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Genetic stock identification of interior Fraser River coho salmon in marine fisheries in 2014.

Report to Southern Fund Committee: Project SF-2013-I-11

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Summary

In 2014 the exploitation rate cap for Interior Fraser River coho was set at 16% for fisheries in Canada. This report will evaluate the impact of southern BC marine fisheries relative to planned exploitation. Estimates of stock composition are reported for 'wild' coho in southern BC marine recreational and commercial salmon fisheries in 2014. We then use these stock compositions to determine estimates of total mortality, including kept catch and incidental release mortalities, of Interior Fraser River (IFR) coho salmon for each fishery stratum.

We sampled only unclipped (adipose fin was present) or 'wild' coho from fisheries. There are a small number of adipose fin clipped and coded wire tagged hatchery coho from IFR. These are added to the final total. The genetic stock compositions reported are only applicable to the unclipped 'wild' portion of the catch.

IFR coho are genetically distinct from other southern BC and Puget Sound coho, resulting in significant confidence in the identification of IFR coho in genetic samples.

In 2014 a total of 3,839 tissue samples from unclipped 'wild' coho caught in recreational, commercial, and test fisheries in southern British Columbia were analyzed for microsatellite variation using 17 loci and a 265 stock baseline ranging from northern British Columbia to California. Tissue samples were collected randomly from southern BC salmon fisheries and pooled by time and area. Sampling rates varied by fishery, time, and area depending on sampling effort within existing monitoring programs such as recreational creel surveys, voluntary sampling by guides and 'avid anglers', commercial catch validations and sampling at processing plants, and test fisheries. Sub-sampling was conducted in some time/area strata. The number of samples analyzed varied with total coho mortalities in that time-area-fishery stratum. That is, more samples were analyzed from areas with high observations of coho encounters.

IFR coho generally comprised a very small proportion of the 2014 salmon fishery, with an estimated mortality of 1343 unmarked 'wild' IFR coho out of an estimated 109,000 total mortalities; or about 1% of the total. Assuming a total pre-fishery abundance in the order of 25,000 IFR wild coho, the determined exploitation rate for 2014 in the marine fisheries is in the order of 5.6%.

In 2014, the distribution of IFR coho catch in the marine area conformed to general understanding of distribution; mainly southern BC and Washington State marine area distribution, with a split between inside waters and outside waters. The results are compared

against the preseason planning tool based on average exploitation pattern in southern BC during the period 1987-97. This comparison suggests a more outside distribution of IFR coho in 2014.

The largest proportions of IFR coho (>2%) occurred in expected areas including the Strait of Georgia in June, Juan de Fuca in September and October, and SWVI in July and August. Anomalies from the general preseason model were the incidence of IFR coho in inshore waters of Barkley Sound in July and offshore waters of NWVI in September.

Acknowledgments

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Introduction

Currently wild Interior Fraser River coho (IFR) are limiting fisheries in both southern British Columbia and Washington State. In 2014 the Southern BC Salmon IFMP stated an ER cap on IFR coho of 16% in southern BC fisheries.

CWT have been the basis for assessing total and distribution of fishing mortalities of key indicator stocks within each coho management unit, including IFR coho. Since about 2000 the utility of CWT has been reduced due to reduced tagging levels in the indicator stock program, low marine survival reducing the number of CWT available to fisheries, reduced fishing, more complicated fishery management actions such as Mark Selective Fisheries (MSF), and low recovery rates from the fisheries. Historical CWT information has been the basis for fishery planning. However, there are significant uncertainties in this approach such as variable distribution of IFR coho.

Better understanding of fishery impacts, distribution, migration and timing for IFR coho are important to assessing fishery management actions. Genetic stock identification (GSI) using DNA can provide a cost-effective and non-lethal alternative method for identifying migration routes and timing of specific stocks of coho salmon. The DNA method uses a coast-wide 17 loci microsatellite baseline available for coho salmon published by Beacham et al. (2012)

In 2000 and 2001 DNA-based stock composition was used to validate exploitation objectives of 3% for IFR coho (Irvine et al. 2000, Irvine et al. 2001).

The initial objective of this Southern Fund (SF) project “Coho Salmon Genetic Stock Identification using historical and recent fisheries samples” was to fund the use of microsatellite variation in coho for Genetic Stock Identification (GSI) from historical scale samples and recently collected tissue samples from fisheries in southern British Columbia. However, in response to management need, the objective was changed to assessment of fishery mortality of IFR coho in southern BC fisheries to validate the preseason planning approach and gain understanding of distribution and migratory timing of IFR coho. All samples were drawn from fishery samples in areas of greatest management concern. 2013 results are presented in a separate report. No historical scale samples were analyzed under this project.

The main stocks of concern were the unmarked ‘wild’ IFR coho from South Thompson, North Thompson, Lower Thompson, Middle Fraser, and Fraser Canyon rivers. However, additional stocks of interest readily identified from the GSI analysis include the Lower Fraser, Southern Mainland, Vancouver Island east coast, Vancouver Island west coast, and Puget Sound/Juan de Fuca.

This SF project provided funding for the analysis of 5,000 samples. In 2013, 3,425 samples were genotyped and reported in the SF final report “Genetic stock identification of Interior Fraser River coho salmon in marine fisheries: Part 1 2013”. In 2014, a total of 3,839 were genotyped and funding for an additional 2,264 sample genotyped and reported in this manuscript came from other internal DFO sources. This report focuses on the 2014 sample collections that were analyzed in proportion to catch and used to estimate total IFR coho mortalities.

Materials and Methods

Fishery Sampling

The objective of the 2014 sampling was to collect a representative sample of DNA from unmarked (unclipped) ‘wild’ coho in South Coast marine salmon fisheries. The proportion of IFR coho in the unmarked coho sample would be applied against an estimate of unmarked coho total fishing mortalities in each fishery.

Tissue samples were collected using a variety of methods from mostly existing programs, such as recreational fishery creel surveys, recreational guide and avid angler voluntary sampling, dockside commercial catch monitoring, test fisheries, and First Nations catch monitoring programs. The specifics of the sampling plan are outlined in Appendix 1.

Sample collections were assumed to be representative of ‘wild’ unmarked coho catch and releases in South Coast marine salmon fisheries. The proportion of IFR coho in the ‘wild’ unmarked coho sample was applied against the estimate of the total mortality of ‘wild’ unmarked coho in each fishery.

Generally there was a minimum requirement of 100 samples collected during each time-area stratum. Priority for sampling effort was assigned (see Table 1 and Table 2 colour coding) based on risk in the fishery, where risk was based on predicted encounters of coho and historic

understanding of IFR coho distribution by time and area (e.g. Juan de Fuca is the highest risk in August since it is the general peak of migration from outside waters to the Fraser).

A majority of the samples collected were taken as caudal punches placed on Whatman paper to air dry, the preferred method of sampling. Some collections were sampled into 1.5 ml vials of denatured ethanol or collected as scale samples. DNA extracted preceded as described by Withler et al. (2000).

Coded Wire Tag (CWT) recoveries for IFR coho are presented in Appendix 3. Recoveries are based on the voluntary head recovery in the marine recreational fishery and plant sampling for the commercial fisheries.

DNA Sample Allocation

In 2014, over 5500 tissue samples were collected from unclipped adult coho salmon captured in sport, commercial, and test fisheries from British Columbia Statistical Areas 11-29 and 121-127 from fisheries between June and Oct, 2014 (see Appendix 2). Random subsampling was conducted at the end of the year for areas with high sample collections. Fisheries with highest risk were allocated highest numbers of samples for DNA analysis. As a result 3,831 samples were genotyped (Table 3 and Appendix 2).

At the end of the year, samples from fisheries occurring in the same general time and area were combined to provide an overall stock composition for that time and area. That is, we assumed that coho stock composition in a time – area stratum is not fishery sector dependent and so samples from one fishery could be used to estimate stock composition in another fishery in that same time and area. Since coho generally mature and migrate home at the same age we assumed that all stocks were equally vulnerable within a fishery. Recreational and seine net fisheries were considered to be non-selective, that is, no sorting by size or stock. Gillnet fishery samples were not considered representative of recreational and seine fisheries.

Laboratory Analysis

Once coho salmon genomic DNA was available, surveys of variation at the following 17 microsatellite loci were conducted: Ots101, OCL8, Ogo2, Oki1, Oki10, Oki100, Oki101, Omy1011, Omy325, One111, One13m, Ots103, Ots213, Ots3, Otsg253b, P53, and Ssa407. Microsatellites were size fractionated in an Applied Biosystems (ABI) 3730 capillary DNA

sequencer, and genotypes were scored by GeneMapper software 3.0 (Applied Biosystems, Foster City, CA) using an internal lane sizing standard.

In general, polymerase chain (PCR) reactions were conducted in 10 µl volumes consisting of 0.06 units of Taq polymerase, 1µl of 30ng DNA, 1.5-2.5mM MgCl2, 1mM 10x buffer, 0.8mM dNTP's, 0.006-0.065µM of labeled forward primer (depending on the locus), 0.4µM unlabeled forward primer, 0.4µM unlabeled reverse primer, and deionized H2O. PCR was completed on an MJResearch™ DNA Engine™ PCT-200 or a DNA Engine Tetrad™ PCT-225. The amplification profile involved one cycle of 2 min @ 92°C, 30 cycles of 15 sec @ 92°C, 15 sec @ 52-60°C (depending on the locus) and 30 sec @ 72°C, and a final extension for 10 min @ 72°C. Specific PCR conditions for a particular locus could vary from this general outline. Further information on laboratory equipment and techniques is available at the Molecular Genetics Laboratory website at http://www.pac.dfo-mpo.gc.ca/science/facilities-installations/pbs-sbp/mgl-lgm.

Baseline Populations

The coast-wide (northern British Columbia to California) coho salmon baseline consisted of variation at seventeen microsatellite markers for 274 population/samples with membership in 34 Genetic Units (GU's). These GU's were further rolled up into nine coarse GSI groupings (CG). IFR coho CG was composed of 5 GU's consisting of coho stocks from South Thompson, North Thompson, Lower Thompson, Middle Fraser, and Fraser Canyon rivers. The accuracy of this baseline has been reported in Beacham et al. 2012. All annual baseline samples available for a specific sample location were combined to estimate population allele frequencies, as was recommended by Waples (1990).

