NECHAKO AND STUART RIVERS
CHINOOK CARCASS RECOVERY
2001

NECHAKO FISHERIES CONSERVATION PROGRAM
Data Report No. M01-2

Prepared by:
Mark Potyrala and Byron Nutton
Fisheries and Oceans Canada
April 2011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

In 2001 adult Chinook salmon (*Oncorhynchus tshawytscha*) carcasses were recovered from the Nechako and Stuart rivers in order to collect biological data on sex, size, fecundity, egg retention, life history and age. This information contributes to the database being compiled under the auspices of the Nechako Fisheries Conservation Program to monitor the Nechako Chinook population.

A total of 400 carcasses were collected on the Nechako River between September 16th and October 6th. Although Nechako River Chinook carcasses recovered in 2001 exhibited mostly similar biological characteristics to those collected from 1988 to 2000, the 2001 return was the highest female to male ratio of the sample (2.23 F/M) since the inception of the monitoring program. Meanwhile, mean post-orbital hypural length for both males and females and mean egg retention values for spawning females fell within the ranges observed in previous years. In addition, the spawning population was exclusively comprised of individuals with a stream-type life history and dominated by the 5_2 age-class.

On the Stuart River, 250 carcasses were sampled to collect information that could be used as a comparison to the Nechako data, to identify possible effects of flow regulation on the Nechako Chinook population. Since no obvious trends or anomalies were identified during the comparison of 2001 Nechako data to previous years, it was not necessary to use the information collected from the Stuart in this manner. However, the data are documented in this report in the event that longer-term analyses are required in the future.

INTRODUCTION

Each year since 1988 the Nechako Fisheries Conservation Program (NFCP) Technical Committee has conducted a suite of projects to monitor the population of Chinook salmon (*Oncorhynchus tshawytscha*) that spawn and rear in the Nechako River. The goal of these projects is to provide the information necessary for the NFCP to assess whether or not the Conservation Goal identified in the 1987 Settlement Agreement (Anon, 1987) is being met.

As part of this program of studies to monitor Nechako River Chinook salmon, the Technical Committee has conducted carcass recovery projects on the Nechako and Stuart rivers each year. The purpose of these projects is to gather biological data on adult spawners, including: sex, size, fecundity, egg retention, life history and age. In particular, analysis of fish age indicates the relative contribution of each brood year to the current years' spawning population, which is used to interpret the results of the annual NFCP enumeration projects. The information collected from the Nechako River is compared to similar information collected from the Stuart River, an adjacent system unaffected by flow regulation (Figure 1), to assist in identifying potential effects of flow regulation on the Nechako Chinook population.

METHODS

Sampling was conducted throughout the period of Chinook spawner die-off, from mid-September to early October.

In the Nechako River sampling was conducted from Cheslatta Falls downstream to Vanderhoof (Figure 2). In order to ensure a representative sample, recovery effort was based on spawner distribution observed during helicopter surveys conducted as part of the concurrent enumeration project. Although the normal target sample size is 200 fish, the target sample size for 2001 was increased to 400 fish due to the relatively large Nechako Chinook return.

Sampling in the Stuart River was conducted from the outlet of Stuart Lake downstream to the confluence of Chinohchey Creek (Figure 3). Carcass sampling was conducted as part of the recovery portion of the mark-recapture enumeration program; all marked carcasses and representative portions of unmarked carcasses from each river section were sampled. The target sample size was set at a minimum of 250 fish, slightly higher than the normal target for the Nechako since Stuart escapements are typically higher.

In each river, several sampling surveys were conducted throughout the period of die-off to ensure that both early and late spawners were represented in the samples. The surveys were conducted by running a jet boat downstream at low speed and recovering carcasses with a gaff. If the carcass was too badly decomposed or eaten by animals to measure body length or take scale samples, it was cut in half to prevent re-counting and returned to the river. Each carcass was assigned a number and its location and date of recovery recorded. When a sufficient number of carcasses had been collected, the crew stopped to collect the following samples and biological information:

- **sex:** The sex of each fish was determined based on morphology, and confirmed by abdominal incision and internal examination.
- **condition:** Carcass condition was recorded as: 1) fresh; 2) fair to good; 3) poor with some fungus; or 4) partially decomposed but still able to be sampled. In addition, other observations were recorded, particularly the presence of net scars or lamprey marks.
- **post-orbital hypural length (POHL):** The distance from the posterior margin of the orbit to the flexure of the hypural plate in the caudal peduncle was recorded to the nearest millimeter.
- **egg retention and fecundity:** The body cavities of females were checked for eggs. All eggs were counted unless the number was greater than 1000, in which case they were estimated volumetrically. In the case of under-developed eggs which could not be separated and

counted, the sample was recorded as a pre-spawn mortality with fully skeined eggs.

- **scales and fin rays:** Ten scales were taken from each processed carcass and stored in gummed, pre-numbered scale books. Five scales were taken from each side of the body in the preferred area (several rows above the lateral line between the posterior end of the dorsal fin and the anterior insertion of the anal fin). Care was taken to avoid regenerated, resorbed and irregular shaped scales. Dorsal fins from each carcass were removed with a knife, placed in pre-labeled plastic bags and frozen. Fish age was later determined by analysis of the scales and fin rays, conducted by staff at Fisheries and Oceans Canada (DFO) laboratory facilities.
- **adipose fin:** A missing adipose fin is evidence of a hatchery raised fish with a coded-wire tag implanted in its head. If the fin was missing, the head was removed and sent to an independent laboratory for tag removal and identification.

All processed carcasses were cut in half to prevent recounting and returned to the river.

RESULTS

Data collected from each Chinook carcass sampled in the Nechako and Stuart rivers in 2001 are presented in Appendices 1 and 2, respectively. Summaries of these data are provided in the respective sections below.

Nechako River

Between September 16th and October 6th a total of 400[1] carcasses were sampled from 11 of the 16 identified Sections representing all 3 river areas – upper, middle and lower river (Table 1). The observed sex ratio was 2.23 F/M, or 69% females and 31% males (n=400). No Chinook jacks were collected. Of the carcasses sampled, 50% were fresh or only a few days old (Table 2).

The length (POHL) of fish sampled ranged from 540 to 825 mm, with a mean of 737 mm (n=124, SD=58) for males, 711 mm (n=276, SD=38) for females and 719 mm (n=400, SD=46) for all fish combined. For males, the majority of individuals sampled were between 701-800 mm long while the majority of females were between 651-750 mm in length (Figure 4).

Of the total number of female carcasses sampled (n=276), 2 were found to be a pre-spawn mortalities; one of which had under-developed skeins and the other with an estimated retention

[1] Any discrepancy between the total number of carcasses sampled and the reported number of carcasses for various parameters is due to the fact that only partial data were recorded for some carcasses. However, all carcasses were maintained in the dataset and any partial data that was recorded was used in the appropriate analyses.

of 7280 eggs. The remaining 274 (>99%) were determined to be fully spawned, based on egg retention of less than 1000. Mean egg retention of the fully spawned females was 12 eggs (n=274, SD=65, range 0–636).

Scale and fin samples from 200 carcasses recovered from the Nechako River were sent to the Pacific Biological Station in Nanaimo for age analysis. Complete ages were determined for 180 of those samples (Table 3). The results indicate that the majority of the fish sampled were of two age-classes, 5_2 (88%) and 4_2 (11%). A chi-square test was used to determine that the numbers of males and females in these age-classes were not significantly disproportionate to the sex ratio of the sample (p=0.45).

None of the recovered Chinook had an adipose fin missing, and no other form of marking or tagging was observed.

In addition to NFCP data collection requirements, bioassay tissue samples were collected from 7 Chinook carcasses for DNA analysis, and 10 Sockeye salmon carcasses were sampled upstream of Larson's Canyon to provide information on this river spawning population. These samples were collected at the request of staff from DFO's Pacific Biological Station and are not directly related to the NFCP sampling program; therefore, the results are not documented in this report.

Stuart River

Between September 18th and September 26th a total of 250[2] carcasses were sampled from the seven Zones (1 to 7) within the study area (Table 4). The observed sex ratio was 1.45 F/M, or 59% females and 41% males (n=250). Of the 250 carcasses with condition documented, 6% were fresh or only a few days old, while a majority (80%) were determined to be in poor condition with some fungus (Table 5).

In addition to the carcasses sampled for this project, sex was determined for all carcasses recovered as part of the mark-recapture enumeration project, and documented in the Nechako and Stuart Rivers Chinook Enumeration report (NFCP M01-1). This information is relevant to carcass sampling results presented in this report, and given the much larger sample size (n=1339)

[2] Any discrepancy between the total number of carcasses sampled and the reported number of carcasses for various parameters is due to the fact that only partial data were recorded for some carcasses. However, all carcasses were maintained in the dataset and any partial data that was recorded was used in the appropriate analyses.

is likely more representative of the population as a whole. In addition, using the larger dataset eliminates the potential bias associated with the practice of sampling all marked carcasses (sampling for tag application might have a sex bias). The observed sex ratio for this larger sample was 1.42 F/M, or 59% females and 41% males (n=1339, including the carcasses selected for biological sampling).

The length (POHL) of the fish sampled ranged from 518 to 920 mm, with a mean of 766 mm for males (n=102, SD=52), 712 mm for females (n=148, SD=51) and 734 mm (n=250, SD=57) for all fish combined. For males, the majority of individuals sampled were between 751-800 mm long while the majority of females were between 651-800 mm in length (Figure 5).

Of the total number of female carcasses sampled (n=148), none were found to be pre-spawn mortalities. Of the total number of female carcasses sampled, 146 (99%) were determined to be fully spawned, based on egg retention of less than 1000. The mean egg retention of the fully spawned females was 10 eggs (n=146, SD=31, range 0–220). Two partially spawned female carcasses (based on egg retention of 1000-4999) were sampled, with retention values of 2000 and 3200 eggs, respectively. When combining partially spawned and fully spawned data, mean egg retention increased to 45 eggs (n=148, SD=310, range 0–3200).

Scale and fin samples from all 250 carcasses recovered from the Stuart River were sent to the Pacific Biological Station in Nanaimo for age analysis. Complete ages were determined for 226 of those samples (Table 6). The results indicate that a majority of the fish sampled were of two age-classes, 5_2 (86%) and 4_2 (12%). The number of males and females in these age-classes was not significantly disproportionate to the sex ratio of the sample (chi-square test, p=0.23).

Carcasses with tags applied as part of the mark-recapture program were collected. This data is documented in the Nechako and Stuart Rivers Chinook Enumeration report (NFCP M01-1) as the tags are not relevant to the biological sampling project. No other form of marking or tagging was observed.

DISCUSSION - COMPARISON TO PREVIOUS YEARS

Nechako River

A comparison of 2001 Nechako River Chinook carcass recovery data was made to data collected by the NFCP each year since 1988 (NFCP M88-4 and M89-2 to M00-2). Although some limited data were collected prior to 1988 it was not deemed necessary to include these data in the comparison, since information has been collected by the NFCP for several years using standardized methods and study areas. The exception is the discussion on fecundity which includes data collected prior to the inception of the NFCP. This exception was made because the prior data adds substantially to the available dataset due to the paucity of information regarding Nechako River Chinook female fecundity.

The observed sex ratio of 2.23 F/M was the highest on record, significantly higher than both the existing range (1.10-1.85) observed from 1988-2000 (Figure 6) and the mean of 1.47 (n=13, SD=0.23), as indicated by 95% confidence limit of 1.35-1.60.

When comparing the mean length (POHL) of both males and females to observations from previous years, no obvious trends were apparent. For both sexes, the mean lengths observed in 2001 fell within the ranges observed in previous years (Figures 7 and 8).

A single female pre-spawn mortality was sampled and the total number of eggs was recorded (7280). When this datum is added to the existing dataset, the average fecundity of Nechako River female Chinook increased to 6563 eggs per fish (Table 7). Although no further analysis of this statistic is conducted for this report, this value may contribute to other aspects of the NFCP monitoring projects, particularly the estimates of egg-to-fry survival.

The mean egg retention in fully and partially spawned carcasses was compared to values from previous years (Table 8). The 2001 mean is the lowest observed but the confidence limits fit within the bounds of all years' results (Figure 9).

The Nechako River Chinook spawning population is almost exclusively comprised of individuals that spend one or more years as a fry or parr in fresh water before migrating out to the ocean (stream-type life history), and is dominated by 4_2 and 5_2 age-classes. These have been consistent

observations since the inception of the NFCP monitoring program. In 2001 age-classes 4_2 and 5_2 accounted for 99% of the return, with all stream-type fish accounting for 100% (Table 9).

