

Canadian Mark Recovery Program CWT Sampling, Coordination, Lab Operations and Reporting – Year 1

October, 2016

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Prepared for:

Pacific Salmon Commission

Under the collaborative agreements:

**Canadian Mark Recovery Program CWT Sampling and Coordination
Canadian Mark Recovery Program CWT Dissection and Reporting**

Glossary

All terms that are specific to PSC management are indicated as (PSC)

AABM	Aggregate Abundance Based Management (PSC)
CoTC	Coho Technical Committee (PSC)
CC	Central Coast – portion of NC (Areas 6-10)
CGSB	Canadian General Standards Board
CTC	Chinook Technical Committee (PSC)
CWT	Coded Wire Tag
CWTIP	CWT Improvement Program (PSC)
CWTIT	Joint CWT Implementation Team (PSC)
DFO / The Department	Department of Fisheries and Oceans Canada
DIT	Double Index Tagging
DSWG	Technical Committee Data Sharing – Data Standards Working Group (PSC)
ISBM	Individual Stock Based Management (PSC)
ETD	Electronic tag detection
FSC	First Nations Food Social and Ceremonial fisheries
FOS	DFO Fisheries Operations Database
MRP	Mark Recovery Program
MRPIS	DFO Mark Recovery Program Information System
MM	Mass Marking
MSF	Mark Selective Fishing
MOU	PST Memorandum of Understanding (PSC)
NBC	Northern British Columbia
NC	North Coast – portion of NBC including Areas 1-5
PFMA	Pacific Fishery Management Area
PSC	Pacific Salmon Commission
PSMFC	Pacific States Marine Fisheries Commission
PST	Pacific Salmon Treaty (PSC)
RMIS	PSMFC CWT database – Regional Mark Information System
SBC	Southern British Columbia
TCDS	Technical Committee on Data Sharing (PSC)
TR18	PSC Technical Report 18 – Report of the Expert Panel on the Future of the CWT Program (PSC)
TR25	PSC Technical Report 25 – An Action Plan in Response to CWT Expert Panel Recommendations (PSC)
TR33	PSC Technical Report 33 – 5-year Synthesis Report of the CWTIP (PSC)
WCVI	West Coast Vancouver Island

Table of Contents

<i>Glossary</i>	2
<i>List of Tables</i>	4
<i>List of Figures</i>	4
1. <i>Introduction</i>	5
1.1 Background	5
1.2 Objectives	6
2. <i>Study Area</i>	7
3. <i>Methods</i>	7
3.1 Sampling Design and Procedures	7
3.2 Estimates of Total Catches and Sample Rates	13
3.3 Lab Operations.....	13
3.4 Data Collection, Management and Analysis	14
4. <i>Results</i>	15
4.1 Sampling Effort	15
4.2 Estimates of Total Catches.....	21
4.3 Sample Rates	24
4.4 Lab Operations.....	25
4.5 Data Collection, Management and Analysis	26
5. <i>Summary and Project Evaluation</i>	29
6. <i>Acknowledgements</i>	30
7. <i>References</i>	31
<i>Appendices</i>	34
Appendix 1. DFO Pacific Fishery Management Areas	34
Appendix 2. DFO Commercial Salmon License Areas.....	35
Appendix 3. 2015 and 2016 Statistical Week Calendars	37
Appendix 4. Chronological Commercial and First Nations Economic Fishery Openings by Gear, Period, and Species	38
Appendix 5. Mark Recovery Sample Form	39
Appendix 6 – Head Labels and Container Labels	40
Appendix 7 – Freezer Troll Bag Labels and Head Delivery Records	43
Appendix 8. Recreational Fisheries - Salmon Head Recovery Program Public Relations, Sampling Materials, and Procedures.....	44
Appendix 9 – Financial Statement	48

List of Tables

Table 1 - Pacific Salmon License Areas	7
Table 2 - 2015 Protocols for CWT Detection Method in Canadian Commercial and First Nations Economic Fisheries	10
Table 3 - Strata and corresponding Pacific Fishery Management Areas (PFMAs) by Fishery/Gear type.....	16
Table 4 - Number of Chinook sampled, CWTs recovered, and Mark Incidence by Sampling Location in BC Commercial Fisheries in BC 2015.....	17
Table 5 - Number of Sport Samples Collected by Area and Month in 2015	20
Table 6 - Comparison of 2014 and 2014 Percentage Sampling Rates and Catch in Canadian by Fisheries.....	24
Table 7 - Number of salmon heads dissected by category in 2013, 2014, and 2015.....	25
Table 8 - Number of 2015 commercial fishery sample records entered by month	26
Table 9 - Number of sport caught salmon heads receive by month from ngliers and guides in the 2015 calendar year	28
Table 10 - Summary of sport head recoveries submitted and processed in 2015 by species and capture year.	29

List of Figures

Figure 1 – The main components of the data exchange protocols between the Canadian and U.S. CWT database systems.....	15
Figure 2 - Salmon Head Recovery Depot Locations.....	19
Figure 3 - Recoveries by Pacific Fishery Management Area.....	19

1. Introduction

This report documents the results of the Canadian Mark Recovery Program(MRP) conducted in British Columbia from April 2015 to March 2016 to conduct a coded-wire tag (CWT) sampling and recovery program to implement Chapter 3 of the Pacific Salmon Treaty(PST) and to support domestic and international stock assessment and sustainable fisheries management.

In 2014, the Pacific Salmon Commission (PSC) recognized that management agencies in Canada and the U.S. preparing for the 2015-2018 fishing seasons were facing financial challenges in meeting obligations for stock assessment and data collection and would be unable to build existing PSC programs into their agency budgets. Fisheries and Oceans Canada (DFO) had faced increasing budget pressures since 2009 and alternative funding sources such as the CWT Improvement Program (CWTIP) were used increasingly to maintain catch monitoring, CWT sampling, the indicator stock program. Looking forward, anticipated cuts were expected to reduce the extent of fishery monitoring and indicator stocks to levels much less than those that led the PSC to convene the CWT Expert Panel in 2004. With the CWTIP ending in 2013 in Canada and in 2014 in the U.S., the PSC Joint Technical Committees, supported by the PSC, identified this project as a “very high priority chinook project” to address Chapter 3 data needs.

The Mark Recovery Program completed its forty-third year of operation in 2015. This is year one of a multi-year collaborative project to maintain the MRP to sample, dissect, read, and report statistically-reliable and timely CWT data from British Columbia (BC) fisheries, hatcheries and spawning grounds.

1.1 Background

The PST, signed by Canada and the United States in 1985, provides the framework through which the two countries work together to manage and conserve Pacific salmon. A high degree of bilateral cooperation is required to achieve harvest sharing agreements and to help ensure conservation.

Pacific salmon are highly migratory and, over the course of their lifecycle, fish originating in the rivers of one country are often subject to the fisheries of the other. With the development of comprehensive evaluations of science-based management regimes on interception fisheries and on the stocks which contribute to those fisheries under the PST, Canada and the U.S. considered it necessary to maintain a CWT tagging and recapture program designed to provide statistically reliable data (PST MOU 1985). Over the last 30 years, a high level of cooperation has occurred between Canada and the U.S. to develop coast wide standards for use of CWTs in tagging projects, for sampling fisheries, tag recovery, data collection and data exchange.

DFO relies on the CWT Program to provide stock and fishery specific information for chinook and coho salmon, to evaluate salmon enhancement activities, and to support domestic fisheries management (PSC Reports TCCOHO (13)-1, TCCHINOOK (15)-1, TCCHINOOK (15)-2). The Department also uses the data to determine stock status (Wild Salmon Policy), forecast stock

abundance, and monitor trends in regional survival patterns for ecosystem-based assessment to support domestic and international sustainable fisheries management.

Since the early 2000s, DFO and U.S. agencies have been challenged to maintain the CWT Program given declining resources, increasing fisheries management complexity including the introduction of mass marking (MM) and mark selective fisheries (MSFs).

- In 2004, as a result of growing concern over the statistical reliability of the CWT Program, the PSC convened an Expert Panel to review the CWT Program (PSC TR18)
- In 2008, a bilateral Working Group was formed to develop an Action Plan in response to the review. (PSC TR25)
- In 2009, the comprehensive renewal of Chapter 3 (Chinook) of the PST established a \$15,000,000 5-year CWT Improvement Fund to support the CWT Program. (PSC PST)
- In 2014, with the sun setting of the CWT Improvement Fund, the PSC Commissioners identified this project as a “very-high-priority” project in response to bilateral concerns over the maintenance of CWT Program improvements that were achieved. (PSC TR32)

1.2 Objectives

The specific objectives of this project were:

- 1) Develop 2015 Statement of Work and negotiate contract for MRP contractual activities, by March 31, 2015
- 2) Complete CWT sampling at sufficient levels (weighted average of 20%) and data entry of commercial, recreational and First Nations fisheries by January 15, 2016.
- 3) Complete CWT lab and data entry activities for commercial, recreational and First Nations fisheries, and escapement data by January 15, 2016.
- 4) Complete integration of data sources and computer analyses associated with the calculation of stratified CWT estimates by Jan
- 5) 31, 2016.
- 6) Publish data to Pacific States Marine Fisheries Commission (PSMFC) for validation and upload into the U.S. Regional Mark Information System (RMIS) to meet PST data sharing commitments and make data widely available to the PSC Chinook Technical Committee for analysis by Feb 15, 2016
- 7) Complete final project report to PSC for project activities and budget expenditures by Feb 29, 2016.

1.2.1 Modifications to Objectives

- 2) Complete CWT sampling and data entry of British Columbia commercial, recreational and First Nations sales fisheries by January 15, 2016.

This objective was not fully stated. Sampling of Yukon, First Nations Food, Social and Ceremonial (FSC) fisheries, First Nations Demonstration fisheries, and Test fisheries was not within the scope of this project as these activities are the responsibility of DFO Area-Based personnel; However, sampling supplies are provided by the Mark Recovery Unit for consistency in program delivery.

- 5) Complete final project report to PSC for project activities and budget expenditures by November 20, 2016.

For the first year of the project, it was recognized that the schedule for the final report was over-optimistic and was modified to provide a more reasonable time line to balance the workload to provide a meaningful synthesis of results, with the workload within the Mark Recovery Unit to meet PSC commitments, DFO financial year-end obligations, and pre-season and in-season project activities for year 2 of the project.

2. Study Area

The study area was the province of British Columbia, Canada. The North Coast Area (NBC) includes tidal waters stretching from the Alaskan boundary in the north to Cape Caution in the south and incorporates the non-tidal waters that flow into this area. This includes Pacific Fishery Management Areas (PFMAs) 1 to 10 and offshore waters as well as adjacent freshwater watersheds. The South Coast Area (SBC) includes tidal waters stretching Cape Caution in the north to the Washington boundary in the south and incorporates the non-tidal waters that flow into this area. This includes PFMAs 11-29 and offshore waters as well as adjacent freshwater watersheds. Commercial fisheries are also described by License Area as described in Table 1.

Pacific Salmon License Area	Gear	Corresponding Pacific Fisheries Management Areas (PFMA)
Salmon Area A	Seine	Areas 1 to 10, Subarea 101-7
Salmon Area B	Seine	Areas 11 to 29 and 121
Salmon Area C	Gill net	Areas 1 to 10, Subarea 101-7
Salmon Area D	Gill net	Areas 11 to 15 and 23 – 27
Salmon Area E	Gill net	Areas 16 to 22, 28, 29 and 121
Salmon Area F	Troll	Areas 1 to 10, 101 to 110, 130 and 142
Salmon Area G	Troll	Areas 11, 20 to 28, 111, 121, 123 to 127 and Subareas 12-5 and 12-6
Salmon Area H	Troll	Areas 12 to 19, 28 and 29

Table 1 - Pacific Salmon License Areas

Maps of DFO Commercial Salmon License Areas (Areas A-F) and Pacific Fishery Management Areas (Areas) are provided in Appendices 1 and 2.

3. Methods

3.1 Sampling Design and Procedures

The DFO Mark Recovery Unit conducted this project from April 2015 – Mar 2016. In addition to commercial, First Nations economic, and recreational fisheries sampling conducted under this project, area-based DFO personnel were engaged in CWT sampling in Test Fisheries, with First Nations Food, Social and Ceremonial (FSC) fisheries, and escapement sampling.

Because fisheries sampling is required throughout year in remote geographic areas and priorities can change quickly to respond to fishery dynamics, often on short notice, DFO conducted this project using a contracted service provider. The service provider, J.O. Thomas and Associates, was selected through a Public Works and Service Canada open competition, was listed with the Canadian General Standards Board (CGSB 2015b), met ISO 9001 quality management standards (CGSB 2015e), and was designated by Fisheries and Oceans Canada as a certified provider of dockside monitoring services.

A bi-laterally accepted sample target of 20% has been established to provide an adequate number of CWT recoveries to meet statistical criteria to estimate fishery and stock parameters (PSC TR25). In 2015, sampling for CWTs was designed to sample 20% of the catch for all Canadian fisheries which allowed legal retention of chinook or coho in BC waters in which salmon with CWT indicator stocks would be intercepted. BC fisheries were CWT sampled using a stratified sampling design by dividing the fisheries into non-overlapping subpopulations by fishery geographic regions (catch regions) and period fished (weeks, months) that are similar in the stock composition of the population present. Under this assumption, estimates of the number of tagged fish harvested in the strata are unbiased for each tag code (TR 25 2008).

Sample design and methods for Canadian CWT programs varied across fishery types as a result of different DFO catch monitoring programs and different conduct of the fisheries. The definition of the spatial-gear-time strata for sampling was determined by the conduct of the fisheries and the associated DFO catch monitoring program.

3.1.1 Commercial and First Nations Economic Fisheries

For all commercial and First Nations economic fisheries, representative samples were taken at fishery landing stations or processing sites, aligning to the fishery temporal and spatial dynamics with a target sample of 20% of the total landed catch in the fishery within each gear type (troll, seine, and gillnet), Pacific Fishery Management Area and statistical week (beginning Sunday). The sample unit was the entire catch of a selected vessel to reduce the risk of bias by sampling partial offloads. Pacific Fishery Management Areas and statistical week calendars are provided in Appendix 2 and 3. See Appendix 4 for a listing of sampled commercial fishery openings.

