

JOB COMPLETION REPORT

As requested by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-7-R-11

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

Job No. D-1 Fisheries Problems Determination

Project Leader: Lonnie Peters

J. Weldon Watson
Executive Director
Parks and Wildlife Department
Austin, Texas

Marion Toole
D-J Coordinator

Eugene A. Walker
Assistant Director, Wildlife

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ABSTRACT

Most fisheries problems in the major public waters of Region I-A are associated with either overabundance of rough fish species or with ecological problems of poor water quality and food production.

Fishing opportunities are limited by the scarcity of public waters in the area, but new lakes recently completed or near completion will add considerably to the total area of public fishing waters.

Chemical control of rough fish will be a valuable management tool in certain lakes where costs and lasting effects are favorable but is not practical in certain waters. Justification of chemical control and evaluating results on an economic or monetary basis are dependent upon lake usage and fisherman harvest records. The latter are not available for the waters of this region owing to the fact that creel census have been omitted.

Specific fishery problems and recommended management practices for the lakes of this region include renovations, fertilization and habitat improvements.

Further studies regarding fish populations and ecology are needed on some waters.

JOB COMPLETION REPORT

State of Texas

Project No. F-7-R-11

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

Job No. D-1

Title: Fisheries Problems Determination

Period Covered January 1, 1963 - December 31, 1963

Objectives:

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

Procedures:

Field collected data were perused, fish population changes and specific problems were noted. Emphasis in preparation of this report was given to the amount of available public waters and degree of usage by fishermen.

Findings:

Fisheries problems of specific nature in the waters of Region I-A were found to be mostly related to fish population composition. Undesirable species are greatly dominant in most major waters and thus are detrimental to the sport fishery. This problem, which has always existed in the reservoirs of this area which exceed a few years in age, has been discussed in detail in past job completion reports.

The Rough Fish Problem

Table 1 lists the major public waters of the region and gives the degree to which rough fish are considered detrimental to the sport fishery. Note that only four of the lakes listed are considered as not having a rough fish problem. One of these four is a new lake while the other is a newly renovated lake. Childress Lake is shown as not having a rough fish problem because recent survey data indicate a favorable percentage of game species, and the only undesirable species present is the black bullhead. Lake Marvin does not have a serious rough fish problem, but limited numbers of bullhead catfish and carp do exist in the lake. Lake Marvin does, however, have a sunfish problem due to extreme clarity of water and abundant submerged vegetation.

Lakes listed as having moderate rough fish problems are Lake Baylor (excessive bullheads and a potential carp problem), Buffalo Springs Lake (extreme overabundance of bullheads, - but also ecological problems including water quality and limited littoral zone), and Lake Rita Blanca (dominant bullhead population and potential goldfish problem).

Lakes having major rough fish problems include Buffalo Lake (carp, hybrid carp, goldfish, and bullheads), Lake Fryer, (carp and bullheads), Lake McClellan

Table 1 Summary of Fisheries Problems in Eleven Major Public Lakes in Region I-A

| Lake | Degree of Rough Fish Problem | | | Ecological Problems Water-Other | Sunfish or White Crappie Problem |
|-----------------|------------------------------|-----------------|------------------|------------------------------------|--|
| | Not Problem | Mod. Problem | Major Problem | | |
| Baylor | | X | | X | X(SF) |
| Buffalo | | | X | | |
| Buffalo Springs | | X | | X | |
| Childress | X | | | X | |
| Fryer | | | X | X | X(W. Cr.) |
| Marvin | X | | | X | X(SF) |
| McClellan | | | X | X | X(W. Cr.) |
| Rita Blanca | | X | | X | |
| Stamford | | | X | | |
| Pauline | X | | | | |
| W. R. Reservoir | X | | | | |
| Totals | 4 | 3 | 4 | 7 | (2SF) 4 (2W. Cr.) |

(carp, bullheads and river carpsucker) and Lake Stamford (river carpsucker, carp, smallmouth buffalo and gizzard shad). At Lakes Fryer and McClellan, ecological problems of flooding and high populations of stunted white crappie add to the problem of rough fish.

At present the only effective solution to rough fish problems in certain lakes is to eradicate the existing population and to restock with desirable game and forage species. Such work has been proven valuable in temporary rehabilitation of some lakes, but in certain other waters, costs, public opinion, or impossibility of preventing rapid reintroduction of rough species preclude such work.