In addition to identifying life history strategies, age data combined with the current years' escapement estimate are used to determine the relative success of past brood years in generating subsequent returns to the river. Since this analysis requires the results of several years, age-at-return data since the inception of the NFCP is documented in Table 10 to facilitate the discussion in the Nechako and Stuart Rivers Chinook Enumeration report (NFCP M01-1).

Stuart River

Information is collected from the Stuart River as a comparison to the Nechako River, to assist in identifying potential effects of flow regulation on the Nechako Chinook population. The geographic proximity of the two rivers means that Chinook returning to the Stuart River most likely experience similar migration timing, ocean conditions and harvest rates as Nechako River Chinook. Given these assumptions, identified trends or anomalies in the Nechako population that were absent from the Stuart might be attributable to factors intrinsic to the Nechako River, but similarities would likely indicate extrinsic factors unrelated to flow regulation.

In 2001, the comparison of information collected from the Nechako to previous years did not identify any significant trends or anomalies, therefore it was not necessary to use the information collected from the Stuart to identify possible intrinsic vs. extrinsic effects. However, the data are documented in this report in the event that longer-term analyses are required in the future.

ACKNOWLEDGMENTS

Nechako River carcass recovery was conducted by Colin Barnard.

Stuart River carcass recovery was carried out by Ecofor Consulting Ltd. and members of the Nak'azdli Band.

Staff at DFO’s Pacific Biological Station in Nanaimo analyzed the various samples.

Rhonda Thibeault and Liz Murphy assisted with data compilation.

REFERENCES

Anonymous. 1987. Settlement Agreement between Alcan Aluminum Ltd., the Minister of Fisheries and Oceans and the Minister of Energy, Mines and Petroleum. Signed September 14, 1987 in Vancouver, BC.

Fee, P. and M. Sheng. 1978. Nechako River Chinook Fry and Spawning Survey. Unpublished manuscript prepared by Department of Fisheries and Oceans, Vancouver, BC.

Jaremovic, L. and D. Rowland. 1988. Review of Chinook Salmon Escapements in the Nechako River, British Columbia. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1963.

NFCP. Nechako and Stuart Rivers Chinook Carcass Recovery 1988 to 2000. Nechako Fisheries Conservation Program Data Reports M88-4 and M89-2 to M00-2.

Olmsted, W.R., M. Whelan and G.A. Vigers. 1980. 1979 Investigations of Fall Spawning Chinook Salmon **(***Oncorhynchus tshawytscha*), Nechako and Quesnel/Horsefly Rivers, B.C. Prepared by E.V.S. Consultants Ltd. North Vancouver, B.C. for the Department of Fisheries and Oceans.

Russell, L.R., K.R. Conlin, O.K. Johansen and U. Orr. 1983. Chinook Salmon Studies on the Nechako River: 1980, 1981, 1982. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1728.

