MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana Name Southwest Montana Fishery Study

Project No.: F-9-R-9 Title Canyon Ferry Investigation

Job No.: II A

Period Covered: May 1, 1960 to April 30, 1961

Abstract:

Canyon Ferry Dam, on the Missouri River, was completed in 1953 and the reservoir filled in 1955. A series of duplicated gill net samples were made in 1955, 1958 and 1960 in an attempt to measure changes in the fish population and their growth rates.

Carp sucker and yellow perch populations from flooded Lake Sewell rapidly expanded and dominated the fish population by 1955. Brown trout were numerous in the net samples. Rainbow trout fingerlings stocked into the reservoir produced an excellent fishery as the reservoir filled and then the fishery declined. A shift to catchable size rainbow in 1958 appears to be correlated with a more successful fishery although net samples do not show significant changes.

Age and growth studies show increased growth rates for all fishes during the first years of impoundment followed by a decrease to pre-impoundment growth rates.

It is indicated that the fish population had expanded to fill the new environment by 1955, when the lake first filled completely.

Objectives:

There is a need for a better understanding of the changes in fish populations in new reservoirs, particularly in reservoirs constructed on productive trout streams. If we are to manage these reservoirs it will be necessary to study in detail the physical and chemical nature of these waters as well as the ecology of the organisms in the reservoir. This job was designed to measure trends in the fish population of a new reservoir, observe the relative abundance of various species, measure changes in growth rates and give some measure of the effectiveness of trout stocking. Fish collections were to be made by means of a series of duplicated gill net sets.

Techniques and Findings:

There is extensive literature concerning reservoirs and reservoir fishes but only limited studies on pre- and post-impoundment conditions in the same reservoir. Eschmeyer and Jones (1941) and Eschmeyer, Stroud and Jones (1942) record increased growth rates during the early years of the impoundment of T.V.A. lakes with decreased growth rates during later years. Hall and Jenkins (1953) and Buck and Cross (1952) studies the fish populations in two new reservoirs in Oklahoma. A series of intensive studies of the effects of the Clearwater Dam on the fish population, in the transition from stream to lake environment, in Missouri has been reported by Funk et al. (1953), Partriarche and Cambell (1957) and Katherine (1953). In the Clearwater Reservoir the population of small fish, mainly minnows, was established during the first 3 years after impoundment and the population of larger fishes had apparently reached the carrying capacity of the reservoir in 5 years. These studies demonstrate the rapid expansion of a fish population to fill a new environment and changes in the population as the streams are dammed. Species formerly found in backwater areas, or deep pools tend to dominate the new population in a warmwater reservoir. Intensive pre- and post-impoundment studies involving large productive trout streams and reservoirs in the Rocky Mountain area have not been published.

Description of Canyon Ferry Reservoir:

Canyon Ferry Dam is located on the Missouri River about 17 miles northeast of Helena, Montana. The reservoir is about 25 miles long. At maximum operating pool level (3,800 feet m.s.l.) the reservoir has a capacity of 2,050,900 acre feet, a surface area of 35,180 acres and a maximum depth of 165 feet. Canyon Ferry Reservoir flooded Lake Sewell, an impoundment of 2,900 acres located about 1.5 miles above the present dam. (Figure 1).

The Missouri River supplies almost all of the water in the lake. Several small streams flow into the lake but most of the summer flows are diverted for irrigation.

Canyon Ferry Dam was closed in March, 1953 and the reservoir reached maximum operating levels during July, 1955. After 1955 the operating levels fluctuated between 3,781 and 3,800 feet m.s.l. and the yearly pattern of fluctuations were similar each year.

The area inundated had a population of fishes which included rainbow trout, brown trout, brook trout, cutthroat trout, whitefish as well as yellow perch, burbot, white suckers, longnose suckers and carp. Lake Sewell was known to have a large rough fish population.

Fish Collections:

During 1955, 1958 and 1960 a duplicated series of gill net samples were made in the reservoir. Graduated mesh nylon gill nets (square mesh ¾ to 2 inches, 6 x 125 feet) were used. All sets were made overnight with an average of 18.5 hours per set in 1955; 16.3 hours in 1958 and 14.8 hours in 1960. Nets were set on the bottom at various points around the reservoir

