STATE Texas

PROJECT NO. F-3-R-1, Job B-1

PERIOD Dec. 1, 1953 - June 30, 1954

Job Completion Report

by

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TITLE

Inventory of the Species Present in Caddo Lake.

OBJECTIVES

To determine the species present and their relative abundance as well as to determine the ecological factors influencing their distribution.

METHODS

Four netting stations were selected at widely separated sites in order to sample the various environments in the lake. (See attached map for location of stations). These stations were netted once each month using experimental type gill nets composed of 25 ft. sections of varying mesh, including 3/4", 1", 1½", 2" and 3" square mesh. Hoop and fyke nets of 1/4" and 1" mesh were also used. Fish were kept alive until examined for length, weight, sex and stage of sexual development. Scale samples were taken and saved for future study and comparison with those from other sections of the State. Some doubt exists at present as to the reliability of annuli in age determination at this latitude. Stomachs of sport species were preserved for food analysis. Results of the analysis of ten species and recorded in Table No. 7.

Ecological data recorded for each collection include:

a. Temperature: air and surface water
b. pH
c. Turbidity
d. Depth of water
e. Depth of net set
f. Direction and strength of wind
g. Dissolved oxygen
h. Main cover types
i. Bottom type

Because of the heavy vegetation in Caddo Lake seining stations were difficult to find. The five sites were chosen simply because they were about the only ones open enough to allow seining operations and even these become impossible at times because of thick mats of water hyacinths. Seining collections were made once each month after waders became available. All seining specimens were brought to the laboratory for counting and identification. Ecological data recorded for each collection include the same items listed above for netting collections.

For the purpose of comparing populations and conditions in the different areas of the lake, the data for each netting station was treated separately. Five collections were made at each station during the period covered by this report. It has been proposed that this job continue into the next segment in order to obtain monthly collections for a full year period. Further collections will undoubtedly bring out seasonal aspects that fail to show up in this report.

Netting Collections

Station No. 1 - This site is located where the dense cypress breaks open into the waters of the Big Lake area. The area contains scattered cypress (Taxodium distichum) of a density of about four or five trees to an acre. Submerged aquatics occur here in dense beds although they do not cover the area completely. The more important ones in estimated order of abundance include: pondweeds (Potamogeton) water millfoil (Myriophyllum), coontail (Ceratophyllum) and muskgrass (Chara). By early summer, dense beds of water lily (Nymphaea) and lotus (Nelumbo) emerge to cover part of the area. Water hyacinths (Eichhornia crassippes)almost cover the area at times, depending on the time of year and wind direction and velocity. The bottom of this station is a sandy silt covered with organic litter. The water depth is normally 5 to 8 feet. Twenty-two species of fish, including nine families were collected at this station. Gizzard shad (Dorosoma cepedianum) were the most abundant, making up more than half of the total collections both by weight and numbers. Table 1 shows the relative abundance of each species taken at this station. The pH at this station ranged from 6.2 to 6.7 with a mean of 6.5. Results of complete water analyses for each station are recorded in Table 5.

Station No. 2 - This station is located in the open water of the Big Lake area. There are some widely scattered cypress trees in the area but they are so few that the area may be considered open water. Depth of the water ranges from 4 to 8 ft. and due to wind action it is generally more turbid than the the other stations . Submerged aquatics are present but are much less abundant than at other stations. Water milfoil, (Myriophyllum), pondweeds (Potamogeton) Coontail (Ceratophyllum) and muskgrass (Chara) were found in the more shallow water. Mats of water hyacinths (Eichhornia crassipes) drift through the area with water and wind currents. The pH ranged from 6.4 to 7.0 with a mean of 6.7. Twenty-two species representing nine families of fish were taken at this station. Gizzard shad were the most abundant, making up approximately half of the total weight and numbers. Table 2 shows the relative abundance at this station.

Station No. 3 - This station lies in the Clinton Lake area as shown on the attached map. Woody vegetation in the area consists of thick cypress breaks and open water dotted with scattered cypress trees. In warm weather, Clinton Lake becomes choked with submerged aquatics to such an extent that boat travel becomes very difficult. The major submerged species found here include: pondweeds (Potamogeton), water milfoil (Myriophyllum), coontail (Ceratophyllum) and muskgrass (Chara). Some scattered beds of water lilies (Nymphaea) and lotus (Nelumbo) emerge in the spring.

