

JOB COMPLETION REPORT

FILE

As required by  
FEDERAL AID IN FISHERIES RESTORATION ACT  
TEXAS

Federal Aid Project No. F-3-R-14

Region 3-B Fisheries Studies

Job No. B-22 Basic Survey and Inventory of Fish  
Species in Sam Rayburn Reservoir

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## ABSTRACT

A total of 51 species were collected during seining and netting activities on Sam Rayburn Reservoir during the 2 segment period of this study. Twenty-nine species of fish were netted from the Reservoir this segment. Twelve game fish species were collected and 17 rough fish species as compared to 12 game fish species and 15 rough fish species taken in 1965. All the game fish species exhibited a high coefficient of condition.

Sam Rayburn Reservoir has become one of the most popular fishing lakes in Region 3-B. Bass and crappie fishing has been excellent with many fishermen catching limits.

Numerous camping and launching facilities have been built by the U. S. Corps of Engineers and the U. S. Forest Service. Many recreational areas are under construction at present.

Netting data compiled during both segments indicate considerable increases in game fish numbers during the spring and summer months. These increases are primarily due to the collection of young fish which suggests that successful spawning has occurred. In review of these data further stocking of largemouth bass and crappie is not recommended.

Sufficient field data have been collected to establish criteria for game and rough fish populations and the need for further stocking of game fish. It is therefore recommended that this job be terminated.

FINAL REPORT

State of Texas Name: Region 3-B Fisheries Studies  
Project No. F-3-R-14 Title: Basic Survey and Inventory of  
Fish Species in Sam Rayburn  
Job No. B-22 Reservoir  
Period Covered: February 1, 1966 - January 31, 1967

OBJECTIVES:

To gather fundamental information on the newly impounded waters of Sam Rayburn Reservoir in relation to their physical, chemical and biological aspects.

HISTORY:

Sam Rayburn Reservoir was authorized by the River and Harbor Act of March 2, 1945. Work was begun on the dam in 1957 and completed in 1965.

The earth filled dam is located on the Angelina River, 25.2 river miles above its confluence with the Neches River and approximately 10 miles northwest of Jasper, Texas. The dam has a height of 120 feet above the stream bed, a 30 foot crown, and a overall length of 19,430 feet. The dam has an uncontrolled spillway of 2,200 feet. The upstream slope of the dam is protected from eorsion by rip-rap.

Water was impounded in April, 1965. At the top of the power pool, elevation 164.0 feet, the lake will cover an area of approximately 114,500 acres with approximately 560 miles of shore line. The present surface acreage is approximately 80,000 - 90,000.

Sam Rayburn Dam is designed as a multi-purpose dam providing water conservation, hydro-electric power, flood control, recreation, and benefits to navigation.

Hatchery fish were stocked in the reservoir in 1965 and 1966. Listed below are the species and number that have been stocked to date.

Largemouth bass	461,000
Warmouth	80,000
Redear sunfish	530,000
Longear sunfish	40,000
Crappie	7,000

PROCEDURES:

A collecting trip was planned for each month of the segment. Data collected each month included gill netting results and seining collections.

### Netting Methods

Experimental gill nets were used for all netting. These nets are 150 feet long and 8 feet deep with mesh size ranging from 1 to 3½ inches in 25 foot sections. The nets were set out in the afternoon and picked up the following morning.

All netted fish were separated according to species, then counted and weighed. Sexual condition and stomach contents were also recorded. Coefficients of condition ("K" factor) of game fish species were calculated.

### Seining

Seining collections were made with a 26 foot by 6 foot bag seine with ½ inch mesh and a 15 foot by 4 foot bag seine with 1/8 inch mesh.

### Fish Collections

A total of 51 species, representing 14 families were collected from Sam Rayburn Reservoir as shown in Table 1. This is an increase of 22 species and five (5) families over the previous segment.

### Netting

A total of 2,132 fish made up of 29 species were collected by netting. The smallmouth buffalo (Ictiobus bubalus) was the most numerous species collected with a total of 667 (31.29 per cent). Figure 1 shows a sample of smallmouth buffalo. Black bullhead (Ictalurus melas) was by number the second most numerous species collected with 246 (11.54 per cent). The most numerous game fish species netted was the black crappie (Pomoxis nigromaculatus) with 194 (9.10 per cent). Smallmouth buffalo had the highest percentage by weight (26.15 per cent) with the carp (Cyprinus carpio) having the second highest per cent by weight (19.59 per cent). Figure 2 shows some of the 209 carp taken during the 1966 segment. Table 2 contains the number, per cent of number, weight and per cent of weight of the total netting results during the 1966 segment. Table 3 contains the number, per cent of number, weight and per cent of weight of the total netting results during the 1965 segment. Table 4 is a chart showing the monthly catch of individual species. Table 5 indicates the coefficient of condition ("K" factor) for each species of game fish collected. All species of game fish collected were in good condition. Figure 3 shows a sample of largemouth bass (Micropterus salmoides) taken in January 1967.

### Seining Collections

Six seining collections were made this segment consisting of 60 seine drags. A total of 1,640 specimens, representing 35 species were collected. Seining conditions have improved this segment due to the water level becoming more stable and killing the small brush along the marginal areas of the lake. Table 6 gives the number of each species taken by seining this segment.

