Chapter 82
The U.S. Army Corps of Engineers and the Mississippi River Cutoff Plan

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82.1 Introduction

In 1861 Capt. Andrew Humphreys and Lt. Henry Abbot of the U.S. Army Topographical Engineers released their monolithic work, the *Report on the Physics and Hydraulics of the Mississippi River*, more commonly called *The Delta Survey*. It was, according to historian John Barry (1997: 50–51), "one of the most influential single engineering reports ever written on any subject." In response to the mandate of Congress, the authors reviewed a variety of flood control methods: outlets, reservoirs, levees, reclamation, and cutoffs. While generally in agreement with previous studies on the use of levees, Humphreys and Abbot were in clear disagreement with other engineers in some of their conclusions. For example, they rejected a system of reservoirs proposed by civil engineer Charles Ellet only nine years previously. On the matter of making cutoffs, or cuts across the meandering loops of a river, their opinion was particularly strong. After comparing observations of the two known human-made Mississippi River cutoffs – Shreve's cutoff of 1831 and the Raccourci cutoff of 1849 – with European cutoffs and general theory, the report concluded that "a cut-off raises the surface of the river at the foot of the cut nearly as much as it depresses it at the head," thus proving that a system of cutoffs "is entirely inapplicable to the Mississippi River, in whole or in part" (Humphreys & Abbot, 1861: 402–403).

For nearly 70 years, leading river engineers embraced their recommendation, and though some engineers disagreed with the position, from the establishment of the Mississippi River Commission (MRC) in 1879, the verdict of Humphreys and Abbot remained the official policy of the U.S. government. Then, quite suddenly, the U.S. Army Corps of Engineers changed its position on cutoffs in 1932. Over the next dozen years, the Corps and the MRC set out on a channel rectification program that included more than a dozen cutoffs from Arkansas to Louisiana, which, along with other river improvements, shortened the river by 170 mi or 25% of the total length

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between Memphis, Tennessee, and Baton Rouge, Louisiana, and significantly lowered flood stages. Given the Corps' opposition to them only a few years prior, the cutoffs were one of the most dramatic reversals in river engineering policy, remarkable not only for their departure from accepted theory, but for their sudden end in 1944.

82.2 Origin of the Cutoff Policy

By the time that Congress established the MRC in 1879 to oversee improvements to the Mississippi River after a series of damaging floods, the ban on man-made cutoffs was already in effect. Leading engineers agreed that cutoffs were harmful. In addition to Humphreys and Abbot, Ellet had questioned the effectiveness of cutoffs, and the 1874 Warren Levee Commission, which Congress established to investigate reclamation of the river basin subject to inundation, had also opposed cutoffs. Leading civil engineers such as James Eads also believed them harmful. In this matter, the MRC merely received accepted tradition (Camillo & Pearcy 2006). When Mark Twain ridiculed the MRC in his novel *Life on the Mississippi* saying that "ten thousand River Commissions, with the mines of the world at their back, cannot tame that lawless stream," one of the charges that the character Uncle Mumford got wrong was the belief that the MRC would "plow down into an old ditch where the river used to be in ancient times; and they think they can persuade the water around that way" (Twain, 1986: 205, 207). In fact, the MRC tried to maintain the current riverbed to the largest degree possible.

Based mainly on Humphreys' *Delta Survey*, the view developed among most MRC engineers that any benefits from cutoffs were temporary in that they raised flood heights below the cut to the same degree they lowered them above, and caused dangerous increases in velocity that increased erosion and bank caving (U.S. Congress, 1880). Further analysis for the MRC by civil engineer Robert E. McMath in 1886 seemed to confirm this conclusion, and in fact he argued that the river was 100–200 mi too short. The logic, though odd to university-educated hydraulic engineers of the early twentieth century, then seemed obvious to engineers working by rule of thumb. As a consulting engineer for the MRC later explained McMath's position,

> . . .he rightly reasoned that if the channel were longer the fall per mile would be less and the current consequently slower and less able to erode the banks, so that from the standpoint of navigation the conditions would be improved. (Gardner, 1930: 1)

In other words, reduce the length and increase slope of the river, and higher velocities would result that would cave banks, reduce river draft, and damage navigation. Even had the technical analysis of MRC engineers been more favorable, it had neither the funding nor the dredging equipment necessary to seriously consider a cutoff program. While hydraulic dredges had existed since 1871, the first effective hydraulic dredge designed for use on the Mississippi did not appear until 1892 (Matthes, 1948).