The water in this area is very clear, becoming turbid only after prolonged rains and very high water. The pH ranges from 6.2 to 7.2 with a mean of 6.7. Water depth ranges from three to eight feet. The bottom is a sandy clay covered with organic litter. Twenty species representing nine families of fish were collected at station three with the gizzard shad making up better than half of the total weight and numbers.

Station No. 4 - This station is located in the Carter Lake Area in the extreme upper end of Caddo Lake. Aquatic vegetation at station four is much the same as at station three. However, station four receives even less water from the bayou than station three. This can easily be seen on the attached map. Very seldon does all of the water in Carters Lake become turbid. The pH at this station ranges from 6.4 to 7.0 with a mean of 6.7. The bottom is sandy clay and sandy silt covered with organic litter.

Netting collections at station four produced 15 species of fish which include nine families. Again the gizzard shad was the most abundant, making up approximately 60 percent of the total weight and numbers.

## Seining Collections

Due to the short period covered by this report the seining collection data is not sufficient to warrant full analysis of each station at this time. It has been proposed that this job be extended into the next fiscal year to obtain a full all-seasons aspect. Table 6 shows the relative abundance of species taken at all of the stations.

The Micropterus salmoides recorded on the chart were approximately two to four weeks old. This indicates fair spawning success.

## SUMMARY

In order to measure and compare ecological differences in various localities in Caddo Lake, data from each collection station was recorded and studied separately. Four netting stations and five seining stations were selected in widely separated areas for this purpose. Collections were made and ecological data recorded once each month at each station.

It has been proposed that this job be extended into the next segment. Therefore, the writer feels that conclusions should be withheld until data can be collected and studied covering a full year period. However there are two problems that are very obvious at this time. These problems both involve vegetation control.

Water hyacinths (Eichhornia crassippes) have invaded the lake and are spreading at a tremendous rate. These plants now cover large areas that were once good fishing waters and spawning beds. They have closed many of the boat roads to traffic.

The other vegetation problem involves submerged aquatics. Some of the quieter waters of the lake become choked with these plants in summer to the extent that fishing and boat travel become extremely difficult. Data collected on this job in the next segment will be studied to determine any further effects these conditions may have on fish populations.

Table No. 1

Results of Netting Collections, Stations No. 1, Caddo Lake, Harrison County, Texas, Jan. 26, 1954 through June 15, 1954

| Species | No. | Weight In Pounds | Percent By Number | Percent By Weight |
|---|---|---|---|---|
| Lepisosteus productus | 10 | 31.76 | 1.4 | 3.6 |
| Lepisosteus osseus | 24 | 186.87 | 3.5 | 19.7 |
| Dorosoma cepedianum | 446 | 452.35 | 64.2 | 51.9 |
| Esox niger | 20 | 32.90 | 2.9 | 3.7 |
| Ictiobus bubalus | 1 | 1.50 | 0.1 | 0.2 |
| Minytrema melanops | 36 | 55.25 | 5.1 | 6.3 |
| Erimyzon sucetta | 6 | 3.68 | 0.9 | 0.4 |
| Notemigonus crysoleucas | 1 | 0.25 | 0.1 | 0.1 |
| Icatalurus punctatus | 1 | 1.88 | 0.1 | 0.1 |
| Ameiurus melas | 6 | 7.45 | 0.9 | 0.8 |
| Ameiurus natalis | 2 | 2.37 | 0.3 | 2.3 |
| Pilodictus olivaris | 2 | 4.18 | 0.3 | 0.5 |
| Morone chrysops | 14 | 15.70 | 2.1 | 1.8 |
| Morone interrupta | 71 | 36.37 | 10.2 | 4.2 |
| Micropterus punctulatus | 1 | 0.75 | 0.1 | 0.1 |
| Micropterus salmoides | 3 | 3.50 | 0.4 | 0.4 |
| Chaenobryttus coronarius | 8 | 3.24 | 1.2 | 0.4 |
| Lepomis microlophus | 6 | 2.43 | 0.9 | 0.2 |
| Lepomis macrochirus | 10 | 2.26 | 1.4 | 0.3 |
| Pomoxis annularis | 3 | 2.62 | 0.4 | 0.3 |
| Pomoxis nigromaculatus | 19 | 15.75 | 2.7 | 1.8 |
| Aplodinotus grunniens | 5 | 8.06 | 0.8 | 0.9 |
| Total | 695 | 871.12 | 100.0 | 100.0 |

