

LM273

REPORT III

LIFE HISTORY OF STEELHEAD
TROUT (Salmo gairdneri) IN THE CAPILANO
RIVER - BASED ON ANGLER'S CATCHES AND
HATCHERY RETURNS BETWEEN 1949 and 1977

by

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Abstract

In total 99 scale samples were examined from adult steelhead in the Capilano river after 1970. Eight of these fish were hatchery returns. Most of the sample was made up of fish caught by anglers but some of these fish were those stripped for eggs at Capilano hatchery. In addition 44 scales were examined from adult steelhead returning from smolt releases in the 1950's (Cartwright 59). Records of 252 steelhead were also available for sex ratio and timing before 1961 but there were no scale samples from these fish. All scale information is recorded on the adult scale sample sheets, copies of which are in the scale file, report appendix and master reference report.

The Capilano steelhead were separated into summer and winter run. Summer run fish were assumed to be those caught from mid-May to October. The most common age class for summer runs was 3.2 with 61% of the total. The most common freshwater age was 3. with 76.7% and the most common saltwater age was .2 with 83% of the total. After 1970, for summer runs the female to male ratio was 0.8:1 for wild fish, hatchery returns were 1:1. Before 1961 the female to male ratio was 1.5:1. Sex ratio may be biased by angling selectivity. The peak months for angler catch of summer steelhead were May and June. The best week was May 22-31 with 23.2% of the total catch.

For winter runs the most common age class was 3.2+ with 34.9% of the total. The most common freshwater age was 3. (57.1%) and the most common saltwater age .2+ (65.4%). The most common saltwater age for hatchery fish before 1961 was .1+ (52.3%) followed by .2+ (43.2%). Hatchery fish were more likely to return to the stream after only one winter in the sea. After 1970 the female to male ratio was 1.3:1. Before 1961 the female to male ratio for wild fish was 1.6:1 and for hatchery fish was once again 1:1. The peak months for angler catch of winter steelhead was February with 45.8%. The best week was February 8-14 with 14.1% of the total catch.

Repeat spawners were very uncommon in the Capilano samples. Only 1 fish (2.4%) for summer run and 2 fish (4.4%) for winter run. All of these fish were females.

Comparisons of freshwater radii of hatchery and wild fish after 1970 suggests that adult hatchery fish that have survived to return to the river were probably the result of a few large smolts in the hatchery release that were of a size comparable to natural smolts.

INTRODUCTION

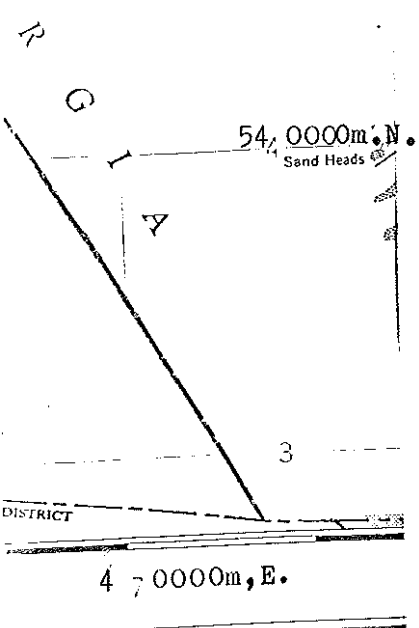
Historically, the Capilano River was 22 miles long and drained a 70 square mile watershed north of Burrard Inlet (Fig. 1). The river used to support large runs of both salmon and steelhead and was well known for it's fine sport fishery.

Numerous encroachments of man, including the Cleveland Dam in 1954 which left only 3½ miles of the river downstream of its concrete structure, reduced the great runs of fish to mere remnants of their former abundance. Intensive management is needed to build up the stocks of steelhead and baseline information on their life histories is an initial step.

The report presents an analysis of scale samples taken from both hatchery and wild steelhead stocks, some of the fish caught by anglers, and some obtained from fish stripped for eggs at Capilano Hatchery. The results are categorized into age class structure, freshwater and saltwater ages. In addition, some comparisons are made of scale radii in wild and hatchery stock. Hatchery fish are from two sources. Those caught after 1970 were released as smolts from the new Capilano Hatchery. Those caught before 1961 were released as smolts that were raised in Cultus Lake Hatchery for a steelhead propagation program in the 1950's (Cartwright '59).



Fig. 1 Location map of the Capilano River.



SCALE: 1:250,000



To Bellingham

MATERIALS AND METHODS

All materials and methods are virtually the same as those outlined by Caverly (1977), Reports I and II. The age designation used for steelhead is the one widely accepted, where a fish aged 3.2+ has spent three years in freshwater before smolting and going to sea where he spent an additional two winters. The + designation indicates summer growth following the last annulus or winter check on the scale. An S designation indicates a spawning check and includes one winter's growth.

Samples were available from two time periods, 1949-1960 and 1970-1977. Scale samples were available for all fish caught after 1970 but only for the hatchery returns before 1961. Information for sex-ratio and timing for wild fish before 1961 came from record sheets in the Capilano file but the scale samples could not be located. The pre-1961 hatchery fish scale samples were examined for saltwater age, freshwater radius, saltwater and total radius.

Both summer and winter run steelhead are present in the Capilano during April and May. For breaking down timing of the run by week it was necessary to eliminate a period of overlay to distinguish the summer and winter stocks. The last two weeks of April and first week of May were eliminated. Winter runs were assumed to be fish caught from December to mid-April, summer runs from mid-May to October. A more complete explanation of the two Capilano stocks can be found in Smith (1960).

RESULTS

I. Summer Run

Total Age (Table I) (Fig. 2)

By far the most common age class of 41 summer steelhead was 3.2 (61%). The next two age classes were 3.3 and 4.2, both with 12.2%.

Freshwater Age (Table II) (Fig. 3)

Samples from 43 fish were examined for freshwater age. The most common age was 3. (76.7%) followed by 2. and 4., each with 11.6%.

Saltwater Age (Table III) Fig. 3)

Samples from 47 fish were examined for saltwater growth; 5 of these were hatchery returns. The most common age was .2 (83%) followed by .3 (15%). All five hatchery fish were age .2.

Repeat Spawners (Table IV)

Of 42 fish only one (2.4%) was a repeat spawner. This fish was a female in the age group 3.1Sl.

Sex Ratio

(i) After 1970 (Table V) (Fig. 4)

The sex ratio for 35 wild fish caught by anglers was 0.8:1 favouring males. The sex ratio for hatchery fish was 1:1.

(ii) Before 1961 (Table VI) (Fig. 5)

The F:M ratio of 110 wild summer steelhead caught by anglers was 1.5:1.

II. Timing of run

(i) After 1970 (Table VII)

Overall the best fishing month on the Capilano river appears to be April. Both winter and summer run fish contributed to the catch which made up 37.8% of the total.

(ii) Before 1961 (Table VIII) (Table IX) (Fig. 6) (Fig. 7)

Overall the three best months for steelhead fishing, winter or summer, were February, May and June, with 16.9%, 16.4% and 16.9% respectively. For summer steelhead the peak months appear to be May and June. The best weeks appear to be the last week in May (23.2%) and the third week in June (18.5%). The two weeks between these dates accounted for 12% and 9.3%, respectively, of the total catch. The results were averaged over 7 years.

TABLE I. AGE CLASS STRUCTURE OF WILD SUMMER RUN
STEELHEAD IN THE CAPILANO RIVER AFTER 1970.

YEAR	SEX	2.2	2.3	3.1	3.2	3.3	4.2	TOTAL
1971	M	-	-	-	(3?)	-	(1?)	(4?)
	F	-	-	-	-	-	-	-
	TOTAL	-	-	-	3	-	1	4
1972	M	-	-	-	1(4?)	-	(1?)	1(5?)
	F	-	-	-	2	-	-	2
	TOTAL	-	-	-	7	-	1	8
1973	M	-	-	1	5	1	1	8
	F	-	-	-	4	2	-	6
	TOTAL	-	-	1	9	3	1	14
1974	M	-	2	-	-	1	-	3
	F	-	-	-	1	-	-	1
	TOTAL	-	2	-	1	1	-	4
1975	M	-	-	-	1	-	1	2
	F	-	-	-	-	1	-	1
	TOTAL	-	-	-	1	1	1	3
1976	M	1(1?)	-	-	(1?)	-	-	1(2?)
	F	-	-	-	-	-	1	1
	TOTAL	1	-	-	1	-	1	
1977	M	1	-	-	1	-	-	2
	F	-	-	-	2	-	-	2
	TOTAL	1	-	-	3	-	-	4
TOTAL	M	2	2	1	8	2	2	17
	F	-	-	-	9	3	1	13
	UNKNOWN	1	-	-	8	-	2	11
	TOTAL	3	2	1	25	5	5	41
% OF TOTAL		7.3%	4.9%	2.4%	61%	12.2%	12.2%	

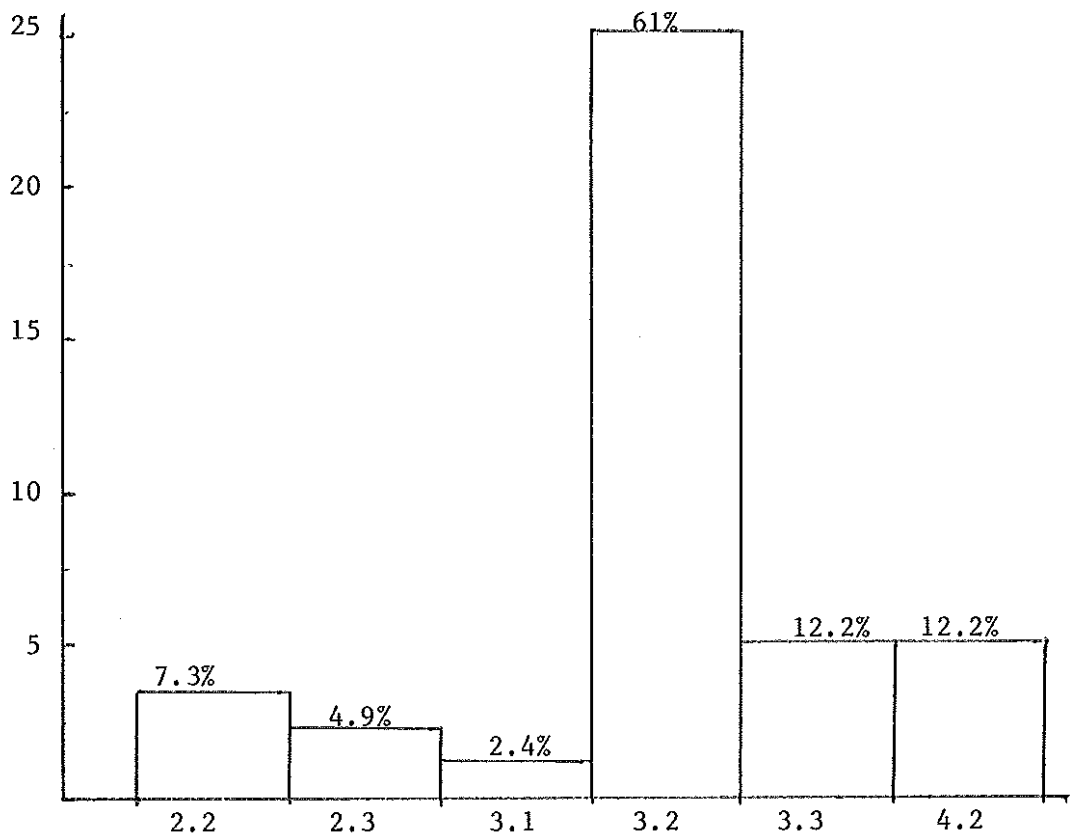


Fig. 2 Age Class Structure of Wild Summer Run Steelhead After 1970.

TABLE II. FRESHWATER AGE GROUPS OF WILD SUMMER

STEELHEAD IN THE CAPILANO RIVER AFTER 1970.

