

The Application of Chinook Salmon Stock Composition Data to Management of the Queen Charlotte Islands Troll Fishery, 2002 to 2005

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THE APPLICATION OF CHINOOK SALMON STOCK COMPOSITION DATA TO
MANAGEMENT OF THE QUEEN CHARLOTTE ISLANDS TROLL FISHERY,
2002 TO 2005

by

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ABSTRACT

Winther, I., and Beacham, T.D. 2006. The application of Chinook salmon stock composition data to management of the Queen Charlotte Islands troll fishery, 2002 to 2005. Can. Tech. Rep. Fish. Aquat. Sci. 2665: vii + 88 p.

Fisheries & Oceans Canada has managed the Northern British Columbia (NBC) troll fishery since 1995 to reduce impacts on Chinook salmon (*Oncorhynchus tshawytscha*) stocks from the West Coast of Vancouver Island (WCVI). Most of the management actions prior to 2002 were large scale quota reductions and area closures that resulted in significantly reduced catches of Chinook salmon relative to the existing quota. Stock identification methods were rarely used as a management tool in the troll fishery and were limited to the identification of coded wire tags. Since 2002, microsatellite DNA based stock identification has been used to address stock specific management in a mixed stock fishery. Chinook salmon stock compositions were estimated in-season for the NBC troll fishery from 2002 to 2005, and these fisheries were managed in-season to catch targets for WCVI Chinook salmon. The application of stock specific management allowed internationally negotiated catch allocations to be approached while reducing the exploitation of WCVI Chinook. Stock compositions were applied to catch to provide region specific estimates of the impact of the 2002 to 2005 NBC troll fisheries on all of the Chinook stock groups encountered.

RÉSUMÉ

Winther, I., and Beacham, T.D. 2006. The application of Chinook salmon stock composition data to management of the Queen Charlotte Islands troll fishery, 2002 to 2005. Can. Tech. Rep. Fish. Aquat. Sci. 2665: vii + 88 p.

Le ministère des Pêches et des Océans du Canada gère la pêche à la traîne dans le Nord de la Colombie Britannique depuis 1995 afin de réduire les effets sur les stocks de saumon quinnat (*Oncorhynchus tshawytscha*) de la côte Ouest de l'île de Vancouver. Avant 2002, la plupart des mesures de gestion étaient des réductions de quotas et des fermetures de zones à grande échelle qui ont eu pour résultat une baisse considérable du nombre de saumons quinnats capturés par rapport au quota existant. Les méthodes d'identification des stocks étaient rarement utilisées comme outil de gestion de la pêche à la traîne et ne servaient qu'à identifier que les micromarques codées. Depuis 2002, la méthode d'identification des stocks fondée sur l'ADN microsatellite est utilisée aux fins de gestion de stocks individuels dans le cadre de la pêche de stocks mélangés. La composition des stocks de saumon quinnat a été estimée durant la saison de pêche à la traîne dans le Nord de la C.-B. de 2002 à 2005, et ces pêches étaient gérées en cours de saison afin d'atteindre les objectifs de prise de saumon quinnat de la côte Ouest de l'île de Vancouver. La gestion de stocks individuels a permis de capturer la presque totalité des allocations de prises négociées à l'échelle internationale tout en réduisant l'exploitation du saumon quinnat de la côte Ouest de l'île de Vancouver. La composition des stocks a été utilisée lors de l'analyse des prises afin de fournir des estimations propres à la région des effets des pêches à la traîne dans le Nord de la C.-B. de 2002 à 2005 sur tous les groupes de stocks de saumon quinnat observés.

INTRODUCTION

The area around the Queen Charlotte Islands (QCI) has a long history of commercial troll fisheries for Chinook salmon (*Oncorhynchus tshawytscha*). Trolling for Chinook salmon became a significant fishery in the northern district of British Columbia in the 1920s, just shortly after the development of power fishing vessels and power gurdies. A sales slip system was introduced to commercial fisheries in British Columbia in 1951, and records of historic catch are presented in Figure 1. Prior to 1957 no closed periods were applied to the troll fishery. A closed season of November 1 to April 14 was adopted by Canada and the United States following an International Conference on the Coordination of Fishery Regulations (Milne, 1964). Opening times varied somewhat but typically began April 15th and ended September 30 until the Pacific Salmon Treaty was established in 1985.

Allocations of Chinook salmon to the troll fishery in the North Coast of British Columbia are influenced by international agreements, domestic allocation policy, and management for stocks of concern. Under the 1985 Pacific Salmon Treaty (PST), the Northern British Columbia (NBC) troll fishery was part of the North and Central British Columbia (NCBC) complex that included all tidal fisheries for Chinook salmon. From 1985 to 1989, the annual all gear NCBC catch ceiling was 263,000 Chinook salmon. In 1990 an increment of 39,000 Chinook salmon was added to the existing NCBC ceiling with the understanding that these fish were to be caught in the northern portion of the region. The 302,000 NCBC ceiling in 1990 also excluded catches in extreme terminal areas near the Skeena River and the Bella Coola River (Pacific Salmon Treaty, Annex IV amended May, 1990). In 1991 the catch ceiling was revised to 263,000 fish plus 10,000 fish excluding catches in the terminal areas. The ceiling reverted back to 263,000 fish in 1992. There were no agreed PST ceilings in 1993 and 1994 but Canada operated its NCBC Chinook fisheries as though the 263,000 ceiling was in place. No PST ceilings were in place from 1995 to 1998 however, Canada's domestic management for stocks of concern limited fishing opportunities.

Under the revised agreement for the period 1999 to 2008, the Northern British Columbia (NBC) troll fishery and the Queen Charlotte Islands (QCI) sport fishery were the two fisheries defined within the Aggregate Abundance Based Management (AABM) regime implemented by the Pacific Salmon Treaty (2000) for the North Coast of British Columbia. They represent the largest Chinook salmon fisheries in the North Coast. The agreement specifies allowable catches of Chinook salmon relative to an abundance index determined from annual pre-season model runs conducted by the PST Chinook Technical Committee (CTC). Annual catch ceilings are determined for the AABM regime (CTC, 2005). The index ranged from 1.45 to 1.69 between 2002 and 2005. Although Canada negotiated Chinook salmon catch ceilings with the United States from 1999 to 2001, in most years those ceilings were not approached due to management actions to protect stocks of conservation concern.

Conservation takes precedence in the management of Chinook salmon stocks followed by food, social and ceremonial requirements and treaty obligations to First Nations. Once these obligations are met, the sport fishery receives priority access to Chinook salmon. Thus the troll fishery is first to be influenced by any management actions to protect weak stocks. Canada's domestic allocation policy is described in the document "An Allocation Policy for Pacific Salmon" (Anon. 1999). Chinook salmon are allocated within the following context: *"After conservation needs are met, and priority access for First Nations . . . is addressed, recreational anglers will be provided ... priority to directed fisheries on Chinook ..."* Since the policy provides no explicit numerical constraints to the QCI sport catch, the domestic troll allocation within the AABM regime is developed using a pre-season estimate of the sport catch. Pre-

season sport catch forecasts were approximated by the previous years catch plus 10% to account for continued growth during the period of this study. The annual troll allocation is the catch associated with the pre-season index of abundance for the AABM fishery less the projected sport catch.

Beginning in 1995, fisheries in Northern British Columbia were restricted due to concerns for WCVI Chinook salmon. WCVI Chinook salmon are primarily ocean type and far north migrating. They return as adults at ages 3, 4 and 5. The Robertson Creek hatchery (RCH) is the major production facility for Chinook salmon on the west coast of Vancouver Island and fish produced are used as an indicator stock for WCVI Chinook salmon. Successive broods of WCVI Chinook were subject to very poor marine conditions in the 1990s due to warm water events (El Nino, La Nina, etc.). The progeny of the 1991, 1992, 1995, 1996 and 1997 broods experienced very poor marine survivals.

Domestic ceilings have limited the Northern British Columbia fisheries since 1995 in attempts to rebuild WCVI Chinook stocks (Table 1). For the most part, management actions have resulted in catch foregone from the NBC troll fishery and in one year, 1996, reductions to catches in the QCI sport fishery as well. As a result of these management actions from 1995 to 2001, over 800,000 Chinook salmon that were available for harvest under PST agreements were not caught. The major impetus for the application of DNA-level markers for stock identification in the NBC troll fishery was to allow the quota to be harvested while continuing to reduce impact on stocks of conservation concern.

Canadian troll fisheries were also limited from 1997 to 2005 due to conservation concerns for coho salmon in the upper Skeena River and Thompson River. Management responses included restricted or no directed troll fisheries on coho salmon and limited or cancelled fisheries for other species where coho by-catch was an issue (e.g. the normal A-B line pink fishery did not occur in 1999 due to collateral impacts that would have occurred on coho salmon). Further, NBC troll fisheries targeting Fraser River sockeye salmon were eliminated after 1995. These actions reduced or eliminated many Chinook non-retention fisheries and/or incidental catches of Chinook salmon. Historic management targets and details are presented in Appendix 1.

In addition to severe reductions in available catch due to weak stock management and allocation policy revisions, the troll fleet was affected by licence area changes and fleet reduction initiatives aimed at reducing fishing capacity. Several licence-restructuring regimes were undertaken to reduce salmon fishing fleets. Prior to 1966 commercial salmon licences were not limited. Commercial licence limitation began in 1966 with the implementation of three initial salmon licence categories, A, B and N. All of these categories were permitted to fish for Chinook salmon via trolling. The Strait of Georgia and adjacent waters were licensed as a separate "Inside" troll area in 1984. The remainder of the B.C. coast from the border with Washington to the border with Alaska was licensed under an "Outside" troll licence from 1984 to 1996. Combination vessels that could fish both troll and gillnet gear were permitted and these vessels made up a significant portion of the fleet. New licence areas were defined for management of the troll fishery in 1996. Licences were restricted to a single gear type and a single licence area. The North Coast troll fishery was defined as Area F licence category consisting of Pacific Fishery Management Areas 1 to 10, 101 to 110, and 130 and 142 (Figure 2.). These troll fleet reduction initiatives reduced the fleet that could fish in the North Coast from over 1000 vessels to as low as 146 vessels over 2 decades. The process of fleet reduction removed less viable operations so the relationship between the reduction in licences and fishing capacity was not linear. Much of fleet now consists of the "high-liners" and significant fishing power remains. During the period of this study the Area F fleet varied between 146 and 168 licensed vessels (Table 2).

In comparison to the troll fishery, most of the sport fishery has relatively recent beginnings in the QCI with the inception of fishing lodges and catered sport opportunities occurring in the late 1980s. The sport fishery has experienced considerable growth, particularly since 1998 (Table 1). The closure of the Chinook salmon sport fishery in 1996 to conserve WCVI Chinook salmon stocks and management measures to conserve upper Skeena coho salmon in the late 1990s restrained sport fishing opportunities.

Stock identification is a key component in the management of mixed stock salmon fisheries. The application of DNA-level markers for stock identification, particularly microsatellites, has provided much greater resolution among Chinook salmon populations than was possible with previous genetic markers (Beacham et al. 1996; Banks et al. 2000; Beacham et al. 2003b). For example, it is possible to discriminate among Chinook salmon populations from specific tributaries in the Fraser River drainage in southern British Columbia with a high degree of accuracy (Beacham et al. 2003a). If the baseline used to estimate stock composition is adequate, microsatellites can be applied successfully on a local basis to provide information on stock composition even when there is a complex mixture of populations in the catch (Beacham et al. 2006).

We describe the development of procedures using microsatellite variation in Chinook salmon as a tool for management of stocks of conservation concern encountered by the troll fishery off the Queen Charlotte Islands. Our challenge was to provide advice to managers that would allow the Northern British Columbia (Area F) troll fishery to maximize catch of Chinook salmon while minimizing the exploitation of WCVI Chinook salmon. The biological sampling objectives were to generate age specific stock compositions for troll catch of Chinook salmon by time and area. The intent was to identify stock specific impacts for the fishery and to generate information useful to structuring future fisheries.

METHODS

Our concept was to identify fishing sites, set up a standard sampling regime to establish trends in stock composition, and sample fisheries to identify catch composition. Sites were established from existing data and test fishery information. Existing data and test fisheries provided trends in stock composition and commercial fisheries were positioned according to the trends. Commercial fishery sampling provided catch composition and augmented the trend data used to position fisheries.

CWT ANALYSIS

Coded wire tag (CWT) data from fishery sampling were extracted from the Mark Recovery Program (MRP) database in 2002. Estimated recoveries (Kuhn et. al., 1988) of CWTs from the RCH on the west coast of Vancouver Island were examined by time and area for the NBC troll fishery. These data in addition to the RCH distribution of reported catch and escapement from the 2002 model calibration (CTC, 2002) were used to generate timing graphs for RCH Chinook through the NBC troll fishery.

SITE SELECTION

The NBC troll fishery covers a vast area from the southern end of QCI and Banks Island, to the border between B.C. and Alaska (Figure 2). Two separate approaches were used to select sites. First, we examined existing catch and mark-recovery data for RCH Chinook salmon. Second, we reviewed historic catch records and asked troll fishers to identify preferred Chinook

fishing areas for test fisheries. Ten sites were sampled in 2002 and 2 sites, Buck Point and La Perouse Reef, were selected for continued sampling from 2003 to 2005.

TEST VESSEL SELECTION

Test fishing vessels were solicited from Area F licensed troll fishing vessels. Lotteries were used to select from the respondents to annual requests for test fishing participants. This selection process was adjusted in 2005 to exclude operators that had received previous test fishing opportunities. Advice from industry was to spread test opportunities among more of the fleet. Chinook caught in the test fishery were kept as payment by the test vessel operators. The use of fish funding was approved annually by the Area Harvest Committee (the body representing commercial troll fishers to Fisheries & Oceans Canada). Sampling sites and procedures were reviewed with the test fishing operators when they picked up their sampling equipment. An example of sample instructions is provided in Appendix 3.

CATCH DATA

Catch data were assembled from two sources; phone-in hails and fish slips. Both forms of catch data are required as a condition of licence in the NBC troll fishery. Phone-in hails are required within 24 hours of landing or within 24 hours of the closure of the fishery and consist of a report of date fished, area fished, number of fish caught and retained by species and number of fish caught and released by species as well as other information. These reports are received and entered in the "Fisheries Operating System" (FOS) by a service company contracted by the fishers. Fish slips are records of the fish landed by a vessel that include the weight and grade of fish landed.

Fish slip data were queried from the Catch Statistics database by size, grade and gear type. Average weights were used to determine piece counts when there were insufficient data on pieces per delivery. Average weights were obtained from the MRP database for each size and grade of Chinook salmon delivered to each company. These combined data sets are hereafter referred to as slip data.

Daily catches reported in the FOS were summed and compared with landings reported on the fish slips. Each record was reviewed and a decision was made on whether the FOS or slip data best represented the catch. Incidents that confounded these analyses were multiple slips generated for a single load, freezer vessels retaining catch over multiple deliveries, non-reporting of catch and deliberate misreporting of catch. In this process the FOS estimate was used most often unless the comparison showed evidence of missing catch. Catch and sample data are presented for each year beginning October 1 of the previous year and ending September 30 to parallel the practice used in presenting Chinook salmon data for the PST.

In 2005 the NBC troll fishery included a quota component where individuals received an allocation (quota) of 1000 Chinook salmon. This particular fishery included a validation requirement where every Chinook salmon offloaded had to be counted by a third party contractor. The records of validated catch were used as a third catch estimate for comparison with the FOS and fish slip records. Validated landings were used most often for the quota portion of the 2005 troll fishery.

SAMPLE COLLECTION

Preliminary samples were collected from the NBC troll fishery in 2000 and 2001. The first test fishery was conducted in 2002.

2002 Commercial fishery sampling

A program was set up in 2002 to sample commercial fishery landings with the objective of tracking the stock composition of the fishery using the results from microsatellite DNA analysis. Tissue samples were collected as part of the existing MRP contract. Batch samples of tissues were collected from troll fishery landings. These tissues were only matched to the area fished and the week of landing. Samples from multiple vessels were pooled in the same vial for the same week and area fished.

2002 Test fishery sampling

A test fishery was conducted to collect biological data from major Chinook salmon troll fishing locations in the North and Central Coast. The design was to sample 10 locations during 4 periods of 15 days each in July and August of 2002. Catch and sampling targets were set at 100 legal sized Chinook salmon, up to 100 sublegal Chinook salmon encountered while fishing for legal Chinook salmon, and up to 100 coho salmon encountered while fishing for Chinook salmon. Length and sex data, scales and tissue were collected from each Chinook salmon sampled.

Biological sampling

A common paper punch was used to collect tissue samples from the operculum of the Chinook salmon being sampled (Figure 3). One tissue sample was collected from each Chinook salmon. Tissues were preserved in a solution of 95% non-denatured ethanol. Samples collected from the 2002 commercial fishery and the 2004 spring fishery were stored with multiple fish samples per vial. All other tissue samples were kept in individual vials. Data on the geographic location, date, and sampler accompanied each sample. Samples were forwarded to the Fisheries & Oceans Canada, Molecular Genetics Laboratory at the Pacific Biological Station in Nanaimo.

Each Chinook salmon encountered by a test fishing vessel was measured for nose-fork length and incised to determine sex. Scales and tissue were collected from each fish. Data were recorded on waterproof sampling sheets.

Individual Chinook salmon sampled from commercial fishery landings were sampled for nose-fork length, scales and tissue. (Sex could not be determined because fish landed by the commercial fishery were dressed.)

Most scale samples were collected on to scale books as described by MacLellan (1999). This procedure was used for all scale samples collected except the 2003 commercial fishery samples which were collected into the DNA vials of ethanol and later mounted in scale books when the samples were processed in Prince Rupert. Two scales were collected per fish from 2002 to 2004. Five scales per fish were collected beginning in 2005 to reduce age data losses due to collection of regenerate scales. Scales sampled in 2002 were not submitted for ageing.

In 2002, and 2004 commercial fishery samples were typically collected from the first fish encountered by the MRP samplers. Similarly, 2003 samples of the commercial fishery were from test vessels sampling the first fish encountered. In 2005 this procedure was modified to sample every 5th or 10th fish from a load depending on the size of the load.

Annual sampling targets are presented in the results section. An inventory of samples collected from the NBC Troll fishery appears in Appendix 4.

Sample Size

Test fishery samples were used to provide trends in stock composition for positioning the fishery temporally and spatially. Samples of the landed catch from the open fishery were used to

determine the stock specific impacts. The sample design was approached from the perspective of a binomial problem where Chinook salmon were identified as either from WCVI or not. Available funds dictated the maximum extent of sample analyses. Managers were provided with the levels of precision for the range of expected WCVI Chinook salmon encounters for the sample sizes afforded by the funding level. This approach was different than the usual design of defining the level of precision necessary for the encounter estimate and developing the sample design to meet that level of precision. However, precision levels at various proportions of WCVI Chinook in the stock composition paralleled the relative level of concern for the stock: The smaller the proportion of WCVI Chinook salmon in the fishery, the less management concern and a lower level of precision was required around the estimate.

The proposed sample of 1000 Chinook in 2002 was based on 95% confidence limits within approximately 30% of the estimate if the actual proportion WCVI chinook in the catch was 5%. (Previous samples from April and May 2001 were between 4.1% and 7.8% WCVI.) In-season data representing only portions of the 1000 sample target would have respectively broader confidence limits.

SAMPLE ANALYSIS

Chinook salmon collections were compared against genetic baselines from Chinook salmon populations from Southeast Alaska through Canada and the lower United States of America (Appendices 5 & 6). A baseline of 182 populations was used early in 2002 then revised to 233 populations in 2003 and to 240 populations in 2004. Samples were analyzed for 13 microsatellite loci using methods of DNA extraction, PCR reaction, electrophoresis, and allele scoring described by Candy et. al. (2002) and Beacham et. al. (2006).

The Molecular Genetics Laboratory provided the sample analysis. A new version of the computer program as outlined by Pella and Masuda (2001) was developed and used for the analyses presented here. This program called “c-BAYES” is available upon request from the Fisheries & Oceans Canada, Molecular Genetics Laboratory at the Pacific Biological Station in Nanaimo. The model output presented includes the Bayesian probability estimates for the 5 most probable populations for each sample (J. R. Candy, Fisheries & Oceans Canada, pers. comm.).

RESULTS

CWT DATA

Examination of CWT recoveries indicated some general trends in the encounters of RCH Chinook salmon; more RCH Chinook salmon were encountered per unit effort in the Central Coast than in the North Coast (Appendix 7) and more RCH Chinook salmon were encountered in August than in other months (Figure 4 and Appendix 8). August had the highest incidence of RCH CWT recoveries per unit effort. Seasonal comparisons suffer from a lack of troll fishing effort in the months of March to June and October for most years.

TEST SITES

Sample sites are identified in Figure 5. Initial sites from 2002 included most of the major troll fishing areas in the North and Central Coast regions of British Columbia: Milbanke Sound, Caamano Sound, Oval Bank and Dundas Islands on the east side of Hecate Strait; Scudder Point and Sandspit on the west side of Hecate Strait; the A-B line strip from Cape Chacon to Cape Muzon on the north side of Dixon Entrance and Wiah Point to Jalun River on the south side of

Dixon Entrance; the La Perouse reef area between Langara Island and Frederick Island on the northwest side of QCI; and the Kano Inlet to Buck Point area on the west side of QCI.

Catches from the 2002 test fisheries are presented in Table 3. A total of 2704 Chinook salmon was sampled. The sample objective of 100 legal-sized Chinook salmon was met consistently in every time/area strata sampled from the Buck Point and La Perouse Reef sites on the west coast of QCI. Sample collections from these sites were also completed in 3 days or less. Complete samples were not obtained from any of the other sites in every time period. Collections from the Wiah Point to Jalun River site on the south side of Dixon entrance were influenced by a vessel engine problem for the first time period, but most of the samples were collected from this site in subsequent time periods. Collections of Chinook salmon samples from the Milbanke and Laredo Sound area were successful in all but the last time period.

Undersized Chinook salmon were most prevalent in the Dundas Island and Oval Bay sites and least prevalent on the west coast of QCI. Encounters of coho salmon increased with time from the beginning of July to the end of August in all areas. Coho salmon catch data from La Perouse Reef are difficult to interpret because of the relatively short sample times. Coho salmon were most prevalent at sites on the east side of Hecate Strait.

Chinook salmon length frequencies collected from sites sampled in 2002 are presented in Figure 6. Smaller-sized Chinook salmon were most prevalent in the 2002 samples collected at Dundas Island and Oval Bank sites in the north eastern portion of the study area. They were least prevalent on the west side of QCI at the La Perouse Reef and Buck Point sites.

STOCK COMPOSITION

Stock compositions for annual NBC troll catches from 2002 to 2005 are presented by stock group in Table 4. The small catch components not assigned to the GSI data represent test catch that was not submitted for analyses in 2002 and catch that was not sampled in October of 2003 and 2004. All of the 2005 catch was assigned to stock composition samples. Common trends in the annual catches are the prevalence of South Thompson (SOTH), Upper Columbia Summer and Fall (Up Col-Su/F) and Oregon stock groups that made up the largest portions of the NBC troll catches.

2002 TROLL FISHING PLAN

The 2002 pre-season Aggregate Abundance Based Management (AABM) index was 1.45 with an associated allowable catch of 192,700 Chinook salmon for NC Troll and QCI sport fisheries. The pre-season estimate of the sport catch was only slightly more than the 2001 catch at 30,700 fish leaving 162,000 fish as the pre-season troll allocation. The 2002 in-season target for the NBC troll fishery was a maximum exploitation rate of 1.5% on Chinook salmon of WCVI origin. This target was estimated at 3052 fish.

Troll quotas were assigned on a quarterly basis with a maximum catch of 5000 chinook permitted in each of the quarters from October to December 2001 and from January to March 2002. Any remaining quota could be carried forward to the next quarter.

2002 TROLL CATCH

A total of 103,038 Chinook salmon was landed by the 2002 NBC troll fishery from AABM regime areas with 101,306 fish from commercial troll fisheries and 1732 fish from test fisheries. Troll test fisheries in individual stock based management (ISBM) regime areas (Areas 6 and 106 in Figure 2) caught 479 Chinook salmon. In addition to the 2211 legal-sized Chinook salmon caught in test fisheries, 490 undersized (<67 cm fork length) Chinook salmon were caught. Catch and effort by day for 2002 Chinook troll fisheries appear in Figure 7.

2002 STOCK IDENTIFICATION

The NBC troll fishery was underway prior to development of a sampling plan for the 2002 fishery. We proposed to collect 1000 tissue samples from Chinook salmon caught in the spring commercial fishery and an additional 200 Chinook salmon tissues from the fall fishery. A total of 682 Chinook salmon were sampled during the spring fishery and 153 were sampled from the 2002 fall fishery.

Stock compositions from legal-sized Chinook salmon samples analyzed in 2002 appear in Table 5 and Table 6 for Areas 1/101 and 2W/142 respectively. DNA analyses were not conducted for test samples collected in other areas. Stock compositions from 2002 are applied to commercial troll catches in Table 8. Stock composition from undersized Chinook salmon sampled from Areas 1/101 and 2W/142 appear in Table 7.

2002 MANAGEMENT ACTIONS

The 2002 NBC troll fishery targets were 3052 WCVI Chinook salmon and a maximum PST catch of 162,000 fish. The post season troll catch ceiling was reduced to 145,600 because of a larger than expected QCI sport catch.

It was necessary to convert the exploitation rate objective into a numerical catch target. The exploitation rate indicator for WCVI chinook was the Robertson Creek Hatchery. The projected return to Canada was 80,300 RCH Chinook salmon (Riddell et. al., 2002). For the purposes of generating a target catch of WCVI Chinook salmon, the total forecast, including the Alaskan harvest, was estimated at 96,000 RCH Chinook salmon and RCH was expected to make up 47% of the WCVI return. Thus the in-season target of 1.5% exploitation represented a catch of less than 3052 WCVI Chinook salmon.

Results from DNA analyses were the basis for a single management action for the troll fishery in 2002. Results for the first 3 samples from Area 2W/142 and the first sample from Area 1/101 (Table 5 and Table 6) were received May 31, 2002. The average proportion of WCVI chinook in the samples (approximately 11%) combined with the estimated catch of 38,000 fish resulted in the closure of the troll fishery on June 8. Catch was found to be significantly underestimated and the WCVI component persisted in the samples analyzed after May 31. The spring fishery caught 77,668 Chinook salmon of which an estimated 6451 fish were determined to be of WCVI origin.

There was reluctance on the part of managers to develop and use decision rules regarding the 2002 in-season stock composition data as they wanted to retain maximum flexibility. The lack of decision rules limited their ability to react quickly. Consequently, when stock composition estimates were provided May 31 that indicated the target catch of WCVI Chinook salmon had been exceeded, managers gave the fleet a week's notice and the fishery remained open until June 8. The fishery was left open partly due to past practice and partly because catch was underestimated. Reliance on telephoned hails of troll catches resulted in a significant lag between when the fish were caught and when the catch was reported. Also, this was a period when effort was increasing after a severe weather event had most of the fleet tied up (Figure 7).

The troll fishery opened again from September 8 to 30, 2002 because this timing was thought to be relatively benign with respect to impacts on WCVI Chinook salmon. 2002 Troll fishery catches by stock region as determined from DNA samples are presented in Table 8. A total of 6775 WCVI Chinook salmon were taken in commercial fisheries and an additional 36 fish were taken in test fisheries. The catch of 6811 WCVI chinook was 223% of the 3052 preseason target. The estimated post-season exploitation rate was 3.3%.

2003 TROLL FISHING PLAN

The 2003 pre-season Aggregate Abundance Based Management (AABM) index was 1.48 with an associated catch allowance of 197,067 Chinook salmon for NC Troll and QCI sport fisheries. Managers initially forecast the QCI sport catches to be approximately 45,000 fish but in-season estimates were revised in July to 55,000 fish based on final 2002 catch estimates. The portion of the AABM ceiling allocated to the troll fishery was 142,000 Chinook salmon.

The in-season target for the troll fishery was a maximum of 6718 Chinook salmon of WCVI origin which was revised to 6811 when the 2002 catch data were audited through the FOS and fish slip comparison described in the methods. The plan was to fish 40% of the allowable catch of WCVI beginning April 1, 2003, 50% beginning June 15 and the remaining 10% beginning September 8, 2003. The plan included a rule that any overage or underage in a particular fishery would be carried to the next fishery.

This plan was modified following the closure of the fishery May 12, 2003. A decision rule was made for the fishery opening in June: If samples from the mid June test were less than 9% WCVI then fish to 90% of the allowable WCVI mortalities, if test results were greater than 9% WCVI then fish to 65% of the allowable WCVI mortalities. The catch target for the decision rule of less than 9% WCVI was later changed to 80% of the allowable WCVI mortalities (Fishery Notice 0312, June 16, 2003). These changes in decision rules did not significantly alter the sampling strategy.

2003 TROLL CATCH

The NBC troll fishery was opened for Chinook salmon fishing from October 1, 2002 to May 12, 2003, from June 19 to July 5 and from September 4 to 9, 2003. A total of 136,257 Chinook salmon was caught. The test fishery caught 1100 legal-sized Chinook salmon, which are included in the total. Catch and effort by day are presented in Figure 8.

2003 SAMPLING & STOCK IDENTIFICATION

We proposed to collect 28 samples of 100 Chinook salmon tissues over the course of the 2003 troll fishery. The actual number of samples collected was 26. DNA analyses were initially proposed for 15 of the samples, but analyses were actually completed for 19 samples representing 1775 Chinook salmon. Sampling protocols for 2003 are detailed in Appendix 3. Table 9 provides the proposed and actual numbers of samples collected and analyzed in 2003 by time and area. Stock compositions from legal-sized Chinook salmon samples analyzed in 2003 appear in Table 10 and Table 11 for Areas 1/101 and 2W/142 respectively. 2003 Stock compositions are applied to commercial troll catches in Table 12 and Table 13.

2003 MANAGEMENT ACTIONS

The 2003 NBC fishery targets were to catch fewer WCVI Chinook salmon than in 2002 (the initial target of 6718 was revised to 6811) while attempting to catch the PST ceiling of 142,000 fish in three fisheries. Individual targets of 40%, 50% and 10% of the allowable WCVI mortalities were assigned to each of the proposed fisheries.

The troll fishery was underway when the test sample program was initiated in April 2003. Analysis of the first sample indicated that the proportion of WCVI chinook was 11.6% in Area 2W. At this level the target of 40% of WCVI mortalities (2724 chinook) was projected to be exceeded by May 12. Although additional samples were collected, their analysis was not expected until after May 12 so the decision was made to close the fishery on the basis of the single sample. The outstanding samples revealed lower estimates of WCVI chinook in the catch. The fishery caught 31% (2090 chinook) of the annual WCVI in-season target.

Analysis of two samples (one per area) was proposed for early June prior to a fishery beginning June 15. A high proportion (38.8%) of WCVI Chinook salmon was encountered in the Area 2W sample collected June 1. The sample from Area 1 during the same time period was 7.3% WCVI. The fishery was postponed to allow for the collection of additional samples. Three samples collected from June 15 to 19 indicated a north-south cline in the proportion of WCVI that was evident earlier in the month. The WCVI components in the samples were 0.8% near Frederick Island, 4.2% from Tian Head to Port Louis and 11.7% near Buck Point. A decision was made to conduct the fishery beginning June 19 north of Skalu Point, near the south end of Hippa Island (Figure 2).

Samples collected during the June 19 to July 5 fishery were less than 9% WCVI. The target under this condition was 80% of WCVI mortalities by the end of the fishery, which equated to a catch of 3359 WCVI Chinook salmon. Actual catch of WCVI Chinook salmon for this fishery ended up at 4103 fish (including the test catch). Total catch by the troll fishery was 6193 WCVI Chinook salmon by July 5, or 91% of the annual in-season target of 6811 WCVI Chinook. Samples collected around August 1 included significant components of WCVI Chinook salmon, 23.8 % in Area 101 and 12.3% in Area 2W. A decision to open the fishery on September 4 was made without the August 1 sample results.

An additional 51 Chinook salmon of WCVI origin were caught in test fisheries before the September 4 opening. The target for the September fishery was 474 WCVI Chinook salmon. Samples collected from August 27 to 30 included WCVI components of 10.1% in Area 2W and 5% in Area 101. A decision was made to close the fishery on September 9. Fishery samples indicated 7.6% WCVI chinook in Area 101 and 3.6% in Area 2W. Total catch for the fishery was 1393 Chinook salmon of WCVI origin.

Total catch of WCVI Chinook salmon was 7637 fish or 112% of the in-season target of 6811 fish. The estimated post-season exploitation rate was 2.7%. The total Chinook salmon catch was 136,257 fish or 96% of the 142,000 fish allowable catch. Table 14 describes the data delivered to management from the troll test program in 2003 and how the results contributed to openings and closures of the fishery.

2004 TROLL FISHING PLAN

The pre-season abundance index for NBC troll and QCI Sport fisheries in 2004 was 1.67, which allowed a total PST catch of 243,640 Chinook salmon in these fisheries. The pre-season forecast sport catch was 60,000 fish leaving a troll catch target of 183,640 fish. The in-season target for the troll fishery was to catch a maximum of 7800 WCVI Chinook salmon. The fishing plan was to catch 10,000 Chinook salmon between October 1, 2003 and March 31, 2004 and the remainder of the allowable catch in June and July. The winter fishery was extended to April 15 to approach the catch target.

2004 TROLL CATCH

The total AABM catch was 241,508 fish with 167,508 fish caught in commercial troll fisheries and 74,000 fish caught in sport fisheries. The troll fishery was opened for Chinook salmon fishing from October 1, 2003 to April 15, 2004, from June 15 to July 1 and from July 18 to 22, 2004. A total of 167,508 Chinook salmon was caught. There were 9189 Chinook salmon caught in the winter fishery, with only 72 fish landed in October 2003 and 9117 fish landed from February to April 15 of 2004. Test fisheries conducted in areas off the west coast of QCI caught 800 legal-sized Chinook salmon. Test catch is included in the total for the troll fishery. Troll catch and effort by day are presented in Figure 9.

2004 SAMPLING & STOCK IDENTIFICATION

The fishery was underway when the sample program was initiated in the spring of 2004. The first samples (200) were collected from the commercial fishery in early April when most of the 9117 catch occurred. The October landings were not sampled. The target catch was 10,000 Chinook salmon for the winter fishery. A 2-week extension was provided into April to approach the TAC.

A test fishery was designed to collect monthly samples in May, June, August and September with the early June sample as a pre-fishery test. July samples were expected from the commercial fishery. The sampling objective for the commercial fishery was to collect 1000 Chinook salmon samples relative to catch. The test fishery sample objectives were met with 800 Chinook salmon sampled. The open fishery sample objectives were also met with 1580 Chinook salmon sampled for a total of 2380 Chinook salmon sampled, including 280 fish from the spring fishery. DNA analyses were completed for 1911 of the samples collected.

Stock compositions from legal-sized Chinook samples analyzed in 2004 appear in Table 15 and Table 16 for Areas 1/101 and 2W/142 respectively. Stock compositions in 2004 are applied to commercial troll catches in Table 17 and Table 18.

2004 MANAGEMENT ACTIONS

The annual target for the 2004 NBC troll fishery was 7800 WCVI Chinook salmon with a total allowable catch of 183,640 fish within the PST ceiling. The winter fishery resulted in a catch of 2065 WCVI Chinook salmon but the preliminary estimate used in-season was 1800 WCVI Chinook salmon which left 6000 fish for fisheries that followed.

The second NBC troll fishery of 2004 was scheduled to open June 10. Relatively high levels of WCVI Chinook salmon in the southern sample and a declining trend in the proportion of WCVI Chinook at both sites were the impetus for the fishery being postponed until June 15. When the fishery was opened it was limited to Area 1/101 and a small portion of 2W/142 north of Hippa Island. The fishery was sampled opening day and the results from the sample collected at Port Louis, just north of the closure boundary, resulted in the remainder of Area 2W/142 being opened effective June 25. A sample from fishery landings reported caught from a similar location was 18.2% WCVI chinook salmon. These data were received June 28 and resulted in the closure of the fishery July 1. Subsequent samples of this fishery were all less than 3% WCVI chinook which prompted another fishery. The opening and closing dates for the 5-day fishery from July 18 to 22 were defined by managers without further sample data.

Total catch for the season was 167,508 Chinook salmon with 10,065 fish of WCVI origin. The catch of WCVI Chinook salmon was 129% of target and the total catch was 91% of the pre-season target and 99% of the post season allowable catch (QCI sport catch was higher than expected). The estimated post-season exploitation rate on WCVI Chinook salmon was 2.9%. Table 19 provides the sequence of management actions in response to the sample results.

2005 TROLL FISHING PLAN

The 2005 pre-season abundance index for NBC troll and QCI Sport fisheries was 1.69, which allowed a total catch of 246,600 Chinook salmon. The pre-season estimate of sport catch was 76,600 Chinook salmon which left 170,000 fish as the troll allocation.

A quota of 5000 Chinook salmon was allocated to the winter fishery, 2500 fish from October to December 2004 and 2500 fish from January to March of 2005. The annual target for the 2005 NBC troll fishery was 11,600 WCVI Chinook based on a 3.6% harvest rate on the forecast return of RCH Chinook to Canadian waters. This target was equivalent to the post-season harvest rate estimated for the 2002 NBC troll fishery.

A demonstration fishery to examine the application of individual transferable quotas (ITQ) in the troll fishery was held in 2005. The in-season target for the traditional style or derby fishery was 7000 Chinook salmon and the target for the ITQ fishery was 161,000 Chinook salmon (1000 per licence).

2005 TROLL CATCH

The total 2005 AABM catch was estimated at 243,606 Chinook salmon, with 174,806 fish caught in NBC troll fisheries and 68,800 fish caught in sport fisheries. The NBC troll fishery was opened for Chinook salmon fishing from October 1, 2004 to March 30, 2005 and from June 3 to September 30, 2005. The total allowable catch for the winter fishery was 5000 Chinook salmon. There were 1870 Chinook salmon caught in October 2004 and 3173 Chinook salmon caught in the first quarter of 2005. The summer fishery accounted for a total of 174,806 Chinook salmon, with 161,321 fish caught under the ITQ system and 6953 fish caught under the regular style or derby fishery. The test fishery accounted for 1489 legal-sized Chinook salmon which are included in the total for the troll fishery. Troll catch and effort by day are presented in Figure 10.

