Report of Fisheries Investigations

Resurvey and Appraisal of Several Public Waters in Region 4-B.

by

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Dingell-Johnson Project F-4-R-6, Job B-26
November 1, 1958 - October 31, 1959

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Segment Completion Report

State of TEXAS

Project No. F-4-R-6 Name: Fisheries Investigations and Surveys of the Waters of Region 4-B.

Job No. B-26 Title: Resurvey and Appraisal of Several Public Waters in Region 4-B.

Period Covered: November 1, 1958 - October 31, 1959

General Abstract:

Three major impoundments of Region 4-B in North Central Texas were resurveyed. These include Lakes Benbrook, Worth, and Eagle Mountain in Tarrant County.

Gizzard shad control work on Fincastle Lake in Henderson County was rechecked to determine the effectiveness of the selective kill.

An abstract and discussion of each lake, including population changes, is made separately.

Objectives:

A. To study changes in abundance and in physical condition of the principal fish populations within the waters previously surveyed and as may occur.

B. To determine the ecological succession of dominance of various species and to appraise the conditions that influence and/or create such trends.

C. To more accurately determine and define the extent and duration of conditions effecting dominance and to determine what methods may be employed to bring about conditions favorable to the propagation and harvesting of game species.

D. To maintain an up-to-date knowledge of the various waters so that reliable and accurate data will be available in considering future management plans and recommendations.

Procedure:

Net collections were made at net stations established during previous work in Lakes Benbrook, Eagle Mountain, Worth, and Fincastle. Specimens taken were weighed, measured, and opened to determine sexual development, and stomach contents. These data were recorded and filed for future use.

These collections were made with nylon gill nets 100 feet by 8 feet with $1\frac{1}{2}$ inch square mesh.

Chemical analysis of the waters was not made because of the difficulty in keeping fresh standards and solutions. Some work of this type was attempted but the results were discarded when the reagents and indicators were found to have become unreliable.

Changes in water level prevented the use of the former seine and rotenone collection stations and these collection methods were not used.

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Date January 18, 1960

Lake Benbrook

Abstract:

Population trends in Lake Benbrook have changed from game fish dominance in 1953-54, when 84.77 percent of the total net catch were largemouth bass, to rough fish dominance in 1954-55. This rough fish dominance continued until 1958-59 when game fish made up 63 percent of the net catch, with channel catfish providing 30.44 percent of the total.

Discussion and Findings:

Lake Benbrook is located on the Clear Fork of the Trinity River near Ft. Worth, Texas. The dam was constructed by the U. S. Corps of Engineers as a flood control and water conservation impoundment.

The dam was closed September 29, 1952, but because of the lack of rainfall the lake was not completely filled until 1957.

Population trends have changed to a marked degree. The net catches of the 1953-54 segment contained 89.07 percent game fish, with largemouth bass making up 84.77 percent of the total. The 1954-55 netting was dominated by gizzard shad, comprising 22.22 percent of the total. Largemouth bass comprised only 15.90 percent of the 1954-5 net catch, with channel catfish and spotted sucker comprising 14.78 and 13.46 percent respectively. Game species no longer dominated the catch since they made up only 32.62 percent. The 1955-56 netting results showed a further drop in percentage of game fish to 29.50 percent. Spotted suckers accounted for 51.48 percent of the total catch, followed by white crappie and gizzard shad with 21.39 and 11.75 percent respectively. Channel catfish and largemouth bass were comparatively unimportant insofar as numbers taken were concerned. No. netting was done in 1957 but the 1958-59 netting showed a further change with game fish making up the bulk of the catch with 63 percent (Table 1). Channel catfish were the most numerous species with 30.44 percent. Spotted sucker, gizzard shad, and largemouth bass followed with 18.47, 17.39, and 16.30 percent respectively.

Table 1. Benbrook Lake Netting Results, 1958 - 1959.

