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Report of Fisheries Investigations  
Inventory of Species Present in Lake Colorado City  
Near Colorado City, Texas

by

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Project Leader

Dingell-Johnson Project F-5-R-7, Job B-27  
April 16, 1959 - April 1, 1960

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## A B S T R A C T

Lake Colorado City is primarily to provide cooling water for a Texas Electric Service Company power plant. The lower half of the lake, where the power plant is located, is prohibited to public access. A circulation effect produced by the intake and expulsion of water through the power plant resulted in unique thermal and hydrological conditions that were found to be attractive to gizzard shad and channel catfish. Forty-three gill net collections were made at thirty-seven stations and 819 fish were captured.

These populations were dominated by channel catfish (38.83 percent) and river carpsuckers (24.05 percent). Twelve seining collections were made and these data together with netting data established knowledge of the presence of seventeen species of fish from nine families. Although it is known that sampling is not yet adequate to provide sufficiently complete information on the lake's fishery resource, a continuation of this job is not recommended. Other work on the reservoir will be included in future resurvey work.

The production of fish in Lake Colorado City appears to be excellent. The fishing reputation is good, creels indicated a successful harvest, and no management effort is needed or practical at this time. It is recommended that future resurvey work include additional sampling of the fish populations, that further study of the thermal and hydrological conditions and their attraction or repulsion tendencies to fish be made, and that all possible assistance be afforded to prevent further encroachment by trespassers into the restricted area.

## Job Completion Report

State of TEXAS

Project No. F-5-R-7

Name: Fisheries Investigations and Surveys  
of the Waters of Region 3-B.

Job No. B-27

Title: Inventory of Species Present in Lake  
Colorado City, near Colorado City,  
Texas.

Period Covered:

April 16, 1959 - April 1, 1960

### OBJECTIVES

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

### PROCEDURE

Thirty-seven gill net stations were selected and nets were set in such a manner to permit part of the resulting data to be comparative of the basic ecological influences on the resulting catch. All stations were netted at least once and duplicate netting at six stations in the restricted area of the reservoir permitted a comparison of summer and winter sampling. However, only winter netting data was obtained for the unrestricted portions of the lake.

It was proposed in the planned procedure to set hoop and fyke nets in such a manner as to provide data on the attraction influence of the water being released from the steam-electric power plant. However, the force of the current was too great to permit this type of sampling.

Experimental nylon gill nets 125-feet long, 8-feet deep, and made up in 25-foot sections were used. Mesh sizes for these nets increased progressively in each following section, at one-half inch intervals, beginning with a one-inch square mesh section and terminating with a three-inch square mesh section. Forty-three sets were made during the period.

Seining was done more or less in accordance with what the gradient and bottom obstructions would permit. For that reason systematic collection of data by seining was impossible. Twelve locations in the lake permitted limited seining collections.

Water analyses to determine dissolved oxygen content and the quantity of dissolved carbon dioxide were made at the time of each seining and netting collection. Surface temperature, pH, and weather conditions were recorded for each trip and turbidity was also checked.

In netting collections, samples from each collection and for each species were

weighed, measured, and sexed. This work was done in the field. Stomachs and other organs that were needed for laboratory examination were preserved in 10 percent formalin solution, and specimens not readily identifiable in the field were similarly preserved for laboratory identification.

## FINDINGS

### Lake Description

Reservoir and Dam - Lake Colorado City is situated on Morgan Creek, a small tributary of the Upper Colorado River in north-central Texas. The dam was built in 1949 by the Texas Electric Service Company to provide a supply of cooling water for the steam-electric power plant constructed at the same time on the shore of the lake. The dam is five miles southwest of Colorado City and one and five-tenths miles above the confluence of Morgan Creek. The reservoir area is owned by the power company.

Reservoir Capacity - The capacity of the reservoir at service spillway level is 31,800 acre-feet and the corresponding surface area is 2,030 acres. The lake is about three and one-half miles long and two miles wide at the dam. Since its construction the reservoir has not spilled.

Impoundment and Watershed - The dam is rolled-earth construction and approximately 4,800 feet long and 85 feet above stream bed. The drainage area of Morgan Creek above the dam is 267 square miles. Average inflow (two years measurement) is between 13.4 and 17.3 cfs. For periods of as long as several months inflow is practically nil and the above figures may be somewhat misleading for that reason.

### Climatology

The climate of the Colorado City area is semi-arid. The average annual temperature is about 66.2° F. Normal rainfall is 19.8 inches and average wind velocity is 10.4 m.p.h. Approximately one-fourth of the annual rainfall occurs in April and May.

### Geology

The general formations for the contributing watershed that lie about 30 to 40 miles below and southeast of the Llano Estacado cap rock, are dominated by groups from the Triassic and Permian periods. The Dockum group, along the eastern edge of the escarpment in Borden, Scurry, Howard, and Mitchell counties, has a thickness of from 300 to 450 feet and consists largely of dark-red clay with interbedded layers of gray, cross-bedded sandstone, and coarse sandstone conglomerate. The sandstone is micaceous. The lower part of the Dockum group, near Colorado City, in Mitchell county, though predominantly red clay, contains numerous beds of massive gray cross-bedded sandstone. Outcropping of the Dockum group occurs in the stream bed of Morgan Creek. Soils are clay and sandy loams.

### Utilization

The primary purpose of this reservoir is to provide water for cooling the thermo-electric plant located near the dam. Water is withdrawn from Lake Colorado City at an intake on the north shore, off the peninsula, and is pumped to the plant where it is used for cooling. The water is then returned to the lake through two canals. The canals discharge into the reservoir nearly one mile distant from the plant. Returning water flows over a weir and falls freely into the reservoir.

The reservoir also provides municipal water for Colorado City, although this is a minor function when quantity of water consumed is considered. The upper half of the reservoir is heavily utilized for recreational purposes. Public access to the lower half of the lake is restricted by the power company in compliance with instructions from the authorities responsible for the national defense.

