NECHAKO RIVER
CHINOOK CARCASS RECOVERY
2006

NECHAKO FISHERIES CONSERVATION PROGRAM
Data Report No. M06-2

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ABSTRACT

In 2006 adult Chinook salmon (*Oncorhynchus tshawytscha*) carcasses were recovered from the Nechako River 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 200 carcasses were collected on the Nechako River between September 21st and October 5th. Nechako River Chinook carcasses recovered in 2006 exhibited mostly similar biological characteristics to those collected from 1988 to 2005. Values for the female to male ratio of the sample and the mean post-orbital hypural length for both males and females fell within the ranges observed in previous years. The spawning population was almost exclusively comprised of individuals with a stream-type life history and dominated by the 5_2 age-class.

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 a carcass recovery project on the Nechako River each year. The purpose of this project 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 project.

In the past, the information collected from the Nechako River has been 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. As no obvious trends or anomalies were identified over the initial 18 years of the study history (1988-2005), it was decided by the NFCP Technical Committee that the continuation of the annual Stuart River component was not necessary. The annual Stuart River study component may be restarted in the future if deemed necessary.

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. The normal Nechako River target sample size is 200 fish.

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 survey was 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:** 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. Fish age was later determined by analysis of the scales, 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 River in 2006 are presented in Appendix 1. Summaries of this data are provided in the respective sections below.

Between September 21st and October 5th a total of 200[1] carcasses were sampled from 5 of the 16 identified Sections representing all 3 river areas – upper, middle and lower river (Table 1). The observed sex ratio was 1.78 F/M, or 64% females and 36% males (n=200). No Chinook jacks were collected. Of the carcasses sampled, 54% were fresh or only a few days old while 35% were in poor condition with some fungus (Table 2).

The length (POHL) of the fish sampled ranged from 479 to 816 mm, with a mean of 723 mm (n=72, SD=59) for males, 680 mm (n=128, SD=42) for females and 695 mm (n=200, SD=53) 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=128), none were found to be a pre-spawn mortality. One sample was found to be partially spawned, as determined by a retention value of between 1000 and 4999 eggs. Meanwhile, 127 (>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 8 eggs (n=127, SD=46, range 0–450). When including data from the partially spawned sample, mean egg retention of the fully and patrially spawned females increased to 22 eggs (n=128, SD=165, range 0–1803).

Scale 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 184 of those samples (Table 3). The results indicate that the majority of the fish sampled were of two age-classes, 5_2 (79%) and 4_2 (16%). A chi-square test was used to determine that the numbers of males and females in these age-classes were not significantly proportionate to the sex ratio of the sample (p=0.15).

[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.

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

DISCUSSION - COMPARISON TO PREVIOUS YEARS

A comparison of 2006 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 M05-2). 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 1.78 F/M was within the existing range (1.10-2.28) observed from 1988-2005 (Figure 4), and higher than the mean of 1.61 (n=18, SD=0.32), as indicated by 95% confidence limit of 1.46-1.75.

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 2006 fell within the ranges observed in previous years (Figures 5 and 6).

The average fecundity of Nechako River female Chinook is estimated at 6563 eggs per fish (Table 4) based on egg retention estimates of unspawned females collected since 1978. 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 5). The 2006 mean is among the lowest values when compared to historic data but the confidence limits fit within the bounds of all years' results (Figure 7).

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 2006, age-classes 4_2 and 5_2 accounted for 95% of the return (n=184), with all stream-type fish accounting for 96% of the sample (Table 6).

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 7 to facilitate the discussion in the Nechako River Chinook Enumeration report (NFCP M06-1).

ACKNOWLEDGMENTS

Nechako River carcass recovery was conducted by Colin Barnard.

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

Rhonda Thibeault and Liz Murphy assisted with data compilation.

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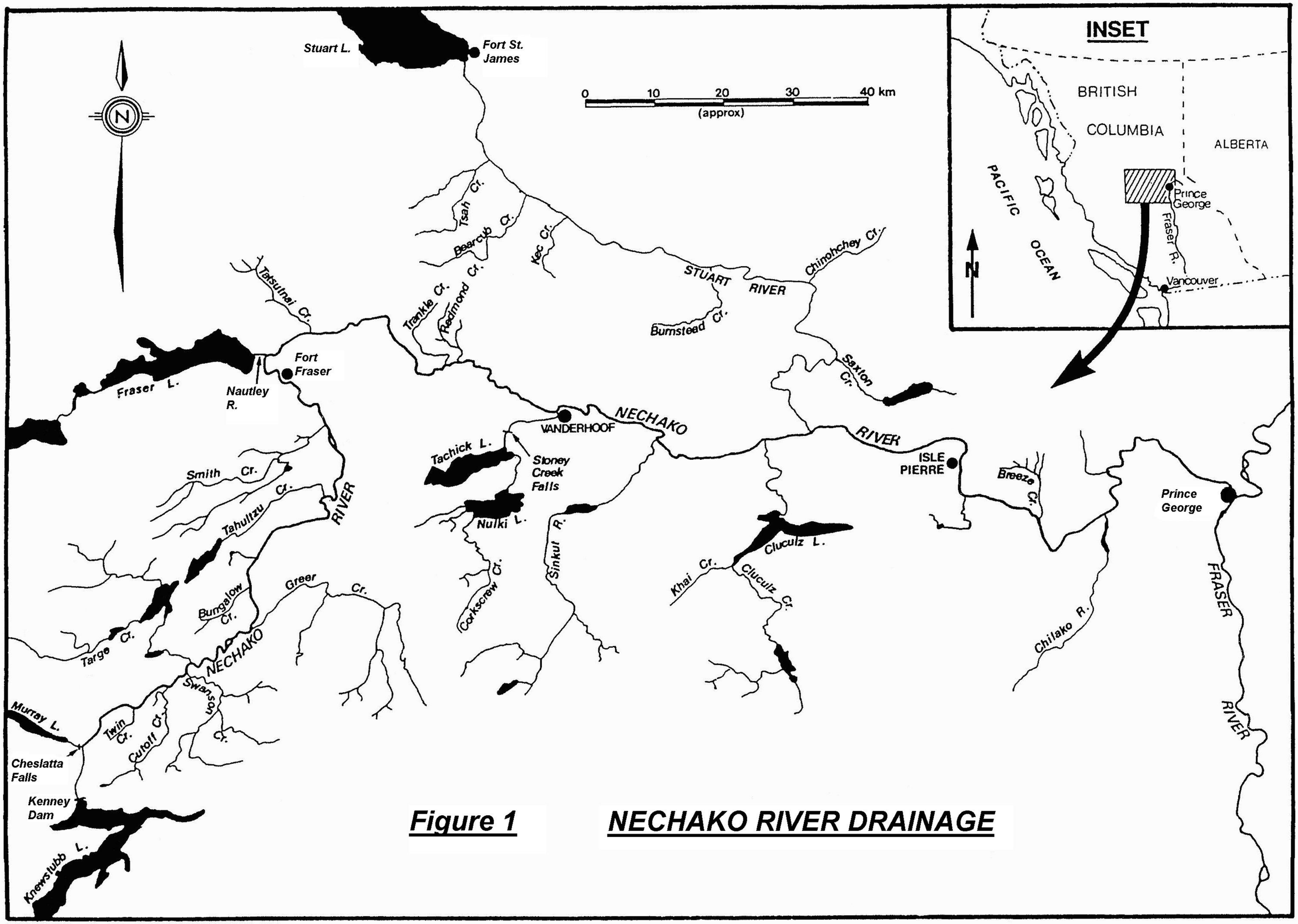


