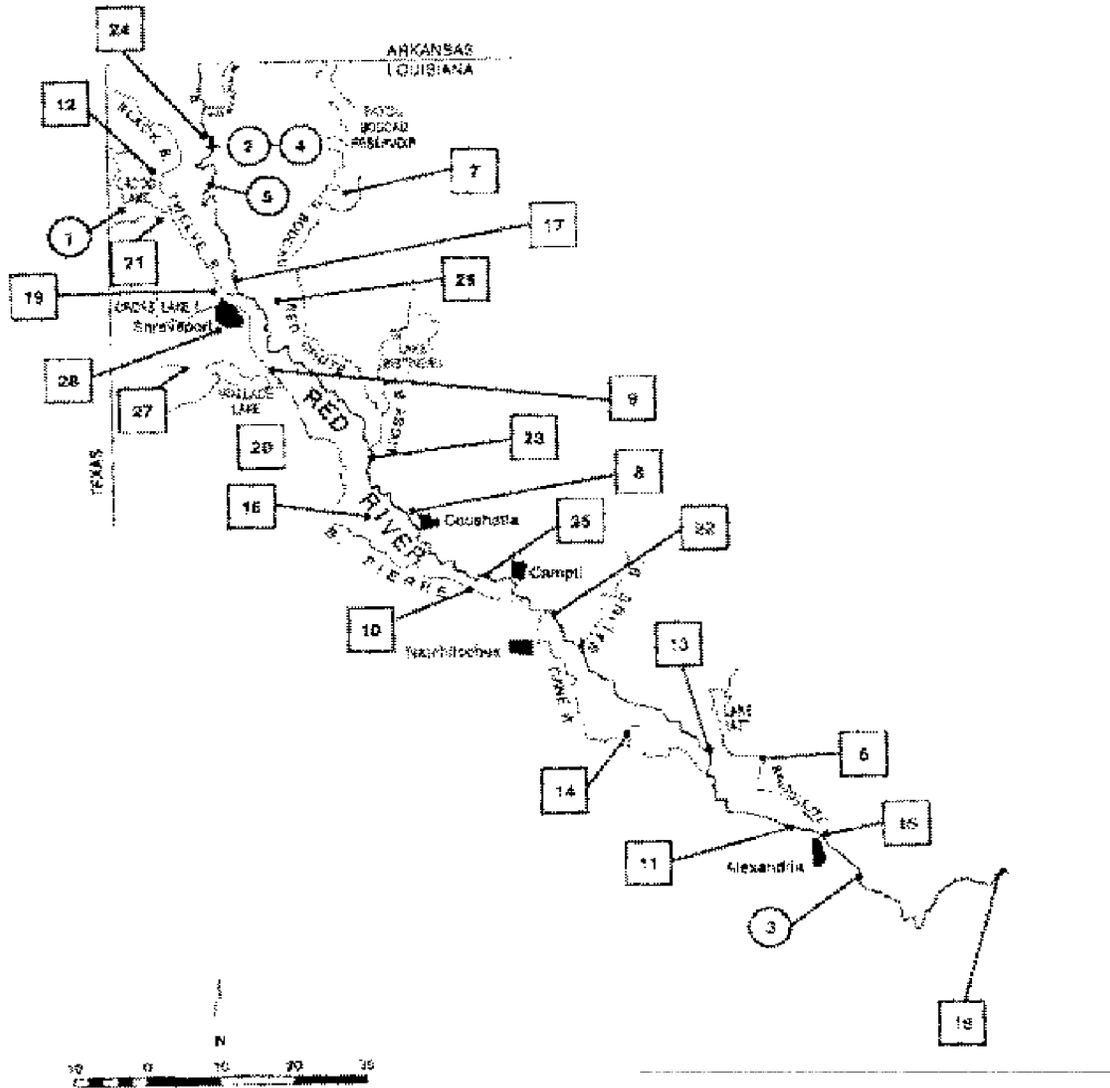


# Red River Basin



## Projects

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# Red River Basin

## Introduction

The Red River, more than 1,200 miles long, is a major tributary of the Mississippi. Through the years, the allure of the Red River has compelled the literary interests of writers and lyricists. Yet in the past, the Red River has also had the typical difficulties of an alluvial stream, complicated by erratic flow and a sandy flood plain soil. Well documented accounts of the incredible Red River rafts of the 1800s are a part of the history of the area.

Improvements during the 19th century, made under small appropriations and limited conception, did not cure the difficulties in the river and its valley. A new, broader approach came with the 20th century--a concept of developing a whole river valley in an integrated manner with comprehensive basin planning.



The Red River winds around the town of Coushatta

## Projects

### **Armistead Bank Protection**

(Vicksburg District)

To prevent further caving of the right bank of Red River above the Armistead-Coushatta highway bridge across Red River, a standard board revetment was constructed above the bridge in 1951. It was extended upstream in 1952 and 1954 at a total cost of \$380,289. Accomplished under the provisions of Section 14 of the Flood Control Act of 1946, this project protects about 4,800 linear feet of bank. Maintenance of the completed improvements is the responsibility of the Red River Levee and Drainage District.

### **Bayou Nicholas and Coushatta**

(Vicksburg District)

The improvement consists of a ring levee for the protection of Coushatta. The levee extends from the hills to the high bank along Red River, about one-half mile upstream from the U.S. Highway 84 bridge. A second levee commences about 0.5 mile below the bridge and continues downstream along the river for 0.5 mile, then easterly to the Kansas City Southern Railway tracks.

Outlet for the local drainage is through a gated culvert in each levee. This project was authorized under Section 205, Flood Control Act of 1948. Completed in 1964, the project cost the Federal government \$70,700. Maintenance of the completed improvements is the responsibility of the Red River Levee and Drainage District.

