Report of Fisheries Investigations

Fisheries Problem Determination

by

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Dingell-Johnson Project F-7-R-6, Job D-1
June 1, 1958 through May 31, 1959

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Segment Completion Report

State of TEXAS

Project No. F-7-R-6 Name: Fisheries Investigations and Surveys of the Waters of Region 1-B.

Job No. D-1 Title: Fisheries Problem Determination.

Period Covered: June 1, 1958 through May 31, 1959.

Abstract:

The most outstanding problem encountered on the natural history study during this period of study was lack of time. The number of jobs in Region B-1, as well as the work load in general, must be reduced.

Two years after the selective-kill treatment at Lake Diversion, condition factors of rough fish species either increased or remained the same as they were during the preceding year; whereas game fish species and shad showed a decrease. Although some species have a lower condition factor during this segment, as compared to the previous segment, all species are equal to or higher than during the period preceding the selective-kill treatment. The gizzard shad population, according to gill netting results, was reduced from 36.6 percent to 6.8 percent by the treatment, but shad replenished themselves to 22.5 percent within two years after the treatment. White bass, black bass and channel catfish have made substantial gains, but crappie have decreased in numbers. Apparently, the rotenone treatment killed the mayfly nymphs in March 1957, removing them from the diet of fishes during the 1957-1958 period. They began to re-appear in stomachs of game fishes, as well as the buffalofishes, in August 1958.

Laboratory work should continue to determine toxicity and selectivity of insecticides and other new chemicals coming into widespread use. This work has developed to the extent that it could very easily constitute full time employment of a trained chemist or biologist and a crew. It is very time-consuming and should not be attempted on a part-time basis. This work should be transferred to a better equipped laboratory and set up as a full-time job.

There is an increasing need for more efficient equipment for treating large bodies of water. Although a treating unit was developed during this segment period that will mix and discharge up to 2,000 pounds of rotenone powder per hour, several improvements are needed. Provisions must be made to increase horizontal dispersal over the surface and to retard vertical descent of the chemical. This will permit more fish, most of which are in the upper 6 to 8 feet of water, to come into contact with the chemical before it sinks to the bottom. Therefore, an additive chemical is needed to react as a dispersant in the discharged mixture which will cause the rotenone to spread horizontally as far as possible, then settle slowly towards the bottom, diluting as it descends. This will prevent heavy concentrations of rotenone dropping to the bottom, and perhaps, decrease mortality of benthic organisms.

No additional stocking of redfish and speckled trout were made during this period of study. Reliable information concerning survival and growth rate of the previously introduced marine species is still undetermined. Gill netting and seining in Lake Kemp has 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 no definite identifications have been made.

Industrial pollution of the Canadian River is still a problem. Studies are continuing in cooperation with the State Department of Public Health to determine the extent and results of abatement measures by the violating industrial concern.

An over-abundance of golden shiners and black bullhead catfish continues to be the most outstanding problem at Rita Blanca Lake near Dalhart. An experimental management project has been initiated in an effort to control these species.

As could be expected, rough fish species greatly outnumber game fish species at Lake Kemp. One smallmouth buffalo was taken, which is the first of this species to be recorded from Lake Kemp.

Floods and other unavoidable factors have caused postponement of the Buffalo Springs total-kill treatment until early fall of 1959.

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 F-7-R-6 have been studied to determine the existence of problems that may require additional investigations or experimental methods of resolution.

Findings:

Natural History Studies

The most outstanding problem encountered on this job was the lack of sufficient time to devote to the many aspects of a natural history study. Unfortunately, untimely segment report writing prevented concentrated field work during the spawning season of the species under study. Other official obligations interfered with field work during weather changes and at other times important to life history studies. As a result, much valuable information was lost. The segment termination date for F-7-R has been changed to December 31, instead of May 31, which will partially alleviate this problem in the future. The number of jobs in Region B-1, as well as the work load in general, must be reduced in order to accomplish the many objectives of the natural history project.

Lake Diversion (Job E-2)

An estimated minimum of 185 tons of fish, mostly shad and drum, was removed from Lake Diversion by an experimental selective-kill treatment in March 1957. Inventory was made by nets and seines from ten months before to 26 months after the treatment in order

compile comparative data which may indicate possible effects of the treatment. The most significant changes in the fish population immediately following the treatment were: (1) increase in condition factors for all species; (2) reduction of the shad population; (3) increase in the relative abundance of carpsucker and buffalo, and (4) increase in average weight of all species except shortnose gar and carp.

Two years after treatment, condition factors of rough fish species either increased or remained the same as they were during the preceding year; whereas, game fish species and shad showed a decrease in "K". Although some species have a lower condition factor during this segment, as compared to factors for the previous segment, all species are equal to or higher than during the period preceding the selective-kill treatment.

Although having been reduced from 36.6 percent to 6.8 percent by the treatment, shad have replenished themselves to 22.5 percent of the nettable fish population within two years. Game fish species increased from 14.9 percent during the 1956-1957 segment to 20.2 percent during the 1957-1958 segment, but dropped to 19.6 percent during the 1958-1959 segment. White bass, black bass and channel catfish have made substantial gains, but crappie decreased.

Apparently, the rotenone treatment killed the mayfly nymphs in March 1957, removing them from the diet of fishes during 1957-1958. They began to re-appear in stomachs of game fishes, as well as the buffalofishes, in August 1958.