Figure 1 **NECHAKO RIVER DRAINAGE**

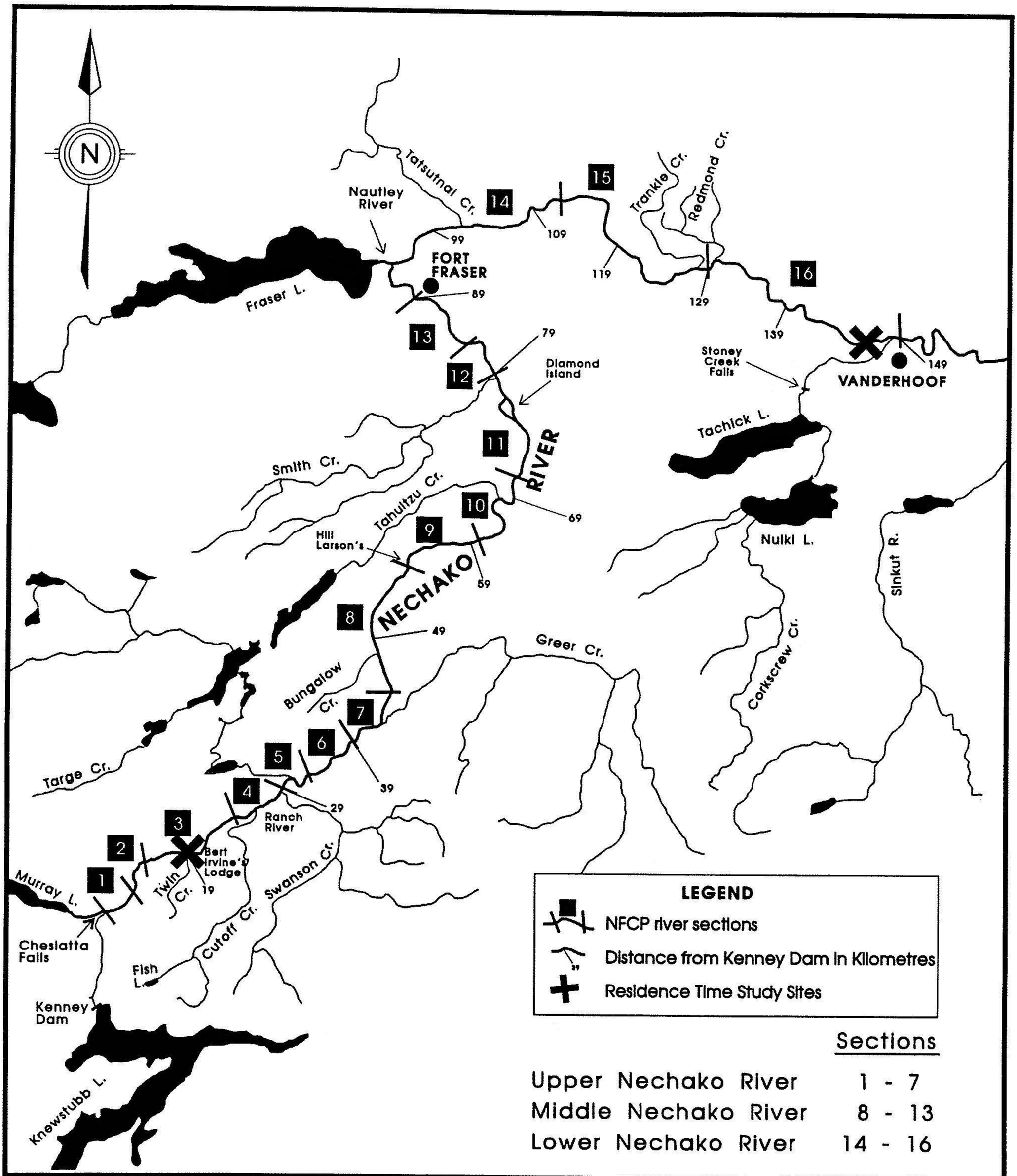


FIGURE 2. NECHAKO RIVER CHINOOK SPAWNING STUDY AREA

Table 1
Nechako River Chinook Carcass Recovery by Section, 2006

Section	Number	Percent
UPPER NECHAKO		
Section 1	0	0.0
Section 2	0	0.0
Section 3	70	35.0
Section 4	0	0.0
Section 5	0	0.0
Section 6	0	0.0
Section 7	0	0.0
SUB-TOTAL	70	35.0
MIDDLE NECHAKO		
Section 8	0	0.0
Section 9	0	0.0
Section 10	0	0.0
Section 11	30	15.0
Section 12	60	30.0
Section 13	0	0.0
SUB-TOTAL	90	45.0
LOWER NECHAKO		
Section 14	0	0.0
Section 15	20	10.0
Section 16	20	10.0
SUB-TOTAL	40	20.0
TOTAL RIVER	200	100.0