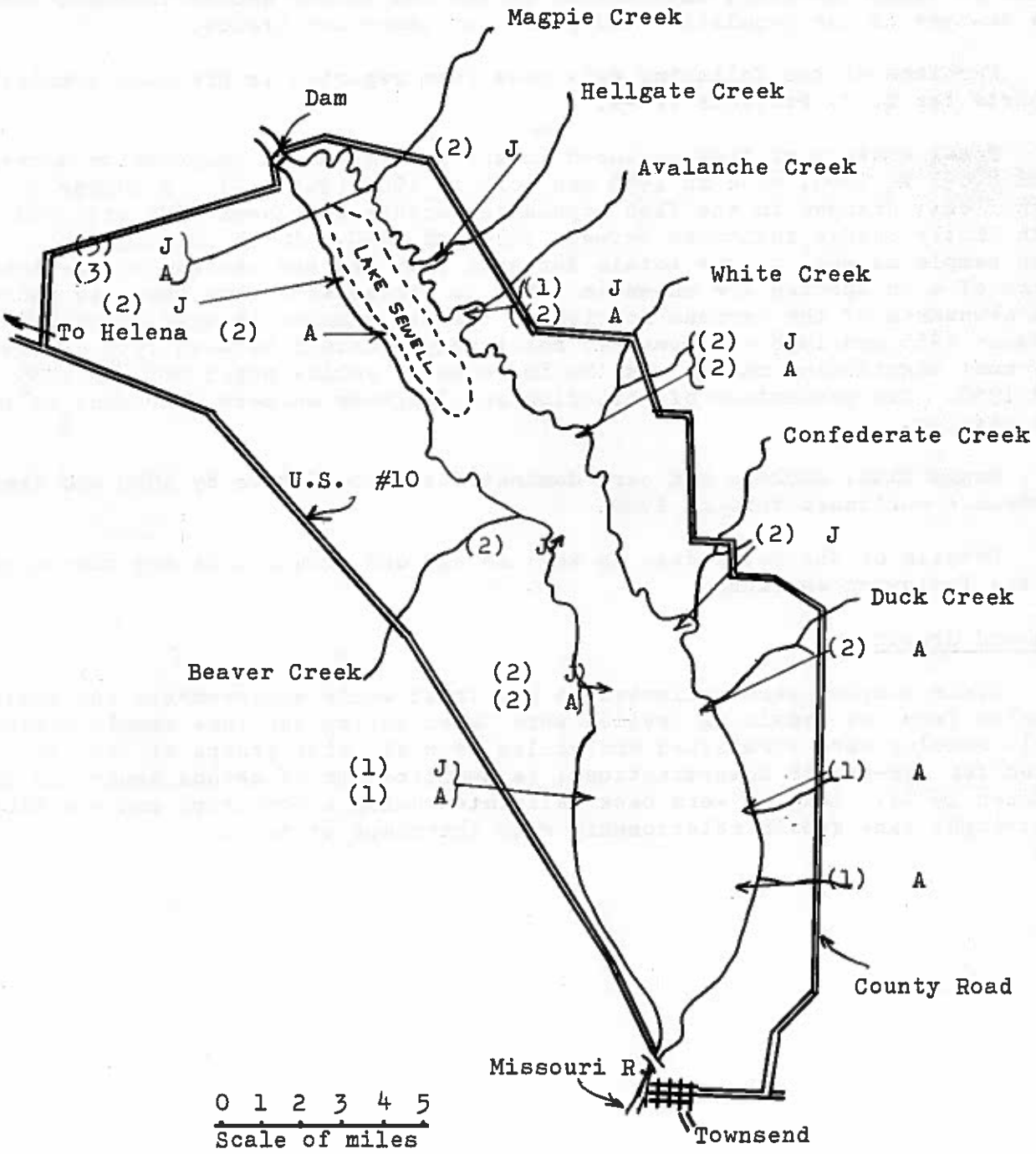

Figure 1 - Map of Canyon Ferry Reservoir and vicinity. Locations and numbers of gill net sets are indicated by the numbers in ( ). J indicates June sets while A indicates August sets.

(Figure 1), at depths of 7 to 90 feet. A total of 17 net sets were made in June and 16 net sets in August of each year. Seine hauls were made in shallow areas during August with a 20-foot common sense seine in order to capture young of the year fish.

It is well known that gill nets are selective both as to the species and sizes of fish. However, duplication of the net series should indicate relative changes in the population and point out important trends.

Portions of the following data have been reported in previous completion reports for D. J. Projects F-9-R.

Total numbers of fish captured in the nets showed a progressive decrease from 8,691 in 1955, 6142 in 1958 and 4618 in 1960 (Table I). A number of significant changes in the fish population occurred between 1955 and 1958 with little change indicated between 1958 and 1960. Catch composition of each sample as well as the totals for each year and the percent of the total catch of each species are shown in Table 1. These data show that the relative abundance of the various species in the net samples changed drastically between 1955 and 1958 and remained relatively constant between 1958 and 1960. The most significant change was the increase in yellow perch between 1955 and 1958. The percentage of whitefish and longnose suckers decreased in the net samples.

Rough fish, suckers and carp dominated the population by 1955 and their dominance continued through 1960.

Details of the catch data as well as age and growth data are discussed in the following sections.

Age and Growth

Scale samples were collected on all trout while measurements and scale samples from the remaining species were taken during the June sample period. Scale samples were stratified and scales from all size groups of fish selected for age-growth determinations, (a modification of method described by Ketchen 1949). Lengths were back calculated using a nomograph and assuming a straight line growth relationship with intercept at zero.

Table I - Catch Composition of 33 Duplicate Gill Net Sets in Canyon Ferry Reservoir, 1955, 1958 and 1960.

Name	Date	1955 Number (% of Total)	1958	1960
White Sucker	June	3692 (72.4)	2191 (73.0)	1961 (78.6)
Catostomus commersoni	August	2649 (73.6)	2067 (55.7)	1483 (69.9)
	Total	6341 (72.9)	4258 (69.3)	3444 (74.6)
Longnose Sucker	June	978 (19.2)	79 (2.6)	88 (3.5)
Catostomus catostomus	August	350 (9.7)	26 (0.8)	18 (0.9)
	Total	1337 (15.4)	105 (1.7)	106 (2.3)
Carp	June	78 (1.5)	64 (2.1)	67 (2.7)
Cyprinus carpio	August	372 (10.3)	146 (4.6)	101 (4.8)
	Total	450 (5.2)	210 (3.4)	168 (3.6)
Yellow Perch	June	109 (2.1)	581 (19.3)	313 (12.6)
Perca flavesens	August	141 (3.9)	841 (26.7)	483 (22.8)
	Total	250 (2.9)	1422 (23.1)	796 (17.2)
Whitefish	June	98 (1.9)	6 (0.2)	9 (0.4)
Prosopium williamsoni	August	21 (0.6)	5 (0.2)	2 (0.1)
	Total	119 (1.4)	11 (0.2)	11 (0.2)
Brown Trout	June	89 (1.7)	57 (1.9)	39 (1.6)
Salmo trutta	August	14 (0.4)	16 (0.6)	12 (0.6)
	Total	103 (1.2)	73 (1.2)	51 (1.1)
Rainbow Trout	June	35 (0.7)	10 (0.3)	7 (0.3)
Salmo Gairdneri	August	27 (0.8)	6 (0.2)	15 (0.7)
	Total	62 (0.7)	16 (0.3)	22 (0.5)
Flathead Chub	June	5 (0.1)	8 (0.3)	7 (0.3)
Hybopsis gracilis	August	23 (0.6)	38 (1.2)	8 (0.4)
	Total	28 (0.3)	46 (0.8)	15 (0.3)
Stonecat	June	6 (0.1)	5 (0.2)	3 (0.1)
Noturus flavus	August	0	2 (0.1)	0
	Total	6 (0.1)	7 (0.1)	3 (0.1)
Mountain Sucker	June	2	0	1
Pantosteus platyrhynchus	August	0	0	0
	Total	2	0	1
Burbot	June	0	1	0
Lota lota	August	0	0	0
	Total	0	1	0
Total Catch		8691	6142	4618

