

PALLANT CREEK STEELHEAD

1985 - 86

By

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ABSTRACT

From November 1, 1985 to May 26, 1986, 148 adult steelhead were captured by study participants in Pallant Creek on the Queen Charlotte Islands. One hundred and forty three were tagged with anchor tags. Of these, 38 were recaptured once, and 3 were recaptured twice. Five fish were recaptured from the previous year's study. Of the total fish tagged, 67 (47%) were taken in March, with lesser numbers in December (13, or 9%), January (21, or 15%), and in February and April (5%). Sixty fish (42%) were taken in Zone 6, or the downstream reach of the river. Two-thirds of the recaptures were taken within the original tagging zone. Twenty seven of the 41 recaptures (66%) were taken within 20 days of their original tagging date. The time lag between first capture and first recapture ranged from 0 to 163 days. The five fish which were recaptured from the former season were all taken close to their original tagging date. Sex ratio favoured females slightly over males. The dominant age groups were 3.2 (33.3%), 3.3 (26.7%), 4.2S1 (20%), 4.3 (13.3%) and 4.2SS1 (6.7%). Average fork length was 71.6 cm and ranged from 43.2 to 91.4 cm. Two-and-three-ocean males averaged 66.0 and 76.9 cm respectively, while females of similar ages averaged 69.6 and 75.7 cm respectively. Three different multiple sample population estimation techniques calculated 374, 365 and 435 adults steelhead in Pallant Creek during the study. Results and the fishery are discussed.

INTRODUCTION

Steelhead trout contribute substantially to non-tidal angling of the Queen Charlotte Islands. The Pallant Creek fishery is no exception. During the winter season of 1981-82, a steelhead tagging study was initiated on this stream (de Leeuw, 1985a), repeated in 1983-84 (de Leeuw, 1985b), and 1984-85 (de Leeuw, 1985c), and again in 1985-86. This report covers the latter season.

It is hoped the work will continue annually, establishing Pallant Creek as an adult steelhead index stream for the Queen Charlotte Islands. The continued commitment to this project by the Queen Charlotte Island Chapter of the British Columbia Steelhead Society and the Pallant Creek hatchery staff, combined with the small size and accessibility of the stream, make Pallant Creek a favourable location for this type of long term study.

Like the previous years, the objectives of the 1985-86 Pallant Creek steelhead tagging study were to:

1. Describe steelhead run timing and migration behaviour.
2. Describe life history characteristics.
3. Estimate population size.

THE FISHERY

Except for the study season, steelhead fishing effort as reported annually in the Steelhead Harvest Analysis has increased steadily from the early seventies to the present (Table 1). A drop in angler use expressed as days fished and number of anglers is evident in the 1985-86 period. The total catch was also considerably less during this time while success or catch/day for all recorded Charlotte streams was highest in the 85-86 season, higher in fact than the success rate of Pallant Creek. Excepting 1978-79 and the study season, the catch/day for Pallant Creek has consistently been higher than the Charlottes as a whole. This may explain the reduced effort on the Pallant during the 85-86 steelheading period since anglers who were successful in other Charlotte Streams had no need to fish Pallant Creek.

The apparent rise in angler use during the late seventies was likely the result of hatchery staff participation. The hatchery was constructed in 1978. Initiation of the steelhead tagging program during the 1980-81 season possibly also contributed to elevated angler effort.

Table 1. Pallant Creek Steelhead Harvest Analysis¹ data 1970-71 - 1985-86

Season	Days Fished	No. Anglers	Steelhead Kept	Steelhead Released	Kept Day	Catch Day	Charlottes Catch/Day
70-71	8	4	8	20	1.00	3.50	.36
71-72	10	3	21	25	2.00	4.60	.52
72-73	89	12	45	86	.50	1.47	.31
73-74	26	3	26	34	1.00	2.22	.33
74-75	10	3	7	0	.67	.67	.27
75-76	73	30	23	40	.32	.86	.47
76-77	107	46	47	20	.45	.65	.37
77-78	74	30	48	92	.64	1.86	.48
78-79	177	42	35	26	.21	.38	.41
79-80	236	50	36	86	.16	.53	.48
80-81	382	53	59	709	.16	1.96	.79
81-82	227	66	41	190	.22	1.05	.93
82-83	293	50	17	511	.06	1.80	1.23
83-84	235	37	39	330	.17	1.57	.57
84-85	359	58	66	620	.18	1.92	1.32
85-86	<u>137</u>	<u>41</u>	<u>14</u>	<u>185</u>	<u>.10</u>	<u>1.44</u>	<u>1.65</u>
Mean:	153	33	34	184	.48	1.66	.63

¹Steelhead Harvest Analysis B.C. Fish and Wildlife Branch annual reports.

METHODS

The river was partitioned into seven zones (Fig. 1). Adult steelhead were angled on conventional gear and tagged with orange, numbered anchor (7.62 cm spaghetti) tags. Weights were generally estimated while fork lengths were measured. Sex, date of capture, tag number and colour as well as zone of capture were also 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 distance of recaptured fish were estimated by calculating the zone length between the mid points of original and recapture zones.

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, 1984).