2005 SAMPLING & STOCK IDENTIFICATION

The NBC troll sampling protocol for 2005 included a test fishing program and a sampling program for landed catch. Sampling strategies were intensified to account for the longer fishery expected due to the ITQ program. The sampling protocols represented approximately twice the amount of DNA samples collected and an increase in analyses of 30 to 50% over previous years.

The test fishing program was designed to collect 16 samples over 8 time periods and 2 locations between May 1 and September 15, 2005. The tests began in early May to sample 100 Chinook salmon from each of 2 sites: Area 101 between Langara and Frederick Island and Area 2/142 around Buck Point. Samples were collected near the beginning and middle of each month such that stock composition data could be supplied to the managers and reported near the 1st and 15th of each month. A test vessel was not scheduled during the period from June 15 to July 1 because managers expected some commercial opportunity at that time that will allow for direct sampling of the fishery. Complete samples were collected by the test fisheries for all but the September samples. Only 56 and 33 Chinook salmon were collected in the September sample in areas 1/101 and 2W/142 respectively due to bad weather. The total test catch was 1489 Chinook salmon and DNA analyses were completed for 1427 of the fish landed in test fisheries.

Catch was sampled from the ITQ demonstration fishery and the regular style fishery. The objective was to collect tissue samples from 1.5% of the catch (2400 Chinook salmon) and have the DNA analyses completed for approximately 1% of the catch (1600 Chinook salmon). The sampling of each fishery was to reflect the participation and landings expected in each fishery. Fishery sampling objectives were met with a total of 2648 Chinook salmon sampled, 2198 and 450 Chinook salmon sampled from the ITQ and derby fisheries respectively. Analyses were completed for 1069 of the tissues collected from fishery landings. Requests for analyses were reduced as many of the test samples occurred in the same time and area as the fishery samples.

Stock composition from legal-sized Chinook samples analyzed in 2005 appear in Table 20 and Table 21 for Areas 1/101 and 2W/142 respectively. Stock compositions in 2005 are applied to commercial troll and test catches in Table 22 and Table 23.

2005 MANAGEMENT ACTIONS

Managers were still designing the 2005 troll fisheries when the first test results became available from the early May sample. The proposed decision rule for opening the ITQ fishery was to open when the proportion of WCVI Chinook dropped below 10% but the fishery opening was delayed because the procedures for validation of ITQ catch were not finalized. Samples indicated a slightly higher incidence of WCVI chinook in the Buck Point samples so the fishery was held north of Hippa Island.

Prior to the start of the 2005 summer fisheries there were approximately 10,400 WCVI Chinook salmon remaining in the 11,600 target. In order to meet the target, catches would have to average less than 6.2% WCVI Chinook salmon. The majority of catch occurred in June and early July when low proportions of WCVI Chinook salmon prevailed. With most of the catch at WCVI proportions below target and only a small amount of catch remaining, the ITQ troll fishery was left open for the remainder of the season.

The derby fishery opened June 16 to July 17, 2005. Low proportions of WCVI Chinook salmon prevailed and no additional management actions were warranted on the basis of stock composition.

Decisions to keep the ITQ and derby fisheries open and the area closure in the southern part of the fishery were the only management actions predicated by stock composition data. The southern portions of Areas 2W & 142 below Hippa Island were opened September 14 to 30.

Total catch for 2005 was 174,806 Chinook salmon with 8,125 of WCVI origin. The catch of WCVI Chinook salmon was 70% of the pre-season target. Total catch of Chinook salmon was 103% of the pre-season target and 98% of the post season allowable catch (QCI sport catch was lower than expected). The estimated post-season exploitation rate on WCVI Chinook salmon was 3.5% and the estimated harvest rate on the return of WCVI Chinook salmon to Canada was 4.1%.

GENERAL

Management targets and actual catches for 2002 to 2005 are presented in Table 24 with pre-season forecasts and post-season estimates for WCVI and RCH chinook salmon. Total annual NBC troll catches were within 10% of the pre-season targets for the duration of the study. The target catch of WCVI Chinook salmon was exceeded in all years other than 2005. The 2002 fishery represents the most extreme overage at 223% of target.

The proportion of WCVI chinook in each sample is compared by date for each year in Figure 11. Figure 12 and Figure 13 compare monthly contributions by large stock complexes to the samples collected from the west coast of QCI from 2002 to 2005.

Ageing data are presented by sample year and stock region in Table 25 and Table 26. Comparing stock components by age and year reveal the poor performance of most chinook cohorts that went to sea in 2001. Both 2000 brood ocean-type stocks and 1999 brood stream-type stocks appeared in much smaller proportions in the samples than cohorts from the previous brood (1999 brood ocean type and 2000 brood stream type). This is also evident in the comparison of length frequencies between years (Figure 14). The average size of Chinook salmon caught in NBC Troll fisheries was smaller in 2005 since most of the larger 4 marine year fish were missing. The size differential between years was more prevalent in the northern samples from Area 1/101.

DISCUSSION

SITE SELECTION

Sites were limited to the west side of QCI and Dixon Entrance. The advantages to these sites were high Chinook salmon catch rates, low encounters of sublegal Chinook salmon, and low encounters of other species during much of the year. Also, the river mouth for the nearest local Chinook salmon stock, the Yakoun River, was over 130 kilometers away from the La Perouse Reef site by water, so a spawning concentration at a river mouth was not going to influence the stock mixes at either of the sites selected. Both sites were within the area designated for the AABM regime and have significant historic catches. The disadvantages of these sites were their remote location and lack of protection from bad weather.

Factors influencing final site selection included Chinook salmon abundance, the ability to collect samples consistently, the presence of WCVI Chinook salmon, the presence of undersized Chinook salmon, and fiscal constraints. The annual budgets allocated to this program were the primary constraints to the number of samples analyzed. Budget was also the primary constraint to the number of sites and the frequency with which sites were sampled. Other important considerations in structuring the test fisheries were the incidence of other species and the management regime associated with the site (AABM or ISBM). In selecting test sites, we considered the areas of highest use and fishing success as well as whether the location that would most accurately represent the fish in the area (e.g. a local “hot-spot” highly influenced by a single stock would not be a viable site). Sites had to be known fishing areas with a history of high success. The troll fishers were also interested in accessing as much fishing ground as possible to limit congestion, so sites had to be representative of a significant geographic area.

The economic impetus and primary objective for the NBC troll fishery is to harvest the allowable number of Chinook salmon within the allocation afforded under the AABM regime. Management constraints to a wide-open fishery include minimizing encounters of undersized Chinook salmon and non-target species, minimizing fisheries where legal and sublegal Chinook salmon have to be released, and management for stocks of conservation concern. Normal procedures for the NBC troll fishery have been discussed further by the PST Chinook Technical Committee (CTC 2005).

Catch results from the test fishery in 2002 confirmed some significant information relative to the selection of test fishing locations that would essentially dictate options for future troll fishing opportunities if they were to be based on results from DNA analysis. Important results were the high catch levels on the west side of QCI in conjunction with low encounters of small (<67 cm) Chinook salmon. Also, the relatively high to extreme encounters of small Chinook salmon in the tests conducted on the north-east side of Hecate Strait precluded their consideration as an area for a full directed fishery on Chinook salmon (Figure 6). Fishing was so poor on the west side of Hecate Strait that these sites were dropped from the study after the first attempt (i.e. none of the test fishers would go there).

Examination of coded wire tag recoveries relative to troll fishing effort revealed that the Central Coast had a higher incidence of WCVI Chinook salmon based on recoveries from the Robertson Creek hatchery indicator stock. This analysis was confounded by the inability to clearly identify and remove troll effort directed at species other than Chinook. Central Coast areas were not included in the AABM allocations afforded the NBC troll and QCI sport fisheries and indications from CWTs were that Central Coast sites were higher in WCVI encounters than North Coast areas, so Central Coast sites were not considered in the final site selection.

SEASON SUMMARIES 2002 TO 2005

2002

The 2002 fishery presented significant challenges to the assessment and management for WCVI Chinook salmon. The preliminary design of the 2002 fishery was to fish spring and fall to avoid the time when it appeared most WCVI Chinook salmon emigrated through the NBC fishing area according to CWT data (Figure 4). The fishery was positioned before and after the main migration of WCVI Chinook to attempt the objective of reduced WCVI Chinook salmon interceptions.

The NBC chinook troll fishery was open from October 4, 2001 into the spring of 2002 but there was no fishing activity from November to February. The fishery was underway before PST allocations and WCVI Chinook salmon forecasts were finalized April 30. A large allocation to Alaskan AABM fisheries resulted in a reduction to the domestic Canadian management target from 15% exploitation on WCVI Chinook salmon in Canadian outside fisheries to 10%. The portion assigned to the NBC troll fishery represented an exploitation rate of 1.5% on WCVI Chinook salmon.

Methods available to measure troll fishery encounters of Chinook salmon by stock included CWT sampling, otolith sampling and DNA. All three methods were attempted in 2002 but using otoliths and CWTs in-season suffered from the difficult field sample requirements and the relatively long time required to process samples. Further, relating the stock composition of a fishery catch back to an exploitation rate objective for a single component of the catch required intimate knowledge of the stock in question.

Lessons from the 2002 experience included the need to reduce the time between when fish were caught and when a management action occurred in response to the sample data. The most time consuming parts of the data collection process were the practical procedures of sampling fish and the logistics of transporting samples to the laboratory for analysis. Catch samples from landings were from fish caught several days previously. Obtaining sufficient samples required visits to multiple landings. Transportation of samples from QCI to Prince Rupert took 1 or 2 days where samples were catalogued, sub-sampled, and forwarded to Nanaimo by courier which took 2 or 3 working days. Once they received the samples, the laboratory was able to return the results from DNA analyses quickly, often in less than 3 days. The addition of an 8-day management response time after receipt of the stock composition information meant the management reaction was 2 to 3 weeks after the fish were caught.

The 2002 fishery was timed according to historic CWT knowledge of the WCVI run timing past QCI with a peak timing of early August. However, CWT information about troll stock compositions in winter and spring was extremely limited because the troll fishery had not operated prior to late June or early July since the signing of the PST agreement in 1985 and CWT recoveries from fisheries before 1985 suffered from small numbers of tagged releases. The DNA data revealed that fishing later in the year (late June or July) would have resulted in fewer WCVI mortalities for the same catch. This hindsight provided the momentum for the 2003 experiment.

Summer troll fisheries were excluded from traditional fishing areas around Langara Island and the north end of Graham Island since 1997 to avoid conflicts with the sport fishery. The pattern of sport fishery recoveries of WCVI Chinook salmon around Langara Island closely resembles the pattern of historic CWT recoveries (Appendices 9, 11 & 13). The highest proportions of WCVI chinook are evident in August for both data sets. Moving the summer troll fishery offshore had the effect of reducing WCVI encounters but also made the pattern of encounters more difficult to predict.

2003

The challenge in 2003 was to limit the Area F troll exploitation rate on WCVI Chinook salmon while attempting to reach the Pacific Salmon Treaty (PST) ceiling. The management benchmark for allowable exploitation on WCVI Chinook salmon was the level achieved in 2002 or lower. DNA data from 2002 had provided some interesting insights into stock compositions of Chinook salmon on the west coast of QCI. WCVI Chinook salmon were present in most samples and their relative proportion seemed to be driven to a large degree by the presence of Columbia River and Fraser River stocks. Fraser River Chinook salmon returned in record numbers in 2002. Useful data to managers would include stock compositions for periods just prior to proposed fisheries and catch composition during and after fisheries. It was identified early in the design that more fisheries would allow for increased precision by allowing for post-fishery assessments of catch and stock composition with revisions to targets for subsequent fisheries.

The DNA sampling protocol was to sample 1% of the troll catch in each fishery and have monthly samples collected from 2 locations. The monthly samples were designed to provide the proportion of WCVI Chinook salmon in the time/area strata just prior to the fishery when possible. The sample locations were Buck Point, in Area 2W, and La Perouse Reef, in Area 101, both off the west coast of QCI. Sample rate was largely determined by available funding.

The 2003 troll fishery provides the best example of the application of DNA stock composition to fisheries management in the time series. Decision rules were designed prior to each fishery to meet the targets and the trigger points were within the range of the results encountered. The forecast underestimated the return of WCVI Chinook salmon so even though the in-season management target was exceeded, the fishery was below the exploitation rate target when evaluated post-season.

2004

Test vessels followed the normal protocol of collecting samples near Buck Point in Area 2W/142 and near La Perouse Reef in Area 1/101. A troll fishery was tentatively scheduled for June 10. A pre-fishery test sample was scheduled for around June 1 so results could be available on June 8 (weather etc. permitting). The managers would decide what constituted an acceptable proportion of WCVI Chinook salmon for the opening. Decision rules were not developed as the managers wanted to retain flexibility. Managers provided a rough guideline of not fishing if all areas were above 12% WCVI. Area closures were proposed if a cline in the proportion of WCVI was observed as in 2003. Test vessels were not equipped to collect extra samples under the rationale that if the June sample had an unacceptable proportion of WCVI Chinook salmon, another set of samples would take about a week to 10 days for collection and analysis. Managers felt that after a week of waiting they would want to fish regardless of the results from the second set of samples. The test design accommodated the scenario of waiting a week to open the fishery, then deferring to the catch samples if results from the June samples were unsatisfactory.

No changes were made to the sample design to accommodate reopening the fishery after a closure. The rationale was that in the event of a closure with large amount of catch remaining the only quick re-open scenario would occur if catch sample results collected later in the fishery exhibited much lower WCVI components than the earlier catch samples that were used to generate the closure estimate. Under this situation the fishery would re-open quickly to take advantage of the low proportion of WCVI observed in the later catch samples. This was the case for the June 15 to July 1 fishery but managers did not include the possibility of re-opening the fishery in the closure notice to fishers. As a consequence much of the fleet left the area and

fishing representatives made the case to delay re-opening to allow that portion of the fleet to return.

In the event of a small amount of harvest available after the June/July fisheries in 2004 a fall fishery was proposed. The September samples could have been adjusted to accommodate collection of pre-fishery data. This fishery was not necessary since the allowable catch of WCVI was exceeded in the July fishery.

Managers met with troll fishery representatives at each of the critical decision points in 2004, once on June 7 to develop the decision to delay the fishery and again on July 13 to delay the re-opening until July 18. This unwieldy process could have been replaced with simple decision rules for management reactions to stock composition data.

2005

The 2005 troll fishery was unique since the majority of fishing was conducted under an individual vessel quota of 1000 Chinook salmon per vessel. Another unique aspect was that this was the first year that the return of WCVI Chinook salmon was underestimated. No management actions were required to meet the catch objectives set by the forecast of WCVI Chinook salmon. The catch of WCVI Chinook salmon was only 70% of numerical target set for the 2005 troll fishery yet the post season analysis revealed that the exploitation rate target was exceeded by 10% (Table 24).

GENERAL STOCK COMPOSITION PATTERNS

A large number of stocks contribute to Chinook salmon encounters off the north and west coast of QCI. The 2002 to 2005 samples collected near Langara Island typically consisted of more stock groups than those collected further south at Buck Point or other locations in Area 2W/142. Northern stocks were not as prevalent down the west side of QCI. The north to south reduction in stocks appears to reflect the northern components of the mixture moving off to terminal areas as the seasons progressed. The greatest number of stocks occurred in June and July. The proportion of samples made up by stocks from the United States increased from June to September.

Annual trends in the proportion of WCVI Chinook salmon observed were lowest in late June / early July and again in late September (Figure 11). These findings contradict the CWT data that indicated that spring fisheries could have a relatively low impact on WCVI chinook. Possible explanations are bias in the spring CWT collections and/or composition differences due to the spatial changes between recent and historic troll fisheries. There was a relative lack of spring fisheries to collect CWT data after the PST was signed in 1985 which may account for bias in the CWT collections. A major spatial difference was the exclusion of the troll fishery from areas near the beach of Langara Island and northern Graham Island. The trends in WCVI Chinook salmon abundance in the fall GSI samples were consistent with the CWT information. Typically the proportion of WCVI Chinook dropped to near zero late in September.

The age and size data combined with the stock region from the DNA analyses provide the opportunity to compare or relate biological attributes from mixed samples at sea. They also provide some insight into the ability to correctly identify specific cohorts within mixed stocks. Errors are evident as noted by the larger than normal stream type components identified for some stocks that are primarily ocean type, and the inverse, larger than normal ocean type contributions to primarily stream type stocks. We attribute these errors to the difficulty in ageing the freshwater portion of the scales and sampling errors in the collection procedures (where scales do not match the tissue collected). The actual cohorts for stocks with significant components of both stream and ocean types are suspect because of the difficulty interpreting freshwater age.

COMPARISON OF TROLL SAMPLES TO SPORT SAMPLES

The QCI sport fishery forms the other major fishery in the AABM regime. The sport fishery operates continuously through the year but most catch occurs from May 15 to September 15. Sampling of QCI sport fisheries was less rigorous because management actions to protect WCVI Chinook salmon were not anticipated in northern sport fisheries. The sampling structure was continuous through the summer (sampled 5 fish per day, 5 days per week across 2 areas (Winther, 2005)). Catches by stock region for the QCI Sport fishery for 2003 to 2005 are presented in Table 27.

Troll and sport fishery samples were presented in monthly time steps to compare the patterns of Chinook salmon stock contributions between the two fisheries. (Appendix 9 through Appendix 14). The pattern of WCVI Chinook salmon contributions to the Area 1/101 sport fishery more closely resemble the pattern of historic CWT recoveries from the troll fishery (Figure 4) than recent GSI samples of the troll fishery. This was not surprising as most of the historic troll catch from Area 1/101 was attributed to the area around Langara Island by the catch data and by anecdotal accounts.

Differences in stock composition between the 2003 to 2005 troll and sport catches may be considered in terms of near-shore and off-shore influences. The sport fleet tended to stay near shore and a ribbon boundary excluded trollers from fishing within one mile of the beach. This spatial separation may not persist as the sport fishery has begun to ply more offshore waters. WCVI Chinook salmon were more prevalent in all Area 1/101 sport samples than in troll samples collected from similar months (Appendix 9, Appendix 11 and Appendix 13) which suggests a spatial preference by WCVI Chinook salmon for the near shore area. This separation is not as evident in Area 2W/142 samples (Appendix 10, Appendix 11 and Appendix 14), probably because there was no spatial separation of the troll and sport fleets. Also, the hydrographic features may not afford the opportunity for stock separation in lower Area 2W/142 since the continental shelf is much closer to the shore of Moresby Island than at the north end of Graham Island. Essentially, stocks traveling along the continental shelf in Area 2W/142 would be combined with those along the beach.

EFFECTS OF MANAGEMENT CHANGE

The management practices to reduce impacts on WCVI Chinook salmon between 1995 and 2001 took the form of reductions in total allowable catch (TAC). During this time catch targets for the NBC Troll fishery were reduced significantly from the TAC that would have been available if there were no conservation concerns. In one year, 1996, the NBC troll catch target for Chinook salmon was zero. The average reduction in the TAC was approximately 70% from 1995 to 2001. Since the inception of the DNA program in 2002 only 13% of the target catch has not been caught. Most of this foregone catch occurred in 2002. The average catch foregone from 2003 to 2005 was less than 4% of the preseason NBC troll catch target. The difference in catch foregone between the GSI and TAC reduction management practices represents over 380,000 Chinook salmon to the NBC troll fishery.

These catch increases occurred while still affording a significant level of protection to WCVI Chinook salmon. Prior to conservation concerns for the WCVI stock the average total fishing mortality from 1985 to 1994 was 9.2%. Average total fishing mortality by the NBC troll fishery in the TAC reduction era from 1995 to 2001 was 3.3% of the RCH indicator stock. The average total fishing mortality by the NBC troll fishery from 2002 to 2005 was 2.3% of the RCH indicator stock when DNA techniques were applied (A. Tompkins, Pacific Biological Station, Nanaimo, unpublished data).

An inherent weakness in this study was the reliance on preseason forecasts to set numerical targets for WCVI Chinook salmon. Forecasts were based largely on the RCH forecast

with adjustments for other hatchery and wild components. The mean absolute percent error in the RCH forecast was 21% from 1988 to 2001 (Riddel, et. al. 2002). Future application of GSI techniques for mixed-stock salmon fisheries would benefit from improved forecasting. Similar techniques would be well suited to mixed stock fisheries where the abundance of the stock of concern could be modeled or updated in-season.

SUMMARY

In-season stock composition of troll fishery catches of Chinook salmon using microsatellite DNA was provided to fishery managers beginning in 2002. Microsatellite-based stock composition analysis identified component stocks that comprised catches of Chinook salmon in the NBC troll fishery, and influenced the design of the fishery to protect the WCVI stock aggregate. Management application of in-season stock composition to NBC troll fishery management would benefit from more accurate forecasts of WCVI Chinook salmon abundance, or alternatively a method for revising forecasts of WCVI abundance in-season. Management of the NBC troll fishery may be further enhanced if clear decision rules regarding application of stock composition analysis were developed. Applying in-season estimates of microsatellite-based stock composition to fishery management decisions during 2002-2005 resulted in a cumulative catch of approximately 380,000 more Chinook salmon than would have been expected had the management practices of 1995-2001 continued through 2005. These catch increases occurred while providing an increased level of protection to WCVI Chinook salmon.

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TABLES

Table 1. Landed catch of Chinook salmon by the NBC Troll and QCI sport fisheries relative to domestic and PST allocations, 1985 to 2005.

Year	PST ¹ Preseason Ceiling	Total ² PST Catch (1000's)	Domestic Troll Ceiling	Potential Troll allocation within the PST ceiling (1000's)	Actual NBC Troll Catch (Areas 1-5) ³	QCI Sport Catch
1985	263,000	274	= portion of PST ceiling	180	186,723	600
1986	263,000	261	= portion of PST ceiling	164	152,999	1,153
1987	263,000	283	= portion of PST ceiling	167	177,457	2,644
1988	263,000	247	= portion of PST ceiling	174	152,369	7,059
1989	263,000	301	= portion of PST ceiling	173	207,679	20,652
1990	302,000	253	= portion of PST ceiling	208	154,116	16,827
1991	273,000	304	= portion of PST ceiling	169	194,015	15,047
1992	263,000	268	= portion of PST ceiling	148	142,336	21,358
1993	*	257	186,000	172	161,775	25,297
1994	*	251	160,000	179	164,492	28,973
1995	*	119	60,000	202	56,863	22,531
1996	*	27	0	236	15	670
1997	*	167	85,000 before Sep.	188	86,787	27,738
1998	*	180	110,000 before Sep.	201	116,407	34,130
1999	145,600	75	50,000 before Sep.	120	44,572	30,227
2000	130,000	32	0 before Sep.	108	9,948	22,100
2001	132,600	43	0 before Sep.	102	13,100	30,400
2002	192,700	151	3,052 WCVI Chinook	146	103,517	47,100
2003	197,100	192	6,718 WCVI Chinook	142	137,357	54,300
2004	243,600	241	7,800 WCVI Chinook	170	167,508	74,000
2005	246,600	244	11,600 WCVI Chinook	178	174,806	68,800

¹ From 1985-1992, the PST agreed catch ceiling for all north and central coast fisheries combined was 263,000. Increments were added in 1990 and 1991. From 1993-1998, no formal agreement on catch limits was in place. In 1993 and 1994, Canada chose to fish to the pre-1993 ceiling; conservation concerns from 1995-1998 kept Canada's harvest well below this ceiling. Since 1999, catch allowance were developed annually through an abundance based management approach.

² Up until 1998, catch included all north and central coast landings from Areas 1 to 10. Since 1999, catch reported includes only NBC troll landings in Areas 1 to 5 and QCI sport landings in Areas 1 and 2.

³ Area 1 to 5 troll data from fish slips up to 2000 then from combined hails & slips.

Table 2. Distribution of British Columbia troll fishing licences issued annually by area.

Year	# Inside licences issued	# Outside licences issued
1984	140	768
1985	195	1071
1986	186	1002
1987	172	841
1988	154	685
1989	147	550
1990	162	507
1991	161	591
1992	149	631
1993	136	564
1994	171	534
1995	161	470

Year	# Area F licences issued	# Area G licences issued	# Area H licences issued	# Licences issued but area data not retained¹
1996	340	592	176	193
1997	314	468	220	
1998	312	467	221	
1999	235	336	180	
2000	147	238	153	
2001	142	234	156	
2002	146	233	153	
2003	154	231	150	
2004	159	229	142	
2005*	168	227	143	

* preliminary

¹In 1996 area data was not retained for 193 of the troll licences issued. These vessels may have been designated to any of the three areas F, G or H.

Table 3. Catch of Chinook and coho at test locations in the North and Central Coast.

Area	Time	Location	Subareas	Chinook (>65cm)	Chinook (≤65cm)	Coho	Days Fished	Comments
1	July 1-15	La Perouse Rf.	1-1, 101-1, 101-2	101	1	6	2	
1	July 16-31	La Perouse Rf.	1-1, 101-1, 101-2	100	1	27	2	
1	Aug 1-15	La Perouse Rf.	1-1, 101-1, 101-2	102	4	12	1	
1	Aug 15-31	La Perouse Rf.	1-1, 101-1, 101-2	100	8	61	3	
2W	July 1-15	Buck Pt.	142-2	103	0	3	1	
2W	July 16-31	Buck Pt.	142-2	100	1	8	1	
2W	Aug 1-15	Buck Pt.	142-2	103	2	6	1	
2W	Aug 15-31	Buck Pt.	142-2	100	3	42	3	
1	July 1-15	Wiah Pt./ Jalun R.	101-6 & 7, 1-2, 3 & 7	38	7	23	2	Engine Problem
1	July 16-31	Wiah Pt./ Jalun R.	101-6 & 7, 1-2, 3 & 7	93	12	94	5	
1	Aug 1-15	Wiah Pt./ Jalun R.	101-6 & 7, 1-2, 3 & 7	100	7	169	4	Coho open
1	Aug 15-31	Wiah Pt./ Jalun R.	101-6 & 7, 1-2, 3 & 7	100	15	120	4	Coho open
1	July 1-15	A-B Line Strip	101-3, 5, 8 & 9	-	-	-	-	No Test Fishery
1	July 16-31	A-B Line Strip	101-3, 5, 8 & 9	-	-	-	-	No Test Fishery
1	Aug 1-15	A-B Line Strip	101-3, 5, 8 & 9	52	27	106	4	Coho open
1	Aug 15-31	A-B Line Strip	101-3, 5, 8 & 9	89	2	201	3	Coho open
3	July 1-15	Dundas Isl.	3-1, 4-1, 103	46	45	89	6	
3	July 16-31	Dundas Isl.	3-1, 4-1, 103	100	75	94	5	
3	Aug 1-15	Dundas Isl.	3-1, 4-1, 103	14	9	92	2	
3	Aug 15-31	Dundas Isl.	3-1, 4-1, 103	100	>100	385*	3	Coho open
5	July 1-15	Oval Bank Area	4-3, 5-11, 104-3, 105-1	12	10	92	5	
5	July 16-31	Oval Bank Area	4-3, 5-11, 104-3, 105-1	94	77	98	6	
5	Aug 1-15	Oval Bank Area	4-3, 5-11, 104-3, 105-1	40	13	89	4	
5	Aug 15-31	Oval Bank Area	4-3, 5-11, 104-3, 105-1	20	12	385*	2	Coho open
6	July 1-15	Caamano Sd	106, 6-9, 6-13	57	7	24	5	
6	July 16-31	Caamano Sd	106, 6-9, 6-13	22	12	39	4	
6	Aug 1-15	Caamano Sd	106, 6-9, 6-13	20	3	215	3	Coho open
6	Aug 15-31	Caamano Sd	106, 6-9, 6-13	-	-	-	-	No Test Fishery
7	July 1-15	Milbank./Lar. Sd	107, 7-1, 7-31	100	1	18	UK	
7	July 16-31	Milbank./Lar. Sd	107, 7-1, 7-31	100	5	21	3	
7	Aug 1-15	Milbank./Lar. Sd	107, 7-1, 7-31	100	20	316	7	Coho open
7	Aug 15-31	Milbank./Lar. Sd	107, 7-1, 7-31	80	12	699	9	Coho open
2E	July 1-15	Sandspit	102-2 & 3, 2-2 to 2-19	9	4	7	2	1
2E	July 1-15	Scudder Point	102-1	4	1	3	3	1

* estimated coho catch

¹ The Area 2E sites were abandoned by test fishers after the first attempt.

Table 4. Chinook catch by stock group for NBC troll fisheries from 2002 to 2005. Abbreviations are described in Appendix 6. Standard deviations (SD) appear in brackets.

Year	2002		2003		2004		2005	
NBC AABM Troll Catch	103,038		137,357		167,508		174,806	
Catch assigned to DNA	101,305		137,117		167,436		174,806	
DNA analyzed (Σ N)	934		1,775		1,911		2,496	
DNA baseline size	182/233		233		240		240	

Stock Group 2002 & 2003	Catch	STD	Catch	STD	Catch	STD	Catch	STD	Stock Group 2004 & 2005
UPFR	1,769	(605)	1,295	(676)	680	(548)	813	(500)	UPFR
MUFR	2,064	(650)	3,525	(1110)	3,251	(1104)	1,465	(655)	MUFR
LWFR	1,237	(695)	1,481	(774)	88	(204)	464	(296)	LWFR-Sp
					2,892	(1120)	1,245	(572)	LWFR-F
NOTH	2,525	(653)	2,675	(769)	7,592	(1583)	4,193	(1032)	NOTH
SOTH	21,388	(1880)	14,573	(2198)	38,729	(2895)	39,439	(2234)	SOTH
LWTH	6,364	(1563)	10,160	(2212)	55	(120)	633	(423)	LWTH
ECVI	1,087	(660)	2,315	(893)	1,357	(686)	3,677	(876)	ECVI
WCVI	6,775	(1097)	7,637	(1471)	10,065	(1204)	8,125	(1027)	WCVI
SOMN	2,189	(637)	980	(506)	1,438	(766)	326	(365)	SOMN
NOMN	6,159	(1249)	4,042	(959)	7,974	(1671)	7,902	(1351)	NOMN
Nass	2,100	(647)	2,491	(772)	419	(344)	430	(373)	NASS
QCI	0	(0)	81	(78)	323	(324)	2	(29)	QCI
Alaska	236	(352)	286	(409)	1,268	(784)	0	(81)	Alaska
					21	(84)	167	(224)	Alsek
Taku	58	(171)	635	(281)	578	(534)	8	(79)	Taku
Stikine	1,533	(783)	4,610	(1267)	527	(470)	943	(500)	Stikine
Skeena	4,608	(1093)	5,792	(1552)	4,302	(1286)	6,219	(1197)	Skeena
Puget Sound	649	(568)	2,228	(754)	2,600	(866)	498	(386)	Puget Sound
Juan de Fuca	521	(205)	708	(269)	71	(68)	127	(208)	Juan de Fuca
Coastal Wash	10,344	(1404)	7,704	(1540)	9,670	(1858)	7,309	(1170)	Coastal Wash
					3,452	(1158)	4,451	(981)	Low Col
Low Col/Will	2,329	(807)	11,194	(1798)	2,281	(646)	639	(376)	Up Willamette
					177	(290)	0	(89)	Mid Col-Sp
Mid/Up Col-Sp	0	(69)	537	(429)	253	(196)	0	(172)	Up Col-Sp
					30,303	(2692)	40,805	(2270)	Up Col-Su/F
Up Col-Su/F	11,449	(1234)	20,084	(1917)	146	(245)	0	(149)	Snake-Sp/Su
Snake-Sp/S	65	(82)	412	(234)	2,724	(1205)	831	(750)	Snake-F
Snake-F	905	(698)	2,080	(1140)	32,827	(2823)	44,059	(2236)	Oregon coastal
Oregon	14,712	(1338)	29,275	(2099)	411	(417)	33	(115)	S.Oregon/Cal coast
					32	(101)	0	(58)	Up Klam/Trinity
California	241	(237)	318	(430)	1	(5)			Sacramento
					896	(575)	0	(111)	Cent Val-F
					27	(106)	0	(82)	Cent Val-Sp

Table 5. Chinook stock composition as observed in samples of 2002 troll catches from Area 1/101. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 182 stock baseline for all samples except July and September where a 233 population baseline was used.

Area 1/101	2002		2002		2002		2002		2002		2002		2002		2002		2002			
Date	30-Mar		14-May		31-May		3-Jun		10-Jun		7-Jul		Jul 18 & 20		4-Aug		16-Aug		17-Sep	
Fishery	Troll		Troll		Troll		Troll		Troll		Test		Test		Test		Test		Troll	
N	28		49		98		68		61		100		94		99		100		53	
UPFR	0.0	(0.0)	1.2	(1.9)	3.9	(2.0)	2.5	(1.7)	3.1	(2.3)	1.1	(1.1)	0.3	(0.7)	0.7	(0.8)	3.2	(1.8)	0.0	(0.0)
MUFR	3.7	(4.5)	2.0	(2.4)	1.2	(1.4)	1.6	(2.0)	1.7	(2.4)	0.0	(1.3)	2.3	(1.8)	3.9	(2.6)	1.6	(2.6)	5.6	(3.7)
LWFR	0.0	(0.9)	5.5	(3.9)	0.0	(0.5)	0.0	(2.0)	0.0	(0.2)	0.0	(1.5)	0.0	(0.7)	0.0	(2.2)	1.3	(2.4)	3.8	(3.2)
NOTH	3.6	(3.5)	2.4	(2.8)	1.9	(1.2)	4.5	(2.5)	1.7	(2.8)	0.0	(0.9)	0.3	(0.8)	2.2	(2.3)	0.0	(0.8)	0.0	(1.0)
SOTH	3.6	(3.4)	18.6	(7.9)	35.9	(5.4)	32.7	(7.1)	36.3	(7.5)	22.4	(5.4)	16.5	(6.0)	8.8	(3.5)	1.1	(1.9)	0.0	(0.8)
LWTH	0.0	(2.1)	22.0	(8.9)	6.9	(3.8)	0.0	(2.4)	0.0	(4.8)	7.2	(4.4)	16.3	(5.2)	6.3	(3.9)	6.4	(3.2)	0.0	(0.0)
ECVI	7.0	(6.6)	0.0	(1.5)	1.0	(1.9)	3.4	(2.8)	0.0	(2.4)	0.0	(1.7)	0.1	(1.5)	0.3	(1.9)	0.5	(1.8)	2.6	(4.1)
WCVI	21.3	(7.0)	8.5	(4.3)	7.8	(3.2)	3.0	(2.1)	6.6	(3.2)	2.2	(2.8)	2.6	(2.2)	6.6	(3.0)	4.2	(2.3)	0.0	(0.0)
SOMN	0.0	(0.0)	6.2	(4.0)	0.7	(0.7)	0.0	(1.0)	2.1	(1.9)	1.1	(1.0)	2.4	(2.4)	1.0	(0.9)	0.1	(0.6)	5.3	(3.5)
NOMN	17.7	(7.0)	20.3	(6.1)	5.0	(2.9)	6.1	(4.2)	2.9	(3.0)	1.8	(2.4)	4.2	(3.5)	4.9	(3.3)	5.7	(3.8)	1.2	(4.0)
Nass	2.3	(3.3)	0.0	(0.6)	3.8	(2.1)	3.2	(2.2)	3.3	(2.3)	0.0	(0.3)	0.0	(0.5)	0.0	(0.4)	0.0	(0.4)	0.0	(1.6)
QCI	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Alaska	0.0	(0.7)	0.0	(1.1)	0.0	(1.2)	0.0	(0.0)	0.0	(1.0)	0.0	(0.7)	0.0	(0.0)	1.0	(1.4)	2.0	(1.6)	0.0	(0.1)
Taku	3.0	(3.5)	0.0	(1.2)	0.0	(0.2)	0.0	(0.4)	0.0	(0.0)	0.0	(0.7)	0.1	(0.4)	0.0	(0.2)	0.3	(1.5)	0.0	(0.8)
Stikine	4.4	(6.4)	2.2	(2.5)	0.0	(1.4)	4.3	(2.7)	0.0	(1.4)	0.0	(1.3)	2.7	(2.4)	4.4	(3.7)	2.1	(2.2)	2.4	(3.7)
Skeena	8.2	(5.7)	3.7	(3.0)	4.4	(2.7)	5.8	(3.0)	7.8	(4.1)	0.0	(1.8)	0.0	(1.0)	1.5	(2.7)	2.9	(3.0)	8.6	(4.4)
Puget Sound	0.0	(1.4)	2.1	(3.5)	0.0	(0.7)	0.0	(1.6)	2.7	(2.7)	1.1	(1.2)	1.2	(1.3)	2.4	(2.3)	3.1	(2.3)	0.0	(0.8)
Juan de Fuca	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	3.0	(1.6)	2.6	(1.9)	1.1	(1.0)	0.0	(0.2)	0.0	(0.7)	0.0	(0.0)	0.0	(0.0)
Coastal Wash	0.0	(3.3)	4.1	(3.1)	6.0	(2.7)	14.1	(4.4)	6.6	(3.5)	12.8	(4.0)	4.0	(2.3)	20.7	(4.8)	22.4	(5.6)	8.2	(5.1)
Low Col/Will	0.0	(1.2)	1.2	(1.6)	3.2	(2.3)	1.6	(1.8)	3.5	(2.6)	6.9	(3.4)	3.0	(2.4)	3.7	(2.4)	8.1	(2.7)	2.5	(3.8)
Mid/Up Col-Sp											0.0	(0.2)	0.1	(0.4)					0.0	(1.2)
Up Col-Su/F	10.9	(4.9)	0.0	(1.5)	11.1	(2.7)	12.3	(4.4)	13.1	(4.8)	7.1	(3.6)	3.7	(2.0)	10.7	(4.0)	9.0	(3.2)	3.4	(3.1)
Snake-Sp/S											0.0	(0.3)	0.0	(1.2)					1.3	(1.6)
Snake-F	0.0	(0.8)	0.0	(0.5)	0.5	(2.3)	0.6	(2.7)	1.7	(1.6)	2.2	(2.2)	0.1	(1.3)	6.9	(3.0)	2.1	(2.0)	3.0	(1.7)
Oregon	14.3	(6.2)	0.0	(0.2)	6.8	(2.4)	1.6	(2.1)	4.4	(3.0)	31.1	(5.3)	40.1	(5.6)	12.1	(4.3)	22.0	(4.9)	52.2	(8.2)
California	0.0	(0.0)	0.0	(0.0)	0.0	(0.2)	0.0	(0.0)	0.0	(0.0)	2.1	(1.4)	0.1	(0.9)	1.8	(2.0)	0.0	(0.9)	0.0	(2.3)

Table 6. Chinook stock compositions observed in samples of 2002 troll catches from Area 2W/142.

Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 182 stock baseline for all samples except July and September where a 233 population baseline was used.

Area 2W/142	2001		2002		2002		2002		2002		2002		2002		2002		2002		2002			
Date	20-27-Oct		Mar7-Apr19		11-May		25-May		13-May		10-Jun		7-Jul		19-Jul		4-Aug		16-Aug		Sep 20-27	
Fishery	Troll		Troll		Troll		Troll		Troll		Troll		Test		Test		Test		Test		Troll	
N	102		96		91		26		20		145		102		94		103		96		95	
UPFR	0.87	0.97	0.0	(0.7)	0.0	(1.4)	3.8	(4.9)	4.6	(4.6)	1.7	(1.5)	2.8	(2.6)	0.0	(0.4)	1.1	(0.6)	0.0	(0.7)	0.0	(0.0)
MUFR	5.1	2.44	3.4	(2.5)	1.9	(1.5)	7.6	(5.6)	0.0	(5.3)	5.3	(2.7)	6.4	(3.0)	0.9	(1.5)	0.0	(1.2)	2.1	(1.8)	0.0	(1.0)
LWFR	2.6	(2.3)	0.0	(0.8)	0.0	(0.3)	2.2	(3.8)	4.4	(5.1)	0.0	(0.2)	0.0	(0.3)	0.1	(2.2)	1.3	(1.5)	0.0	(1.3)	1.2	(2.4)
NOTH	0.0	(0.9)	0.0	(0.4)	1.0	(0.6)	5.4	(6.2)	15.0	(8.3)	5.8	(2.0)	3.1	(1.9)	0.0	(0.7)	0.7	(1.0)	0.3	(1.1)	1.4	(1.3)
SOTH	0.0	(0.1)	12.0	(3.8)	21.6	(6.1)	15.7	(7.2)	14.6	(8.6)	35.3	(4.6)	27.5	(5.9)	21.8	(5.6)	15.6	(5.0)	4.1	(2.3)	0.0	(0.1)
LWTH	0.0	(0.4)	2.7	(2.9)	13.2	(5.3)	0.0	(4.8)	3.4	(5.5)	7.3	(3.7)	8.3	(4.1)	10.5	(4.9)	3.5	(3.6)	0.0	(3.1)	0.1	(0.8)
ECVI	1.0	(1.9)	1.1	(1.7)	0.0	(1.5)	0.0	(1.4)	0.0	(2.1)	2.4	(1.7)	1.6	(2.1)	0.0	(1.0)	0.4	(2.3)	3.4	(3.1)	1.3	(1.2)
WCVI	0.0	(1.4)	11.4	(3.5)	9.9	(3.3)	11.6	(6.8)	20.4	(8.0)	4.0	(1.8)	1.9	(1.7)	1.6	(1.9)	10.7	(3.3)	5.3	(2.7)	1.8	(1.6)
SOMN	0.0	(0.9)	0.0	(0.7)	6.0	(2.4)	4.0	(3.4)	0.0	(2.2)	0.0	(0.8)	0.0	(1.1)	0.0	(0.3)	1.6	(1.6)	0.0	(0.8)	0.1	(0.8)
NOMN	10.5	(4.5)	6.9	(3.4)	5.1	(2.9)	3.6	(5.1)	8.6	(6.6)	3.8	(1.9)	0.0	(2.0)	1.5	(2.3)	2.8	(2.8)	7.8	(3.7)	2.2	(2.9)
Nass	0.0	(1.0)	1.0	(1.0)	4.3	(2.5)	3.9	(4.0)	0.0	(2.7)	0.8	(0.9)	0.0	(0.5)	0.0	(0.3)	0.1	(0.5)	0.0	(0.4)	0.0	(0.0)
QCI	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Alaska	0.4	(1.0)	1.1	(1.0)	0.0	(0.0)	0.0	(0.8)	6.8	(6.6)	0.0	(0.5)	0.0	(0.6)	0.0	(0.0)	0.0	(0.8)	3.2	(2.0)	0.0	(0.1)
Taku	0.0	(0.2)	0.0	(0.2)	0.0	(0.5)	0.0	(0.2)	0.0	(0.0)	0.6	(0.8)	0.0	(0.4)	0.0	(0.0)	0.0	(0.2)	1.3	(1.4)	0.0	(0.0)
Stikine	3.6	(2.4)	0.0	(1.2)	3.3	(2.5)	0.0	(3.9)	0.0	(3.6)	4.3	(2.0)	1.7	(2.4)	1.3	(1.4)	1.2	(1.5)	0.0	(2.3)	0.6	(2.5)
Skeena	2.2	(2.3)	8.1	(3.4)	4.0	(2.9)	15.2	(7.9)	0.0	(2.0)	2.5	(2.3)	0.8	(1.5)	0.1	(1.3)	6.0	(2.9)	1.8	(2.0)	1.4	(3.0)
Puget Sound	12.5	(3.9)	0.7	(1.2)	0.8	(2.0)	0.0	(2.7)	0.0	(2.5)	1.1	(1.3)	1.0	(1.1)	1.5	(1.5)	0.4	(1.9)	0.0	(1.7)	0.0	(0.7)
Juan de Fuca	0.0	(0.1)	0.0	(0.0)	0.0	(0.0)	3.9	(3.3)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.2)	0.0	(0.0)
Coastal Wash	27.4	(4.7)	5.9	(2.2)	4.4	(2.9)	8.0	(5.5)	5.3	(4.6)	4.6	(2.0)	10.1	(3.6)	12.6	(4.4)	13.8	(4.0)	39.4	(6.1)	27.8	(5.7)
Low Col/Will	1.8	(1.5)	3.9	(2.7)	0.0	(0.8)	0.0	(1.6)	0.0	(1.8)	0.0	(0.8)	2.5	(2.5)	6.5	(3.2)	8.0	(3.2)	0.0	(1.2)	4.7	(2.7)
Mid/Up Col-Sp													0	(0.0)	0	(0.0)					0	(0.2)
Up Col-Su/F	15.3	(4.5)	33.4	(5.6)	21.2	(5.1)	15.3	(7.9)	17.2	(9.8)	14.7	(3.7)	2.4	(1.9)	5.7	(2.5)	21.4	(4.9)	8.9	(3.1)	5.0	(2.6)
Snake-Sp/S													0.0	(0.0)	0.0	(0.0)					0.0	(0.0)
Snake-F	2.0	(1.2)	1.9	(3.1)	0.9	(1.9)	0.0	(1.5)	0.0	(2.3)	2.8	(2.2)	5.89	(2.4)	0.95	(2.1)	3.5	(2.4)	2.2	(1.7)	0.57	(1.3)
Oregon	14.8	(4.2)	6.5	(2.4)	2.5	(2.1)	0.0	(0.0)	0.0	(0.0)	2.9	(1.5)	24.0	(4.7)	34.9	(5.9)	7.1	(3.1)	20.2	(4.9)	50.5	(5.9)
California	0.0	(0.1)	0.0	(0.9)	0.0	(0.6)	0.0	(0.9)	0.0	(0.0)	0.0	(0.2)	0.0	(0.9)	0.0	(1.0)	1.2	(1.3)	0.0	(0.0)	1.3	(1.0)

Table 7. Chinook stock compositions observed in sublegal samples of 2002 troll test catches from Areas 1/101 and 2W/142.

Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 182 stock baseline for all samples except July where the 233 population baseline was used.

Sublegal Area	2002 2W/142		2002 2W/142		2002 2W/142		2002 1/101		2002 1/101		2002 1/101	
Date	16-Jul		4-Aug		16-Aug		Jul 18 & 20		4-Aug		16-Aug	
Fishery	Test		Test		Test		Test		Test		Test	
N	1		2		8		8		4		3	
UPFR	0.0		0.0	(0.1)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.1	(0.9)
MUFR	0.0		0.0	(0.1)	0.0	(6.2)	0.0	(0.0)	0.0	(0.1)	0.1	(15.2)
LWFR	0.0		17.8	(28.9)	0.0	(3.4)	0.0	(0.0)	0.0	(0.0)	0.0	(11.6)
NOTH	0.0		0.0	(0.1)	10.8	(13.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.5)
SOTH	0.0		0.0	(0.1)	0.0	(0.0)	0.0	(7.9)	0.0	(0.0)	0.1	(0.6)
LWTH	0.0		0.0	(0.0)	0.0	(0.1)	29.5	(18.4)	0.0	(2.5)	33.0	(25.6)
ECVI	0.0		32.5	(31.0)	0.0	(2.4)	14.3	(10.9)	0.0	(11.0)	0.1	(9.8)
WCVI	0.0		49.6	(34.7)	12.5	(11.2)	14.3	(12.5)	49.6	(22.7)	0.1	(0.6)
SOMN	0.0		0.0	(7.3)	0.0	(0.0)	0.0	(3.6)	0.0	(8.3)	0.1	(17.3)
NOMN	0.0		0.0	(11.2)	12.6	(9.9)	14.1	(12.7)	0.0	(6.3)	33.3	(28.5)
Nass	0.0		0.0	(0.1)	0.0	(6.9)	0.0	(0.3)	0.0	(2.8)	0.1	(0.6)
QCI	0.0		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)
Alaska	0.0		0.0	(0.0)	0.0	(0.0)	0.0	(1.6)	0.0	(0.0)	0.0	(0.1)
Taku	0.0		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.4)	0.0	(0.2)
Stikine	0.0		0.0	(0.1)	0.0	(2.8)	0.0	(0.0)	0.0	(7.5)	0.0	(0.2)
Skeena	0.0		0.0	(0.1)	12.6	(14.1)	0.0	(0.0)	0.0	(11.0)	0.1	(27.5)
Puget Sound	99.8		0.0	(0.0)	0.0	(2.6)	0.0	(0.0)	2.1	(18.4)	0.0	(0.4)
Juan de Fuca	0.0		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(2.5)	0.0	(0.1)
Coastal Wash	0.0		0.0	(0.0)	35.9	(15.7)	0.0	(0.0)	0.0	(0.1)	0.0	(0.2)
Low Col/Will	0.0		0.0	(0.0)	12.7	(6.8)	0.0	(10.6)	23.3	(20.9)	0.0	(0.1)
Mid/Up Col-Sp	0						0.0	(0.0)				
Up Col-Su/F	0.0		0.0	(0.0)	1.6	(10.1)	0.0	(1.4)	0.0	(0.0)	33.0	(18.7)
Snake-Sp/S	0.0						0.0	(0.0)				
Snake-F	0		0.0	(0.1)	0.0	(0.0)	14.3	(11.9)	24.8	(20.9)	0.1	(0.6)
Oregon	0.0		0.0	(0.0)	1.3	(9.5)	13.6	(12.1)	0.0	(9.5)	0.0	(0.2)
California	0.0		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.3)

Table 8. Chinook catch applied to stock compositions observed in samples of 2002 troll catches from Areas 1/101 and 2W/142. Abbreviations are described in Appendix 6. Test catch is not included.

Year	2002		2002		2002		2002		2001		2002		2002		2002		2002	
Area	1		1		1		1		2W		2W		2W		2W		2W	
Month	Feb-Apr		May		Jun		Sep		Oct		Feb-Apr		May		Jun		Sep	
Catch	687		33,454		13,638		5,142		253		3,981		19,094		6,814		18,242	
N	28	STD	147	STD	130	STD	53	STD	102	STD	96	STD	137	STD	146	STD	95	STD
UPFR	0	(0)	1008	(488)	376	(193)	0	(2)	2	(2)	0	(29)	263	(282)	118	(99)	2	(7)
MUFR	25	(31)	493	(404)	223	(209)	289	(192)	13	(6)	137	(100)	515	(313)	364	(181)	5	(190)
LWFR	0	(6)	609	(448)	0	(145)	196	(163)	7	(6)	0	(30)	199	(200)	0	(16)	226	(440)
NOTH	25	(24)	687	(416)	429	(251)	0	(49)	0	(2)	0	(17)	739	(330)	394	(137)	254	(244)
SOTH	25	(24)	10074	(1481)	4691	(706)	0	(40)	0	(0)	479	(151)	3713	(848)	2405	(315)	0	(24)
LWTH	0	(15)	3985	(1308)	0	(357)	0	(1)	0	(1)	106	(114)	1766	(713)	497	(253)	9	(140)
ECVI	48	(46)	221	(465)	244	(252)	135	(211)	2	(5)	43	(68)	0	(201)	164	(117)	232	(226)
WCVI	146	(48)	2696	(853)	637	(253)	0	(2)	0	(3)	455	(138)	2242	(535)	272	(123)	325	(297)
SOMN	0	(0)	856	(467)	135	(144)	270	(180)	0	(2)	0	(27)	904	(334)	0	(52)	22	(140)
NOMN	122	(48)	3372	(939)	624	(361)	62	(206)	27	(11)	274	(133)	1015	(445)	259	(128)	407	(522)
Nass	16	(23)	854	(483)	444	(214)	0	(80)	0	(3)	41	(39)	688	(357)	57	(63)	0	(5)
QCI	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Alaska	0	(5)	0	(285)	0	(67)	0	(3)	1	(3)	45	(39)	190	(187)	0	(37)	0	(18)
Taku	21	(24)	0	(138)	0	(32)	0	(43)	0	(1)	0	(8)	0	(60)	37	(54)	0	(4)
Stikine	30	(44)	242	(417)	307	(214)	122	(188)	9	(6)	0	(48)	424	(359)	296	(137)	106	(454)
Skeena	56	(39)	1396	(682)	920	(338)	440	(226)	6	(6)	321	(137)	1054	(473)	168	(159)	246	(544)
Puget Sound	0	(10)	235	(418)	174	(210)	0	(43)	32	(10)	29	(46)	98	(275)	77	(87)	2	(128)
Juan de Fuca	0	(0)	0	(0)	382	(167)	0	(0)	0	(0)	0	(0)	140	(119)	0	(0)	0	(0)
Coastal Wash	0	(23)	1798	(690)	1438	(389)	421	(262)	69	(12)	236	(86)	992	(433)	315	(136)	5079	(1031)
Low Col/Will	0	(8)	850	(537)	337	(211)	129	(193)	4	(4)	153	(107)	0	(125)	0	(55)	856	(500)
Mid/Up Col-Sp							0	(60)									0	(33)
Up Col-Su/F	75	(34)	2469	(623)	1725	(444)	177	(161)	39	(11)	1328	(221)	3724	(753)	1003	(254)	910	(480)
Snake-Sp/S							65	(82)									0	(5)
Snake-F	0	(5)	103	(520)	156	(219)	155	(85)	5	(3)	74	(121)	114	(255)	192	(147)	104	(244)
Oregon	98	(43)	1505	(533)	398	(243)	2682	(423)	37	(11)	259	(95)	317	(266)	196	(105)	9218	(1084)
California	0	(0)	0	(45)	0	(0)	0	(116)	0	(0)	0	(35)	0	(80)	0	(16)	241	(181)

Table 9. Proposed and actual numbers of samples collected and analyzed from the NBC Chinook troll fishery in 2003.

Numbers in brackets represent samples analyzed.

Fishery>	April open	May open	May/June test	June/July open	July test (<i>early Aug</i>)	August test	September open
Area 1 Proposed	1	3	2	4	1	1	2
Area 1 Actual	0	3 (2)	2/2 (0)/(2)	4 (2)	1 (1)	1 (1)	1 (1)
Area 2W Proposed	1	3	2	4	1	1	2
Area 2W Actual	1 (1)	2 (0)	1/3 (0)/(3)	3 (3)	1 (1)	1 (1)	1 (1)

Table 10. Chinook stock composition as observed in samples of 2003 troll test catches from Area 1/101. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 233 stock baseline for all samples.

Area 1/101	2003		2003		2003		2003		2003		2003		2003		2003		2003	
Date	May 1-5		May 3-9		Jun 3-4		Jun 16-19		Jun 19-20		Jun21-27		Aug 4-6		Aug 25-31		Sep 4-9	
Fishery	Troll open		Troll open		Troll test		test + open		Troll open		Troll open		Troll test		Troll test		Troll open	
N	96		99		95		95		95		89		96		93		70	
UPFR	1.0	(1.5)	8.5	(3.0)	0.0	(0.5)	1.7	(1.7)	0.0	(0.8)	0.0	(1.5)	0.0	(0.0)	0.0	(0.0)	0.0	(0.8)
MUFR	0.6	(2.0)	1.7	(2.5)	3.6	(2.4)	2.9	(2.5)	5.8	(2.5)	2.5	(2.4)	0.4	(1.0)	1.1	(1.9)	1.3	(1.7)
LWFR	0.0	(0.4)	0.0	(1.0)	0.0	(0.9)	1.8	(2.4)	2.4	(1.5)	2.4	(1.8)	0.0	(1.1)	0.0	(0.2)	0.0	(0.2)
NOTH	1.0	(0.9)	4.4	(1.7)	5.0	(3.0)	3.0	(2.1)	0.1	(1.0)	2.4	(1.6)	0.0	(1.5)	0.0	(0.4)	0.0	(0.6)
SOTH	2.7	(3.2)	5.0	(2.1)	12.8	(5.3)	14.4	(5.3)	27.9	(6.2)	14.9	(5.1)	0.0	(2.4)	0.0	(0.2)	0.0	(0.3)
LWTH	6.1	(3.5)	2.8	(1.9)	11.0	(4.4)	12.2	(5.7)	11.9	(5.5)	11.9	(5.3)	4.6	(2.4)	0.0	(1.0)	0.0	(0.0)
ECVI	6.9	(3.8)	0.0	(0.4)	2.2	(1.5)	0.0	(0.8)	0.3	(1.8)	1.9	(1.8)	1.0	(1.7)	1.1	(1.3)	2.9	(2.3)
WCVI	5.5	(2.2)	4.2	(2.5)	7.3	(3.0)	0.8	(1.3)	4.3	(2.1)	6.1	(3.3)	23.8	(3.8)	5.0	(2.5)	7.6	(4.1)
SOMN	2.2	(1.9)	0.0	(1.0)	1.2	(1.4)	0.6	(0.9)	2.2	(1.7)	0.0	(0.7)	1.0	(1.2)	0.0	(0.6)	1.3	(1.6)
NOMN	2.7	(3.0)	7.1	(3.6)	8.4	(3.4)	1.4	(2.1)	4.1	(2.1)	1.0	(1.5)	0.0	(2.3)	1.1	(1.0)	1.4	(1.8)
Nass	5.7	(2.7)	10.2	(3.9)	0.9	(1.9)	2.6	(1.7)	2.6	(1.8)	0.0	(1.3)	0.0	(0.4)	0.0	(0.1)	0.0	(1.0)
QCI	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Alaska	0.0	(0.9)	1.1	(0.9)	0.0	(0.5)	0.7	(1.9)	1.1	(0.9)	0.0	(0.7)	0.0	(0.5)	0.0	(0.6)	0.0	(0.3)
Taku	0.0	(0.6)	0.0	(0.3)	3.3	(2.1)	0.0	(0.7)	0.0	(0.0)	1.1	(0.5)	0.0	(1.0)	0.0	(0.3)	0.0	(0.8)
Stikine	6.3	(3.2)	9.4	(3.1)	2.7	(3.3)	3.5	(3.0)	1.3	(1.1)	4.3	(2.9)	0.0	(1.7)	0.0	(1.1)	1.5	(1.8)
Skeena	4.9	(2.6)	9.0	(4.3)	9.0	(3.7)	6.8	(3.1)	3.1	(2.4)	6.3	(3.8)	6.5	(3.6)	1.0	(1.6)	0.0	(1.7)
Puget Sound	6.5	(3.8)	0.0	(0.7)	0.2	(0.8)	1.2	(1.2)	1.1	(1.3)	0.0	(0.8)	4.8	(2.5)	0.9	(1.7)	6.0	(3.3)
Juan de Fuca	1.1	(1.0)	0.0	(0.0)	0.0	(0.0)	1.1	(1.1)	0.0	(0.0)	1.1	(0.6)	0.0	(0.3)	0.0	(0.0)	0.0	(0.0)
Coastal Wash	0.0	(0.7)	2.1	(1.3)	1.5	(1.5)	4.9	(2.6)	2.2	(1.7)	7.9	(3.4)	17.0	(4.4)	12.0	(4.5)	4.4	(4.8)
Low Col/Will	16.4	(4.8)	8.4	(3.5)	6.5	(2.9)	4.5	(2.4)	2.1	(1.9)	8.2	(3.9)	6.2	(2.7)	2.0	(3.5)	7.7	(4.5)
Mid/Up Col-Sp	1.0	(0.6)	0.0	(0.7)	0.0	(0.4)	0.0	(0.1)	0.0	(0.1)	1.1	(1.1)	0.2	(0.5)	0.0	(0.3)	0.0	(1.2)
Up Col-Su/F	20.4	(4.4)	18.2	(4.7)	13.4	(3.7)	13.2	(4.2)	14.3	(4.5)	12.2	(3.6)	9.3	(3.6)	22.2	(5.4)	6.2	(3.7)
Snake-Sp/S	0.0	(0.8)	0.0	(0.0)	0.0	(0.2)	0.0	(0.0)	2.1	(1.7)	0.0	(0.0)	0.0	(0.0)	0.0	(0.6)	0.0	(0.6)
Snake-F	3.1	(3.7)	2.1	(3.4)	0.5	(2.4)	2.3	(2.3)	4.1	(2.8)	0.0	(1.9)	1.5	(1.2)	0.0	(2.0)	0.0	(2.6)
Oregon	5.8	(2.5)	5.7	(2.4)	10.6	(3.0)	20.7	(4.4)	6.3	(3.5)	14.6	(4.3)	23.7	(5.3)	52.6	(5.9)	59.7	(7.4)
California	0.0	(0.4)	0.0	(0.0)	0.0	(0.2)	0.0	(1.0)	0.9	(0.7)	0.0	(0.8)	0.0	(0.5)	1.0	(1.3)	0.0	(1.4)

Table 11. Chinook stock composition as observed in samples of 2003 troll test catches from Area 2W/142. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 233 stock baseline for all samples.

Area 2W/142	2003		2003		2003		2003		2003		2003		2003		2003		2003			
Date	Apr 23-27		Jun 1-2		Jun 15		June 15-16		Jun 19		Jun 19-20		Jun 23-27		Aug 1-3		Aug 25-31		Sep 8-9	
Fishery	Troll open		Troll test		Troll test		Troll test		Troll open		Troll open		Troll open		Troll Test		Troll test		Troll open	
N	92		94		93		95		96		96		95		96		94		96	
UPFR	1.7	(1.6)	0.9	(1.3)	0.0	(0.0)	0.0	(1.1)	2.1	(1.7)	0.0	(0.9)	0.4	(0.8)	0.0	(0.5)	0.0	(0.0)	0.0	(0.2)
MUFR	3.7	(2.3)	2.1	(1.8)	1.4	(1.5)	5.1	(3.1)	1.8	(2.4)	4.4	(2.3)	3.0	(2.4)	4.2	(2.4)	0.6	(0.5)	0.0	(0.3)
LWFR	0.0	(1.0)	0.0	(1.4)	0.9	(1.0)	3.0	(2.8)	0.0	(0.7)	1.2	(1.5)	0.0	(2.1)	0.0	(1.5)	0.0	(0.7)	0.8	(0.8)
NOTH	0.0	(1.1)	0.0	(1.4)	1.6	(1.6)	2.2	(1.6)	1.1	(1.0)	3.3	(2.5)	5.8	(2.9)	1.1	(1.3)	0.0	(0.9)	0.0	(0.3)
SOTH	2.6	(2.2)	7.5	(3.8)	23.3	(5.3)	10.9	(4.3)	10.8	(3.9)	13.2	(4.9)	14.1	(4.4)	7.0	(3.1)	0.0	(0.8)	0.0	(0.5)
LWTH	6.9	(3.2)	9.2	(3.6)	7.0	(4.7)	10.8	(4.1)	10.8	(4.2)	8.0	(3.9)	2.2	(3.0)	6.3	(2.9)	0.0	(1.8)	0.0	(0.4)
ECVI	3.0	(2.2)	4.6	(2.4)	3.8	(2.2)	2.7	(1.9)	0.0	(1.5)	1.3	(1.8)	1.7	(1.8)	2.1	(2.2)	1.1	(1.3)	0.0	(0.4)
WCVI	11.6	(3.6)	38.8	(5.5)	11.7	(3.2)	4.2	(2.2)	7.3	(3.0)	1.1	(2.1)	5.3	(2.3)	12.3	(3.9)	10.1	(3.5)	3.3	(2.3)
SOMN	0.0	(1.1)	1.2	(2.1)	0.0	(1.2)	1.3	(1.7)	0.0	(0.7)	3.3	(2.4)	0.0	(1.0)	0.0	(0.4)	2.2	(1.3)	0.7	(1.7)
NOMN	9.0	(3.9)	7.8	(3.3)	3.9	(2.2)	4.8	(3.1)	5.3	(2.4)	3.2	(2.3)	1.3	(1.9)	4.5	(2.7)	1.9	(2.0)	2.5	(2.7)
Nass	3.8	(2.6)	0.9	(1.6)	3.0	(2.2)	0.3	(0.9)	2.3	(1.7)	0.0	(1.0)	1.0	(1.6)	0.0	(0.3)	1.0	(1.2)	0.0	(0.3)
QCI	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	1.1	(1.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Alaska	0.0	(0.3)	1.1	(1.0)	0.0	(0.8)	0.0	(0.0)	0.0	(0.2)	0.0	(0.0)	0.0	(1.6)	0.0	(0.7)	0.0	(0.1)	0.0	(0.0)
Taku	0.0	(0.0)	0.8	(1.0)	0.8	(1.0)	0.0	(0.9)	0.0	(0.0)	0.0	(0.2)	1.9	(1.5)	0.0	(1.2)	0.0	(0.4)	0.0	(0.2)
Stikine	0.0	(2.1)	0.1	(2.2)	1.5	(2.5)	4.5	(3.4)	2.3	(1.9)	3.7	(2.6)	5.4	(3.0)	0.0	(1.2)	0.0	(0.8)	0.4	(1.5)
Skeena	6.7	(3.0)	7.6	(3.1)	5.0	(2.4)	4.3	(2.9)	3.1	(2.1)	4.8	(3.1)	0.0	(2.0)	2.7	(2.1)	0.0	(1.3)	0.0	(1.6)
Puget Sound	0.5	(1.0)	1.1	(1.9)	1.1	(1.4)	1.1	(1.2)	2.4	(1.9)	1.0	(1.6)	2.6	(2.4)	1.6	(1.9)	0.0	(0.2)	0.0	(0.6)
Juan de Fuca	0.0	(0.1)	0.0	(0.0)	1.1	(0.9)	0.0	(0.0)	0.0	(0.1)	0.0	(0.0)	1.1	(0.9)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Coastal Wash	2.3	(1.9)	0.2	(1.4)	3.6	(1.7)	6.4	(2.3)	1.2	(2.0)	6.7	(3.2)	5.5	(3.2)	11.3	(3.5)	17.2	(6.0)	17.1	(5.2)
Low Col/Will	17.2	(4.3)	1.6	(1.6)	5.5	(3.0)	4.4	(3.7)	9.6	(3.3)	9.1	(3.0)	5.9	(4.2)	11.5	(4.4)	8.5	(3.9)	4.0	(2.5)
Mid/Up Col-Sp	0.0	(0.0)	0.0	(0.0)	0.0	(0.1)	0.0	(0.9)	0.0	(0.0)	0.9	(1.1)	0.0	(0.2)	0.0	(0.4)	0.0	(0.4)	0.0	(0.2)
Up Col-Su/F	27.7	(5.2)	12.0	(3.7)	13.4	(3.6)	15.6	(4.5)	23.1	(4.9)	13.7	(4.2)	19.0	(5.2)	13.0	(4.5)	14.3	(4.2)	3.7	(2.1)
Snake-Sp/S	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.2)	0.0	(0.0)	0.0	(0.2)	0.8	(0.6)	0.0	(0.0)	0.0	(0.6)	0.7	(0.6)
Snake-F	0.0	(2.6)	2.7	(2.0)	0.0	(2.5)	1.4	(2.4)	0.0	(2.3)	0.9	(1.9)	7.2	(4.1)	1.6	(3.1)	1.2	(2.6)	0.0	(0.7)
Oregon	3.5	(1.6)	0.0	(0.8)	11.4	(3.3)	17.0	(4.2)	14.8	(3.2)	18.8	(4.4)	15.9	(4.3)	21.0	(5.0)	41.7	(7.3)	66.9	(6.0)
California	0.0	(0.0)	0.0	(0.6)	0.0	(0.3)	0.0	(0.3)	2.3	(1.9)	0.5	(1.2)	0.0	(1.2)	0.0	(0.9)	0.2	(1.1)	0.0	(0.3)

Table 12. Chinook catch applied to stock compositions observed in samples of 2003 troll catches from Area 1/101. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 233 stock baseline for all samples.

Area 1/101	2003		2003		2003		2003		2003		2003		2003		2003			
Date	May 1-5		May 3-9		Jun 3-4		Jun 16-19		Jun 19-20		Jun21-27		Aug 4-6		Aug 25-31		Sep 4-9	
Fishery	Troll open		Troll open		Troll test		test + open		Troll open		Troll open		Troll test		Troll test		Troll open	
Catch	7263.5		7263.5		100		11305.5		11205.5		35322		100		100		14081	
N	96		99		95		95		95		89		96		93		70	
UPFR	76	(106)	618	(216)	0	(0)	191	(189)	2	(91)	0	(523)	0	(0)	0	(0)	0	(110)
MUFR	46	(143)	121	(184)	4	(2)	322	(285)	651	(276)	893	(855)	0	(1)	1	(2)	189	(244)
LWFR	0	(32)	0	(73)	0	(1)	200	(267)	263	(167)	848	(625)	0	(1)	0	(0)	0	(32)
NOTH	76	(62)	320	(123)	5	(3)	344	(239)	15	(106)	837	(554)	0	(1)	0	(0)	0	(82)
SOTH	199	(232)	364	(153)	13	(5)	1,625	(600)	3,121	(698)	5,269	(1815)	0	(2)	0	(0)	0	(45)
LWTH	442	(256)	206	(137)	11	(4)	1,375	(643)	1,328	(611)	4,217	(1879)	5	(2)	0	(1)	0	(0)
ECVI	503	(277)	0	(32)	2	(1)	0	(90)	31	(199)	682	(646)	1	(2)	1	(1)	410	(322)
WCVI	402	(161)	308	(180)	7	(3)	86	(151)	482	(233)	2,151	(1158)	24	(4)	5	(3)	1,066	(583)
SOMN	160	(140)	0	(76)	1	(1)	62	(97)	244	(189)	0	(254)	1	(1)	0	(1)	187	(228)
NOMN	199	(216)	514	(263)	8	(3)	158	(241)	454	(238)	346	(537)	0	(2)	1	(1)	197	(249)
Nass	412	(195)	741	(282)	1	(2)	291	(197)	292	(205)	0	(466)	0	(0)	0	(0)	0	(146)
QCI	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Alaska	0	(63)	83	(62)	0	(0)	84	(214)	119	(100)	0	(240)	0	(0)	0	(1)	0	(45)
Taku	0	(46)	0	(23)	3	(2)	0	(75)	0	(0)	396	(159)	0	(1)	0	(0)	0	(106)
Stikine	455	(231)	686	(228)	3	(3)	392	(339)	141	(118)	1,526	(1021)	0	(2)	0	(1)	207	(253)
Skeena	354	(186)	655	(314)	9	(4)	763	(346)	345	(267)	2,235	(1324)	7	(4)	1	(2)	0	(237)
Puget Sound	469	(272)	0	(49)	0	(1)	140	(133)	118	(148)	0	(297)	5	(3)	1	(2)	839	(470)
Juan de Fuca	76	(72)	0	(0)	0	(0)	119	(128)	0	(0)	378	(194)	0	(0)	0	(0)	0	(0)
Coastal Wash	0	(52)	152	(97)	1	(1)	557	(288)	244	(193)	2,779	(1215)	17	(4)	12	(4)	625	(682)
Low Col/Will	1,194	(351)	607	(252)	6	(3)	511	(269)	239	(213)	2,899	(1370)	6	(3)	2	(3)	1,084	(628)
Mid/Up Col-Sp	73	(40)	0	(54)	0	(0)	0	(10)	1	(12)	392	(378)	0	(1)	0	(0)	0	(170)
Up Col-Su/F	1,478	(322)	1,324	(341)	13	(4)	1,490	(476)	1,607	(500)	4,319	(1282)	9	(4)	22	(5)	866	(514)
Snake-Sp/S	0	(54)	0	(0)	0	(0)	0	(0)	236	(195)	0	(0)	0	(0)	0	(1)	0	(87)
Snake-F	228	(272)	149	(245)	0	(2)	256	(261)	462	(315)	0	(667)	2	(1)	0	(2)	0	(369)
Oregon	423	(179)	415	(172)	11	(3)	2,340	(499)	706	(396)	5,156	(1529)	24	(5)	53	(6)	8,410	(1044)
California	0	(28)	0	(0)	0	(0)	0	(115)	104	(80)	0	(275)	0	(1)	1	(1)	0	(193)

Table 13. Chinook catch applied to stock compositions observed in samples of 2003 troll catches from Area 2W/142. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 233 stock baseline for all samples.

Area 2W/142	2003		2003		2003		2003		2003		2003		2003		2003		2003			
Date	Apr 23-27		Jun 1-2		Jun 15		June 15-16		Jun 19		Jun 19-20		Jun 23-27		Aug 1-3		Aug 25-31		Sep 8-9	
Fishery	Troll open		Troll test		Troll test		Troll test		Troll open		Troll open		Troll open		Troll Test		Troll test		Troll open	
Catch	11904		100		100		100		7677.5		7677.5		12674		100		100		9943	
N	92		94		93		95		96		96		95		96		94		96	
UPFR	201	(195)	1	(1)	0	(0)	0	(1)	160	(129)	0	(68)	46	(101)	0	(1)	0	(0)	0	(21)
MUFR	438	(274)	2	(2)	1	(2)	5	(3)	134	(183)	334	(179)	378	(299)	4	(2)	1	(0)	0	(30)
LWFR	0	(120)	0	(1)	1	(1)	3	(3)	0	(54)	90	(112)	0	(269)	0	(2)	0	(1)	77	(84)
NOTH	0	(126)	0	(1)	2	(2)	2	(2)	82	(78)	253	(193)	739	(361)	1	(1)	0	(1)	0	(31)
SOTH	306	(263)	7	(4)	23	(5)	11	(4)	828	(300)	1010	(375)	1790	(556)	7	(3)	0	(1)	0	(47)
LWTH	821	(384)	9	(4)	7	(5)	11	(4)	828	(324)	611	(302)	283	(383)	6	(3)	0	(2)	0	(42)
ECVI	362	(262)	5	(2)	4	(2)	3	(2)	0	(114)	97	(139)	212	(222)	2	(2)	1	(1)	0	(41)
WCVI	1380	(424)	39	(5)	12	(3)	4	(2)	560	(231)	88	(161)	674	(294)	12	(4)	10	(4)	327	(230)
SOMN	0	(135)	1	(2)	0	(1)	1	(2)	0	(55)	253	(180)	0	(122)	0	(0)	2	(1)	67	(166)
NOMN	1071	(464)	8	(3)	4	(2)	5	(3)	408	(186)	246	(180)	169	(236)	4	(3)	2	(2)	248	(269)
Nass	449	(313)	1	(2)	3	(2)	0	(1)	178	(129)	0	(73)	122	(199)	0	(0)	1	(1)	0	(34)
QCI	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	81	(78)	0	(0)	0	(0)	0	(0)	0	(0)
Alaska	0	(36)	1	(1)	0	(1)	0	(0)	0	(15)	0	(0)	0	(205)	0	(1)	0	(0)	0	(0)
Taku	0	(1)	1	(1)	1	(1)	0	(1)	0	(0)	0	(15)	234	(184)	0	(1)	0	(0)	0	(19)
Stikine	0	(252)	0	(2)	2	(3)	5	(3)	177	(149)	286	(201)	688	(374)	0	(1)	0	(1)	43	(150)
Skeena	796	(361)	8	(3)	5	(2)	4	(3)	236	(160)	372	(234)	0	(255)	3	(2)	0	(1)	0	(162)
Puget Sound	64	(119)	1	(2)	1	(1)	1	(1)	182	(149)	75	(121)	330	(303)	2	(2)	0	(0)	0	(63)
Juan de Fuca	0	(8)	0	(0)	1	(1)	0	(0)	0	(6)	0	(0)	134	(114)	0	(0)	0	(0)	0	(0)
Coastal Wash	270	(226)	0	(1)	4	(2)	6	(2)	88	(150)	516	(246)	700	(403)	11	(3)	17	(6)	1703	(514)
Low Col/Will	2043	(506)	2	(2)	5	(3)	4	(4)	734	(254)	697	(232)	742	(530)	11	(4)	9	(4)	398	(244)
Mid/Up Col-Sp	0	(2)	0	(0)	0	(0)	0	(1)	0	(1)	71	(82)	0	(29)	0	(0)	0	(0)	0	(24)
Up Col-Su/F	3291	(623)	12	(4)	13	(4)	16	(5)	1772	(375)	1055	(325)	2406	(660)	13	(4)	14	(4)	363	(211)
Snake-Sp/S	0	(12)	0	(0)	0	(0)	0	(0)	0	(1)	0	(18)	106	(75)	0	(0)	0	(1)	69	(64)
Snake-F	0	(306)	3	(2)	0	(3)	1	(2)	0	(179)	65	(146)	911	(520)	2	(3)	1	(3)	0	(73)
Oregon	411	(192)	0	(1)	11	(3)	17	(4)	1132	(243)	1443	(338)	2012	(550)	21	(5)	42	(7)	6650	(596)
California	0	(4)	0	(1)	0	(0)	0	(0)	177	(144)	36	(91)	0	(150)	0	(1)	0	(1)	0	(28)

Table 14. Decision table describing the data delivered from the 2003 troll test program and how the test results contributed to the management of the troll fishery.