More than two years have passed since the selective-kill treatment at Lake Diversion. Progeny of surviving individuals of all species are now over two years old and will be represented in gill net samples in increasing numbers during the remainder of the study. Collections should continue until sufficient data is obtained to determine overall effects of the reduction of shad and drum, selectively, with rotenone.

Experimental Control of Undesirable Species

There is still 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 toxic to fish. Some of these new chemicals may also be very useful in total eradication, and perhaps, selective 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.

Work covered by this job has developed to the extent that it could very easily constitute full-time employment of a trained chemist, biologist and a crew. It is both time-consuming and important, and should not be attempted on a part-time basis. Serious consideration should be given to the possibility of transferring this work to a better equipped laboratory and to setting it up as a full-time job.

There is an increasing need for suitable equipment for treating large bodies of water so that knowledge gained by research may be utilized to the greatest extent. This equipment should be designed so as to decrease cost in time and manpower of applying fish toxicants, to permit distribution of chemicals in all forms with minimal contact with bodies of workmen, to attain uniform distributions, and to eliminate waste. An experimental treating barge was developed during this segment period which is capable of mixing and discharging up to 2,000 pounds of rotenone powder, or its equivalent, per hour. It is completely portable and can be unloaded and assembled within one hour by a trained crew. Field tests with this unit have definitely resulted in tremendous savings in both

time and labor, and, to a lesser extent, chemicals. A crew of only three men is required for its complete operation. Although this machine probably represents the most efficient method powdered chemical application in operation at this time, work should continue to modify, improve, and re-design this machinery until the ultimate in treating devices is obtained.

In order to receive full benefits from the treating unit now in use, provisions must be made to increase horizontal dispersal and retard vertical descent of the chemical. After being discharged behind the barge, the concentrated powder and water mixture now settles towards the bottom quite rapidly before it can be properly dispersed by wind and wave action, thereby permitting many of the fish in the upper stratum of water to avoid contact with the chemical. Therefore, we are in great need of a "dispersant" that can be injected into the mixing water prior to the introduction of powder which will cause the rotenone and water mixture to spread horizontally as far as possible, then settle slowly towards the bottom. Since most of the fish that we wish to kill, especially shad, may be in the upper 6 to 8 feet of water, optimum results cannot be achieved with this type of machinery on large-scale treatments until such a dispersant is available. Provisions have been made for the installation of an injector on the water system, and a search is being made for experimental dispersants. Of course, if a suitable dispersant can be found in powder form and homogenized with the rotenone powder before being sacked at the factory, lake treatments may be greatly simplified.

One of the most outstanding and immediate effects of selective-kill treatments in the past has been the increase in crappie feeding, and to a lessor extent, bass and channel catfish. This was not clearly understandable because most of the shad and drum being killed were far too large to be utilized as food, especially by crappie. Perhaps the discovery that selective-kill treatments also kill mayfly nymphs and other insect larvae will help to explain the sudden increase in crappie feeding on fishermen's minnows following treatments. Overall effects of eradicating insect larvae and other benthic organisms should receive further investigation. Perhaps a change in technique or time of treatment will prevent this loss of important fish food.

Experimental Introduction of Fish Species

Due to the great expense and many difficulties involved, no additional stockings of redfish and speckled trout were made during this study period. Reliable information concerning survival and growth rate of the introduced marine species is still undetermined. 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.

No additional stockings of white bass into Buffalo Lake were attempted during this segment. A fishery survey following extensive freeze-kills in January and February 1959, revealed that only carp, goldfish, carpsucker, black bullhead catfish, and a relatively small number of channel catfish survived. Depletion of game fish populations justified total eradication of the remaining population and restocking. Restocking with white bass will not be attempted unless shad reinfest the lake in sufficient numbers to constitute a problem.

Pollution

Industrial pollution of the Canadian River near Borger continues to be an outstanding problem. It is most encouraging, however, that results of surveys conducted by F-7-R personnel in the past have aroused the attention and interest of the State Department of Public Health who has initiated a study of the problem. Studies will be continued in cooperation with the State Health Department to determine existing conditions, as well as the extent and results of the industrial concern's efforts to abate their contributing pollution of the Canadian River.

Rita Blanca Lake

Resurveys of Rita Blanca Lake, near Dalhart, continued to show that the most outstanding problem affecting the fishery is the over-abundance of golden shiner and black bullhead catfish. An experimental management project has been initiated in an effort to control these species.

Buffalo Lake

Results of re-surveys of Buffalo Lake following extensive freeze-kills in January and February 1959, revealed that only carp, goldfish, carpsucker, black bullhead catfish and a relatively small number of channel catfish survived. Depletion of game fish populations justified total eradication of the remaining population and restocking. A total kill treatment with toxaphene was given the lake in April 1959.

Lake Kemp

Resurveys of Lake Kemp revealed that rough fish still greatly outnumber game fish. Rough fish species increased from 76 percent to 91 percent of the total fish taken in nets and game fish species decreased from 24 percent to 9 percent of the total. One smallmouth buffalo was taken, which is the first of this species to be recorded from Lake Kemp. Gill netting and seining failed to produce experimentally introduced redfish and speckled trout of any size.

Buffalo Springs Lakes

Surveys and preparations were continued during this segment for the total-kill treatment of Buffalo Springs Lakes, near Lubbock. Unfortunately, floods and other unavoidable factors have caused postponement of treatment several times since it was planned. Finally, the estimated treatment date was set for July 7, 1959, and the job was approved as submitted in the Job Description F-14-D-3, Job 16a-19. However, another series of floods occurred during June, and this work was again postponed until early fall of 1959.

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