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

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

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

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

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 DISCUSSIONS

During the 1985/86 study period, 143 steelhead were tagged in Pallant Creek. Of these, 38 were recaptured once, and 3 were recaptured twice. An additional 5 fish were recaptured from the previous season's tagging study when 123 were tagged.

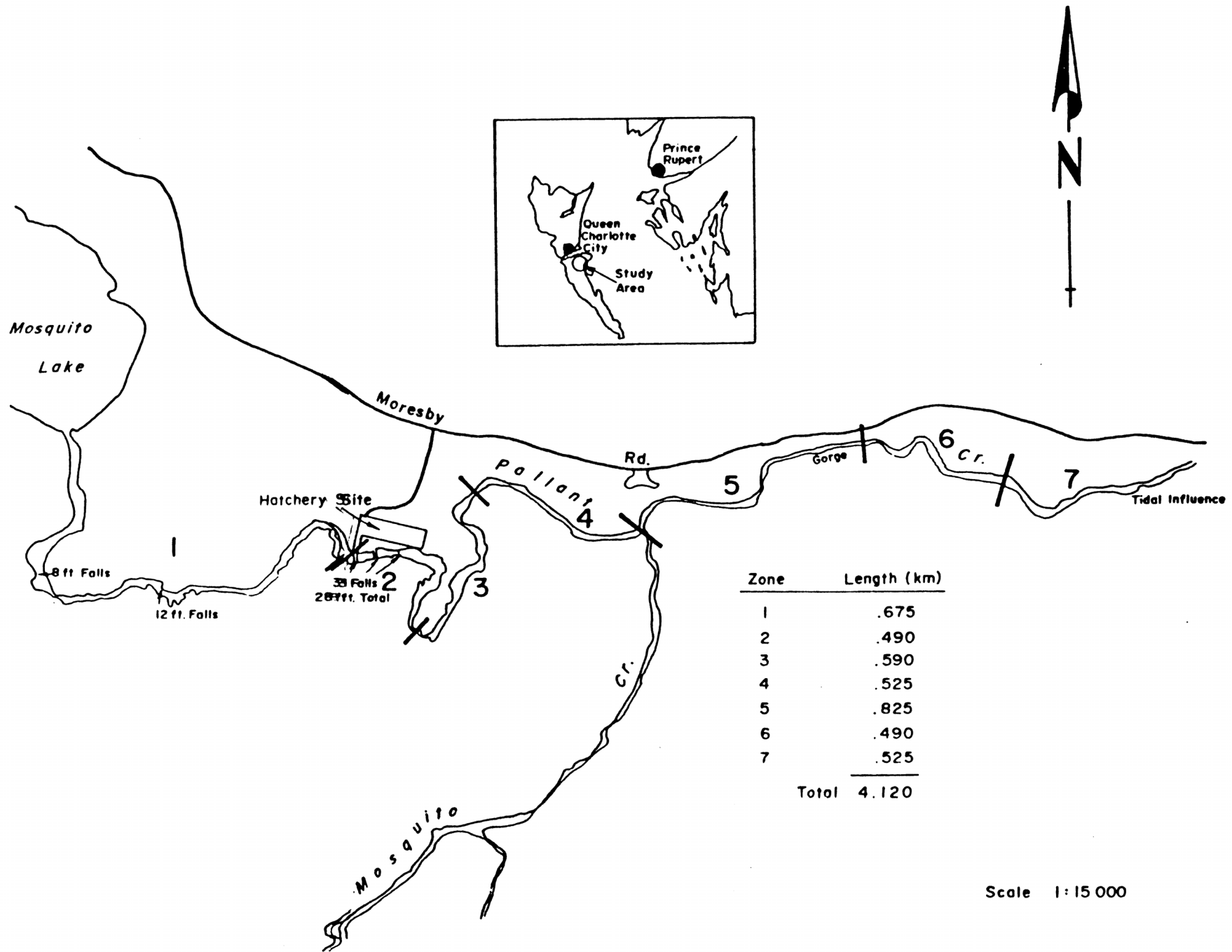


Fig. 1 Pallant Creek Angling Zones During The 1985-86 Steelhead Tagging Study

SPATIAL AND TEMPORAL DISTRIBUTION

Spatial distribution of the catch during the 85-86 season was markedly different from the previous study (Table 2). A large portion of steelhead in the present study were taken from the lower area or Zone 6 (42%), where as only 14% came from this location the previous season. In the 84-85 season, the majority of fish came from the upper river (Zones 2 and 4). This distribution was reversed during the present study. Since the river is short and readily accessible it is likely these differences were a reflection of actual steelhead distribution rather than the distribution of angler effort. On Pallant Creek, adult steelhead appear to spatially distribute themselves differently from one year to the next.

Table 2. Pallant Creek steelhead tagged during the 1985-86 and 1984-85 winter seasons by zone.

Zone	Steelhead Tagged (%)	
	1985-86	1984-85
1	1 (1)	0 (0)
2	16 (11)	27 (22)
3	29 (20)	13 (11)
4	13 (9)	34 (28)
5	14 (10)	2 (1)
6	60 (42)	17 (14)
7	10 (7)	11 (9)
Not recorded	- -	19 (15)
Total	<u>143(100)</u>	<u>123(100)</u>

Since the stream was partitioned differently during the seasons prior to 84-85 (less reaches), these catches were not included in the above table.