Rainbow Trout

Relative abundance of rainbow trout in the net catch showed a decline from 0.7 to 0.3 percent of the catch between 1955 and 1958 and up to 0.5 percent in 1960, (Table I). Although the numbers of fish captured were small, these changes in the net catch appear to parallel the pattern of fishing success. During 1955 to 1958 approximately 750,000 fingerling rainbow trout were stocked each year (Table II). Starting in 1958 catchable trout (6 inches and longer) were stocked in the reservoir with 190,225 catchable trout stocked in 1960.

Table II - Trout Stocked Into Canyon Ferry Reservoir, 1952 to 1960.

Date	Name	Number	Size
1960	Rainbow Trout	202,375	190,225 Catchable size (over 6")
			12,150 3"
1959	Rainbow Trout	192,853	Catchable size
1958	Rainbow Trout	195,855	55,134 Catchable size
			140,721 4" to 5"
1957	Rainbow Trout	684,900	Fingerlings
1956	Rainbow Trout	759,871	Fingerlings
1955	Rainbow Trout	851,990	Fingerlings
1954	Rainbow Trout	757,350	Fingerlings
1953	Rainbow Trout	717,995	Fingerlings
1952*	Brown Trout	8,000	?
	Rainbow Trout	16,800	?
1951*	Rainbow Trout	46,600	?
	Brown Trout	10,800	?

* Stocked into the Missouri River in and above the reservoir site in Broadwater County.

Age and growth studies were made of the 1955 and 1958 collections of rainbow trout (Table 111). Growth rates were excellent with fish reaching an average of 15.8 to 17.1 inches at the third annulus.

Table III-Average Calculated Lengths of Rainbow Trout Collected in 1955 and 1958 From Canyon Ferry Reservoir.

1955 Sample			Year of Life					
Age Group	Year Class	No. of Fish	I	II	III	IV	V	VI	VII
II	1953	44	5.4	14.1					
III	1952	10	3.8	8.9	15.8				
1958 Sample									
		9*	6.2	13.6	17.1				

* There is a check mark on 2.9 inches that was a hatchery or stocking check.

In 1960, 17 of the 22 rainbow trout captured in nets had the eroded dorsal fins characteristic of the hatchery fish stocked. No age analysis was possible because of the confused pattern of growth rings on the scales.

There was little variation in the size of the rainbow trout captured in the nets from year to year, possibly indicating net selectivity. In 1955 the fish captured were from 8.3 to 21.8 inches long (average 16.2 inches) and weights ranged from 0.2 to 3.9 pounds (average 1.74 pounds); in 1958 the lengths ranged from 7.5 to 20.9 inches (average 15.9 inches) and weights ranged from 0.2 to 3.1 pounds (average 1.45 pounds) in 1960 the lengths ranged from 9.7 to 18.9 inches (average 15.9 inches) and the weights ranged from 0.36 to 2.64 pounds (average 1.45 pounds).

Brown Trout

Brown trout were more abundant than rainbow in the net samples and remained a constant portion of the catch during 1955 through 1960. No brown trout were stocked in the drainage during this period. In 1955 the brown trout captured ranged from 7.8 to 26.0 inches in length (average 15 inches) and weighed 0.19 to 9.25 pounds (average 1.33 pounds).

Table IV - Average Calculated Lengths of Brown Trout Collected in 1955 and 1958 1960 From Canyon Ferry Reservoir:

Year Class	Age Group	No. of	Year of Life						
1960 Sample		Fish	1	2	3	4	5	6	7
1958	II	4	3.9	9.1					
1957	III	8	3.6	9.5	13.6				
1956	IV	15	3.8	9.3	13.8	15.6			
1955	V	11	3.5	7.0	13.6	16.1	17.6		
1954	VI	9	3.7	6.9	13.6	17.1	18.6	19.6	
1953	VII	2	3.8	8.4	14.7	17.2	19.5	21.3	22.9
1958 Sample									
1955	III	32	4.3	11.3	14.9				
1954	IV	26	4.1	9.4	14.7	16.7			
1953	V	6	5.1	10.8	15.5	18.6	20.2		
1952	VI	3	4.3	10.0	15.2	18.5	21.7	23.6	
1955 Sample									
1953	II	48	4.4	12.5					
1952	III	41	4.0	8.7	14.8				
1951	IV	1	4.0	9.4	13.8	17.2			
1950	V	5	3.8	9.3	14.4	18.0	21.1		

In 1958 the average size was larger with the lengths ranging from 13.7 to 27.3 inches (average 17.0 inches) and weights of brown trout ranging from 0.8 to 7.0 pounds (average 1.87 pounds). There was little change in the size of the 1960 sample with lengths of 10.7 to 24.1 inches (average 16.8 inches) and weights from 0.5 to 6.88 pounds (average 1.94 pounds).

Growth rates were excellent and the fastest growth occurred during the first years of impoundment (Table IV). A large variation in the annual growth increments of individual fish in a single year class was noted. A possible explanation could be the time of residence in the parent stream before moving to the lake.

Whitefish

A relatively low population of mountain whitefish was present in the reservoir in 1955 and this population appeared to decline by 1958 and then remain at about the same level. Whitefish were 1.4 percent of the 1955 sample; 0.2 percent of the 1958 sample and 0.2 percent of the 1960 sample (Table I).

Age and growth data indicate increased growth during 1953 and 1954 (Table V).