Species	Total No.	% of No.	Total Lbs.	% of Wt.	Avg. Length (in mm.)	No. Per 100' Net	Lbs. Per 100' Net	"K" Range	"K" Avg.
Gizzard shad	16	17.39	5.65	9.68	209	2.67	.96	1.50-2.40	1.73
Spotted sucker	17	18.47	14.12	24.22	279	2.83	2.35	1.55-1.87	1.76
Channel catfish	28	30.44	21.38	36.67	273	4.67	3.56	1.20-2.30	1.65
Black bullhead	1	1.09	0.68	1.16	230	0.17	0.11	2.60-2.60	2.60
Largemouth bass	15	16.30	11.71	20.08	251	2.50	1.95	2.00-2.70	2.27
Bluegill sunfish	7	7.61	1.67	2.87	136	1.17	0.28	2.30-4.90	3.86
White crappie	8	8.70	3.10	5.32	199	1.33	0.52	2.50-3.00	2.70
Totals	92	100.00	58.31	100.00		15.34	9.73		

Eagle Mountain Lake

Abstract:

The dominance of game species in the net catch of the 1955-56 segment was rather marked. This was largely due to the abundance of white bass which made up 48.99 percent of the total. This dominance gave way in the 1958-59 netting and rough fish accounted for 78.57 percent, with longnose gar and gizzard shad the two most abundant species.

This increase in the shad population may be due, in part, to the absence of good spawning conditions for white bass which resulted in fewer predators to feed on shad. There is no reason for the increase in the number of gar taken that is apparent at this time.

Discussion and Findings:

Eagle Mountain Lake is located on the West Fork of the Trinity River between Lake Worth and Lake Bridgeport. The dam was completed in 1932 as a water supply for the City of Ft. Worth, Texas.

A survey of this lake was made in 1955-56. Game fish dominated the net catches during that survey with 67.67 percent of the total. White bass made up 48.99 percent of the catch. Gizzard shad and river carpsucker were the predominant rough fish species.

The results of gill net collections during this segment indicate rough fish dominance in that 78.57 percent of all fish taken were rough fish (Table 2). Longnose gar and gizzard shad made up 31.43 and 25.72 percent of the total catch respectively.

This increase in the shad population may be partially due to the low water conditions of the past several years which prevented the normal spawning runs of the white bass. White bass are known to feed extensively on shad and a reduction in the numbers of white bass would reduce the pressure on the shad to allow an expansion of their population.

The increase in the number of gar taken is significant since the netting was done in November and therefore their abundance is not due to spawning activity.

Table 2. Eagle Mountain Lake Netting Results, 1958 - 1959.

Species	Total No.	% of No.	Total Lbs.	% of Wt.	Avg. Length (in mm.)	No. Per 100' Net	Lbs. Per 100' Net	"K" Range	"K" Avg.
Spotted gar	7	10.00	12.00	10.52	447	2.33	4.00	-----	----
Longnose gar	22	31.43	69.00	60.47	672	7.33	23.00	-----	----
Gizzard shad	18	25.72	11.20	9.82	231	6.00	3.73	1.90-2.65	2.23
Smallmouth buffalo	4	5.71	6.30	5.52	272	1.33	2.10	3.00-3.40	3.25
River carpsucker	4	5.71	2.90	2.54	240	1.33	0.91	1.67-1.67	1.67
Channel catfish	6	8.57	8.30	7.27	335	2.00	2.76	1.07-2.20	1.62
White bass	3	4.29	1.90	1.67	233	1.00	0.63	2.10-2.25	2.36
Largemouth bass	1	1.43	0.70	0.61	240	0.33	0.23	2.48-2.48	2.48
White crappie	5	7.14	1.80	1.58	184	1.66	0.60	2.20-3.30	2.71
Totals	70	100.00	114.10	100.00		23.31	37.96		

Lake Worth

Abstract:

Lake Worth is an old impoundment located on the West Fork of the Trinity River near Ft. Worth, Texas. This is a shallow murky lake with a densly populated shoreline. Heavy fishing by the residents along the shoreline produces good catches of fish.