Area	Sample site description	fishery	Sample date	Analysis Received	WCVI %	Comment	Result
2W	142-2 Tian	open	Apr 23-27	7-May-03	11.6%	At this rate 40% target will be reached by May 12. No other sample data will be available prior to May 12.	Close May 12
101	101-1,2,6&7 Tian to Shag	open	May 1-5	23-May-03	5.5%	WCVI in Area 1 lower than the 2W sample.	Analyse another sample to confirm.
101	101-2 La Perouse Rf.	open	May 3-9	29-May-03	4.2%	Lower value confirmed and applied to catch.	Carry excess 10% to June fishery
2W	142-2 Kindakun Rk.	test	Jun 1-2	12-Jun-03	38.8%	What now?	Collect additional samples to see if the fishery can be adjusted.
101	101-1&2 Frederick I.	test	Jun 3-4	12-Jun-03	7.3%	Lower in the North?	
2W	2-63 Buck Pt.	test	Jun 15	18-Jun-03	11.7%	Higher levels still evident in the South.	Fish North of Hippa.
2W	142-2 Tian to Louis	test	Jun 15-16	19-Jun-03	4.2%		
101	101-1 Frederick I.	test + open	Jun 16-19	23-Jun-03	0.8%	Fishery samples less than 9%	Fish to 80% of WCVI target
101	101-2&7 E. Langara & W. Perry Pass	open	Jun 19-20	26-Jun-03	4.3%	<9%	
2W	142-2 Hippa to Tian	open	Jun 19	26-Jun-03	7.3%	<9%	
2W	142-2 Louis to Tian	open	Jun 19-20	26-Jun-03	1.1%	<9%	Close fishery July 5.
101	101-2&7 E. Langara & W. Perry Pass	open	Jun 21-27	11-Jul-03	6.1%		Total fishery and test near 93% of target.
2W	142-2 Hippa I.	open	Jun 23-27	11-Jul-03	5.3%		
101	101-1&2, Tian to La Perouse	test	Aug 4-6	27-Aug-03	23.8%	August high as expected.	
2W	142-2, Buck Pt. to Rennel Sd.	test	Aug 1-3	27-Aug-03	12.3%		
101	Areas 101& 2-69&2-88	test	Aug 27-30	4-Sep-03	5.0%	Samples average 7.5%	
2W	2-49 & 69, Englefield Bay & Kano	test	Aug 27-30	4-Sep-03	10.1%	Samples average 7.5%	Fishery closed Sep 9.
101	Subareas 1-2 and 101-2, Langara	open	Sep 4-9	19-Sep-03	7.6%		
2W	142-2, Tian to Hippa	open	Sep 8-9	19-Sep-03	3.3%		

Table 15. Chinook stock composition as observed in samples of 2004 troll test catches from Area 1/101. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 1/101	2004		2004		2004		2004		2004		2004		2004		2004		2004	
Date	Apr 15		May 4-9		May 27		Jun 15		June 15-22		June 23-28		July 18-21		Aug 5-6		Sept 5-7	
Fishery	Troll		Test		Test		Troll		Troll		Troll		Troll		Test		Test	
N	107		96		96		96		96		142		96		96		96	
UPFR	0.7	(1.1)	2.4	(1.7)	0.9	(1.6)	0.9	(1.2)	1.2	(1.9)	0.2	(0.5)	0.2	(0.5)	0.1	(0.3)	0.1	(0.3)
MUFR	0.5	(0.9)	6.2	(2.8)	4.2	(2.7)	2.5	(2.1)	5.5	(3.2)	0.3	(0.7)	0.4	(0.9)	0.1	(0.3)	2.2	(1.5)
LWFR-F	0.0	(0.3)	0.9	(1.6)	0.0	(0.2)	0.6	(1.0)	0.4	(1.1)	0.6	(1.0)	4.6	(2.4)	0.0	(0.2)	0.0	(0.2)
NOTH	0.5	(1.0)	0.0	(0.2)	0.3	(0.9)	1.8	(2.0)	7.2	(3.2)	0.1	(0.2)	11.2	(3.5)	1.1	(1.1)	0.0	(0.2)
SOTH	7.4	(3.4)	18.4	(4.1)	39.8	(5.2)	30.6	(5.0)	21.3	(4.7)	36.4	(4.2)	16.8	(4.2)	5.4	(2.7)	0.1	(0.3)
LWTH	0.0	(0.2)	0.0	(0.2)	1.8	(1.5)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
ECVI	0.1	(0.2)	0.2	(0.5)	0.1	(0.5)	0.1	(0.3)	0.2	(0.6)	0.1	(0.3)	2.9	(1.9)	1.3	(1.3)	3.6	(2.0)
WCVI	20.5	(4.0)	13.7	(3.7)	8.4	(2.8)	8.2	(2.8)	3.0	(1.9)	0.1	(0.2)	3.4	(2.0)	6.5	(2.5)	3.2	(1.8)
SOMN	0.7	(0.9)	1.1	(1.5)	0.1	(0.3)	0.1	(0.2)	2.3	(1.8)	1.6	(1.1)	0.4	(1.2)	0.1	(0.5)	0.1	(0.2)
NOMN	17.8	(4.1)	8.7	(3.2)	4.7	(3.0)	5.1	(3.4)	11.4	(4.4)	5.4	(2.4)	2.3	(1.7)	1.1	(1.1)	1.6	(1.8)
NASS	0.1	(0.5)	1.6	(1.7)	0.1	(0.4)	0.2	(0.7)	0.3	(0.8)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
LWFR-Sp	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.1	(0.6)	0.0	(0.1)	0.0	(0.1)
QCI	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.7	(0.7)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Alaska	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	2.8	(1.7)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)
Taku	0.2	(0.7)	0.2	(0.6)	0.0	(0.2)	0.1	(0.5)	1.4	(1.9)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.1	(0.3)
Stikine	3.7	(2.2)	2.0	(1.8)	0.3	(0.9)	0.3	(1.0)	0.5	(1.3)	0.0	(0.2)	0.3	(0.9)	0.1	(0.4)	0.1	(0.5)
Skeena	1.0	(1.6)	0.1	(0.5)	7.6	(3.2)	6.7	(3.4)	3.4	(3.0)	2.6	(1.4)	1.3	(2.1)	0.1	(0.3)	0.1	(0.5)
Alesek	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.1	(0.5)
Puget Sound	1.0	(1.6)	1.7	(1.5)	0.0	(0.2)	1.5	(1.3)	0.1	(0.3)	0.6	(0.7)	3.6	(2.0)	0.0	(0.2)	0.1	(0.4)
Juan de Fuca	0.1	(0.5)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Coastal Wash	4.2	(2.1)	2.3	(1.9)	2.0	(1.9)	6.5	(3.2)	0.1	(0.6)	0.1	(0.5)	3.7	(3.5)	10.9	(3.8)	26.4	(5.2)
Low Col	10.4	(3.7)	0.4	(0.9)	6.2	(2.6)	0.9	(1.1)	4.6	(2.6)	2.0	(1.4)	1.1	(1.9)	3.6	(3.5)	0.1	(0.5)
Up Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	1.9	(1.6)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)
Up Col-Su/F	17.0	(3.8)	14.8	(3.8)	8.8	(3.1)	4.0	(2.1)	17.6	(4.1)	16.2	(3.6)	25.3	(4.7)	20.7	(4.6)	15.3	(3.8)
Snake-Sp/Su	0.1	(0.3)	0.3	(0.6)	0.1	(0.3)	0.1	(0.4)	0.1	(0.2)	0.1	(0.2)	0.2	(0.6)	0.5	(0.9)	0.1	(0.2)
Snake-F	0.0	(0.4)	0.0	(0.1)	0.1	(0.6)	0.0	(0.4)	0.7	(1.9)	5.5	(2.4)	0.1	(0.5)	1.1	(1.9)	0.2	(0.8)
Oregon coastal	5.8	(2.4)	21.9	(4.4)	14.3	(3.9)	27.5	(5.0)	17.6	(4.2)	21.3	(3.7)	22.1	(4.6)	45.9	(5.6)	44.6	(5.7)
S.Or./Cal coast	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.1	(0.3)	0.7	(0.8)	0.0	(0.1)	1.2	(1.8)	0.1	(0.6)
Sacramento	0.0	(0.1)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Up Klam/Trinity	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Mid Col-Sp	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.5	(1.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)
Up Willamette	8.0	(3.1)	3.1	(1.8)	0.0	(0.1)	0.2	(0.7)	0.5	(1.2)	0.9	(0.9)	0.1	(0.4)	0.0	(0.2)	1.6	(1.5)
Cent Val-F	0.0	(0.1)	0.1	(0.4)	0.1	(0.3)	0.1	(0.3)	0.1	(0.2)	1.7	(1.2)	0.1	(0.2)	0.0	(0.2)	0.1	(0.3)
Cent Val-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)

Table 16. Chinook stock composition as observed in samples of 2004 troll test catches from Area 2W/142. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 2W/142	2004		2004		2004		2004		2004		2004		2004		2004		2004	
Date	Apr 15		May 6-8		May 29		Jun 15		June 15-18		June 22-28		July 18-22		Aug 9-10		Sept 8-9	
Fishery	Troll		Test		Test		Troll		Troll		Troll		Troll		Test		Test	
N	173		96		96		96		95		50		96		96		96	
UPFR	0.1	(0.2)	0.1	(0.4)	6.3	(2.5)	0.7	(1.3)	0.2	(0.6)	0.2	(0.6)	0.2	(0.8)	0.1	(0.4)	1.2	(1.1)
MUFR	1.0	(0.9)	0.8	(1.1)	0.1	(0.4)	1.3	(1.8)	0.1	(0.5)	6.9	(3.8)	1.2	(1.8)	0.1	(0.3)	0.1	(0.4)
LWFR-F	0.0	(0.1)	0.9	(1.1)	0.0	(0.2)	0.0	(0.1)	0.2	(0.5)	3.6	(2.9)	1.9	(1.7)	0.0	(0.2)	0.4	(0.9)
NOTH	0.0	(0.1)	0.1	(0.4)	1.6	(1.8)	1.0	(1.3)	0.9	(1.8)	9.2	(4.3)	2.2	(1.7)	2.3	(1.6)	0.0	(0.2)
SOTH	7.2	(2.1)	6.1	(2.6)	15.3	(4.4)	33.0	(5.0)	14.7	(4.4)	23.1	(6.1)	5.5	(2.5)	8.4	(2.9)	0.6	(1.1)
LWTH	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.1	(0.4)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)
ECVI	2.5	(1.2)	4.8	(2.3)	6.2	(2.6)	0.1	(0.3)	1.2	(1.1)	0.1	(0.5)	0.4	(1.0)	1.1	(1.1)	1.9	(2.8)
WCVI	24.0	(3.3)	15.1	(3.7)	15.9	(3.8)	3.1	(1.8)	18.2	(4.0)	2.1	(1.9)	21.3	(4.4)	7.4	(2.7)	2.0	(1.6)
SOMN	0.1	(0.3)	0.2	(0.6)	0.0	(0.2)	0.1	(0.3)	0.5	(1.3)	0.1	(0.4)	0.1	(0.3)	0.0	(0.2)	0.0	(0.2)
NOMN	2.3	(1.3)	5.0	(2.5)	5.2	(2.4)	3.8	(2.3)	4.5	(3.7)	1.0	(1.7)	1.0	(1.6)	0.4	(0.9)	0.1	(0.3)
NASS	0.0	(0.1)	1.0	(1.1)	0.6	(1.5)	0.1	(0.5)	1.5	(1.4)	0.1	(0.5)	1.1	(1.5)	0.0	(0.2)	0.3	(0.8)
LWFR-Sp	0.8	(0.8)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
QCI	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Alaska	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
Taku	0.1	(0.3)	0.1	(0.3)	0.2	(0.8)	0.0	(0.2)	0.0	(0.2)	1.4	(1.9)	0.0	(0.2)	0.0	(0.3)	0.1	(0.3)
Stikine	0.2	(0.7)	0.1	(0.6)	0.0	(0.3)	0.1	(0.5)	1.0	(1.4)	0.1	(0.3)	0.2	(0.8)	0.0	(0.2)	0.1	(0.5)
Skeena	2.1	(1.4)	3.5	(2.4)	8.1	(3.1)	5.8	(2.8)	7.0	(3.1)	0.3	(0.9)	0.8	(1.4)	0.1	(0.3)	0.6	(1.1)
Alesek	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.4	(1.0)
Puget Sound	1.4	(1.3)	0.0	(0.2)	0.8	(1.1)	2.0	(1.5)	1.1	(1.2)	0.1	(0.5)	3.9	(2.3)	0.1	(0.3)	0.0	(0.2)
Juan de Fuca	1.2	(0.8)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Coastal Wash	3.5	(1.7)	1.5	(1.6)	0.5	(1.2)	10.4	(3.3)	3.3	(2.6)	25.5	(6.6)	13.0	(4.7)	7.3	(3.1)	15.3	(4.3)
Low Col	7.2	(2.4)	2.3	(3.4)	4.7	(2.2)	0.0	(0.3)	0.9	(1.7)	0.2	(0.9)	1.1	(2.0)	3.1	(1.8)	0.0	(0.3)
Up Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Up Col-Su/F	16.8	(3.0)	37.1	(5.0)	17.1	(4.0)	16.0	(4.0)	28.9	(4.8)	9.8	(4.3)	25.0	(4.8)	25.3	(4.7)	0.8	(1.6)
Snake-Sp/Su	0.0	(0.1)	0.1	(0.2)	0.1	(0.2)	0.1	(0.4)	0.1	(0.2)	0.1	(0.4)	0.1	(0.2)	0.5	(0.8)	0.1	(0.2)
Snake-F	0.1	(0.5)	0.1	(0.6)	0.0	(0.1)	0.4	(1.3)	0.0	(0.3)	0.2	(0.9)	0.1	(0.7)	1.7	(1.9)	0.6	(1.2)
Oregon coastal	8.7	(2.4)	8.4	(3.0)	17.1	(4.1)	20.7	(4.4)	15.3	(4.1)	14.8	(5.5)	19.7	(4.9)	41.6	(5.3)	75.3	(5.1)
S.Or./Cal coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.2	(0.5)	0.0	(0.2)	0.4	(1.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)
Sacramento	0.0	(0.1)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Up Klam/Trinity	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.1	(0.3)	0.0	(0.2)	0.0	(0.3)	0.1	(0.4)	0.0	(0.2)	0.0	(0.1)
Mid Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.2	(0.7)	0.1	(0.4)	0.1	(0.4)	0.4	(0.8)	0.0	(0.1)
Up Willamette	20.6	(3.3)	12.4	(4.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.8	(1.6)	1.1	(1.4)	0.0	(0.1)	0.0	(0.1)
Cent Val-F	0.0	(0.1)	0.1	(0.3)	0.1	(0.4)	0.7	(1.2)	0.2	(0.7)	0.1	(0.4)	0.0	(0.2)	0.1	(0.2)	0.1	(0.2)
Cent Val-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.1	(0.3)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)

Table 17. Chinook catch applied to stock compositions observed in samples of 2004 troll catches from Area 1/101.

2004. Abbreviations are described in Appendix 6.

Area 1/101	2004		2004		2004		2004		2004		2004		2004		2004		2004	
Date	Apr 15		May 4-9		May 27		Jun 15		June 15-22		June 23-28		July 18-21		Aug 5-6		Sept 5-7	
Fishery	Troll		Test		Test		Troll		Troll		Troll		Troll		Test		Test	
Catch	4,054		100		100		11,641		21,610		45,186		33,516		100		100	
N	107		96		96		96		96		142		96		96		96	
UPFR	27	(45)	2	(2)	1	(2)	108	(134)	253	(415)	108	(230)	50	(158)	0	(0)	0	(0)
MUFR	20	(38)	6	(3)	4	(3)	291	(241)	1184	(683)	122	(298)	117	(288)	0	(0)	2	(2)
LWFR-F	2	(11)	1	(2)	0	(0)	64	(114)	84	(238)	289	(470)	1538	(804)	0	(0)	0	(0)
NOTH	20	(39)	0	(0)	0	(1)	212	(236)	1558	(681)	23	(108)	3737	(1156)	1	(1)	0	(0)
SOTH	300	(139)	18	(4)	40	(5)	3557	(581)	4609	(1007)	16457	(1884)	5624	(1418)	5	(3)	0	(0)
LWTH	2	(9)	0	(0)	2	(1)	5	(26)	6	(41)	9	(54)	10	(64)	0	(0)	0	(0)
ECVI	2	(10)	0	(1)	0	(0)	8	(33)	39	(127)	36	(136)	959	(627)	1	(1)	4	(2)
WCVI	831	(163)	14	(4)	8	(3)	953	(331)	657	(400)	23	(90)	1143	(674)	6	(3)	3	(2)
SOMN	27	(38)	1	(1)	0	(0)	6	(28)	506	(393)	705	(497)	124	(409)	0	(1)	0	(0)
NOMN	723	(167)	9	(3)	5	(3)	594	(390)	2457	(942)	2436	(1066)	757	(583)	1	(1)	2	(2)
NASS	5	(19)	2	(2)	0	(0)	17	(80)	63	(162)	14	(77)	13	(70)	0	(0)	0	(0)
LWFR-Sp	0	(5)	0	(0)	0	(0)	1	(13)	2	(26)	5	(41)	30	(188)	0	(0)	0	(0)
QCI	0	(2)	0	(0)	0	(0)	0	(7)	0	(11)	321	(321)	0	(27)	0	(0)	0	(0)
Alaska	0	(4)	0	(0)	0	(0)	1	(15)	9	(69)	1243	(777)	3	(34)	0	(0)	0	(0)
Taku	9	(27)	0	(1)	0	(0)	12	(55)	303	(415)	5	(50)	7	(54)	0	(0)	0	(0)
Stikine	149	(91)	2	(2)	0	(1)	36	(113)	97	(277)	14	(81)	97	(292)	0	(0)	0	(0)
Skeena	39	(63)	0	(0)	8	(3)	780	(391)	741	(655)	1184	(651)	422	(700)	0	(0)	0	(1)
Alsek	0	(3)	0	(0)	0	(0)	1	(10)	4	(50)	5	(27)	3	(50)	0	(0)	0	(1)
Puget Sound	41	(63)	2	(2)	0	(0)	171	(154)	11	(54)	289	(325)	1217	(677)	0	(0)	0	(0)
Juan de Fuca	5	(19)	0	(0)	0	(0)	2	(23)	0	(15)	0	(18)	0	(27)	0	(0)	0	(0)
Coastal Wash	170	(85)	2	(2)	2	(2)	759	(367)	28	(134)	54	(235)	1227	(1160)	11	(4)	26	(5)
Low Col	423	(149)	0	(1)	6	(3)	106	(129)	988	(558)	890	(651)	382	(644)	4	(3)	0	(1)
Up Col-Sp	0	(4)	0	(0)	0	(0)	226	(180)	4	(26)	5	(36)	7	(44)	0	(0)	0	(0)
Up Col-Su/F	691	(154)	15	(4)	9	(3)	468	(247)	3801	(886)	7307	(1613)	8486	(1575)	21	(5)	15	(4)
Snake-Sp/Su	2	(10)	0	(1)	0	(0)	10	(44)	11	(48)	23	(95)	64	(198)	1	(1)	0	(0)
Snake-F	2	(15)	0	(0)	0	(1)	5	(41)	140	(413)	2472	(1103)	23	(154)	1	(2)	0	(1)
Oregon coastal	237	(97)	22	(4)	14	(4)	3206	(584)	3808	(905)	9607	(1672)	7407	(1538)	46	(6)	45	(6)
S.Or./Cal coast	1	(6)	0	(0)	0	(0)	2	(15)	11	(67)	312	(352)	7	(40)	1	(2)	0	(1)
Sacramento	0	(4)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Up Klam/Trinity	0	(4)	0	(0)	0	(0)	1	(13)	2	(26)	5	(54)	3	(34)	0	(0)	0	(0)
Mid Col-Sp	1	(5)	0	(0)	0	(0)	2	(20)	117	(257)	9	(54)	7	(54)	0	(0)	0	(0)
Up Willamette	324	(127)	3	(2)	0	(0)	27	(77)	104	(249)	420	(402)	27	(141)	0	(0)	2	(1)
Cent Val-F	1	(6)	0	(0)	0	(0)	7	(35)	11	(48)	782	(556)	17	(74)	0	(0)	0	(0)
Cent Val-Sp	0	(3)	0	(0)	0	(0)	2	(19)	2	(26)	9	(81)	3	(37)	0	(0)	0	(0)

Table 18. Chinook catch applied to stock compositions observed in samples of 2004 troll catches from Area 2W/142.

2004. Abbreviations are described in Appendix 6.

Area 2W/142	2004		2004		2004		2004		2004		2004		2004		2004		2004	
Date	Apr 15		May 6-8		May 29		Jun 15		June 15-18		June 22-28		July 18-22		Aug 9-10		Sept 8-9	
Fishery	Troll		Test		Test		Troll		Troll		Troll		Troll		Test		Test	
Catch	5,135		100		100		5,384		7,534		17,249		15,327		100		100	
N	173		96		96		96		95		50		96		96		96	
UPFR	4	(11)	0	(0)	6	(3)	39	(69)	14	(41)	33	(102)	34	(116)	0	(0)	1	(1)
MUFR	49	(45)	1	(1)	0	(0)	71	(95)	11	(39)	1182	(659)	190	(271)	0	(0)	0	(0)
LWFR-F	1	(7)	1	(1)	0	(0)	1	(7)	11	(39)	614	(500)	285	(254)	0	(0)	0	(1)
NOTH	1	(5)	0	(0)	2	(2)	54	(68)	68	(133)	1583	(740)	331	(257)	2	(2)	0	(0)
SOTH	370	(105)	6	(3)	15	(4)	1779	(268)	1107	(333)	3991	(1050)	840	(388)	8	(3)	1	(1)
LWTH	2	(7)	0	(0)	0	(0)	2	(11)	3	(18)	10	(60)	5	(29)	0	(0)	0	(0)
ECVI	130	(64)	5	(2)	6	(3)	4	(16)	87	(85)	19	(78)	54	(156)	1	(1)	2	(3)
WCVI	1234	(168)	15	(4)	16	(4)	166	(99)	1370	(302)	359	(335)	3257	(671)	7	(3)	2	(2)
SOMN	4	(16)	0	(1)	0	(0)	3	(16)	41	(96)	14	(71)	8	(38)	0	(0)	0	(0)
NOMN	120	(69)	5	(2)	5	(2)	205	(124)	335	(278)	166	(300)	155	(247)	0	(1)	0	(0)
NASS	2	(7)	1	(1)	1	(1)	6	(24)	111	(105)	19	(93)	166	(233)	0	(0)	0	(1)
LWFR-Sp	43	(39)	0	(0)	0	(0)	1	(6)	1	(9)	3	(41)	2	(18)	0	(0)	0	(0)
QCI	0	(2)	0	(0)	0	(0)	0	(4)	0	(5)	2	(29)	0	(9)	0	(0)	0	(0)
Alaska	1	(3)	0	(0)	0	(0)	2	(13)	1	(8)	7	(57)	2	(17)	0	(0)	0	(0)
Taku	3	(13)	0	(0)	0	(1)	1	(11)	2	(14)	235	(321)	3	(26)	0	(0)	0	(0)
Stikine	11	(33)	0	(1)	0	(0)	6	(29)	72	(106)	9	(55)	34	(123)	0	(0)	0	(0)
Skeena	107	(71)	3	(2)	8	(3)	314	(153)	530	(231)	48	(160)	116	(218)	0	(0)	1	(1)
Alsek	0	(3)	0	(0)	0	(0)	1	(8)	1	(8)	3	(29)	2	(15)	0	(0)	0	(1)
Puget Sound	70	(68)	0	(0)	1	(1)	109	(79)	83	(92)	14	(81)	593	(359)	0	(0)	0	(0)
Juan de Fuca	61	(43)	0	(0)	0	(0)	1	(6)	1	(8)	2	(21)	0	(9)	0	(0)	0	(0)
Coastal Wash	178	(89)	2	(2)	1	(1)	562	(180)	245	(198)	4390	(1137)	1991	(722)	7	(3)	15	(4)
Low Col	368	(125)	2	(3)	5	(2)	2	(15)	69	(130)	29	(148)	175	(313)	3	(2)	0	(0)
Up Col-Sp	1	(4)	0	(0)	0	(0)	1	(8)	2	(10)	5	(40)	3	(20)	0	(0)	0	(0)
Up Col-Su/F	861	(155)	37	(5)	17	(4)	859	(218)	2178	(365)	1682	(745)	3830	(730)	25	(5)	1	(2)
Snake-Sp/Su	2	(7)	0	(0)	0	(0)	4	(19)	4	(18)	17	(74)	8	(34)	0	(1)	0	(0)
Snake-F	7	(24)	0	(1)	0	(0)	19	(68)	2	(23)	31	(150)	18	(109)	2	(2)	1	(1)
Oregon coastal	448	(123)	8	(3)	17	(4)	1117	(237)	1149	(310)	2558	(950)	3022	(753)	42	(5)	75	(5)
S.Or./Cal coast	1	(4)	0	(0)	0	(0)	8	(29)	2	(13)	64	(204)	3	(23)	0	(0)	0	(0)
Sacramento	1	(4)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Up Klam/Trinity	1	(3)	0	(0)	0	(0)	3	(18)	2	(13)	5	(43)	11	(54)	0	(0)	0	(0)
Mid Col-Sp	1	(7)	0	(0)	0	(0)	1	(9)	14	(55)	10	(67)	14	(66)	0	(1)	0	(0)
Up Willamette	1057	(168)	12	(4)	0	(0)	1	(6)	2	(17)	129	(274)	173	(219)	0	(0)	0	(0)
Cent Val-F	1	(5)	0	(0)	0	(0)	39	(62)	18	(50)	14	(69)	6	(34)	0	(0)	0	(0)
Cent Val-Sp	0	(3)	0	(0)	0	(0)	3	(17)	2	(11)	3	(41)	2	(14)	0	(0)	0	(0)

Table 19. Decision table describing the data delivered from the 2004 troll test program and how the test results contributed to the management of the troll fishery.

Area	Sample site description	fishery	Sample date	Analysis Received	WCVI %	Comment	Result
1/101	Area 1/101	open	completed April 15	10 May 04	20.5	Fishery closed prior to receipt of analyses.	Reduce WCVI in-season target for remaining fisheries from 7800 to 6000.
2W/142	Area 2W	open	completed April 15	10 May 04	24.0	Fishery closed prior to receipt of analyses.	as above
1/101	La Perouse Reef	test	May 4-9	19 May 04	13.7	WCVI declining.	
2W/142	Buck Point	test	May 6-8	19 May 04	15.1	WCVI declining.	
1/101	La Perouse Reef	test	May 27	6 June 04	8.4	Managers decided to meet with fishers to discuss results.	Postpone fishery opening to June 15.
2W/142	Buck Point	test	May 29	6 June 04	15.9	as above	June 15 fishery to open north of Hippa Island only.
1/101	La Perouse Reef	open	June 15	21 June 04	8.2	Opening day sample.	Fishery continues.
2W/142	Port Louis	open	June 15	21 June 04	3.1	Opening day sample.	Open remainder of Area 2W/142 effective June 25.
2W/142	Tian Head, Hippa I.	open	June 15-18	28 June 04	18.2	Fishery landing sample.	Fishery closed July 1.
1/101	Sub-area 101-2	open	June 15-22	5 July 04	3.0	Fishery landing sample.	
2W/142	142-2	open	June 22-28	11 July 04	2.1	As below.	Fishery opened July 18 to 22.
1/101	Sub-areas 101-1 & 101-2	open	June 23-28	11 July 04	0.1	Preliminary assessment of samples and catch to date indicate 70,000 PST chinook and 2352 WCVI chinook remaining in TAC.	Fishery opened July 18 to 22.
1/101	Sub-areas 101-1 & 101-2	open	July 18-21	4 Aug 04	3.4	Fishery landing sample. Opening day samples cancelled due to fog.	No further chinook retention fisheries.
2W/142	Sub-area 142-2	open	July 18-22	4 Aug 04	21.3	Preliminary assessment indicates WCVI target of 7800 exceeded by 1540.	No further chinook retention fisheries. (Final WCVI catch = 10,065)
1/101	La Perouse Reef	test	Aug 5-6	27 Aug 04	6.5		
2W/142	Buck Point	test	Aug 9-10	27 Aug 04	7.4		
1/101	La Perouse Reef	test	Sep 5-7	4 Oct 04	3.2		
2W/142	Buck Point	test	Sep 8-9	4 Oct 04	2.0		

Table 20. Chinook stock composition as observed in samples of 2005 troll catches from Area 1/101. Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 1/101	2004		2005		2005		2005		2005		2005		2005		2005		2005			
Date	Oct 4-9		May 7-8		May 15		Jun 3		June 3-8		June 3-8		June 6-22		June 8-22		July 3-5		Jun 30- Jul 3	
Fishery	Troll		Test		Test		Test		Troll		Troll		Troll		Troll		Test		Troll	
N	98		96		96		95		95		95		89		236		95		95	
UPFR	0.0	(0.3)	0.0	(0.3)	0.9	(1.2)	3.9	(2.1)	0.8	(1.4)	0.2	(1.3)	0.8	(1.1)	0.0	(0.3)	0.0	(0.5)	0.5	(1.5)
MUFR	0.0	(0.3)	0.0	(0.5)	0.6	(1.5)	0.0	(0.5)	0.8	(1.4)	1.3	(1.6)	0.0	(0.3)	0.1	(0.8)	2.7	(2.8)	0.4	(1.6)
LWFR-F	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.8	(1.0)	0.0	(0.2)	0.0	(0.4)	0.0	(0.4)
NOTH	0.0	(0.2)	0.0	(0.2)	6.5	(2.7)	3.1	(1.8)	4.8	(2.5)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	6.7	(2.9)	2.8	(1.9)
SOTH	0.0	(0.3)	0.3	(1.4)	10.2	(3.1)	10.4	(3.3)	17.7	(3.9)	11.8	(3.4)	19.9	(4.0)	24.1	(4.4)	26.1	(4.5)	22.2	(4.3)
LWTH	0.0	(0.2)	0.0	(0.2)	0.0	(0.5)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)	0.9	(1.1)
ECVI	8.9	(3.0)	9.8	(3.2)	0.0	(0.5)	0.0	(0.3)	0.0	(0.3)	3.1	(1.9)	1.0	(1.3)	7.2	(2.7)	0.8	(1.1)	2.0	(1.5)
WCVI	0.8	(1.1)	37.5	(5.2)	4.2	(2.1)	3.1	(1.8)	3.0	(1.8)	8.8	(2.9)	7.8	(2.7)	8.9	(3.0)	3.0	(1.8)	8.0	(2.8)
SOMN	0.0	(0.2)	0.0	(0.4)	0.0	(0.2)	0.0	(0.4)	0.0	(0.3)	0.0	(0.3)	0.0	(0.3)	0.0	(0.8)	0.0	(1.1)	0.0	(0.1)
NOMN	4.0	(2.1)	1.9	(2.0)	3.4	(2.0)	8.7	(3.1)	1.3	(1.5)	2.3	(1.9)	6.1	(3.4)	3.9	(2.2)	10.6	(3.6)	0.1	(1.3)
NASS	0.0	(0.4)	0.0	(0.3)	0.0	(1.2)	0.0	(1.2)	3.3	(2.6)	3.0	(2.0)	0.0	(0.4)	0.0	(0.4)	2.4	(2.2)	2.4	(1.7)
LWFR-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	1.8	(1.5)	0.0	(0.7)	0.0	(0.1)
QCI	0.0	(0.1)	0.0	(0.1)	1.8	(1.5)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Alaska	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.4)	0.0	(0.4)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)
Taku	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.2)	0.0	(0.7)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)
Stikine	0.0	(0.2)	2.3	(2.5)	8.9	(3.2)	10.1	(3.7)	2.3	(2.1)	0.0	(1.4)	3.8	(2.3)	0.0	(0.6)	2.8	(2.0)	0.7	(1.5)
Skeena	0.0	(0.3)	0.0	(1.6)	11.9	(3.7)	15.1	(4.2)	9.7	(3.5)	6.4	(2.9)	5.0	(2.8)	0.0	(0.7)	5.2	(3.0)	10.2	(3.4)
Alesek	0.7	(1.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.8)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
Puget Sound	0.0	(0.4)	0.0	(1.7)	0.0	(0.2)	0.0	(0.4)	0.3	(1.0)	0.0	(0.2)	0.2	(1.0)	0.0	(0.3)	0.0	(0.2)	1.3	(1.5)
Juan de Fuca	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Coastal Wash	10.2	(3.8)	2.3	(2.0)	4.6	(2.4)	4.5	(2.3)	5.8	(2.8)	4.3	(2.5)	6.3	(3.2)	1.4	(1.6)	4.6	(2.9)	1.0	(1.3)
Low Col	4.8	(3.1)	6.2	(2.7)	1.3	(1.5)	0.0	(1.0)	0.0	(0.2)	6.7	(2.7)	0.0	(0.8)	1.5	(1.7)	2.1	(1.6)	0.0	(0.5)
Up Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)
Up Col-Su/F	10.3	(3.1)	39.7	(5.3)	12.0	(3.4)	22.8	(4.4)	13.8	(3.6)	22.0	(4.7)	20.8	(4.2)	39.1	(5.0)	12.9	(3.9)	10.9	(3.4)
Snake-Sp/Su	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.7)	0.0	(0.3)	0.0	(0.5)	0.0	(0.4)	0.0	(0.2)	0.0	(0.2)
Snake-F	0.0	(0.4)	0.0	(0.4)	0.0	(0.1)	0.0	(1.3)	0.0	(0.3)	8.1	(3.4)	0.0	(0.2)	0.0	(0.7)	0.0	(0.5)	6.3	(2.9)
Oregon coastal	58.4	(5.5)	0.0	(1.0)	33.7	(5.1)	14.2	(3.6)	36.5	(5.3)	21.8	(4.4)	27.5	(4.9)	11.2	(3.5)	20.0	(4.3)	28.1	(4.7)
S.Or./Cal coast	1.7	(2.4)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Up Klam/Trinity	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.5)	0.0	(0.1)
Mid Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Up Willamette	0.0	(1.6)	0.0	(0.4)	0.0	(0.2)	4.0	(2.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.7	(1.1)	0.0	(0.1)	2.0	(1.6)
Cent Val-F	0.0	(0.2)	0.0	(0.5)	0.0	(0.2)	0.0	(0.7)	0.1	(0.9)	0.1	(0.9)	0.0	(0.3)	0.0	(0.2)	0.0	(0.2)	0.0	(0.5)
Cent Val-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.6)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.7)

continued next page.

Table 20 continued.

Area 1/101	2005		2005		2005		2005		2005		2005	
Date	July 18-19		July 16-26		Aug 3-5		Aug-16		Sep 1-16		Sep 10-15	
Fishery	Test		Troll		Test		Test		Troll		Test	
N	96		189		96		96		70		33	
UPFR	0.0	(0.8)	0.0	(0.2)	0.0	(0.3)	0.3	(1.1)	0.0	(0.4)	0.0	(0.7)
MUFR	1.3	(1.5)	1.1	(0.9)	0.0	(0.3)	0.1	(0.9)	0.0	(0.4)	0.0	(0.8)
LWFR-F	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
NOTH	0.9	(1.1)	2.6	(1.2)	2.3	(1.7)	0.0	(0.3)	0.0	(0.2)	0.0	(0.6)
SOTH	19.0	(4.0)	19.7	(2.9)	14.3	(3.6)	14.7	(3.8)	0.0	(1.4)	0.0	(0.7)
LWTH	0.0	(0.8)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.5)
ECVI	0.0	(0.5)	0.1	(0.5)	1.5	(1.7)	0.0	(0.3)	0.0	(0.3)	3.3	(5.5)
WCVI	6.9	(2.6)	2.1	(1.1)	2.3	(1.9)	11.6	(3.2)	0.9	(1.5)	0.0	(0.9)
SOMN	0.8	(1.0)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)	0.0	(0.4)
NOMN	0.0	(0.4)	2.6	(1.3)	0.0	(0.5)	0.0	(0.7)	0.0	(0.9)	5.6	(3.8)
NASS	0.0	(0.2)	0.0	(0.4)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)	0.0	(0.6)
LWFR-Sp	1.9	(1.5)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.3)
QCI	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
Alaska	0.0	(0.6)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)	0.0	(0.3)
Taku	0.0	(0.1)	0.0	(0.0)	0.0	(0.5)	0.0	(0.1)	0.3	(1.4)	0.0	(0.3)
Stikine	0.0	(0.2)	1.2	(1.3)	0.6	(1.1)	0.0	(0.3)	0.7	(1.7)	0.0	(0.4)
Skeena	0.0	(0.2)	0.0	(0.4)	0.0	(1.4)	0.0	(0.3)	0.0	(0.5)	0.0	(0.9)
Alsek	0.0	(0.1)	0.0	(0.4)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.4)
Puget Sound	0.0	(0.2)	0.1	(0.5)	0.0	(0.4)	0.0	(0.2)	0.0	(0.2)	3.5	(4.2)
Juan de Fuca	0.0	(0.1)	0.0	(0.0)	0.0	(0.2)	0.0	(0.1)	0.9	(1.7)	0.0	(0.2)
Coastal Wash	1.1	(2.3)	6.1	(2.5)	7.8	(3.4)	20.4	(4.6)	22.6	(5.2)	4.9	(5.5)
Low Col	0.9	(1.7)	3.2	(2.4)	4.1	(2.2)	2.7	(2.3)	0.0	(0.7)	0.0	(0.4)
Up Col-Sp	0.0	(0.9)	0.0	(0.6)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.3)
Up Col-Su/F	24.8	(5.9)	25.1	(3.2)	41.6	(5.2)	35.2	(4.9)	8.8	(3.7)	7.9	(5.1)
Snake-Sp/Su	0.0	(0.2)	0.0	(0.5)	0.0	(0.3)	0.0	(0.2)	0.0	(0.3)	0.0	(0.6)
Snake-F	0.0	(3.5)	0.0	(1.0)	0.0	(0.7)	0.0	(0.3)	3.1	(2.6)	0.0	(0.3)
Oregon coastal	42.6	(5.7)	36.1	(3.7)	23.6	(4.9)	15.0	(4.6)	62.6	(6.1)	74.8	(8.7)
S.Or./Cal coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.4)	0.0	(0.1)	0.0	(0.3)	0.0	(0.7)
Up Klam/Trinity	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.4)
Mid Col-Sp	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.3)
Up Willamette	0.0	(0.1)	0.0	(0.1)	1.8	(1.7)	0.0	(0.1)	0.0	(1.0)	0.0	(0.3)
Cent Val-F	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.5)	0.0	(0.7)
Cent Val-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.3)

Table 21. Chinook stock composition as observed in samples of 2005 troll catches from Area 2W/142.