Southern B.C. area 29 (Fraser River) fisheries, primarily targeting chum during fall fisheries, had a sample target of 30% to increase the likelihood to acquire tags from Fraser River indicator stocks.

Historic fishery catch and effort by area, day, and week was modelled and used as a tool to develop sample plans and set weekly sample or daily quotas to adjust for in-season fishery dynamics. Sample opportunities were identified using fishery notices, daily phone-ins, electronic catch and offload reports from vessels, and direct contact with DFO fishery managers and primary buyers to confirm times and locations for sample events. In some fisheries, conditions of license provided designated offload locations.

Samplers were deployed to primary offload sites but occasionally operate in secondary processors in Nanaimo or Vancouver for cost effective program delivery in net fisheries. At primary offload sites, the sample unit is the catch of an entire vessel to reduce the risk of bias by sampling partial offloads. At secondary processors, if the catch from individual vessels has been mixed, the sample unit is the truck.

Access to fish in commercial and First Nations economic fisheries is ensured by the Fishery (General) Regulations (DFO 1993) which state:

- When requested, the master or owner of fishing vessels and the owner or any person who has the care, charge or control of a fish landing station must permit access to the catch and provide CWT samplers with assistance that is reasonably necessary to enable them to perform their duties according to DFO-approved sampling protocols including:
- (i) Making the fish readily accessible to the CWT samplers,
 - (ii) Providing samplers with a suitable work area, and
 - (iii) Permitting CWT samplers to remove the head from the fish free of charge.

For commercial landings selected for CWT sampling, the sampling event included a vessel operator interview designed to collect vessel identification information, fishing period, and fishing location. Samplers counted and sampled all of the landed fish, and collected all heads with tags following DFO protocols for visual sampling or full electronic sampling. Heads of CWT-tagged fish were recovered, labelled with durable bar-coded and numbered waterproof tags. Each tag recovery was measure for length. All data associated the landing and head recoveries were recorded on uniquely numbered waterproof Mark Recovery Sample Forms which were delivered to the Project office within one week of field sampling. Samples were packaged and labelled with waterproof container labels and shipped or delivered to the CWT Head Lab for processing within one week of field sampling. Mark Recovery Sample forms and Commercial head labels and container labels can be found in Appendix 5 and 6.

Detection Method

In all commercial and First Nations economic fisheries, the method for CWT detection is dependent upon the presence of mass marked or double index tagged fish in the fishery. A requirement for all sampling was that each fish in a sample was inspected and that all heads identified as potentially containing a CWT are collected for lab processing.

Visual sampling requires a fish to be inspected for a missing adipose fin to indicate that there is a CWT. Electronic sampling requires all fish in the sample to be inspected, regardless of adipose clip status, with electronic tag detection (ETD) by passing the fish through a tube detector or using a handheld wand. Visual sampling is the cost effective method to CWT sample for fisheries which do not encounter mass-marked Chinook or Coho because the adipose-clip is a cue to recognize that a fish contains a CWT. Full electronic sampling is required in all fisheries that encounter large proportions of mass-marked (MM) Chinook or Coho and intercept doubled index tag (DIT) stocks to ensure all tags in the sample are acquired because there is no visual cue

to indicate a fish contains a tag. Visual sampling combined with electronic screening is effective in reducing the effort to sample, the impact on the harvester or buyer, and the cost to ship heads in fisheries that encounter large proportions mass-marked Chinook or Coho but do not encounter DIT stocks. Detection methods by geographic fishing area are provided in Table 2.

	Chinook		
	MM fish present	DIT fish present	Detection Method
NC & SC marine mixed stock fisheries	Y	Y	E
NC & SC inshore terminal fisheries	N	N	V
WCVI marine mixed stock fisheries	Y	Y	E
WCVI inshore terminal fisheries (Areas 21, 24-27 Nitinat, Clayquot Sound, Nootka/Esperanza, Kyuquot Sound, Quatsino)	N	N	V
WCVI inshore and terminal Robertson Creek fisheries (Area 23 Barkley Sound and Alberni Inlet)	N	N	V
SC Inside Areas (Johnstone Strait, Strait of Georgia), Juan de Fuca Strait)	Y	Y	E
Fraser River terminal fisheries	N	N	V

Table 2 - 2015 Protocols for CWT Detection Method in Canadian Commercial and First Nations Economic Fisheries

Custom sampling infrastructure such as sorting tables, stands and receiving tables that can accommodate electronic tube detectors have been integrated into many fish offload sites or processing operations to facilitate positive relationships with industry to minimize disruption to the industry's offloading and grading processes.

Freezer Trollers

To ensure freezer troll caught heads are available to sample, the Department has established a condition of license for all troll vessels that remove heads at sea prior to freezing to retain and land heads with their catch. With this condition of license, the legal mechanism to select a random sample of vessels to retain heads can be put in place through a fishery notice that exempts randomly selected vessels from the condition of license (thus designating the remainder to keep heads).

For the Northern BC Area F troll fishery, 70% of the fleet was exempted from the condition of license (30% sample target). This higher sample target was established in recognition that that historically, the compliance rate to provide samples that meet MRP quality assurance standards has been about 70%, resulting in an adjusted post-compliance sample target of 21%.

Recognizing that vessels may have space limitations for retaining heads, the Department allowed the alternative of retaining only the portion of the head likely to contain the CWT, referred to as the 'snout' and provided instructions that, at a minimum, the portion of each head retained must include the upper portion of the head extending from the tip of the snout to a cut travelling from the top of the head, passing 1 centimeter behind the eye, and ending at the back corner of the mouth.

The 2015 conditions of license required the following protocols for head storage:

- Heads must be stored in DFO-supplied heavy weight Salmon Head Recovery Program.

- Heads must be kept frozen until delivery and each bag must contain only the heads from a single week of fishing (where weeks run from Sunday to Saturday).
- All bags must be labelled completely with DFO-supplied Freezer Troll Bag labels and securely closed.
- The vessel master shall ensure that all bags containing heads are offloaded at the first designated fish landing station at which chinook or coho catch is offloaded.

All freezer heads that were landed were sampled electronically to acquire CWTs. Essential sample information included the recording of compliance data to support enforcement using Freezer Troll Delivery Record and Mark Recovery Sample forms, to support tracking and adjudication, to collect data to ensure that samples meet DFO standards for quantity (> 95% heads landed vs. # bodies landed) and quality (> 80% heads landed frozen with correct head cut > 1 cm behind eye), and to provide sample resolution at the individual bag level. All data associated the landing, the sampling of bags, and tag recoveries were delivered to the Project office within one week of field sampling. Freezer Troll Bag Labels and Freezer Troll Delivery Records can be found in Appendix 7.

T'aaq-wiihak and Kamloops Lake Demonstration Economic Fisheries

CWT sampling for First Nations demonstration fisheries was not within the scope of this project, while sampling supplies are provided by the Mark Recovery Unit for consistency in program delivery.

In 2015, the Kamloops Lake Demonstration fishery had a higher requirement for catch monitoring by the Department, which included CWT sampling of 100% of the catch.

In 2015, the WCVI T'aaq-wiihak fishery had the same target sample rate and sampling methods, using the same contracted service provider, as all other commercial and economic fisheries. While the procedures were the same, with Mark Recovery Unit personnel involved in training and audits for quality assurance/quality control.

3.1.2 Test Fisheries

CWT sampling for Test fisheries is not within the scope of this project, while sampling supplies are provided by the Mark Recovery Unit for consistency in program delivery.

In 2015, DFO and PSC fisheries were required to sample 100% of their catch visually. CWT sampling protocols and MRP Research Head Labels were provided to DFO area-based project leads, who were responsible for CWT sampling, attaching barcoded waterproof labels to head recoveries, labelling boxes or containers of samples with MRP Container labels, shipping or delivering the containers to the DFO Head and data entry of research sample data into the DFO Fisheries system. Research head labels can be found in Appendix 6.

3.1.3 Recreational Fisheries

For all recreational fisheries, samples are provided to DFO through fisher submissions to Salmon Head Recovery Depots throughout BC. The target sample rate is 20% of the estimated marked catch in the fishery within each catch region and month. Because of the reliance on fisher-provided samples, sample rates are also known as submission rates in recreational fisheries. It is cost-prohibitive to acquire the 20% sample target through direct sampling of recreational fisheries due to the wide distribution of the fishery throughout the year and throughout BC.

For all recreational fisheries, the sampling method involved public relations and promotion of the sampling requirements to *support future fisheries*. Samples were acquired by requesting marinas, tackle stores, fishing lodges, and hatcheries to sign-up as Salmon Head Recovery Head Depots and by requesting anglers, guides or lodges to use visual sampling protocols to identify samples, label heads with DFO-supplied water-proof labels, and submit the head to a network of Salmon Head Depots.

More than 250 Salmon Head Depots were located throughout BC, and Salmon Head Depot operators provided sampling supplies to anglers and stored the samples in freezers or buckets containing a brine solution to preserve them. Scheduled servicing and maintenance of Salmon Head Depots was performed by J.O. Thomas and Associated under contract or by area-based DFO personnel. All samples picked up from depots were labelled in batches with barcoded DFO container labels to associate the samples to the service event.

Maintaining positive public relations is essential in this sampling regime so the Department maintained a toll-free line for inquiries or issues, maintained detailed records of servicing, provided feedback to Depots regarding servicing events via a Depot Service Log and Postcard, and provided letters with CWT results to anglers, guides, and depots at regular intervals through the season.

Recreational Head Labels and Container Labels can be found in Appendix 6. Additional Salmon Head Recovery Program public relations and sampling materials are provided in Appendix 8.

3.1.4 First Nations Food Social and Ceremonial (FSC) and Treaty Fisheries

CWT sampling methods varied in these fisheries due to the variation in area-based delivery of catch monitoring programs in FSC and Treaty fisheries and regional differences in priorities for CWT sampling.

Collaboration with First Nations fisheries managers and communities is essential to access samples. In some FSC fisheries, CWT sampling was integrated into the catch monitoring program and samples were acquired by First Nations monitors as fish were landed. In other fisheries, samples were acquired as they are for recreational fisheries by requesting aboriginal harvester to use visual sampling protocols to identify samples, label heads with DFO-supplied water-proof labels, and submit the head to a fishery monitor, guardian, or to a Salmon Head Depot.

As in all other fisheries, each head sample was labelled with a barcoded waterproof label and all samples were shipped or delivered to the DFO head lab with barcoded waterproof container labels to associate the samples to the service event.

FSC Head Labels can be found in Appendix 6. CWT sampling for these fisheries is not within the scope of this project, while sampling supplies are provided by the Mark Recovery Unit for consistency in program delivery.

3.2 Estimates of Total Catches and Sample Rates

In order to estimate the total number of tagged fish in harvest, the sampled tags are expanded for the fraction sampled by strata (area, gear, and period). The sample fraction is the number sampled over the total available for sample, i.e., the total catch. Catch data for each chinook and coho fishery was collected and assembled by DFO resource managers and stock assessment programs from a variety of sources such as logbooks (paper and electronic), fishery phone-in hails, harvester/creel surveys, aerial or on-water gear counts, on-board observers, dockside monitoring/validation tallies, individual quota fishery reports, landing slips, and buyer fish slips. The extent and intensity of the monitoring requirements varied significantly with the fishery's size and location, particular management risks and information challenges, and other factors. (DFO 2012).

While the form of catch monitoring may vary across fisheries, all DFO catch monitoring programs collected data to support an estimate of the total pieces of chinook or coho caught in the fishery by Pacific Fishery Management Area. DFO Recreational and First Nations FSC catch monitoring programs had the additional objective to estimate the mark rate for adipose clipped chinook and coho harvested by Pacific Fishery Management Area.

3.3 Lab Operations

All fish head samples collected in fisheries and DFO escapement sampling programs were processed to recover and decode CWTs at the DFO-contracted J.O.Thomas and Associates CWT dissection lab in Vancouver. This process involved the management of all samples received and the dissection, reading (decoding) the tag using microscopes electronically equipped with LCD screens, transcribing the tag information to appropriate forms, and data entry.

Dissection required the use of a specialized electronic metal detector that indicates which portion of the snout the CWT is in after successive sectioning of the sample. If no tag was found, the sample was passed through a magnetic field to re-magnetize the tag (if present).

Tag dissection schedules were structured to process sport and commercial recoveries within six weeks of receipt. Commercial recoveries were processed by sampling location and by statistical week, while sport recoveries were processed by area and month of recovery. Escapement heads were processed on the basis of priorities established by DFO stock assessment and hatchery personnel to ensure completion of milestones for analysis by January and February.

The lab maintained quality control checks on the reading of CWTs to ensure that tags were accurately read and data entered. To check the accuracy of tag reading, each tag was initially read by a technician and the read a second time by a different technician to verify the first reading. Several error checks were run, including verification that the tagcode is legitimate (ie, was previously released) and that the species is correct and the age is reasonable.

3.4 Data Collection, Management and Analysis

All personnel responsible for sampling received training in the purpose and methods for the surveys and were supervised by experienced staff for quality control/quality assurance. Standard forms and data collection processes were developed to optimize field data collection, and all forms were manually reviewed by field chiefs and office staff to ensure that obviously erroneous data were corrected. For commercial and First Nations economic fishery sampling, the Mark Recovery Sample Forms were designed to record incomplete or problem samples as an addition quality control measure. All samples were managed with barcoded container labels and head labels.

Data forms were delivered from all programs within a week of sampling, where they were sorted by data prior to data entry. Custom J.O. Thomas and Associates data entry applications were used throughout the season to input and validate field data. DFO audit procedures of field work and data entry were performed for early checking of the quality of the data collection process.

Data was uploaded and validated by the MRP Information System (MRPIS) at regular intervals and further validated against an extensive set of checks to verify the integrity and accuracy of the data. The rules are specified in the PSC Data Standards Workgroup (DSWG) database specification report (PSC-DSWG 2014).

Data Analysis was conducted using the MRPIS system to integrate sample data with lab data and post-season catch estimates from January – Feb 2016. Kuhn et al. (1988) summarize formulae utilized by the MRPIS to calculate CWT tag estimates, stratified by gear, geographic area and time. All samples from direct sampling programs in commercial, test and First Nations economic fisheries were expanded to the estimated total catch in the fisheries. Samples mark catch from submission sampling programs were expanded to the estimated total of marked catch in the fisheries.