About 175 privately owned cabins are located on the lake's shores. A public park is maintained on the north shore by Colorado City. A recreation charge (used to maintain access roads, docking facilities, the public park, and to pay the lake patrolman) is levied and collected by the city. Twenty-five cents for a day permit and three dollars for an annual permit is the current charge. Fees collected from this source during 1958 (about \$10,000), exceeded the sum paid by the city for the water consumed in municipal use. Fishermen are the primary and most numerous recreationists. The lake has had a favorable reputation for fishing.

The lower half of the lake, or the restricted area, is an important resting area for waterfowl and the aesthetic value of this bird life is of unmeasured, but considerable importance.

#### Thermal and Hydrological Conditions

The following data and discussion are included because much of this data is unavailable for other reservoirs within the region. For that reason this information may be used as the only general indicator available for this region.

Thermal Effects of the Operation of the Powerplant on Lake Colorado City - As previously stated, lake water is withdrawn at the plant for steam-condenser units and is discharged through canals into the lake at the dam. The circulating flow created in this manner is between 320 and 600 cfs or between 627 and 1,176 acre-feet of water each day. This results in the warming of portions of the restricted area in the winter time and greater fluctuation of the lake level from increased evaporation. (Figures 1 and 2)

The minimum temperature recorded for the outflow of water re-entering the lake from the plant was 8 degrees C., or about 46.4 degrees F. The maximum temperature for the outflow was 36 degrees C., or 96.8 degrees F. Thus, it would appear that the general tendency of this circulating effect on the restricted area of the lake, which is over one-half the total storage, was to reduce extreme temperatures during the winter and to increase them during the summer. The possible effects of this condition upon fish life will be taken up later in this report.

The effect of the addition of this heat from a power plant on the thermal structure and evaporation rate of Lake Colorado City was studied intensively by the U.S. Geological Survey Service during 1954 and 1955. The results were published by the United States Department of Interior in 1958.<sup>1</sup> The following is a summarization of that study.

<sup>1</sup> Harbeck, G.E. Jr., G.E. Koberg, and G.H. Hughes. The effect of the addition of heat from a powerplant on the thermal structure and evaporation of Lake Colorado City, Texas. Geological Survey Professional Paper 272-B, United States Government Printing Office. Washington, 1959.

Figure 1 - Lake Colorado City near Colorado City, Texas

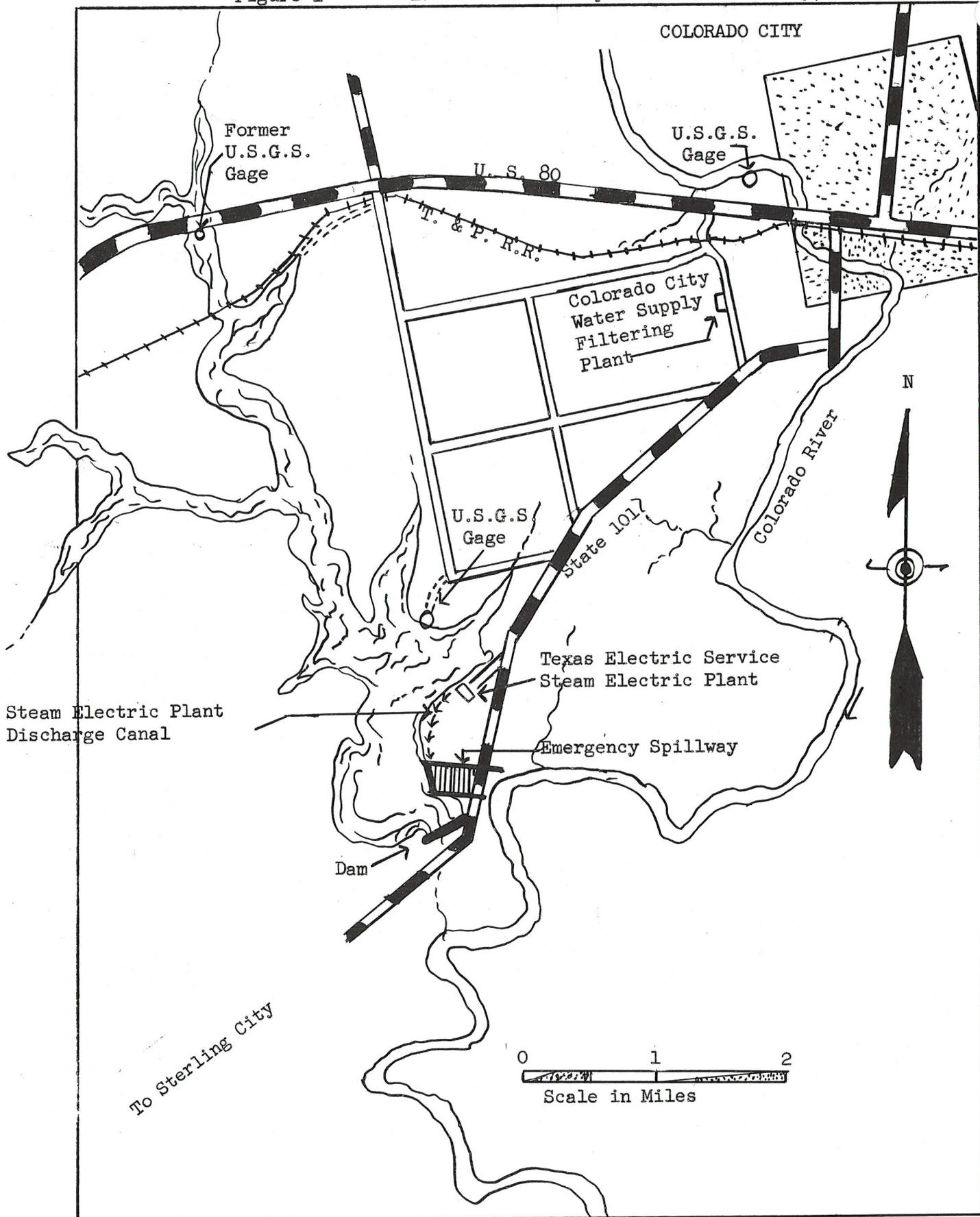


Figure 2 - Daily Average Temperature for Air and Water at Colorado City Lake.