Estimation of Stock Composition

Analysis of fishery samples was conducted with a Bayesian procedure (BAYES) as outlined by Pella and Masuda (2001). Each locus was assumed to be in Hardy-Weinberg equilibrium, and expected genotypic frequencies were determined from the observed allele frequencies and used as model inputs. For BAYES, the initial FORTRAN-based computer program as outlined by Pella and Masuda (2001) required large amounts of computer analytical time when applied to stock identification problems with a baseline as comprehensive as employed in the current study. Given this limitation, a new version of the program was developed by our laboratory as a

C-based program which is available from the Molecular Genetics Laboratory website (Neaves et al. 2005). In the analysis, ten 20,000-iteration Monte Carlo Markov chains of estimated stock compositions were produced, with initial starting values for each chain set at 0.90 for a particular population which was different for each chain. Estimated stock compositions were considered to have converged when the shrink factor was < 1.2 for the 10 chains (Pella and Masuda 2001). The last 1,000 iterations from each of the 10 chains were then combined, and for each fish the probability of originating from each population in the baseline was determined. These individual probabilities were summed over all fish in the sample, and divided by the number of fish sampled to provide the point estimate of stock composition. Standard deviations of estimated stock compositions were determined from the last 1,000 iterations from each of the 10 chains incorporated in the analysis. In this report, we provide only fishery stock compositions. Individual fish id's are not presented in this report but are available.

Combining DNA stock composition and catch estimates

The stock proportion from DNA estimates were applied to the catch estimates by reporting region (see Appendix 2). Final reporting strata consisted of monthly intervals of June-October by Fraser River, Strait of Georgia, Johnstone Strait, South West Vancouver Island (SWVI) inshore, North West Vancouver Island (NWVI) inshore, SWVI offshore, NWVI offshore, Juan de Fuca-west coast of Vancouver Island (WCVI), SWVI-Area 21/121, and Juan de Fuca-Strait of Georgia. The corresponding statistical areas can be seen in Figure 1 and Table 3.

Recreational fishery catch estimates were derived from creel surveys (effort surveys and dockside monitors) in combination with fisher dependent logs. Commercial fishery estimates of catch and release were derived by local Fishery Managers from a combination of fisher dependent logs, sales slips, hails, and fisher independent catch validations.

Total mortalities of approximately 109,000 out of a total of 114,000 'wild' unclipped coho were apportioned to the stock groupings by fishery stratum (see Appendix 2).

Sources of uncertainty

Uncertainty in the DNA estimated mortality of IFR coho likely includes:

- uncertainty in the estimated catch and releases, as well as release mortalities
- uncertainty due to sampling and sample size
- uncertainty due to variation in stock assignment within the DNA methodology

Uncertainty in the recreational catch is well known, since the survey is designed to achieve a CV of 10% for chinook and coho catch during the main fishing season. Uncertainty is higher in areas and periods of lower catch and effort. The commercial and First Nations catches are best estimates from the local Fishery Managers based on a variety of data sources such as fisher logs, sales slips, hails, and dockside validations. In a recent CSAS review of the domestic IFR coho planning model (Van Will et al. reviewed) a recommendation was made to review of release mortality rates from various fisheries. The release mortality rates used in this analysis are identified in the current IFMP.

Uncertainty in IFR coho estimates varies with sample size. In Figure 2, simulated mixtures were estimated against the coastwide baseline assuming a 2% contribution of IFR coho. We used 100 bootstrapped simulated mixtures for each of the sample size ranging from 25 to 450 fish per mixture (Figure 2). These results show that the 90% confidence intervals narrowed rapidly toward the true 2% contribution of IFR coho as sample sizes increased to 100 fish (ranging from 0-4%) in the mixture sample. As sample size increased to 450 the confidence interval narrowed to 1-3%.

The uncertainty shown in the result tables (Tables 5-11) in this report is limited to variation in stock assignments in the DNA methodology as described above in the methodology section. Note that IFR coho are relatively unique genetically, they are the most genetically distinctive grouping of populations surveyed from Oregon to southeast Alaska (Irvine et al. 2000). Consequently the probability of misallocation from IFR coho to other stock regions is very low, and similarly there is low probability of misallocation from other stock regions to IFR coho.

Results and Discussion

Sampling effectiveness.

A total of 39 month-area fishery strata were sampled between June and October which are the primary months where coho become vulnerable to fisheries and the primary months where salmon fisheries affecting coho operate. Sampling rates varied by fishery strata (see Appendix 2). May fishery strata had presumed low catch and were poorly monitored (ignore zeros in the Appendix 2 table). The overall sample rate was 4.8% with a range of 1.1% to 16.6% for fishery strata with 1000 or more wild ‘ unmarked’ coho mortalities.

In fishery strata with high sample rates, subsampling was conducted to limit the number of samples provided to the DNA lab. The number of samples provided to the DNA lab are shown in Appendix 2 and summarized in Table 3 (discount the strata with zero samples since many of these strata were not sampled). Generally the fishery strata with highest total mortalities (highest risk) had the greatest number of samples provided to the lab to increase confidence in the results. See Figure 2 for the relationship between sample size and precision of the estimated IFR coho stock proportion. Sub-samples of 200 were preferred in higher risk fisheries. After subsampling, the overall sample rate was 3.0% with a range of 1.0% to 6.5% for fisheries with 1000 or more wild 'unmarked' coho mortalities.

Of the 39 fishery strata sampled, 9 fishery strata achieved at least 200 sample size, 7 strata achieved 100-200 with both representing 78,000 total coho mortalities. The remaining 23 strata (total mortalities = 29,000) had less than 100 samples run for DNA analysis where precision would decline rapidly (see Figure 2).

Sample analysis issues.

Not all samples entering the lab for DNA analysis were successfully genotyped due to a number of reasons including, missing tissues from Whatman sheets, non-amplification of DNA, non-coho samples, and DNA contamination. Poor tissue quality was likely the most common reason why tissue samples would result in DNA that would not amplify. Failed samples accounted for less than < 5% total samples processed. In 2014, approximately 160 samples did not amplify due to poor tissue quality (possibly frozen/thawed in the back of a fridge) and were replaced by additional samples from the same reporting strata. Also, 19 chinook, 16 sockeye, and 3 unknown salmonid species were sampled as coho account for 0.96% of the samples analyzed for 2014.

DNA stock compositions

The 2014 stock compositions are reported by regional groups for the major fishing areas: Fraser (Table 5), Strait of Georgia (Table 6), Johnstone Strait (Table 7), NWVI and SWVI inshore (Table 8), NWVI and SWVI offshore (Table 9), and SWVI Areas 121-21 and Juan de Fuca/Strait of Georgia (Table 10). Individual fish assignments and probability are not presented in this report but are available.

IFR coho mortalities

Of the approximately 109,000 total unclipped 'wild' coho mortalities in southern BC marine salmon fisheries which were sampled, 1343 were estimated to IFR coho, with a 95% confidence interval (error of DNA assignment only) of 1300-1400 (Table 11). Additional mortalities from unsampled fisheries include First Nations FSC. With modelled mortalities from First Nations FSC fisheries included the estimated marine fishery impact is about 5.6% ER (Table 12). For comparison the model projections of marine fishery ER range from 4.5% preseason to 6.1% post season (actual effort used).

The results by area are presented in Table 12 and Figure 3. The results in Figure 3 suggest that the distribution of IFR coho was more WCVI oriented than the average distribution used in the modelled approach. That is, the model overestimated impacts in inside fisheries and underestimated impacts in outside fisheries. Hence the model also underestimated the impact during migration through Juan de Fuca.

The results do not include hatchery contributions for IFR coho at this time. Appendix 3 outlines recoveries and releases of IFR coho from Coldwater and Eagle rivers. A total of 137 estimated CWT were recovered in Canadian fisheries or about 9% of the marine total IFR coho mortalities. A total of 368 estimated CWT were recovered in escapement sampling (C. Parken pers comm) out of an estimated total escapement of 18,500 or about 2%.

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Tables

Table 1. List and priority of commercial fisheries to be sampled for coho DNA. Color suggests potential risk, or level of fishery impact on IFR coho and should be used to prioritize sampling effort. Red highest priority, green lowest priority.

Fishery	Coho Catch estimate	Coho Mark rate estimate	Notes
Area B SX – Area 20/29	>10000	3.5	Estimate 10,000 pieces landed --> top priority
Area B SX – Area 12/13/	<10000	3.5	Estimate 10,000 pieces landed --> top priority after JdeF fisheries
Area H SX – Areas 12, 13, 18, 29	10	0	very low CO landings expected
Area G CN – WCVI troll Sept & Oct	4000	0.7	CN fishery will be sampled, CO concerns low after Sep 15.
Area E SX – Area 29	25	0	very low CO landings expected
Area B CM – Area 29 demo fishery	150	0.4	very low CO landings expected
Area B CM – Areas 12, 13, 14	500	0.4	very low CO landings expected
Area H CM – Area 13	5	0	very low CO landings expected
Area E CM – Area 29	15		very low CO landings expected
Area D SX – Area 12-13	25	0	very low CO landings expected
Area D CM – Area 12-14	20		very low CO landings expected

Table 2. List and priority of recreational fisheries to be sampled for coho DNA.
Color suggests potential risk, or level of fishery impact on IFR coho and should be used to prioritize sampling effort. Red highest priority, green lowest priority. Minimum sample size is 100.

	Jun29-Jul12	Jul13-26	Jul27-Aug9	Aug10-23	Aug24-Sep6	Sep7-20
FISHING AREA						
Upper JST, Port Hardy / McNeil	100	100	100	100	100	100
GSN, Campbell R - Courtenay	100	100	100	100	100	100
GSS, Nanaimo - Sydney	100	100	100	100	100	100
Area 19-20 inner JdeF	100	100	100	100	100	100
Area 20 outer JdeF	100	100	100	100	100	100
offshore NWVI	100	100	100	100	100	100
offshore SWVI	100	100	100	100	100	100
WCVI inside surfline	100	100	100	100	100	100
lower Fraser below Vedder			100	100	100	100
lower Fraser above Vedder			100	100	100	100

Table 3. Coho sample collections for 2014 analyzed for microsatellite variation by reporting area (gear and statistical areas) and month.