YEAR	SEX	2.	3.	4.	TOTAL
1971	M	-	-(3?)	-(1?)	-(4?)
	F	-	-	-	-
	TOTAL	-	3	1	4
1972	M	-	1(4?)	-(1?)	1(5?)
	F	-	2	-	2
	TOTAL	-	7	1	8
1973	M	1	7	1	9
	F	-	6	-	6
	TOTAL	1	13	1	15
1974	M	2	2	-	4
	F	-	2	-	2
	TOTAL	2	4	-	6
1975	M	-	1	1	2
	F	-	1	-	1
	TOTAL	-	2	1	3
1976	M	1(1?)	-(1?)	-	1(2?)
	F	-	-	1	1
	TOTAL	2	1	1	4
1977	M	-	1	-	1
	F	-	2	-	2
	TOTAL	-	3	-	3
TOTAL	M	4	12	2	18
	F	-	13	1	14
	UNKNOWN	1	8	2	11
	TOTAL	5	33	5	43

% OF
TOTAL

11.6%

76.7%

11.6%

TABLE III. SALTWATER AGES OF SUMMER RUN STEELHEAD
IN THE CAPILANO RIVER AFTER 1970

SALTWATER AGE GROUPS					
YEAR	SEX	.1	.2	.3	TOTAL
1971	M	-	-(4?)	-	-(4?)
	F	-	-	-	-
	TOTAL	-	4	-	4
1972	M	-	1(5?)	-	1(5?)
	F	-	2	-	2
	TOTAL	-	8	-	8
1973	M	1	5	1	7
	F	-	6	2	8
	TOTAL	1	11	3	15
1974	M	-	-	3	3
	F	-	2	-	2
	TOTAL	-	2	3	5
1975	M	-	2	-	2
	F	-	-	1	1
	TOTAL	-	2	1	3
1976	M	-	1(2?)	-	1(2?)
	F	-	1	-	1
	TOTAL	-	4	-	4
1977	M	-	1(1*)	-	2
	F	-	2(4*)	-	6
	TOTAL	-	8	-	8
TOTALS	M	1	11	4	16
	F	-	17	3	20
	UNKNOWN	-	11	-	11
	TOTAL	1	39	7	47
% OF TOTAL		2.1%	83%	15%	

? SEX UNKNOWN

* HATCHERY FISH

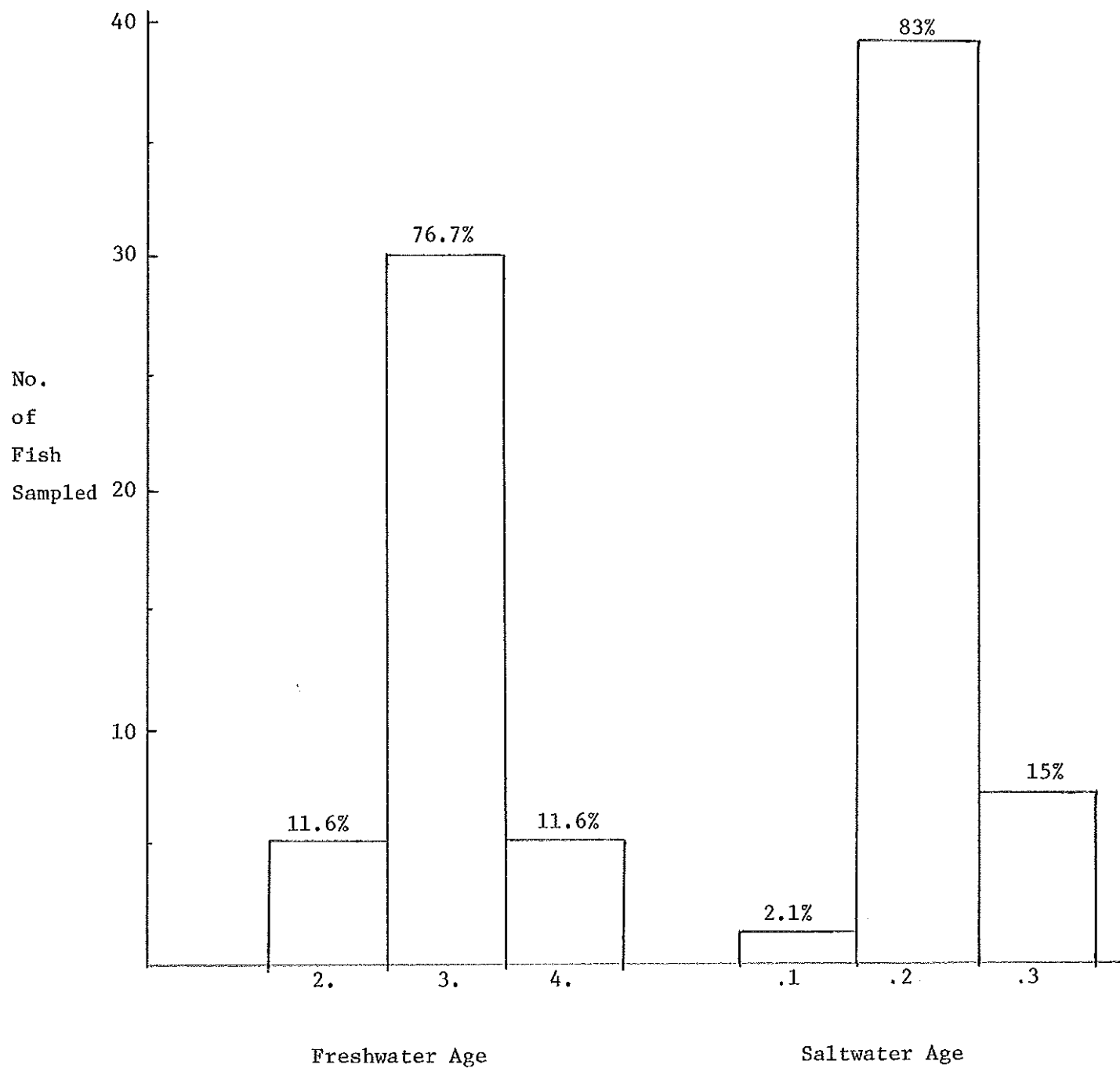


Fig.3 Freshwater and Saltwater Ages of Wild Summer Run Steelhead After 1970

TABLE IV. AGE CLASS OF REPEAT SPAWNING SUMMER RUN
STEELHEAD IN THE CAPILANO RIVER AFTER 1970

AGE & CLASS			
YEAR	SEX	3.1S1	TOTAL
1974	M	-	-
	F	1	1
	TOTAL	1	1

- Repeat spawners made up of 2.5% of the total number of
summer run scales examined.

TABLE V. SEX RATIO OF SUMMER RUN STEELHEAD IN
THE CAPILANO RIVER AFTER 1970.

SEX			
YEAR	MALE	FEMALE	FEMALE: MALE RATIO
1972	1	2	2:1
1973	9	7	0.8:1
1974	4	3	0.8:1
1975	2	1	0.5:1
1976	1(1*)	1	0.5:1
1977	2(2*)	2(3*)	1.3:1
HATCHERY TOTAL	3	3	1:1
WILD FISH TOTAL	19	16	0.8:1
TOTAL	22	19	0.9:1

* HATCHERY FISH

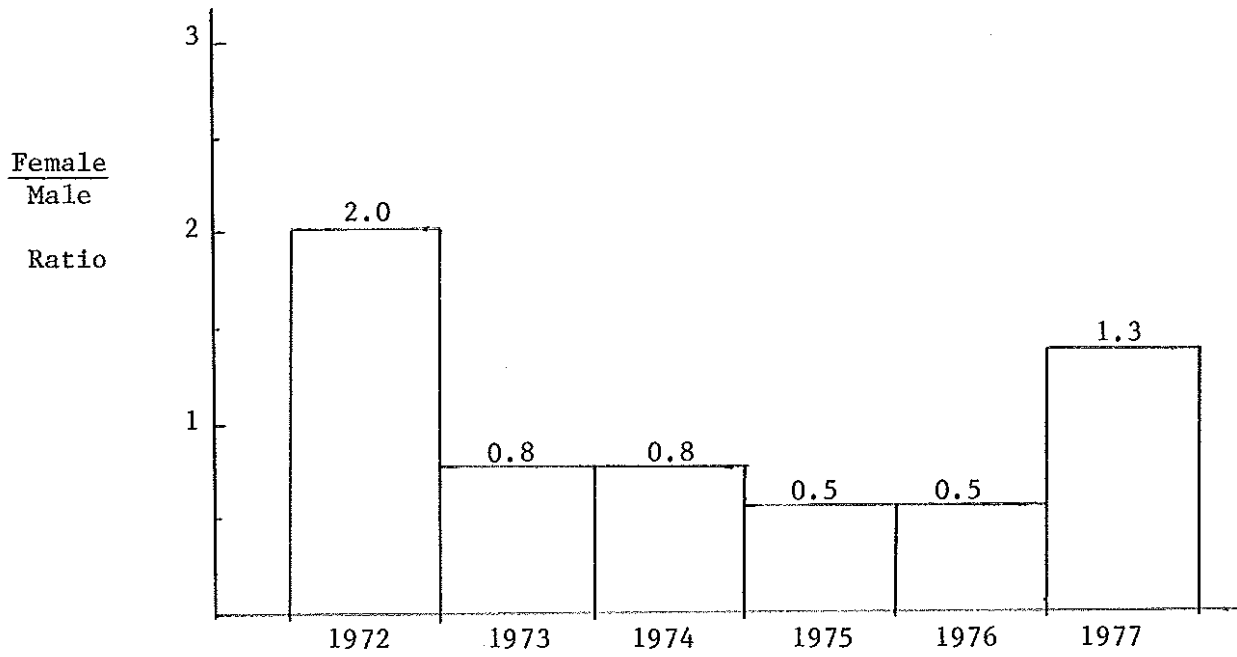


Fig. 4 Sex Ratio of Summer Run Steelhead After 1970.
F:M

TABLE VI. SEX RATIO OF SUMMER STEELHEAD CAUGHT
BY ANGLER'S BEFORE 1961

(*) HATCHERY FISH			
YEAR	SEX		FEMALE: MALE RATIO
	MALE	FEMALE	
1949	3	5	1.7:1
1950	7	11	1.6:1
1951	3	9	3:1
1952	15	19	1.3:1
1953	6	7	1.2:1
1954	4	4	1:1
1955	2	8	4:1
1956	2	3	1.5:1
1958	1(1*)	-	-
TOTAL	44	66	1.5:1

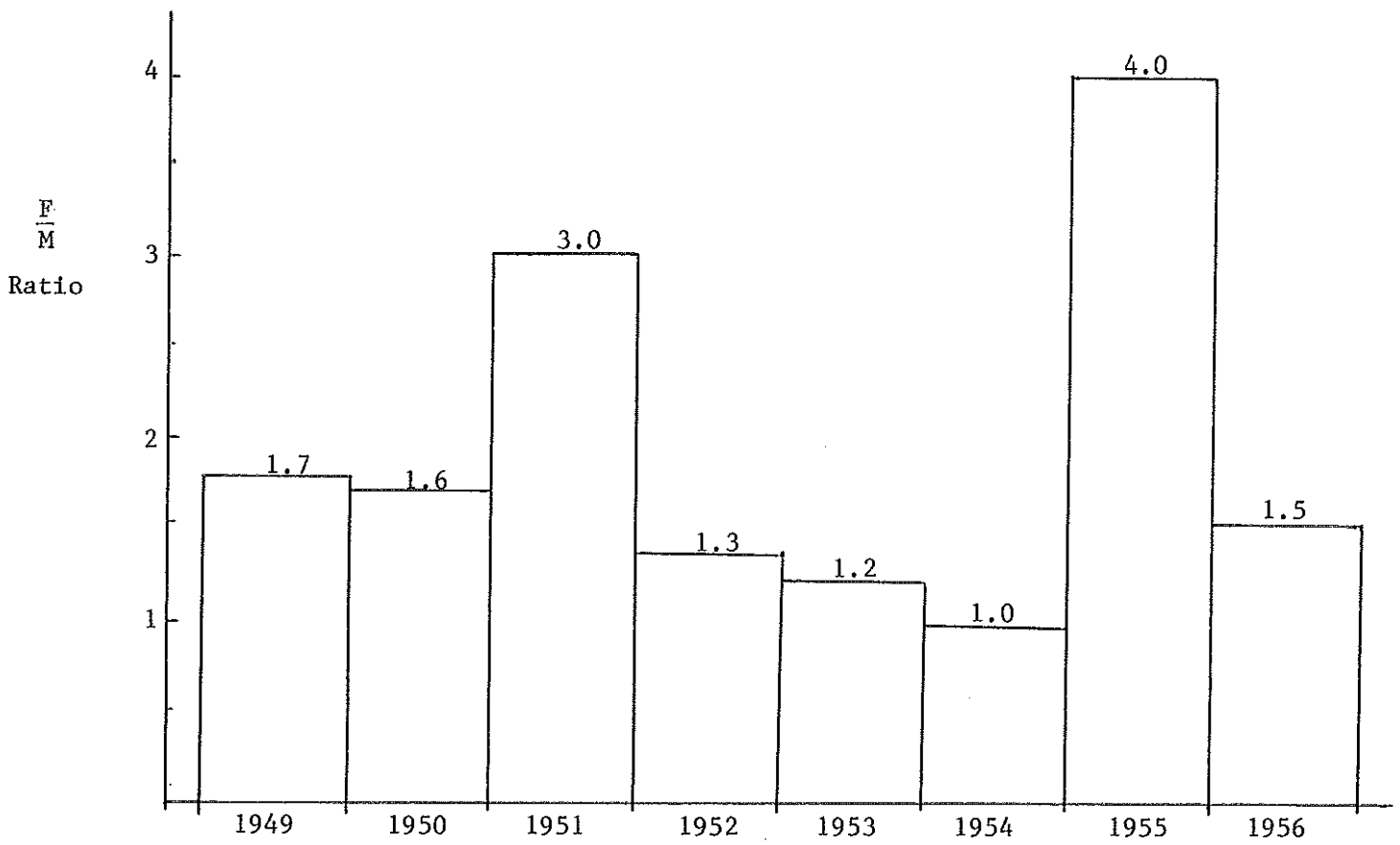


Fig. 5 Sex Ratio of Summer Steelhead Caught By Anglers Before 1961.

Table VII. Timing of the Run - Based on Angler Catch per Month After 1970.