Upon completion of the CWT estimation process, CWT data was available to users directly from the MRPIS. Upon completion of the data exchange with the PSMFC, validated datasets of summary Canadian CWT recoveries, catch and samples are available to U.S. users through RMIS. Likewise, U.S. CWT recoveries, catch and samples provided by the PSMFC is imported into the MRPIS. The data flow process for the MRPIS and RMIS are documented in Figure 2 (PSC TR25).

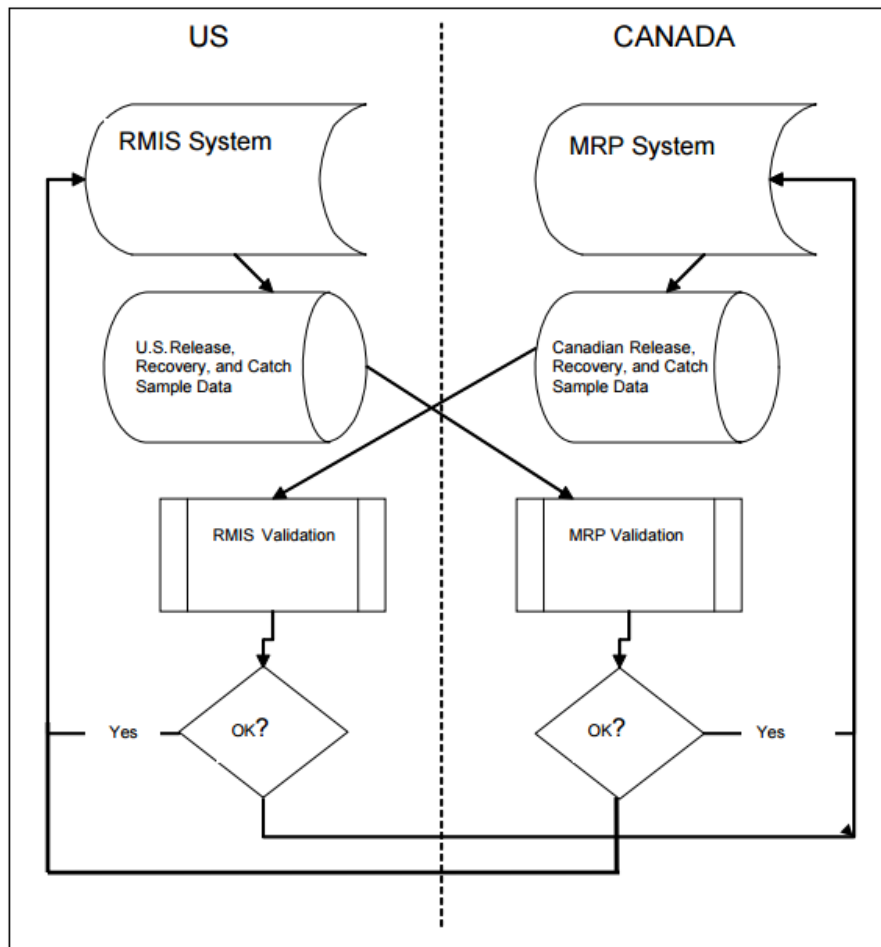


Figure 1 – The main components of the data exchange protocols between the Canadian and U.S. CWT database systems

4. Results

4.1 Sampling Effort

4.1.1 *Commercial and First Nations Economic Fisheries*

All BC commercial and First Nations salmon fisheries with retention of Chinook or Coho as target species or by-catch were sampled consistently over the entire season. See Appendix 4 for a list of sampled commercial fishery openings in 2015.

Commercial catches are landed and processed at a wide variety of locations, landing sites, and processing plants. The extremely complex mixture of net and troll fisheries which occur simultaneously for salmon, the large number of processors involved at different locations, and the differing processing and grading systems used by these processors all combined to make the task of obtaining representative samples from each statistical area for each type of gear a very difficult undertaking. A further complication is the requirement for electronic detection sampling, and the availability of physical space. Allocation of resources to meet sampling

requirements was accomplished by a dynamic “Coordinated Location Sampling Strategy.” This method relies on the experience of several key management personnel as well as senior staff coordinating schedules in each of the field sample locations to achieve necessary sample quotas. Project managers allocate sampling effort based on past and present experience of fishery dynamics and in-season reports from DFO to predict probable vessel landing locations and known processors where fish would be landed. Sampling crews kept in constant contact with project managers to ensure that sampling quotas were being met and to coordinate sampling effort between different locations. This system ensured coastwide, representative catch and biological sampling by MRP crews in an efficient and cost-effective manner.

Net and troll fisheries present different problems in estimating catches and therefore required different catch assessment procedures. Net fisheries operate in a more restrictive spatial and temporal profile from those of troll fisheries. The primary process to establish quotas is to first acquire information on the fleet size by gear, and second, determine the catch of the target species. Most net fisheries target on more abundant species like sockeye, pink or chum salmon. For gillnet fisheries, sample quotas are set on sampling a prescribed number of boat deliveries, as well as a number and weight of the target species catch. Seine fisheries are generally sampled to a specified number of vessel landings. Sampling levels are established to acquire 20% of troll and net vessel deliveries and account for the unloading of approximately 20% of the target species catch, respectively by gear type. For troll fisheries, quotas and sample rates are generally calculated and monitored by evaluating weekly and accumulated boat days sampled.

Geographic strata used in the MRP divides the British Columbia coast into 14 net and six troll fishery specific strata (Table 3). Each stratum may contain one or more Pacific Fishery Management Areas (PFMAs).

Fishery/Gear	Fishery Strata	PFMAs
Commercial/Troll	Northern Troll	1 to 5,101 to 105,2W,142
	North Central Troll	6,106,7,107,8,108,9,109
	South Central Troll	10,110,11,111,12
	Georgia Strait Troll	13 to 18, 29
	Southwest Vancouver Is Troll	21,121,23,123,24,124
	Northwest Vancouver Is Troll	25,125,26,126,27,127
Commercial Net, First Nations Economic & Test Fisheries	Northern Net	1 to 5,101 to 105,2W,142
	Central Net (excluding PFMA 8 terminal)	6,106,7,107,9,109,10,110
	Central Net Terminal PFMA 8, 108	8,108
	Johnstone Strait Net	11,12,13
	Georgia Strait Net	14 to 18
	Juan de Fuca Net	20
	Northwest Vancouver Is Net	25 to 27
	Fraser Seine	29-3,29-4,29-6
	Fraser Gillnet & Test Fisheries	29
	Skeena Test Fishery	4
	South Taaq-wihak Economic Fishery	23,123,24,124
	North Taaq-wihak EO Fishery	25,125,26,126
	SW Vancouver Is Net excl. Alberni Inlet	21, 24
	Alberni Inlet Gillnet + Tsu-mass Economic Fishery	23

Table 3 - Strata and corresponding Pacific Fishery Management Areas (PFMAs) by Fishery/Gear type

Commercial sampling effort was distributed throughout BC at 3 ports and 7 landing sites in Northern BC and at 9 ports and 16 landing sites in Southern BC. Distribution of sampling effort closely followed fishing effort during the season. In NBC fisheries, the sampling period extended from June to September, while in SBC fisheries, the sampling period was year round.

The MRP program sampled 68,813 commercially caught for CWTs in 2015. In 2015, 67% in NBC and 4% in SBC froze Chinook catch at sea. The majority (58%) of commercial landings of chinook were sampled in North Coast locations in 2015. Port Edward, Masset, and Prince Rupert sampled 34%, 23%, and 1% of all samples, respectively. The remaining 42% of samples were obtained in Ucluelet/Tofino/Nanaimo/French Creek (16%), Vancouver/Richmond/Delta (13.5%), and Coal Harbour/Port Hardy/Zeballos (12.5%).

A total of 3,568 CWTs were detected and recovered from chinook and coho from random commercial fishery samples in 2015.

The distribution of samples and CWT recoveries for chinook and coho by fishery is provided in Table 4. The vast majority of chinook samples (91%) and CWT recoveries (90%) originated from troll fisheries in 2015. Random samples in net fisheries represented 9% of all samples and 10% of the CWT recoveries.

Location	Number sampled	Number of CWT recoveries	Percent mark incidence
Port Edward	23,722	953	4.0
Masset	15,911	526	3.3
Vancouver	7,717	286	3.7
Coal Harbour	3,987	302	7.6
Zeballos	3,644	175	4.8
Ucluelet	3,426	365	10.7
Nanaimo	3,161	336	10.6
Tofino	2,928	239	8.2
Richmond	1,587	226	14.2
French Creek	1,450	93	6.4
Port Hardy	827	64	7.7
Prince Rupert	451	3	0.7
Delta	2	0	0
Total	68,813	3,568	5.2

Table 4 - Number of Chinook sampled, CWTs recovered, and Mark Incidence by Sampling Location in BC Commercial Fisheries in BC 2015

Freezer Trollers

When fish were landed to port, sample crews were required to intercept the offloads of all designated freezer trollers to maximize the recovery of heads retained. Vigilant communication with processors who receive troll deliveries was also required in order to intercept and sample all the freezer troll vessels designated for head retention. This process was aided during the

Area F chinook ITQ fishery because, under a separate individual quota management contract with harvesters, fishers are required to hail in to a JO Thomas toll-free phone number before delivering their fish to a port processor.

Freezer troll offloads were also visually sampled for the presence of adipose fin-clipped fish in addition to the electronic sampling of any heads that were retained by the vessel to obtain mark rates. If a freezer vessel retained all of the heads, the offload was to obtain the total number of fin-clips in the sample; however, the fin-clip status for each head that contained a CWT was unknown as it is impossible to determine which “body” the head originated from. Occasionally, a less desirable situation occurred when the vessel selectively retained the heads of only adipose fin-clipped fish. This resulted in a non-random sample that could not be utilized for analysis.

MRP sampling involved visual identification and counting of all mixed chinook and coho bodies delivered by a vessel. All bagged freezer heads were sampled for CWTs by the MRP crew by thawing out the heads and putting them through the R9500 detector, segregated by bag data where provided. The corresponding heads from that vessel were also counted by species and adjudicated for “cut quality” – basically a tally of good (head cuts that met DFO criteria) and bad (head cuts that did not meet DFO criteria) was made. The data comparing the number of chinook/coho heads to the number of chinook/coho bodies delivered and the percent of good and bad head cuts are key to the determination of an acceptable quality sample or not. Good quality samples that had greater than 95% of heads retained and good quality head criteria resulted in the sample being defined as “Random”. Samples of less than 95% of heads retained and an unacceptable proportion (>20% bad head cuts) rendered a non-compliant sample, and was designated as a “Select” sample

4.1.2 Recreational Fisheries

Recreational sampling effort occurred primarily from May –September. Sport anglers provided head samples of adipose fin-clipped salmon to 259 Sport Head Recovery Program’s Salmon Head Recover Depots located throughout the province at marinas, resorts, tackle shops, DFO offices, or DFO Hatcheries.

Depots were provided with an information package at the beginning of the season which contained head labels and promotional materials. They were also provided a letter summarizing the origins of all the heads that were returned to them in the previous year. In many sport fishing locations, chest freezers and associated infrastructure (freezer and bucket enclosures, sign boards, and posters) were supplied by DFO and distributed and maintained by the contractor.

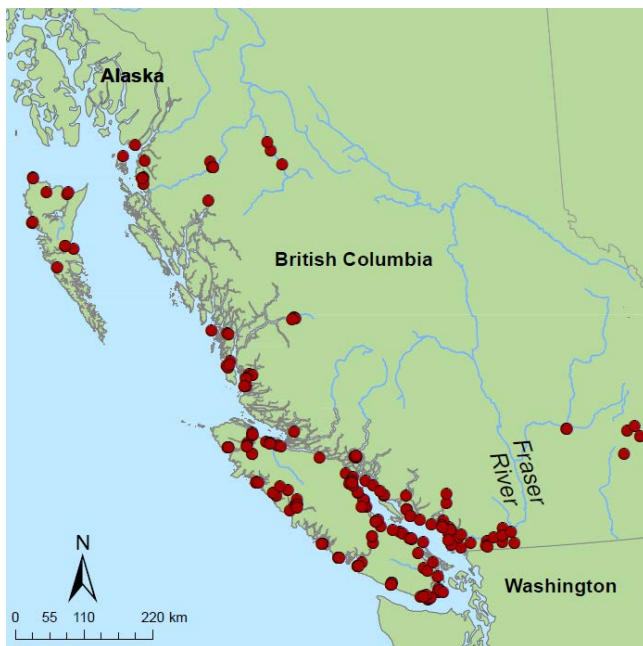


Figure 2 - Salmon Head Recovery Depot Locations

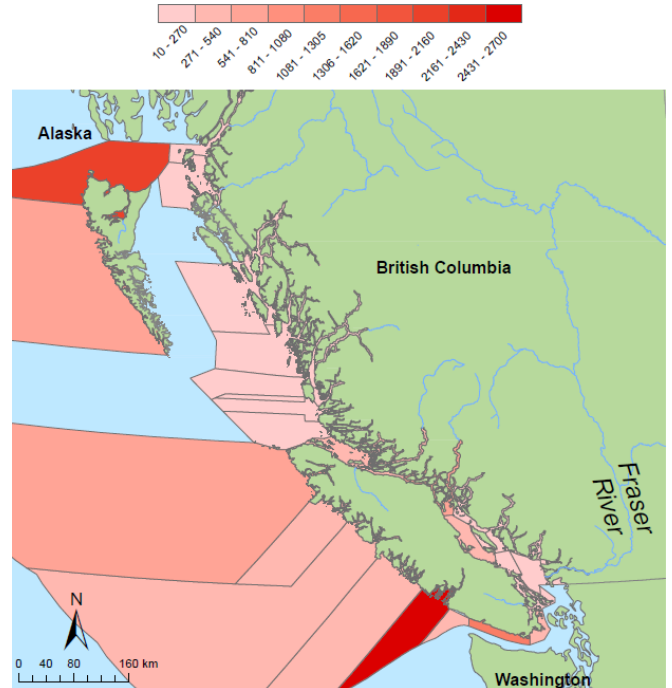


Figure 3 - Recoveries by Pacific Fishery Management Area

A total of 12,845 salmon head recoveries were submitted by sport anglers and collected through the MRP Sport Head Recovery Program (SHRP) in 2015. Of this total, 9,724 heads were from chinook and 3,060 were from coho. The remaining heads were comprised of six chum, six steelhead, and 49 that were pink, sockeye or unknown species. The total number of sport heads collected or submitted in 2015 was 18% fewer than the number of heads received in 2014 (15,594). A breakdown of the number of heads received by month and area is presented in Table 5.

