JOB COMPLETION REPORT

TATE OF TEXAS

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

Job No. B-12 Title Basic Survey and Inventory of Species Present and their Distribution in the Upper Colorado River of Texas.

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

ABSTRACT

1. About sixty-eight percent of the 20,700 square miles of watershed were included in sampling during 1955 - 56.

2. Of the above four stream areas were found to differ significantly in their physical, chemical and biological aspects. Area 1, the contributing watershed above Lake J. B. Thomas was entirely dependent upon run-off and was intermittent pools. Area 2; the stream from below Thomas Dam to a point three miles below Silver, Texas, was highly saline in nature because of natural salt deposits. Area 3; the stream from the point below Silver to Ballinger was intermittent pool association except for a ten mile semi-permenant flow area located almost entirely on the J. S. Hall ranch two miles west of Robert Lee, Texas. Area 4; the Concho River below Tom Green County Line to the confluence was intermittent pool and semi-permenant flow association.

3. One hundred and two man days work on the various aspects of this job resulted in capture of 4,850 individuals of thirty-two species and twelve families. Confirmation is necessary on a number of individuals taken to establish identity.

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
Upper Colorado River Municipal Water 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 adequate sampling of the fishery populations as to their distribution and relative abundance.

1. Because of the stream conditions it was impossible to establish exact seining stations in those portions of the watershed above Ballinger, Texas; however sixty-eight seining collections were obtained from that portion of the watershed and from portions of

the Concho River not included in the North and South Concho River surveys. Bag seines were used where practical; however eight foot, nylon common sense seines were the type found to be most adaptable to stream conditions and were the type most frequently employed.

2. Four gill net stations were established and six net collections were obtained. 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 in length.

3. Water analysis, pH, air and water temperatures, and other data pretaining 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.

5. The portions of the Upper Colorado River System to be included in this survey are as follows:

a. All contributing watershed from the upper origins of the river system in Andrews, Gaines, Dawson and Martin counties to and including the confluence with the San Saba River in San Saba County.

b. Excepting; those portions of the Concho Rivers above the Tom Green County line (these waters were surveyed and reported on in Jobs A-1, B-1, A-2, and B-2); the San Saba River (inventory work on that stream is being done by personnel from Region 7-B, Project F-9-R-4); and Pecan Bayou and it's tributaries, as that inventory is to be done at future date in conjunction with future work.

FINDINGS

Of the above described contributing area of about 20,700 square miles only the river above Ballinger and that portion of the Concho River between Tom Green County line and the confluence were worked during 1955 - 1956. This represents about sixty-eight percent of the total watershed to be surveyed. The stream in that area is usually intermittent except where low water dams are fed by sufficient quanitites of seepage to stabalize, on a partial basis, stream flow for a limited area below their location. Stream flow resulting from run-off, virtually all significant discharge, is controlled primarily by Lake J. B. Thomas, a 310,000 acre feet capacity reservoir and Colorado City Lake on Morgan Creek that has a total capacity of 30,900 acre feet. The Concho Rivers are controlled by San Angelo Reservoir and by Lake Nasworthy; whose combined capacity is about 350,000 acre feet. The named reservoirs are discussed under other jobs. For convenience in discussion; the area covered is divided into stream areas that because of the variation in their physical, chemical and biological aspects differ significantly.

Area 1. The contributing watershed above Lake J. B. Thomas. This portion of the watershed is intermittent pools within the riverbed; there are no springs, and the only permanant pools are created by low water dams. Normally there is no stream flow and the only discharges are a result of run-off. The water above Lake J. B. Thomas and that impounded is comparatively pure having chloride content from 26 to 120 ppm and a total hardness of from 88 to 122 ppm. It was for this reason that the chosen dam site was selected. Maximum dissolved carbon dioxide recorded in this protion of the stream was 16 ppm, minimum oxygen content determined was 7 ppm, and pH was from 8.4 to 8.6. Maximum turbidity was 11 inches. Excepting bullrushes at the mouth of the lake, no aquatic

vegetation is in this area.

Area 2. From one-fourth mile below Lake J. B. Thomas dam to a point on the river about three miles below Silver, Texas; the stream is highly saline in nature as a result of exposures of halite and alkali formations. In addition to the quantities of these materials introduced by the erosive action of stream flow; great quantities of these native salts are induced into the streambed as a result of the seepage and percolative action of ground-water discharges into the stream. The area is usually clear, excepting rare periods of brief duration when run-off occurs, and concentrations of parrot feather, Myriophyllum sp., saw grass, Zizaniopsis sp. and muskgrass, Chara sp. are in localities. Total chlorides recorded were from 420 to 5,000 ppm; total hardness from 428 to 1,500 ppm, minimum recorded dissolved oxygen was 6 ppm, maximum carbon dioxide determined was 15 ppm, and pH was from 8.4 to 8.9.