Date	Av. Air Temp. (C°)	Inflow	Outflow
July 1954	Max. 34° Min. 24° Av. 29°	Max. 28° Min. 28° Av. 28°	Max. 36° Min. 33° Av. 35°
Aug. 1954	Max. 31° Min. 25° Av. 29°	Max. 28° Min. 26° Av. 27°	Max. 35° Min. 31° Av. 33°
Sept. 1954	Max. 31° Min. 21° Av. 25°	Max. 27° Min. 24° Av. 26°	Max. 33° Min. 28° Av. 31°
Oct. 1954	Max. 26° Min. 9° Av. 21°	Max. 25° Min. 17° Av. 21°	Max. 30° Min. 21° Av. 26°
Nov. 1954	Max. 16° Min. 8° Av. 13°	Max. 17° Min. 12° Av. 15°	Max. 21° Min. 15° Av. 20°
Dec. 1954	Max. 19° Min. - .6° Av. 10°	Max. 13° Min. 8° Av. 10°	Max. 18° Min. 12° Av. 15°
Jan. 1955	Max. 18° Min. - 1° Av. 7°	Max. 10° Min. 7° Av. 8°	Max. 14° Min. 12° Av. 12°
Feb. 1955	Max. 19° Min. - 1.6° Av. 10°	Max. 11° Min. 8° Av. 10°	Max. 17° Min. 12° Av. 13°
Mar. 1955	Max. 22° Min. - 1.5° Av. 14°	Max. 15° Min. 11° Av. 13°	Max. 20° Min. 15° Av. 17°
April 1955	Max. 22° Min. - 1.5° Av. 15°	Max. 15° Min. 11° Av. 13°	Max. 20° Min. 15° Av. 17°
May 1955	Max. 28° Min. 15° Av. 23°	Max. 23° Min. 20° Av. 22°	Max. 30° Min. 24° Av. 26°
June 1955	Max. 32° Min. 16° Av. 26°	Max. 26° Min. 22° Av. 24°	Max. 31° Min. 26° Av. 28°
July 1955	Max. 30° Min. 23° Av. 26°	Max. 27° Min. 26° Av. 27°	Max. 33° Min. 30° Av. 32°
Aug. 1955	Max. 31° Min. 23° Av. 26°	Max. 27° Min. 26° Av. 26°	Max. 33° Min. 30° Av. 32°
Sept. 1955	Max. 29° Min. 21° Av. 25°	Max. 26° Min. 25° Av. 25°	Max. 31° Min. 28° Av. 29°
Oct. 1955	Max. 24° Min. 12° Av. 17°	Max. 26° Min. 17° Av. 23°	Max. 30° Min. 21° Av. 25°

Evaporation rate normally would reduce the lake level by about 85 inches. The thermal increase brought about by the circulation of the water through the plant, resulted in 93 inches lost by evaporation, or an increase of about ten percent. The average change in temperature in the affected area was about 1.6 degrees C., or 2.89 degrees F. The difference in temperature of the water entering the plant and that immediately surrounding the outflow below the weirs was usually about 4.6 degrees C., or 8.28 degrees F. (Figure 2). The upper portions of the lake were not affected to any measurable degree. Although temperatures were higher in the lower lake in the winter, they were apparently the same in the upper and lower lake during the summer. The increase in surface evaporation produced by this heat was about 910 acre-feet of water, or about the amount that was consumed by Colorado City for municipal purposes.

A comparison between average lake temperatures, as determined from thermal surveys, and plant intake water temperatures indicates that water was withdrawn from all levels of the lake above the pump intakes. The degree of thermal influence of the circulation of the water through the plant is directly related with the quantity of water within the lake - the less water the greater the heating effect and inversely, the greater the quantity of water the less the total influence.

Hydrology - As shown in Figure 3, Lake Colorado City is somewhat more stable than many of the reservoirs within this region of the state, and this favorable circumstance is reflected in its fishery populations as discussed later. However, it is relatively certain that the late spring fluctuations would probably have adverse influences for specific years, and that the previously described thermal influences, accompanied by reductions in water level during the hottest part of the year, could or might be detrimental for short periods of time.

#### Water Quality

Water quality for Lake Colorado City may be generally described as above average for the region and is particularly superior to the waters of the Upper Colorado River, only 1.9 miles below the dam. Examples for the two would be about as follows:

A. Lake Colorado City

Solids	pH	Alkalinity	Chlorides	Sulfate
442 p.p.m.	7.8	126 p.p.m.	78 p.p.m.	104 p.p.m.

B. Upper Colorado River near Colorado City

Solids	pH	Alkalinity	Chlorides	Sulfate
15,500 p.p.m.	8.2	1,000 p.p.m.	4,500 p.p.m.	900 p.p.m.

Other work indicated that there were no oxygen deficiencies or excessive dissolved carbon dioxide during the inventory. However, this type analysis was not done during the extreme summer months when it might easily be most likely to take place. Turbidity at the upper lake stations was usually from 8 to 14 inches and no record of turbidity greater than 38 inches was made near the dam.

#### Aquatic and Shore Vegetation

Bullrushes, Scirpus sp., are abundant and to a degree prohibit access to portion of the upper reservoir. Muskgrass, Chara sp., and Sagittaria are also present in limited concentrations. Vegetation is not regarded as a problem of importance at this time.

