WYOMING GAME AND FISH COMMISSION

FISH DIVISION

ADMINISTRATIVE REPORT

July 13, 1966

Project: 0166-23-5501

Title: Summarization of Life History and Management Studies on the Rocky Mountain Whitefish in the Snake River Drainage, 1952-1964.

Personnel: Fisheries Management Area #1

Introduction:

Although, from 1952 to 1964 there was considerable effort expended studying the whitefish in the Snake River Drainage, there is no single report which summarizes the many facets of these investigations. This report assembles most of the data collected to date. It is hoped that, as a result of this summarization, whitefish investigations will progress into those areas were information is sketchy or lacking, and that management procedures may be developed on the basis of present findings. The report will also enable the dissemination of these observations to other fisheries' workers.

Findings:

Age and Growth

Phelps Lake, 1952-1953:

Phelps Lake is typical of a series of piedmont lakes in Teton National Park. A study of the whitefish population was accomplished by Harold Hagen during 1952 and 1953. This was the most comprehensive study undertaken in the drainage. Gill nets were used and considered effective in taking a representative sample

Phelps Lake, 1952-1953 - Continued:

of all ages and sizes of fish other than age group 0. The fish collection period for both years was July 1 through December 15. A stratified sample of 910 fish was aged and calculated lengths were determined (Table VI). A total of 283 fish was measured and not aged. These were inserted with the age-frequency information according to the limits of the determined range of fork length (Table IV).

The calculated length is interpreted, as the size of the fish, at the time the new annulus is being laid down. The calculated length for 0 age fish is the size at which the first annulus was formed and at age I the second annulus had formed, but no new growth had started. It would be inaccurate to compare the calculated lengths with the mid-points of the size range for each age. The size range includes all fish regardless of sex or season of capture and sampling variation would influence the width of some size ranges. The logical discrepancy of calculated and measured lengths, greater in the younger age groups than the older, can be noticed. The correspondence between the empirical and calculated lengths for each age group gives added assurance that the interpretations of the annuli were valid.

Calculations of growth were empirically derived by actual measurement of each annulus and was projected and marked on tag boards and by back-calculation from these scale measurements. The relationship of scale radius to any given length was constant from year to year and between sexes.

The length-weight relationship was similar to the cubic relationship found by Sigler, 1951, for the Logan River whitefish. Sigler determined

Phelps Lake, 1952-1953 - Continued:

mathematically that the weight increased almost exactly as the cube of the length. Similar growth was found at Phelps Lake with both sexes showing a slightly higher cubic relationship.

The size at which a fish was first fully scaled was determined from observations and measurements to be approximately 40 millimeters (1.6 inches) fork length (2.1 inches total length). The time of new annulus formation was found to be either in late May or early June.

It was impossible to get an accurate picture of the age group distribution for the whole population due to gill net selectivity. Age groups I through IV were not truly represented. It was felt that true age ratios were presented for age groups V through X. Age groups V through VIII showed a near linear realtionship of approximately one-third natural mortality. Above age VIII the mortality was approximately 80 percent and greater. Evidently, very few fish survive beyond age IX, as only 2.8 percent of the total munber of fish aged were IX years and above. Based on the size of the gill nets used, recruitment was at age II.

Snake River - March 1, 1953:

A sample of 110 whitefish was taken with electro-fishing gear near the Wilson Bridge. The sex ratio was 45 females and 65 males. The fish were aged by means of scale annuli and it was determined that 98.44 percent of the males and 92.0 percent of the females occurred in age groups II through V. There was considerable overlap of length distribution among the II through V age groups, but no overlap in the VI and VII age groups. Only

Snake River- March 1, 1953 - Continued:

six fish were aged at VI years and older which indicates a high natural mortality after age groupd V. The relative abundance of certain age groups could be due to the small size of the total sample.

The mean length and weight was determined for each age group (Table I). The mean K factor based on standard length for all age groups was 1.532. The K factor was taken from a nomograph by Carlander. The total length was calculated as being 1.213 times the standard length. The mean total length for the sample was 12.4 inches. There was a slight sexual difference in growth. Female fish in age groups III and IV were larger than the males. In age group V this was reversed with the males being larger. The sexual difference was considered insignificant due to the lack of seasonally distributed sample dates.

Salt River - March 21, 1953:

A sample of 96 whitefish was taken with electro-fishing gear in the vicinity of the Etna Lane Bridge. The sex ratio was 44 females to 48 males with four fish described as immature. The immature fish were all in age group I. Age groups II and III contained 85.42 percent of the total number of males and 65.91 percent of the females. Age groups IV and V indicated a decline in the number of fish present in the population. No fish beyond age group V were taken. There was considerable overlap of length distribution among age groups II and IV but no overlap with age group V.

Salt River - March 21, 1953 - Continued:

The mean length and weight was determined for each age group (Table I). The mean K factor for each age group was taken from a nomograph by Carlander and was determined to be 1.59. The relationship between standard and total length was determined to be, total length equals 1.17 of the mean standard length. The mean total length for the sample was 11.7 inches.

