PALLANT CREEK STEELHEAD

1989 - 90

by

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TABLE OF CONTENTS

INTRODUCTION

Steelhead angling on the Queen Charlotte Islands is a popular recreation for resident and nonresident anglers from December to May. This report describes a steelhead tagging project carried out on Pallant Creek during the winter of 1989-90. Similar studies were conducted during the winters of 1981-82, 1983-84 and each successive winter thereafter (deLeeuw 1984; deleeuw 1985a, 1985b, 1985c; deleeuw 1989a, 1989b, 1989c. This ongoing project is aimed at documenting long term steelhead population changes and establishing Pallant Creek as a steelhead index stream for the Queen Charlotte Islands. Continued commitment by the British Columbia Steelhead Society (Queen Charlotte Island Chapter) and the Department of Fisheries and Oceans, (Pallant Creek Hatchery staff) to this project, combined with the small size and accessibility of the stream, make Pallant Creek a favourable location for this type of long term study.

As in previous years, the objectives of the 1989-90 Pallant Creek steelhead tagging study were to:

1. describe steelhead run timing and movement;
2. describe life history characteristics; and
3. estimate population size.

A description of the study area can be found in previous reports on this project (de Leeuw 1985a, 1985b, 1985c).

THE FISHERY

Except for the current study season steelhead fishing effort as reported annually in the Steelhead Harvest Analysis has increased steadily since the early seventies (Table 1). The apparent rise in angler use during the last decade was likely the result of participation of the hatchery staff and B.C. Steelhead Society members involved in the steelhead tagging program. A drop in angler use expressed as days fished is evident in the 1989-90 period, although the number of anglers has remained about the same for the last few years. The total catch and catch per day was also considerably less than it has been at any time since the 1970's. Success or catch/day for other Charlotte streams did not drop to the same degree in 1989-80. Reduced effort on Pallant may be explained by the comparatively high catch/day and attractiveness of other Queen Charlottes streams during the 1989-90 season.

METHODS

The river was partitioned into seven zones (Fig. 1). Adult steelhead were angled on conventional gear and tagged with white, numbered, anchor (7.62 cm spaghetti) tags. Fork length, sex, date of capture, tag number and colour as well as zone of capture were recorded. After the removal of a few scales between the dorsal fin and lateral line, fish were released at the capture site. In-stream migration distances of recaptured fish were estimated by calculating the distance between the mid points of original and recapture zones.

Table 1. Pallant Creek steelhead harvest analysis[1] 1970-71 to 1989-90.

Season	Days Fished	No. of Anglers	Kept	Released	Kept/ Day	Catch/	Charlottes Catch/Day
70—71	8	4	8	20	1.00	3.50	0.36
71—72	10	3	21	25	2.00	4.60	0.52
72—73	89	12	45	86	0.50	1.47	0.31
73—74	26	3	26	34	1.00	2.22	0.33
74—75	10	3	7	0	0.67	0.67	0.27
75—76	73	30	23	40	0.32	0.86	0.47
76—77	107	46	47	20	0.45	0.65	0.37
77—78	74	30	48	92	0.64	1.86	0.48
78—79	177	42	35	26	0.21	0.38	0.41
79—80	236	50	36	86	0.16	0.53	0.48
80—81	382	53	59	709	0.16	1.96	0.79
81—82	227	66	41	190	0.22	1.05	0.93
82—83	293	50	17	511	0.06	1.80	1.23
83—84	235	37	39	330	0.17	1.57	0.57
84—85	359	58	66	620	0.18	1.92	1.32
85—86	137	41	14	185	0.10	1.44	1.65
86—87	219	70	17	350	0.10	1.65	1.51
87—88	507	64	36	1026	0.07	2.07	1.28
88—89	348	68	12	535	0.05	1.58	1.41
89—90	129	61	15	95	0.11	0.85	1.14
Mean	182	40	31	249	0.41	1.63	0.79

[1] Steelhead Harvest Analysis B.C. Fisheries Branch annual reports.