There had been several natural cutoffs over the years, such as one that occurred in 1876 at Vicksburg, Mississippi, that separated the riverfront and port from the main channel. But once the MRC took charge of the river, its policy was not only to bar man-made cutoffs, but to prevent natural ones from occurring, primarily through bank stabilization works such as revetment, dikes, and groins. It was not always successful in doing so. There had been at least one natural cutoff in 1886 at Terrapin Neck creating Eagle Lake, and at least 13 natural chute cutoffs, the enlargement of a diverging channel across a meandering bend, which the MRC considered less dangerous because they were shorter and more gradual. For example, in 1913 an enlargement of the Albemarle Chute resulted in the Newman Cutoff (Matthes, 1948; Winkley, 1977). In addition, bank caving threatened cutoffs at many other locations, which the MRC tried to prevent. Even in September after the Flood of 1927, when Chief of Engineers Maj. Gen. Edgar Jadwin was formulating a radical departure from 50 years of river policy on outlets, the MRC reported,

> . . .the Commission adheres to its policy of preserving the river generally in its present form, and cannot subscribe to a plan of flood control or of improvement for navigation that involves the formation of cut-offs. Rather the Commission believes that its first duty . . . is to prevent cut-offs. (MRC, 1927: 119)

As a result, a cutoff program was not included in the Mississippi River and Tributaries Project that evolved from Jadwin's recommendations.

There were, of course, many engineers who vehemently disagreed with this stand, even within the MRC. In the MRC's preliminary report, Maj. C.B. Comstock and Benjamin Harrison wrote in the minority report that "we are not prepared to absolutely reject their use," provided that sufficient revetment is made above and below the cutoff (U.S. Congress, 1880: 22). As early as 1859, there was recognition that a system of cutoffs could be beneficial, although fears of the adverse effect of isolated local cutoffs continued. In 1882 J.B. Johnson, assistant engineer for the MRC, submitted a recommendation for improvements in the lower Mississippi using artificial cutoffs. Several imminent civil engineers agreed, including John R. Freeman, who recommended investigating the possibility of cutoffs, and James B. Miles, who proposed specific details on the number and location of cutoffs. Yet before 1917 Congress made only limited appropriations for river improvement and none specifically for flood control, leaving little funding for the MRC to even consider the plans, particularly given the costs associated with dredging and relocation of works such as levees and dikes. Federal funding levels remained limited until after the Flood of 1927, which, due to its devastating impact on the Lower Mississippi Valley, prompted Congress to approve broad spending. This opened the door to consideration of a number of cutoff plans, including ones proposed by John F. Coleman and W.E. Elam (Matthes, 1948).

82.3 Cutoff Policy Changes

After 1929, three circumstances combined to change the outlook of the MRC on the question of cutoffs. The first was the occurrence of a natural cutoff at Yucatan

Bend at the end of 1929. For some years, the MRC was aware of the possibility of a cutoff from mile 638 to mile 640 where the Big Black River intercepted the Mississippi south of Vicksburg. The bank was caving on both sides of the loop located there, gradually narrowing the neck. However, as late as 1928 no one knew exactly where or when it might take place. In August 1928 the MRC had placed revetment between mile 639–640 and in September had placed revetment in the Big Black about midway across the neck. The low water inspection in September 1929 and an inspection by MRC President Brig. Gen. Thomas H. Jackson in December revealed that only a narrow ridge existed between the Big Black and Mississippi rivers. When the senior engineer returned to inspect the location the following May, a junction some 300–500 ft had appeared, and about 10% of the river was flowing through it. At that point the engineer began to take gauge readings and discharge measurements, which he compared with high water readings from 1927 to 1929, a hydrographic survey from 1913, and a bank survey from 1927 to track the progress of the cutoff. In August 1930 engineers took a small launch through the junction and reported depth measurements in excess of 18 ft other than at the revetment across the Black River. Recognizing the opportunity to gain valuable insight into cutoffs in general, rather than trying to prevent the cutoff according to MRC policy, at the behest of Chief of Engineers Maj. Gen. Lytle Brown, Jackson established 11 cross-section surveys in the vicinity of the cutoff to observe how it developed. Measurements taken throughout 1931 and 1932 captured the best information on the cutoff process to that time ever observed (MRC, 1932).

