

JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-7-R-10

FISHERIES INVESTIGATIONS AND SURVEYS OF THE WATERS OF REGION I-A

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

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ABSTRACT

Changes in the composition of the fish population during this segment were slight. The only important change was that the relative abundance of channel catfish decreased about six per cent, while the relative abundance of black bullheads increased about six per cent.

An additional 97 flathead catfish were obtained from the Colorado City Lake, tagged and released in Rita Blanca Lake during this segment. Subsequent recoveries of these fish were made in May, July, October, and December. The tagged flatheads were found to have lost weight during the two-month-period following their release, but recoveries in the following months revealed fairly good weight increases for most fish.

A total of 40 catfish spawning devices, made from concrete-weighted five-gallon pails was placed in Rita Blanca Lake to promote better reproduction of channel catfish.

Brush piles were installed at four localities to provide added protection to the white crappie population, which appears to be increasing steadily.

For the second consecutive year, golden shiners were absent from the gill net collections and were much less abundant in seine samples than they were in previous years. Predation and continued parasitism by an anchor worm, Lernaea sp., has kept the golden shiner population greatly reduced since 1960.

JOB COMPLETION REPORT

State of Texas

Project No. F-7-R-10

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

Job No. E-3

Title: Experimental Management of the Rita Blanca Lake Fishery

Period Covered January 1, 1962 - December 31, 1962

Objectives:

To initiate and conduct experimental management practices at Rita Blanca Lake, to restore balance in the fish population through the control of excessive populations of golden shiners, black bullhead catfish, and goldfish.

Techniques Used:

Periodic netting and seining collections were made to determine changes in the composition of the fish population and to evaluate the results of experimental management practices previously employed. Additional flathead catfish were stocked to replace those that had died or were taken by fishermen. These additional flatheads, which were stocked in March, were measured, weighed and tagged before being released, in order to provide a means for determining growth rates of this species. Brush piles were installed to provide cover for white crappie. Channel catfish spawning devices were constructed and installed at various locations. Attempts were made to reduce the golden shiner, goldfish, and black bullhead catfish populations by seining.

Findings:

Fish Collections

Four gill net collections were made during this segment to determine composition changes in the fish population. Basically there has been little change as compared with the data collected during the previous segment, except that channel catfish showed a 6.53 per cent decrease, while black bullheads showed a corresponding 6.81 per cent increase in numbers. For the second consecutive year, golden shiners were absent from the gill net collections.

The percentage of game fish in the four net collections made during this segment varied from 8.18 per cent to 68.75 per cent and averaged 26.44 per cent. In percentage by weight, however, game fish accounted for 64.31 per cent. Channel catfish and flathead catfish each accounted for roughly one-fourth of the total weight of fish taken. Bullheads continue to be abundant in numbers but very small in size, averaging 0.17 pounds this year, which is a slight increase over last year's average of 0.15 pounds. Tables 1, 2, 3 and 4 give the percentage composition by number, weight, and the average weight of fish taken by gill nets in February, July, October and December of this year. Table 5 is a composite of Tables 1 to 4.

Table 1. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Rita Blanca Lake, February 12, 1962.

| Species | Number | Per Cent | | Average Weight |
|------------------|--------|-----------|--------------|----------------|
| | | by Number | Total Weight | |
| River Carpsucker | 1 | .16 | 3.42 | 3.42 |
| Channel Catfish | 70 | 11.02 | 99.59 | 1.42 |
| Black Bullhead | 438 | 68.98 | 76.82 | 0.18 |
| Flathead Catfish | 8 | 1.26 | 113.53 | 14.19 |
| Largemouth Bass | 1 | .16 | 4.08 | 4.08 |
| White Crappie | 117 | 18.42 | 32.93 | 0.28 |
| Totals | 635 | 100.00 | 330.37 | 100.00 |
| Game Fish | 196 | 30.86 | | |
| Rough Fish | 439 | 69.14 | | |

Table 2. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Rita Blanca Lake, July 27, 1962.

| Species | Number | Per Cent | | Average Weight |
|------------------|--------|-----------|--------------|----------------|
| | | by Number | Total Weight | |
| Carp | 1 | .69 | 3.85 | 3.85 |
| Carp X Goldfish | 5 | 3.48 | 16.75 | 3.35 |
| Goldfish | 5 | 3.47 | 6.89 | 1.37 |
| Channel Catfish | 18 | 12.50 | 31.23 | 1.73 |
| Black Bullhead | 34 | 23.61 | 7.59 | 0.22 |
| Flathead Catfish | 1 | 0.69 | 7.27 | 7.27 |
| White Bass | 3 | 2.08 | 3.75 | 1.25 |
| White Crappie | 76 | 52.78 | 14.79 | 0.19 |
| Bluegill Sunfish | 1 | 0.70 | 0.08 | 0.08 |
| Totals | 144 | 100.00 | 92.20 | 100.00 |
| Game Fish | 99 | 68.75 | | |
| Rough Fish | 45 | 31.25 | | |

Table 3. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Rita Blanca Lake, October 17, 1962.

| Species | Number | Per Cent | | Average Weight |
|-----------------|--------|-----------|--------------|----------------|
| | | by Number | Total Weight | |
| Goldfish | 7 | 2.84 | 6.41 | 0.91 |
| Channel Catfish | 7 | 2.85 | 11.59 | 1.65 |
| Black Bullhead | 182 | 73.99 | 28.90 | 0.15 |
| White Bass | 1 | 0.40 | 2.10 | 2.10 |
| White Crappie | 49 | 19.92 | 12.59 | 0.25 |
| Totals | 246 | 100.00 | 61.59 | 100.00 |
| Game Fish | 57 | 23.17 | | |
| Rough Fish | 189 | 76.83 | | |

Table 4. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Rita Blanca Lake, December 20, 1962.

| Species | Number | Per Cent by Number | Total Weight | Per Cent by Weight | Average Weight |
|------------------|--------|--------------------------|-----------------|--------------------------|-------------------|
| Goldfish | 2 | 0.45 | 1.70 | 1.76 | 0.85 |
| Channel Catfish | 2 | 0.45 | 6.19 | 6.44 | 3.09 |
| Black Bullheads | 402 | 91.37 | 61.12 | 63.54 | 0.15 |
| Flathead Catfish | 2 | 0.45 | 12.44 | 12.93 | 6.22 |
| White Bass | 2 | 0.46 | 2.61 | 2.71 | 1.30 |
| Largemouth Bass | 1 | 0.22 | 4.00 | 4.16 | 4.00 |
| White Crappie | 29 | 6.60 | 8.13 | 8.46 | 0.28 |
| Totals | 440 | 100.00 | 96.19 | 100.00 | |
| Game Fish | 36 | 8.18 | | 34.70 | |
| Rough Fish | 404 | 91.82 | | 65.30 | |