Composition presented as % of the sample N. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 2W/142	2005		2005		2005		2005		2005		2005		2005		2005			
Date	Mar 5-24		May 5-6		May 16-17		June 2-3		July 1-2		July 15-17		Aug 1-2		Aug 15			
Fishery	Troll		Test		Test		Test		Test		Test		Test		Test & IVQ			
N	91		96		96		96		95		96		95		96			
UPFR	0.0	(0.3)	3.9	(2.1)	0.2	(1.3)	0.0	(0.3)	2.1	(1.7)	0.0	(0.5)	0.1	(0.9)	0.0	(0.3)	0.0	(0.5)
MUFR	0.0	(0.5)	0.0	(0.5)	1.3	(1.6)	0.1	(0.8)	0.0	(0.7)	4.3	(2.4)	0.1	(1.1)	1.7	(1.6)	0.0	(0.4)
LWFR-F	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)
NOTH	0.0	(0.2)	3.1	(1.8)	0.0	(0.2)	0.0	(0.2)	0.9	(1.2)	9.6	(3.4)	0.0	(0.3)	0.0	(0.3)	0.0	(0.3)
SOTH	0.3	(1.4)	10.4	(3.3)	11.8	(3.4)	24.1	(4.4)	21.7	(4.3)	23.2	(4.4)	15.6	(3.8)	13.5	(3.7)	1.0	(1.5)
LWTH	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.9	(1.2)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)
ECVI	9.8	(3.2)	0.0	(0.3)	3.1	(1.9)	7.2	(2.7)	2.7	(1.8)	1.1	(1.6)	0.8	(1.1)	1.0	(1.2)	0.0	(0.8)
WCVI	37.5	(5.2)	3.1	(1.8)	8.8	(2.9)	8.9	(3.0)	9.6	(3.0)	5.3	(2.4)	11.5	(3.3)	14.7	(3.6)	0.0	(0.5)
SOMN	0.0	(0.4)	0.0	(0.4)	0.0	(0.3)	0.0	(0.8)	0.0	(0.8)	0.0	(0.2)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)
NOMN	1.9	(2.0)	8.7	(3.1)	2.3	(1.9)	3.9	(2.2)	4.1	(2.3)	3.0	(2.0)	0.0	(0.4)	0.0	(0.2)	0.0	(0.3)
NASS	0.0	(0.3)	0.0	(1.2)	3.0	(2.0)	0.0	(0.4)	0.0	(0.6)	0.9	(1.1)	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)
LWFR-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	1.8	(1.5)	0.8	(1.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)
QCI	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)
Alaska	0.0	(0.1)	0.0	(0.4)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.2)
Taku	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Stikine	2.3	(2.5)	10.1	(3.7)	0.0	(1.4)	0.0	(0.6)	0.3	(1.9)	0.0	(0.4)	0.0	(0.3)	0.0	(0.2)	0.0	(0.2)
Skeena	0.0	(1.6)	15.1	(4.2)	6.4	(2.9)	0.0	(0.7)	0.2	(1.4)	0.0	(0.6)	0.0	(0.6)	0.0	(0.2)	0.0	(0.4)
Alesek	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Puget Sound	0.0	(1.7)	0.0	(0.4)	0.0	(0.2)	0.0	(0.3)	0.0	(1.3)	4.1	(2.3)	0.0	(0.2)	1.5	(1.6)	0.0	(0.3)
Juan de Fuca	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.8	(1.0)	1.0	(1.6)	0.0	(0.1)	0.0	(0.0)	0.0	(0.0)
Coastal Wash	2.3	(2.0)	4.5	(2.3)	4.3	(2.5)	1.4	(1.6)	8.7	(3.2)	3.8	(2.8)	9.7	(3.7)	4.1	(2.8)	38.8	(6.2)
Low Col	6.2	(2.7)	0.0	(1.0)	6.7	(2.7)	1.5	(1.7)	0.9	(1.1)	0.0	(0.2)	1.0	(1.5)	5.7	(2.6)	0.0	(0.3)
Up Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.2)
Up Col-Su/F	39.7	(5.3)	22.8	(4.4)	22.0	(4.7)	39.1	(5.0)	24.1	(5.1)	20.7	(4.1)	32.1	(5.5)	32.0	(5.3)	9.7	(3.5)
Snake-Sp/Su	0.0	(0.2)	0.0	(0.2)	0.0	(0.3)	0.0	(0.4)	0.0	(0.2)	0.0	(0.3)	0.4	(1.2)	0.0	(0.2)	0.0	(0.3)
Snake-F	0.0	(0.4)	0.0	(1.3)	8.1	(3.4)	0.0	(0.7)	1.6	(3.2)	0.0	(0.7)	5.9	(3.5)	11.1	(4.4)	0.0	(0.2)
Oregon coastal	0.0	(1.0)	14.2	(3.6)	21.8	(4.4)	11.2	(3.5)	20.8	(4.1)	22.1	(4.4)	22.6	(4.8)	14.9	(4.1)	50.5	(6.2)
S.Or./Cal coast	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.7	(1.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Up Klam/Trinity	0.0	(0.1)	0.0	(0.3)	0.0	(0.1)	0.0	(0.1)	0.0	(0.9)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Mid Col-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.2)	0.1	(1.4)	0.0	(0.1)	0.0	(0.1)
Up Willamette	0.0	(0.4)	4.0	(2.1)	0.0	(0.1)	0.7	(1.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)
Cent Val-F	0.0	(0.5)	0.0	(0.7)	0.1	(0.9)	0.0	(0.2)	0.0	(0.3)	0.0	(0.4)	0.0	(0.2)	0.0	(0.5)	0.0	(0.4)
Cent Val-Sp	0.0	(0.1)	0.0	(0.1)	0.0	(0.6)	0.0	(0.1)	0.0	(1.2)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)	0.0	(0.1)

Table 22. Chinook catch applied to stock compositions observed in samples of 2005 troll catches from Area 1/101. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 1/101	2004		2005		2005		2005		2005		2005		2005		2005		2005			
Date	Oct 4-9		May 7-8		May 15		Jun 3		June 3-8		June 3-8		June 6-22		June 8-22		July 3-5		Jun 30- Jul 3	
Fishery	Troll		Test		Test		Test		Troll		Troll		Troll		Troll		Test		Troll	
Catch	1,870		100		100		7,939		7,839		7,839		10,164		48,428		20,489		20,389	
N	98		96		96		95		95		95		89		236		95		95	
UPFR	0	(5)	1	(1)	1	(1)	66	(85)	0	(43)	43	(115)	68	(114)	593	(393)	12	(194)	0	(86)
MUFR	0	(6)	1	(1)	1	(1)	0	(24)	213	(217)	32	(127)	257	(247)	357	(371)	250	(318)	0	(73)
LWFR-F	0	(2)	0	(0)	0	(0)	60	(83)	0	(29)	0	(31)	0	(13)	1185	(557)	0	(29)	0	(80)
NOTH	0	(3)	6	(3)	5	(2)	0	(16)	526	(224)	220	(148)	242	(190)	1299	(628)	96	(498)	1077	(488)
SOTH	0	(6)	10	(3)	18	(4)	1581	(318)	2046	(356)	1742	(339)	3251	(512)	11579	(1366)	5285	(974)	6280	(984)
LWTH	0	(3)	0	(0)	0	(0)	0	(15)	0	(27)	67	(85)	0	(21)	198	(248)	367	(315)	0	(40)
ECVI	166	(56)	0	(1)	0	(0)	81	(101)	64	(85)	160	(119)	77	(113)	1698	(664)	172	(226)	809	(439)
WCVI	16	(20)	4	(2)	3	(2)	616	(216)	232	(140)	626	(218)	13	(114)	2426	(711)	403	(315)	432	(334)
SOMN	0	(4)	0	(0)	0	(0)	0	(24)	0	(82)	0	(12)	144	(242)	0	(43)	0	(38)	105	(228)
NOMN	75	(39)	3	(2)	1	(2)	484	(271)	832	(284)	8	(102)	530	(345)	3994	(1070)	178	(220)	1139	(516)
NASS	0	(7)	0	(1)	3	(3)	0	(35)	190	(173)	191	(136)	42	(152)	0	(63)	0	(229)	0	(48)
LWFR-Sp	0	(2)	0	(0)	0	(0)	0	(14)	0	(54)	0	(11)	97	(121)	0	(34)	174	(214)	0	(25)
QCI	0	(1)	2	(1)	0	(0)	0	(4)	0	(5)	0	(5)	0	(6)	0	(11)	0	(15)	0	(16)
Alaska	0	(2)	0	(0)	0	(0)	0	(9)	0	(10)	0	(27)	0	(11)	0	(26)	0	(25)	0	(19)
Taku	0	(2)	0	(0)	0	(1)	0	(9)	0	(7)	0	(6)	0	(18)	0	(36)	0	(24)	0	(45)
Stikine	0	(4)	9	(3)	2	(2)	303	(184)	217	(160)	59	(120)	0	(47)	0	(283)	0	(61)	0	(105)
Skeena	0	(5)	12	(4)	10	(4)	396	(219)	408	(232)	801	(266)	121	(221)	3447	(968)	1003	(485)	0	(161)
Aleek	13	(19)	0	(0)	0	(1)	0	(11)	0	(9)	0	(12)	0	(10)	0	(28)	0	(21)	153	(207)
Puget Sound	0	(7)	0	(0)	0	(1)	16	(82)	0	(16)	105	(119)	0	(86)	0	(63)	0	(36)	309	(315)
Juan de Fuca	0	(1)	0	(0)	0	(0)	0	(4)	0	(4)	0	(6)	0	(6)	105	(197)	0	(13)	0	(51)
Coastal Wash	191	(71)	5	(2)	6	(3)	502	(257)	364	(226)	76	(102)	832	(345)	0	(272)	204	(276)	964	(703)
Low Col	91	(57)	1	(2)	0	(0)	0	(66)	164	(129)	0	(38)	740	(281)	0	(134)	1006	(511)	1142	(533)
Up Col-Sp	0	(3)	0	(0)	0	(0)	0	(9)	0	(12)	0	(11)	0	(73)	0	(26)	0	(41)	0	(28)
Up Col-Su/F	192	(59)	12	(3)	14	(4)	1650	(330)	1015	(303)	855	(264)	2736	(473)	12544	(1437)	2731	(766)	5370	(1012)
Snake-Sp/Su	0	(4)	0	(0)	0	(1)	0	(40)	0	(17)	0	(16)	0	(29)	0	(50)	0	(58)	0	(50)
Snake-F	0	(8)	0	(0)	0	(0)	0	(19)	0	(36)	497	(231)	0	(21)	0	(62)	235	(414)	0	(402)
Oregon coastal	1093	(104)	34	(5)	36	(5)	2184	(388)	1569	(333)	2203	(365)	1014	(371)	8597	(1288)	8374	(1043)	2610	(818)
S.Or./Cal coast	32	(45)	0	(0)	0	(0)	0	(25)	0	(10)	0	(6)	0	(40)	0	(79)	0	(26)	0	(33)
Up Klam/Trinity	0	(2)	0	(0)	0	(0)	0	(9)	0	(36)	0	(8)	0	(9)	0	(26)	0	(21)	0	(20)
Mid Col-Sp	0	(2)	0	(0)	0	(0)	0	(9)	0	(9)	0	(10)	0	(15)	0	(64)	0	(24)	0	(23)
Up Willamette	0	(30)	0	(0)	0	(0)	0	(6)	0	(7)	154	(125)	0	(59)	406	(339)	0	(17)	0	(24)
Cent Val-F	0	(4)	0	(0)	0	(1)	0	(24)	0	(17)	0	(40)	0	(25)	0	(60)	0	(45)	0	(42)
Cent Val-Sp	0	(2)	0	(0)	0	(0)	0	(11)	0	(8)	0	(56)	0	(9)	0	(29)	0	(33)	0	(30)

continued next page.

Table 22 continued.

Area 1/101	2005		2005		2005		2005		2005		2005	
Date	July 18-19		July 16-26		Aug 3-5		Aug-16		Sep 1-16		Sep 10-15	
Fishery	Test		Troll		Test		Test		Troll		Test	
Catch	10,079		19,647		4,236		7,591		2,379		1,155	
N	96		189		96		96		70		33	
UPFR	0	(77)	0	(47)	0	(14)	24	(80)	0	(9)	0	(8)
MUFR	131	(148)	207	(177)	0	(14)	9	(71)	0	(9)	0	(9)
LWFR-F	0	(10)	0	(13)	0	(5)	0	(7)	0	(3)	0	(2)
NOTH	90	(113)	519	(239)	99	(73)	0	(22)	0	(5)	0	(7)
SOTH	1911	(405)	3878	(573)	605	(154)	1116	(287)	0	(34)	0	(8)
LWTH	0	(81)	0	(22)	0	(9)	0	(12)	0	(6)	0	(6)
ECVI	0	(51)	22	(107)	64	(73)	0	(21)	0	(7)	38	(64)
WCVI	691	(262)	414	(215)	99	(81)	878	(245)	22	(35)	0	(11)
SOMN	77	(104)	0	(22)	0	(8)	0	(12)	0	(7)	0	(4)
NOMN	0	(43)	509	(263)	0	(20)	0	(51)	0	(22)	65	(44)
NASS	0	(18)	0	(80)	0	(8)	0	(14)	0	(7)	0	(7)
LWFR-Sp	191	(147)	0	(12)	0	(6)	0	(10)	0	(5)	0	(4)
QCI	0	(7)	0	(8)	0	(2)	0	(5)	0	(1)	0	(2)
Alaska	0	(59)	0	(11)	0	(5)	0	(8)	0	(7)	0	(4)
Taku	0	(7)	0	(8)	0	(22)	0	(9)	8	(33)	0	(4)
Stikine	0	(22)	228	(262)	25	(47)	0	(20)	18	(39)	0	(5)
Skeena	0	(23)	0	(78)	0	(61)	0	(19)	0	(12)	0	(10)
Alesek	0	(11)	0	(73)	0	(5)	0	(8)	0	(3)	0	(5)
Puget Sound	0	(24)	22	(100)	0	(15)	0	(15)	0	(6)	40	(49)
Juan de Fuca	0	(6)	0	(5)	0	(8)	0	(5)	21	(39)	0	(2)
Coastal Wash	115	(236)	1199	(500)	332	(144)	1546	(346)	539	(123)	57	(64)
Low Col	88	(169)	633	(469)	173	(95)	202	(174)	0	(18)	0	(5)
Up Col-Sp	0	(86)	0	(115)	0	(5)	0	(11)	0	(3)	0	(4)
Up Col-Su/F	2495	(592)	4931	(633)	1763	(222)	2675	(374)	210	(87)	92	(59)
Snake-Sp/Su	0	(23)	0	(99)	0	(11)	0	(16)	0	(6)	0	(7)
Snake-F	0	(354)	0	(199)	0	(31)	0	(23)	73	(62)	0	(3)
Oregon coastal	4290	(570)	7085	(718)	1002	(206)	1140	(352)	1488	(146)	864	(101)
S.Or./Cal coast	0	(9)	0	(17)	0	(16)	0	(10)	0	(6)	0	(9)
Up Klam/Trinity	0	(10)	0	(11)	0	(4)	0	(7)	0	(2)	0	(4)
Mid Col-Sp	0	(11)	0	(37)	0	(6)	0	(26)	0	(3)	0	(4)
Up Willamette	0	(11)	0	(12)	75	(71)	0	(8)	0	(23)	0	(3)
Cent Val-F	0	(19)	0	(22)	0	(10)	0	(18)	0	(12)	0	(8)
Cent Val-Sp	0	(12)	0	(14)	0	(6)	0	(9)	0	(4)	0	(3)

Table 23. Chinook catch applied to stock compositions observed in samples of 2005 troll catches from Area 2W/142.

Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Area 2W/142	2005		2005		2005		2005		2005		2005		2005		2005		2005	
Date	Mar 5-24		May 5-6		May 16-17		June 2-3		July 1-2		July 15-17		Aug 1-2		Aug 15		Sep 1-10	
Fishery	Troll		Test		Test		Test		Test		Test		Test		Test		Test & Troll	
Catch	3,173		100		100		100		100		100		100		100		689	
N	91		96		96		96		95		96		95		96		75	
UPFR	0	(10)	4	(2)	0	(1)	0	(0)	2	(2)	0	(0)	0	(1)	0	(0)	0	(3)
MUFR	0	(17)	0	(1)	1	(2)	0	(1)	0	(1)	4	(2)	0	(1)	2	(2)	0	(3)
LWFR-F	0	(5)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)
NOTH	0	(6)	3	(2)	0	(0)	0	(0)	1	(1)	10	(3)	0	(0)	0	(0)	0	(2)
SOTH	10	(46)	10	(3)	12	(3)	24	(4)	22	(4)	23	(4)	16	(4)	13	(4)	7	(10)
LWTH	0	(7)	0	(0)	0	(0)	0	(0)	0	(0)	1	(1)	0	(0)	0	(0)	0	(2)
ECVI	310	(101)	0	(0)	3	(2)	7	(3)	3	(2)	1	(2)	1	(1)	1	(1)	0	(6)
WCVI	1189	(165)	3	(2)	9	(3)	9	(3)	10	(3)	5	(2)	12	(3)	15	(4)	0	(3)
SOMN	0	(12)	0	(0)	0	(0)	0	(1)	0	(1)	0	(0)	0	(0)	0	(0)	0	(2)
NOMN	62	(64)	9	(3)	2	(2)	4	(2)	4	(2)	3	(2)	0	(0)	0	(0)	0	(2)
NASS	0	(8)	0	(1)	3	(2)	0	(0)	0	(1)	1	(1)	0	(0)	0	(0)	0	(2)
LWFR-Sp	0	(4)	0	(0)	0	(0)	2	(1)	1	(1)	0	(0)	0	(0)	0	(0)	0	(1)
QCI	0	(2)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Alaska	0	(3)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)
Taku	0	(3)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Stikine	73	(79)	10	(4)	0	(1)	0	(1)	0	(2)	0	(0)	0	(0)	0	(0)	0	(2)
Skeena	0	(50)	15	(4)	6	(3)	0	(1)	0	(1)	0	(1)	0	(1)	0	(0)	0	(3)
Alsek	0	(4)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)
Puget Sound	0	(54)	0	(0)	0	(0)	0	(0)	0	(1)	4	(2)	0	(0)	1	(2)	0	(2)
Juan de Fuca	0	(2)	0	(0)	0	(0)	0	(0)	1	(1)	1	(2)	0	(0)	0	(0)	0	(0)
Coastal Wash	73	(64)	4	(2)	4	(2)	1	(2)	9	(3)	4	(3)	10	(4)	4	(3)	267	(43)
Low Col	195	(85)	0	(1)	7	(3)	1	(2)	1	(1)	0	(0)	1	(2)	6	(3)	0	(2)
Up Col-Sp	0	(4)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)
Up Col-Su/F	1261	(168)	23	(4)	22	(5)	39	(5)	24	(5)	21	(4)	32	(6)	32	(5)	67	(24)
Snake-Sp/Su	0	(8)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)	0	(0)	0	(2)
Snake-F	0	(12)	0	(1)	8	(3)	0	(1)	2	(3)	0	(1)	6	(3)	11	(4)	0	(1)
Oregon coastal	0	(30)	14	(4)	22	(4)	11	(3)	21	(4)	22	(4)	23	(5)	15	(4)	348	(43)
S.Or./Cal coast	0	(3)	0	(0)	0	(0)	0	(0)	1	(1)	0	(0)	0	(0)	0	(0)	0	(1)
Up Klam/Trinity	0	(3)	0	(0)	0	(0)	0	(0)	0	(1)	0	(0)	0	(0)	0	(0)	0	(1)
Mid Col-Sp	0	(4)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)	0	(0)	0	(1)
Up Willamette	0	(12)	4	(2)	0	(0)	1	(1)	0	(0)	0	(0)	0	(0)	0	(0)	0	(1)
Cent Val-F	0	(16)	0	(1)	0	(1)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(3)
Cent Val-Sp	0	(4)	0	(0)	0	(1)	0	(0)	0	(1)	0	(0)	0	(0)	0	(0)	0	(1)

Table 24. Management targets and actual catches for NBC troll fisheries from 2002 to 2005.

Year	AABM Preseason Ceiling	Total AABM Catch	QCI Sport Catch	Pre-season NBC Troll allocation	Post-season NBC Troll allowable catch	Actual NBC Troll Catch
2002	192,700	150,617	47,100	162,000	145,600	103,517
2003	197,067	191,657	54,300	152,000*	142,767	137,357
2004	243,640	241,508	74,000	183,640	169,640	167,508
2005	246,600	243,606	68,800	170,000	177,800	174,806

* Revised in-season to 142,000

Year	Pre-season Troll target of WCVI Chinook (pieces)	Actual Troll catch of WCVI Chinook (pieces)	Pre-season Troll HR Target on WCVI Returns to Canada	Estimated Post-Season Troll HR on WCVI Return to Canada	Pre-season Target NBC Troll ER on WCVI	Estimated Post-season NBC Troll ER on WCVI Chinook
2002	3,052	6,811	1.6%	3.6%	1.5%	3.3%
2003	6,811	7,637	!	3.2%	!	2.7%
2004	7,800	10,065	3.6%	3.4%	3.3%	2.9%
2005	11,600	8,125	3.6%	4.1%	3.3%	3.5%

Year	RCH Chinook returns to Canada		RCH Chinook catch in Alaskan fisheries ¹	Total WCVI Chinook returns to Canada		Proportion of RCH in WCVI Chinook returns	
	Pre-season forecast	Post-season estimate		Pre-season forecast	Post-season estimate	Pre-season forecast	Post-season estimate
2002	80,300	92,237	9,179	170,900	190,967	47%	48%
2003	86,600	103,184	16,054	180,400	241,084	48%	43%
2004	96,437	153,688	34,416	211,700	279,433	45.6%	55%
2005	189,400	114,910	21,007	313,600	198,121	60.4%	58%

Returns to Canada = catch in Canadian fisheries + Escapement

HR = Harvest Rate

ER = Exploitation Rate approximated by NBC Troll Catch / (Total Catch in all fisheries + Escapement) assuming all catch is of fish returning the same year caught.

! Pre-season ER and HR targets were not developed in 2003 because the forecast was not available at the time the target was set. The 2003 target was the equivalent number of chinook caught in 2002 which was expected to provide slightly lower ER and HR targets than realized by the 2002 catch.

¹ from CWT's (State of Alaska, Department of Fish and Game. Mark, Tag and Age Laboratory. PO Box 115526, Juneau, AK 99811-5526. <http://tagotoweb.adfg.state.ak.us>)

2002 forecast data from Riddell et. al. (2002). RCH and WCVI return data and forecasts for 2003 to 2005 from A. Tompkins, W. Luedke, D. Dobson, D. Lewis, Fisheries & Oceans Canada, 3190 Hammond Bay Road, Nanaimo, B.C. V9T-6N7 unpublished data.

Table 25. Chinook salmon age data by year and stock region for samples with major contributions to NBC Troll Fisheries 2003 to 2005. Gilbert – Rich age designation system A_b where A = the age of the fish in years starting from the egg stage and b = the number of winters in fresh water starting from the egg stage. M = marine age only for those cases where the freshwater age could not be interpreted.

Year	Stock Region	3 ₁	3 ₂	4 ₁	4 ₂	5 ₁	5 ₂	5 ₃	6 ₁	6 ₂	6 ₃	7 ₁	7 ₂	1M	2M	3M	4M	5M	Total aged
2003	NASS			7		4	10			4						11			36
2004	NASS	1			1		2									1	1		6
2005	NASS			1			6									3	1		11
2003	Skeena	1		8	1	4	25		1	2						19	4		65
2004	Skeena	1		5	4	8	7		1	5					1	4	5		41
2005	Skeena	1		9	2	3	46			5						17	3		86
2003	NOMN			10		5	11			2						16	5		49
2004	NOMN	2		11	4	16	4			3			1			8	5		54
2005	NOMN	1		24	2	8	21	1	1	9						13	3		83
2003	WCVI	2	1	53	1	18	7		1						1	23	4		111
2004	WCVI	4		18	1	63	4		1	2						7	11		111
2005	WCVI	7		90	1	12			1	1						4			116
2003	ECVI	2		13		2	1								2	5			25
2004	ECVI	3		6		3										5	1		18
2005	ECVI	4		22		2	1		1							6			36
2003	MUFR	1		5		3	13								2	5	1		30
2004	MUFR				2	3	8			1					2	5	2		23
2005	MUFR			1	3	1	10			1						7	1		24
2003	NOTH			3	2	2	10								1	2	1		21
2004	NOTH	1		5	1	3	5		1						5	9	2		32
2005	NOTH	1		5	4	2	26			3					2	9	1		53
2003	SOTH			103	1	58	14			5					4	32	24		241
2004	SOTH	2		106	1	89	7		1	2				1	3	22	27		261
2005	SOTH	8		279	6	70	7	1	1		1		1		4	22	6		406
2003	Coastal Wash			13		19	3		2	4						8	5	5	59
2004	Coastal Wash	1		20		38	3		4	1					2	6	13		88
2005	Coastal Wash	3		36	1	49	13		10	4			2			12	11	3	144
2003	Up Col-Su/F	3		98	4	69	22		1	3	4					41	21		266
2004	Up Col-Su/F	5		34	7	126	15		4	4					4	13	33	2	247
2005	Up Col-Su/F	4		227	12	94	62		25	17	3	1	1		1	31	9	4	491
2003	Low Col	3		32	2	12	9			1	1				2	12	4		78
2004	Low Col	2		6	2	3	1		1						2	3	5	1	26
2005	Low Col			15	1	16	9			1						3			45
2003	Snake-F			5		2	2									2			11
2004	Snake-F			5		8										1	3		17
2005	Snake-F			20		2	6		2	1						3	1		35
2003	Oregon coastal	7		101	2	84	23		9	9	1				5	55	35	3	334
2004	Oregon coastal	6		81	9	141	8		6	8				1	8	33	66	2	369
2005	Oregon coastal	9		168	3	222	27	1	32	19			9		2	32	49	5	578

Table 26. Chinook salmon age data by year and stock region for samples with minor contributions to NBC Troll Fisheries 2003 to 2005.

Year	Stock Region	3 ₁	3 ₂	4 ₁	4 ₂	5 ₁	5 ₂	5 ₃	6 ₁	6 ₂	6 ₃	7 ₁	7 ₂	1M	2M	3M	4M	5M	Total aged
2003	Alaska						1												1
2004	Alaska			1	1	1				1							1		5
2005	Alsek				1														1
2003	Taku																		0
2004	Taku			1			1												2
2005	Taku															1			1
2003	Stikine			3		2	5									10	2		22
2004	Stikine						3												3
2005	Stikine			5	1	4	16			6					1	1	1		35
2003	QCI			2											1				3
2004	QCI															1			1
2005	QCI								1								1		2
2003	SOMN								1						1				2
2004	SOMN			1			1										2		4
2005	SOMN			1	1														2
2003	UPFR			5			3									3	1		12
2004	UPFR				1	1	5									6			13
2005	UPFR			3	4		6			1						2			16
2003	LWTH						1												1
2004	LWTH			1		1													2
2005	LWTH				3										2				5
2003	LWFR-Sp															1			1
2005	LWFR-Sp	1		2	1		2												6
2003	LWFR-F			3			1									1			5
2004	LWFR-F			2		1				2					2	1	2		10
2005	LWFR-F	1		3		2	1												7
2003	Puget Sound	2		9	1	5	2									6	1		26
2004	Puget Sound			3	1	5	1								1	3	3		17
2005	Puget Sound	3		4		2	1									3			13
2003	Juan de Fuca															3			3
2005	Juan de Fuca			2		2	1												5
2003	Up Col-Sp			1															1
2004	Up Col-Sp					1	1												2
2005	Up Col-Sp															1			1
2003	Snake-Sp/Su															2	1		3
2004	Snake-Sp/Su			1															1
2005	Snake-Sp/Su				1														1
2005	Mid Col-Sp						1												1

... continued.

Table 26 continued.

Year	Stock Region	3 ₁	3 ₂	4 ₁	4 ₂	5 ₁	5 ₂	5 ₃	6 ₁	6 ₂	6 ₃	7 ₁	7 ₂	1M	2M	3M	4M	5M	Total aged
2003	Up Willamette			2	1	1	2			1						4	1		12
2004	Up Willamette			1	7	1	1								2	4	1		17
2005	Up Willamette			1		2	6												9
2003	S.Oregon/Cal coast			2												1			3
2004	S.Oregon/Cal coast			1		1													2
2005	S.Oregon/Cal coast			1			1												2
2003	Up Klam/Trinity									1									1
2004	Cent Val-F					2													2
2005	Cent Val-F			1															1

Gilbert – Rich age designation system A_b where A = the age of the fish in years starting from the egg stage and b = the number of winters in fresh water starting from the egg stage. M = marine age only for those cases where the freshwater age could not be interpreted.

Table 27. Chinook catch by stock group for QCI Sport fisheries 2003 to 2005. Abbreviations are described in Appendix 6. Standard deviations appear in brackets. Mixture analyses were performed with a 240 stock baseline for all samples.

Year	2003		2004		2005	
QCI Sport AABM Catch	54,300		74,000		68,800	
Catch assigned to DNA	54,000		74,000		67,800	
DNA analyzed (Σ N)	358		597		684	
DNA baseline size	240		240		240	
	Est.	STD	Est.	STD	Est.	STD
UPFR	43	(94)	235	(147)	371	(328)
MUFR	36	(92)	407	(351)	1,010	(456)
LWFR-F	1,064	(457)	380	(323)	0	(57)
NOTH	883	(459)	1,073	(650)	136	(383)
SOTH	10,071	(1,209)	7,584	(1,261)	10,230	(1,042)
LWTH	11	(44)	84	(93)	0	(57)
ECVI	717	(374)	592	(199)	187	(218)
WCVI	8,124	(1,047)	13,871	(1,539)	13,347	(1,072)
SOMN	128	(202)	18	(80)	455	(394)
NOMN	1,769	(741)	3,119	(1,008)	5,181	(950)
NASS	232	(260)	990	(577)	692	(447)
LWFR-Sp	2	(19)	195	(281)	0	(37)
QCI	103	(144)	889	(437)	535	(284)
Alaska	5	(25)	5	(22)	0	(42)
Taku	262	(304)	9	(50)	0	(34)
Stikine	763	(501)	2,105	(828)	0	(185)
Skeena	2,583	(779)	2,410	(1,011)	3,227	(870)
Alsek	2	(14)	2	(28)	0	(32)
Puget Sound	145	(174)	236	(198)	0	(261)
Juan de Fuca	131	(152)	269	(81)	0	(33)
Coastal Wash	4,145	(1,024)	9,954	(1,664)	4,790	(875)
Low Col	2,326	(677)	1,048	(305)	511	(325)
Up Col-Sp	5	(30)	7	(32)	0	(81)
Up Col-Su/F	7,048	(1,158)	10,820	(1,382)	11,939	(1,063)
Snake-Sp/Su	19	(58)	15	(74)	0	(80)
Snake-F	2,782	(861)	123	(927)	219	(364)
Oregon coastal	9,979	(1,305)	16,734	(1,738)	14,826	(1,276)
S.Or./Cal coast	13	(62)	127	(484)	0	(60)
Up Klam/Trinity	3	(31)	0	(7)	0	(32)
Mid Col-Sp	5	(23)	0	(23)	0	(32)
Up Willamette	19	(66)	2	(22)	58	(103)
Cent Val-F	563	(358)	688	(542)	86	(162)
Cent Val-Sp	11	(44)	5	(53)	0	(69)

FIGURES

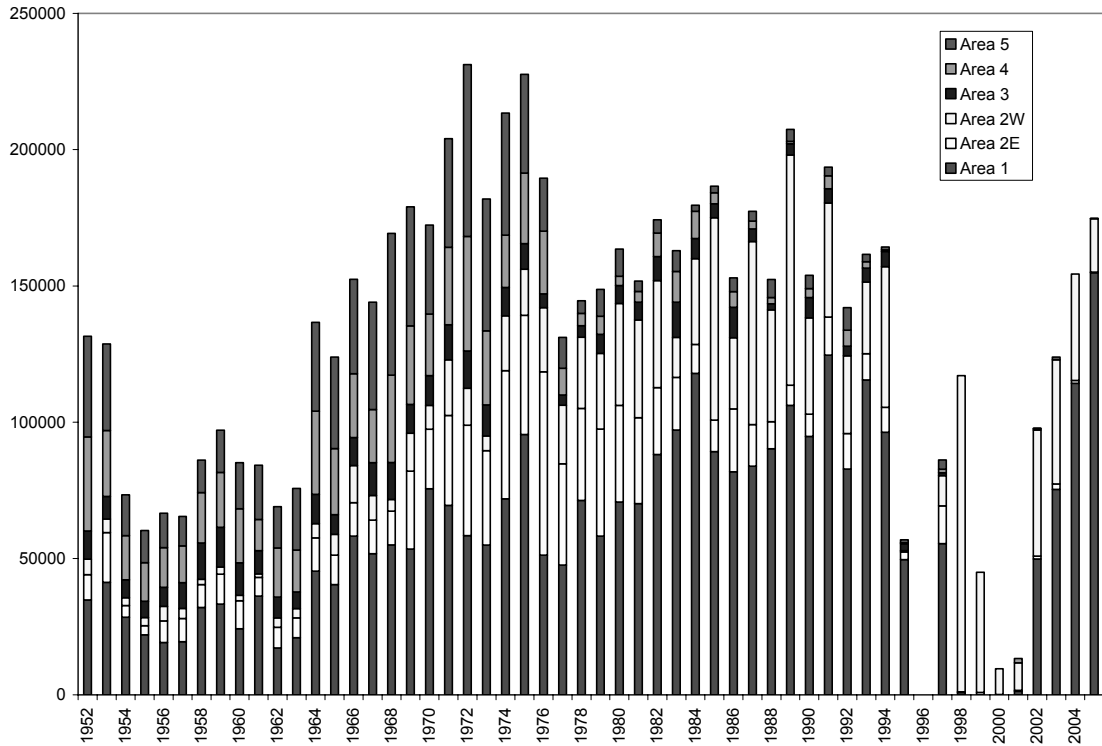


Figure 1. Catches of Chinook salmon by the troll fishery in the North Coast of British Columbia from 1952 to 2005.

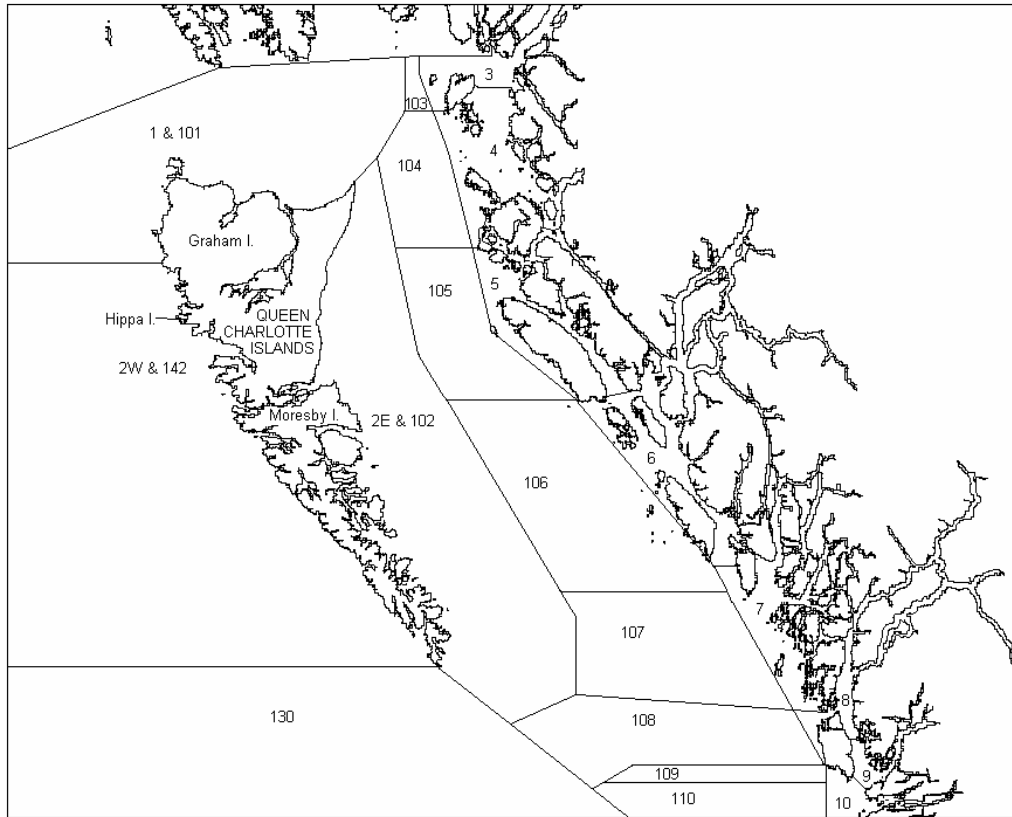


Figure 2. The North Coast of British Columbia showing Pacific Fishery Management Areas 1 to 10, 101 to 110, 130 and 142.