Figure 3. - Hydrology for Lake Colorado City

Date	Elevation (Ft.)	Volume(Acre Ft.)	Monthly Fluctuation(Ft.)	Fluctuation(Vol)
1954 July	67.20	26,560	.40	640 AF
Aug.	66.56	25,475	.99	1,450
Sept.	65.57	23,925	.91	1,350
Oct.	64.80	22,850	.62	800
Nov.	64.27	21,990	.41	120
Dec.	63.88	21,685	.36	490
1955 Jan.	63.61	21,320	.23	240
Feb.	63.35	21,020	.29	360
Mar.	62.95	20,540	.49	600
Apr.	62.34	19,820	.65	840
May	63.54	21,345	3.27	4,110
June	64.82	22,840	.45	520
July	64.35	21,605	.49	650
Aug.	64.39	22,255	.51	650
Sept.	68.35	21,690	.60	740
Oct.	65.27	23,550	2.45	370
1958 Oct.	65.03	23,185	.23	430
Nov.	64.73	22,770	.36	390
Dec.	64.35	22,250	.35	390
1959 Jan.	64.02	21,870	.27	380
Feb.	63.79	21,560	.17	240
Mar.	63.43	21,140	.54	600
Apr.	62.87	20,420	.51	600
May	62.48	19,940	.58	600
June	62.64	20,000	.41	720
July	63.15	20,780	1.35	1,560
Aug.	62.98	20,600	.97	1,200
Sept.	62.04	19,116	.86	930

Fish Populations

The production of fish populations in Lake Colorado City appears to be excellent, and game fish-rough fish ratios are more favorable than for most of the area reservoirs. The existing populations of undesirable species constitute a dormant threat to future production of game species for sportsmen. The ability of river carpsucker, Carpiodes carpio, and carp, Cyprinus carpio, to expand to overwhelming dominance has been frequently demonstrated in the region's public waters. The occurrence of questionable species as freshwater drum, Aplodinotus grunniens, and gizzard shad, Dorosoma cepedianum, is not regarded as undesirable.

Annotated Check List of Species of Fish Taken from Lake Colorado City

LEPISOSTEIDAE - Gars

Lepisosteus osseus - longnose gar. Not taken in netting or seining but actually observed in several localities.

CLUPEIDAE - Herrings

Dorosoma cepedianum - gizzard shad. Abundant but not indicated as excessively numerous. Apparently concentrated to some extent during the summer months about the discharge weir from the power plant, possibly for spawning activity

CATOSTOMIDAE - Suckers

Carpoides carpio - river carpsucker. Common and abundant throughout the reservoir. High average coefficient of condition, the most significant aspect of this population is the question of what apparently controls or limits their increase.

CYPRINIDAE - Minnows

Cyprinus carpio - carp. Common but not numerous in the sense of concentrations. Apparently more numerous in the upper reservoir areas.

Notropis lutrensis - redhorse shiner. Common and numerous in specific localities, possibly the most abundant minnow in the reservoir.

Pimephales vigilax - parrot minnow. About as common as the redhorse shiner and found throughout the reservoir.

AMEIURIDAE - Catfishes

Ictalurus punctatus - channel catfish. Common and abundant throughout the reservoir, but particularly numerous at the outlet of water from the power plant during the summer months.

Pylodictus olivaris - flathead catfish. Common but not abundant; also, found more abundantly near the dam.

CYPRINODONTIDAE - Killifishes and topminnows

Fundulus kansae - plains killifish. Common and abundant in the upper reservoir areas.

Gambusia affinis - mosquitofish. Common and occurring wherever protection was afforded.

SERRANIDAE - Basses

Roccus chrysops - white or striped bass. Common but not excessive in any portion of the reservoir. Most common near the dam within the restricted area.

CENTRARCHIDAE - Black basses and sunfish

Micropterus salmoides - largemouth bass. Common, numerous, and in excellent condition. Taken in all size classes and particularly numerous when the seining conditions are taken into account.

Chaenobryttus gulosus - warmouth bass. Rare but taken at three seining collection stations.

Lepomis cyanellus - green sunfish. The most common sunfish in the reservoir but not particularly numerous.

Lepomis macrochirus - bluegill. About as numerous as green sunfish, but possibly more widely distributed.

Pomoxis annularis - white crappie. Common but not abundant. No evidence of stunting.

SCAENIDAE - Drum

Aplodinotus grunniens - freshwater drum. Common but not numerous, evenly distributed throughout the reservoir.

Forty-three gill net collections and twelve seining collections resulted in establishing knowledge of the presence of seventeen species of fish from nine families. It is virtually certain that these findings are inadequate to determine the actual number of species present. A more complete checklist will be compiled in the future when additional work is possible.

Thirteen adult Ictalurus furcatus, Rio Grande blue catfish, were introduced into the reservoir in October, 1959. No evidence of survival is known and successful introduction is not presumed. Seining collections in mid-winter are regarded as completely inadequate.

#### ANALYSIS AND DISCUSSION

Total figures for all netting collections indicate that channel catfish were the most abundant species (38.83 percent) and that river carpsuckers were second in occurrence. However, for reasons that will be made more apparent in later analysis and discussion, these figures are regarded as misleading and inaccurate. Other total percentages are: carp - 1.34 percent, flathead catfish - 0.49 percent, white bass - 3.18 percent, largemouth bass - 9.03 percent, white crappie - 5.25 percent and freshwater drum - 0.25 percent.

