

Segment Completion Report

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FILE

TITLE

Inventory of Species in San Angelo Reservoir.

OBJECTIVES

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

PROCEDURE

Fifty-four gill net collections were made at 23 netting stations in the San Angelo Reservoir. Experimental nylon gill nets measuring 125 ft. long x 8 ft. in depth and made up in five, 25 ft. sections, were used. Mesh size for these nets increased progressively in each following section at one-half inch intervals beginning with one-inch mesh and terminating with a three inch mesh section.

Nineteen seining collections were made at fourteen localities along the lake shore. In nearly all collections both 26 ft. $\frac{1}{4}$ " mesh bag seines and 15 ft. $\frac{1}{4}$ " mesh common sense seines were used. To estimate relative abundance a count was made of all individuals taken in two hauls with a 26 ft. $\frac{1}{4}$ " mesh bag seine for each collection. In addition, seining where abundance data was not taken, a four ft. common sense seine with a $\frac{1}{16}$ " mesh was used to collect fry after the spring spawning by fishes.

Water analysis for dissolved carbon dioxide and oxygen content was taken each month and surface temperature, pH and the climatic conditions were recorded for each netting and seining collection. Turbidity was recorded on four occasions.

To make a detailed study of the largemouth black bass population, 2,237 individuals of that species were tagged and released at eight localities in the reservoir.

In net collections, most fish were identified, counted, weighed, measured and sexed in the field. A sample number of each species were examined for stomach content and a scale sample taken. On occasion it was necessary to preserve an individual, its stomach or some other organ for more detailed examination in the laboratory. When this was required, the specimen was preserved in 10% formalin.

FINDING

San Angelo Reservoir is adjacent to much of north and western San Angelo. The 37,500 ft. rolled earth dam was constructed in 1951-52 by the U. S. Corp of Engineers and is located approximately 6.5 miles above the confluence of the South and North Concho Rivers. Because the dam is primarily for flood control, the maximum lake elevation practical for permanent water conservation is 1,908 feet above mean sea level. At that elevation, the lake would have 5,441 surface acres and contain about 90,000 acre feet of water. Elevation 1,886 is designated as dead storage, the area allocated for siltation. The water rights for the area between 1,886 and 1,908 are owned by the City. The water,

when available, is to be used primarily for municipal and industrial purposes. However, irrigation is a future possibility. At elevation 1,936 emergency spillway level, the reservoir would contain about 391,000 acre feet and have 12,696 surface acres. Maximum design for the dam is 691,000 acre feet. In June 1954, the lake level was at 1,891.

The contributing watershed of 1,677 square miles is predominately San Angelo sandstone formation and top soils are usually Abeliene sands and Frio silts and loams. Vegetative cover is primarily mesquite-grassland association and the area is used almost exclusively for farming and ranching. Climate for the watershed is semi-arid, having an average annual rainfall of 19.83 inches. The average annual discharge of the North Concho River is 47.4 c. f. s.; however, a maximum discharge of 94,600 c. f. s. was recorded in September of 1936 and recent discharges have averaged 1.67 c. f. s. in 1952 and 39.3 c. f. s. in 1953.

The lake's water is usually clear and no recordable turbidity was observed except following floods. Maximum surface temperature recorded was 79 degrees F. and a minimum was 40 degrees F. pH was 8.3 - 8.4. A maximum carbon dioxide content of 14 ppm was recorded and the minimum dissolved oxygen, taken at that time, was 4 ppm. Dissolved carbon dioxide is usually about 11 - 12 ppm and oxygen usually about 5 - 8 ppm.

Excepting algae and small pleagic forms, there is no aquatic vegetation in the San Angelo Reservoir. The areas north of the river channel to elevation 1,886 and south of the channel to elevation 1,908 were cleared of all woody vegetation prior to inundation.

NETTING COLLECTIONS

As shown in Tables 1 and 11, fifty-four experimental gill net sets resulted in the capture of 1,741 individuals of fifteen species, an average of .257 fish per ft. of net set. In Table 1, collection data shows a marked increase in the numerical percentages of carp (*Cyprinus carpio*), carp suckers (*Carpoides carpio*) and drum (*Aplodinotus grunniens*) and a corresponding decrease in largemouth black bass (*Micropterus salmoides*). In Table 11, the over all average percentages are believed to be somewhat misleading for that reason. However, it is possible that percentages for river carp suckers, largemouth bass and southern channel catfish (*Ictalurus punctatus*) may be excessive. Drum and white crappie (*Pomoxis annularis*) are probably more numerous than indicated. In all instances (except three) four experimental gill nets were set at established netting stations. In June and July 1953, insufficient equipment prevented setting a standard for sampling and two experimental nets were set for each of those collections. In January, six experimental nets were used. The January collection is also known to be biased because three nets were set in the upper lake where water was confined to the old river bed. The usual number of nets set in that station is one. Of 212 river carp suckers taken in the collection, 168 were from the three nets set in the upper lake and advanced sexual development in that species indicated a pre-spawning concentration.