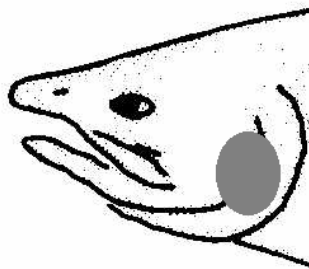


Figure 3. Tissue samples were punched from the opercula of Chinook salmon in the location indicated by the shaded area on the diagram.

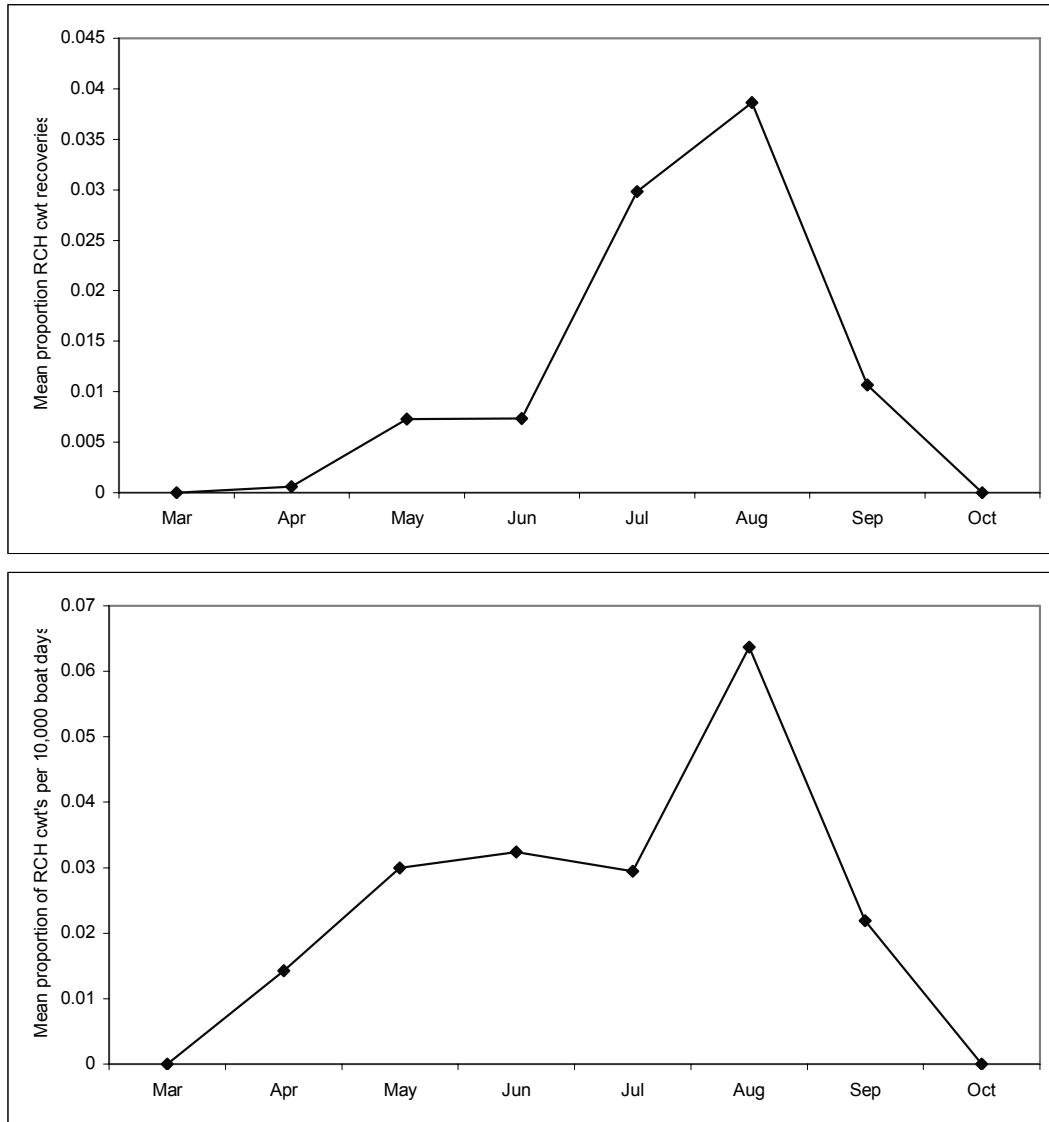


Figure 4. Mean proportion of Robertson Creek Hatchery (RCH) cwt recoveries by the Northern Troll fishery from 1979 to 2000 versus month and the same data corrected for effort (per 10,000 boat days).

(Mean proportion = RCH cwt encounters by the NTR fishery per month / total estimated RCH cwt's in the catch and escapement for the year, averaged across years from 1979 to 2002)

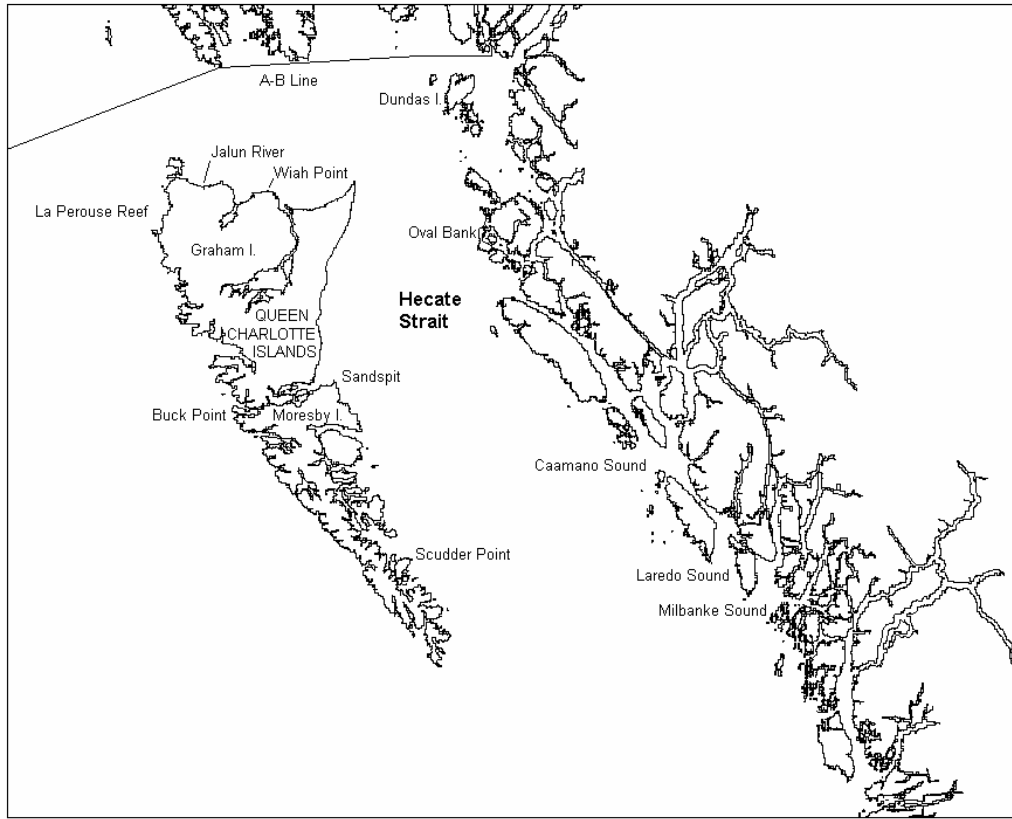


Figure 5. Troll test fishery sample sites.

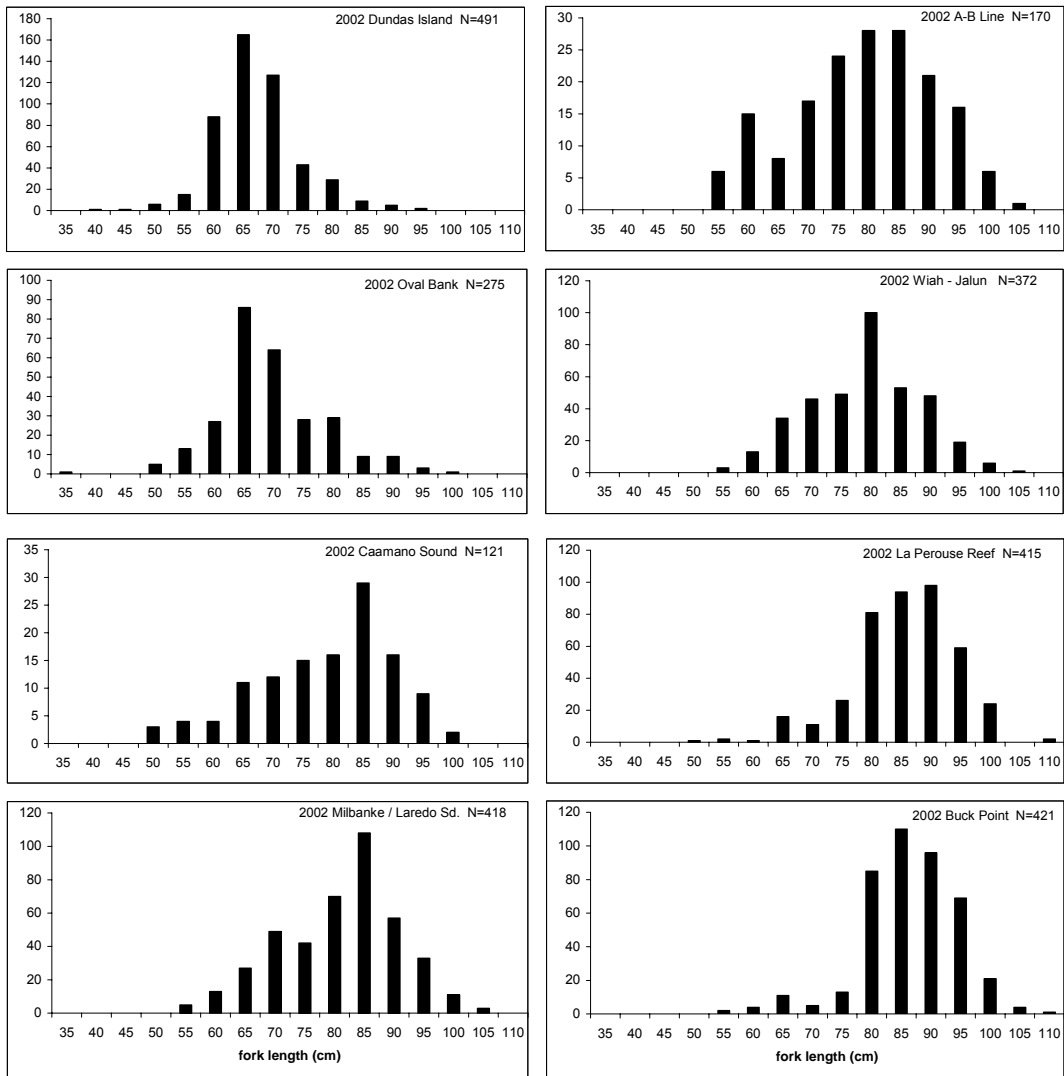


Figure 6. Chinook length frequencies from test sites sampled in July and August 2002.

Note that the division between bins labeled 65 and 70 cm corresponds with the 67 cm size limit.

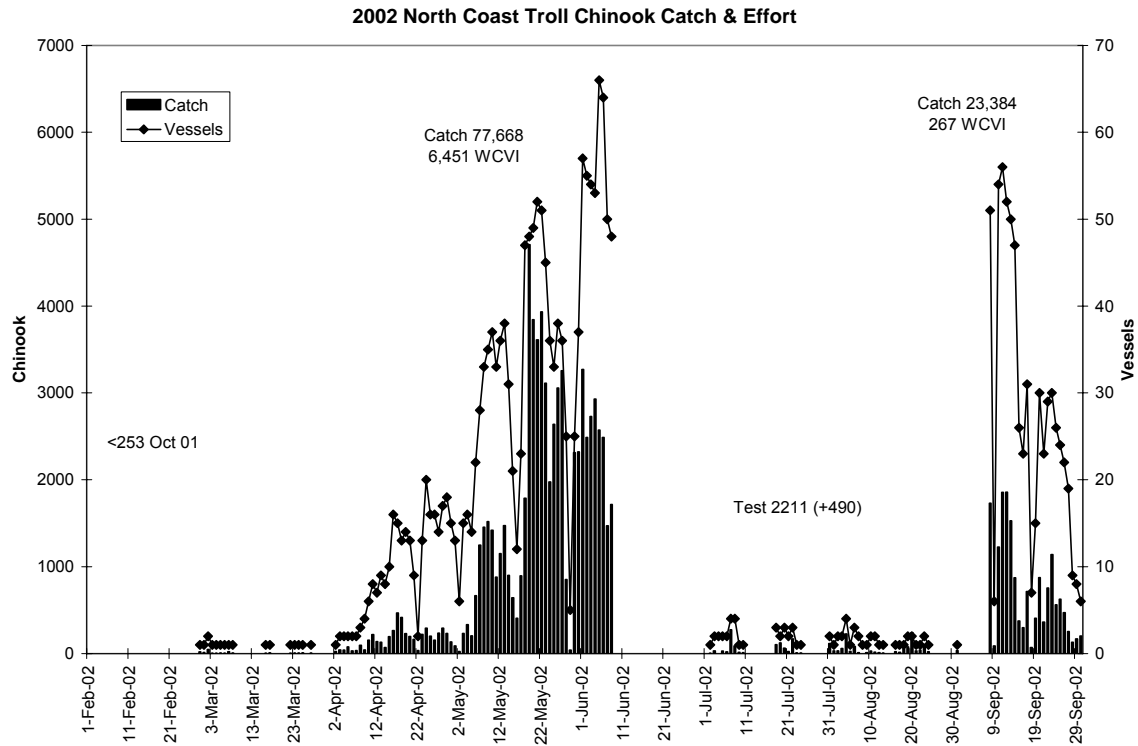


Figure 7. 2002 Chinook daily catch and effort in the NBC Troll fishery.

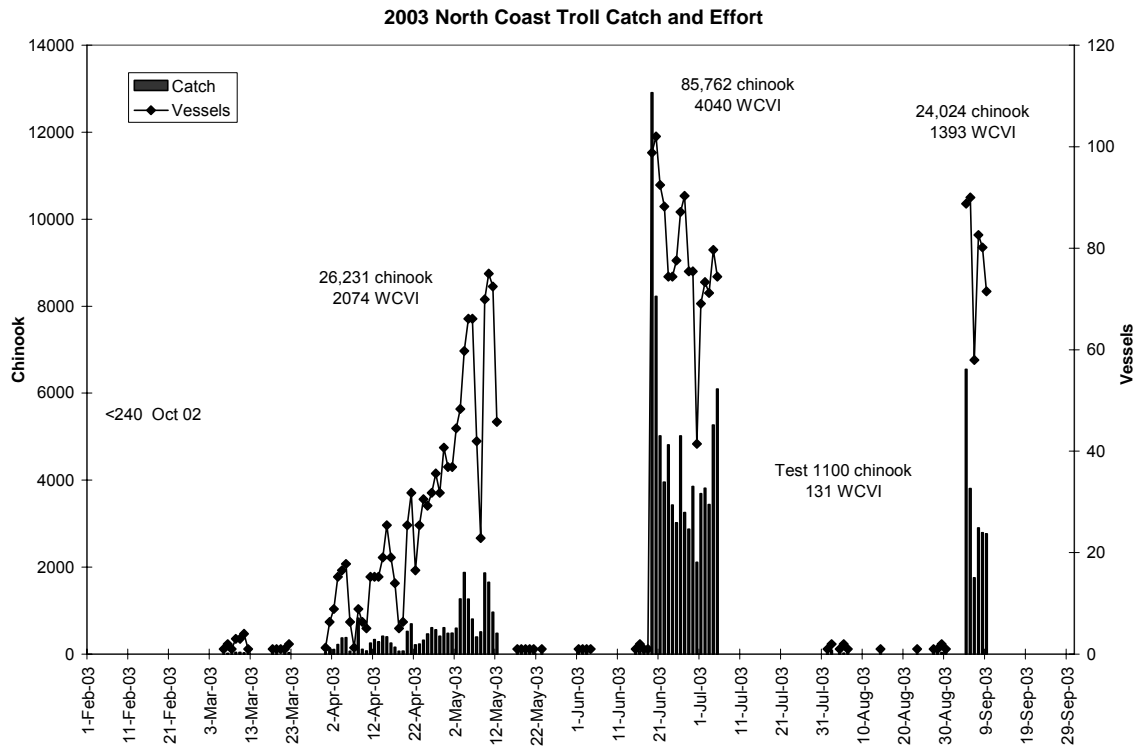


Figure 8. 2003 Chinook daily catch and effort in the NBC Troll fishery.

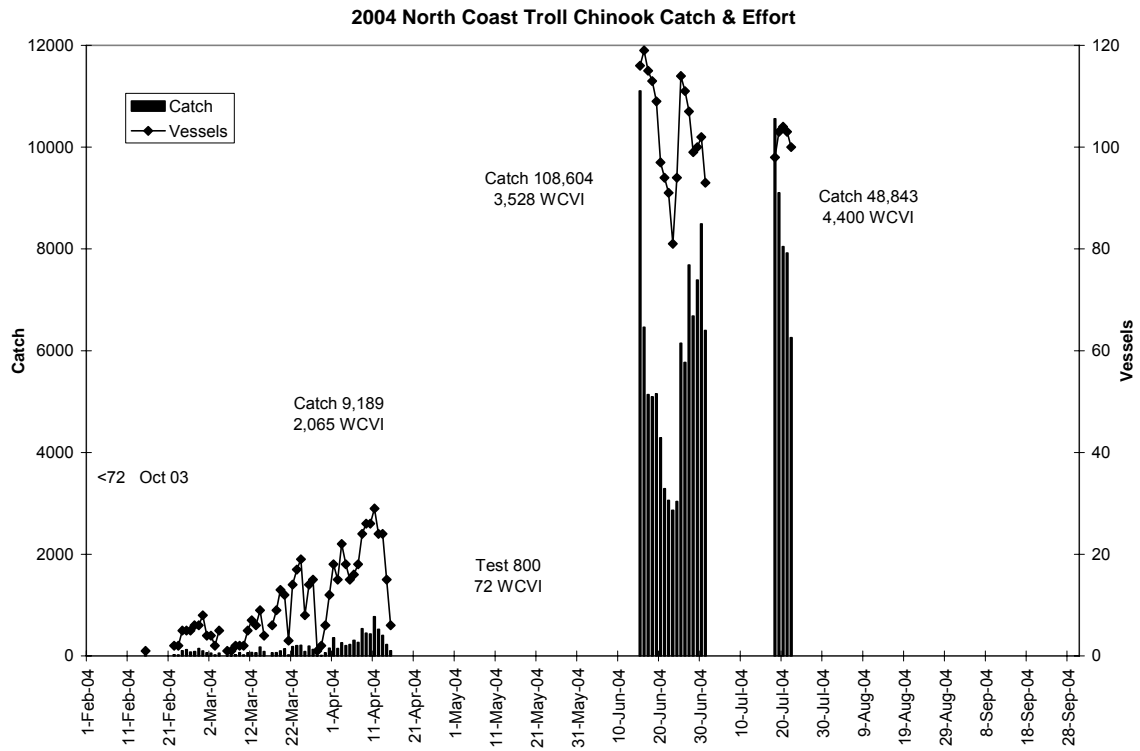


Figure 9. 2004 Chinook daily catch and effort in the NBC Troll fishery.

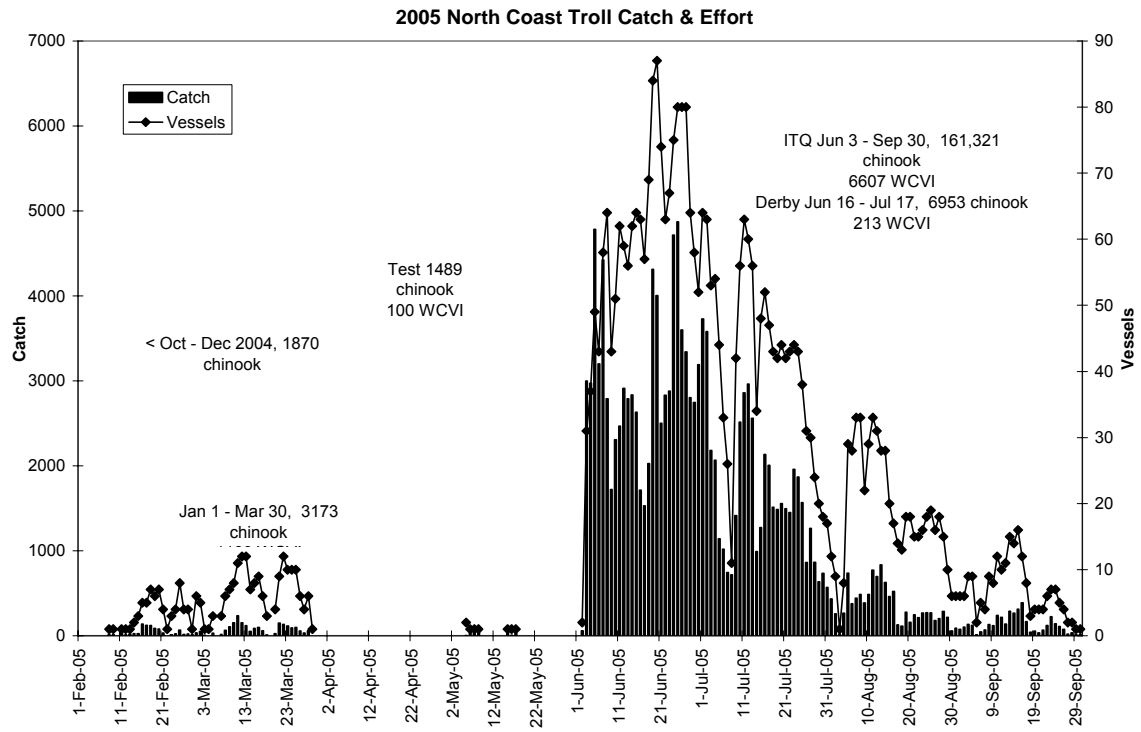


Figure 10. 2005 Chinook daily catch and effort in the NBC Troll fishery.

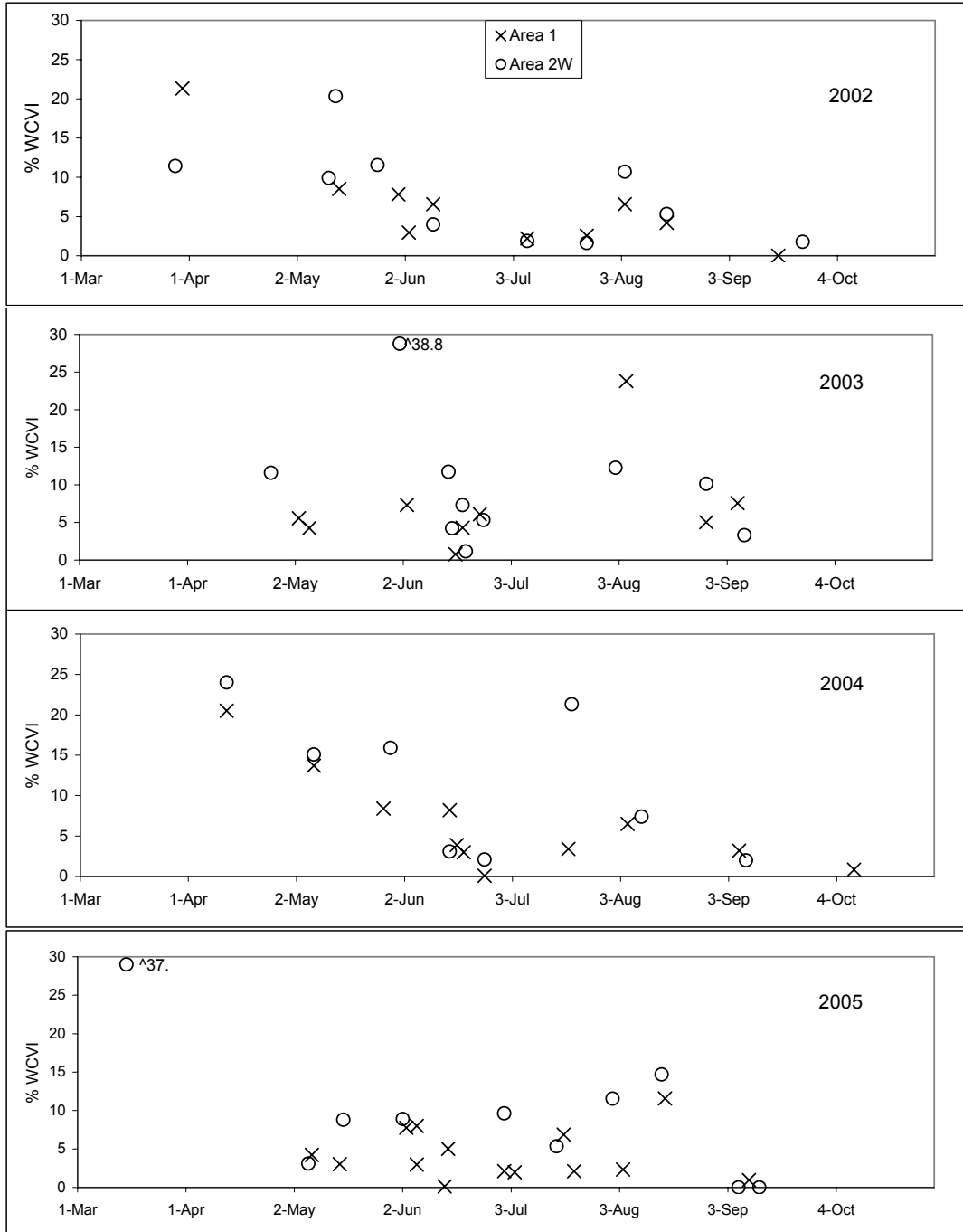


Figure 11. Proportion of WCVI Chinook observed in samples collected from 2002 to 2005 plotted against date sampled.

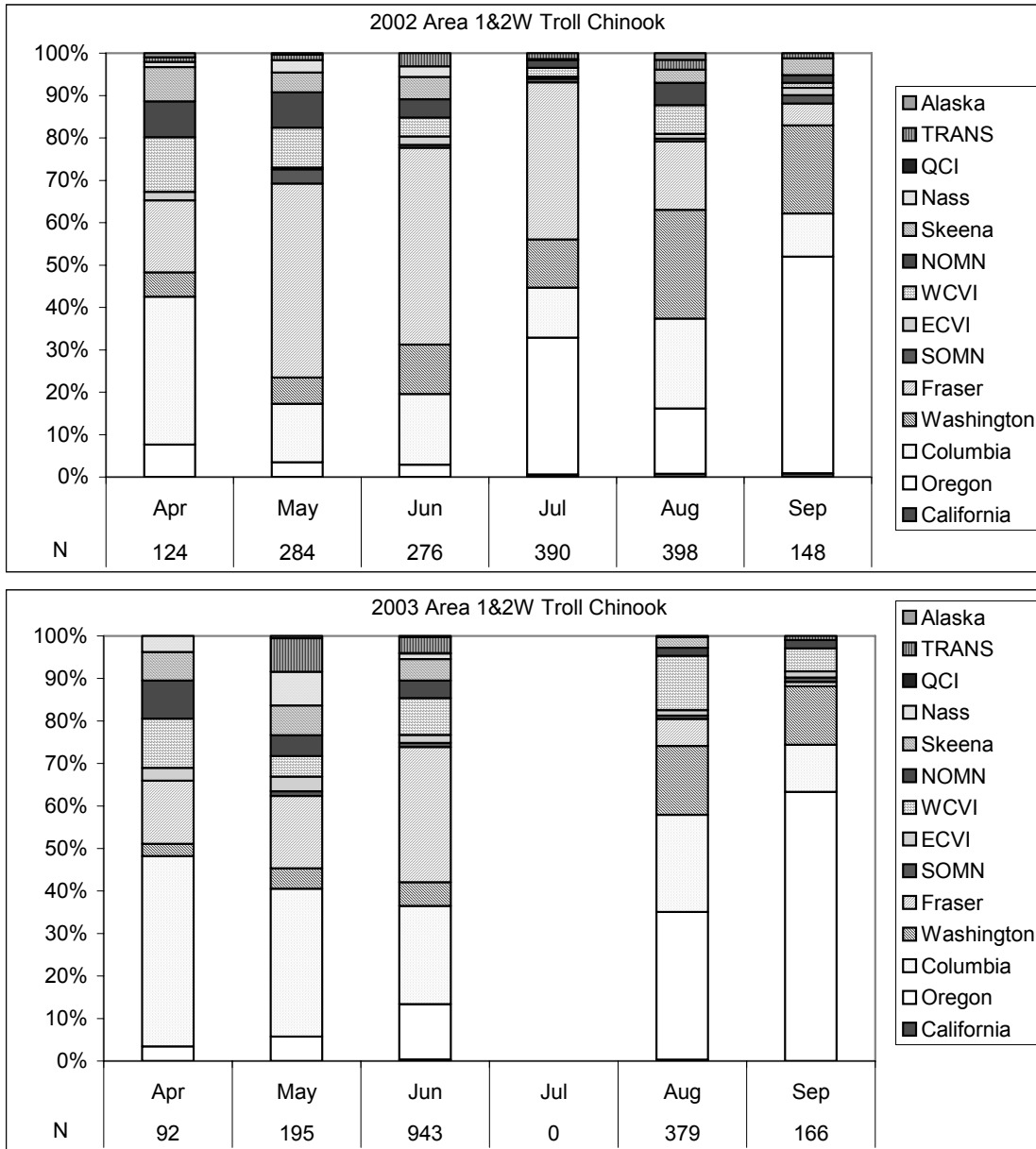


Figure 12. Monthly proportions of major stock groups from troll samples collected on the West Coast of QCI from 2002 and 2003. Samples from Areas 1/101 & 2W/142 are pooled.

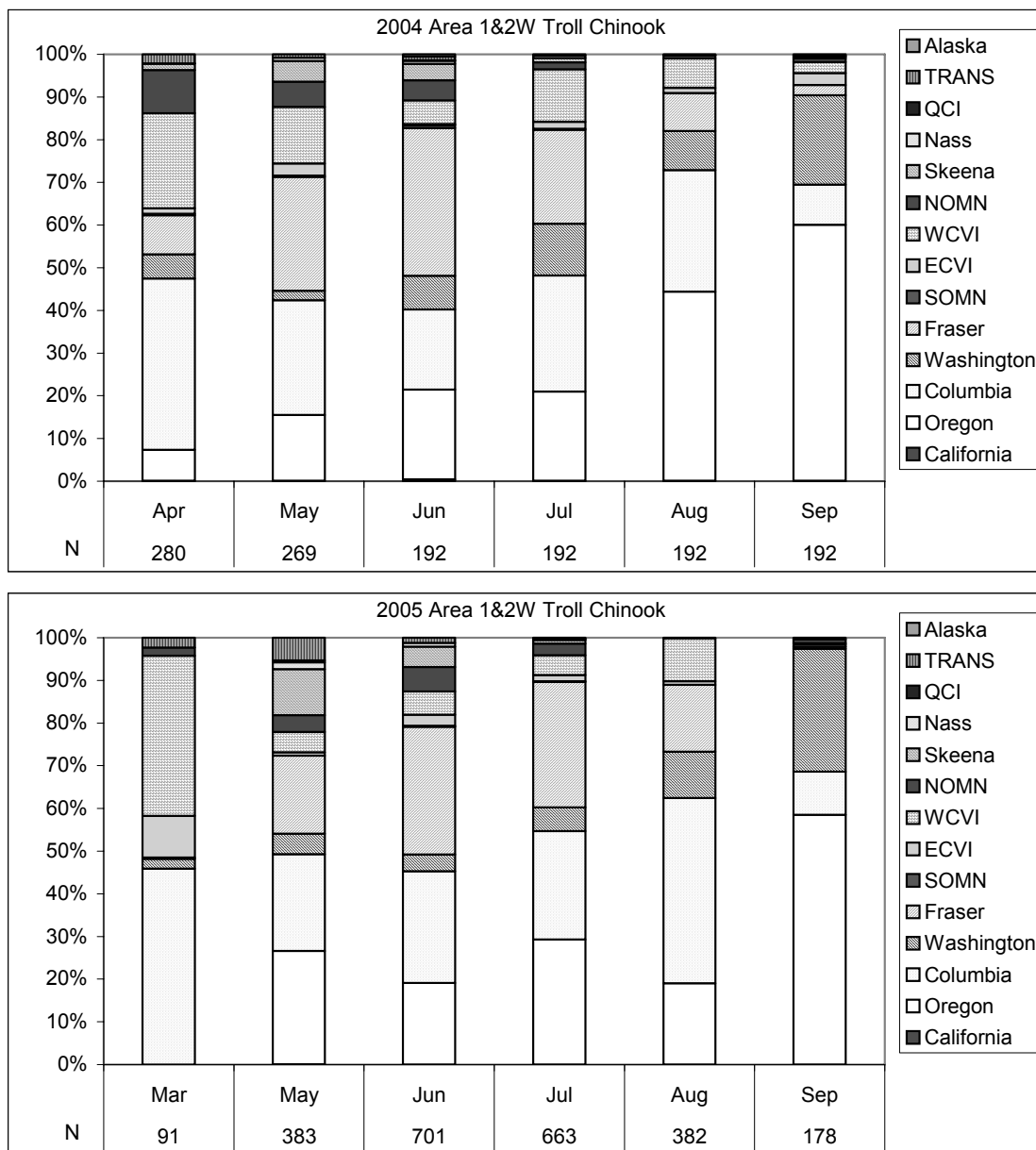


Figure 13. Monthly proportions of major stock groups from troll samples collected on the West Coast of QCI from 2004 and 2005. Samples from Areas 1/101 & 2W/142 are pooled.

Note that 2005 samples begin in March and no samples were collected in April 2005.

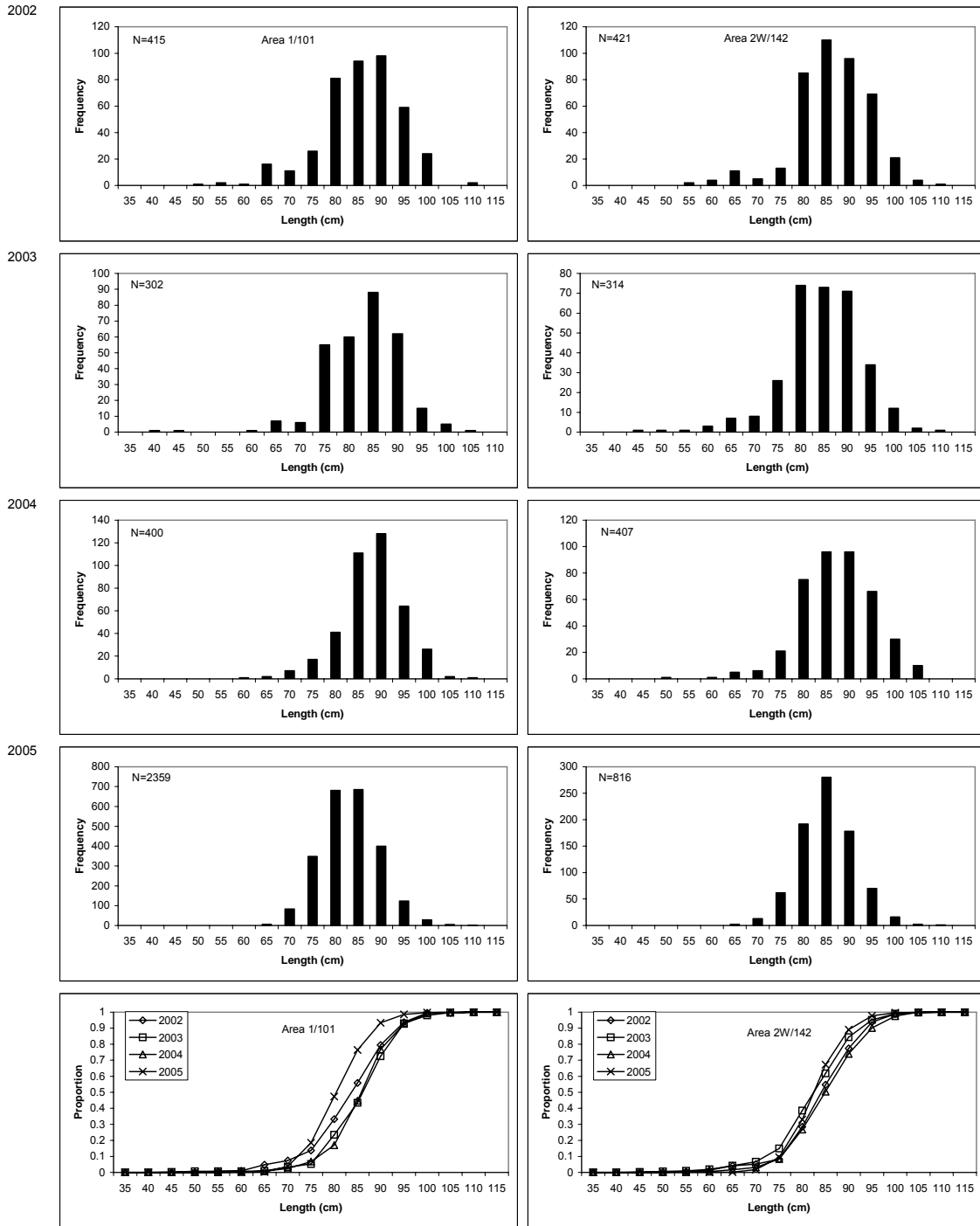


Figure 14. Comparison of length frequencies from NBC Troll caught Chinook salmon sampled from 2002 to 2005. Bottom graphs are cumulative proportions of total length sampled.

APPENDICES

Appendix 1. Historic management targets and details for the NBC Troll fishery.

Management objectives and the Pacific Salmon Treaty (PST) allocations for the NBC troll fishery are identified in Table A1. NBC troll fishery openings and management details from 1992 to 2005 are provided in Table A2. From 1957 to 1982 open times varied somewhat but typically began April 15th and ended September 30. Prior to 1957 there were no closed seasons in the troll fishery. The NBC troll “redline area” used from 1993 to 1997 is depicted in Figure A1.

