

## JOB COMPELTION REPORT

STATE OF TEXAS

Project No. F5R3 Name Fisheries Investigations and Surveys of the Waters of Region 3-B.

Job No. B-13 Title Basic Survey and Inventory of Species Present and their Distribution in the Pecos River of Texas.

Period Covered: May 1, 1955 - May 1, 1956

### ABSTRACT

The portions of the Pecos River and its principal tributaries between the Texas-New Mexico Border and Imperial, Texas were studied. This stream area is intermittent, controlled by Red Bluff Reservoir, and highly saline in nature.

Fifty-nine man days were spent working on the above portion of the river, twenty-two seining collections and three gill net collections were obtained.

Twenty-three species of ten families were identified from collections. Only gizzard shad were captured in gill net collections.

White bass are the most important game species of the area, and spottail shiners and redhorse shiners are apparently the most important forage species.

Rainbow trout were found in a tributary of Delaware Creek and there was some evidence of reproduction.

### OBJECTIVES

To gather fundamental data on the above waters in regard to their physical, chemical and biological aspects. To determine the distribution of fish species present, their relative abundance and the ecological factors influencing their distribution.

### COOPERATING AGENCIES

Texas Board of Water Engineers  
United States Geological Survey  
Red Bluff Power Water and Control District

### PROCEDURE

#### a. Basic Survey

By standard procedures to secure the information necessary to complete stream survey forms similar to those given by Lagler in his HANDBOOK OF FRESHWATER FISHERY BIOLOGY.

#### b. Inventory of Species

To set up seining stations as may be deemed necessary to adequately sample fishery populations as to their distribution and relative abundance.

1. Because of the stream conditions it was impossible to establish the commended number of seining stations in the Upper Pecos River; however, twenty-two seining collections were taken. Bag seines were used for some sampling; however, eight foot, nylon common sense seines were the type most often employed.

2. Three nylon gill nets were set at netting stations on the river. Experimental nets 125 feet long by 8 feet deep, and in 25 feet sections of varying mesh were used. Mesh ranges were from  $\frac{1}{2}$  inch to 3 inch increasing at  $\frac{1}{2}$  inch intervals each 25 feet length.

3. Water analysis, pH, air and water temperatures, and other data pertaining to water quality and conditions were recorded at appropriate intervals of the stream area worked.

4. Where field identification was in doubt, individuals were preserved in 10% formalin and examined in the laboratory.

### FINDINGS

The Pecos River has its origins in Mora, Santa Fe, San Miguel, and Torrance Counties of New Mexico. The contributing watershed above the Texas-New Mexico Border is about 20,239 square miles. Average discharge into Red Bluff Reservoir is about 315.6 c. f. s. A series of reservoirs beginning with Nichols Reservoir on Santa Fe Creek and including Alamogordo Reservoir, Lake McMillian, and Lake Avalon regulate stream flow into Texas. These reservoirs have a combined storage capacity of 182,000 plus acre feet. Diversions and ground-water withdrawals above the state line provide irrigation for 181,500 acres of New Mexico farm land.

Most of the water entering Texas from the Upper Pecos River is controlled by the Red Bluff Water Power and Control District with offices in Pecos, Texas. Except for an unknown portion of the quantities of local run-off, insignificant seepage, and slight contributions from springs into the river bed; all stream flow is controlled by Red Bluff Reservoir. This reservoir has a potential storage of 307,000 acre feet volume and has not reached spillway capacity since its construction in 1937. Through a system of an estimated 128 miles of canals and laterals a maximum of about 21,000 acres may be irrigated between Menton and Imperial, Texas. This upper portion of the river was the location of all work for the period May 1, 1955 through May 1, 1956. The River Bed under study was in an intermittent pool condition and accessibility was extremely difficult. Principal tributaries in the area were usually non-contributing during the period, and natural playa salt lakes as Lake Toyah, the Salt Lakes on the peneplanes below the Sierrro Diablo and Guadalupe mountains, and those of the Alkaline Marsh were examined and found to be devoid of fish life. Only two streams were encountered where any stability of flow was observed. A tributary of Delaware Creek located in the Guadalupe Mountains in McKittrick Canyon on the J. C. Hunter ranch was maintained by springs and drainage from the mountains. This stream was about fourteen miles long and entered a porous formation about seven miles west of the Van Horn - Carlsbad highway near Pine Springs. This stream was a trout stream. Maderia Springs, the canal system of Toyah Creek, and the springs contributing to the irrigation reservoir at Balmorhea were examined and seining was done for collections. The spring-fed canal system above the State Park are of Permanant flow, others are seasonal.