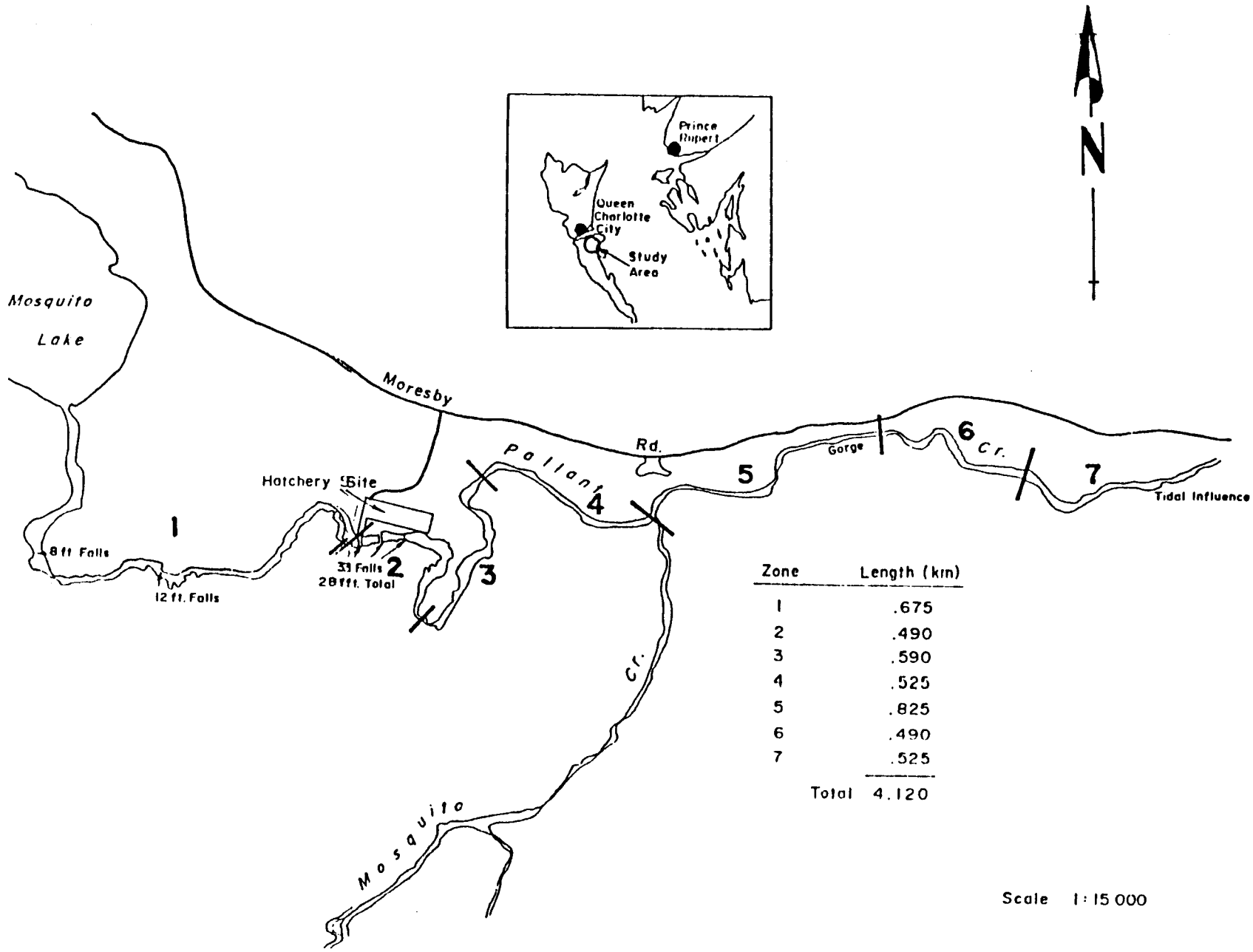

Fig. 1 Pallant Creek Angling Zones During The 1985 – 86 Steelhead Tagging Study

Scales were viewed using a dissecting microscope. The two best examples from the sample were cleaned and mounted on gummed cards. Impressions of the scales were made on acetate cards by applying heat (85 to 95°C) and pressure (100 ft lbs.) for 60 seconds. A Leitz Prado projector was then used to examine each scale for freshwater and ocean age (Narver and Withler 1974).

Population size was determined using the Schnabel, Schumacher and Schnabel-Chapman adjusted multiple census techniques (Ricker, 1975). The formulae were:

Schnabel:
$$N = \frac{\sum (Ct\ Mt)}{R}$$

Schumacher:
$$\frac{1}{N} = \frac{\sum (Mt\ Rt)}{\sum (Ct\ Mt^2)}$$

Schnabel, Chapman revised:
$$N = \frac{\sum (Ct\ Mt)}{R + 1}$$

where:

t = 5-day time period
Ct = total catch during time t
Mt = total fish tagged and released during time t
M = sum of Mt
Rt = total recapture during time t
R = sum of Rt

RESULTS AND DISCUSSION

During the 1989-90 study period, 82 steelhead were tagged in Pallant Creek. Of these, 20 were recaptured once, and six were recaptured twice and one fish was recaptured three times for a total of 27 recaptures (25%). An additional four fish from previous tagging studies were also

recaptured. Two of these were returns from 87 tags disbursed in 1988-89, while the other two were a result of 160 tags from 1987-88. Doug Turvey of Pallant Creek Hatchery (pers. comm.) noted that the lower number of tagged fish was due to an increase in “non-tagging” fishermen, low water flows and a busy season at the hatchery decreasing the hatchery staff’s fishing time.