Table 5. Percentage Composition by Number and Weight and Average Weight of Fish Taken From Rita Blanca Lake by Gill Nets in February, July, October and December 1962.

| Species | Number | Per Cent by Number | Total Weight | Per Cent by Weight | Average Weight |
|------------------|--------|--------------------------|-----------------|--------------------------|-------------------|
| River Carpsucker | 1 | 0.06 | 3.42 | 0.59 | 3.42 |
| Carp | 1 | 0.07 | 3.85 | 0.68 | 3.85 |
| Goldfish | 14 | 0.96 | 15.00 | 3.63 | 1.07 |
| Carp X Goldfish | 5 | 0.34 | 6.89 | 1.21 | 1.38 |
| Channel Catfish | 97 | 6.63 | 148.60 | 26.05 | 1.53 |
| Black Bullhead | 1,056 | 72.13 | 174.43 | 30.58 | 0.17 |
| Flathead Catfish | 11 | 0.75 | 133.24 | 23.36 | 12.11 |
| White Bass | 6 | 0.41 | 8.46 | 1.48 | 1.41 |
| Largemouth Bass | 2 | 0.13 | 8.08 | 1.42 | 4.04 |
| White Crappie | 271 | 18.52 | 68.44 | 12.00 | 0.25 |
| Totals | 1,464 | 100.00 | 570.41 | 100.00 | 0.39 |
| Game Fish | 387 | 26.44 | 366.82 | 64.31 | 0.95 |
| Rough Fish | 1,077 | 73.56 | 203.59 | 35.69 | 0.19 |

Seining results indicate that there was a good spawn of white crappie this year. Out of 10,719 fish taken with 200 and 300 foot seines, 5,247 were white crappie. Bullheads taken in seines totaled only 3,038 which is quite a contrast to last year's seining results. Goldfish and golden shiners each comprised about 10 per cent of the seine catch, while all other species were of minor importance. Table 6 gives the seining results on six dates during this segment. There was no evidence of reproduction by either white bass or flathead catfish, and it appears that there was very limited reproduction of channel catfish and largemouth bass. It should be noted that golden shiners were relatively scarce in the seine samples as compared to their abundance in previous years. Prior to 1961,

Table 6. Percentage Composition of Fish Taken by a Two-Hundred and a Three-Hundred-Foot Seine From Rita Blanca Lake, 1962.

| Date | Feb. 11 | | Feb. 12 | | August 23 | | Dec. 20 | | Dec. 21 | | Dec. 22 | | Total | |
|------------------|---------|----------|---------|----------|-----------|----------|---------|----------|---------|----------|---------|----------|--------|----------|
| Species | Number | Per Cent | Number | Per Cent | Number | Per Cent | Number | Per Cent | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Carp | 0 | | 0 | | 15 | 0.51 | 0 | | 1 | 0.03 | 0 | | 16 | 0.14 |
| Goldfish | 199 | 34.26 | 516 | 52.49 | 92 | 3.12 | 256 | 9.64 | 29 | 0.93 | 2 | 0.48 | 1,094 | 10.21 |
| Carp X Goldfish | 0 | | 0 | | 0 | | 0 | | 50 | 1.60 | 0 | | 50 | 0.47 |
| Golden Shiner | 301 | 51.81 | 205 | 20.86 | 378 | 12.81 | 4 | 0.15 | 79 | 2.52 | 0 | | 967 | 9.02 |
| Fathead Minnow | 0 | | 0 | | 7 | 0.24 | 0 | | 0 | | 0 | | 7 | 0.06 |
| Channel Catfish | 3 | 0.51 | 1 | 0.10 | 36 | 1.22 | 0 | | 0 | | 2 | 0.48 | 42 | 0.40 |
| Black Bullhead | 59 | 10.16 | 150 | 15.26 | 1,671 | 56.62 | 205 | 7.72 | 570 | 18.21 | 383 | 91.40 | 3,038 | 28.34 |
| White Bass | 0 | | 0 | | 3 | 0.10 | 0 | | 1 | 0.04 | 2 | 0.48 | 6 | 0.05 |
| Largemouth Bass | 17 | 2.92 | 31 | 3.16 | 96 | 3.25 | 12 | 0.46 | 12 | 0.38 | 1 | 0.24 | 169 | 1.58 |
| Bluegill Sunfish | 0 | | 11 | 1.12 | 0 | | 0 | | 52 | 1.66 | 0 | | 63 | 0.59 |
| Sunfish sp. | 2 | 0.34 | 0 | | 18 | 0.61 | 0 | | 0 | | 0 | | 20 | 0.18 |
| White Crappie | 0 | | 699 | 7.01 | 635 | 21.52 | 2,178 | 82.03 | 2,336 | 74.63 | 29 | 6.92 | 5,247 | 48.96 |
| Totals | 581 | 100.00 | 983 | 100.00 | 2,951 | 100.00 | 2,655 | 100.00 | 3,130 | 100.00 | 419 | 100.00 | 10,719 | 100.00 |

literally gallons of golden shiners could be taken in one drag with a 300-foot seine. Predation and parasitism have kept this species greatly reduced in 1961 and 1962.

Twenty-foot seine results, given in Tables 7 and 8, show that the fathead minnow and the plains killifish were the most abundant minnow species taken.

