

STATE Texas
PROJECT F-2-R-2, Job A-4
PERIOD June 1 through Nov. 31, 1954

FILE

Job Completion Report

by

Kenneth C. Jurgens and Billy D. Cooper

TITLE

Basic survey of the remaining portions of the San Gabriel River and Brushy Creek within Region 6-B, which were not covered in Job A-2, Project F-2-R-1.

OBJECTIVES

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

METHODS

Seven stations were selected on the North San Gabriel River and the Russel Fork of the North San Gabriel River in Burnet County, Texas. Seven other stations on the San Gabriel River and Brushy Creek, in Milam County, were also selected. These fourteen stations, combined, were considered sufficient to complete the overall survey of the San Gabriel River and its principal tributaries as begun under Job A-2, Project F-2-R-1. The locations of these stations are shown in Table 1 and on the accompanying maps.

Each of the stations selected were visited at least once during the course of the job. On these occasions the following data were gathered: average width and depth; turbidity; volume of flow (wherever possible); pool size, type and frequency; bottom types, both in the pools and on the riffles; kinds and abundance of aquatic vegetation; a description of the surrounding country and the immediate shoreline; a notation of the larger tributaries and evidences of pollution where indicated.

FINDINGS

Since the work done under the present job was a continuation of work done under an earlier job, the findings of this job must be reported upon in two separate sections. The first section deals with that portion of the North San Gabriel River which lies in Burnet County. The remainder of the report is concerned with those portions of the San Gabriel River and Brushy Creek within Milam County, Texas.

The San Gabriel River, Burnet County: - The North San Gabriel River heads in Burnet County, approximately ten miles north of the town of Burnet. From its source, the river flows in a southeasterly direction to the Williamson County line and continues on, as described in the report for Job A-2, Project F-2-R-1, in a "southeasterly direction to the vicinity of Georgetown where it is joined by the South and Middle San Gabriel Rivers."

The North San Gabriel and Russel Fork of the North San Gabriel River, the only tributary of consequence in Burnet County, flow through country which is characterized by thin to medium bedded, hard, continuous limestone strata, alternat-

ing with marls or marly limestones. The headwater sections of both streams flow through country with rough, rolling type of topography, with soils on the hills limited to a thin mantle of calcareous soils. Further east in Burnet County, the topography becomes more gently rolling with tillable valleys and flood plains. Soils in this area are gray-black calcareous clays with thin seams of bedded limestone.

Both the North San Gabriel and Russel Fork are intermittent, running only during periods of prolonged rainfall. Above the confluence of the North San Gabriel and Russel Fork, both streams have bed rock bottoms with shallow to non-existent banks. Below the confluence, the river has a tendency to become more deeply entrenched in the deeper soils and has medium to deep cut banks with sandy to silty gravel bottoms on both the riffles and in the pools. Very scanty aquatic vegetation; composed principally of filamentous green algae; musk grass (Chara sp.) and coontail (Ceratophyllum demersum); is limited to the small pools. Due to the extreme drouth, which this part of the country has undergone during recent years, these streams no longer flow.

Water temperatures in the North San Gabriel River and Russel Fork varied from 79°F to 82°F during the study period. The pH in this portion of the San Gabriel River system ranged from 8.0 to 8.3.

The fish populations of the San Gabriel River in Burnet County were found to be very limited not only in numbers but in species, occurring in the small pools, isolated by drouth conditions, and preyed upon by both animals and man. Fish kills in these pools, due to oxygen deficiencies caused by low water, almost never occur because the pools are cleared of fish by predation before the deficiency can come about.

In the total of approximately 34 stream miles covered by this survey in Burnet County, 12 species, representing 4 fish families, were found in the North San Gabriel River and Russel Fork. A checklist of these species is given in Table III.

The San Gabriel River and Brushy Creek, Milam County: - After entering Milam County, the San Gabriel River and Brushy Creek flow through three geological formations: the Taylor, the Navarro and the Midway.

Taylor and Navarro formations are similar in that they consist of chalks, marls and sandy clays which have weathered into waxy, black soils which are used mostly for farming and for the most part, are gently rolling.

Along a line running approximately NNE and SSW between the towns of San Gabriel and Thorndale, in Milam County, both the San Gabriel River and Brushy Creek enter the third of the three formations, the Midway. This formation differs from the other two in that it consists of sands and sandy clays and the soils derived from it are chocolate brown in color and are lighter, since they contain more sand.

