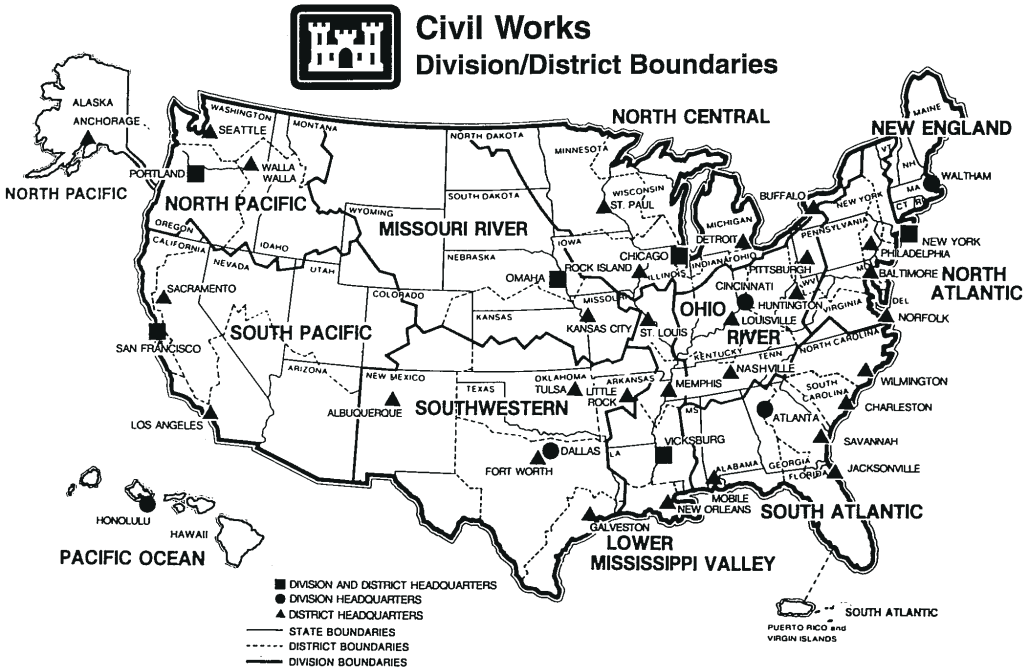
Chapter One

A Prologue to 1976

The Vicksburg District of the U.S. Army Corps of Engineers is defined in part by its present responsibilities and resources, but it is also the product of more than a century of historical development. The way in which the Vicksburg District engineers understand themselves and their mission, and the ways in which they are perceived by the people of the Lower Mississippi valley, are shaped by a tradition of service that includes making the rivers suitable for commerce, providing protection against floods, responding to emergencies, and making sites available for water recreation. In these ways and others, the district has enriched the lives of the people of Mississippi, Arkansas, and Louisiana.

The purpose of this volume is to provide an historical account of the Vicksburg District over the last fifteen years, from 1977 through 1991. It brings up to date the story told by Gary B. Mills in *Of Men & Rivers: The Story of the Vicksburg District*. However, many readers of this book will not have read the earlier study. This introductory chapter provides a thematic overview of the district's history from its inception. Surveyed in the following pages are the evolution of the Vicksburg District as an organization, the development of its navigation mission, the emergence of flood-control responsibilities in the twentieth century, and the environmental emphasis that



Civil Works divisions of the Corps of Engineers are shown on this map. The Vicksburg District is in the Lower Mississippi Valley Division.

has affected Corps of Engineers activities since the 1960s. All of these provide necessary background to the district's activities since 1976.

The Corps in Evolution

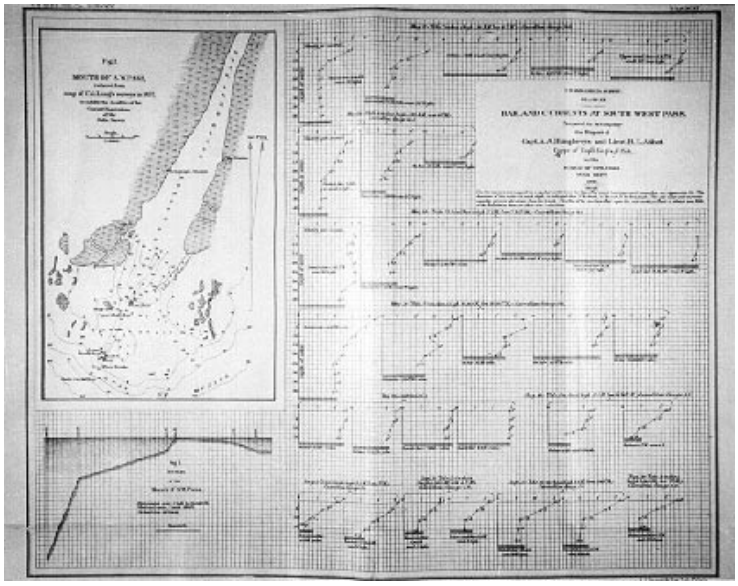
When George Washington took command of what would become the Continental Army in July of 1775, the former Virginia surveyor immediately began to recruit engineers to assist in the construction of fortifications around Boston, where the British Army was headquartered. Four years later, the Continental Congress recognized the importance of military construction by forming the "engineers in the service of the United States" into a separate "corps," which continued in existence through the monumental siege of Yorktown. Disbanded with the rest of the Continental Army after the Treaty of Paris in 1783, the Corps of Engineers was recreated in 1802 and has been in continuous existence since that time.[1]

Army engineers became involved in civil works as the new nation viewed its transportation problems and the "internal improvements" that were necessary to surmount them. In 1808, Albert Gallatin, Thomas Jefferson's Secretary of the Treasury, issued a report calling on the national government to take a leading role in the development of roads and canals. His point was underscored during the War of 1812 when the abysmal state of American transportation made it difficult for the United States to move troops in their own country; after the war, the renewal of the westward movement gave new urgency to the need for improved transportation. In 1819, Secretary of War John C. Calhoun suggested that the Army Corps of Engineers be used to improve the situation, and the next year Congress called on two members of the Corps, General Bernard, who had one of Napoleon's finest engineers, and Colonel Totten, later to be a chief of engineers, to survey navigational problems on the Ohio and Mississippi Rivers. In 1824, Congress passed the General Survey Act, which authorized President Monroe to carry out surveys for possible roads and canals and specifically to employ "skilful (sic) civil engineers, and such officers of the corps of engineers . . . as he may think proper."[2]

During the 1820s and 1830s, Army engineers were active on the lower Mississippi and in what

would become the Vicksburg District. Bernard and Totten issued their report on the Ohio and the Mississippi in 1822, emphasizing the immediate need to remove the numerous snags in the Mississippi that made for perilous navigation. In 1824, Congress passed its first Rivers and Harbors Act, which included the appropriation of $75,000 for work on the Ohio and the Mississippi. In 1826, Henry M. Shreve was placed in charge of clearing these rivers, and three years later he had built and was operating his own snag boat. Between 1833 and 1838, Shreve cleared a way through the Red River Raft, a hundred miles of tangled tree trunks and vegetation that had completely blocked the Red River in the vicinity of what is now Shreveport, Louisiana.

