STATE Texas
PROJECT F-2-R-3, Job B-16
PERIOD June 1955 through January 1956

FILE

SEGMENT COMPLETION REPORT

JOHN E. TILTON
Assistant Project Leader

TITLE

Inventory of Species Present in Lake Granite Shoals, Texas.

OBJECTIVES

To determine the species present and their relative abundance.

METHODS AND MATERIALS

Fish collections and ecological observations were made monthly throughout the segment period. Three collecting methods were used in obtaining specimens for study. Seining and netting provided the largest number of individuals for study and were the primary collecting methods employed. One rotenone sample was obtained from a slough containing approximately three acre feet of water.

Seine collections were made at random over the lake and specimens were preserved in 10 per cent formalin for later laboratory identification and study. Gill net sets were also made at random, but all specimens taken were identified, weighed, measured, and checked for gonadal development in the field. Seining and netting locations are shown on Map I.

Ecological data was recorded with each fish collection made. In addition water samples were taken and analyzed. Two sampling sites were selected and one was visited each month. Samples were taken at 10 feet intervals from the surface to 30 feet. Temperature, in degrees Farenheit, dissolved oxygen in ppm, dissolved carbon dioxide in ppm, and pH were recorded for each depth.

PHYSICAL DESCRIPTION

Lake Granite Shoals is a 177,000 acre foot impoundment, constructed by the Lower Colorado River Authority. The lake is slightly over 19 miles in length, measured from Alvin Wirtz Dam to the Arnold Dam at the head of the lake. Maximum width of Lake Granite Shoals is slightly less than 1.5 miles and the total area inundated is approximately 6,300 acres.

The lake is designated as a power supply reservoir and maintains a constant level, with water level fluctuations over two feet uncommon. The lake forms the boundary between Burnet and Llano Counties, with the dam about four miles from the town of Marble Falls, Burnet County, Texas. Alvin Wirtz Dam, impounding Lake Granite Shoals, was completed in 1952 to become the sixth dam constructed on the Colorado River and stands third in the chain, below Lake Inks and Lake Buchanan.

The major tributaries of Lake Granite Shoals are the Colorado River, Llano River, and Big Sandy Creek. The lake above the juncture of the Llano river is narrow, less than 200 yards in width, while below the river junction the lake increases in width and reaches its maximum of 1.5 miles a short distance above Alvin Wirtz Dam.

The lake is located in the Central Basin of Texas in rugged hill country on the Burnet-Llano County line. The economy of the area is based on livestock, with cattle, sheep, wool, goats, and mohair as principal income sources. In addition, a fair tourist trade is enjoyed by both Llano and Burnet County with four lakes, excellent hunting, and some guest ranches available. Little farming is done in the area surrounding Lake Granite Shoals as the rocky, rolling country is much better suited to ranching.

Dense growths of cedar, mesquite, post oak, and hackberry are found on the hills surrounding the lake while pecan, cottonwood, and willows are found in the creek bottoms and around the lake edges.

The soils in the immediate area are derived from the underlying granite and in many areas solid granitic intrusions with little or no topsoil form the shoreline of Lake Granite Shoals.

Rubble, granite gravel, mud, sand, and solid granite bottom types are all found in the lake with mud banks and bottom restricted largely to the upper end of the lake, while sloping sand, rubble, and granite bottoms characterize the lower end. Large areas of sandy shoals provide excellent spawning grounds for the centrachid fishes, while the sand and gravel shoals above the junctures of the three tributaries provide spawning areas for large numbers of white bass.

The water in Lake Granite Shoals is generally clear, as Lake Buchanan and Lake Inks settle out a large portion of silt carried down by the Colorado River.

As a recreation area, Lake Granite Shoals is moderately popular with thirteen major resorts providing cabins and other facilities for tourists. Approximately 130 boats are available for rent from eighteen boat docks on the lake. Bait, tackle, and fishing information, are also available in a number of stores throughout the area.