Although 1930 and 1931 were low-water years, the cutoff proceeded at a moderate speed. Discharge through the cutoff increased from 10% in 1930 to 40% by January 1932. After the high water of the spring of 1932, discharge increased to 58% by mid-April with a peak of 850,000 ft^3/s. Observations showed a gradual enlargement of the cutoff from 1930 to 1932 with a rather rapid change in the "controlling" section from January to April 1932. The cross-sections showed great variability in slope due to local conditions, but seemed to indicate that the overall effect was slightly in excess of one foot. The sections immediately below the cutoff showed a small increase across all stages from 1931 to 1932, with sections further downstream showing very little change or even a slight decrease in discharge. Sections above the cutoff showed very little change. A comparison of readings from 1930 to 1932 showed a definite lowering of stages above and a slight increase below, but that 5 or 6 mi upstream or downstream showed no change in gauge readings. Because the MRC did not take regularly scheduled readings, there was some question of their accuracy, but it appeared that the variance in stages was very slight and localized to the vicinity of the cutoff, and that the gradual nature of the cutoff precluded any major impacts to navigation (MRC, 1932). By September 9, 1932, the U.S. Lighthouse Willow reported navigation was established on the cutoff and that around Yucatan Bend discontinued (Persons, 1934).

Even the preliminary suggestion that a cutoff could occur without the much anticipated negative impacts on velocity and navigation generated several recommendations for cutoff and channel rectification programs. For example, Gardner Williams, a consulting engineer for the MRC, in 1930 tried to demonstrate the

illogic of old anti-cutoff arguments and instead proposed re-carving a river channel from Cairo, Illinois to St. Delphine Landing, Louisiana, south of Baton Rouge and creating a new outlet across the Atchafalaya River to West Cote Blanche Bay on the Gulf of Mexico (Fig. 82.1). Another plan he analyzed by comparison carved a channel directly from Cairo to Atchafalaya Bay, in essence abandoning the Mississippi River channel for a human-made one (Williams, 1930). A more modest plan proposed within the Corps came from Col. Harley B. Ferguson, the South Atlantic Division Engineer and member of the Board of Engineers of Rivers and Harbors. In a memo to the board dated November 22, 1930, he summarized the situation: "The flood problem above the Arkansas is solved by levees. The problem below Old River is solved by the Atchafalaya floodway and the Bonnet Carre spillway." It was the critical stretch from the Arkansas River to the Red River that posed the problem, not the entire river (Ferguson, 1930: 1).

Ferguson's solution included increasing the carrying capacity of this stretch of the river while maintaining control of the river through a combination of revetment,

