippi River. On December 11, 1928, Coolidge approved the federal acquisition of flowage rights—a one-time indemnity paid landowners to flood their land during the operation of the Birds Pont-New Madrid floodway. Coolidge also authorized the purchase of a strip of land immediately adjacent to the upper fuseplug section of the frontline levee at price capped at two times the 1928 assessed value of the land, but stipulated that the fuseplug levee could not be constructed until at least 50 percent of the flowage rights had been secured.

Construction was scheduled to commence in the summer of 1929, but George W. Kirk, who owned land in the floodway, filed a lawsuit seeking an injunction to stop the awarding of contracts. In the lawsuit (Kirk v Good), Kirk maintained that because of the floodway, he would be unable to sell his property or use it as security to obtain loans. Judge Charles B. Davis of the Federal District Court of Missouri denied the injunction on the grounds that the damages Kirk would sustain would be "mere consequential damages such as the construction of any major public work is likely to entail." If damages were to be realized through the operation of the floodway, the landowner had "complete and adequate remedy" for compensation under the provisions of the1928 Flood Control Act.

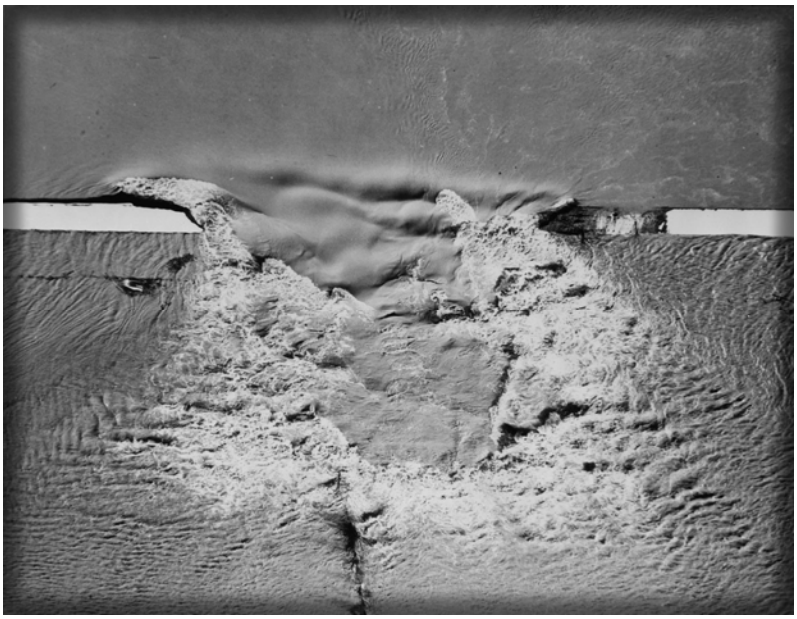
Following the dismissal of the case, construction of the setback levee commenced on October 21, 1929, as did improvements to carry the drainage intercepted by that levee. This work was completed by the end of October 1932. For all intents and purposes, the floodway was operational. The only remaining work involved degrading the fuseplug levee to a height corresponding to 55 feet on the Cairo gage. The levee had not been degraded because the federal government had reached agreement to purchase only 44 percent of the necessary flowage easements within the floodway. Easements for the remaining tracts were either before the courts for review and settlement or tied up in litigation.

The most prominent of the unsettled easement acquisitions involved 20,088 acres comprising several tracts known collectively as the "Matthews tracts." These lands fell within the backwater limits inside of the floodway. In January 1932, the Corps of Engineers offered nearly $400,000 for the purchase of flowage easements over the property. The owners of the land accepted the offer, but the Department of Justice later determined that the acquisition price was too high for lands subject to backwater flooding and formally withdrew it. New offers were made, but they were rejected by the owners. In June, A.J. Matthews, trustee of the property, brought suit in the Court of Claims to enforce payment of the original offer on the grounds that he had entered into an enforceable contract with the federal government. The next April, Matthews voluntarily

withdrew the suit and filed a separate action in the Court of Claims under the Tucker Act (Matthews v United States). Matthews argued that the federal government, by virtue of constructing the floodway, had taken his land and was liable to pay him $1.9 million in damages as just compensation. The court, though, ruled that construction of the floodway at the time the suit was filed did not constitute a taking of the land. Furthermore, the court determined that the land in question would already be inundated from backwater flooding through the 1,500-foot gap by the time stages on the Mississippi River would necessitate the operation of the floodway. In simpler terms, the court essentially found that water on top of water did not represent a taking of the land.