In addition, several free camp sites are found along the lake shore, erected by the L.C.R.A. and Burnet County for use by both local citizens and tourists to the area.

AQUATIC VEGETATION AND COVER

Lake Granite Shoals supports a large growth of aquatic plants with two types, coontail, Cerataphyllum sp., and parrot feather, Myriophyllum sp., accounting for the bulk of the shallow water vegetation. During the late spring, summer, and fall months, shoreline areas to a depth of over ten feet, are so choked with these plants that shore fishing is difficult and boat travel in the shallow area practically impossible.

Probably due to the relatively short time the lake has been inundated, other aquatics are not too numerous. Some willows, Salix nigra; saw grass, Zizaniopsis sp; and Cattails, Typha sp. are found along bank areas, but to date present no problem from over abundance.

The coontail and parrot feather provide excellent cover for sunfish, black

bass, a variety of shiners and other small fish. In addition, large areas of the lake are former timber land and which was imperfectly cleared before impoundment, and now provide submerged timber and natural brush piles throughout the lower portion of the lake. Large granite boulders, rubble, and man made break waters provide many crevices and nooks as cover.

CHEMICAL CHARACTERISTICS

Water samples were collected from one of two sampling sites each month, depending upon which section of the lake was being worked. Samples were taken at ten foot intervals from surface to a maximum of 30 feet. Dissolved oxygen, dissolved carbon dioxide, pH, and water temperature were recorded from each depth sampled.

No unusual chemical or thermal conditions were found in the waters of Lake Granite Shoals throughout the segment period, and no traces of pollution were noted. The results of chemical analysis are found in Table I.

FISH COLLECTIONS

Table II contains a checklist of species taken in Lake Granite Shoals during the segment period. A total of 29 species were taken and undoubtedly the list will be increased during the next segment period when the area near the mouth of the Llano River is more intensively worked.

Table III shows the results of seining collections during the segment period. A total of 1,396 individuals representing eighteen species were collected and identified in the laboratory. The spottail shiner, Notropis venustus, was the most abundant species taken in seines, with a total of 425 or 30.4 per cent of the total number, while the bluegill, Lepomis macrochirus, was second with 193 specimens and 13.82 per cent of the total number. Of the more desirable game fish, the largemouth black bass, Micropterus salmoides, was the most abundant with 41 individuals making up 2.93 per cent of the total. It is interesting to note that during the segment period, rough fish and forage species excluding sunfish, made up 71.71 per cent of the total number of seined specimens.

Table IV lists the number of specimens taken in gill nets during the segment period. The data is presented by months and includes consolidated total both in numbers and per cent of total.

The gizzard shad, Dorosoma cepedianum, accounted for the largest number of individuals, with 431 specimens and 27.82 per cent of the total number taken. Second most abundant species netted was the river carpsucker, Carpiodes carpio, with 225 individuals and 14.52 per cent of the total. The white bass, Morone chrysops, and white crappie, Pomoxis annularis, were the most numerous game fish with 197 white bass (12.71 per cent of total number) and 176 white crappie (11.37 per cent of total number) taken during the segment period. As in other lakes on the Colorado River chain, rough fish dominated the catch with 991 specimens of a total of 1,549 fish taken, or 63.98 per cent of the total.

However, as shown in Table IV, rough fish made up less than one-half of the total weight netted with 465.85 pounds, or 45.58 per cent of the 1,022.11 pounds taken in gill nets during the segment period. A game species, the white bass, contributed the largest amount of total weight with 217.94 pounds and 21.33 per cent of total weight. The river carpsucker, Carpiodes carpio, was second with 181.45 pounds and 17.76 per cent of the total. The flathead or yellow catfish, Pilodictus olivaris,

contributed 135.33 pounds to the total, due primarily to the capture of several large individuals in the upper end of the lake near the mouth of the Llano River.

