

*John
1957*

Report of Fisheries Investigations

Inventory of Species Present in Imperial Reservoir, near Imperial, Texas

by

Lawrence D. Campbell
Project Leader

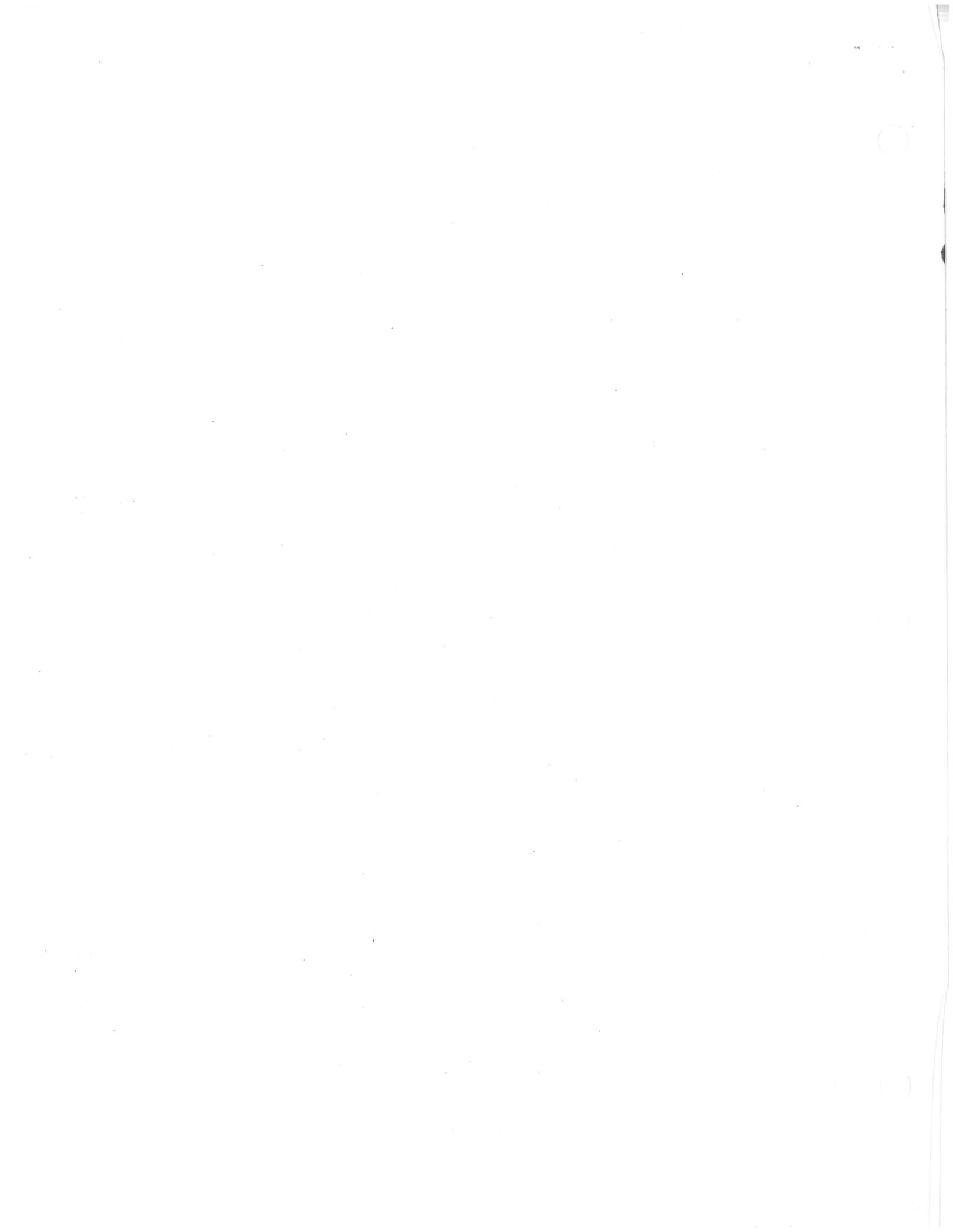
Dingell-Johnson Project F-5-R-4, Job B-20
April 16, 1956 - April 16, 1957

H. D. Dodgen - Executive Secretary

Texas Game and Fish Commission
Austin, Texas

Marion Toole
Coordinator

William H. Brown
Asst. Coordinator



JOB COMPLETION REPORT

State of TEXAS

Project No. F5R4

Name: Fisheries Investigations and Surveys of the Waters of Region 3-B.