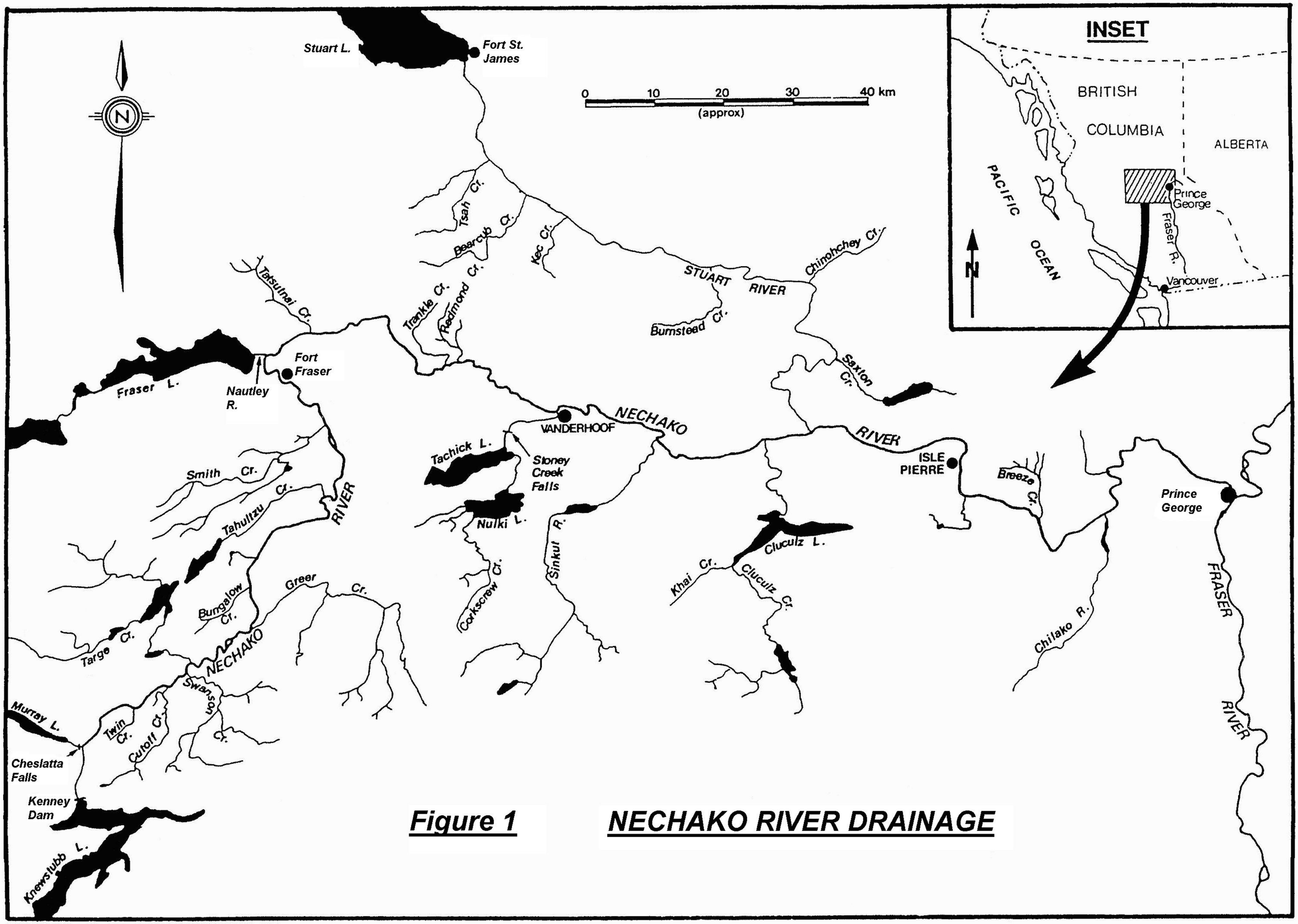


Figure 1 **NECHAKO RIVER DRAINAGE**

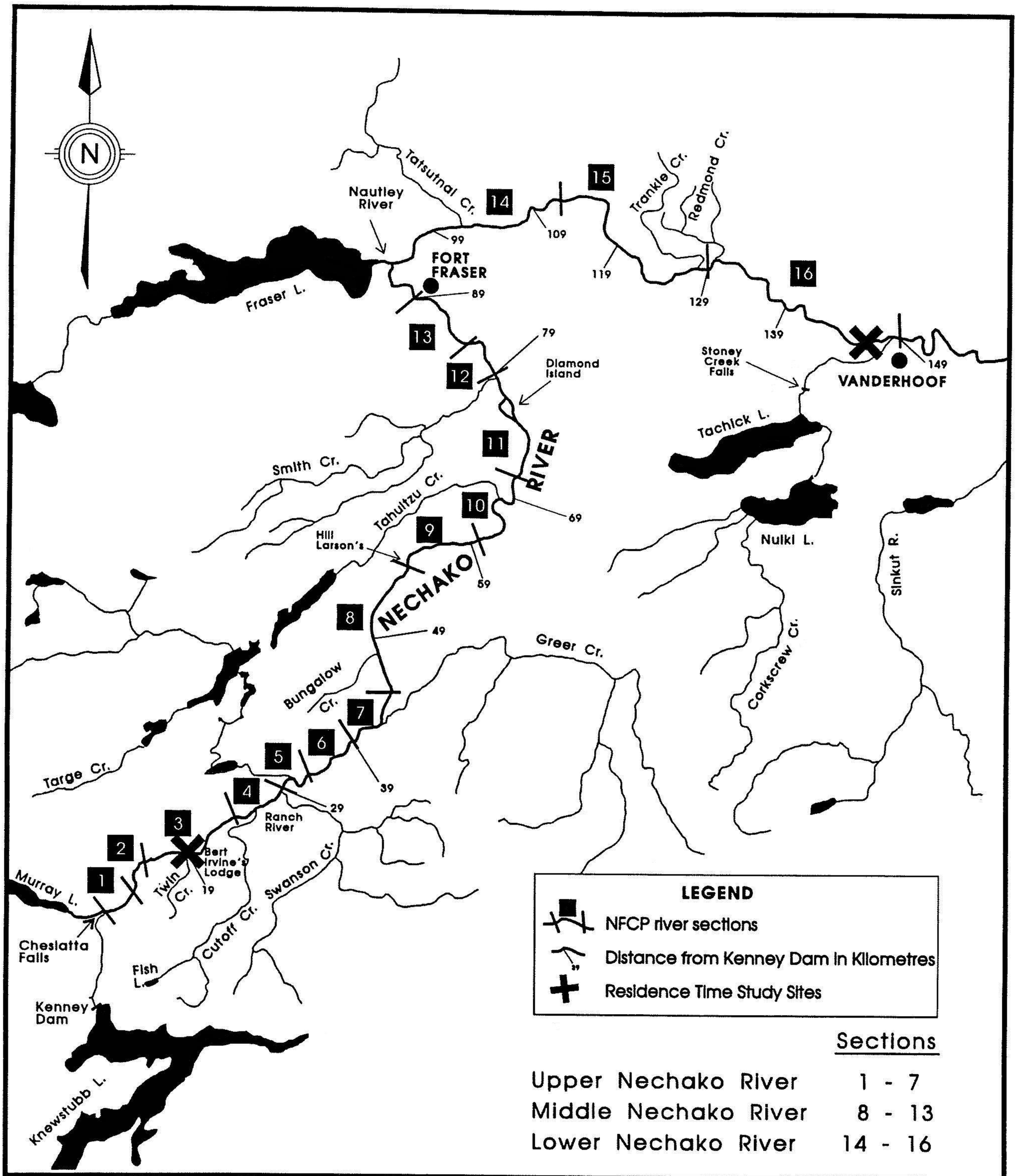


FIGURE 2. NECHAKO RIVER CHINOOK SPAWNING STUDY AREA

Figure 3

STUART RIVER CHINOOK SPAWNING STUDY AREA

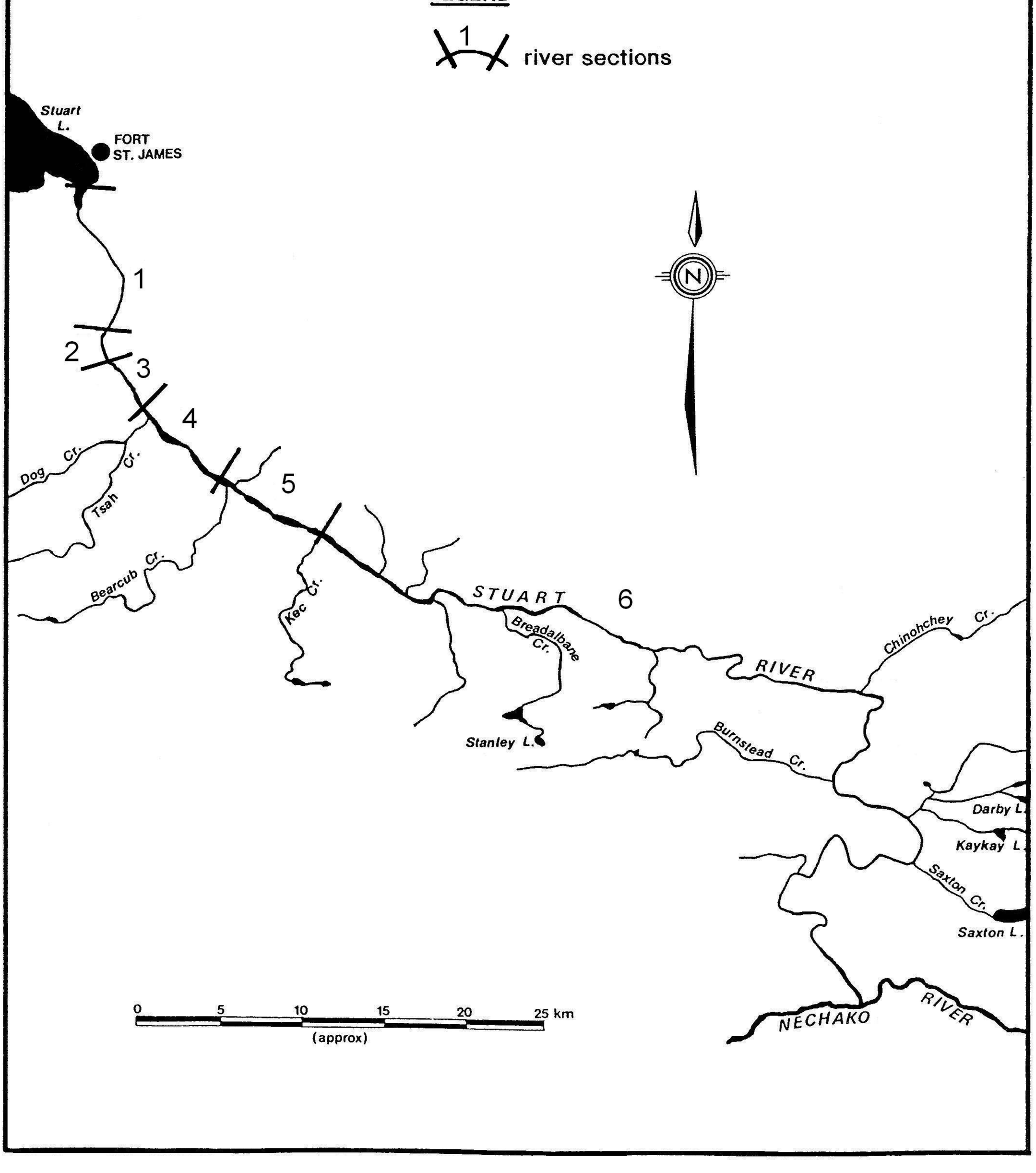


Table 1
Nechako River Chinook Carcass Recovery by Section, 2001

Section	Number	Percent
UPPER NECHAKO		
Section 1	0	0.0
Section 2	0	0.0
Section 3	35	8.8
Section 4	80	20.0
Section 5	30	7.5
Section 6	35	8.8
Section 7	0	0.0
SUB-TOTAL	180	45.0
MIDDLE NECHAKO		
Section 8	0	0.0
Section 9	31	7.8
Section 10	13	3.3
Section 11	24	6.0
Section 12	97	24.3
Section 13	15	3.8
SUB-TOTAL	180	45.0
LOWER NECHAKO		
Section 14	0	0.0
Section 15	19	4.8
Section 16	21	5.3
SUB-TOTAL	40	10.0
TOTAL RIVER	400	100.0

Table 2
Nechako River Chinook Carcass Condition, 2001

Condition *	Number	Percent
1	107	26.8
2	94	23.6
3	131	32.8
4	67	16.8
TOTAL	399	100.0

* Carcass Condition
1 - Fresh carcass
2 - Fair to good carcass (2 - 3 days old)
3 - Poor carcass condition with some fungus
4 - Very old and decomposed carcass

Table 3
Nechako River Chinook Age Composition (%) by Sex, 2001

	4-2	5-2	5-3	6-2	Total # Aged
Males	13.3	83.3	1.7	1.7	60
Females	10.0	90.0	0.0	0.0	120

Table 4
Stuart River Chinook Carcass Recovery by Zone, 2001

Zone	Number	Percent
1	1	0.4
2	2	0.8
3	41	16.4
4	116	46.4
5	48	19.2
6	42	16.8
TOTAL	250	100.0

Table 5
Stuart River Chinook Carcass Condition, 2001

Condition *	Number	Percent
1	0	0.0
2	16	6.4
3	199	79.6
4	35	14.0
TOTAL	250	100.0

* Carcass Condition
1 - Fresh carcass
2 - Fair to good carcass (2 - 3 days old)
3 - Poor carcass condition with some fungus
4 - Very old and decomposed carcass

Table 6
Stuart River Chinook Age Composition (%) by Sex, 2001

	4-2	5-2	5-3	6-2	Total # Aged
Males	9.4	89.6	0.0	0.0	96
Females	14.6	83.8	0.8	0.8	130

Table 7
Nechako River Chinook Fecundity, 1978-2001

Year	Post-orbital Hypural Length (mm)	Fecundity (eggs/female)	Sources*	Cumulative Mean
1978	684	5250	1	
1978	663	6305	1	
1979	703	7200	2	
1979	611	5313	2	
1979	611	5284	2	
1980	710	5000	3	
1980	710	5000	3	
1985	760	6800	4	5769
1989	733	6073		
1989	695	5831		
1989	720	5500		
1989	730	5065		5718
1990	760	8831		
1990	730	7040		6035
1991	715	7289		
1991	710	6901		
1991	670	5714		6141
1992	680	7395		
1992	705	7111		6258
1993	690	6848		
1993	630	5705		
1993	720	5575		6229
1995	706	6750		
1995	712	5109		6204
1998	751	10026		
1998	745	9473		
1998	765	8216		
1998	712	6437		6537
2001	642	7280		6563

*Sources: 1 = Fee and Sheng (1978),
2 = Olmsted *et al.* (1980),
3 = Russell *et al.* (1983), and
4 = Jaremovic and Rowland (1988)

Table 8
Nechako River Chinook Egg Retention, 1988-2001

	Fully Spawned			Partially Spawned		Fully + Partially
Year	n	range	mean	n	range	mean
1988	123	0-500	11.5	4	1000-4320	91.4
1989	144	0-757	21.5	3	2760-3960	90.6
1990	226	0-982	40.7	2	4066-4503	78
1991	154	0-732	22.4	2	1383-2005	43.8
1992	219	0-862	20.2	3	1484-4021	60.5
1993	100	0-529	32.8	3	1045-4686	115.8
1994	90	0-249	10.7	2	1565-2272	52.2
1995	144	0-899	38.3	8	1613-4600	216.1
1996	166	0-212	5.8	2	1100-3600	33.7
1997	127	0-326	13.1	4	2700-4081	125.5
1998	124	0-849	33.2	0	n/a	33.2
1999	129	0-389	9.2	4	3100-4000	113.5
2000	153	0-965	10.9	3	1366-3500	52.8
2001	274	0-636	12.4	0	n/a	12.4

Table 9
Percent Contribution of Stream-type Life Histories
to Nechako Chinook Escapements, 1988-2001

Year	% Contribution		Sample Size
	4-2 + 5-2	All Stream-type	
1988	80	99	210
1989	81	97	200
1990	80	98	225
1991	68	96	210
1992	90	99	200
1993	85	100	188
1994	88	100	172
1995	97	99	207
1996	87	99	211
1997	96	100	206
1998	97	99	207
1999	95	100	204
2000	97	100	250
2001	99	100	180

Table 10
Percent Contribution of Age-at-Return Groupings
to Nechako Chinook Escapements, 1988-2001

	% Contribution					Sample
Year	3 years	4 years	5 years	6 years	7 years	Size
1988	0.0	9.0	72.4	18.6	0.0	210
1989	1.0	30.0	52.5	15.5	1.0	200
1990	0.0	5.3	76.0	17.3	1.3	225
1991	1.0	16.7	54.3	25.7	2.4	210
1992	1.0	7.0	84.0	8.0	0.0	200
1993	0.0	13.3	71.8	14.9	0.0	188
1994	0.0	11.0	76.7	11.0	1.2	172
1995	0.0	14.0	84.5	1.4	0.0	207
1996	0.0	40.8	49.8	9.5	0.0	211
1997	0.0	20.9	75.7	3.4	0.0	206
1998	0.0	24.6	73.4	1.9	0.0	207
1999	0.5	44.1	51.0	4.4	0.0	204
2000	0.0	64.8	32.4	2.8	0.0	250
2001	0.0	11.1	88.3	0.6	0.0	180