Table 1

A Checklist of Sam Rayburn Reservoir Fish Species

- I. Family: LEPISOSTEIDAE - Gar
  - 1. Lepisosteus spatula - alligator gar
  - 2. Lepisosteus oculatus - spotted gar
  - 3. Lepisosteus osseus - longnose gar
- II. Family: AMIIDAE - Bowfin
  - 4. Amia calva - bowfin
- III. Family: CLUPEIDAE - Herrings
  - 5. Dorosoma petenense - threadfin shad
  - 6. Dorosoma cepedianum - gizzard shad
- IV. Family: ESOCIDAE - Pickerels
  - 7. Esox americanus - grass pickerel
  - 8. Esox niger - chain pickerel
- V. Family: CATOSTOMIDAE - Suckers and buffalofishes
  - 9. Cycleptus elongatus - blue sucker
  - 10. Ictiobus cyprinellus - bigmouth buffalo
  - 11. Ictiobus bubalus - smallmouth buffalo
  - 12. Carpionodes carpio - river carpsucker
  - 13. Minytrema melanops - spotted sucker
  - 14. Erimyzon sucetta - lake chubsucker
- VI. Family: CYPRINIDAE - Shiners and minnows
  - 15. Cyprinus carpio - carp
  - 16. Notemigonus crysoleucas - golden shiner
  - 17. Notropis atherinoides - emerald shiner

Table 1 (continued)

A Checklist of Sam Rayburn Reservoir Fish Species

18. Notropis fumeus - ribbon shiner
19. Notropis chalybaeus - ironcolor shiner
20. Notropis texanus - weed shiner
21. Notropis amnis - pallid shiner
22. Notropis venustus - blacktail shiner
23. Notropis lutrensis - redhorse shiner
24. Notropis stramineus - sand shiner
25. Notropis atrocaudalis - blackspot shiner
26. Notropis maculatus - taillight shiner
- VII. Family: AMEIURIDAE - Freshwater catfishes
  27. Ictalurus punctatus - channel catfish
  28. Ictalurus furcatus - blue catfish
  29. Ictalurus melas - black bullhead
  30. Ictalurus natalis - yellow bullhead
  31. Pylodictis olivaris - flathead catfish
- VIII. Family: CYPRINODONTIDAE - Killifishes and topminnows
  32. Fundulus notatus - blackstripe topminnow
- IX. Family: POECILIDAE - Mosquitofishes
  33. Gambusia affinis - mosquitofish
- X. Family: ATHERINIDAE - Silversides
  34. Labidesthes sicculus - brook silversides
- XI. Family: APHREDODERIDAE - Pirate perch
  35. Aphredoderus sayanus - pirate perch

Table 1 (continued)

A Checklist of Sam Rayburn Reservoir Fish Species

XII. Family: CENTRARCHIDAE - Black basses and sunfishes

- 36. Micropterus punctulatus - spotted bass
- 37. Micropterus salmoides - largemouth bass
- 38. Chaenobryttus gulosus - warmouth
- 39. Lepomis cyanellus - green sunfish
- 40. Lepomis punctatus - spotted sunfish
- 41. Lepomis microlophus - readear sunfish
- 42. Lepomis macrochirus - bluegill sunfish
- 43. Lepomis humilis - orangespotted sunfish
- 44. Lepomis auritus - redbreast sunfish
- 45. Lepomis megalotis - longear sunfish
- 46. Pomoxis annularis - white crappie
- 47. Pomoxis nigromaculatus - black crappie
- 48. Centrarchus macropterus - flier

XIII. Family: PERCIDAE - Perches and darters

- 49. Percino caprodes - logperch
- 50. Etheostoma gracile - slough darter

XIV. Family: SCIAENIDAE- Croakers, drum, and weakfishes

- 51. Aplodinotus grunniens - freshwater drum

Table 2

## Netting Collections from Sam Rayburn Reservoir - 1966

<u>Species</u>	<u>Number</u>	<u>Per Cent No.</u>	<u>Weight</u>	<u>Per Cent Weight</u>
Alligator gar	23	1.08	235.56	9.65
Spotted gar	34	1.59	67.94	2.78
Longnose gar	42	1.97	99.87	4.09
Bowfin	93	4.36	329.94	13.51
Gizzard shad	48	2.25	8.21	0.34
Grass pickerel	1	0.05	0.37	0.02
Chain pickerel	2	0.09	1.06	0.04
Bigmouth buffalo	48	2.25	132.01	5.41
Smallmouth buffalo	667	31.29	638.63	26.15
River carpsucker	1	0.05	1.75	0.07
Spotted sucker	55	2.58	41.81	1.71
Lake chubsucker	3	0.14	0.87	0.03
Carp	209	9.80	478.45	19.59
Golden shiner	1	0.05	0.13	0.01
Channel catfish	14	0.66	25.24	1.03
Black bullhead	246	11.54	104.56	4.28
Yellow bullhead	53	2.48	40.36	1.65
Flathead catfish	5	0.23	19.87	0.81
Spotted bass	5	0.23	4.13	0.17
Largemouth bass	34	1.59	54.99	2.25
Warmouth	75	3.52	17.88	0.73
Spotted sunfish	1	0.05	0.25	0.01
Redear sunfish	1	0.05	0.37	0.02
Bluegill sunfish	110	5.16	25.18	1.03

Table 2 (continued)

Netting Collections from Sam Rayburn Reservoir - 1966

<u>Species</u>	<u>Number</u>	<u>Per Cent No.</u>	<u>Weight</u>	<u>Per Cent Weight</u>
Redbreast sunfish	6	0.28	1.32	0.05
White crappie	130	6.10	43.18	1.77
Black crappie	194	9.10	31.57	1.29
Flier	14	0.66	1.50	0.06
Drum	17	0.80	35.38	1.45
Totals	2132	100.00	2442.38	100.00

