

Final Report of DNA Stock Composition of Catch and Release Chinook Salmon in the 2007 WCVI Troll Fishery

Background

DNA can provide information on stock group specific impacts of the WCVI troll fishery. This is important for managing the WCVI troll fishery since limited coded wire tag (CWT) information exists for non-summer portions of the year. In response to domestic conservation requirements in recent years, the WCVI troll fishery has shifted slightly compared to the Pacific Salmon Commission (PSC) Chinook model base period (1979-82). During the base period, fishery impacts occurred mainly from March to October, whereas recently, fishery impacts have shifted away from summer months to avoid weak stocks, and expanded further into the winter months. Additionally, catches are currently considerably lower than they were during the base period. Consequently, the current impacts of the WCVI troll fishery as determined by the PSC Chinook model (using CWT data from the base period) may not be comparable. In addition, the relatively low numbers of CWT recovered by the Mark Recovery Program (MRP) may not be sufficient to accurately identify fishery impacts from the smaller catches characteristic of winter fishery openings, especially on the monthly time scale required. The use of DNA methods provides an independent means of evaluating the impact of this fishery on chinook stocks, and is used to supplement the CWT information to provide the best available estimate of impact on stocks. In addition, WCVI troll fishery planning for Chinook requires that management objectives for weak stocks are met using limited CWT and DNA information. This project provides improved information for evaluating current impacts and avoiding future impacts on weak stocks, thereby achieving conservation objectives of the PST while minimizing economic disruption associated with elimination of fisheries.

Project Objectives

The program objectives were to:

- 1) Determine the stock composition of WCVI troll chinook fisheries from January 2007 to May 2008 using DNA analysis techniques. Although this component of the project has been funded by the SEF since 2004, a more comprehensive sampling approach has been used since December 2006 (sampling of the total catch for DNA vs. sampling only unmarked (mainly wild) Chinook).
- 2) Summarize existing DNA stock composition data collected from the WCVI Chinook troll fishery in a technical report format. The DNA based stock composition data will be compared to CWT based stock composition data.

Results

Stock Composition Estimates (Objective 1)

The total catch from each fishery opening (strata = month and PFMA) was sub-sampled using stratified random sampling to obtain a minimum of 100-200 DNA samples per monthly fishing area stratum, or at least a 4% sampling rate (whichever was greater). The samples were collected mainly through the existing MRP program, but also opportunistically through observers/fishers at sea. A description of the DNA sampling protocol used during the project period is included in Appendix 1. A total of 13062 Chinook DNA samples were collected

from the WCVI troll fishery from January 2007 to May 2008 (Table 1). DNA samples were collected from 3% to 49% of the total catch (average of 22%) in each stratum (NWVI, SWVI) and month when fishery openings occurred.

Of samples collected, the goal was to analyse samples from approximately 2% of the total catch in each catch region and month (or a minimum of 100 plugs), totalling an estimated 3250 samples for the period. Samples were selected to be representative of the catch in each PFMA and then rolled up to the catch region (NWVI, SWVI) level. Of the 13062 DNA samples collected, 3250 samples were analysed by the PBS molecular genetics lab (Table 2) at a cost of \$20 per fish. Samples were analysed with the GAPS (Genetic Analysis of Pacific Salmon; version 2.1, plus additional DFO populations submitted but not included in a new GAPS release) baseline which is based on thirteen microsatellite loci surveyed in approximately 25,000 chinook from 181 populations ranging from Russia and Alaska to California. Stock composition results by month and catch region are found in Appendix 2.

DNA Report Compilation (Objective 2)

A manuscript report has been compiled for DNA data collected from 2002 to 2008. This report is currently undergoing near final revisions (73 pp.), to be followed by a review process. The final report is estimated to be available by fall 2009. The following is a Table of Contents from the report. The List of Tables and Figures is given in Appendix 3. A draft report is available for review upon request.

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Table 1. Chinook catch, PFMA's fished, number of DNA samples collected and analysed, and percent of catch sampled for DNA, by month and catch region stratum (SWVI, NWVI) from January 2007 to May 2008.

Sampling Year	Sampling Month	Catch Region	Chinook Catch	Areas Fished	# DNA Plugs Collected	# DNA Plugs Analysed	% of Catch Sampled
2007	Jan	SWTR	736	23-24/123-124	271	99	37%
		NWTR	4,704	25-27/125-127	1259	187	27%
2007	Feb	SWTR	1,044	23-24/123-124	383	52	37%
		NWTR	1,543	125/126/27/127	218	100	14%
2007	Mar	SWTR	1,205	23/123	596	133	49%
		NWTR	1,107	125-126	217	100	20%
2007	Apr	SWTR	3,277	23/123	529	145	16%
		NWTR	1,946	126-127	167	100	9%
2007	May	SWTR	18,520	23/123	1955	369	11%
		NWTR	4,944	126-127	1047	99	21%
2007	Jun	SWTR	12,464	23/123-124	802	250	6%
		NWTR	12,519	126-127	2134	251	17%
2007	Jul	SWTR	0	no fishery	0	0	n/a
		NWTR	0	no fishery	0	0	n/a
2007	Aug	SWTR	0	no fishery	0	0	n/a
		NWTR	0	no fishery	0	0	n/a
2007	Sep	SWTR	4,936	123-124	825	100	17%
		NWTR	1,046	125-127	139	95	13%
2007	Oct	SWTR	2,065	123-124	468	100	23%
		NWTR	1,072	125-127	338	81	32%
2007	Nov	SWTR	0	no fishery	0	0	n/a
		NWTR	0	no fishery	0	0	n/a
2007	Dec	SWTR	0	no fishery	0	0	n/a
		NWTR	0	no fishery	0	0	n/a
2008	Jan	SWTR	464	23/123-124	161	100	35%
		NWTR	1,170	25-26/125-127	245	122	21%
2008	Feb	SWTR	921	23-24/123-124	331	100	36%
		NWTR	990	25-26/125-126	305	102	31%
2008	Mar	SWTR	0	no fishery	0	0	n/a
		NWTR	0	no fishery	0	0	n/a
2008	Apr	SWTR	11	23-24/123-124	0	0	0%
		NWTR	1,706	125-127	424	396	25%
2008	May	SWTR	7,754	23-24/123-124	248	167	3%
					13062	3248	