The majority of heads originating from recreational fisheries were caught and submitted in the summer months from June to Sept (Figure 3.1) and originated from the west coast of Vancouver Island (Areas 23-27, 123-127), the Queen Charlotte Islands (Areas 1, 101, 2W, 142), and the Strait of Juan de Fuca (Areas 19, 20) sport fisheries.

The number of sport recoveries in 2015 is comparable to historic highs seen in the early 1990s (10,000+ recoveries annually). The number of heads submitted to the program dropped dramatically in the mid-1990s as a result of lowered overall abundance and the introduction of mass marking.

Statistical Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1				1	66	686	605	487	84				1,929
2W		1	1		3	78	179	291	13				566
3					17	41	50	31	3				142
4	8	3	1	4	16	104	80	23	4	3	4	2	252
5						3							3
6			2			5	31	11	1				50
7					1	27	38	18	1				85
8						9	38	20	3				70
9						74	100	32	1				207
10							1	9					10
11		1				5	20	7					33
12					3	47	190	139	49				428
13	5	6		8	29	127	217	273	79	33	1	12	790
14	4	2		6	36	65	83	71	22	8	1		298
15		1		3	10	12	11	12			2		51
16		1		4	14	7	11	1				3	41
17	3	3	1	11	62	41	46	20	4	2		1	194
18	3	5	5	10	7	4	1	6	3				44
19	48	42	51	28	77	88	76	39	28	20	7	17	521
20	33	27	15	29	86	178	245	349	258	49	2	12	1,283
21					1	17	4	6	2				30
121						65	178	95	6				344
23	5	23	17	26	27	49	88	233	100				568
123					35	210	853	1138	15				2,251
24	1				4	12	30	8	2				57
124				8	19	102	332	300	13	4		1	779
25		1			5	19	80	32	3				140
125						75	93	49					217
26						19	15	5	1				40
126						39	141	292	1				473
27		2	3	10	17	51	91	89	18				281
127			2			7	12	13	3				37
28	1	2	2		5	6	21	6	13	16	5	3	80
29	5	6		4	13	6	4	23	13	26	20		120
FW		1						3	43	269	113	1	430
ALASKA								1					1
Total	116	127	100	152	553	2,278	3,964	4,132	786	430	155	52	12,845

Table 5 - Number of Sport Samples Collected by Area and Month in 2015

Dedicated contractor MRP sport samplers picked up heads from and serviced all depots with supplies along the Strait of Georgia, west coast Vancouver Island, and the Fraser Valley and maintained visitation and service records. Depots in the North and Central coast and Interior BC were maintained and serviced by contracted field staff in Prince Rupert and Masset. DFO Fishery Officers or representatives from regional DFO offices also received head submissions and shipped them to the DFO-contracted head lab. For remote locations and lodges in Areas 12, 13 in Johnstone Strait, and Areas 26, 126 and 25, 125, 27 and 127 in Northern West Coast Vancouver Island, Salmon Head Recovery Depots were serviced with support from DFO offices in

Campbell River and Port Hardy. The contracted sport sampler arranged pick up of heads from these fisheries through staging depots in Port Hardy for Areas 12, 13, 26, 126, 27, and 127 and Campbell River for Areas 12, 13, 25, and 125. Table 5 provides a total of Chinook and Coho heads submitted by the Sport Sector in 2015.

Fisher-provided samples may introduce bias in the CWT data. Anglers who return tags may not represent the fishing patterns of all anglers, resulting in some tag groups being overestimated and others underestimated. There is no recovery of unmarked tags (from double index tag (DIT) groups).

4.2 Estimates of Total Catches

Northern British Columbia (NBC) Fisheries

NBC Chinook Aggregate Abundance-Based Management (AABM)

The pre-season abundance index for NBC troll and Haida Gwaii recreational chinook fisheries in 2015 was 1.23, which permitted a total allowable catch of 160,400 chinook salmon in these fisheries. Catch estimates indicated a total catch of 158,302 chinook salmon; 106,702 caught in commercial troll fisheries and 51,600 in the Haida Gwaii recreational fishery (Queen Charlotte Islands Areas 1 and 2). In 2015, 67% of the fleet froze their catch at sea.

NBC Chinook Individual Stock-Based management (ISBM)

Fisheries included in this category are commercial net fisheries throughout north and central BC, First Nations FSC fisheries in both marine and freshwater areas, marine recreational fisheries along the mainland coast, and freshwater recreational.

The NBC troll fishery was opened for chinook fishing from June 18 to July 30 and from August 25 to September 30. Of the total 160,400 caught, over 80,000 pieces were landed in the first two weeks of the fishery while 24,015 were landed prior to July 30 and 2,683 were landed during the second opening. North Coast commercial gill net catches totalled 2,413 chinook from Areas 3 to 5 (from hailed catch data). Central Coast commercial gill net catches totalled 5,333 chinook with 5,328 from Area 8 and 23 from Area 7. A total of 787 chinook and jacks were caught in the Tyee Test fishery on the Skeena River. AABM recreational catch in Areas 1-2 were estimated at 51,600. Preliminary estimates for tidal recreational catches near the mainland coast of NBC in were 12,760 from a creel survey conducted in Areas 3 and 4 in 2015. Approximately 11,930 chinook were retained at lodges operating in Smiths Inlet, Rivers Inlet, Hakai Pass and Bella Bella in areas 6-9 of the central coast in 2015. In the North Coast, Haida catches on Haida Gwaii were estimated at 2,530 chinook, Nisga'a and Gitanyow catches from the Nass River were 8,503 chinook and catches by First Nations fisheries in the Skeena River were estimated at 6,491 chinook. Catches by First Nations in the tidal portion of the Central Coast were reported as 180 chinook. The non-tidal catches included 2,598 Atnarko River chinook (Area 8) from May – September and 2 chinook from Rivers Inlet (Area 9).

Southern British Columbia Fisheries

For the 2014/2015 chinook year (October 2014 to September 2015), fisheries were shaped by conservation concerns for the following domestic stocks: natural WCVI, Lower Strait of Georgia (LGS), and Fraser River Spring 4₂, Spring 5₂, Summer 5₂ chinook and Interior Fraser River coho. Commercial measures included barbless hooks, time and area closures, gear restrictions, mandatory use of revival tanks, daily catch reporting, mandatory logbooks and non-retention provisions for most fisheries. Recreational measures included barbless hooks, time/area closures, size restrictions and mark selective fisheries. In 2015, recreational fisheries in freshwater areas were also closed for parts of the summer in many parts of SBC due to high water temperatures. FSC management actions included time and area closures and reduced fishing times.

SBC Chinook Aggregate Abundance-Based Management (AABM)

For the period October 2014 through September 2015, the forecast chinook abundance index was 0.85 of the PST base period. Therefore, under treaty provisions, the maximum allowable catch was 127,278 chinook for WCVI AABM fisheries.

SBC Chinook Individual Stock Based management (ISBM)

Fisheries included in this category are commercial net fisheries throughout SBC, marine recreational fisheries along the inside areas, freshwater recreational, and First Nations FSC fisheries in both marine and freshwater areas.

Catch estimates indicate a total catch of 54,260 caught in the Area G commercial troll fishery. In 2015, 4% of the fleet froze their catch at sea in the WCVI troll fishery. In 2015 there were no seine fisheries; however an Area D gillnet opening in Alberni Inlet in early September targeting chinook returns to Robertson Creek Hatchery had a total catch of 438 pieces and an Area D gillnet opening in Tlupana Inlet targetting chinook returns to the Conuma River hatchery had a catch of 9,615 pieces. There were no Area E gillnet fisheries in Georgia Strait in 2015. The total number of chinook harvested during the Fraser River Albion test fishery from April to October was 2,655. An additional 1,124 adults and 61 jacks were harvested in the Fraser River PSC test fisheries at Whonnock, Cottonwood, and Qualark.

The WCVI AABM recreational chinook catch and effort are largely driven by abundance and weather, and together both can affect annual harvests. The fishery primarily takes place in offshore Areas 121-127 from June to September. Chinook catch in the AABM recreational fishery is estimated through several catch monitoring programs, including a creel survey, and a logbook program.

In 2015 marine recreational fisheries were monitored by creel surveys in five main areas:

- 1) Johnstone Strait including Areas 11 to 13;
- 2) The Strait of Georgia including Areas 14 through 18, that portion of Area 19 north of Cadboro Point, Areas 28 and 29; and West Coast Vancouver Island;
- 3) Juan de Fuca including Victoria (south of Cadboro Point),

- 4) Juan de Fuca Strait through Subareas 20-1,
- 5) WCVI, and
- 6) Fraser River.

Monitoring of these fisheries has been fairly consistent from year to year using an access point (landing site) survey for collecting catch and CPUE, combined with an aerial survey for effort counts. In addition, logbook programs, directed at estimating the recreational catch by fishing guides during guided trips, were conducted in the Campbell River, Victoria and WCVI Areas in 2015. In 2015, the total recreational catch was 196,817.

First Nations Economic

In 2015, the Department authorized an AABM chinook salmon economic fishery for the T'aaq-wiihak Nations between July and September. This fishery was monitored by T'aaq-wiihak fishery monitors and DFO staff. Both the WCVI troll fishery and the T'aaq-wiihak fishery were verified by J.O. Thomas and Associates, a company that provides independent certified dockside monitoring services. 6,234 chinook were caught in the T'aaq-wiihak economic fishery

In 2015, in the WCVI inshore area, there was a First Nations economic fishery in Alberni Inlet in early September targeting small male chinook salmon returns to Robertson Creek Hatchery with an estimated catch of 6,692 chinook, and a T'aaq-wiihak economic fishery in Nootka Sound targeting enhanced returns to Conuma River and Burman River with a catch of 54 chinook from Conuma and 978 chinook from Burman.

In the Lower Fraser Area, a total of 22 chinook were harvested as bycatch in pink and chum economic fisheries in September. In the B.C. Interior, the Secwepemc Fisheries Commission harvested 2,493 chinook on Kamloops Lake in September.

First Nations Food Social and Ceremonial (FSC) and Treaty

Total AABM chinook reported for First Nations FSC and domestic fisheries was 3,946. The 2015 WCVI Nuuchah-nulth Tribal Council (NTC) AABM FSC chinook reported catch was 996, and catch from Maa-nulth Nations domestic fisheries was estimated at 3,384. Catches by First Nations fisheries in Johnstone Strait, Strait of is estimated at 261 and 4 respectively. Catches by First Nations in the Fraser and Thompson watershed were 20,979.

4.3 Sample Rates

Chinook Salmon Retention Fishery Area		% Sample Rate	
		2014	2015
Northern BC (Areas 1-5, 101-105, 142)			
1	AABM Troll	20.3%	32.7%
2	AABM Sport – Haida Gwaii (Areas 1, 2W)	60.9%	27.3%
3	ISBM Net – Area 3 & 4 Gillnet	6.9%	31%
4	ISBM Sport – Nass/Skeena Tidal (Areas 3-5)	12.4%	34.3%
5	ISBM Troll	No Fishery	No Fishery
6	ISBM First Nations Food, Social, Ceremonial (FSC) ¹	0%	0%
7	ISBM Test Fishery – Skeena Tyee Gillnet ²	83.4%	85%
Central BC (Areas 6-10, 106-110, 130)			
8	ISBM Net – Area 7 & 8 Gillnet	39.2%	17.5%
9	ISBM Sport – Areas 7-10	41.1%	78.5%
10	ISBM Troll – Areas 6-10	No Fishery	No Fishery
11	ISBM First Nations – Nuxalk Bella Coola R FSC ²	100%	100%
West Coast Vancouver Island (Areas 21-27, 121-127)			
12	AABM Troll	26.5%	29%
13	AABM Sport	17.1%	26.7%
14	AABM First Nations Commercial – T'aaq-wiihak ²	27.6%	46.1%
15	ISBM Net	No Fishery	No Fishery
16	ISBM Sport	26.6%	29.1%
17	ISBM First Nations Economic – Tsu-Ma-Uss Alberni Inlet	0.6%	28.3%
Johnstone Strait (Area 11-13)			
18	ISBM Net	No Fishery	No Fishery
19	ISBM Sport	35.8%	31.9%
20	ISBM First Nations FSC ¹	0%	0%
Strait of Georgia (Areas 14 – 18, 28, 29)			
21	ISBM Net	No Fishery	No Fishery
22	ISBM Sport	20.2%	22%
23	ISBM First Nations FSC ¹	0%	0%
Strait of Juan de Fuca (Areas 19, 20)			
24	ISBM Net	No Fishery	No Fishery
25	ISBM Sport	15.8%	8.2%
Fraser River			
26	ISBM Net – Area E Gillnet	25%	No Fishery
27	ISBM Sport	14.9%	8.3%
28	ISBM First Nations FSC ²	8.6%	14.7%
29	ISBM Test Fishery – Albion, Cottonwood, Whonnock, Qualark ²	90%	99.5%

¹ Multiple complex First Nations Food, Social and Ceremonial (FSC) harvest agreements with no First Nations catch monitoring and low catch.

² Sampling programs for these fisheries are funded through alternate DFO resources. CWT sampling is small incremental cost to Test Fishery programs.

Table 6 - Comparison of 2014 and 2014 Percentage Sampling Rates and Catch in Canadian by Fisheries

4.4 Lab Operations

The MRP dissection laboratory processed 30,251 salmon head samples in 2015, representing a 19% decrease from the previous year (37,309 heads processed in 2014) (Table 7).

