

Report of Fisheries Investigations  
Fisheries Problem Determination

by

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Dingell-Johnson Project F-7-R-5, Job D-1  
June 1, 1957 - May 31, 1958

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## SEGMENT COMPLETION REPORT

State of TEXAS  
Project No. F7R5 Name: Fisheries Investigations and Surveys of the Waters of Region 1-B.  
Job No. D-1 Title: Fisheries Problem Determination.  
Period Covered: June 1, 1957 through May 31, 1958

### OBJECTIVES:

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

### PROCEDURE:

Data collected during the work on the various jobs in Segment F7R5 have been studied to determine the existence of problems that may require additional investigations or experimental methods of resolution.

### FINDINGS:

#### Rita Blanca Lake:

The most outstanding fisheries problem of this lake is water supply. Rita Blanca Lake is commonly maintained at unusually low levels, mainly because of low annual rainfall average and high evaporation rate. The average annual rainfall in the Dalhart area from 1908 to 1957 was 17.52 inches, whereas the average annual evaporation rate is 72 inches. Before attempting long range rehabilitation measures to improve the fishery at Rita Blanca, an adequate water supply must be assured. Past records have proven that this lake cannot rely upon rainfall alone to provide sufficient water to maintain satisfactory water levels.

The water is often quite turbid due to the extremely low mineral content and roiling action of the frequently high winds.

The only aquatic vegetation observed during the study were small amounts of Chara and algae. Floating and marginal vegetation was completely lacking, due, probably, to the extremes in water level fluxuations.

Although present in the lake, carp and goldfish are not numerous enough to constitute a problem. Channel catfish and crappie are two of the most abundant species in the lake, whereas only two black bass were taken in gill nets during the study. It is doubtful that black bass successfully reproduce here due to the lack of spawning facilities during the periods of low water levels.

The most problematical fish species seems to be the golden shiner, which is the most abundant species found in Rita Blanca. Individuals of this species were large enough to be taken in gill nets, constituting 20.8 percent of the total gill net collections. It also comprised 49.7 percent of the forage fish fauna taken in seine collections. Since this species feed on fry of other fish, their over-abundance may be responsible for the lack of successful reproduction of bass, and possibly other nest-building sunfishes. It is definitely a problem species, and a reduction of their numbers would be beneficial.

Remedial recommendations included stabilization of the water level with sub-surface water of high mineral content, control of golden shiners, provision of artificial spawning facilities, stocking of yearling or adult bass and crappie to utilize spawning facilities and to aid in the control of golden shiners, and additional studies to determine future requirements to maintain the fishery at Rita Blanca Lake.

#### Buffalo Lake:

Quite similar to Rita Blanca Lake, the most outstanding fisheries problem of Buffalo Lake is the lack of adequate water supply. Rains that have occurred in practically all other parts of Texas failed to occur on the watershed of Buffalo Lake, and the lake has been reduced to an abnormally low level. Conditions have resulted that would have been a detriment to the fishery of any body of water.

An estimated 200 tons of fish, mostly gizzard shad and carp, were removed from Buffalo Lake from May, 1956 through June, 1957. Netting and seining operations during routine fisheries surveys since that time have removed an additional 1,813 pounds of shad and 8,133 pounds of carp. In spite of this population reduction, shad and carp have replenished themselves in sufficient numbers to constitute a major problem to the fishery of Buffalo Lake.

Low water levels for the past two years is the most probable cause of the excessive relative-abundance of rough fish species in Buffalo Lake. Most of the natural nesting and breeding sites of black bass, crappie and sunfishes are no longer under water, making it more difficult for these species to reproduce in the mud and silt-laden bottom. Whereas, the rough fish species were able to produce successful spawns on wind-deposited tumbleweeds, larger rocks and other objects above the silt.

Regrettably, the work done at Buffalo Lake has failed to serve as an adequate check on selective-kill methods. Therefore, this Job (B-9) will be discontinued, at least until more natural environmental conditions are restored in the lake. Buffalo Lake will be checked periodically on a re-survey job to determine any possible benefits derived from the work in the past.