Evaluating Rough Fish Control Work

One problem of immediate concern to the continuance of our chemical control of rough fish program is that of establishing the economics of such work. With the present restriction on the use of toxaphene, lake renovations will cost about one dollar per acre foot of water treated. Justification of such and expenditure will be somewhat difficult, especially on larger impoundments where costs would be high.

Creel censuses have been neglected in this area in the past due to the time consuming nature of such work. Gill netting and seining surveys have been relied upon to provide the data on which management recommendations have been made. Such surveys conducted periodically on each of our waters are essential to proper management because they provide the biologist with a history of the fish population changes that occur. Admittedly, however, survey data alone do not show the important features of fishing pressure and fisherman harvest, the importance of which to the overall management program might be illustrated in the following manner. If we consider that two lakes within an area are both in

need of a renovation because of excessive abundance of rough fish, but for budgetary or some other reasons only one lake could be renovated, the problem of deciding which lake would receive the renovation would most easily be resolved on the basis of which lake, if renovated, would provide better fishing for the most fishermen. In such a case, the value of having harvest and fishing pressure records is obvious. If one lake had relatively low fisherman usage whereas the other had relatively high usage, the first would probably be more adequately meeting the fishing demands than the latter. The criteria then in deciding for a treatment of the lake with higher usage would be based on fisherman usage records and degree of fisherman success based on creel census. Gill netting and seining will not provide this information.

Since gill netting and seining surveys have been the source of data showing the fish population in the waters of this area, the evaluation of previous lake renovations has been based on such data. Survey data of this type is relative, and actual populations are never known, fisherman harvest records would be a valuable supplement to the ordinary survey data.

If we consider a newly renovated lake, and find by netting that the fish population has been changed from 10 per cent game fish to 90 per cent game fish, it follows that a great improvement has been made. The poor fishing that preceded the renovation would attest to the fact that a low game fish population was present, and the good fishing that followed the renovation would similarly attest to the fact that the fishery was improved. But, the critical fact insofar as evaluating the economics of the renovation is concerned, is how much did the fishing improve, and how long did the good fishing last.

If we are to be expected to evaluate the economics of chemical renovations on a monetary basis, for future justification of such work, we must establish before - and - after harvest of game fish and amount of fisherman usage, define a unit of fishing recreation, assess a dollar value to the unit of fishing recreation defined and then make a comparison. If the value of increased fishing recreation following the renovation approximates the cost of the renovation, then justification can be realized.

The Demand for More and Better Fishing

In Region I-A, public fishing waters are relatively widespread and limited in size and numbers. Under such conditions, one might think that fishing interest would be low. But such is not the case, and per capita fishing license sales in this area approximate that of any other area in the state. Outdoor recreation in the Panhandle is centered around the water-oriented sports of fishing, boating and skiing. People are water-conscious; probably because of the arid nature of the area. The statewide rate of fishing license sales based on 1963 sales data and 1960 census figures was 9.1 per cent while Region I-A was 7.3 per cent. If influence of coastal fishing on license sales was omitted, then Region I-A would probably be above average.

The significance of this in relation to fisheries management is that since the waters are heavily fished and that the demand for more fishing will probably increase, fisheries management must be designed towards maximum game fish production in all of the waters in the area.

In Region I-A, the population centers are located around Lubbock (population 156,271) and Amarillo (population 149,493). Buffalo Lake, 1800 acres, is located about 25 miles from Amarillo, and Buffalo Springs Lake, 220 acres, is located about 6 miles from downtown Lubbock.

Except for Buffalo Lake which cannot supply all the fishing demands of the Amarillo area fishermen, the next nearest bodies of water are Lake McClellan (150 acres and 57 miles distance), Rita Blanca Lake (285 acres and 78 miles distance), Lakes Childress and Baylor (575 acres combined and 110 miles distance), Lake Fryer (100 acres and 115 miles distance), Lake Marvin (60 acres and 111 miles distance) and Lake Pauline (600 acres and 148 miles distance).

Except for Buffalo Springs Lake which cannot supply the fishing demands of the Lubbock area fishermen, the next nearest lakes are Lake J. B. Thomas (8000 acres and 115 miles distance), Lake Fort Phantom Hill (3950 acres and 170 miles distance) and Lake Stamford (6000 acres and 161 miles distance).