In light of this decision by the Court of Claims, the federal government did not purchase flowage easements covering the Matthews tracts, even though flowage rights had already been purchased for more than 30,000 acres comprising several other tracts within the backwater limit. The acquisition of flowages easements and land rights had proved difficult and time consuming. It was not until January 1942—fourteen years after the passage of the 1928 Flood Control Act—that the federal government completed the acquisition of flowage rights on the necessary 106,858 acres within the floodway at an average price of $17 per acre.

The 1937 Flood



The Great Flood of 1937 along the Ohio and Mississippi valleys provided the first significant test of the MR&T flood control project and, more precisely, of the Birds Point-New Madrid floodway. The flood emanated from the Ohio River and reached a record maximum discharge of 1,850,00 cfs at Cairo. While the Mississippi River above Cairo was at a low stage, the combined flows surpassed the highest flood stages ever experienced between Cairo and Helena, Arkansas. As flood stage exceeded 58 feet on the Cairo gage on January 23, Brig. Gen. Harley Ferguson, the president of the Mississippi River Commission, approved the operation of the floodway. Reminiscent of the 1927 flood, a handful of the 3,000 inhabitant residing in the floodway, armed themselves and threatened to prevent the opening of the floodway. As a result, the Missouri Governor summoned the Nation Guard to remove the stragglers and protect workers attempting to open the floodway.

Birds Point-New Madrid Floodway

With floodwater already spilling over the frontline levee through groupings of natural crevasses near river mile 18 and river mile 30, personnel from the Corps of Engineers Memphis District attempted to breach the upper fuseplug levee, which had still not been degraded, with picks and shovels. These efforts failed to produce the desired result. On January 24, preparations were made to open the northern portion of the upper fuseplug with dynamite. On January 25, the explosives were detonated, opening a small section of the levee and sending floodwaters coursing through the floodway. A second artificial crevasse near the upper fuseplug section was executed the following day, and another grouping of natural crevasses in the frontline levee later developed near river mile 49. At crest stage, the Mississippi River Commission estimated that the floodway was passing approximately one-fourth of the entire flood discharge at Cairo. If the floodway had not been artificially crevassed, most of the floodway would still have been flooded as a result of natural crevasses and overtopping along the frontline levee and backwater flooding through the 1,500-foot gap.

The operation of the floodway, while successful, left a profound impact on Maj. Gen. Edward Markham, the Chief of Engineers. After the operation of the floodway, Markham testified before the House Committee on Flood Control that, “I am now of the opinion that no plan is satisfactory which is based upon deliberately turning floodwaters upon the homes and property of people, even though the right to do so may have been paid for in advance.”