#### Lake Diversion:

An estimated minimum of 185 tons of fish, mostly gizzard shad and drum, was removed from Lake Diversion by an experimental selective-kill treatment in March 1957. Inventory had been taken by gill nets and seines for ten months prior to the treatment in order to compile data which would be comparative to that collected following treatment. Work done during this segment period has produced data collected during 12 consecutive months following treatment, which may indicate resulting effects of reducing the shad and drum populations.

The most significant changes in the fish populations following the treatment are: (1) increase in "K" factors for all species, including shad; (2) reduction of the shad population; (3) increase in average weight of all species except shortnose gar and carp.

Discrepancies in the methods of sampling fish populations for drum were emphasized again during this segment. According to gill netting results prior to the treatment, the drum population was 0.7 percent of the total. During the treatment, an estimated 400,000 drum weighing 99.8 tons were killed. According to gill netting results following the treatment, the drum population was still 0.6 percent of the total. The method of sampling fish populations by gill nets failed to indicate either the great over-population of drum before the treatment or the decrease in drum population following the treatment. It is a proven fact in this case that the drum population was much smaller during this segment than it was during the preceding segment, however, gill netting failed to show this reduction.

There are indications that a direct relationship exists between shad and carpsucker, buffalo and carp. Experiments on other large bodies of water have shown that when shad populations decrease, carpsucker and buffalo, or carp populations greatly increase. One obvious explanation for this is that when the shad population is greatly reduced in a lake, they represent a smaller percentage of the total number taken by gill nets. It follows that the carpsucker, buffalo and carp populations, which are not greatly affected by the treatment, would naturally comprise a larger percentage of the total number taken by gill nets even if their populations remained the same. However, attempts to discover any possible relationships, and explanations for same if they exist, as well as many other unknown factors, will be made during future segments when natural history studies will be conducted on these rough fish species.

Knowledge obtained by field testing experimental methods of selective-killing, such as that conducted at Lake Diversion, and continuing surveys to determine their effects, clearly indicates the value of this work. Only in this manner can fisheries workers determine whether or not laboratory methods and results can be duplicated in the field. Even if selective-killing of unwanted species can be successfully achieved, the desirability of the resulting changes in the ecology of treated waters must be ascertained. This job should definitely be continued.

#### Experimental Introductions:

Very few problems were encountered on this job that were not present during segments in the past. Outstanding was the problem of obtaining redbfish and speckled trout for introduction into Lake Kemp. Adverse weather conditions and lack of proper equipment greatly hampered the capture, and especially, the temporary storage of marine species before transporting. Due to these difficulties and the great expense involved, work on this job during this segment has been confined primarily to determining results and benefits of previous stockings.

Reliable information concerning the growth rate of these introduced marine species is still undetermined. Capture by gill netting was not attempted until only recently because of the possibility of killing or injuring these very valuable fishes, and reports from sports fishermen are seldom acceptable. Attempts were made to investigate each of the numerous reports of capture by fishermen, but

most of them were found to be either falsehoods, practical jokes or mistaken fish identifications. Several of these reports could have been authentic, however, but positive identifications could not be made because the fish had been eaten and the remains destroyed by the time the report was checked.

On May 26 and 27, 1958, approximately 2,400 feet of gill nets were set in Lake Kemp, from the headwaters to the dam, in an effort to determine the status of redbfish and speckled trout. Check-seining was also done insofar as possible, in areas devoid of stumps, rocks and deep water. None of the introduced species of any size were taken in the nets or seines. This is not surprising, however, because these species could be very plentiful in the 22,800 acres of Lake Kemp and avoid capture in an overnight set with only 2,400 feet of gill net. Opportunities for more thorough checks on these studies will be conducted on rough fish species in Lake Kemp. The lake will be netted, trapped and seined extensively from the dam to the headwaters and tributary streams, and the possibility of taking redbfish and speckled trout will be much greater than at any time since their introduction.

No additional stockings of marine species into Lake Kemp are planned until the feasibility and benefits of the work accomplished to date have been determined and the cost justified.

Apparently, most of the 1,420 white bass that were introduced into Buffalo Lake during the segment have survived the transplanting. Although very few white bass have been taken in the netting and seining collections of routine monthly surveys since that time, reports of capture by sports fishermen are common.

Conditions that are conducive to the spawning of white bass have not been afforded in Buffalo Lake since the stocking. As stated previously in the discussion of work done at Buffalo Lake, the lake has been reduced to very low levels due to lack of sufficient rainfall on the watershed for the past two years. Being deprived of running water in the tributary stream and wave-swept sandy beaches, the white bass have apparently failed to spawn up to the time of this writing.