Table 3

Netting Collections from Sam Rayburn Reservoir - 1965

<u>Species</u>	<u>Number</u>	<u>Per Cent No.</u>	<u>Weight</u>	<u>Per Cent Weight</u>
Alligator gar	121	13.67	493.19	34.56
Spotted gar	25	2.82	29.31	2.05
Longnose gar	44	4.97	77.37	5.42
Bowfin	96	10.84	184.64	12.93
Gizzard shad	6	0.68	6.57	0.47
Blue sucker	1	0.11	2.75	0.19
Bigmouth buffalo	13	1.47	26.12	1.83
Smallmouth buffalo	138	15.60	145.67	10.21
River carpsucker	22	2.49	5.26	0.37
Spotted sucker	3	0.34	2.50	0.18
Lake chubsucker	1	0.11	0.19	0.02
Carp	239	27.00	280.62	19.66
Channel catfish	14	1.58	18.75	1.31

Table 3 (continued)

Netting Collections from Sam Rayburn Reservoir - 1965

<u>Species</u>	<u>Number</u>	<u>Per Cent No.</u>	<u>Weight</u>	<u>Per Cent Weight</u>
Blue catfish	8	0.91	36.13	2.53
Black bullhead	49	5.53	22.38	1.56
Yellow bullhead	9	1.01	7.12	0.50
Flathead catfish	9	1.02	29.29	2.05
Spotted bass	2	0.23	2.68	0.19
Largemouth bass	8	0.90	9.37	0.66
Warmouth	21	2.37	4.44	0.31
Bluegill sunfish	16	1.81	3.56	0.25
Redbreasted sunfish	3	0.34	0.26	0.02
Longear sunfish	1	0.12	0.19	0.01
White crappie	12	1.36	10.24	0.72
Black crappie	8	0.90	3.13	0.22
Flier	1	0.12	0.25	0.02
Drum	15	1.70	25.12	1.76
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Totals	885	100.00	1427.10	100.00

Food

Most of the fish stomachs examined contained some type of food. The most common food items found were small shad and crayfish. Seining collections and the sighting of many schools of small shad indicates that there is a good supply of forage fish available for the game fish species.

## Monthly Catch of Individual Species

Species	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total
Alligator gar	0	8	2	2	3	1	2	5	0	0	0	0	23
Spotted gar	0	6	8	2	3	2	1	12	0	0	0	0	34
Longnose gar	0	5	24	5	3	1	0	4	0	0	0	0	42
Bowfin	11	4	10	13	8	4	5	5	10	6	2	15	93
Gizzard shad	1	1	0	1	3	3	10	6	15	4	0	4	48
Grass pickerel	0	0	0	0	0	0	0	0	0	0	0	1	1
Chain pickerel	2	0	0	0	0	0	0	0	0	0	0	0	2
Bigmouth buffalo	9	0	0	1	5	1	3	2	3	11	5	8	48
Smallmouth buffalo	192	56	16	18	35	6	20	25	67	93	83	56	667
River carpsucker	0	0	0	0	0	0	1	0	0	0	0	0	1
Spotted sucker	3	2	1	0	0	0	0	0	0	16	7	26	55
Lake chubsucker	3	0	0	0	0	0	0	0	0	0	0	0	3
Carp	51	29	19	14	29	8	22	8	13	4	4	8	209
Golden shiner	0	0	0	0	0	0	0	0	0	0	0	1	1
Channel catfish	5	1	0	0	6	0	0	0	1	1	0	0	14
Black bullhead	96	16	18	29	9	1	10	1	10	13	19	24	246
Yellow bullhead	8	0	0	0	8	9	10	0	3	2	4	9	53
Flathead catfish	1	3	0	0	0	0	0	0	1	0	0	0	5
Spotted bass	0	0	0	0	0	0	3	0	1	0	1	0	5

Table 4 (continued)

## Monthly Catch of Individual Species

Species	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Total
Largemouth bass	7	0	0	2	8	0	2	0	5	0	2	8	34
Warmouth	1	5	9	14	22	9	4	4	2	2	2	1	75
Spotted sunfish	0	0	0	0	0	0	0	0	0	1	0	0	1
Redear sunfish	0	0	0	0	1	0	0	0	0	0	0	0	1
Bluegill sunfish	0	14	5	7	14	9	12	10	15	14	5	5	110
Redbreast sunfish	0	1	1	1	1	1	0	0	0	0	1	0	6
White crappie	17	12	0	7	11	7	24	4	19	6	17	6	130
Black crappie	132	3	5	10	6	1	8	13	15	0	1	0	194
Flier	9	0	0	4	0	1	0	0	0	0	0	0	14
Drum	5	3	4	2	0	2	0	0	1	0	0	0	17
Totals	553	169	122	132	175	66	137	99	181	173	153	172	2132

Table 5

Coefficient of Condition ("K" factor) for Sam Rayburn Reservoir  
Average "K"

<u>Species</u>	<u>Number</u>	<u>"K" Range</u>	<u>1966</u>	<u>1965</u>
Channel catfish	13	1.51 - 3.36	2.16	1.89
Flathead catfish	2	2.20 - 2.63	2.42	2.41
Spotted bass	6	2.17 - 3.20	2.69	3.00
Largemouth bass	41	2.33 - 3.91	3.20	3.03
Warmouth	23	3.18 - 5.32	4.33	4.51
Redear sunfish	1	4.19	4.19	0
Bluegill sunfish	22	3.36 - 6.18	4.78	5.21
White crappie	42	1.04 - 5.28	2.94	3.49
Black crappie	37	1.95 - 3.78	3.20	3.23