Operations Since 1937

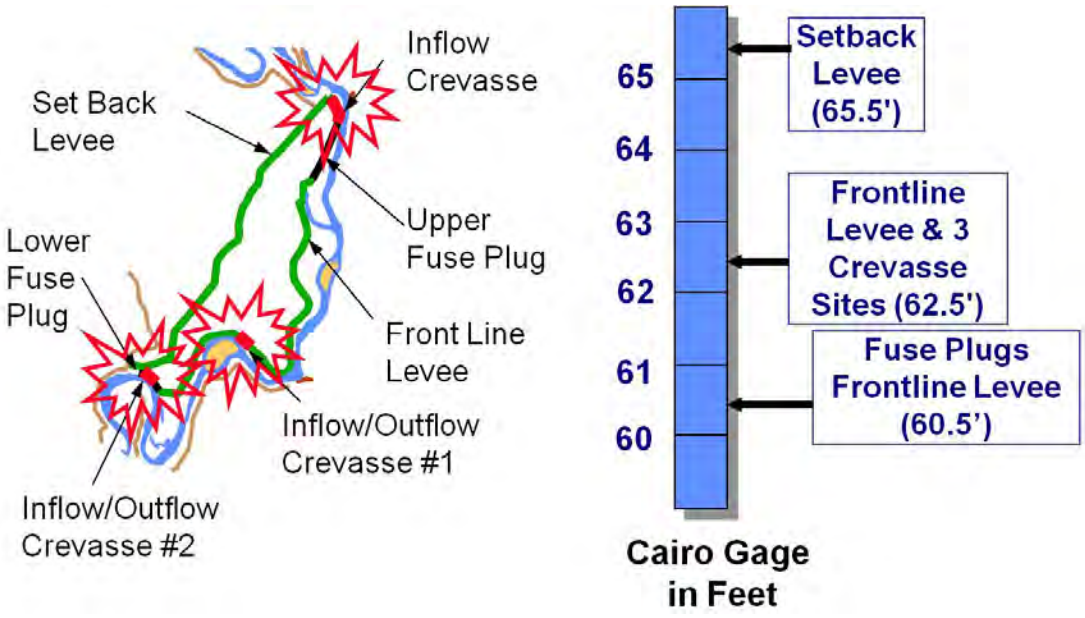
The Birds Point-New Madrid floodway has not been placed into operation since the 1937 flood. One contributing factor has been the construction of two major reservoirs—Kentucky and Barkley lakes—on the Tennessee and Cumberland rivers. Though they are not features of the MR&T project, the reservoirs are authorized through the 1944 Flood Control Act to reduce flood stages to safeguard the levee system on the Mississippi River in the vicinity of and downriver from Cairo and to reduce the frequency of operation of the Birds-Point New Madrid floodway.

The floodway came perilously close to operation during the 1950 flood. In January of that year, three to four times the normal rainfall fell over a 200-mile band extending from Memphis, Tennessee, to Toledo, Ohio. This rainfall event over the Ohio River basin was second only to the 1937 storm that produced the great flood of that year. In response, the Mississippi River Commission and the Corps of Engineers began positioning equipment and personnel at the site of the fuseplug sections. As excessive rains continued to fall over a large swath of the Ohio River basin during the first three weeks of February, floodway residents received notices alerting them oft the possible operation of the floodway. Many residents from within the floodway evacuated the area. The flood crested at 55.9 feet on the Cairo gage on February 15, but river stages remained above 50 feet until the end of the month. It was not until March 1 that the Corps of engineers released notices indicating that the operation of the floodway would not be necessary.

After 1950 the Mississippi River did not experience any significant floods until 1973, however, backwater flooding resulting from lower magnitude high water events continued to plague more than 80,000 acres in the lower portion of the floodway. The 1954 Flood Control Act sought to

remedy the situation by authorizing a new levee to project grade extending across the 1,500-foot gap at the lower end of the frontline levee and providing for the construction of a gravity drainage structure. Under the provisions of the act, up 32,000 acres of low land near the control structure would be utilized as a ponding area. The legislation also required local interests to furnish all lands, easements, rights-of-way, and flowage rights.

In 1959, the St. John Levee and Drainage District began acquiring the necessary easements within the backwater area and succeeded in obtaining those easements covering 57,000 acres. The acquisition program, however, encountered resistance from landowners closer to gap over the use of their property as a ponding area. The landowners preferred the construction of a pumping plant in conjunction with the authorized gravity drainage structure. Because of this lack of cooperation, the levee district was unable to acquire the necessary easements covering 21,500 acres, and the acquisition program went dormant. The local sponsor's failure to complete the acquisitions prevented the Corps of Engineers from initiating the authorized work. While the lower portion of the floodway continued to experience significant backwater flooding, the inability to close the gap and construct the drainage structure posed no threat to floodway operations.



Following a comprehensive review of the MR&T project in 1959, the Mississippi River Commission recommended that the frontline levee be raised to a grade corresponding to 62 feet on the Cairo gage and that the fuseplug sections be raised to a grade corresponding to 60 feet on that same gage. The levee improvements would enhance the level of protection within the floodway by reducing the expected frequency of its operation. The 1965 Flood Control Act authorized these recommendations. The act also stipulated that the floodway would not be placed into operation by overtopping until a flood stage of 60 feet was predicted, but still allowed for the Mississippi River Commission to create artificial crevasses in the fuseplug levee or elsewhere when stages reached 58 feet on the Cairo gage and a stage higher than 60 feet was predicted.

