

Report of Fisheries Investigations

Fisheries Problem Determination

by

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Dingell-Johnson Project F-7-R-7, Job D-1  
June 1, 1959 - December 31, 1959

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## A B S T R A C T

More adequate sampling methods are needed in order to obtain maximum benefits from the natural history study. Information concerning depth distribution of undesirable species as related to seasons, temperature, barometric pressure, etc., is needed in order to determine proper times for selective-kill treatments. More time is needed to devote to the natural history studies. The number of jobs in Region 1-B, as well as the work load in general, must be reduced.

Gizzard shad (Dorosoma cepedianum) have gradually increased in numbers since their reduction by the selective-kill treatment at Lake Diversion in March 1957, and are once again present in abundance. Average weight of shad immediately following the treatment was 1.43 pounds, but at present, their average weight is 0.51 pounds. Smaller shad are now greatly dominant. Game fish species, which were benefited by reduction of shad and drum, have decreased in relative abundance, as well as in average weight, as shad have reinfested the lake. Conditions in general have almost returned to where they were before the treatment approximately three years ago. Techniques should be changed, sampling equipment improved, and netting stations increased in order to obtain data from which final conclusions will be made.

Effective methods of controlling all species of rough fish are greatly needed - not just shad and drum (Aplodinotus grunniens). This will require a great deal of research and should be shared by chemists and biologists in different regions. This will enable personnel in each region to devote more time to the various aspects of rough fish control research simultaneously.

No additional stockings of redbird (Sciaenops ocellata) and speckled trout (Cynoscion nebulosus) into Lake Kemp should be attempted until the feasibility and benefits of experimental introductions in the past have been determined and the cost justified.

Industrial pollution of the Canadian River continues to be an outstanding problem. Insecticides used in large feed lots on watersheds of Rita Blanca Lake and Buffalo Springs Lake continue as threatening problems.

Excessive populations of bullhead catfish (Ictalurus melas) and golden shiners (Notemigonus crysoleucas) pose a problem to the fishery of Rita Blanca Lake at Dalhart. Since manual methods of control have been proven to be slow, restricted, laborious, and too expensive to constitute effective control measures, Rita Blanca was stocked with substantial numbers of adult black bass (Micropterus salmoides) and large flathead catfish (Pylodictus olivaris) to increase predation on these undesirable species. Periodic resurveys should be continued to determine effects of these experimental introductions on the fishery of Rita Blanca Lake.

Studies should continue to determine causes of rapid oxidation of rotenone compounds in Buffalo Springs water at twice the normally required dosage. If suitable explanations are found, considerable time, money and effort may be saved in treatments of other waters in the future.

## Job Completion Report

State of TEXAS

Project No. F-7-R-7

Name: Fisheries Investigations and Surveys  
of the Waters of Region 1-B.

Job No. D-1

Title: Fisheries Problem Determination

Period Covered:

June 1, 1959 through December 31, 1959

### OBJECTIVES

Analysis of data to determine specific fisheries problems in the concerned waters.

### PROCEDURE

Data collected during the work on various jobs in Segment F-7-R-7 have been studied to determine the existence of problems that may require additional investigations or experimental methods of resolution.

### FINDINGS

This is a short segment report, covering a period of only seven months between June 1 and December 31, 1959.

#### Natural History Studies

One of the more outstanding problems of this study has been the inadequacy of collecting and sampling methods. It has been quite obvious that gill netting is entirely too selective to produce a truly representative sample of the fish population. Seining methods, too, are limited to areas of shallow water devoid of stumps, rocks, vegetation and other objects that are attractive to fish. In order to obtain maximum benefits from this study, collecting methods must be developed that will acquire data from any or all parts of waters under study. Work on this problem was begun during this segment, and it will continue to receive special attention during future segments.

Efforts should also be directed to determining depth distribution of undesirable species as related to seasons, temperature, barometric pressure, etc. This knowledge would be very useful in determining proper times for selective-kill treatments. For example, there would be no need to postpone a selective-kill treatment until a thermocline existed at 20 feet in the summer time when the fish to be killed may occur only in the upper 10 feet normally and at a time affording more desirable treating conditions.

During this very brief study, a number of very interesting problems have been encountered. However, crowded work schedules and other official obligations have not permitted sufficient time to devote to the many aspects of a natural history study. Plans are being made to reduce the number of jobs, as well as the work load in general,

so that more time can be devoted to this study. Meanwhile, work on this job will be confined primarily to preparations and planning for future work and to the collection of materials for the laboratory study at Midwestern University, in accordance with the inter-agency contract agreement.

