JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-5-R-12

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

Job No. B-32 Fisheries Reconnaissance

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ABSTRACT

Fish populations were sampled at San Angelo Reservoir, New Winters Lake, Lake Talpa and Valley Creek Reservoir. These investigations indicated a need for population improvement at all four lakes.

A selective rotenone treatment to control gizzard shad and heavier contour or area applications to reduce river carpsuckers was recommended for San Angelo Reservoir.

A complete eradication of existing fish populations and restocking program was recommended for New Winters Lake. This program was completed during the segment by using State funds.

No recommendations have been made for Lake Talpa, pending more favorable hydrological conditions and additional documentation of the existing fishery.

Management recommendations for Valley Creek Reservoir have also been postponed until a more intensive survey can be obtained.

JOB COMPLETION REPORT

State of Texas

Project No. F-5-R-12 Name: Fisheries Investigations and Surveys of the Waters of Region I-B

Job No. B-32 Title: Fisheries Reconnaissance

Period Covered March 1, 1964 - February 28, 1965

Objectives:

To conduct limited investigations of regional waters:

1. To maintain a biological history of lakes not covered under other jobs, utilizable in future justification and evaluation of management or development projects.

2. To indicate when more detailed studies are required for the purpose of recommending management or development.

3. For use as background information in making fish harvest recommendations to the Texas Parks and Wildlife Department, as counties are added in regulatory responsibility.

4. Where urgent but unanticipated situations arise demanding investigation or consultation.

Procedures:

Standard gill nets and seines were used to measure fish populations in four lakes. Standard nets have six 25- by 8-foot sections. The first section has 1-inch mesh. In each succeeding section the mesh is 1/2 inch larger. Most standard nets are made to droop. This slack is created by tying 6-foot cords between the float and lead lines at 9-foot intervals. All nets were set overnight.

A variety of seines were used. The measurements of each are described as their catches are reported. A seining collection is two or three drags of a 20-, 30-, or 40-foot seine or one drag of a 100-, 200-, or 300-foot seine in an area no larger than 2 acres.

Fish captured in seines were counted and a length range was determined. Unusual specimens were preserved in 10 per cent formalin solution and identified in the laboratory.

Fish captured in nets were counted, weighed and measured. The gonadal development and stomach contents of at least 50 specimens of each species were examined when that many were available.

Physical data, such as air and water temperature, wind speed and direction, and weather conditions, were recorded at the time nets were run. This was supplemented by information from calendars, almanacs and the United States Weather Bureau.

Total numbers, total weights, per cents, average weights and "K" factors were tabulated with an automatic calculator. It was set to automatically round off percentages to two places.

Common names of fishes are used in this report. A checklist is presented to prevent any confusion of terminology. These names are specified in "A list of Common and Scientific Names of Fishes from the United States and Canada", Second Edition, American Fisheries Society, Special Publication No. 2, 1960.

Longnose gar	Lepisosteus osseus
Gizzard shad	Dorosoma cepedianum
Carp	Cyprinus carpio
Golden shiner	Notemigonus crysoleucas
Red shiner	Notropis lutrensis
Blacktail shiner	N. venustus
Fathead minnow	Pimephales promelas
River carpsucker	Carpiodes carpio
Smallmouth buffalo	Ictiobus bubalus
Gray redhorse	Moxostoma congestum
Black bullhead	Ictalurus melas
Channel catfish	I. punctatus
Flathead catfish	Pylodictus olivaris
Mosquitofish	Gambusia affinis
White bass	Roccus chrysops
Warmouth	Chaenobryttus gulosus
Redbreast sunfish	Lepomis auritus
Orangespotted sunfish	L. humilis
Bluegill	L. macrochirus
Longear sunfish	L. megalotis
Largemouth bass	Micropterus salmoides
White crappie	Pomoxis annularis
Logperch	Percina caprodes
Freshwater drum	Aplodinotus grunniens

San Angelo Reservoir

Findings:

San Angelo Reservoir, near San Angelo, Texas, decreased in volume during the project period from 36,000 to 25,000 acre feet. The conservation pool capacity is 119,000 acre feet.

Fishermen report that many small white crappie have been caught but that largemouth bass and white bass fishing has been poor. Trotline anglers have had slightly better luck than artificial bait fishermen. Several stringers of large channel catfish have been reported, and occasionally a flathead catfish is caught.

Samples of the fish population were taken in March, July, September and November of 1964. Twelve seining and 24 netting collections were obtained.

The results of the 12 seining collections are given individually so that seasonal variations in catches may be noted. River carpsuckers were abundant in the shallows during the spring. Blacktail shiners were prevalent in the seining areas during the fall. Gizzard shad were numerous during both periods (Table 1).

Table 1. Results of Individual Seining Collections Obtained From San Angelo Reservoir From March 1, 1964, to February 28, 1965.