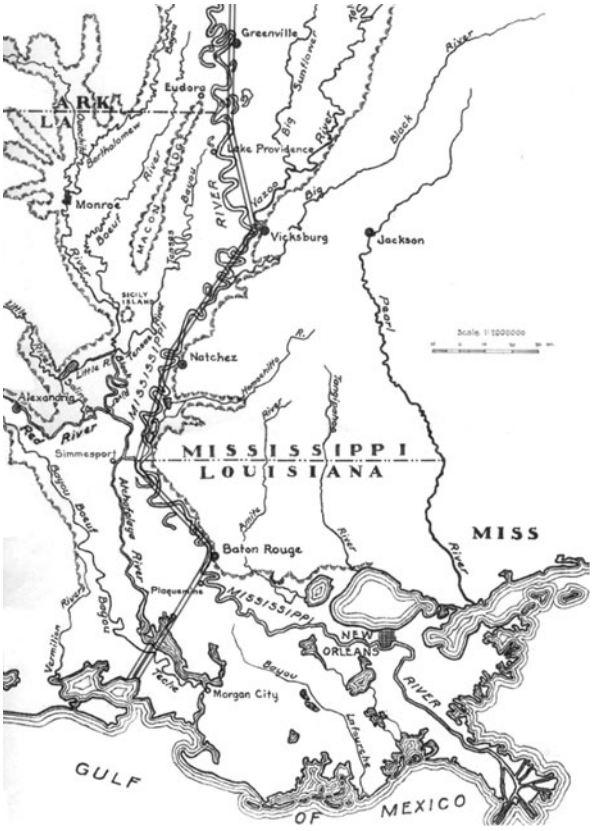

Fig. 82.1 The Williams channel rectification plan. (Adapted from Williams, 1930)

removal of obstructions, and natural control works. However, the truly radical change proposed was that "there can be no possible harm in reducing the river to the length which it had in 1880." He argued for humanmade cutoffs in targeted locations, primarily Gaillardo Lake (Glasscock), Giles Bend, Grand Gulf (Diamond Point), and the Greenville Bends. On the side of caution, he added that "it will be necessary to have several dredges on hand" to ensure navigation and that "before any cut-off is made, the river should be protected above and below, by such revetments and dikes as are necessary to prevent the upsetting of conditions desired." Further, he argued that it was necessary to enlarge the riverbed through "corrective dredging" above and below a proposed cut. Long-term, he argued that "the amount by which the flood capacity of the main river channel can eventually be increased can be determined only by proceeding with the work and measuring the effects" – in effect that the only real way of determining once and for all whether cutoffs were beneficial or not was to proceed with a program such as what he proposed (Ferguson, 1930: 2).

The second circumstance that enabled the cutoff plan to proceed was hydraulic experimentation at the U.S. Waterways Experiment Station (WES) in 1930. For many years after civil engineer John R. Freeman first suggested the idea of a national hydraulic laboratory in 1922, the Corps resisted its establishment for non-engineering reasons. However, with changing national opinion favoring increased spending for flood protection after the Mississippi River Flood of 1927, Chief of Engineers Maj. Gen. Edgar Jadwin included a plan to establish a modest laboratory as part of his flood control recommendations, which Congress authorized in the Flood Control Act of 1928. When Brown came in as Chief of Engineers in late 1929, he gave the lab a boost by directing additional funding to it and moving its proposed location from Memphis, Tennessee to a more spacious location near Vicksburg. As with other hydraulic laboratories in vogue in the first half of the 20th century, WES conducted hydraulic experiments using physical models based on the principle of similitude, i.e., that fluids would act the same in similar situations though at different scales. Engineers at WES would run water through flumes containing precise models of rivers and structures, carefully measuring results. They also experimented with movable-bed models, in which sediment or like materials demonstrated the behavior of sediments in the river (Fatheree, 2004). Engineers could then apply the results to actual river projects.

One of the first projects assigned to WES was modeling of a cutoff at Tarpley Neck in the Greenville Bends. At the request of Brown, in November 1930 Jackson ordered WES Director 1st Lt. Herbert Vogel to prepare a study of the Greenville Bends, a particularly meandering and flood-prone span of river between Memphis and Vicksburg running 98 mi over a 45-mile distance. WES started work on the fixed-bed model of Tarpley Neck in December, ran more than 100 tests, and in April 1931, WES Director 1st Lt. Herbert Vogel submitted the preliminary report. In it, he presented the "irrefutable" results: a lowering of stages by 2.2 ft for 45 mi above the cutoff and no change below it. Further, the model showed "no indication of detrimental effects due to the cut-off," directly contradicting earlier theories based on the Humphreys and Abbot report (Vogel, 1931). Gerard Matthes and others involved