SEINING COLLECTIONS

Suitable permanent seining stations were difficult to locate and because of lake level fluctuation (from 7,736 acre feet in June 1953 to a maximum of 47,372 acre feet in June of 1954.), changes in the location of all seining stations were necessary. For that reason, the numerical percentages for several species shown in Table 111 are believed to be in error. The bias induced by the required relocation of seining sites makes the reliability of all seining data questionable. However, this data appears to be a more reliable indicator of the actual numerical percentage of some of the smaller forage species (notably *Notropis*) and for sunfishes (*Lepomis*). The selectivity of this method is demonstrated by its failure to capture any southern channel catfish (*Ictalurus punctatus*), smallmouth buffalo (*Ictiobus bubalus*) carp (*Cyprinus carpio*), freshwater drum (*Aplodinotus grunniens*) or several other species known to occur in the lake.

REMARKS

Both netting and seining collections produced a greater number of individuals and species in the third and fourth quarters than were taken during the first half of the period. For the named reasons, inconsistency in data for the period because the lake is increasing but is seventeen feet below conservation pool elevation and because it is believed much can be determined by a continued study of population trends, it is concluded that at least another year's work is necessary before this inventory can be completed.

Table 11

Netting Collections

Species	Pop. Sample	Avg. Wt. gms.	Total Wt. 1000 gms.	% by		K Range	Avg. K
				Wt.	Number		
<i>Dorosoma cepedianum</i>	Avg. of 60	231	570	12.85	14.29	1.51-3.12	1.69
<i>Carpionodes carpio</i>	Avg. of 98	652	2160	72.00	29.02	2.03-2.78	2.47
<i>Cyprinus carpio</i>	Avg. of 30	567	17.0	.38	.17	2.32-2.71	2.54
<i>Ictiobus bubalus</i>	Avg. of 1	595	.59	.01	.07		2.59
<i>Lepisosteus osseus</i>	Avg. of 4	840	3.36	.07	.26		2.08
<i>Moxostoma congestum</i>	Avg. of 16	801	12.58	.27	.94	2.13-2.65	2.31
<i>Aplodinotus grunniens</i>	Avg. of 7	164	1.10	.02	.42	2.09-2.50	2.21
<i>Morone chrysops</i>	Avg. of 2	281	.56	.01	.15		2.04
<i>Ameiurus natalis</i>	Avg. of 7	201	1.40	.03	.42	2.24-2.69	2.47
<i>Pilodictus olivaris</i>	Avg. of 4	1049	4.19	.09	.26	2.18-2.46	2.22
<i>Ictalurus punctatus</i>	Avg. of 110	94	29.40	.67	17.92	1.86-2.42	2.18
<i>Micropterus salmoides</i>	Avg. of 321	312	100.00	2.28	18.51	2.12-4.54	2.84
<i>Pomoxis annularis</i>	Avg. of 41	192	484.00	11.10	14.57	2.13-3.69	2.73
Sunfishes	Avg. of 34	71	2.70	.06	.25	3.00-3.70	3.25
			4386.88	99.84	100.00		

Checklist of Fish Species for San Angelo Reservoir
June 22, 1953 to June 22, 1954

Common Name	Scientific Name
1. Longnose gar	<i>Lepisosteus osseus</i>
2. Gizzard shad	<i>Dorosoma cepedianum</i>
3. Smallmouth buffalo	<i>Ictiobus bubalus</i>
4. River carpsucker	<i>Carpionodes carpio</i>
5. Gray redhorse sucker	<i>Moxostoma congestum</i>
6. German carp	<i>Cyprinus carpio</i>
7. Golden shiner	<i>Notemigonus crysoleucas</i>
8. Blacktail shiner	<i>Notropis venustus</i>
9. Red shiner	<i>Notropis lutrensis</i>
10. Parrot minnow	<i>Pimephales vigilax</i>
11. Southern channel catfish	<i>Ictalurus punctatus</i>
12. Yellow bullhead	<i>Ameiurus natalis</i>
13. Flathead catfish	<i>Pilodictus olivaris</i>
14. Common mosquitofish	<i>Gambusia affinis</i>
15. White bass	<i>Morone chrysops</i>
16. Largemouth black bass	<i>Micropterus salmoides</i>
17. Warmouth bass	<i>Chaenobryttus coronarius</i>
18. Green sunfish	<i>Lepomis cyanellus</i>
19. Redear sunfish	<i>Lepomis microlophus</i>
20. Spotted sunfish	<i>Lepomis punctatus</i>
21. Bluegill	<i>Lepomis macrochirus</i>
22. Orangespotted sunfish	<i>Lepomis humilis</i>
23. Yellowbelly sunfish	<i>Lepomis auritus</i>
24. Western longear sunfish	<i>Lepomis megalotis</i>
25. Freshwater drum	<i>Aplodinotus grunniens</i>

SUMMARY

1. Fifty-four gill net collections and nineteen seining collections were made.
2. Water analysis was taken each month. Climatic conditions recorded and all fishes captured were identified
3. For population studies, a sample number of each species were weighed, measured and other pertinent data recorded. Food, growth and age studies were begun for the more important species.
4. A special study of largemouth black bass was started. 2,237 individuals were tagged.
5. In abundance and distribution work, 1,741 individuals of fifteen species were taken by gill nets and 2,547 individuals of 16 species were taken by seining.
6. Because of inconsistencies in data taken thus far, and because the lake is below the elevation designated as its conservation level, further work is required before the inventory can be completed.

SAN ANGELO RESERVOIR