(*) Hatchery Fish

Year	Month												Total
	Jan.	Feb.	Mar.	Apr.	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
1972	-	-	-	-	-	-	-	-	-	-	2	1	
1973	-	2	1	-	2	-	-	-	-	-	-	-	
1975	-	-	-	-	-	3	-	-	-	-	-	-	36
1976	-	-	-	-	-	-	-	-	-	-	-	3(1*)	(9*)
1977	1	1	3	11(6*)	3(1*)	3(1*)	River Closed To Angling						
Total Wild	1	3	4	11	5	6	-	-	-	-	2	4	36
% of Total Wild	2.7%	8.3%	11.1%	30.5%	13.9%	16.7%	-	-	-	-	5.6%	11.1%	
Total Hatchery	-	-	-	6	1	1	-	-	-	-	-	1	9
Total Hatchery & Wild	1	3	4	17	6	7	-	-	-	-	2	5	45
% of Total	2.2%	6.7%	8.9%	37.8%	13.3%	15.6%	-	-	-	-	4.4%	11.1%	

MONTH

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1949	-	5	1	1	5	5	-	-	-	-	-	3	20
1950	1	6	4	-	2	10	7	-	-	-	-	6	36
1951	2	3	1	2	2	10	-	-	-	-	-	3	23
1952	-	10	7	14	21	14	7	-	-	-	4	-	77
1953	3	7	3	5	8	4	3	1	1	1	1	1	38
1954	2	5	1	1	5	6	1	-	-	-	-	3	24
1955	4	-	-	4	2	3	4	-	-	2	-	-	19
1956	4	3	-	7	5	-	2	-	-	-	-	-	21
1957	1(1*)	-	-	-	-	-	-	-	-	-	(1*)	-	1(2*)
1958	-	(5*)	3(1*)	-	-	-	-	-	-	-	-	-	3(6*)
1959	(2*)	(5*)	(23*)	2(1*)	-	-	-	-	-	-	-	-	2(31*)
1960	(1*)	(3*)	-	(1*)	-	-	-	-	-	-	-	-	(5*)

TOTAL	17	39	20	36	50	52	24	1	1	3	5	16	260
PERCENT (WILD)	6.5%	15%	7.7%	13.9%	19.2%	20%	9.2%	0.4%	0.4%	1.2%	1.9%	6.1%	
TOTAL HATCHERY (4*)	(4*)	(13*)	(24*)	(2*)	-	-	-	-	-	-	(1*)	-	(44*)
WILD & HATCHERY TOTAL	21	52	44	38	50	52	24	1	1	3	6	16	308
PERCENT	6.8%	16.9%	14.4%	12.3%	16.4%	16.9%	7.9%	0.3%	0.3%	1.0%	2.0%	5.2%	

(*) HATCHERY
 TABLE VIII. TIMING OF THE RUN - BASED ON ANGLER CATCH
 PER MONTH BEFORE 1960.

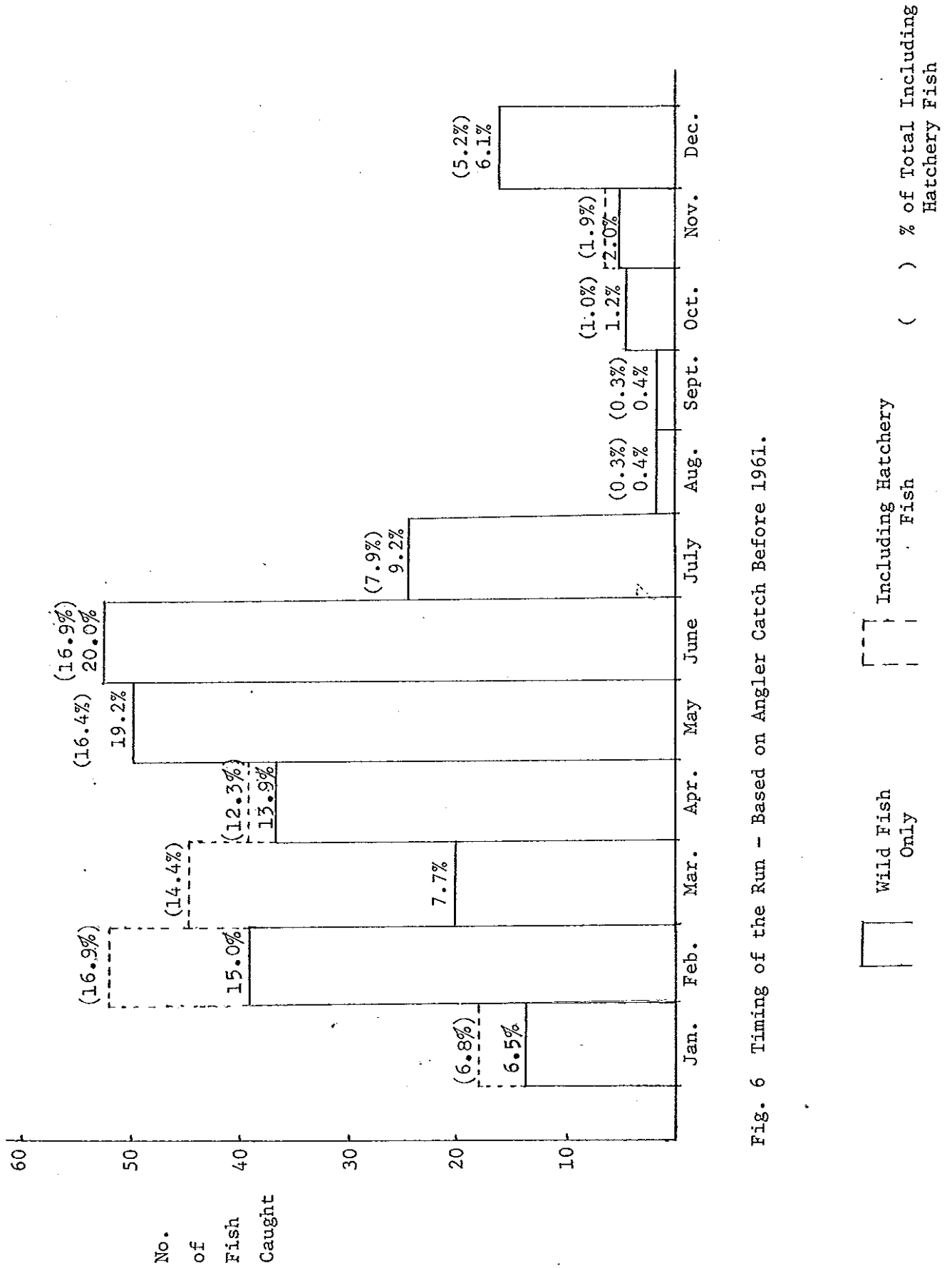


Fig. 6 Timing of the Run - Based on Angler Catch Before 1961.

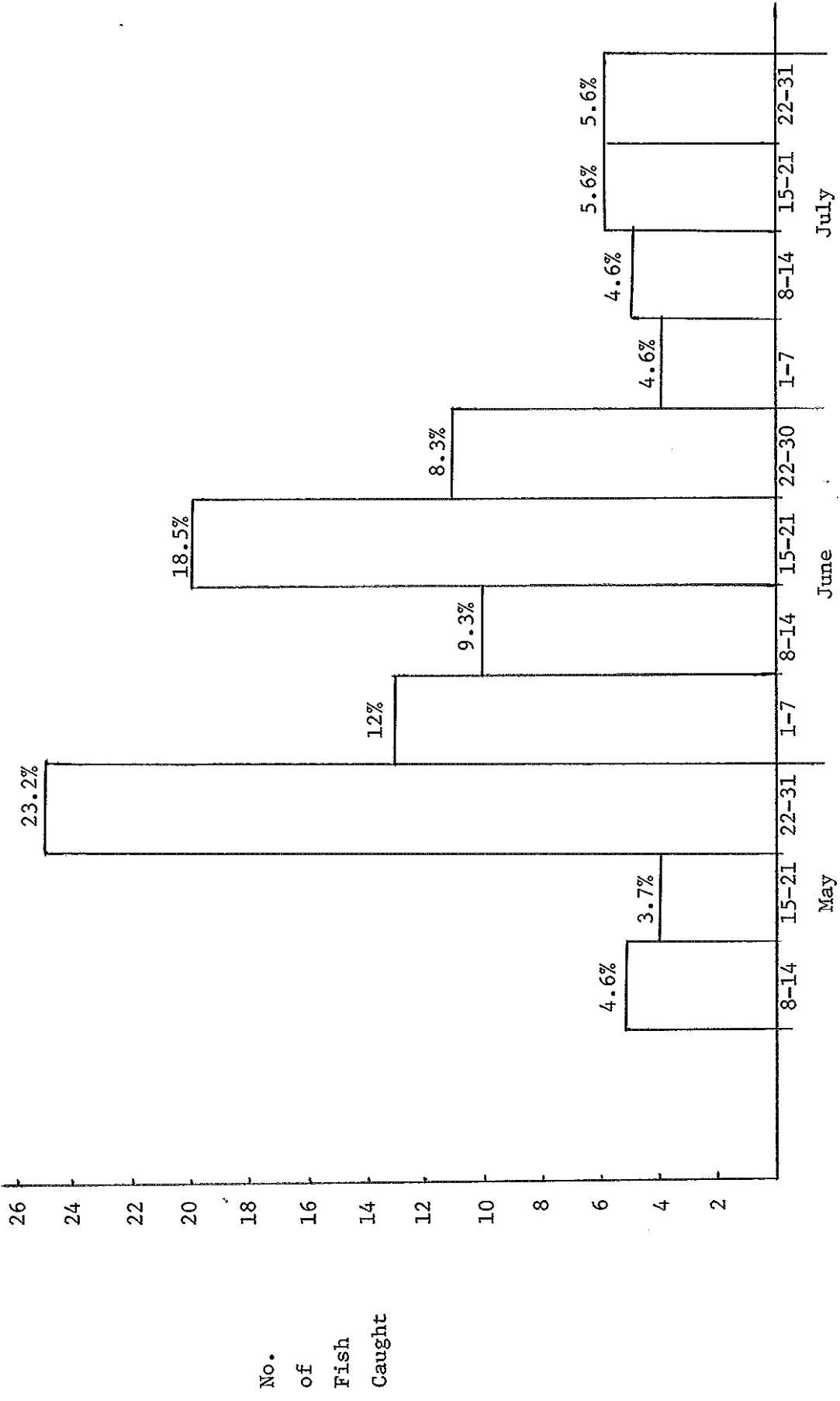


Fig. 7. Timing of the Run (Summer Steelhead) - Based on Angler's Catches Between 1949 and 1956.

Year	Date of Catch													Total
	May				June				July					
	1-7	8-14	15-21	22-31	1-7	8-14	15-21	22-30	1-7	8-14	15-21	22-31		
1949	-	-	-	4	2	-	3	-	-	-	-	-	-	
1950	1	-	-	1	1	3	4	2	-	1	2	4	-	
1951	-	-	1	1	4	1	3	2	-	-	-	-	-	
1952	1	2	2	11	3	2	6	3	3	2	2	-	-	
1953	1	1	1	3	1	1	3	-	1	1	-	1	-	
1954	1	-	-	2	-	2	2	2	1	-	-	-	-	
1955	-	-	-	1	2	-	-	1	1	1	2	1	-	
1956	1	-	-	2	-	1	-	1	-	-	-	-	-	
Totals	5	4	4	25	13	10	20	9	5	5	6	6	108	
% of Total	4.6%	3.7%	3.7%	23.2%	12%	9.3%	18.5%	8.3%	4.6%	4.6%	5.6%	5.6%		

Table IX. Timing of the Run (Summer Steelhead), Based on Angler Catch Before 1960.

II. Winter Run

In total 54 scales were examined for age from winter run steelhead. Two of these were repeat spawners and 11 were adult returns from the Capilano hatchery. These fish were all caught after 1970. A further 195 sample results from winter run steelhead caught before 1961 were used for sex ratio and timing of the run. Of these 43 were returns from hatchery reared smolt releases in the Capilano river during the 1950's and were compared to saltwater ages, sex and timing of wild fish.

Total Age (Table X) (Fig. 8)

The most common age class of 46 steelhead scales examined was 3.2+ (34.9%) followed by 3.1+ (21.7%) and 2.2+ (19.6%). The age class 2.1+ made up another 15.2%.

Freshwater Age (Table XI) (Fig. 9)

Samples from 42 fish were examined for freshwater age. The most common age group was made up of 24 fish (57.1%) that had spent three winters in freshwater. Another 17 fish (40.5%) had spent two winters in freshwater and only 1 fish (2.4%) had four winters of freshwater growth.

Saltwater Age

(i) After 1970 (Table XII) (Fig. 9)

Samples from 52 fish were examined for saltwater growth. Three of these samples were hatchery returns. All three of these fish had spent two winters in the ocean. In total 34 fish (65.4%) had two winters of ocean growth (.2+) and 16 fish (30.7%) had only one winter (.1+). Only 2 fish (3.9%) had spent three winters (.3+) at sea.