in the cutoff plan later doubted the influence of modeling at WES on the plan they actually developed, mainly because additional modeling conducted by Vogel on cutoffs on the remaining necks in the Greenville Bends in 1932 showed questionable benefits (Matthes 1948). Although the results of the April 1932 report were mixed, with a cutoff at Diamond Point showing positive results, a cutoff at Ashbrook showing negative results, and most of the others showing no great benefit or detriment, the earlier 1931 tests helped to scientifically confirm the observations at the Yucatan Cutoff, further removing opposition to cutoffs in some quarters. They may have also helped to decide where such a program should begin, although certainly Ferguson did not let modeling results dictate his program, later ordering additional modeling of several sites.

The third circumstance enabling cutoffs was the promotion of Ferguson to brigadier general and his assignment as president of the MRC in the spring of 1932. General Ferguson, or Fergy as his friends called him, was one of the most flamboyant characters in the Corps in the first half of the twentieth century. As Capt. Paul W. Thompson, the director of the Waterways Experiment Station from 1937 to 1939, later described him, he was

> . . .whimsical and picturesque and not very precise in conveying instructions, impatient of experimental results which failed to fit his own instinctive conclusions – but a man of moral courage unsurpassed (yes, unequaled), a man whose 'instinctive conclusions' were so often and so uncannily right – especially when the stakes were high. (Tiffany, 1968, p. IV-2)

On assuming his position, Ferguson requested studies of additional proposed cutoff locations, began an intensive regimen of data collection, developed a plan for how to proceed, and pushed for a test cutoff at Diamond Point. In addition, in March 1932, Brown appointed Ferguson president of a Mississippi River Engineering Board of Review, where he was able to introduce and discuss his plan, expanded to include a dozen cutoffs. Although some engineers testifying before the board continued to resist cutoffs, Brown approved Ferguson's plan in 1933 (Matthes, 1948).

82.4 The Cutoff Program

The first human-made cutoff in the program was at Diamond Point below Vicksburg, which General Ferguson started to plan within days of assuming his MRC post on June 15, 1932 with a goal of completing the work before the next high water. Although Jackson evidently conducted some preliminary surveys and preparation in the spring of 1932, it was Ferguson who made the final plans, acquired the rights-of-way and initiated dredging operations that summer. The technique used, as with all of the cuts that followed, was to lower the riverbed near the cut through dredging as he argued in 1930, and to make a pilot channel from either side using dragline machines and cutter-head dredges instead of allowing the river to carve its own channel. This avoided the "piling-up" of water that typically resulted from natural cutoffs. He left the old bends open to allow "valley storage" or locations to temporarily store up floodwaters and avoid raising of flood stages during high water.

Location was also of great importance. In essence, he tried to choose the most stable locations to make the cut so as to avoid any impediments to navigation. The bends he selected were usually stretches of river with mild curvature, no islands or chutes, and no excessive bank erosion or sedimentation. He avoided cuts across the narrow necks where instability already existed, did not attempt to straighten the river unduly and thus risk excessive bank caving, and in general planned cuts from south to north and only after the channel below was able to carry eroded material. The engineers completed the cut at Diamond Point on January 8, 1933, dramatically dynamiting the narrow ridge separating the pilot channels. With the approval of his overall scheme in 1933, additional cutoffs quickly followed at Glasscock Point and Giles Bend near Natchez, Mississippi in March and May 1933, with preparation started at several others (Matthes, 1948).