Note: NWVI = Northwest Vancouver Island; SWVI = Southwest Vancouver Island

Table 2. Number of DNA samples analysed by month and catch region stratum from 2007 and early 2008 WCVI troll fisheries.

Sample Number	Sample Year	Gear	Areas Fished	Collection Month	Sample Size	# Samples Excluded
1	2007	troll	SWVI Area23/123-124	January	99	0
2	2007	troll	NWVI Area125-126	January	187	0
3	2007	troll	SWVI Area23/123	February	52	0
4	2007	troll	NWVI Area126	February	100	0
5	2007	troll	SWVI Area23/123	March	133	0
6	2007	troll	NWVI Area125/126	March	100	0
7	2007	troll	SWVI Area23/123	April	145	0
8	2007	troll	NWVI Area126-127	April	100	0
9	2007	troll	SWVI Area23/123	May	369	0
10	2007	troll	NWVI Area126-127	May	99	1
11	2007	troll	SWVI Area23/123/124	June	250	0
12	2007	troll	NWVI Area126-127	June	251	0
13	2007	troll	SWVI Area123	September	100	0
14	2007	troll	NWVI Area125-127	September	95	1
15	2007	troll	SWVI Area123	October	100	0
16	2007	troll	NWVI Area125-126	October	81	0
1	2008	troll	SWVI Area23/123	January	100	0
2	2008	troll	NWVI Area125/126/26	February	122	0
3	2008	troll	SWVI Area23/123	February	100	0
4	2008	troll	NWVI Area125/126	March	102	0
5	2008	troll	NWVI Area 125-127	April	396	0
6	2008	troll	SWVI Area123124	May	167	0
					3248	2

Budget

The total overall allocated Southern Endowment Fund budget was \$116,750 (Canadian funds). The DFO in kind contribution was estimated at \$21,750.

Proposed and actual direct costs and DFO in-kind contributions are as follows:

<u>Direct</u>		<u>Proposed</u>	<u>Actual</u>
▪ DNA sampling			
	(2 staff @50 days @8 hr/day day @\$25/hr) =	\$20,000	\$8,413.09
▪ Report compilation	=	\$6,000	\$11,182.22
▪ DNA sampling materials	=	\$1,500	\$0
▪ Mileage / travel expenses	=	\$2,500	\$211.75
▪ DNA lab analysis for proposed 3250 samples, including labour and supplies (3250 samples x \$20/fish)	=	<u>\$65,000</u>	<u>\$65,000</u>
TOTAL	=	\$95,000	\$84,807.06

<u>DFO – In Kind</u>			
▪ Project consultation, (1 staff @5 days @7.5 hr/day @\$40/hr)	=	\$1,500	\$1,500
▪ Project management (2 staff @20 days @7.5 hr/day @\$30/hr)	=	\$9,000	\$9,000
▪ Report compilation (2 staff @25 days @7.5 hr/day @\$30/hr)	=	<u>\$11,250</u>	<u>\$11,250</u>
TOTAL	=	\$21,750	\$21,750
TOTAL COSTS	=	<i>\$116,750</i>	

The 10% hold-back funding of \$9,500 has not been included in the actual costs due to the fact that the end date and final report deadline were missed resulting in the holdback amount not being received.

DNA sampling costs were lower than proposed: only 30 sampling days were required for 2 samplers versus the 50 days estimated in the proposal. Report compilation costs were higher than proposed due to the long history of the DNA program (7 years), and the amount of data being compiled from various data handlers. DNA sampling material and travel costs were much lower than proposed due to the fact that the DNA lab now covers sample vials and ethanol costs. The DNA lab analysis costs, and in-kind costs were as proposed.

Project Benefits

This project relates to the harvest rate indices prescribed in the PST for chinook salmon in the WCVI AABM fishery. These are management goals based on base period fishing patterns. Regional planning processes use CWT information related to base period fishing patterns as the basis for planning. In the non-summer fishing period there are few CWT data and so planning process are compromised. The effect of changes in fishing patterns from the base period and impact on harvest rate indices is an issue. DNA information from the fisheries will improve the knowledge base more quickly than using CWT only. Increased conservation and improved fisheries management will provide potential for increased returns of stocks of concern. Increased returns will provide more rapid rebuilding. DNA information will also provide insight into the spatial and temporal distribution of various chinook stock groups, allowing fisheries to be better shaped to avoid stocks of concern.