Largest catches occurred during late December/early January, and throughout March (Table 3). It was likely this distribution reflected two separate runs rather than a bimodal distribution of angler effort, since study participants fished consistently throughout the season. This apparent pattern of two separate times of river entry implicated from the catch was not observed during the 84-85 and 83-84 study years, but was to some degree in the 81-82 season. It appears therefore that run timing of Pallant Creek winter steelhead varied between years, possibly as a function of stream discharge. Fish may also have been in the river, but not caught during some periods due to low flows, temperature or other unfavourable angling conditions.

Table 3. Number of steelhead tagged during the 1985–86 study on Pallant Creek (catch grouped by 10-day periods).

Date	Males	Females	Not Recorded	Total
12/01–10				
12/11–20	5	5		10
12/21–30	6	7		13
01/01/10	5	8		13
01/11–20	2	2		4
01/21–30	3	1		4
02/01–10	1	3		4
02/11–20	4	3		7
02/21–30	3	3		6
03/01–10	9	9		18
03/11–20	12	11		23
03/21–30	13	11	2	26
04/01–10	2	5		7
04/11–20	3	4		7
04/21–30		1		1
Total	<u>68</u> (47.5%)	<u>73</u> (51.1%)	<u>2</u> (1.4%)	<u>143</u>

Of the 143 fish tagged, 38 fish were recaptured once, and 3 were recaptured twice, for a total recapture of 41 (18.7%). Twenty-five or 66% of the first recaptures were taken in the zone of original capture (Table 4). The remaining 13 (34%) had migrated both upstream (8 fish) and downstream (5 fish). Distance travelled varied from .5 to almost 2 km. Increases in migration distance were not reflected in a larger time period between captures. Migration is limited however since the total accessible mainstem stream length is only 4.12 km (Fig. 1).

Time duration between original capture and recapture varied from 0 (i.e. fish recaptured on day of capture) to 163 days. Twenty-seven (66%) of the 41 recaptures were taken within 20 days of first capture, of which 2 fish were captured twice on the same day. The remaining 13 fish averaged 76 days between captures with a range of 30 to 163 days. The overall average time between captures of all recaptured fish was 32.6 days. If the recapture information is indicative of stream residency in general, then it would appear the majority of adult Pallant Creek steelhead spend only a short time (less than 1 month) in the stream, while some spend considerably longer. A short adult stream residency was also alluded to in the previous Pallant Creek study (de Leeuw, 1985).

Females were slightly more dominant in both the original capture (51%) and recapture (57%) populations regardless of apparent stream residency duration. Of the 13 long time residents (i.e. longer than 20 days between captures) 7 were females, and the two longest residents were both a male (163 days) and a female (102 days).

Table 4. Movement and residency of recaptured steelhead in Pallant Creek, 1985-86.

Tag No.	Original Capture			First Recapture		Second Recapture		Total km.	Total Days (1st recap)
	Sex	Zone	Date	Zone	Date	Zone	Date		
02813	M	6	Dec 12	6	Dec 21			0	9
02817	F	2	Dec 21	2	Dec 22			0	1
03932	M	6	Dec 21	6	Dec 23			0	2
02812	M	6	Dec 21	6	Dec 24			0	3
03945	F	6	Dec 12	3	Dec 26	3	Apr 10 (kelt)	+1.89	(14)105
03941	F	6	Dec 15	6	Jan 01			0	17
03937	M	3	Dec 27	3	Jan 04			0	8
02901	F	6	Dec 31	6	Jan 01	5	Mar 19	+ .658	(1) 78
02814	F	6	Jan 02	6	Jan 05			0	3
03939	M	6	Jan 01	6	Jan 08			0	7
03942	M	3	Jan 04	3	Jan 09			0	5
03943	F	3	Dec 22	3	Jan 25			0	34
03940	F	6	Jan 01	7	Feb 23			- .508	53
03874	F	6	Feb 18	7	Feb 27			0	9
03896	F	5	Mar 05	5	Mar 05			0	0
03867	F	6	Mar 01	6	Mar 07			0	6
03929	M	3	Jan 09	4	Mar 13			- .558	63
02631	F	6	Mar 12	6	Mar 15			0	3
02907	M	2	Mar 08	2	Mar 15			0	7
03856	F	7	Feb 23	3	Mar 15			+2.398	20
02823	M	2	Dec 16	2	Mar 18			0	92
03854	M	6	Feb 18	2	Mar 20			+1.899	30
02263	F	6	Mar 12	6	Mar 21			0	9
02268	F	5	Mar 20	5	Mar 21			0	1
02904	F	3	Jan 17	6	Mar 21			-1.694	63
02646	F	3	Mar 13	4	Mar 22			+ .558	9
02282	M	2	Mar 23	2	Mar 23			0	0
02908	M	2	Mar 08	2	Mar 23			0	15
02915	F	2	Mar 15	2	Mar 25			0	10
03938	F	3	Jan 09	3	Mar 27			0	77
02264	F	6	Mar 26	6	Mar 28			0	2
02913	M	5	Mar 15	3	Mar 28			+1.35	13
02278	F	6	Mar 23	6	Mar 28			0	5
03942	F	3	Jan 04	4	Mar 30			- .558	85
02910	M	6	Mar 15	2	Mar 31			+1.899	16
03865	M	3	Feb 20	5	Apr 04			-1.233	43
03885	M	3	Jan 04	3	Apr 11			0	97
02824	M	3	Dec 14	2	May 21	2	May 26	+ .540	(158)163