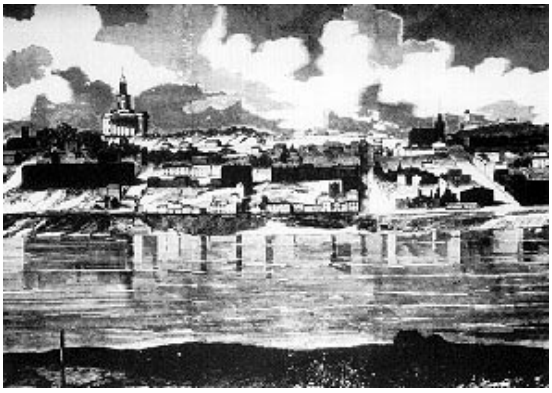
The General Survey Act was repealed in 1838. The mood of the country had shifted from an interest in national concerns supported by a broad interpretation of the Constitution toward sectional interests that were served by the strict construction of its provisions. Internal improvments were out of favor. Still, the Mississippi River was difficult to ignore. Whereas the need for commercial navigation had prompted early legislation, devastating floods in the late 1840s led to the passage of the Swamp Lands Acts that turned over millions of acres of federal land to states along the river, among them Mississippi, Arkansas, and Louisiana, in the vain hope that they would sell the land and build levees with the proceeds.[3]



During the 1850s, Congress funded two separate surveys of flooding problems in the Mississippi delta, both of which would have long-term significance. The first, by Charles Ellet, a civilian engineer, was published in 1851. Lacking in detailed measurements, it nonetheless was far-sighted enough to forecast that reservoirs as well as levees would be necessary to contain the mighty river and its tributaries. The second study, by two officers of the Corps of Engineers, Andrew A. Humphreys and Henry L. Abbott, appeared in 1861. It was a masterpiece of empirical research, measuring the flows and mapping the channel of the Mississippi River from Cairo, Illinois, to New Orleans and earning Humphreys, the principal author, an international reputation. Humphreys and Abbot argued that neither

reservoirs to contain excessive rainfall nor cutoffs to straighten the river and speed its flow would be valuable in keeping the river within its banks. In their view, levees were the sole effective means of flood control on the lower Mississippi. Humphreys became Chief of Engineers in 1866 and served until 1879, and he championed his views with vigor. Within the Corps of Engineers, "levees only" became the orthodox view of Mississippi River flood control and remained so until after the Flood of 1927.[4]

Vicksburg came into prominence during the Civil War when its guns commanded the Mississippi and denied the North the use of the river. In 1862 and 1863, the northern army demonstrated its vast resources as well as the ingenuity of modern civil engineering in a vain attempt to effect a cutoff that would divert the river from the city or develop an alternative route for it through the bayous. The Mississippi was too strong for General Grant, but Vicksburg eventually fell to his siege. Having resolved the questions of slavery and states' rights by force of arms, the United States after 1865 gave renewed attention to matters of navigation and flood control. In 1873, the Office of Western Rivers of the Army Corps of Engineers sent Captain William H. H. Benyaurd, a thirty-two-year-old, West Point Class of 1863, Medal of Honor winner, to Monroe, Louisiana, where he was to supervise engineering projects on the Ouachita and Yazoo Rivers.



Discouraged with the lack of transportation and commercial facilities at Monroe, Benyaurd quickly obtained permission to move to Vicksburg, where he arrived in August 1873. From this location, the young Supervising Engineer took charge of snag boats that were attempting to make things safer for steam vessels on the Ouachita and of hull-clearing operations that were performing the same service on the Yazoo. He supervised renewed efforts to clear the Red River Raft, and did harbor work at Memphis, Vicksburg, and Natchez as well as maintenance of the water gauges that told riverboat captains about the level of the river. In 1875, Benyaurd moved from Vicksburg to Memphis, from where until 1882 he continued to supervise the same projects, almost all of them in what is now the Vicksburg District.[5]

In 1879, Congress created the Mississippi River Commission (MRC) to coordinate federal water policy on the river. The MRC was to be made up of seven members, three officers from the Corps of Engineers, one official of the Coast and Geodetic Survey, and three civilians, two of them civil engineers. Its mission was to create a comprehensive plan for navigation and flood control on the Mississippi and to direct all civil works on that river. At first, the MRC attempted to execute the work as well as plan it, but, after 1882, it supervised units of the Corps of Engineers, which were charged with carrying out its projects. The commission divided the Mississippi below Cairo, Illinois, into four

districts, one of which, extending from the mouth of White River to about ten miles below Vicksburg, was administered from Vicksburg. Army engineers at Vicksburg worked on the Mississippi under the authority of the MRC, but retained their own responsibility for the tributaries.[6]

The Vicksburg District was born officially in 1888 when the Corps of Engineers organized the United States into geographic divisions and subdivided the divisions into districts. It included large sections of Mississippi, Arkansas, and Louisiana, defined by the basins of the Yazoo, Ouachita, and Red Rivers. Vicksburg itself, happy with its fifteen-year association with the Corps of Engineers and the Mississippi River Commission and pleased with this new recognition of its status, began to think of itself as "The Engineer City."

Major Joseph L. Willard, who was the district engineer from 1886 to 1899, played an important role in the development of the early district. One of his significant problems was providing facilities and equipment for his staff. In 1891, he succeeded in moving the district office into the new post office at Crawford and Walnut Streets, now the headquarters of the MRC. Under Willard's direction, the district's steam vessels were converted from wood to fossil fuel and a telephone system was installed. He also bought a Remington typewriter for his clerks and three bicycles for his topographers. In 1895, he oversaw the purchase of a second steam-powered dredge, this one equipped with a 90-foot conveyor for the dredged material, which it moved at a rate nearly twice that of its predecessor.