### WATER QUALITY

An accurate knowledge of the variation in the quality of water in this portion of the Pecos River would require extensive study, and is not available from other sources; however, the general quality of the river is high in chlorides (1,500 - 2,500 ppm), has a high total hardness (1,800 - 2,750) and is high in carbonate content (47-60 ppm). No oxygen difficiencies were recorded the minimum being 7 ppm, and dissolved carbon dioxide was not excessive except below Red Bluff Dam where 18 ppm were recorded. pH was from 8.6 to 8.9.

VEGETATION

In areas of heavy silt deposits cattails (Typha sp.) and saw grass (Zizaniopsis sp.) were dense, and in the canals coontail (Ceratophyllum sp.), parrot feather (Myriophyllum sp.) and cara (Cara sp.) were present. Various species of cedar along the streamway are extremely dense, and are believed to be a significant influence on stream flow. The U. S. Department of Agriculture has an experimental program for control of this species, and is making studies to determine the quantities of water required by these plants.

FISH POPULATIONS

During the period, twenty-two seining collections and three netting locations were worked. Twenty-three species of ten families were collected and identified. In addition to these; positive identification of two other species has not yet been determined and hybridization in sunfishes is apparent. The following is a checklist of species obtained during the 59 man days spent working on the described portions of the river.

Common Name	Family Name	Scientific Name
Longnose gar	<u>Lepisosteidae</u>	<u>Lepisosteus osseus</u>
Spotted gar	<u>Lepisosteidae</u>	<u>Lepisosteus productus</u>
Gizzard shad	<u>Clupeidae</u>	<u>Dorosoma cepedianum</u>
Rainbow trout	<u>Salmonidae</u>	<u>Salmo gairdneri</u>
Banded Tetra	<u>Characidae</u>	<u>Astyanax fasciatus</u>
River caprsucker	<u>Catostomidae</u>	<u>Carpiodes carpio</u>
ldfish	<u>Cyprinidae</u>	<u>Carassius auratus</u>
Spottail shiner	<u>Cyprinidae</u>	<u>Notropis venustus</u>
Redhorse shiner	<u>Cyprinidae</u>	<u>Notropis lutrensis</u>
Plains minnow	<u>Cyprinidae</u>	<u>Hybognathus placitus</u>
Parrot minnow	<u>Cyprinidae</u>	<u>Pimephales vigilax</u>
Stoneroller	<u>Cyprinidae</u>	<u>Campostoma ornatum</u>
Channel catfish	<u>Ameiuridae</u>	<u>Ictalurus punctatus</u>
Rio Grande killifish	<u>Cyprinodontidae</u>	<u>Fundulus zebrinus</u>
Plains killifish	<u>Cyprinodontidae</u>	<u>Fundulus kansae</u>
Variegated cyprinodon	<u>Cyprinodontidae</u>	<u>Cyprinodon variegatus</u>
Leon springs pupfish	<u>Cyprinodontidae</u>	<u>Cyprinodon bovinus</u>
Pecos river pupfish	<u>Cyprinodontidae</u>	<u>Cyprinodon sp.</u>
Green sunfish	<u>Centrarchidae</u>	<u>Lepomis cyanellus</u>
Bluegill	<u>Centrarchidae</u>	<u>Lepomis macrochirus</u>
Redear sunfish	<u>Centrarchidae</u>	<u>Lepomis microlophus</u>
Longear sunfish	<u>Centrarchidae</u>	<u>Lepomis megalotis</u>
White bass	<u>Serranidae</u>	<u>Roccus chrysops</u>
Freshwater drum	<u>Sciaenidae</u>	<u>Aplodinotus grunniens</u>

NETTING COLLECTIONS

Only three gill net collections were made and the entire catch of thirty-eight individuals were gizzard shad. This catch will be incorporated in the completion data for consideration when the survey is completed.

PRINCIPAL SPECIES

Shiners and Minnows - Complete dominance was not apparent for any species; however, spottail shiners and redhorse shiners were about equally abundant, and dominance between these species was probably dependent upon the conditions of local areas.

Killifishes - The ecological significance of these species is not known. There is probably a correlatable interrelationship between dominance by an individual species and the chloride content of a stream area, or some other chemical or physical property.

Game Species - White bass are probably the most important game species of the upper River areas and since no largemouth bass (Micropterus salmoides) were taken; it is concluded that species of this genus are not suited to this type habitat. Largemouth bass are known to exist in Red Bluff Reservoir.

CONCLUSIONS AND REMARKS

The amount of work done during the year did not provide a sufficient basis for ratio estimations for fishery populations and more work is needed for an accurate understanding of the conditions of the Pecos River.

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