Table VI records the number of pounds of fish per foot of net both in consolidated totals and by month.

One rotenone collection was made in January on a small slough containing approximately three acre feet of water. The average depth of the treated area was seven feet and maximum depth was twelve feet. It was felt that a large fish population would be present in the area even though water temperatures were in the low 50's. The area was treated with rotenone and the result was extremely disappointing, although a complete kill was assured by the amount of rotenone used. A total of 415 fish were taken, including 288 bluegills under four inches in length. With the exception of one channel catfish, I. punctatus, three log perch, P. caprodes, and one orangethroat darter, E. spectabile, all individuals were juveniles. Rotenone specimens were not included in total weight or total number figures in the report.

DISCUSSION

Lake Granite Shoals is undoubtedly one of the best fishing lakes on the Colorado chain. The lake is easily accessible to fishermen, facilities for the sportsman are available, and excellent catches of all game species were observed during the segment period.

However, several problems are forming in regard to continued fishing and fishing success. Aquatic vegetation, particularly, Myriophyllum sp. is becoming a distinct problem. With little water level fluctuation and relatively mild winters, this plant species has gained a solid foothold and threatens to congest the lake to such an extent that fishing will be difficult or impossible. Large sections of the lake, particularly shallow sloughs and shoreline areas are becoming more congested each year. Camp operators and boat dock owners carry on a year round campaign to open boat paths for access to the lake, relying on mechanical means which is both an expensive and temporary measure. An effective method of vegetation control or eradication is needed to prevent the further encroachment of Myriophyllum sp. into the better fishing waters of the lake and to open areas which are now closed to fishermen.

Rough fish, a constant problem in Texas lakes, are already extremely abundant in Granite Shoals, and with the passage of time will undoubtedly increase tremendously in both numbers, and particularly, in total weight. The average weight for all species of rough fish taken in Granite Shoals is now below the average for other lakes which have been surveyed on the Colorado chain. With a relatively high fertility and too few large predators, the rough fish will continue a rapid growth, taking a high percentage of the natural productivity of the lake, to the detriment of the more important game species.

With abundant cover, excellent spawning areas and a variety of habitats, Lake Granite Shoals produces large numbers of game fish to the sports fishermen. Fishing pressure is light on this lake and it is felt that a desirable recreation area is not being utilized to its potential and that much larger quantities of game fish could be taken if fishing pressure were increased. Probably only a small segment of the potential crop of edible fish is now being harvested, leaving a large surplus untouched and wasted each year.

Results of stomach analyses have not been included but will be presented in the Job Completion Report at the end of the next segment.

SUMMARY

1. Lake Granite Shoals, the third lake in the Colorado River chain of lakes was inventoried for species present and relative abundance.

2. A large rough fish population was found to occur, although average size of individuals was relatively small due to the age of the lake.

3. Over abundant aquatic vegetation, particularly parrot feather, is rapidly becoming a problem, as it is closing large shoreline and shallow areas to fishing and boat travel.

4. A large game fish population of desirable size individuals was found to occur in the lake and good catches of game fish by sportsmen were observed during the segment period.

5. No adverse thermal or chemical conditions were found and no evidences of pollution noted.

Table 1. Lake Granite Shoals Water Analysis, July 1955 through January 1956.

DATE	Depth in Feet	Air Temp. °F	Water Temp. °F	pH	O_2 ppm	CO_2 ppm
July	1	85	85	8.2	8.8	4
	10	85	84	8.1	8.6	5
	20	85	84	8.1	8.1	12
August	1	95	90	8.2	8.7	5
	10	95	86	8.0	8.3	7
	20	95	80	7.6	7.6	14
	30	95	80	7.4	7.5	17
September	1	93	86	8.2	10.0	0
	10	93	82	7.9	6.5	10
	20	93	81	7.6	4.0	20
	30	93	81	7.6	1.0	30
October	1	93	84	8.1	9.0	3
	10	93	83	7.8	2.0	7
	20	93	82	7.6	5.0	10
	30	93	81	7.5	0.0	9
November	1	70	69	7.8	10.0	trace
	10	70	69	7.8	8.2	2
	20	70	69	7.7	7.0	6
	30	70	69	7.7	5.4	12
December	1	67	58	8.2	9.0	0
	10	67	58	8.2	6.0	3
	20	67	57	8.1	4.0	6
	30	67	57	8.1	4.0	10
January	1	41	55	8.3	--	trace
	10	41	54	8.3	8.7	trace
	20	41	53	8.2	8.6	trace
	30	41	51.5	8.1	7.4	1