This project will benefit the chinook stocks, the fishery managers, the fishermen, and the local WCVI communities. Chinook stocks will benefit from increased conservation and more rapid rebuilding of weaker stocks. Fishery managers will benefit through improved fisheries management information, including the ability to avoid weaker stocks. Fishers will benefit from greater fishing opportunities made possible through avoidance of weaker stocks. Rebuilding of weaker stocks will increase TAC in future years. Local WCVI communities will benefit from greater fishing activity in their areas, improving their economic outlook.

Appendices

Appendix I. WCVI Chinook Troll DNA Sampling Protocol (January 2007 to May 2008)

Appendix II. Regional DNA results from the sampling of the West Coast Vancouver Island Chinook troll fishery (from WCTR_CN_DNAdata_Jan07_May08_SEF.xls).

Appendix III. List of Tables and Figures from the draft manuscript report summarizing DNA information collected from 2002 to 2008 West Coast Vancouver Island Chinook troll fisheries.

Data

DNA results (raw regional data spreadsheet) are provided in hardcopy as well as on the accompanying CD.

Electronic Files Provided

SEF 2007 Chinook DNA Cover Letter.doc

SEF 2007 Chinook DNA Final Rpt.doc

WCTR_CN_DNAdata_Jan07_May08_SEF.xls

APPENDIX I

WCVI Chinook Troll DNA Sampling Protocol (January 2007 to May 2008)

WCVI Troll Chinook DNA Sampling Protocol for Sampling to Occur from January 2007 to May 2008

Objective:

- To collect a sample of chinook DNA from each WCVI troll PFMA that is representative of catch in that PFMA.
- The temporal stratum is the length of the fishery opening (samples should represent the catch over the whole length of that opening).

DNA Sampling Approach:

- The number of DNA samples to be collected from each offload is summarized in Table 1 below.
- DNA sample collection should be spread out over the length of the fishery opening as much as possible (although collect more plugs than needed at the start of the fishery opening in case of unforeseen closures).
- DNA sample collection should be taken from single vessel samples (unmixed samples) and single (unmixed) areas as priorities wherever possible.
- DNA sample collection should be taken from as many vessels as possible.
- Whether fish are graded or ungraded, the sample should be taken so as to be random and representative of the catch, regardless of mark.
- DNA samples should be kept separate by mark (2 bulk vials for each of adipose-on fish and adipose-off fish).
- Where fish caught on more than one vessel have been mixed as a result of grading (i.e. 2 boats' fish in 1 tote), these fish can be sampled as long as the boats have fished in the same catch region (NWVI or SWVI) and the areas fished are known.
- Sample the entire catch from a vessel (or vessels if the catch was graded and combined over PFMA).

Appendix 1 continued.

Table 1. DNA sampling requirements for different chinook catch levels in the WCVI troll fishery.

Number of Offloaded Chinook	DNA Sample To be Taken From:
<35	Every fish
36-75	Every 2 nd fish
76-125	Every 3 rd fish
126-750	Every 5 th fish
751 or greater	Every 10 th fish

Data Recording Requirements:

- Sampling Date and Location
- Sampler Names
- Vessel Name (s)
- PFMA Fished
- Mark Type (adipose-on, adipose-off)
- DNA Vial #
- # plugs in each vial

APPENDIX II

Regional DNA results from the sampling of the
2007/08 West Coast Vancouver Island
Chinook troll fisheries

Species = chinook Number of populations = 181 Baseline Description = GAPS 2.1 enhanced Number of loci = 13
 Max missing loci = 8 Number of chains = 8 Number of Reps = 20000 Reps Kept = 1000