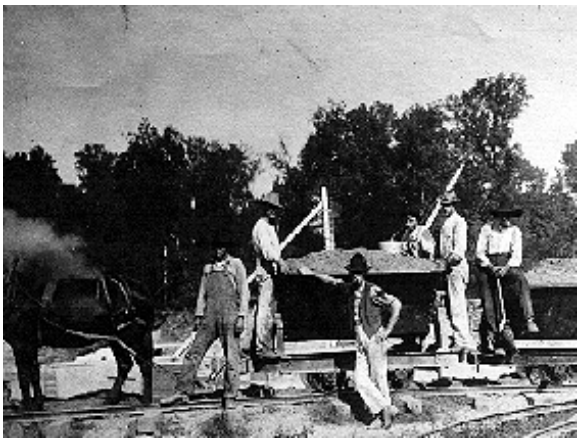
Willard also played a role in helping to restore Vicksburg to its status as a commercial port. In 1876, the Mississippi had cut through Delta Point opposite Vicksburg and made a new channel, leaving the city overlooking a becalmed and cut-off oxbow lake rather than the river. Nature had accomplished what General Grant had failed to do during the Siege of Vicksburg, and Vicksburg rapidly declined economically. Working with a local engineer, Thomas G. Dabney, Willard developed a plan to divert the Yazoo River past Vicksburg, which Congress approved in 1892. Finished in 1905, the Yazoo Diversion Canal made Vicksburg once again a viable Mississippi port. The Vicksburg District also supervised the building of the National Military Park that was authorized for Vicksburg in 1899.[7]

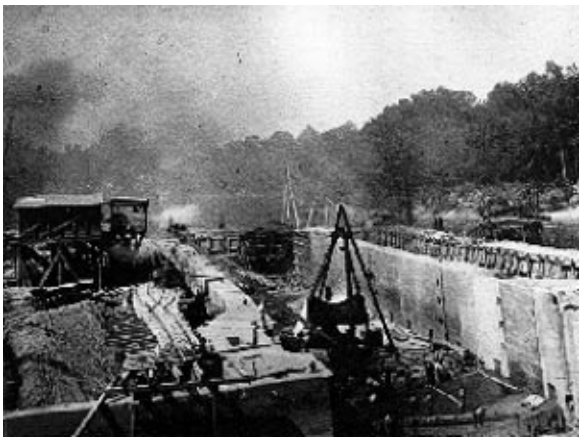
Reopening the Waterways

While it performed a variety of functions in this early period, the Vicksburg District was involved mainly with the improvement of navigation. Much of the time, Vicksburg engineers worked on the Ouachita River, which rose in the Ouachita Mountains of Arkansas, flowed southeasterly through Arkansas and Louisiana, and eventually merged with the Black River and emptied into the Red River. In the 1870s, the Ouachita River was a busy avenue of commerce, carrying cotton and other products out of the fertile plains of northern Louisiana and southern Arkansas. Steamboats travelled as far north as Camden, Arkansas, when the water was high, but they were threatened by obstructions in the best of times and in the summer the water was too low for any passage.

The Corps of Engineers began work on the Ouachita in 1871, removing snags and overhanging limbs with the aid of two flatboats, only one of which was steam-powered. Captain Benyaurd took charge of this operation in 1873 after his arrival in Vicksburg. He built an iron-hulled, light-draught snag boat that made the work proceed faster. Meanwhile, an earlier civilian study funded by Congress resulted in a recommendation to build five wooden locks and dams between Trinity, Louisiana (now Jonesville), and Camden, Arkansas. Benyaurd, however, argued that the plan would cost much more than was estimated, and that it would not achieve a satisfactory water level. The project was dropped. In 1877, however, Benyaurd built dikes at Spoon Camp and Buffalo Flats where the Ouachita was particularly low. Made of pilings covered with woven willow mattresses weighted with sandbags, stones, and logs, these structures jutted out from the banks and angled downstream. By forcing the water into a narrower and deeper channel, the dikes improved navigation. Residents of the area continued to want year-round navigation of

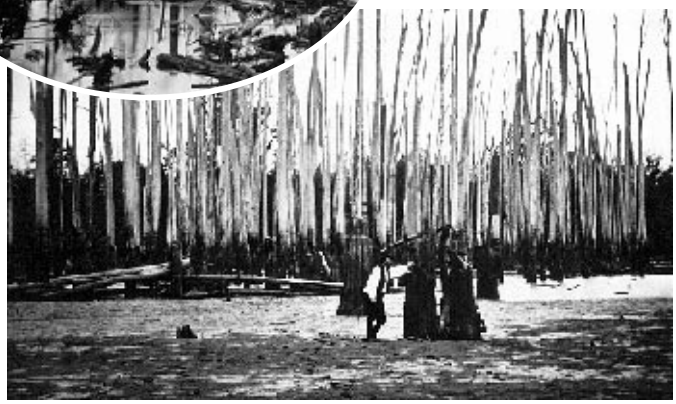
the Ouachita, and in 1904 Congress authorized the creation of a 6.5-foot channel from the mouth of Black River to Camden, Arkansas, a distance of 360 miles. Six locks and dams, each 55 feet wide and 268 feet long, four in Louisiana and two in Arkansas, were to provide the necessary water. Construction began in 1904, but was halted for a time in 1908 because of difficulties with a contractor. The project was reauthorized in 1915 and completed in 1925. Its estimated cost was $2 million, and the final cost was $5.3 million.[8]





The Red River also required a great deal of attention, although only in the early years of the district. Like the Ouachita, it did not have an adequate flow for commerce, running particularly low in the late summer and fall when farmers needed it most. In addition, because of the sandy soil through which it coursed, the Red suffered from frequent cave-ins that deposited dirt and trees into the stream. Untended since the days of Captain Shreve, the Red had created a new raft that in 1870 covered seven miles in a thirty-two mile stretch near the Shreveport area. The federal government began again to clear the obstruction in 1872, and in 1874 the Corps of Engineers transferred the task of supervising that operation from New Orleans to Captain Benyaurd in Vicksburg. Using boats that were equipped to saw timber and haul it away and liberal amounts of dynamite and nitroglycerine, the work force eventually removed the obstruction. Benyaurd found, as would later district engineers, that it was not always possible to please everyone. The town of Jefferson, Texas, located northwest of Shreveport, had developed into a thriving river port as a

result of water that the raft had forced into a small stream known as Cypress Bayou. Clearing the raft meant the end of navigation at Jefferson and the commercial decline of the town.[9]



