

STATE Texas  
PROJECT NO. F-2-R-2, Job A-5  
PERIOD December 1, 1954 through  
May 30, 1955

Job Completion Report

by

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FILE

TITLE

Basic survey of those portions of the Brazos River bordering on or lying within Region 6-B.

OBJECTIVES

To gather fundamental data on the above waters in regard to their physical, chemical and biological aspects.

METHODS

The lower Brazos River, from U. S. Highway 190 to the Gulf Coast, was divided into thirteen stream sections for convenience in working the river. The locations of these stream sections are shown in Table I and on the accompanying map.

The following data was recorded from at least one station within each stream section of the lower Brazos River; average width and depth; pool size; type and frequency; sechi sk readings; bottom types; both in the pools and on the riffles; and kinds and abundance of aquatic vegetation. A description of the surrounding country, its land use and vegetation, the immediate shoreline, and a river profile were also included.

The above defined portions of the Brazos River and its tributaries were examined for evidences of pollution. On each occasion chemical and thermal aspects of the stream, including air and water temperatures, pH, carbon dioxide, and chlorides, were recorded.

RESULTS

The lower Brazos River flows south through the Post Oak Belt, which lies principally along the broad band of the Eocene extending from northeast to southwest across Texas and down across the Coastal Prairies to the Gulf of Mexico. Geologically the stream also traverses the Pliocene, Miocene, Oligocene, and the Quaternary. These areas do not have distinct boundary lines, and there is much overlapping of physical characteristics, which makes ecological regions based on soil types difficult to define.

The Post Oak Belt, to the north, is a rolling wooded plain of sand and sandy loams, much of which has been cleared for agricultural purposes. The stream has cut deep into these soils to form high vertical banks along much of its course. In places the stream bed is several hundred feet wide, and during periods of low water level, the stream may be very narrow, exposing wide expanses of sand, silt and/or gravel. The stream in other places is very shallow, flowing over most of the wide river bed. Often the fine silt found in this type association is in near solution, and has characteristics similar to quicksand. There are also large pools of deeper water in the Post Oak Belt area, which have heavy deposits of organic matter and silt. Bottom ooze was found occasionally, usually two to three feet deep, along the edges of the pools.

Farther south in the Coastal Prairies the soils are usually grass covered, heavy clays. Native grasses are grazed and cut for hay by ranchers, while much of the sod has been turned under to form fertile fields for cotton, corn, and rice growing. The pools are usually deeper and longer in this area and become more continuous near the Gulf Coast. Moderate to steep cut banks often covered with heavy undergrowth, prevail in the Coastal Prairies, but taper off near the flat coastland.

A total of 23 water analysis stations were selected on the lower Brazos River and its tributaries. These stations are shown on the enclosed map and Table I gives the location of each station. During the study period, the water levels fluctuated from time to time because of rains on the watershed. Variations in chemical analyses might be attributed to these fluctuations.

Table II gives an indication of the chemical aspects of the Brazos River. Water temperatures from November 1954 through May 1955 ranged from 51 to 83°F, with an average of 65.4°F. The pH of the river ranged from 7.4 to 8.8 with an average of 8.1, indicating that the soils of the watershed are alkaline. Dissolved carbon dioxide ranged from 0 to 11 parts per million, averaging 3.3 parts per million.

The chloride content of the river varied from 10 to 17,000 parts per million. Sea water is backed up in the river for several miles above Freeport and has been known to extend 35 to 40 miles upstream past Brazoria and East Columbia, on various occasions. During this study period, the oil and chemical industries of Brazoria and Fort Bend Counties were believed to have contributed to minor pollution of the river, but are not believed to have damaged the ecology of the river to any great extent. Dow Chemical Company, near Velasco, is known to be spending thousands of dollars each year for the control of waste materials produced by their plants.

The turbidity of the stream, as recorded in Table II by sechi disk readings in inches, varies from 3 to 20 inches in depth, and averages 7.7 inches. The highly erodible soils of the watershed contribute greatly to the turbidity of the stream, as do the large amounts of decaying organic matter of plant origin that is washed in by floods and rises. The Brazos River valley, within the boundaries of Region 6-B, has a normal annual precipitation rate of from 30 to 40 inches, and often receives over 40 inches near the coast.

Stream flow data provided by the U. S. Geological Survey shows that the average annual discharge at Bryan, Hempstead and Richmond, over a 10 year period from 1945 to 1954, was 3,539; 5,401 and 5,571 cubic feet per second respectively. The Navasota River flowing into the Brazos River below Bryan contributes some to the higher rate of discharge reported at Hempstead and Richmond. The maximum discharge rate of 42,860 second feet was recorded in April, 1944, at Hempstead. The minimum discharge of 111 second feet was recorded at Bryan in October, 1953.