Category	2013	2014	2015
Commercial	5,239	5,939	5,330
Escapement	11,273	15,989	11,081
First Nations (FSC)	364	340	316
Sport	23,838	14,948	13,036
Misc./Small Projects	1,485	93	488
Total	42,199	37,309	30,251

Table 7 - Number of salmon heads dissected by category in 2013, 2014, and 2015

Commercial head dissections, which included samples from Test Fisheries (Albion, Cottonwood, Whonnock, Qualark (Fraser River); Tyee (Skeena River); and Yukon (lower Stikine River)), and First Nations Economic and Demonstration fisheries, decreased by 10% in 2015 compared to 2014. The highest increase by category was observed in the Miscellaneous/Small Projects/Research category. There was a five-fold increase in the number of heads received from this category in 2015 compared to 2014. Part of the reason for this increase was the receipt of 247 samples that were not dissected in 2014 after the CWTIP period that were recovered in the DFO Sardine Trawl survey in 2013 and 2014. Other projects included the Hake Trawl Incidental Salmon Catch Program (Archipelago Marine Research), WCVI Acoustic Trawl Survey, La Perouse Juvenile Chinook Study, Tyee Club Research, Kyuquot/Brooks Peninsula Chinook Research, and the Capilano River Hatchery Chinook Study.

First Nation FSC samples were approximately the same as the previous two years; down about 7% and 13% in 2015 compared to the 2014 and 2013, respectively. Sport head recoveries were down modestly by 13% in 2015 compared to those processed in 2014. Escapement samples were also down by about 31% in 2015 compared to those received in 2014.

The lab processed 207 heads from DFO and PSC Test Fisheries in 2015; 131 from Albion (DFO Fraser River), 14 from Whonnock/Cottonwood (PSC Fraser River), 39 from Tyee (DFO Skeena River), 20 from the Yale First Nations Qualark Creek Test Fishery (Middle Fraser River), and three (3) from the Taku coho Test Fishery in the Yukon.

Very few tags that are initially identified by technicians are subsequently lost during or after dissection. There were a total of 24 (<0.1%) "Lost Pins" out of 30,251 heads dissected by lab staff in 2015, which represents approximately one lost pin for every 1,260 heads dissected.

Approximately half (46%) of these lost pins were associated with escapement samples which can be problematic for lab staff due to mineral and metallic contaminants in the samples originating from the spawning grounds. Some of these samples can also be heavily decomposed and therefore can be difficult or impossible to dissect and recover the pin.

Whenever tags were perceived to be lost during dissection, laboratory staff made every attempt to recover them using earth magnets and conducting systematic searches of the surrounding dissection area. If a tag is 'found', it is recorded as a 'lost and found' status as a quality control measure should there be an inquiry as to the validity of the tag read.

Laboratory procedures included observations on the specific location of tags recovered within each fish head. This information is important as a measure of tagging quality.

4.5 Data Collection, Management and Analysis

4.5.1 Commercial and First Nations Economic Fisheries Data Management

The processing and data entry of 2015 commercial and First Nations fisheries began in April 2015 and continued through to November 2015, coinciding with the beginning and conclusion of the commercial salmon fishing season in each of these months, respectively. Subsequent entries in 2015 and through to March of 2016, were primarily latent data from DFO Test Fisheries and the Area G WCVI chinook troll fishery that occurred during the winter and spring months. The timing of data entry of commercial CWT sample and recovery data are presented in Table 8.

Entry Year	Entry Month	Number of Vessels	Number of Recoveries Entered	% of Total Recoveries Entered	Total Records Entered	% of Total Records Entered
2015	Jun	117	912	18.7%	1029	14.4%
2015	Jul	651	1,636	33.5%	2287	32.0%
2015	Aug	725	849	17.4%	1574	22.0%
2015	Sep	682	883	18.1%	1565	21.9%
2015	Oct	71	468	9.6%	539	7.5%
2015	Nov	9	17	0.3%	26	0.4%
2015	Dec	4	0	0%	4	0.1%
2016	Jan	3	69	1.4%	72	1.0%
2016	Feb	4	14	0.3%	18	0.3%
2016	Mar	4	27	0.6%	31	0.4%
2016	Apr	1	7	0.1%	8	0.1%
Total		2,271	4,882	100%	7,153	100%

Table 8 - Number of 2015 commercial fishery sample records entered by month

Batch uploading of 2015 commercial and sport sample and recovery data from the project office to the DFO MRP database occurred on the following dates:

Date Exported	Commercial CWT Data	Sport CWT Data	Date Exported	Commercial CWT Data	Sport CWT Data
4-May-15		x	15-Oct-15		x
12-May-15	x		21-Oct-15	x	
13-May-15		x	28-Oct-15		x
24-Jun-15	x		9-Nov-15	x	x
25-Jun-15		x	10-Nov-15	x	
8-Jul-15		x	25-Nov-15		x
9-Jul-15	x		1-Dec-15		x
15-Jul-15		x	7-Dec-15		x
16-Jul-15	x		15-Dec-15		x
24-Jul-15	x		17-Dec-15	x	
31-Jul-15	x	x	30-Dec-15	x	
10-Aug-15	x		4-Jan-16		x
17-Aug-15	x		5-Jan-16		x
20-Aug-15		x	11-Jan-16	x	
26-Aug-15	x		12-Jan-16	x	
4-Sep-15	x		15-Jan-16		x
11-Sep-15	x		20-Jan-16		x
15-Sep-15	x		27-Jan-16	x	
17-Sep-15	x		1-Feb-16	x	
25-Sep-15	x		26-Feb-16		x
29-Sep-15	x	x	14-Mar-16	x	
1-Oct-15		x	22-Apr-16	x	
14-Oct-15		x			

Commercial data progressed through a rigorous system of error checks and coding procedures. Pre-entry tasks included checking data for completeness and integrity.

Another key task during coding is examining the relationship of statistical week landed versus the date of landing. It is critical that samples from trucks and packers are properly “backdated” to attribute samples to the correct week of catch. Backdating is most common for truck deliveries of troll samples as troll fisheries can and often overlap two or more statistical weeks while most net fisheries are of much shorter duration and occur within one particular statistical week. Proper allocation of samples is critical to catch sample ratios, and CWT estimate calculations.

Online edits focused on the legitimacy of the tag code compared to the reported species as well as the validity of the tag code itself and whether the brood year provided by the code is feasible for that species. Fish length is also checked against valid ranges for each species. Additionally, coding of geographic area and timing are checked against valid fishery openings.

Records which did not meet acceptable entry criteria were isolated and reviewed by senior program personnel. All questionable tag codes were re-read. Species conflicts were evaluated by

reviewing the size and age relationships of the tag and the associated biological data collected. When a tag was discovered to be outside of its normal temporal and geographic distribution of recovery, the recovery data was scrutinized to ensure the accuracy of this data and rule out any transcription errors.

4.5.2 Recreational Fisheries Data Management

Sport fishery sample data was processed by the contracted Sport Data Technician. Primary duties included correspondence with anglers, data entry and editing, and production of data summaries and in-season and post-season reports that are used for checking and editing data as well as providing updates to DFO and feedback to anglers that submit data to the program.

A total of 12,851 submissions from anglers were received and processed in 2015 (Table 9). The total number of submissions decreased by almost 17% over those received in 2014 (15,498 heads). Table 10 provides a comparison of sport head submissions for each species in 2015 by capture year.

Month-Year	Number of sport heads received
Jan-15	116
Feb-15	127
Mar-15	100
Apr-15	151
May-15	553
Jun-15	2,277
Jul-15	3,964
Aug-15	4,138
Sep-15	784
Oct-15	430
Nov-15	155
Dec-15	52
Total^a	12,851

Table 9 - Number of sport caught salmon heads received by month from anglers and guides in the 2015 calendar year

Total number of sport heads received in 2015 by year caught						
Species	2009	2011	2012	2013	2014	2015
Chinook	1	6	1	5	94	9,444
Coho	0	0	0	3	132	2,935
Pink	0	0	0	0	0	20
Chum	0	0	0	0	0	17
Sockeye	0	0	0	0	0	25
Steelhead	0	0	0	0	2	6
Unk Salmon	0	0	0	0	0	10
Total	1	6	1	8	228	12,457

Table 10 - Summary of sport head recoveries submitted and processed in 2015 by species and capture year.

4.5.3 CWT Estimates

All analysis was completed by Mark Recovery Unit staff, following standard algorithms for the calculation of CWT estimates, using the MRP Information System to synthesize catch, sample, recovery, and lab data across multiple DFO systems. Canada submitted all observed and estimated CWT tag recovery data and associated catch and sample data to the PSMFC for validation and upload into RMIS on February 3, 2016.

5. Summary and Project Evaluation

Under this collaborative project, the 2015-16 Canadian Mark Recovery Program was successful in meeting its project objectives to conduct a statistically reliable and timely CWT sampling and recovery program to support domestic and international stock assessment and sustainable fisheries management.

1) Did the intended activities take place within scope, within budget?

Yes. All objectives of the project were achieved. See Appendix 9 for the Financial Statement for the project. As this was the first year of the joint project, some errors were made in the budget phase resulting in some categories of expenditures were over-estimated or underestimated. For example, DFO salary was overestimated by 38K, travel was overestimated by 125K, sampling materials were overestimated by 43K and disposal of waste was overestimated by 19K.

Contractor salary was underestimated by 72K and lab rentals of 56.6K were erroneously not included in the budget. However, the project was under-budget by \$123,730 and a total of \$45,803 was returned to the Pacific Salmon Commission.

2) Were the resources allocated in the most efficient and effective manner, or given the results would a different allocation have been more appropriate, and if so will be considered for any potential future projects as applicable?

In future years, the budget will be modified to better reflect the actual expenditures.

3) Were the milestones achieved?

All milestones, with the exception of the final report, were achieved.

4) Were the deliverables of the project delivered?

All deliverables of the project were delivered as planned.

5) Did the collaboration achieve its purpose?

Yes – an overall sample rate of 20% was achieved and data was delivered to the U.S. CWT data repository according to agreed schedules for use by PSC Committees.

6) Were there any difficulties encountered within the performance of the project and if so, how were they managed to achieve resolution?

Workload and unclear reporting requirements and authority to define them resulted in delays in the provision of a meaningful in-season and final report. This has been fully resolved with input from the Northern Endowment Fund Committee.

6. Acknowledgements

Fisheries and Oceans Canada is grateful for the financial support for this project from the Pacific Salmon Commission Endowment Fund. The author wishes to thank the DFO Core Stock Assessment Mark Recovery Program Unit biologists and technicians - Nicholas Komick, Brenda Ridgway, Doug Herriott and Erik Grundmann - for their commitment and hard work for all aspects of the project, as well as the various DFO Regional resource management, stock assessment staff, and salmon enhancement program for their valuable roles in regional catch monitoring program delivery and CWT sampling, and J.O.Thomas and Associates in performing fisheries sampling and CWT lab operations. Finally, thanks to the many thousands of harvesters who participate in all aspects of DFO catch monitoring – providing catch data and biological samples to support sustainable fisheries management.