The lengths and weights of age groups for the Snake, Salt, and Tongue River (Sowards, 1958) whitefish are compared with those established for the Logan River, Utah (Sigler, 1951) in Table I. The Logan River whitefish lengths are expressed as mean calculated lengths, so it is difficult to make a direct comparison. A comparison of weights indicates that whitefish in the Salt River grow twice as fast during their first four years of life as thosein the Snake, Tongue and Logan Rivers.

Fish Creek - 1957-1958:

An upstream trap was installed during the spring to intercept spawning cutthroat trout and migrant whitefish. The trapping periods were from March 3 to May 29 in 1957 and April 7 to May 20 in 1958. During the 1958 trapping period, a sample of 235 whitefish was selected from the total catch for age-growth analysis. Scale annuli were used to determine ages.

The established age groups (Figure II) represent two whitefish populations - the resident population of Fish Creek and the Snake River migrants (Table II). Evidence for this can be interpreted from the extensive length range and overlap for age groups V, VI, and VII (Figure II). The length ranges for age groups III and IV are less extensive due to trap selectivity

Fish Creek - 1957-1958 - Continued:

which provided only a partial sample of fish 9.0 to 12.4 inches in length. It is also noticeable (Figure II) that the length ranges for age groups VI and VII encompass the length ranges of age groups VIII and IX. This is probably due to the larger size of the Snake River migrants in age groups V through VIII, and there were few if any fish VIII years or older in the movement.

A total of 1,377 whitefish measured in 1957 had a mean length of 13.5 inches (Figure I). The mean length was the same in 1958 from a measured sample of 1,775 fish (Figure II).

Food Habits:

During 1952, stomach analyses were made of whitefish from Fish Creek, a tributary to the Gros Ventre River. Several minor notes have also been recorded of stomach analyses on small numbers of whitefish from Two Ocean Creek, Spring Creek (Gros Ventre), Polecat Creek and Spring Creek below the Jackson Lake Dam. Other, more extensive studies were reviewed but no notation had been made of date or drainage area involved.

Diptera (chironomid) larvae and adults were the most dominant food items due to their abundance and availability. Other important food items were the aquatic insect larvae, pupae and adults of Plecoptera, Ephemeroptera and Trichoptera. Many terrestrial insects were found in the stomachs as well as remains of fish eggs.

Migration and Spawning Habits:

Information obtained from trapping operations on tributaries to the Snake River indicates that some whitefish migrate out of the Snake River and into tributary streams during the spring and summer. The cause of these migrations is believed to be due to a feeding pattern, with fish returning to preferred feeding areas. Spring movements were closely associated with increasing water temperatures and volumes in the tributary streams.

During April and May of 1957 and 1958, a trap operated at Fish Creek caught hundreds of whitefish moving upstream. Tag returns (Table II) indicated that these fish returned to the Snake River sometime prior to December 1.

An overpour trap was operated at Horse Creek, approximately 100 yards from the mouth, from 1960 through 1963. The earliest date of installation was July 7 and the latest was August 14. Each year whitefish were taken in the trap the day after installation. The movement of whitefish out of Horse Creek was generally over by September 11. Evidently whitefish move into Horse Creek just prior to or during high water. During the middle of April, 1961, prior to the high water period, electro-fishing work above the trap site failed to take any whitefish. The movement of whitefish out of Horse Creek is probably due to the gradual decrease in flow. Sigler (1951) mentions that upstream movement of whitefish apparently stops where the pools have less than a maximum width of 16 feet and a maximum depth of four feet at the season of least flow. Horse Creek has an estimated maximum flow of 30 to 40 c.f.s. during spring runoff and a minimum of three c.f.s during the winter. The major portion of whitefish taken at Horse Creek were adult fish.

Migration and Spawning Habits - Continued:

Overpour and upstream traps were operated at the Blue Crane Creek fish ladder, approximately 50 yards from the mouth, during 1962, 1963, and 1964. The earliest date of installation was August 24 for the overpour trap and March 17 for the upstream trap. The latest date of removal was July 31 for both traps. Whitefish were caught moving up and downstream during April and May.

Evidently young-of-the-year whitefish utilize Blue Crane Creek as a nursery area during spring, summer, and fall and return to the Snake River as yearlings during the winter. During the trapping period the ladder was a barrier to the upstream movement of fingerling fish. On various occasions during April and May, concentrations of young-of-the-year whitefish were observed in pools below the fish ladder. During the period November, 1963 through January, 1964 there were 188 whitefish taken in the overpour trap. Of this total 145 were yearlings.