Gear Type	Report Area	Statistical Area	June	July	August	September	October	Total
Gillnet	Fraser	Area 29	0	0	3	37	24	64
Sport	GST	Strait of Georgia (13 - 29, excluding 20-5)	37	206	205	163	50	661
sport/Mixed Commerical	JST	Area11-12-13	0	197	398	200	100	895
Sport	SWVI - Inshore	Area23-24	0	76	59	32	0	167
Sport	NWVI - Inshore	Area25-26-27	17	141	82	0	0	240
Sport/Troll	NWVI - Offshore	OffsA125-127	12	178	361	150	0	701
Sport/Troll	SWVI - Offshore	OffsA123-124	0	26	77	455	197	755
Sport	JDF - WCVI	Area20 (except 20-5)	0	0	0	54	0	54
Sport	SWVI - Area 21/121	Area21-121	0	36	100	0	0	136
Sport	JDF - GST	GSTArea20-5	0	0	0	93	127	220
Total			**66**	**860**	**1285**	**1184**	**498**	**3893**

Table 4. Baseline of 265 sample sites/populations by Genetic Units (GU) and further roll-up of GU's to Course Groupings used to estimate stock composition of IFR coho salmon from southern British Columbia in 2013 and 2014 fisheries samples.

Course Groups	Genetic Units	Populations/Sample locations
North Central BC	Nass R	Meziadin, Tseax, Zolzap
	Area1	Chown, Datlamen,LoonLake_Cr, Nadu,Nadu, Yakoun
	Area2E	Copper, Deena, Honna, Pallant, Tlell
	Area2W	Mercer_Cr, Tasu
	Area3-4 Coastal	Lackmach, Oona
	Upper Skeena R	Damshilgwit_Cr, Kluatantan, Motase, Slamqeesh_Dam, Sustut
	Babine R	Boucher, U_Babine
	Bulkley/Morice	Bulkley, Morice, Owen, Toboggan
	Middle Skeena R	Kispiox, Kitwanga, Singlehurst
	Lower Skeena R	Clear, Clearwater, Coldwater_SK, Deep, Ecstall, Exchamsiks, Hadenschild, Kalum, Kasiks, McNeil_Green, Schulbuckhand, Sockeye, Zymagotitz
	Area5-6-7	Aaltanhash, Bella_Bella, Canoona, Drake_Cr, Evelyn_Cr, Gilttoyees_Cr, Hartley_Bay, Hugh_Cr, Kainet, Khutze, Kiltuish, Kiskosh, Kitasoo, Kitimat, McLoughlin, Paril, Quaal, Quartcha, Sally_Cr, Shaw, Tankeeah, Tyler_Cr
	Area8-10	Atnarko, Hagensborg_Slou, Jenny_Inlet_Wes ,Long_Lake, Martin, Necleetsconnay, Neechanz, Nekite, Paisla_Cr, PtJohn_hooknose, Quatlena_West, Salloomt, Sheemahant, Snootli, Thorsen
Southern Mainland	A12-13 mainland	Devereux, Glendale, Heydon_Bay, Homathko, Kakweiken, Klinaklini, Kwalate, Phillips, Village_Bay
	A15-16-28 south mainland	Ashlu, Capilano, Chapman, Lang, Mamquam, Seymour, Shovelnose, Sliammon, Tenderfoot
East Coast VI	A12-13 east-coast VI	Cluxewe, Glenlion, Keogh, Nahwitti, Nimpkish, Quatse, Quatsese, Tsulquase
	A14-18 east-coast VI	Big_Qualicum, Black_Cr, Chase, Chemainus, Cowichan, Goldstream, Nanaimo, Puntledge, Quinsam, Rosewall_Cr,R oy_Cr, Shawnigan
West Coast VI	A19-26 west-coast VI	Conuma, Cypre, Kennedy, Kirby, Kootowis, Maggie, Nitinat, Pachena, Robertson, San_Juan, Sarita, Sooke, Thornton_Cr,T ranquil, U_Megin, UpperClayoquot
	A27 north-west VI	Goodspeed, Marble, Stephens, Washlawlis, Waukwaas
Lower Fraser	Chilliwack R	Chilliwack, Post_Cr
	Birkenhead R	Birkenhead, Poole_Cr, Upper_Birkenhead
Continued		

Course Groups	Genetic Units	Populations/Sample locations
	Lower Fraser R	Alouette, Barnes, Blaney, Chehalis, Chilqua, Coghlan, Hicks_Cr, Hopedale_Cr, Inch, Kanaka, Kawkawa_Cr, Nathan_Cr, Nicomen, Norrish, Salmon_LF, Siddle, Silverdale, Squakum, Stave, U_Pitt, Whonnock, Worth_Cr
Interior Fraser	Middle Fraser R	Bridge, Chilko, Gates_Cr, Mckinley, Seton_Cr
	North Thompson R	Albreda, Avola, Barriere, Birch_Island, Blue, Cook_Cr, Dunn ,E_Barriere ,Fennel l, Finn ,Lemieux, Lion,Louis, Mann, Pig_Channel, Raft, Reg_Christie, Tumtum_Cr
	South Thompson R	Bessette, Danforth, Duteau_Shwp, Eagle,Harbour_Cr, Harris_Cr ,Ireland,LangChan_Shwp, McMomee, Mid_Shuswap, Momich, Salmon_SA, Senn, Sinmax, Wap_Cr
	Lower Thompson R	Bonaparte, Coldwater, Deadman, Spius
	Fraser Canyon	Nahatlatch
Puget Sound	North Puget Sound	Baker_R, Beaver_Cr@Wash, Grizzly, Jones_Cr, Marblemount, Nooksack, Nooksack_s, Skykomish, Sorensen, Stillaguam_N, Wallace
	South-central Puget Sound	Issaquah, Minter, Nisqually, Puyallup, White
	Juan de Fuca	Dungeness, Elwha
	Hood Canal	Dewatto, Quilcene
Southern US-Columbia	Washington Coastal	Bingham, Clearwa_US, Queets, Quillayute, Shale, Willapa
	Columbia R	Bing_Cr_H, Bonneville_H, Clackamas, Cowlitz, Eagle_Cr, Elocho_E, Elocho_L, Fallert_H, Kalama_Falls, Lewis, Sandy_Hatch
	Oregon	Alsea, Beaver_Cr@Ore, Nehalem, Siletz, Siltcoos_Lake, Siuslaw, Tahkenitch_L, Ten_Mile_Lake, Trask_Hatch, Umpqua, Yaquina
	California	Eel_South, Eel_West, Lagunitas_Cr, Noyo_Cal, Smith_River

Table 5. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the Fraser River. IFR coho marked in green.

Year	2014			2014		
Julian Date	244-272			274-293		
Gear	Gillnet			Gillnet		
Region	Fraser_			Fraser_		
Month	September			October		
Sample Date Range	Sep01-Sep29			Oct01-Oct20		
Processed DNA Sample Size	40(0)			24(0)		
Requested sample Size	44			20		
Est. Unmarked Coho Mortalities						
Region1	%	SD	Est. Catch	%	SD	Est. Catch
North_Central_BC	0.0	(1.3)	0	0.0	(2.0)	0
A12-13 Mainland	0.0	(0.4)	0	0.0	(0.6)	0
A12-13 ECVI	0.0	(0.4)	0	0.0	(0.6)	0
A15-16-28 S.Mainl	5.0	(3.3)	0	0.0	(0.9)	0
A14-18 ECVI	0.0	(0.6)	0	0.0	(0.6)	0
A19-26 WCVI	0.0	(0.6)	0	0.0	(0.9)	0
A27 NWVI	0.0	(0.4)	0	0.0	(0.4)	0
Chilliwack River	10.0	(4.6)	0	21.8	(8.4)	0
Birkenhead	17.5	(5.8)	0	8.3	(5.3)	0
LWFR	5.0	(3.4)	0	32.3	(9.5)	0
MDFR	1.5	(2.5)	0	0.0	(0.6)	0
NOTH	23.4	(6.7)	0	18.1	(7.8)	0
SOTH	18.3	(6.7)	0	12.1	(6.3)	0
LWTH	16.4	(5.9)	0	7.2	(5.0)	0
Fraser Canyon	2.8	(2.6)	0	0.0	(0.3)	0
North Puget Sound	0.0	(0.6)	0	0.1	(1.0)	0
South-Central Pug	0.0	(0.3)	0	0.0	(0.6)	0
JDF	0.0	(0.2)	0	0.0	(0.3)	0
Hood Canal	0.0	(0.3)	0	0.0	(0.3)	0
Washington Coasta	0.0	(0.3)	0	0.0	(0.9)	0
Columbia	0.0	(0.5)	0	0.0	(0.6)	0
Oregon	0.0	(0.5)	0	0.0	(0.9)	0
California	0.0	(0.3)	0	0.0	(0.4)	0
Region2						
North_Central_BC	0.0	(1.3)	0	0.0	(2.0)	0
Southern_Mainland	5.0	(3.3)	0	0.0	(1.1)	0
East_Coast VI	0.0	(0.7)	0	0.0	(0.9)	0
West_Coast VI	0.0	(0.7)	0	0.0	(1.0)	0
Lower_Fraser	32.5	(7.2)	0	62.4	(9.6)	0
Interior_Fraser	62.5	(7.4)	0	37.5	(9.4)	0
Puget_Sound	0.0	(0.7)	0	0.1	(1.3)	0
Columbia_Southern_US	0.0	(0.8)	0	0.0	(1.4)	0

Table 6. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the Strait of Georgia (GST). IFR coho marked in green.