Figure 4
Nechako River Chinook Length Frequency Distribution, 2001

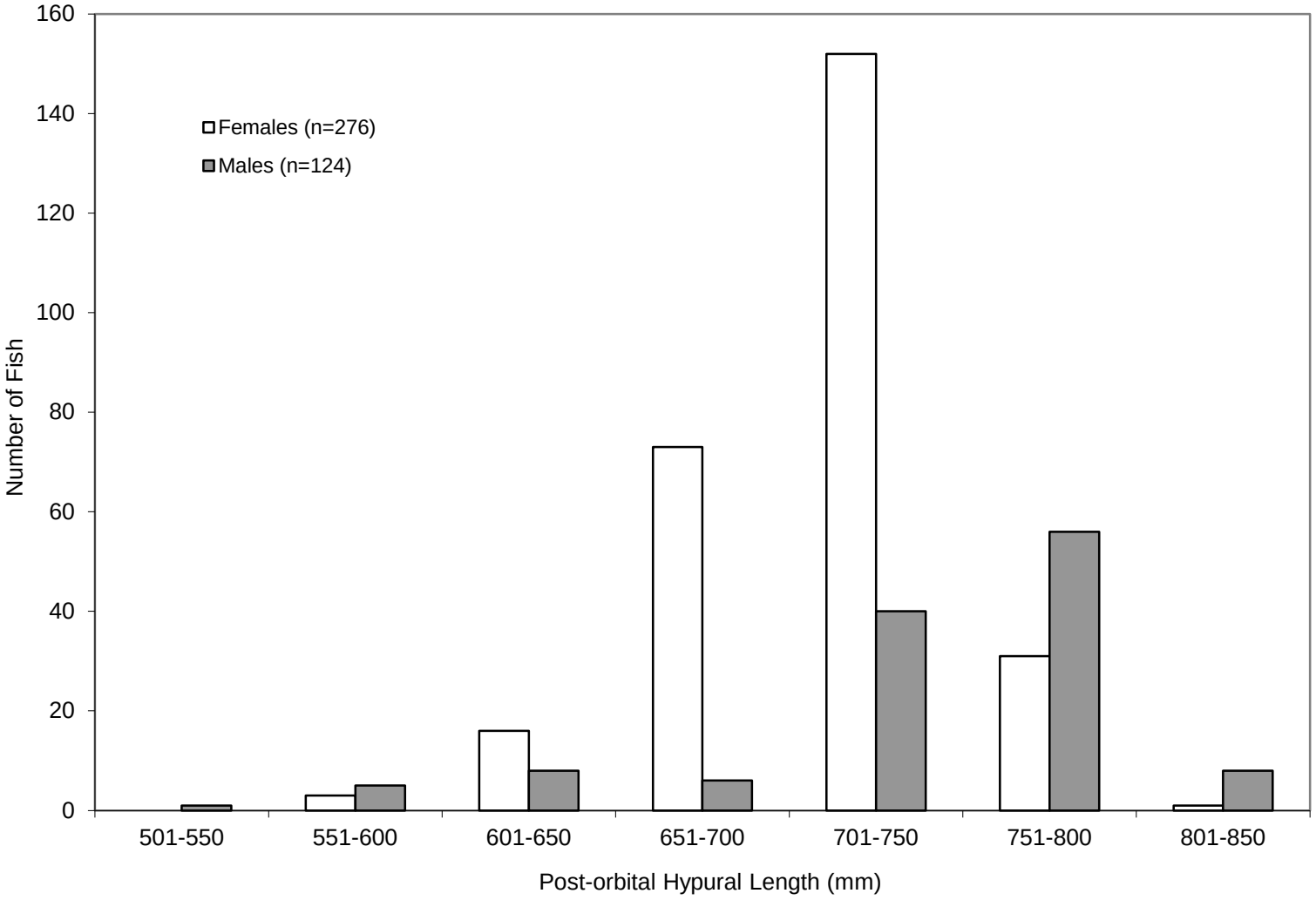


Figure 5
Stuart River Chinook Length Frequency Distribution, 2001

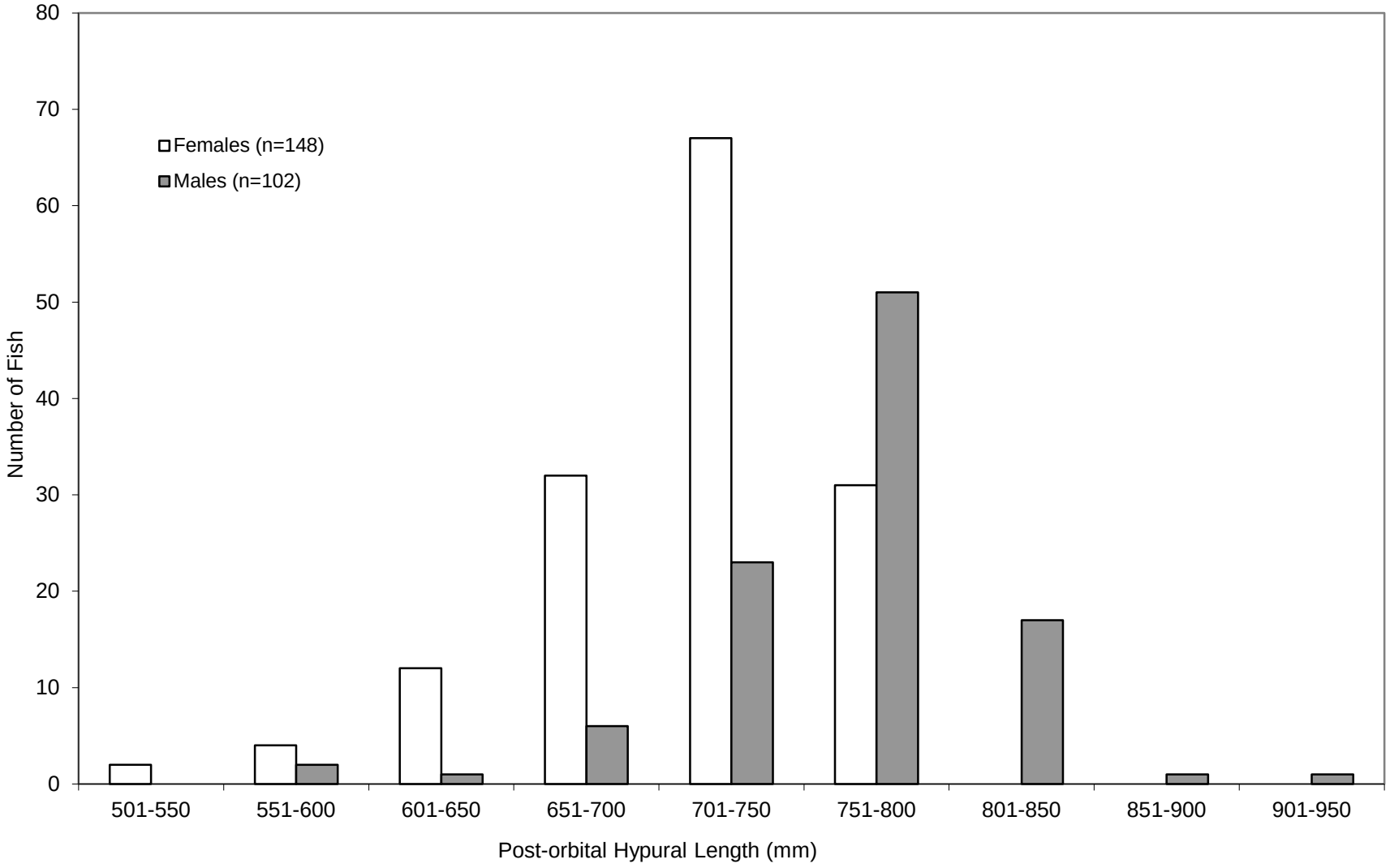


Figure 6
Nechako River Chinook Sex Ratio, 1988-2001

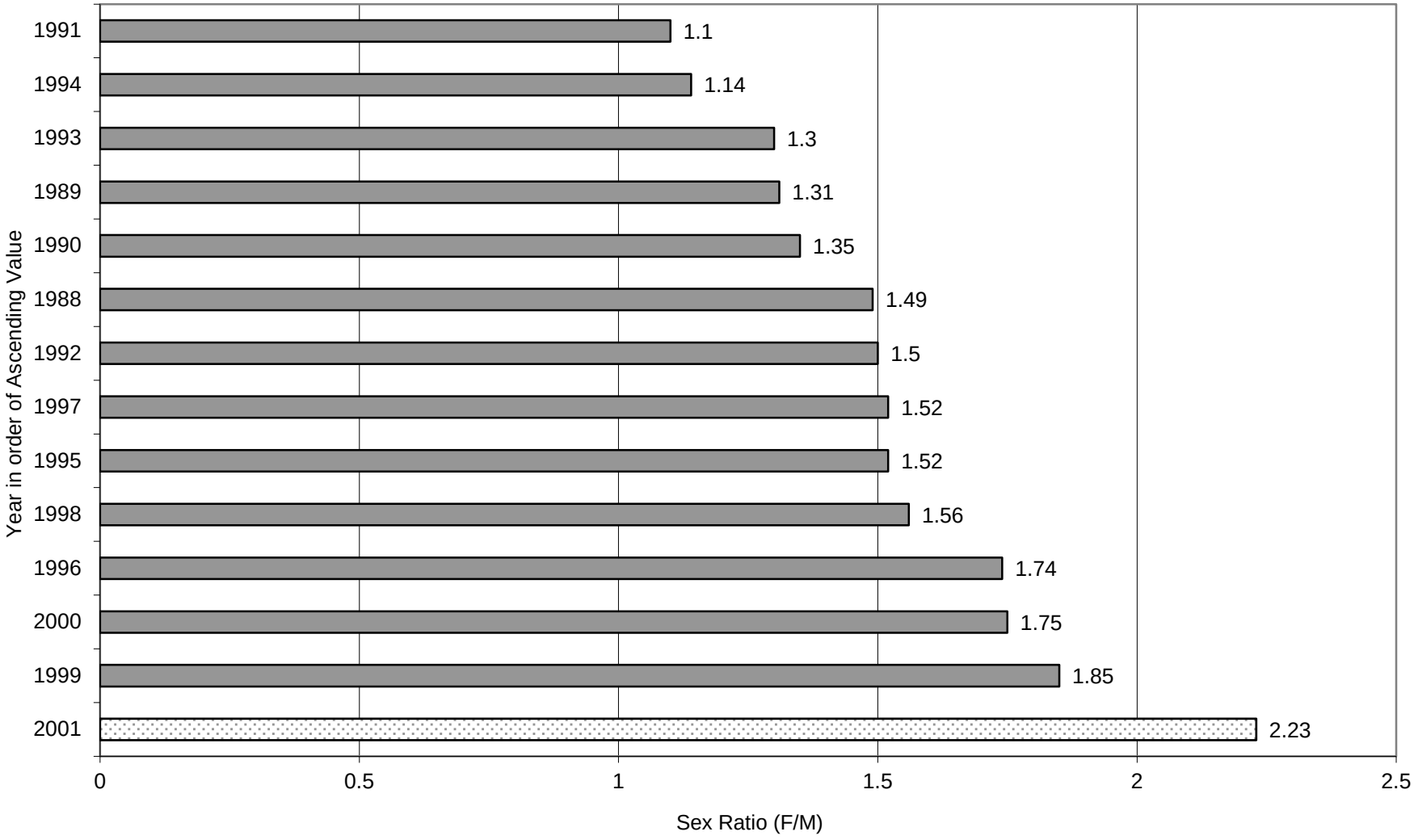


Figure 7
Nechako River Chinook Male Mean Length, 1988-2001

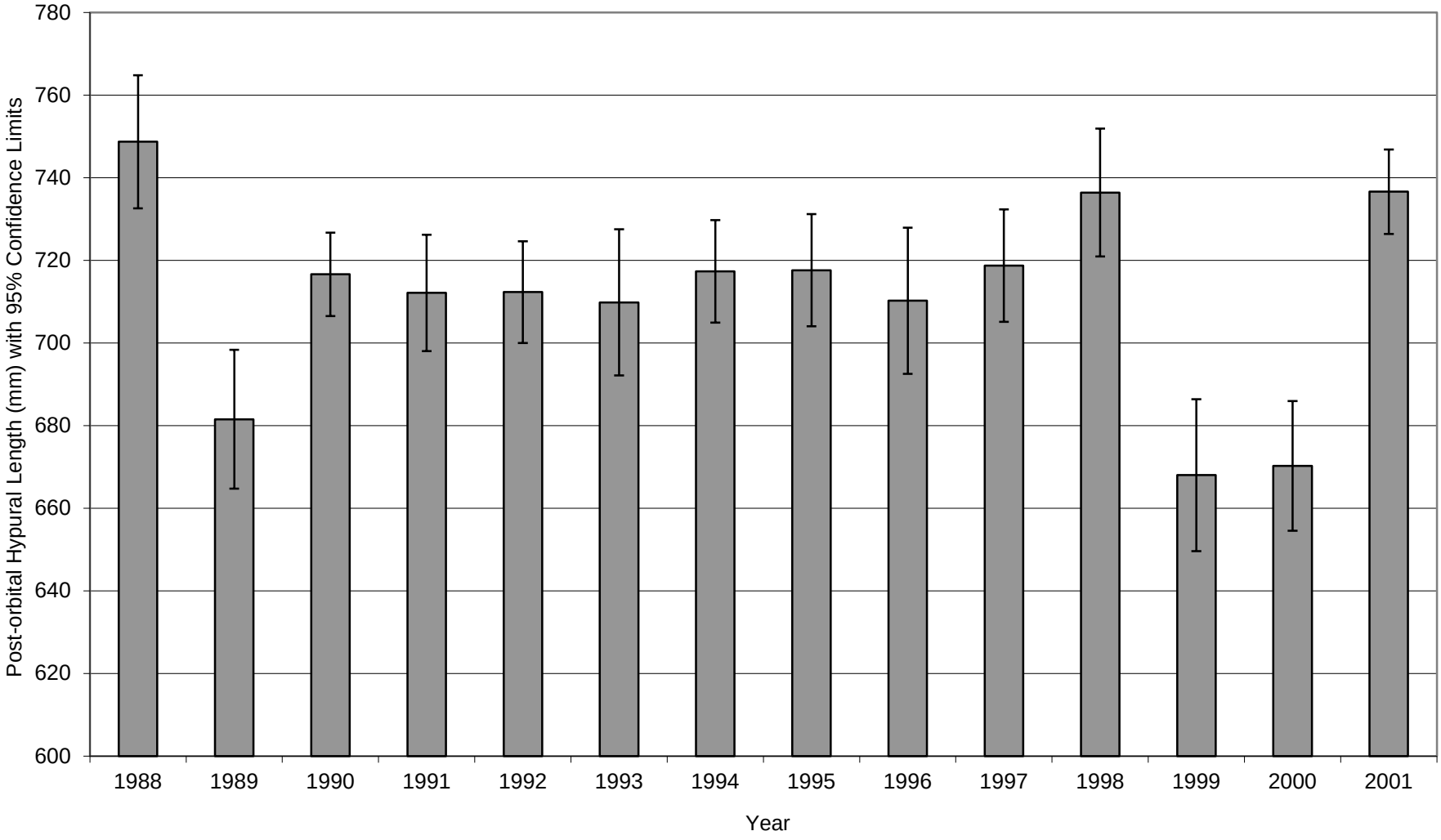


Figure 8
Nechako River Chinook Female Mean Length, 1988-2006

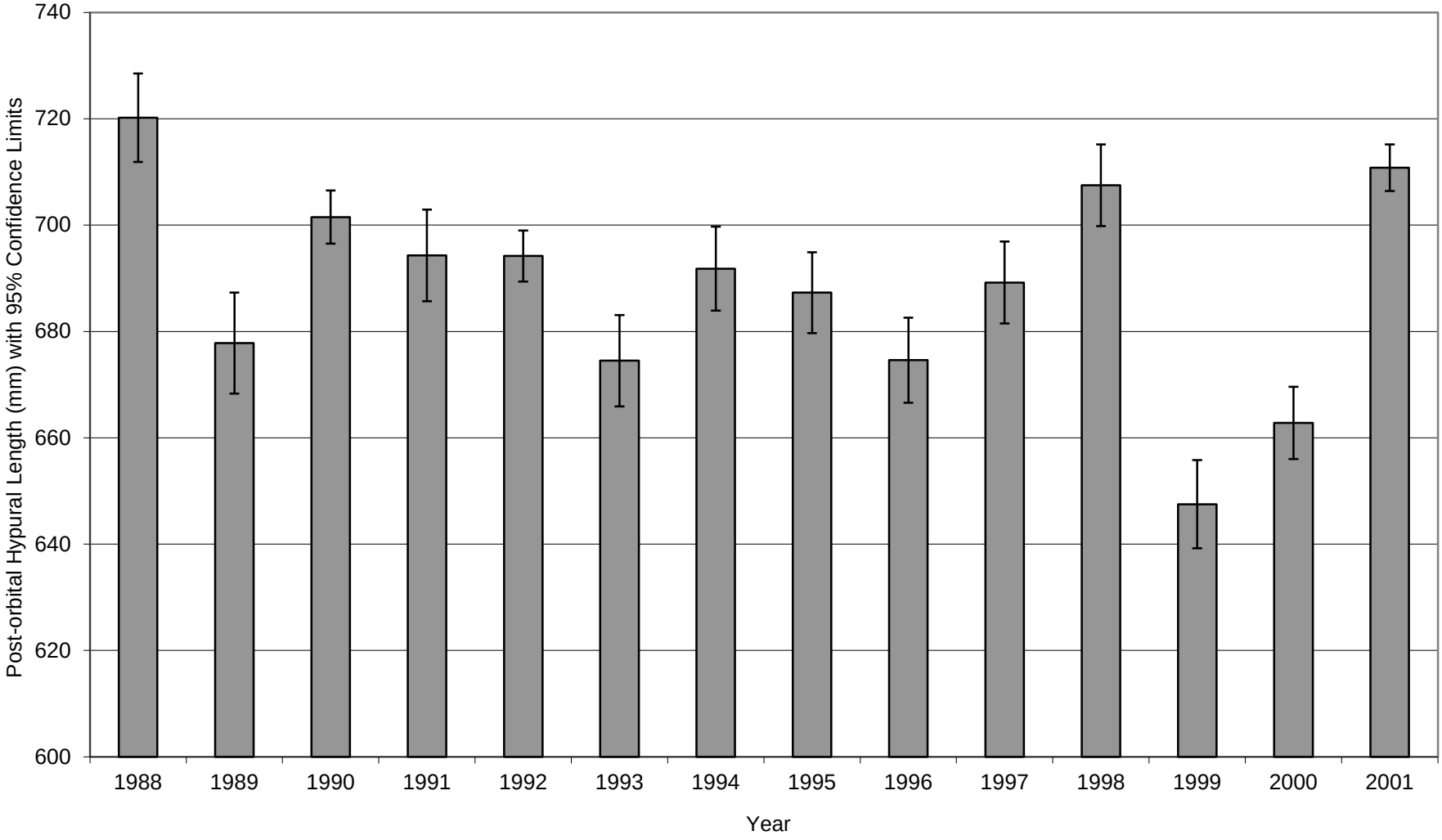
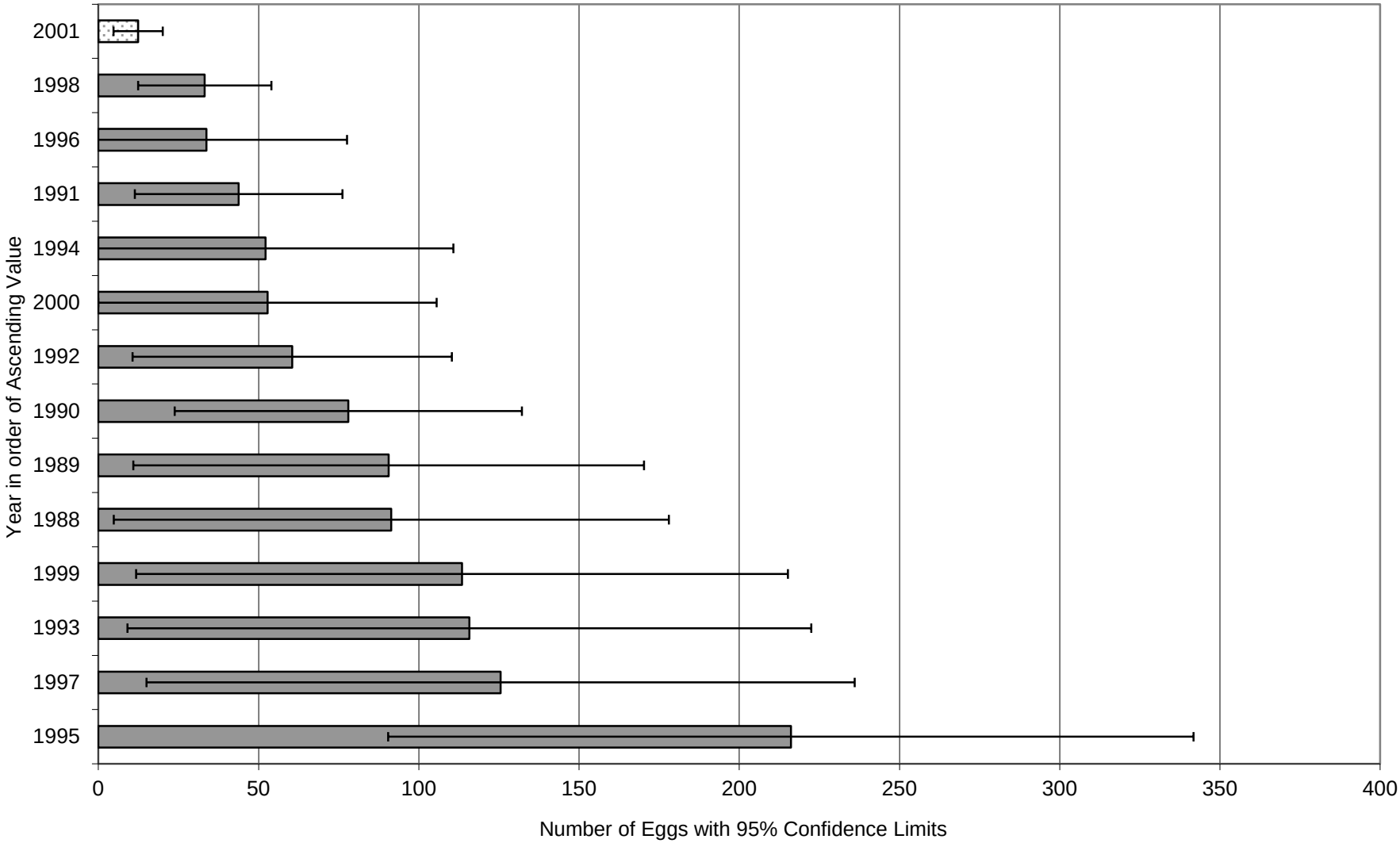


Figure 9
Nechako River Chinook Mean Egg retention, 1988-2001



Appendix 1. Nechako River Carcass Data

Carcass #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs	Scale Samples Book	Spaces	Age (G-R)	Comments
1	16-Sep-01	11	F	2	695	0	79001	1	3M	
2	16-Sep-01	11	F	1	755	0	79001	2	52	
3	16-Sep-01	11	F	2	715	21	79001	3	52	
4	16-Sep-01	11	F	2	717	0	79001	4	52	
5	16-Sep-01	11	F	3	704	3	79001	5	52	
6	16-Sep-01	12	F	3	685	4	79002	1	n/a	
7	16-Sep-01	12	F	2	723	1	79002	2	n/a	
8	16-Sep-01	12	M	2	825		79002	3	n/a	
9	16-Sep-01	12	F	1	699	28	79002	4	n/a	
10	16-Sep-01	12	M	1	792		79002	5	n/a	
11	16-Sep-01	12	M	1	784		79003	1	52	
12	17-Sep-01	3A	F	1	757	115	79003	2	52	
13	17-Sep-01	3A	M	1	603		79003	3	42	
14	17-Sep-01	3A	F	1	692	3	79003	4	52	
15	17-Sep-01	3A	M	1	762		79003	5	52	
16	17-Sep-01	3A	F	2	714	29	79004	1	n/a	
17	17-Sep-01	3A	F	2	705	636	79004	2	n/a	
18	17-Sep-01	3A	F	3	741	629	79004	3	n/a	
19	17-Sep-01	3A	F	1	732	105	79004	4	n/a	
20	17-Sep-01	3A	M	1	732		79004	5	n/a	
21	17-Sep-01	3A	M	4	739		79005	1	52	
22	17-Sep-01	3A	M	1	777		79005	2	52	
23	17-Sep-01	3A	F	1	698	3	79005	3	52	
24	17-Sep-01	3B	F	1	752	311	79005	4	52	
25	17-Sep-01	3B	M	1	594		79005	5	53	
26	18-Sep-01	3B	M	1	702		79006	1	n/a	
27	18-Sep-01	3B	F	1	721	4	79006	2	n/a	
28	18-Sep-01	3B	F	3	724	1	79006	3	n/a	
29	18-Sep-01	3B	M	1	794		79006	4	n/a	
30	18-Sep-01	3B	F	2	752	13	79006	5	n/a	
31	18-Sep-01	3B	M	1	786		79007	1	52	
32	18-Sep-01	3B	M	1	754		79007	2	52	
33	18-Sep-01	3B	F	2	578	33	79007	3	4M	

34	18-Sep-01	3B	F	1	709	0	79007	4	52	
35	18-Sep-01	3B	M	1	646		79007	5	42	
36	18-Sep-01	3B	M	1	777		79008	1	n/a	
37	18-Sep-01	3B	F	2	716	42	79008	2	n/a	
38	18-Sep-01	3B	F	2	551	41	79008	3	n/a	
39	18-Sep-01	3B	F	1	724	2	79008	4	n/a	
40	20-Sep-01	9	F	1	746	0	79008	5	n/a	
41	20-Sep-01	9	F	2	779	0	79009	1	52	
42	20-Sep-01	9	F	1	777	0	79009	2	52	
43	20-Sep-01	9	F	2	741	19	79009	3	52	