#### Summer Collections and the Restricted Area

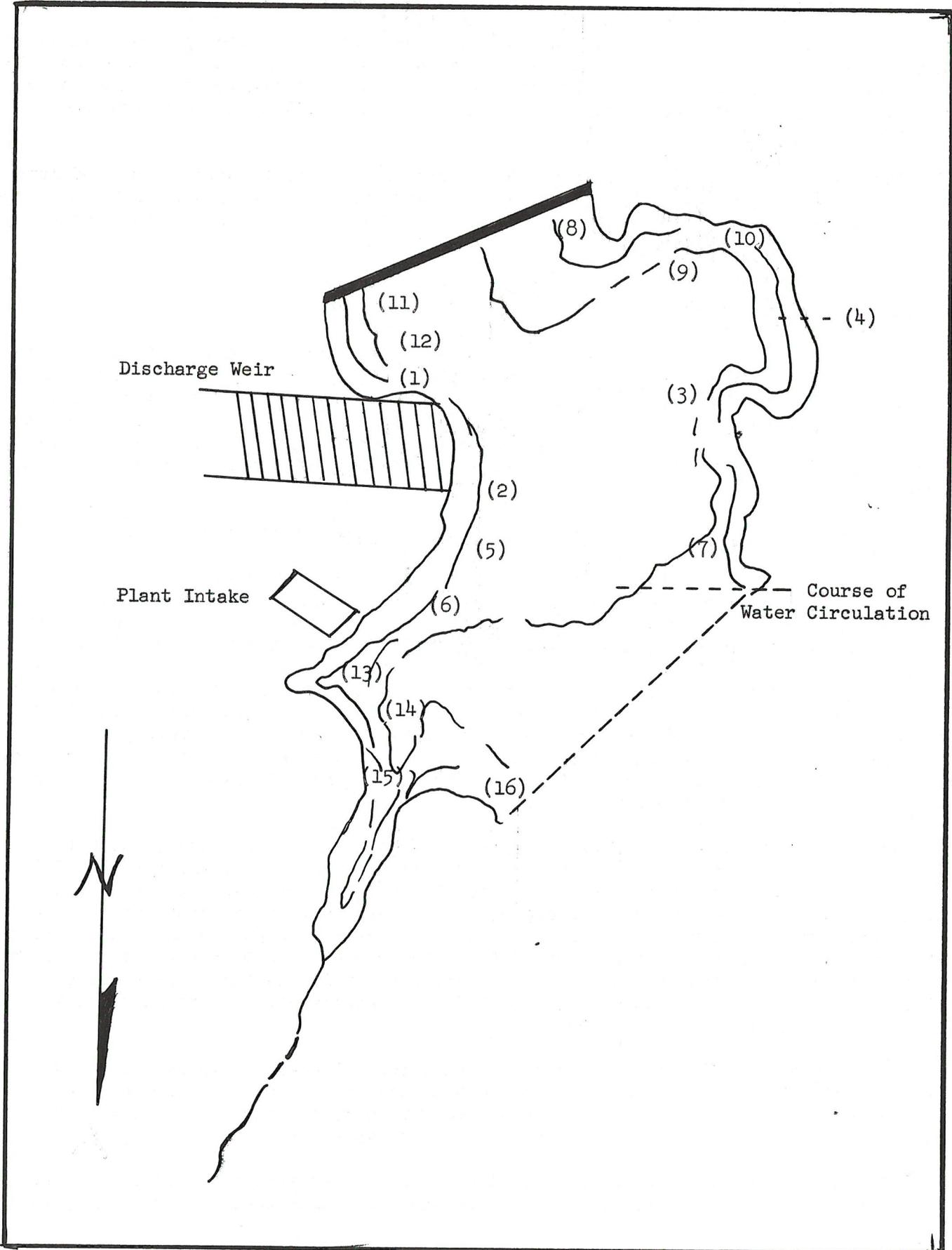
In the following statistics it is apparent that the flow supplied by the circulation of the water through the power plant, and also probably augmented by the plant policy of restricting or prohibiting public access to this area, has resulted in attraction and concentration of fish during the summer months. Over sixty-three percent (63.19) of all gizzard shad taken were captured within the restricted area and 76.72 percent of all channel catfish were taken from the same six gill nets during the summer. All white bass were also taken from this area and most of the carp were captured in this netting trip. Of all fish captured by gill nets, 52.01 percent were taken from 13.95 percent of the total number of gill nets set. The lack of proportion or randomness in sampling is more apparent when a comparison is made of collections from the netting stations during the winter. (Figures 6, 7, & 8.)

In addition to the statistics here presented channel catfish, shad, and river carpsuckers were observed milling in and about the race created by the ten-foot fall of water over the weir, at the end of the canal. Reports and observations of fish moving around the shoreline and the eagerness of trespassers to violate the restriction are in conformity with these findings. In spite of extensive public warnings, armed guards maintained on a twenty-four hour basis, and other means of restraint and detection employed by both the city and company, poachers persist in risking prosecution and other penalty by crossing into this area of fishing abundance. No rumors of failure to secure fish by poachers were heard.

The degree of attraction of the circulating thermal condition, previously described, upon channel catfish and gizzard shad is perhaps best illustrated by the duplicated netting that showed the incidence of these species decreased during the winter, while there was a notable increase in largemouth bass and white crappie.

Although evidence is as yet insufficient to establish specific causes of attraction, indications are that temperature is not the only influence. Stomach analysis

Figure 4 - Netting Stations Located within Restricted Area



indicated that channel catfish were feeding almost exclusively on shad when they were captured in concentration. The attracting influence, in view of findings to date, is probably attraction of shad to the current and a resulting concentration of channel catfish in the immediate area for feeding purposes.

It is possible that virtually all species are more or less attracted by temperature and/or the current, or by a circulating effect of the water. However, the greater summer catch may be attributed to increased activity by all fish, to the protection afforded by the restriction, or to as yet unknown influences.

#### The Unrestricted Area

Possibly the most important deficiency in the sampling of the lake and in the resulting data was a lack of information for summer, or warm weather, netting of the unrestricted area. This was not the result of an oversight but was considered of secondary importance when a choice of obtaining more complete data on the restricted area was involved.

As shown in the statistical record, river carpsuckers dominated this area. Channel catfish and largemouth bass were numerous and in excellent condition. However, there was some indication of stunting in white crappie. (Figure 10).

Lake Colorado City has had an excellent reputation for fishing for the past few years, and evidence of this was observed in the creels of fishermen while inventory was in progress. Although the restricted area, as previously discussed, is regarded as a sort of "Utopia" by sportsmen, the upper lake maintains a consistently high production of utilizable game fish. With the exception of a possible control effort in the future of excessive numbers of river carpsuckers, no management or control is needed.