Table 7. Results of Seining With a Twenty-Foot Seine from Rita Blanca Lake, October 17, 1962.

| Species | Number | Per Cent |
|------------------|--------|----------|
| Goldfish | 1 | 0.40 |
| Red Shiner | 26 | 10.44 |
| River Shiner | 2 | 0.81 |
| Fathead Minnow | 138 | 55.42 |
| Plains Killifish | 81 | 32.53 |
| Largemouth Bass | 1 | 0.40 |
| Totals | 249 | 100.00 |

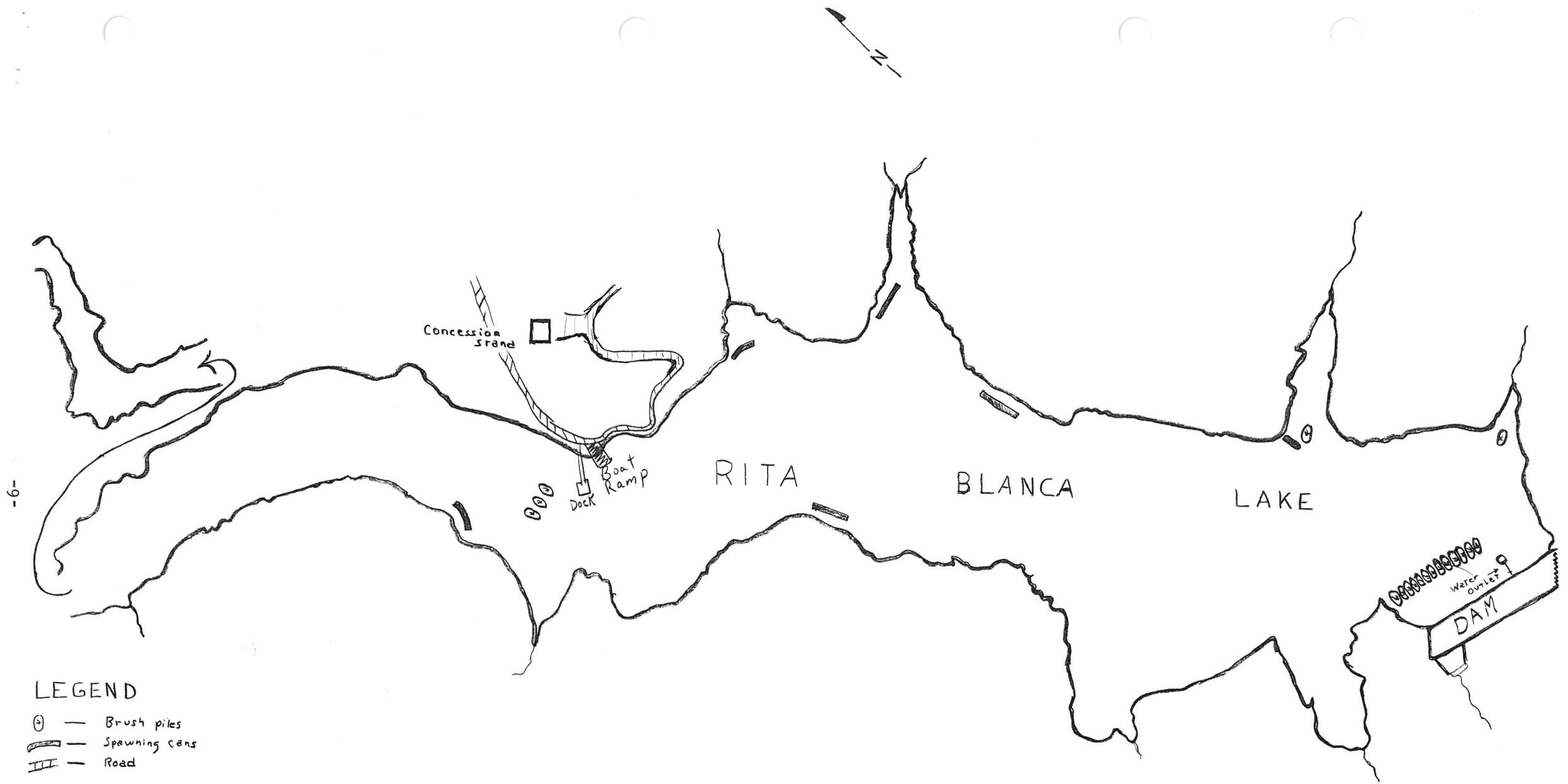
Table 8. Results of Seining With a Twenty-Foot Minnow Seine from Rita Blanca Lake, December 20, 1962.

| Species | Number | Per Cent |
|-----------------|--------|----------|
| Goldfish | 55 | 14.70 |
| Black Bullhead | 225 | 60.16 |
| Red Shiner | 1 | 0.27 |
| Fathead Minnow | 85 | 22.73 |
| Largemouth Bass | 8 | 2.14 |
| Totals | 374 | 100.00 |

Habitat Improvement

In September 1962, several brush piles were placed in Rita Blanca Lake to aid the crappie population. Brush (mostly green elm), tied in bundles two to three feet in diameter and ten to twelve feet in length, was weighted and sunk in areas having water depths of eight to eleven feet. A majority of these brush piles were located in the deeper water near the dam, and all of the brush piles were located along cables supported by floating barrels. It is hoped that these brush piles will lend protection to small crappie as well as provide fishermen with well-located places to fish for crappie. Figure I shows the locality of the brush piles.

A total of 40 channel catfish spawning devices was installed during this segment. These spawning containers, shown in Figures 2 and 3, were made of five-gallon pails weighted with concrete. The spawning devices were located at depths of two to four feet in areas having hard sand or rocky bottoms. They were installed too late to provide spawning places this year, but it is hoped they will promote much-needed natural reproduction of channel catfish in 1963.



LEGEND

- ⊙ — Brush piles
- ▬ — Spawning cans
- ≡ — Road

Figure 1 Map of Rita Blanca Lake showing Locations of Brush Piles and Approximate Locations of Catfish Spawning Cans.