### Lake Diversion

The purpose of this job was to collect data from which the overall effects of the selective-kill treatment of Lake Diversion in March 1957 can be determined. Thus far several important results have been noted. Although gizzard shad (Dorosoma cepedianum) and drum (Aplodinotus grunniens) were not totally eliminated, they were greatly reduced. This reduction of shad and drum affected the game fish populations in that game fish increased in numbers and were in better condition. In the absence of great numbers of shad and drum, game fish probably had to move about more in search of food, thereby increasing fishing success.

Those shad that survived the treatment also fared very well. With less competition, they too were in better condition. Shad have steadily increased in numbers, and now, after three years, are once again present in abundance. The average weight of shad immediately following the treatment was 1.43 pounds, but at present, their average weight is 0.51 pounds, indicating that smaller shad are greatly dominant now.

Generally speaking, shad have gradually increased since their reduction, but game fish, which have done very well in the absence of an abundance of shad, have decreased in relative abundance, as well as average weight as shad reinfested the lake. Conditions in general have almost returned to the point they were before the treatment.

Data collected by present netting techniques have failed to show the true relative abundance of species. At present, the status of the drum in Lake Diversion is still not known. It is believed that drum and black bass (Micropterus salmoides) both are much more abundant than data show them to be. It will probably be necessary to make a rotenone sample in an enclosed bay in order to see just how abundant the drum have become.

During the next segment netting techniques will be changed. Different types of specially rigged gill nets will be used, and possibly more netting stations will be selected. By varying sampling methods, more complete and accurate data should be obtained.

If at the end of the next segment (December 31, 1960), it is found that conditions have stabilized and that all changes due to the rotenone treatment have been learned, then this job will be terminated and final conclusions will be made. If however, new changes are realized, this job will be continued.

### Experimental Control of Undesirable Species

Thus far, work accomplished on this job (Job E-1) has resulted in the selective control of only gizzard shad, drum, and to a lesser extent, carp (Cyprinus carpio). Effective methods of controlling all of the rough fish species are greatly needed. Considerable time has been devoted during this period of study to the natural history study of shad, carp, carpsucker (Carpionodes carpio), and the buffalo fishes (Ictiobus sps.), in order to collect data that may result in the development of effective

controls of these species.

Since natural history studies and the work covered by this job are very time consuming, only one of these very important fields of endeavor can be pursued effectively in any one region at any one time. Therefore, the laboratory category of this job has been transferred to the San Marcos Fisheries Laboratory, and the remaining categories were discontinued, at least temporarily, effective January 1, 1960. This will enable personnel of F-7-R (Region 1-B) to spend considerably more time studying living habits of problematical species. It will also enable the laboratory work to receive full time attention of a chemist, assisted by fisheries biologists at the San Marcos laboratory. Thus, the problems of rough fish control can be approached from two different directions simultaneously.

#### Experimental Introduction of Fish Species

Due to the great expense and many difficulties involved, no additional stockings of redbfish (Sciaenops ocellata) and speckled trout (Cynoscion nebulosus) were made during this study period. Reliable information concerning survival and growth rate of the introduced marine species has not been received. Gill netting and seining in Lake Kemp have failed to produce any specimens of any size. Reports and rumors of capture by sports fishermen and bait seiners have been received and investigated for authenticity, but definite identifications have not been made. No additional stockings of marine species into Lake Kemp or any other waters of Region 1-B are planned until the feasibility and benefits of the work accomplished to date have been determined and the cost justified.

Efforts will be increased at Lake Kemp during the next segment period to determine status of these experimental introductions. Plans are to net, trap and seine extensively from the dam to the headwaters and tributary streams in an effort to catch a specimen that was either stocked originally or a progeny that was spawned in Lake Kemp. Sufficient time has lapsed since the original stocking for reproduction of redbfish and speckled trout in Lake Kemp, if it is going to occur.

Flathead catfish (Pylodictus olivaris) were experimentally introduced into Rita Blanca Lake (near Dalhart) in an effort to restore balance by controlling excessive populations of golden shiners (Notemigonus crysoleucas) and bullhead catfish (Ictalurus melas), as well as threatening populations of carp and goldfish (Carassius auratus). A total of 285 flatheads, ranging from 3 to 28 pounds, was successfully transferred from Lake Stamford to Rita Blanca Lake. The average weight was 11.1 pounds and comprised a total weight of 3,171 pounds. No restrictions were placed on their capture by sports fishermen, which makes them an additional sports fish for the upper Panhandle region. Periodic resurveys will be conducted to detect effects of this experimental introduction on the fishery of Rita Blanca Lake.