#### Relative Abundance of Species

Netting collection data are regarded as the most suitable and detailed expression of the relative abundance of species in the upper and lower reservoir areas. In addition to these, and the statements included under the annotated check list, the following information was obtained by seining not recorded numerically. Juvenile game fish, particularly white bass and channel catfish, were most abundant in the upper reservoir areas during the winter field work. No juvenile carpsuckers or carp were taken in seining and centrarchids were not abundant at any particular locality or station. The following catches were made at the described gill netting stations and are shown on the map at the location bearing the corresponding number.

Symbols:	Sh - shad	Wc - White crappie
	Rcs - river carpsuckers	Cc - Channel catfish
	Cp - carp	Flc - flathead catfish
	Lmb - largemouth bass	Dr - Freshwater drum
	Wb - White bass	

Netting Collections from the Restricted Area:

Station No. 1\*  
Sh - 34  
Rcs - 8  
Cc - 25  
Lmb - 1

Station No. 6\*  
Sh - 34  
Rcs - 16  
Lmb - 3  
Wb - 2  
Wc - 2  
Cc - 27

Station No. 12  
Rcs - 10  
Lmb - 9  
Wc - 2  
Cc - 3  
Flc - 1

Station No. 2\*  
Sh - 3  
Rcs - 4  
Cp - 1  
Cc - 40  
Dr - 1

Station No. 7  
(Winter Collections Only)  
Rcs - 6  
Lmb - 1  
Cc - 1

Station No. 13  
Sh - 2  
Rcs - 3  
Lmb - 2  
Cc - 7  
Flc - 1

Station No. 3\*  
Sh - 9  
Rcs - 7  
Cp - 2  
Lmb - 3  
Cc - 41  
Dr - 1

Station No. 8  
Sh - 5  
Rcs - 1  
Lmb - 2  
Flc - 1  
Cc - 6

Station No. 14  
Sh - 3  
Rcs - 6  
Lmb - 5  
Wc - 8  
Cc - 16

Station No. 4\*  
Sh - 24  
Rcs - 7  
Cp - 1  
Lmb - 6  
Wb - 5  
Wc - 2  
Cc - 19

Station No. 9  
Lmb - 3  
Wc - 1

Station No. 15  
Rcs - 9  
Cp - 1  
Lmb - 6  
Cc - 4

Station No. 5\*  
Sh - 2  
Rcs - 19  
Lmb - 5  
Wb - 19  
Cc - 104

Station No. 10  
Sh - 1  
Lmb - 1  
Wc - 1  
Cc - 6

Station No. 16  
Rcs - 5  
Cc - 1

Station No. 11  
Sh - 3  
Rcs - 11  
Lmb - 5  
Wc - 2  
Cc - 5

\* Data for summer and winter netting are included under Stations 1 through 6.

Netting Collections from the Unrestricted Area:

Station No. 17  
Sh - 3  
Rcs - 3  
Lmb - 1  
Wc - 3

Station No. 19  
Rcs - 11  
Wc - 2  
Cc - 1

Station No. 21  
Rcs - 9  
Cp - 1  
Lmb - 1

Station No. 18  
Sh - 3  
Wc - 1

Station No. 20  
No catch

Station No. 22  
Sh - 1  
Rcs - 6  
Wc - 1

Netting Collections from the Unrestricted Area: (continued)

Station No. 23 Lmb - 2	Station No. 28 Rcs - 1 Wc - 2	Station No. 33 Rcs - 2 Wc - 1
Station No. 24 Sh - 9 Cc - 2 Wc - 1	Station No. 29 Lmb - 2 Wc - 1	Station No. 34 Lmb - 1 Wc - 2 Cc - 2
Station No. 25 Rcs - 2	Station No. 30 Sh - 2 Rcs - 11 Wc - 2	Station No. 35 Rcs - 1 Wc - 1
Station No. 26 Rcs - 9 Lmb - 2	Station No. 31 Rcs - 9 Wc - 2	Station No. 36 Rcs - 8 Lmb - 4 Cc - 2
Station No. 27 Sh - 4 Rcs - 7 Cc - 1 Lmb - 2 Wc - 2	Station No. 32 Rcs - 5 Lmb - 1 Wc - 1 Cc - 1	Station No. 37 Sh - 2 Rcs - 1 Lmb - 1 Cc - 2

RECOMMENDATIONS

1. Resurvey of the reservoir should be done, as may prove convenient in connection with other future work, in order to further establish the species of fish present, their distribution, and to provide additional data regarding their relative abundance by netting in the unrestricted area during the warmer periods of the year.

2. The study to evaluate, and if possible, to ascertain the degree of attraction or repulsion of influences provided by the unique thermal and hydrological conditions in the restricted portions of the lake should be continued.

3. The commission should provide all possible assistance to the city and to the power company in preventing further encroachment by trespassers into the protected area.

This harassment of authority is obviously contrary to the best interests of the fishing public because Lake Colorado City is a privately owned reservoir where public access is freely given. The only charges involved are used to maintain roads and access structures, and it is believed that many violaters of the restricted waters do not fully appreciate or properly evaluate the danger to life and property involved. One plant official has stated that consideration should be given to closing the entire lake to public fishing if the restrictions are not respected. The area where fishing is now permitted cannot be increased unless a basis for confidence in the public's willingness to comply with the present regulations is provided.