Job No. B-20

Title: Inventory of Species Present in Imperial Reservoir, near Imperial, Texas

Period Covered: April 16, 1956 through April 16, 1957

ABSTRACT:

Inventory data indicated a complete dominance of this reservoir by white bass. The water is highly saline, slightly turbid most of the time, and because of the sandy bottom and other factors, the reservoir has a very high productivity of game species. The reservoir is drained at irregular intervals through irrigation processes.

OBJECTIVES:

To determine the species present and their relative abundance and to determine the ecological factors influencing their distribution.

PROCEDURE:

Twelve gill nets were set at five locations in the reservoir. Experimental nylon gill nets measuring 125 feet long by eight feet deep and made up in five, 25 foot sections were used. Mesh size for these nets increased progressively in each following section at half-inch intervals beginning with a one-inch mesh section and terminating with a three-inch mesh section.

Eight seining collections were made at eight seining stations in the reservoir. In nearly all collections, both 26 foot- 1/4 inch mesh bag seines and 15 foot- 1/4 inch common sense seines were used. To estimate relative abundance, a count was made of all individuals taken in two hauls with a 26foot - 1/4 inch mesh fry seine.

Water analysis to determine dissolved oxygen content and the quantity of dissolved carbon dioxide was taken for each netting collection. Surface temperature, pH and weather conditions were recorded for each netting and seining collection. Turbidity was taken on two occasions.

In netting collections, samples from each collection and for each species were weighed, measured and sexed. This work was done in the field. A scale sample was taken from a sample number of individuals for each species and stomachs preserved for laboratory analysis.

FINDINGS:

Description - Imperial Reservoir is located ten miles northwest of the city of Imperial near the meeting of the Crane, Ward, and Pecos County lines. The reservoir was formerly called

Zimmerman Reservoir. The reservoir is part of an irrigation system and is used for holding and controlling releases from Red Bluff Reservoir into the Pecos River. Releases are then diverted as required. Maximum storage is about 2,800 acre-feet and at that elevation the reservoir has about 895 surface acres. The lake is owned by Red Bluff Power and Water District and is fished extensively by sportsmen from Pecos, Midland and Odessa. The water is usually very high in chlorides (4,570 ppm to 2,970 ppm), is very hard (3,500 ppm) and has total dissolved solids of about (10,500 ppm). No oxygen deficiencies were recorded, the minimum recorded being 11 ppm and pH was 8.2 to 8.4. The lake, slightly turbid on occasions, has a sandy bottom and is shallow. The reservoir was constructed by adding dykes to a playa lake. The lake is virtually drained once each eighteen months.

Netting Collections - The following data is the catch recorded by setting fifteen hundred feet of experimental gill net at five locations in the lake. As shown, white bass (Roccus chrysops) completely dominated the fish populations. Since it is known that the reservoir was virtually drained about eight months before netting collections were taken the significance of this dominance in relation to the proposed fishery management program is apparent.

Gill Netting Collections from Imperial Reservoir

Species	Number	% Numerically	Av. Wt. ounces	% by Weight	Average K
White Bass	161	82.07	18.5	89.51	238
Channel Catfish	1	.51	21.0	.64	226
Gizzard Shad	26	13.34	4.0	3.12	181
River Carp Suckers	8	4.08	28.0	6.73	240
	196	100.00		100.00	

Seining Collections - The following information and comments are based on seining collections taken at six locations on the reservoir. As previously stated the reservoir has a sandy bottom and is clear of obstructions. For that reason the more extensive seining effort probably resulted in sampling more indicative of the true importance of several species, notably Carp (Cyprinus carpio), gizzard shad (Dorosoma cepedianum) and freshwater drum (Aplodinotus grunniens). It was obvious, when consideration was given to the entire seining effort, that in the particular seining hauls made in order to estimate population ratios (using the customary twenty-six foot bag seine) that the findings thus obtained by chance were entirely misleading and were significantly distorted as to the true interrelationship as it was shown to exist by more complete seining with lighter equipment. In order to prevent such a misrepresentation, the seining information obtained is included in the following check list.