44	20-Sep-01	9	F	1	707	0	79009	4	52	
45	20-Sep-01	9	F	1	722	2	79009	5	52	
46	21-Sep-01	9	M	1	722		79010	1	n/a	
47	21-Sep-01	9	M	2	645		79010	2	n/a	
48	21-Sep-01	9	F	1	671	0	79010	3	n/a	
49	21-Sep-01	9	F	3	642	7280	79010	4	n/a	unspawned premort
50	21-Sep-01	9	M	2	738		79010	5	n/a	
51	21-Sep-01	9	M	2	770		79011	1	52	
52	21-Sep-01	9	M	3	786		79011	2	52	
53	21-Sep-01	9	F	2	766	68	79011	3	52	
54	21-Sep-01	9	F	2	762	7	79011	4	52	
55	21-Sep-01	9	M	1	676		79011	5	52	
56	21-Sep-01	9	F	2	727	2	79012	1	n/a	
57	21-Sep-01	9	F	1	697	0	79012	2	n/a	
58	21-Sep-01	9	F	3	676	1	79012	3	n/a	
59	21-Sep-01	9	M	1	747		79012	4	n/a	
60	21-Sep-01	9	F	3	723	3	79012	5	n/a	
61	21-Sep-01	9	F	2	691	6	79013	1	52	
62	21-Sep-01	9	F	1	757	0	79013	2	3M	
63	21-Sep-01	9	F	3	731	0	79013	3	52	
64	21-Sep-01	9	F	1	719	0	79013	4	52	
65	21-Sep-01	9	F	3	707	0	79013	5	52	
66	21-Sep-01	9	M	2	770		79014	1	n/a	
67	21-Sep-01	9	M	3	776		79014	2	n/a	
68	21-Sep-01	9	F	2	752	3	79014	3	n/a	
69	21-Sep-01	9	F	2	705	10	79014	4	n/a	
70	21-Sep-01	9	F	3	678	136	79014	5	n/a	

71	22-Sep-01	12	F	1	684	0	79015	1	52
72	22-Sep-01	12	F	2	705	0	79015	2	52
73	22-Sep-01	12	F	1	681	0	79015	3	52
74	22-Sep-01	12	F	2	676	14	79015	4	52
75	22-Sep-01	12	F	1	674	2	79015	5	3M
76	22-Sep-01	12	F	3	684	0	79016	1	n/a
77	22-Sep-01	12	M	1	739		79016	2	n/a
78	22-Sep-01	12	F	3	662	4	79016	3	n/a
79	22-Sep-01	12	M	3	707		79016	4	n/a
80	22-Sep-01	12	M	3	586		79016	5	n/a
81	22-Sep-01	12	M	2	755		79017	1	52
82	22-Sep-01	12	F	1	732	1	79017	2	52
83	22-Sep-01	12	F	1	755	18	79017	3	52
84	22-Sep-01	12	F	2	710	0	79017	4	52
85	22-Sep-01	12	F	3	696	0	79017	5	3M
86	22-Sep-01	12	F	3	698	9	79018	1	n/a
87	22-Sep-01	12	F	1	742	0	79018	2	n/a
88	22-Sep-01	12	M	2	707		79018	3	n/a
89	22-Sep-01	12	F	3	731	0	79018	4	n/a
90	22-Sep-01	12	M	4	765		79018	5	n/a
91	22-Sep-01	12	F	1	745	2	79019	1	52
92	22-Sep-01	12	F	2	740	1	79019	2	52
93	22-Sep-01	12	M	2	759		79019	3	52
94	22-Sep-01	12	F	1	717	0	79019	4	52
95	22-Sep-01	12	F	1	726	0	79019	5	52
96	22-Sep-01	12	M	3	743		79020	1	n/a
97	22-Sep-01	12	F	2	692	0	79020	2	n/a
98	22-Sep-01	12	M	1	701		79020	3	n/a
99	22-Sep-01	12	M	3	745		79020	4	n/a
100	22-Sep-01	12	F	3	689	0	79020	5	n/a
101	22-Sep-01	12	M	3	764		79021	1	52
102	22-Sep-01	12	F	1	688	4	79021	2	52
103	22-Sep-01	12	M	1	754		79021	3	52
104	22-Sep-01	12	M	1	598		79021	4	42
105	22-Sep-01	12	F	3	721	1	79021	5	52
106	22-Sep-01	12	F	2	726	1	79022	1	n/a
107	22-Sep-01	12	M	3	676		79022	2	n/a