### **Bayou Rapides**

This project, authorized under Section 205 of the Flood Control Act of 1948, consists of 22.6 miles of snagging, clearing, and chemical treatment of the stumps. Work was completed in 1951 at a cost of \$95,179. Cumulative benefits from flood damage prevented through 1993 are estimated at \$4,539,000. Maintenance is the responsibility of the Red River, Atchafalaya and Bayou Boeuf Levee District.

### **Black Bayou-Pine Island Area**

(Vicksburg District)

Authorized under Section 205 of the Flood control Act of 1948, this project consists of about 7 miles of levees along the right bank of Black Bayou and a drainage structure for discharge of interior runoff. The project affords the Pine Island oil field protection against floods on Twelvemile and Black bayous. Floods occur about once in 25 years. The project was completed in 1963 at an estimated Federal cost of \$336,063. Maintenance of the completed project is the responsibility of the Caddo Levee District. Cumulative benefits attributable to the project through 1982 are \$1.25 million.

A crevasse approximately 1,500 feet above the levee's downstream terminus occurred during heavy rains in April 1966, resulting in flooding of a large portion of the oil field which it protects. The crevasse occurred without warning and no preventive work could be accomplished.

### **Brush Bayou**

(Vicksburg District)

Under the authority of Section 205 of the Flood Control Act of 1948, as amended, a plan has been developed for channel enlargement and realignment of this stream, between Mile 1.20 and 7.42, in combination with nonstructural measures for flood plain management. A portion of the project between Mile 1.20 and Mile 5.86 was completed and turned over to the Caddo Parish Commission for maintenance in 1978. The remaining portion between Mile 5.86 and Mile 7.42 was completed by the Office of Public Works and the Caddo Parish Police Jury. Construction of the project was initiated in 1976. The Federal cost of the project is \$1 million, and the non-federal cost is \$2.48 million.

### **Caddo Lake, Replacement of Dam**

(Vicksburg District)

Replacement of the existing dam was authorized by the Flood Control Act of October 1965. The new dam, located immediately downstream of the existing structure, has the same flow characteristic as

the existing dam.

The continued existence of Caddo Lake, used for municipal and industrial water supply and recreation, is now ensured. Completed in 1971, the dam consists of 2,400 linear feet of concrete wall, with the central 860 feet of crest at elevation 168.5 feet NGVD and the remaining 1,540 feet at 170.5 feet NGVD. An earth embankment 1,200 feet long ties the concrete dam to the hill line at one end; at the opposite end, the dam abuts the hill line.

The Federal cost of the project through 1976 was \$3,586,000. The non-federal cost was \$228,000. The Water Resources Development Act of 1976 transferred the operation and maintenance of the dam from local to Federal responsibility.

### **Colfax Cutoff** (Vicksburg District)

The Colfax Cutoff was constructed to stop caving banks along Red River and to protect the town of Colfax. This emergency channel improvement was completed in 1936 at a cost of \$148,282, and was enlarged in 1939 at a cost of \$70,348.

### **Coushatta Bank Protection** (Vicksburg District)

The north approach to the Armistead-Coushatta highway bridge is protected by 1,136 linear feet of standard board revetment on the left bank of Red River. Constructed in 1950 under Section 14, Flood Control Act of 1946, this improvement cost \$90,276, with the Federal government contributing \$50,000 and local interests contributing the balance.

### **Cypress Bayou and Waterway Between Jefferson, Texas and Shreveport, Louisiana** (Vicksburg District)

This project provided for removing obstructions, dredging, and straightening the channel from Jefferson, Texas, to Shreveport, Louisiana, a distance of 66 miles, and construction of a dam without a lock at the foot of Caddo Lake. The project was completed in 1914 at a cost of \$202,817. A new dam has since been built to replace the original one.



Caddo Lake Dam



Cypress Lake Dam

Privately owned, except for Caddo Lake State Park, the 170-mile shoreline of Cypress Bayou offers excellent recreational opportunities. Commercial camps operating along the shoreline provide cabins, boats, fishing, hunting, and other recreational facilities. Owners of hundreds of homes and private camps also take advantage of recreational opportunities along the waterway. Visitors to the waterway number from 500,000 to one million annually.

Heavy infestations by aquatic vegetation occurs in low-water years, completely covering large areas of upper Caddo Lake. The 26,800-acre lake and Cypress Bayou below Jefferson have an average depth of 4.8 feet. No commerce has been reported since 1979.

The project was also modified by the Rivers and Harbors Act of 1968, to become part of the Red River Waterway project.

### **Fire Point Cutoff and Revetment** (Vicksburg District)

This emergency channel improvement project in Caddo Parish, near Benton, was completed in 1936 at a cost of \$124,178. The construction of 1,650 linear feet of the board revetment at this location was completed in 1950 at a cost of \$104,632.

### **Gahagan Bend** (Vicksburg District)

Bank protection works under this project consist of three pile dikes in Red River, near the town of Gahagan, Louisiana, to protect the flood control levee and avoid relocating a paved highway and main-line railroad. The original work (under provisions of Section 14 of the Flood Control Act of 1946) was completed in 1948 and strengthened in 1951 at a cost of \$201,966. It protects approximately 2,700 linear feet of bank.

### **Lucas Bend** (Vicksburg District)

Bank protection works on Red River under this project consist of articulated concrete mattresses, 4 by 4-foot steel fascine boxes placed on dredged sand fill, and pile dikes at Lucas Bend, about 9 miles below the city of Shreveport. Authorized under Section 11 of the Flood Control Act of 1948, this project protects the flood control levee and makes unnecessary the relocation of the main line of the Texas and Pacific Railroad, a paved highway and a 12-inch gas pipeline. Approximately 4,750 linear feet of bank have been protected at a cost of \$641,676.