Fluctuations in stream flow of the Brazos are due to several major factors. Besides rainfall, the river fluctuates as water is released from Lake Whitney for production of power, and for irrigation. In the spring, during the rice growing season, large quantities of water are pumped from the river for the irrigation of the rice crops. This, of course, causes a very irregular flow in the river.

The fact that submerged aquatic vegetation on the Brazos is very limited, may be attributed to the extreme turbidity of the stream as well as to the variation of stream flow. Blue-green algae were noted on a very few occasions, and sedges were noted high on the bank in an area near Hearne. Willows, Salix nigra, were found to be relatively abundant along the course of the river. Timber along the banks represents a wide variety, including pecan, post oak, live oak, ash, cotton wood, elm, walnut, hickory, sycamore and various shrubs.

Table III contains a checklist of fishes that are known to occur in the previously defined portion of the lower Brazos River.

#### SUMMARY

1. The lower Brazos River flows in a Southeasterly direction, down through the overlapping ecology of the Post Oak Belt, and the Coastal Prairies, and empties in the Gulf of Mexico.
2. A variety of agricultural crops are grown along the lower Brazos, which include cotton, corn, rice and grass and legumes for cattle grazing and hay.
3. Twenty-three water analysis stations were selected on the Brazos River, but study revealed no evidence of major pollution during this segment period.
4. Due to the highly erodable soils, and large amounts of decaying organic matter that are washed into the stream by the area's relatively high rainfall, the Brazos is extremely turbid.
5. Discharge fluctuations along the Brazos River are caused by water being released from Lake Whitney for power production and irrigation, consequent pumping of the water from the river, and by rainfall.
6. Submerged aquatic vegetation is limited to blue-green algae, which is unable to propagate its self successfully under conditions of high turbidity, and fluctuating water levels.
7. A checklist of fishes known to occur in the lower Brazos River is included in this report.

Table I  
Key to Water Analysis Stations on the Lower Brazos River and its Tributaries.

Station number	Location
1.	Brazos River, at crossing of U. S. Highway 190, west of Hearne.
2.	Brazos River, at crossing of U. S. Highway 79, southwest of Hearne.
3.	Brazos River, at crossing of State Highway 21, southwest of Bryan.
4.	Brazos River, at crossing of Farm Road 60, southwest of College Station.
5.	Brazos River, at crossing of farm road, southwest of Welborn.
6a.	Brazos River, at Washington State Park, Washington.
6b.	Brazos River, five miles upstream from Washington, off Farm Road 159.
6c.	Navasota River, twelve miles southeast of College Station, off State Highway 6.
6d.	Navasota River, at crossing of State Highway 6, two miles north of Navasota.
6e.	Navasota River, at crossing of State Highway 90, west of Navasota.
6f.	Navasota River, at confluence of Brazos River, near Washington.
7.	Brazos River, at crossing of U. S. Highway 290, west of Hempstead.
8.	Brazos River, at crossing of State Highway 159, southwest of Hempstead.
9.	Brazos River, at San Felipe State Park, east of Sealy.
10.	Brazos River, at crossing of Farm Road 723, north of Rosenberg.
11a.	Brazos River, four miles northeast of Crabb, Ronson Farm, Fort Bend County.
11b.	Brazos River, at the Santa Anita Ranch, Fort Bend County.
11c.	Brazos River, at the Agnes Booth Farm, Fort Bend County.
11d.	Brazos River, at South Texas Water Co., near Juliff, Fort Bend County.
12a.	Brazos River, at the J. E. Fairfield Ranch, Brazoria County.
12b.	Brazos River, at crossing of State Highway 35, East Columbia.
12c.	Brazos River, at crossing of Farm Road 521, near Brazoria.
13.	Brazos River, at crossing of State Highway 36, near Freeport.