Area 3. The remaining portions of the Colorado River worked, from three miles below Silver to Ballinger, were intermittent pools dependent entirely upon run-off; except for a stream area of about ten miles that passes through the J. S. Hall Ranch and terminates when it enters gravel deposits about two miles west of Robert Lee, Texas. That section of stream had semi-permenant flow as a result of ground-water movements that were a result of a particular geological condition that is unusual for this part of the Upper Colorado River system. Gravel deposits collected seepage and where these deposits terminated in bedrock the ground-water that was collected was forced upward to the surface by pressure resulting from the build up. The result was surface flow over the bedrock formation. Water quality for that portion of the stream was only slightly saline with recorded chlorides from 12 ppm to 32 ppm. Exact total hardness is not known, but is considered to be less than the previously described stream areas. The water had no recordable turbidity except following run-off, the minimum dissolved oxygen content was 11 ppm, there was no recordable carbon dioxide, and pH was from 7.8 to 8.2. Only bullrushes were found in this area.

Area 4. The Concho River from the Tom Green County line to it's confluence is a series of pools and riffles with semi-permenant stream flow as a result of geological conditions similar to those described above. The principal difference between this area and the Upper Colorado River above Robert Lee and below Silver is the greater concentrations and deposits of silt in many pools created by low water dams on the Concho System. Water quality for the lower Concho is superior to much of the Colorado; chrolide content is usually about 71 ppm and total hardness about 250 ppm. No oxygen difficiencies were recorded, ranging from 8 to 10 ppm, and carbon dioxide records were from 5 to 12 ppm. The water is normally turbid with readings averaging about 11 inches and pH is from 8.2 to 8.6.

FISH POPULATIONS

During the 1955-56 period 152 man days work on the various aspects of this job resulted in sixty-eight seining collections and four gill net collections being obtained. An estimated 4,850 individuals representing thirty-two species, and twelve families were captured.

In addition to the identified species a number of individual fish captured are not identified, or identification has not been confirmed. To prevent necessary corrections if these should be incurred, information on these specimens is withheld at this time; however this data will be included in future reports. To prevent duplication of the expense involved in publication the remaining data taken during 1955-56 is not included; however in submitting the final completion report for this job, charts and suitable distribution maps will be included with the necessary statistical data. The following is a check list of the species collected during the year.

Checklist of Species for the Upper Colorado River.

Common Name	Family Name	Scientific Name
Longnose gar	Lepisosteidae	Lepisosteus osseus
Gizzard shad	Clupeidae	Dorosoma cepedianum
Banded Tetra	Caracidae	Astyanax fasciatus
Smallmouth buffalo	Catastomidae	Ictiobus bubalus
River carpsucker	Catastomidae	Carpiodes carpio
Gray redhorse sucker	Catastomidae	Moxostoma congestum
Carp	Cyprinidae	Cyprinus carpio
Golden shiner	Cyprinidae	Notemigonus crysoleucas
Plains shiner	Cyprinidae	Notropis percobromus
Spottail shiner	Cyprinidae	N. venustus
Redhorse shiner	Cyprinidae	N. lutrensis
Mimic shiner	Cyprinidae	N. vollucellus
Roundnose minnow	Cyprinidae	Dionda episcopa
Plains minnow	Cyprinidae	Hybognathus placita
Parrot minnow	Cyprinidae	Pimephales vigilax
Stoneroller	Cyprinidae	Campostoma sp.
Yellowbullhead	Ameiuridae	Ictalurus natalis
Flathead catfish	Ameiuridae	Pylodictus olivaris
Plains killifish	Cyprinodontidae	Cyprinodon kansae
Mosquitofish	Poeciliidae	Gambusia sp.
White bass	Serranidae	Roccus chrysops
Largemouth bass	Centrarchidae	Micropterus salmoides
Spotted bass	Centrarchidae	Micropterus sp.
Warmouth bass	Centrarchidae	Chaenobryttus coronarius
Green sunfish	Centrarchidae	Lepomis cyanellus
Spotted sunfish	Centrarchidae	L. punctatus
Bluegill	Centrarchidae	L. macrochirus
Redear sunfish	Centrarchidae	L. megalotis
Yellowbelly sunfish	Centrarchidae	L. auritus
White crappie	Centrarchidae	Pomoxis annularis
Logperch	Percidae	Percina caprodes
Freshwater drum	Sciaenidae	Aplodinotus grunniens

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Date April 1, 1957