SPATIAL AND TEMPORAL DISTRIBUTION

The largest portion of the steelhead catch in the present study occurred in Zones 2 (41.5%) and 3 (47.6%) (Table 2). In combination, these zones have contributed over 50% of the catch during all study years. The fact that these two zones are closest to the hatchery (Fig. 1) where access is readily available is likely the most significant factor controlling catch distribution.

As in other years steelhead were tagged from mid December to early May, with the majority of the catch occurring after mid January (Table 3). Although the larger component of the Pallant Creek steelhead run enters in the latter part of the season, peaks in run timing have been variable from year to year.

Time between the original capture and recapture varied from zero (i.e. fish recaptured on day of capture) to 115 days (Table 4). Nine (33%) of the 27 recaptures occurred within 20 days of first capture but only one fish was captured on the same day. The remaining 14 fish averaged *55* days between captures with a range of 21 to 163 days. The overall average time between captures of all recaptured fish was 30.1 days.

Table 2. Pallant Creek steelhead tagged during the 1984-85 to 89-90 winter seasons by zone.

Zone	Steelhead tagged 1984–85 n (%)	1985-86 n (%)	1986–87 n (%)	1987–88 n (%)	1988–89 n (%)	1989–90 n (%)	Total n (%)
1	0(0)	1(1)	3(2)	9(6)	0(0)	——	13(2)
2	27(22)	16(11)	40(24)	46(34)	44(51)	34(42)	207(27)
3	13(11)	29(20)	50(29)	49(25)	22(25)	39(48)	202(26)
4	34(28)	13(9)	32(19)	18(11)	1(1)	3(4)	101(13)
5	2(1)	14(10)	26(15)	19(12)	11(13)	2(2)	74(10)
6	17(14)	60(42)	18(11)	18(11)	9(10)	2(2)	124(16)
7	11(9)	10(7)	1(1)	1(1)	0(0)	——	23(3)
Not recorded	19(15)	0	0	0	0	2(2)	21(3)
Total	123(100)	143(100)	170(100)	160(100)	87(100)	82(100)	765(100)

Table 3. Number of steelhead tagged during the 1984-85 to 1989-90 winter seasons grouped in 10 day periods.

Date (mm/dd)	1984–85	1985–86	1986–87	1987–88	1988–89	1989–90	Total
10/01–10	0	0	0	0	0	0	0
11–20	0	0	0	3	0	0	3
21–30	0	0	0	0	0	0	0
11/01–10	0	0	0	0	0	0	0
11–20	0	0	2	0	0	0	2
21–30	0	0	0	5	4	0	9
12/01–10	0	0	12	1	4	0	17
11–20	3	10	16	15	6	2	52
21–30	1	13	6	10	3	2	35
01/01–10	1	13	14	8	4	3	43
11–20	3	4	6	13	2	9	37
21–30	7	4	24	16	4	9	64
02/01–10	4	4	11	10	2	5	36
11–20	3	7	8	21	4	8	51
21–28	17	6	8	8	10	8	57
03/01–10	4	18	9	16	11	1	59
11–20	20	23	12	9	6	0	70
21–30	18	26	6	7	15	4	76
04/01–10	41	7	3	7	10	16	84
11–20	0	7	22	10	2	5	46
21–30	0	1	8	0	0	5	14
05/01–10	1	0	3	0	0	5	9
11–20	0	0	0	1	0	0	1
Total	123	143	170	160	87	82	765

Table 4. Movement and residency of recaptured steelhead in Pallant Creek. 1989-90.

No.	Sex	Original Capture Zone	Original Capture Date	First Recapture Zone	First Recapture Date	Second Recapture Zone	Second Recapture Date	Third Recapture Zone	Third Recapture Date	Total KM	Total Days (1^{st} Recatpture)
W 2851	F	2	Dec. 18	2	Jan. 9						22
W 2877	F	2	Jan. 16	2	Jan. 19						3
W 2857	M	3	Dec. 31	2	Jan. 27	2	Feb. 11				(15)27
W 2862	F	2	Jan. 27	2	Jan. 30	3	Feb. 17				(18)3
W 2864	F	2	Jan. 30	2	Feb. 2						3
W 2891	M	3	Jan. 24	3	Feb. 3	3	Mar. 1				(26)10
W 2878	F	2	Jan. 16	2	Feb. 3						18
W 2881	F	2	Jan. 18	2	Feb. 3	3	Apr. 1	2	Apr. 15		(14)(57)16
W 2885	M	3	Jan. 29	3	Feb. 9	3	Mar. 25				(44)11
W 2899	M	3	Feb. 12	3	Feb. 12						same day
W 2858	F	2	Jan. 14	3	Feb. 16						33
W 2866	M	2	Feb. 4	2	Feb. 18						14
W 2876	M	*3*	Jan. 17	3	Feb. 23						37
W 2855	F	3	Dec. 31	5	Mar. 2						61
W 2852	F	2	Dec. 20	2	Mar. 10						80
W 2861	F	5	Jan. 20	4	Mar. 30						69
W 2892	F	3	Jan. 24	3	Apr. 1						67
W 2939	M	?	Feb. 23	4	Apr. 1						37
W 2853	F	2	Dec. 22	2	Apr. 13	2	Apr. 16				(3)112
W 2929	M	2	Apr. 21	2	May 5						14

Equal numbers of males and females were captured but females dominated (58%) the recaptures. Of the 14 longtime residents (i.e. longer than 20 days between recaptures), nine were females. The two longest residents were females at 115 days and 87 days.