Despite the best efforts, some cuts were unplanned or came out of sequence. The Leland Neck Cutoff in July 1933 was the first of these. This section of river right off the Greenville, Mississippi, business district was an area that Ferguson had considered for a cutoff location. The neck had narrowed from 2 mi in 1824 to 4,000 ft, while nearby Chicot Point grew in length by 2 mi. Prior to the river cresting in 1933, it had washed out a permeable dike and started flooding the neck on June 3, making a natural cutoff inevitable (Fig. 82.2). Within eight days, the Corps started work on the cutoff, removing the dike, dynamiting a ridge, and starting dredging operations. By August 7 the cutoff was 575-ft wide and had captured 29% of the river (Schweizer, 1933). The cutoff at Leland Neck greatly impacted the program, which relied heavily on careful planning, and it eventually required large expenditures in dredging and revetment, the addition of a cutoff at Ashbrook Point two years later, and adjustments in the locations of planned cutoffs nearby. Another

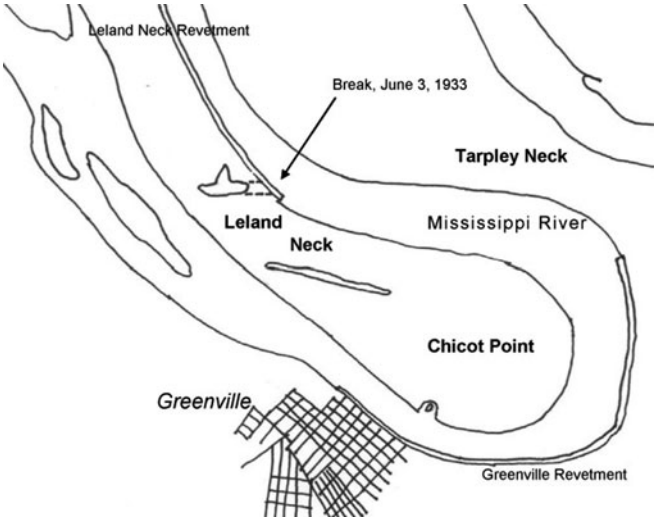

Fig. 82.2 Sketch of the Leland Neck cutoff. (Adapted from Schweizer, 1933)

stretch where there was chronic bank caving was Paw Paw Bend near Marshall Point which in 1932 threatened to cause a junction with an abandoned channel of the Yazoo River that would have required 3 mi of revetment. Instead the MRC began work on a cutoff on October 19, 1933, completing it on March 12, 1934. A similar situation occurred when the Corps went forward with a cutoff at Worthington Point ahead of schedule to alleviate rapid bank caving in Kentucky Bend (Matthes, 1948).

Another issue faced by Ferguson was the possibility of rendering inoperative the proposed Boeuf Floodway, a part of the Mississippi River and Tributaries Plan originally recommended by Jadwin in 1928 but delayed by lawsuits. Located near Arkansas City, Arkansas, the floodway would include a floodwater dispersal area down the Boeuf-Tensas Basin and a "fuse-plug levee," a levee of reduced height that would give way during river stages of a planned height. By 1934 it became obvious that the increased carrying capacity of the Greenville Bends might lower water levels enough to prevent the operation of the proposed fuse plug. Getting the fuse plug to operate was relatively simple, either by lowering the levee or diverting more water into the floodway through a series of dikes. The larger problem was that, since it would now require a larger volume of water, 2.15 million ft^3/s versus 1.95 million under the 1933 water levels to make the fuse plug operate correctly, the river south to Vicksburg would have to pass more water volume before the floodway began to operate, thereby increasing potential flooding (Morris, 1934). In fact by 1937 the cutoff program had reduced flood stages sufficiently from Greenville to Old River so as to make the Boeuf Floodway and an alternatively proposed floodway at Eudora, Arkansas, unnecessary, a circumstance which Brown had foreseen when approving the cutoff plan. As a result, Congress deauthorized the floodway in the Flood Control Act of 1941, although debate over the impact of higher flood stages on and solutions for the Yazoo River backwater area continued to present day (Camillo & Pearcy, 2006).

By the end of 1935 nine cutoffs were in operation at Yucatan, Diamond Point, Glasscock, Giles, Leland, Worthington, Willow Point, Marshall Point, and Ashbrook, with two more under construction. In a report to the Chief of Engineers that year, Ferguson was able to state,

> The Commission concludes that no material adverse effect on through navigation has occurred or is to be anticipated due to these cut-offs. It considers that the Department is committed to the completion of the cut-offs that have been authorized and that they should be completed.