		2007 07wctdfo troll SWVI Area23/123-124		2007 07wctdfo troll NWVI Area125-126		2007 07wctdfo troll SWVI Area23/123		2007 07wctdfo troll NWVI Area126		2007 07wctdfo troll SWVI Area23/123	
		January 99(0)		January 187(0)		February 52(0)		February 100(0)		March 133(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
1	Alsek	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
2	California Coast	0.0	(0.1)	0.0	(0.0)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
3	Central BC Coast	0.0	(0.1)	0.0	(0.1)	0.1	(0.7)	0.0	(0.1)	0.0	(0.2)
4	Central Valley fa	1.0	(1.2)	1.6	(1.0)	0.0	(0.4)	1.0	(1.0)	0.0	(0.1)
5	Central Valley sp	0.3	(0.6)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)	0.0	(0.1)
6	Central Valley wi	0.0	(0.1)	0.0	(0.0)	0.0	(0.2)	0.0	(0.1)	0.0	(0.0)
7	Deschutes R. fa	0.0	(0.1)	0.0	(0.2)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)
8	E Vancouver Is.	1.0	(1.1)	4.6	(1.6)	2.0	(2.0)	4.7	(2.2)	0.3	(0.7)
9	Hood Canal	17.7	(5.4)	13.8	(3.8)	9.4	(7.5)	7.3	(7.7)	16.5	(5.8)
10	Juan de Fuca	0.1	(0.4)	0.5	(0.6)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
11	Klamath R.	0.0	(0.1)	0.5	(0.6)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)
12	L Columbia R. fa	0.0	(0.1)	4.0	(1.6)	0.0	(0.3)	5.1	(2.3)	0.9	(1.1)
13	L Columbia R. sp	0.0	(0.1)	0.1	(0.3)	0.0	(0.2)	2.4	(1.7)	1.2	(1.1)
14	L Fraser R.	4.0	(2.0)	8.8	(2.1)	0.5	(1.3)	14.9	(3.7)	3.8	(1.7)
15	L Skeena R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.2	(0.6)	0.0	(0.1)
16	L Thompson R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
17	Mid and Upper Columbia R. sp	0.0	(0.2)	0.0	(0.1)	0.0	(0.5)	0.0	(0.2)	0.1	(0.5)
18	Mid Columbia R. tule	1.0	(1.0)	4.7	(1.6)	9.6	(4.1)	1.9	(1.4)	3.9	(1.7)
19	Mid Fraser R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)	0.0	(0.1)
20	Mid Oregon Coast	0.0	(0.2)	0.0	(0.1)	6.2	(3.9)	0.6	(1.1)	0.0	(0.3)
21	N California/S Oregon Coast	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
22	N Gulf Coast; Alsek R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
23	N Gulf Coast; Situk R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.3)	0.0	(0.1)	0.0	(0.0)
24	N Oregon Coast	0.0	(0.2)	0.0	(0.1)	0.0	(0.4)	0.3	(0.7)	0.0	(0.2)
25	N Puget Sound	50.6	(5.9)	21.7	(4.9)	58.4	(9.6)	11.9	(4.3)	38.1	(6.5)

		2007 07wctdfo troll SWVI Area23/123-124		2007 07wctdfo troll NWVI Area125-126		2007 07wctdfo troll SWVI Area23/123		2007 07wctdfo troll NWVI Area126		2007 07wctdfo troll SWVI Area23/123	
		January 99(0)		January 187(0)		February 52(0)		February 100(0)		March 133(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
	26 N Thompson R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)
	27 Nass R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)
	28 NSE Alaska; King Salmon R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	29 NSE Alaska;Chilkat R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	30 Rogue R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
	31 S BC Mainland	0.0	(0.1)	0.0	(0.1)	0.1	(0.4)	0.0	(0.1)	0.0	(0.1)
	32 S Puget Sound	24.3	(6.1)	22.2	(5.3)	12.4	(7.3)	33.4	(8.9)	29.9	(7.5)
	33 S Thompson R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)
	34 Snake R. fa	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.5	(0.8)
	35 Snake R. sp/su	0.0	(0.2)	0.0	(0.1)	0.0	(0.4)	0.0	(0.2)	0.0	(0.1)
	36 SSE Alaska	0.0	(0.2)	0.0	(0.1)	0.0	(0.5)	0.2	(0.7)	0.0	(0.1)
	37 SSE Alaska; Stikine R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.4)	0.0	(0.2)
	38 Stikine	0.0	(0.2)	0.0	(0.1)	0.0	(0.4)	0.5	(1.1)	0.6	(1.0)
	39 Taku	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.4)	0.0	(0.2)
	40 Taku R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)	0.0	(0.1)
	41 U Columbia R. su/fa	0.0	(0.2)	13.9	(2.7)	0.1	(0.6)	7.5	(2.7)	1.9	(1.4)
	42 U Fraser R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.3)	0.0	(0.1)
	43 U Skeena R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.1	(0.4)	0.0	(0.1)
	44 U Stikine R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	45 W Vancouver Is.	0.0	(0.2)	0.5	(0.5)	0.0	(0.3)	0.0	(0.2)	0.0	(0.2)
	46 Washington Coast	0.0	(0.2)	1.3	(0.9)	0.0	(0.4)	2.4	(1.6)	0.0	(0.2)
	47 Willamette R.	0.0	(0.1)	1.6	(0.9)	1.1	(1.7)	5.5	(2.4)	2.2	(1.3)

Species = chinook Number of populations
 Max missing loci = 8 Number of chains = 8