Table V - Average Calculated Lengths of Whitefish Collected in 1955 From Canyon Ferry Reservoir.

Year Class	Age Group	No. of Fish	Year of Life 1	2	3	4	5
1954	I	8	6.0				
1953	II	28	5.1	10.3			
1952	III	17	4.5	8.0	11.3		
1951	IV	9	5.4	8.9	11.4	13.6	
1950	V	3	4.4	8.5	11.7	13.7	15.3

Yellow Perch

The yellow perch population expanded rapidly in the new reservoir. In 1955 yellow perch were 2.2 percent of the net catch while they comprised 23.1 and 17.2 percent in 1958 and 1960. The average size of individual perch caught was approximately the same in 1955 through 1960 although larger fish made up a greater part of the catch in 1960.

Length frequency curves for the three sample years are shown in Figure 2. The largest perch taken in the reservoir was 13.6 inches in length and weighed 1.4 pounds.

Age and growth of the perch population show increased growth rates during the first years of impoundment. Growth rates are shown in Table VI and the changes in growth rates are shown graphically in Figure 3.

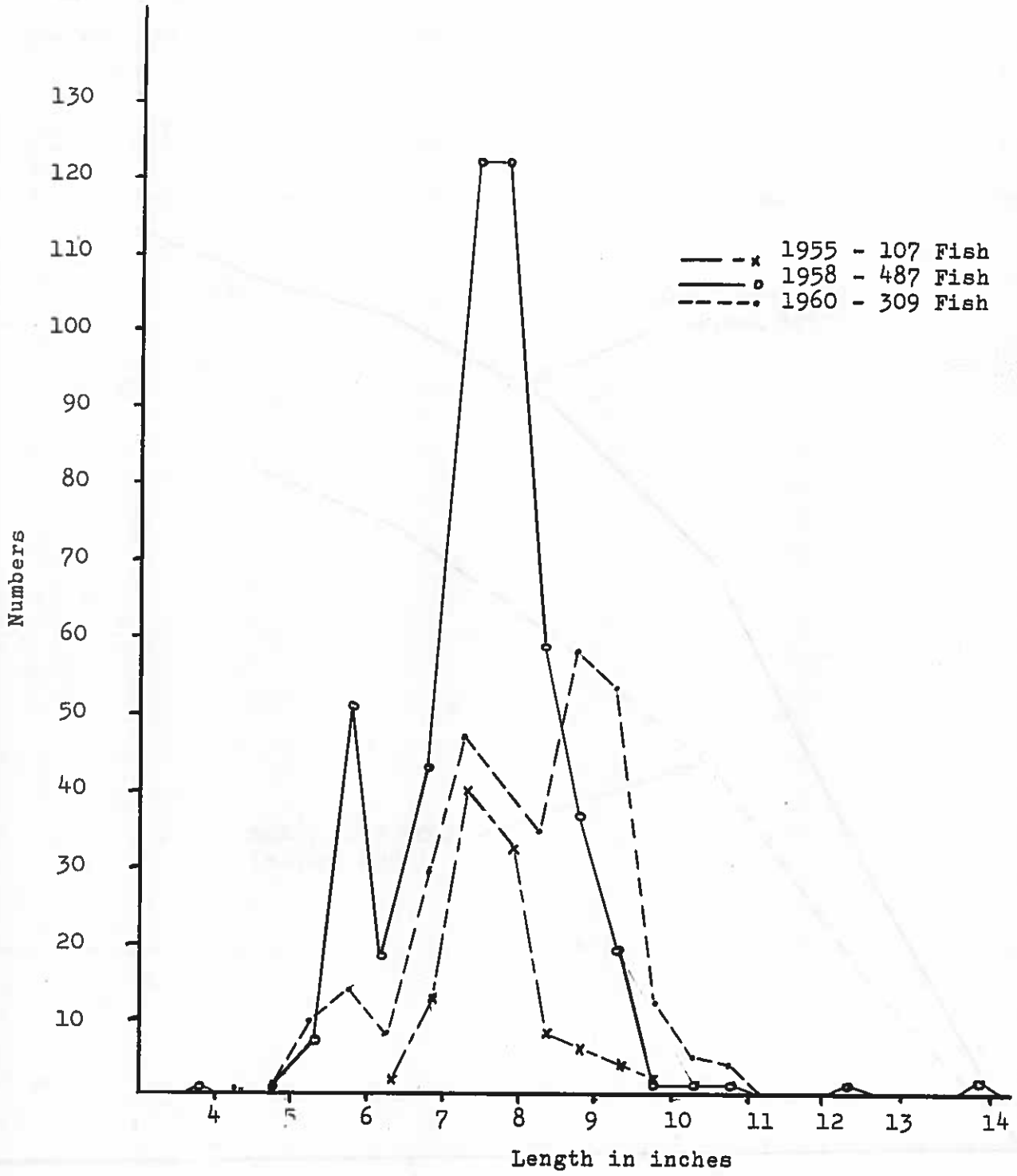

Figure 2 - Length frequency curves for the yellow perch captured in the June samples from Canyon Ferry Reservoir.