For more than half a century after the raft was cleared, Vicksburg engineers continued to police the Red River, keeping open a channel as far as Fulton, Arkansas, whenever water permitted. As late as 1930, the Red River carried $72 million in commerce. A Corps of Engineers report in 1936 suggested a variety of ways to improve navigation as well as a massive flood control program for the Red River basin. The study did not find sufficient economic justification for these projects, but a number of flood control projects were constructed on the Red River over the next ten years, including dams at Denison, Texas, and Altus, Oklahoma. In 1946, the Red was transferred from the Vicksburg District to the New Orleans District.[10]

Benyaurd also initiated activity on the Yazoo River, which rises in northwest Mississippi and flows south toward Vicksburg through rich farmlands. Military activity during the Civil War, and a few commercial mishaps as well, had left some forty hulks in the Yazoo, nineteen of which were considered hazardous to navigation. Using his first iron-hulled vessel, the *Wagner*, built on the Ouachita, and another, the *John R. Meigs*, constructed in 1879 especially for this purpose, Benyaurd methodically cleared the river. During the 1880s and 1890s, the Corps also worked on the Sunflower River, a major tributary of the Yazoo, removing snags, building dikes, and making that stream into an effective vehicle for taking cotton to market.

River traffic declined on the smaller streams of the Vicksburg District as the newly built railroads of the South offered effective competition to the steamboats.[11] The Mississippi River, however, continued to be a major artery of commerce for the South and for the nation. While the Mississippi flowed through the

Vicksburg District, the river was not part of the district's responsibility until 1928. Up to then it was under the authority of the MRC and administered by the Third District, which had its headquarters at Memphis until 1905 and after that at Vicksburg. The river vessels used by the Third District were maintained at Greenville, Mississippi, even before 1905.[12] As with the smaller streams, the Corps of Engineers removed snags and dangerous hulks from the Mississippi and maintained the gauges. Because of the commercial importance of the river, it also devoted great efforts to stabilizing her banks and channel.

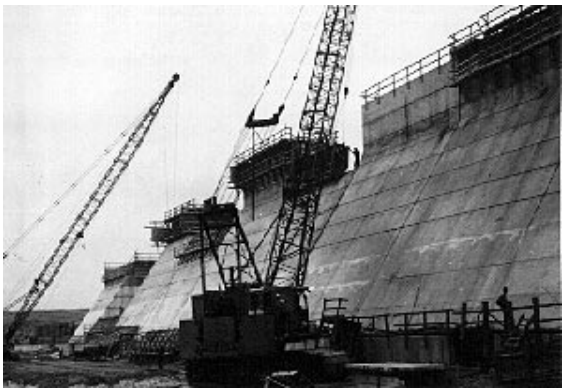
Fighting Old Man River

The banks of the Mississippi were a special problem because the force of the river was capable of eating away large amounts of land, pulling dirt, trees, and even buildings into the water. Such cave-ins were a hazard to navigation because they created obstructions and also altered the channel in abrupt and mysterious ways. To deal with the problem, MRC engineers developed techniques of bank stabilization, known as "revetment" from the French word for a lining or covering. The first part of the process involved grading the bank to reduce the drop-off. In the early twentieth century, this was often done by washing out the steep portions with high-pressure water hoses. After bank grading came mat laying. Until World War I, the mats were made of woven willow saplings. Young willows, 3 to 6 inches in diameter and 40 to 50 feet long, were woven into squares that were attached together until the final mattress was 1,000 feet long and perhaps 250 feet wide. This work was done on barges anchored off the bank. When the mat was finished, it was covered with rocks and sunk. The willow mat was flexible enough to cover the river bottom; strong enough, when covered with rock, to protect against the scouring current; and very durable under water. Still, the mats sometimes ripped, the willow eventually rotted, and willow trees began to be scarce.

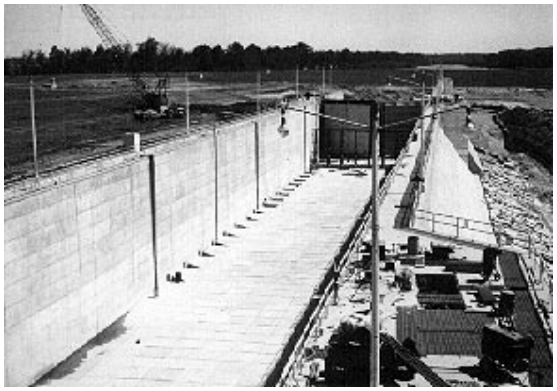
Between 1914 and 1917, engineers working for the MRC developed a more effective revetment. Known as an "articulated concrete mattress," it consisted of domino-like slabs of concrete, three inches thick and about

one foot by four feet, held together with heavy wire mesh that protruded on all sides. By binding the wires, workmen fabricated a concrete square, roughly four feet by twenty-five feet (one hundred square feet). Squares were then bound to other squares to create large expanses of mat. Finally, the mat was sunk, lowered from a barge onto a freshly graded bank, beginning above the waterline and extending to the lowest part of the riverbed. This form of revetment has proven extremely effective. It is still used today, although modern equipment has made the process much faster.

In addition to working on the banks of the Mississippi, the Vicksburg District also maintained a navigation channel that was at least nine feet deep and three hundred feet wide. Dredging, removing sand and sediment from problem areas, was the basic element of channel work. In many of these areas, the district built dikes to redirect the current, providing a dependable and relatively inexpensive solution to channel maintenance.