The total cost at that point was at $8.1 million for easements, levees, and dredging, while the actual savings in maintenance dredging was $385,000. The cost was still below Ferguson's 1930 cost-avoidance estimate of $10 million for reveting much of the river from Memphis to Baton Rouge should the plan fail (Ferguson, 1935: 1). However, these estimates did not include benefits for lowering of flood stages. In 1939 flood crest heights declined 12.8 ft between gauges at Cairo, Illinois, and Arkansas City, and 7.4 ft between Cairo and Vicksburg, versus an average increase of 2.5 and 0.1 feet over the same stretches during flood years from 1915 to

1932 (MRC, 1939). At the same time, there was a significant improvement in navigation measured in travel times. By 1938 the trip downriver from Helena, Arkansas, to Baton Rouge, Louisiana, took nearly 11 hours less than in 1931; the trip upriver took more than 20 hours less than in 1931 (Camillo & Pearcy, 2006).

The MRC completed cutoffs at Sarah and Rodney bends in 1936 and another at Caulk in 1937. With three additional cutoffs made between the Arkansas River and Memphis in 1941 and 1942, there were 16 cutoffs in operation after the end of World War II (Fig. 82.3), which had reduced the length of the Mississippi between Memphis and Baton Rouge by 151.9 mi, as shown in Table 82.1. Adding to cuts corrective dredging, chute enlargements, and other improvements, the total reduction in length was 170 mi. Increase in slope was for several of the cutoffs less than a tenth of a foot per mile, while the overall flood stages from the Arkansas City to Vicksburg gages were anywhere from 7 to 13 ft lower than in 1933, even though some readjustment in flood stages later occurred at some locations. The plan had not proceeded without some difficulties – unexpected bank caving caused the Corps to proceed with the Leland and Worthington cutoffs a year ahead of schedule in 1933 and to add another cutoff at Ashbrook Neck in 1935, while difficulties in cutting through clay at the Glasscock Cutoff prevented its opening by five years (Matthes, 1948; Winkley, 1977).

Although some participants in the cutoff program believed that additional correction of the river would be necessary in the future with additional cutoffs to avoid bank caving at other locations, in fact no such program ever recurred. In the Flood Control Act of 1944 (PL 78-534), Congress authorized a channel stabilization program that Charles Senour, the MRC Chief of Engineering called "the necessary sequel to the flood control and navigation improvement hitherto accomplished." While including significant deepening of the channel through dredging and adjustment to proposed dispersal of floodwaters using controlled outlets, the law's most dramatic change was the adoption of a channel stabilization plan that ended the cutoff program. Even in 1928 the Corps saw the need for stabilizing the channel through revetment or other bank protection, but it was not until the Corps refined the use of articulated concrete mattresses as a replacement for willow mattress revetment then in use that this plan became possible. At the same time, further modeling and geological investigations greatly improved knowledge of the meandering process. This program greatly stabilized the riverbanks and made further correction of the river largely unnecessary (Senour, 1947: 277).

Even had there been the desire to create further cutoffs, political and environmental considerations have rendered such a program practically impossible to implement today. For example, many scientists or engineers have proposed relocating or diverting a portion of the river channel to produce new wetland areas, such as a plan included under the Louisiana Coastal Area (LCA) program proposed by Sherwood Gagliano, who was one of the first to document the extent and causes of wetland loss (Dean, 2006). However, these proposals have met repeated opposition from various stakeholders ranging from flood control, navigation, or environmental advocates. Despite their different purposes, modern schemes of channel rectification being for coastal wetland restoration rather than improved navigation, the proposal