Table 2
Nechako River Chinook Carcass Condition, 2006

Condition *	Number	Percent
1	66	33.0
2	41	20.5
3	69	34.5
4	24	12.0
TOTAL	200	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, 2006

	4-1	4-2	5-2	6-2	Total # Aged
Males	3.1	10.8	86.2	0.0	72
Females	4.2	18.5	75.6	1.7	128

Table 4
Nechako River Chinook Fecundity, 1978-2006

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 5
Nechako River Chinook Egg Retention, 1988-2006

	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
2002	133	0-813	13.5	0	n/a	13.5
2003	125	0-696	15.7	2	1100-3032	48
2004	139	0-417	6.7	0	n/a	6.7
2005	123	0-584	13.2	1	3000	37.3
2006	127	0-450	7.5	1	1803	21.6

Table 6
Percent Contribution of Stream-type Life Histories
to Nechako Chinook Escapements, 1988-2006

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
2002	93	98	178
2003	96	100	164
2004	98	100	169
2005	95	100	170
2006	95	96	184

Table 7
Percent Contribution of Age-at-Return Groupings
to Nechako Chinook Escapements, 1988-2006

	% 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
2002	0.6	22.5	73.0	3.9	0.0	178
2003	1.2	31.1	65.2	2.4	0.0	164
2004	0.6	37.3	60.9	1.2	0.0	169
2005	0.6	27.1	67.6	4.7	0.0	170
2006	0.0	19.6	79.3	1.1	0.0	184