(ii) Before 1961 (Table XIII) (Fig. 10)

These fish were all hatchery reared smolts released in the 1950's, 44 in total. The ages were somewhat different. In total 23 fish (52.3%) had spent one winter (.1+) in the ocean and 19 fish (43.2%) had spent two winters (.2+). Only 1 fish (2.3%) had three winters in the sea (.3+) and 1 fish came back as a precocious male (.+).

Repeat Spawners (Table XIV)

Of 48 scale samples only 2 fish (4.4%) were repeat spawners. Both fish were females; one in the age group 2.1S+ and one in the age group 2.2S+.

Sex Ratio

(i) After 1970 (Table XV) (Fig. 11)

The overall sex ratio for 43 winter steelhead was 1.3:1. Yearly variation was from 0.8:1 to 3:1. The ratio was M:F.

(ii) Before 1961 (Table XVI) (Fig. 12)

The overall sex ratio for 186 winter steelhead was 1.6:1 favouring females. Of interest is the sex ratio of steelhead caught that had been hatchery reared and released as smolts. The sex ratio of 43 angler caught adults was almost 1:1.

Timing of the Run (Table XVII) (Fig. 13)

Due to the small number of samples available after 1970 only the samples from before 1961 were used to breakdown the timing by week. Eighty-three samples were available from this time period. Fish caught from the last week of December to the second week of April were determined to be winter run. The peak month appeared to be February with 45.8% of the total. The peak week of February 8-14 had 12 fish (14.1%) and the week of the 22-28 had 11 fish (12.9%),

Table X - Age Class Structure of Wild Winter-Run
Steelhead in the Capilano River After 1970

		Total Age Group							
Year	Sex	2.1+	2.2+	2.3+	3.1+	3.2+	4.1+	4.2+	Total
1972	M	1 (2?)	1 (1?)	-	- (4?)	2 (2?)	- (1?)	-	4 (10?)
	F	-	1	-	-	2	-	1	4
	Total	3	3	-	4	6	1	1	18
1973	M	1	-	-	1	3	-	-	5
	F	-	1	1	-	1	-	-	3
	Total	1	1	1	1	4	-	-	8
1976	M	-	-	-	1	- (1?)	-	-	1
	F	-	1	-	-	-	-	-	1
	Total	-	1	-	1	1	-	-	
1977	M	2	1	-	-	2	-	-	5
	F	1	3	1	3	3	-	-	11
	Total	3	4	1	3	5	-	-	
Total	M	4	2	-	2	7	-	-	15
	F	1	6	2	4	6	-	1	20
	Unknown	2	1	-	4	3	1	-	11
	Total	7	9	2	10	16	1	1	46
% of Total		15.2%	19.6%	4.4%	21.7%	34.9%	2.2%	2.2%	

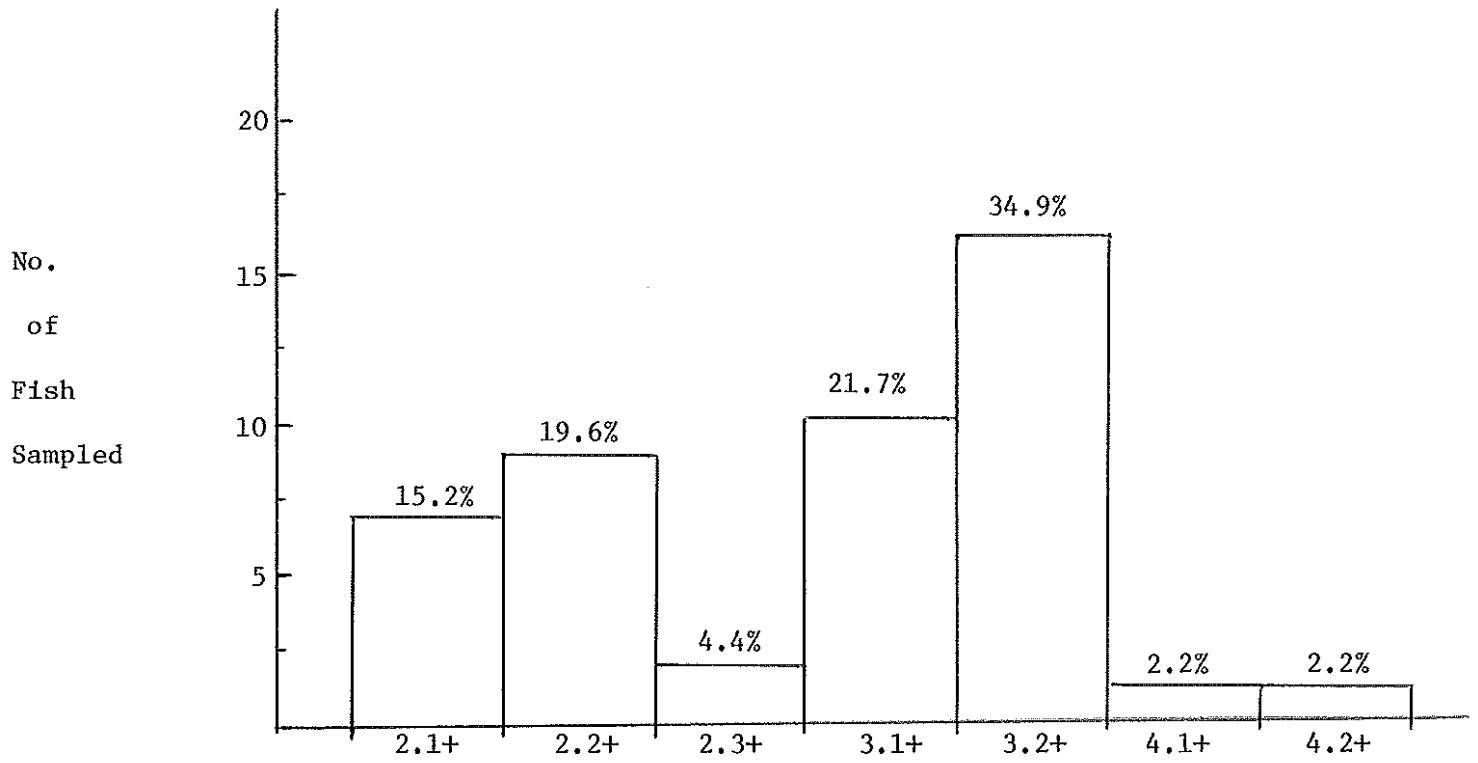


Fig. 8 Age Class Structure of Wild Winter Run Steelhead After 1970.

TABLE XI. FRESHWATER AGE GROUPS OF WILD WINTER RUN
STEELHEAD AFTER 1970.

FRESHWATER AGE GROUP					
YEAR	SEX	2.	3.	4.	TOTAL
1972	M	2 (3?)	-(5?)	-(1?)	2 (9?)
	F	1	4	-	5
	TOTAL	6	9	1	16
1973	M	1	4	-	5
	F	3	1	-	4
	TOTAL	4	5	-	9
1976	M	-	1 (1?)	-	1 (1?)
	F	-	-	-	-
	TOTAL	-	2	-	2
1977	M	2	2	-	4
	F	5	6	-	11
	TOTAL	7	8	-	15
TOTAL	M	5	7	-	12
	F	9	11	-	20
	UNKNOWN	3	6	1	10
	TOTAL	17	24	1	42
% OF TOTAL		40.5%	57.1%	2.4%	

? SEX UNKNOWN

TABLE XII. Saltwater Ages of Winter Run Steelhead After 1970

Saltwater Age Group					
Year	Sex	.1+	.2+	.3+	Total
1971	M	-	1	-	1
	F	-	- (1?)	-	- (1?)
	Total	-	2	-	2
1972	M	1	1	-	2
	F	- (6?)	7 (3?)	-	7 (9?)
	Total	7	11	-	18
1973	M	2	4	-	6
	F	-	2	1	3
	Total	2	6	1	9
1976	M	1	-	-	1
	F	-	- (1?)	-	- (1?)
	Total	1	1	-	2
1977	M	3	4(3*)	-	7
	F	3	6	1	10
	Total	6	10(3*)	1	17(3*)
Total Wild	M	7	10	-	17
	F	3 (6?)	16 (5?)	2	21 (11?)
	Total	16	31	2	49
% of Total Wild		33.3%	62.5%	4.2%	
Total Wild & Hatchery	M	7	13	-	20
	F	3 (6?)	16 (5?)	2	21
	Total	16	34	2	52
% of Total		30.7%	65.4%	3.9%	

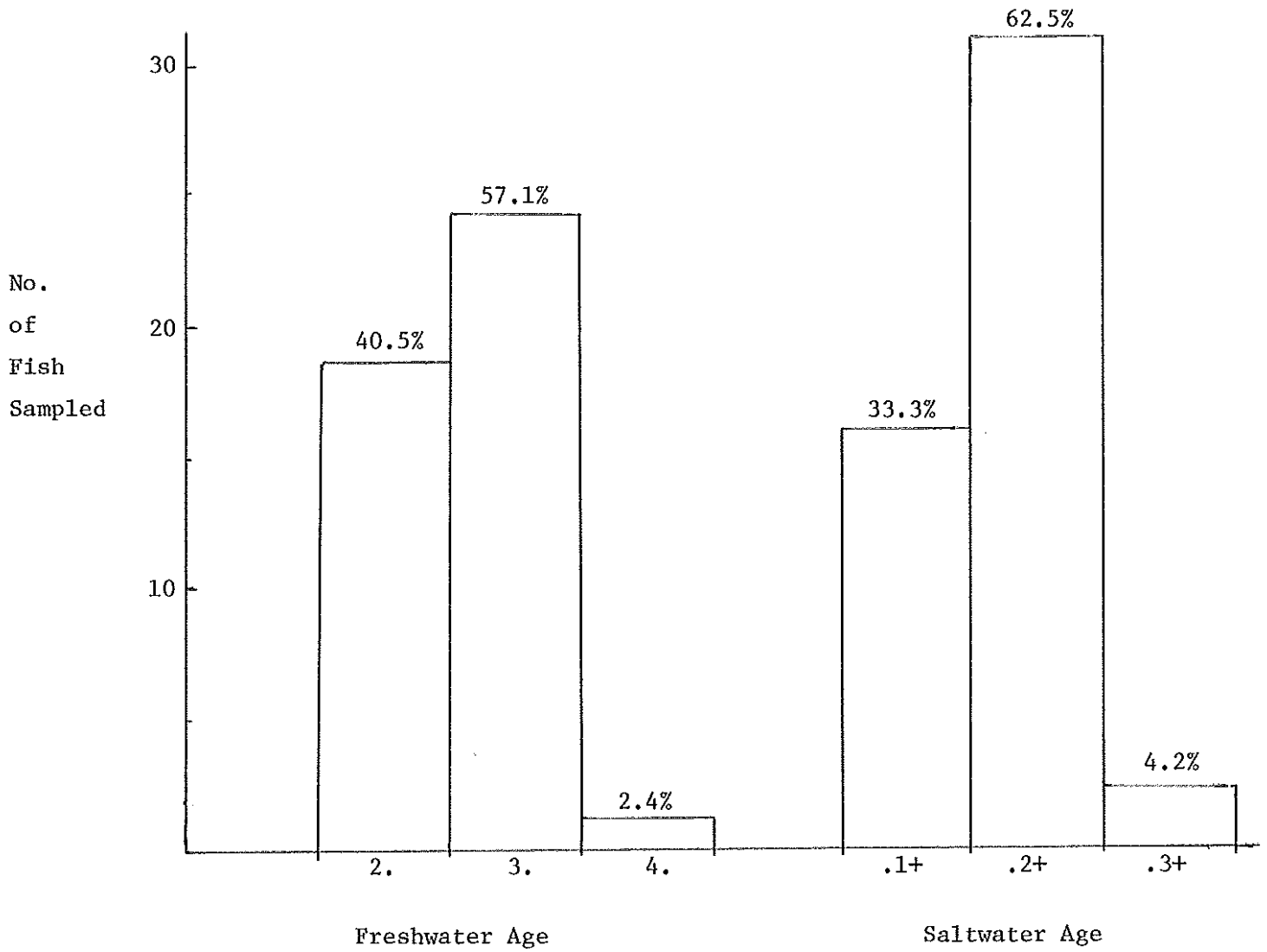


Fig. 9 Freshwater and Saltwater Ages of Wild Winter Run Steelhead After 1970

Table XIII, Salt Water Age Groups of Hatchery Reared Winter Steelhead Between 1958 and 1960.