Table A1. Landed catch of Chinook salmon by the NBC Troll and QCI sport fisheries with Canadian management objectives and PST allocations, 1993 to 2005.

Year	PST ¹ Preseason AABM Ceiling	Total ² PST Catch (1000's)	Canadian Domestic Troll Ceiling	Ceiling Objective	Post Season NBC Troll AABM TAC	Actual NBC Troll Catch (Areas 1to5) ³	QCI Sport Catch
1993	*	257	186,000	263,000 NCBC chinook catch		161,775	25,297
1994	*	251	160,000	263,000 NCBC chinook catch		164,492	28,973
1995	*	119	60,000	Conservation of WCVI chinook.		56,863	22,531
1996	*	27	0	Maximum protection of WCVI chinook.		15	670
1997	*	167	85,000 before September.	Reduced ER on WCVI chinook		86,787	27,738
1998	*	180	110,000 before September.	Reduce pre-1995 Canadian ER on WCVI chinook by 50%. Protect Skeena & Thompson coho.		116,407	34,130
1999	145,600	75	50,000 before September.	Reduce pre-1995 Canadian ER on WCVI chinook by 50%	115,373	44,572	30,227
2000	130,000	32	0 before September.	Protect WCVI chinook. Determine chinook stock composition in September	107,900	9,948	22,100
2001	132,600	43	0 before September.	<5% ER on WCVI chinook in Canada	102,200	13,100	30,400
2002	192,700	151	3,052 WCVI chinook ⁴	<10% ER in Canada, <1.5% ER by NBC troll	145,600	103,517	47,100
2003	197,100	192	6,811 WCVI chinook ⁴	10 to 15% ER in Canada, <number of chinook caught in 2002	142,767	137,357	54,300
2004	243,600	241	7,800 WCVI chinook ⁴	<15% ER in Canada <3.3% ER by NBC troll	169,640	167,508	74,000
2005	246,600	244	11,600 WCVI chinook ⁴	<15% ER in Canada ⁵ <3.3% ER by NBC troll	177,800	174,806	68,800

¹ From 1985-1992, the PST agreed catch ceiling for all north and central coast fisheries combined was 263,000. Increments were added in 1990 and 1991. From 1993-1998, no formal agreement on catch limits was in place. In 1993 and 1994, Canada chose to fish to the pre-1993 ceiling; conservation concerns from 1995-1998 kept Canada's harvest well below this ceiling. Since 1999, catch allowance were developed annually through an abundance based management approach. ER=exploitation rate.

² Up until 1998, catch included all north and central coast landings from Areas 1 to 10. Since 1999, catch reported includes only NBC troll landings in Areas 1 to 5 and QCI sport landings in Areas 1 and 2. all gear up to 99

³ Area 1 to 5 troll data from fish slips up to 2000 then from combined hails & slips thereafter.

⁴ Ceiling calculated based on forecasted return and expected Alaskan harvest.

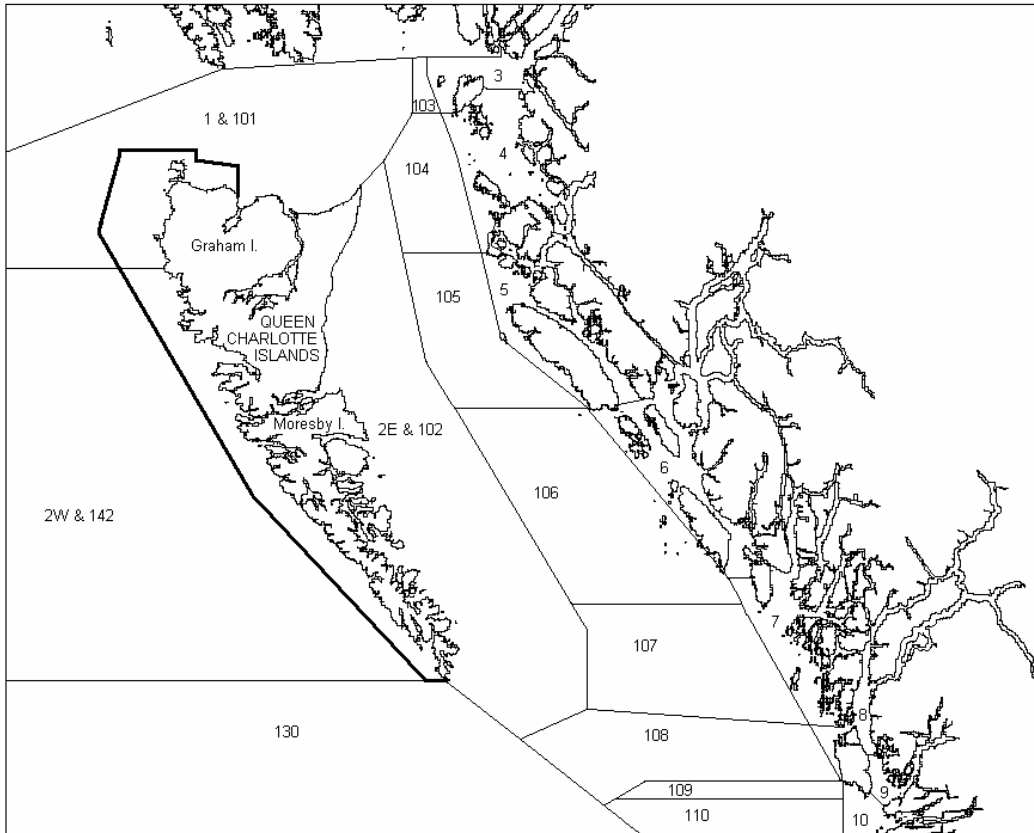
⁵ The 2005 Integrated Fisheries Management Plan indicates 10% ER in Canada but the 3.3% ER by NBC Troll target was based on 15% ER in Canada. The 3.3% ER target for NBC troll was not revised with the change from 15% to 10% ER in Canada.

Table A2. NBC Troll directed fishing times, Area 1 to 5 catch and management details 1982 to 2005.

Year	TROLL SEASON	Chinook season	Catch	Chinook Management Details
1982	April 15 to October 31	same	186,981	
1983	April 15 to June 15 July 1 to September 30	same	178,319	
1984	May 23 to June 3 July 1 to September 30	same	193,317	
1985	May 9 to 20 July 1 to September 30	same	186,723	
1986	June 20 to September 5	same	152,999	
1987	July 1 to September 8?	same	177,457	
1988	July 1 to August 4?	same	152,369	
1989	July 1 to September 5	same	207,679	
1990	June 28 to September 30	June 28 to August 18	154,116	
1991	July 1 to September 30	July 1 to September 3	194,015	
1992	July 1 to September 15	July 1 to August 15	142,336	
1993	July 1 to August 15 August 19 to September 12	July 1 to August 5 August 19 to September 12	161,775	redline area (Figure A1) closed August 19-27 and September 8-12
1994	July 1 to September 14	July 1 to September 5	164,492	redline closed to all trolling September 5-14
1995	July 1 to September 10	July 1 to July 15	56,863	WC QCI chinook non-retention. Chinook red line area closed to all trolling.
1996	July 8 to September 23	Closed	15	Chinook nonretention all year. Chinook red line area closed to all trolling.
1997	July 1 to October 15	July 1 to October 15	86,787	WCQCI and red line area closed most of the year to protect WCVI chinook.
1998 ¹	July 8 to October 6	July 8 to August 24 September 5 to October 6	116,407	Area closures in Dixon Entrance and south of QCI to protect upper Skeena and Thompson coho.
1999	August 1 to August 15	August 1 to 15	44,572	No fishing in Areas 1,3,4 & 5 to protect upper Skeena coho.
2000	August 8 to 22 September 2 to 24	September 2 to 24	9,948	Fall chinook fishery only. Observers mandatory. Fishery to provide information on September stock composition.
2001 ¹	June 4 to 15 July 2 to 18 August 26 to September 30	June 4 to 15 and July 6 to 18. September 8 to 30	13,100	Portions of Area 4 only open in June & July. Allocation 2000, catch 2300. September Area 2W test fishery.
2002	October 4, 2001 to June 8, 2002 August 1 to September 30	Oct. 4, 2001 to June 8, 2002 September 8 to 30	103,517	Troll fisheries based on historic cwt timing for Robertson Creek (WCVI). WCVI component monitored through DNA.
2003	October 1, 2002 to May 12, 2003 June 19 to July 5 July 25 to August 31 September 4 to 9	October 1, 2002 to May 12, 2003 June 19 to July 5 September 4 to 9	137,357	Summer opening based on pre-fishery DNA sampling. In-season monitoring via DNA.
2004	October 1, 2003 to April 15, 2004 June 15 to July 1 July 15 to September 30	Oct. 1, 2003 to April 15, 2004 June 15 to July 1 July 18 to July 22	167,508	June 15 opening based on DNA sampling. In-season monitoring via DNA.
2005	October 1, 2004 to March 31, 2005 June 3 to September 30, 2005	Same	174,806	Fishery opening and monitoring based on DNA. IVQ fishery June 3 to September 30 with a target of 161,000 chinook Derby portion June 16 to July 17 with a target of 7000 chinook

¹ Prior to 1998 and in 2001 trollers were also allowed to fish during net fishing open times. However, trollers did not participate in most net fishery openings. IVQ=Individual Vessel Quota. WC = West Coast.

Figure A1. Pacific Fishery Management Area map of Northern British Columbia. The heavy line indicates the approximate location of the commercial troll redline area.



Appendix 2. Stock composition by region for Chinook salmon sampled from sport catches near Kano Inlet and Langara Island in 2003.

Standard deviations appear in brackets. Regions are organized approximately from north to south. Abbreviations are described in Appendix 6. 240 stock baseline 13 loci.

Region 2003	Kano Inlet	Langara Island
Dates sampled	June 2 – August 18	June 11 – September 7
# sampled	133	225
Alaska	0.0 (0.1)	0.0 (0.1)
Alsek	0.0 (0.1)	0.0 (0.0)
Taku	0.0 (0.3)	0.7 (0.9)
Stikine	1.5 (1.6)	1.3 (1.1)
QCI	0.0 (0.0)	0.3 (0.4)
NASS	0.1 (0.5)	0.6 (0.7)
Skeena	6.4 (2.5)	3.9 (1.8)
NOMN	4.0 (2.4)	2.9 (1.7)
WCVI	14.2 (3.2)	15.5 (2.5)
ECVI	1.3 (1.2)	1.3 (0.9)
SOMN	0.0 (0.2)	0.4 (0.6)
UPFR	0.1 (0.3)	0.1 (0.2)
MUFR	0.1 (0.2)	0.1 (0.2)
NOTH	2.9 (1.5)	0.9 (1.0)
SOTH	18.2 (3.6)	18.9 (2.9)
LWTH	0.0 (0.1)	0.0 (0.1)
LWFR-Sp	0.0 (0.1)	0.0 (0.0)
LWFR-F	0.8 (0.8)	2.6 (1.3)
Puget Sound	0.7 (0.8)	0.0 (0.2)
Juan de Fuca	0.7 (0.8)	0.0 (0.1)
Coastal Wash	5.0 (2.6)	9.2 (2.6)
Up Col-Sp	0.0 (0.1)	0.0 (0.1)
Up Col-Su/F	13.4 (3.6)	12.9 (2.7)
Snake-Sp/Su	0.1 (0.2)	0.0 (0.1)
Snake-F	8.1 (3.0)	3.5 (1.9)
Mid Col-Sp	0.1 (0.3)	0.0 (0.1)
Up Willamette	2.9 (1.8)	0.0 (0.1)
Low Col	0.1 (0.5)	6.7 (2.0)
Oregon coastal	19.3 (4.0)	18.0 (3.1)
S.Oregon/Cal coast	0.1 (0.3)	0.0 (0.1)
Up Klam/Trinity	0.0 (0.1)	0.0 (0.1)
Sacramento	0.0 (0.0)	0.0 (0.1)
Cent Val-Sp	0.0 (0.2)	0.0 (0.0)
Cent Val-F	0.0 (0.2)	0.0 (0.1)

Appendix 3. 2003 Chinook troll test fishery sample instructions and sample details.

2003 NORTH COAST CHINOOK TROLL TEST FISHERY SAMPLE

This entire sample kit including DNA, scale books, data and equipment must be delivered to DFO in Prince Rupert immediately after the samples are collected.

INSTRUCTIONS

Collect 2 samples from the west side of the Queen Charlotte Islands in the following locations:

1. Area 1/101 in the vicinity of La Perouse Reef; and
2. Area 2W in the vicinity of Buck Point.

Use the correct forms and vials:

- The sample sheets and vial boxes are labeled with your vessel information and the Area.
- There are 2 data sheets for each site, one for legal sized Chinook (>67 cm) and one for sublegal sized Chinook (<67cm).
- There are 2 boxes of DNA vials for each site, a box of 100 for legal sized Chinook and a box of 25 for sublegal sized Chinook.
- Sample the first 100 legal sized Chinook caught and up to a maximum 25 sub-legal sized Chinook from each site. (You will probably catch very few sublegal Chinooks.)

Collect DNA, scales, length and sex data from each fish according to the following protocol:

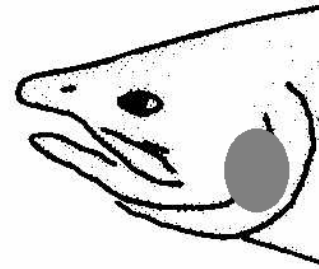
- Use pencil.
- Record the location at the top of the page.
- Record the scale book number at the top of every column of 25 fish. You will need 4 books to collect the scales for 100 Chinook. Be sure to record all of the book numbers.
- Record the date (you can use dittos or arrows for fish sampled on the same day).
- Sample each fish in sequence according to the numbers on the vials and in the scale books.
- Sublegal sized Chinooks have a separate data sheet and separate vials. Scales from sublegal Chinooks go in a separate scale book.
- Measure the fish from the tip of the nose to the fork of the tail using the tape measure and record the length in cm on the data sheet.
- Collect one DNA tissue sample from each fish as noted on the back of this sheet.
- Collect 2 scales from each fish as noted on the back of this sheet.
- **MAKE SURE THE NUMBERS ON THE DATA SHEETS MATCH THE VIAL NUMBERS AND THE NUMBERS ON THE SCALE BOOKS.**
- Dress the fish and note the sex by circling M for male or F for female on the data sheet.

If fishing is good you will probably have to stop fishing every 10 or 20 fish to do the sampling.

It is the responsibility of the test vessel operator to ensure that the samples arrive at the DFO office in Prince Rupert immediately after being collected.

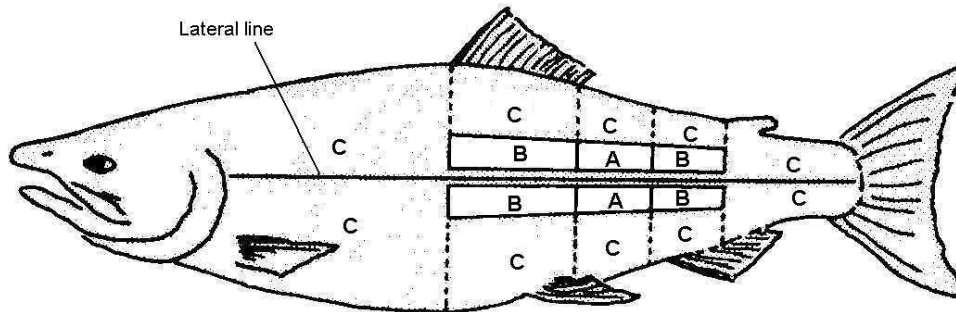
DNA Tissue Samples:

- Use the paper punch provided to punch a small circle of tissue from the gill plate (operculum) in the location indicated by the shaded area in the diagram to the right.
- Add the DNA sample to the appropriate vial.
- Ensure the tissue sinks into the ethanol and is not stuck to the lid or caught in the bubble at the top of the vial.
- Rinse off the punch before taking the next sample.
- **THE DNA VIAL NUMBER MUST MATCH THE DATA ON THE SAMPLE SHEETS.**



Scale Samples:

- Record the scale book number on the data sheet. Each book will contain scales from 25 fish.
- Scale samples must come from preferred locations on the fish as indicated by an "A" in the diagram below.
- Avoid collecting scales near scars, wounds or net marks. To avoid scars you may have to collect scales from the locations marked "B" in the diagram below.
- Do not collect scales from the lateral line or from the areas marked "C".



- Using the forceps provided collect a scale from the preferred location.
- Check the scale to ensure the rings extend all the way to the center of the scale. If not, discard the scale and select another. Regenerated scales have a clear spot in the center of the scale which is missing the rings necessary to determine the age of the fish.
- Wipe off the scale and add it to the scale book on the appropriate numbered square.
- Do not turn the scale over, leave the scale with the same side up as it is on the fish.
- Select a second scale and add it to the adjacent square bearing the same number.
- Keep the scale books dry.
- Once the book is full, fill out the information on the back of the page bearing the scales.
- **THE SCALES MUST MATCH THE NUMBERS ON THE DATA SHEETS.**

Return all data samples and equipment to: Ivan Winther
 Fisheries & Oceans Canada
 417 West 2nd Avenue
 Prince Rupert, B.C. V8J-1G8
 (250) 627-3459
 wintheriv@pac.dfo-mpo.gc.ca

Test vessels must comply with all regulations and licence conditions.

2003 Sampling details

Sample size and strata

A single sample consisted of 100 fish from one area in a single time period. We anticipated funding for 1500 fish (15 samples). Collecting up to twice this many samples would ensure the analysis of 1500 that best represented the fishery and additional samples could be archived for future use. The tables below identify the proposed open fishery samples and test samples collected during closed times. Managers did not identify any priorities for the Individual Stock Based Management (ISBM) fishery that occurs in Areas 6 to 10. No samples were collected from these areas.

We attempted to sample the troll catch relative to abundance. The sampling target was 1% of the commercial catch.

Sampling Protocol

Sampling occurred during the commercial fishery and during closed times. The sampling protocols (open & closed) differed in order to simplify the samples collected during the commercial fishery. Length and sex data were only collected from test opportunities during the commercial closed times. Otoliths were not collected.

The test sites identified in Areas 1 and 2W were La Perouse Reef and Buck Point respectively. The open fishery sites were essentially where the majority of the fishing occurred.

The table below represents the initial proposed sampling strata. The design was for 20 samples from the open fishery and 8 samples during closed times. The test opportunity in May depended on the amount of time left after the fishery closure. The late June and late August test samples were designed to provide information to the fishery openings.

Time	April open	May open	May/June test	June/July open	July test	August test	September open
1	1	3	2	4	1	1	2
2W	1	3	2	4	1	1	2

All sampling vessels, regardless of whether they froze their catch or delivered it on ice, were required to collect, report and deliver the data from the samples they collect. Samples were delivered to Fisheries & Oceans at 417 Second Avenue West in Prince Rupert. There was no contract to collect dockside DNA samples from test vessels in 2003.

Time Period	Sample Type
late May / early June	test
June 1 to 9	Pre-fishery test
early August	test
late August	Pre-fishery test

Open Commercial Fishery Sampling

The objective was for the 4 test fishing vessels to collect 20 samples during the open fisheries and 8 samples during closed times. These 2800 DNA samples from individual chinook would be subsampled (to 1500) to best represent the catch.

An open fishery sample consisted of 100 legal sized chinook. Sublegal sized chinook were not sampled from the open fishery. We recommended sampling the first 100 legal sized chinook caught in a trip or the first 25 each day. Once the sampling regime was set it could not change. The objective was to ensure that samples collected were representative of the catch.

Therefore, the sampling regime could not change simply because fishing improves and the samplers couldn't keep up. Samples collected during the open fishery have were simplified to ensure success: The strategy for samples collected during the open fishery was to collect only one opercular tissue sample for DNA analysis and two scales for ageing from each of the 100 legal sized chinook. Tissue and scales for each fish were preserved together in individual vials of ethanol. Date and location data were recorded on waterproof sheets included with the vial boxes.

Test Fishery sampling during closed times

Test fishery samples during closed times consist of 100 legal sized chinook and all sublegal sized chinook (up to a maximum of 25) caught while fishing for the 100 legal sized fish. Sampling consisted of length and sex data matched to tissue and scale samples. Scales collected during closed times were attached to scale books. Tissue vials were numbered and length/sex data were matched to individual vial numbers and scale book numbers. Data was recorded on waterproof sheets.

Closed time samples were designed to provide a form of payment for test samples collected during the open fishery. Quality was assured through the following condition: If the open fishery sample were incomplete or not accompanied by the correct information the test vessel would not be authorised to collect a sample during the closed period.

2003 NBC Troll Sample Inventory

Code	Area	area description	fishery	Sample date	N	Arrival at PBS	Analysis Returned
A1 IMA	101	101-1,2,6&7 Tian to Shag	open	May 1-5	96	21-May-03	23-May-03
A1 VHB	101	101-2 La Perouse Rf.	open	May 3-9	99	27-May-03	29-May-03
A1 IMB	101	101-7	open	May 6-11	100	No analysis	
A1 IM1L	101	101-1&2	test	May 17-19	100	No analysis	
A1 VH1L	101	101-1&2 Frederick I.	test	June 3-4	95	10-Jun-03	12-Jun-03
A1L IMSP	101	101-1 Frederick I.	test + open	June 16-19	95	20-Jun-03	23-Jun-03
A1 SFD	101	101-2&7 E. Langara & W. Perry Pass	open	Jun 19-20	95	24-Jun-03	26-Jun-03
A1 IM1D	101	101-1&2	open	June 19-21	100	No analysis	
A1 SFE	101	101-2&7 E. Langara & W. Perry Pass	open	Jun 21-27	89	08-Jul-03	11-Jul-03
A1 SF1D	101	101-7	open	June 29-July 2	100	No analysis	
A1 SF1L	101	101-1&2, Tian to La Perouse	test	Aug 4-6	96	20-Aug-03	27-Aug-03
A1 JS1L	101	MIXED AREAS 101& 2-69&2-88	test	Aug 27-30	93	03-Sep-03	04-Sep-03
A1 PP1F	101	Subareas 1-2 and 101-2, Langara	open	Sep 4-9	70	18-Sep-03	19-Sep-03
A2W JSA	MIX	101 & 2W	open	Apr 28 - May 10	100	No analysis	
A2W STA	2W	2W	open	Apr 21-May 11	100	No analysis	
A2W VHA	2W	142-2 Tian	open	Apr 23-27	92	05-May-03	07-May-03
A2W IM2L	2W	142-2	test	May 20-23	100	No analysis	
A2W VH2L	2W	142-2 Kindakun Rk.	test	June 1-2	94	10-Jun-03	12-Jun-03
A2WL VHSP	2W	142-2 Tian to Louis	test	June 15-16	95	18-Jun-03	19-Jun-03
A2WL JSSP	2W	2-63 Buck Pt.	test	June 15	93	17-Jun-03	18-Jun-03
A2W JSD	2W	142-2 Hippa to Tian	open	June 19	96	24-Jun-03	26-Jun-03
A2W VHD	2W	142-2 Louis to Tian	open	Jun 19-20	96	24-Jun-03	26-Jun-03
A2W JSE	2W	142-2 Hippa I.	open	Jun 23-27	95	08-Jul-03	11-Jul-03
A2W SF2L	2W	142-2, Buck Pt. to Rennel Sd.	test	Aug 1-3	96	20-Aug-03	27-Aug-03
A2W JS2L	2W	2-49 & 69, Englefield Bay & Kano	test	Aug 27-30	94	03-Sep-03	04-Sep-03
A2W VH2F	2W	142-2, Tian to Hippa	open	Sep 8-9	96	18-Sep-03	19-Sep-03

Appendix 4. Inventory of samples collected from the NBC Troll Fishery 2000 to 2005.

Year	Month	Area	N	Format	GSI	Catch applied to DNA	Catch without samples	Catch for Time/Area	Comment
2000	Sep	101	186	Batch	88	0	0	381	
2000	Sep	2W	0			0	9,567	9,567	
2001	Mar-May	101	316	Batch	316	850		850	
2001	Mar-May	2W	720	Batch	720	1,350		1,350	
2001	Jun-Jul	4	0				2,300	2,300	
2001	Sep	101	85	Batch	85	600		600	
2001	Sep	2W	946	Batch	946	8,000		8,000	
2001	Oct	2W	102	Batch	102	253		253	
2002	Mar	101	28	Batch	28	687		687	
2002	Apr	2W	100	Batch	96	3,981		3,981	
2002	May	101	147	Batch	147	33,454		33,454	
2002	May	2W	137	Batch	137	19,094		19,094	
2002	Jun	101	130	Batch	130	13,638		13,638	
2002	Jun	2W	146	Batch	146	6,814		6,814	
2002	Jul-Aug	MIX	1390	Test	0	0	1,402	1,402	Not Submitted
2002	Jul	101	200	Test	194	201		201	
2002	Jul	2W	202	Test	196	203		203	
2002	Aug	101	200	Test	199	202		202	
2002	Aug	2W	203	Test	199	203		203	
2002	Sep	101	53	Batch	53	5,142		5,142	
2002	Sep	2W	100	Batch	95	18,242		18,242	
2002	Oct	2W	0				240	240	
2003	Apr	2W	100	Test	92	11,904		11,904	
2003	May	101	400	Test	195	14,527		14,527	
2003	May	2W	200	Test	0				Not Submitted
2003	May	MIX	100	Test	0				Not Submitted
2003	Jun	101	500	Test	374	57,933		57,933	
2003	Jun	2W	600	Test	569	28,329		28,329	
2003	Jul	101	100	Test	0				Not Submitted
2003	Aug	101	200	Test	189	200		200	
2003	Aug	2W	200	Test	190	200		200	
2003	Sep	101	100	Test	70	14,081		14,081	
2003	Sep	2W	100	Test	96	9,943		9,943	
2003	Oct	MIX	0				72	72	
2004	Apr	101	107	Batch	107	4,054		4,054	
2004	Apr	2W	173	Batch	173	5,135		5,135	
2004	May	101	100	Test	96	100		100	
2004	May	2W	100	Test	96	100		100	
2004	Jun	101	700	Test & Troll	526	78,537		78,537	150 not submitted
2004	Jun	2W	350	Test & Troll	337	30,267		30,267	
2004	Jul	101	250	Troll	96	33,516		33,516	150 not submitted
2004	Jul	2W	200	Troll	96	15,327		15,327	100 not submitted
2004	Aug	101	100	Test	96	100		100	
2004	Aug	2W	100	Test	96	100		100	
2004	Sep	101	100	Test	96	100		100	
2004	Sep	2W	100	Test	96	100		100	
2004	Oct	101	100	Volunteer	98	1,870		1,870	DNA & scales only
2005	Mar	2W	93	Volunteer	91	3,173		3,173	DNA & scales only
2005	May	101	200	Test	191	200		200	
2005	May	2W	200	Test	192	200		200	
2005	Jun	101	230	Troll	0	0			Not Submitted
2005	Jun	101	630	Test & Troll	605	82,209		82,209	100 test, 530 IVQ
2005	Jun	2W	100	Test	96	100		100	
2005	Jun	MIX	98	Troll	0	0			Not Submitted
2005	Jul	101	450	Batch	0	0			Not Submitted - Derby
2005	Aug	101	300	Troll	0	0			Not Submitted
2005	Jul	101	500	Test & Troll	472	70,604		70,604	200 test, 200 IVQ, 100 Derby
2005	Jul	2W	200	Test	191	200		200	
2005	Jul	MIX	100	Troll	0	0			Not Submitted
2005	Aug	101	300	Troll	0	0			Not Submitted
2005	Aug	101	200	Test	191	11,827		11,827	
2005	Aug	2W	200	Test	191	200		200	

...continued.

Appendix 4 continued.

Year	Month	Area	N	Format	GSI	Catch applied to DNA	Catch without samples	Catch for Time/Area	Comment
2005	Aug	MIX	200	Troll	0	0			Not Submitted
2005	Sep	101	103	Test & Troll	103	2,379		2,379	70 IVQ, 33 test
2005	Sep	2W	76	Test & Troll	76	1,844		1,844	56 test, 20 IVQ
2005	Sep	MIX	70	Troll	0	0			Not Submitted

N = number of samples collected

GSI = analysis completed for this number of samples.

Batch = Samples from multiple vessel landings were pooled in the same vial for the same week and area fished.

Test = Samples collected at sea by test fishing vessels in individual vials with associated biological data.

Troll = Samples collected from NBC troll fishery landings in individual vials with associated biological data. Maximum 50 fish per vessel. Samples were collected from the first fish encountered except in 2005 when samples were stratified to every 5th or 10th fish depending on load size.

Further sampling details are provided in the text.

Appendix 5. Baseline samples used in the mixture analyses from 2002 to 2005.

#	Region	Population	N	#	Region	Population	N
1	UPFR	Bowron__	X 176	7	ECVI	Big_Qualicum	X 374
1	UPFR	Dome__	X 385	7	ECVI	BigQul@Lang	293
1	UPFR	Fontoniko	X 63	7	ECVI	Chemainus	X 261
1	UPFR	Goat__	X 77	7	ECVI	Cowichan	X 684
1	UPFR	Holmes__	X 216	7	ECVI	L_Qualicum	X 209
1	UPFR	Horsey__	X 41	7	ECVI	Nanaimo_Upper	Z 118
1	UPFR	Indianpoint	X 47	7	ECVI	Nanaimo_F	X 546
1	UPFR	James	57	7	ECVI	Nanaimo_SP	99
1	UPFR	Kenneth_Cr	78	7	ECVI	Nanaimo_SU	X 278
1	UPFR	MacGregor	X 126	7	ECVI	Nimpkish	X 57
1	UPFR	Morkill_River	X 208	7	ECVI	Puntled_SU	X 899
1	UPFR	R_Chehalis	127	7	ECVI	Puntledge_F	X 576
1	UPFR	R_Chilliwack	163	7	ECVI	Quatse__	X 38
1	UPFR	Salmon@PG	X 263	7	ECVI	Quinsam_	X 457
1	UPFR	Slim__	X 204	7	ECVI	Woss_Lake	31
1	UPFR	Swift__	X 411	8	WCVI	Burman__	X 273
1	UPFR	Tete_Jaune	X 488	8	WCVI	Colonial_Cay	40
1	UPFR	Torpy_River	170	8	WCVI	Conuma__	X 456
1	UPFR	Walker__	X 42	8	WCVI	Gold_R	93
1	UPFR	Willow__	X 85	8	WCVI	Kennedy_	X 49
2	MUFR	Baezeako	82	8	WCVI	Marble@NVI	X 507
2	MUFR	Bridge__	X 425	8	WCVI	Nahmint__	X 258
2	MUFR	Chilako_	X 45	8	WCVI	Nitinat_	X 346
2	MUFR	Chilcotin_mix	X 47	8	WCVI	Rob@Gold	225
2	MUFR	Chilko__	X 270	8	WCVI	Rob@Muchalat_	33
2	MUFR	Cottonwood	X 53	8	WCVI	Robertson	X 386
2	MUFR	Elkin__	X 235	8	WCVI	San_Juan	196
2	MUFR	Endako__	X 87	8	WCVI	Sarita__	X 415
2	MUFR	Horsefly	X 58	8	WCVI	Stamp__	X 303
2	MUFR	L_Cariboo	X 33	8	WCVI	Tahsis	310
2	MUFR	L_Chilcoti	X 232	8	WCVI	Thornton_	X 518
2	MUFR	Nazko	194	8	WCVI	Tlupana	Z 66
2	MUFR	Nechako_	X 577	8	WCVI	Toquart_River	87
2	MUFR	Portage_	X 201	8	WCVI	Tranquille	X 342
2	MUFR	Quesnel_	X 565	9	SOMN	Bute__	X 72
2	MUFR	Stuart__	X 555	9	SOMN	Capilano	126
2	MUFR	Taseko__	X 200	9	SOMN	Devereux	X 329
2	MUFR	U_Cariboo	X 171	9	SOMN	Homathko	X 52
2	MUFR	U_Chilcotin	X 277	9	SOMN	Kiinaklini	X 448
2	MUFR	Westroad	X 39	9	SOMN	Porteau_Cove	X 357
3	LWFR-F	Chilliwac@Stave	X 377	9	SOMN	Squamish	X 157
3	LWFR-F	Harrison	X 603	9	SOMN	Mamquam_	XYZ 20
3	LWFR-F	W_Chilliwack	X 481	9	SOMN	Phillips	XYZ 26
4	NOTH	Barriere	X 55	10	NOMN	Ashlum__	X 64
4	NOTH	Blue_River	X 52	10	NOMN	Atnarko_	X 275
4	NOTH	Clearwater	X 262	10	NOMN	Chuckwalla	X 279
4	NOTH	Finn__	X 171	10	NOMN	Dean_River	Z 38
4	NOTH	Lemieux_Creek	X 98	10	NOMN	Docee__	50
4	NOTH	N_Thom@Main	X 115	10	NOMN	Hirsch__	X 474
4	NOTH	Raft__	X 248	10	NOMN	Kibbella	X 161
5	SOTH	Bessette	X 59	10	NOMN	Kildala_	X 441
5	SOTH	Duteau_Cr	X 46	10	NOMN	Kitimat_	X 482
5	SOTH	Eagle__	X 42	10	NOMN	Kloiya_River	X 46
5	SOTH	L_Adams_	X 208	10	NOMN	Kwinamass	X 275
5	SOTH	L_Shuswap	X 356	10	NOMN	Neechanze	XZ 57
5	SOTH	L_Thompson	X 173	10	NOMN	Nusatsum	X 43
5	SOTH	L_Shus@U_Adams	X 45	10	NOMN	Saloompt	X 96
5	SOTH	Little__	X 158	10	NOMN	U_Atmarko	X 155
5	SOTH	M_Shuswap	X 376	10	NOMN	U_Dean	Z 51
5	SOTH	Salmon@SA	X 214	10	NOMN	Wannock_	X 510
5	SOTH	South_Thom	X 267	11	NASS	Cranberry	X 164
6	LWTH	Bonaparte	X 308	11	NASS	Damdochax	X 257
6	LWTH	Coldwater	X 279	11	NASS	Kincolith	X 287
6	LWTH	Deadman__	X 299	11	NASS	Kwinageese	X 299
6	LWTH	Louis__	X 577	11	NASS	Meziadin	X 195
6	LWTH	Nicola__	X 468	11	NASS	Owegee__	X 219
6	LWTH	Spilus__	X 136	11	NASS	Seaskinnish	X 99
6	LWTH	U_Coldwat_SP	X 141	11	NASS	Snowbank_	X 54
6	LWTH	U_Spius_SP	X 131	11	NASS	Teigen__	XYZ 30

#	Region	Population	N	#	Region	Population	N
11	NASS	Tseax__	X 180	56	Snake-Sp/Su	Valley_Creek	X 43
12	LWFR-Sp	Big_Silver	X 111	56	Snake-Sp/Su	Wenaha__	X 43
12	LWFR-Sp	Birkenhead	X 255	57	Snake-F	Lyon's_Ferry_F	X 123
12	LWFR-Sp	Upper_Pitt	Z 88	57	Snake-F	Snake__	X 62
13	LWFR-Su	Maria_Slough	X 302	58	Oregon coastal	Cole_River	49
14	QCI	Yakoun__	X 201	58	Oregon coastal	Elk_River	70
15	Alaska	Chickamin	X 116	58	Oregon coastal	Euchre_Creek	57
15	Alaska	King_Salmon	X 57	58	Oregon coastal	Hunter_Creek	96
15	Alaska	Unuk__	X 193	58	Oregon coastal	Lobster_Creek	49
17	Taku	Little_Tatsam.	X 204	58	Oregon coastal	Nehalem__	53
17	Taku	Little_Trapper	X 131	58	Oregon coastal	Pistol_River	95
17	Taku	Nahlin__	XYZ 22	58	Oregon coastal	Siuslaw__	37
18	Stikine	Andrew_Creek	X 144	58	Oregon coastal	Trask_hat_SP	X 48
18	Stikine	Christina	X 238	58	Oregon coastal	Trsk_hat_F	X 98
18	Stikine	Craig_River	114	58	Oregon coastal	Umpqua_Smith	93
18	Stikine	Little_Tahltan	X 413	59	S.Oregon/Cal	Blue_Creek	94
18	Stikine	Shakes_Creek	159		coast		
18	Stikine	Verrett	X 467	59	S.Oregon/Cal	Winchuk__	80
19	Skeena Upper	Bear__	X 177	59	coast		
19	Skeena Upper	Sustut__	X 416	61	Up Klam/Trinity	Trinity_F	X 100
20	Skeena	Babine__	X 266	61	Up Klam/Trinity	Trinity_SP	X 100
21	Skeena	Bulkley	X 585	62	Mid Col-Sp	John_Day_main	36
21	Skeena	Bulkley	X 585	62	Mid Col-Sp	John_Day_middle	40
21	Skeena	Bulkley	X 585	62	Mid Col-Sp	John_Day_north	40
21	Skeena	Bulkley	X 585	62	Mid Col-Sp	Naches_Sp	XYZ 30
22	Skeena Mid	Morice__	X 228	63	Up Willamette	Clackamas_North	79
22	Skeena Mid	Kispiox_	X 105	63	Up Willamette	North_Santiam	X 97
22	Skeena Mid	Kitwanga	X 288	64	Cent Val-F	American_River	69
23	Skeena Lower	Cedar__	X 116	64	Cent Val-F	Battle_Creek	40
23	Skeena Lower	Ecstall_	X 293	64	Cent Val-F	Butte_F	49
23	Skeena Lower	Gitnadoix	Z 42	64	Cent Val-F	Feather_F	128
23	Skeena Lower	L_Kalum	X 457	64	Cent Val-F	Merced__	200
23	Skeena Lower	L_Kalum@AC	X 190	64	Cent Val-F	Mokelumne	X 94
23	Skeena Lower	Moonlit_Creek	X 83	64	Cent Val-F	Sacr_F__	X 136
24	Alsek	Blanchard	376	64	Cent Val-F	Sacr_LF__	X 96
24	Alsek	Klukshu_	432	64	Cent Val-F	Toulume__	34
24	Alsek	Takhanne	188	64	Cent Val-F	Yuba__	50
50	Puget Sound	Kendall_Green_F	X 50	65	Cent Val-Sp	Butte_Sp	43
50	Puget Sound	Kendall_Nook_SP	X 100	65	Cent Val-Sp	Feather_Sp	82
50	Puget Sound	LittleCampbell	90	65	Cent Val-Sp	Yuba_Sp__	32
50	Puget Sound	Serpentine	46				
50	Puget Sound	Skagit_SU	X 282				
50	Puget Sound	Skykomish_SU	X 75				
50	Puget Sound	Soos_Green_F	X 100				
50	Puget Sound	Stillaguamish	X 87				
50	Puget Sound	White_F_	X 100				
51	Juan de Fuca	Elwha_F_	X 99				
52	Coastal Wash	Hoh_River_SP_SU	X 59				
52	Coastal Wash	Queets__	X 57				
52	Coastal Wash	Quinault_F	X 64				
52	Coastal Wash	Solduc_F	X 98				
53	Low Col	Abernathy_F	X 100				
53	Low Col	Coweeman_	X 77				
53	Low Col	Sandy__	89				
54	Up Col-Sp	Chewuch_SP	X 100				
54	Up Col-Sp	Chiwawa_SP	X 100				
54	Up Col-Sp	Entiat__	64				
54	Up Col-Sp	Twisp_SP	X 100				
55	Up Col-Su/F	Deschutes-F	100				
55	Up Col-Su/F	Hanford_Reach	X 98				
55	Up Col-Su/F	Silmilkameen_SU	X 100				
55	Up Col-Su/F	Wenatchee_SU	X 100				
56	Snake-Sp/Su	Frenchman-SP	61				
56	Snake-Sp/Su	Imnaha__	X 99				
56	Snake-Sp/Su	Marsh_Creek	X 220				
56	Snake-Sp/Su	McCall_Hat	X 41				
56	Snake-Sp/Su	McCall_River	X 32				
56	Snake-Sp/Su	Rapid_Sp	X 80				
56	Snake-Sp/Su	Salmon_E.Fork	53				
56	Snake-Sp/Su	Tucannon_SP	X 100				
56	Snake-Sp/Su	Up_Salmon-SP	165				
56	Snake-Sp/Su	Upper_Valley	X 77				

X = stocks used in the 182 stock baseline.