Figure 4
Nechako River Chinook Length Frequency Distribution, 2006

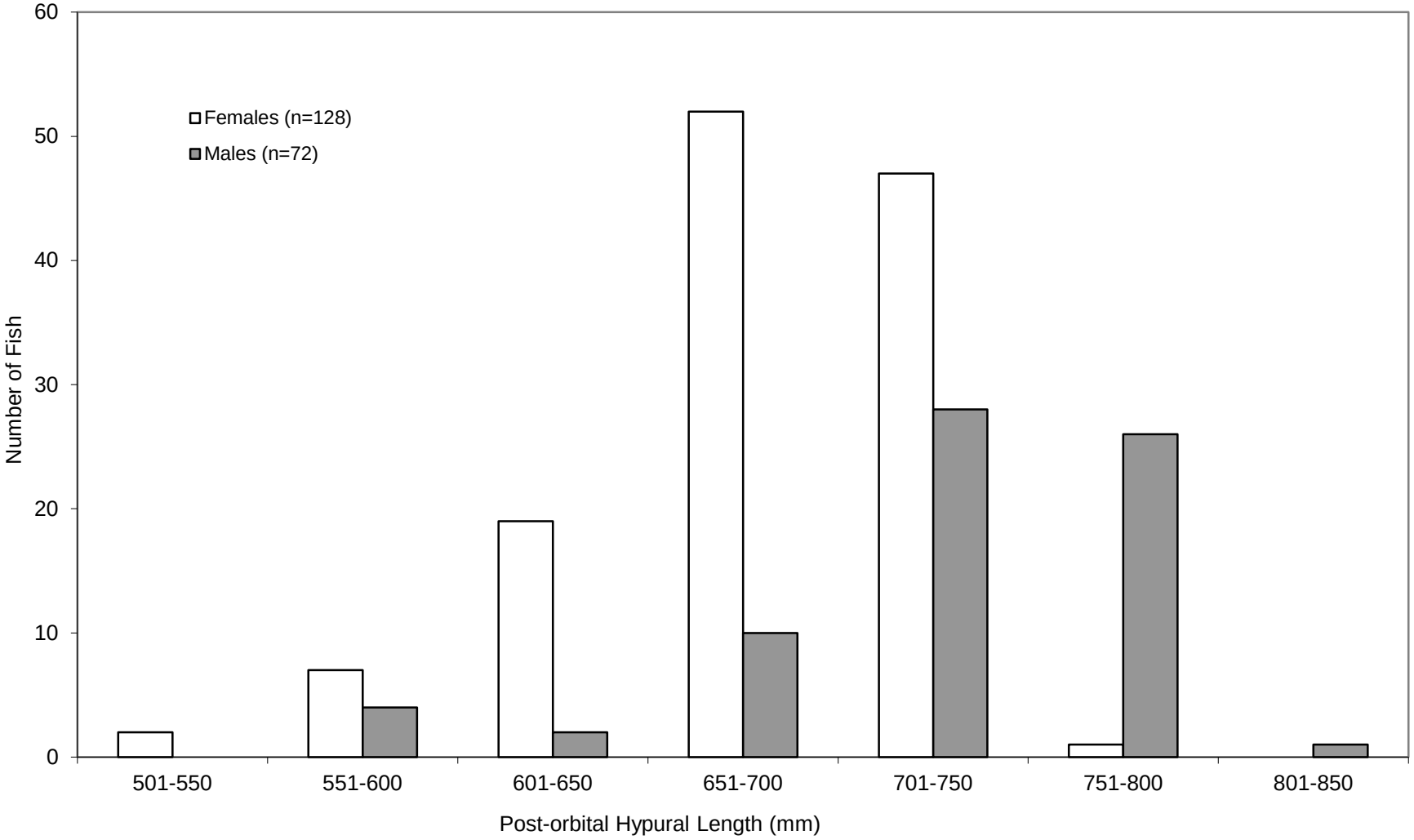


Figure 5
Nechako River Chinook Sex Ratio, 1988-2006

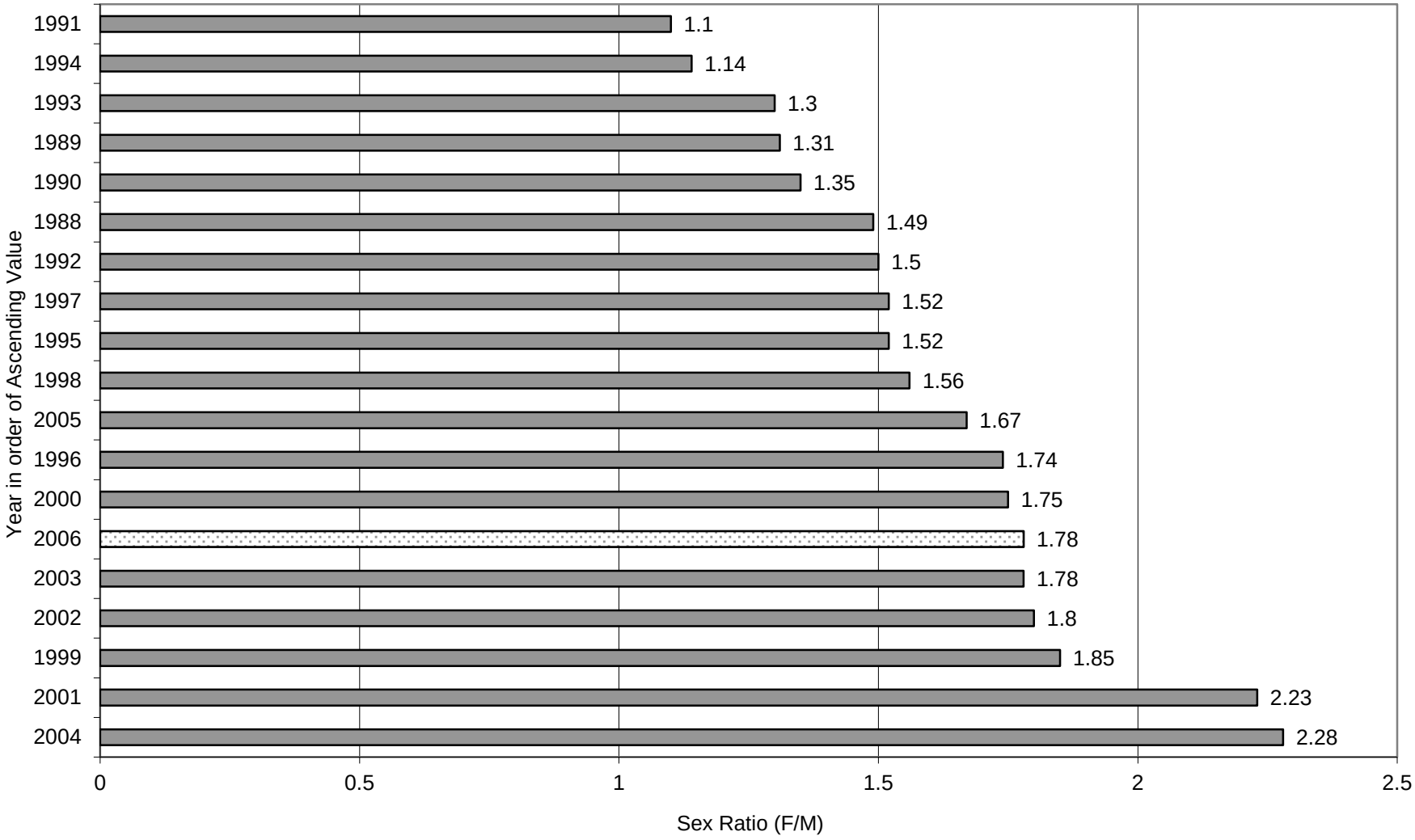


Figure 6
