

JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-7-R-9

Fisheries Investigations and Surveys
of the Waters of Region 1-B

Job No. E-3 Experimental Management
of the Rita Blanca Lake Fishery

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February 20, 1962

ABSTRACT

Two important changes have occurred in the fishery of Rita Blanca Lake. The golden shiner population was reduced at least 90 per cent due to predation by game fish stocked for that purpose, and parasitism by an anchorworm, Lernea sp.

There has been an apparent decrease in larger bullheads. This is attributed to predation by flathead catfish which were stocked for that purpose in 1959. During a check in September 1961, the bullheads averaged only 0.15 pounds each and very few exceeded 100 grams, whereas in 1960 the bullheads averaged 0.61 pounds each and many individuals exceeded 400 grams.

Condition factors for all species were very good, but were generally slightly lower than last year. Good reproduction of white crappie, black bullheads, and channel catfish was noted, and there is some evidence that perhaps white bass successfully spawned. There was no indication that black bass had spawned which is an old problem at Rita Blanca, but one which will be carefully studied in the future.

Retaining ponds were constructed to collect and hold runoff water from a watershed feed lot. This lot has been the source of insecticides and very rich organic material which have caused minor fish kills in the past.

JOB COMPLETION REPORT

State of Texas

Project No. F-7-R-9

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

Job No. E-3

Title: Experimental Management of the Rita
Blanca Lake Fishery

Period Covered January 1, 1961 - December 31, 1961

Objectives:

To initiate and conduct experimental management practices at Rita Blanca Lake to restore balance through the control of excessive populations of golden shiners (Notemigonus crysoleucas) and black bullhead catfish (Ictalurus melas).

Techniques Used:

Predation on golden shiners and black bullhead catfish as well as threatening populations of goldfish (Carassius auratus) and carp-goldfish hybrids (Cyprinus-Carassius) was increased by stocking adult flathead catfish (Pylodictis olivaris), yearling black bass (Micropterus salmoides), and white crappie (Pomoxis annularis).

Extensive seining was conducted to reduce populations of all problematical species.

Attempts were made to remove black bullheads, golden shiners, and other problematical species through use of special hoop nets and small mesh gill nets.

Artificial spawning devices were installed to enhance reproduction of flathead and channel catfish (Ictalurus punctatus), and suitable areas for installing spawning aids for other game species were located.

Periodic surveys and checks were made to obtain data from which changes in the fish population or other aspects resulting from the experimental procedures could be noted.

Findings:

The original basic survey and inventory of species, as well as the surveys that followed, have consistently indicated that a very small population of black bass existed in Rita Blanca Lake. Large stockings of bass of all sizes were made; yet the lake did not show a noticeable increase in bass, nor was any reproduction of bass noted.

These surveys also showed that golden shiners and black bullhead catfish were the dominant species and when combined, their numbers comprised as much as 84 per cent of some gill net collections. Since bullheads and shiners existed in such great abundance, and shiners were reputedly predaceous on the young of black bass and other bottom-nesting species, the control of these two species, along with lesser populations of carp and goldfish, became the major objectives of the experimental management program.

An undisclosed number of adult black bass were transferred to Rita Blanca Lake in April 1959 from a state-owned lake located near Canadian, Texas. In July 1959, 10,000 black bass, from 4 to 7 inches in length, were stocked from a U. S. Fish and Wildlife Hatchery at Tishomingo, Oklahoma. All of these bass were too large to be eaten by shiners, and were stocked in an effort to increase the predation on shiners.

In July 1960, approximately 6,850 white crappie were transferred from Lake McClellan, where an excessive population existed, to Rita Blanca Lake. In April 1961, 5,000 white crappie were stocked from the same source. Included in these stockings were a few hundred sunfish, and numerous small white bass. These fish were also stocked to increase predation on the shiner population.

To increase predation on black bullheads, 288 adult flathead catfish were obtained from Lake Stamford and transferred to Rita Blanca in November 1959. In October 1961, seven flathead catfish, which were left over from a trade for striped bass with the California Fish and Game Department, were moved to Rita Blanca. Of the original 288 flatheads stocked, about 40 eventually died from injuries received in netting or handling, and about 20 were taken by fishermen, leaving an estimated 230 flatheads still remaining in the lake.

Extensive seining was carried out in an attempt to reduce the population of all undesirable species. Many drags were made by Game and Fish Commission personnel using a 200-foot one-half-inch mesh seine, and although thousands of shiners were removed, this method was too restricted and slow to be an effective control. However, bait dealers, seining under the supervision of a state game warden, removed in excess of 300 gallons of shiners. The total seining effort resulted in the removal of over 50,000 golden shiners.

Special hoop nets and small mesh gill nets were tested for effectiveness in removing undesirable species. While they were fairly effective, they caused injuries to many channel catfish and white crappie, so their use was discontinued.

Spawning facilities, consisting of concrete culverts 12 inches in diameter and 36 inches in length, were installed to enhance reproduction of catfishes. The culverts were installed primarily to be used by the flathead catfish; however, their use by channel catfish was also expected.