Prepared by Lawrence S. Campbell  
Project Leader

Approved by Marion Toole  
Director Inland Fisheries Division

Date January 16, 1961

Figure 5 - Netting Stations within Unrestricted Area

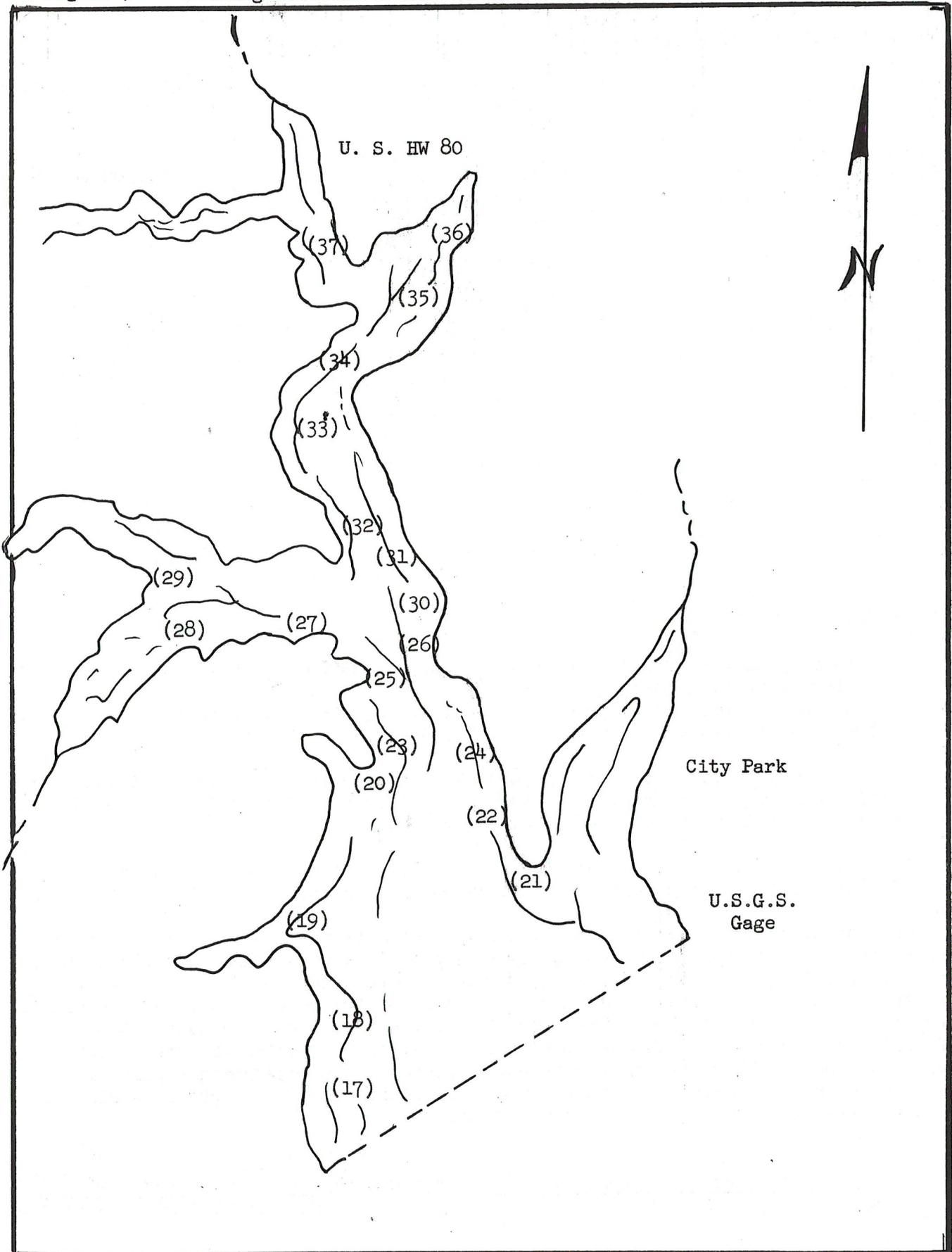


Figure 6. - Gill netting collections from six stations on Lake Colorado City in the restricted area (summer collection).

Species	Number	Percent of total number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of total weight	Average "K"
Gizzard shad	91	21.36	22	12		4	3.29	1.58
River carpsucker	46	10.79	59	8	1	4.7	8.60	2.35
Channel catfish	244	57.28	494	1	2	0.4	71.49	1.84
Carp	8	1.88	55	0	6	14	7.95	1.98
White bass	26	6.10	39	0	1	8	5.64	2.21
Largemouth bass	5	1.18	16	2	3	3.6	2.34	2.62
White crappie	4	0.94	3	4		13	0.47	3.17
Freshwater drum	2	0.47	1	8		12	0.22	1.94
Totals	426	100.00	691	3			100.00	

Figure 7. - Gill netting collections from sixteen stations on Lake Colorado City in the restricted area (winter collection).

Species	Number	Percent of total number	Total weight lbs. ozs.	Average weight lbs. ozs.	Percent of total weight	Average "K"
Gizzard shad	29	12.71	7 3	4	2.08	1.58
Carp	2	0.88	11 4	5 10	3.27	1.98
Channel catfish	61	26.76	123 14	2 0.5	35.94	1.84
Flathead catfish	4	1.75	44 0	11 0	12.77	2.18
Largemouth bass	50	21.93	58 13	1 3.8	17.06	2.62
White crappie	16	7.02	13 13	14	4.02	3.17
River carpsucker	66	28.95	85 11	1 4.8	24.86	2.35
Totals	228	100.00	344 10		100.00	

Figure 8. - A comparison between the summer and winter collections in the restricted area

Species	Summer		Winter	
	Number	Percent of total number	Number	Percent of total number
Gizzard shad	91	21.36	29	12.71
River carpsucker	46	10.79	66	28.95
Carp	8	1.88	2	0.88
Channel catfish	244	57.28	61	26.76
Flathead catfish	---	---	4	1.75
White bass	26	6.10	---	---
Largemouth bass	5	1.18	50	21.93
White crappie	4	0.94	16	7.02
Freshwater drum	2	0.47	---	---
Totals	426	100.00	228	100.00

Figure 9. - Gill netting collections from twenty-one stations on Lake Colorado City in the upper lake or unrestricted area.