Table 6

Seining Collections from Sam Rayburn Reservoir 1966

<u>Species</u>	<u>Number</u>
<u>Dorosoma petenense</u> - threadfin shad	30
<u>Dorosoma cepedianum</u> - gizzard shad	87
<u>Esox americanus</u> - grass pickerel	9
<u>Esox niger</u> - chain pickerel	3
<u>Minytrema melanops</u> - spotted sucker	1
<u>Notemigonus crysoleucas</u> - golden shiner	239
<u>Notropis atherinoides</u> - emerald shiner	4
<u>Notropis fumeus</u> - ribbon shiner	4
<u>Notropis chalybaeus</u> - ironcolor shiner	1
<u>Notropis texanus</u> - weed shiner	8

Table 6 (continued)

## Seining Collections from Sam Rayburn Reservoir 1966

<u>Species</u>	<u>Number</u>
<u>Notropis amnis</u> - pallid shiner	17
<u>Notropis venustus</u> - blacktail shiner	1
<u>Notropis lutrensis</u> - redhorse shiner	4
<u>Notropis stramineus</u> - sand shiner	85
<u>Notropis atrocaudalis</u> - blackspot shiner	53
<u>Notropis maculatus</u> - taillight shiner	1
<u>Ictalurus melas</u> - black bullhead	137
<u>Ictalurus natalis</u> - yellow bullhead	2
<u>Fundulus notatus</u> - blackstripe topminnow	66
<u>Gambusia affinis</u> - mosquitofish	258
<u>Labidesthes sicculus</u> - brook silversides	258
<u>Aphredoderus sayanus</u> - pirate perch	1
<u>Micropterus punctulatus</u> - spotted bass	2
<u>Micropterus salmoides</u> - largemouth bass	47
<u>Chaenobryttus gulosus</u> - warmouth	7
<u>Lepomis cyanellus</u> - green sunfish	9
<u>Lepomis punctatus</u> - spotted sunfish	28
<u>Lepomis microlophus</u> - readear sunfish	19
<u>Lepomis macrochirus</u> - bluegill sunfish	177
<u>Lepomis auritus</u> - redbreast sunfish	2
<u>Pomoxis annularis</u> - white crappie	23
<u>Pomoxis nigromaculatus</u> - black crappie	11
<u>Centrarchus macropterus</u> - flier	41
<u>Percina caprodes</u> - logperch	4
<u>Etheostoma gracile</u> - slough darter	1

### Game and Rough Fish Ratio

During this segment 12 game fish species and 17 rough fish species were netted. Of the 2,132 individual specimens taken 589 were game fish and 1,543 were rough fish. By per cent of number this was 27.63 per cent game fish and 72.37 per cent rough fish. This is an increase of 5.99 per cent of game fish by number over the previous segment. The percentage by weight was 9.23 per cent game fish and 90.77 per cent rough fish, an increase of 0.94 per cent of game fish by weight over the previous segment. The smallmouth buffalo was the most common rough fish netted, with 31.29 per cent of the total number. Black bullhead was next with 11.54 per cent of the total number. Table 7 is a comparison of the monthly rough and game fish percentages by number for the 1965 segment. Table 8 is a comparison of the monthly rough and game fish percentages by number for the 1966 segment. Table 9 is a comparison of the monthly rough and game fish percentages by weight for the 1965 segment. Table 10 is a comparison of the monthly rough and game fish percentages by weight for the 1966 segment. These proportional comparisons in graph form were designed to offer a clearer picture of game and rough fish percentages from monthly collections. As shown in Table 8, a greater number of game fish were collected during the spring and summer months than in the fall and winter. Mean percentage by number of game fish for the 12 month period is 24.74 per cent. Mean percentage by weight of game fish for the 12 month period is 8.70 per cent. The increase in the number of game fish taken in summer collections is due primarily to collection of young fish. This is indicated by relatively stable percentages by weight as contained in Table 10 for the summer months.

### Vegetation

Observations of aquatic vegetation in the Reservoir have been made in conjunction with the netting activities. Numerous species of submerged aquatic plants are present in marginal areas but have not attained excessive growth to date. Bladderwort (Utricularia sp.) and coontail (Ceratophyllum sp.) are common plants. When conservation pool level is reached in the reservoir marginal water depth will be sufficient in many areas to prevent excessive growth of submerged vegetation. Flat shallows will no doubt become infested with vegetation as the turbidity decreases with stabilization.