Steelhead which were tagged early in the season had a considerably better chance of being recaptured than late arriving fish (Table 5). Recaptures of early tagged (December and January) fish were distributed throughout the season while all late fish were recaptured within the months of original capture (April) or not recaptured at all. In addition to the recaptures tagged during the 1989-90 study, two fish were recaptured from the 1987-88 study and two from the 1988-89

study (Table 6). Of particular interest were two female steelhead tagged during the 1987-88 season. One fish was originally tagged on January 15, 1988, recaptured February 13, 1988 and again on March 16, 1988 as a kelt. The same fish was recaptured two years later on January 20, 1990 and had grown 16.5 cm. The other fish was originally tagged on December 5, 1988, recaptured in February 27,1989 and recaptured again on two consecutive days a year later (January 14 and 15, 1990). This fish had grown 10.8 cm.

Table 5. Pallant Creek steelhead original capture and recapture dates grouped by months within the 1989-90 winter season.

Original Capture		Recapture						
Date	Total	Dec. n(%)	Jan. n(%)	Feb. n(%)	Mar. n(%)	Apr. n(%)	May n(%)	Total n(%)
Dec.	7	0	2(29)	1(14)	2(29)	2(29)	0	7(100)
Jan.	18	0	3(17)	7(39)	3(17)	3(17)	0	16(89)
Feb.	21	0	0	2(10)	0	1(5)	0	3(14)
Mar.	5	0	0	0	0	0	0	0
Apr.	26	0	0	0	0	0	1(4)	1(4)
May	5	0	5(6)	10(12)	5(6)	6(7)	1(1)	27(33)

Table 6. Pallant Creek steelhead originally tagged in 1987-88 and 1988-89 and recaptured in 1989-90.

Tag #	Sex	Tagged			Recaptured		
		Zone	Date	Length (cm)	Zone	Date	Length (cm)
BL 1285	F	4	Jan 15/88	77.5	5	Jan 20/90	94.0
BL 1290	F	4	Jan 29/88	75.6	3	Apr 4/90	86.4
BL 1239	M	2	Dec 5/88	71.1	2	Jan 14/90	74.9
Y 1559	M	3	Mar 29/89	63.5	3	Jan 28/90	66.0

The scale readings were inconclusive as to the number of times these fish had spawned; either some females spawn every other year or the scale readers are missing the ocean annulus because

of scale regeneration during spawning.

Although the recaptures from 1987-88 were not taken in the original zone of tagging during this study, there was a close overlap. The fish recaptured from 1988-89 study were caught in the same zone as the original tagging the previous year.

AGE AND SIZE

Only 27 sets of readable scales were collected from the 82 tagged fish. The most prevalent age class in this small sample was three years of fresh water followed by three years of ocean growth (3.3) which made up 69.2% of the readable sample (Table 7). A small male *(55.9* cm) caught December 22, 1989 was a resident rainbow trout. This fish was six years old and had spawned once in its fifth year (4S1).

Freshwater age 3 fish made up 88.5% of the sample. The remaining 11.5% migrated to the ocean after four years of stream residency (Table 8). Three years of fresh water growth prior to ocean migration is typical of Queen Charlotte Island steelhead (Chudyk 1982: de Leeuw and Whately 1983; de Leeuw 1986).

The dominant ocean age was .3 (82.6%) followed by .2 (17.4%) (Table 9). Of the 27 fish sampled, 3 (11.5%) had spawned previously and of these one was in its third spawning migration (Table 7). The percentage of repeat spawners in Pallant Creek has varied

Table 7. Number and percent male and female steelhead of different total age groups Pallant Creek, 1989-90 (N = 26).

Total Age Group	Males	Females	♂ + ♀	% of Total
3.2	1	1	2	7.7
3.3	4	14	18	69.2
4.2	1	1	2	7.7
4.3	1		1	3.8
3.1S1	2		2	7.7
3.1SS1	—	1	1	3.8

Table 8. Number and percent male and female Pallant Creek steelhead of different freshwater ages. 1989-90 (N = 26).

Freshwater Age	Males	Females	♂ + ♀	% of Total
3	6	17	23	88.5
4	2	1	3	11.5
Total	8	18	26	100.0

Table 9. Number and percent male and female Pallant Creek steelhead of different ocean ages. 1989-90 (N = 23).