Comparing stream characteristics of Blue Crane and Horse Creeks, the relatively stable flow and low gradient of Blue Crane Creek probably influences whitefish movement more than any other factors. Blue Crane Creek averages approximately 15 c.f.s. with the flow originating from several springs. The flow reaches maximum volume during the summer when water is diverted from the Snake River into the creek for irrigation purposes. Compared to Horse Creek the increase in the volume is considerably less during runoff. The Blue Crane Creek drainage area ia approximately five square miles in size and is located on the Snake River bottoms. Horse Creek has a

Migration and Spawning Habits - Continued:

drainage area approximately 40 square miles in size and is located in an extensive, mountainous area.

Trapping of whitefish has indicated a homing tendency. At Horse Creek there were 155 whitefish trapped during 1961 and all were marked by removal of the left ventral fin. During 1962, 59 whitefish were trapped and four of these were fish marked in 1961. Fish not marked had the right ventral fin removed. During 1963, 47 fish were trapped and four of these were marked in 1961, two in 1962, and two were marked but no notation was made as to what fin. During the 1962-1963 trapping period at Blue Crane Creek, 183 whitefish were taken in the overpour trap and marked by removal of the right ventral fin. During 1963-1964, 40 whitefish two years or older were taken in the overpour trap. Of this total 23 had been marked the year before.

Very little information is available pertaining to movement patterns of whitefish in lakes of the Snake River drainage. According to Hagen (1955) whitefish could be found at some time in almost every section of Phelps Lake during 1952 and 1953. Catch records proved that the fish rarely sought depths over 60 feet and usually ranged in depths between 15 and 60 feet. A considerable vertical movement from bottom to top was expected to exist as a result of the almost exclusive diet of plankton during the summer months.

Whitefish generally spawn during October and November and there is a certain amount of migration associated with this period. The majority of fish in the Snake and Salt Rivers do not move into tributary streams to spawn. No doubt there is some movement within the two rivers by fish locating preferred spawning areas. These areas are generally deep pools with gravel riffles immediately above or below.

Migration and Spawning Habits - Continued:

Cravid females and ripe males were taken in the Blue Crane Creek overpour trap during October, 1962. Evidently these fish were moving toward the Snake River to spawn. Spawning occurs in Fish Creek; however, there is no information available as to whether the majority are resident or migrant fish.

Whitefish residing in lakes will congregate at preferred areas within the lake for spawning purposes. During 1952 and 1953 mature whitefish in Phelps Lake were found to spawn along many sections of shoreline at depths ranging from 20 to 40 feet. The bottom in the areas of spawning was either fine or coarse rubble. This same spawning pattern is believed to exist at Jackson Lake as ripe whitefish have been taken at various bars during lake trout spawning operations in October. It is suspected that some fish move out of Jackson Lake and up the Snake River to spawn, however, there is no concrete evidence to support this. There was no evidence of fish spawning in the inlet or outlet of Phelps Lake.

The age at maturity of the Phelps Lake whitefish is between fish in their third year of life and before they have started their fifth year for both sexes. The female fish mature at an older age than do the males. The size at maturity ranged from 180 millimeters (7.1 inches) to approximately 235 millimeters (9.3 inches) in fork length.

The reproductive potential of whitefish in the Snake River drainage is believed to be comparable to that indicated for Rocky Mountain whitefish by Lagler (1956). He stated that the average yeild is nearly 7,000 eggs per pound of female. According to Simon (1946) females taken from Jackson Lake during the fall of 1938 produced an average of 6,885 eggs per pound of fish.

Migration and Spawning Habits - Continued:

At Phelps Lake during October, 1953, 12 fish were examined and found to produce 7,759 eggs per pound of fish.

Management:

Early History

Very little information is available pertaining to the existence of the whitefish in the Snake River drainage during the early 1900's. According to a preliminary report by Simpson (1938) seining for whitefish was a practice of the first settlers of Star Valley. For many years seiners did not need a license and were permitted to keep all fish caught.

Eventually legislation was passed which permitted the taking of non-game fish only and a license had to be obtained from the Wyoming Game and Fish Commission. In 1936 an act of legislation made the Rocky Mountain whitefish a game fish. A special concession was made to the residents of Star Valley to continue the seining of whitefish. The practice followed was for a group of people to pool resources and buy a seine and permit. A permit was issued from the office of the Wyoming Game and Fish Commission for five dollars. During 1937 five seining permits were issued. To conform with section 49-187 of Game, Bird and Fish Laws of Wyoming, revised March 1, 1937, a permit to seine had to be issued in the name of one person and not to a club or group of men. There was no provision made in the law which governed the number of persons who could seine with the holder of said permit and receive fish thereby.

Management - Continued:

It was determined that from seven to 20 persons had interests in a seining permit. It was estimated by individuals associated with the permits that approximately 200 fish were taken per trip. A trip lasted from five to seven hours and 10 men were needed per trip in order to handle a seine efficiently. It was estimated that each permit was used on the average of three times each month. The seining season lasted from three to five months. It was estimated that 3,000 fish per month or 9,000 per season were harvested by seining permit holders and associates. It was estimated that of the fish taken per trip, five percent were trout, five percent were suckers and 90 percent were whitefish. Before the construction of the East Side Canal Dam, sometime prior to 1938, considerable seining was done along that portion of the river between the Auburn-Grover Lane and the narrows.