Gill net collections from the 1955-56 segment show that game species made up 57.02 percent of the catch, with white crappie providing 43.80 percent of the total. The gizzard shad was the predominant rough fish species with 23.47 percent of the total.

The 1958-59 net collections were dominated by bluegill sunfish and largemouth bass with 36.59 and 12.20 percent of the total catch respectively. Game species totaled 75.61 percent.

Discussion and Findings:

Lake Worth is an old lake located on the West Fork of the Trinity River about 8 miles west of Ft. Worth. The dam was closed in 1912 and impounds some 5,400 acres when full. This is a murky lake with shallow margins and a large amount of aquatic getation, primarily cattails and sedges.

This is one of the more productive lakes of this area. The area is developed as a residential section with homes built almost entirely around the lake. The residents of these homes fish almost constantly with trotlines or set lines and many fish are taken.

The results of gill net collections made in 1955-56 show that 57.02 percent of the catch were game species, with white crappie making up 43.80 percent of the total. The predominant rough fish was the gizzard shad which accounted for 23.47 percent.

Game fish species continued to dominate the net catch in 1958-59 but the bluegill sunfish was the most numerous species, comprising 36.59 percent of the catch. It was followed by the largemouth bass with 12.20 percent. Game fish combined represented 75.61 percent of the total catch (Table 3).

It is believed that the 1958-59 net catch was somewhat influenced by the ecology of the new netting stations and does not necessarily reflect a true picture of the Lake Worth fish population. It is suspected that the changes in lake level which required the selection of new netting stations produced a decided variation in the catch when compared with previous years.

Table 3. Lake Worth Netting Results, 1958 - 1959.

Species	Total No.	% of No.	Total Lbs.	% of Wt.	Avg. Length (in mm.)	No. Per 100' Net	Lbs. Per 100' Net	"K" Range	"K" Avg.
Spotted gar	1	2.44	1.10	4.78	410	0.33	0.36	0.72-0.72	0.72
Gizzard shad	2	4.88	0.60	2.61	192	0.66	0.20	1.80-2.05	1.92
Smallmouth buffalo	2	4.88	2.50	10.87	250	0.66	0.83	3.60-3.60	3.60
River carpsucker	3	7.31	3.10	13.47	250	1.00	1.03	2.40-3.00	2.73
Carp	2	4.88	2.70	11.74	280	0.66	0.90	2.80-2.90	2.85
Channel catfish	3	7.31	1.60	6.96	244	1.00	0.53	1.45-1.75	1.63
White bass	1	2.44	0.40	1.74	210	0.33	0.13	2.40-2.40	2.40
Largemouth bass	5	12.20	4.00	17.39	250	1.66	1.33	2.10-2.60	2.35
Redear sunfish	1	2.44	0.20	0.87	150	0.33	0.06	3.60-3.60	3.60
Bluegill sunfish	15	36.59	3.90	16.96	134	5.00	1.30	4.80-5.00	4.91
White crappie	4	9.75	1.90	8.26	198	1.33	0.63	2.50-3.64	2.86
Drum	2	4.88	1.00	4.35	215	0.66	0.33	2.15-2.40	2.27
Totals	41	100.00	23.00	100.00		13.62	7.63		

Fincastle Lake

Abstract:

Fincastle Lake is located in Henderson County, Texas. It has an area of 54 acres and a volume of 382 acre-feet.

This lake was surveyed during a previous segment and found to contain 69.10 percent gizzard shad along with 75.40 percent rough species. A selective kill of shad was recommended.

Rotenone was applied to this lake in two applications of 0.065 parts-per-million at intervals of 18 hours. An estimated kill of 36,960 shad, weighing 16,592 pounds were killed.