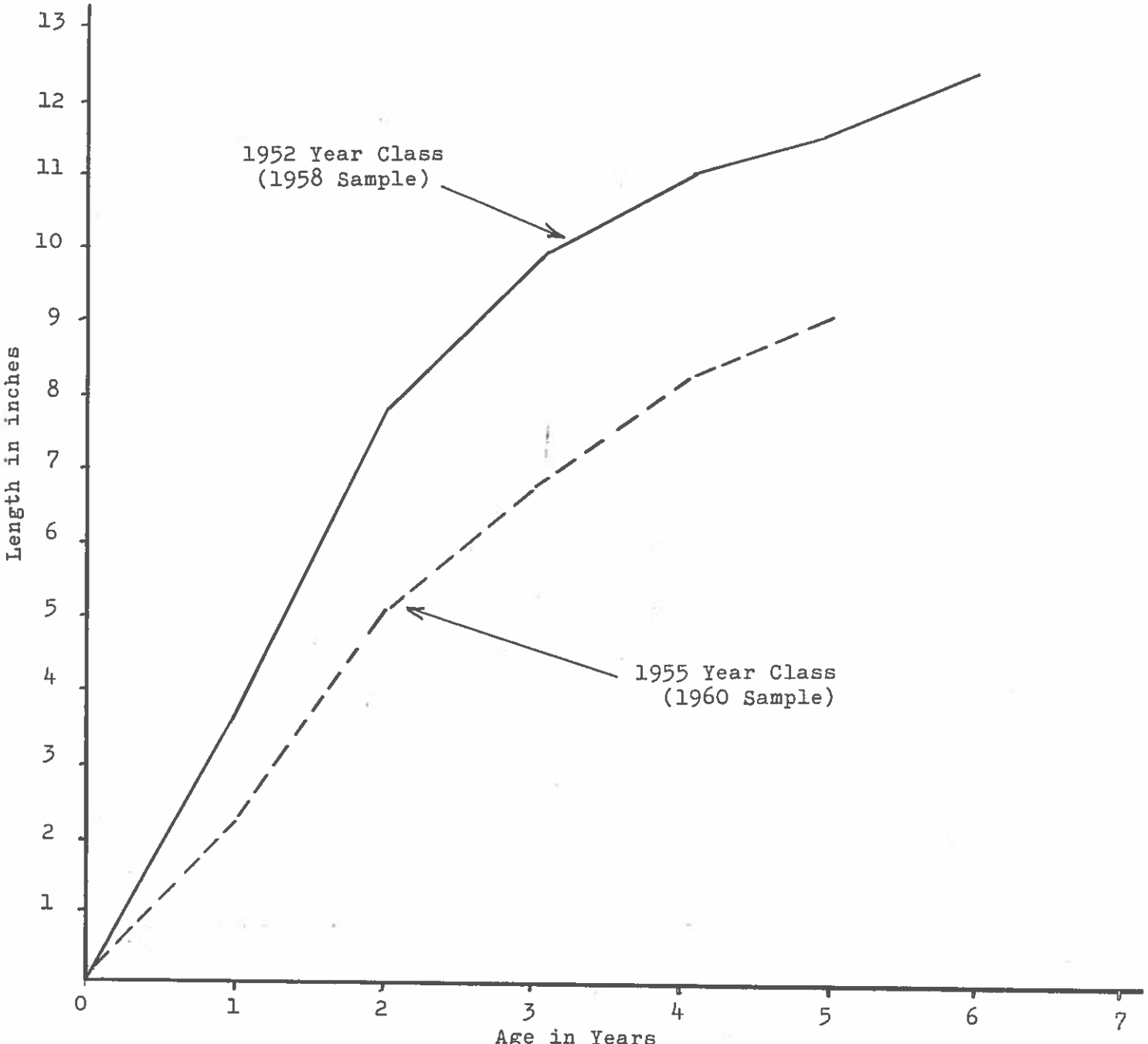

Figure 3 - Growth of Yellow Perch from Canyon Ferry Reservoir.

Comparison of age and growth data with the length frequency curves for the June samples indicates the net samples were dominated by the 1953 year class perch in 1955, the 1954-55 year classes in 1958 and the 1955-56 year classes in 1960.

During 1958 field examination of 79 perch stomachs, from fish alive in one net, revealed 37 stomachs held entomostraca; 2 entomostraca and fish scales, 1 filamentous algae; 1 fish scales; 1 crayfish and 26 were empty.

Table VI - Average Calculated Lengths of Yellow Perch Collected During 1955, 1958 and 1960 From Canyon Ferry Reservoir.

1960 Collection			Year of Life						
Year Class	Age Group	No. of Fish	1	2	3	4	5	6	7
1960	0	60	(Average length 1.7 inches August 10, 1960)						
1959	I	1	2.4						
1958	II	22	2.9	5.2					
1957	III	49	2.1	4.8	6.6				
1956	IV	22	2.3	4.7	6.9	8.0			
1955	V	34	2.3	4.8	6.8	8.3	9.0		
1954	VI	15	2.2	4.8	6.5	8.0	8.9	9.5	
1953	VII	4	2.3	4.5	6.8	8.7	9.8	10.7	11.2
Average		146	2.3	4.8	6.7	8.1	9.0	9.8	11.2
1958 Collection									
1958	0	114	(Average length 1.54 inches on August 11,1958)						
1957	I	0							
1956	II	21	2.3	4.8					
1955	III	28	2.2	4.7	6.7				
1954	IV	32	2.7	5.4	7.3	8.4			
1953	V	4	3.7	7.1	8.5	9.2	9.9		
1952	VI	3	3.7	7.8	9.9	11.0	11.6	12.4	
1955 Collection									
1954	I	2	3.3						
1953	II	49	3.7	7.0					
1952	III	8	3.5	6.7	8.7				

White Suckers

White suckers dominated the gill net catch during both sample periods. Although the total number captured during 1958 was less than in 1955 the percentage of the total net catches remained approximately the same during both samples making up 69 and 73 percent of the catch (Table I). Examination of the length frequencies of the two samples show the 1955 sucker population was composed mainly of young fish representing an expanding population while the length frequency curves for 1958 and 1960 are as expected for a stabilized sucker population.sampled with gill nets (Figure 4).