A few small public impoundments not mentioned exist in the region but are of little importance except to local fishermen, and few people from the population centers mentioned visit these lakes.

The total number of people living in Region I-A is about 802 thousand, based on the 1960 population census. Major public fishing waters in the region total about 22 thousand surface acres at present. Fishing license sales in the 1962-1963 season totaled 58,707 and persons fishing without a license (permitted in home county unless a winding device is used - and persons under 17 or over 65 years of age) totaled an estimated 28,000. On the basis of these figures, there are at least four fishermen living within Region I-A for every acre of public water that exists.

Fishermen usage figures for five lakes in Region I-A are given in Table 2. In this table, annual fishing visits for the years 1961-62-63, average annual visits, and approximate number of visits per surface acre of water are given.

Buffalo Springs Lake at Lubbock had an average of 130,259 fishing visits for the 3-year period. Since the lake only covers about 300 surface acres, fishing visits amounted to an astounding 434 per acre of water. This is far above the average for any other lake in this region and is a reflection of the scarcity of public fishing waters in close proximity to the Lubbock area.

Buffalo Lake averaged 101,408 fishing visits during 1961-63 which amounted to an average of 60 visits per acre of water.

Rita Blanca Lake has shown a sharp decline in fishing pressure since 1961, but averaged 23,322 visits for the 3-year period and 83 visits per acre of water.

For Lakes Marvin and McClellan, the figures given are for only the actual number of fishing permits sold, and no attempt was made to estimate the number of additional fishing visits made by children and people over 65 nor for the extra number of visits accruing from annual fishing permits. Sixty-acre Lake Marvin averaged 2,828 fishing visits annually and 47 per acre while Lake McClellan averaged 9,222 visits annually and 61 visits per acre.

Table 2 Summary of Recent Lake Usage based on Available Data

| Lake | 1963 | 1962 | 1961 | Ave. No. Yearly Visits | Approximate Ave. Annual Visits/Acre |
|---------------------------------|-------------------|-------------------|-------------------|------------------------|-------------------------------------|
| Baylor and Childress (combined) | - | - | - | - | - |
| Buffalo Springs | 155,859 <u>1/</u> | 130,135 <u>1/</u> | 104,784 <u>1/</u> | 130,259 | 434 |
| Buffalo | 180,000 <u>2/</u> | 85,000 <u>2/</u> | 39,225 <u>2/</u> | 101,408 | 60 |
| Fryer | - | - | - | - | - |
| Marvin | 2,274 | 2,691 | 3,520 | 2,828 | 47 |
| McClellan | 8,265 | 9,338 | 10,062 | 9,222 | 61 |
| Rita Blanca | 16,575 <u>3/</u> | 20,918 <u>3/</u> | 32,472 <u>3/</u> | 23,322 | 83 |
| Pauline | - | - | - | - | - |

- 1/ Supplied by Buffalo Springs Lake Office (Based on revenue from fishing of \$42,059, \$29,267, \$19,784 for years 1963-62-61 respectively).
- 2/ Based on Road Counter Figures (Per Cent of Total number visits = fishing visits as follows: 1963-45%, 1962-25%, 1961-13%).
- 3/ Based on fishing permit sales. Twenty five per cent of the number of daily fishing permits sold was added to include the fishing by persons under 17 and over 65; also an annual pass was considered as equivalent to 25 fishing visits.

It is apparent from the figures given that fishing on these five lakes is generally very heavy; excessively so at Buffalo Springs Lake.

Figure 1 shows county populations and county fishing license sales according to groups.

Six population groups are listed and nine license sales groups are listed. The relation of population groups to license sales groups gives an index to fishing interest in each county, and can be correlated with proximity to public fishing waters and population density. Where the difference between population group number and license sales group number is 3 or more a significant amount of fishing interest is indicated. Eighteen of the 54 counties in Region I-A show a significant difference between these group figures, and in 11 of the 18, close proximity to a major public lake is the obvious cause. In two counties (Hutchinson and Dawson) population density is a factor in high proportionate license sales. Two counties, (Wheeler and Donley) register high license sales because of fishing in local small lakes and streams, while 3 counties (Cottle, Dickens, and Garza) show proportionately high sales because the local interest in fishing is high, but most fishing is done at public lakes a considerable distance away.