Seasons:

In 1951 the sportsmen of Jackson Hole expressed a desire for a winter fishing season for whitefish in the Snake River. An experimental season was set in 1953. Fishing was allowed during January and February on four miles of river from the Wilson Bridge to the mouth of the Gros Ventre River. The limit was 12 fish per day with one day's catch in possession.

In 1954 the season was extended from January 1 to March 15. The Wilson Bridge section was extended to one-half mile below the bridge. Four other sections of river were opened to fishing (Table III). The day and possession limits remained the same. A creel census study during the 1954 season supplied the following information. A total of 230 fishermen and 2,257 fish were checked.

Seasons - Continued:

This amounted to success figures of 9.8 fish per man and 4.3 fish per hour. The harvest for the whole season was calculated from this data as being 15,757 whitefish. There were 213 resident fishermen, of which 167 were from Star Valley, and 17 non-resident fishermen contacted during the study. The mean total length of 508 whitefish was 12.8 inches. An age-growth study was made in conjunction with the creel census. Scale analysis indicated that age groups III and IV dominated the catch, and it was believed that the majority had spawned at least once.

Creel census data collected during the 1953 and 1954 seasons indicated that fishermen success was good and that only a few trout were being taken. The general consensus was that the whitefish season was popular.

In 1955 the dates of the whitefish season remained the same. The Snake River proper except the South Park feed ground was opened to fishing. The daily limit remained 12 fish; however, the possession limit was changed to three days. A season was set on the Salt River from the Freedom-Etna Bridge to the Lower Valley Power Plant Dam and from the mouth of Willow Creek to the mouth of Flat Creek. A creel census study was conducted during the Salt River season and it was found that fishing pressure was very light and success was low. This was due to the following reasons: 1) turbid water and floating ice was more prevalent than on the Snake River; 2) access was poor; 3) preferred fishing water was limited.

In 1956 the opening date was changed to December 1, which added a month to the following season. The open area on the Snake River was the same, and the

Seasons - Continued:

Salt River was opened from the Auburn-Grover Lane to the Wyoming-Idaho state-line. The daily limit was increased to 25 fish and the possession limit remained unchanged. This was the last change of the limits.

In 1957 the season dates remained the same for the Snake and Salt Rivers except for a special area one-fourth mile above and below the Wilson Bridge which was extended through March 31.

In 1958 the dates remained the same for the Snake River with no special area extension near the Wilson Bridge. The season on the Salt River was discontinued because of the light fishing pressure and poor success.

During 1959 and 1960 the season dates remained January 1 through March 15 and December 1 through December 31.

In 1961 the season remained the same except the closing date was extended through March 31 and no fishing was allowed below the mouth of Wolf Creek. This closure was set to coincide with the Idaho fishing season at Palisades Reservoir and to protect suspected concentrations of cutthroat trout spawners moving from the reservoir.

During 1962 and 1963 a calendar year season was set for the Snake River above the mouth of Wolf Creek and fishing was allowed on the South Park feed ground. The recommendation for a calendar year season was based on the following information: 1) fishing pressure during past seasons had not reduced the whitefish population noticeably; 2) there was no justification for the season being closed during April, May, and November; 3) trout populations were not jeopardized.

Seasons - Continued:

In 1964 the entire Snake River was opened to a calendar year season. The closure below the mouth of Wolf Creek was terminated because: 1) the opening date of the fishing season for Idaho's portion of Palisades Reservoir was changed from the first Saturday in June to the first Saturday in May; 2) gill nets set in the Snake River arm of the reservoir during April and May, 1960, did not intercept a significant number of cutthroat trout spawners.

Population Manipulation:

Prior to 1955 sportsmen of Star Valley urged that a program be initiated to reduce the whitefish population in the Salt River in order to improve the trout fishery. During September of 1955 and February-March 1956, Fisheries Management Crew 1, with the aid of Star Valley residents, electro-fished and seined portions of the river in the upper and lower valleys. A total of 2,722 whitefish weighing 2,777 pounds was removed at a cost of 19 cents per pound. The fish were distributed among those persons helping with the operation. It was the opinion of Department personnel involved that the project did little to reduce the whitefish population, but had some value in public relations with Star Valley residents.

From 1956 to 1960, proposals to establish a winter whitefish season on the Salt River met with little success; however, there still remained an intense interest to reduce the population by some method.

In October 1960, another attempt was made to remove fish from the river in the upper valley by means of electro-fishing. During two days of work 949 fish weighing approximately 1,364 pounds were removed from one-half mile of river at a cost of 8.7 cents per pound.