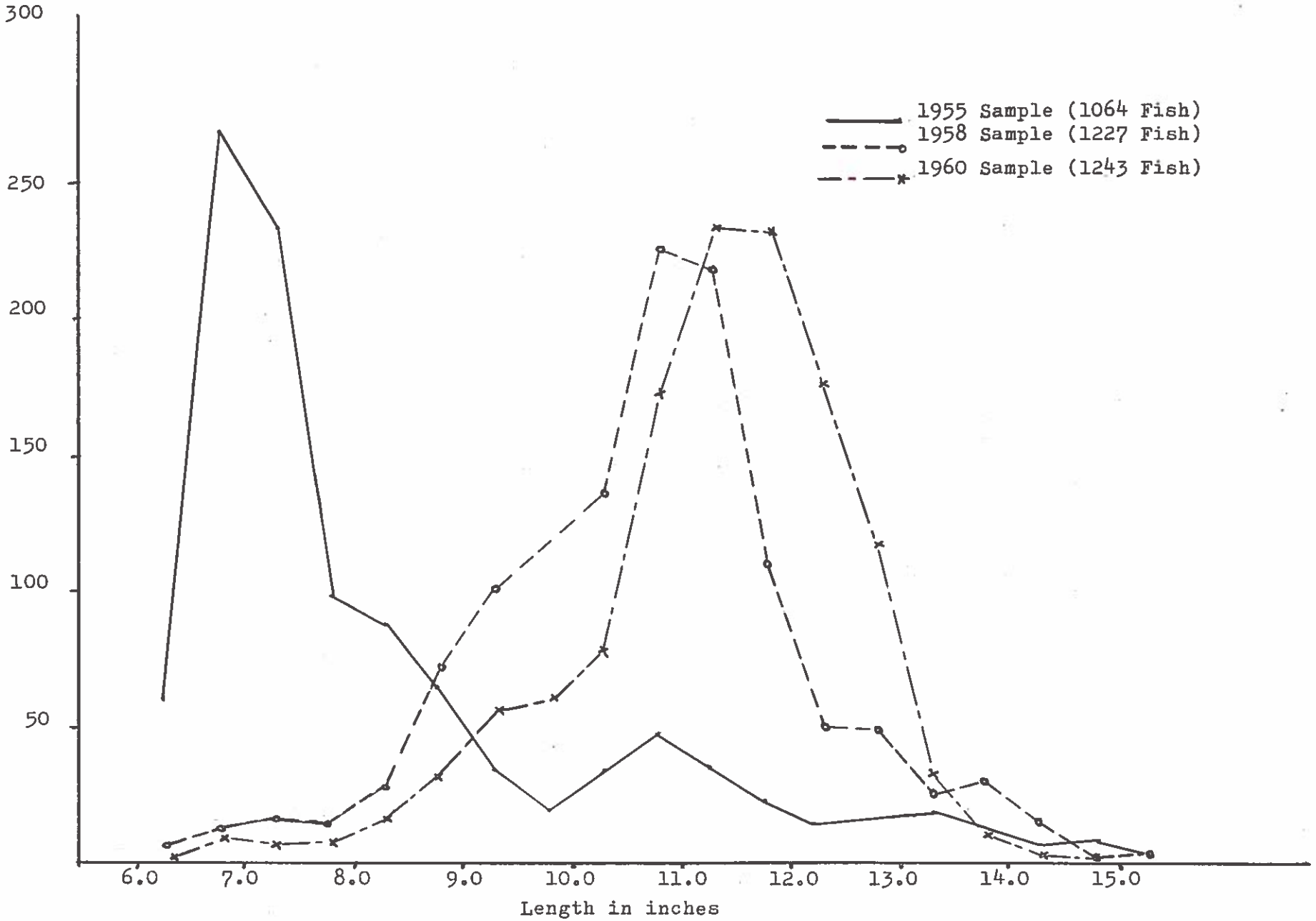

Figure IV - Length frequency curves for white suckers from Canyon Ferry Reservoir.

Measurements were obtained for 1,071 of the suckers taken during 1955 (16.9%); 1,227 (29%) of the 1958 sample and 1,243 in 1960. These measurements indicate an increase in both the average length and weights of the white suckers. In 1955 the lengths ranged from 6.0 to 17.2 inches (average 8.3) and weights ranged from 0.08 to 2.08 pounds (average 0.27). In contrast the 1958 sample contained suckers ranging from 4.4 to 17.1 inches (average 10.6) in length and with weights ranging from 0.09 to 1.5 pounds (average .47). In 1960 the lengths ranged from 6.3 to 14.7 inches (average 11.2) and weights ranged from 0.04 to 1.22 pounds (average 0.56 pound).

Age and growth determination were made on a stratified sample selected from the scale collections. A total of 69 scale samples were examined from the 1955 collection and 111 samples from the 1958 collection and 164 in 1960.

In the 1955 sample the 1953 year class of suckers dominated the population, in the 1958 sample the 1953 and 1954 year classes were the most numerous and the 1960 the 1954 and 1955 year classes dominated the catch. Age and calculated lengths for both samples are shown in Table VII. Growth rates of the common suckers increased during the early years of the impoundment and then decreased again. The growth data from the 1955 scale sample were divided so as to compare lengths attained at each age before and after impoundment (Table VII). These data indicate growth was accelerated immediately following impoundment but by 1960 growth rates had slowed and were similar to those found prior to impoundment.

Longnose Sucker

It appears the longnose sucker was unable to compete successfully in the reservoir for they declined in the net catch from 1337 to 105 or a decrease from 15.2 to 1.7 percent of the catch (Table I). Measurements of 255 of the 1955 collection and 42 of the 1958 collection and 87 of the 1960 collection were made. Total lengths ranged from 6.0 to 7.1 inches (average 8.3) in 1955; from 6.8 to 12.0 inches (average 9.9) in 1958 and 6.2 to 15.7 inches (average 9.5 inches) in 1960. Weights ranged from 0.09 to 1.71 pounds (average 0.23) in 1955; from 0.1 to 0.55 pounds (average .32) in 1958 and from 0.07 to 1.14 pounds (average 0.34 pounds) in 1960.

Scale samples from 51 fish were examined in 1955, from 42 fish in 1958 and 69 in 1960 (Table VIII). These data indicate increased growth rates during the early years of the impoundment followed by a decrease in growth although this decrease is not so great as was observed in the yellow perch or even white sucker population.