		2007 07wctdfo troll NWVI Area125/126		2007 07wctdfo troll SWVI Area23/123		2007 07wctdfo troll NWVI Area126-127		2007 07wctdfo troll SWVI Area23/123		2007 07wctdfo troll NWVI Area126-127	
		March 100(0)		April 145(0)		April 100(0)		May 369(0)		May 99(1)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
1	Alsek	0.0	(0.3)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	1.0	(1.2)
2	California Coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.2)
3	Central BC Coast	0.0	(0.1)	0.0	(0.2)	1.9	(2.1)	0.0	(0.2)	0.7	(1.2)
4	Central Valley fa	1.7	(1.5)	1.0	(0.9)	2.7	(1.8)	0.6	(0.5)	0.0	(0.2)
5	Central Valley sp	0.0	(0.2)	0.0	(0.2)	0.2	(0.7)	0.2	(0.4)	0.0	(0.2)
6	Central Valley wi	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)
7	Deschutes R. fa	0.4	(1.1)	1.5	(1.0)	0.0	(0.1)	0.0	(0.0)	1.4	(1.7)
8	E Vancouver Is.	2.3	(1.7)	4.1	(1.8)	0.7	(1.2)	0.0	(0.1)	4.9	(2.2)
9	Hood Canal	15.2	(4.5)	15.2	(5.5)	1.5	(2.9)	23.8	(3.7)	7.0	(2.9)
10	Juan de Fuca	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)
11	Klamath R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.0)	0.0	(0.1)
12	L Columbia R. fa	3.5	(2.1)	6.7	(2.3)	4.6	(2.7)	7.4	(1.5)	3.1	(2.5)
13	L Columbia R. sp	0.3	(0.8)	0.0	(0.2)	1.0	(1.7)	0.0	(0.1)	0.2	(0.6)
14	L Fraser R.	10.0	(3.2)	7.3	(2.2)	5.9	(2.4)	13.5	(1.9)	18.6	(4.0)
15	L Skeena R.	0.0	(0.1)	0.0	(0.1)	0.5	(1.3)	0.0	(0.0)	0.1	(0.5)
16	L Thompson R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)
17	Mid and Upper Columbia R. sp	0.0	(0.4)	0.0	(0.3)	0.0	(0.4)	0.2	(0.3)	0.4	(1.6)
18	Mid Columbia R. tule	1.9	(1.4)	7.4	(2.3)	3.7	(2.1)	4.0	(1.0)	2.2	(1.6)
19	Mid Fraser R.	0.1	(0.4)	0.0	(0.1)	2.1	(1.4)	0.0	(0.1)	3.8	(2.7)
20	Mid Oregon Coast	3.2	(2.1)	0.5	(0.8)	2.1	(2.5)	0.2	(0.5)	1.5	(1.8)
21	N California/S Oregon Coast	0.0	(0.1)	0.1	(0.4)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)
22	N Gulf Coast; Alsek R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.0)	0.1	(0.4)
23	N Gulf Coast; Situk R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.2)	0.0	(0.0)	0.1	(0.4)
24	N Oregon Coast	0.2	(0.6)	0.0	(0.2)	3.6	(2.7)	0.0	(0.1)	0.5	(1.1)
25	N Puget Sound	25.1	(6.1)	16.3	(5.0)	4.8	(3.1)	15.2	(3.4)	6.3	(3.1)

2007 07wctdfo troll NWVI Area125/126	2007 07wctdfo troll SWVI Area23/123	2007 07wctdfo troll NWVI Area126-127	2007 07wctdfo troll SWVI Area23/123	2007 07wctdfo troll NWVI Area126-127
March 100(0)	April 145(0)	April 100(0)	May 369(0)	May 99(1)

Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
	26 N Thompson R.	0.1	(0.4)	0.0	(0.1)	1.0	(1.0)	0.6	(0.4)	0.1	(0.5)
	27 Nass R.	0.0	(0.1)	0.0	(0.1)	2.0	(1.4)	0.0	(0.1)	1.3	(1.3)
	28 NSE Alaska; King Salmon R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)
	29 NSE Alaska;Chilkat R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)
	30 Rogue R.	0.0	(0.1)	0.0	(0.1)	0.5	(1.1)	0.0	(0.0)	0.1	(0.5)
	31 S BC Mainland	0.0	(0.1)	0.0	(0.1)	1.0	(1.0)	0.0	(0.1)	0.0	(0.1)
	32 S Puget Sound	15.0	(5.0)	27.7	(5.6)	7.8	(3.7)	25.0	(3.8)	0.0	(0.3)
	33 S Thompson R.	0.2	(0.7)	0.7	(0.7)	6.7	(2.8)	0.0	(0.1)	10.0	(3.4)
	34 Snake R. fa	0.0	(0.2)	2.3	(1.3)	0.0	(0.4)	2.5	(0.9)	0.1	(0.5)
	35 Snake R. sp/su	0.1	(0.4)	0.0	(0.2)	0.0	(0.3)	0.0	(0.1)	0.0	(0.3)
	36 SSE Alaska	0.0	(0.2)	0.0	(0.3)	0.0	(0.3)	0.0	(0.1)	0.3	(0.9)
	37 SSE Alaska; Stikine R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.0)	0.4	(1.1)
	38 Stikine	0.0	(0.2)	0.0	(0.2)	0.4	(1.0)	0.0	(0.1)	0.7	(1.7)
	39 Taku	0.0	(0.1)	0.0	(0.1)	1.3	(1.7)	0.0	(0.0)	0.3	(0.8)
	40 Taku R.	0.0	(0.1)	0.0	(0.1)	0.2	(0.6)	0.0	(0.1)	3.9	(3.3)
	41 U Columbia R. su/fa	15.6	(4.0)	6.3	(2.2)	27.9	(4.7)	4.8	(1.2)	22.2	(4.6)
	42 U Fraser R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.0)	2.0	(2.3)
	43 U Skeena R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.3	(1.1)
	44 U Stikine R.	0.0	(0.1)	0.0	(0.1)	0.5	(1.1)	0.0	(0.0)	1.0	(2.3)
	45 W Vancouver Is.	0.0	(0.2)	0.0	(0.1)	1.1	(1.0)	0.0	(0.1)	0.0	(0.2)
	46 Washington Coast	0.1	(0.4)	1.3	(1.1)	5.6	(2.6)	0.0	(0.1)	0.0	(0.3)
	47 Willamette R.	5.1	(2.2)	1.4	(1.0)	8.4	(2.8)	1.9	(0.8)	5.4	(2.3)