Check List of Species by Seining

Gizzard shad (Dorosoma cepedianum) - very numerous and at the time this work was done, uniform in size averaging about 135 mm.

Carp (Cyprinus carpio) - less numerous than river carpsuckers but very abundant in localities. Larger specimens than are usually taken by this method of sampling were obtained and there was a conspicuous uniformity of size averaging about 25 cm. A number of these fish were found dead along the shore; however the exact cause of this mortality was not determined.

River carpsuckers (Carpiodes carpio) - abundant, taken at all areas seined.

Pecos river killifish (Fundulus sp.) - This is probably the most numerous species for the reservoir; however as indicated later in stomach analysis and as is apparent in work on the Pecos River; the utility of this species as forage is questionable.

Redhorse shiners (Notropis lutrensis) - numerous and unusually brilliantly colored. The only shiner taken from the reservoir.

Mosquitofish (Gambusia sp.) - taken from the canal supplying the reservoir, but not included in seining collections from the lake.

White bass (Roccus chrysops) - Only two of these fish were captured by seining; however these individuals were about the same size as those taken by gill nets. This is regarded as supporting evidence of the uniformity of growth of this species and as an indication that these fish were probably introduced from the Pecos River when the reservoir was filled in the early spring.

Freshwater drum (Aplodinotus grunniens) - common occurrence throughout the reservoir. Individuals of this species were found at five of the six localities seined.

Interpretation and Comments - since it is known that the reservoir is usually drained every eighteen months and is greatly reduced in the winter and then refilled in the early spring, the large numbers of white bass are concluded to have been introduced in the form of fertilized eggs, fry, and/or fingerling size fish. The size of the fish captured is regarded as indicative of their potential growth rate under favorable conditions, and because of their high ratio and the reservoir should yield excellent sport fishing. There is no known evidence to support the possibility of spawning by this species in the reservoir, and the extreme reduction during the winter months (to a capacity of about 100 acre feet with about 35 surface acres) further indicated that possibility as improbable. The irrigation methods employed by the water and power district (i.e., periodic draining and refilling) offer the possibility of controlling the fish populations within this reservoir by screening or otherwise controlling the fish that are introduced at the time of the winter or spring refilling. If the apparent rapid growth aptitudes of white bass are to be utilized, consideration must be given to means or methods for their introduction as the success of spawning by the species in the Pecos River is probably too unreliable.

Recommendation - No managerial effort is deemed necessary at this time. It is recommended that Imperial Reservoir be included in and considered as an integrated part of future management plans or programs for the Upper Pecos Watershed. It is proposed that under annual re-survey work for the region, this reservoir be included in order to obtain additional data.

SUMMARY:

Fifteen hundred feet of experimental gill net were set at five locations within Imperial

Reservoir. One hundred and ninety-six individuals of four species were captured. Of this number 161 (82.07 percent) were white bass.

2. Six localities along the reservoir shore were seined extensively and the results of this work indicated that several species were more numerous than indicated by gill net collections. Freshwater drum, carp, and gizzard shad were numerous and uniform in size.
3. The reservoir is unusually high in chlorides (4,570 ppm to 2,970 ppm) is used by Red Bluff Power and Water District to control releases from Red Bluff Reservoir for irrigation purposes, and is subject to extreme fluctuations.
4. Imperial Reservoir because of management practices offers definite fishery management possibilities, and it is recommended that further study of the lake be included in future plans.

Prepared by: Lawrence D. Campbell
Project Leader

Approved by:

Marion Toole
Chief Aquatic Biologist

Date: April 8, 1958