

Condition at end of fiscal year.—The locks and dams have been maintained in fair condition. As only the pools of Locks and Dams Nos. 1 and 2 and of 6 and 7 are connected, no through navigation is practicable at low-water stages, the depth over shoals being only a few inches. The total expended to June 30, 1920, was \$204,893.15, all for maintenance.

Terminal facilities.—There are no terminal facilities established on the canalized portion of the Trinity River. The city of Dallas owns land for municipal wharves, but no steps toward construction have been taken.

Proposed operations.—The locks and dams will be operated and maintained under allotments from the permanent indefinite appropriation provided by section 6 of the river and harbor act of March 3, 1909.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—The pools above Locks and Dams Nos. 1, 2, 7, and 25 (White Rock Shoals) have been used at intervals during the entire year, the commerce transported amounting to 1,184 tons of logs and cordwood, valued at \$13,890. This tonnage is included in the commercial statistics for Trinity River, Tex.

33. BRAZOS RIVER, TEX., FROM OLD WASHINGTON TO WACO.

Location and description.—The Brazos River rises in northwest Texas and flows southeasterly 950 miles through the east central portion of the State, discharging into the Gulf of Mexico 50 miles southwest of Galveston. Its drainage area above Old Washington, which is 254 miles from the mouth, is about 34,783 square miles, of which 9,540 are in the 175-mile section comprising this improvement, the balance of 23,723 being above Waco. At Waco the extreme low-water discharge is 19 second-feet; the extreme high-water discharge has not been measured, but at a gage reading of 29 feet at Waco it was about 88,000 second-feet. The highest recorded gage reading at Waco was 39.7 feet on December 3, 1913.

Original condition.—This section shows the usual alternation of pools and shoals, the average slope being 1.3 feet per mile. It is navigable in high water as far up as Hidalgo Falls, 260 miles above the mouth, but no navigation is practicable at low water either above or below that point.

Previous projects.—None.

Existing project.—The river and harbor act approved March 3, 1905, contained the following item:

Improving Brazos River, Texas, from Old Washington to Waco: The Secretary of War is authorized and directed to cause an examination of this section of the river with a view of determining whether four or six months' navigation can be secured to Waco at a reasonable cost by any method other than by locks and dams, and if not the least number of locks and dams that will furnish such navigation, and in the event it should appear feasible to secure four to six months' navigation by open-channel work or by not to exceed nine locks and dams the Secretary of War may expend for the improvement of said river an amount not to exceed \$75,000, which amount under the conditions named is hereby appropriated.

Under the provisions of this act the examination was made and report submitted for a project which contemplated securing a navi-

gable depth of 4 feet at ordinary stage of water for four months and 3½ feet for six months of the year by constructing eight locks and dams and 103 miles of open-channel work, at a total estimated cost of \$2,915,000, these locks to be 170 feet long and 55 feet wide, except Lock No. 8, which is 143 feet long and 55 feet wide, with from 0 to 4½ feet over the lower miter sill at low water. (H. Doc. No. 705, 59th Cong., 1st sess.) This project has not been adopted as a whole, but Lock and Dam No. 1, at Hidalgo Falls, was authorized by the river and harbor act approved March 2, 1907; Lock and Dam No. 8 by the act approved June 25, 1910; and Locks and Dams Nos. 3 and 6 by the act approved July 25, 1912. No map has been published.

Locks and dams.

	No. 1.	No. 3. ¹	No. 6. ²	No. 8.
Distance to nearest town.....miles..	7.....	8.....	4.....	4.....
Name of nearest town.....	Navasota.....	Hearne.....	Highbank.....	Downs.....
Distance below Waco.....miles..	169.5.....	89.5.....	51.....	11.....
Width of lock chamber.....feet..	55.....	55.....	55.....	55.....
Available length for full width.....feet..	170.....	170.....	170.....	140.....
Lift.....do.....	Maximum, 17.....	18.5.....	16.....	Maximum, 15.....
Depth on lower sill, low water.....feet..	Minimum, 2.....	1.5.....	2.....	Minimum, 2.....
Character of foundation.....	Piles in sand and gravel.....	Soft rock.....	Soft rock.....	Piles in sand and gravel.....
Kind of dam.....	Movable.....	Movable.....	Movable.....	Movable.....
Type of dam.....	Pass: Chanoine; weir, Boulé; chute, Bear trap.....	Pass: Chanoine; weir, Bebout.....	Chanoine.....	Chanoine.....
Year of completion.....	1914.....	(¹).....	(²).....	1917.....
Cost.....	\$451,640.88.....	\$485,000.00.....	\$385,000.00.....	\$659,514.06.....

¹ Under construction.

² Proposed.

³ Estimated in 1917.

Operations and results during fiscal year.—No work was done except caring for plant at Lock No. 3. The total expended was \$1,591.75, all for new work.

Condition at end of fiscal year.—Locks and Dams Nos. 1 and 8 are completed. Navigation is impracticable, except in the pools above the two dams, as the low-water depth over shoals is only a few inches. Lock and Dam No. 3 is about 68 per cent complete. The work yet remaining to be done to complete the existing project of four locks and dams is the completion of Dam No. 3 and the construction of Lock and Dam No. 6 (see table under *Existing project*). Work on Lock and Dam No. 6 was postponed until Lock and Dam No. 3 is completed. The total expenditure on the project to June 30, 1920, was \$1,439,887.21, all for new work.