Population Manipulation - Continued:

Although whitefish were taken in large numbers, the efficiency of recovery was poor. This was mainly due to the average width of the river, which was greater than the span of electrodes, and the size and depth of the larger holes where water velocities and consequently, fish sank to the bottom where they could not be netted. From a biological viewpoint the project had little to offer. The electro-fishing was not indicative of the total population and there was little hope of reducing the numbers of whitefish because of the immigration of fish from sections of river not worked. Also there was no desire to remove small fish that could not be utilized so all the yearlings and almost all of the two-year olds were returned to the stream. It was decided that the project could be justified by realizing a harvest of a resource that was going to waste and improving public relations for the Department.

The project was continued in 1961 with all work limited to the upper valley where the volume of water was less of a problem. The disposition of fish was handled by issuing a day's limit to people assisting with the work and any surplus distributed to people in Star Valley or Jackson. From 1961 through 1963 there were 16 electro-fishing trips made and 14,054 whitefish removed. All but one trip was made within the section of river beginning one and one-half miles above the Auburn-Grover Lane and terminating at the Narrows Bridge. The section was approximately four and one-half miles in length; the actual river miles being greater because of the river's meander.

Population Manipulation - Continued:

During 1963 it became apparent that whitefish were less abundant and trout were more numerous in the catch. The increase in trout numbers was noted mainly in the brown trout. Yearlings were observed in riffles and other shallow areas during 1962 and 1963. In 1963, two-year olds were taken in deeper water along with the whitefish.

Prior to 1963 the numbers of trout in the catch, mainly large brown trout, seemed insignificant. It was felt that the brown trout were less susceptible to the electrical field and more adept at eluding it, therefore no attempt was made to enumerate the trout.

During the two days of removal work in August 1964, the upper three miles of the removal section were electro-fished. All trout entering the catch were measured before being released. There were 234 brown, 60 cutthroat, 9 rainbow, and 3 brook trout taken for a total of 306 trout. The total number of whitefish removed was 532 which amounted to a trout-whitefish ratio of 1 to 1.7. The 1964 removal work on the lower three-fourths of the study section duplicated the removal work done in a three-day period in November 1961. During this period 4,428 whitefish were removed with the trout-whitefish ratio estimated at 1 to 44.

Discussion:

Evidently the sample of 96 whitefish taken from a section of the Salt River in 1953 was not representative of the entire population; or specifically fish older than age group V. In 1962, 768 fish were removed from approximately the same area. A sample of 102 fish was picked at random and

Discussion - Continued:

measured. There were 83 fish within the 13.5 to 17.9 inch length-frequency range; these were the minimum and maximum lengths established for age groups IV and V in 1953. There were 14 fish which measured 18 inches and larger indicating the presence of fish in age group VI and possibly VII. During 1962 and 1963 removal work there was a random sample of 557 fish measured from 9,683 fish removed. Of this sample 74.4 percent were within the size range established for age groups IV and V and 7.2 percent measured 18 inches and larger.

Comparing food habits of whitefish in the drainage with cutthroat trout in the Snake River, there is an overlap in the utilization of aquatic insects. A total of 123 cutthroat stomachs were collected from May through September during 1959 and 1960. Stomach analysis, using the volumetric method, showed that the dominant food items utilized by the whitefish (Diptera, Plecoptera, Ephemeroptera, Trichoptera) amounted to 37 percent of the total volume utilized by the cutthroat during these two year. For cutthroat trout, fish were the dominant food item contributing 48 percent to the total volume.

A total of 77 stomachs taken from whitefish out of the Logan River had Trichoptera, Diptera, Ephemeroptera and Plecoptera as dominant food items. These four orders of aquatic insects were the most important food items in 101 stomachs of whitefish from the Tongue River.

Discussion - Continued:

Although there is an overlap in the utilization of aquatic insects by whitefish and trout in the Snake River Drainage, competition for these organisms has not been established. The Snake and Salt Rivers produce an abundance of aquatic insects, and growth rates for whitefish and trout are good in both waters.

If some form of competition exists between whitefish and trout, it is probably for available habitat; or more specifically, space. The 1964 Salt River removal work, where trout seemed to be replacing removed whitefish in the deep holes, might be indicative of this type of competition.

Management Recommendations:

The removal of whitefish from the Salt River should be continued with greater emphasis on enumerating the trout present in the catch. If possible, removal work should be extended downstream from the Narrows Bridge.

The calendar year season on the Snake River has proven to be satisfactory and should be continued. The limits could probably be increased; however, it is difficult to determine where the dividing line is between a sport fishing limit and a commerical fishing limit. A 25 fish per day-75 fish in possession limit is close to being a commerical limit and further increase would possibly cheapen the resource for the sport fisherman. Limited access on the Snake River during the winter months favors no limit increase because approximately 10 miles of the river sustains 90 percent of the winter whitefish fishing pressure.