### Fishing Success and Recreational Facilities

Sam Rayburn Reservoir has become one of the most popular fishing lakes in Region 3-B. Bass fishing has been excellent with many fisherman reporting limits in the 2 to 4 pound class. Crappie fishing has improved as both the black and white crappie have shown a good increase in size. Figure 4 is an example of largemouth bass and white crappie from the January collection. Trotline fisherman have reported good catches of both channel and flathead catfish. Sam Rayburn Reservoir should become



Figure 1. Thirty pounds of smallmouth buffalo



Figure 2. 209 carp netted in 1966

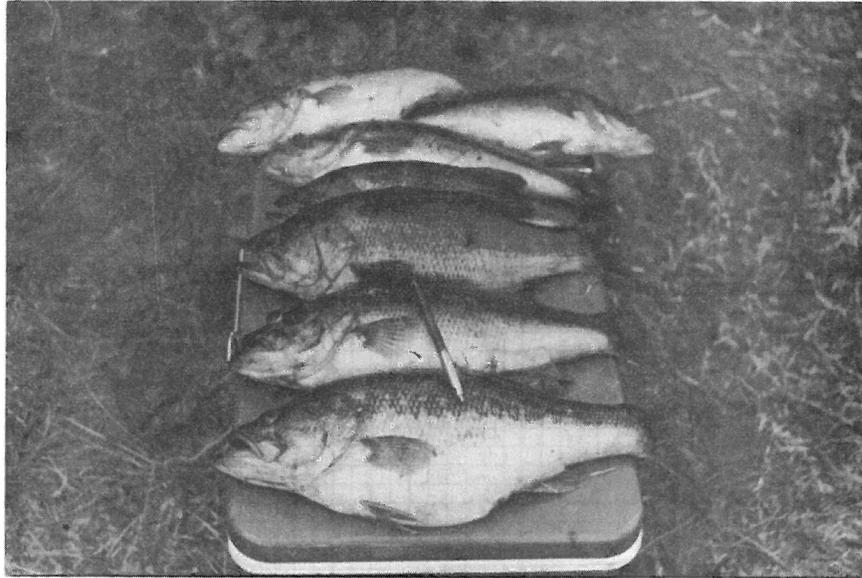


Figure 3. Largemouth bass show excellent condition

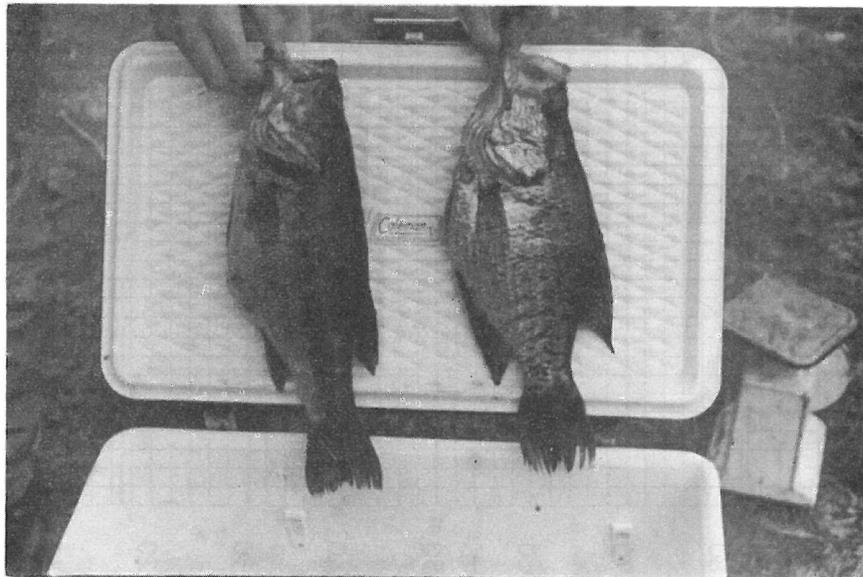
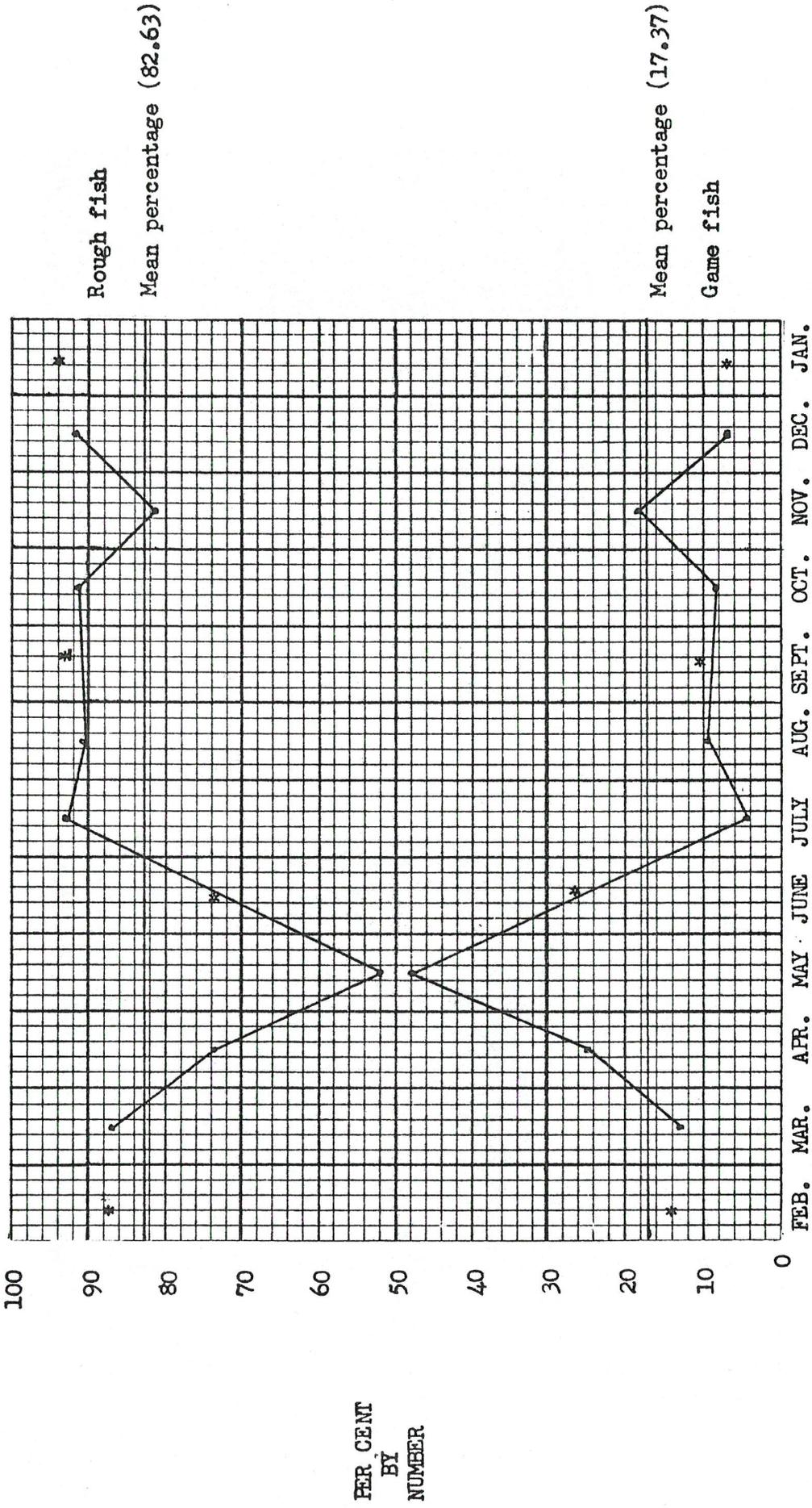