Carp

Gill nets are not effective in sampling carp populations so the relative numbers in the catch mean little. During 1955 the nets took large numbers of two year old carp which were growing rapidly. Seine samples revealed that young of the year carp were abundant in shallow areas of the reservoir.

In 1955 the carp were growing rapidly with the average length of the two year old carp increasing from 718 to 9.8 inches between the June and August sample.

Table VII - Average Calculated Lengths of White Suckers Collected From Canyon Ferry Reservoir, 1955, 1958 and 1960.

1960 Sample

Year Class	Age Group	No. of Fish	1	2	3	4	5	6	7	8	9
1960	0	85									
1959	I										
1958	II	26	2.7	6.9							
1957	III	23	2.0	5.5	7.9						
1956	IV	33	1.8	4.9	7.9	10.3					
1955	V	62	1.9	4.8	8.0	10.3	11.6				
1954	VI	18	1.8	4.8	7.7	9.7	11.2	12.3			
1953	VII	2	1.5	3.6	6.5	8.2	9.9	11.1	12.0		

1958 Sample

1958	0	10	(Average length 1.4 inches on August 11, 1958)								
1957	I	4	2.2								
1956	II	8	2.2	5.7							
1955	III	19	2.0	4.9	7.5						
1954	IV	39	2.0	5.0	8.2	10.2					
1953	V	35	1.9	5.5	9.2	11.6	12.9				
1952	VI	1	.9	3.4	6.4	9.9	14.3	15.6			
1951	VII	2	1.6	3.5	8.5	11.2	13.2	14.6	15.7		
1950	VIII	2	1.7	4.5	7.0	9.7	11.4	13.6	15.1	16.5	
1949	IX	1	1.5	4.3	7.4	10.2	12.5	14.4	15.4	16.5	17.1

1955 Sample

1953	II	22	2.7	7.2							
1952	III	22	1.7	6.0	10.1						
1951	IV	11	1.6	4.7	9.9	13.4					
1950	V	7	1.6	4.4	7.9	12.0	14.1				
1949	VI	3	1.9	5.7	8.8	11.9	14.0	15.4			
1948	VII	4	1.7	4.7	8.5	11.2	13.2	15.0	16.7		

Average length before impoundment (1955 Sample)	1.7	4.7	8.2	11.5	13.2				
Average length after impoundment (1955 Sample)	2.7	6.6	10.0	12.8	14.1	15.1	16.7		

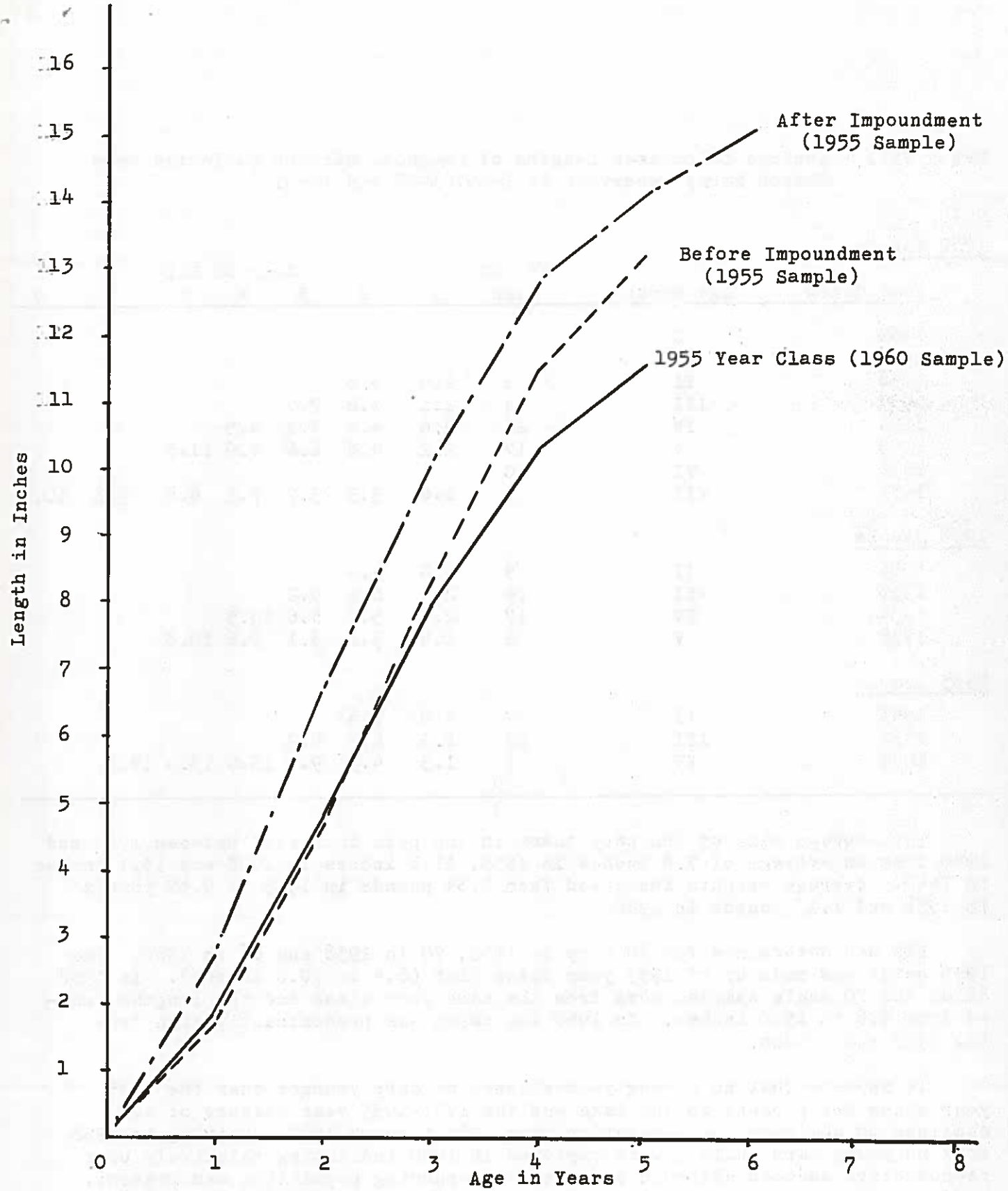

Figure 5 - Growth of white suckers before and after impoundment of Canyon Ferry Reservoir

Table VIII - Average Calculated Lengths of Longnose Suckers Collected From Canyon Ferry Reservoir in 1955, 1958 and 1960.