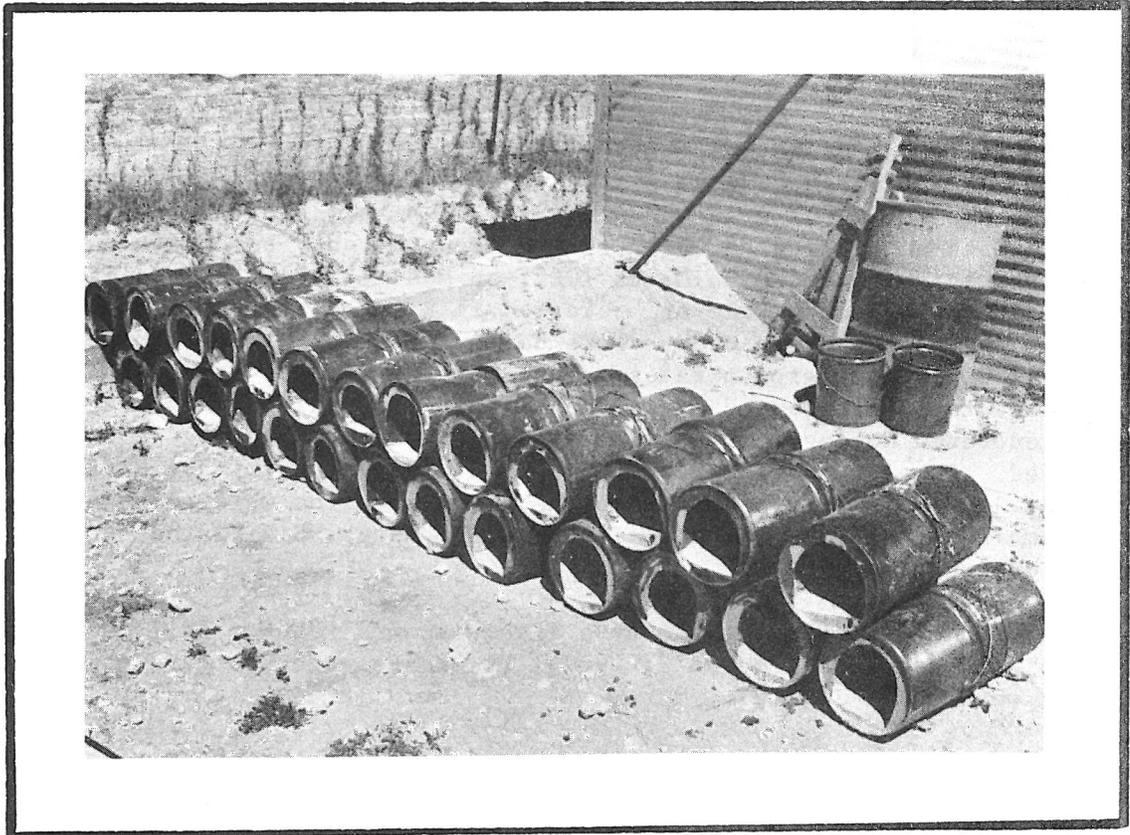


Figure 2. A pile of spawning cans ready to be placed in Rita Blanca Lake.

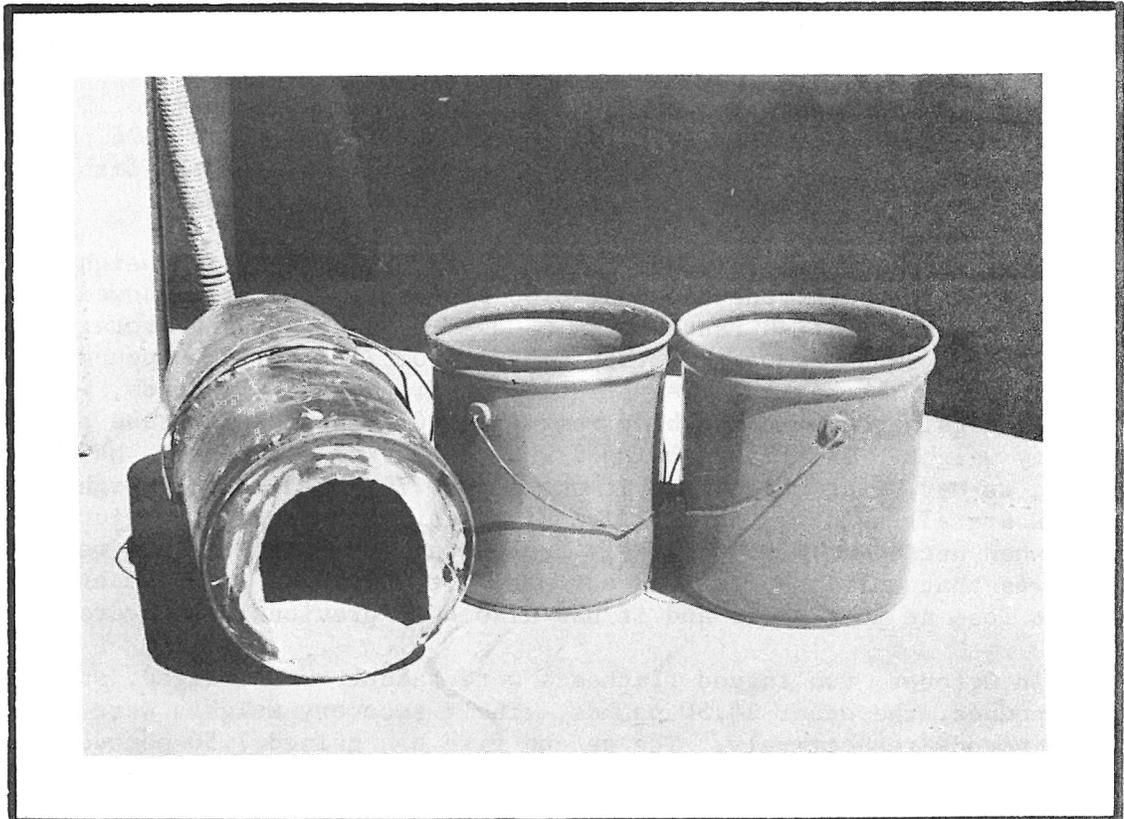


Figure 3. A spawning can made of two five-gallon cans with concrete added for weight.

Flathead Catfish Introductions

The original stocking of flathead catfish was in November 1959, when 285 fish were transferred to Rita Blanca from Lake Stamford. Reports of these fish having been found dead or taken by fishermen indicated that since 1959 the flathead population had been reduced considerably below the one per acre stocking ratio desired. In March 1962, an additional 97 flatheads were obtained from the Colorado City Lake and released in Rita Blanca. These fish were all tagged, weighed, and measured before being released in order that future recoveries would show growth rates and weight increases. Figures 4 and 5 show tagged flatheads recovered in December 1962. Several of these tagged flatheads were recovered during this segment and their weights and tag numbers were recorded. In all, 34 recoveries were made. One recovery, by a fisherman, was made on June 27, 1962, about 3½ months after the fish were released. All of the remaining recoveries were made with gill nets. Six flatheads were recovered twice during the year.

The tagged flathead taken by a fisherman was tag No. 5611 and weighed 8.50 pounds when stocked on March 9, 1962. It was reported to have weighed 11.25 pounds when taken June 27.