Table No. 2

Results of Netting Collections, Station No. 2, Caddo Lake, Harrison County, Texas, Jan. 26, 1954 through June 15, 1954

| Species | No. | Weight In Pounds | Percent By Number | Percent By Weight |
|---|---|---|---|---|
| Lepisosteus productus | 6 | 17.19 | 1.5 | 5.0 |
| Lepisosteus osseus | 5 | 30.69 | 1.2 | 8.1 |
| Alosa chrysochloris | 1 | 1.44 | 0.2 | 0.5 |
| Dorosoma cepedianum | 216 | 163.01 | 50.4 | 47.1 |
| Esox niger | 3 | 6.28 | 0.7 | 1.7 |
| Ictiobus bubalus | 3 | 4.69 | 0.7 | 1.4 |
| Carpiodes carpio | 11 | 14.81 | 2.5 | 4.2 |
| Minytrema melanops | 9 | 10.75 | 2.1 | 3.2 |
| Erimyzon sucetta | 2 | 2.56 | 0.4 | 0.7 |
| Icatalurus punctatus | 7 | 8.00 | 1.6 | 2.4 |
| Icatalurus furcatus | 1 | 0.69 | 0.2 | 0.2 |
| Pilodictus olivaris | 5 | 15.45 | 1.2 | 4.5 |
| Morone chrysops | 22 | 19.86 | 5.2 | 5.8 |
| Morone interrupta | 92 | 23.69 | 21.3 | 7.0 |
| Micropterus punctulatus | 1 | 1.25 | 0.2 | 0.4 |
| Micropterus salmoides | 3 | 1.99 | 0.7 | 0.7 |
| Lepomis microlophus | 12 | 3.86 | 2.8 | 1.2 |
| Lepomis macrochirus | 3 | 0.97 | 0.7 | 0.3 |
| Lepomis megalotis | 1 | 0.31 | 0.2 | 0.1 |
| Pomoxis annularis | 14 | 8.99 | 3.3 | 2.6 |
| Pomoxis nigromaculatus | 4 | 1.63 | 0.9 | 0.6 |
| Aplodinotus grunniens | 8 | 7.75 | 1.9 | 2.2 |
| Total | 429 | 345.86 | 100.0% | 100.0% |

Table No. 3

Results of Netting Collections, Station No. 3, Caddo Lake
Harrison County, Texas, Jan. 26, 1954 through June 15, 1954

| Species | No. | Weight In Pounds | Percent By Number | Percent By Weight |
|---|---|---|---|---|
| Lepisosteus productus | 35 | 80.70 | 6.5 | 13.74 |
| Lepisosteus osseus | 4 | 37.56 | 0.8 | 6.4 |
| Dorosoma cepedianum | 301 | 309.80 | 63.2 | 52.8 |
| Esox niger | 21 | 26.63 | 3.3 | 4.5 |
| Carpiodes carpio | 1 | 3.37 | 0.2 | 0.6 |
| Minytrema melanops | 19 | 29.02 | 3.9 | 5.0 |
| Erimyzon sucetta | 15 | 12.82 | 3.0 | 2.2 |
| Notemigonus crysoleucas | 1 | 0.25 | 0.2 | 0.1 |
| Icatalurus punctatus | 1 | 0.25 | 0.2 | 0.1 |
| Ameiurus melas | 14 | 23.38 | 2.9 | 4.0 |
| Ameiurus natalis | 4 | 3.62 | 0.8 | 0.6 |
| Pilodictus olivaris | 1 | 2.56 | 0.2 | 0.4 |
| Morone interrupta | 21 | 14.90 | 3.3 | 2.5 |
| Micropterus salmoides | 4 | 3.25 | 0.8 | 0.5 |
| Chaenobryttus coronarius | 14 | 6.57 | 2.9 | 1.1 |
| Lepomis microlophus | 7 | 2.68 | 1.4 | 0.5 |
| Lepomis macrochirus | 10 | 3.92 | 2.0 | 0.7 |
| Pomoxis annularis | 1 | 1.06 | 0.2 | 0.2 |
| Pomoxis nigromaculatus | 22 | 21.70 | 4.0 | 3.8 |
| Aplodinotus grunniens | 1 | 1.62 | 0.2 | 0.3 |
| TOTAL | 483 | 585.66 | 100.0% | 100.0% |