It is interesting to note that Dallam County, less than 5,000 population - group 1, was in group 7 (2,000 - 4,000) in license sales and was the county having the greatest difference between population and license sales groups. Fishing at Rita Blanca Lake, which is the only major public lake in Texas within 100 miles, influenced this.

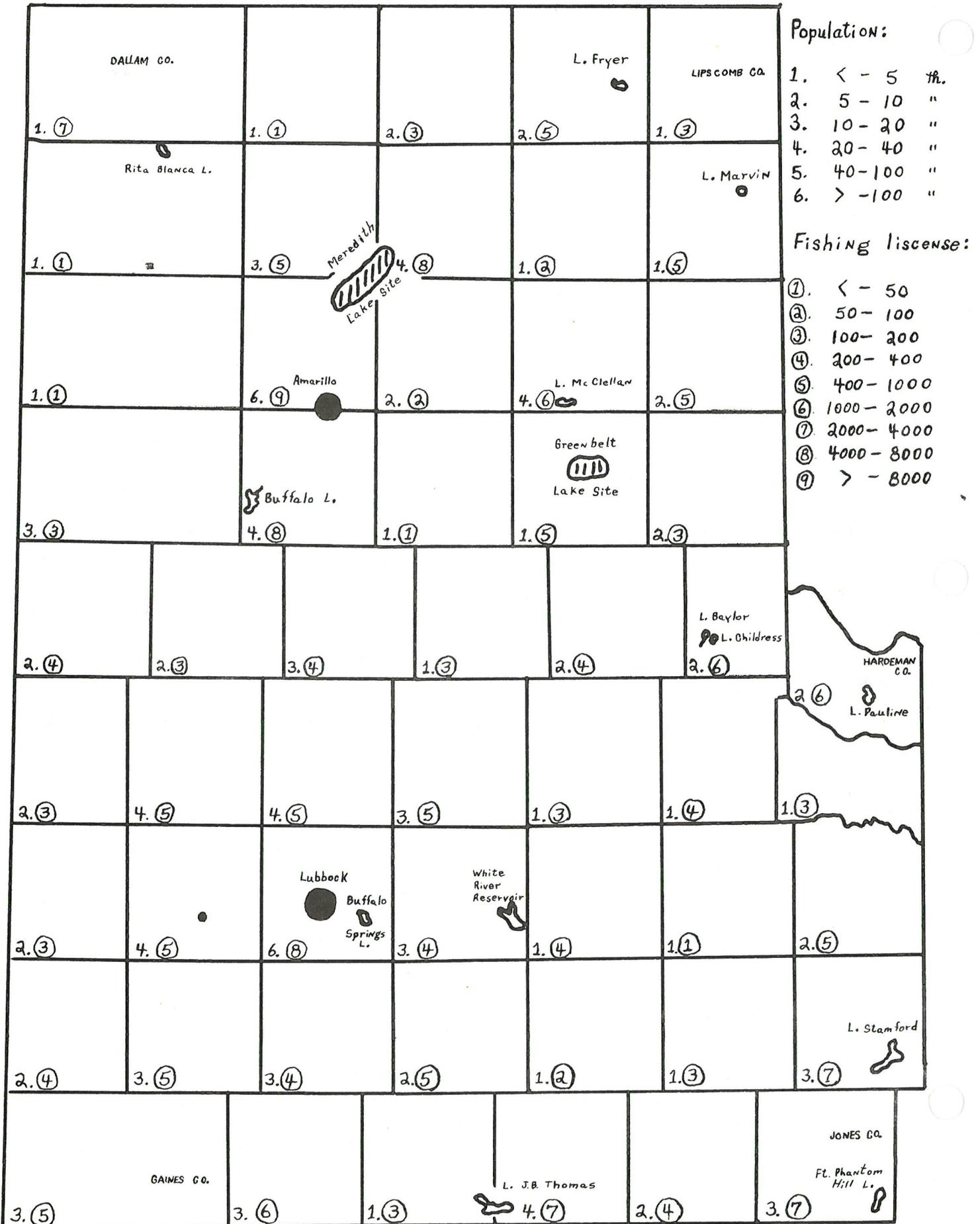


Fig. 1

Construction of New Public Lakes

The construction of three new lakes in Region I-A will greatly help to relieve the shortage of public fishing areas. The newly completed White River Reservoir (1200 acres - probable average pool) is located 19 miles South of Crosbyton and 58 miles East of Lubbock. This lake will supply much needed fishing for the Lubbock area and will help to relieve the heavy fishing pressure on Buffalo Springs Lake. A second new lake, Meredith Lake (115,000 acres - probable average pool) located on the Canadian River about 30 miles North of Amarillo is presently under construction and when completed will be the largest lake in the area of Northwest Texas. A third lake, the Greenbelt Lake (2,000 acres - probable average pool) located on the Salt Fork of the Red River about 10 miles northeast of Clarendon is presently in the planning stage but construction will probably begin during 1964. Probable opening dates for fishing on the White River, Meredith, and Greenbelt lakes are 1965, 1966, and 1967 respectively. The combined surface acreage of the three lakes will increase the present acreage of public waters by almost 100 per cent.

Specific Fisheries Problems and Proposed Management

New Lakes

Prior to a pre-impoundment rough fish eradication on the White River watershed, carp and black bullhead catfish existed in great numbers. The rotenone treatment of the lake basin, about 20 miles of stream area and about 30 private ranch ponds was carried out in an effort to reduce the initial stock of rough fish in the new lake. The lake basin has been heavily stocked with game species and after spring rains fill the lake, good growth is expected.

No pre-impoundment work on the Meredith Lake is anticipated. The vastness of the watershed which extends into eastern New Mexico precludes any rough fish control work. Rough species known to exist in the Canadian River presently include carp, shad and black bullhead catfish.

At the Greenbelt Lake, pre-impoundment work should probably include the strategic location of brush piles in the basin before the lake fills. The need for watershed rough fish control work has not been investigated, but will probably not be needed.

Lake McClellan