#### Pollution

Industrial pollution of the Canadian River near Borger continues to be an outstanding problem. Although possibly improved, the Canadian River is still being polluted by industrial effluents in the Borger area. Efforts of the polluting industrial concerns have not been sufficient to substantially reduce the previously reported pollution violation.

An investigation was made to determine causes of a fish-kill in the Rita Blanca Lake, near Dalhart, following a light rain on the watershed. The toxicant responsible for the fish-kill was Cooper-Tox, an insecticide containing toxaphene, which had been used to control flies in a watershed feed lot. This feed lot remains as a threatening problem because it is located immediately above Rita Blanca Lake, and its insects and grubs must be controlled chemically.

A pollution study was conducted in October 1959, to determine causes of an extensive fish-kill on the Yellow House Creek, near Lubbock. The fishery of all three V-8 Ranch Lakes on the Yellow House Creek was destroyed. Only black bullhead catfishes remained after the die-off. Causes of pollution were insecticides which were used to control flies and grubs in large, watershed feed lots, and were washed into the creek by heavy thundershowers. No legal action was taken by the Game and Fish Commission because only privately owned waters were affected. It continues to constitute a problem, however, because Buffalo Springs Lake is located immediately below the V-8 Ranch Lakes on the same creek. No fish were killed in Buffalo Springs Lake because it had been treated with rotenone earlier in the month for total eradication of all species. Fortunately, this lake had not been re-stocked prior to the fish-kill in Yellow House Creek. A pollution survey is presently being made by the State Health Department.

#### Rita Blanca Experimental Management

Previous investigations at Rita Blanca Lake, near Dalhart, revealed excessive populations of bullhead catfish and golden shiners, as well as threatening populations of carp and goldfish. As a result of this work, an experimental management project was initiated to control excessive populations of undesirable species.

During this seven month period of study, Rita Blanca Lake was checked with various types of fishing equipment to determine the most effective methods of removing unwanted fish species, primarily golden shiners and bullhead catfish. Equipment used included small-meshed gill nets, ordinary fyke nets, seines and "bullhead nets". However, since the manual methods that were used during this segment proved to be slow, restricted, laborious, and too expensive to constitute effective control measures, the decision was made to rely primarily on biological controls. Rita Blanca was stocked with substantial numbers of adult black bass and large flathead catfish to increase predation on the excessive, undesirable species.

#### Buffalo Springs Lake

Fishery surveys have shown that Buffalo Springs Lake contained excessive populations of rough fish, including carpsuckers and black bullhead catfish (Ictalurus melas). A total kill treatment was recommended as an effort to rehabilitate the fishery.

In September 1959, the lake and a part of its watershed was treated with rotenone compounds at concentrations in excess of one part per million. Although an excellent kill was indicated on the day of treatment, check-seining on the morning of September 28, twenty-four hours after treatment, revealed that considerable numbers of bullhead catfish and golden shiners had not been affected by the rotenone. The lake was re-treated the same day in order to take advantage of any rotenone that may have been still present in the water.

Gill nets were set on the morning of September 30 to determine final results of both treatments. Again, bullheads and golden shiners were taken in good condition, but in reduced numbers. It was quite obvious that a total-kill had not been achieved with rotenone which was distributed at more than twice the normally required dosage.

In an effort to ascertain reasons for the unsuccessful treatment, the lake volume was re-figured and found to be correct. Consideration was also given to fresh-water springs on the lake bottom, which are known to be present. However, flow from these springs was estimated and an allowance made for their contributing volume prior to the treatment. Water samples were collected and sent to the San Marcos State Fish Hatchery Laboratory for analysis and bio-assay to detect presence of any chemicals or organic matter which may cause rapid oxidation of rotenone.

Although a total kill was not achieved on bullhead catfish and golden shiners at Buffalo Springs Lake, the eradication of all other species, especially carpsucker, is considered justification for the treatment. Bullheads and golden shiners were greatly reduced, however, and will probably be partially controlled by an adequate stocking of black bass, channel catfish, and crappie.

A study will continue to determine causes of rapid rotenone dissipation in Buffalo Springs water.

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