Table No. 4

RESULTS OF NETTING COLLECTIONS, STATION NO. 4, CADDO LAKE
HARRISON COUNTY, TEXAS, JAN. 26, 1954 THROUGH JUNE 15, 1954

| Species | No | Weight In Pounds | Percent By Number | Percent By Weight |
|---|---|---|---|---|
| Lepisosteus productus | 9 | 15.88 | 1.6 | 2.7 |
| Amia calva | 1 | 4.88 | 0.2 | 0.8 |
| Dorosoma cepedianum | 343 | 352.67 | 59.8 | 60.0 |
| Esox niger | 24 | 34.31 | 4.4 | 5.8 |
| Minytrema melanops | 36 | 56.68 | 6.1 | 9.6 |
| Erimyzon sucetta | 42 | 23.62 | 7.2 | 4.1 |
| Notemigonus crysoleucas | 1 | 0.25 | 0.2 | 0.1 |
| Ameiurus melas | 22 | 34.81 | 3.8 | 5.9 |
| Ameiurus natalis | 6 | 6.44 | 1.1 | 1.1 |
| Morone interrupta | 6 | 5.18 | 1.1 | 0.9 |
| Micropterus salmoides | 3 | 6.07 | 0.5 | 1.0 |
| Chaenobryttus coronarius | 26 | 10.63 | 4.7 | 1.9 |
| Lepomis microlophus | 13 | 5.67 | 2.3 | 0.9 |
| Lepomis macrochirus | 10 | 4.17 | 1.7 | 0.7 |
| Pomoxis nigromaculatus | 31 | 26.13 | 5.3 | 4.5 |
| Total | 573 | 587.39 | 100.0% | 100.0% |

TABLE NO. 5

WATER ANALYSES, FOUR NETTING STATIONS, CADDO LAKE, HARRISON COUNTY, TEXAS

| STATION NO. I | AIR TEMP. F | TURBIDITY (ppm.) JACKSON TURBIDMETER | WATER TEMP. F | | DISSOLVED QYGEN ppm. | | CARBON DIOXIDE | | pH HELIGE COMP. | M. O. ALKALINITY ppm |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | BOTTOM | SURFACE | BOTTOM | SURFACE | BOTTOM | SURFACE | | |
| Maximun | 72.0 | under 25 | 72 | 73.0 | 7.6 | 11.7 | 8.0 | 8.0 | 6.7 | |
| Minimum | 54.0 | under 25 | 54 | 45.0 | 6.6 | 6.9 | 4.5 | 4.0 | 6.2 | |
| Average | 62.1 | under 25 | 65.3 | 58.7 | 7.0 | 8.4 | 6.5 | 6.8 | 6.5 | 19.0 |
| STATION NO.II | | | | | | | | | | |
| Maximun | 79.0 | 78.0 | 72.0 | 72.0 | 12.2 | 15.2 | 5.0 | 6.0 | 7.0 | |
| Minimum | 57.0 | under 25 | 58.0 | 45.5 | 8.0 | 7.7 | 3.0 | 3.0 | 6.4 | |
| Average | 65.6 | | 65.5 | 61.2 | 9.6 | 9.4 | 4.1 | 5.0 | 6.7 | 21.2 |
| STATION NO.III | | | | | | | | | | |
| Maximun | 76.0 | under 25 | 77.0 | 77.0 | 7.6 | 11.1 | 8.0 | 8.0 | 7.2 | |
| Minimum | 60.0 | under 25 | 65.0 | 51.5 | 7.6 | 7.6 | 8.0 | 1.0 | 6.2 | |
| Average | 65.6 | under 25 | 71.0 | 63.7 | 7.6 | 9.5 | 8.0 | 4.8 | 6.7 | 15.0 |
| STATION NO.IV | | | | | | | | | | |
| Maximun | 78.0 | under 25 | 80.0 | 80.0 | 10.0 | 10.0 | 3.0 | 5.8 | 7.0 | |
| Minimum | 59.0 | under 25 | 58.0 | 50.5 | 4.7 | 4.0 | 3.0 | 3.0 | 6.4 | |
| Average | 68.3 | under 25 | 69.3 | 65.0 | 8.4 | 8.1 | 3.0 | 3.9 | 6.7 | 17.0 |