Birds Point-New Madrid Floodway

Following the passage of the 1965 Act, the Mississippi River Commission further modified the plan for operating the Birds Point-New Madrid floodway. The new plan raised the fuseplug sections to a height corresponding to 60.5 feet on the Cairo gage, raised the frontline levee to 62.5 feet, and raised the setback levee to a height of 65.5 feet. The plan called for the operation of the floodway through explosives detonation only at the upper fuseplug section when stages reached 58 feet at Cairo with a forecast of stages to exceed 60 feet.

These changes necessitated a round of modified easement acquisition covering 80,982 acres of land, of which more than 76,000 acres were already embraced under the original easements obtained between 1928 and 1942. Pursuant to the ruling in the Matthews decision, all of these lands were above elevation 300 NVGD and, therefore, were outside of the backwater limit. Between 1968 and 1974, the federal government acquired the necessary modified flowage easements at prices ranging from $1 to $100 per tract.

The easements conformed to the new plan of operation and reserved for the federal government the right to operate the floodway by artificial crevassing. The easement also reserved to the owners the right to compensation if operation of the floodway resulted in "excessive deposits of sand and gravel" upon the land.

Following the floods of 1973, 1975, and 1979, the Mississippi River Commission revised its plan further after concluding that the operation of the floodway would be more safe and effective if artificial crevasses, including the use of explosives, were not limited to the upper fuseplug section. The new plan of operation included artificial crevasses at four locations along the frontline levee: two at the upper fuseplug section, one at the lower fuseplug section, and one in the frontline levee opposite Hickman, Kentucky. To assure the artificial crevasses came at the precise time to protect against the project design flood, the commission made provisions for the use of explosives if necessary.

The Mississippi River Commission and the Corps of Engineers, though, soon realized that neither possessed sufficient property rights to enable personnel to access the levee to place explosive materials as prescribed in the modified plan. The original and modified easements obtained under the authority of the 1928 and 1965 flood control acts covered only those lands between the landside toe of the frontline levee and the riverside toe of the setback levee. The easements did not extend to lands upon which the frontline levee rested.

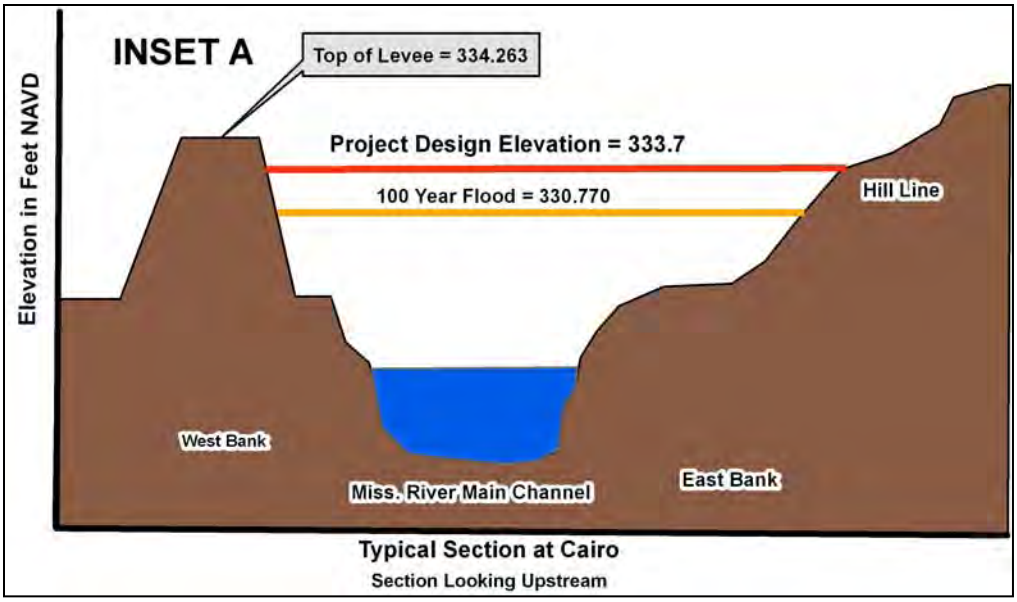
On July 20, 1981, Colonel W.H. Reno, the Memphis District commander, requested that the St. John Levee and Drainage District and Levee District No. 3 of Mississippi County, Missouri, grant rights of entry for district personnel to access the levee in order to artificially crevasse it with explosives in the event river conditions warranted operation of the floodway. Both sponsors refused in early November.