Figure 4. Largemouth bass and white crappie from January collection

TABLE 7

Comparison of Monthly Rough and Game Fish Percentages by Number 1965



\* No sample taken this month

PER CENT  
BY  
NUMBER

TABLE 8

Comparison of Monthly Rough and Game Fish Percentages by Number 1966

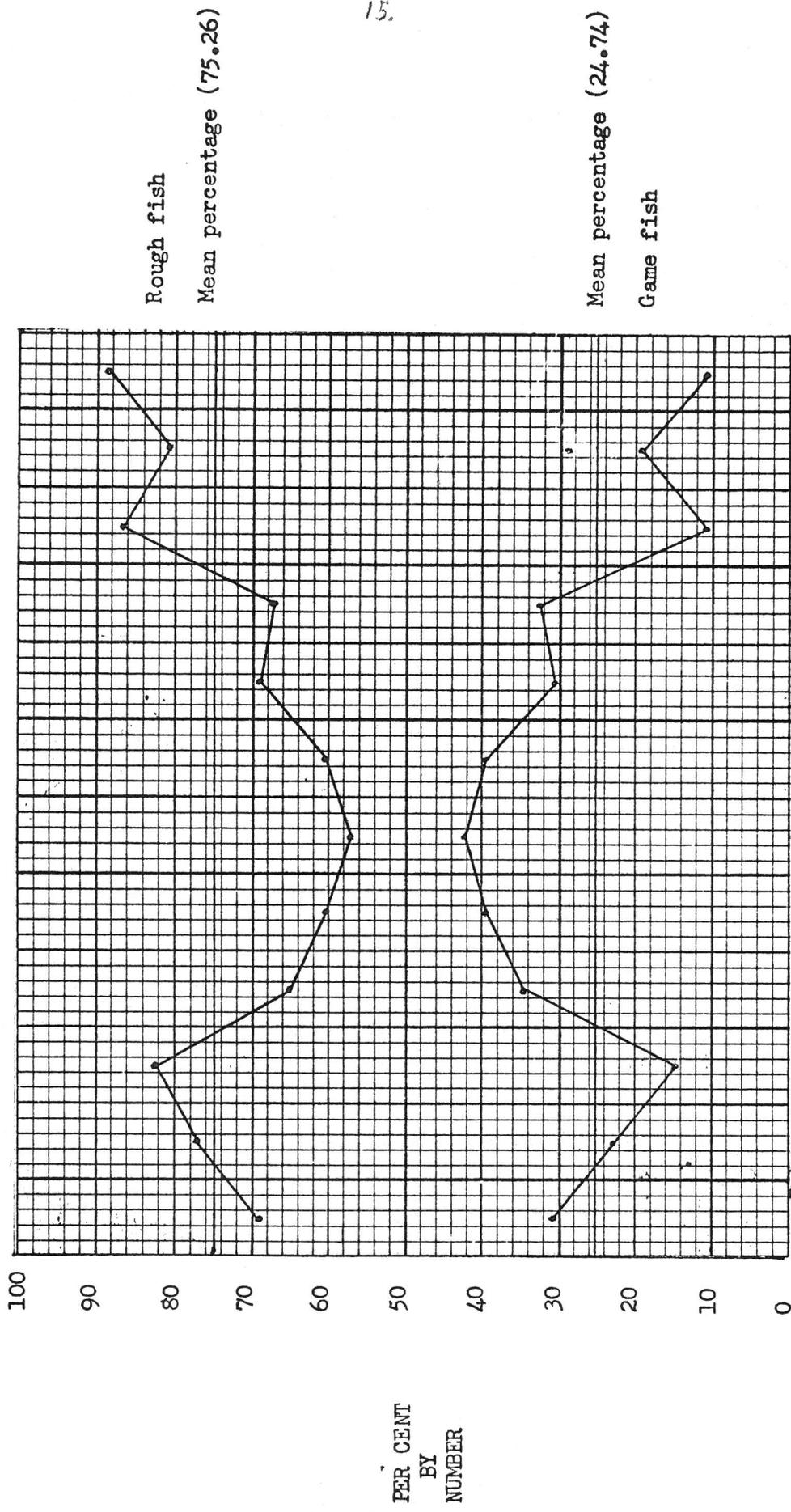
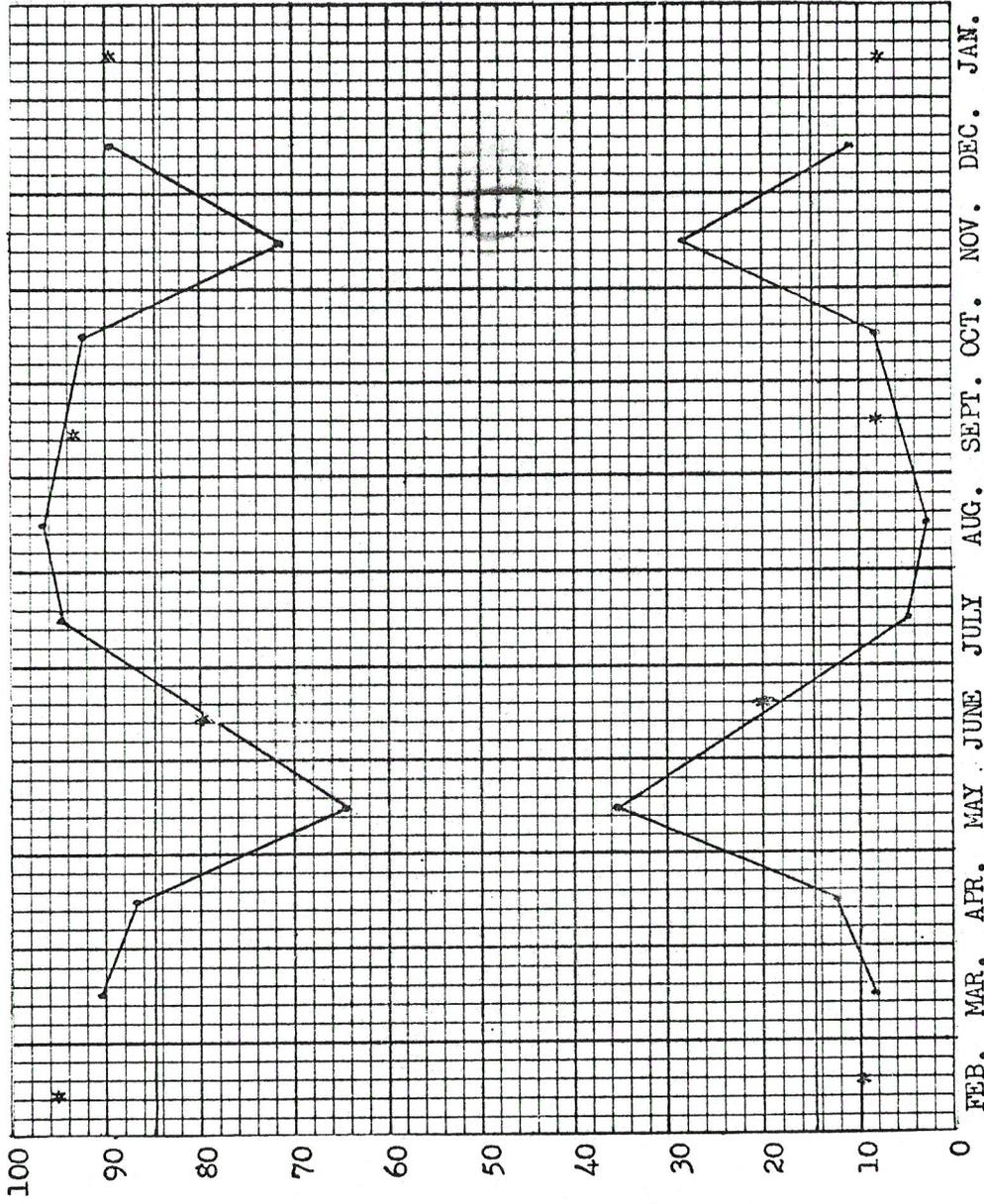


TABLE 9

Comparison of Monthly Rough and Game Fish Percentages by Weight 1965



Rough fish

Mean percentage (85.81)

Mean percentage (14.19)