On May 9, two months after the tagged flatheads had been released, 18 recoveries were made with gill nets. When stocked, these 18 fish ranged from 5.00 to 17.50 pounds and averaged 11.15. All but four of these fish showed weight losses when recovered. Losses in weight ranged from 0.04 for the smallest fish in the group to 2.13 pounds for one of the largest fish. The average weight of the 18 flatheads was 10.69 pounds when recovered on May 9, therefore, the average weight loss per fish was 0.47 pounds for the two month period. In terms of weight loss per pound of body weight, the total weight of the 18 fish was 200.75 pounds when tagged, the total weight loss was 8.42 pounds, so the rate of loss was 0.04 pounds per one pound of body weight.

The four fish showing weight gains in May ranged from 9 to 12 pounds in weight when tagged. Their weight gains varied from 0.08 to 1.76 pounds. One of these four was recovered a second time, while three of the fish showing weight losses in May were recovered a second time later in the year.

Five tagged flatheads were recovered in July. One fish weighed the same as it did when released, one had lost 0.50 pounds, while three showed good weight gains. These five fish ranged from 4.00 to 9.50 pounds and averaged 8.05 pounds when tagged. When recovered, they ranged from 7.00 to 14.00 pounds and averaged 10.50 pounds. The average weight gain per fish was 2.45 pounds, while the rate of weight gain per pound of body weight was 0.30 pounds increase per one pound of body weight. The fish showing a weight loss of 0.50 pounds had been previously netted on May 9, at which time it showed a 0.79 pound loss, (weight gains or losses are all relative to the fishes' weight when tagged). Injuries to this fish when netted on May 9 probably caused this fish not to gain weight. A similar case was that only one flathead out of eight recovered in December showed a weight loss at that time, and it had also been previously recovered in May.

In October, two tagged flatheads were taken. When tagged, one fish weighed 7.50 pounds, the other 14.50 pounds. Their recovery weights were 9.00 and 22.00 pounds respectively. The second fish had gained 7.50 pounds in slightly over seven months, and had been previously recovered on May 9 at which time it weighed 14.19 pounds.

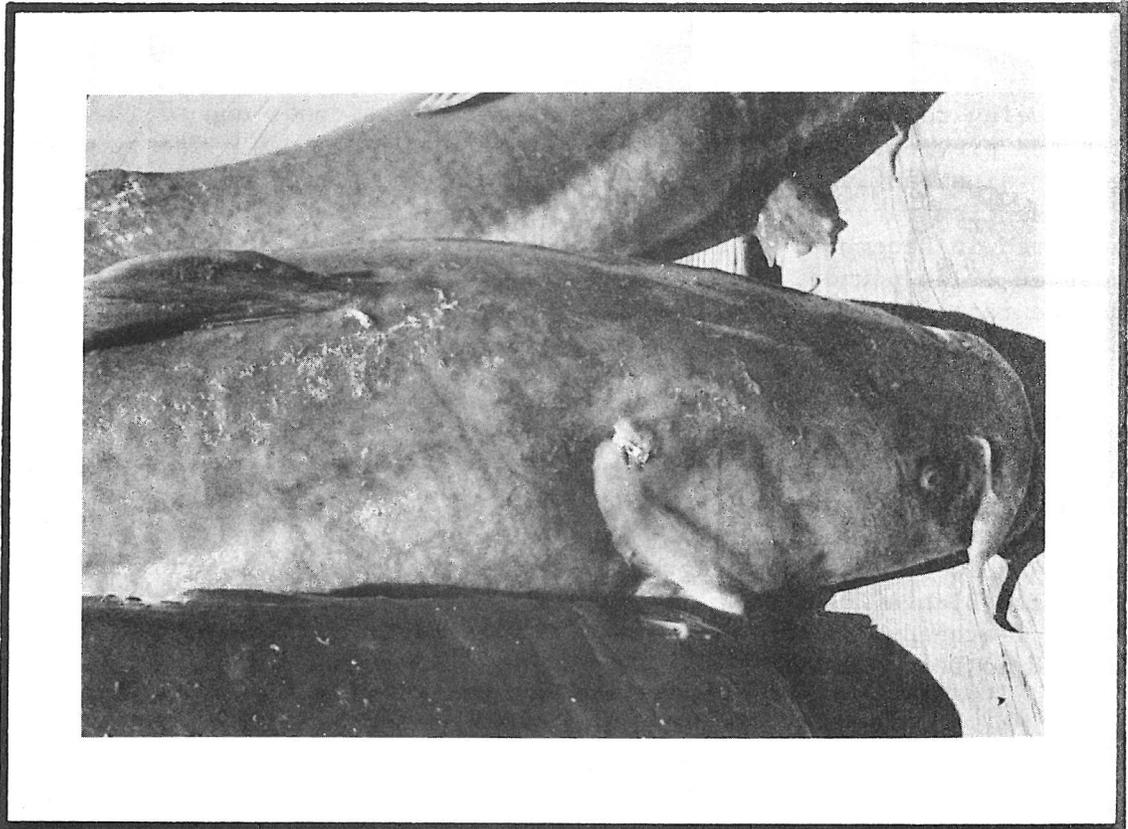


Figure 4. Closeup of tagged flathead catfish from Rita Blanca Lake. Note position of tag on Operculum.