Salt Water Age Group						
Year	Sex	.+	.1+	.2+	.3+	Total
1958	M	-	5	-	-	5
	F	-	2	-	-	2
	Total	-	7	-	-	7
1959	M	-	5	8	1	14
	F	-	10	8	-	18
	Total	-	15	16	1	32
1960	M	1	-	(1?)	-	1(1?)
	F	-	1	2	-	3
	Total	1	1	3	-	5
Total	M	1	10	8	1	20
	F	-	13	10	-	23
	Unknown	-	-	1	-	1
	Total	1	23	19	1	44
% of Total		2.3%	52.3%	43.2%	2.3%	

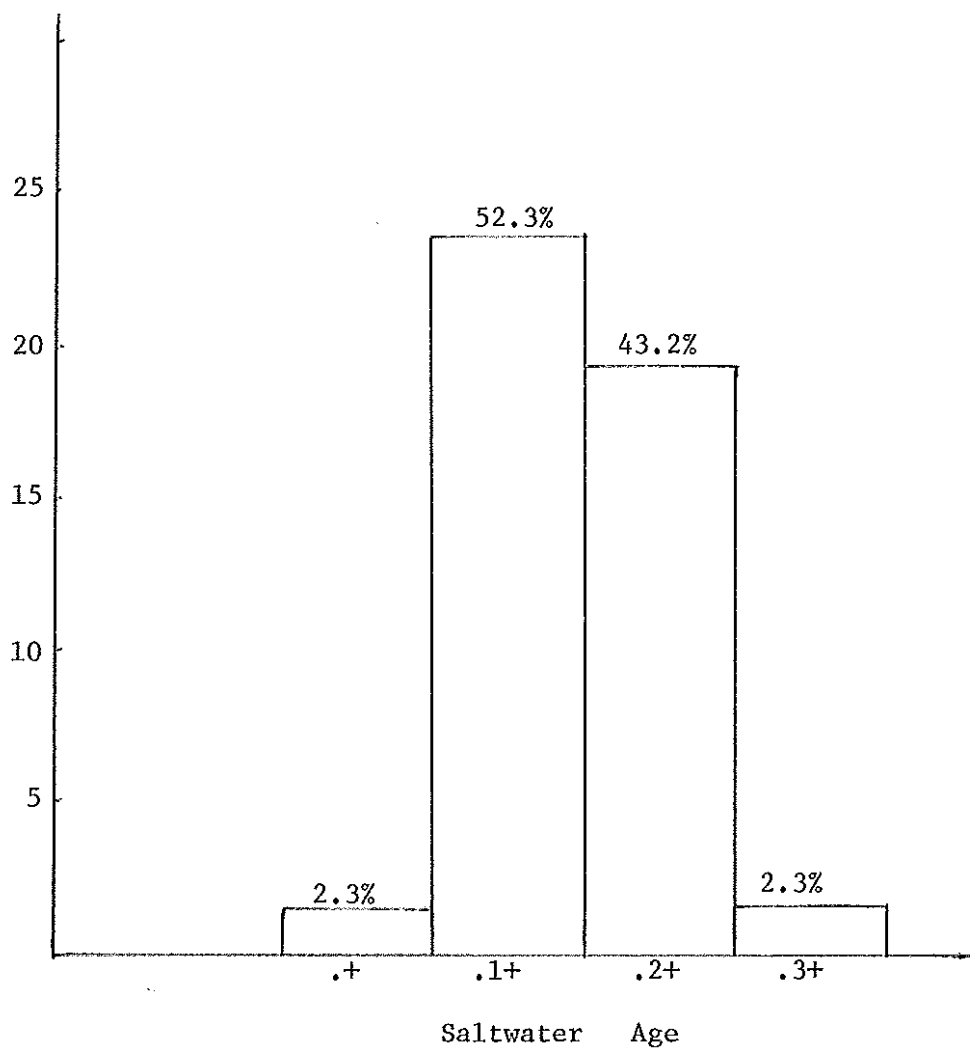


Fig. 10 Saltwater Ages of Hatchery Reared Winter Steelhead Between 1958 and 1960.

TABLE XIV. Age Class of Repeat Spawning Winter Steelhead After 1970

Age Class				
Year	Sex	2.1S+	2.2S+	Total
1973	M	-	-	-
	F	1	-	1
	Total	1	-	1
1977	M	-	-	-
	F	-	1	1
	Total	-	1	1
Totals	M	-	-	-
	F	1	1	2
	Total	1	1	2

- Repeat spawners made up 4.4% of the total number of scales examined from winter runs.

Table XV - Sex Ratio of Winter Run Steelhead After 1970

Sex			
	Male	Female	Female:Male Ratio
1972	2	6	3:1
1973	6	5	0.8:1
1976	1	1	1:1
1977	7(3*)	12	1.2:1
Wild Fish Total	16	24	1.5:1
Total	19	24	1.3:1

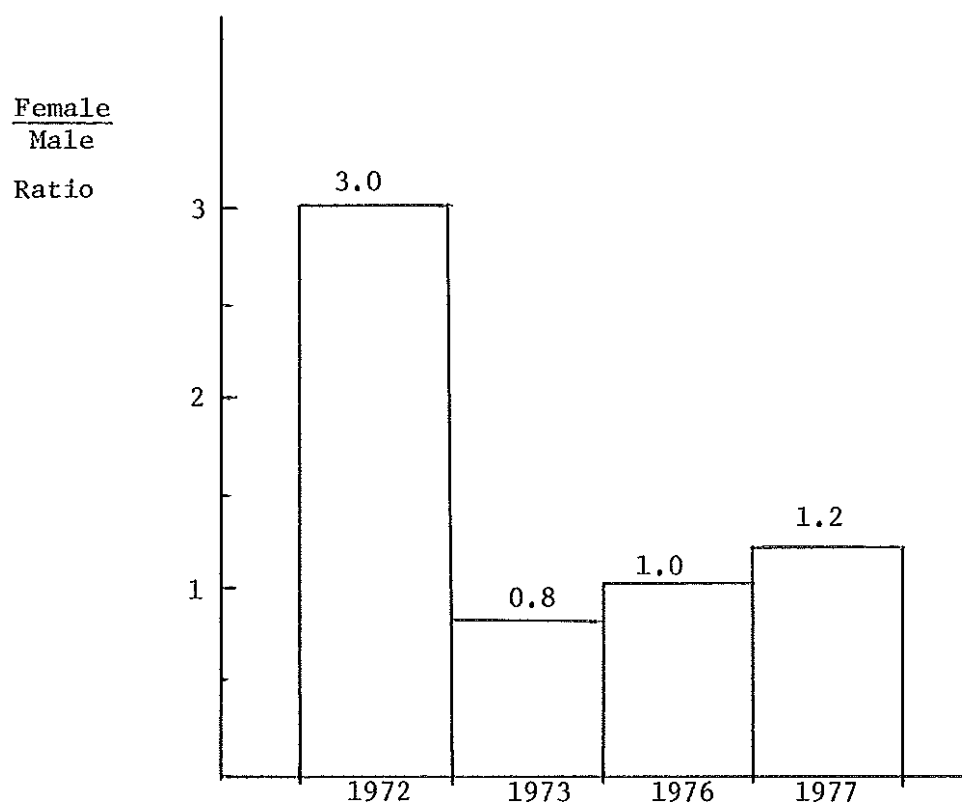


Fig.11 Sex Ratio of Winter Run Steelhead Caught by Anglers After 1970.

Table XVI- Sex Ratio of Winter Steelhead Caught in
Capilano by Anglers Before 1961

(*) Hatchery Fish

Sex			
Year	Male	Female	Female:Male Ratio
1949	3	7	2.3:1
1950	4	14	3.5:1
1951	6	6	1:1
1952	16	26	1.6:1
1953	8	16	2:1
1954	4	10	2.5:1
1955	5	4	0.8:1
1956	4	7	1.8:1
1958	-(4*)	3(2*)	1.3:1
1959	-(13*)	-(18*)	1.4:1
1960	-(5*)	-(1*)	0.2:1
Total Wild	50	93	1.7:1
Total Hatchery	22	21	0.96:1
Total	72	114	1.6:1

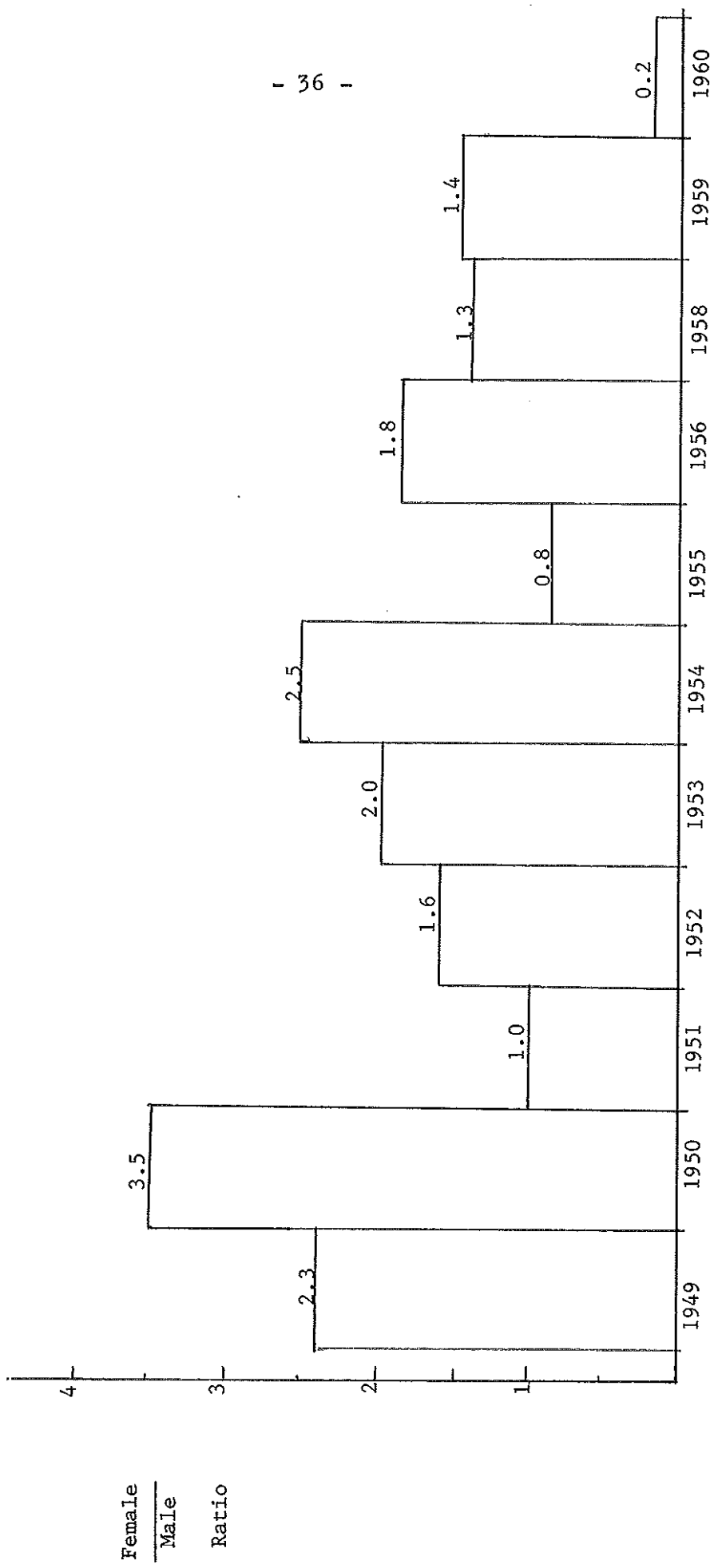


Fig. 12 Sex Ratio of Winter Steelhead Caught By Anglers Before 1961.

Year	Date of Catch												Total			
	Dec.			January			February			March				April		
	22-31	1-7	8-14	15-21	22-31	1-7	8-14	15-21	22-28	1-7	8-14	15-21		22-31	1-7	8-14
48/49	-	-	-	-	-	1	-	2	2	-	-	-	1	-	-	6
49/50	2	-	1	-	-	-	1	3	1	-	-	-	1	-	-	12
50/51	-	-	-	1	1	-	2	-	1	-	-	-	1	1	2	9
51/52	1	-	-	-	-	4	1	1	4	-	3	1	3	2	3	23
52/53	-	-	-	1	2	1	6	-	-	-	1	-	2	1	1	15
53/54	-	1	1	-	-	-	1	2	2	-	-	1	-	-	-	8
54/55	-	-	-	2	2	-	-	-	-	-	-	-	-	1	2	7
55/56	-	-	-	-	-	1	1	-	1	-	-	-	-	2	-	5
Total	3	1	2	4	5	7	12	8	11	-	7	2	8	7	8	85
% of Total	3.5%	1.4%	2.4%	4.7%	5.9%	8.2%	14.1%	9.4%	12.9%	-	8.2%	2.4%	9.4%	8.2%	9.4%	

Table XVII Timing of the Run (Winter Steelhead) Based on Angler Catch Between 1949 and 1956.