Ocean Age	Males	Females	♂ + ♀	% of Total
.2	2	2	4	17.4
.3	5	14	19	82.6
Total	7	16	23	100.0

considerably from year to year. The composition of multiple spawners in previous studies has ranged from 10% (1983-84) to 27% (1985-86). Variability in the percentage of multiple spawners during any given year is dependent on previous years populations and post spawning survival. An accurate estimation of repeat spawning frequency requires full analysis of population

age structure/life history. The number of repeat spawners this year would then be looked at relative to last year's spawning population and the percentage calculated.

Like the earlier Pallant Creek studies, steelhead size was linked to ocean age. After two years of ocean growth, Pallant Creek steelhead averaged 67.1 cm, while with an additional year fish were more than 10 cm longer (Table 10). Two year ocean males were marginally longer (67.8 cm) than females of the same age (66.5 cm) and males were again larger at the end of three years (M = 81.5 cm, F = 78.3 cm). The average fork length of steelhead tagged and measured during this study was 74.5 cm and ranged from 54.6 cm to 94.6 cm.

Table 10. Fork lengths (cm) of male and female Pallant Creek steelhead of different ocean ages, 1989-90.

Ocean	Males			Females			Total		
Age	N	$\bar{x}$	Range	N	$\bar{x}$	Range	N	$\bar{x}$	Range
.2	3	67.8	64.8 — 73.7	3	66.5	61.0 — 76.2	6	67.1	61.0 — 76.2
.3	5	81.5	77.5 — 85.0	15	78.3	71.1 — 87.0	20	79.8	71.1 — 87.0
.2+.3	8	74.6	64.8 – 85.0	18	72.3	61.0 – 87.0	26	73.4	61.0 – 87.0

POPULATION ESTIMATE

The three multiple capture estimates calculated populations of 170, 164 and 219 adult steelhead in Pallant Creek during 1989-90 (Table 11). These estimates are only valid if the following conditions are met:

1. marked fish suffer the same mortality as the unmarked;

2. marked fish are as vulnerable to capture as the unmarked ones;
3. marked fish do not lose their mark;
4. marked fish mix randomly with the unmarked ones such that the distribution of fishing effort (in subsequent sampling) is proportional to the number of fish present in different parts of the body of water;
5. all marks are recognized and reported on recovery;
6. there is only a negligible amount of recruitment to the catchable population during the time the recoveries are being made (Ricker 1975).

Since there were fresh fish entering and kelts leaving the study area, validity of the population estimates is questionable. For example, of the 36 fish tagged during March, April and May, only one was recaptured, indicating that these fish had a short riverine residence time and were not as vulnerable to capture. The tagged population or, more importantly, catch per unit effort (CPUE) is a much better parameter on which to base assumptions about stock size from year to year.

Table 11. Pallant Creek steelhead population estimates during the 1989-90 winter season.

		95% Confidence Limits	
Method	Estimate	Poisson distribution	Normal Distribution
Schnabel	170	117 – 258	123 – 277
Chapman	164	114 – 247	120 – 259
Schumacher	219	156 - 373	
Mean	184		

SUMMARY

1. Eighty-five steelhead were captured by study participants in Pallant Creek from December 18, 1989 to May 9, 1990. Of these, 82 were tagged and an additional four were recaptures from other years' tagging.
2. The majority of the fish were taken in April, January and February in the two zones below the hatchery. Seventy-five percent of all recaptures occurred in the zone of original capture while both upstream and downstream migrations were noted amongst the remainder. Nine of the 27 recaptures were taken within 20 days of their original tagging date. The total days between original and repeat capture ranged from zero to 115. The average number of days between original and repeat capture was 38.9. Only one fish was captured twice on the same day.
3. There was no significant difference in the percentages of males (50.6%) and females (49.4%).
4. Scale samples were interpreted from only 30 fish of which three (10.3%) were multiple spawners. Only 29 scales were used to calculate the age classes as one fish was a resident fish (4S1). The dominant age class was 3.3 (69.2%) followed by 3.2 (7.7%), 4.2 (7.7%), 3.1S1 (7.7%), 4.3 (3.8%), and 3.1SS1 (3.8%).
5. The overall average fork length of Pallant Creek steelhead during the 1989-90 study was 74.5 cm and ranged from 54.6 to 94.6 cm. Where both fork length and ocean age were determined, males with two or three years of marine growth averaged 67.8 cm and 81.5

cm respectively while females of similar ages averaged 66.6 cm and 78.3 cm respectively.

6. Estimates of the 1989-90 Pallant Creek steelhead population were 170 (Scbnabel), 164 (Chapman) and 219 (Schumacher).

ACKNOWLEDGEMENTS

This project, like the previous Pallant Creek steelhead studies was largely the result of volunteer work by the Pallant Creek Hatchery staff and members of the Queen Charlotte Islands Chapter of the B.C. Steelhead Society. Their assistance in this project was invaluable and greatly appreciated. Data collection was supervised by Tom Rutherford (Community Advisor, D.F.O.) and Doug Turvey (Pallant Creek Hatchery). Mark Beere calculated the population estimates. This report was typed by Marilyn Barnard. The study was funded as a public involvement project by the Salmonid Enhancement Program.