Collection 1. March 13, 1964 300-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	350	4-6
Carp	4	12-16
River carpsucker	9	5-15
White bass	3	7-14
Redbreast sunfish	1	6
Total	367	

Collection 2. March 13, 1964 300-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	42	4-7
Carp	3	14-20
River carpsucker	294	8-18
Channel catfish	3	5-8
White bass	27	6-14
Redbreast sunfish	3	5-6
Total	372	

Collection 3. March 13, 1964 40-Foot Straight Seine, 8 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	7	4-8
Blacktail shiner	4	2-3
Total	11	

Collection 4. March 13, 1964 40-Foot Straight Seine, 8 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	19	4-8
Blacktail shiner	11	2-3
Fathead minnow	23	1-3
Redbreast sunfish	2	4-5
Longear sunfish	17	2-4
Logperch	2	2-3
Total	74	

Collection 5. September 9, 1964 200-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	600	2-9
Carp	9	7-16
River carpsucker	8	1-16
Channel catfish	3	5-6
Redbreast sunfish	2	4-5
White crappie	12	3-7
Freshwater drum	1	6
Total	635	

Collection 6. September 9, 1964 200-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	120	2-9
River carpsucker	6	4-16
White crappie	3	4-6
Total	129	

Collection 7. September 9, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	24	1-5
Blacktail shiners	44	½-1½
River carpsucker	5	4
Redbreast sunfish	4	4-5
Longear sunfish	1	4
Total	78	

Collection 8. September 9, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	32	1-4
Blacktail shiner	58	½-1½
River carpsucker	7	1-4
Total	97	

Collection 9. November 4, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	87	3-7
Blacktail shiner	280	1-2½
Bluegill	3	3-4
Largemouth bass	1	4
Logperch	1	4
Total	372	

Collection 10. November 4, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	22	3-7
Blacktail shiner	149	1-2½
Largemouth bass	2	4-5
Total	173	

Collection 11. November 4, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	52	3-7
Blacktail shiner	211	1-2½
River carpsucker	7	2-5
Bluegill	2	3-4
Total	272	

Collection 12. November 4, 1964 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Blacktail shiner	108	1-2½

When seining collections are grouped according to the size seine used, selectivity is indicated. Several species were too small to be captured in the 1-inch mesh seines. River carpsuckers, white bass and channel catfish may have run under or around the smaller seines (Table 2).

Table 2. Results of all Seining Collections Obtained from San Angelo Reservoir from March 1, 1964 to February 28, 1965, Grouped According to Seine Size.

Two Collections - 300-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	392	4-7
Carp	7	12-20
River carpsucker	303	5-18
Channel catfish	3	5-8
White bass	30	6-14
Redbreast sunfish	4	5-6
Total	739	

Two Collections - 200-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	720	2-9
Carp	9	7-16
River carpsucker	14	1-16
Channel catfish	3	5-6
Redbreast sunfish	2	4-5
White crappie	15	3-7
Freshwater drum	1	6
Total	764	

Two Collections - 40-Foot Straight Seine, 8 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	26	4-8
Blacktail shiner	15	2-3
Fathead minnow	23	1-3
Redbreast sunfish	2	4-5
Longear sunfish	17	2-4
Logperch	2	2-3
Total	85	

Six Collections - 30-Feet Straight Seine, 6 Feet Deep with ¼-Inch Mesh.

Species	Number	Size Range in Inches
Gizzard shad	217	1-7
Blacktail shiner	850	½-2½
River carpsucker	19	1-5
Redbreast sunfish	4	4-5
Bluegill	5	3-4
Longear sunfish	1	4
Largemouth bass	3	4-5
Logperch	1	4
Total	1,100	

A compilation of seining results indicates that gizzard shad, blacktail shiners and river carpsuckers are all very numerous. Rebreast sunfish appear to be the only sunfish growing large enough to be desirable in the angler's creel. Not many largemouth bass have successfully reproduced during the last 2 years (Table 3).

Table 3. Results of all 12 Seining Collections Obtained from San Angelo Reservoir from March 1, 1964, to February 28, 1965.

Species	Number	Size Range in Inches
Gizzard shad	1,355	1-9
Carp	16	7-20
Blacktail shiner	865	½-3
Fathead minnow	23	1-3
River carpsucker	336	1-18
Channel catfish	6	5-8
White bass	30	6-14
Redbreast sunfish	12	4-6
Bluegill	5	3-4
Longear sunfish	18	2-4
Largemouth bass	3	4-5
White crappie	15	3-7
Logperch	3	2-4
Freshwater drum	1	6
Total	2,688	

Seasonal netting results are presented independently so that selectivity in gill netting is reflected as well as variations in relative abundance. Most nets were set near the shore in water less than 10 feet deep. Considering this, the netting results support the seining indication that river carpsuckers were in shallow water during the spring (Tables 4, 5, 6 and 7).

Table 4. Results of Eight Standard Nets Set in San Angelo Reservoir on March 11, 1964.