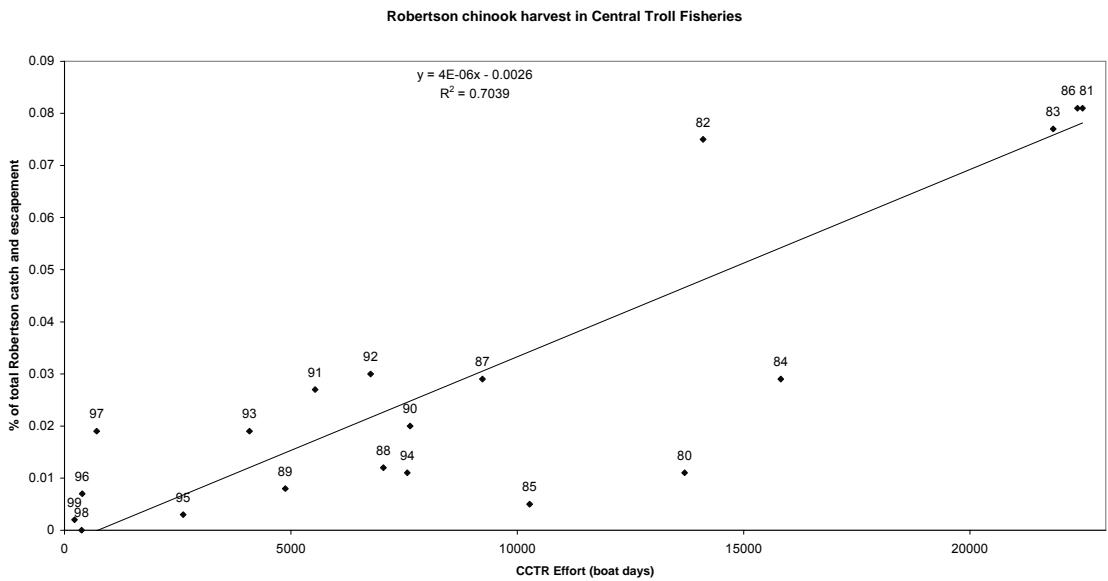
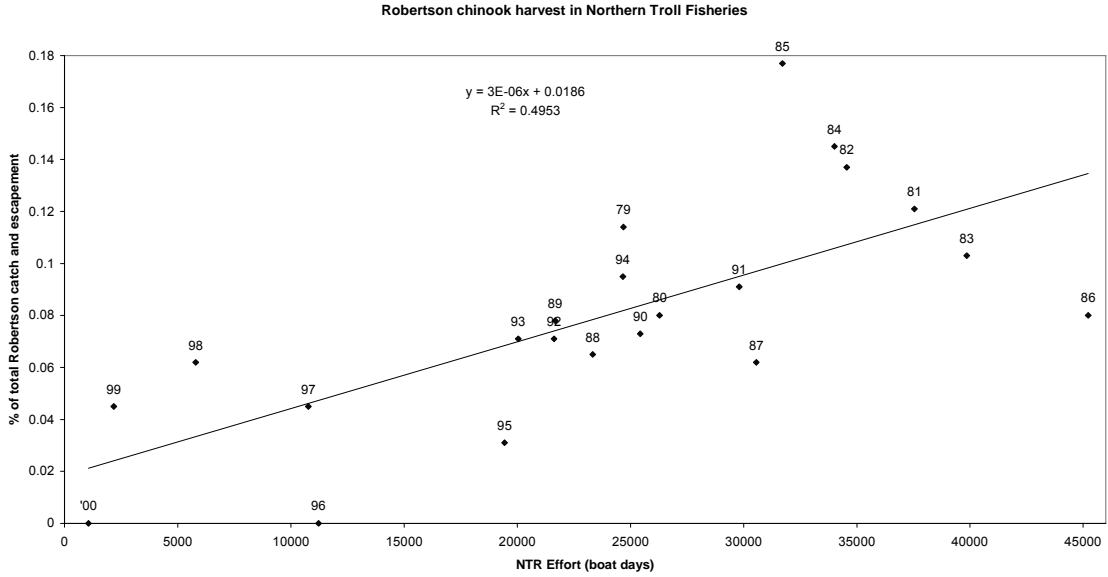
Y = stocks not used in 240 stock baseline.

Z = stocks not used in 233 stock baseline.

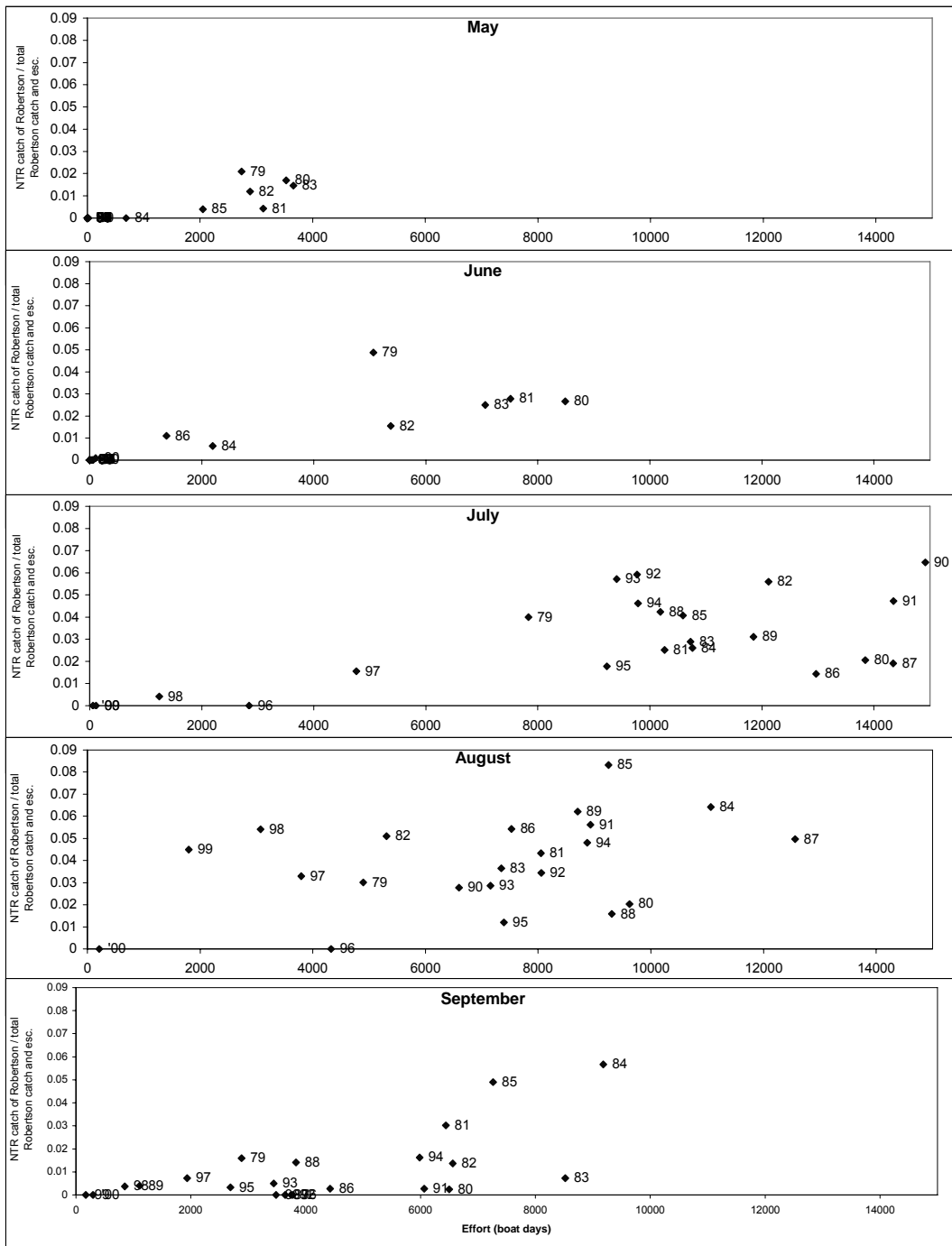
Appendix 6. Abbreviations used to describe regions.

#	Abbreviation	Region
1	UPFR	Upper Fraser River
2	MUFR	Middle Fraser River
3	LWFR-F	Lower Fraser River Fall
4	NOTH	North Thompson River
5	SOTH	South Thompson River
6	LWTH	Lower Thompson River
7	ECVI	East Coast of Vancouver Island
8	WCVI	West Coast of Vancouver Island
9	SOMN	Southern Mainland BC
10	NOMN	Northern Mainland BC
11	NASS	Nass River
12	LWFR-Sp	Lower Fraser River Spring
13	LWFR-Su	Lower Fraser River Summer
14	QCI	Yakoun River
15	Alaska	Alaska
17	Taku	Taku River
18	Stikine	Stikine River
19	Skeena Upper	Skeena Upper
20	Skeena Babine	Skeena Babine
21	Skeena Bulkley	Skeena Bulkley
22	Skeena Mid	Skeena Mid
23	Skeena Lower	Skeena Lower
24	Alek	Alek
50	Puget Sound	Puget Sound
51	Juan de Fuca	Juan de Fuca Strait
52	Coastal Wash	Coastal Washington
53	Low Col	Lower Columbia
54	Up Col-Sp	Upper Columbia spring timed
55	Up Col-Su/F	Upper Columbia summer & fall timed
56	Snake-Sp/Su	Snake River spring & summer timed
57	Snake-F	Snake River fall timed
58	Oregon coastal	Oregon coastal
59	S.Oregon/Cal coast	Southern Oregon Coastal and California Coastal
61	Up Klam/Trinity	Upper Klamath & Trinity
62	Mid Col-Sp	Middle Columbia Spring timed
63	Up Willamette	Upper Willamette
64	Cent Val-F	Central Valley fall timed
65	Cent Val-Sp	Central Valley spring timed
1-6, 12 & 13	Fraser	Fraser River and tributaries
19-23	Skeena	Skeena River and tributaries
17, 18 & 24	TRANS	Transboundary Rivers originating in Canada flowing through Southeast Alaska
53-57, 61-63	Columbia	Columbia River and tributaries
58 & 59	Oregon	Oregon coastal
61, 64 & 65	California	California
50-52	Washington	Washington

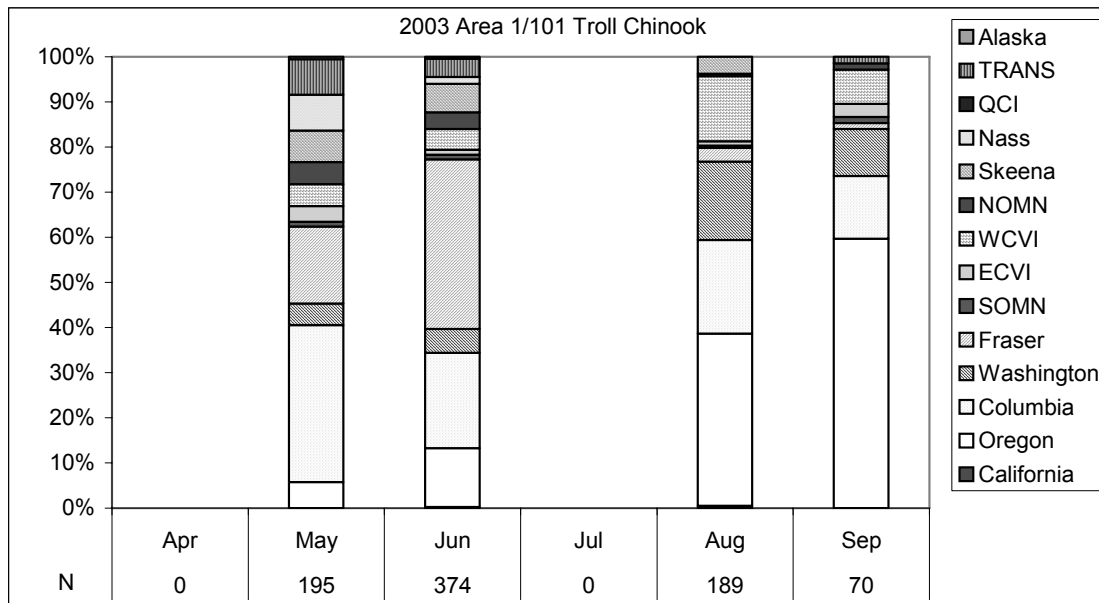
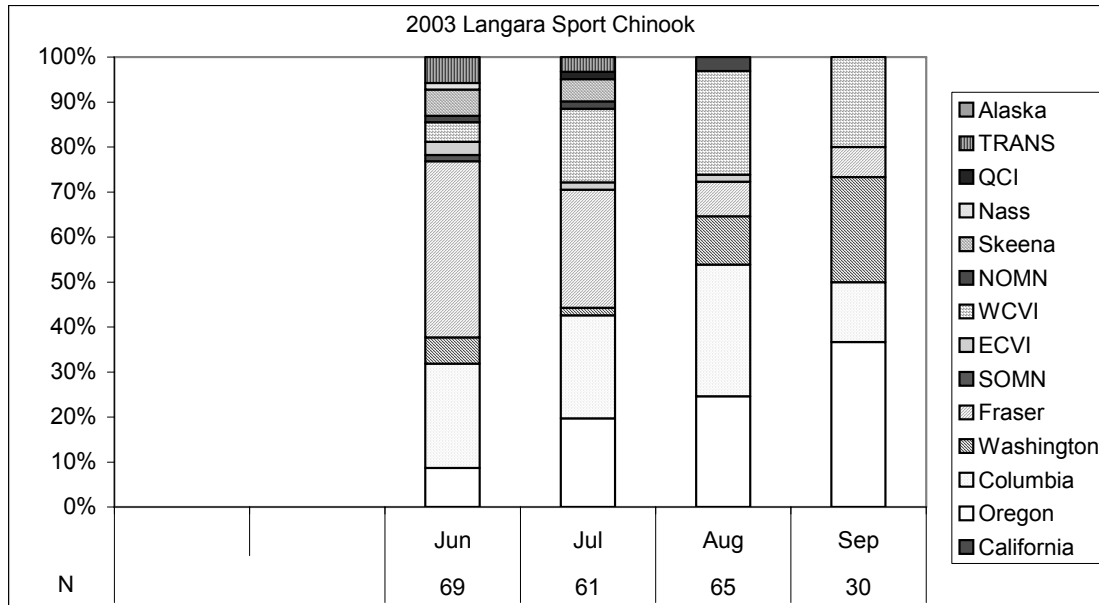
Appendix 7. Graphs of the annual proportion of Robertson Creek Hatchery coded wire tag recoveries (catch/total catch & escapement) versus effort in North Coast and Central Coast troll fisheries.



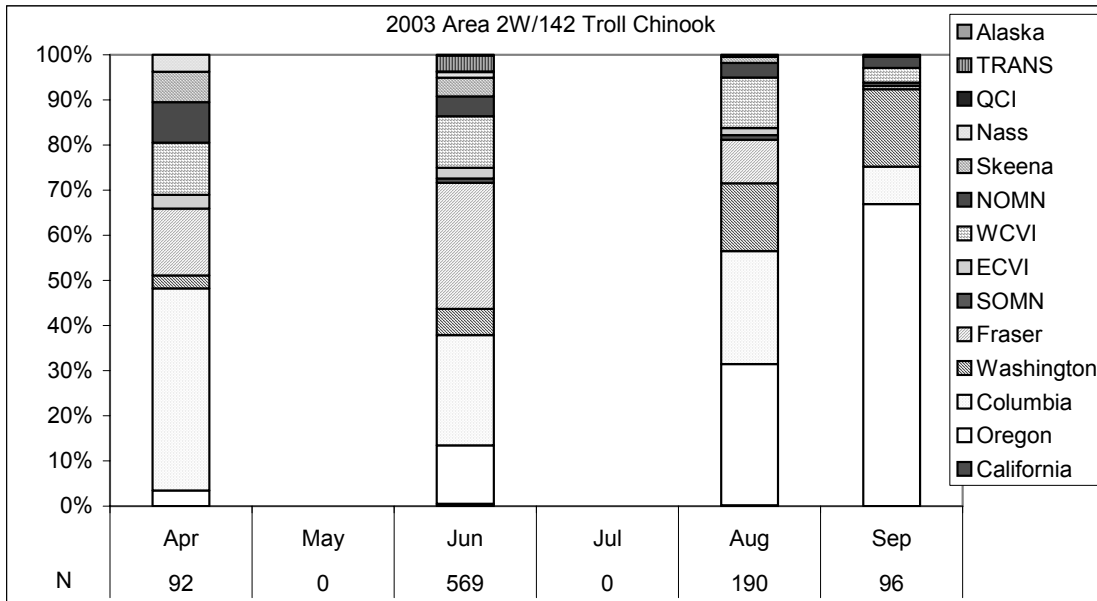
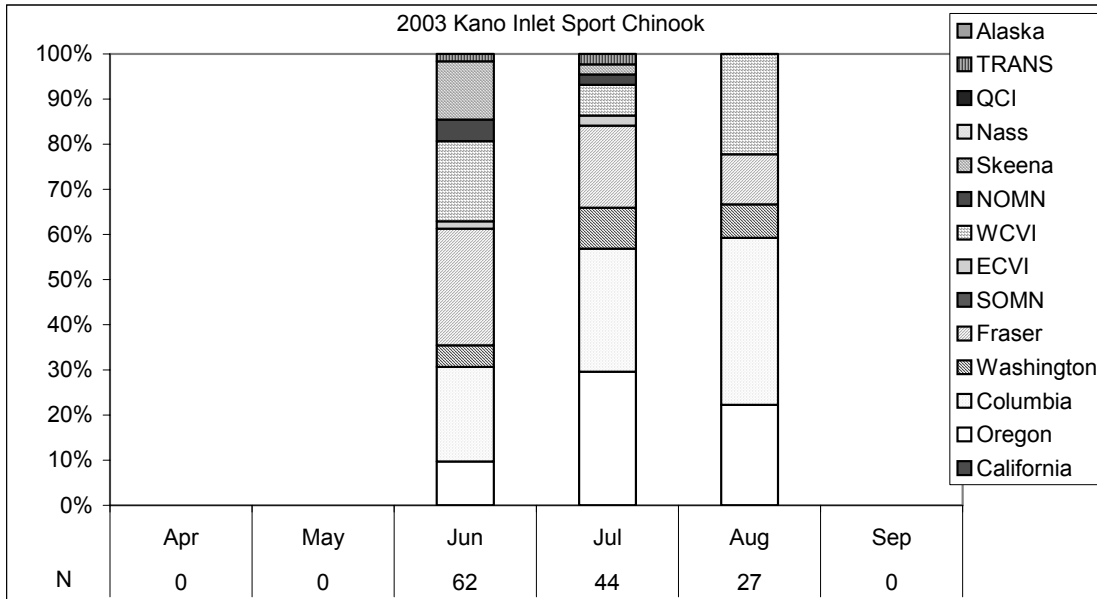
Appendix 8. Graphs of the annual proportion of Robertson Creek Hatchery coded wire tag recoveries (catch/total catch & escapement) versus effort for each month in North Coast troll fisheries.



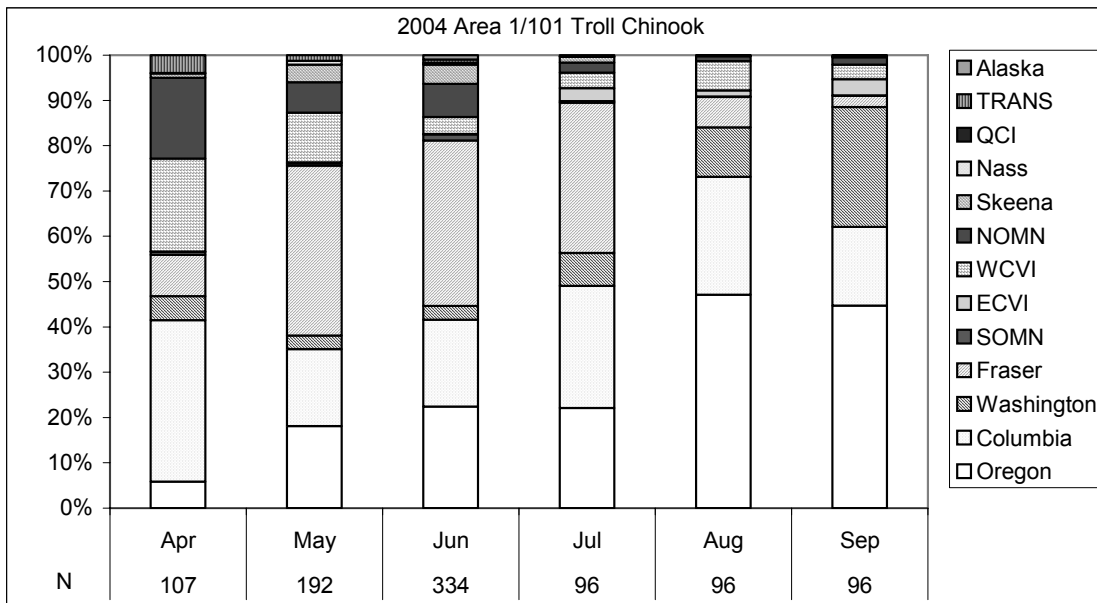
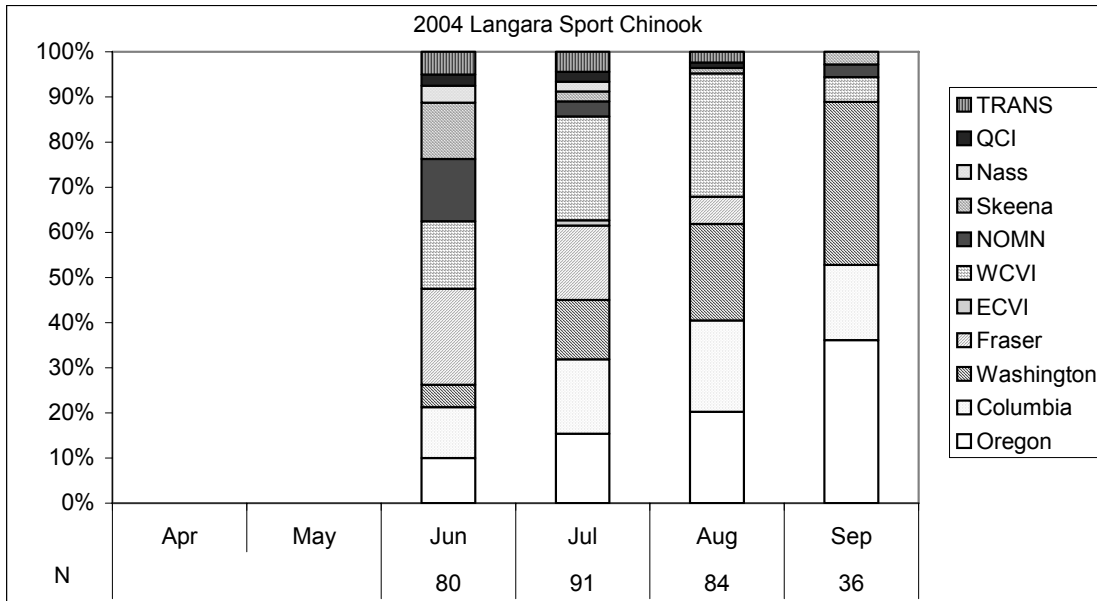
Appendix 9. Histograms comparing monthly stock compositions of 2003 Chinook salmon catch from sport and troll samples in Area 1/101.



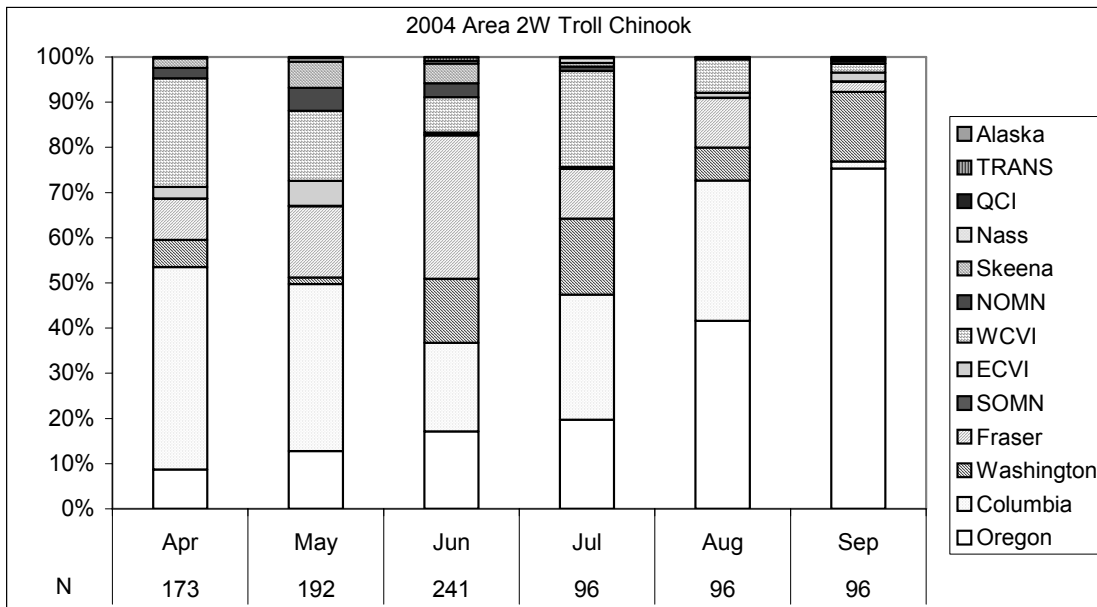
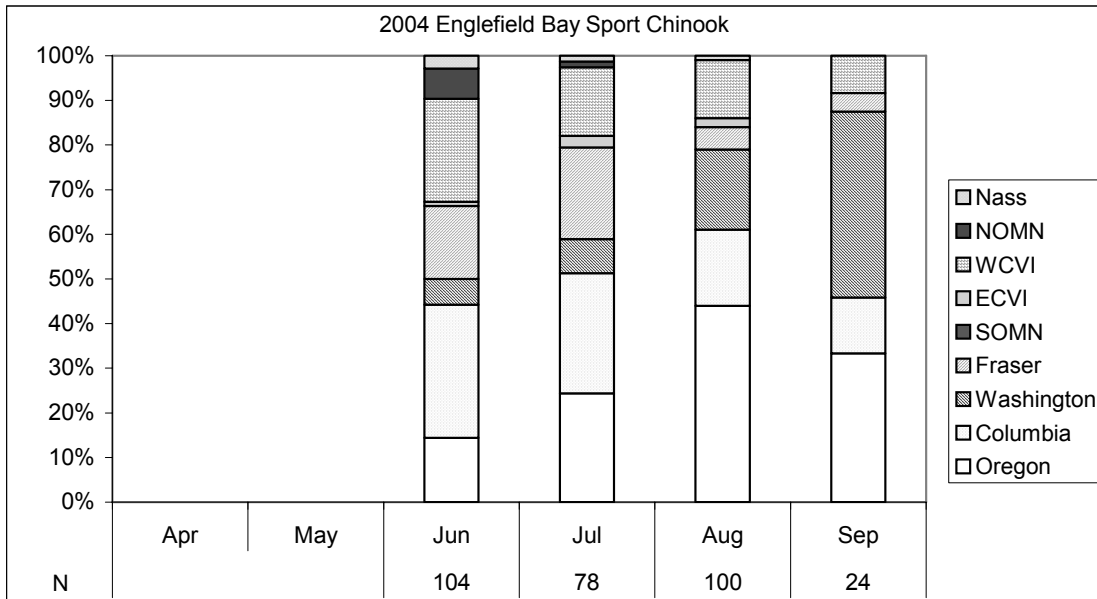
Appendix 10. Histograms comparing monthly stock compositions of 2003 Chinook salmon catch from sport and troll samples in Area 2W/142.



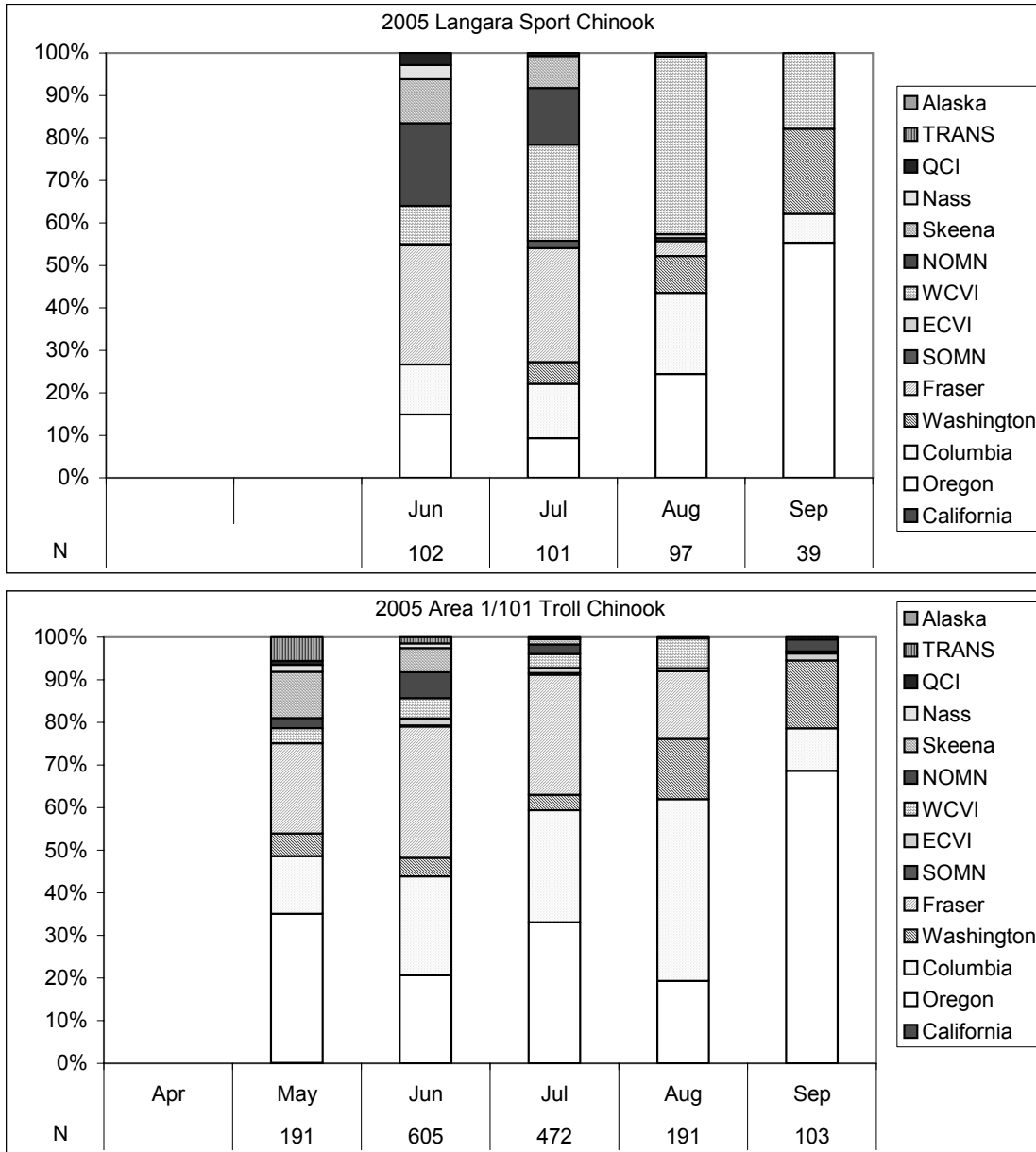
Appendix 11. Histograms comparing monthly stock compositions of 2004 Chinook salmon catch from sport and troll samples in Area 1/101.



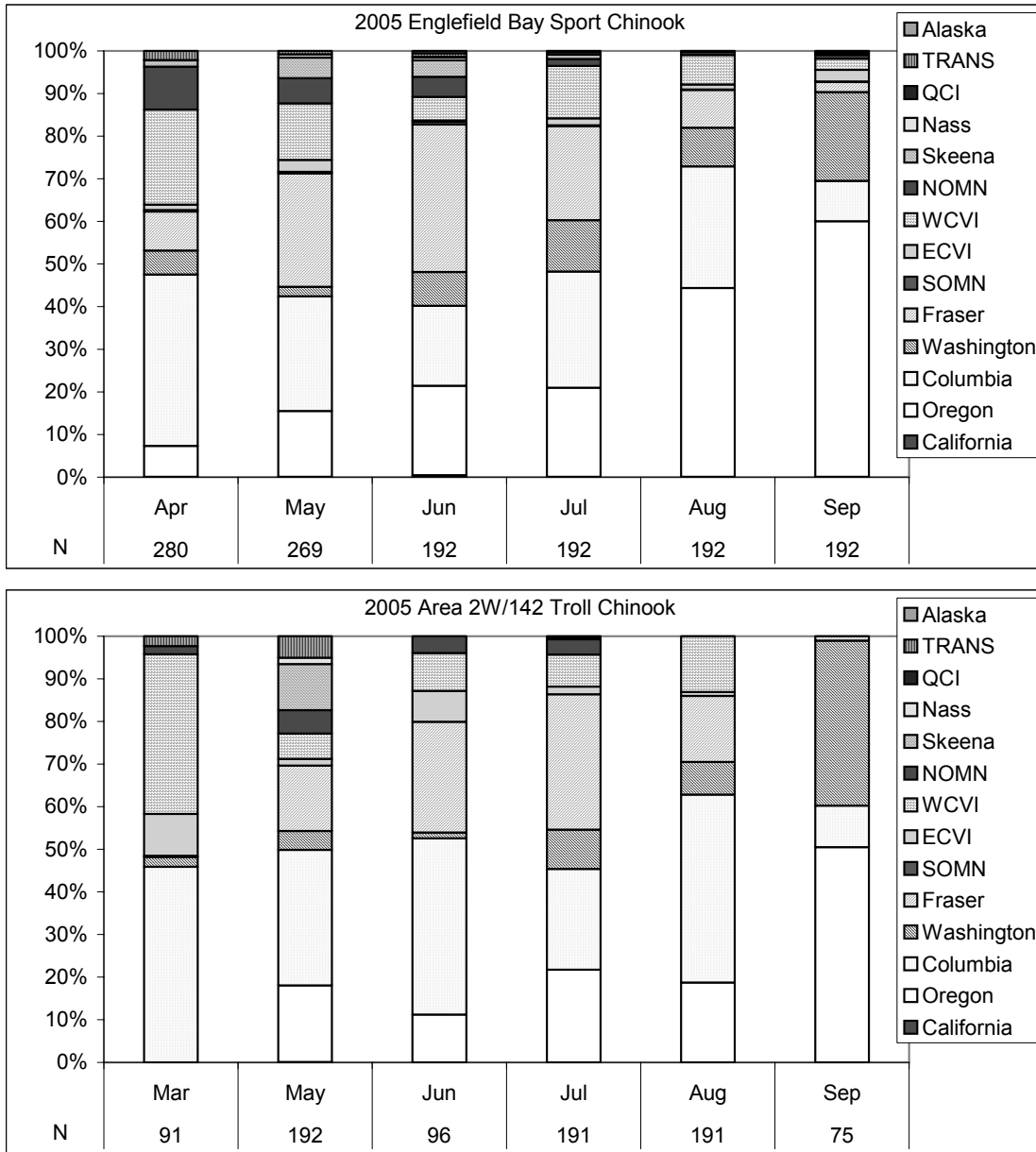
Appendix 12. Histograms comparing monthly stock compositions of 2004 Chinook salmon catch from sport and troll samples in Area 2W/142.



Appendix 13. Histograms comparing monthly stock compositions of 2005 Chinook salmon catch from sport and troll samples in Area 1/101.



Appendix 14. Histograms comparing monthly stock compositions of 2005 Chinook salmon catch from sport and troll samples in Area 2W/142.



Note that the first 2005 Area 2W troll sample was collected in March and no sample was collected in April.