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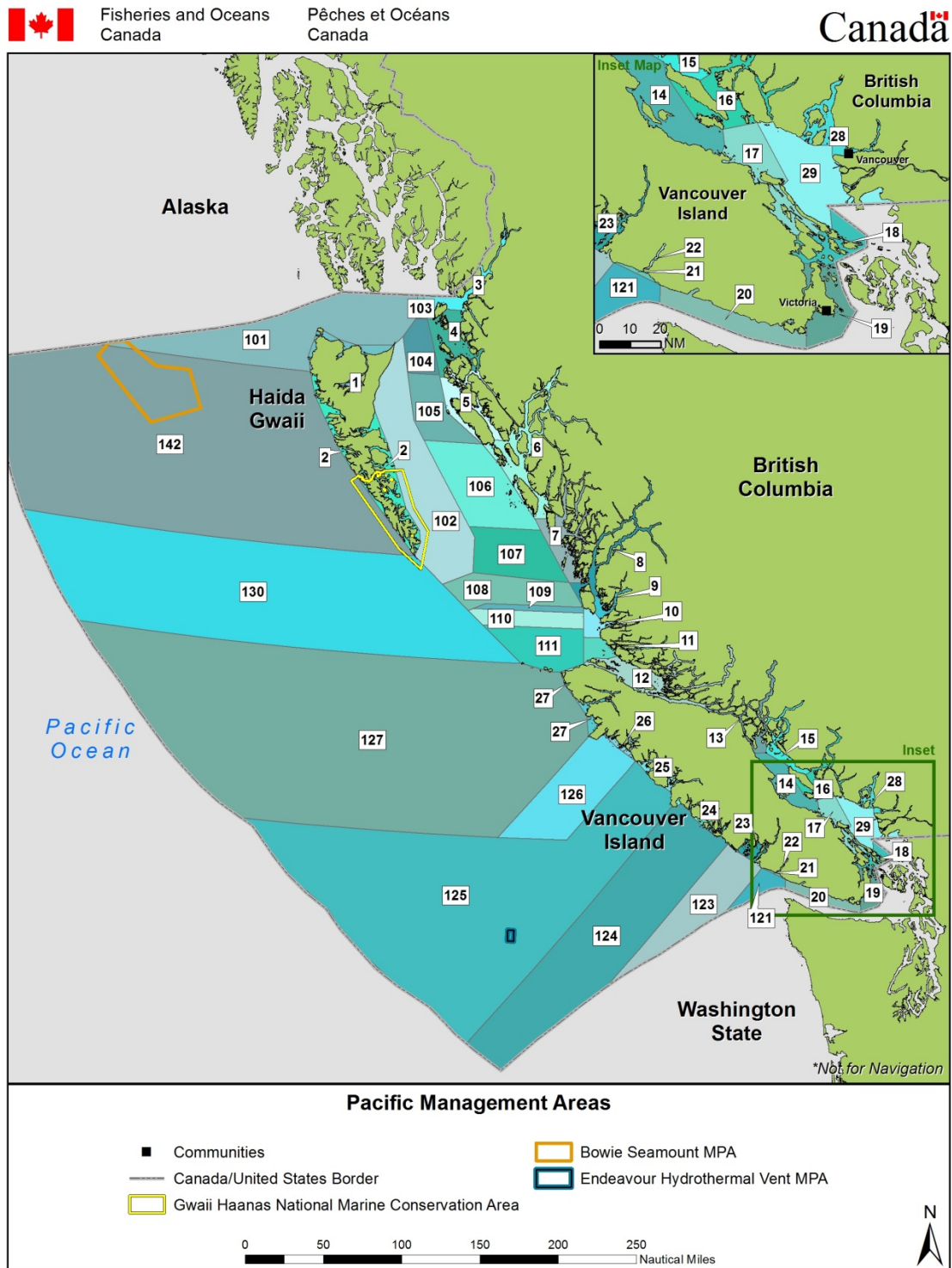
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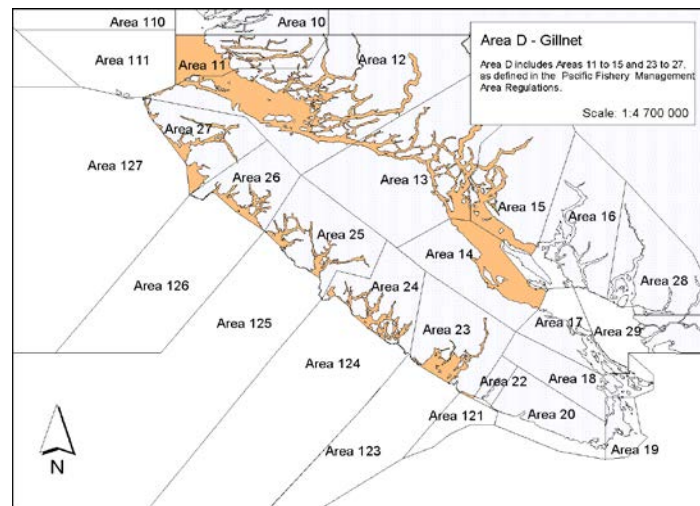
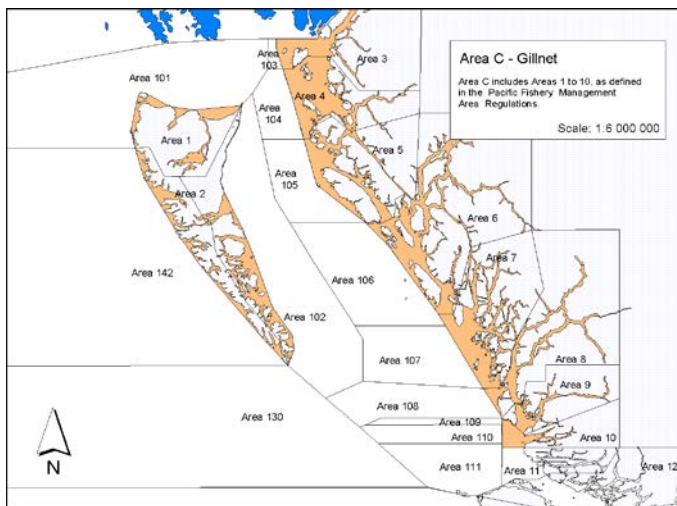
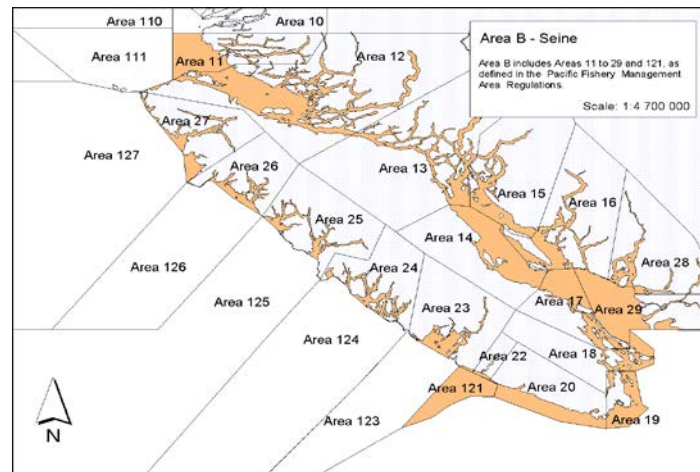
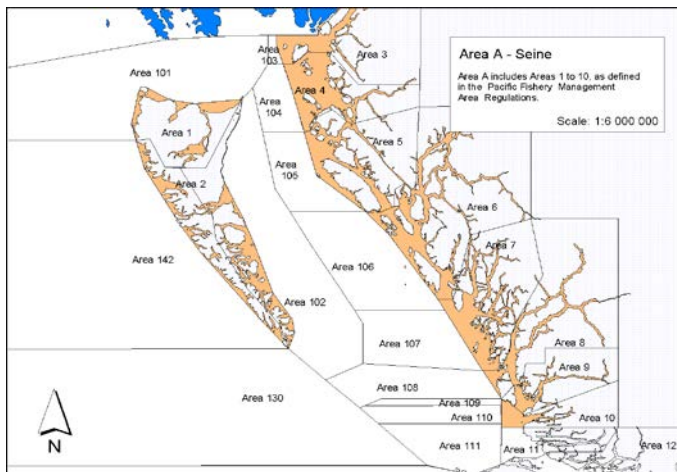
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Appendices

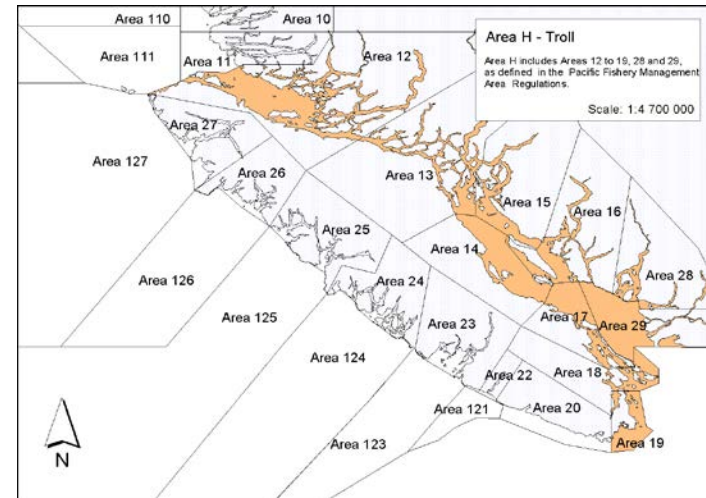
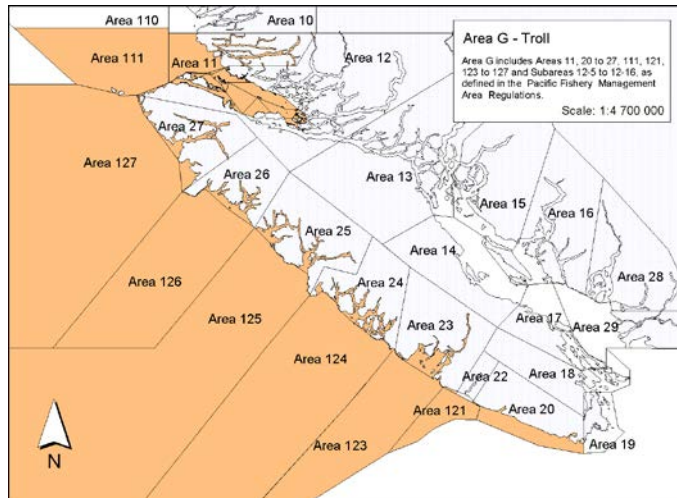
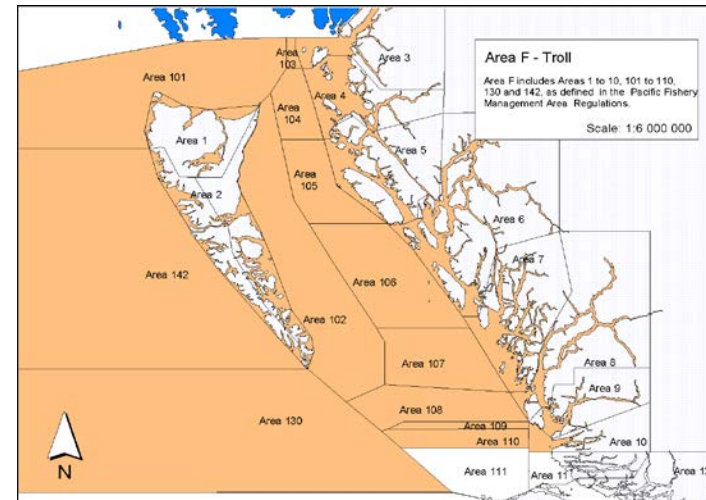
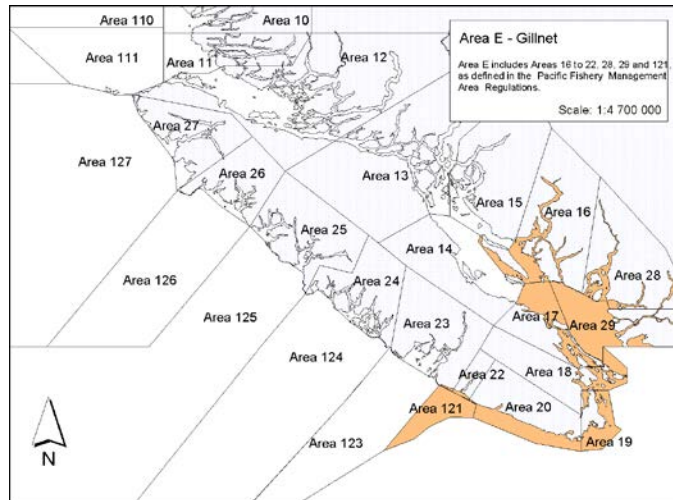
Appendix 1. DFO Pacific Fishery Management Areas



Appendix 2. DFO Commercial Salmon License Areas



Appendix 3 - cont'd. DFO Commercial Salmon License Areas



Appendix 3. 2015 and 2016 Statistical Week Calendars

2015				2016			
DFO STATWEEK CODE	PSC STATWEEK CODE	FROM	TO	DFO STATWEEK CODE	PSC STATWEEK CODE	FROM	TO
				011	01	1-Jan-16	2-Jan-16
				012	02	3-Jan-16	9-Jan-16
				013	03	10-Jan-16	16-Jan-16
				014	04	17-Jan-16	23-Jan-16
				015	05	24-Jan-16	30-Jan-16
				021	06	31-Jan-16	6-Feb-16
				022	07	7-Feb-16	13-Feb-16
				023	08	14-Feb-16	20-Feb-16
				024	09	21-Feb-16	27-Feb-16
				031	10	28-Feb-16	5-Mar-16
				032	11	6-Mar-16	12-Mar-16
				033	12	13-Mar-16	19-Mar-16
				034	13	20-Mar-16	26-Mar-16
				041	14	27-Mar-16	2-Apr-16
041	14	29-Mar-15	4-Apr-15				
042	15	5-Apr-15	11-Apr-15				
043	16	12-Apr-15	18-Apr-15				
044	17	19-Apr-15	25-Apr-15				
045	18	26-Apr-15	2-May-15				
051	19	3-May-15	9-May-15				
052	20	10-May-15	16-May-15				
053	21	17-May-15	23-May-15				
054	22	24-May-15	30-May-15				
061	23	31-May-15	6-Jun-15				
062	24	7-Jun-15	13-Jun-15				
063	25	14-Jun-15	20-Jun-15				
064	26	21-Jun-15	27-Jun-15				
071	27	28-Jun-15	4-Jul-15				
072	28	5-Jul-15	11-Jul-15				
073	29	12-Jul-15	18-Jul-15				
074	30	19-Jul-15	25-Jul-15				
075	31	26-Jul-15	1-Aug-15				
081	32	2-Aug-15	8-Aug-15				
082	33	9-Aug-15	15-Aug-15				
083	34	16-Aug-15	22-Aug-15				
084	35	23-Aug-15	29-Aug-15				
091	36	30-Aug-15	5-Sep-15				
092	37	6-Sep-15	12-Sep-15				
093	38	13-Sep-15	19-Sep-15				
094	39	20-Sep-15	26-Sep-15				
101	40	27-Sep-15	3-Oct-15				
102	41	4-Oct-15	10-Oct-15				
103	42	11-Oct-15	17-Oct-15				
104	43	18-Oct-15	24-Oct-15				
105	44	25-Oct-15	31-Oct-15				
111	45	1-Nov-15	7-Nov-15				
112	46	8-Nov-15	14-Nov-15				
113	47	15-Nov-15	21-Nov-15				
114	48	22-Nov-15	28-Nov-15				
121	49	29-Nov-15	5-Dec-15				
122	50	6-Dec-15	12-Dec-15				
123	51	13-Dec-15	19-Dec-15				
124	52	20-Dec-15	26-Dec-15				
125	53	27-Dec-15	31-Dec-15				

Appendix 4. Chronological Commercial and First Nations Economic Fishery Openings by Gear, Period, and Species