Steelhead which were tagged early in the season had a considerably better chance of being recaptured than late captured fish. Those originally tagged during the following months: December, January, February, March and April were recaptured at rates of 61, 43, 24, 21 and 0% respectively (Table 5). Recaptures of early tagged fish (Dec and Jan) were furthermore distributed throughout the season, while all late fish (March) were recaptured within the months of original capture. During a steelhead tagging study on the Campbell-Quinsam river system, Vancouver Island, a similar trend was alluded to, with early migrants residing longer than late arrivals (Hooton and Carswell, 1981).

Table 5. Pallant Creek steelhead original capture and recapture dates grouped by months within the 1985-86 winter season.

Original Capture		Recapture (%) ¹						
Date	Total	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total
Dec	23	5(22)	4(17)		2(9)	1(4)	2(9)	14(61)
Jan	21		3(14)	1(5)	4(19)	1(5)		9(43)
Feb	17			1(6)	2(12)	1(6)		4(24)
Mar	67				14(21)			14(21)
Apr	15							
Total	143	5(3)*	7(5)*	2(1)*	22(15)*	3(2)*	2(1)*	41(29)

¹ percent recapture of monthly fish tagged.

* percent of total tagged.

In addition to the recaptures tagged during the 85-86 study, 5 fish (4%) were recaptured from the previous season when 123 were tagged (Table 6).

Table 6. Pallant Creek steelhead originally tagged in 1984-85 and recaptured in 1985-86.

Tag #	Sex	Zone	Date	(cm)	Zone	Date	(cm)
03124	F	3	Jan 28/85	81.3	7	Nov 1/85	-
02751	F	4	Mar 14/85	63.5	6	Mar 7/86	73.7
02763	F	3	Mar 13/85	76.2	6	Mar 9/86	81.2
03641	F	4	Apr 9/85	-	5	Mar 12/86	76.2
03643	M	4	Apr 9/85	-	6	Mar 31/86	66.0*

* retagged, #02253

Although the recaptures from 1984-85 were not taken in the original zone of tagging during this study, there was close date overlap. A fish tagged on January 28, 1985 (an early fish for the Pallant) was recaptured at the fence (the following season) on November 1, 1985. The other four fish were recaptured during this season within

4 to 28 days of their original tagging date a year earlier.

AGE AND SIZE

Only 23 sets of scales were collected from 143 tagged fish. The most prevalent age class in this small sample was three years of fresh water followed by 2 years of ocean growth (3.2), and made up 33.3% of the readable sample (Table 7). Other age classes included 3.3 (26.7%), 4.2S1 (20%), 4.3 (13.3%) and 4.2SS1 at 6.7%.

Sixty percent of all scale sampled fish had spent 3 years in the stream prior to ocean migration. The remaining 40% migrated to the ocean after 4 years of fresh water growth (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 .2 (56.5%) followed by .3 (43.5%, Table 9). Of the 23 fish sampled, 4 (17%) had spawned previously, and of these one was in its third spawning migration (Table 7).

Table 7. Steelhead trout age groups from Pallant Creek, 1985-86. N=15.

Age Group	Males	Females	Total	% of Total
3.2	3	2	5	33.3
3.3	2	2	4	26.7
4.3	2	—	2	13.3
4.2SS1	—	1	1	6.7
4.2S1	—	3	3	20.0
Total	7	8	15	100.00
R*.2	2	2	4	
R.3	1	3	4	

R* Central area of scale is resorbed, fresh water age not readable.

Table 8. Number and percentage of male and female Pallant Creek steelhead of different fresh water ages, 1985-86, N = 15.

Freshwater Age	Males	Females	Total	% of Total
3	5	4	9	60
4	2	4	6	40
Total	7	8	15	100

Table 9. Number and percentage of male and female Pallant Creek steelhead of different ocean ages, 1985-86; N = 23.

Ocean Age	Males	Females	Total	% of Total
.2	5	8	13	56.5
.3	5	5	10	43.5
Total	10	13	23	100.0

The most abundant ocean age group in all previous Pallant Creek studies however was .3 and ranged from 81 to 38%.

The percentage of repeat spawners in Pallant Creek has varied considerably from year to year. During the 1981-82 season, multiple spawners comprised 19% (N=5) of the sampled population, while in 1983-84 and 84-85 it was 10% (N=5) and 24% (N=9) respectively. In the present sample, 27% (N=6) were repeat spawners. Variability in the percentage of multiple spawner during any given year is dependent on previous years' populations, and post-spawning survival. Since the magnitude of the run varied from year to year, the number of multiple spawners was also expected to vary.