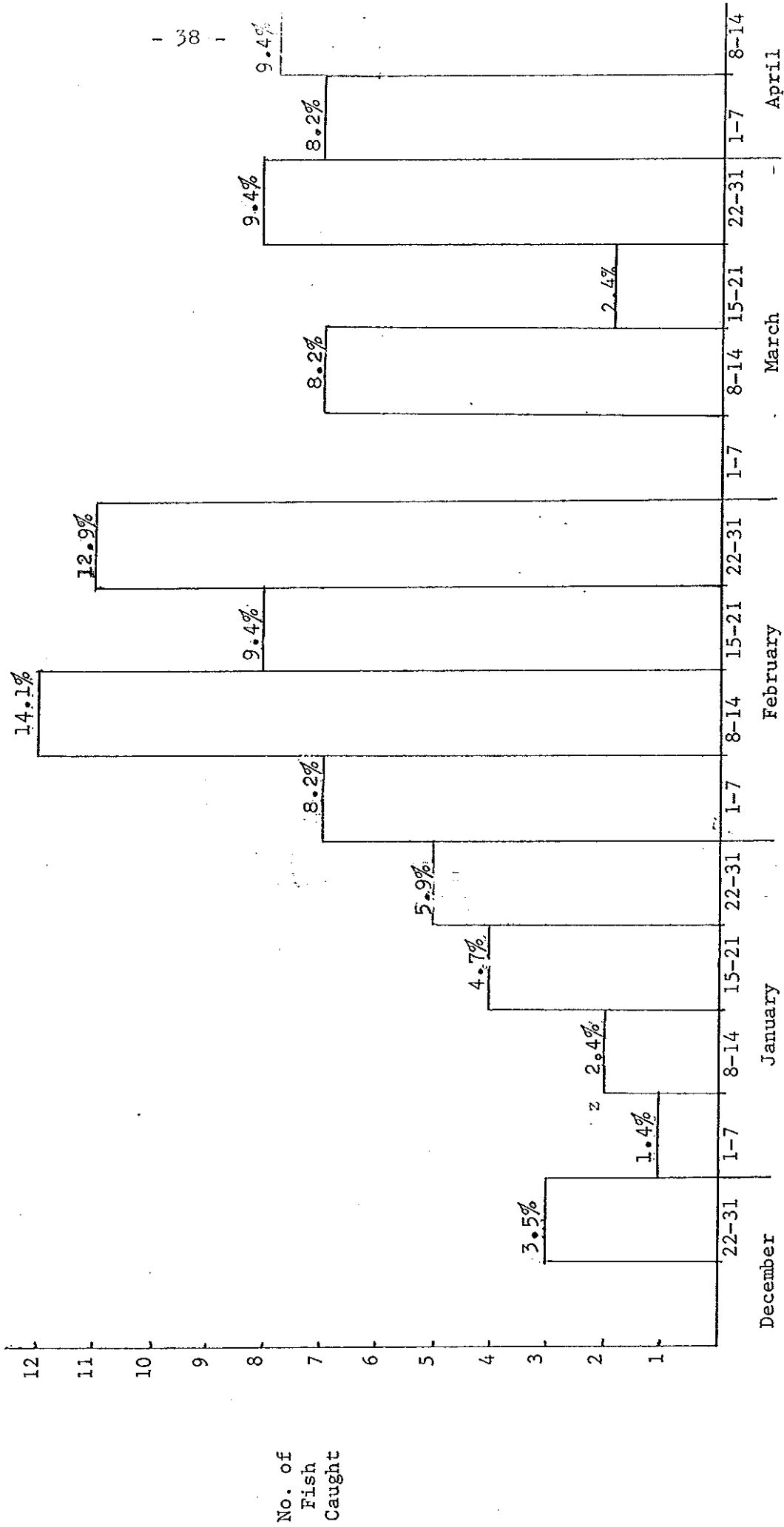


Fig. 13 Timing of the Run (Winter) - Based on Angler Catch Between 1949 and 1956.

Discussion

Two factors may affect the results of this report with respect to the steelhead population in the Capilano River. The first is that most of the steelhead from which samples were taken were caught by anglers. This may introduce a bias into the results. The other factor is the relatively small sample size of steelhead scales from summer and winter fish. This will only affect age class results as a large sample of information on fish caught before 1961 was available for sex ratio and timing.

1. Age Class

The age class structure of winter run and summer run may not be representative due to the small sample size. In total there were 41 samples for summer-runs. The most common age class was 3.2 (61%) followed by 3.3 and 4.2, each with 12.2%. This data does however compare to Withler's results for the Capilano in 1966. He found the most common age group to be 3/2 with 48.3% and 3/3 with 32%. Withler had 86 summer run samples.

There were only 46 samples available for winter run steelhead. The age group 3.2 made up 34.9%, followed by 3.1+ with 21.7% and 2.1+ with 15.2%. Withler had slightly different results with the 3/2 age group making up 40%, followed by the 2/2 group with 25% and 2/3 with 20%. There were 70 winter run samples in his study.

2. Freshwater Radius

Comparisons were made between freshwater radius of adult wild steelhead and adult hatchery steelhead. Wild winter run steelhead had an average radius of 3.0 cm., hatchery winters caught in 1977 had an average radius of 3.3 cm. and hatchery winters caught before 1961 averaged 3.7 cm. These measurements seem to suggest that most hatchery returns were smolts as large or larger than the natural smolts. In contrast though, are summer runs with wild fish having an average radius of 3.4 cm. and hatchery fish averaging 3.0 cm. This was from very few samples however. The most interesting point came out with examination of 25 scales from smolts released from Capilano hatchery in 1973 at 20 to the pound. The average scale radius was

2.9 cm. The 1977 adult returns were from release in 1975. No scale samples are available from 1975 but hatchery records show that smolt releases averaged 30 fish to the pound. These were smaller fish than the 1973 release and therefore could have had a scale radius smaller than 2.9 cm. The fact that the adult returns averaged 3.0 to 3.3 cm, suggests two things that may be occurring. The first possibility is that adult hatchery returns resulted from smolts that were somewhat larger than the average size of smolts in the releases. The other possibility is that a portion of the smolts released remained in the river as residuals for one year before going to sea. These fish would have gained enough size to survive and return as adults. The latter possibility also suggests that the fish were 1974 brood stock. This however was not possible because these fish were destroyed by furunculosis and therefore were never released. Comparisons of smolt scales to adult returns known to be of that brood year should resolve the dilemma. Head tag recovery will also confirm some suspicions. Coded wire tags, with place of origin and date of release were implanted in all smolts released from Capilano hatchery.

3. Repeat Spawners

Repeat spawners made up a very small percentage of both summer and winter stocks. Only 2.5% (1 fish) for summer run and 4.4% (2 fish) for winter run. All of these fish were females. Withler, in his study found that 6.1% of the summer run and 7.8% of the winter run were repeat spawners. Most of these fish were females. Male steelhead may have a higher mortality rate after spawning because they remain in the river for a longer period of time, spawning with several females.

4. Sex Ratio

The sex ratio of wild summer runs after 1970 was 0.8:1 favouring males. Hatchery summers had a ratio of 1:1. The ratio of wild summer runs caught before 1961 was 1.5:1 favouring females. The ratio of wild winter runs after 1970 was 1.5:1 favouring females. The three hatchery fish were all males. The ratio of wild winter runs before 1961 was 1.7:1 favouring females. But once again the ratio of hatchery winters was almost 1:1. This is an interesting point as it is common for anglers to catch a higher percentage of females (Caverly 77) (Withler 66).

5. Timing of the Run

Timing of the run was difficult to determine in the Capilano with respect to separating summer and winter stocks. This is due to the fact that both summer and winter stocks enter the river and are caught by anglers during April and May. To account for this, timing was broken down by month for all steelhead caught in two time periods, before 1961 and after 1970. Then, to break down summer and winter run separately, the weeks between April 15 and May 7 were eliminated as the major period of overlap. Winter run timing was broken down into weekly segments from December to April and summer runs from May to July.

The best fishing month in the year, after 1970, was April with 36.2% of the total, both summer and winter fish. Before 1961 the catch appeared to be more evenly spread out over the year with 19.9% in June, 19.2% in May, and 14.2% in February. The best weeks for summer runs appeared to be the last week in May (23.2%) and the third week in June (18.5%). These dates roughly coincide with high spring flows at that time of year (Fig. 14).

For winter runs the best month was February with 45.8%. The peak weeks were February 8-14 (14.6%) and the 22-28 (13.3%). Water flows in February were quite high compared to the other winter months. This may be significant as it seems to prove that angler catch is related to timing of entry which is related to water flow. Other factors such as temperatures may also tie in to fish movements.

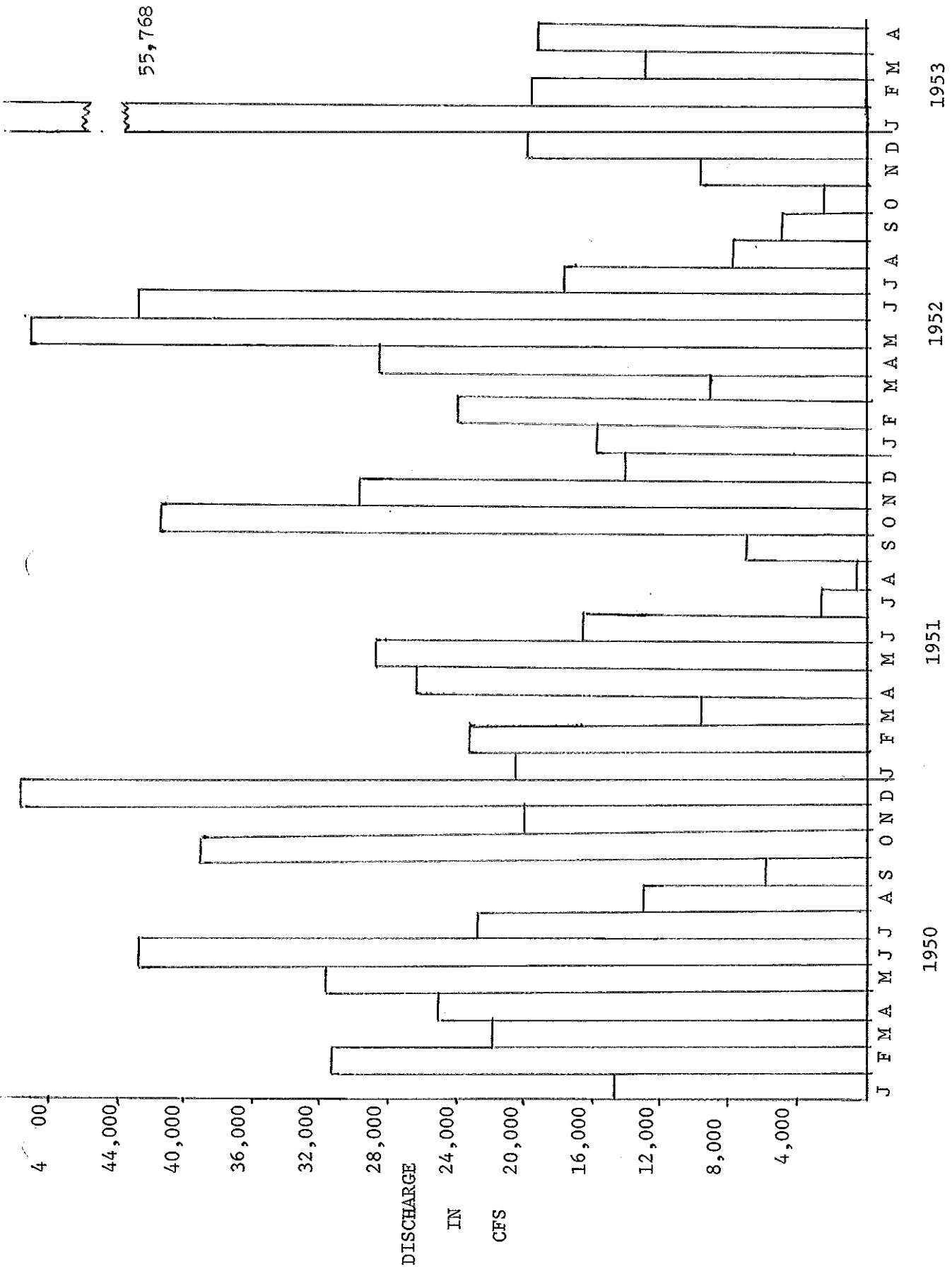


FIG14 MONTHLY DISCHARGE OF THE CAPILANO RIVER

CONCLUSIONS

1. Hatchery steelhead, caught after 1970 as adults, are probably the result of a few larger smolts in the release in 1975.
2. Hatchery steelhead, returning as adults might have been as large as natural smolts when released, based on freshwater radius comparisons.
3. Hatchery steelhead caught before 1961 were more likely to return to the stream after only one year of ocean residence, than were wild fish.

RECOMMENDATIONS

1. The missing scale samples from before 1961 should be located and read if possible.
2. Scale samples should be taken annually from a portion of the smolts released at Capilano Hatchery. Scale radius should be compared to samples from returning adults.
3. Future steelhead investigations should separate summer and winter stocks to accurately determine timing of the runs.
4. Scale features such as freshwater radius of Capilano steelhead should be compared to stocks of other rivers in an attempt to determine racial distinctions.

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Appendix I. Adult scale sample record sheets.