108	22-Sep-01	12	M	3	718		79022	3	n/a	
109	22-Sep-01	12	M	3	746		79022	4	n/a	
110	22-Sep-01	12	F	4	718	0	79022	5	n/a	
111	23-Sep-01	15	F	1	753	2	79023	1	52	
112	23-Sep-01	15	M	3	753		79023	2	52	
113	23-Sep-01	15	F	3	715	2	79023	3	52	
114	23-Sep-01	15	M	3	802		79023	4	62	1030 fork length
115	23-Sep-01	15	M	3	780		79023	5	52	
116	23-Sep-01	15	F	4	722	8	79024	1	n/a	
117	23-Sep-01	15	F	1	703	0	79024	2	n/a	
118	23-Sep-01	15	F	4	681	3	79024	3	n/a	
119	23-Sep-01	15	M	4	702		79024	4	n/a	
120	23-Sep-01	15	F	3	681	2	79024	5	n/a	
121	23-Sep-01	15	F	3	684	3	79025	1	52	
122	23-Sep-01	15	F	3	705	0	79025	2	52	
123	23-Sep-01	15	F	3	715	3	79025	3	52	
124	23-Sep-01	15	F	3	744	0	79025	4	52	
125	23-Sep-01	15	M	3	605		79025	5	42	
126	23-Sep-01	15	M	3	778		79026	1	n/a	
127	23-Sep-01	15	M	3	649		79026	2	n/a	
128	23-Sep-01	15	M	3	760		79026	3	n/a	
129	23-Sep-01	15	F	3	782	1	79026	4	n/a	
130	23-Sep-01	16	F	2	698	0	79026	5	n/a	partially eaten
131	24-Sep-01	12	F	1	740	8	79027	1	52	
132	24-Sep-01	12	F	1	716	1	79027	2	52	
133	24-Sep-01	12	F	1	747	0	79027	3	52	
134	24-Sep-01	12	F	1	659	344	79027	4	42	
135	24-Sep-01	12	F	2	691	0	79027	5	52	
136	24-Sep-01	12	M	1	712		79028	1	n/a	
137	24-Sep-01	12	F	1	721	0	79028	2	n/a	
138	24-Sep-01	12	M	2	746		79028	3	n/a	
139	24-Sep-01	12	F	1	718	4	79028	4	n/a	
140	24-Sep-01	12	F	1	748	12	79028	5	n/a	
141	24-Sep-01	12	F	2	773	0	79029	1	3M	
142	24-Sep-01	12	F	2	717	0	79029	2	52	
143	24-Sep-01	12	F	3	686	0	79029	3	52	
144	24-Sep-01	12	F	1	697	4	79029	4	52	

145	24-Sep-01	12	F	2	751	1	79029	5	52	
146	24-Sep-01	12	F	1	696	0	79030	1	n/a	
147	24-Sep-01	12	F	2	635	37	79030	2	n/a	
148	24-Sep-01	12	F	1	747	3	79030	3	n/a	
149	24-Sep-01	12	F	1	724	1	79030	4	n/a	
150	24-Sep-01	12	M	1	756		79030	5	n/a	971 nose to fork
151	24-Sep-01	12	M	3	782		79031	1	52	989 nose to fork
152	24-Sep-01	12	F	2	690	0	79031	2	52	
153	24-Sep-01	12	F	2	712	1	79031	3	52	
154	24-Sep-01	12	F	3	748	0	79031	4	52	
155	24-Sep-01	12	F	1	746	1	79031	5	52	
156	24-Sep-01	12	F	1	626	2	79032	1	52	
157	24-Sep-01	12	F	3	660	0	79032	2	52	
158	24-Sep-01	12	F	2	715	4	79032	3	42	
159	24-Sep-01	12	F	2	726	1	79032	4	42	
160	24-Sep-01	12	F	3	705	0	79032	5	52	
161	24-Sep-01	12	F	3	647	0	79033	1	42	
162	24-Sep-01	12	F	1	742	3	79033	2	52	
163	24-Sep-01	12	F	2	720	6	79033	3	52	
164	24-Sep-01	12	F	3	716	0	79033	4	52	
165	24-Sep-01	12	M	3	800		79033	5	52	1034 nose to fork
166	24-Sep-01	12	F	1	719	1	79034	1	n/a	
167	24-Sep-01	12	F	2	717	0	79034	2	n/a	
168	24-Sep-01	12	M	2	793		79034	3	n/a	1000 nose to fork
169	24-Sep-01	12	F	1	614	12	79034	4	n/a	
170	24-Sep-01	12	F	3	744	1	79034	5	n/a	
171	24-Sep-01	12	F	1	704	0	79035	1	52	
172	24-Sep-01	11	F	1	735	2	79035	2	52	
173	24-Sep-01	11	F	2	784	0	79035	3	52	
174	24-Sep-01	11	F	2	621	1	79035	4	42	
175	24-Sep-01	11	M	3	801		79035	5	52	
176	24-Sep-01	11	F	3	676	1	79036	1	n/a	
177	24-Sep-01	11	F	1	718	0	79036	2	n/a	
178	24-Sep-01	11	F	2	711	3	79036	3	n/a	
179	24-Sep-01	11	M	2	666		79036	4	n/a	
180	24-Sep-01	11	F	3	739	6	79036	5	n/a	
181	25-Sep-01	16	F	4	719	0	79037	1	n/a	

182	25-Sep-01	16	F	2	711	11	79037	2	n/a
183	25-Sep-01	16	M	4	540		79037	3	n/a
184	25-Sep-01	16	F	1	622	12	79037	4	n/a
185	25-Sep-01	16	F	3	728	0	79037	5	n/a
186	25-Sep-01	16	F	3	721	0	79038	1	n/a
187	25-Sep-01	16	M	3	770		79038	2	n/a
188	25-Sep-01	16	F	3	725	0	79038	3	n/a
189	25-Sep-01	16	M	2	761		79038	4	n/a
190	25-Sep-01	16	M	1	778		79038	5	n/a
191	25-Sep-01	16	F	4	704	6	79039	1	3M
192	25-Sep-01	16	M	1	765		79039	2	52
193	25-Sep-01	16	F	4	695	0	79039	3	52
194	25-Sep-01	16	F	2	722	0	79039	4	52
195	25-Sep-01	16	F	1	608	4	79039	5	42
196	25-Sep-01	16	F	2	692	0	79040	1	n/a
197	25-Sep-01	16	M	2	775		79040	2	n/a
198	25-Sep-01	16	F	1	740	5	79040	3	n/a
199	25-Sep-01	16	F	3	709	4	79040	4	n/a
200	25-Sep-01	16	F	3	767	0	79040	5	n/a
201	27-Sep-01	13	M	4	749		79041	1	4M
202	27-Sep-01	13	M	4	725		79041	2	52
203	27-Sep-01	13	M	4	776		79041	3	52
204	27-Sep-01	13	M	4	768		79041	4	52
205	27-Sep-01	13	M	4	714		79041	5	52
206	27-Sep-01	13	F	3	742	0	79042	1	n/a
207	27-Sep-01	13	F	3	698	0	79042	2	n/a
208	27-Sep-01	13	F	3	699	0	79042	3	n/a
209	27-Sep-01	13	F	3	690	0	79042	4	n/a
210	27-Sep-01	13	F	2	621	0	79042	5	n/a
211	27-Sep-01	13	F	2	757	0	79043	1	3M
212	27-Sep-01	13	F	3	709	0	79043	2	52
213	27-Sep-01	13	F	2	644	1	79043	3	42
214	27-Sep-01	13	M	3	749		79043	4	52
215	27-Sep-01	13	F	3	718	0	79043	5	52
216	28-Sep-01	4	M	4	775		79044	1	n/a
217	28-Sep-01	4	F	3	627	0	79044	2	n/a
218	28-Sep-01	4	F	2	712	0	79044	3	n/a

219	28-Sep-01	4	F	3	756	0	79044	4	n/a
220	28-Sep-01	4	M	4	735		79044	5	n/a
221	28-Sep-01	4	F	3	690	0	79045	1	52
222	28-Sep-01	4	F	2	724	2	79045	2	52
223	28-Sep-01	4	M	4	733		79045	3	52
224	28-Sep-01	4	F	3	663	0	79045	4	3M
225	28-Sep-01	4	M	2	606		79045	5	42
226	28-Sep-01	4	F	1	682	3	79046	1	n/a
227	28-Sep-01	4	M	3	727		79046	2	n/a
228	28-Sep-01	4	M	3	749		79046	3	n/a
229	28-Sep-01	4	F		719	0	79046	4	n/a
230	28-Sep-01	4	M	3	767		79046	5	n/a
231	28-Sep-01	4	M	1	598		79047	1	42
232	28-Sep-01	4	F	2	734	15	79047	2	52
233	28-Sep-01	4	F	1	742	0	79047	3	52
234	28-Sep-01	4	F	2	732	0	79047	4	52
235	28-Sep-01	4	F	3	701	0	79047	5	42
236	28-Sep-01	4	F	2	737	0	79048	1	n/a
237	28-Sep-01	4	F	2	750	0	79048	2	n/a
238	28-Sep-01	4	M	1	747		79048	3	n/a
239	28-Sep-01	4	F	1	748	1	79048	4	n/a
240	28-Sep-01	4	F	1	735	1	79048	5	n/a
241	28-Sep-01	4	M	3	741		79049	1	52
242	28-Sep-01	4	M	2	790		79049	2	52
243	28-Sep-01	4	F	3	678	0	79049	3	52
244	28-Sep-01	4	F	1	712	0	79049	4	52
245	28-Sep-01	4	F	2	730	0	79049	5	52
246	28-Sep-01	4	F	3	707	0	79050	1	n/a
247	28-Sep-01	4	F	3	668	0	79050	2	n/a
248	28-Sep-01	4	F	1	749	1	79050	3	n/a
249	28-Sep-01	4	M	1	767		79050	4	n/a
250	28-Sep-01	4	F	1	714	2	79050	5	n/a
251	29-Sep-01	4	M	1	780		79201	1	52
252	29-Sep-01	4	F	2	726	0	79201	2	52
253	29-Sep-01	4	M	2	647		79201	3	42
254	29-Sep-01	4	F	3	702	11	79201	4	52
255	29-Sep-01	4	M	1	752		79201	5	52

256	29-Sep-01	4	F	2	734	0	79202	1	52	
257	29-Sep-01	4	M	1	780		79202	2	52	
258	29-Sep-01	4	F	2	702	2	79202	3	52	
259	29-Sep-01	4	F	2	716	3	79202	4	2M	
260	29-Sep-01	4	F	3	719	0	79202	5	52	
261	29-Sep-01	4	F	1	774	2	79203	1	n/a	
262	29-Sep-01	4	M	3	789		79203	2	n/a	
263	29-Sep-01	4	F	1	700	4	79203	3	n/a	
264	29-Sep-01	4	F	1	758	3	79203	4	n/a	
265	29-Sep-01	4	M	2	784		79203	5	n/a	
266	29-Sep-01	4	F	3	740	0	79204	1	n/a	
267	29-Sep-01	4	F	2	732	5	79204	2	n/a	
268	29-Sep-01	4	M	3	761		79204	3	n/a	
269	29-Sep-01	4	M	1	751		79204	4	n/a	
270	29-Sep-01	4	F	2	712	0	79204	5	n/a	
271	29-Sep-01	4	F	3	689	4	79205	1	3M	
272	29-Sep-01	4	F	1	603	0	79205	2	42	
273	29-Sep-01	4	F	4	683	356	79205	3	52	
274	29-Sep-01	4	F	4	707	3	79205	4	52	
275	29-Sep-01	4	F	2	694	0	79205	5	3M	
276	29-Sep-01	4	F	2	744	0	79206	1	n/a	
277	29-Sep-01	4	M	2	717		79206	2	n/a	
278	1-Oct-01	10	F	3	735	0	79206	3	n/a	
279	1-Oct-01	10	F	3	730	0	79206	4	n/a	
280	1-Oct-01	10	M	3	806		79206	5	n/a	1018 nose to fork
281	1-Oct-01	10	M	3	708		79207	1	52	
282	1-Oct-01	10	F	3	760	1	79207	2	52	
283	1-Oct-01	10	M	4	722		79207	3	52	
284	1-Oct-01	10	F	3	725	0	79207	4	52	
285	1-Oct-01	10	F	4	658	0	79207	5	52	
286	1-Oct-01	10	F	4	681	0	79208	1	n/a	
287	1-Oct-01	10	F	4	734	0	79208	2	n/a	
288	1-Oct-01	11	F	2	759	2	79208	3	n/a	
289	1-Oct-01	11	F	3	719	skein	79208	4	n/a	skeins too tight to count
290	1-Oct-01	11	F	2	634	0	79208	5	n/a	
291	1-Oct-01	10	F	3	722	0	79209	1	n/a	
292	1-Oct-01	10	M	4	563		79209	2	n/a	