Like the earlier Pallant Creek studies, steelhead size was determined by pre-spawning ocean residency. After two years of ocean growth, Pallant Creek steelhead averaged 67.8 cm, while with an additional year fish were almost 10 cm longer (Table 10). Two year ocean females were marginally longer (69.6 cm) than males of the same age (66.0 cm) while at the end of 3 years this size difference was reversed (F=75.7 cm, M=76.9 cm). These results were inconclusive however due to the small (n9) sample size.

In the previous three studies, male steelhead were larger than females in all ocean age classes. The overall average fork length of steelhead tagged and measured during this study was 71.6 cm, and ranged from 43.2 to 91.4 cm.

Table 10. Fork lengths (cm) of male and female Pallant Creek Steelhead of different ocean ages, 1985-86.

Ocean Age	Males			Females			Total		
	N	X	Range	N	X	Range	N	X	Range
.2	5	66.0	61.0-71.1	5	69.6	63.5-81.3	10	67.8	61.0-81.3
.3	4	76.9	71.1-81.3	5	75.7	66.0-86.4	9	76.2	66.0-86.4
.2+.3	9	70.8	61.0-81.3	10	72.7	63.5-86.4	19	71.8	61.0-86.4

POPULATION ESTIMATION

The three multiple capture population estimates calculated populations of 374, 365, and 435 adult steelhead in Pallant Creek during the 1985-86 season (Table 10). Of the 143 fish tagged, 38 were recaptured once and 3 twice, consequently the confidence limits were fairly narrow. Other than the potential of tag loss which tends to inflate results, the estimates likely closely approximated the actual population. Recaptures in the previous studies, were far fewer, and ranged from 7.3 to 10.3%. According to the questionnaire generated catch results (Table 1) only 14 steelhead were harvested in Pallant Creek in 1985-86. The fishery was therefore not considered a conservation concern.

Table 11. Pallant Creek steelhead population estimates during the 1985-86 winter season.

Method	Estimate	95% Confidence Limits	
		Poisson distribution	Normal distribution
Schnabel	374	276 - 522	283 - 551
Schumacher	365	336 - 617	
Chapman	<u>435</u>	270 - 506	279 - 529
Mean	<u>= 391</u>		

SUMMARY

1. One hundred and forty-eight steelhead were captured by study participants in Pallant Creek from November 1, 1985 to May 26, 1986. Of these, 143 were tagged, and an additional 3 were recaptured twice.

2. The majority of the fish were taken in March, and late December/- early January in the upstream sections of the river. Two-thirds of all recaptures were taken in the zone of original capture with the remaining one third having migrated both up-and-downstream. Twenty-seven of the 41 recaptures were taken within 20 days of their original tagging date. Total days between original and repeat capture ranged from 0 to 163. Only 2 fish were captured twice on the same day.

3. Sex ratio favoured females (51.1%) over males (47.5%) while 2 fish (1.4%) were not sexed.

4. Scale samples were taken from only 23 fish of which 4 (17.4%) were multiple spawners. The dominant age class was 3.2 (33.3%) followed by 3.3 (26.7%), 4.2S1 (20%), 4.3 (13.3%) and 4.2SS1 (6.7%).

5. The overall average fork length of Pallant Creek steelhead during the 1985-86 study was 71.6 cm and ranged from 43.2 to 91.4 cm. Where both fork length and ocean age were determined, males with 2 or 3 years of marine growth were 61.0 and 71.1 cm respectively while females of similar ages were 67.8 and 76.2 cm respectively.

6. Population estimates for the 1985-86 study calculated 374 (Schnabel), 365 (Schumacher) and 435 (Chapman) steelhead in Pallant Creek. Since almost 1/3 of all tagged fish were recaptured confidence limits were narrow and these estimates are therefore considered fairly accurate.

ACKNOWLEDGEMENTS

This project, like the previous Pallant Creek steelhead studies, was largely the result of volunteer work by the Queen Charlotte Islands Chapter of the B.C. Steelhead Society with the excellent help of the Pallant Creek Hatchery staff. Their assistance in this project was invaluable and greatly appreciated. Organization of field-collected data was supervised by Tom Rutherford, Community Advisor, Department of Fisheries and Oceans. Scale interpretations were provided by R. Tetreau and G. Schultze. M. Lough calculated the population estimates. This report was typed by Betty Lockhart and Eileen Bouvier.

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APPENDICES

- I. Original steelhead captures from Pallant Creek, 1985-86 winter season.
- II. Steelhead recaptures from Pallant Creek, 1985-86 winter season.

APPENDIX I. Original steelhead captures from Pallant Creek, 1985–86 winter season.