The use of sub-surface water for stabilizing water levels and decreasing turbidity has been employed. Two electric pumps deliver water from two 6-inch wells located on the northeast end of the lake. This sub-surface water has increased the amount of total dissolved salts in the lake by about 250 ppm, resulting in clearer water and an improved habitat for game fish.

Netting in September 1961 produced a total of 395 fish. (See Table 1.)

Table 1. Netting results, Rita Blanca Lake, September 12, 1961

<u>Species</u>	<u>Number</u>	<u>Per Cent by Number</u>	<u>Total Weight</u>	<u>Average Weight</u>	<u>Per Cent by Weight</u>
Goldfish	3	0.75	4.76	1.59	2.04
Goldfish-Carp Hybrid	5	1.27	14.98	3.00	6.45
Channel Catfish	52	13.16	76.24	1.47	32.81
Bullhead Catfish	258	65.32	37.80	0.15	16.27
Flathead Catfish	4	1.02	60.50	15.13	26.03
White Bass	2	0.50	2.70	1.35	1.16
White Crappie	70	17.73	34.73	0.50	14.95
Black Crappie	1	0.25	0.67	0.67	0.29
Totals	395	100.00	232.38		100.00

Conspicuously absent from the above number were golden shiners, which had always constituted a sizeable percentage of the gill net catch during previous surveys.

The 20-foot seine results, given in Table 2, also reflect the reduction of this species.

Table 2. Seining results using a 20-foot one-eighth-inch mesh minnow seine, Rita Blanca Lake, September 12, 1961

<u>Species</u>	<u>Scientific Name</u>	<u>Number Collected</u>
Golden Shiner	Notemigonus crysoleucas	16
Red Shiner	Notropis lutrensis	199
Fathead Minnow	Pimephales promelas	712
Black Bullhead	Ictalurus melas	5
Plains Killifish	Fundulus kansae	105
Mosquitofish	Gambusia affinis	1
Bluegill Sunfish	Lepomis macrochirus	12
White Crappie	Pomoxis annularis	3
Total		1,053

Of the 1,053 fish shown above, only 16 were shiners. This very obvious reduction in the shiner population was found to have been caused, in part, by widespread parasitism by an anchorworm, Lernea sp. This parasitic copepod was found on about 90 per cent of the remaining shiner population. Since larger shiners are taken by gill nets and as none were taken in this manner, it would appear that the population of larger shiners was the first to be reduced. While this great reduction in golden shiners is vastly beneficial to the lake fishery, it was untimely in that it prevents a good evaluation of the amount of predation by those fish which were stocked for that purpose. During the September survey, predation on shiners was noted to have increased above that of previous checks. Table 3, which gives a food-items summary, shows that of 26 channel catfish having food in their stomachs, the frequency of occurrence of golden shiners was 10, and fish remains was 14. Golden shiners probably constituted a great part of the latter item also. Table 3 further shows that white crappie and white bass also had fed heavily on the shiners, which is in contrast to previous data which

showed very little predation on shiners. This increase in the frequency in which shiners were found in the stomach of game species might be attributed partially to the fact that many of the parasitized shiners were very weak and sluggish, making them easy prey to other species.

Table 3. Frequency of occurrence of food items of fish collected by gill nets from Rita Blanca Lake, September 12, 1961

Species	Golden Shiner	Fish Remains	Algae	Wheat Grains	Oat Grains	Longtail Maggots	Pupae Cases	Grasshoppers	Insect Larvae	Crustaceans
Channel Catfish	10	14	1	1	2	2	3	2	1	
Black Bullhead		1	4						2	
White Bass	2									
White Crappie	5	23							1	16
Black Crappie	—	—	—	—	—	—	—	—	1	—
Totals	17	38	5	1	2	2	3	2	5	16

Although black bullheads are still abundant, there is some evidence that the flathead catfish have been feeding on them. There was an apparent scarcity of adult bullheads in the last collection. For example, of the 25 bullheads processed, there was only 1 large individual weighing close to 1 pound, and only 2 others that exceeded 100 grams in weight. The average weight of the 258 bullheads taken was only 0.15 pounds each, as compared to an average of 0.61 pounds each for the 37 bullheads processed last year. It is therefore very possible that the major part of the adult bullhead population has been disposed of by the flatheads.

Four flatheads taken on this check weighed a total of 60.50 pounds, averaged 15.13 pounds each, and were exceedingly fat. Although it was evident they had been feeding well, none of the four were sacrificed just for the purpose of examining their stomach contents. It will be very interesting to determine the source of food of the flathead catfish, but this will not be done until they reproduce or have had another year or two in which to spawn. It is considered more important at present to maintain a population of flatheads in the lake and carefully note any change in the population of bullheads that might be attributed to the flatheads, than it is to sacrifice fish which were difficult to obtain and expensive to transfer.

The first recovery of stocked white bass was made during this survey, when two very nice individuals, weighing slightly over 1 pound and 1½ pounds, were

netted. A surprising fact was that both were spent females, indicating a possible successful spawn of this species this year. No young-of-the-year white bass were taken by seining, however. In addition to the two white bass netted, two more adult white bass were taken during seining and were released back into the lake.