293	1-Oct-01	10	F	3	751	0	79209	3	n/a	
294	1-Oct-01	11	M	3	752		79209	4	n/a	
295	1-Oct-01	11	F	3	691	0	79209	5	n/a	
296	1-Oct-01	11	M	4	602		79210	1	42	
297	1-Oct-01	11	M	4	729		79210	2	52	
298	1-Oct-01	11	M	4	651		79210	3	52	
299	1-Oct-01	11	M	4	759		79210	4	52	
300	1-Oct-01	11	F	1	677	7	79210	5	52	
301	2-Oct-01	3B	F	2	714	2	79211	1	n/a	
302	2-Oct-01	4	F	1	740	12	79211	2	n/a	
303	2-Oct-01	5	F	3	665	0	79211	3	n/a	
304	2-Oct-01	5	F	1	770	0	79211	4	n/a	
305	2-Oct-01	5	M	4	736		79211	5	n/a	
306	2-Oct-01	5	M	2	775		79212	1	n/a	982 nose to fork - very deep
307	2-Oct-01	5	F	2	738	4	79212	2	n/a	
308	2-Oct-01	5	F	3	694	1	79212	3	n/a	
309	2-Oct-01	5	F	4	612	0	79212	4	n/a	
310	2-Oct-01	5	F	3	752	2	79212	5	n/a	
311	2-Oct-01	5	F	4	722	0	79213	1	52	
312	2-Oct-01	5	F	4	679	0	79213	2	52	
313	2-Oct-01	5	M	3	806		79213	3	3M	1042 nose to fork
314	2-Oct-01	5	M	3	763		79213	4	52	
315	2-Oct-01	5	F	4	697	0	79213	5	52	
316	2-Oct-01	5	F	4	715	0	79214	1	n/a	
317	2-Oct-01	5	F	3	722	0	79214	2	n/a	
318	2-Oct-01	5	F	4	732	0	79214	3	n/a	
319	2-Oct-01	5	F	4	724	0	79214	4	n/a	
320	2-Oct-01	5	F	2	723	0	79214	5	n/a	
321	2-Oct-01	5	F	2	732	7	79215	1	52	
322	2-Oct-01	5	F	3	710	0	79215	2	52	
323	2-Oct-01	5	F	4	776	1	79215	3	52	
324	2-Oct-01	5	F	4	692	3	79215	4	52	
325	2-Oct-01	5	M	4	791		79215	5	52	
326	2-Oct-01	5	F	3	734	0	79216	1	n/a	
327	2-Oct-01	5	F	1	739	1	79216	2	n/a	
328	2-Oct-01	5	F	3	749	0	79216	3	n/a	
329	2-Oct-01	5	F	2	713	3	79216	4	n/a	

330	2-Oct-01	5	M	3	771		79216	5	n/a	
331	2-Oct-01	5	F	3	810	0	79217	1	52	989 nose to fork
332	3-Oct-01	3B	F	2	768	0	79217	2	52	
333	3-Oct-01	3B	F	1	709	5	79217	3	52	
334	3-Oct-01	3B	F	3	713	0	79217	4	52	
335	3-Oct-01	3B	F	4	722	0	79217	5	52	
336	3-Oct-01	3B	F	2	760	1	79218	1	n/a	
337	3-Oct-01	3B	M	3	780		79218	2	n/a	
338	3-Oct-01	4	F	3	688	0	79218	3	n/a	
339	3-Oct-01	4	M	3	735		79218	4	n/a	
340	3-Oct-01	4	M	4	801		79218	5	n/a	
341	3-Oct-01	4	M	3	747		79219	1	52	
342	3-Oct-01	4	F	3	768	2	79219	2	4M	
343	3-Oct-01	4	F	3	692	4	79219	3	52	
344	3-Oct-01	4	M	3	753		79219	4	52	
345	3-Oct-01	4	F	3	683	2	79219	5	42	
346	3-Oct-01	4	F	2	723	7	79220	1	n/a	
347	3-Oct-01	4	F	4	743	0	79220	2	n/a	
348	3-Oct-01	4	F	3	692	1	79220	3	n/a	
349	3-Oct-01	4	M	3	715		79220	4	n/a	
350	3-Oct-01	4	F	1	654	1	79220	5	n/a	
351	3-Oct-01	4	F	2	711	9	79221	1	3M	
352	3-Oct-01	4	F	1	747	0	79221	2	3M	
353	3-Oct-01	4	F	2	726	19	79221	3	52	severe crinkle back
354	3-Oct-01	4	F	3	613	4	79221	4	42	
355	3-Oct-01	5	F	1	698	0	79221	5	52	
356	3-Oct-01	6	F	4	706	0	79222	1	n/a	
357	3-Oct-01	6	F	3	698	3	79222	2	n/a	
358	3-Oct-01	6	F	2	729	0	79222	3	n/a	
359	3-Oct-01	6	F	3	722	0	79222	4	n/a	
360	3-Oct-01	6	F	4	720	0	79222	5	n/a	
361	3-Oct-01	6	F	4	696	0	79223	1	3M	
362	3-Oct-01	6	F	3	698	0	79223	2	52	
363	3-Oct-01	6	F	4	668	0	79223	3	42	
364	3-Oct-01	6	F	4	726	0	79223	4	52	
365	3-Oct-01	6	F	3	720	0	79223	5	52	
366	3-Oct-01	6	F	4	735	0	79224	1	n/a	

367	3-Oct-01	6	F	4	598	0	79224	2	n/a	body cavity pecked open
368	3-Oct-01	6	F	3	713	0	79224	3	n/a	
369	3-Oct-01	6	F	1	738	0	79224	4	n/a	
370	3-Oct-01	6	F	4	664	0	79224	5	n/a	
371	3-Oct-01	6	M	2	744		79225	1	52	
372	3-Oct-01	6	M	3	717		79225	2	52	
373	3-Oct-01	6	F	1	762	9	79225	3	52	
374	3-Oct-01	6	F	4	688	0	79225	4	52	
375	3-Oct-01	6	M	1	787		79225	5	52	
376	3-Oct-01	6	M	3	787		79226	1	n/a	
377	3-Oct-01	6	F	4	658	0	79226	2	n/a	
378	3-Oct-01	6	F	3	692	2	79226	3	n/a	
379	3-Oct-01	6	F	1	614	6	79226	4	n/a	
380	3-Oct-01	6	F	4	731	0	79226	5	n/a	
381	3-Oct-01	6	F	3	718	0	79227	1	3M	
382	3-Oct-01	6	F	3	682	0	79227	2	52	
383	3-Oct-01	6	F	3	722	0	79227	3	3M	
384	3-Oct-01	6	M	2	803		79227	4	52	1011 nose to fork
385	3-Oct-01	6	F	3	712	0	79227	5	52	
386	3-Oct-01	6	F	4	705	0	79228	1	n/a	
387	3-Oct-01	6	F	4	713	0	79228	2	n/a	
388	3-Oct-01	6	M	4	741		79228	3	n/a	
389	3-Oct-01	6	M	4	813		79228	4	n/a	1023 nose to fork
390	3-Oct-01	6	F	4	707	0	79228	5	n/a	partially eaten
391	6-Oct-01	12	M	3	762		79229	1	52	
392	6-Oct-01	12	M	1	755		79229	2	52	
393	6-Oct-01	12	M	4	713		79229	3	52	
394	6-Oct-01	12	M	4	768		79229	4	52	
395	6-Oct-01	12	M	4	690		79229	5	52	
396	6-Oct-01	12	F	4	691	0	79230	1	52	
397	6-Oct-01	12	F	4	705	0	79230	2	52	
398	6-Oct-01	12	M	4	684		79230	3	52	
399	6-Oct-01	12	M	4	701		79230	4	52	
400	6-Oct-01	12	F	4	699	0	79230	5	52	

Appendix 2 Stuart River Carcass Data

Carcass #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs	Scale Samples Book	Spaces	Age (G-R)	Comments
1	18-Sep-01	5	M	3	750		78961	1	52	
2	18-Sep-01	5	F	3	715	0	78961	2	52	
3	18-Sep-01	5	M	3	830		78961	3	52	
4	18-Sep-01	5	M	4	780		78961	4	52	
5	18-Sep-01	5	M	4	721		78961	5	52	
6	18-Sep-01	6	M	3	760		78962	1	52	
7	18-Sep-01	6	M	3	810		78962	2	52	
8	18-Sep-01	6	M	3	775		78962	3	52	
9	18-Sep-01	1	F	2	695	16	78962	4	3M	
10	19-Sep-01	2	F	3	665	220	78962	5	52	
11	19-Sep-01	3	M	3	779		78963	1	52	pre spawn
12	19-Sep-01	3	M	3	765		78963	2	52	
13	19-Sep-01	3	M	4	735		78963	3	3M	
14	19-Sep-01	3	F	3	750	22	78963	4	52	
15	19-Sep-01	3	M	3	757		78963	5	52	
16	20-Sep-01	4	M	3	775		78965	1	42	
17	20-Sep-01	4	F	2	723	0	78965	2	52	
18	20-Sep-01	4	F	2	743	0	78965	3	52	
19	20-Sep-01	4	F	3	785	50	78965	4	52	
20	20-Sep-01	4	F	3	734	3	78965	5	52	
21	20-Sep-01	4	F	3	737	0	78966	1	3M	tag missing
22	20-Sep-01	4	F	4	518	0	78966	2	52	
23	20-Sep-01	4	F	2	625	0	78966	3	42	
24	20-Sep-01	4	F	2	778	0	78966	4	52	
25	20-Sep-01	4	F	3	742	5	78966	5	52	
26	20-Sep-01	4	M	2	810		78967	1	S2	
27	20-Sep-01	4	F	3	743	5	78967	2	52	
28	20-Sep-01	4	M	3	735		78967	3	52	tag missing
29	20-Sep-01	4	F	2	755	30	78967	4	52	
30	20-Sep-01	4	F	3	695	3200	78967	5	52	not spawned
31	20-Sep-01	4	F	3	674	0	78960	1	52	
32	20-Sep-01	4	F	3	724	0	78960	2	52	
33	20-Sep-01	4	F	3	700	0	78960	3	52	

34	20-Sep-01	4	F	3	675	1	78960	4	52	
35	20-Sep-01	4	F	3	705	0	78960	5	52	
36	20-Sep-01	4	M	3	785		78959	1	52	
37	20-Sep-01	4	F	3	730	0	78959	2	RS	
38	20-Sep-01	4	F	4	760	0	78959	3	52	
39	20-Sep-01	4	F	3	745	0	78959	4	52	
40	20-Sep-01	4	F	3	730	0	78959	5	RG	
41	20-Sep-01	4	F	3	725	0	78968	1	52	
42	20-Sep-01	4	M	4	775		78968	2	52	
43	20-Sep-01	4	F	4	710	0	78968	3	52	
44	21-Sep-01	4	M	3	746		78968	4	52	
45	21-Sep-01	4	M	3	765		78968	5	52	
46	21-Sep-01	4	F	3	756	0	78969	1	52	
47	21-Sep-01	4	M	3	728		78969	2	52	no gill damage from tag
48	21-Sep-01	4	F	3	751	10	78969	3	52	
49	21-Sep-01	4	F	4	718	10	78969	4	52	
50	18-Sep-01	5	F	3	755	0	78951	5	52	
50	21-Sep-01	4	M	4	831		78969	5	52	
51	18-Sep-01	5	M	3	800		78951	1	52	
52	18-Sep-01	5	M	3	790		78951	2	52	
53	18-Sep-01	5	M	3	800		78951	3	52	
54	18-Sep-01	5	F	3	750	0	78951	4	52	
55	18-Sep-01	6	M	3	816		78952	1	52	
56	18-Sep-01	6	M	3	920		78952	2	52	
57	18-Sep-01	6	M	3	758		78952	3	52	
58	18-Sep-01	6	M	3	829		78952	4	52	
59	18-Sep-01	6	F	3	761	0	78952	5	52	
60	19-Sep-01	2	F	2	762	13	78953	1	52	
61	19-Sep-01	3	F	2	750	136	78953	2	52	
62	19-Sep-01	3	F	3	655	2	78953	3	52	
63	19-Sep-01	3	F	3	653	1	78953	4	52	
64	19-Sep-01	3	F	2	637	3	78953	5	52	
65	19-Sep-01	3	M	3	791		78964	1	52	
66	19-Sep-01	3	F	3	601	0	78964	2	42	
67	19-Sep-01	3	M	3	759		78964	3	52	
68	19-Sep-01	3	F	3	615	2	78964	4	42	
69	19-Sep-01	3	F	3	745	11	78964	5	52	