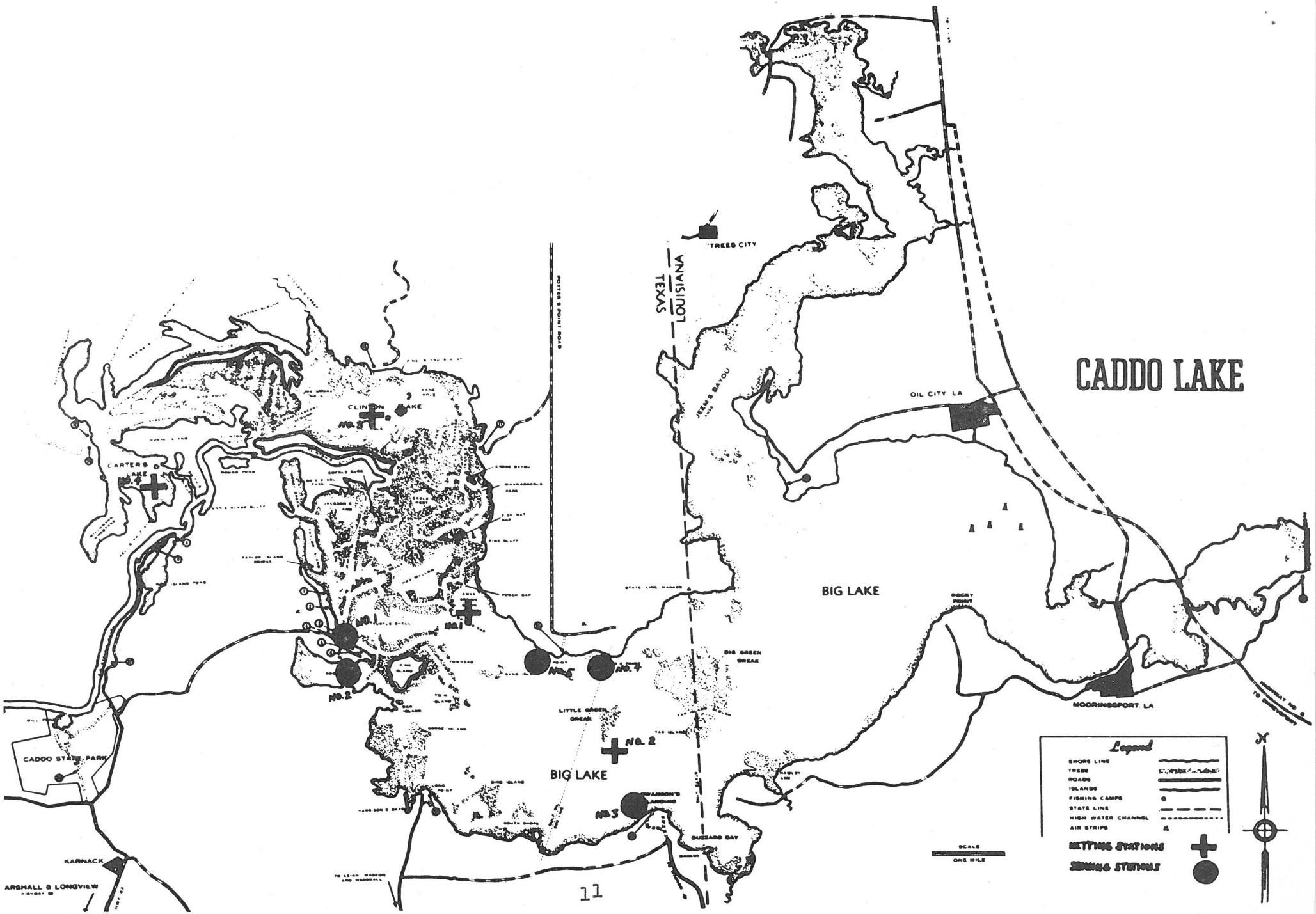
Table No. 6

Results of Seining Collections by Percent of Total No.

| Species | No. | % of Total |
|---|---|---|
| Esox vermiculatus | 3 | 0.29 |
| Esox niger | 8 | 0.78 |
| Notemigonus crysoleucas | 1 | 0.10 |
| Opsopoeodus emiliae | 8 | 0.78 |
| Notropis chalybeus | 14 | 1.36 |
| Notropis roseus | 5 | 0.48 |
| Notropis venustus | 2 | 0.19 |
| Notropis lutrensis | 2 | 0.19 |
| Notropis deliciosus | 1 | 0.10 |
| Notropis volucellus | 1 | 0.10 |
| Pimephales vigilax | 15 | 1.45 |
| Ameiurus melas | 1 | 0.10 |
| Schilbeodes mollis | 2 | 0.19 |
| Fundulus chrysotus | 5 | 0.48 |
| Fundulus notatus | 46 | 4.46 |
| Fundulus notti | 28 | 2.72 |
| Gambusia affinis | 59 | 5.72 |
| Menidia audens | 31 | 3.01 |
| Labidesthes sicculus | 115 | 11.16 |
| Micropterus salmoides | 237 | 22.99 |
| Chaenobryttus coronarius | 7 | 0.68 |
| Lepomis microlophus | 112 | 10.86 |
| Lepomis macrochirus | 318 | 30.84 |
| Elassoma zonatum | 2 | 0.19 |
| Etheostoma proliare | 8 | 0.78 |
| Totals | 1031 | 100.0% |

TABLE 7. Results of Stomach Analysis, Ten Species, Caddo Lake, December 1, 1953 to June 30, 1954