Birds Point-New Madrid Floodway

In 1983 another flood struck the Mississippi valley. The National Weather Service forecasted that flood stages would reach 60 feet on the Cairo gage, prompting the Mississippi River Commission to make contingency plans for the operation of the floodway. In early March, the federal government instituted eminent domain proceedings seeking immediate possession of the necessary easements to allow Memphis district personnel to access the frontline levee and put the plan of operation into effect if conditions necessitated. In response, several landowners joined with Levee District No. 3 in filing a lawsuit with the Federal District Court in Cape Girardeau, Missouri, seeking a temporary injunction to prevent the operation of the floodway. On May 10, Judge Kenneth Wangelin issued a permanent injunction against the plan to operate the floodway with four artificial crevasses. In making his decision, Wangelin ruled that the 1965 Act did not provide congressional approval to artificially crevasse the frontline levees, to include the fuseplug sections, and that no substantial evidence existed to suggest that it was necessary to make artificial crevasses to ensure operation of the floodway. Wangelin also ordered that if his injunction was reversed by appeal the federal government must deposit $10.4 million dollars with the court for “just compensation” if the floodway were operated.

The predicted flood stages never materialized during the 1983 flood due in part to the reduction in stages provided by Kentucky and Barkley lakes. The operation of the Birds Point-New Madrid floodway would have been a moot point, but the district court’s injunction remained intact. The federal government appealed the case to the 8th U.S. Circuit Court of Appeals. On April 15, 1984, the appellate court reversed the district court’s decision by finding that the plan to operate the floodway was not “arbitrary, capricious or an abuse of discretion.” The court also questioned Wangelin’s authority to review the case at all by finding that the decision to operate the floodway “is one committed to agency discretion by law…and is unreviewable.” Last the court ruled that the district court had erred in instructing the federal government to deposit the $10.4 million as compensation.

In the aftermath of the 1983 flood, the Mississippi River Commission tweaked the operational plan in 1986 in an effort to reduce preparatory actions and to delay the operation of the floodway until later in the project design flood curve. Elements of the plan included raising 2.5 miles of the upper fuseplug section and 1.5 miles of the lower fuseplug, and imbedding the raised sections with polyethylene pipe that could be filled with blasting agent in less than a day. The explosives could also be removed safely in the event that river stages did not necessitate the operation of the floodway. The timetable for the new operational plan was based on the river elevations projected in the design hydrograph for floods approaching the project design flood. When stages reached 56 feet on the Cairo gage, a tow with the necessary equipment would depart the Ensley Engineer Yard. Preparation of the inflow crevasse would begin when stages reached 59 feet and would be completed by the time the river reached 60 feet. Artificial crevassing of the levee would commence upon the command of the Mississippi River Commission president prior to river stages reaching 61 feet on the Cairo gage with additional stage increases in the forecast.



Residents within the floodway, though, pushed for its outright abandonment. In 1987, Missouri congressman William Emerson prodded the House Committee on Public Works and Transportation to pass a resolution that directed the Corps of Engineers to determine feasible alternatives to operating the floodway. This resulted in a 1990 reconnaissance that investigated several alternatives to include purchasing the land within the floodway; constructing permanent auxiliary channels in the floodway to confine floodwaters diverted into the area, rather than allow them to overflow the entire floodway; realigning and setting back the frontline levee at five locations to provide a wider floodplain; executing a cutoff at Bessie Bend to increase the slope and lower flood stages upstream of the bend throughout the floodway reach; and a plan of natural overtopping of the frontline levee. The study concluded that several of the alternatives were feasible from an engineering viewpoint, but were not justified economically. The study further concluded that the plan of natural overtopping of the frontline levee without artificial crevasses would serve as an alternative to the 1986 plan of operation and would provide a higher level of protection for the lands within the floodway. This alternative would

require raising the upper fuseplug section to height corresponding to 64.5 feet on the Cairo gage, while leaving the elevation of the lower fuseplug section unchanged.