LOCATION: CAPILANO RIVER, WEST VANCOUVER INTERPRETER: ALAN CAVERLY
 SPECIES: STEELHEAD DATE: JUNE 1977
 REPORT NO: III

DATE		SCALE		SCALE		inc.	lbs.	TOTAL	FRESH	FRESH	cm.	SALT	SALT	TOTAL
DAY	NO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS		AGE	RADIUS	RADIUS
26	02	56	1	NA	F	30.5	12.2	3.3+	3.	2.1	48x	.3+	6.0	18.2
27	05	56	2 S	NA	F	27.0	7.5	3.2	3.	3.1	"	.2	9.9	17.2
12	01	57	3	NA	F	—	5.0	R.2+	R.	—	"	.2+	—	—
19	01	57	4 A	"	—	—	2.75	R	R	—	"	—	—	—
05	11	57	5 W	NA	—	—	3.0	—	—	—	"	—	—	—
02	02	58	6 W	NA	M	23.0	5.5	H.1+	H.	2.3	"	.1+	10.4	14.6
07	02	58	7 W	"	F	22.0	4.0	H.1+	H.	3.2	"	.1+	11.4	14.6
15	02	58	8 A	"	M	24.0	6.0	H.1+	H.	3.9	"	.1+	10.8	14.0
16	02	58	9 W	"	F	25.0	6.0	H.1+	H.	4.0	"	.1+	13.0	16.2
16	02	58	10 A	"	M	25.0	6.0	H.1+	H.	2.5	"	.1+	10.6	14.1
02	03	58	11	¹⁻¹ #1,2,3	F	25.0	9.0	4.2+	4.	5.0	"	.2+	9.0	15.1
02	03	58	12	¹⁻¹ #4,5,6	F	30.0	11.0	3.2+	3.	3.1	"	.2+	11.5	20.8
05	03	58	13 W	NA	M	25.0	5.5	R.1+	R.	—	"	.1+	—	—
18	03	58	14	¹⁻¹ #7,8,9	F	27.0	6.0	3.2+	3.	3.1	"	.2+	9.0	15.2
14	04	58	15 A	NA	—	—	—	—	—	—	"	—	—	—
17	05	58	16 S	¹⁻² #1,2,3	M	29.0	9.5	3.2	3.	4.0	"	.2	14.6	20.5
22	05	58	17 S W	NA	M	25.0	4.25	H.1+	H.	3.0	"	.1+	9.7	13.7
25	01	59	18 A	NA	M	22.0	4.0	H.2	H.	3.5	"	.2	8.8	14.5
25	01	59	19 A	"	F	23.0	5.0	H.2	H.	4.4	"	.2	8.7	15.5
21	02	59	20 A	"	M	23.5	4.25	H.2+	H.	4.4	"	—	9.0	14.2
07	02	59	21 A	"	M	23.5	5.0	H.1+	H.	4.0	"	.1+	9.0	11.1
08	02	59	22 A	"	M	—	7.0	H.2	H.	—	"	.2	—	—
10	02	59	23 W	"	F	28.0	8.0	H.2+	H.	3.1	"	.2+	8.9	15.6
26	02	59	24 A	"	F	26.0	5.25	H.1+	H.	3.7	"	.1+	9.5	14.8
01	03	59	25 A	"	F	21.0	3.0	H.1+	H.	2.5	"	.1+	10.7	17.0
03	03	59	26 A	"	M	25.0	5.0	H.1+	H.	3.3	"	.1+	9.3	13.7
07	03	59	27 A	"	F	—	5.0	H.2	H.	—	"	.2	—	—

S - SUMMER RUN LV - LEFT VENTRAL MISSING

LOCATION: CAPILANO RIVER, SE OF VANCOUVER, B.C.

INTERPRETER: ALAN CAVERLY

SPECIES: STEELHEAD

DATE: JULY 1977

REPORT NO: III

DATE			SCALE	SCALE		in.	lbs.	TOTAL	FRESH	FRESH	cm.		TOTAL	
DAY	MO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS	MAG	SALT	SALT	RADIUS
												AGE	RADIUS	RADIUS
07	03	59	28 A	NA	M	24.5	5.5	H.2	H.	3.5	48x	.2	9.0	14.3
07	03	59	29 A	"	F	29.0	4.6	H.1	H.	5.0	"	.1	12.5	17.0
07	03	59	30 A	"	F	23.25	4.0	H.1+	H.	5.2	"	.1+	8.7	13.7
08	03	59	31 A	"	M	26.5	6.0	H.1+	H.	3.5	"	.1+	10.8	16.0
09	03	59	32 A	"	F	25.5	6.0	H.1+	H.	4.5	"	.1+	10.0	15.0
12	03	59	33 A	"	M	24.5	4.5	H.2	H.	3.8	"	.2	8.3	13.0
14	03	59	34 A	"	F	24.0	4.0	H.2	H.	4.0	"	.2	9.0	15.0
16	03	59	35 A	"	F	25.0	5.0	H.2	H.	5.0	"	.2	9.8	14.0
17	03	59	36 A	"	M	24.0	6.0	H.2	H.	3.0	"	.2	9.0	14.0
17	03	59	37 A	"	M	25.0	6.5	H.2	H.1	3.5	"	.2	10.0	16.0
17	03	59	38 A	"	F	27.5	8.0	H.2	H.	4.0	"	.2	10.0	15.0
19	03	59	39 A	"	M	23.0	5.5	H.1+	H.	3.6	"	.1+	8.0	11.6
21	03	59	40 A	"	F	28.5	4.4	H.1+	H.	4.0	"	.1+	8.3	12.3
24	03	59	41 A	"	M	—	6.0	H.2	H.	—	"	.2	—	—
25	03	59	42 A	"	F	28.0	4.4	H.1+	H.	4.1	"	.1+	9.5	15.0
26	03	59	43 A	"	M	24.5	5.75	H.1+	H.	3.0	"	.1+	8.3	12.3
28	03	59	44 A	"	F	24.5	3.5	—	—	—	"	—	—	—
28	03	59	45 A	"	F	24.5	3.5	H.1+	H.	3.3	"	.1+	8.1	13.5
28	03	59	46 A	"	F	27.0	4.2	H.2	H.1	3.8	"	.2	10.0	15.1
30	03	59	47 A	"	F	24.0	5.0	H.1+	H.	4.7	"	.1+	11.3	16.4
05	04	59	48 A	"	F	24.0	6.0	H.1+	H.	4.4	"	.1+	9.9	15.0
06	04	59	49 S	1-2 #4.5,6	M	33.5	14.0	4.3	4.	8.2	"	.3	13.0	22.3
07	04	59	50 S	1-2 #7,8,9	F	27.0	7.5	3.2	3.	2.8	"	.2	10.4	15.3
											"			
30	01	60	51 A	NA	F	26.0	5.75	H.1+	H.	4.2	"	.15+	10.8	15.1
17	02	60	52 A	"	F	29.0	5.8	H.1+	H.	3.0	"	.1+	12.0	16.7
17	02	60	53 A	"	F	26.5	6.5	H.2+	H.	4.3	"	.2+	10.5	19.0
19	02	60	54 A	"	F	—	9.0	R.	R.	—	"	.2+	—	—
23	02	60	55 A	"	—	—	7.0	H.2	H.	—	"	.2	—	—
30	04	60	56 RV	11.	M	12.0	0.75	H.+	H.	3.0	"	.+	—	6.0
											"			
											"			

A - ADIPOSE CLIP

S - SUMMER-RUN

RV - RIGHT VENTRAL CLIP

() MARKED HATCHERY FISH, U.S.U.V. FRESHWATER GEN.

CATION: CAPILANO R., WEST VANCOUVER, B.C.
 SPECIES: STEELHEAD
 REPORT NO: III

INTERPRETER: ALAN CAOERLY
 DATE: JUNE 1977
 ANGLER: ERIC CARLISLE

DATE	SCALE	SCALE		in.	lbs.	TOTAL	FRESH	FRESH	MAG	SALT	SALT	TOTAL		
DAY	NO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS	AGE	RADIUS	RADIUS	
11	11	72	63 w	# ²⁻¹ _{1,2,3}	F	30.25	11.75	3.2+	3.	8.3	48x	.2+	10.9	19.9
29	11	72	64	# ²⁻¹ _{4,5,6}		15.0	1.0	3.1+	3.	2.5	"	.1+	5.6	7.2
06	12	72	65 w	# ²⁻¹ _{7,8,9}	F	—	12.25	3.2+	3.	—	4	.2+	—	—
→ 09	02	73	66 w	# ²⁻² _{1,2,3}	F	31.0	12.75	2.15+	2.	3.0	"	.15+	9.1	18.7
19	07	73	67 w	# ²⁻² _{4,5,6}	F	32.0	12.5	2.3+	2.	2.6	"	.3+	5.7	19.2
15	03	73	68 w	# ²⁻² _{7,8,9}	F	26.0	7.0	2.2+	2.	2.1	"	.2+	8.8	13.3
07	05	73	69 s	# ²⁻³ _{1,2,3}	F	25.5	6.25	3.2	3.	3.1	"	.2	8.5	15.0
19	05	73	70 s	# ²⁻³ _{4,5,6}	M	35.0	15.5	3.3	3.	3.4	"	.3	11.0	20.5
31	01	76	71a w	—	M	26.0	5.0	3.1+	3.	3.5	"	.1+	10.3	17.1
14	12	76	71b. HS	# ²⁻³ _{7,8,9}	M	—	6.0	H.2	H.1	2.8	"	.2	8.0	12.6
19	12	76	72 s	# ²⁻⁴ _{1,2,3}	M	—	7.0	2.2	2.	2.8	"	.2	8.5	15.5
29	12	76	73 w	# ²⁻⁴ _{4,5,6}	F	—	7.25	2.2	2.	3.5	"	.2	9.5	14.2
31	12	76	74 s	# ²⁻⁴ _{7,8,9}	F	—	7.5	4.2	4.	3.2	"	.2	9.2	17.6
31	12	76	75	# ³⁻¹ _{1,2,3}		—	12.0	—	—	—	—	—	—	—
17	01	77	75 w	# ³⁻¹ _{4,5,6}	M	—	12.0	R.2+	R.	—	"	.2+	—	—
28	02	77	76 w	# ³⁻¹ _{7,8,9}	F?	—	7.0	2+.2+	2+	3.0	"	.2+	9.5	16.0
22	03	77	77 wK	# ³⁻² _{1,2,3}	F	—	7.5	2.2+	2.	2.3	"	.2+	8.5	13.8
22	03	77	78 w	# ³⁻² _{4,5,6}	F	—	5.5	2.1+	2.	2.4	"	.1+	7.7	10.2
22	03	77	79 wK	# ³⁻² _{7,8,9}	F	—	12.0	2.3+?	2.	3.2	"	.3+	9.0	17.0
06	04	77	80 w	# ³⁻³ _{1,2,3}	F	—	8.0	3.2+	3.	3.3	"	.2+	10.8	18.2
08	04	77	81 w	# ³⁻³ _{4,5,6}	F	—	7.5	3.2+	3.	3.9	"	.2+	9.9	17.0
09	04	77	82 wH	# ³⁻³ _{7,8,9}	M	—	7.5	H.2	H.	3.5	"	.2+	10.6	15.5
→ 09	04	77	83 w	# ³⁻⁴ _{1,2,3}	F	—	15.5	2.15+	3.	2.8	"	.25+	11.0	21.5
10	04	77	84 wH	# ³⁻⁴ _{4,5,6}	M	—	6.5	R.?	R.	—	"	.2+	—	—
12	04	77	TAG NO. 17 85 wH	# ³⁻⁴ _{7,8,9}	M?	—	7.0	H.2	H.	3.0	"	.2+	9.0	14.7
12	04	77	86 w	# ⁴⁻¹ _{1,2,3}	F?	—	8.5	R.2	R.	—	"	.2	—	—
	04	77	87 w	# ⁴⁻¹ _{4,5,6}	M	—	7.0	2.1+	2.	2.5	"	.1+	6.7	9.7
17	04	77	TAG NO. 19 88 HS	# ⁴⁻¹ _{7,8,9}	M	—	8.0	R.2	R.	—	"	.2	—	—
18	04	77	89 s	# ⁴⁻² _{1,2,3}	M	—	9.5	2+.2	2+	3.0	"	.2	9.5	16.0
22	04	77	90 w	# ⁴⁻² _{4,5,6}	F.	—	7.0	3.1+	3.	3.3	"	.1+	9.5	13.5

H. - HATCHERY FISH W - WINTER RUN K - KILT
 S - SUMMER RUN H. - HATCHERY FISH → REPEAT SPAWNER

LOCATION: CAPILAND RIVER, WEST VANCOUVER, B.C.