Table 2. Checklist of Species Found to Occur in Granite Shoals Lake.

Scientific Name	Common Name
Lepisosteus platostomus	shortnose gar
Lepisosteus osseus	longnose gar
Dorosoma cepedianum	gizzard shad
Ictiobus bubalus	smallmouth buffalo
Carpiodes carpio	river carpsucker
Moxostoma congestum	gray redhorse
Cyprinus carpio	carp
Notropis venustus	spottail
Notropis lutrensis	redhorse shiner
Pimephales vigilax	parrot minnow
Campostoma anomalum	stoneroller
Ictalurus punctatus	channel catfish
Pilodictus olivaris	yellow catfish
Gambusia affinis	gambusia
Morone chrysops	white bass
Micropterus punctulatus	Kentucky spotted bass
Micropterus treculi	Texas spotted bass
Micropterus salmoides	largemouth black bass
Chaenobryttus coronarius	warmouth
Lepomis cyanellus	green sunfish
Lepomis microlophus	redear sunfish
Lepomis macrochirus	bluegill sunfish
Lepomis auritus	yellowbelly sunfish
Lepomis megalotis	longear sunfish
Pomoxis annularis	white crappie
Percina caprodes	logperch
Etheostoma spectabile	orangethroat darter
Aplodinotus grunniens	freshwater drum
Cichlasoma cyanoguttata	Rio Grande perch

Table 3. Number of Specimens Taken in Seines From Lake Granite Shoals, July 1955 through December 1956.

Fish Species	July	August	September	October	November	December	Total	Per Cent of Total
D. cepedianum	41	46	46	22	0	0	155	11.10
Carpiodes carpio	20	1	6	1	0	1	29	2.08
N. venustus	59	8	23	264	0	71	425	30.44
N. lutrensis	68	5	3	57	0	39	172	12.32
P. vigilax	21	1	0	146	0	0	168	12.03
C. anomalum	1	0	0	0	0	0	1	0.08
G. affinis	3	8	0	1	0	2	14	1.00
M. punctulatus	3	0	0	0	0	0	3	0.21
M. treculi	0	0	3	5	0	0	8	0.58
M. salmoides	0	17	23	0	0	1	41	2.93
C. coronarius	0	1	0	0	0	2	3	0.22
L. cyanellus	0	1	0	2	0	1	4	0.29
L. microlophus	0	1	16	1	0	0	18	1.29
L. macrochirus	17	3	75	53	0	45	193	13.82
L. auritus	0	3	0	8	0	0	11	0.79
L. megalotis	37	2	65	10	0	0	114	8.16
P. caprodes	1	1	0	28	0	0	30	2.15
C. cyanoguttata	0	1	6	0	0	0	7	0.51
Totals	271	99	266	598	0	162	1396	100.00

Table 4. Number of Specimens Taken by Gill Nets From Granite Shoals Lake, July 1955 through December 1955.