Year	2014			2014			2014			2014			2014			2014			2014			2014				
Julian Date	152-181			182-212			213-243			213-243			246-273			246-273			275-302			275-302				
Gear	Sport			Sport			Sport			Commercial			Sport			Commercial			Sport			Commercial				
Region	GST_			GST_			GST_			GST_			GST_			GST_			GST_			GST_				
Month	June			July			August			August			September			September			October			October				
Sample Date Range	Jun01-Jun30			Jul01-Jul31			Aug01-Aug31			Aug01-Aug31			Sep03-Sep30			Sep03-Sep30			Oct02-Oct29			Oct02-Oct29				
Processed DNA Sample Size	34(0)			199(0)			198(0)			198(0)			156(0)			156(0)			48(0)			48(0)			Est. Unmarked Coho Mortalities	
Requested sample Size	37			203			205			205			171			171			50			50			GST Totals	
Est. Unmarked Coho Mortalities	524			3,081			5,817			281			3,576			513			756			343			14,891	
Region1	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	Est. Catch
North_Central_BC	4.4	(4.2)	23	0.4	(0.9)	12	2.8	(1.8)	164	2.8	(1.8)	8	1.6	(2.4)	57	1.6	(2.4)	8	5.3	(4.3)	40	5.3	(4.3)	18	2.1%	313
A12-13 Mainland	5.6	(6.6)	29	46.9	(4.4)	1,445	35.0	(4.1)	2,038	35.0	(4.1)	98	43.4	(5.6)	1,551	43.4	(5.6)	222	0.4	(1.3)	3	0.4	(1.3)	1	36.2%	5,386
A12-13 ECVI	0.1	(1.0)	1	0.1	(0.4)	4	0.3	(0.6)	16	0.3	(0.6)	1	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.4)	0	0.0	(0.4)	0	0.1%	22
A15-16-28 S.Mainl	9.0	(7.2)	47	18.3	(3.9)	565	27.9	(4.4)	1,621	27.9	(4.4)	78	20.9	(4.7)	747	20.9	(4.7)	107	32.3	(7.6)	244	32.3	(7.6)	111	22.9%	3,409
A14-18 ECVI	35.1	(8.7)	184	11.6	(2.9)	358	13.2	(2.9)	770	13.2	(2.9)	37	24.3	(3.9)	869	24.3	(3.9)	125	29.5	(7.0)	223	29.5	(7.0)	101	17.2%	2,566
A19-26 WCVI	0.1	(1.0)	1	0.7	(0.9)	21	0.1	(0.3)	4	0.1	(0.3)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.5)	0	0.0	(0.5)	0	0.2%	27
A27 NWVI	0.0	(0.3)	0	0.0	(0.2)	1	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0%	1
Chilliwack River	0.1	(1.1)	1	1.2	(1.0)	38	0.0	(0.3)	3	0.0	(0.3)	0	1.3	(1.0)	45	1.3	(1.0)	6	2.1	(2.1)	16	2.1	(2.1)	7	0.7%	108
Birkenhead	0.0	(0.2)	0	0.0	(0.1)	0	0.7	(0.6)	40	0.7	(0.6)	2	0.7	(0.7)	23	0.7	(0.7)	3	1.5	(1.9)	11	1.5	(1.9)	5	0.5%	80
LWFR	34.4	(8.7)	180	16.9	(3.0)	520	17.2	(3.2)	1,003	17.2	(3.2)	48	1.9	(1.3)	69	1.9	(1.3)	10	28.6	(6.8)	216	28.6	(6.8)	98	13.7%	2,047
MDFR	0.0	(0.3)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.3)	0	0.0	(0.3)	0	0.0%	0
NOTH	0.0	(0.7)	0	0.5	(0.5)	15	0.6	(0.5)	32	0.6	(0.5)	2	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.6)	0	0.0	(0.6)	0	0.3%	49
SOTH	0.0	(0.6)	0	0.0	(0.1)	0	1.0	(0.7)	56	1.0	(0.7)	3	0.9	(0.8)	31	0.9	(0.8)	5	0.0	(0.4)	0	0.0	(0.4)	0	0.6%	95
LWTH	2.9	(2.9)	15	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.4	(0.6)	14	0.4	(0.6)	2	0.0	(0.2)	0	0.0	(0.2)	0	0.2%	32
Fraser Canyon	0.0	(0.2)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0%	0
North Puget Sound	8.0	(5.3)	42	2.5	(1.5)	76	0.7	(1.5)	43	0.7	(1.5)	2	3.8	(2.5)	134	3.8	(2.5)	19	0.0	(0.6)	0	0.0	(0.6)	0	2.1%	317
South-Central Pug	0.0	(0.4)	0	0.1	(0.2)	2	0.1	(0.3)	4	0.1	(0.3)	0	0.8	(1.3)	29	0.8	(1.3)	4	0.0	(0.3)	0	0.0	(0.3)	0	0.3%	39
JDF	0.0	(0.2)	0	0.0	(0.1)	0	0.2	(0.4)	10	0.2	(0.4)	1	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.1%	11
Hood Canal	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0%	0
Washington Coasta	0.0	(0.5)	0	0.0	(0.1)	0	0.0	(0.2)	1	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.3)	0	0.0	(0.3)	0	0.0%	2
Columbia	0.0	(0.6)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.1	(0.4)	4	0.1	(0.4)	1	0.2	(1.0)	2	0.2	(1.0)	1	0.0%	6
Oregon	0.0	(0.7)	0	0.8	(1.2)	25	0.2	(0.4)	9	0.2	(0.4)	0	0.0	(0.3)	1	0.0	(0.3)	0	0.0	(0.6)	0	0.0	(0.6)	0	0.2%	36
California	0.0	(0.4)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.3)	0	0.0	(0.3)	0	0.0%	0
Region2																										
North_Central_BC	4.4	(4.2)	23	0.4	(0.9)	12	2.8	(1.8)	164	2.8	(1.8)	8	1.6	(2.4)	57	1.6	(2.4)	8	5.3	(4.3)	40	5.3	(4.3)	18	2.1%	313
Southern_Mainland	14.6	(6.9)	77	65.2	(3.8)	2,009	62.9	(4.3)	3,659	62.9	(4.3)	177	64.2	(4.8)	2,298	64.2	(4.8)	330	32.7	(7.6)	247	32.7	(7.6)	112	59.1%	8,796
East_Coast VI	35.3	(8.7)	185	11.7	(2.9)	362	13.5	(2.9)	786	13.5	(2.9)	38	24.3	(3.9)	869	24.3	(3.9)	125	29.5	(7.0)	223	29.5	(7.0)	101	17.4%	2,588
West_Coast VI	0.1	(1.1)	1	0.7	(1.0)	22	0.1	(0.4)	4	0.1	(0.4)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.5)	0	0.0	(0.5)	0	0.2%	28
Lower_Fraser	34.5	(8.8)	181	18.1	(3.1)	558	18.0	(3.2)	1,046	18.0	(3.2)	51	3.8	(1.7)	137	3.8	(1.7)	20	32.2	(6.9)	243	32.2	(6.9)	110	15.0%	2,236
Interior_Fraser	2.9	(3.1)	15	0.5	(0.5)	15	1.5	(0.9)	89	1.5	(0.9)	4	1.3	(0.9)	46	1.3	(0.9)	7	0.0	(0.8)	0	0.0	(0.8)	0	1.2%	177
Puget_Sound	8.0	(5.3)	42	2.5	(1.6)	78	1.0	(1.5)	58	1.0	(1.5)	3	4.6	(2.6)	163	4.6	(2.6)	23	0.1	(0.8)	0	0.1	(0.8)	0	2.5%	367
Columbia_Southern_US	0.0	(1.1)	0	0.8	(1.2)	25	0.2	(0.5)	10	0.2	(0.5)	0	0.2	(0.5)	6	0.2	(0.5)	1	0.2	(1.2)	2	0.2	(1.2)	1	0.3%	44

Table 7. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the Johnstone Strait (JST). IFR coho marked in green.

Year	2014			2014			2014			2014			2014			2014				
Julian Date	183-212			183-212			213-243			213-243			244-252			295-296				
Gear	Sport			Commercial			Sport			Commercial			Commercial			Commercial				
Region	JST_			JST_			JST_			JST_			JST_			JST_				
Month	July			July			August			August			September			October				
Sample Date Range	Jul02-Jul31			Jul02-Jul31			Aug01-Aug31			Aug01-Aug31			Sep01-Sep09			Oct22-Oct23				
Processed DNA Sample Size	195(2)			195(2)			326(14)			326(14)			191(2)			13(1)			Est. Unmarked Coho Mortalities	
Requested sample Size	200			200			400			400			200			13			JST Totals	
Est. Unmarked Coho Mortalities	4,633			85			7,633			4,492			3,886			1,591			22,320	
Region1	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	Est. Catch
North_Central_BC	18.1	(3.6)	839	18.1	(3.6)	15	24.4	(3.4)	1,865	24.4	(3.4)	1,097	10.1	(3.4)	394	6.2	(9.1)	99	19.3%	4,310
A12-13 Mainland	47.6	(4.4)	2,207	47.6	(4.4)	40	45.6	(3.9)	3,478	45.6	(3.9)	2,047	54.7	(4.8)	2,127	0.5	(2.8)	8	44.4%	9,907
A12-13 ECVI	13.5	(2.9)	624	13.5	(2.9)	11	6.1	(1.7)	467	6.1	(1.7)	275	3.2	(2.0)	126	0.0	(1.0)	0	6.7%	1,503
A15-16-28 S.Mainl	9.0	(2.5)	419	9.0	(2.5)	8	13.7	(2.9)	1,045	13.7	(2.9)	615	15.4	(3.7)	600	21.2	(11.0)	337	13.5%	3,023
A14-18 ECVI	4.7	(2.0)	219	4.7	(2.0)	4	7.6	(1.9)	578	7.6	(1.9)	340	9.3	(2.7)	361	38.1	(13.4)	607	9.4%	2,108
A19-26 WCVI	4.0	(1.6)	185	4.0	(1.6)	3	0.2	(0.3)	15	0.2	(0.3)	9	0.8	(0.8)	33	0.0	(1.5)	0	1.1%	246
A27 NWVI	1.3	(1.1)	61	1.3	(1.1)	1	0.0	(0.1)	2	0.0	(0.1)	1	0.0	(0.1)	0	0.0	(0.8)	0	0.3%	65
Chilliwack River	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.0	(0.5)	0	0.0%	1
Birkenhead	0.0	(0.1)	0	0.0	(0.1)	0	0.1	(0.2)	5	0.1	(0.2)	3	0.0	(0.1)	0	3.4	(5.7)	55	0.3%	63
LWFR	0.2	(0.6)	9	0.2	(0.6)	0	1.1	(0.9)	84	1.1	(0.9)	49	1.0	(0.9)	38	28.9	(12.6)	460	2.9%	640
MDFR	0.4	(0.5)	19	0.4	(0.5)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.4	(0.5)	17	0.0	(1.0)	0	0.2%	36
NOTH	0.1	(0.3)	5	0.1	(0.3)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(1.8)	0	0.0%	5
SOTH	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(1.6)	0	0.0%	1
LWTH	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.5	(0.5)	20	0.0	(0.7)	0	0.1%	20
Fraser Canyon	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.1)	1	0.0	(0.7)	0	0.0%	1
North Puget Sound	0.8	(1.4)	38	0.8	(1.4)	1	0.5	(0.9)	40	0.5	(0.9)	24	3.6	(1.9)	141	1.1	(3.7)	17	1.2%	260
South-Central Pug	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	2	0.0	(0.1)	1	0.0	(0.2)	1	0.5	(2.8)	8	0.1%	11
JDF	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	2	0.0	(0.1)	1	0.0	(0.1)	0	0.0	(0.3)	0	0.0%	3
Hood Canal	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	4	0.0	(0.2)	2	0.0	(0.1)	0	0.0	(0.8)	0	0.0%	6
Washington Coasta	0.1	(0.3)	3	0.1	(0.3)	0	0.6	(0.5)	43	0.6	(0.5)	26	0.4	(0.7)	16	0.0	(1.2)	0	0.4%	89
Columbia	0.0	(0.2)	1	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(1.1)	0	0.0%	1
Oregon	0.1	(0.3)	4	0.1	(0.3)	0	0.0	(0.2)	3	0.0	(0.2)	2	0.3	(0.6)	11	0.0	(1.9)	0	0.1%	20
California	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(1.4)	0	0.0%	0
Region2																				
North_Central_BC	18.1	(3.6)	839	18.1	(3.6)	15	24.4	(3.4)	1,865	24.4	(3.4)	1,097	10.1	(3.4)	394	6.2	(9.1)	99	19.3%	4,310
Southern_Mainland	56.7	(4.3)	2,625	56.7	(4.3)	48	59.3	(3.8)	4,523	59.3	(3.8)	2,662	70.2	(4.3)	2,727	21.7	(11.2)	345	57.9%	12,930
East_Coast VI	18.2	(3.4)	843	18.2	(3.4)	15	13.7	(2.5)	1,045	13.7	(2.5)	615	12.5	(3.3)	487	38.1	(13.4)	607	16.2%	3,612
West_Coast VI	5.3	(2.0)	247	5.3	(2.0)	5	0.2	(0.3)	17	0.2	(0.3)	10	0.8	(0.8)	33	0.0	(1.7)	0	1.4%	311
Lower_Fraser	0.2	(0.6)	9	0.2	(0.6)	0	1.2	(0.9)	89	1.2	(0.9)	52	1.0	(0.9)	38	32.4	(13.0)	515	3.2%	704
Interior_Fraser	0.5	(0.6)	24	0.5	(0.6)	0	0.0	(0.1)	0	0.0	(0.1)	0	1.0	(0.8)	38	0.0	(2.8)	0	0.3%	63
Puget_Sound	0.8	(1.4)	38	0.8	(1.4)	1	0.6	(0.9)	48	0.6	(0.9)	28	3.6	(2.0)	142	1.6	(4.6)	25	1.3%	281
Columbia_Southern_US	0.2	(0.5)	8	0.2	(0.5)	0	0.6	(0.5)	46	0.6	(0.5)	27	0.7	(0.9)	28	0.0	(2.8)	0	0.5%	109