Year Class	Age Group	No. of Fish	Year of Life 1	2	3	4	5	6	7
1960 Sample									
1960	0								
1959	I								
1958	II	1	2.9	6.6					
1957	III	24	2.1	4.8	7.7				
1956	IV	26	2.6	4.0	7.2	9.5			
1955	V	17	2.2	4.8	8.6	9.9	11.3		
1954	VI	0							
1953	VII	1	1.6	3.5	5.7	7.1	8.8	9.8	10.5
1958 Sample									
1956	II	9	2.0	4.9					
1955	III	14	2.5	6.6	9.2				
1954	IV	17	2.4	5.5	8.6	10.5			
1953	V	2	1.9	5.2	8.1	9.6	10.8		
1955 Sample									
1953	II	27	3.0	7.6					
1952	III	23	2.3	6.4	9.9				
1949	IV	1	1.5	4.5	9.0	13.0	15.4	17.1	

The average size of the carp taken in the nets increased between 1955 and 1960 from an average of 7.8 inches in 1955, 11.8 inches in 1958 and 13.1 inches in 1960. Average weights increased from 0.34 pounds in 1955 to 0.87 pounds in 1958 and 1.13 pounds in 1960.

Age was determined for 20 carp in 1955, 70 in 1958 and 66 in 1960. The 1955 catch was made up of 1953 year class fish (6.4 to 10.0 inches). In 1958 68 of the 70 scale samples were from the same year class and the lengths ranged from 9.6 to 15.0 inches. In 1960 the catch was predominantly fish from the 1955 year class.

It appears that no strong year classes of carp younger than the 1955 year class are present in the lake and the 1953-1955 year classes of carp continue to dominate the population from 1955 through 1960. Seining in 1958 took no young carp while 3 were captured in 1960 indicating relatively poor reproductive success although a tremendous spawning population was present.

Other Fishes

Mountain sucker, burbot, stonecat and flathead chub were present in low numbers as indicated in Table I. Creel records indicate cutthroat trout and largemouth bass were captured infrequently in the reservoir.

Creel Census

Excellent trout fishing was reported during the first years after impoundment (1954-1955) but no creel census was in effect to measure this fishery. The fishery apparently declined rapidly for complaints of fishermen and resort owners were registered by 1956 and 1957.

A warden creel census was initiated during 1955 and the creel reports taken on an unscheduled basis appear to indicate some general trends in the fishery. In these creel reports fishing success for trout declined from 0.8 trout per hour in 1955 to 0.1 trout per hour in 1958 and increased to 0.5 trout per hour in 1960. Trout comprised 99 percent of the creels in 1955; 16 percent in 1958 and 48 percent in 1960. Rainbow trout predominated in the creel with brown trout comprising from 5 to 18 percent of the total creel. According to the warden records rainbow trout with deformed or eroded dorsal fins (characteristic of the hatchery fish) predominated in the fish checked. Yellow perch were not reported in the creels in 1955 although they were numerous in the lake and undoubtedly were taken by the fishermen. In 1958 yellow perch made up 84 percent of the total creel and in 1959 and 1960 they were about half of the creel.

Discussion and Recommendations

The fish population in Canyon Ferry Reservoir expanded rapidly during the first years of impoundment and appears to have reached the carrying capacity of the reservoir during 1955. By 1955 all species had produced strong year classes of young fish. As was expected the carp, sucker and yellow perch populations of Lake Sewell expanded rapidly and dominated the population by 1955. The increased growth rates found during 1953 and 1954 were not evident after 1955 with growth rates dropping to pre-impoundment levels.

The stocking of rainbow trout fingerlings was successful during the first years of the impoundment but they could not successfully compete with the rough fish after 1955 and a decline in the fishery followed. The shift to catchable rainbow trout in 1958, 1959 and 1960 appear to have increased the fishing success in the reservoir. The limited data from from warden creel checks indicates a higher catch per hour for trout although the net samples showed little change either in numbers of fish or the size of the trout. Posewitz (1958) showed in his studies on Harrison Lake that brown trout were captured more frequently in bottom sets in deep water while predominately rainbow trout were captured in floating sets. This suggests the need for both floating and bottom net sets when both rainbow and brown trout are to be sampled.

There is certainly a need to evaluate the effectiveness of the stocking of larger fish in the management of the reservoir. In a large reservoir with relatively low fishing pressure one can hardly expect a high return of stocked fish to the creel. During 1960 fish up to 2 per pound, which would average 10.8 inches in length, were stocked. In order to take advantage of this productive reservoir it would appear that smaller fish might be more economical in management. The 190,000 catchable rainbow trout stocked in 1960 cost approximately $25,100 if one used the costs estimates of Tunison (1957). If the average size were reduced from 6.8 to 4.8 inches approximately 587,400 trout could be stocked for the same cost or the same number of trout could be stocked at a lower cost. These rough calculations are presented merely to emphasize the need to evaluate more closely stocking rates and sizes in this type reservoir. With good growth rates it is possible that we could get a better return for the cost from smaller fish (4 to 5 inches).

The brown trout population appears to have maintained a relatively stable population after the initial period of bloom. In the net samples the brown trout were the largest fish taken.

As in all large reservoirs there is poor utulization of the fish particularly the so-called rough fish and also the yellow perch. There is a need to encourage the utilization of these fish in Canyon Ferry.

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