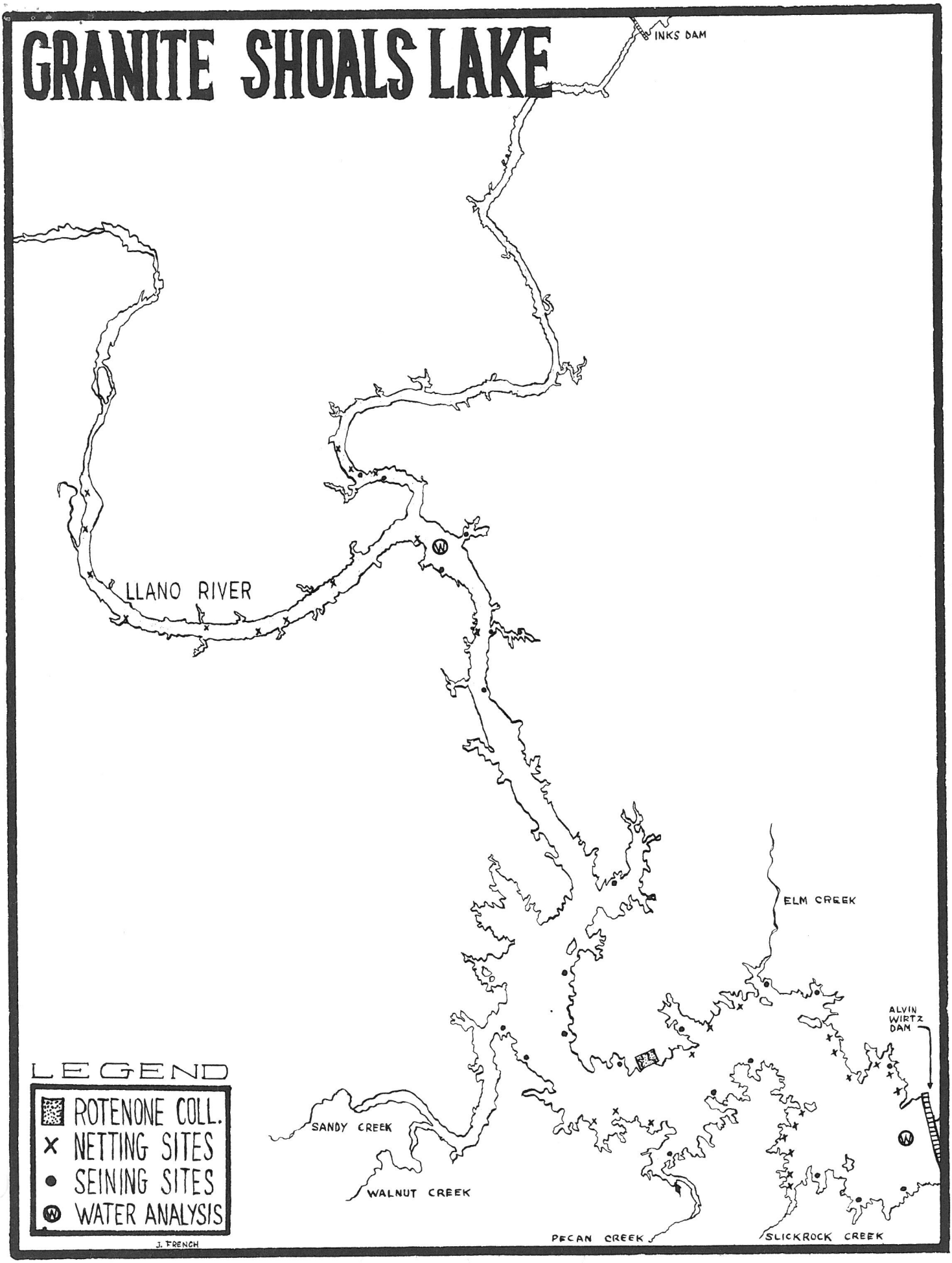
Fish Species	July	August	September	October	November	December	Total	Per Cent of Number
L. platostomus	2	0	0	0	0	0	2	0.12
L. osseus	0	0	0	0	1	0	1	0.07
D. cepedianum	63	33	65	103	75	92	431	27.82
I. bubalus	19	15	32	9	5	20	100	6.46
Carpiodes carpio	31	21	28	59	31	55	225	14.52
M. congestum	0	0	0	6	1	1	8	0.52
Cyprinus carpio	8	1	2	1	1	4	17	1.10
I. punctatus	18	6	10	15	23	60	132	8.52
P. olivaris	3	11	4	1	0	0	19	1.23
M. chrysops	19	0	1	50	18	109	197	12.71
M. treculi	0	0	0	0	2	0	2	0.12
M. salmoides	0	0	0	2	0	3	5	0.33
L. macrochirus	3	9	1	11	1	1	26	1.67
L. megalotis	0	0	0	0	0	1	1	0.07
P. annularis	13	46	62	13	25	17	176	11.37
A. grunniens	37	113	55	1	0	1	207	13.37
Totals	216	255	260	271	183	364	1549	100.00