Local cooperation.—Local interests provided the sites for Locks Nos. 1, 3, 6, and 8, together with rights of way for railway spur tracks and wagon roads.

Terminal facilities.—None.

Effect of improvement.—There has been no effect on freight rates, and none is expected until the improvement is completed.

Proposed operations.—Such portion of the available funds as may be necessary will be expended at a fairly uniform rate in caring for Government property at Lock No. 3. It has been considered undesirable to continue further work on this lock and dam until another appropriation has been made, as the amount remaining is not sufficient to complete it.

No estimate for further funds is submitted, but if it is desired to continue work on this project an appropriation of \$750,000 is recommended.

Recommended modifications of project.—Abandonment of the project, including the maintenance, care, and operation of the locks and dams already constructed, has been recommended in the reexamination report published in House Document No. 298, Sixty-sixth Congress, first session.

References to published articles not previously reported.—None.

Commercial statistics.—There is no traffic on this section of the river, and it is not believed that any will develop.

Financial summary.

Amount expended on all projects to June 30, 1920, after deducting receipts from sales, etc., amounting to \$15,523.14:

New work.....	\$1,439,887.21
Maintenance.....	
Total appropriations to date of this report.....	1,550,000.00

Fiscal year ending June 30.	1916	1917	1918	1919	1920
Expended for new work ¹	\$116,254.35	\$125,308.97	\$169,293.94	\$49,276.04	\$1,591.75
Expended for maintenance.....					
Appropriated or allotted.....		200,000.00			

July 1, 1919, balance unexpended.....	\$111,144.29
Receipts from sales, etc., during fiscal year 1920.....	560.25
	111,704.54
June 30, 1920, amount expended during fiscal year for new work ¹ ..	1,591.75
July 1, 1920, balance unexpended.....	110,112.79
July 1, 1920, amount covered by uncompleted contracts.....	249.18
	109,863.61
July 1, 1920, balance available.....	109,863.61

34. OPERATING AND CARE OF LOCKS AND DAMS, BRAZOS RIVER, TEX.

The improvement for which report is made under this caption forms part of the project for improving Brazos River from Old Washington to Waco. See page 1117, where general information regarding the improvement can be found. The completed locks and dams have been operated and maintained under the permanent indefinite appropriation since the following dates: No. 1, January 1, 1915, and No. 8, August 1, 1917.

Operations and results during fiscal year.—Except for practically completing the repairs to Lock No. 1 by day labor, operations were limited to minor repairs and maintenance. The total amount expended during the fiscal year was \$20,431.30, all for maintenance.

Condition at end of fiscal year.—Lock and Dam No. 1 was completed in 1915, and Lock and Dam No. 8 in 1917. Lock and Dam No. 8 is in fair condition, but the bank above the lock is in bad condition. Lock and Dam No. 1 is in fair condition except for part of the movable portions of the dam and some of the wooden cribs.

¹ Not deducting receipts from sales, etc.

Except in the pools above the two completed locks and dams navigation is impossible except during rises. The low-water depth over shoals is only a few inches. The total expended to June 30, 1920, was \$95,702.15, all for maintenance.

Terminal facilities.—None.

Proposed operations.—The locks and dams will be operated and maintained under allotments from the permanent indefinite appropriation provided by section 6 of the river and harbor act of March 3, 1909.

Recommended modification of project.—Abandonment of the project, including the maintenance, care, and operation of the locks and dams already constructed, has been recommended in the reexamination report published in House Document No. 298, Sixty-sixth Congress, first session.

References to published articles not previously reported.—None.

Commercial statistics.—There has been no traffic in the open river nor in the pools formed by the locks and dams.

RED AND SULPHUR RIVERS, ARK. AND TEX., AND CYPRESS BAYOU, AND WATERWAY BETWEEN JEFFERSON, TEX., AND SHREVEPORT, LA. (GROUP E.)

35. RED RIVER FROM FULTON, ARK., TO MOUTH OF WASHITA RIVER, OKLA. (E1.)

Location and description.—The Red River rises in northwest Texas near the New Mexico boundary, flows south of east to Fulton, Ark., thence south to Shreveport, La., and thence southeasterly to the Mississippi River, a distance of about 1,275 miles. From the mouth to Fulton is 482 miles. The portion from Fulton to the mouth of the Washita River, Okla., 292 miles, is under improvement in this district. Its drainage area is about 48,500 square miles. The low-water discharge at Arthur City (184.5 miles above Fulton) is probably less than 1,300 second-feet. The 1908 flood discharge at Fulton has been computed as over 300,000 second-feet. The fall from the mouth of the Washita to Fulton is 298 feet, or approximately 1 foot per mile. The banks are, in general, soft earth or sand, readily eroded, and for the most part subject to overflow at high stages. The distance between the banks varies from 500 feet to upward of 4,000 feet, the average being about 1,400 feet. The river flows between these banks in a winding, shifting channel 100 to 200 feet wide in the bends at low water.

Original condition.—The river was obstructed by sand bars, drift, and snags brought in by the constant caving of the banks, which were generally covered by trees. Low-water depths varied from a few inches to about 4 feet. It is stated that at high stages light-draft boats have ascended as far as Denison, 763 miles from the mouth and 11 miles below the mouth of the Washita, but Lanesport, 75 miles above Fulton, was the usual head of navigation, with occasional boats to the mouth of the Kiamichi, a farther distance of 83 miles.

Previous projects.—The original project was adopted by the river and harbor act of August 5, 1886, and modified by the river and