Table 8. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the NWVI and SWVI inshore. IFR coho marked in green.

Year	2014			2014			2014			2014			2014			2014				
Julian Date	183-210			213-243			245-257			171-180			183-212			214-242				
Gear	Sport			Sport			Sport			Sport			Sport			Sport				
Region	SWVI-Inshore_			SWVI-Inshore_			SWVI-Inshore_			NWVI-Inshore_			NWVI-Inshore_			NWVI-Inshore_				
Month	July			August			September			June			July			August				
Sample Date Range	Jul02-Jul29			Aug01-Aug31			Sep02-Sep14			Jun20-Jun29			Jul02-Jul31			Aug02-Aug30				
Processed DNA Sample Size	75(0)			55(1)			32(0)			15(1)			131(2)			80(0)			Est. Unmarked Coho Mortalities	
Requested sample Size	76			59			32			17			143			82			SWVI / NWVI Inshore Totals	
Est. Unmarked Coho Mortalities	5,611			3,586			1,785			346			2,254			1,818			15,400	
Region1	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	Est. Catch
North_Central_BC	13.4	(5.5)	751	7.4	(4.4)	266	5.6	(6.0)	101	7.9	(8.9)	27	14.3	(7.9)	322	21.0	(6.4)	382	12.0%	1,849
A12-13 Mainland	0.9	(2.0)	48	1.4	(2.4)	51	0.4	(2.0)	7	0.7	(2.9)	2	3.5	(2.8)	79	7.9	(4.0)	144	2.1%	331
A12-13 ECVI	0.0	(0.4)	2	0.0	(0.4)	0	3.8	(5.1)	68	0.6	(2.1)	2	17.1	(5.0)	385	7.7	(3.7)	141	3.9%	598
A15-16-28 S.Mainl	7.4	(3.8)	418	1.1	(3.1)	38	0.0	(0.7)	0	12.9	(10.8)	45	7.3	(2.9)	165	0.3	(0.9)	5	4.4%	670
A14-18 ECVI	7.5	(3.3)	422	4.5	(3.5)	162	0.2	(1.2)	3	19.1	(10.1)	66	16.8	(6.4)	378	4.7	(3.4)	86	7.3%	1,117
A19-26 WCVI	59.5	(6.9)	3,341	83.4	(5.6)	2,991	73.0	(9.5)	1,304	10.0	(8.5)	35	8.1	(3.1)	182	8.4	(3.9)	153	52.0%	8,005
A27 NWVI	1.8	(3.2)	103	0.0	(0.3)	0	1.0	(2.6)	17	48.6	(12.8)	168	22.7	(8.6)	511	29.0	(5.5)	527	8.6%	1,327
Chilliwack River	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.5)	1	0.0	(0.7)	0	0.1	(0.3)	2	1.3	(1.8)	24	0.2%	27
Birkenhead	1.3	(1.3)	75	0.0	(0.3)	0	0.0	(0.3)	0	0.0	(0.5)	0	0.8	(0.8)	18	0.1	(0.5)	2	0.6%	95
LWFR	4.9	(3.1)	277	0.0	(0.5)	0	12.5	(7.5)	223	0.1	(2.1)	0	4.3	(2.6)	96	4.1	(2.7)	75	4.4%	673
MDFR	1.4	(1.3)	78	0.0	(0.1)	0	0.0	(0.3)	0	0.0	(0.7)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.5%	78
NOTH	0.1	(0.6)	6	0.0	(0.5)	0	0.0	(0.8)	0	0.0	(1.5)	0	0.0	(0.2)	0	0.0	(0.3)	0	0.0%	6
SOTH	0.2	(0.8)	13	0.0	(0.4)	0	0.0	(0.7)	0	0.0	(1.5)	0	0.0	(0.2)	0	0.0	(0.3)	0	0.1%	13
LWTH	1.0	(1.2)	53	0.0	(0.2)	0	0.0	(0.4)	0	0.0	(0.7)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.3%	53
Fraser Canyon	0.0	(0.0)	0	0.0	(0.1)	0	0.0	(0.3)	0	0.0	(0.3)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.0%	0
North Puget Sound	0.3	(1.0)	19	0.1	(0.8)	5	1.9	(5.3)	33	0.1	(2.0)	0	4.1	(4.1)	93	6.2	(4.6)	113	1.7%	264
South-Central Pug	0.0	(0.3)	3	0.2	(0.9)	8	0.4	(1.9)	8	0.0	(0.9)	0	0.7	(1.2)	15	0.0	(0.3)	1	0.2%	34
JDF	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.4)	0	0.0	(0.2)	1	0.0	(0.2)	0	0.0%	1
Hood Canal	0.0	(0.3)	2	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.7)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0%	2
Washington Coasta	0.0	(0.2)	0	0.0	(0.3)	0	0.0	(0.4)	0	0.0	(0.9)	0	0.0	(0.1)	0	5.2	(2.6)	94	0.6%	94
Columbia	0.0	(0.3)	0	1.8	(1.9)	65	0.0	(0.7)	0	0.0	(1.2)	0	0.3	(0.6)	6	2.4	(1.7)	44	0.7%	115
Oregon	0.0	(0.3)	0	0.0	(0.3)	0	1.1	(2.9)	20	0.0	(1.5)	0	0.0	(0.3)	1	0.2	(0.9)	4	0.2%	26
California	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.5)	0	0.0	(0.9)	0	0.0	(0.1)	0	1.3	(1.2)	23	0.1%	23
Region2																				
North_Central_BC	13.4	(5.5)	751	7.4	(4.4)	266	5.6	(6.0)	101	7.9	(8.9)	27	14.3	(7.9)	322	21.0	(6.4)	382	12.0%	1,849
Southern_Mainland	8.3	(4.2)	466	2.5	(3.8)	89	0.4	(2.2)	7	13.6	(11.0)	47	10.8	(3.6)	244	8.2	(4.1)	148	6.5%	1,001
East_Coast VI	7.6	(3.4)	424	4.5	(3.6)	162	4.0	(5.2)	71	19.6	(10.2)	68	33.9	(9.1)	763	12.5	(5.1)	227	11.1%	1,715
West_Coast VI	61.4	(6.5)	3,444	83.4	(5.6)	2,992	74.0	(10.0)	1,321	58.6	(12.7)	203	30.8	(9.1)	693	37.4	(6.3)	680	60.6%	9,332
Lower_Fraser	6.3	(3.3)	353	0.0	(0.6)	0	12.6	(7.4)	224	0.1	(2.2)	0	5.1	(2.7)	116	5.6	(3.2)	102	5.2%	795
Interior_Fraser	2.7	(1.9)	150	0.0	(0.7)	0	0.0	(1.2)	0	0.0	(2.3)	0	0.0	(0.3)	0	0.0	(0.5)	0	1.0%	150
Puget_Sound	0.4	(1.2)	24	0.3	(1.2)	12	2.3	(5.5)	41	0.1	(2.3)	0	4.8	(4.1)	109	6.3	(4.6)	114	2.0%	301
Columbia_Southern_US	0.0	(0.5)	1	1.8	(2.0)	65	1.1	(3.0)	20	0.0	(2.3)	0	0.3	(0.7)	7	9.0	(3.4)	164	1.7%	257

Table 9. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the NWVI and SWVI offshore. IFR coho marked in green.