Table 5. Pounds of Each Fish Species Taken by Gill Nets From Granite Shoals Lake, July 1955 through December 1956.

Fish Species	July	August	September	October	November	December	Total	Percent of Weight
L. platostomus	9.63	0.00	0.00	0.00	0.00	0.00	9.63	0.94
L. osseus	0.00	0.00	0.00	0.00	1.06	0.00	1.06	0.10
D. cepedianum	12.81	8.75	9.25	19.38	14.63	19.94	84.76	8.29
I. bubalus	8.56	29.50	34.63	5.81	9.00	13.19	100.69	9.85
Carpiodes carpio	26.31	11.94	19.88	34.56	33.13	55.63	181.45	17.76
M. congestum	0.00	0.00	0.00	5.44	1.00	0.94	7.38	0.72
Cyprinus carpio	14.19	0.75	2.25	1.31	1.31	7.19	27.00	2.64
I. punctatus	24.13	6.88	5.63	26.44	33.63	43.13	139.84	13.68
P. olivaris	13.63	85.13	34.44	2.13	0.00	0.00	135.33	13.24
M. chrysops	21.38	0.00	0.25	37.25	16.81	142.25	217.94	21.33
M. treculi	0.00	0.00	0.00	0.00	1.69	0.00	1.69	0.16
M. salmoides	0.00	0.00	0.00	4.19	0.00	4.50	8.69	0.85
L. macrochirus	0.31	0.69	0.19	1.56	0.13	0.13	3.01	0.30
L. megalotis	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.01
P. annularis	3.75	7.75	10.94	7.00	9.81	10.38	49.63	4.85
A. grunniens	13.75	24.25	13.31	2.19	0.00	0.38	53.88	5.28
Totals	148.45	175.64	130.77	147.26	122.20	297.79	1022.11	100.00

Table 6. Success of Gill Netting in Terms of Number and Pounds of Fish, July 1955 through December 1955.

Month	Number of Nets Set	Number of Foot Net Set	Number of Fish Caught	Number lbs. Fish Caught	Average Number Fish/net	Average No. Fish Ft. of Net	Average No. lbs. Fish/net	Average No. Lbs. Fish per Ft. of Net
July	7	750	216	148.45	30.85	0.288	21.21	0.197
August	6	750	255	175.64	42.50	0.340	29.27	0.234
September	6	750	260	130.77	43.33	0.346	21.79	0.174
October	6	750	271	147.26	45.16	0.361	24.54	0.196
November	5	625	183	122.20	36.60	0.292	24.44	0.195
December	8	1000	364	297.79	45.50	0.364	37.22	0.297
Total	38	4625	1549	1022.11	40.76	0.334	26.89	0.220


GRANITE SHOALS LAKE
INKS DAM
LLANO RIVER
ELM CREEK
ALVIN WIRTZ DAM
SANDY CREEK
WALNUT CREEK
PECAN CREEK
SLICKROCK CREEK
LEGEND
ROTENONE COLL.
NETTING SITES
SEINING SITES
WATER ANALYSIS
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