As in previous surveys, channel catfish and white crappie were the only game species abundant in the netting collection. Channel catfish comprised 13.16 per cent of the catch, averaged 1.47 pounds each, and accounted for 32.81 per cent of the total weight. White crappie comprised 17.73 per cent of the catch, averaged 0.50 pounds each, and accounted for 14.95 per cent of the total weight. Black crappie, which have been taken quite frequently in the past, have now declined in abundance and there was no evidence of reproduction of this species this year. Seining with the long seine showed very good reproduction of white crappie however, and sufficient reproduction of channel catfish.

Seining for the removal of undesirable species was performed on three successive days, September 11-13. The results of this seining are shown in Table 4. All game fish were returned to the lake and other species were removed. The most effective seining was on the second day when large numbers of black bullheads were taken, practically all of which were fingerlings. Due to the great number taken, they were not counted, but were conservatively estimated at 10 to the pound, and about 2,198 pounds were removed. Water conditions were such that the bullheads were concentrated in muddy shallows where each drag averaged over 100 pounds of fingerling bullheads, and one drag produced over 400 pounds.

Table 4. Seining results using a 200-foot one-half-inch mesh seine, Rita Blanca Lake, September 11-13, 1961

<u>Species</u>	<u>Sept. 11</u>	<u>Sept. 12</u>	<u>Sept. 13</u>	<u>Total</u>
Golden Shiner	1,158	570	95	1,823
Goldfish	67	100	17	184
Goldfish-Carp Hybrid	11	20	5	36
Channel Catfish	6	191	13	210
Black Bullhead	1,392	21,980*	184	23,556
White Bass	2	0	0	2
Black Bass	3	0	0	3
Sunfish	13	50	4	67
White Crappie	119	280	94	493
Logperch	0	0	1	1
Totals	2,771	23,191	413	26,375

*Due to the very large numbers of bullheads taken on this date, this number was estimated.

Condition factors remained high, although there was a general decrease as compared to the 1960 results. Bullhead catfish showed the greatest decrease, which could be an indication of overabundance of this species or a reflection of the small size of the individuals taken. It is hoped that the latter is the cause. Condition factor ranges and averages for each species are given in Table 5.

Discussion:

Outstanding changes in the Rita Blanca fishery which have occurred since last year include a marked decrease in the shiner population, and an apparent decrease in the population of larger black bullhead catfish. The shiner decrease can be attributed to two causes; increased predation by fish stocked for that purpose, and parasitism by an anchorworm of the genus Lernea. It could not be determined which of the two causes was the greatest factor, but both effected a decrease of 90 per cent or more in the shiner population. The fact that no large shiners were taken in gill nets indicates an almost total elimination of this group. Future checks will more accurately establish the status of the shiner in Rita Blanca.

The decrease in larger bullheads is attributed to predation by flathead catfish; however, none of the flatheads taken in the gill nets were sacrificed to verify this assertion.

Since several flatheads have been taken by fishermen, and approximately 40 eventually died due to injuries, plans have been made to restore the population of flatheads to 1 per acre, and closely observe further changes in the bullhead population which may occur as a result of predation. If the shiner population has been effectively reduced, then an increase in predation on small bullheads by species other than flathead catfish can be expected. One crappie taken in 1960 was noted to have eaten a bullhead measuring 144 mm.

In the absence of an abundance of shiners, it may be possible to obtain spawns of black bass. This has not occurred in the past, but the possibility will be fully pursued in the forthcoming segment. Bass spawning facilities consisting of gravel beds will be installed, and possibly an area will be screened off to protect the bass fry which may be spawned inside the screened area or obtained from a state fish hatchery. If this is done, it can be established whether or not failure of bass to increase has been due to predation on the fry. Since there are no apparent reasons why bass have not successfully spawned (except for possible predation by other species) considerable effort to propagate bass in Rita Blanca, and to determine why they have not previously been successful, seems well justified.

The problems caused by organic materials washed into the lake from a nearby feedlot should be curtailed by retaining ponds which have been constructed between the feedlot and the lake. The ponds will hold the runoff until the organic material and insecticides have had an opportunity to oxidize. This should prevent the periodic fish kills which have occurred in the bay receiving the runoff from the feed lot.

The use of purified sewage effluent to stabilize the lake level would cut the cost of pumping sub-surface water which is used for the same purpose. This has been suggested in the past, but no action has been taken. The present sewage treatment plant is grossly inadequate, and a new system will be necessary in the near future. Sewage water, given proper treatment by the new plant and circulated through a series of oxidation ponds, would probably be of better quality than is now found in the lake. However, uncomprehending persons object to the idea of putting treated sewage into the lake, even if it is biologically pure enough to meet State Health Department recommendations.

Recommendations:

Periodic surveys and management practices should be continued at Rita Blanca Lake in an effort to further improve the game fish population, to control undesirable species, and to evaluate the work that has been done.

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Date February 20, 1962

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