Mangement Recommendations - Continued:

If the 1.2 percent tag return of whitefish tagged at Fish Creek during 1957 and 1958 is any indication of the total harvest from a group of 2,947 fish, then management policy should favor increasing this harvest by some means. It is recommended that the majority of whitefish trapped at Fish Creek, in conjunction with the 1964-1966 Cutthroat Trout Study and subsequent studies, be removed to evaluate the effect on cutthroat trout population.

Report by: Jon Erickson

Date: July 13, 1966

TABLE I. Comparison of Age Group Lengths (inches) and Weights (ounces) of Four Mountain Whitefish Studies.

The Numbers of Fish in Each Group are Included in Parentheses.

Location	Number of Fish		Age Groups I	II	III	IV
Snake River	110	Length	-	8.9 (1)	10.4 (39)	12.6 (39)
		Weight	-	3.1	5.6	9.5
Salt River	96	Length	5.4 (4)	10.2 (47)	12.7 (23)	15.2 (16)
		Weight	0.7	5.5	11.1	18.1
Logan River	281	Length	4.6 (2)	8.1 (4)	10.2 (43)	11.6 (79)
		Weight	0.6	3.2	6.0	8.8
Tongue River	225	Length	7.7 (33)	10.2 (116)	11.9 (57)	12.4 (12)
		Weight	-	2.7	6.0	7.8

Age Groups - Continued

Location	Number of Fish		V	VI	VII	VIII	IX
Snake River	110	Length	14.4 (25)	17.5 (5)	20.3 (1)		
		Weight	15.0	27.4	44.3		
Salt River	96	Length	16.8 (6)				
		Weight	23.6				
Logan River	281	Length	12.8 (75)	14.1 (39)	15.4 (22)	16.4 (8)	17.4 (9)
		Weight	11.9	15.9	20.8	24.9	29.8
Tongue River	225	Length	12.9 (6)	16.2 (1)			
		Weight	10.5	18.5			

* Lengths of fish from the Snake, Salt, and Tongue Rivers are mean actual lenghts while lenghts of fish from the Logan River are mean calculated lengths.

TABLE II. Summary of Whitefish Tagging Records From 1950 to 1961.

1957 - A total of 1,367 whitefish were tagged at the Fish Creek trap near the town of Wilson with opercle strap tags. The first tags were applied on April 29 and the last on May 13. Six of these tags were returned before the end of the general fishing season; two from Fish Creek; two from Lake Creek; one from the Snake River, and one catch site unknown.

1958 - A total of 1,553 whitefish were tagged at the Fish Creek trap. The first tag was applied April 8 and the last on May 20. A total of 142 whitefish tagged in 1957 were taken in the trap; 31 had recently lost their opercle tags. Most of the tagged whitefish caught were re-tagged and released. There were 22 returns of whitefish tagged in 1957 during the winter whitefish season; all from the Snake River. The returns came from an area extending from three miles above the Wilson Bridge to one and one-half miles below Cabin Creek; a stream distance of about 30 miles. A fish tagged during the spring was caught from Fish Creek during the general season. The trapping operation was terminated this year.

1959 - There was one return of a whitefish tagged in 1957 and three returns of fish tagged in 1958. All fish were caught from the Snake River; three near the mouth of Dog Creek and one at the Astoria Hot Springs.

1960 - A whitefish tagged in 1957 was caught from the Snake River near the Wilson Bridge.
Twenty-seven whitefish were tagged at the Horse Creek trap from July 8 to October 3; no returns.

A total of 2,947 fish were tagged with returns amounting to 1.2 pounds.

Table III. Summary of Whitefish Fishing Seasons on The Snake and Salt Rivers from 1953 to 1964.

Year	Dates	Name and Description of Open River	Limits	
			Fish Per Day	Fish In Possession
1953	January 1 to February 28	Snake River - Highway 22 to mouth of Gros Ventre River. (Approximately 4 miles of river)	12	12
1954	January 1 to March 15	Snake River - Alpine Bridge to mouth of Greys River; one-half mile above and below Highway 89 bridges located near the Hoback Junction, Moose, Flagg Ranch; and one mile below Highway 22 Bridge to mouth of Gros Ventre River. (Approximately nine miles of river)	12	12
1955	January 1 to March 15	Snake River Proper except for the South Park Feedground. Salt River - Etna Lake Bridge to Lower Valley Power and Light Dam and from the mouth of Willow Creek to mouth of Flat Creek. (Approximately 11 miles of river)	12	12
1956	December 1 to March 15	Snake River Proper except South Park Feedground. Salt River - Grover-Auburn Lane to Idaho Line	25	75
	March 15 to March 31	Snake River - one-fourth mile above and below the Wilson Bridge		
1957	December 1 to March 15	Snake River Proper except for the South Park Feedground. Salt River - Grover-Auburn Lane to the Idaho State Line.	25	75
	March 15 to March 31	Snake River - one-fourth mile above and below the Wilson Bridge.		
1958	December 1 to March 15	Snake River Proper except for the South Park Feedground. Salt River season terminated.	25	75
1959	December 1 to March 15	Snake River Proper except for the South Park Feedground.	25	75
1960	December 1 to March 15	Snake River Proper except for the South Park Feedground.	25	75

Table III. Summary of Whitefish Fishing Seasons on The Snake and Salt Rivers from 1953 to 1964 - Continued.