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APPENDICES

APPENDIX I

PALLANT CREEK STEELHEAD TAGGING DATA

YEAR: 1989/90

Original steelhead captures from Pallant Creek, 1989–90 winter season.

NUMBER	DATE	TAG NUMBER	COLOR	SEX	LENGTH (INCHES)	LENGTH (M.M.)	WEIGHT (APPROX)	LOCATION	COMMENTS	ANGLER
1	DEC18/89	02351	WHITE	F	29.00	737		-2	BRIGHT,FRESH	DT
2	DEC20/29	02852	WHITE	F	32.00	813		2	BRIGHT,RED STRIPE	DT
3	DEC22/89	02853	WHITE	F	30.00	762		2	BRIGHT	DT
4	DEC22/89	02854	WHITE	M	22.00	559		2	BRIGHT,RED STRIPE, RESIDENT??	DT
5	DEC31/89	02355	WHITE	F	31.50	800		3	BRIGHT	DT
6	DEC31/29	02856	WHITE	F	34.25	870		3	SEMI–BRIGHT	DT
7	DEC31/89	02857	WHITE	M	33.25	945		3	SILVER BRIGHT	DT
8	JAN12/90	02879	WHITE	F	27.25	692		5	BRIGHT	BW
9	JAN14/90	02858	WHITE	F	30.50	775		2	BRIGHT	DT
10	JAN14/90	02860	WHITE	F	30.50	775		2	BRIGHT	DT
11	JANI6/90	02878	WHITE	F	30.00	762		2	COLORED	MM
12	JAN16/90	02877	WHITE	F	32.00	813		2	BRIGHT	MM
13	JAN17/90	02876	WHITE	M	33.75	857		3	COLORED	MM
14	JAN17/90	02875	WHITE	F	24.00	610		3	SILVER BRIGHT	MM
15	JAN18/90	02881	WHITE	F	29.00	737		2	BRIGHT	SL
16	JAN20/90	02861	WHITE	F	31.00	787		5	BRIGHT	DT
17	JAN24/90	02890	WHITE	F	24.50	622		3	SILVER BRIGHT	MM
18	JAN24/90	02891	WHITE	M	25.50	648		3	SILVER BRIGHT	MM
19	JAN24/90	02892	WHITE	F	28.00	711		3	SILVER BRIGHT	MM
20	JAN27/90	02862	WHITE	F	30.25	768		2	COLORED,SOFT	DT
21	JAN28/90	02863	WHITE	F	33.00	838		2	SEMI–BRIGHT	DT
22	JAN29/90	02884	WHITE	F	30.00	762		3	SEMI–BRIGHT	SL
23	JAN29/90	02885	WHITE	M	31.00	787		3	BRIGHT	SL
24	JAN29/90	02887	WHITE	F	29.00	737		3	SOME COLOR	SL
25	JAN31/90	02864	WHITE	F	33.00	838		2	SEMI–BRIGHT	DT
26	FEB01/90	02888	WHITE	F	31.00	787		3	SILVER BRIGHT,STRONG	SL
27	FEB01/90	02865	WHITE	M	33.50	851		2	COLORED	DT
28	FEB03/90	02889	WHITE	M	30.00	762		3	COLORED	SL
29	FEB04/90	02866	WHITE	M	36.25	921		2	COLORED,STRONG	DT
30	FEB04/90	02867	WHITE	M	37.25	946		2	GETTING COLORED,A BRUTE	DT
31	FEB11/90	02894	WHITE	F	29.00	737		2	BRIGHT,NET MARKS AROUND HEAD	MM
32	FEB11/9O	02897	WHITE	F	31.75	806		2	BRIGHT	MM
33	FEB12/90	02899	WHITE	M	31.00	787		3	COLORED,STRONG	SL
34	FEB13/90	02895	WHITE	M	30.50	775		2	BRIGHT	MM
35	FEB14/90	02900	WHITE	M	32.00	813		3	COLORED	SL
36	FEB16/90	02896	WHITE	F	29.50	749		3	BRIGHT,SCARS LEFT	MM
37	FEB17/90	02905	WHITE	M	25.50	648		6	SILVER BRIGHT	MM
28	FEB20/90	02901	WHITE	F	30.50	775		3	BRIGHT,SCARS BOTH FLANKS	SL
39	FEB21/90	02902	WHITE	M	26.50	673		6	BRIGHT,SCARS BOTH SIDES	SL
40	FEB21/90	02906	WHITE	F	29.50	749		3	SLIGHT COLOR	MM
41	FEB23/90	02903	WHITE	M	31.00	787		3	CDLDRED,SOFT	SL
42	FEB23/90	02930	WHITE	F	30.00	762		?	KELT	MW
43	FEB23/90	02939	WHITE	M	30.00	762		?	SLIGHT COLOR	MW
44	FEB25/90	02904	WHITE	M	24.50	622		3	SILVER BRIGHT	SL
45	FEB27/90	02907	WHITE	M	32.50	826		3	COLDRED,SCARS LEFT SIDE	MM
46	FEB27/90	02911	WHITE	F	30.00	762		3	SLIGHTLY COLORED	SL
47	MAR10/90	02869	WHITE	F	26.00	660		2	SEMI-BRIGHT	DT
48	MAR25/90	02913	WHITE	M	28.00	711		3	SEMI–BRIGHT,SCARRED	SL
49	MAR25/90	02914	WHITE	M	27.25	692		3	BRIGHT	SL
50	MAR25/90	02920	WHITE	M	25.00	635		2	SEMI–BRIGHT	DT