### **Moncla Bridge** (Vicksburg District)

Protection for the left bank approach to the Louisiana State Highway 107 bridge over Red

River at the town of Moncla is provided by 1,900 linear feet of standard board revetment. This bank protection work was completed in 1953 (under the provision of Section 14 of the Flood Control Act of 1946) at a cost of \$117,671. The Federal government contributed \$50,000 and local interests contributed the balance.

### **Overton-Red River Waterway (Vicksburg District)**

This project was authorized in 1946 as a modification of the project "Red River Below Fulton, Arkansas," described subsequently. Under the modification, a 9-foot-deep by 100-foot-wide navigation channel was to be constructed from the Mississippi River via the Old and Red rivers for a distance of 31 miles, then through a new land-cut generally along existing streams on the right bank of the Red River flood plain to a turning basin on Bayou Pierre at Shreveport. The project, which is about 205 miles long, would have nine locks, a pumping plant, and numerous control structures.

Surveys and preliminary studies were suspended in 1961 because local interests would not agree to participate in the project. The Louisiana Constitution was amended in 1965 to authorize formation of the Red River Waterway District. This district furnished an acceptable act of assurance of local cooperation for the lower 31 miles of the waterway in 1967. Planning was resumed in 1965 on that part of the project.

Construction of the project, with channel dimensions of 9 feet deep by 200 feet wide, was initiated in 1968. Authorization of the Red River Waterway project eliminated the need for the Overton-Red River Waterway above mile 31. For this reason, that portion above mile 31 was placed in an inactive status in 1971. See "Red River Waterway Project, Louisiana, Arkansas, Oklahoma and Texas," discussed subsequently. Completion funds for the lower 31 miles of the project were received in 1982, and that portion of the project was completed in fiscal year 1982 at a Federal cost of \$26,654,000 and non-Federal cost of \$52,000. The lower 31 miles were

subsequently incorporated into the Red River Waterway, Mississippi River to Shreveport, Louisiana, Project.



Early morning persistence paid off for this lucky hunter

### **Red River Below Denison Dam, Texas, Oklahoma, Arkansas and Louisiana (Vicksburg and Tulsa Districts)**

A comprehensive plan for flood control in the Red River Valley below Denison Dam was authorized by the Flood Control Act of 1946 and subsequent modifications. The plan provides for the construction of Boswell, Hugo, Pine Creek, Lukfata, and Broken Bow reservoirs in Oklahoma; Millwood, DeQueen, Gillham, and Dierks reservoirs in Arkansas; and Cooper Lake, Wright Patman Lake, and Lake O' the Pines in Texas.

The project also includes enlarging and strengthening the Red River levee system, constructing channel stabilization and bank protective works where levee setbacks are impossible or uneconomical, constructing several local protection projects, and incorporating several previously authorized projects into the comprehensive plan.

This project has been modified by the Red River Waterway Project, authorized by the Rivers and Harbors Act of 1968. Because of the wide scope of the project, its various features are treated as separate projects, as listed in the accompanying table.

***Bayou Bodcau and Tributaries*** (Vicksburg District). Bayou Bodcau drains 1,158 square miles in southwestern Arkansas and northwestern Louisiana. It rises in the vicinity of Hope, Arkansas, and flows southerly through Bodcau Dam and joins Cypress Bayou to form Red Chute Bayou. The flow continues through Red Chute Bayou, Flat River, and Loggy Bayou and enters Red River from the left bank about 50 miles below Shreveport. The protection authorized by the Flood Control Act of October 1965 consists of levees and channel improvement which would afford protection against a headwater flood with a recurrence interval of 25 years and a backwater flood of the same magnitude as the 1945 flood on the Red River under 1962 reservoir conditions. The project will benefit an estimated 20,710 acres of fertile Red River agricultural lands.

This project was one of the water resources projects reviewed in 1977 under the President's Review Criteria. As a result of the review, the project was found not to have sufficient benefits to offset the adverse environmental impacts. Deletion of funding in the 1978 budget, as well as deauthorization of the project, was recommended.

The Senate Report (97-256) pursuant to the 1982 Appropriation Act stated that the partially constructed project was reconfirmed for completion without further studies and analysis. In light of development in the project area, which had occurred during the inactive construction period (1977 to 1982), it was deemed advisable to reanalyze the project scope. General re-evaluation studies were initiated in 1983 and were completed in 1987. The re-evaluation study found that none of the alternatives investigated to alleviate the flooding problems were economically justified. For this reason, the project was reclassified as inactive.

***Bayou Bodcau Dam and Reservoir, Arkansas and Louisiana*** (Vicksburg District). Bayou Bodcau Reservoir is located in Webster and Bossier parishes, Louisiana, and Lafayette County, Arkansas. This heavily forested, single-purpose flood control reservoir retains no permanent pool. The dam is an 11,900

-foot-long rolled-earth fill with twin uncontrolled conduits 10 feet in diameter and a 4,000-foot uncontrolled spillway.

The top of the flood pool is at elevation 199.5 feet NGVD. For flood control storage, the reservoir has a capacity of 357,300 acre-feet, which will cover 21,000 acres. Seventy-two thousand acres of fertile bottomland, including parts of Barksdale Air Force Base and Bossier City are protected by the reservoir.



Bayou Bodcau Dam

During the Flood of May 1958, stages at the U.S. Highway 80 gage were reduced by an estimated 2.9 feet and flooding was prevented on 9,900 acres of cropland. Estimated cumulative flood damages of \$578,000 were prevented by this project through 1981.

Recreational development has spurred visitation to the reservoir from an estimated 8,000 people in 1955 to approximately 328,000 in 1979. Facilities including picnicking, camping, boat launching, rest rooms and potable water supply systems were developed by the Corps of Engineers at a cost of about \$132,000 through 1974.