Gill nets were used to check the results of the treatment and an attempt was made to set the nets in exactly the same locations as they were set before chemical reduction of the shad population. The results of this netting indicate a drastic reduction in the shad population since this species has completely disappeared from the catch. Crappie and bass increased in the catches of both nets and fishermen.

Discussion and Findings:

Fincastle Lake is located on the headwaters of Catfish Creek in Henderson County, Texas. This lake was surveyed during the course of a survey of the Trinity River Watershed and was found to have a population dominated by rough fish. The gill net catch was 75.40 percent rough fish and 69.10 percent gizzard shad. Redear and bluegill sunfish accounted for 11.50 and 8.50 percent respectively. Largemouth bass and white crappie comprised 0.20 and 4.40 percent respectively.

This predominance of shad indicated the need for selective control, and a shad kill by the use of rotenone was undertaken. This kill was made on May 20, 1958, when 0.065 parts-per-million of rotenone was applied by the use of drum boat and power spray. A second application of 0.065 parts-per-million was made after a lapse of 18 hours. This brought the total to 0.13 parts-per-million.

An estimated total of 36,960 shad, weighing 16,592 pounds, were killed in this 54 acre lake. The volume of the lake was calculated plotting soundings on an aerial photograph and was calculated to be 382 acre feet.

Net sets made after the kill showed a considerable change in the fish population. These sets were made in the same locations as were those before the kill. The nets used were of the same $1\frac{1}{2}$ inch square mesh and 500 feet of net was used in each overnight set. An effort was made to repeat the netsets that were made prior to the kill in order that comparable results might be obtained. The results of three overnight netting trips was a catch of 199 fish. Game species made up 73.40 percent of this total with redear sunfish and bluegill sunfish providing 31.20 and 24.60 percent respectively. White crappie increased to 15.60 percent and black crappie made up 0.50 percent. Gizzard shad dropped to 1.50 percent which indicated a drastic reduction in the shad population.

During the present segment three overnight sets using 500 feet of net were made. These nets were set at the sites previously used. Rough fish comprised 52.71 percent of the catch but gizzard shad were absent from the catch. Chubsuckers and spotted gar provided 31.76 and 12.16 percent respectively. Redear sunfish and bluegill sunfish continued to dominate the game fish catch with 12.16 and 19.59 percent respectively. Largemouth bass, white crappie and black crappie showed a decided increase with 2.70, 4.73, and 7.44 percent respectively.

The results of the netting indicate that the shad population has been drastically reduced if not eliminated. The increase in percentage of game fish taken has been accompanied by an increase in weight of the crappie and sunfish caught by fishermen.

Table 4. Fincastle Lake Netting Results, 1958 - 1959.

Species	Total No.	% of No.	Total Lbs.	% of Wt.	Avg. Length (in mm.)	No. Per 100' Net	Lbs. Per 100' Net	"K" Range	"K" Avg.
Spotted gar	18	12.16	39.50	36.18	524	1.20	2.63	0.52-0.68	0.59
Chubsucker	47	31.76	31.79	29.13	290	3.13	2.12	2.25-2.80	2.50
Black bullhead	3	2.03	5.80	5.31	879	0.20	0.38	2.90-3.20	3.03
Yellow bullhead	10	6.76	6.80	6.23	308	0.67	0.45	2.50-3.30	2.86
Largemouth bass	4	2.70	7.30	6.69	831	0.27	0.48	1.50-2.90	2.14
Warmouth	1	0.67	0.30	0.28	155	0.07	0.02	3.20-3.20	3.20
Redear sunfish	18	12.16	5.24	4.80	144	1.20	0.35	2.30-4.40	3.10
Bluegill sunfish	29	19.59	7.06	6.46	117	1.93	0.47	3.40-5.00	3.95
White crappie	7	4.73	1.36	1.25	172	0.47	0.09	1.85-2.60	2.16
Black crappie	11	7.44	4.00	3.67	180	0.73	0.27	2.35-3.00	2.70
Totals	148	100.00	109.15	100.00		9.87	7.26		