70	19-Sep-01	3	M	3	745		78954	1	52
71	19-Sep-01	3	F	3	598	6	78954	2	42
72	20-Sep-01	4	M	3	760		78954	3	52
73	20-Sep-01	4	F	3	700	0	78954	4	42
74	20-Sep-01	4	M	3	795		78954	5	52
75	20-Sep-01	4	M	3	825		78955	1	52
76	20-Sep-01	4	M	3	760		78955	2	52
77	20-Sep-01	4	M	3	750		78955	3	52
78	20-Sep-01	4	F	3	695	100	78955	4	3M
79	20-Sep-01	4	F	3	530	0	78955	5	42
80	20-Sep-01	4	F	3	725	30	78956	1	52
81	20-Sep-01	4	F	3	695	0	78956	2	52
82	20-Sep-01	4	F	4	745	0	78956	3	52
83	20-Sep-01	4	F	3	735	9	78956	4	52
84	20-Sep-01	4	M	3	725		78956	5	52
85	20-Sep-01	4	F	2	695	2	78957	1	52
86	20-Sep-01	4	F	3	565	0	78957	2	42
87	20-Sep-01	4	M	3	735		78957	3	52
88	20-Sep-01	4	M	3	780		78957	4	52
89	20-Sep-01	4	F	3	720	0	78957	5	3M
90	20-Sep-01	4	F	2	725	0	78958	1	52
91	20-Sep-01	4	F	2	645	0	78958	2	42
92	20-Sep-01	4	F	3	665	30	78958	3	52
93	20-Sep-01	4	F	2	695	0	78958	4	52
94	20-Sep-01	4	F	2	715	0	78958	5	52
95	26-Sep-01	6	F	4	753	1	79000	1	52
96	26-Sep-01	6	F	3	722	1	79000	2	62
97	26-Sep-01	6	F	3	700	0	79000	3	52
98	26-Sep-01	6	F	3	595	38	79000	4	42
99	26-Sep-01	6	F	3	649	1	79000	5	53
100	21-Sep-01	4	F	3	741	15	78970	1	3M
101	21-Sep-01	4	M	3	820		78970	2	52
102	21-Sep-01	4	M	3	833		78970	3	52
103	21-Sep-01	4	M	4	736		78970	4	3M
104	21-Sep-01	4	M	3	778		78970	5	52
105	21-Sep-01	4	F	4	700	0	78971	1	52
106	21-Sep-01	4	F	3	739	30	78971	2	52

107	21-Sep-01	4	F	3	732	0	78971	3	52
108	21-Sep-01	4	M	4	761		78971	4	42
109	21-Sep-01	4	M	4	815		78971	5	52
110	21-Sep-01	4	F	3	720	0	78972	1	52
111	21-Sep-01	4	M	3	815		78972	2	52
112	21-Sep-01	4	M	3	770		78972	3	52
113	21-Sep-01	4	M	3	555		78972	4	42
114	21-Sep-01	4	M	3	660		78972	5	42
115	21-Sep-01	4	M	3	810		78973	1	52
116	21-Sep-01	4	M	3	740		78973	2	52
117	21-Sep-01	4	M	3	805		78973	3	52
118	21-Sep-01	4	M	3	785		78973	4	52
119	21-Sep-01	4	M	3	830		78973	5	52
120	21-Sep-01	4	F	3	761	12	78974	1	52
121	21-Sep-01	4	M	4	812		78974	2	52
122	21-Sep-01	4	M	4	767		78974	3	52
123	21-Sep-01	4	M	3	560		78974	4	42
124	21-Sep-01	4	M	3	711		78974	5	52
125	21-Sep-01	4	M	3	755		78975	1	52
126	21-Sep-01	4	F	3	710	0	78975	2	52
127	21-Sep-01	4	M	3	775		78975	3	52
128	21-Sep-01	4	F	3	729	0	78975	4	52
129	21-Sep-01	4	M	3	801		78975	5	52
130	21-Sep-01	4	F	3	791	5	78976	1	52
131	21-Sep-01	4	M	3	732		78976	2	52
132	21-Sep-01	4	F	3	795	3	78976	3	52
133	21-Sep-01	4	F	3	733	10	78976	4	52
134	21-Sep-01	4	F	4	735	0	78976	5	3M
135	21-Sep-01	4	F	3	762	0	78977	1	52
136	21-Sep-01	5	M	3	785		78977	2	52
137	21-Sep-01	5	M	4	780		78977	3	52
138	21-Sep-01	5	M	3	735		78977	4	52
139	21-Sep-01	5	M	3	794		78977	5	52
140	21-Sep-01	5	F	3	694	100	78979	1	3M
141	21-Sep-01	5	M	4	770		78979	2	52
142	21-Sep-01	5	F	3	738	30	78979	3	52
143	21-Sep-01	5	F	3	721	1	78979	4	52

144	21-Sep-01	5	M	4	772		78979	5	3M	
145	21-Sep-01	5	M	3	618		78980	1	52	
146	21-Sep-01	5	M	3	771		78980	2	52	
147	21-Sep-01	5	F	3	710	6	78980	3	52	
148	21-Sep-01	5	M	4	778		78980	4	52	
149	22-Sep-01	6	F	3	730	0	78980	5	52	
150	21-Sep-01	5	M	3	768		78978	1	52	
151	21-Sep-01	5	M	3	810		78978	2	42	
152	21-Sep-01	5	M	3	851		78978	3	52	
153	21-Sep-01	5	M	3	785		78978	4	52	
154	21-Sep-01	5	M	3	798		78978	5	52	
155	22-Sep-01	6	M	3	795		78981	1	52	
156	22-Sep-01	6	F	3	720	12	78981	2	42	
157	22-Sep-01	6	M	3	800		78981	3	52	
158	22-Sep-01	6	M	3	785		78981	4	52	
159	22-Sep-01	6	M	3	755		78981	5	52	
160	22-Sep-01	6	F	3	750	0	78982	1	52	
161	22-Sep-01	6	F	3	775	0	78982	2	52	
162	22-Sep-01	6	F	3	715	5	78982	3	52	
163	22-Sep-01	6	F	3	690	0	78982	4	3M	
164	22-Sep-01	6	F	3	760	0	78982	5	52	
165	22-Sep-01	6	F	3	705	20	78983	1	3M	
166	22-Sep-01	6	F	3	770	4	78983	2	52	
167	22-Sep-01	6	F	3	690	0	78983	3	52	
168	22-Sep-01	6	M	3	695		78983	4	42	
169	22-Sep-01	6	M	3	778		78983	5	52	
170	22-Sep-01	6	M	3	745		78984	1	52	
171	22-Sep-01	6	F	3	775	0	78984	2	52	
172	22-Sep-01	6	F	3	710	0	78984	3	52	
173	22-Sep-01	6	M	3	750		78984	4	42	
174	22-Sep-01	6	F	3	725	40	78984	5	52	
175	22-Sep-01	6	M	3	790		78985	1	52	
176	22-Sep-01	6	F	3	745	70	78985	2	3M	
177	22-Sep-01	6	F	3	630	2000	78985	3	42	not spawned - pre spawned mort
178	23-Sep-01	4	F	3	765	5	78985	4	52	
179	23-Sep-01	4	F	3	690	10	78985	5	52	
180	23-Sep-01	4	F	3	710	0	78986	1	3M	

181	23-Sep-01	4	F	3	700	4	78986	2	52
182	23-Sep-01	4	F	3	705	0	78986	3	52
183	23-Sep-01	4	M	3	700		78986	4	4M
184	23-Sep-01	4	M	3	780		78986	5	52
185	23-Sep-01	4	F	3	750	2	78987	1	52
186	23-Sep-01	4	F	3	760	0	78987	2	3M
187	23-Sep-01	4	F	3	600	6	78987	3	42
188	23-Sep-01	4	F	3	610	0	78987	4	42
189	23-Sep-01	4	F	3	715	2	78987	5	52
190	23-Sep-01	4	F	3	725	8	78988	1	52
191	23-Sep-01	4	F	3	635	4	78988	2	2M
192	23-Sep-01	4	F	3	760	0	78988	3	52
193	23-Sep-01	4	M	3	690		78988	4	52
194	23-Sep-01	4	F	3	775	2	78988	5	52
195	23-Sep-01	4	F	3	750	3	78989	1	52
196	23-Sep-01	4	F	3	730	15	78989	2	52
197	23-Sep-01	4	F	3	760	0	78989	3	52
198	23-Sep-01	4	M	3	750		78989	4	3M
199	23-Sep-01	4	F	3	660	0	78989	5	2M
200	24-Sep-01	3	F	3	770	2	78990	1	3M
201	24-Sep-01	3	F	3	770	2	78990	2	52
202	24-Sep-01	3	F	4	760	0	78990	3	42
203	24-Sep-01	3	F	3	755	0	78990	4	52
204	24-Sep-01	3	F	3	670	4	78990	5	52
205	24-Sep-01	3	M	3	750		78991	1	52
206	24-Sep-01	3	F	4	740	0	78991	2	42
207	24-Sep-01	3	M	3	800		78991	3	63
208	24-Sep-01	3	M	3	760		78991	4	52
209	24-Sep-01	3	F	3	790	1	78991	5	52
210	24-Sep-01	3	F	4	737	0	78992	1	52
211	24-Sep-01	3	F	3	625	0	78992	2	42
212	24-Sep-01	3	F	3	725	0	78992	3	52
213	24-Sep-01	3	F	3	718	3	78992	4	52
214	24-Sep-01	3	F	3	695	6	78992	5	52
215	24-Sep-01	3	M	3	744		78993	1	52
216	24-Sep-01	3	F	4	754	0	78993	2	52
217	24-Sep-01	3	F	3	750	30	78993	3	52

218	24-Sep-01	3	F	3	720	20	78993	4	52	
219	24-Sep-01	3	F	3	670	0	78993	5	52	
220	24-Sep-01	3	F	3	710	10	78994	1	42	
221	24-Sep-01	3	F	3	700	0	78994	2	52	
222	24-Sep-01	3	F	3	730	5	78994	3	52	
223	24-Sep-01	3	M	3	760		78994	4	52	
224	24-Sep-01	3	M	3	800		78994	5	52	
225	25-Sep-01	5	F	4	695	15	78995	1	52	
226	25-Sep-01	5	F	3	717	0	78995	2	52	
227	25-Sep-01	5	F	3	618	7	78995	3	42	
228	25-Sep-01	5	F	4	694	220	78995	4	52	
229	25-Sep-01	5	F	3	725	0	78995	5	52	
230	25-Sep-01	5	F	4	675	0	78996	1	52	
231	25-Sep-01	5	F	3	743	0	78996	2	52	
232	25-Sep-01	5	F	2	707	12	78996	3	52	
233	25-Sep-01	5	F	3	763	0	78996	4	52	
234	25-Sep-01	5	F	3	766	0	78996	5	3M	
235	25-Sep-01	5	M	3	792		78997	1	52	
236	25-Sep-01	5	M	3	684		78997	2	42	
237	25-Sep-01	5	M	4	718		78997	3	52	
238	25-Sep-01	5	M	3	777		78997	4	52	
239	25-Sep-01	5	M	3	743		78997	5	52	
240	25-Sep-01	5	F	4	700	0	78998	1	52	
241	25-Sep-01	5	F	3	710	0	78998	2	52	
242	25-Sep-01	5	F	3	680	0	78998	3	52	
243	25-Sep-01	5	F	4	740	0	78998	4	52	
244	25-Sep-01	5	F	3	620	0	78998	5	42	
245	26-Sep-01	6	M	4	671		78999	1	52	
246	26-Sep-01	6	M	4	711		78999	2	52	
247	26-Sep-01	6	M	3	783		78999	3	52	scales on one side
248	26-Sep-01	6	F	4	681	1	78999	4	52	scales taken on one side
249	26-Sep-01	6	F	3	715	0	78999	5	52	