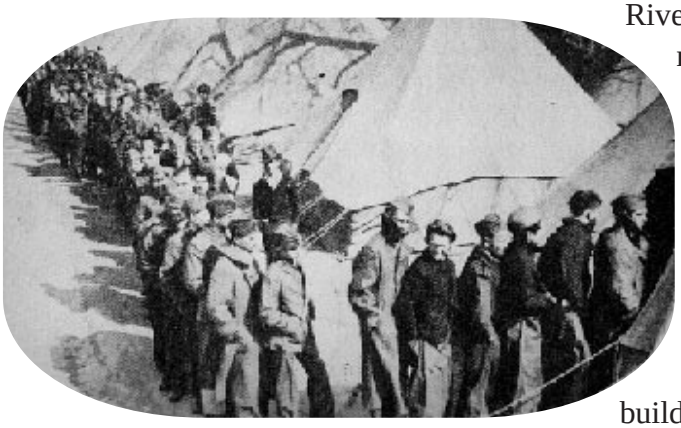
At the middle of the century, Vicksburg engineers once again became heavily involved with improving navigation on the Ouachita River. The six-foot system no longer allowed for economical loads. Local residents, associated with the Ouachita River Valley Association, persuaded Congress to authorize a nine-foot channel for the river as far as Camden, Arkansas, a project that involved extensive dredging and the construction of four concrete locks and dams. The first two structures, Jonesville Lock and Dam and Columbia Lock and Dam, both in Louisiana, were built between 1964 and 1972 and placed in operation in the latter year.[13]



Floods and Flood Control

Not until long after it was accustomed to promoting navigation did the federal government assume responsibility for controlling floods. During the nineteenth century, Congress passed the Swamp Lands Act, funded surveys of the Mississippi, and created the Mississippi River Commission, all without giving up the idea that floods were essentially a local problem. The first federal flood-control measure was the Ransdell-Humphreys

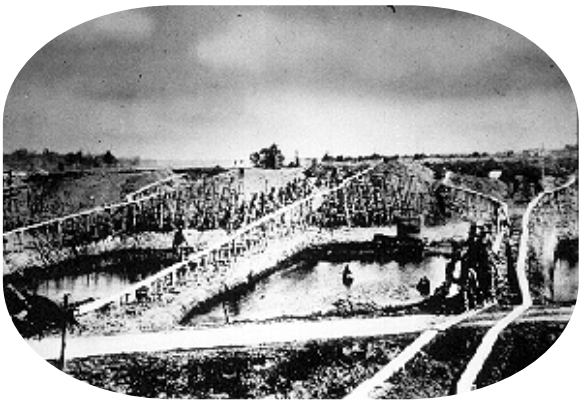
Flood Control Act of 1917, which included $45 million for flood works on the lower Mississippi to be spent under the authority of the Mississippi River Commission. Local interests were to provide rights of way and pay 50 percent of the costs.[14]

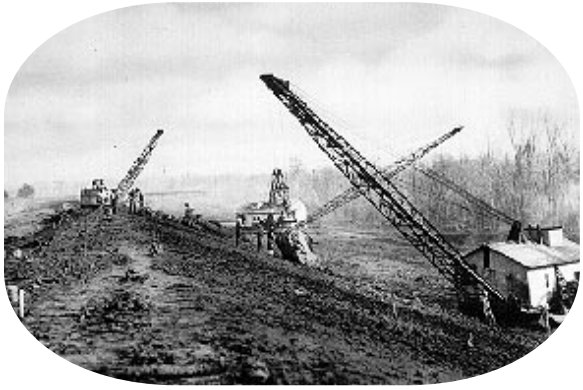


While a start had been made, the Flood of 1927 deserves credit for generating a comprehensive flood-control program for the Lower Mississippi valley. In the spring of that year, the Mississippi inundated more than 16 million acres in 7 states, flooding 160,000 homes and destroying 41,000 buildings. The Red Cross sheltered 326,000 people in 154 camps and fed an additional 312,000 people. The hardest hit states were those of the Vicksburg District: Arkansas, Mississippi, and Louisiana. A break in the levee at Mound Landing, Mississippi, allowed a torrent of water, comparable to the Niagara River as it flows over the falls, to sweep into Greenville, Mississippi, and surrounding areas.[15] The depth and duration of the flood was such that James P. Stafford, who was about nine years old at the time and would later become chief of the Construction Division in the Vicksburg District, spent six weeks living with his family and six other families on the second story of a schoolhouse, getting food and supplies from boats that docked at windows on the first floor.[16] Under the impact of this unprecedented natural disaster, the federal government passed legislation that continues to define flood-control policy on the lower Mississippi River.

The Flood Control Act of 1928, also known as the Reid-Jones Act, was based on the Jadwin Plan, developed by the then Chief of Engineers, Major General Edgar Jadwin. The plan was designed to protect against the Project Design Flood, a theoretical event that would occur when the highest recorded levels of water on Mississippi tributaries would coincide with the most intense rainfall on record. Jadwin determined that it would be prohibitively expensive to raise levees to the height necessary to deal with the Project Design Flood, and thus joined a growing chorus of dissent against the "levees only" policy that was identified with Humphreys and Abbot. He called instead for the creation of floodways, relatively unoccupied areas where the water could drain away with little damage, and spillways, alternative channels for a swollen river.

In effect, Jadwin's idea was to give the river more horizontal space. The 1928 Act defined flooding on the Mississippi as a national problem and authorized a comprehensive program of floodworks based on Jadwin's ideas and funded by the federal government that would be known as the Mississippi River and Tributaries project. Jadwin was opposed to the use of reservoirs as a means of flood control, but there was growing sentiment for them among other engineers, and the new law provided for the study of their effectiveness.[17]





Following the Flood Control Act of 1928, both the U.S. Army Corps of Engineers and the MRC underwent reorganizations that led to the strengthening of Vicksburg as a center of Army engineering. The old Western Division of the Corps of Engineers, which had been headquartered at St. Louis, was divided into an Upper Mississippi Valley Division, also based at St. Louis, and a Lower Mississippi Valley Division (LMVD) with its headquarters at Vicksburg. At the same time, the MRC gave up its autonomous districts and merged them with the regular Corps districts. Thus, the Vicksburg Engineer District took over the staff and duties of the old Third District of the MRC. The new district was now supervised both by the LMVD and by the MRC, which in 1929 moved its headquarters to Vicksburg.[18]

As a result of these developments, the Vicksburg District found itself very busy. The Flood Control Act of 1928 called for continued revetment of the Mississippi, dredging to enlarge the river's channel, raising the height of levees and moving some of them further back from the water, and the creation of a floodway along the Boeuf River in the Tensas River Basin of Louisiana. The first three of these tasks consumed a great deal of time and energy in the decade of the 1930s and continue to be important down to the present. The floodway concept, however, was destined not to be implemented in the Vicksburg section of the river.