Fish No.	Date	Sex	Length cm	Weight (est) kg	Tag No. and Color	Area	Remarks	Age
1	Dec 12	M	838	4.1	02813	Orange	6	Bright, fresh
2	Dec 12	F	686	3.2	03945	Orange	6	Bright, fresh
3	Dec 14	F	686	3.2	02818	Orange	3	Bright, fresh
4	Dec 14	M	635	2.3	02824	Orange	3	Colored, close to spawning
5	Dec 15	F	787	3.9	02811	Orange	6	Bright, strong
6	Dec 15	F	660	2.9	03935	Orange	6	Bright, cheeks colored
7	Dec 15	F	787	3.9	03941	Orange	6	Bright, blemish left side
8	Dec 16	M	813	4.5	02823	Orange	2	Red stripe, old scar right side
9	Dec 17	M	660	2.3	02820	Orange	6	Bright
10	Dec 19	M	457	1.6	03946	Orange	2	Colored
11	Dec 21	F	787	3.9	02817	Orange	2	Bright
12	Dec 21	F	711	—	02819	Orange	4	Bright
13	Dec 21	M	660	1.8	02812	Orange	6	
14	Dec 21	M	711	2.7	02821	Orange	6	
15	Dec 22	F	660	2.3	03943	Orange	3	Bright
16	Dec 22	M	787	4.1	03932	Orange	6	Bright, sea lice
17	Dec 25	F	737	4.1	03933	Orange	3	Bright
18	Dec 25	M	813	4.5	03934	Orange	3	Bright, cheeks colored, strong
19	Dec 25	F	686	3.2	03949	Orange	3	Bright, strong
20	Dec 26	F	635	2.7	02797	Orange	6	Bright
21	Dec 26	M	889	5.4	03936	Orange	2	Dark, left eye damaged
22	Dec 27	M	711	3.6	03937	Orange	3	Bright, strong
23	Dec 31	F	711	3.6	02901	Orange	6	Bright, scars left side
24	Jan 01	M	686	2.7	03939	Orange	6	Bright
25	Jan 01	F	610	1.8	03940	Orange	6	Bright
26	Jan 02	F	711	3.4	02814	Orange	6	Bright, old scars both sides
27	Jan 02	M	610	1.4	03928	Orange	3	Vigorous, red stripe
28	Jan 02	F	635	1.8	03930	Orange	3	Bright
29	Jan 04	M	646	2.3	03885	Orange	3	Bright, thin
30	Jan 04	M	559	1.4	03942	Orange	3	Red stripe and cheeks
31	Jan 05	F	610	2.3	03878	Orange	6	Bright, real jumper
32	Jan 05	F	686	3.2	03879	Orange	6	Bright, strong
33	Jan 07	F	838	5.0	03880	Orange	6	Bright, wild
34	Jan 09	F	813	4.5	03938	Orange	3	Bright 4.2SS1
35	Jan 09	M	787	4.1	03929	Orange	3	Red stripe, darkening a bit
36	Jan 10	F	686	3.2	03948	Orange	3	Just a tinge of color starting

Fish No.	Date	Sex	Length cm	Weight (est) kg	Tag No. and Color	Area	Remarks	Age
37	Jan 16	F	737	4.1	03944	Orange	3	Silver bright
38	Jan 17	M	813	5.4	02902	Orange	6	Fresh 4.3
39	Jan 17	M	711	3.6	02903	Orange	3	Colored 3.3
40	Jan 17	F	711	3.6	02904	Orange	3	Fresh 4.2S1
41	Jan 22	M	660	2.7	02825	Orange	4	Little bit of color, R. 2
42	Jan 24	M	610	2.3	02822	Orange	3	Bright R.2
43	Jan 24	M	813	4.5	03947	Orange	3	Starting to color, 4.3
44	Jan 25	F	737	3.6	03883	Orange	3	Colored
45	Feb 02	M	635	2.7	03884	Orange	6	Bright, red stripe
46	Feb 02	F	711	4.1	03887	Orange	6	Bright, bare spot by adipose
47	Feb 05	F	864	6.4	02905	Orange	6	Bright R.3
48	Feb 06	F	686	2.7	02815	Orange	3	Getting a little pink 3.3
49	Feb 18	F	610	2.3	03874	Orange	6	Bright
50	Feb 18	M	838	5.4	03854	Orange	6	Bright
51	Feb 19	F	686	3.2	03855	Orange	1	Spawned out, dorsal missing chunk
52	Feb 20	M	622	2.3	03865	Orange	3	Little bit of color
53	Feb 20	F	711	4.1	03864	Orange	3	Little reddish, belly little soft
54	Feb 20	M	864	6.4	03870	Orange	2	Dark
55	Feb 20	M	762	4.5	03860	Orange	5	Slight reddening
56	Feb 23	F	813	5.4	03871	Orange	7	Bright
57	Feb 23	M	711	3.6	03863	Orange	7	Slight red streak, red cheeks
58	Feb 23	F	762	4.5	03856	Orange	7	Bright
59	Feb 27	M	864	6.4	03861	Orange	7	Bright, piece of caudal missing
60	Feb 27	F	711	4.1	03869	Orange	6	Bright
61	Feb 28	M	787	4.5	03862	Orange	3	Darkening, piece of caudal missing
62	Mar 01	F	737	4.1	03867	Orange	6	Bright
63	Mar 01	M	711	3.6	03892	Orange	6	Bright, fresh
64	Mar 02	M	686	3.2	03893	Orange	6	Slightly colored
65	Mar 04	M	813	5.4	03866	Orange	6	Slightly colored
66	Mar 04	F	0	4.1	03859	Orange	6	Bright, fresh
67	Mar 05	F	787	5.4	03896	Orange	5	Bright, red cheeks
68	Mar 05	M	635	3.2	03898	Orange	5	Bright, red stripe
69	Mar 05	M	838	5.9	03900	Orange	5	Gumboot, colored, scarred, milt running
70	Mar 05	F	737	4.1	03872	Orange	6	Bright
71	Mar 07	F	711	3.6	02262	Orange	6	Bright, strong, hook in mouth
72	Mar 07	F	737	4.1	02268	Orange	6	Bright
73	Mar 08	M	0	3.2	02907	Orange	2	Dark 3.3
74	Mar 08	M	0	1.8	02908	Orange	2	—