Water temperature	46° F.	Precipitation	None
General turbidity	30 inches	Relative humidity	12%-65%
Air temperature	36°-75° F.	Barometric pressure	29.82-30.13 inches
Wind speed and direction	12.0 mph, North	Moon phase	Last ¼ + 5 days
Cloud cover	50%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Longnose gar	5	1.51	25.69	5.14	6.49
Gizzard shad	71	21.45	8.73	.12	2.20
Carp	3	..90	9.50	3.17	2.41
River carpsucker	195	58.91	292.51	1.50	73.93
Smallmouth buffalo	1	.31	6.63	6.63	1.67
Channel catfish	5	1.51	7.43	1.49	1.88
Flathead catfish	1	.30	4.50	4.50	1.14
White bass	16	4.83	16.93	1.06	4.27
Bluegill	1	.31	.12	.12	.04
Largemouth bass	2	.60	10.13	5.07	2.56
White crappie	31	9.37	13.49	.44	3.41
Total	331	100.00	395.66		100.00

Table 5. Results of Four Standard Nets Set in San Angelo Reservoir on July 1, 1964.

Water temperature	80° F.	Precipitation	None
General turbidity	35 inches	Relative humidity	25%-56%
Air temperature	74°-105° F.	Barometric pressure	27.87-28.00 inches
Wind speed and direction	7.4 mph, SSE.	Moon phase	Last ¼
Cloud cover	10%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	74	37.00	8.48	.11	5.58
Carp	9	4.50	18.27	2.03	12.03
River carpsucker	75	37.50	99.44	1.33	65.48
Channel catfish	6	3.00	6.56	1.09	4.32
Flathead catfish	1	.50	3.12	3.12	2.06
White bass	16	8.00	9.83	.61	6.47
Bluegill	10	5.00	.87	.09	.57
Largemouth bass	1	.50	3.68	3.68	2.42
White crappie	4	2.00	1.07	.27	.71
Freshwater drum	4	2.00	.54	.14	.36
Total	200	100.00	151.86		100.00

Table 6. Results of Six Standard Nets Set in San Angelo Reservoir on September 10, 1964

Water temperature	80° F.	Precipitation	None
General turbidity	14 inches	Relative humidity	30%-72%
Air temperature	74°-98° F.	Barometric pressure	27.88-28.00 inches
Wind speed and direction	6.9 mph, South	Moon phase	New + 5 days
Cloud cover	20%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	43	23.62	4.41	.10	2.38
Carp	16	8.79	36.20	2.26	19.55
River carpsucker	63	34.62	92.22	1.46	49.82
Smallmouth buffalo	1	.55	8.31	8.31	4.49
Channel catfish	18	9.89	25.00	1.39	13.51
Flathead catfish	1	.55	3.43	3.43	1.85
White bass	9	4.94	4.82	.54	2.60
Bluegill	6	3.30	.50	.08	.27
Largemouth bass	1	.55	.19	.19	.11
White crappie	17	9.34	3.54	.21	1.91
Freshwater drum	7	3.85	6.49	.93	3.51
Total	182	100.00	185.11		100.00

Table 7. Results of Six Standard Nets Set in San Angelo Reservoir on November 5, 1964.

Water temperature	69° F.	Precipitation	Trace of rain
General turbidity	20 inches	Relative humidity	53%-93%
Air temperature	43°-60° F.	Barometric pressure	28.18-28.25 inches
Wind speed and direction	4.7 mph, WNW.	Moon phase	First ¼ + 3 days
Cloud cover	70%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	37	21.38	4.39	.12	1.81
Carp	11	6.36	17.53	1.59	7.25
River carpsucker	77	44.51	111.87	1.45	46.28
Gray redhorse	1	.58	2.31	2.31	.95
Channel catfish	17	9.82	47.82	2.81	19.78
Flathead catfish	5	2.89	37.56	7.51	15.54
White bass	13	7.52	8.76	.67	3.62
Warmouth	1	.58	.05	.05	.02
Bluegill	3	1.73	.28	.09	.12
Largemouth bass	2	1.16	9.81	4.91	4.06
White crappie	6	3.47	1.37	.23	.57
Total	173	100.00	241.75		100.00

Combined results of the 24 netting collections indicate that most crappie are small; all sunfish are small; largemouth bass are big but scarce; white bass and channel catfish are the most abundant game species. River carpsuckers were the most abundant fish captured in the nets. Their total weight was greater than the total weight for any other species (Table 8).

Table 8. Combined Results of 24 Standard Nets Set in San Angelo Reservoir from March 1, 1964, to February 28, 1965.

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Longnose gar	5	.56	25.69	5.14	2.63
Gizzard shad	225	25.39	26.01	.12	2.67
Carp	39	4.41	81.50	2.09	8.37
River carpsucker	410	46.27	596.04	1.45	61.17
Smallmouth buffalo	2	.23	14.94	7.47	1.53
Gray redhorse	1	.11	2.31	2.31	.24
Channel catfish	46	5.19	86.81	1.89	8.91
Flathead catfish	8	.90	48.61	6.08	4.98
White bass	54	6.10	40.34	.75	4.14
Warmouth	1	.11	.05	.05	.01
Bluegill	20	2.26	1.77	.09	.18
Largemouth bass	6	.68	23.81	3.97	2.45
White crappie	58	6.54	19.47	.34	1.99
Freshwater drum	11	1.25	7.03	.64	.73
Total	886	100.00	974.38		100.00

When netted fish are categorized according to desirability, the game fish ratio is small (Table 9).