Year	Dates	Name and Description of Open River	Limits	
			Fish Per Day	Fish In Possession
1961	December 1 to March 31	Snake River Proper, except for the South Park Feedground, above the mouth of Wolf Creek.	25	75
1962	Calendar year	Snake River Proper above the mouth of Wolf Creek.	25	75
1963	Calendar year	Snake River Proper above the mouth of Wolf Creek.	25	75
1964	Calendar year	Snake River Proper	25	75

TABLE IV. Age Classes and Mean Calculated Total Lengths for 915 Whitefish and Age-Frequency of Total Measured Catch From Phelps Lake, 1952-1953.

Age Class	Number	Calculated *Length (inches)	Number	Total Length Range (inches)
0	30	5.4	30	2.1 - 3.1
1	78	7.3	104	7.2 - 10.6
2	100	8.9	192	9.2 - 11.9
3	141	10.5	183	10.7 - 12.4
4	117	11.6	141	11.8 - 13.2
5	158	12.5	202	12.3 - 13.7
6	122	13.3	151	13.0 - 14.4
7	85	14.2	99	13.5 - 14.9
8	59	14.7	66	13.9 - 15.2
9	16	15.6	20	14.7 - 16.1
10	4	15.7	4	16.0 - 16.6
11			2	16.3 - 16.8
12			3	16.3 - 17.0
13			-	-
14			-	-
15			-	-
16			1	19.8
	910		1198	

* All lengths taken for the study were fork lengths. The conversion factor 1.2896 was used to determine total length.