Under the Jadwin Plan, the Boeuf Floodway would allow floodwaters to flow over low levees into Arkansas at a point below the mouth of the Arkansas River and follow the Boeuf River south into Louisiana where

they would join the Red River and finally the Atchafalaya River. The inundation of the floodway, which was largely swamps and timberland, would take pressure off the Mississippi and reduce flooding in the heavily settled areas along the river. Jadwin's argument was sensible enough to objective observers but not to residents of the floodplain. They demanded compensation for the decrease in land values resulting from the new high-risk flood status. The cost proved excessive, and the plan was finally given up in favor of another floodway that would start further south, at Eudora, Arkansas, and follow Bayou Macon and the Tensas and Black Rivers. The Eudora Floodway was not authorized until 1936, however, and by the following year it became clear that cutoffs had made these floodways unnecessary.

In 1929, the Mississippi ate through Yucatan Neck below Vicksburg and created a natural cutoff that increased the velocity of the river and reduced flood stages. Moving beyond the Jadwin Plan, the MRC authorized fourteen man-made cutoffs, twelve of them in the Vicksburg District. Cutterhead dredges dug three hundred-foot-wide trenches a mile or more in length across bendways in the Vicksburg District, removing one third of the 300 miles that the river had originally traveled. In 1937, when another superflood occurred on the Mississippi, the waters did extensive damage on the upper reaches but passed speedily, and with little damage, through Arkansas, Mississippi, and Louisiana. The improved levees, the legions of floodfighters who maintained them, and the cutoffs had made the lower valley safer. In 1941, to the delight of area residents and with the blessings of the Corps of Engineers, Congress abandoned the idea of a Eudora floodway.[19]

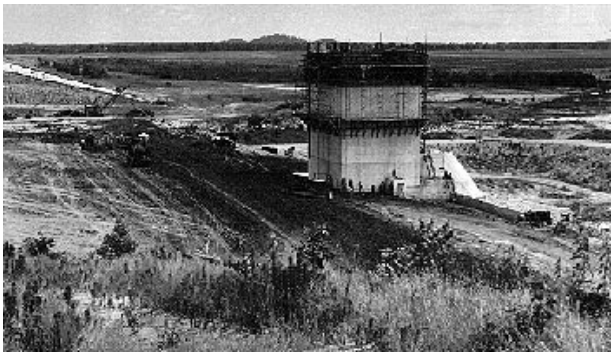
In the Flood Control Act of 1936, passed on June 22, Congress accepted a federal role in controlling floods all over the United States and gave the Corps of Engineers responsibility for implementing the program. The measure also provided for building reservoirs where they would be important in preventing floods.[20] A separate measure, passed a week earlier, dealt with the Yazoo basin, an area with severe flood-control problems that was also the home of an influential and persuasive national legislator, Congressman Will M. Whittington of Greenwood, Mississippi, who would soon be Chairman of the House Flood Control

Committee. Under Whittington's auspices, Congress approved a program that included seven reservoirs for the Yazoo Basin, despite a lack of economic justification and an absence of support from the Jadwin Plan and among the Corps of Engineers. Brigadier General Harly B. Ferguson, president of the MRC, wrote in 1938 that "reservoirs never were justified except for work relief." Eventually only four reservoirs were built, but Whittington supplemented them with an impressive array of levees and downstream channelization.[21]

The first of the Yazoo reservoirs, Sardis Lake, was built between 1936 and 1940 on the Little Tallahatchie River near Batesville, Mississippi. Vicksburg engineers used a hydraulic-fill technique in which the dam was constructed from soil dredged just downstream from the damsite, and they designed and built a portable dredge to do the job. A second reservoir, Arkabutla Lake, on the Coldwater River, near Coldwater, Mississippi, was finished in 1943. After World War II, two other reservoirs, Enid Lake on the Yocona and Grenada Lake on the Yalobusha, were finished. Together, the basin reservoirs reduced by more than two-thirds the peak flow of water out of the Yazoo headwaters during heavy rainfalls.

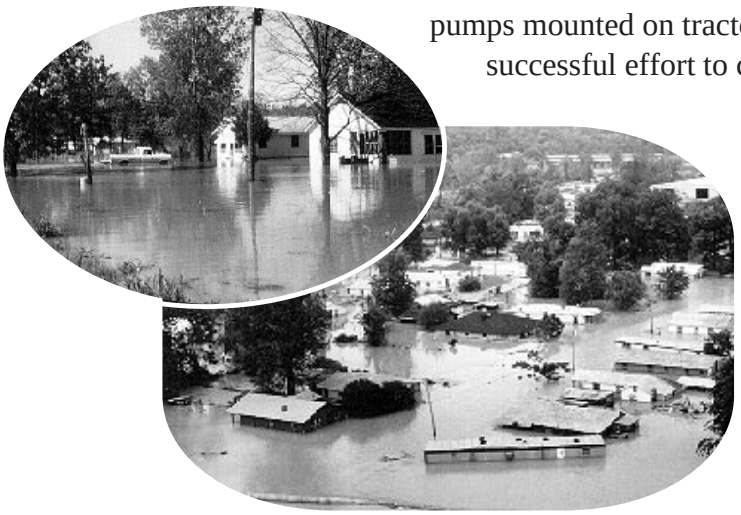
The most spectacular feature of the mainstem work was the Will M. Whittington Channel, an auxiliary route for the Yazoo designed to take pressure off the main channel. It left the Yazoo near Tchula Lake and intersected the Big Sunflower River near where that river flows into the Yazoo. Completed in 1962, the Whittington Channel proved so effective at reducing stages on the lower Yazoo that it allowed much land, once regularly flooded, to be opened for farming. The Vicksburg District also built more than three hundred miles of levees in the Yazoo Basin and made extensive channel improvements to speed the flow of floodwaters.[22]

The Flood Control Acts of 1928 and 1936 authorized the Corps of Engineers to assist local levee boards in building new levees and upgrading old ones. In general, the Vicksburg District built the levees, inspected existing levees on an annual basis, and did major maintenance work. The levee boards provided the right-of-way and did routine maintenance. By 1975, the district had 461 miles of levees



on the Mississippi, 186 miles on the east bank, and 275 on the west bank. There were also several hundred miles of levees on the tributary rivers within the district. Where conditions merited and funds were available, levees were reinforced with berms, which are low mounds of dirt built against the levee. Berms were used on the river side of the levee to prevent slides and on the land side to minimize seepage water.[23]