Table 9. Rough Fish - Game Fish Ratio as Indicated by Netting Results from San Angelo Reservoir.

	Number	Per Cent by Number
Undesirable Fish (Shad, buffalo, suckers, carp, sunfish and crappie less than 4 ounces, and drum)	754	85.10
Desirable Fish (Catfish, largemouth bass, white bass, and crappie larger than 4 ounces)	132	14.90
Total	886	100.00

A summary of 9 year's netting results indicates that game fish populations will increase very little in relative abundance even if the lake fills. Significant gains in volume occurred in 1957 and high levels were maintained until 1961.

(The 1962-1963 netting data must be partially disregarded because 11 collections were made with large meshed nets and all 30 samples were taken in January when largemouth bass are most easily captured).

During the last 5 years, most average weights and "K" factors varied no more than would be expected from normal sampling error (Table 10).

Table 10. A Comparative Summary of Yearly Netting Results from San Angelo Reservoir.

Year	1953-1954			1954-1955			1955-1956		
Number of Nets				79					
Species	No.	Per Cent	Avg. "K"	No.	Per Cent	Avg. "K"	No.	Per Cent	Avg. "K"
Longnose gar	4	.22	.21	2	.14	.35	3	.38	.33
Gizzard shad	247	14.13	1.69	352	26.00	1.85	269	34.76	1.84
Carp	30	1.72	2.54	4	.30	2.60	10	1.29	2.66
River carpsucker	505	28.89	2.47	499	36.85	2.64	316	40.83	2.54
Smallmouth buffalo	1	.06	2.59	0	0	0	1	.13	3.64
Gray redhorse	16	.91	2.31	4	.29	2.27	4	.51	2.26
Black bullhead	7	.40	2.47	1	.08	2.10	1	.13	2.30
Channel catfish	313	17.91	2.18	130	9.60	1.97	76	9.82	2.09
Flathead catfish	4	.23	2.22	0	0	0	0	0	0
White bass	2	.11	2.04	18	1.33	2.23	21	2.71	2.40
Sunfishes	39	2.23	3.25	128	9.45	4.08	7	.91	3.62
Largemouth bass	321	18.37	2.84	54	3.99	2.92	16	2.07	2.90
White crappie	252	14.41	2.73	126	9.31	3.37	29	3.74	3.10
Freshwater drum	7	.41	2.21	36	2.66	2.40	21	2.72	2.28
Total	1,748	100.00		1,354	100.00		774	100.00	

Year	1957-1958				1958-1959			
Number of Nets	11				12			
Species	No.	Per Cent	Avg. Wt.	Avg. "K"	No.	Per Cent	Avg. Wt.	Avg. "K"
Longnose gar	0	0	0	0	7	1.97	4.25	.63
Gizzard shad	252	48.83	.18	1.75	122	34.36	.34	1.33
Carp	63	12.21	6.00	2.58	13	3.67	2.37	1.97
River carpsucker	127	24.61	2.31	2.43	68	19.15	1.31	2.24
Smallmouth buffalo	0	0	0	0	2	.56	3.87	2.78
Gray redhorse	0	0	0	0	21	5.92	1.18	1.88
Black bullhead	0	0	0	0	17	4.79	.31	1.82
Channel catfish	12	2.33	3.12	2.12	14	3.94	.43	1.68
White bass	33	6.39	2.87	3.32	32	9.02	1.18	2.10
Bluegill	0	0	0	0	16	4.50	.28	4.00
Largemouth bass	8	1.56	4.56	2.96	1	.28	1.50	2.19
White crappie	19	3.68	.18	2.97	38	10.71	.37	3.08
Freshwater drum	2	.39	.87	2.31	4	1.13	.93	1.84
Total	516	100.00			355	100.00		

Table 10 continued.

Year	1959-1960				1961-1962			
Number of Nets	12				5			
Species	No.	Per Cent	Avg. Wt.	Avg. "K"	No.	Per Cent	Avg. Wt.	Avg. "K"
Longnose gar	1	.16	1.12	.33	45	12.60	3.13	.53
Gizzard shad	369	59.04	.20	1.38	140	39.22	.47	1.38
Carp	8	1.28	.09	2.32	9	2.52	3.78	1.50
River carpsucker	77	12.32	1.81	2.54	47	13.16	2.63	2.56
Black bullhead	1	.16	.43	2.23	0	0	0	0
Channel catfish	33	5.28	1.68	2.17	19	5.32	2.11	1.56
White bass	66	10.56	1.08	2.46	27	7.57	1.03	2.17
Bluegill	4	.64	.14	2.82	6	1.68	.06	3.14
Longear sunfish	0	0	0	0	1	.28	.06	2.70
White crappie	59	9.44	.16	1.81	17	4.76	.08	3.10
Freshwater drum	7	1.12	.37	1.66	46	12.89	.36	1.80
Total	625	100.00			357	100.00		