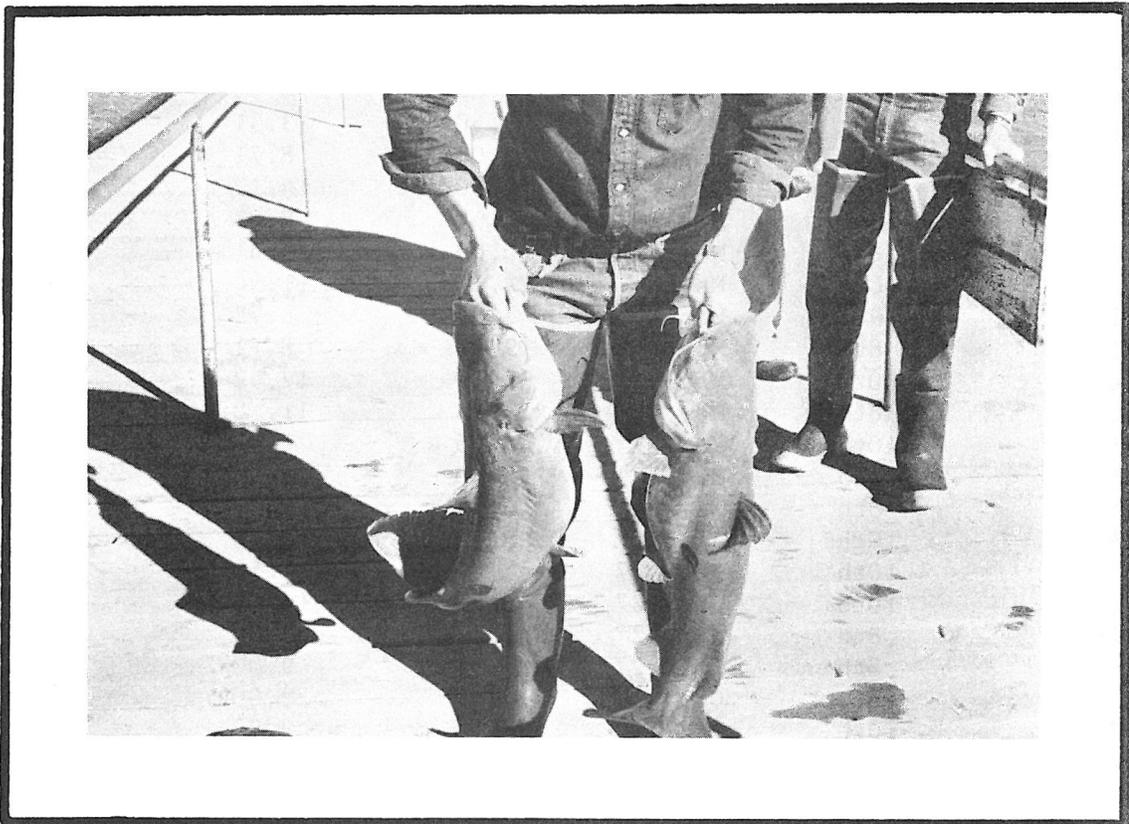


Figure 5. Field personnel displaying tagged flatheads taken from Rita Blanca Lake.

Weight changes of eight fish recovered in December, about nine months after being released, were very erratic. As mentioned, one of these eight fish had previously been netted and showed a weight loss. The seven others showed gains ranging from 0.11 pounds up to 7.00 pounds. The original weights of these fish ranged from 5.75 to 17.50 pounds and averaged 10.13 pounds. When recovered in December, these eight fish ranged from 6.50 to 20.00 pounds, and averaged 12.44 pounds. The average weight increase per fish was 2.31 pounds, and the rate of weight increase per pound of body weight was 0.23 pound increase per one pound of body weight.

It is interesting to note that one flathead (tag No. 5630) weighed 8.75 pounds when tagged on March 10. It weighed 14.00 pounds when taken on July 27, but only 12.25 pounds when recovered again on December 20. Although it gained weight very well between March and July, it had lost weight between July and December. Again, this loss may have been due to the fishes' being netted in July. Table 9 lists the length and weights of all the tagged flatheads recovered from Rita Blanca Lake. Table 10 lists the initial and recovery weights of the tagged flatheads, and their average rate of weight change for the period from March 8 to December 20, 1962.

Table 9. Weight Changes of Tagged Flathead Catfish Recovered From Rita Blanca Lake, May to December 1962.

| Tag No. TGFC-A- | Date Tagged in March | Date Recovered | Weight When Tagged | Recovery Weight | Weight Change |
|--------------------|-------------------------|-------------------|-----------------------|--------------------|------------------|
| 5631 | 10th | May 9 | 11.00 | 12.76 | 1.76+ |
| 5590 | 9th | May 9 | 12.00 | 12.76 | 0.76+ |
| 5645 | 10th | May 9 | 9.00 | 9.76 | 0.76+ |
| 5606 | 8th | May 9 | 10.75 | 10.83 | 0.08+ |
| 5618 | 9th | May 9 | 5.00 | 4.96 | 0.04- |
| 5641 | 10th | May 9 | 13.50 | 13.31 | 0.19- |
| 5687 | 10th | May 9 | 9.00 | 8.71 | 0.29- |
| 5577 | 8th | May 9 | 14.50 | 14.19 | 0.31- |
| 5574 | 8th | May 9 | 9.50 | 8.82 | 0.68- |
| 5575 | 8th | May 9 | 10.50 | 9.81 | 0.69- |
| 5573 | 8th | May 9 | 12.25 | 11.54 | 0.71- |
| 5589 | 9th | May 9 | 7.50 | 6.72 | 0.78- |
| 5583 | 8th | May 9 | 9.50 | 8.71 | 0.79- |
| 5633 | 10th | May 9 | 13.75 | 12.92 | 0.83- |
| 5560 | 8th | May 9 | 12.75 | 11.78 | 0.88- |
| 5639 | 10th | May 9 | 8.75 | 7.39 | 1.36- |
| 5564 | 8th | May 9 | 17.50 | 15.40 | 2.10- |
| 5598 | 8th | May 9 | 14.00 | 11.78 | 2.13- |
| 5630 | 10th | July 27 | 8.75 | 14.00 | 5.25+ |
| 5638 | 10th | July 27 | 4.00 | 8.50 | 4.50+ |
| 5631 | 10th | July 27 | 11.00 | 14.00 | 3.00+ |
| 5563 | 8th | July 27 | 7.00 | 7.00 | 0.00 |
| 5583 | 8th | July 27 | 9.50 | 9.00 | 0.50- |
| 5577 | 8th | Oct. 17 | 14.50 | 22.00 | 7.50+ |
| 5634 | 10th | Oct. 17 | 7.50 | 9.00 | 1.50+ |

Table 9 (continued)

| Tag No. TGFC-A- | Date Tagged in March | Date Recoverd | Weight When Tagged | Recovery Weight | Weight Change |
|--------------------|-------------------------|------------------|-----------------------|--------------------|------------------|
| 5582 | 9th | Dec. 20 | 12.50 | 19.50 | 7.00+ |
| 5597 | 9th | Dec. 20 | 12.00 | 16.50 | 4.50+ |
| 5630 | 10th | Dec. 20 | 8.75 | 12.25 | 3.50+ |
| 5564 | 8th | Dec. 20 | 17.50 | 20.00 | 2.50+ |
| 5624 | 10th | Dec. 20 | 5.75 | 6.50 | 0.75+ |
| 5603 | 9th | Dec. 20 | 8.75 | 9.09 | 0.34+ |
| 5659 | 9th | Dec. 20 | 7.05 | 7.16 | 0.11+ |
| 5639 | 10th | Dec. 20 | 8.75 | 8.49 | 0.26- |