The fishery of Lake McClellan is in poor condition. Recent surveys show a rough fish population consisting of nearly 90 per cent rough species. The problematical species, listed in decreasing order of abundance (by weight) are carp, bullheads, and river carpsucker. In addition to fish population problems, the lake is characterized by having heavy spring flooding, rapid siltation, rapidly falling water level during summer months (the top five feet of water is being released to provide flood storage), limited fertility and a stunted white crappie population. Through a cooperative effort with the U. S. Forest Service, a complete lake management plan has been prepared, and if approved, will be carried out in 1964 during the period when construction on a new spillway is underway. The management plan calls for a total kill treatment with rotenone,

increasing natural cover by adding brush piles, planting the lake bed with a grain crop, relocating catfish spawning devices, restocking with forage species and game species. The habitat improvement work will be facilitated by the fact that the lake will be lowered at least 10 feet during construction and much of the lake bed will be exposed during this time. After the new spillway is complete the lake will not be lowered five-feet as has previously been done to provide flood control storage. This will increase the average size of the lake considerably.

Lake Marvin

Fishery problems at Lake Marvin are largely related to the extreme clarity of the water. Heavy growths of submerged plants persist throughout most of the year, and sunfish are problematical due to stunting and overabundance. Immediate management plans call for fertilization with 16-20-0 fertilizer applied in three applications of 150 lb. per acre in early April, 75 lb. per acre in late May and an additional 75 lb. per acre in early July. This work will also be carried out as a cooperative effort with the Forest Service. Success of the fertilization in controlling submerged vegetation, increasing basic productivity, and alleviating the sunfish problem will be evaluated, and if successful will probably be continued in later years. If fertilization is unsuccessful, chemical control of vegetation and possibly a rotenone renovation will be considered. Fish eradication work would have to include treatment of a lake of similar size and nature located immediately upstream from Lake Marvin. This lake which also has a sunfish problem is owned by the Boy Scouts of America, and because water from this lake is released into Marvin, it would serve as a source of sunfish for rapid reinfestation of Marvin should it not also be treated.