Nechako River Chinook Male Mean Length, 1988-2006

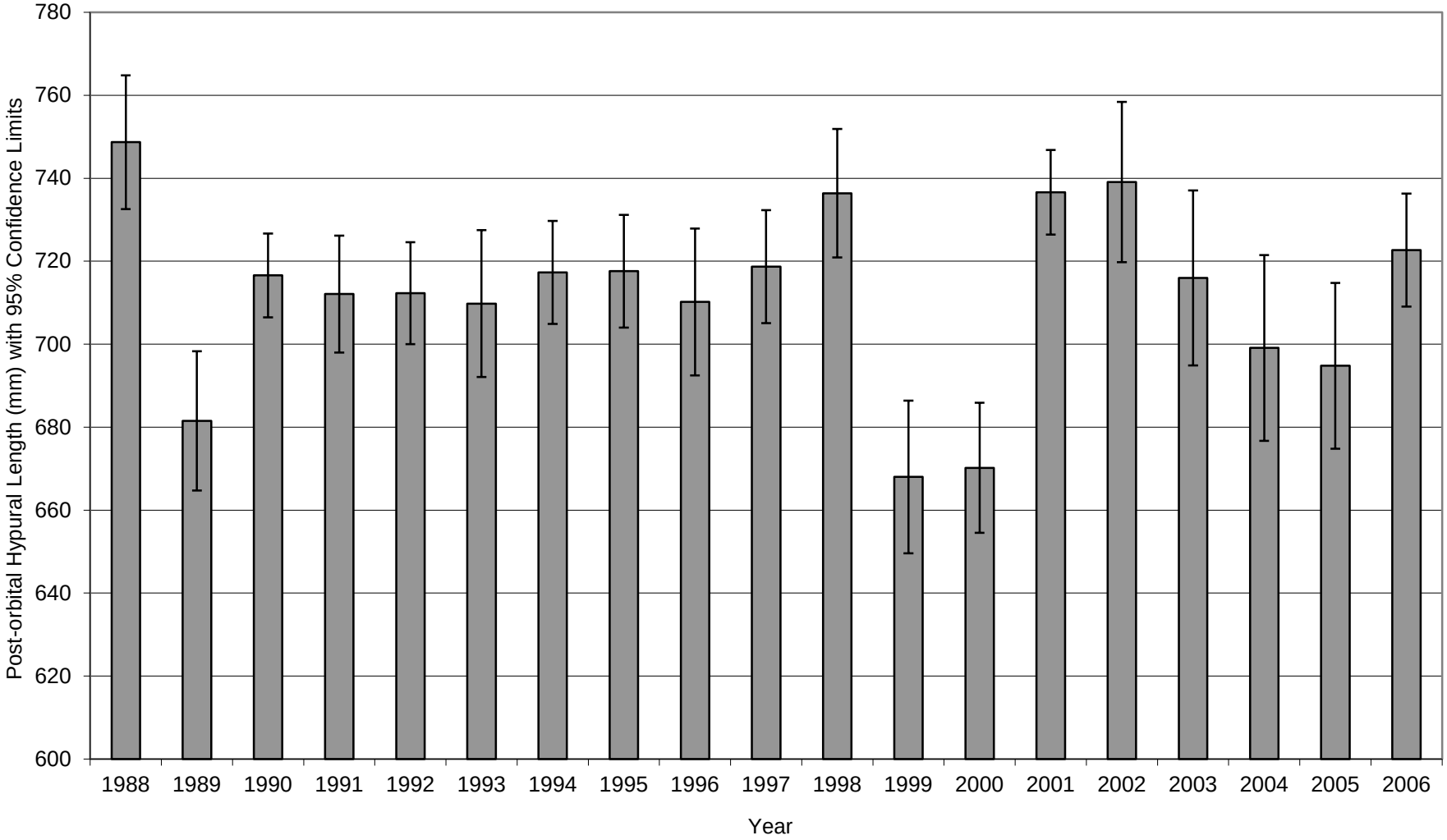


Figure 7
Nechako River Chinook Female Mean Length, 1988-2006

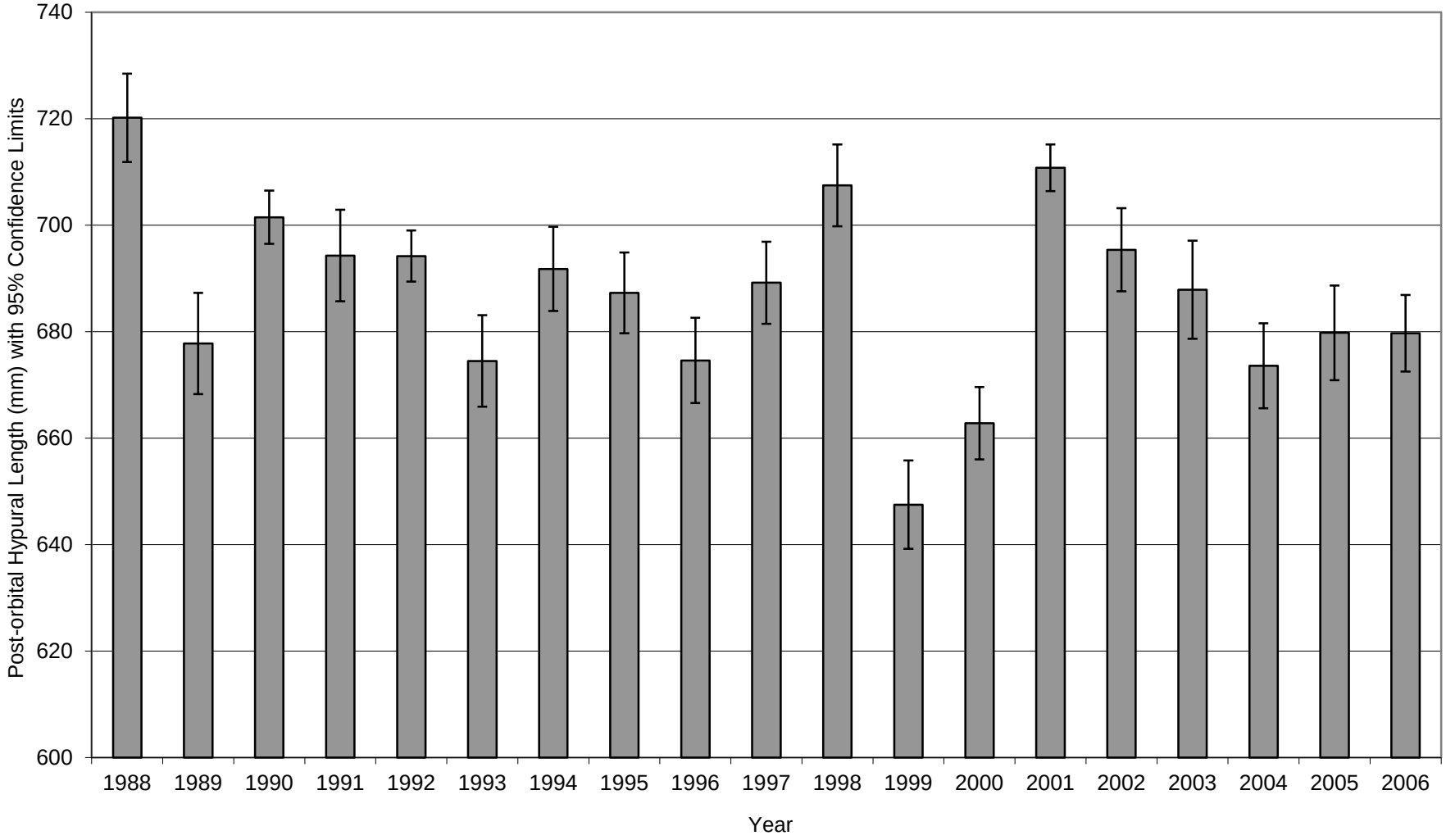
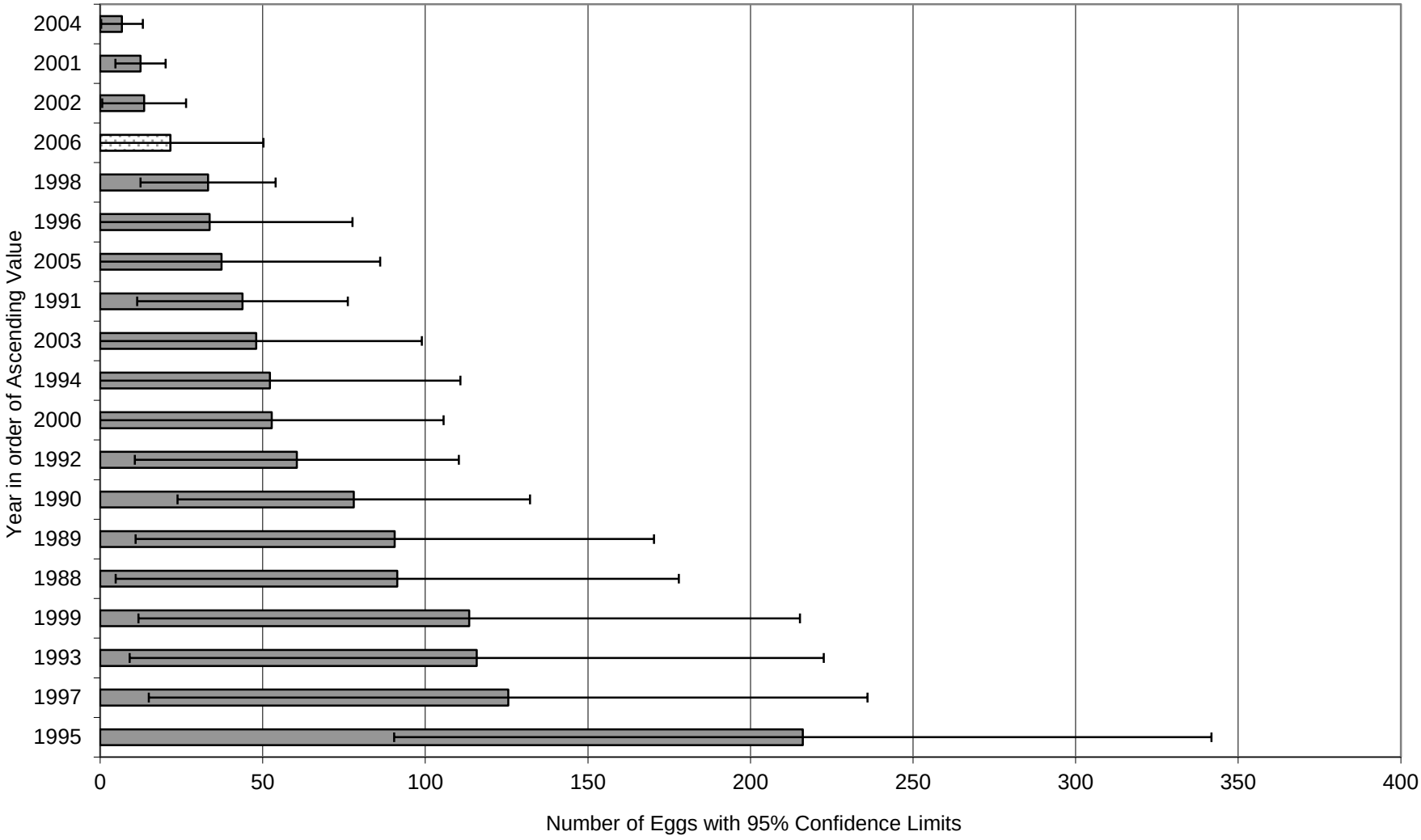