Game fish

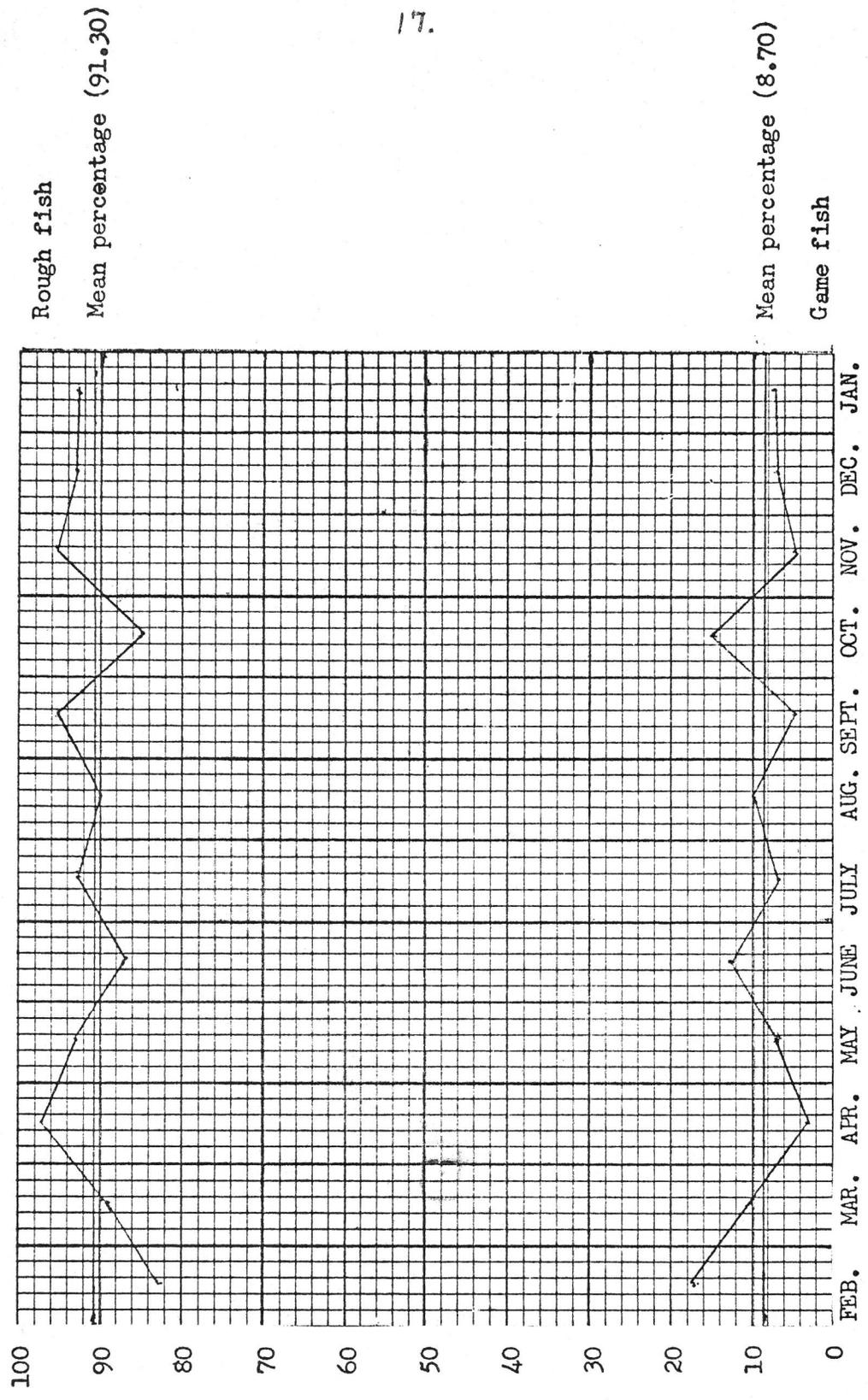
PER CENT  
BY  
WEIGHT

\* No sample taken this month

PER CENT  
BY  
WEIGHT

TABLE 10

Comparison of Monthly Rough and Game Fish Percentages by Weight 1966



an important commercial fishery due to the number of largemouth buffalo, smallmouth buffalo, and carp present. It was reported that commercial fishermen took thousands of pounds of flathead catfish out of the reservoir during the spring months.

Sam Rayburn Reservoir has many fine launching sites and camping areas built by the U. S. Corps of Engineers and the U. S. Forest Service. Many recreational areas are complete and others are under construction at the present time. At present, the lake is approximately 10 feet below the conservation pool level, but most of the launching ramps can be utilized.

#### Conclusions and Recommendations

Sam Rayburn Reservoir has become one of the favorite fishing and recreational areas in Region 3-B. Many fine camping and launching areas have been built by the U. S. Corps of Engineers and the U. S. Forest Service. Although the lake is still approximately 10 feet below the conservation pool level most of the concrete launching ramps can be used.

Netting data compiled during both segments indicate considerable increases in game fish numbers during the spring and summer months. These increases are primarily due to the collection of young fish which suggests that successful spawning has occurred. These increases in game fish per cents by number are indicated in Tables 2 and 3. Largemouth bass, white and black crappie were also collected by seining as contained in Table 6. Sufficient protective cover is present in most areas of the reservoir for young fish.

In review of these data further stocking of largemouth bass and crappie is not recommended. At this time relatively few channel catfish have been collected by netting and no channel catfish fry or finerlings have been seined. It is therefore recommended that additional stocking of this species be conducted.

The many complex factors influencing fish population dynamics in a reservoir make difficult the analysis of collection data. With the rapid increase of habitat area of Sam Rayburn Reservoir the validity of comparing unit net samples for both segments is questionable. It is doubtful that fish populations in the reservoir expanded during 1966 as rapidly as habitat area. Therefore numbers of individuals collected per unit of net would decrease although total populations were increasing in the reservoir. As contained in Table 3, 1965 netting data, and Table 2, 1966 netting data, this is not indicated for most species in the reservoir. Species showing notable decreases in per cent by numbers are carp, alligator gar, longnose gar, and bowfin.

In general, netting data indicate good populations of game fish species and sport fishing success is increasing on the reservoir. Fisherman useage to date is far below the potential of the reservoir. It is anticipated that Sam Rayburn will develop into an excellent sport and commercial fishery.

Sufficient field data have been collected to establish criteria for game and rough fish populations and the need for further stocking of game fish. It is therefore recommended that this job be terminated. A separate job concerning the effects of paper mill effluent on Sam Rayburn Reservoir is planned for the coming segment.

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