All three of these formations have provided soils which are easily erodable and as a result the stream beds of both the San Gabriel River and Brushy Creek are progressively more deeply entrenched as the streams flow toward their confluence with each other and with the Little River about six miles northeast of Rockdale.

The streams themselves consist of relatively deep pools, averaging from four to six feet in depth, with maximum depths up to ten feet. Bottom types in the pools are mostly silt with some gravel and the more infrequent riffles have bottoms

of sand and gravel with some silt.

On the San Gabriel River, towards the confluence with the Little River, the stream bottom changes slightly in that some sandstone rubble occurs on some of the riffles and in some of the pools.

What vegetation occurs in these streams is limited to filamentous green algae, on the riffles, and musk grass (*Chara* sp.) in the pools. Some arrow-head (*Sagittaria platyphylla*) occurs on the edges of some of the pools on the San Gabriel River.

Physically, Brushy Creek differs only in that it is narrower and more deeply entrenched than is the San Gabriel River. It is also more heavily shaded. As a result, water temperatures in Brushy Creek were found to be somewhat cooler than those of the San Gabriel, averaging about 77°F. While the San Gabriel had temperatures ranging from 82°F to 87°F.

The pH in the San Gabriel ranged from 7.2 to 7.9 and in Brushy Creek from 7.4 to 7.6. (Table 11).

Fish populations in the San Gabriel River and in Brushy Creek are concentrated into the larger pools because of the lack of flowing surface water. There are indications that these populations are out of balance due to silt pollution and predation. Many of the clearwater forms were reduced in numbers because of the necessity of their having to live in turbid pools.

Thirty-one species, representing 8 families of fish, were found to be present in the 17 miles of the San Gabriel River surveyed in Milam County during the study period. A smaller number, only 18 species representing 7 families, were found in Brushy Creek during the survey. Approximately 15 miles of Brushy Creek were covered by the survey in Milam County.

A checklist of the species found to occur in Brushy Creek and in the San Gabriel River in Milam County are also given in Table 111.

Since neither Brushy Creek nor the San Gabriel River were flowing during the study period, data concerning the rate of flow was not obtained. Furthermore, the U. S. Geological Survey records do not include stream flow data for either stream in Milam County.

The only evidences of pollution encountered during the course of the survey were instances of pollution due to silt which is a direct result of the poor land management practices which were common in this area during the last fifty to one-hundred years. Some positive efforts are being made at present to remedy this situation by farmers and ranchers. Perhaps in time these streams will once more become favorable habitats for the desired game species which, we are told, were once so abundant.

SUMMARY

1. The work was divided between those portions of the North San Gabriel River in Burnet County and the remaining portions of the San Gabriel River and Brushy Creek, not covered previously, in Milam County.

2. The North San Gabriel and Russel Fork are typically small, shallow bedrock streams with a tendency to become more or less deeply entrenched with sand, silt and gravel bottoms below their confluence.

3. The San Gabriel River and Brushy Creek in Milam County are very deeply entrenched with silt and gravel bottoms and have long, deep pools and short, shallow riffles.

4. Aquatic vegetation occurs infrequently and in scant amounts in both the streams of Burnet County and those of Milam County covered in this survey.

5. Prolonged drouth has all but dried these streams up and during most of the survey period very little flow was observed and none could be measured.

6. A total of 33 species, representing 10 families, were found to occur in these waters. Of these, only 12 species were found in the North San Gabriel in Burnet County, all but one species was found in the lower San Gabriel in Milam County and 17 species were found in Brushy Creek.

7. Other than pollution due to silt, no evidences of pollution were encountered during the survey.

North San Gabriel River (Burnet County)	
Station No.	Location
1.	Russell Fork North San Gabriel, 6 mi. NE Bertram
2.	Russell Fork North San Gabriel 5 mi. N Burnet on Farm Road 963
3.	North San Gabriel River, 5 mi. SE Lake Victor
4.	North San Gabriel River, 3 mi. NNW Tamega
5.	North San Gabriel River, crossing at Joppa
6.	Russell Fork North San Gabriel, 2 mi. S. Joppa
7.	North San Gabriel River, 4 mi. SW Mahomet on Farm Road 243
San Gabriel River (Milam County)	
Station No.	Location
8.	$\frac{1}{2}$ mi. S town of San Gabriel, Farm Road 486
9.	$\frac{6}{6}$ mi. SE town of San Gabriel on county road
10.	7 mi. NW Rockdale on county road
11.	6 mi. N. Rockdale on Farm Road 487
Brushy Creek (Milam County)	
Station No.	Location
12.	1 mi. E Thorndale on Texas Highway 79
13.	6 mi. E Thorndale on county road
14.	5 mi. NW Rockdale on county road

Table 1. Locations of Survey Stations Used During Study Period under Job A-4, Project F-2-R-2, Basic Survey of the Remaining Portions of the San Gabriel River and Brushy Creek Within Region 6-B, Which Were Not Covered in Job A-2, Project F-2-R-1.