Gear	Licence Area	Dates	Target Species/Fishery	Areas
Troll	Area G	Apr 19-30	WCVI chinook	Areas 125-127,23-27
Troll	Area G	May 1-20	WCVI chinook	Areas 124-127,23-27
Troll	Area G	May 21-31	WCVI chinook	Areas 123-127,23-27
Gillnet	Area C	Jun 1,2	Atnarko chinook	Area 8
Gillnet	Area D	Jun 9	Somass sockeye	Area 23
Troll	Area F	Jun 18-Jul 31	Area 1,2W chin (ITQ)	Areas 101,1,142,2W
Gillnet	Area C	Jun 8,9	Atnarko chinook	Area 8
Gillnet	Area C	Jun 9	Nass sock	Area 3
Gillnet	Area C	Jun 12	Skeena chinook	Area 4
Gillnet	Area C	Jun 15,16	Atnarko chinook	Area 8
Gillnet	Area C	Jun 15,16	Nass sock	Area 3
Gillnet	Area D	Jun 16	Somass sockeye	Area 23
Gillnet	Area C	Jun 22,23,24	Atnarko chinook	Area 8
Gillnet	Area C	Jun 22,23,25,26	Nass sock	Area 3
Troll	Area F	Jul 1-Aug 7	Area 101-Dixon Entrance pink,coho,sock(by-catch)	Area 101
Gillnet	Area D	Jun 23	Somass sockeye	Area 23
Seine	Area B	Jun 22-24	Somass sockeye	Area 23
Gillnet	Area C	Jun 27,28	Skeena chinook	Area 4
Troll	Area F	Jul 10-Aug 7	Area 1,2W,102-106 pink,coho	Areas 101,1,142,2W,102,103,
Troll	Area F	Jul 10-Aug 7	Area 101,1,103,104 sock	Areas 101,1,103,104
Gillnet	Area C	Jun 29,30	Area 8 chum,Atnarko chinook	Area 8
Gillnet	Area C	Jun 29,30	Nass sock	Area 3
Seine	Area B	Jun 29-Jul 1	Somass sockeye	Area 23
Gillnet	Area D	Jun 30-Jul 1	Somass sockeye	Area 23
Gillnet	Area C	Jul 6,7	Area 8 chum,Atnarko chinook	Area 8
Gillnet	Area C	Jul 4,5	Nass sock	Area 3
Seine	Area A	Jul 6,7,9	Nass sock	Area 3
Gillnet	Area D	Jul 7,8	Somass sockeye	Area 23
Seine	Area B	Jul 6-8	Somass sockeye	Area 23
Gillnet	Area C	Jul 9-10	Nass sock	Area 3
Gillnet	Area C	Jul 13	Area 8 chum,Atnarko chinook	Area 8
Seine	Area A	Jul 13	Area 8 chum,Atnarko chinook	Area 8
Seine	Area B	Jul 13-15	Somass sockeye	Area 23
Seine	Area A	Jul 13,14,16,17	Nass sock	Area 3
Gillnet	Area C	Jul 13,14,17,18	Nass sock	Area 3
Gillnet	Area C	Jul 20,21	Area 8 chum	Area 8
Seine	Area A	Jul 20,21	Area 8 chum	Area 8
Seine	Area B	Jul 20-22	Somass sockeye	Area 23
Gillnet	Area D	Jul 21	Somass sockeye	Area 23
Seine	Area A	Jul 20,21	Nass pink	Area 3
Troll		Jul 18-21	First Nations Demonstration Fishery-WCVI chinook	Area 25
Troll		Jul 24-27	First Nations Demonstration Fishery-WCVI chinook	Areas 24,124-126
Gillnet	Area C	Jul 27,28	Area 8 chum	Area 8
Seine	Area A	Jul 27,28	Area 8 chum	Area 8
Gillnet	Area C	Jul 27	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Seine	Area B	Jul 27	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Seine	Area A	Jul 27,30,31	Nass pink	Area 3
Seine	Area B	Jul 27-29	Somass sockeye	Area 23
Gillnet	Area D	Jul 28,29	Somass sockeye	Area 23
Gillnet	Area C	Jul 26,27,Jul 31-Aug 3,6,7	Nass sock	Area 3

Gear	Area	Dates	Target Species	Areas
Gillnet	Area D	Aug 2-4,5,6	Somass sockeye	Area 23
Gillnet	Area C	Aug 3,4	Area 6 pink	Area 6
Gillnet	Area C	Aug 3,4	Area 8 chum	Area 8
Seine	Area A	Aug 3,4	Area 8 chum	Area 8
Gillnet	Area C	Aug 3,4	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Seine	Area B	Aug 3,4	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Troll		Aug 6-9	First Nations Demonstration Fishery-WCVI chinook	Area 25
Troll	Area G	Aug 8-9	WCVI chinook	Areas 123-127
Troll	Area F	Aug 8-Sep 30	Area 101-Dixon Entrance pink,coho	Area 101
Troll	Area F	Aug 8-Sep 30	Area 1,2W,102-106 pink,coho	Areas 101,1,142,2W,102,103,
Gillnet	Area C	Aug 10	Area 8 chum	Area 8
Seine	Area A	Aug 10	Area 8 chum	Area 8
Gillnet	Area C	Aug 10	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Seine	Area B	Aug 10	Area 7 chum (Mussel,Kynock,Mathieson,Finlayson)	Area 7
Gillnet	Area C	Aug 9,10,13,14	Area 8 chum	Area 6
Gillnet	Area D	Aug 10,11,12	Somass sockeye	Area 23
Seine	Area B	Aug 10-12	Somass sockeye	Area 23
Gillnet	Area C	Aug 10,11	Nass sock	Area 3
Gillnet	Area C	Aug 13	Nass sock	Area 3
Troll		Aug 16	First Nations Demonstration Fishery-WCVI chinook	Areas 124-126
Seine	Area B	Aug 17-19	Somass sockeye	Area 23
Gillnet	Area D	Aug 16-18,19	Somass sockeye	Area 23
Gillnet	Area C	Aug 17,18	Area 8,Bella Coola chum	Area 8
Seine	Area A	Aug 17,18	Area 8,Bella Coola chum	Area 8
Gillnet	Area C	Aug 17,18	Area 7 chum (Mussel,Kynock,Neekas,Roscoe,Mathieson)	Area 7
Seine	Area B	Aug 17,18	Area 7 chum (Mussel,Kynock,Neekas,Roscoe,Mathieson)	Area 7
Gillnet	Area C	Aug 17,18,21	Kitimat Hatchery chum	Area 6
Troll	Area F	Aug 25-Sep 30	Area 1,2W chin (ITQ)	Areas 101,1,142,2W
Gillnet	Area C	Aug 23,24	Skeena sock	Area 4
Seine	Area A	Aug 23,24	Skeena sock	Area 4
Troll		Aug 29	First Nations Demonstration Fishery-WCVI chinook	Areas 124-126
Gillnet	Area C	Aug 31	Area 7 chum (Neekas,Roscoe)	Area 7
Seine	Area B	Aug 31	Area 7 chum (Neekas,Roscoe,McLoughlin Bay)	Area 7
Troll		Sep 1	First Nations Demonstration Fishery-WCVI chinook	Areas 124-126
Seine	Area B	Sep 8	Area 7 chum (Klemtu Hatchery)	Area 7
Gillnet	Area C	Sep 7	Area 7 chum (Klemtu Hatchery, McLoughlin Bay)	Area 7
Gillnet	Area D	Sep 7	Alberni Inlet coho	Area 23 (limited effort)
Troll	Area G	Sep 15,16-30	WCVI chinook	Areas 123-127
Gillnet	Area D	Sep 10,11,12	Somass coho	Area 23
Troll	Area F	Sep 14-30	Area F chin,coho,pink	Areas 101,1,2W,142
Seine	Area B	Sep 14	Area 7 chum (Neekas,McLoughlin Bay)	Area 7
Gillnet	Area C	Sep 14	Area 7 chum (Neekas)	Area 7
Troll		Sep 16	First Nations Demonstration Fishery-WCVI chinook	Areas 124-126
Gillnet	Area D	Sep 17,18,19	Somass coho	Area 23
Troll		Sep 23	First Nations Demonstration Fishery-WCVI chinook	Areas 124-126
Seine	Area B	Sep 28,29	Area 7 chum (Neekas)	Area 7
Gillnet	Area C	Sep 28,29	Area 7 chum (Neekas)	Area 7
Seine	Area B	Oct 5,19	Johnstone Strait chum	Areas 12,13
Troll	Area G	Oct 4-31	WCVI chinook	Areas 124-127
Gillnet	Area C	Oct 5,6	Area 7 chum (Neekas)	Area 7
Seine	Area B	Oct 5,6	Area 7 chum (Neekas)	Area 7
Troll	Area G	Nov 1-Dec 31	WCVI chinook	Areas 23-27,123-127
Troll	Area G	Jan 1-Feb 29, 2016	WCVI chinook	Areas 23-27,123-127
Troll	Area G	Mar 1-15	WCVI chinook	Areas 23-27,125-127

Mark Recovery Sample Form

Sample #: **107501** Master Sample #

XREF Number _____ Trip ID Number _____

Location Name _____ Code

Sampling Site _____ Code

VTP ☐ Vessel Name _____ VRN _____

First Day Fished Last Day Fished Stat Week Caught Gear Fishery Type
 d d m m y y y y y y d d m m y y y y y y

	Head Number	Freezer Cut Quality	Fork Length (mm)	Species	AD Fin Mark	Scale Book #	Scale #
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Date Sampled
 d d m m y y y y

Stat Week Sampled

Page Number _____

FISHING LOCATION

PFMA - PFMA SUB TROLL ZONE
 1 -
 2 -
 3 -
 4 -

CHINOOK

Sample Status TOTAL LANDED Product Type Cut Type # Head-On or # Good # Poor

COHO

Sample Status TOTAL LANDED Product Type Cut Type # Head-On or # Good # Poor

Detection Method ☐

UNKNOWN

Poor

VTP	Fishery Type	Gear	Detection Method	Product Type	Cut Type
1 - Vessel	C - Commercial	7 - Rod and Reel	T - Tube	B - Body Only	H - Head
2 - Truck	F - FSC	10 - Gillnet	V - Visual	H - Head Only	M - Mixed
3 - Packer	N - EO or Demo	15 - Mixed Net	W - Wand	W - Whole Fish	S - Snout
	T - TEST	20 - Seine			
		31 - Freezer Troll	Freezer Cut Quality	Species	AD Fin Mark
		33 - Ice Troll	G - Good	15 - Coho	0 - Not Clipped
			P - Poor	24 - Chinook	1 - Clipped
					2 - Stubby

Sample Status
 D - Complete Sample with heads (entire vessel)
 C - Complete Sample with no heads (entire vessel)
 I - Incomplete Sample (entire vessel not sampled)
 P - Problem Sample

} SAMPLE COMMENTS required

Sample Comments

Conducted by _____ Code

Recorded By _____


DFO 2015/03

Appendix 6 – Head Labels and Container Labels




Head Labels – Commercial, First Nations Economic, Test Fisheries, and Escapement

○

Commercial




1 2 3 4 0 0 1

Lab Use
P  H  C 




15
24

○

Research




1 2 2 2 0 0 0

Lab Use
P  H  C 




15
24

○

First Nations
Fisheries




1 2 2 9 0 0 1

Lab Use
P  H  C 




15
24

○

Escapement




1 2 2 9 0 0 0

Lab Use
P  H  C 

15
24


Container Labels – Used for all shipments of samples to the Lab

○	SALMON HEAD RECOVERY PROGRAM		Recorded by:	
	CONTAINER LABEL			
	Fishery: <input checked="" type="checkbox"/> Test <input type="checkbox"/> Commercial <input type="checkbox"/> Sport <input type="checkbox"/> 1st Nations <input type="checkbox"/> DFO Creel <input type="checkbox"/> Research <input type="checkbox"/> Escapement <input type="checkbox"/> Other (Describe on back)		Bag/Container From: <input type="checkbox"/> Rep <input type="checkbox"/> Fisher	
	Depot Name:			
	Pickup Date:		Catch Month:	
	Project Name:		Stat Week: (Commerc)	
Location:		Sample Year:		

CL-1001



Appendix 6 - cont'd. Head Labels and Container Labels

Head Labels - Recreational Fisheries (front and back)



Fisheries and Oceans
Canada

Pêches et Océans
Canada



1197001

F# _____

ENT _____

SC ☐ INV ☐

Office Use

Lab Use


15 24

1197001

Salmon Sport Head Recovery Program

Check for missing Adipose Fin
If missing:

1. Cut off Head – Remove Gills
2. Fill out label and attach to Jaw
3. Place Head in freezer or in bucket



Please Use Pencil

Required Information

Place Fish Caught: _____
(Local Name)

Management Area: _____

Date Caught:

Year			

Month	

Day	

example 2 0 2 3 0 7 1 4


Type of Catch: Sport Saltwater ☐ Sport Freshwater ☐

Other _____

Species: Chinook ☐ Coho ☐

Length: _____ or _____
(centimetres) (inches)

Nose to Fork



1197001

Detach For Angler Reference

To receive information about your catch
complete the reverse side of this label.

Label Number 1197001

R.D. PENHALL LTD. • MADE IN VANCOUVER, CANADA • DUKSIAK WATERPROOF

OFO 2015/05



Optional (to receive email about your catch)

Angler Contact Information

Name: _____

E-mail: _____

Phone: _____

Mailing Address (alternative to email)

Address: _____

City: _____

Prov / State: _____

Postal / Zip Code: _____

Guide Contact Information

Guide #:

To receive your guide #
contact 1-866-483-9994

OR

Name: _____

E-mail: _____

Phone: _____

Mailing Address (alternative to email)

Address: _____

City: _____

Prov / State: _____

Postal / Zip Code: _____




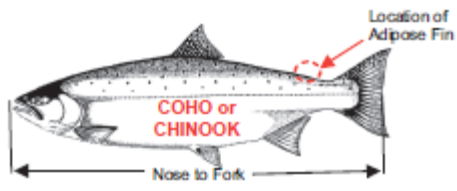

Place Fish Caught: _____


Date Caught: _____

Salmon Sport Head Recovery Program 1-866-483-9994

Appendix 6 - cont'd. Head Labels and Container Labels

Head Labels - Food, Social, and Ceremonial Fisheries (front & back)

	Fisheries and Oceans Canada	Pêches et Océans Canada	 1 0 0 1 1 1 1																								
F# _____ ENT _____ SC <input type="checkbox"/> INV <input type="checkbox"/>		Lab Use <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 33%;">P <input type="checkbox"/></td> <td style="text-align: center; width: 33%;">H <input type="checkbox"/></td> <td style="text-align: center; width: 33%;">C <input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">24</td> <td></td> </tr> </table>		P <input type="checkbox"/>	H <input type="checkbox"/>	C <input type="checkbox"/>	15	24																			
P <input type="checkbox"/>	H <input type="checkbox"/>	C <input type="checkbox"/>																									
15	24																										
First Nation Salmon Head Recovery Program																											
If your Chinook or Coho is missing the Adipose Fin: 1. Cut off the head and remove the gills 2. Fill out a label and attach to the jaw 3. Leave the head with your Fishery Monitor or Guardian or take it to your Community Salmon Head Recovery Depot																											
																											
Please Use Pencil																											
Required Information																											
_____ <small>Nation or Band or Monitoring Organization</small>																											
Place Fish Caught: _____ <small>(Local Name)</small>																											
Management Area: _____																											
Date Caught: <table border="1" style="display: inline-table; width: 60px; text-align: center;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td colspan="4">Year</td></tr> </table> <table border="1" style="display: inline-table; width: 60px; text-align: center;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td colspan="4">Month</td></tr> </table> <table border="1" style="display: inline-table; width: 60px; text-align: center;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td colspan="4">Day</td></tr> </table>								Year								Month								Day			
Year																											
Month																											
Day																											
<small>example</small> 2 0 2 3 0 8 1 4																											
Type of Catch: Food, Social or Ceremonial <input type="checkbox"/> Economic or Demonstration <input type="checkbox"/>																											
Other: _____																											
Species: Chinook <input type="checkbox"/> Coho <input type="checkbox"/>																											
Length: _____ or _____ <small>(centimetres) (inches)</small>																											
Nose to Fork																											
Gear:																											
<input type="checkbox"/> Troll <input type="checkbox"/> Drift Net																											
<input type="checkbox"/> Set Net <input type="checkbox"/> Beach Seine																											
<input type="checkbox"/> Dip Net <input type="checkbox"/> Fish Wheel																											
<input type="checkbox"/> Gill Net																											
Other: _____																											
			 1 0 0 1 1 1 1																								