Year	1962-1963				1964-1965			
Number of Nets	30				24			
Species	No	Per Cent	Avg. Wt.	Avg. "K"	No. No.	Per Cent	Avg. Wt.	Avg. "K"
Longnose gar	2	.28	6.40	.44	5	.56	5.14	.42
Gizzard shad	19	2.69	.15	1.50	225	25.39	.12	1.58
Carp	29	4.10	12.71	2.10	39	4.41	2.09	2.29
Golden shiner	1	.14	.14	-	0	0	0	0
River carpsucker	481	68.03	1.74	2.20	410	46.27	1.45	2.29
Smallmouth buffalo	9	1.28	12.71	2.80	2	.23	7.47	3.20
Gray redhorse	5	.70	2.18	2.10	1	.11	2.31	.95
Black bullhead	1	.14	.65	-	0	0	0	0
Channel catfish	18	2.55	1.88	1.60	46	5.19	1.89	1.75
Flathead catfish	1	.14	50.13	-	8	.90	6.08	2.18
White bass	66	9.34	1.82	2.60	54	6.10	.75	2.61
Warmouth	0	0	0	0	1	.11	.05	3.95
Bluegill	4	.57	.07	3.40	20	2.26	.09	3.61
Largemouth bass	40	5.66	5.64	2.90	6	.68	3.97	3.01
White crappie	30	4.24	.52	2.30	58	6.54	.34	2.58
Freshwater drum	1	.14	1.13	-	11	1.25	.64	1.94
Total	707	100.00			886	100.00		

When individual "K" factors for game species are plotted on a graduated scale, great intraspecific deviations appear (Table 11).

Average "K" and "K"-ranges have been calculated to maintain a record of the physical condition of each species as their environmental influences change (Table 12).

Table 12. "K"-Range and Average "K" for all Species Netted from San Angelo Reservoir from March 1, 1964, to February 28, 1965.

Species	Number	"K"-Range	Average "K"
Longnose gar	5	0.37-0.49	0.42
Gizzard shad	225	1.00-1.96	1.58
Carp	39	1.15-4.49	2.29
River carpsucker	410	1.55-3.01	2.29
Smallmouth buffalo	2	3.07-3.34	3.20
Gray redhorse	1	0.95	0.95
Channel catfish	46	1.37-2.35	1.75
Flathead catfish	8	1.61-2.82	2.18
White bass	54	1.78-3.33	2.61
Warmouth	1	3.95	3.95
Bluegill	20	2.80-4.14	3.61
Largemouth bass	6	1.70-3.66	3.01
White crappie	58	1.91-3.77	2.58
Freshwater drum	11	1.39-2.31	1.94
Total	886		

At least 50 stomachs, when that many were available, were examined to determine each game species' feeding habit. Only one flathead catfish, dead when the nets were run, was cut open. The others were returned, alive, to the lake (Table 13).

Gonads from all species were examined. Results of these investigations are recorded individually on field forms. They are not tabulated and included in this report because of its voluminosity and relative unimportance. Two carp and one largemouth bass were examined which contained hardened, partially atrophied egg sacs. All other fish appeared to be following normal spawning patterns.

Recommendations:

Since San Angelo Reservoir is very low and only 15 per cent of the netting sample is desirable fish, a partial rotenone renovation is recommended. A selective and contour treatment should drastically reduce the gizzard shad population and eliminate smaller numbers of river carpsuckers and other undesirable species. This would provide room and food for hatchery fish and the natural reproduction from existing game species.

Although this type of renovation is shortlived, the cost is also comparatively low. Since San Angelo Reservoir is presently the only local lake with a large enough volume to support extensive recreational activities, the small cost would probably be well justified.

Table 11. "K" Factor Distribution for Principal Game Species Netted from San Angelo Reservoir from March 1, 1964, to February 28, 1965.

Date	Sex	"K"	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Channel catfish																										
3-12-64	Males							1																		
	Females			1		1			1			1														
7-2-64	Males			1	1			1																		
	Females				1				1	1																
9-10-64	Males		1	1	2	2																				
	Females		2	3	3		2	1					1													
11-5-64	Males		2		1		2	3																		
	Females				2			3	1	1	1	1														
	Totals		5	6	10	3	4	9	3	2	1	2	1													
Flathead catfish																										
3-12-64	1/											1														
7-2-64	1/				1																					
9-10-64	1/							1																		
11-5-64	1/									1	1	1				1	1									
	Totals				1			1		1	1	2				1	1									
White bass																										
3-12-64	Males																		2	2	3	1				
	Females						1									2		1		1	1	2				
7-2-64	Males							1	2	1	1	3	2	1	1	1	1									
	Females											1	1													
9-10-64	Males							1			1			1						1						
	Females								1				2		2											
11-5-64	Males										1			1	2	1										
	Females										1	2	1			1										
	Totals						1	2	3	1	4	6	6	3	5	5	1	1	2	4	4	3				

Table 11 Continued.