Year	2014			2014			2014			2014			2014			2014			2014			2014			2014				
Julian Date	179-181			183-212			213-243			258-261			183-210			213-241			213-241			252-272			252-272			281-282				
Gear	Sport			Sport			Sport			Sport			Sport			Sport			Commercial			Sport			Commercial			Commercial				
Region	NWVI-Offshore_			NWVI-Offshore_			NWVI-Offshore_			NWVI-Offshore_			SWVI-Offshore_			SWVI-Offshore_			SWVI-Offshore_			SWVI-Offshore_			SWVI-Offshore_			SWVI-Offshore_				
Month	June			July			August			September			July			August			August			September			September			October				
Sample Date Range	Jun28-Jun30			Jul02-Jul31			Aug01-Aug31			Sep15-Sep18			Jul02-Jul29			Aug01-Aug29			Aug01-Aug29			Sep09-Sep29			Sep09-Sep29			Oct08-Oct09				
Processed DNA Sample Size	11(0)			164(2)			354(3)			133(0)			21(0)			72(1)			72(1)			224(0)			224(0)			196(0)			Est. Unmarked Coho Mortalities	
Requested sample Size	13			200			364			150			26			72			72			228			228			200			SWVI / NWVI Offshore Totals	
Est. Unmarked Coho Mortalities	51			3,259			4,600			2,296			2,277			4,510			45			1,096			15,429			8,650			42,213	
Region1	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	Est. Catch
North_Central_BC	36.2	(14.8)	18	13.6	(3.9)	444	4.5	(2.8)	206	5.8	(3.0)	132	31.2	(10.7)	711	4.5	(3.5)	204	4.5	(3.5)	2	0.5	(0.9)	6	0.5	(0.9)	83	4.1	(1.9)	355	5.1%	2,161
A12-13 Mainland	1.8	(5.3)	1	7.8	(3.5)	256	17.1	(3.4)	785	1.0	(1.6)	22	0.1	(1.3)	1	9.7	(4.2)	437	9.7	(4.2)	4	3.8	(1.8)	42	3.8	(1.8)	591	0.1	(0.3)	7	5.1%	2,147
A12-13 ECVI	11.3	(9.0)	6	3.7	(1.9)	120	3.3	(1.3)	153	10.1	(3.1)	232	0.0	(0.9)	1	5.4	(3.6)	246	5.4	(3.6)	2	0.6	(0.8)	6	0.6	(0.8)	86	0.0	(0.2)	1	2.0%	852
A15-16-28 S.Mainl	25.3	(13.3)	13	2.5	(2.3)	81	7.7	(2.2)	354	6.7	(2.6)	154	3.2	(5.8)	72	8.8	(4.1)	399	8.8	(4.1)	4	2.4	(2.4)	26	2.4	(2.4)	365	5.9	(2.1)	507	4.7%	1,976
A14-18 ECVI	0.0	(1.8)	0	10.2	(2.8)	332	8.4	(2.0)	384	8.9	(2.7)	203	21.8	(9.9)	496	12.7	(4.2)	571	12.7	(4.2)	6	15.5	(2.8)	170	15.5	(2.8)	2,395	13.2	(2.9)	1,140	13.5%	5,698
A19-26 WCVI	0.0	(1.8)	0	15.4	(4.1)	503	20.8	(4.7)	958	26.4	(4.8)	605	10.0	(6.5)	228	18.1	(5.3)	817	18.1	(5.3)	8	12.6	(2.9)	138	12.6	(2.9)	1,940	0.7	(1.3)	59	12.5%	5,256
A27 NWVI	7.7	(7.6)	4	8.4	(2.5)	273	4.6	(2.1)	214	7.0	(3.0)	162	8.5	(6.6)	193	0.0	(0.2)	0	0.0	(0.2)	0	0.2	(0.6)	2	0.2	(0.6)	31	0.0	(0.1)	0	2.1%	879
Chilliwack River	0.0	(0.3)	0	1.3	(0.9)	43	3.0	(1.1)	140	0.0	(0.1)	0	0.4	(1.4)	9	0.0	(0.3)	1	0.0	(0.3)	0	1.6	(1.1)	18	1.6	(1.1)	252	1.6	(1.3)	142	1.4%	605
Birkenhead	0.0	(0.8)	0	2.0	(1.2)	66	0.8	(0.5)	38	3.0	(1.5)	70	0.0	(0.5)	0	2.8	(1.9)	127	2.8	(1.9)	1	0.1	(0.2)	1	0.1	(0.2)	8	3.2	(1.3)	278	1.4%	589
LWFR	8.4	(8.4)	4	10.2	(2.8)	333	9.1	(1.9)	420	6.1	(2.6)	140	0.0	(1.5)	0	6.3	(3.3)	285	6.3	(3.3)	3	13.6	(2.6)	149	13.6	(2.6)	2,094	10.4	(2.8)	900	10.3%	4,328
MDFR	0.0	(0.8)	0	0.6	(0.6)	20	0.3	(0.3)	15	0.4	(0.7)	8	0.0	(0.5)	0	0.1	(0.6)	5	0.1	(0.6)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.1%	48
NOTH	0.0	(2.0)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.8	(0.8)	18	0.0	(1.0)	0	1.4	(1.4)	65	1.4	(1.4)	1	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.2)	2	0.2%	85
SOTH	0.0	(1.5)	0	0.6	(0.6)	20	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(1.1)	0	0.0	(0.3)	0	0.0	(0.3)	0	0.9	(0.6)	10	0.9	(0.6)	138	0.0	(0.1)	0	0.4%	168
LWTH	0.0	(0.9)	0	0.0	(0.1)	0	0.2	(0.3)	11	0.0	(0.1)	0	0.0	(0.4)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0%	11
Fraser Canyon	0.0	(0.5)	0	0.0	(0.0)	0	0.3	(0.3)	13	1.4	(1.1)	33	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.1%	46
North Puget Sound	0.1	(2.3)	0	15.8	(3.8)	516	10.8	(2.4)	498	7.8	(3.1)	179	13.0	(8.0)	297	21.2	(5.4)	954	21.2	(5.4)	10	26.1	(4.6)	286	26.1	(4.6)	4,022	29.3	(5.6)	2,533	22.0%	9,294
South-Central Pug	0.0	(1.4)	0	1.5	(1.8)	50	3.3	(1.4)	150	1.4	(1.2)	33	10.7	(7.6)	243	2.3	(3.1)	103	2.3	(3.1)	1	2.0	(1.5)	22	2.0	(1.5)	308	6.6	(2.3)	567	3.5%	1,477
JDF	0.0	(0.6)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.7	(2.8)	15	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.0)	0	0.0	(0.0)	0	0.5	(0.8)	43	0.1%	59
Hood Canal	0.0	(0.7)	0	0.0	(0.1)	0	0.0	(0.1)	1	0.0	(0.1)	0	0.0	(0.4)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	1	0.0	(0.1)	1	0.0%	2
Washington Coasta	0.0	(1.2)	0	5.1	(2.0)	165	1.8	(0.7)	85	5.0	(2.0)	114	0.0	(0.7)	0	3.6	(2.3)	160	3.6	(2.3)	2	16.7	(2.9)	183	16.7	(2.9)	2,583	16.6	(3.1)	1,433	11.2%	4,725
Columbia	9.1	(7.7)	5	0.7	(0.8)	24	1.7	(0.8)	78	2.4	(1.4)	56	0.1	(1.2)	2	2.6	(1.9)	116	2.6	(1.9)	1	2.5	(1.1)	28	2.5	(1.1)	389	0.6	(0.6)	52	1.8%	751
Oregon	0.0	(1.6)	0	0.4	(0.9)	13	2.1	(1.1)	97	5.9	(2.8)	136	0.3	(2.0)	8	0.4	(1.4)	19	0.4	(1.4)	0	0.9	(0.7)	10	0.9	(0.7)	143	7.3	(2.5)	630	2.5%	1,056
California	0.0	(1.5)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0	(0.1)	0	0.0	(0.7)	0	0.0	(0.2)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0%	0
Region2																																
North_Central_BC	36.2	(14.8)	18	13.6	(3.9)	444	4.5	(2.8)	206	5.8	(3.0)	132	31.2	(10.7)	711	4.5	(3.5)	204	4.5	(3.5)	2	0.5	(0.9)	6	0.5	(0.9)	83	4.1	(1.9)	355	5.1%	2,161
Southern_Mainland	27.1	(13.8)	14	10.3	(4.4)	337	24.8	(3.7)	1,140	7.7	(2.7)	177	3.2	(5.9)	74	18.5	(5.3)	836	18.5	(5.3)	8	6.2	(2.9)	68	6.2	(2.9)	956	5.9	(2.2)	513	9.8%	4,122
East_Coast VI	11.4	(9.2)	6	13.9	(3.3)	453	11.7	(2.4)	537	18.9	(3.9)	435	21.8	(10.0)	497	18.1	(5.2)	817	18.1	(5.2)	8	16.1	(2.9)	176	16.1	(2.9)	2,480	13.2	(2.9)	1,141	15.5%	6,550
West_Coast VI	7.7	(7.9)	4	23.8	(4.5)	776	25.5	(4.8)	1,172	33.4	(4.6)	767	18.5	(8.6)	421	18.1	(5.3)	817	18.1	(5.3)	8	12.8	(3.0)	140	12.8	(3.0)	1,971	0.7	(1.3)	60	14.5%	6,135
Lower_Fraser	8.4	(8.5)	4	13.6	(3.0)	442	13.0	(2.1)	598	9.1	(3.0)	210	0.4	(2.1)	9	9.2	(3.7)	413	9.2	(3.7)	4	15.3	(2.7)	167	15.3	(2.7)	2,355	15.3	(3.0)	1,320	13.1%	5,522
Interior_Fraser	0.0	(2.9)	0	1.2	(0.9)	40	0.8	(0.5)	39	2.6	(1.4)	59	0.0	(1.7)	0	1.6	(1.6)	70	1.6	(1.6)	1	0.9	(0.7)	10	0.9	(0.7)	138	0.0	(0.2)	2	0.8%	358
Puget_Sound	0.1	(2.8)	0	17.4	(3.9)	566	14.1	(2.6)	648	9.2	(3.2)	211	24.4	(10.1)	556	23.5	(5.8)	1,058	23.5	(5.8)	11	28.1	(4.4)	308	28.1	(4.4)	4,330	36.3	(5.4)	3,144	25.7%	10,832
Columbia_Southern_US	9.1	(8.0)	5	6.2	(2.2)	202	5.7	(1.5)	260	13.3	(3.5)	305	0.4	(2.5)	10	6.6	(2.9)	296	6.6	(2.9)	3	20.2	(3.1)	221	20.2	(3.1)	3,115	24.5	(3.9)	2,116	15.5%	6,532

Table 10. The GSI % of 'wild' unmarked coho sample applied against the estimate of the total 'wild' unmarked coho catch in the SWVI-Area121-21 and Juan de Fuca/Strait of Georgia (JDF-GST). IFR coho marked in green.