Table 10. Weight Changes of Tagged Flathead Catfish Recovered From Rita Blanca Lake, May to December 1962.

| | May | July | October | December |
|---|-------|--------|---------|----------|
| Number of Fish Recovered | 18 | 5 | 2 | 8 |
| Average Weight When Tagged | 11.15 | 8.05 | 11.00 | 10.13 |
| Average Weight When Recovered | 10.19 | 10.50 | 15.50 | 12.44 |
| Total Weight Change of Group | -8.42 | +12.25 | +9.00 | +18.44 |
| Average Weight Change Per Fish | -0.47 | + 2.45 | +4.50 | + 2.31 |
| Average Weight Change Per One Pound of Body Weight | -0.04 | + 0.30 | +0.41 | + 0.23 |

Food Habits

Examination of game fish stomachs revealed that channel catfish fed mostly on insects, insect larvae, and vegetation. "Fish" occurred only once out of 30 stomachs containing food.

Crappie fed on crustaceans and insects mostly, while white bass fed mostly on fish. A golden shiner was identified in one white bass stomach. Bullheads were noted to have fed heavily on insect, algae, and crustaceans.

Since flathead catfish were returned alive to the lake, there was little opportunity to examine their food habits. However, one flathead that died as a result of being netted was opened. The stomach of this fish contained fish remains easily identified as black bullhead. In another instance, a flathead catfish caught in a gill net had regurgitated its food which became entangled in the net. The regurgitated food of this fish was also the remains of a black bullhead. Tables 11 to 14 give the frequency of occurrence of food items found in the stomachs of fish taken by gill nets from Rita Blanca Lake.

Table 11. Frequency of Occurrence of Food Items in Fish Taken from Rita Blanca Lake, February 12, 1962.

| Species | Number Examined | Number Containing Food | Food Items | Frequency Occurrence |
|-----------------|-----------------|------------------------|----------------|----------------------|
| Channel Catfish | 16 | 14 | Eggs | 1 |
| | | | Insect Larvae | 12 |
| | | | Mud | 1 |
| | | | Insect Remains | 3 |
| Black Bullhead | 11 | 11 | Insect Larvae | 8 |
| | | | Mud | 2 |
| | | | Fish Remains | 3 |
| White Crappie | 16 | 15 | Crustaceans | 1 |
| | | | Insect Remains | 1 |
| | | | Eggs | 9 |
| | | | Fish Remains | 3 |
| | | | Vegetation | 1 |
| | | | Golden Shiner | 2 |

Table 12. Frequency of Occurrence of Food Items in Game Fish Taken From Rita Blanca Lake, July 27, 1962.

| Species | Number Examined | Number Containing Food | Food Items | Frequency Occurrence |
|-----------------|-----------------|------------------------|----------------|----------------------|
| Channel Catfish | 16 | 10 | Mussels | 3 |
| | | | Fish Remains | 1 |
| | | | Vegetation | 1 |
| | | | Insect Larvae | 2 |
| | | | Algae | 2 |
| | | | Rodent Hair | 1 |
| | | | Shrimp | 1 |
| | | | Potamogeton | 2 |
| Black Bullhead | 20 | 10 | Insect Remains | 2 |
| | | | Algae | 7 |
| | | | Insect Larvae | 3 |
| | | | Crustaceans | 2 |
| | | | Black Bullhead | 1 |
| White Bass | 3 | 2 | Fish Remains | 1 |
| | | | Golden Shiner | 1 |
| White Crappie | 25 | 16 | Golden Shiner | 1 |
| | | | Insect Remains | 7 |
| | | | Vegetation | 1 |
| | | | Insect Eggs | 3 |
| | | | Algae | 2 |
| | | | Crustaceans | 6 |

Table 13. Frequency of Occurrence of Food Items Found in Fish Taken From Rita Blanca Lake, October 17, 1962.

| Species | Number Examined | Number Containing Food | Food Items | Frequency Occurrence |
|-----------------|-----------------|------------------------|----------------|----------------------|
| Channel Catfish | 7 | 5 | Potamogeton | 3 |
| | | | Algae | 1 |
| | | | Dragon Fly | 1 |
| | | | Insect Larvae | 2 |
| | | | Plant Leaf | 1 |
| | | | Insect Remains | 1 |
| | | | | |
| Black Bullhead | 25 | 10 | Algae | 5 |
| | | | Crustaceans | 5 |
| | | | Insect Larvae | 3 |
| White Bass | 1 | 1 | Insect Remains | 1 |
| White Crappie | 25 | 24 | Bee | 1 |
| | | | Crustaceans | 24 |
| | | | Fly | 2 |
| | | | Back Swimmer | 12 |
| | | | Insect Remains | 1 |
| | | | Fish Remains | 1 |
| | | | Dragon Fly | 1 |

Table 14. Frequency of Occurrence of Food Items in Fish Taken From Rita Blanca Lake, December 20, 1962.

| Species | Number Examined | Number Containing Food | Food Items | Frequency Occurrence |
|-----------------|-----------------|------------------------|-------------------|----------------------|
| Channel Catfish | 2 | 1 | Insect Larvae | 1 |
| | | | Insect Remains | 1 |
| Black Bullhead | 43 | 20 | Insect Larvae | 6 |
| | | | Algae | 9 |
| | | | Insect Remains | 4 |
| | | | Crustaceans | 6 |
| | | | Freshwater Shrimp | 1 |
| | | | Wood Bit | 2 |
| | | | Johnsongrass Seed | 1 |
| | | | Sand | 1 |
| | | | Mud | 1 |
| | | | | |
| White Bass | 2 | 1 | Fish Remains | 1 |
| Largemouth Bass | 1 | 0 | None | 0 |
| White Crappie | 31 | 23 | Crustaceans | 16 |
| | | | Insect Remains | 4 |
| | | | Fish Remains | 2 |
| | | | Golden Shiner | 1 |

Condition Factors

K factors of channel catfish were high in February (2.0) but gradually decreased through the following months. In July the average was 1.8, while in October it was 1.7. White crappie were in fair condition, averaging about 2.8 - 2.9 throughout the year. Bullhead catfish K factors were very high in February (3.0) but, similar to channel catfish, decreased to 2.0 in October. K factors for white bass at 3.3, 3.6, and 3.1 in July, October, and December respectively, were very good. Tables 15-18 give the K factor range and average for species taken by gill nets in February, July, October, and December respectively.