Waterfowl and upland game hunting areas have been enhanced by the Louisiana Department of Wildlife and Fisheries, through license agreement with the Secretary of the Army. Public hunting and fishing on about 32,000 acres in the area have been improved through an intensive habitat management program in cooperation with the Corps of Engineers.

A 500-acre subimpoundment, Ivan Lake, has been constructed on an arm of Bodcau Lake, just north of State Highway 160, by the Bossier Parish Police Jury under license agreement and in cooperation with the state Department of Transportation and Development, Office of Public Works. The feature included recreational development of 1,110 acres surrounding the lake.

Construction of the dam was initiated in 1947 and completed in 1961 with the exception of recreational facilities. The total project cost to date is \$1,232,000, including \$132,000 for recreational facilities.



Rare snow events provide excellent duck hunting opportunities

***Bayou Bodcau, Red Chute, and Loggy Bayou*** (Vicksburg District). Located downstream of Bodcau Dam, about 25 miles southeast of Shreveport, this project consists of channel improvement for flood control.

Improvement of the lower 7.8 miles of the channel consisted of 2.4 miles of snagging and clearing and 5.4 miles of channel enlargement. The project was completed in 1948 at a Federal cost of \$319,200. A modification of this project, Bayou Bodcau and Tributaries, was described previously.

During the Flood of May 1958, stages at the U.S. Highway 80 gate, just northeast of Shreveport, were estimated to have been reduced by 21.6 feet, and the flooding of 9,100 acres of cropland was prevented because of this project. Estimated benefits cumulative through 1983 were \$412,000. The Bossier

Levee District maintains the project.

***Bayou Pierre*** (Vicksburg District). This 30-mile channel improvement project for flood control extends from Bayou Wincey to the mouth of Bayou Pierre. It was completed in 1939 at a cost of \$299,529. Cumulative benefits through 1982 were estimated at \$921,000. The improvement is operated and maintained by the Corps of Engineers.

***Bayou Pierre, Vicinity of Shreveport*** (Vicksburg District). Drainage for parts of south Shreveport and the agricultural lands below the city is provided by this project. The channel enlargement and snagging and clearing involved 21 miles of channel in and below Shreveport to the mouth of Cypress Bayou. Completed in 1950, the cost was \$332,383 of which \$89,047 was contributed by local interests.

Stages for the Flood of April 1953, the largest since completion of the improvements, were reduced an estimated 2.5 feet. About 290 acres within Shreveport and about 4,800 acres downstream of the city were protected from overflow. Cumulative project benefits through 1982 were estimated at \$2,235,000.

Within the city limits, the channel improvement is maintained by the city of Shreveport, while the remainder of the improvements are maintained by the Caddo Parish Commission. Portions of the bayou in Caddo Parish have been enlarged by the Commission, in cooperation with the state Department of Transportation and Development, Office of Public Works.

***Campti-Clarence Levee*** (Vicksburg District). Flood protection for 29,500 acres of land and improvements on the left descending bank of Red River below Campti is provided by this levee. Works consist of 30 miles of ring levee to protect the area from Red River and Saline Bayou overflow, and construction of interior drainage improvements to alleviate the local interior flood problem. Construction of the project was initiated in 1964 and completed in 1968. Total cost of the project was \$2,053,000, which included \$180,000 non-Federal costs.



Bertrand Dikes on the Red River

***East Point Levee*** (Vicksburg District). This project consisted of approximately 13 miles of levee along the left bank of Loggy Bayou and Red River with appurtenant drainage works, including a control structure at Coushatta Bayou. About 9,000 acres of Red River bottomlands near Coushatta are protected. Construction was initiated in 1966 and completed in 1968. Total cost was \$553,100, including a \$67,000 local cost.

***Grant Parish Below Colfax*** (Vicksburg District). The Grant Parish below Colfax project was designed to provide increased flood protection to the town of Colfax and vicinity. The improvement consists of an extension of the levee system along the left bank of Red River from Colfax to the west bank of Bayou Darrow, a distance of about 16 miles.

Without the levee, completed in 1941 at a cost of \$38,809, Colfax would have been flooded to an estimated depth of five feet in April 1945.

The levee extension has since been enlarged and extended by a companion project, "Aloha-Rigolette Area, Grant and Rapides Parishes," which was completed in 1956.

Since both projects provide partial protection to the same area, benefits from the two projects are inseparable. Cumulative benefits from the prevention of floods for the two projects through 1984 were \$2,591,000.

***Natchitoches Parish*** (Vicksburg District). Approximately 135,000 acres in the Cane River "Island" area are protected from Red River overflow by this project. Work was completed in 1956 at a cost of \$1,780,000, of which \$250,000 was contributed by local interests.

The project consists of 34.4 miles of levee along the right bank of the Red River, extending from the vicinity of Natchitoches to Cane River and then along and across Cane River to the hills on the south bank; a diversion channel about 4.3 miles long, extending from Cane River through the hills to Red Bayou; the widening of 1.2 miles of Red Bayou channel to Red River; and rearrangement of the interior drainage.

An estimated 57,000 acres were protected during the flood of May 1942. The levee system saved portions of the town of Natchitoches from flooding in April 1945, even though practically all of the Cane River

"Island" area was inundated.

Flooding occurred over approximately 72,000 acres in the Cane River, Kisatchie Bayou, and Old River area during May 1953. However, the levee protected an additional 40,000 acres from Red River overflow. Sixty-six thousand acres were protected from flooding during both April-June 1957 and May 1958.

Cumulative benefits (through 1982) from this project were estimated at \$4,226,000. Maintenance of the project is the responsibility of the Natchitoches Levee & Drainage District.