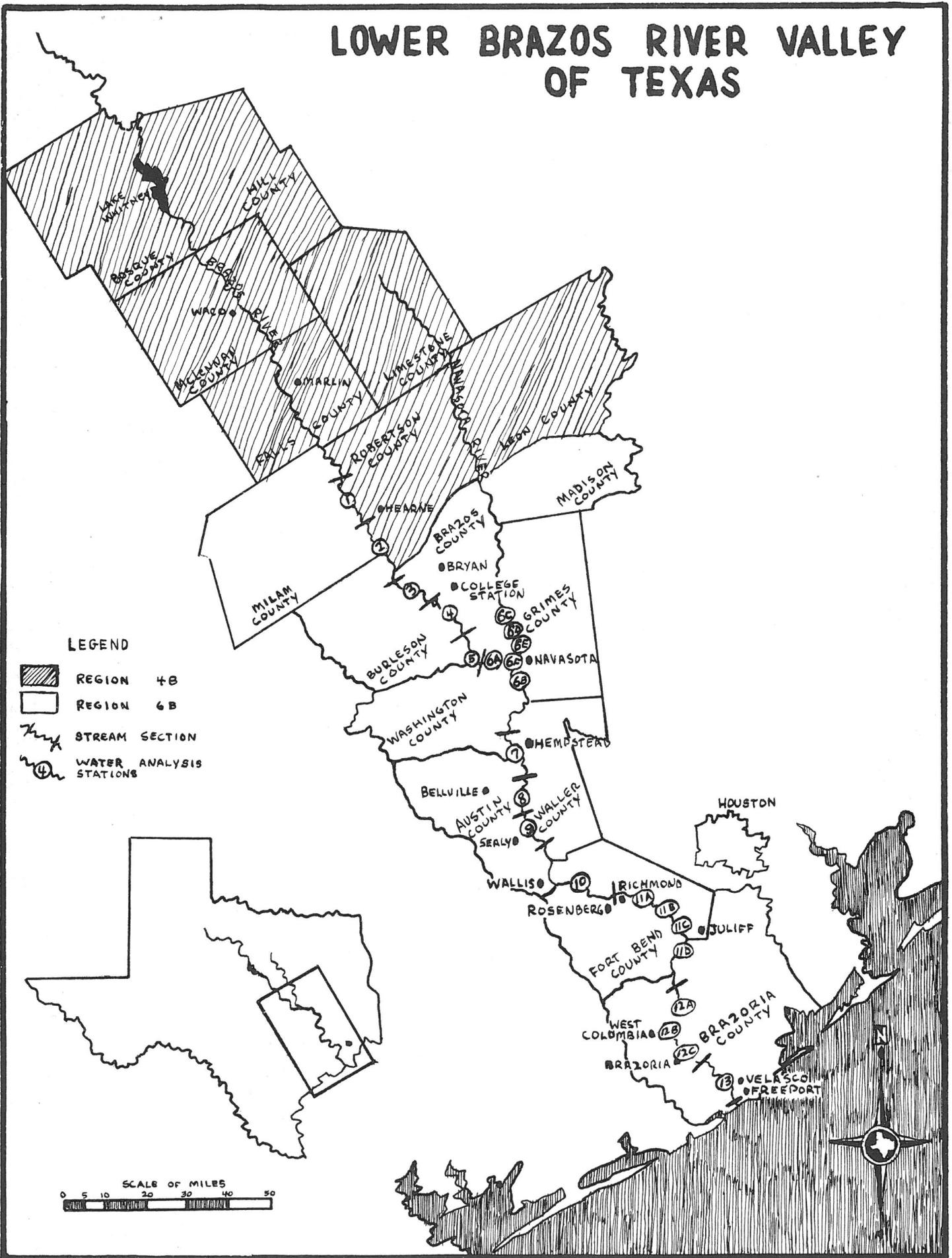
Table II  
Lower Brazos River Water Analyses, November 1954 through May 1955.

Stream Section	Date	Air Temp. °F	Water Temp. °F	pH	Carbon Dioxide ppm	Chlorides ppm	Secchi Disk (inches)	Remarks
1	11-29-54	64	58	8.2	2	16	11	
2	11-29-54	66	58	7.9	4	14	4	
3	11-29-54	65	59	8.5	1	14	8	
4	11-29-54	73	61	8.6	0	15	10	
5	11-29-54	68	59	8.8	0	14	--	
6a	11-30-54	63	57	8.1	3	14	7	
6b	2-22-55	52	55	8.4	2	11	11	
6c	2-21-55	39	51	8.4	3	10	4	
6d	2-21-55	39	51	8.6	2	11	4	
6e	2-21-55	39	51	8.6	3	11	4	
6f	2-23-55	59	51	8.6	3	11	4	
7	11-30-54	64	60	8.3	2	33	2	
7	3-8-55	64	60	7.6	5	17	7	Receding water level.
8	11-30-54	70	63	7.9	5	39	8	
8	3-8-55	64	62	7.6	6	19	5	Receding water level.
9	11-30-54	72	62	8.1	2	13	5	
9	3-8-55	68	62	7.6	6	31	6	Receding water level.
10	11-30-54	77	66	8.4	1	14	5	
10	3-11-55	72	68	7.6	5	22	6	
11a	1-5-55	75	70	8.3	3	19	10	
11b	1-5-55	74	70	8.2	1	20	10	
11c	1-5-55	83	71	8.2	Trace	20	10	
11d	1-6-55	45	60	8.0	6	30	12	
11d	3-9-55	68	62	7.6	2	21	6	
12a	1-6-55	65	64	7.8	11	1380	14	
12b	1-6-55	65	65	8.4	2	28	5	Surface sample.
12b	5-6-55	79	81	7.4	2	12	5	Bottom sample.
12b	5-6-55	79	81	7.4	4	12	--	
12c	3-17-55	78	76	8.5	3	20	12	
12c	5-5-55	83	81	7.4	3	13	4	Surface sample.
12c	5-5-55	83	81	7.4	4	13	Bottom sample.	
12c	4-13-55	75	70	7.6	6	7000	River on rise.	
13	3-17-55	82	78	8.2	4	15350	3	Surface (river on rise).
13	4-12-55	75	70	8.2	3	8050	12	Bottom (river on rise).
13	4-12-55	75	70	8.2	7	13050	6	Surface sample.
13	5-4-55	81	78	8.4	3	13650	20	Surface sample.
13	5-4-55	81	78	7.9	2	17000	--	Bottom sample.