| SPECIES | Number of Specimens | | Ephimerida | | Odonata | | Hemiptera | | Coleoptera | | Molusca | | Crustacea | | Game Fish | | Forage Fish | | Detritus | | Miscellaneous | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % | No | % |
| Esox niger | 63 | | | | | | | | | | | | | 11 | | 34 | | 38 | | | | 17 |
| Morone chrysops | 22 | | | 9 | | | | | 1 | 3 | | | | 46 | | | | 36 | | | | 1 |
| Morone interupta | 139 | | | 17 | | 10 | | | | | | | | 35 | | | | 17 | | 5 | | 16 |
| Micropterus puhctulatus | 2 | | | | | | | | | | | | | | | | | 50 | | 50 | | |
| Micropterus salmoides | 15 | | | | | 2 | | | | | | | | 19 | | 3 | | 57 | | 5 | | 14 |
| Choenobryttus cordnarius | 32 | | | | | 8 | | | | 3 | | | | 49 | | 9 | | 13 | | 7 | | 11 |
| Lepomis microlophus | 22 | | | | | | | | | | | 14 | | 2 | | | | | | 22 | | 62 |
| Lepomis macrochirus | 22 | | | 1 | | 17 | | | | 1 | | | | 4 | | | | | | 18 | | 59 |