**Pineville** (Vicksburg District). The Pineville project is designed to protect the city of Pineville and vicinity against floodwaters of the Red River. Improvements authorized in 1941 consist of about 1.14 miles of levee, the raising and widening of 1,240 feet of railroad embankment, four drainage structures and a pumping station. The major portions of this work were completed in 1951 at a cost of \$232,426.

During the flood of May 1953, approximately 130 acres in the area were protected by the levee system. Cumulative flood damages prevented by the project through September 1982 are estimated at \$37,000. Maintenance of the project, including operation of the four drainage structures and the pumping station, is the responsibility of the Red River, Atchafalaya, and Bayou Boeuf Levee District.

**Red River, Vicinity of Shreveport** (Vicksburg District). Consisting of bank protection works, this project extends intermittently from the lower limits of Bossier City, mile 304.6, upstream to mile 315.0. This effort to stabilize the Red River channel and prevent excessive bank caving includes works at Brownlee Bend, Honore Bend and Bossier City front on the left bank. Twelvemile Bayou Bend, Douglas Island Bend, and Shreveport front on the right bank.

Features of the project protect about 58,000 linear feet of Red River banks and include 31,000 feet of board revetment, 6,800 feet of pile dike, 5,300 feet of rock groins, 19,780

feet of fascine boxes, 9,930 feet of pile revetment, and 470 feet of baffle dikes.

Costs for the project, completed in 1953, were \$3,908,000. Through 1982, the project had prevented an estimated total of \$2,015,000 in cumulative flood damages. The project is maintained by the Caddo and Bossier levee districts, each of which maintains the work within its own district.

**Red River Levees and Bank Stabilization Below Denison Dam, Texas, Oklahoma, Arkansas and Louisiana** (Vicksburg and Tulsa Districts). Work under this project will protect against a flood equivalent to that of 1945, had that flood been confined by levees. The project consists of raising and strengthening the existing and authorized levees of Red River from the vicinity of Index, Arkansas, to Pineville, Louisiana, on the left descending bank and to Boyce, Louisiana, on the right descending bank. There are approximately 153 miles of levees on the left bank and 240 miles of levees on the right bank in the system. Approximately 30 miles of additional levee along the left bank have been subsequently incorporated into this project. Bank protection and channel stabilization works are constructed in areas where levee relocations are infeasible or uneconomical.

In Louisiana, approximately 76 miles of levee on the right bank and 27 miles on the left bank have been raised to grade and section. A total of 38 miles of bank have been protected and four cutoffs have been constructed in Louisiana. Authorized in 1946, this project will cost an estimated \$83,069,000 in Federal funds, of which \$73,461,000 were allocated through 1995. The project is scheduled for completion in 2000. The completed portions of the project are maintained by local interests.

**Red River Parish** (Vicksburg District). About 176,000 acres of land in the Bayou Pierre Basin along Red River are protected by this project. Completed in 1940 at a cost of \$149,435, the improvements include 31 miles of new levees and levee enlargement along the south bank of Red River in Red River Parish.

Although the levee was breached during the Flood of 1945, 20,000 acres were still protected from floodwaters. The levees protected about 29,000 acres of land during the flood of April-June 1957 and about 31,000 acres during the flood of May 1958.

Cumulative benefits for this project through 1982 were estimated at \$1,706,000. The project is maintained by the Red River Levee and Drainage District.

**Saline Point** (Vicksburg District). Designed to reduce flood stages by increasing the efficiency of the channel, this project consists of two cutoffs on Red River. Completed in 1942 at a cost of \$124,100, the Saline and Double Eddy cutoffs connect mile 65.5 to 54 (1938 mileage). Necessary levee setbacks were also included in the project. The improvements have significantly reduced flood stages in the area, and benefits through 1982 were estimated at \$65,000.

**Wallace Lake** (Vicksburg District). Wallace Lake, located on Cypress Bayou below Shreveport, provides protection from floodwaters to about 90,000 acres of agricultural lands in Caddo and DeSoto Parishes. The original project was authorized by the Flood Control Act of June 1936, as amended by the Act of June 1938.

Construction was initiated in 1941 and completed in 1946 at a total project cost of \$1,219,371, including \$17,164 for recreational facilities.

The dam, which is located 14 miles southeast of Shreveport, rises to a maximum of 48 feet above the valley floor. It is an earth-fill dam 4,300 feet long, with a reinforced concrete overflow spillway 644 feet in length with the crest at elevation 158 feet NGVD, and outlet works. The outlet works, consisting of four rectangular conduits, each 8.25 feet wide and 3 feet high, with an invert of 140 feet NGVD, are integral with the spillway. The lake controls the runoff from 260 square miles of the Cypress Bayou Watershed.

The total storage capacity of the lake is 96,100 acre-feet, of which 7,800 acre-feet are for conservation and 88,300 acre-feet are for flood control. The surface area of the lake is 2,300 acres at conservation pool, elevation 142 feet NGVD, and 9,300 acres at flood pool, elevation 158 feet NGVD.

The project prevented an estimated \$1,118,000 in flood damages through September 1981.

Wallace Lake is one of the secluded recreation spots of the Shreveport area. The conservation pool of the lake and its baldcypress tree wetland environment provide opportunities for fishing and hunting.

Improved access roads to the lake have been constructed. Boats, tackle, bait and other necessities may be obtained at fishing camps located on the lake. In 1979, an estimated 104,000 persons visited the project for recreational purposes. The project is operated and maintained by the Corps of Engineers.