 <p style="color: red; font-weight: bold;">Optional Information</p> <p style="color: red; font-weight: bold;">***Please Print Clearly***</p> <p style="text-align: center;">Fisher Mailing Information</p> <p style="text-align: center; font-style: italic;">Complete this section to receive information about your catch.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> Name: _____ </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> E-mail: _____ </div> <p style="text-align: center; font-weight: bold; margin: 20px 0;">OR</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> Address: _____ </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> City: _____ </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> Province: _____ </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> Postal Code: _____ </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> Phone Number: _____ </div>
--

Appendix 7 – Freezer Troll Bag Labels and Head Delivery Records

R.D. PENHALL LTD. • MADE IN VANCOUVER, CANADA • DURSEBAX WATERPROOF



Vessel Name: _____

VRN: _____

Trip ID: _____

Management Area(s): _____

EACH BAG MUST CONTAIN SNOUTS/HEADS
FROM CHINOOK AND COHO CAUGHT WITHIN
THE SAME WEEK AND SAME TRIP ID

START A NEW BAG EVERY SUNDAY AND
EVERY NEW TRIP

Heads/Snouts in this bag were caught between:

Start Date: 20

End Date: 20

(year) (mm) (dd)

PLEASE USE PENCIL

Contact: J.O Thomas & Assoc. for collection.
Toll Free 1-800-863-3344

Chinook/Coho Head Delivery Record

Chinook/Coho Head Delivery Record # 12345

Landing Information		Head Delivery Compliance Information	
Observer present during offload	Y <input type="checkbox"/> N <input type="checkbox"/>	Total # of bags received	
Vessel required to keep heads	Y <input type="checkbox"/> N <input type="checkbox"/>	# non DFO bags	
Port		# containers open or broken	
Offload Site		# not frozen	
Vessel name		# missing labels	
VRN		# missing vessel name, location or date	
Trip Id Number		Date received	dd / mm / yyyy
Offload Date	dd / mm / yyyy		

Comments: (For example: why missing information, why no heads? why poor bag and labeling compliance, etc.)

I certify that I have completely monitored the salmon head delivery of the above vessel and that this validation record is complete and accurate to the best of my ability.

Print Name: _____

Signature: _____

I certify that I am authorized to sign on behalf of the license holder and acknowledge receipt of this validation record.

Print Name: _____

Signature: _____

White (original) - stays in book / Yellow (copy) - Vessel Master SHRP021303

Appendix 8. Recreational Fisheries - Salmon Head Recovery Program Public Relations, Sampling Materials, and Procedures

Poster

SAVE YOUR HEAD FOR FUTURE FISHERIES.



Is your Chinook or Coho missing its adipose fin? If so, it counts!

SEND US YOUR SALMON HEADS SO WE CAN TELL YOU "A REALLY BIG FISH STORY!"

Many Chinook and Coho salmon in the Pacific Northwest with a missing adipose fin also have a microscopic Coded Wire Tag (CWT) in their snout. When you send us your salmon head we can tell you about the origin of your fish. And when we receive enough heads and good catch information from fishers like you, we all benefit from a truly "big fish story" about the survival, distribution and long-term health of salmon stocks. When it comes to future fisheries, there's no question that, your catch counts!

THE CWT IS INVISIBLE TO YOU, SO THE CLIPPED FIN IS YOUR CLUE!

WHAT TO DO

PLEASE REMOVE YOUR SALMON HEADS AND TAKE THEM TO A HEAD RECOVERY DEPOT NEAR YOU. Over 250 Depots in BC are conveniently located at marinas, tackle stores, hatcheries and fishing lodges, where you can fill out and attach a head label like the one shown here.

FOR MORE INFO OR A LIST OF HEAD RECOVERY DEPOTS

SEARCH: DFO SALMON HEAD RECOVERY 1-866-493-9994



SALMON HEAD RECOVERY PROGRAM

 Fisheries and Oceans Canada Pêches et Océans Canada

 WORKING TOGETHER catch! counts

Appendix 8 cont'd. Recreational Fisheries - Salmon Head Recovery Program Public Relations, Sampling Materials, and Procedures

Depot Sign-up Form

	Fisheries and Oceans Pêches et Océans	Salmon Sport Head Recovery Program Depot Signup Sheet	
			Date Month/Day

1. Depot Details

ID#	Depot Name		
Zone	PFMA	Location	
Physical Address			
Coordinates (Decimal Degree)		Longitude	
Depot Type	<input type="checkbox"/> Marina <input type="checkbox"/> Store <input type="checkbox"/> Lodge <input type="checkbox"/> Charter <input type="checkbox"/> Federal <input type="checkbox"/> Other	Accessibility <input type="checkbox"/> Public <input type="checkbox"/> Private	Operational <input type="checkbox"/> Seasonal <input type="checkbox"/> Year Round
	Setup Type <input type="checkbox"/> Visit <input type="checkbox"/> Mail		
Minimum Service Level(s)	<input type="checkbox"/> Weekly <input type="checkbox"/> 2 Weeks <input type="checkbox"/> 6 Weeks <input type="checkbox"/> Monthly <input type="checkbox"/> 2 Months <input type="checkbox"/> 3 Months <input type="checkbox"/> Start & End of Season <input type="checkbox"/> Closed From <input type="checkbox"/> Early <input type="checkbox"/> Mid <input type="checkbox"/> Late Month To <input type="checkbox"/> Early <input type="checkbox"/> Mid <input type="checkbox"/> Late Month		
	<input type="checkbox"/> Weekly <input type="checkbox"/> 2 Weeks <input type="checkbox"/> 6 Weeks <input type="checkbox"/> Monthly <input type="checkbox"/> 2 Months <input type="checkbox"/> 3 Months <input type="checkbox"/> Start & End of Season <input type="checkbox"/> Closed From <input type="checkbox"/> Early <input type="checkbox"/> Mid <input type="checkbox"/> Late Month To <input type="checkbox"/> Early <input type="checkbox"/> Mid <input type="checkbox"/> Late Month		
Other			
Hours of Operation			

2. Storage Details

Storage Type <input type="checkbox"/> Freezer <input type="checkbox"/> Bucket	Storage Owner <input type="checkbox"/> DFO <input type="checkbox"/> Depot <input type="checkbox"/> SHRP	DFO Storage ID	Approx. Landing to Storage Distance (m)
SHRP Freezer Size <input type="checkbox"/> 3 <input type="checkbox"/> 5 <input type="checkbox"/> 5W <input type="checkbox"/> 7 <input type="checkbox"/> 14	Shelter for Freezer / Bucket <input type="checkbox"/> Yes <input type="checkbox"/> No	Off-season Depository for Freezer / Bucket <input type="checkbox"/> Onsite <input type="checkbox"/> Offsite	Off-season Depository for Shelter <input type="checkbox"/> Onsite <input type="checkbox"/> Offsite
Storage Location (website description)			

3. Contact Details

Mailing Address (if different)			
Town		Postal Code	
Manager Owner		Alternate	
Phone Public	Phone 1	Phone 2	
Fax	Email		

4. Additional Information

#Poster	#Hats	Pictures	Derby Dates

Depot Signature	Service Rep Signature

Printed:

Appendix 8 cont'd. Recreational Fisheries - Salmon Head Recovery Program Public Relations, Sampling Materials, and Procedures

Depot Instructions

Fisheries and Oceans
Canada

Pêches et Océans
Canada

HEAD DEPOT INSTRUCTIONS

Call toll free 1-866-483-9994 for assistance or for head pickup

Labeling Procedures

When an angler brings in a CHINOOK or COHO head:

- Ensure the adipose fin was missing.**
Before accepting a head, ask the angler if the fish was missing its adipose fin. Do not accept the head from a fish with a clipped maxillary or ventral fin, unless its adipose fin was also absent.
- Give the angler a label to fill out and tie to the jaw.**
 - Instruct the angler to **COMPLETELY** fill out the catch information on the front of the label. The back of the label is for contact information so that the angler/guide can receive information about their catch.
 - Tie the label to the fish's jaw and deposit it in your bucket or freezer. Each head must have its own label. If you can't attach a label to a head put both in a plastic bag and tie off the bag (for frozen heads only).

missing
ADIPOSE FIN

We keep track of label numbers distributed to each depot. **Please do not trade labels with other depots.** If you are running low on labels please call toll free 1-866-483-9994 **before you run out.**

USE PENCIL ONLY

Record the name of the location and management area where the fish was caught. Record the precise catch date (e.g. 2015/07/31)

Anglers who wish to receive information about their catch must write their name, AND either an email address, OR mailing address and phone number.

If the trip was guided, record the guide's information to also receive catch information. OR simply record their guide id. Call 1-866-483-9994 to receive a guide id.

Mark off salt or freshwater and the species. Record the length in cm or inches.

Anglers can tear off the receipt portion to keep for their own records.

Optional Information
Please Print Clearly

Angler Mailing Information

Name: Terry Jones
E-mail: TJones@server.com
OR
Address: 123 10th Street
City: Nanaimo
Prov / State: BC
Postal / Zip Code: V9X 4H9
Phone Number: 250-756-7374

Guide Mailing Information

Name: _____
E-mail: _____ OR
Address: _____
City: _____
Prov: _____
Postal Code: _____
Phone Number: _____ OR
Guide #: _____
To receive your guide # contact 1-866-483-9994

Place Fish Caught: _____
Date Caught: _____
Salmon Sport Head Recovery Program 1-866-483-9994

Appendix 9 – Financial Statement

	SAMPLING			LAB		
Fiscal Year – “2015-16” Consolidated Budget	PSC	DFO	Total	PSC	DFO	Total
Labour / Subcontractors / Consultants						
DFO Salary	\$ 20,858	\$ 245,066	\$ 265,924		\$ 195,049	\$ 195,049
DFO Employee Benefits	\$ 4,172	\$ 49,013	\$ 53,185		\$ 39,010	\$ 39,010
Contractor	\$ 193,523	\$ 285,252	\$ 478,775	\$ 85,523	\$ 134,107	\$ 219,630
Site / Project Costs			\$ -			\$ -
Travel & Living	\$ 100,000	\$ 191,626	\$ 291,626			\$ -
Sampling Supplies & Materials	\$ 25,000	\$ 114,250	\$ 139,250			\$ -
Lab Supplies & Materials			\$ -	\$ 1,500	\$ 3,817	\$ 5,317
Repairs & Maintenance		\$ 10,000	\$ 10,000			\$ -
Disposal of waste			\$ -	\$ 8,000	\$ 15,268	\$ 23,268
Shipping	\$ 5,000	\$ 10,000	\$ 15,000			\$ -
Overhead / Administration Costs			\$ -			\$ -
Field office rentals	\$ 10,000	\$ 18,000	\$ 28,000			\$ -
Lab rental			\$ -			\$ -
Office supplies	\$ 1,875	\$ 4,000	\$ 5,875			\$ -
Communications	\$ 7,431	\$ 15,000	\$ 22,431			\$ -
GST (5%) of PSC Contributions	\$ 17,141		\$ 17,141	\$ 4,751		\$ 4,751
TOTAL	\$ 385,000	\$ 942,207	\$ 1,327,207	\$ 99,774	\$ 387,251	\$ 487,025

	TOTAL BUDGET			ACTUALS			
Fiscal Year – “2015-16” Consolidated Budget	PSC	DFO	Total	PSC	DFO	Total	Variance
Labour / Subcontractors / Consultants							
DFO Salary	\$ 20,858	\$ 440,115	\$ 460,973	\$ 23,128	\$ 399,896	\$ 423,024	\$ 37,949
DFO Employee Benefits	\$ 4,172	\$ 88,023	\$ 92,195	\$ 4,626	\$ 79,979	\$ 84,605	\$ 7,590
Contractor	\$ 279,046	\$ 419,359	\$ 698,405	\$ 255,094	\$ 515,448	\$ 770,542	\$ (72,137)
Site / Project Costs	\$ -	\$ -	\$ -				\$ -
Travel & Living	\$ 100,000	\$ 191,626	\$ 291,626	\$ 55,614	\$ 111,228	\$ 166,843	\$ 124,783
Sampling Supplies & Materials	\$ 25,000	\$ 114,250	\$ 139,250	\$ 38,644	\$ 63,880	\$ 95,819	\$ 43,431
Lab Supplies & Materials	\$ 1,500	\$ 3,817	\$ 5,317	\$ 4,062	\$ 8,125	\$ 12,187	\$ (6,870)
Repairs & Maintenance	\$ -	\$ 10,000	\$ 10,000		\$ 5,678	\$ 5,678	\$ 4,322
Disposal of waste	\$ 8,000	\$ 15,268	\$ 23,268	\$ 1,329	\$ 2,658	\$ 3,986	\$ 19,282
Shipping	\$ 5,000	\$ 10,000	\$ 15,000	\$ 4,059	\$ 8,119	\$ 12,178	\$ 2,822
Overhead / Administration Costs	\$ -	\$ -	\$ -				\$ -
Field office rentals	\$ 10,000	\$ 18,000	\$ 28,000	\$ 6,697	\$ 13,393	\$ 20,090	\$ 7,910
Lab rental	\$ -	\$ -	\$ -	\$ 18,805	\$ 37,611	\$ 56,416	\$ (56,416)
Office supplies	\$ 1,875	\$ 4,000	\$ 5,875	\$ 1,089	\$ 2,178	\$ 3,267	\$ 2,608
Communications	\$ 7,431	\$ 15,000	\$ 22,431	\$ 5,021	\$ 10,042	\$ 15,063	\$ 7,368
GST (5%) of PSC Contributions	\$ 21,893	\$ -	\$ 21,893	\$ 20,804		\$ 20,804	\$ 1,089
TOTAL	\$ 484,775	\$ 1,329,458	\$ 1,814,233	\$ 438,972	\$ 1,258,235	\$ 1,690,503	\$ 123,730
VARIANCE				\$ 45,803	\$ 71,223	\$ 123,730	