PALLANT CREEK STEELHEAD TAGGING DATA

YEAR: 1989/90

NUMBER	DATE	TAG NUMBER	COLOR	SEX	LENGTH (INCHES)	LENGTH (M.M.)	WEIGHT (APPROX)	LOCATION	COMMENTS	ANGLER
51	MAR30/90	02921	WHITE	F	33.00	838		4	KELT,EX.SHAPE	DT
52	APR01/90	02915	WHITE	M	27.00	686		2	COLORED,STRONG	SL
53	APR01/90	02916	WHITE	M	24.50	622		2	COLORED,SOFT	SL
54	APR01/90	02917	WHITE	M	30.00	762		3	BRIGHT	SL
55	APR01/90	02918	WHITE	M	26.50	673		3	BRIGHT	SL
56	APR01/90	02919	WHITE	M	32.00	813		3	BRIGHT	SL
57	APR01/90	02940	WHITE	M	25.50	648		3	BRIGHT	SL
58	APR01/90	02941	WHITE	M	28.00	711		3	BRIGHT	SL
59	APR02/90	02942	WHITE	F	29.50	749		3	SILVER,BRIGHT	SL
60	APR04/90	02943	WHITE	M	26.00	660		3	BRIGHT,SCARS LEFT SIDE	SL
61	APR04/90	02944	WHITE	M	25.50	648		3	BRIGHT,SCARS LEFT SIDE	SL
62	APR04/90	02945	WHITE	M	25.50	648		3	BRIGHT,SCARS BOTH SIDES	SL
63	APR05/90	02938	WHITE	F	28.00	711		2	KELT	DT
64	APR06/90	02946	WHITE	M	26.50	673		3	COLORED	SL
65	APR06/90	02947	WHITE	F	35.75	908		3	STRONG,RED	SL
66	APR08/90	02874	WHITE	F	29.00	737		2	KELT	MW
67	APR08/90	02873	WHITE	F	25.00	635		4	CHROMER,HOOK IN MOUTH	MW
68	APR12/90	02948	WHITE	F	27.50	699		2	SLIGHT COLOR	SL
69	APR12/90	02949	WHITE	M	26.50	673		3	BRIGHT,SCARS LEFT SIDE	SL
70	APR12/90	02872	WHITE	M	28.00	711		4	DARK	MW
71	APR15/90	02950	WHITE	M	31.50	800		2	COLORED,STRONG,SCARS	SL
72	APR17/90	02951	WHITE	M	31.50	800		3	SOME COLOR	SL
73	APR21/90	02929	WHITE	M	31.50	800		2	DARK	DT
74	APR22/90	02952	WHITE	M	27.00	686		2	DARK	SL
75	APR22/90	02953	WHITE	F	32.50	826		2	KELT,GOOD SHAPE	SL
76	APR23/90	02954	WHITE	F	32.00	813		3	SOME COLOR	SL
77	APR27/90	02955	WHITE	M	27.00	686		2	SOME COLOR,STRONG	SL
78	MAY01/90	02956	WHITE	M	27.50	699		3	STRONG,BRIGHT	SL
79	MAY05/90	02957	WHITE	F	32.50	826		2	COLORED	SL
80	MAY05/90	02958	WHITE	M	25.00	635		2	COLORED	SL
81	MAY05/90	02959	WHITE	F	35.00	889		2	FAIRLY BRIGHT	SL
82	MAY09/90	02960	WHITE	F	21.50	546		2	SEMI-BRIGHT	SL
					MEAN:	29.34				

APPENDIX II

PALLANT CREEK STEELHEAD TAGGING DATA

Steelhead recaptures from Pallant Creek, 1989-90 winter season.