Species = chinook Number of populations
 Max missing loci = 8 Number of chains = 8

		2007 07wctdfo troll SWVI Area23/123/124		2007 07wctdfo troll NWVI Area126-127		2007 07wctdfo troll SWVI Area123		2007 07wctdfo troll NWVI Area125-127		2007 07wctdfo troll SWVI Area123	
		June 250(0)		June 251(0)		September 100(0)		September 95(1)		October 100(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
1	Alsek	0.0	(0.1)	0.3	(0.4)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)
2	California Coast	0.0	(0.1)	0.0	(0.0)	1.0	(1.1)	0.0	(0.1)	0.0	(0.1)
3	Central BC Coast	0.0	(0.1)	0.1	(0.3)	0.0	(0.1)	0.0	(0.2)	0.2	(0.8)
4	Central Valley fa	0.0	(0.1)	0.4	(0.4)	0.0	(0.3)	0.0	(0.1)	0.1	(0.4)
5	Central Valley sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
6	Central Valley wi	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
7	Deschutes R. fa	0.1	(0.4)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	3.2	(2.2)
8	E Vancouver Is.	1.2	(0.8)	3.0	(1.2)	2.1	(1.4)	7.9	(3.0)	1.0	(1.0)
9	Hood Canal	25.6	(4.3)	14.0	(3.3)	13.4	(5.1)	0.1	(0.6)	5.1	(4.0)
10	Juan de Fuca	0.0	(0.1)	0.0	(0.1)	0.1	(0.6)	0.0	(0.3)	0.0	(0.1)
11	Klamath R.	0.0	(0.1)	0.0	(0.1)	1.3	(1.2)	0.0	(0.1)	1.1	(1.0)
12	L Columbia R. fa	7.2	(1.9)	4.2	(1.4)	6.4	(2.6)	0.0	(0.3)	4.5	(2.4)
13	L Columbia R. sp	0.2	(0.5)	0.0	(0.2)	1.7	(1.4)	0.0	(0.2)	0.0	(0.2)
14	L Fraser R.	9.4	(1.9)	18.8	(2.6)	7.8	(2.8)	5.4	(2.3)	10.5	(3.1)
15	L Skeena R.	0.0	(0.0)	0.0	(0.1)	0.1	(0.3)	0.0	(0.1)	0.0	(0.1)
16	L Thompson R.	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
17	Mid and Upper Columbia R. sp	0.1	(0.3)	0.0	(0.2)	0.1	(0.4)	0.0	(0.2)	0.0	(0.2)
18	Mid Columbia R. tule	2.7	(1.2)	4.6	(1.4)	2.9	(1.7)	2.5	(1.8)	5.7	(2.5)
19	Mid Fraser R.	0.5	(0.5)	1.2	(1.1)	0.0	(0.2)	1.0	(1.0)	0.0	(0.2)
20	Mid Oregon Coast	0.6	(0.7)	3.6	(1.6)	2.4	(1.7)	11.9	(4.5)	1.4	(1.6)
21	N California/S Oregon Coast	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)
22	N Gulf Coast; Alsek R.	0.0	(0.0)	0.1	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
23	N Gulf Coast; Situk R.	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
24	N Oregon Coast	0.3	(0.5)	0.5	(0.8)	0.1	(0.5)	26.1	(5.2)	0.0	(0.3)
25	N Puget Sound	11.2	(2.9)	12.0	(2.8)	21.1	(5.1)	7.5	(3.2)	21.9	(5.6)

		2007 07wctdfo troll SWVI Area23/123/124		2007 07wctdfo troll NWVI Area126-127		2007 07wctdfo troll SWVI Area123		2007 07wctdfo troll NWVI Area125-127		2007 07wctdfo troll SWVI Area123	
		June 250(0)		June 251(0)		September 100(0)		September 95(1)		October 100(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
	26 N Thompson R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)
	27 Nass R.	0.0	(0.1)	0.4	(0.5)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)
	28 NSE Alaska; King Salmon R.	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	29 NSE Alaska;Chilkat R.	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	30 Rogue R.	0.1	(0.3)	0.0	(0.1)	1.5	(1.6)	0.0	(0.1)	0.0	(0.4)
	31 S BC Mainland	0.0	(0.0)	0.0	(0.0)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
	32 S Puget Sound	30.4	(4.7)	5.0	(2.7)	30.5	(5.9)	12.9	(3.7)	32.9	(6.4)
	33 S Thompson R.	0.7	(0.6)	5.1	(1.5)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)
	34 Snake R. fa	4.0	(1.4)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	35 Snake R. sp/su	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)	0.0	(0.2)
	36 SSE Alaska	0.0	(0.2)	0.1	(0.3)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)
	37 SSE Alaska; Stikine R.	0.0	(0.1)	0.1	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
	38 Stikine	0.0	(0.1)	2.0	(1.0)	0.0	(0.2)	0.1	(0.4)	0.0	(0.3)
	39 Taku	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
	40 Taku R.	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)
	41 U Columbia R. su/fa	2.7	(1.3)	13.6	(2.3)	7.4	(2.7)	7.6	(2.7)	11.7	(3.5)
	42 U Fraser R.	0.4	(0.5)	2.1	(1.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	43 U Skeena R.	0.0	(0.1)	2.7	(1.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	44 U Stikine R.	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	45 W Vancouver Is.	1.3	(0.7)	3.3	(1.1)	0.0	(0.2)	1.0	(1.1)	0.0	(0.2)
	46 Washington Coast	0.0	(0.1)	0.9	(0.6)	0.0	(0.2)	15.8	(3.9)	0.4	(1.1)
	47 Willamette R.	1.2	(0.7)	1.8	(0.9)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)