| Pomoxis annularis | 23 | | | | | | | | | | | | | 31 | | | | 43 | | 18 | | 8 |
| Pomoxis nigromaculatus | 74 | | | 2 | | 16 | | 1 | | | | | | 45 | | | | 13 | | 18 | | 5 |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CLINTON LAKE
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CARTER'S LAKE
No. 4
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No. 3
No. 4
BIG LAKE
BIG LAKE
ROCKY POINT
BIG GREEN BREAK
LITTLE GREEN BREAK
MOORINGSPORT LA
CADDO STATE PARK
KARNACK
MARSHALL & LONGVIEW
BUZZARD BAY
SCALE
ONE MILE
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SHORE LINE
TREES
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ISLANDS
FISHING CAMPS
STATE LINE
HIGH WATER CHANNEL
AIR STRIPS
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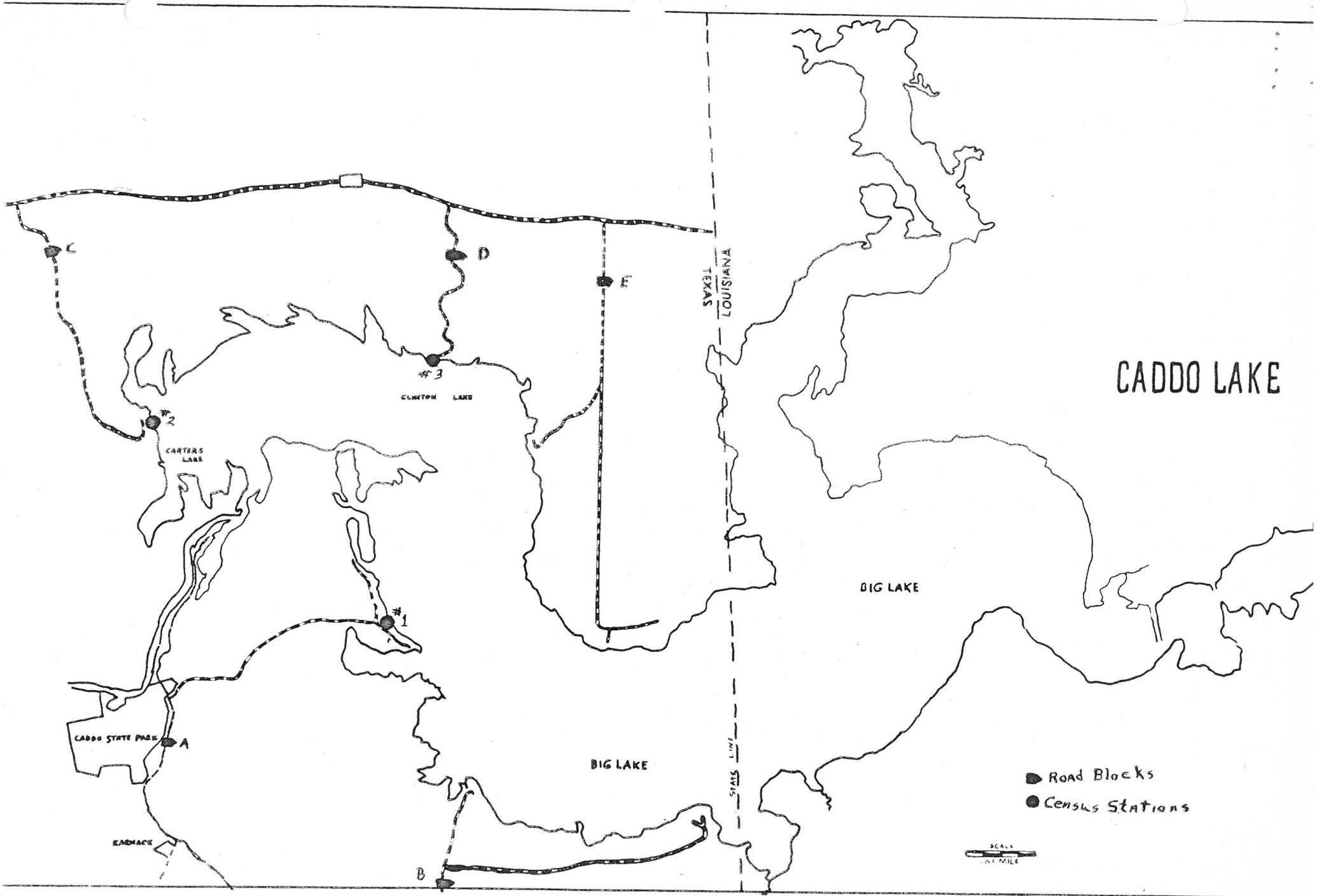
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Road Blocks
Census Stations
SCALE
1/2 MILE

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