Wallace Lake Dam in 1947

**West Agurs Levee** (Vicksburg District). The West Agurs Levee, constructed by local interests in 1961, posed a serious flood threat to the area behind the levee due to possible failure from uplift and underseepage during a large flood. The 700 acres of land located behind the levee is a rapidly expanding area of Shreveport. The project, authorized by the Water Resources Development Act of 1976, provided for improvements to reduce this flood threat and incorporation of the levee into the Federal project Red River below Denison Dam Project. Installation of 232 relief wells along the bottom of the existing drainage canal was first considered. But studies showed that these wells could be subject to sedimentation and possible clogging. Temporary ponding in the borrow pit to counteract uplift pressure during flood conditions became the selected plan.

The Caddo Levee District completed the levee improvements required to accommodate the temporary ponding plan in 1983. The West Agurs Levee was incorporated into the Federal system in 1983.

### **Red River Below Fulton, Arkansas** (Vicksburg District)

Previous work for the improvement of Red River below Fulton, Arkansas, was first authorized in 1828 and subsequent years through 1890. The existing project was authorized by the Rivers and Harbors Act of 1892. A 35-mile link between the Ouachita and Black River navigation project and the Mississippi River was included in the project. Features of the project were clearing of banks, snagging, dredging shoals, building levees, closing outlets, revetting caving banks, and preventing injurious cutoffs. No channel dimensions were specified. Although this is a continuing project, it is considered complete.

Nine-foot navigation on the Red River was available to Shreveport as of 31 December 1994. Traffic in the upper river has been limited to movement of construction equipment and supplies. Average annual traffic from 1986-1995 was 3,443,600 tons.

Work under this authorization, exclusive of

operation and maintenance, totals \$1,963,806. Two later modifications of this project are the Overton-Red River Waterway and Red River Waterway.

### **Red River Waterway Louisiana, Arkansas, Oklahoma, and Texas** (Vicksburg and Tulsa District)

The Rivers and Harbors Act of 1968 authorized, among others, the following improvements:

- ▶ As a modification of the project, "Red River Below Fulton, Arkansas, and Louisiana," a plan for navigation on the Red River from the Mississippi River to Shreveport consisting of a channel 9 feet deep and 200 feet wide, utilizing five navigation locks and dams.
- ▶ As a modification of the project, "Cypress Bayou and Waterway Between Jefferson, Texas, and Shreveport, Louisiana," a plan for navigation on Twelvemile and Cypress Bayous, from Shreveport, Louisiana, to Daingerfield, Texas, consisting of a channel 9 feet deep and 200 feet wide, utilizing three (two existing) navigation dams and three navigation locks.
- ▶ As a modification of the project, "Red River Levees and Bank Stabilization Below Denison Dam, Texas, Arkansas, and Louisiana," a comprehensive plan for bank stabilization and Red River from Denison Dam to the Mississippi River.

Recreation facilities are included as integral parts of each of the above modifications.

The estimated total cost for the project (1986) was \$2,833,473,000. This total included work in the Index, Arkansas, to Denison Dam, Texas, reach of the project which will be performed by the Tulsa District, with a total of \$217 million in Federal costs and \$92 million in nonfederal costs. The Mississippi River to Shreveport reach is the only segment of the project presently under construction. The 1995 estimated costs of this reach were \$1,726,775,000 Federal and \$97,950,000 non-Federal

The Mississippi River to Shreveport reach, located entirely within Louisiana, includes approximately 236 miles of navigation improvements, 225 miles of channel stabilization works, and various recreational facilities. Construction of this reach was initiated in 1973 and has included work on numerous channel realignment and stabilization items. Work was initiated on the Lindy Claiborne Boggs Lock and Dam in 1977, formally dedicated in November 1984, and officially named in 1992.

Construction of the John H. Overton Lock and Dam was initiated in 1983, and this structure was formally dedicated in 1987. Work was initiated on Lock and Dam No. 3 in 1988 and the project was formally dedicated in 1992.

The construction of Lock and Dam No. 4 and the Joe D. Waggoner Jr. Lock and Dam was completed and the waterway was opened to navigation to Shreveport, Louisiana on 31

December 1994. The Joe D. Waggoner Jr. Lock and Dam was dedicated on 17 February 1995, and Lock and Dam 4 was dedicated on 6 May 1995.

Authorization for the purchase of wildlife mitigation lands was included in the Water Resources Development Act of 1986 (PL 99-662). The law allows the acquisition, development, and management of 14,000 acres to offset wildlife habitat losses above river mile 104. This law was modified by the Water Resources Development Act of 1990 to allow acquisition of an additional 12,000 acres in the Bayou Bodeau area. Funds have been appropriated in recent years to re-evaluate the economic, engineering and environmental feasibility of the Shreveport to Daingerfield segment of the project. A feasibility report found the Shreveport to Daingerfield segment of the project to be not economically justified. The project was placed in the inactive category in 1994.



John H. Overton Lock and Dam on the Red River

## Shreves Island Cutoff

(Vicksburg District)

This is an emergency channel improvement project in Bossier Parish near Blenheim, which was completed in 1936 at a cost of \$85,746.

## Twelvemile Bayou

(Vicksburg District)

Enlargement of Twelvemile Bayou between Cash Point Floodgates, mile 9.6, and U.S. Highway 71 Bridge, mile 4.5, and snagging and clearing between U.S. Highway 71 Bridge and Red River, were authorized under Section 205, Flood Control Act of 1948, as amended.

Work on this project was initiated in 1964 and completed in 1965 at a cost of \$335,433.

Cumulative benefits from flood damages prevented through 1982 were estimated at \$77,000.

## Small Projects

*Snagging and clearing* were completed on the following streams in the Red River Basin under the authority of Section 208 of the 1954 Flood Control Act, which amended Section 2 of the 1937 Flood Control Act.