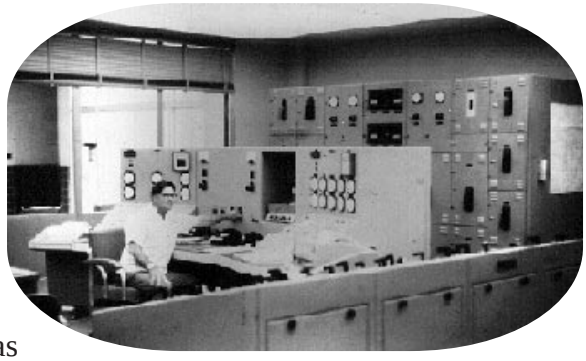
In 1973, the people of the Lower Mississippi valley experienced their third major flood of the twentieth century. Heavy rain on the upper Mississippi sent floodwaters south where they were augmented by local precipitation. In March, high water on the Yazoo threatened Greenwood, Mississippi, and the Corps responded by opening the Fort Pemberton Cutoff and allowing the river to flow away from the city. Later, when the Mississippi reservoirs filled to capacity, Greenwood was imperiled again. This time the engineers raised the levees using plywood flashboards supported by a dirt embankment. Strenuous floodfighting took place on the Ouachita as well, particularly at the cities of Jonesville and Monroe and in the Red River backwater area. Here, and elsewhere, portable pumps mounted on tractors were used for four months in a successful effort to control and evacuate the floodwaters.[24]



In additional to considerable damage, the Flood of 1973 left an important warning to the Vicksburg District. Careful measurement of Mississippi River flows indicated that the carrying capacity of the river had declined. The cutoffs of the 1930s had made the Mississippi more efficient and lowered the flowline for a given velocity

of water. Now it was clear that the meandering tendency of the river had deteriorated its channel, and flowlines were rising. In practical terms, it would be necessary to raise the levees in order to get the same amount of flood protection.[25]

The installation of hydroelectric power facilities on flood control dams was authorized by Congress in 1938, providing the Corps of Engineers and the Federal Power Commission recommended the action. The Vicksburg District developed three such projects on the Ouachita River and its tributaries, all of which flow out of the Ouachita Mountains of western Arkansas. Narrows Dam, built between 1947 and 1950 on the Little Missouri River in Pike County, created Lake Greeson. It also contained the first hydroelectric plant built by the district and one of the first constructed by the Corps of Engineers. A much larger plant was installed in Blakely Mountain Dam, which was finished in 1955, creating Lake Ouachita at Hot Springs. DeGray Dam and Lake, on the Caddo River near Arkadelphia, was the last of the Arkansas hydroelectric projects, opening in 1972.[26]



A Diversified Mission

The civil works mission of the Corps, which had expanded from navigation into flood control, became still more diverse after World War II. One reason was that the more affluent and leisure-oriented society that came into existence in the United States discovered that reservoirs not only stored potential floodwater but also provided excellent locations for fishing, swimming, and boating. In the 1944 Flood Control Act, Congress authorized the Corps to plan for and operate recreational facilities at its reservoirs. By the 1960s, recreation was a significant part of the Corps' mission. In 1971, the Vicksburg District established a Recreation-Resource Management Branch, now called the Project Resources Management Branch, which administered some 400,000 acres of land and water in three states. By the end of the 1970s, the district's reservoirs were being visited annually by millions of people, most of whom had little interest in flood control or hydroelectric power.[27]

While Americans were more interested in using the environment for pleasure, they also became concerned that the air, land, and water of the United States, as well as the plants and creatures that inhabited it, were

endangered by the material progress of modern man. As early as 1958, Congress mandated that the Corps of Engineers consider the conservation of fish and wildlife in its projects and coordinate its planning with the U.S. Fish and Wildlife Service. In the 1960s, a loose coalition of organizations and forces known as the "environmental movement" launched a strong attack on air and water pollution and on what it considered the destructive tendencies of unchecked progress. The U.S. Army Corps of Engineers was a major target of those who felt that progress often moved in the wrong direction.[28] In one early case, environmentalists forced the abandonment of a project to dam the Sangamon River that was favored by the city of Decatur, Illinois, and by the Corps. The opponents of the dam were able to show that the Corps had underestimated the environmental impact of the project and overstated the economic benefits that it would provide.[29]

The environmental movement was also effective in Washington, D.C., particularly in securing passage of NEPA, the National Environmental Policy Act of 1969. This measure required environmental impact studies to be filed for all government projects and created an Environmental Protection Agency to oversee both public and private activities that were related to the environment. For the Corps, environmental planning became a fact of life. Engineers now had to consider how their projects would affect both wildlife and cultural resources and, in the process, listen to the opinions of biologists and archaeologists.

At Vicksburg, the new emphasis on the environment was reflected in a decision, stemming from a suggestion by the Hydraulics Branch, to move the site of a pumping plant in Concordia Parish, Louisiana, rather than risk the destruction of habitat being used by the American alligator, the bald eagle, and the Florida panther. An Environmental Analysis Section, created in 1970, assessed the impact of Corps activity on endangered species of plants and animals and studied the threat to cultural resources such as the material remains of Native Americans and of more modern district residents.