Figure 8
Nechako River Chinook Mean Egg retention, 1988-2006



Appendix 1 Nechako Carcass Data

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
1	21-Sep-06	11	f	1	643	0	79301 1	42	
2	21-Sep-06	11	f	1	577	0	79301 2	52	
3	21-Sep-06	11	f	1	645	7	79301 3	52	
4	21-Sep-06	11	f	1	742	1	79301 4	52	
5	21-Sep-06	11	f	1	654	0	79301 5	52	
6	24-Sep-06	11	f	2	716	0	79302 1	52	
7	24-Sep-06	11	f	2	653	0	79302 2	52	
8	24-Sep-06	11	m	2	683		79302 3	52	
9	24-Sep-06	11	f	1	710	0	79302 4	52	
10	24-Sep-06	11	f	1	665	4	79302 5	52	
11	24-Sep-06	12	f	3	684	0	79303 1	52	
12	24-Sep-06	12	m	2	725		79303 2	52	
13	24-Sep-06	12	m	2	748		79303 3	52	
14	24-Sep-06	12	f	1	691	0	79303 4	52	
15	24-Sep-06	12	m	3	719		79303 5	52	
16	24-Sep-06	12	f	2	711	65	79304 1	52	
17	24-Sep-06	12	m	1	787		79304 2	52	
18	24-Sep-06	12	m	1	723		79304 3	52	
19	24-Sep-06	12	f	2	704	3	79304 4	52	
20	24-Sep-06	12	f	2	721	3	79304 5	52	
21	24-Sep-06	12	f	1	656	0	79305 1	52	
22	24-Sep-06	12	m	3	721		79305 2	52	partially decomposed
23	24-Sep-06	12	f	1	693	17	79305 3	52	
24	24-Sep-06	12	f	4	683	0	79305 4	52	
25	24-Sep-06	12	f	1	672	2	79305 5	52	
26	24-Sep-06	12	m	2	775		79306 1	52	
27	24-Sep-06	12	m	2	757		79306 2	52	
28	24-Sep-06	12	m	4	757		79306 3	52	
29	24-Sep-06	12	f	1	702	0	79306 4	3M	
30	24-Sep-06	12	m	3	754		79306 5	52	
31	25-Sep-06	3.1	m	3	762		79307 1	52	fork length 1011
32	25-Sep-06	3.1	m	1	794		79307 2	52	fork length 1028