Species = chinook Number of populations
 Max missing loci = 8 Number of chains = 8

		2007 07wctdfo troll NWVI Area125-126		2008 08wctdfo troll SWVI Area23/123		2008 08wctdfo troll NWVI Area125/126/26		2008 08wctdfo troll SWVI Area23/123		2008 08wctdfo troll NWVI Area125/126	
		October 81(0)		January 100(0)		January 122(0)		February 100(0)		February 102(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
1	Alsek	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)
2	California Coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
3	Central BC Coast	0.2	(0.6)	0.0	(0.3)	0.0	(0.1)	0.2	(0.8)	0.0	(0.1)
4	Central Valley fa	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)
5	Central Valley sp	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)
6	Central Valley wi	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
7	Deschutes R. fa	0.0	(0.1)	1.5	(1.5)	2.1	(2.0)	0.0	(0.1)	0.0	(0.1)
8	E Vancouver Is.	5.5	(2.5)	3.7	(2.0)	5.8	(2.3)	3.6	(2.1)	1.9	(1.4)
9	Hood Canal	5.4	(5.5)	11.5	(5.7)	19.1	(4.8)	1.4	(3.1)	2.7	(3.3)
10	Juan de Fuca	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.1	(0.3)	0.0	(0.2)
11	Klamath R.	1.5	(1.4)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	2.5	(1.6)
12	L Columbia R. fa	10.6	(3.4)	0.0	(0.2)	2.2	(1.9)	0.0	(0.2)	2.1	(1.6)
13	L Columbia R. sp	0.0	(0.4)	0.3	(0.7)	0.3	(0.7)	0.0	(0.2)	0.1	(0.3)
14	L Fraser R.	4.7	(2.4)	0.0	(0.2)	0.2	(0.5)	1.2	(1.7)	6.5	(2.5)
15	L Skeena R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
16	L Thompson R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
17	Mid and Upper Columbia R. sp	0.0	(0.2)	0.1	(0.4)	2.0	(2.8)	0.3	(0.7)	8.1	(3.6)
18	Mid Columbia R. tule	0.0	(0.3)	4.0	(2.0)	8.2	(2.6)	12.0	(3.2)	9.6	(2.9)
19	Mid Fraser R.	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.5	(1.0)	0.0	(0.2)
20	Mid Oregon Coast	0.1	(0.5)	0.0	(0.4)	0.6	(1.2)	0.2	(0.7)	0.2	(0.7)
21	N California/S Oregon Coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)
22	N Gulf Coast; Alsek R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.2)
23	N Gulf Coast; Situk R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
24	N Oregon Coast	0.3	(0.9)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	3.1	(1.7)
25	N Puget Sound	42.2	(7.0)	48.8	(6.4)	16.6	(3.7)	48.0	(6.1)	25.8	(4.6)

		2007 07wctdfo troll NWVI Area125-126		2008 08wctdfo troll SWVI Area23/123		2008 08wctdfo troll NWVI Area125/126/26		2008 08wctdfo troll SWVI Area23/123		2008 08wctdfo troll NWVI Area125/126	
		October 81(0)		January 100(0)		January 122(0)		February 100(0)		February 102(0)	
Code	Region1	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD	Estimate	SD
	26 N Thompson R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
	27 Nass R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)
	28 NSE Alaska; King Salmon R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	29 NSE Alaska;Chilkat R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	30 Rogue R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	31 S BC Mainland	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
	32 S Puget Sound	21.8	(7.5)	27.6	(6.3)	17.6	(4.8)	28.3	(6.2)	11.6	(4.5)
	33 S Thompson R.	0.0	(0.1)	0.0	(0.1)	2.8	(1.7)	0.0	(0.2)	0.0	(0.2)
	34 Snake R. fa	0.0	(0.1)	0.0	(0.1)	0.0	(0.4)	0.3	(0.7)	0.0	(0.3)
	35 Snake R. sp/su	0.0	(0.3)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
	36 SSE Alaska	0.0	(0.3)	0.0	(0.2)	0.1	(0.4)	0.0	(0.2)	0.0	(0.2)
	37 SSE Alaska; Stikine R.	0.0	(0.4)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)
	38 Stikine	0.1	(0.6)	0.0	(0.2)	0.1	(0.4)	0.0	(0.2)	0.4	(0.8)
	39 Taku	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
	40 Taku R.	0.0	(0.2)	0.0	(0.2)	0.4	(1.0)	0.1	(0.7)	0.0	(0.1)
	41 U Columbia R. su/fa	7.6	(3.0)	1.6	(1.9)	13.3	(4.1)	0.3	(0.7)	16.0	(4.5)
	42 U Fraser R.	0.0	(0.2)	0.0	(0.2)	6.3	(2.5)	1.3	(2.0)	0.4	(1.3)
	43 U Skeena R.	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.1	(0.4)	0.0	(0.2)
	44 U Stikine R.	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.0)	0.0	(0.1)
	45 W Vancouver Is.	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)
	46 Washington Coast	0.0	(0.3)	0.8	(1.1)	2.0	(1.4)	0.0	(0.2)	7.0	(2.5)
	47 Willamette R.	0.0	(0.1)	0.0	(0.1)	0.1	(0.4)	2.0	(1.4)	2.0	(1.3)