Date	Sex	"K"	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7
Largemouth bass																										
3-12-64	Females																							1	1	
7-2-64	Females																	1								
9-10-64	Females					1																				
11-5-64	Females														1									1		
	Totals					1									1			1						2	1	
White crappie																										
3-12-64	Males							1		1	2	1	1	1	1	1	1		1	1	3		2	1		1
	Females							1	1		2	1	1	1	2	1						1	1			
7-2-64	Males									2																
	Females											1	1													
9-10-64	Males									2		2		1			1									
	Females								1		2		3	1		1			1							
11-5-64	Males								1			1														
	Females							1	1			1						1								
	Totals							3	4	5	6	7	6	4	3	3	2	1	2	1	3	1	3	1		1

1/ Sex was not recorded, since most specimens were returned, alive, to the lake.

Table 13. Food Items in Game Fish Netted from San Angelo Reservoir from March 1, 1964, to February 28, 1965.

Species	Channel catfish	Flathead catfish	White bass	Sunfish	Largemouth bass	White Crappie
Number examined	46	1	51	21	6	55
Number with food	20	1	16	10	4	23
Food items			Frequency			
Shad	3	1	7		1	6
Fish remains	11		8		3	11
Insects	3		1	10		7
Algae	2					
Bird remains	1					

If an improvement in the fish population is effectuated, it is recommended that the subsequent improvement in harvest be measured. Previous creel census data are old but should yield some basis for comparison. Harvest data collected the year following renovation could be compared with data from later years to help determine when further management techniques are needed.

A warden creel census program is included in the plans, specifications and estimates for Project F-5-R-13. This job should help implement the above recommendation.

New Winters Lake

Findings:

New Winters Lake is located on Elm Creek, a tributary of the Colorado River, in Runnels County. At maximum capacity the reservoir impounds 11,000 acre feet and covers 250 acres. It is the primary source of municipal water for the city of Winters, Texas. There are no charges or local regulations on fishing.

The lake was netted and seined during June and July of 1964. The deplorable condition of the lake's fishery during that period are summarized in Tables 14, 15 and 16.

Table 14. Results of Ten Seining Collections Obtained from New Winters Lake Prior to Renovation.
(1 Collection with a 200-Foot Straight Seine, 10 Feet Deep with 1-Inch Mesh)
(9 Collections with a 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh)

Species	Number	Size Range in Inches
Gizzard shad	549	4-8
Carp	2	7
Red shiner	11	1-3
Fathead minnow	23	2-4
River carpsucker	7	6-7
Channel catfish	1	8
Mosquitofish	8	1-3
Bluegill	70	1-4
Longear sunfish	79	2-4
Redear sunfish	1	5
Largemouth bass	17	4-24
White crappie	95	3-5
Total	863	

Table 15. Results of 12 Standard Nets Set in New Winters Lake Prior to Renovation.

June 5, 1964			
Water temperature	72° F.	Precipitation	None
General turbidity	6 inches	Relative humidity	36%-90%
Air temperature	87° F.	Barometric pressure	27.91-28.02 inches
Wind speed and direction	5.4 mph, SE.	Moon phase	Last ¼+2 days
Cloud cover	40%		
July 28, 1964			
Water temperature	74° F.	Precipitation	None
General turbidity	6 inches	Relative humidity	27%-63%
Air temperature	100° F.	Barometric pressure	27.94-28.03 inches
Wind speed and direction	7.1 mph, SE.	Moon phase	Full + 4 days
Cloud cover	30%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	133	22.50	14.58	.11	3.86
Carp	19	3.21	62.64	3.30	16.62
River carpsucker	113	19.12	55.45	.49	14.70
Smallmouth buffalo	32	5.42	121.62	3.00	32.26
Black bullhead	2	.34	.27	.14	.07
Channel catfish	37	6.26	46.52	1.26	12.34
Flathead catfish	4	.67	29.65	7.41	7.86
Bluegill	13	2.20	.67	.05	.18
Largemouth bass	4	.68	13.37	3.34	3.55
White crappie	180	30.46	25.28	.14	6.70
Freshwater drum	54	9.14	6.98	.13	1.86
Total	591	100.00	377.03		100.00

Table 16. Rough Fish - Game Fish Ratio as Indicated by Netting Results from New Winters Lake Prior to Renovation.

	Number	Per Cent by Number
Undesirable Fish (shad, buffalo, suckers, carp, black bullheads, sunfish and crappie less than 4 ounces, and drum)	533	90.18
Desirable Fish (catfish, largemouth bass, and crappie larger than 4 ounces)	58	9.82
Total	591	100.00

On July 28, 1964, the Winters City Commission met and voted unanimously to solicit the technical assistance of Parks and Wildlife Department personnel in an effort to clear the lake of rough fish. Local fishermen were complaining of poor fishing and the lake was at a record low (1,249 acre feet covering 180 acres).

An analysis of all previous netting data indicated that the lake had probably reached a plateau in its trend towards rough fish domination and that the fishery would continue to be inadequate until management techniques were effectuated (Table 17).

Table 17. A Comparative Summary of Netting Results from New Winters Lake Prior to its Chemical Treatment on August 1, 1964.