The reconnaissance study served as the basis for engineering review of the potential impacts of the natural overtopping plan along both banks of the Mississippi and Ohio rivers. Published in 1991 by the Memphis District, in coordination with the Louisville District, the engineering review determined that the implementation of the modified plan required improvements to existing levees and floodwalls and alterations to existing pumping stations and culverts in both districts at a cost of $140 million--$100 million in the Memphis District and $40 million in the Louisville district. In April 1992, the Mississippi River Commission endorsed the modified plan and requested that the district furnish copies to local and congressional interests, because the implementation of the plan would require congressional authorization. Such congressional authorization has not been secured, and the 1986 plan of operation remains in effect.

Since the publication of the reconnaissance study and the engineering review, another significant flood struck the lower Mississippi valley in 1997. River stages on the Cairo gage exceeded 56 feet, prompting the Mississippi River Commission to beginning preliminary discussions concerning the possible operation of the floodway. Major General Robert Flowers, the President of the Commission, indicated his intention to operate the floodway if the river continued to rise and if the projected forecast exceeded 60 feet on the Cairo gage. Flowers also directed the Memphis District to load barges with material and equipment necessary to ensure its operation. Those conditions never materialized, thereby averting a showdown over the operation of the floodway. The Birds Point-New Madrid floodway, however, remains an integral fail-safe component of the MR&T flood control project. The very realistic prospect remains that the floodway will again be operated in the future.

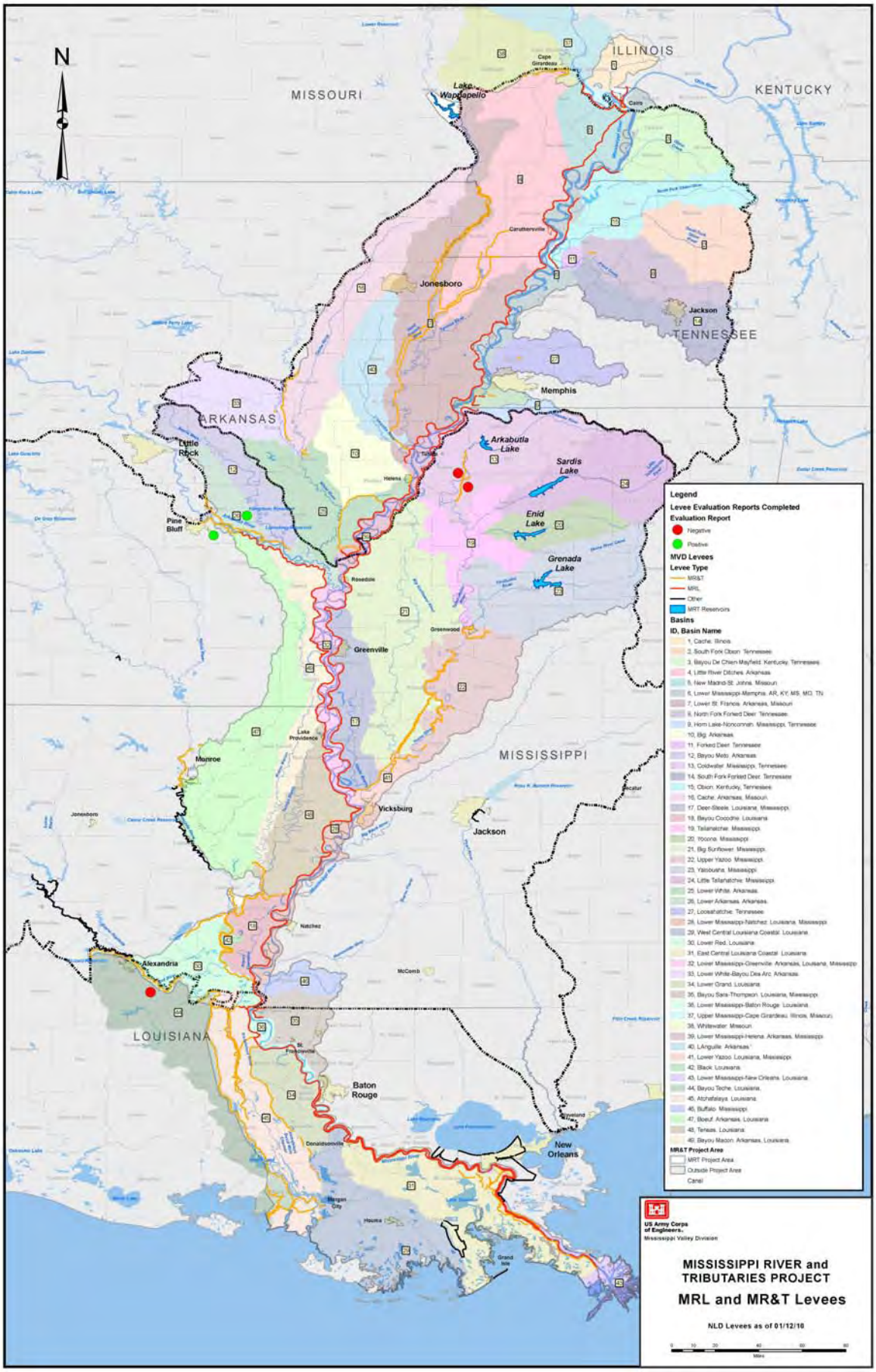
St. John's Bayou-New Madrid Floodway Project