Although all project work, except for an occasional re-survey, has been discontinued at Buffalo Lake, it will be checked periodically to determine the status of white bass.

#### Pollution:

Results of previous studies have shown that the Canadian River is being seriously polluted by industrial wastes in the vicinity of Borger, Texas. The violation was brought to the attention of the responsible industrial concern, who agreed to study the problem and take the necessary action to abate the pollution. This pollution was re-checked during this segment to determine the extent and results, if any, of their efforts.

Results of this study clearly indicated that their efforts have not been sufficient during the past three years to substantially reduce the previously reported violation of pollution.

Periodic observations and studies will continue in the future to determine extent and results of any additional efforts to abate pollution of the Canadian River by this industrial concern.

A broken sewer main, resulting from heavy rainfall, was detected flowing into Holliday Creek. It was investigated, reported and repaired before serious damage was done.

Except for the two instances previously mentioned, above normal precipitation, resulting in flooding conditions on most streams in the region, provided sufficient dilution to eliminate noticeable pollution during this segment. No reports or complaints of suspected pollution were received, and no abnormal conditions were found on any project waters under study.

#### Experimental Control of Undesirable Fish Species:

There is a very definite need for continuing toxicity and selectivity determinations in the laboratory. Many new chemicals for controlling vegetation and insects that are coming into widespread use are also alarmingly toxic to fish and all other aquatic animals. Some of these new chemicals may also be very useful in the selective, and perhaps, biological control of undesirable species. Only by constant laboratory testing can these new chemicals be recognized for what they are, and either be used to the best advantage or else be outlawed before widespread damage is done.

Dowlap 20, a lamprey larvacide, was harmless to all fish tested up to 10 ppm. It has shown promise, however, as a selective control on bullhead catfish at higher concentrations, and should receive further investigation.

EDTA, an organic copper, may be a promising algaecide in alkaline waters. It was harmless to fish up to 6 ppm, but killed algae in concentrations of 1 and 2 ppm. It should be checked in the field on a larger scale.

Three experiments with Simazin 50W, an experimental herbicide, were conducted for 72 hours each at temperatures ranging from 61 to 75 degrees. It had little, if any, effects on any of the species tested in concentrations from 1 ppm to 10 ppm. Other than an increase in the rate of respiration, no signs of distress were noted.

Confirmation was given to the desirability of administering split applications of reduced concentrations when using rotenone compounds for controlling shad and drum during this segment. Additional experiments with Pro-Noxfish and 5% rotenone powder agreed with results of the past insofar as the most desirable temperatures for obtaining selectivity on shad and drum are concerned. They are definitely not as selective in the 70's as they are between 55 and 60 degrees.

Noxfish produced no selectivity at any temperature or concentration. According to all experiments run with noxfish, it has little value as a selective-kill toxicant.

Efforts should be continued to devise equipment for treating large bodies of water in order to decrease cost in time and manpower, permit distribution of chemicals in all forms with minimal contact with bodies of workmen, attain uniform distributions, and to eliminate waste.

Small-scale field testing of laboratory results is still considered as an absolute necessity. We know of no other way to determine if laboratory results can be duplicated in the field under natural conditions.

Sustaining toxicity over longer periods of time with reduced concentrations presents several interesting problems. Considerable thought should be given to the fabrication of mechanical devices to automatically release predetermined concentrations of toxicants into the water at a measured rate. Another possibility is pelletized chemicals that gradually release their contents over known periods of time. These would be especially useful in spawning areas of carp, goldfish, shad and buffalofishes.

Yet to be determined is the overall effects of selectively controlling shad, or any other single species of fish. Although results of surveys following selective-kills are encouraging, there has not been sufficient time since the treatments to formulate factual conclusions. However, data collected during these surveys have definitely emphasized the need for control of rough fish species that are not affected by selective-kill treatments. Effective methods of controlling carpsucker, carp, and to a lesser extent, buffalofishes, are greatly needed. Since very little is known of the living habits of these problematical species, special efforts should be made in this region during future segments to compile data concerning their natural histories. This information may result in the development of effective manual, biological, or perhaps, other means of control.

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