Year	2014			2014			2014			2014			2014				
Julian Date	244-257			206-212			213-239			250-271			277-302				
Gear	Sport			Sport			Sport			Sport			Sport				
Region	JDF-WCVI			SWVI-Area_21_121			SWVI-Area_21_121			JDF-GST			JDF-GST				
Month	September			July			August			September			October				
Sample Date Range	Sep01-Sep14			Jul25-Jul31			Aug01-Aug27			Sep07-Sep28			Oct04-Oct29				
Processed DNA Sample Size	53(0)			16(0)			93(1)			93(0)			126(0)			Est. Unmarked Coho Mortalities	
Requested sample Size	55			36			101			93			127			JDF / 121 Totals	
Est. Unmarked Coho Mortalities	875			555			1,431			5,795			5,658			14,314	
Region1	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	SD	Est. Catch	%	Est. Catch
North_Central_BC	0.2	(1.4)	2	0.5	(4.0)	3	4.6	(2.8)	66	0.2	(0.9)	9	0.6	(1.2)	36	0.8%	116
A12-13 Mainland	1.5	(2.6)	13	0.4	(2.3)	2	5.0	(4.0)	71	0.8	(2.3)	48	0.0	(0.3)	1	0.9%	136
A12-13 ECVI	0.1	(0.6)	0	0.1	(1.3)	1	0.2	(0.7)	3	0.0	(0.3)	1	0.1	(0.3)	3	0.1%	8
A15-16-28 S.Mainl	11.2	(4.8)	98	0.0	(1.3)	0	5.5	(3.8)	78	11.1	(3.8)	646	11.7	(3.2)	664	10.4%	1,487
A14-18 ECVI	21.4	(6.6)	187	3.0	(5.7)	17	12.3	(4.4)	175	18.2	(4.8)	1,055	39.6	(4.8)	2,239	25.7%	3,673
A19-26 WCVI	20.0	(7.6)	175	6.3	(5.6)	35	6.2	(3.1)	89	6.8	(2.7)	396	12.5	(3.2)	710	9.8%	1,405
A27 NWVI	0.0	(0.2)	0	0.0	(1.0)	0	0.4	(0.8)	5	1.1	(1.5)	62	0.6	(1.3)	35	0.7%	102
Chilliwack River	0.0	(0.4)	0	0.0	(0.6)	0	0.3	(1.1)	5	3.9	(2.2)	228	0.3	(1.1)	18	1.8%	251
Birkenhead	1.9	(1.9)	17	0.3	(1.9)	2	1.1	(1.1)	16	7.0	(2.7)	405	5.6	(2.1)	319	5.3%	758
LWFR	7.5	(5.0)	66	0.7	(3.3)	4	12.8	(4.1)	184	18.7	(5.0)	1,081	23.3	(4.2)	1,317	18.5%	2,651
MDFR	0.0	(0.3)	0	6.3	(5.6)	35	0.0	(0.2)	0	3.8	(2.1)	221	0.0	(0.1)	0	1.8%	256
NOTH	5.7	(3.1)	49	0.0	(1.3)	0	2.1	(1.5)	31	0.0	(0.3)	0	0.0	(0.2)	0	0.6%	80
SOTH	1.9	(1.9)	17	0.0	(1.3)	0	0.0	(0.3)	0	1.2	(1.2)	69	2.4	(1.4)	135	1.5%	220
LWTH	1.9	(1.8)	17	0.0	(0.3)	0	0.0	(0.1)	0	0.4	(0.8)	22	0.0	(0.1)	0	0.3%	39
Fraser Canyon	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.0	(0.1)	0	0.0	(0.0)	0	0.0%	0
North Puget Sound	20.3	(6.3)	177	81.1	(11.2)	450	43.1	(5.8)	616	17.6	(5.1)	1,017	2.4	(2.5)	135	16.7%	2,396
South-Central Pug	2.6	(3.0)	23	0.0	(0.6)	0	0.1	(0.5)	1	9.2	(3.5)	534	0.6	(1.2)	32	4.1%	590
JDF	0.0	(0.2)	0	0.0	(1.1)	0	0.0	(0.1)	0	0.0	(0.2)	1	0.0	(0.1)	0	0.0%	1
Hood Canal	0.3	(1.1)	3	0.1	(0.9)	1	0.1	(0.4)	2	0.0	(0.1)	0	0.0	(0.3)	2	0.0%	7
Washington Coasta	3.5	(3.1)	31	1.1	(3.3)	6	3.3	(2.0)	48	0.0	(0.2)	0	0.1	(0.4)	6	0.6%	91
Columbia	0.0	(0.5)	0	0.0	(1.1)	0	2.5	(1.7)	36	0.0	(0.3)	1	0.1	(0.4)	6	0.3%	43
Oregon	0.0	(0.5)	0	0.1	(1.6)	1	0.3	(1.0)	5	0.0	(0.2)	0	0.0	(0.2)	0	0.0%	6
California	0.0	(0.3)	0	0.0	(0.8)	0	0.0	(0.1)	0	0.0	(0.2)	0	0.0	(0.1)	0	0.0%	0
Region2																	
North_Central_BC	0.2	(1.4)	2	0.5	(4.0)	3	4.6	(2.8)	66	0.2	(0.9)	9	0.6	(1.2)	36	0.8%	116
Southern_Mainland	12.7	(5.3)	111	0.4	(2.7)	2	10.5	(4.0)	150	12.0	(3.8)	694	11.8	(3.2)	665	11.3%	1,622
East_Coast VI	21.5	(6.6)	188	3.1	(5.8)	17	12.4	(4.5)	178	18.2	(4.8)	1,056	39.6	(4.8)	2,242	25.7%	3,681
West_Coast VI	20.0	(7.6)	175	6.3	(5.7)	35	6.6	(3.0)	94	7.9	(3.0)	458	13.2	(3.4)	745	10.5%	1,507
Lower_Fraser	9.4	(5.4)	83	1.0	(3.7)	5	14.3	(4.2)	204	29.6	(5.5)	1,714	29.2	(4.5)	1,654	25.6%	3,659
Interior_Fraser	9.4	(3.9)	83	6.3	(5.8)	35	2.2	(1.5)	31	5.4	(2.4)	312	2.4	(1.4)	135	4.2%	595
Puget_Sound	23.2	(6.7)	203	81.2	(11.1)	451	43.3	(5.8)	619	26.8	(5.6)	1,552	3.0	(2.8)	169	20.9%	2,994
Columbia_Southern_US	3.5	(3.2)	31	1.2	(3.9)	7	6.2	(2.7)	89	0.0	(0.4)	1	0.2	(0.7)	12	1.0%	140

Table 11. Summary of estimated IFR unmarked coho mortalities by month and catch region. Total mortalities in months not shown total approximately 5,000 unmarked 'wild' coho. See Appendix 2 for the total mortalities in all fisheries.

Month	Catch Region	Gear	Est. Unmarked Coho Mortalities by Region by Gear	DNA Sample Size	Sampled from	Est. IFR Unmarked Coho Mortalities	SD %	DNA Probility %	`-2 SD	`-1 SD	IFR	`+1 SD	`+2 SD
June	GST	Sport	524	34(0)	Sport	15	(3.1)	2.9	14	15	15	16	16
July	GST	Sport	3,081	199(0)	Sport	15	(0.5)	0.5	15	15	15	16	16
August	GST	Sport	5,817	198(0)	Sport & Comm	89	(0.9)	1.5	87	88	89	90	91
August	GST	Commercial	281	198(0)	Sport & Comm	4	(0.9)	1.5	4	4	4	4	4
September	GST	Sport	3,576	156(0)	Sport & Comm	46	(0.9)	1.3	45	45	46	46	47
September	GST	Commercial	513	156(0)	Sport & Comm	7	(0.9)	1.3	6	7	7	7	7
October	GST	Sport	756	48(0)	Sport & Comm	0	(0.8)	0.0	0	0	0	0	0
October	GST	Commercial	343	48(0)	Sport & Comm	0	(0.8)	0.0	0	0	0	0	0
July	JST	Sport	4,633	195(2)	Sport & Comm	24	(0.6)	0.5	24	24	24	24	24
July	JST	Commercial	85	195(2)	Sport & Comm	0	(0.6)	0.5	0	0	0	0	0
August	JST	Sport	7,633	326(14)	Sport & Comm	0	(0.1)	0.0	0	0	0	0	0
August	JST	Commercial	4,492	326(14)	Sport & Comm	0	(0.1)	0.0	0	0	0	0	0
September	JST	Commercial	3,886	191(2)	Commercial	38	(0.8)	1.0	38	38	38	39	39
October	JST	Commercial	1,591	13(1)	Commercial	0	(2.8)	0.0	0	0	0	0	0
July	SWVI-Inshore	Sport	5,611	75(0)	Sport	150	(1.9)	2.7	144	147	150	152	155
August	SWVI-Inshore	Sport	3,586	55(1)	Sport	0	(0.7)	0.0	0	0	0	0	0
September	SWVI-Inshore	Sport	1,785	32(0)	Sport	0	(1.2)	0.0	0	0	0	0	0
June	NWVI-Inshore	Sport	346	15(1)	Sport	0	(2.3)	0.0	0	0	0	0	0
July	NWVI-Inshore	Sport	2,254	131(2)	Sport	0	(0.3)	0.0	0	0	0	0	0
August	NWVI-Inshore	Sport	1,818	80(0)	Sport	0	(0.5)	0.0	0	0	0	0	0
June	NWVI-Offshore	Sport	51	11(0)	Sport	0	(2.9)	0.0	0	0	0	0	0
July	NWVI-Offshore	Sport	3,259	164(2)	Sport	40	(0.9)	1.2	39	40	40	40	41
August	NWVI-Offshore	Sport	4,600	354(3)	Sport	39	(0.5)	0.8	39	39	39	39	39
September	NWVI-Offshore	Commercial	2,296	133(0)	Commercial	59	(1.4)	2.6	57	58	59	59	60
July	SWVI-Offshore	Sport	2,277	21(0)	Sport	0	(1.7)	0.0	0	0	0	0	0
August	SWVI-Offshore	Sport	4,510	72(1)	Sport & Comm	70	(1.6)	1.6	68	69	70	71	72
August	SWVI-Offshore	Commercial	45	72(1)	Sport & Comm	1	(1.6)	1.6	1	1	1	1	1
September	SWVI-Offshore	Sport	1,096	224(0)	Sport & Comm	10	(0.7)	0.9	10	10	10	10	10
September	SWVI-Offshore	Commercial	15,429	224(0)	Sport & Comm	138	(0.7)	0.9	136	137	138	139	140
October	SWVI-Offshore	Commercial	8,650	196(0)	Commercial	2	(0.2)	0.0	2	2	2	2	2
September	JDF-WCVI	Sport	875	53(0)	Sport	83	(3.9)	9.4	76	79	83	86	89
July	SWVI-Area21/121	Sport	555	16(0)	Sport	35	(5.8)	6.3	31	33	35	37	39
August	SWVI-Area21/122	Sport	1,431	93(1)	Sport	31	(1.5)	2.2	30	30	31	31	32
September	JDF-GST	Sport	5,795	93(0)	Sport	312	(2.4)	5.4	297	305	312	320	327
October	JDF-GST	Sport	5,658	126(0)	Sport	135	(1.4)	2.4	131	133	135	137	138
	Totals		**109,138**	**3,368(30)**		**1,343**			**1,296**	**1,319**	**1,343**	**1,366**	**1,390**