Birds Point-New Madrid Floodway

The flood control features of Kentucky and Barkley lakes, along with the increase in the carrying capacity of the main channel of the Mississippi River and improvements to the frontline levee and fuseplug sections have provided a measure of protection to the lands within the floodway, particularly those above elevation 300 NVGD, by reducing the frequency of operation. Lands having a lower elevation, however, continue to face the threat of backwater flooding. The inability of local interests to fulfill the local cooperation requirements of the 1954 authorization to close the 1,500-foot gap at the lower end of floodway has prevented the backwater area from receiving that same level of flood control as evidenced by significant backwater flooding in 1961, 1962, 1964, 1972, 1974, 1975, 1979, 1983, 1984, 1993, 1994, 1995, 1996, 1997, 1998, 2002, and 2008.

The 1986 Water and Resources Development Act authorized the St. John's Bayou-New Madrid Floodway project as a related, but separate, project to the 1954 authorization to close the 1,500-foot gap in the frontline levee and construction of the gravity drainage structure. Authorized improvements under the 1986 act included the widening and straightening of approximately 144 miles of three separate channels to speed the evacuation of water within the St. John's Bayou basin and the lower portion of the New Madrid floodway. The act also authorized the construction of a 1,000 cfs pumping station for the St. John's Bayou area and a 1,500 cfs pumping station for the New Madrid floodway area to evacuate impounded floodwaters during periods of high stages on the Mississippi River.