Year	1961				1962				1964			
Number of Nets	3				6				12			
Species	No.	Per Cent	Avg. Wt.	Avg. "K"	No.	Per Cent	Avg. Wt.	Avg. "K"	No.	Per Cent	Avg. Wt.	Avg. "K"
Gizzard shad	33	36.66	.13	1.40	70	41.66	.11	1.13	133	22.50	.11	1.63
Carp	0	0	0	0	9	5.36	1.84	2.22	19	3.21	3.30	2.47
River carpsucker	26	28.89	1.26	2.37	18	10.71	.60	2.12	113	19.12	.49	1.95
Smallmouth buffalo	0	0	0	0	1	.60	1.50	2.75	32	5.42	3.80	2.98
Black bullhead	0	0	0	0	0	0	0	0	2	.34	.14	1.84
Channel catfish	19	21.11	.51	1.43	10	5.95	.46	1.30	37	6.26	1.26	1.58
Flathead catfish	1	1.11	2.31	1.58	1	.60	4.88	1.58	4	.67	7.41	2.16
Bluegill	2	2.23	.06	3.17	3	1.78	.08	2.57	13	2.20	.05	3.48
Redear sunfish	1	1.11	.06	3.38	0	0	0	0	0	0	0	0
Largemouth bass	0	0	0	0	2	1.19	.84	1.84	4	.67	3.34	3.02
White crappie	8	8.89	.16	2.00	38	22.62	.18	2.35	180	30.46	.14	2.42
Freshwater drum	0	0	0	0	16	9.53	.19	1.94	54	9.14	.13	1.91
Total	90	100.00			168	100.00			591	100.00		

Since the Winters City Commission was willing to purchase the required rotenone and would sponsor complete responsibility for the treatment, a fish eradication program was recommended.

The first 4 miles of the watershed, which was owned either by the city or by approving landowners, was treated with 200 pounds of powdered rotenone on July 31, 1964. The upper drainage was not treated. The lake proper was treated with 4,050 pounds of 6.7 per cent powdered rotenone on August 1, 1964. At 4.34 pounds per acre-foot this produced a concentration of 1.61 ppm. All time and expense incurred by F-5-R fishery crews in offering technical assistance for this treatment was charged to the State.

Approximately 20,000 red shiners were released in Winters Lake during August following the treatment. On October 1, 1964, 18,200 largemouth bass and 12,000 channel catfish were stocked from the State hatcheries.

Between the time of treatment and restocking several showers on the watershed resulted in significant run-off. These rises were probably beneficial in terms of fish food and growing room. However, several species of rough fish from the untreated watershed were probably reintroduced as a result of these rises.

Three seining collections with a 30-foot straight seine, obtained on August 17, 1964, produced only 26 mosquitofish. Netting yielded six adult rough fish, all sexually ripe (Table 18).

Table 18. Results of Six Standard Nets Set in New Winters Lake after Renovation and Before Restocking.

August 17, 1964

Water temperature	74° F.	Precipitation	None
General turbidity	54 inches	Relative humidity	36%-90%
Air temperature	94° F.	Barometric pressure	27.94-28.06
Wind speed and direction	5.6 mph, N.	Moon phase	First ¼ + 1 day
Cloud cover	60%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Carp	4	66.66	8.62	2.15	82.17
River carpsucker	1	16.67	.62	.62	5.91
Smallmouth buffalo	1	16.67	1.25	1.25	11.92
Total	6	100.00	10.49		100.00

Recommendations:

Netting and seining samples should be taken during the spring or summer of 1965 to determine if additional largemouth bass and channel catfish are required. Flathead catfish should be reintroduced as soon as a stock is available.

A record of the fishery harvest needs to be started. This should aid in evaluating the current renovation and indicate when inventory-type investigations need to be resumed.

Lake Talpa

Findings:

Lake Talpa is located on the Colorado River Watershed in Coleman County. It is the water supply for the town of Talpa. On July 9, 1964, when 6 netting and 8 seining collections were obtained, the lake covered about 28 surface acres and was estimated to contain 140 acre feet of water.

Talpa city officials reported that fishing was poor. They requested that recommendations for improvement be made.

Seining results indicated large populations of gizzard shad, sunfish and small crappie. They also revealed that largemouth bass successfully spawned during the spring of 1964 (Table 19).

Netting results indicate that shad and small crappie are very abundant. Channel catfish appear to be the most prevalent game species. No river carpsuckers were captured (Table 20).

The physical condition of each species, as indicated by their "K" factors, is included for future reference, should management techniques ever be employed (Table 21).

Table 19. Results of Eight Seining Collections Obtained from Lake Talpa on July 10, 1964.
(5 Collections with a 30-Foot Straight Seine, 6 Feet Deep with ¼-Inch Mesh)
(3 Collections with a 100-Foot Straight Seine, 8 Feet Deep with ½-Inch Mesh)

Species	Number	Size Range in Inches
Gizzard shad	409	1-10
Carp	3	18
Golden shiner	59	3-4
Blacktail shiner	110	½-4
Channel catfish	3	6-11
Orangespotted sunfish	3	2-3
Bluegill	180	½-5
Longear sunfish	117	2-4
Largemouth bass	26	1½-6
White crappie	43	1½-6
Logperch	27	2-5
Total	980	

Table 20. Results of Six Standard Nets Set in Lake Talpa on July 10, 1964.