INTERPRETER: ALAN CAUERNY

SPECIES: STEENHEAD

DATE: JUNE 1977

REPORT NO.: III

ANGLER: ERIC CARLISLE

DATE			SCALE	SCALE		inches	lbs.	TOTAL	FRESH	FRESH	MAG	SALT	SALT	TOTAL
DAY	MO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS		AGE	RADIUS	RADIUS
					F	—	—			—	45x		—	
24	04	77	91 W	4-2 #789	F	—	7.0	3.1+	3.	3.3	48x	.1+	9.7	13.5
25	04	77	93 W	4-3 #1,2,3	F	—	11.0	3.2+	3.	2.5	"	.2+	8.5	17.0
25	04	77	93 W	4-3 #4,5,6	M	—	8.5	2.2+	2.	2.8	"	.2+	12.1	17.5
26	04	77	TAG NO. 24 94 HS	4-3 #7,8,9	F	—	7.0	H.2	H.	3.2	"	.2	8.5	14.8
27	04	77	95 W	4-4 #1,2,3	M	—	5.5	R.1+	R.	—	"	.1+	—	—
28	04	77	96 HS	4-4 #4,5,6	F	—	7.0	H.2	H.	2.9	"	.2	9.5	15.6
29	04	77	97	4-4 #1,2,4	F	—	1.25	R.	R.	—	"	—	—	—
02	05	77	98 W	5-1 #1,2,3	M	—	7.5	3.2+	3.	3.4	"	.2+	10.5	17.3
04	05	77	99	5-1 #4,5,6	M	—	7.0	2.2	2.	2.5	"	—	7.3	13.2
19	05	77	100 W	5-1 #7,8,9	M	—	8.5	R.2+	R.	—	"	.2+	—	—
19	05	77	TAG NO. 30 101 HS	5-2 #1,2,3	F	—	7.0	H.2+	3.	2.8	"	.2+	9.1	16.5
19	05	77	102 WK	5-2 #4,5,6	F	—	6.5	2.2+	2.	2.5	"	.2+	7.1	13.0
22	05	77	103 W	5-2 #7,8,9	M	—	7.0	3.2+	3.	2.9	"	.2+	9.0	18.0
01	06	77	TAG NO. 32 104 S	5-3 #1,2,3	F	—	7.0	3.2	3.	3.0	"	.2	9.5	14.8
01	06	77	TAG NO. 34 105 S	5-3 #4,5,6	F	—	9.5	3.2	3.	3.0	"	.2	7.2	13.2
02	06	77	TAG NO. 35 106 HS	5-3 #7,8	M	—	8.0	H.2	H.	3.2	"	.2	9.2	17.3
08	06	77	TAG NO. 39 107 S	5-3 #9,10	M	—	7.5	3.2	3.	2.9	"	.2	7.1	14.5

S - SUMMER RUN K - KILT
H - HATCHERY FISH

ADULT SCALE SAMPLE RECORD SHEET

- SAMPLES FROM ADULT FISH STRIPPED AT CAPIWAND HATCHERY
 - NOT TO BE USED FOR SEX RATIO OR TIMING OF THE RUN

LOCATION: CAPIWAND R., WEST VANCOUVER, B.C.

INTERPRETER: ALAN CAVERLY

SPECIES: STEELHEAD (*Salmo gairdneri*)

DATE: SEPT. 1977

REPORT NO.: III

DATE			SCALE	SCALE		in.	lbs.	TOTAL	FRESH	FRESH	MAG	SALT	SALT	TOTAL
DAY	MO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS		AGE	RADIUS	RADIUS
	05	71	- W	H-1 #1-5	-	-	-	R.2+	R	-	48x	.2+	-	-
			- S	H-1 #6-10	-	-	-	3.2	3.	3.1	"	.2	10.0	16.0
	05	71	- S	H-1 #11-15	-	-	-	3.2	3.	3.5	"	.2	10.0	16.0
	05	71	- S	H-1 #16-20	-	-	-	4.2	4.	4.1	"	.2	12.9	19.1
	06	71	- S	H-1 #21-25	-	-	-	3.2	3.	2.5	"	.2	15.0	10.5
17	05	72	- W	H-2 #41-45	F	30.1	9.9	R.2+	R.	-	"	.2+	-	-
30			- W	H-2 #31-40	M	29.1	9.7	2.2+	2.	3.0	"	.2+	9.5	19.0
30			- W	H-2 #26-30	F	29.6	10.1	2.2+	2.	3.1	"	.2+	9.5	18.5
30			- S	H-2 #21-25	F	33.0	13.7	3.2	3.	3.0	"	.2+	12.8	21.9
30			- W	H-2 #16-20	F	28.3	8.0	3.2+	3.	4.2	"	.2+	9.8	17.2
30			- W	H-2 #11-15	F	28.8	9.0	3.2+	3.	3.4	"	.2+	9.7	18.3
30			- S	H-2 #6-10	M	27.0	7.9	3.2	3.	2.5	"	.2	10.0	19.3
30			- W	H-2 #1-5	M	26.0	7.0	2.1+	2.	3.5	"	.1+	12.7	17.4
14	06		- W	H-3 #1-5	-	-	-	4.1+	4.	-	"	.1+	-	-
14			- W	H-3 #6-10	-	-	-	2.2+	2.	-	"	.2+	-	-
14			- W	H-3 #11-14	-	-	-	3.2+	3.	-	"	.2+	-	-
14			- W	H-3 #15-20	-	-	-	3.1+	3.	-	"	.1+	-	-
14			- W	H-3 #21-25	-	-	-	3.2+	3.	-	"	.2+	-	-
14			- W	H-3 #26-30	-	-	-	3.1+	3.	-	"	.1+	-	-
14			- W	H-3 #31-35	-	-	-	2.1+	2.	-	"	.1+	-	-
14			- S	H-3 #36-40	-	-	-	3.2	3.	-	"	.2	-	-
14			- W	H-3 #41-45	-	-	-	3.1+	3.	-	"	.1+	-	-
14			- W	H-3 #46-50	-	-	-	2.1+	2.	-	"	.1+	-	-
08	09		S -	H-4 #31-35	-	29.1	8.8	3.2	3.	2.8	"	.2	-	18.9
S	14		S -	H-4 #26-30	-	24.8	5.7	4.2	4.	3.8	"	.2	11.0	16.0
S	15		S -	H-4 #21-25	-	27.0	6.6	3.2	3.	3.1	"	.2	11.0	16.4
S	19	12	S -	H-4 #16-20	-	28.5	9.2	3.2	3.	3.6	"	.2	11.5	19.0

S - SUMMER - RUN

ADULT SCALE SAMPLE RECORD SHEET

- SCALE SAMPLES FROM CAPILANO HATCHERY

LOCATION: CAPILANO R., WEST VANCOUVER B.C.

INTERPRETER: ALAN CAVERLY

SPECIES: STEELHEAD (Salmo gairdneri)

DATE: SEPT 1977

REPORT NO.: 111

DATE			SCALE	SCALE		in.	lbs.	TOTAL	FRESH	FRESH	MAG	SALT	SALT	TOTAL
DAY	MO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS		AGE	RADIUS	RADIUS
28	12	72	S -	H-4 #11-15	F	28.4	8.0	3.2	3.	4.2	48x	.2	12.3	19.2
15	02	73	S -	H-4 #6-10	M	28.0	7.2	3.2	3.	3.5	"	.2	10.5	17.3
20			W -	H-4 #1-5	M	30.5	10.7	R.2+	R.	-	"	.2+	-	-
22	04	73	W =	H-5 #11-5	F	26.9	6.7	3.2+	3.	3.7	"	.2+	12.4	20.2
25			S ✓	H-5 #6-13	F	25.0	4.6	R.2	R.	-	"	.2	-	-
03	05		S -	H-5 #11-15	M	28.0	6.5	4.2	4.	4.0	"	.2	13.2	19.3
03			S -	H-5 #16-20	F	24.2	3.5	3.2	3.	3.1	"	.2	11.2	17.0
09			W ✓	H-5 #21-25	F	32.1	13.3	3.			"			
17			S -	H-5 #26-30	M	29.1	8.3	3.2-	3.	3.5	"	.2-	12.7	23.8
18			W -	H-5 #31-35	M	28.9	9.8	3.2+	3.	3.5	"	.2+	10.0	18.5
20			S -	H-5 #36-40	M	24.4	5.6	3.2	3.	3.0	"	.2	12.4	19.6
20			W -	H-5 #41-45	M	24.6	5.1	3.2+	3.	3.1	"	.2+	11.0	17.8
21			S -	H-5 #46-50	M	28.0	7.0	3.2	3.	3.2	"	.2	12.8	18.0
23			S -	H-6 #31-35	M	28.0	6.9	R.2	R.	-	"	.2	12.7	20.0
23			W -	H-6 #26-30	M	28.7	7.0	3.1+	3.	4.0	"	.7+	13.1	19.5
23			S -	H-6 #21-25	F	26.8	5.3	3.2	3.	3.7	"	.2	13.0	19.0
25			W -	H-6 #16-20	M	27.2	6.6	2.1+	2.	3.4	"	.1+	12.5	17.8
25	01	74	W -	H-6 #11-15	M	30.3	10.5	3.2+	3.	3.1	"	.2+	10.5	18.7
25			S -	H-6 #8-10	M	22.4	2.1	3.1	3.	3.7	"	.1	11.0	12.0
03	07		S -	H-6 #1-5	F	31.9	11.4	3.3	3.	4.0	"	.3	10.5	20.3
08	11		S -	H-7 #1-4	F	30.1	9.6	3.2	3.	3.7	"	.2	13.7	21.0
19			S =	H-7 #5-9	F	32.7	11.6	3.3	3.	2.8	"	.3	11.2	20.4
20	11	73	S -	H-7 #10-14	M	27.6	5.8	3.2	3.	4.5	"	.2	10.5	19.8
21			-			27.1	5.7	3.2	3.	3.0	"	.2	11.0	17.0
07	01	74	S -	H-7 #15-20	M	34.4	14.1	2.3	2.	2.6	"	.3	9.9	20.1
22			S -	H-7 #20-24	F	28.0	8.3	3.151	3.	4.2	"	.151	13.0	20.3
14	04		S -	H-7 #25-29	F	33.0	11.7	H.2	H.	5.8	"	.2	10.3	20.5

S - SUMMER RUN

W - WINTER RUN

+ REPEAT SPawner

ADULT SCALE SAMPLE RECORD SHEET

- SCALE SAMPLES FROM CAPILANO HATCHERY

LOCATION: CAPILANO R., WEST VANCOUVER, B.C.

INTERPRETER: ALAN CAVERLY

SPECIES: STEELHEAD (*Salmo gairdneri*)

DATE: SEPT. 1977

REPORT NO.: III

DATE			SCALE	SCALE		in.	lbs.	TOTAL	FRESH	FRESH	MAG	SALT	SALT	TOTAL
DAY	MO.	YR.	ENVELOPE	BOOK	SEX	LENGTH	WEIGHT	AGE	AGE	RADIUS		AGE	RADIUS	RADIUS
17	04	74	S -	H-7 #30-34	M	32.9	12.5	3.3	3.	3.6	4.8x	.3	11.5	22.3
23			S -	H-7 #35-39	F	28.3	7.6	3.2	3.	4.2	"	.2	11.0	21.2
07	05	73	S -	H-7 #40-44	M	34.2	13.2	2.3	2.	2.6	"	.3	9.9	21.6
09		74	S -	H-7 #45-49	M	34.5	14.7	3.15	3.	3.9	"	.15	11.0	19.0
02	11		-	H-8	F	33.1	12.6	3.2	3.	3.5	"	.2	10.5	21.3
29	01	75	- S	H-8	F	33.7	11.9	4.2	4.	3.5	"	.2	7.52	13.0
20			-	H-8	F	27.0	5.5	2.2	3.	4.5	"	.2	10.5	
-	05	76	- W	H-9 #1-5	-	-	-	3.2+	3.	3.2	"	.2+	8.5	21.2
-	05	74	- S	H-9 #6-10	F	32.4	11.1	3.2	3.3	3.3	"	.2	10.7	15.7
-	05		- S	H-9 #11-15	F	34.0	-	4.2	4.	4.1	"	.2	12.0	19.7
-	06	76	- S	H-9 #16-20	F	33.2	11.1	2.2	2.	2.7	"	.2	10.8	16.0
-			-	H-9	F	32.9	11.3	3.3	3.	3.0	"	.3	11.0	13
-			-	H-9	F	33.3	12.6	2.1	2.	3.0	"	.2	11.0	13
27	03		-	H-9	M	33.7	12.2	2.5	2.	2.2	"	.2	10.9	20.0
19	05		-	H-9 #1-4	M	34.7	13.7	3.3	3.	3.1	"	.2+	10.0	17.0
22	0													

S - SUMMER - RUN

H - HATCHERY FISH

SUBJECT: Use of Master Reference Report

The scale sample master record sheets contain all the raw data obtained from scale envelopes and scale samples that have been discussed in reports on Lower Mainland streams. All the samples are arranged chronologically by day whenever possible. Scale samples are stored in the file cabinet for scales at the Region II office. Photomicrographs are in the watershed file, numbered by scale envelope no.

Different formats are used for adult scale samples and juvenile samples. Copies of both are in the scale file. Copies of the adult record sheets are also in the report appendix for each watershed.

Description of Record Sheet Format and Terminology

(i) Adult Samples: Record sheets also included in report appendix

At the top of the record sheet is the following:

Location: River, nearby town

Species: Common name (latin name)

Report No. Roman numeral and report title

Interpreter: Name of person(s) reading scales

Date: Date the scales are read (month/year)

- The rest of the sheet is scale envelope and sample information

- All radii measurements are in centimeters on the dorsal-ventral axis.

Date: Date of sampling

Day Mo. Yr.

Scale Envelope: This number corresponds to the number at the upper right hand corner of the scale envelope

Scale Book: Book number - page number (NA - not applicable) # square no.

Sex: Self-explanatory

Length: Length of fish in inches

Weight: Weight of fish in pounds

Total Age: Freshwater winters. Saltwater winters; This would also include second or third spawnings.

Freshwater age: Number of winters in freshwater

Freshwater Radius: The radius of the freshwater growth zone, measured from the focus to the outer freshwater annulus.

Mag: The magnification used for all scale radii measurements

Saltwater Age: Number of winters of saltwater growth; includes repeat spawning

Saltwater Radius: Measured from the focus to the outer ring of the first saltwater annulus.

Total Radius: Measured from the focus to the outer scale edge.