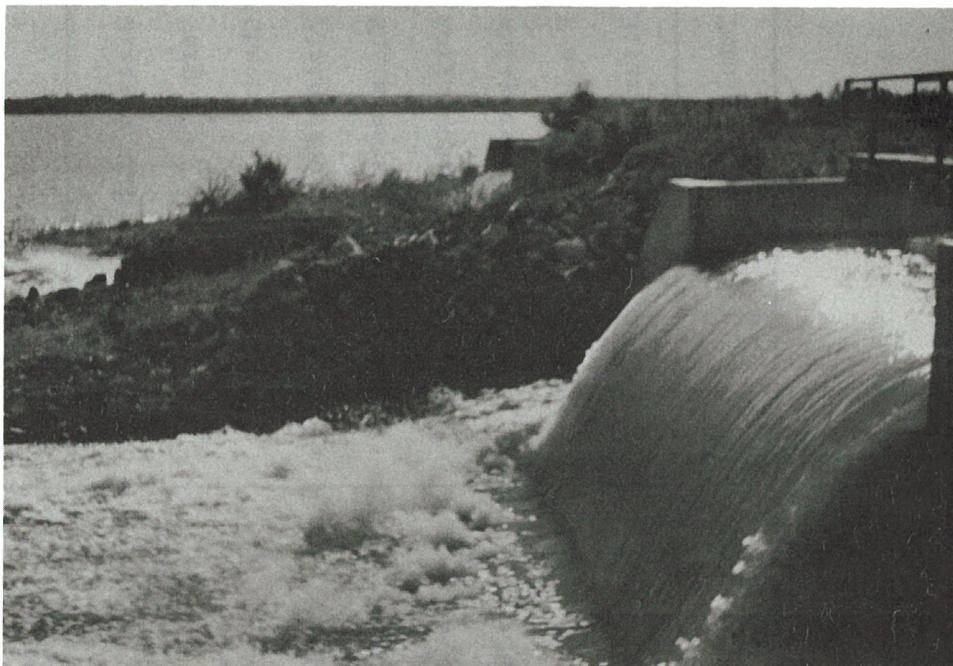
Species	Number	Percent of total number	Total weight lbs. ozs.	Average weight lbs. ozs.	Percent of total weight	Average "K"
Gizzard shad	24	14.54	6	4	2.61	1.58
River carpsucker	85	51.52	110	1 4.8	48.13	2.39
Carp	1	0.60	5	5 10	2.45	1.98
Channel catfish	13	7.88	26	2 1	11.68	1.84
Largemouth bass	19	11.52	60	3 3	26.36	2.62
White crappie	23	13.94	20	14	8.77	3.17
Totals	165	100.00	229	9	100.00	

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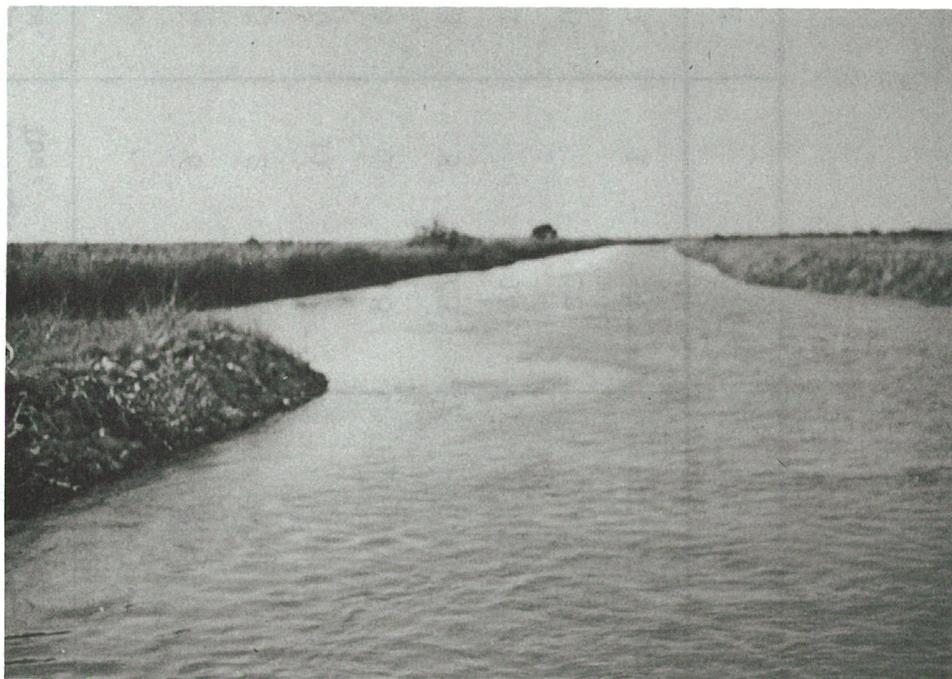
Figure 10. - Total gill netting collections from the restricted area of Lake Colorado City.

Species	Number	Percent of total number	Total weight lbs.	Weight ozs.	Average weight lbs.	Average weight ozs.	Percent of total weight	Average "K"
Gizzard shad	120	18.34	29	15	4	4	2.63	1.58
Carp	10	1.53	66	4	6	13	5.83	1.98
Channel catfish	305	46.64	617	15	2	4	54.42	1.84
Flathead catfish	4	0.61	44	0	11	0	3.87	2.18
White bass	26	3.98	39	0	1	8	3.43	2.21
Largemouth bass	55	8.41	174	13	3	3	15.40	2.62
White crappie	20	3.05	17	1		14	1.50	3.17
Freshwater drum	2	0.31	1	8		12	0.13	1.94
River carpsucker	112	17.13	145	3	1	4.7	12.79	2.35
Totals	654	100.00	1,135	11			100.00	

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Discharge Over Weir from Thermo-Electric Plant  
(Slide No. 1)



Canal from Plant to South Shore of Peninsula Return  
to Lake (Slide No. 2)