Temperature and pH Conditions, San Gabriel River
and Brushy Creek in Burnet and Milam Counties

Station No.	Date	Air Temp °F	Water Temp. °F	pH
1.	June 11	89	80	8.1
2.	June 11	90	81	8.1
3.	June 11	92	82	8.2
4.	June 11	94	82	8.1
5.	June 11	96	79	8.3
6.	June 11	94	81	8.1
7.	June 11	93	81	8.0
8.	July 7	86	82	7.2
8.	Aug. 9	84	86.5	7.6
9.	July 7	no water		
10.	July 16	no water		
11.	July 16	95	85	7.6
11.	Aug. 10	85	87	7.9
12.	July 16	no water		
13.	Sept. 15	92	76.5	7.4
14.	Sept. 16	88	77	7.6

Table 11. Record of Temperature and pH Conditions on the North San Gabriel River and Russell Fork of North San Gabriel River in Burnet County and on the San Gabriel River and Brushy Creek in Milam County During the Study Period, June through September 1954.

Scientific Name

Common Name

San Gabriel River
Burnet County

San Gabriel River
Milam County

Brushy Creek
Milam County

1. <u>Lepisosteus platostomus</u>	shortnose gar			x	
2. <u>Lepisosteus productus</u>	spotted gar			x	
3. <u>Dorosoma cepedianum</u>	gizzard shad			x	x
4. <u>Carpionotus carpio</u>	river carpsucker			x	x
5. <u>Moxostoma congestum</u>	grey redhorse			x	
6. <u>Cyprinus carpio</u>	European carp			x	x
7. <u>Notropis venustus</u>	blacktail shiner	x		x	
8. <u>Notropis lutrensis</u>	red shiner	x		x	
9. <u>Notropis volucellus</u>	mimic shiner	x		x	
10. <u>Notropis buchani</u>	ghost shiner			x	
11. <u>Hybognathus nuchalis</u>	silvery minnow				x
12. <u>Pimephales vigilax</u>	parrot minnow	x		x	x
13. <u>Pimephales promelas</u>	fathead minnow			x	
14. <u>Campostoma anomalum</u>	stoneroller	x		x	
15. <u>Ictalurus punctatus</u>	channel catfish			x	x
16. <u>Ameiurus natalis</u>	yellow bullhead			x	x
17. <u>Ameiurus melas</u>	black bullhead			x	x
18. <u>Pilodictus olivaris</u>	flathead catfish			x	x
19. <u>Schilbeodes gyris</u>	tadpole madtom			x	x
20. <u>Fundulus notatus</u>	blackstripe topminnow			x	
21. <u>Gambusia affinis</u>	common mosquitofish		x	x	x
22. <u>Micropterus punctulatus</u>	spotted black bass		x	x	
23. <u>Micropterus salmoides</u>	largemouth black bass		x	x	
24. <u>Chaenobryttus coronarius</u>	warmouth			x	x
25. <u>Lepomis cyanellus</u>	green sunfish		x	x	x
26. <u>Lepomis macrochirus</u>	bluegill		x	x	x
27. <u>Lepomis humilis</u>	orangespotted sunfish			x	x
28. <u>Lepomis megalotis</u>	longear sunfish			x	x
29. <u>Hadropterus scierus</u>	dusky darter		x	x	x
30. <u>Percina caprodes</u>	log perch			x	
31. <u>Etheostoma chlorosomum</u>	bluntnose darter			x	x
32. <u>Etheostoma spectabile</u>	orangethroat darter			x	x
33. <u>Aplodinotus grunniens</u>	freshwater drum		x	x	x

Table III. A Checklist of Freshwater Fishes Found to Occur in the North San Gabriel River In Burnet County and the San Gabriel River and Brushy Creek in Milam County, Texas.