The Vicksburg District also engaged in a number of mitigation projects that were designed to provide positive environmental effects to offset the negative ones associated with other work. An outstanding example of that was the drainage channel and control structure built for Catahoula Lake in 1972. Located near the Jonesville Lock and Dam on the Ouachita River, Catahoula Lake was an important stopping point for

migratory birds on the Mississippi Flyway. The mitigation work prevented deterioration of that lake that would have been caused by the lock and dam and improved its qualities as a habitat for wildlife. In addition, work was begun on the development of wildlife refuges on the Ouachita, one at Felsenthal Swamp in Arkansas and another in the Bayou D'Arbonne area of Louisiana.[30]

Environmentalism affected the Corps of Engineers in another way. The Rivers and Harbors Act of 1899 required anyone wishing to construct or discharge anything in the navigable waters of the United States to secure a permit from the Corps of Engineers, which was charged with seeing that the waters stayed free of obstruction. This modest authority was greatly enlarged by the Federal Water Pollution Control Act Amendments of 1972, commonly called the Clean Water Act, Section 404 of which required permits from the Corps for dumping dredged or fill material into waters of the United States. As interpreted by the courts, this jurisdiction included the navigable waters of the earlier measure, tributaries of those waters, isolated water whose protection was related to interstate or foreign commerce, and all land areas, known as wetlands, lying along these waters and covered with enough water to have a permanent effect on their ecology. Thus, the Army Corps of Engineers found itself charged with protecting almost all the water resources of the United States against their degradation by property owners or developers. In 1975, the Vicksburg District created a Regulatory Branch to handle the rapidly growing permit program.[31]

Navigation, flood control, and the environment do not exhaust the categories of activities carried out by the Vicksburg District in its nearly one hundred years of existence. They do not, for example, include the major military construction carried out by the district in World War II. Nor do they include the disaster relief provided in times of crisis to areas around the nation by employees on loan from Vicksburg. These categories, however, do encompass the central mission of the district as it had evolved by 1976 when the nation celebrated its 200th birthday.

Chapter One Notes

[1]Paul K. Walker, *Engineers of Independence: A Documentary History of the Army Engineers in the American Revolution, 1775-1783* (Washington: GPO, 1981), pp. 4-5, 37-38, 363; see also U.S. Army Corps of Engineers, *The History of the US Army Corps of Engineers* (EP360-1-21, January 1986).

[2]Forest G. Hill, *Roads, Rails & Waterways: The Army Engineers and Early Transportation* (Norman: University of Oklahoma Press, 1957), pp. 6, 25-26, 37-41, 47-48.

[3]Gary B. Mills, *Of Men & Rivers: The Story of the Vicksburg District* (Vicksburg: U.S. Army Corps of Engineers, 1978), pp. 17-26; Albert Cowdrey, *Land's End: A History of the New Orleans District, U.S. Army Corps of Engineers, and Its Lifelong Battle with the Lower Mississippi and Other Rivers Wending Their Way to the Sea* (New Orleans: U.S. Army Engineer District, 1977), pp. 5-11.

[4]Martin Reuss, "Andrew A. Humphreys and the Development of Hydraulic Engineering: Politics and Technology in the Army Corps of Engineers, 1850-1950," *Technology and Culture* 26 (1985): 1-33.

[5]Mills, *Of Men & Rivers*, pp. 27-33, 39-40.

[6]Floyd M. Clay, *History of Navigation on the Lower Mississippi* (U.S. Army Corps of Engineers, 1983), pp. 15, 17-18.

[7]Mills, *Of Men & Rivers*, pp. 43, 66-68, 73, 77-78, 94, 97-99.

[8]Ibid., 43-51, 92; John W. Anderson, "A Historical Resume of the Vicksburg District," Unpubl. MS, 1967, in the archives of the Historical Office of the U.S. Army Corps of Engineers, p. 7.

[9]Mills, *Of Men & Rivers*, pp. 52-62; Anderson, "Historical Resume," pp. 6-7, 10-12.

[10]James Ware, "Soldiers, Disasters and Dams: The Army Corps of Engineers and Flood Control in the Red River Valley. 1936-1946," *Chronicles of Oklahoma* 57 (1979): 26-33.

[11]Mills, *Of Men and Rivers*, pp. 51-52, 88.

[12]Anderson, "Historical Resume," pp. 6, 8.

[13]Mills, *Of Men & Rivers*, pp. 83-86, 170-8; Clay, *History of Navigation*, pp. 18-21.

[14]Mills, *Of Men & Rivers*, pp. 118-120; Beatrice Hort Holmes, *A History of Federal* Water Resources Programs, 1800-1960 (Washington: U.S. Department of Agriculture, 1972), pp. 4, 7.

[15]Pete Daniel, *Deep'n as it Come: The 1927 Mississippi River Flood* (New York: Oxford University Press, 1977), pp. 9-10.

[16]Oral History Interview, April 11, 1989.

[17]Mills, *Of Men & Rivers*, pp. 132-133; Cowdry, *Land's End*, pp. 43-46.

[18]Anderson, "Historical Resume," p. 8.

[19]Mills, *Of Men & Rivers*, pp. 133-6, 141-3. On the cutoffs, see Oral History Interview with Cicero Nelson, July 11, 1990.

[20]Holmes, *A History of Federal Water Resources Programs*, p. 16.

[21]Martin Reuss, "The Army Corps of Engineers and Flood-Control Politics on the Lower Mississippi," *Louisiana History* 23 (1982):140-48; for a different perspective, see Gary B. Mills, "New Life for the River of Death: Development of the Yazoo River Basin, 1873-1977," *Journal of Mississippi History* 41 (1979): 295-96.

[22]Mills, *Of Men & Rivers*, pp. 153-160; Interview with David Haworth III, Assistant Chief, Engineering Division, August 21, 1987.

[23]Ibid., pp. 148-9.

[24]Mills, *Of Men and Rivers*, pp. 121-29, 219-224; *Mississippi River and Tributaries: Post-Flood Report, 1973* (Vicksburg: Lower Mississippi Valley Division and Mississippi River Commission, n.d.).

[25]Oral History Interview with John E. Henley, May 10, 1989.

[26]Mills, *Of Men & Rivers*, pp. 209-213; Holmes, *History of Federal Water Resources Programs*, p. 16.

[27]Mills, *Of Men & Rivers*, pp. 193-195.

[28]Gene Marine, "America The Raped," *Ramparts* (April 1967), pp. 34-45; Justice William O. Douglas, "The Public Be Dammed," *Playboy* (July 1969), pp. 143, 182-87; Elizabeth B. Drew, "Dam Outrage: The Story of the Army Engineers," *The Atlantic* (April 1970), pp. 51-60.

[29]Mazmanian, Daniel A., and Jeanne Nienaber, *Can Organizations Change? Environmental Protection, Citizen Participation, and the Corps of Engineers* (Washington: The Brookings Institution, 1979), pp. 19-23.

[30]Mills, *Of Men & Rivers*, pp. 196-207.

[31]Mills, *Of Men & Rivers*, pp. 213-216; "Department of the Army Regulatory Program," Regulatory Branch, U.S. Army Engineer District, Vicksburg, March 1986.