Fish No.	Date	Sex	Length cm	Weight (est) kg	Tag No. and Color	Area	Remarks	Age
75	Mar 08	F	0	2.3	02909 Orange	2	Bright	3.2
76	Mar 09	F	660	2.7	02906 Orange	6	Bright	3.3
77	Mar 09	F	864	6.4	03857 Orange	6	Bright, good scrap	
78	Mar 09	M	686	3.2	02267 Orange	4	Bright	
79	Mar 10	M	762	5.0	02269 Orange	4	Colored	
80	Mar 11	M	762	3.6	02266 Orange	5		
81	Mar 12	F	711	3.2	02631 Orange	6	spawned out, a little ragged	
82	Mar 12	M	635	2.3	02258 Orange	6	Bright	
83	Mar 12	F	635	2.3	02263 Orange	6	Bright	
84	Mar 12	M	737	4.1	02634 Orange	5	Bright, faint red stripe	
85	Mar 12	M	711	3.6	02632 Orange	5	Bright, bit of a red stripe	
86	Mar 12	F	813	5.0	02633 Orange	4	Bright	
87	Mar 13	M	711	3.2	02648 Orange	4	Bright	
88	Mar 13	M	686	2.7	02647 Orange	3	Darkening a bit	
89	Mar 13	F	635	2.3	02646 Orange	3	Bright R.2	
90	Mar 14	F	686	3.2	02645 Orange	5	Bright R.2	
91	Mar 15	M	737	4.1	02910 Orange	6	Bright, sea lice R.3	
92	Mar 15	F	635	2.3	02911 Orange	6	Bright 3.2	
93	Mar 15	F	762	4.5	02912 Orange	5	Bright R.3	
94	Mar 15	F	813	5.4	02914 Orange	4	Bright R.3	
95	Mar 15	M	635	2.3	02913 Orange	5	Bright 3.2	
96	Mar 15	M	737	4.1	02276 Orange	3	Bright	
97	Mar 15	F	711	3.2	02915 Orange	2	Bright	
98	Mar 17	F	711	3.2	02254 Orange	3	Bright	
99*	Mar 19	M	787	4.5	02626 Orange	4	Dark, bad shape, had been tagged	
100	Mar 19	F	762	4.5	02627 Orange	4	Bright	
101	Mar 20	M	914	8.2	02628 Orange	5	Bright, red stripe, hook in mouth	
102	Mar 20	F	762	4.5	02256 Orange	6	Bright	
103	Mar 21	M	686	3.2	02629 Orange	5	Pale red stripe, showed milt 3.2	
104	Mar 22	F	660	2.7	02630 Orange	5	Bright, good scrapper	
105	Mar 23	M	0	2.3	02277 Orange	6	Bright	
106	Mar 23	F	0	3.2	02278 Orange	6	Bright	
107	Mar 23	M	0	5.0	02279 Orange	4	Quite bright	
108	Mar 23	F	0	4.1	02280 Orange	4	Quite bright	
109	Mar 23	M	0	2.7	02281 Orange	2	Quite bright	
110	Mar 23	M	0	4.1	02282 Orange	2	Dark, kelt	
111	Mar 23	M	0	4.5	02283 Orange	2	Dark	
112	Mar 23	F	0	4.5	02284 Orange	2	Very dark	
113	Mar 23	M	0	5.0	02285 Orange	2	Dark	
114	Mar 23	F	0	2.3	02286 Orange	2	So-So	
115	Mar 24	F	762	4.5	02275 Orange	6	Bright, roller	
116	Mar 26	M	660	2.3	02257 Orange	6	Bright	