YEAR:1989/90******RECAPTURES******

NUMBER	RECAPTURE DATE	TAG NUMBER	COLOR	SEX	LENGTH (INCHES)	LENGTH (M.M.)	WEIGHT (APPROX)	LOCATION RECAPTURE	DATE TAGGED	LOCATION TAGGED	COMMENTS	ANGLER RECAP.	ANGLER TAG
1	JAN09/90	02851	WHITE	F	29.00	737		2	DEC18/89	2	BRIGHT,FRESH	BW	DT
OY 2	JAN14/90	01239	BLUE	M	29.50	749		2	DEC05/88	2	SILVER BRIGHT	DT	MD
OY * 3	JAN15/90	01239	BLUE	M	29.50	749		2	DEC05/88	2	SILVER BRIGHT	DT	MD
4	JAN19/90	02877	WHITE	F	32.00	813		2	JAN16/90	2	BRIGHT	DT	MM
OY 5	JAN20/90	01285	BLUE	F	37.00	940		5	JAN15/88	4	FRESH,PINKISH	DT	MD
6	JAN27/90	02857	WHITE	M	33.25	845		2	DEC31/89	3	COLORED,STRONG	DT	DT
OY 7	JAN28/90	01559	YELLOW	M	26.00	660		3	MAR29/89	3	COLORED,RED STRIPE	SL	MD
8	JAN30/90	02862	WHITE	F	30.25	768		2	JAN27/90	2	KELT,UNSPAWNED 3 DAYS AGO	DT	DT
9	FEB02/90	02864	WHITE	F	33.00	838		2	JAN30/90	2	SOFT,STRONG	DT	DT
10	FEB03/90	02891	WHITE	M	25.50	648		3	JAN24/90	3	BRIGHT	SL	MM
11	FEB03/90	02878	WHITE	F	30.00	762		2	JAN16/90	2	COLORED,SOFT	DT	MM
12	FEB03/90	02881	WHITE	F	29.00	737		2	JAN18/90	2	BRIGHT	DT	SL
13	FEB09/90	02885	WHITE	M	31.00	787		3	JAN29/90	3	SOME COLOR,STRONG	SL	SL
*14	FEB11/90	02857	WHITE	M	33.25	845		2	DEC31/89	3	DARK,STILL LOTS OF ENERGY	MM	DT
15	FEB12/90	02899	WHITE	M	31.00	787		3	FEB12/90	3	CAUGHT 10 MIN. AFTER TAGGING	SL	SL
OY *16	FEB14/90	01559	YELLOW	M	26.00	660		3	MAR29/89	3	SOFT,COLORED	SL	MD
17	FEB16/90	02858	WHITE	F	30.50	775		3	JAN14/90	2	KELT,DARK,GOOD FIGHT	MM	DT
*18	FEB17/90	02862	WHITE	F	30.25	768		3	JAN27/90	2	KELT,DARK,GOOD FIGHT	MM	DT
19	FEB18/90	02866	WHITE	M	36.25	921		2	FEB04/90	2	COLORED	SC	DT
20	FEB23/90	02876	WHITE	M	33.75	857		3	JAN17/90	3	COLORED	SL	MM
*21	MAR01/90	02891	WHITE	M	25.50	648		3	JAN24/90	3	COLORED	MM	MM
22	MAR02/90	02855	WHITE	F	31.50	800		5	DEC31/89	3	SOME COLOR	SL	DT
23	MAR10/90	02852	WHITE	F	32.00	813		2	DEC20/89	2	KELT,GOOD SHAPE	DT	DT
*24	MAR25/90	02885	WHITE	M	31.00	787		3	JAN29/90	3	COLORED,STRONG	SL	SL
25	MAR30/90	02861	WHITE	F	31.00	787		4	JAN20/90	5	KELT,EX-SHAPE	DT	DT
*26	APR01/90	02881	WHITE	F	29.00	737		3	JAN18/90	2	COLORED	SL	SL
27	APR01/90	02982	WHITE	F	28.00	711		3	JAN24/90	3	KELT,GOOD SHAPE	SL	MM
28	APR01/90	02939	WHITE	M	30.00	762		4	FEB23/90	?	COLORED,STRONG	DT	MW
OY 29	APR04/90	01290	BLUE	F	34.00	864		3	JAN29/88	2	COLORED,WOUND ON HEAD	SL	MD
30	APR13/90	02853	WHITE	F	30.00	762		2	DEC22/89	2	KELT,GOOD SHAPE	SL	DT
**31	APR15/90	02881	WHITE	F	29.00	737		2	JAN18/90	2	KELT,BELLY WOUND	SL	SL
*32	APR16/90	02853	WHITE	F	30.00	762		2	DEC22/89	2	KELT,EX. SHAPE	DT	DT
33	MAY05/90	02929	WHITE	M	34.50	876		2	APR21/90	2	DARK,WOUND OVER TAIL	SL	DT

COMMENTS: * SECOND TIME RECAPTURED
** THIRD TIME RECAPTURED
OY RECAPTURE FROM ANOTHER TAG YEAR