Table 15. K Factor Range and Average for Fish Species Taken From Rita Blanca Lake, February 12, 1962.

| Species | | Range | Average |
|------------------|------|-----------|---------|
| Channel Catfish | (23) | 1.6 - 2.6 | 2.0 |
| Black Bullhead | (25) | 2.2 - 3.6 | 3.0 |
| Flathead Catfish | (8) | 2.1 - 2.5 | 2.3 |
| Largemouth Bass | (1) | 2.7 | 2.7 |
| River Carpsucker | (1) | 2.6 | 2.6 |
| White Crappie | (51) | 2.4 - 4.8 | 3.2 |

Table 16. K Factor Range and Average of Fish Taken From Rita Blanca Lake, July 27, 1962.

| Species | | Range | Average |
|------------------|------|-----------|---------|
| Carp X Goldfish | (5) | 3.4 - 4.2 | 3.9 |
| Goldfish | (5) | 5.0 - 6.6 | 5.5 |
| Channel Catfish | (18) | 1.5 - 2.2 | 1.8 |
| Black Bullhead | (20) | 2.3 - 3.2 | 2.6 |
| Flathead Catfish | (1) | 2.1 | 2.1 |
| White Bass | (3) | 3.1 - 3.5 | 3.3 |
| White Crappie | (28) | 2.6 - 3.7 | 2.9 |

Table 17. K Factor Range and Average of Fish Taken From Rita Blanca Lake, October 17, 1962.

| Species | | Range | Average |
|-----------------|------|-----------|---------|
| Goldfish | (7) | 4.4 - 5.7 | 4.9 |
| Channel Catfish | (7) | 1.6 - 1.9 | 1.7 |
| Black Bullhead | (25) | 1.7 - 2.4 | 2.0 |
| White Bass | (1) | 3.6 | 3.6 |
| White Crappie | (25) | 2.4 - 3.2 | 2.8 |

Table 18. K Factor Range and Average for Fish Species Taken From Rita Blanca Lake, December 20, 1962.

| Species | | Range | Average |
|-----------------|------|-----------|---------|
| Goldfish | | | |
| Male | (1) | 5.4 | 5.4 |
| Female | (1) | 5.0 | 5.0 |
| Channel Catfish | (2) | | |
| Male | | 1.5 | 1.5 |
| Female | | 1.9 | 1.9 |
| Black Bullhead | | | |
| Male | (15) | 1.9 - 2.4 | 2.2 |
| Female | (30) | 2.0 - 2.8 | 2.3 |
| White Bass | | | |
| Male | (2) | 2.9 - 3.3 | 3.1 |
| Largemouth Bass | | | |
| Male | (1) | 3.2 | 3.2 |
| White Crappie | | | |
| Male | (15) | 2.1 - 3.5 | 2.9 |
| Female | (14) | 2.5 - 3.1 | 2.8 |

Recommendations:

The ecological conditions of Rita Blanca Lake have changed greatly since 1960, especially in regard to aquatic vegetation. During the summer of 1959 and 1960 the turbidity of the water in Rita Blanca was greatly reduced due to the addition of sub-surface water high in dissolved salts. During this period the lake had a moderate growth of pondweed in the upper areas, and filamentous algae was very thick all around the lake. Aquatic organisms such as snails, amphipods, insect larvae, and giant *Daphnia* were extremely abundant. It was during this period that a tremendous population of channel catfish was reaching maturity. Their growth rate was rapid owing to the presence of an abundance of small organisms. Beginning in 1960 a great change in the flora of the lake occurred. A minute, one-celled algae became abundant, increasing the turbidity to the extent that filamentous algae is now found only in very shallow areas; and higher submerged aquatics are non-existent. It is believed that this has had a detrimental effect on the production of game fish species in the last two years. In the spring and summer of 1961 the first year of the noxious algae bloom, fishermen were so highly successful that they drastically reduced the channel catfish population. It is believed that the algae bloom, causing the increased turbidity and subsequent curtailment of the production of food organisms, caused a shortage of food for channel catfish thus allowing the fishermen to greatly reduce the population.

The reason for the sudden change in the nature of the lake's vegetation is unknown. A possible cause might have been a change in the nature of the fertility. There has been practically no runoff water entering the lake in the past two years.

Rainfall has been very light and areas that were once flooded are now grown up in weeds and grasses. The fertility once received from a watershed feed lot has ceased. One or a combination of factors may have changed the nutrient quality of the lake in favor of the type of algae which has persisted for the past two years. At any rate, if the noxious algae bloom persists in 1963, it might be advisable to attempt to control it with copper sulphate. A treatment with copper sulphate at the proper concentration might effect a kill of bullhead catfish as well as control the algae. Laboratory experiments under Job E-1 of this project in 1958-1959 revealed that copper sulphate at 2, 3 and 5 ppm was effective in killing bullheads, while other test fish including crappie, carp, and golden shiners were not apparently affected. See Page 5, Job Completion Report F-7-R-6, Job E-3.

Water skiing at Rita Blanca Lake has greatly increased within the last two years, and the constant washing and stirring of bottom sediments in the main area of the lake where skiing is permitted undoubtedly interferes with spawning of the bottom-nesting species. The relatively small portion of the upper end of the lake in which skiing is prohibited, has, for the most part, a muddy bottom not suited to spawning. During the next segment, catfish spawning devices, brush piles, and gravel piles should be located in this protected area to aid reproduction by the game fish population. As previously mentioned, spawning of white bass and flathead catfish has not occurred, and the spawn of channel catfish and black bass has been light. White crappie, however, appear to be increasing.

Gill net recoveries of tagged flathead catfish should be continued during the next segment to provide additional data concerning growth of this species in Rita Blanca. For future reference, Table 19 lists all the flatheads tagged during this segment. Periodic surveys with standard survey gill nets should also be continued to determine changes in the fish population and to evaluate management practices employed.

A shortage of time and personnel did not allow the experiments in rearing largemouth bass in wire enclosed areas of the lake. It was originally intended that suitable areas would be screened off and stocked with adult bass to determine if they would spawn, and if so, whether the young bass would survive in the absence of predation from golden shiners.

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