Water temperature	80° F.	Precipitation	None
General turbidity	10 inches	Relative humidity	15%-64%
Air temperature	75°-105° F.	Barometric pressure	27.90-28.00 inches
Wind speed and direction	10.6 mph, S.	Moon phase	New + 1 day
Cloud cover	10%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	82	39.23	15.02	1.83	29.88
Carp	9	4.31	18.68	2.07	37.17
Channel catfish	7	3.34	3.80	.54	7.56
Warmouth	1	.48	.09	.09	.18
Bluegill	24	11.49	1.63	.06	3.24
Largemouth bass	1	.48	.58	.58	1.15
White crappie	85	40.67	10.46	.12	20.82
Total	209	100.00	50.26		100.00

Table 21. "K"-Range and Average "K" for all Species Netted from Lake Talpa on July 10, 1964.

Species	Number	"K"-Range	Average "K"
Gizzard shad	82	1.23-2.00	1.69
Carp	9	2.43-2.99	2.66
Channel catfish	7	1.35-2.21	1.62
Warmouth	1	3.54	3.54
Bluegill	24	3.16-4.24	3.59
Largemouth bass	1	2.39	2.39
White crappie	85	2.00-2.95	2.59
Total	209		

Recommendations:

A program of selective control of gizzard shad and stocking of game species would probably improve Lake Talpa's fishery. However, the Talpa City Council decided to wait until their water supply was less critical before considering treatment.

This lake is almost on the county line between Runnels and Coleman Counties, but is actually in Coleman County. It should not have been included in the F-5-R project documents. After discovering this error, special authorization was obtained from the Region II fishery supervisor to proceed with the scheduled investigations. Future surveys should be conducted by fishery crews from Region II.

Valley Creek Reservoir

Findings:

Valley Creek Reservoir is on the Colorado River Watershed in Runnels County. It is the primary source of water for the city of Ballinger.

On August 20, 1964, when six netting collections were obtained, the lake was running over the spillway. It was estimated to cover 150 acres and contain 1,350 acre feet. Since shoreline vegetation was inundated, seining was impossible.

Netting samples indicated that gizzard shad, river carpsuckers and small stunted crappie were very abundant. Channel catfish appeared to be the principal fisheries asset. Although no largemouth bass were captured, the lake has had the reputation for good bass fishing (Table 22).

Table 22. Results of Six Standard Nets Set in Valley Creek Reservoir on August 20, 1964.

Water temperature	79° F.	Precipitation	None
General turbidity	8 inches	Relative humidity	26%-58%
Air temperature	77°-102° F.	Barometric pressure	27.69-27.79 inches
Wind speed and direction	13.2 mps, S.	Moon phase	First ¼ + 6 days
Cloud cover	40%		

Species	Number	Per Cent	Total Weight Pounds	Average Weight Pounds	Per Cent by Weight
Gizzard shad	207	47.58	26.79	.13	11.66
Carp	9	2.07	48.70	5.41	21.21
River carpsucker	56	12.87	70.63	1.26	30.75
Black bullhead	1	.23	.23	.23	.10
Channel catfish	18	4.14	33.32	1.85	14.51
Flathead catfish	2	.46	18.79	9.39	8.18
Bluegill	17	3.91	1.26	.07	.55
Longear sunfish	1	.23	.23	.23	.10
White crappie	79	18.16	9.75	.12	4.24
Freshwater drum	45	10.35	19.96	.44	8.70
Total	435	100.00	229.66		100.00

Data on the physical condition of individual species, as indicated by their "K" factors, is included for comparative purposes in case renovation is undertaken at a later date (Table 23).

Table 23. "K" Range and Average "K" for all Species Netted from Valley Creek Reservoir on August 20, 1964.

Species	Number	"K"-Range	Average "K"
Gizzard shad	207	1.30-1.85	1.59
Carp	9	1.92-2.69	2.26
River carpsucker	56	2.07-2.88	2.40
Black bullhead	1	2.01	2.01
Channel catfish	18	1.39-2.31	1.68
Flathead catfish	2	1.98-2.35	2.16
Bluegill	17	3.00-4.09	3.55
Longear sunfish	1	3.39	3.39
White crappie	79	1.38-3.41	2.17
Freshwater drum	45	1.86-2.58	2.19
Total	435		

Recommendations:

It was suggested to the mayor of Ballinger that a management program should be considered and that the Parks and Wildlife Department could plan more intensive investigations should the city be interested. No formal request has been received. It is recommended that Valley Creek Reservoir's fishery problems be examined and analyzed more thoroughly under Project F-5-R-13 if city officials request the Department's services. Data obtained under this segment are inadequate to recommend any specific management procedures.

Prepared by James F. Wilcox
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Date June 30, 1965

Approved by Marion Toole
Coordinator

Leo D. Lewis
Regional Supervisor