Table III  
 Checklist of Fishes found to Occur in the Lower Brazos River.

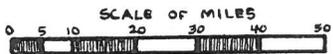
Scientific Name	Common Name
<u>Scoliodon terrae-novae</u>	Sharpnose shark
<u>Lepisosteus spatula</u>	Alligator gar
<u>Lepisosteus platostomus</u>	shortnose gar
<u>Lepisosteus productus</u>	spotted gar
<u>Elops saurus</u>	bigeye herring
<u>Tarpon atlanticus</u>	tarpon
<u>Brevoortia gunteri</u>	bay menhaden
<u>Dorosoma petenensis</u>	threadfin shad
<u>Dorosoma cepedianum</u>	gizzard shad
<u>Anchoa mitchilli</u>	bay anchovy
<u>Cycleptus elongatus</u>	bluesucker
<u>Ictiobus bubalus</u>	smallmouth buffalo
<u>Carpiodes carpio</u>	river carpsucker
<u>Cyprinus carpio</u>	carp
<u>Opsopoeodus emiliae</u>	pugnose minnow
<u>Hybopsis aestivalis</u>	speckled dace
<u>Notropis atherinoides</u>	emerald shiner
<u>Notropis oxyrhynchus</u>	sharpnose shiner
<u>Notropis brazosensis</u>	Brazos River shiner
<u>Notropis potteri</u>	broadhead shiner
<u>Notropis lutrensis</u>	red shiner
<u>Pimephales vigilax</u>	parrot minnow
<u>Ictalurus punctatus</u>	channel catfish
<u>Ictalurus furcatus</u>	blue catfish
<u>Pilodictus olivaris</u>	yellow catfish
<u>Bagre marina</u>	gafftopsail catfish
<u>Galeichthys felis</u>	sea catfish
<u>Gambusia affinis</u>	common mosquitofish
<u>Aphredonderus sayanus</u>	pirate perch
<u>Mugil cephalus</u>	striped mullet
<u>Morone chrysops</u>	white bass
<u>Chaenobryttus coronarius</u>	warmouth bass
<u>Lepomis cyanellus</u>	green sunfish
<u>Lepomis macrochirus</u>	bluegill sunfish
<u>Lepomis humilis</u>	orangespotted sunfish
<u>Lepomis megalotis</u>	longear sunfish
<u>Pomoxis annularis</u>	white crappie
<u>Aplodintus grunniens</u>	freshwater drum
<u>Leiostomus xanthurus</u>	spot
<u>Micropogon undulatus</u>	Atlantic croaker
<u>Cynoscion nebulosus</u>	spotted squeteague
<u>Lagodon rhomboides</u>	pinfish
<u>Urophysis floridanus</u>	hake
<u>Fundulus grandis</u>	large killifish

# LOWER BRAZOS RIVER VALLEY OF TEXAS



## LEGEND

-  REGION 4B
-  REGION 6B
-  STREAM SECTION
-  WATER ANALYSIS STATIONS



This page should be attached to Job Completion Report by Richard H. Clark, Assistant Project Leader, Project No. F-2-R-2, Job A-5, in order to make the following corrections.

Page 2, Paragraph 4. The chloride content of the river varied from 100 (not 10) to 17,000 parts per million.

Table II, Column 7. Chlorides

ppm  
160  
140  
140  
150  
140  
140  
110  
100  
110  
110  
110  
330  
170  
390  
190  
130  
310  
140  
220  
190  
200  
200  
300  
210  
1380  
280  
120  
120  
200  
130  
130  
7000  
15350  
8050  
13050  
13650  
17000