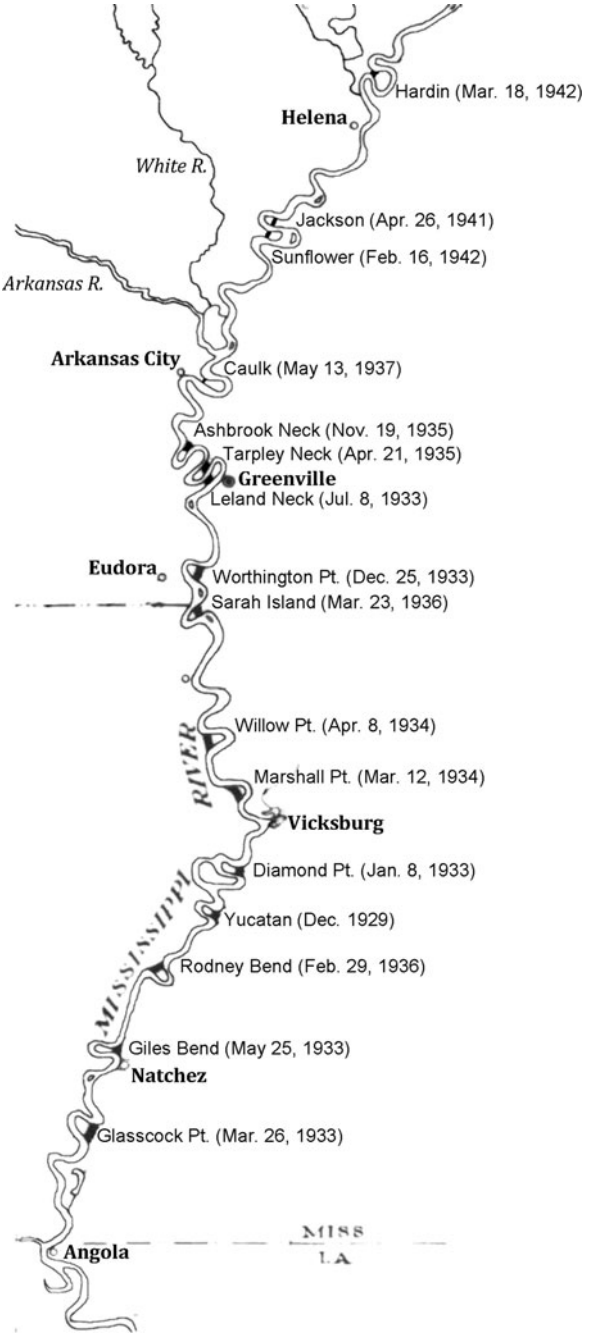

Fig. 82.3 Cutoff Locations from Arkansas to Louisiana. (Adapted from Ferguson, 1935)

Table 82.1 Mississippi river cutoffs in 1946

Name	Date opened	Location (Mi. AHP)	Net shortening (Mi.)
Yucatan	December 1929	404	9.6
Diamond	January 8, 1933	420	12.0
Glasscock	March 26, 1933	342	10.8
Giles	May 25, 1933	364	11.1
Leland	July 8, 1933	532	9.8
Worthington	December 25, 1933	507	4.3
Marshall	March 12, 1934	444	4.2
Willow	April 8, 1934	458	7.7
Tarpley	April 21, 1935	535	8.6
Ashbrook	November 19, 1935	542	11.4
Rodney	February 29, 1936	385	5.8
Sarah	March 23, 1936	498	5.3
Caulk	May 13, 1937	569	15.2
Jackson	April 26, 1941	624	8.7
Sunflower	February 16, 1942	622	10.4
Hardin	March 18, 1942	676	17.0

Adapted from Ferguson (1935) and Matthes (1948)

that engineers should relocate the mouth of the Mississippi River are surprisingly similar to at least part of what Gardner Williams and other engineers proposed after the success of the Yucatan Cutoff in 1930. Whether or not federal, state, or local agencies and stakeholders ultimately recommend and Congress authorizes such a program to proceed, the history of the cutoff program demonstrates the possibility of engineers affecting a change in the course of the river, as Matthes notes, through "a conservative, gradual process, at all times under complete control," rather than through the natural "cataclysmic way of producing a channel in a matter of days" (Matthes, 1948: 14). Even if a channel rectification program remains politically infeasible, the cutoff program demonstrated the potential of engineering to control nature on the grandest scale by actually changing the course of rivers.

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