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
33	25-Sep-06	3.1	m	1	678		79307 3	52	
34	25-Sep-06	3.1	m	1	735		79307 4	3M	
35	25-Sep-06	3.1	m	1	730		79307 5	52	
36	25-Sep-06	3.1	m	3	735		79308 1	52	
37	25-Sep-06	3.1	f	3	681	0	79308 2	52	
38	25-Sep-06	3.1	f	2	714	0	79308 3	52	
39	25-Sep-06	3.1	m	3	765		79308 4	52	fork length 1000
40	25-Sep-06	3.1	m	1	711		79308 5	52	
41	25-Sep-06	3.1	f	1	668	6	79309 1	52	
42	25-Sep-06	3.1	f	3	685	0	79309 2	41	
43	25-Sep-06	3.1	f	2	747	2	79309 3	52	
44	25-Sep-06	3.1	f	2	634	0	79309 4	41	
45	25-Sep-06	3.1	f	4	718	450	79309 5	52	partially spawned
46	25-Sep-06	3.1	m	1	723		79310 1	52	
47	25-Sep-06	3.1	m	2	698		79310 2	52	
48	25-Sep-06	3.1	m	2	772		79310 3	52	
49	25-Sep-06	3.1	f	1	690	42	79310 4	52	
50	25-Sep-06	3.1	f	1	730	0	79310 5	52	
51	25-Sep-06	3.1	f	2	718	0	79311 1	52	
52	25-Sep-06	3.1	f	1	698	0	79311 2	62	
53	25-Sep-06	3.1	m	1	743		79311 3	52	
54	25-Sep-06	3.1	f	2	665	1	79311 4	3M	
55	25-Sep-06	3.1	m	1	723		79311 5	52	
56	25-Sep-06	3.1	m	1	709		79312 1	52	
57	25-Sep-06	3.1	f	2	737	0	79312 2	52	
58	25-Sep-06	3.1	f	1	719	4	79312 3	3M	
59	25-Sep-06	3.2	f	1	664	0	79312 4	41	
60	25-Sep-06	3.2	m	1	784		79312 5	3M	fork length 1033
61	26-Sep-06	3.2	m	3	735		79313 1	52	
62	26-Sep-06	3.2	m	2	754		79313 2	3M	
63	26-Sep-06	3.2	f	3	746	1	79313 3	52	
64	26-Sep-06	3.2	f	1	712	0	79313 4	52	
65	26-Sep-06	3.2	m	1	713		79313 5	52	
66	26-Sep-06	3.2	m	1	723		79314 1	52	

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
67	26-Sep-06	3.2	f	3	704	0	79314 2	52	
68	26-Sep-06	3.2	f	2	694	0	79314 3	3M	
69	26-Sep-06	3.2	m	4	740		79314 4	41	
70	26-Sep-06	3.2	m	3	723		79314 5	52	
71	26-Sep-06	3.2	m	3	767		79315 1	52	fork length 1001
72	26-Sep-06	3.2	f	1	643	2	79315 2	41	
73	26-Sep-06	3.2	f	4	693	0	79315 3	52	
74	26-Sep-06	3.2	f	2	704	0	79315 4	52	
75	26-Sep-06	3.2	m	1	725		79315 5	52	
76	26-Sep-06	3.2	f	1	733	1	79316 1	42	
77	26-Sep-06	3.2	f	4	715	0	79316 2	52	
78	26-Sep-06	3.2	f	1	691	2	79316 3	42	
79	26-Sep-06	3.2	m	2	781		79316 4	52	fork length 1003
80	26-Sep-06	3.2	f	4	725	0	79316 5	52	
81	26-Sep-06	3.2	f	1	719	0	79317 1	52	
82	26-Sep-06	3.2	m	1	758		79317 2	52	
83	26-Sep-06	3.2	f	3	638	1803	79317 3	52	
84	26-Sep-06	3.2	f	1	700	2	79317 4	52	
85	26-Sep-06	3.2	f	3	711	0	79317 5	52	
86	26-Sep-06	3.2	m	1	752		79318 1	52	
87	26-Sep-06	3.2	m	2	716		79318 2	52	
88	26-Sep-06	3.2	f	3	694	0	79318 3	52	
89	26-Sep-06	3.2	f	1	669	0	79318 4	52	
90	26-Sep-06	3.2	m	2	723		79318 5	52	
91	26-Sep-06	3.2	m	4	775		79319 1	3M	fork length 1003
92	26-Sep-06	3.2	m	3	730		79319 2	52	
93	26-Sep-06	3.2	f	1	702	0	79319 3	52	
94	26-Sep-06	3.2	f	4	718	0	79319 4	62	
95	26-Sep-06	3.2	f	1	725	31	79319 5	52	
96	26-Sep-06	3.2	f	3	673	0	79320 2	52	
96	26-Sep-06	3.2	m	3	668		79320 1	52	
97	26-Sep-06	3.2	m	1	675		79320 3	52	crinkle back
99	26-Sep-06	3.2	m	2	793		79320 4	52	fork length 1000
100	26-Sep-06	3.2	f	1	700	0	79320 5	52	