## Emergency Projects

*Emergency Bank Protection* (Vicksburg and Tulsa Districts). Under currently funded projects upstream of the Overton-Red River Waterway (lower 31 miles) project, authorized bank stabilization works are limited to isolated locations for immediate protection of short segments of levee or other improvements. These isolated efforts do not provide an effective solution to the overall problem of bank caving and channel migration. Accelerated bank loss and channel misalignment in various reaches of the Red River have become critical.

A comprehensive bank stabilization program for these critical reaches is proposed under the Red River Waterway Project, as authorized by the Rivers and Harbors Act of 1968. An emergency plan to treat major meanders and correct misalignment in these critical reaches in accordance with the comprehensive program was considered necessary and justifiable and was approved in the 1970 Senate hearings. Construction of bank protection was initiated in 1972 and is currently funded through 1995. The estimated Federal cost of the project is \$113,618,000, and the non-Federal cost is \$2,182,000. Approximately \$100,262,000 have been allocated through September 1995.

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<b>Stream</b>	<b>Length (miles)</b>	<b>Date</b>	<b>Cost (\$)</b>
Wallace Bayou	3.2	1951	11,502
Posten Bayou*	10.0	1951	46,021
Brush Bayou**	4.7	1953	48,317
Cane River	18.6	1960	97,035
Brush Bayou*	4.7	1960	49,785

\* Improved by enlargement.

\*\* Improved by realignment.

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**Natural Disaster Assistance** (Vicksburg District). Under this law the Corps of Engineers is authorized to cooperate with the Federal Emergency Management Agency (FEMA) in providing assistance to state and local governments in dealing with natural disasters.

On December 3, 1978, a tornado struck Bossier City, killing three persons, injuring 164, and inflicting \$1.5 million in damages.

On December 6, 1978, Corps of Engineers personnel and equipment were dispatched to aid FEMA and local agencies in surveying the damage and restoring the area.

**Emergency Flood Activities** (Vicksburg District). Emergency repairs or restoration of any flood work threatened or destroyed by flood, including strengthening, raising, extending, or other modifications deemed necessary for adequate functioning, are authorized under this law. Levee work in Red River Basin, accomplished under this authority, is shown in the following tabulation.

District/Levee	# Setbacks or Repairs	Quantity (yd <sup>3</sup> )	Cost (\$)
Red River			
Red River, Atchafalaya and Bayou Boeuf Levee	69	5,035,468	2,807,006
Red River, Bayous Darrow and Rigolette Levee	2	333,976	81,600
19th Louisiana Levee Drainage	15	759,873	197,681
Cane River Levee and Drainage	16	1,303,185	519,448
Red River Levee and Drainage	31	1,444,331	1,056,734
Saline Levee and Drainage	1	240,881	88,743
Bossier Levee	13	627,659	234,256
North Bossier Levee	8	746,072	160,008
Caddo Levee	26	1,201,752	363,037
5th Louisiana Levee	1	199,426	83,977
Campti-Clarence Levee	3	58,300	57,088
Natchitoches Levee and Drainage	1	15,000	10,000
Twelvemile Bayou Caddo Levee	1	13,414	5,978
Black Bayou Caddo Levee	2	40,466	31,389
Pine Brush Bayou 19th Louisiana Levee	1	15,316	6,099

## Programs and Surveys

### Flood Plain Information Reports

**Benoit Bayou** (Vicksburg District). A special flood hazard information report for the Bossier City area was completed and published in 1973.

**Bickham Bayou** (Vicksburg District). A special flood hazard information report for the area along Bickham Bayou in the vicinity of Shreveport was completed and published in 1973.

**Brush Bayou** (Vicksburg District). A special flood hazard information report for the area along Brush Bayou in the vicinity of Shreveport was completed and published in 1968.

**Sand Beach Bayou** (Vicksburg District). A special flood hazard information report on portions of Bayou Pierre and Sand Beach Bayou in the city of Shreveport and vicinity was completed and published in 1974.

**Shreveport No. 1** (Vicksburg District). A flood plain information report on McCain Creek and Gilmer Bayou in Shreveport and vicinity was completed and published in 1971.

**Shreveport No. 2** (Vicksburg District). A flood plain information report on the Brush Bayou area in the vicinity of Shreveport was completed and published in 1974.

**Shreveport No. 3** (Vicksburg District). A flood plain information report on the Logan and Choctaw bayous area in the vicinity of Shreveport was completed and published in 1974.

### Flood Insurance Studies

In the Red River Basin, insurance studies were completed in Alexandria, Colfax, and unincorporated areas of Caddo Parish and Rapides Parish.

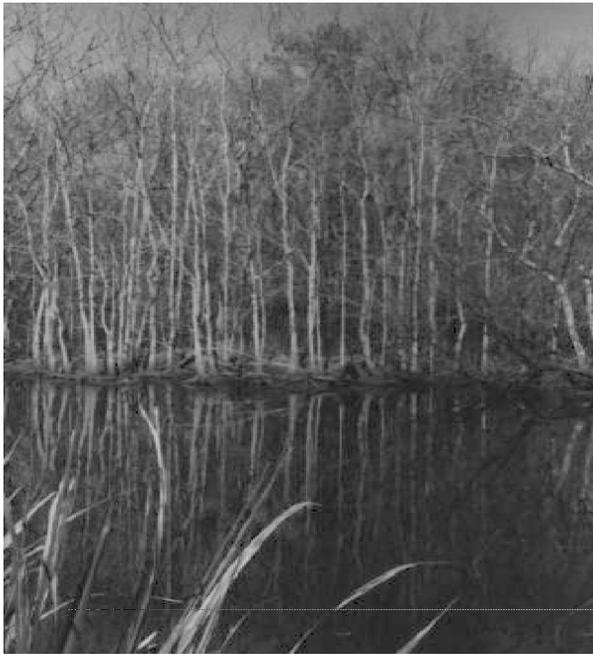
### Surveys Authorized or Under Way

**Aloha-Rigolette Area, Grant and Rapides Parishes** (Vicksburg District). Aloha-Rigolette area, Grant and Rapides parishes, is a flood control project authorized in 1941 as an extension of the previously authorized and completed project, Grant Parish below Colfax. These improvements are designed to prevent flooding of Colfax and fertile alluvial agricultural lands lying along the left bank of the Red River. Also, interior drainage improvements have been made.