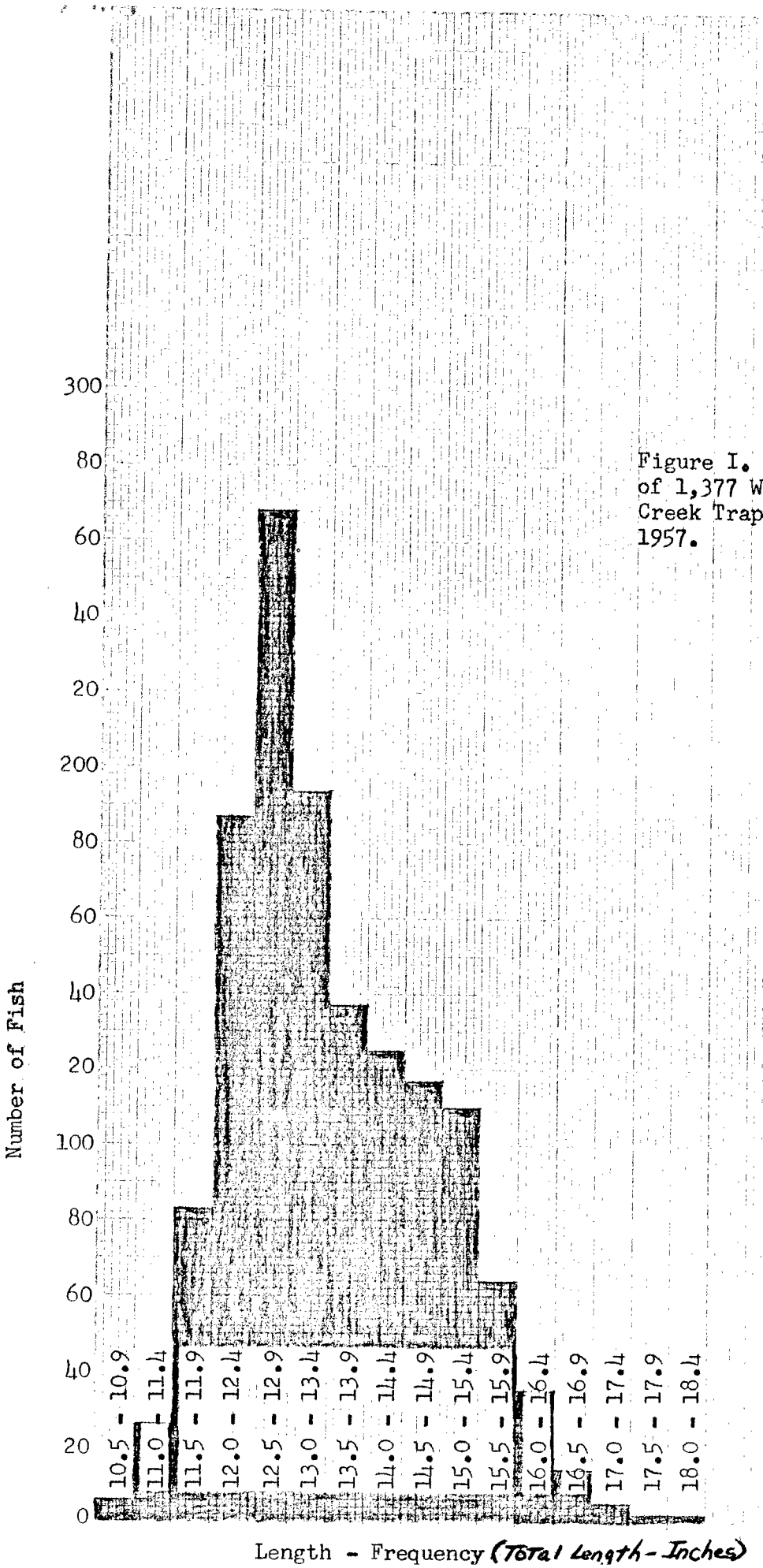

Figure I. Length Frequency Distribution of 1,377 Whitefish Collected at the Fish Creek Trap, March 3rd Through May 29th, 1957.

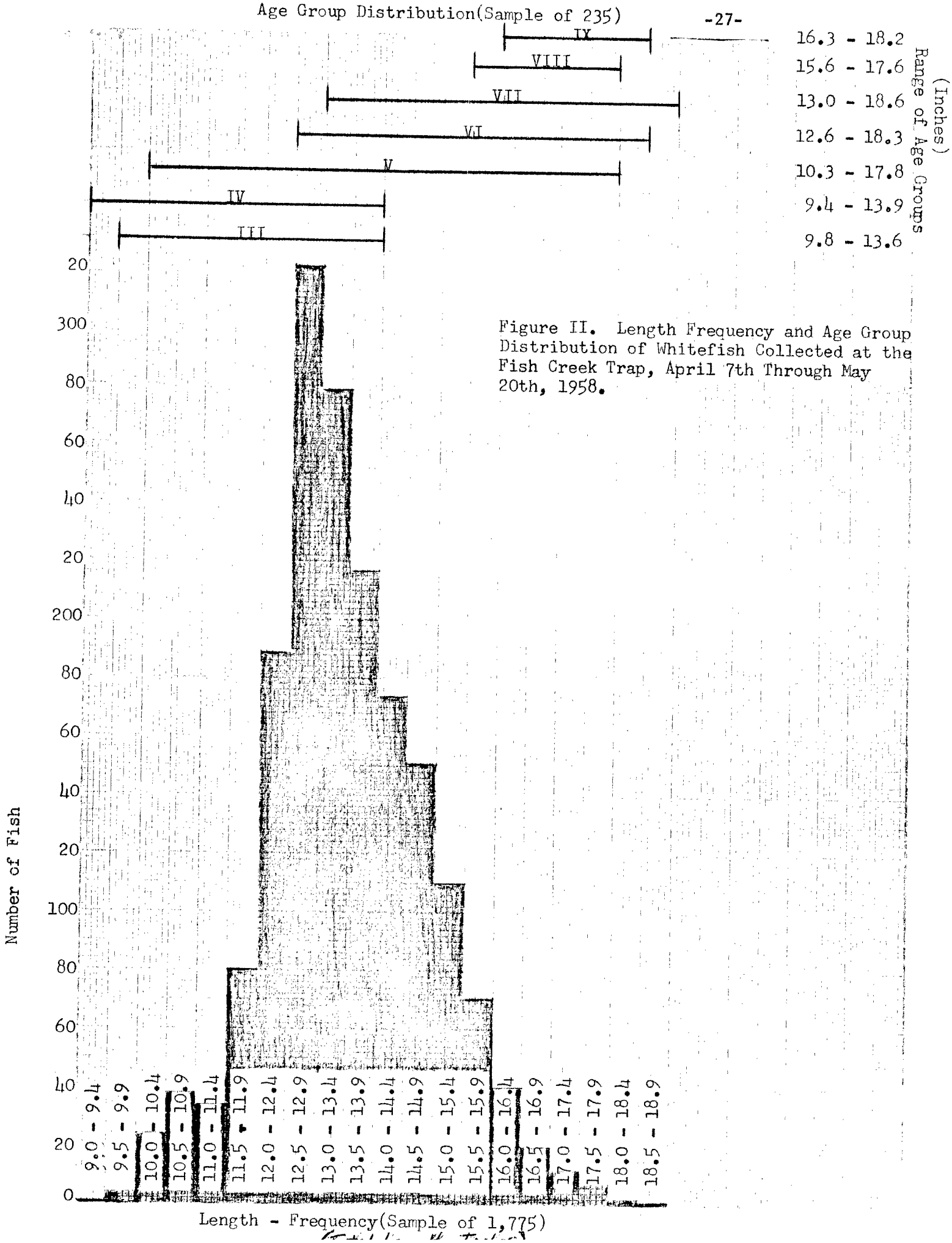

Figure II. Length Frequency and Age Group Distribution of Whitefish Collected at the Fish Creek Trap, April 7th Through May 20th, 1958.

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