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
101	29-Sep-06	15	f	1	613	0	79321 1	42	
102	29-Sep-06	15	f	2	655	0	79321 2	52	
103	29-Sep-06	15	m	3	774		79321 3	52	
104	29-Sep-06	15	f	3	747	0	79321 4	52	
105	29-Sep-06	15	f	3	688	0	79321 5	3M	
106	29-Sep-06	15	f	3	677	0	79322 1	52	
107	29-Sep-06	15	f	2	701	0	79322 2	52	
108	29-Sep-06	15	f	1	628	1	79322 3	42	
109	29-Sep-06	15	f	1	686	1	79322 4	52	
110	29-Sep-06	15	f	1	630	2	79322 5	42	
111	30-Sep-06	15	f	2	727	18	79323 1	52	
112	30-Sep-06	15	m	3	703		79323 2	52	
113	30-Sep-06	15	f	1	688	7	79323 3	52	
114	30-Sep-06	15	f	1	708	0	79323 4	52	
115	30-Sep-06	15	f	1	653	0	79323 5	42	
116	30-Sep-06	15	f	4	691	0	79324 1	52	
117	30-Sep-06	15	f	3	592	0	79324 2	42	
118	30-Sep-06	15	f	1	600	0	79324 3	42	
119	30-Sep-06	15	f	1	631	0	79324 4	42	
120	30-Sep-06	15	f	1	724	0	79324 5	52	
121	1-Oct-06	16	m	3	700		79325 1	52	
122	1-Oct-06	16	f	3	672	2	79325 2	52	
123	1-Oct-06	16	f	1	682	3	79325 3	52	
124	1-Oct-06	16	f	2	720	0	79325 4	52	
125	1-Oct-06	16	m	3	592		79325 5	42	
126	1-Oct-06	16	f	1	677	0	79326 1	52	
127	1-Oct-06	16	m	3	740		79326 2	52	
128	1-Oct-06	16	f	3	695	0	79326 3	n/a	
129	1-Oct-06	16	f	4	631	0	79326 4	42	
130	1-Oct-06	16	m	3	695		79326 5	42	
131	2-Oct-06	16	f	1	702	250	79327 1	52	
132	2-Oct-06	16	m	3	479		79327 2	42	
133	2-Oct-06	16	f	3	641	0	79327 3	3M	
134	2-Oct-06	16	m	2	756		79327 4	52	

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
135	2-Oct-06	16	f	1	721	1	79327 5	52	
136	2-Oct-06	16	m	2	575		79328 1	42	
137	2-Oct-06	16	f	2	622	0	79328 2	52	
138	2-Oct-06	16	m	1	656		79328 3	52	
139	2-Oct-06	16	f	3	632	0	79328 4	42	
140	2-Oct-06	16	f	2	686	0	79328 5	52	
141	2-Oct-06	12	f	3	703	0	79329 1	52	
142	2-Oct-06	12	f	3	688	0	79329 2	52	
143	2-Oct-06	12	f	3	704	0	79329 3	52	
144	2-Oct-06	12	m	4	757		79329 4	52	
145	2-Oct-06	12	f	2	663	0	79329 5	42	
146	2-Oct-06	12	f	3	672	0	79330 1	52	
147	2-Oct-06	12	f	3	590	0	79330 2	42	
148	2-Oct-06	12	f	2	717	0	79330 3	52	
149	2-Oct-06	12	m	3	644		79330 4	n/a	
150	2-Oct-06	12	m	3	594		79330 5	42	
151	3-Oct-06	12	m	3	728		79331 1	52	
152	3-Oct-06	12	f	3	723	0	79331 2	52	
153	3-Oct-06	12	f	4	604	0	79331 3	42	
154	3-Oct-06	12	f	4	665	0	79331 4	52	
155	3-Oct-06	12	f	4	687	0	79331 5	52	
156	3-Oct-06	12	f	2	625	3	79332 1	42	
157	3-Oct-06	12	m	4	770		79332 2	3M	
158	3-Oct-06	12	f	4	720	0	79332 3	52	
159	3-Oct-06	12	m	3	624		79332 4	42	
160	3-Oct-06	12	f	4	683	0	79332 5	52	
161	3-Oct-06	12	f	3	694	0	79333 1	42	
162	3-Oct-06	12	f	4	703	0	79333 2	3M	
163	3-Oct-06	12	f	3	702	0	79333 3	52	
164	3-Oct-06	12	f	3	674	0	79333 4	52	
165	3-Oct-06	12	f	3	704	0	79333 5	52	
166	3-Oct-06	12	f	3	700	0	79334 1	52	
167	3-Oct-06	12	f	3	587	0	79334 2	42	
168	3-Oct-06	12	m	3	721		79334 3	52	

Fish #	Date	Reach	Sex	Condition	POHL (mm)	# Eggs Retained	Fish Sample	Age (Gilbert-Rich)	Comments
169	3-Oct-06	12	f	3	645	0	79334 4	52	
170	3-Oct-06	12	f	2	752	0	79334 5	52	
171	3-Oct-06	12	f	3	692	0	79335 1	52	
172	3-Oct-06	12	f	3	675	0	79335 2	52	
173	3-Oct-06	12	m	3	785		79335 3	52	fork length 1010
174	3-Oct-06	12	f	4	548	0	79335 4	42	
175	3-Oct-06	12	f	3	680	0	79335 5	52	
176	3-Oct-06	12	m	3	577		79336 1	42	
177	3-Oct-06	12	f	3	712	0	79336 2	3M	
178	3-Oct-06	12	f	4	635	0	79336 3	52	
179	3-Oct-06	12	f	3	662	0	79336 4	52	
180	3-Oct-06	12	f	3	586	0	79336 5	52	
181	4-Oct-06	11	m	1	677		79337 1	41	
182	4-Oct-06	11	m	1	778		79337 2	3M	
183	4-Oct-06	11	f	3	701	0	79337 3	52	
184	4-Oct-06	11	m	2	673		79337 4	52	
185	4-Oct-06	11	f	3	715	0	79337 5	52	
186	4-Oct-06	11	f	1	633	22	79338 1	41	
187	4-Oct-06	11	m	1	816		79338 2	52	fork length 1032
188	4-Oct-06	11	f	4	695	0	79338 3	52	
189	4-Oct-06	11	f	2	646	0	79338 4	42	
190	4-Oct-06	11	m	3	716		79338 5	52	
191	5-Oct-06	11	f	3	708	0	79339 1	52	
192	5-Oct-06	11	m	3	768		79339 2	52	
193	5-Oct-06	11	m	4	751		79339 3	52	
194	5-Oct-06	11	f	3	599	0	79339 4	42	
195	5-Oct-06	11	f	1	669	0	79339 5	52	
196	5-Oct-06	11	f	2	670	0	79340 1	52	
197	5-Oct-06	11	m	3	733		79340 2	52	
198	5-Oct-06	11	f	3	701	0	79340 3	52	
199	5-Oct-06	11	f	2	545	2	79340 4	42	
200	5-Oct-06	11	m	4	793		79340 5	52	fork length 1030