Included in the project are: enlargement of 9.2 miles of levee; construction of 12.4 miles of new levee, including closure of Bayou Darrow, to extend the levee to the hills on the left bank of Bayou Rigolette, a floodgate in Bayou Rigolette; diversion of Bayou Darrow to Saline Bayou; approximately 31 miles of snagging and clearing in Bayou Rigolette, and Saline, Walden, and Dry bayous; and the separation of the Bayou Darrow and Bayou Rigolette drainage areas by closure of the head of Bayou Darrow and adjacent sloughs.

After completion of the levee system below Bayou Darrow, the most severe flood experiences occurred in May 1953. Although heavy rainfall flooded a large part of the area, about 5,600 acres were protected from Red River overflow. About 41,600 acres and 36,300 acres were protected from Red River overflow during the floods of April-June 1957 and May 1958, respectively.

The entire project was completed in 1956 at a total Federal cost of \$1,653,237. Benefits from the project are inseparable from those of the companion project, "Grant Parish Below Colfax," since each provides partial protection for the same area. Cumulative benefits from the prevention of floods for the two projects (through 1983) were estimated at \$2,591,000. The project is maintained by the 19th Louisiana Levee District in Grant Parish, and the Red River, Atchafalaya, and Bayou Boeuf Levee District in Rapides Parish.



Bottomland hardwoods along Bayou Darrow

***Aloha-Rigolette (Red River) Area*** (Vicksburg District). The study was authorized by a resolution adopted by the Committee on Public Works of the U.S. Senate in 1974, for the purpose of providing additional flood protection in the Aloha-Rigolette area.

In the mid-1950s, construction of the levee system, which protects the area from Red River overflows, was completed. To evacuate interior runoff from the basin, two 10-foot by 10-foot culverts with floodgates were constructed in the levee at the mouth of Bayou Rigolette. Since the mid-1950s, agricultural development in the basin has increased dramatically. The newly cleared agricultural lands have increased the amount of rainfall runoff and runoff rate. Streams in the agricultural area and the two existing floodgates are now overtaxed by basin runoff.

The project was authorized by the Water Resources Development Act of 1990 (Public Law 101-640) and consists of a floodgate at the mouth of Bayou Darrow and the Red River (consisting of three 10-foot by 10-foot gated concrete culverts), a low flow structure in Bayou Rigolette (consisting of five 5-foot diameter gated concrete culverts), the clearing and snagging of approximately 8.2 miles of channel along Bayou Darrow and Sams Bayou, and a realignment of Sams Bayou.

Mitigation features are included in the project for losses to fishery habitat, wooded riparian habitat and wintering waterfowl habitat. This will be accomplished by the periodic drawdown of Iatt Lake for fishery habitat, the reforestation of approximately 542 acres for riparian and bottomland hardwood habitat, and by the periodic flooding of 400 acres for wintering waterfowl on lands owned by the U.S. Fish and Wildlife Service.

Preconstruction engineering and design activities were completed in September 1993. The Project Cooperation Agreement (PCA) was signed by the town of Colfax on 19 September 1994. The first construction contract, Bayou Darrow Floodgate, is scheduled to be awarded in October 1995.

***Red River Basin and South-Central/Southeast Oklahoma Comprehensive Studies*** (Vicksburg, Tulsa, Fort Worth, and Little Rock Districts). This effort, being conducted and coordinated by Tulsa District, is a comprehensive water resources development study which was authorized by the Supplemental Appropriations Act, 1983. Vicksburg District provided preliminary input to Tulsa District for that portion of the Red River Basin which is within Louisiana. Tulsa District reconnaissance and feasibility studies have focused primarily on the portion of the Red River Basin within Oklahoma. In 1989 the Vicksburg District initiated a reconnaissance study for that portion of the basin within Arkansas and Louisiana. The reconnaissance report was completed in 1990 and no further studies were recommended.

***Bossier Parish, Louisiana*** (Vicksburg District). Reconnaissance studies of flooding problems in Bossier Parish were initiated in November 1991 under the Red River Basin comprehensive study authority. The study is located in the northwest corner of Louisiana, east of the Red River within Bossier Parish. The area to be protected lies between Flat River on the west and Red Chute Bayou to the east. The existing 25-year levee on Red Chute Bayou was overtopped during 1991, resulting in the subsequent crevassing of a portion of the levee. Failure of this levee allowed flows to enter Flat River, causing a considerable rise

in stages and endangering urban developments in the area. The area continues to experience an increase in the level of urbanization. The study addressed the need to provide additional flood control measures in view of the urbanization in the area. Alternative flood control plans developed included raising the existing Red Chute Bayou levees in the upper portion of the study area and new levee construction in the lower portion of the study area. Neither of the alternatives was economically justified. Reconnaissance studies, which recommended the study not

progress to the feasibility phase, were completed in May 1993.

***Red River Navigation Study, Southwest Arkansas, (Vicksburg District).*** Reconnaissance studies were initiated in November 1994 to determine the feasibility and advisability of extending navigation on the reach of the Red River between Shreveport, Louisiana and Index, Arkansas. The reconnaissance report is scheduled for completion in November 1995.



Scenic sunset on Cypress Lake