In 2004, however, the Environmental Defense Fund and the National Wildlife Federation filed a lawsuit to prevent the construction of the project features authorized by the 1954 and 1986 acts. In September 2007, Judge James Robertson of the U.S. District Court issued an injunction preventing further work. Robertson also ordered the dismantling of work already completed. In the summer of 2008, the Department of Justice, after reviewing the court's ruling, determined that it would not appeal the decision. The Memphis District, in coordination with the local sponsor for the project, is currently developed a revised Environmental Impact Statement, which is scheduled for completion in December 2012.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Little Rock
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Sardis Lake
Enid Lake
Grenada Lake
Pine Bluff
Greenville
Monroe
Vicksburg
Jackson
Alexandria
Baton Rouge
New Orleans
Legend
Levee Evaluation Reports Completed
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MVD Levees
Levee Type
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MRL
Other
MRT Reservoirs
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MR&T Project Area
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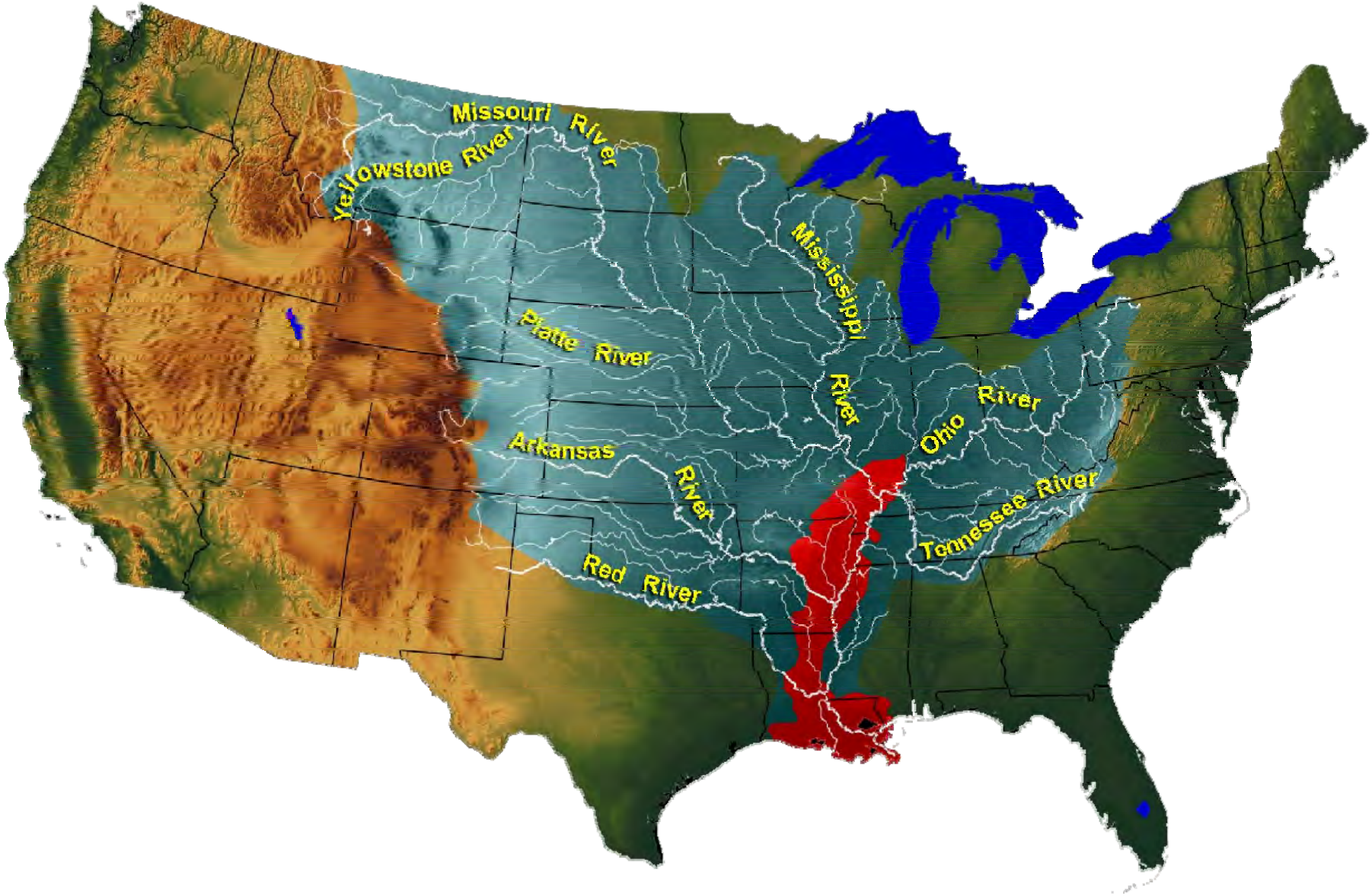
Outside Project Area
Canal
US Army Corps of Engineers
Mississippi Valley Division
MISSISSIPPI RIVER and TRIBUTARIES PROJECT
MRL and MR&T Levees
NLD Levees as of 01/12/10

Worlds 3rd Largest Watershed

Drainage basin for 41% of the United States