Fish No.	Date	Sex	Length cm	Weight (est) kg	Tag No.	and Color	Area	Remarks	Age
117	Mar 26	F	660	2.7	02264	Orange	6	Bright, feisty	
118	Mar 28	M	635	2.3	02252	Orange	6	Bright, old scars right side	
119	Mar 28	M	762	4.1	02635	Orange	6	Red stripe, sea lice, scrapper	
120	Mar 28	F	711	3.2	02636	Orange	6	Bright, scarred left flank	
121	Mar 29	F	686	3.2	02638	Orange	6	Colored	
122	Mar 30	F	635	2.7	03894	Orange	6	Bright, strong	
123	Mar 30	M	711	--	02637	Orange	4	Dark	
124	Mar 31	M	737	4.1	02251	Orange	6	Bright	
125	Mar 31	M	762	4.5	02271	Orange	6	Bright, strong	
126	Mar 31	F	635	2.3	02260	Orange	6	Bright, fresh	
127	Mar 31	—	660	2.7	02287	Orange	2	Dark	
128	Mar 31	—	635	2.3	02253	Orange	6	Kelt	
129	Apr 03	F	711	--	02259	Orange	6	Kelt	
130	Apr 03	M	686	3.2	02270	Orange	6	Bright	
131	Apr 03	F	711	3.6	02274	Orange	6	Bright	
132	Apr 03	M	660	2.7	02369	Orange	3	Bright	
133	Apr 04	F	737	4.1	02273	Orange	6	Bright	
134	Apr 05	F	838	6.4	02670	Orange	4	Bright	
135	Apr 07	F	432	.9	02651	Orange	5	Red stripe, resident??	
136	Apr 11	M	711	3.6	02655	Orange	6	Semi-bright, strong	
137	Apr 11	F	787	5.4	02656	Orange	7	Kelt, good shape	
138	Apr 11	M	635	2.3	02658	Orange	7	Semi-bright, strong	
139	Apr 14	F	762	4.5	02657	Orange	7	Kelt, strong, good shape	
140	Apr 14	M	686	3.2	02652	Orange	7	Reddish, fresh	
141	Apr 14	F	686	3.2	02653	Orange	7	Silver bright, strong	
142	Apr 20	F	737	3.6	02654	Orange	7	Kelt, strong, real jumper	
143	Apr 27	F	762	5.4	02659	Orange	6	Silver bright, super strong	
--	--	M	711	1.0	--	--	--	--	

* had been tagged before, only ½" left

Appendix II. Steelhead recaptures from Pallant Creek, 1985–86 winter season.

Fish No.	Date	Sex	Length cm	Weight kg	Tag No. and Color	Area	Remarks	Age
1	Dec 21	M			Orange 02813	6	Little colored	
2	Dec 22	F			Orange 02817	2	Bright	
3	Dec 23	M			Orange 03932	6	Bright	
4	Dec 24	M			Orange 02812	6		
5	Dec 26	F			Orange 03945	3	Bright	
6	Jan 01	F			Orange 03941	6	Bright, strong	
7	Jan 04	M			Orange 03937	3	Bright, strong	
8	Jan 01	F			Orange 02901	6	Caught 16 hours after tagging	
9	Jan 05	F			Orange 02814	6	Cut left side by tail	
10	Jan 08	M			Orange 03939	6	Bright	
11	Jan 09	M			Orange 03942	3	Red stripe, darkening	
12	Jan 25	F			Orange 03943	3	Darkening	
13	Feb 23	F			Orange 03940	7	Bright	
14	Feb 27	F			Orange 03874	6	Bright	
15	Mar 05	F	787		Orange 03896	5	Caught 15 mins. after tagging	
16	Mar 07	F	762		Orange 03867	6	Bright, strong	
17	Mar 13	M	787		Orange 03929	4	Dark, milt running	
18	Mar 15	F	711		Orange 02631	6	Kelt	
19	Mar 15	M			Orange 02907	2	Dark	
20	Mar 15	F	762		Orange 03856	3	A little dark	
21	Mar 18	M	813		Orange 02823	2	Dark	
22*	Mar 19	F	711		Orange 02901	5	Kelt, bad shape	
23	Mar 20	M	864		Orange 03854	2	Dark, spawning	
24	Mar 21	F	686		Orange 02263	6	A little colored	
25	Mar 21	F	737		Orange 02268	5	Slight color	
26	Mar 21	F	711		Orange 02904	6	Kelt	
27	Mar 22	F	635		Orange 02646	4	Bright	
28	Mar 23	M			Orange 02282	2	Tagged today	
29	Mar 23	M			Orange 02908	2		
30	Mar 25	F			Orange 02915	2	Quite bright	
31	Mar 27	F			Orange 03938	3	Partly spawned	
32	Mar 28	F			Orange 02264	6	Good scrapper	
33	Mar 28	M			Orange 02913	3	Semi-bright	
34	Mar 28	F	711		Orange 02278	6	Bright	
35	Mar 30	F	711		Orange 03942	4	Dark	
36	Mar 31	M			Orange 02910	2		
37	Apr 04	M			Orange 03865	5	Dark	
38*	Apr 10	F			Orange 03945	3	Kelt	
39	Apr 11	M			Orange 03885	3	Colored	
40	May 21	M			Orange 02824	2	Colored	
41*	May 26	M			Orange 02824	2	Excellent shape, 7 fry in mouth	

¹ Recap. N. Males = 17 (43%) *2 Recap N. Males = 1 (33%)
 N. Females = 21 (57%) N. Females = 2 (67%)

* recaptured more than once

Steelhead recaptured from 1984-85 winter season

Fish No.	Date	Sex	Length cm	Weight kg	Tag No. and Color	Area	Remarks	Age
1	Nov 01	F			Orange 03124	Fence	Bright	
2	Mar 07	F	737		Orange 02751	6	Bright, strong	
3	Mar 09	F	813		Orange 02763	6	Bright	
4	Mar 12	F	762		Orange 03641	5	Bright 4.2S1	
5**	Mar 31	M	660		Orange 03643	6	Bright, scarred	

** fish retagged, original was almost out (new tag #02253)