Species = chinook Number of populations
 Max missing loci = 8 Number of chains = 8

2008 2008
 08wctjot 08wctdfo
 troll troll
 NWVI Area 125-126-127 SWVI Area123124

April May
 396(0) 167(0)

Code	Region1	Estimate	SD	Estimate	SD
1	Alsek	0.4	(0.6)	0.0	(0.1)
2	California Coast	0.0	(0.0)	0.0	(0.1)
3	Central BC Coast	0.2	(0.3)	0.2	(0.5)
4	Central Valley fa	0.0	(0.1)	0.0	(0.1)
5	Central Valley sp	0.0	(0.1)	0.0	(0.1)
6	Central Valley wi	0.0	(0.0)	0.0	(0.1)
7	Deschutes R. fa	0.0	(0.2)	0.0	(0.1)
8	E Vancouver Is.	6.0	(1.3)	1.7	(1.2)
9	Hood Canal	6.3	(1.7)	13.2	(3.5)
10	Juan de Fuca	0.0	(0.1)	0.0	(0.1)
11	Klamath R.	0.0	(0.0)	0.0	(0.1)
12	L Columbia R. fa	3.9	(1.3)	6.3	(2.2)
13	L Columbia R. sp	0.4	(0.5)	0.1	(0.3)
14	L Fraser R.	4.3	(1.1)	15.6	(3.1)
15	L Skeena R.	0.4	(0.6)	0.9	(0.9)
16	L Thompson R.	0.0	(0.0)	0.0	(0.1)
17	Mid and Upper Columbia R. sp	1.5	(1.4)	0.2	(0.9)
18	Mid Columbia R. tule	8.3	(1.5)	16.1	(3.2)
19	Mid Fraser R.	0.1	(0.2)	0.0	(0.1)
20	Mid Oregon Coast	0.7	(0.6)	0.7	(0.7)
21	N California/S Oregon Coast	0.0	(0.0)	0.0	(0.0)
22	N Gulf Coast; Alsek R.	0.0	(0.0)	0.0	(0.1)
23	N Gulf Coast; Situk R.	0.1	(0.2)	0.0	(0.1)
24	N Oregon Coast	0.6	(0.5)	0.0	(0.2)
25	N Puget Sound	20.6	(2.4)	15.6	(4.4)

2008
 08wctjot
 troll
 NWVI Area 125-126-127

2008
 08wctdfo
 troll
 SWVI Area123124

April
 396(0)

May
 167(0)

Code	Region1	Estimate	SD	Estimate	SD
	26 N Thompson R.	0.0	(0.0)	0.0	(0.2)
	27 Nass R.	0.9	(0.6)	0.0	(0.1)
	28 NSE Alaska; King Salmon R.	0.0	(0.0)	0.0	(0.1)
	29 NSE Alaska;Chilkat R.	0.0	(0.0)	0.0	(0.1)
	30 Rogue R.	0.0	(0.1)	0.0	(0.1)
	31 S BC Mainland	0.0	(0.1)	0.0	(0.1)
	32 S Puget Sound	8.4	(2.0)	9.7	(3.3)
	33 S Thompson R.	2.7	(0.9)	1.4	(1.0)
	34 Snake R. fa	2.7	(1.0)	3.3	(1.6)
	35 Snake R. sp/su	0.0	(0.1)	0.0	(0.2)
	36 SSE Alaska	0.4	(0.5)	0.0	(0.1)
	37 SSE Alaska; Stikine R.	0.0	(0.1)	0.0	(0.2)
	38 Stikine	0.0	(0.1)	0.0	(0.2)
	39 Taku	0.0	(0.1)	0.0	(0.1)
	40 Taku R.	1.3	(0.9)	0.0	(0.1)
	41 U Columbia R. su/fa	24.2	(2.6)	14.3	(3.1)
	42 U Fraser R.	1.0	(1.0)	0.0	(0.2)
	43 U Skeena R.	0.3	(0.3)	0.0	(0.1)
	44 U Stikine R.	0.0	(0.0)	0.0	(0.1)
	45 W Vancouver Is.	1.7	(0.7)	0.0	(0.1)
	46 Washington Coast	1.0	(0.6)	0.0	(0.1)
	47 Willamette R.	1.6	(0.7)	0.7	(0.7)

APPENDIX III

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West Coast Vancouver Island Chinook troll fisheries

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