Lake Fryer

Lake Fryer is located in, and operated by, Ochiltree County. The lake is smaller than Lake McClellan but is otherwise very similar. Spring flooding, rapid siltation, carp, bullhead, and stunted crappie characterize the lakes fishery problems. A lake renovation has been proposed but will not be carried out because private interests prohibit treatment of the watershed stream areas which would be essential in order to prevent rapid reinfestation of the lake. Presently, management plans for the lake call for continued study of the ecology of the lake with a view to possible habitat improvement, a study of lake usage and game fish harvest, a check into the possibility of constructing upstream flood control dams and supplemental stocking of game fish to increase predation on undesirable species.

Buffalo Springs Lake

Production of game species at Buffalo Springs Lake has been inadequate. The present fish population consists of a high percentage of black bullheads, but serious problems associated with water quality and a very limited littoral zone exist. A special study to determine game fish production and the relation of water quality to the existing ecology has been initiated.

Rita Blanca Lake

The fish population in Rita Blanca Lake has shown some improvement within the last two years, but bullhead catfish remain a serious problem. Ecological problems

associated with a shortage of water exist, but little could be done to relieve these problems, with the possible exception of a copper sulfate treatment to control a bloom of noxious algae that has persisted for the past three years. The fishery of this lake is discussed in detail in job completion report F-7-R-11, Job E-3.

Lake Stamford

The fishery of Lake Stamford is unbalanced in favor of rough species, but the sport fishing has not yet declined to an unacceptable level. The great size of the lake when full (6,000 surface acres) would preclude a chemical renovation at present. During the coming few years, the trend in the Lake Stamford fishery will probably be towards a rapidly declining sport fishery, and eventually some measures will have to be taken to reduce the number of rough species. Perhaps this can be accomplished at some future date when the lake level is sufficiently low to permit chemical treatment at a reasonable cost. There would be a limited amount of watershed treatment, and the creek feeding the lake flows only following rains.

The lake has a gently sloping spillway which is not effective in keeping rough fish from entering the lake from downstream areas during periods of overflow and some modification in the spillway, or else installation of an electrical screen to block upstream migration should be considered before any renovation work is attempted.

Lakes Baylor and Childress

Fish populations at the two adjacent lakes near Childress are fairly well balanced at present. The older and smaller Lake Childress has only the black bullhead as a problematical species, while Baylor Lake contains a considerable number of carp as well as abundant bullheads. Both lakes are characterized by very clear water, low fertility, and low basic food production. Baylor Lake has a limited littoral zone around most of the lake and a major problem exists in the lack of medium-size forage. Ample abundance of minnow species is lacking because of insufficient marginal shallow water cover and heavy predation from sunfish. Reproduction by largemouth bass in both lakes has been successful in recent years, but survival of the young bass is critically low. Competition with sunfishes for food, and predation from larger fishes has resulted in very poor survival of bass to the yearling stage.

A lake renovation would not be advisable at present since a fair balance exists, but habitat improvement work is needed. Fertilization would be the management practice most likely to improve the fishery. The increase in production of small foods that would accompany fertilization should greatly aid in increasing the available forage needed to obtain survival of young game species. Increased turbidity from the algae bloom produced would tend to reduce submerged vegetation which now is serving to harbor and protect an overabundant sunfish population. At present, however, the city of Childress uses water from the lakes for municipal purposes and due to the limited capacity of filtering equipment, the production of plankton that would accompany fertilization is not desirable. After completion of the Greenbelt Lake, the city of Childress will obtain municipal water from this source and use of the local supply will cease. At this time fertilization and other management can be carried out without concern for the present restrictions.

Lake Pauline

No further management for this lake is anticipated in the near future. The lake was renovated in May 1963 and restocked with game species. Recent checks show a rapidly developing bass population, but the status of channel catfish stocked as fingerlings in September 1963 is presently unknown. Bass fry, stocked in mid-May following the rotenone renovation, had by October attained sizes up to about nine inches in standard length and averaged about one-fourth pound in weight. It is possible that these bass preyed upon the smaller channel catfish, but owing to the presence of abundant other forage, depredation of channel catfish fingerlings should not have been excessive. Further surveys in early 1964 will reveal whether added channel catfish are needed.

Recommendations:

Continuance of Job D-1 should be a part of the future work on this project. Attention should be given to the problems above discussed, and where practical, the activities on other jobs of this project should be directed towards resolving the various problems of both specific and general nature.

Prepared by Lonnie Peters
Project Leader

Date May 28, 1964

Approved by Marion Toole
Coordinator

Leo D. Lewis
Regional Supervisor