Table 12. Comparison of DNA based estimates of total mortality of IFR coho compared to planning tool model projections of mortalities assuming 25,000 pre-fishery abundance.

Fishery Area	Sector	Preseason planning model projected ER	Post season model estimated ER	Post season model estimated mortalities	DNA based estimated mortalities	DNA based estimated ER	% Deviation from Model (post season model-DNA /DNA)
JST	Recreational	0.09%	0.40%	101	24	0.10%	320%
GST	Recreational	1.16%	0.97%	244	166	0.66%	47%
JdF	Recreational	0.74%	0.72%	179	530	2.12%	-66%
WCVI Insides Surfline	Recreational	0.23%	0.47%	118	150	0.60%	-21%
WCVI Outside Surfline	Recreational	0.81%	0.61%	153	225	0.90%	-32%
	Total Recreational	**3.03%**	**3.18%**	**795**	**1095**	4.38%	**-27%**
JST	Commercial	0.42%	0.34%	85	38	0.15%	124%
GST	Commercial	0.62%	1.89%	473	11	0.04%	4202%
JdF	Commercial						
WCVI Insides Surfline	Commercial						
WCVI Outside Surfline	Commercial	0.12%	0.36%	90	199	0.80%	-55%
	Total Commercial	**1.16%**	**2.59%**	**649**	**248**	0.99%	**162%**
	subtotal	4.19%	5.77%	1,443	1,343	5.37%	7%
	hatchery addon						
JST	test fisheries		0.04%	10			
GSN	test fisheries						
GSS	test fisheries						
JdF	test fisheries		0.04%	10			
WCVI Insides Surfline	test fisheries						
WCVI Outside Surfline	test fisheries						
	Total test fisheries	0.08%	**0.08%**	20	included in commercial		
Marine FSC	**FSC**	0.19%	**0.19%**	48	48	0.19%	
	Total Marine			1,511	1,391		
		4.46%	6.04%	6.04%	5.56%		
note: assume 25,000 total pre-fishery abundance wild IFR coho				25000	25000		
file: \\dcbcpbsna01a\salmon$\2-coho\2014\							
Copy of Updated 2014 PostSeasonMarineModel(March26).xlsx							

Figures

Figure 1. Map of Statistical Areas outlining coho salmon fishing locations in southern British Columbia. JST includes areas 11-13, GST includes areas 14-18, northern19 plus 29, JdeF includes 20 plus part of area 19, WCVI includes 21-27 for inside and 121-127 for outside.

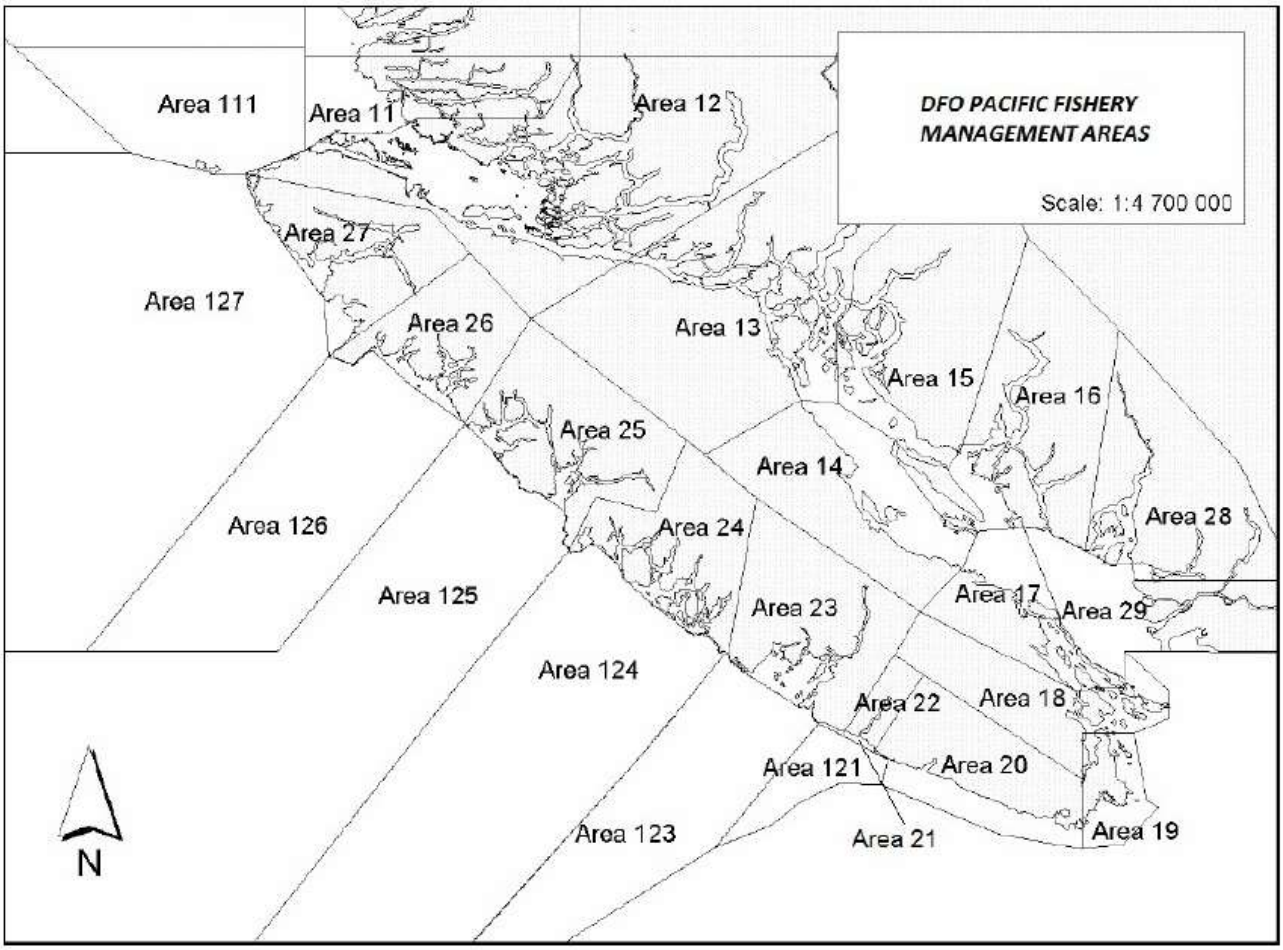


Figure 2. 90% symmetric confidence intervals for the coastwide baseline assuming constant stock proportion of 2% IFR coho. For sub-sampling purpose the target sample size was 200 for fisheries with at least 1000 total coho mortalities.

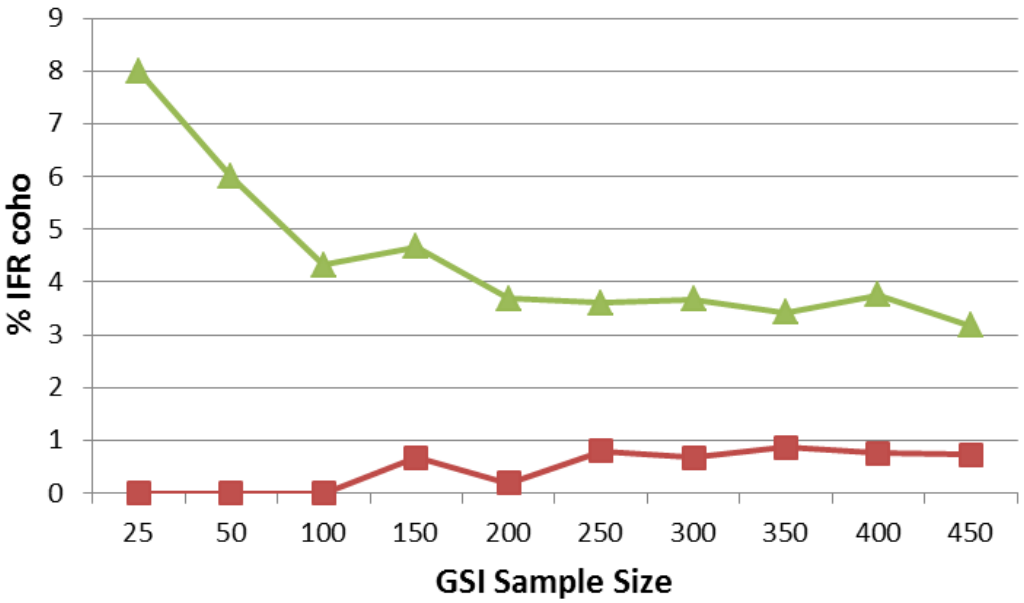
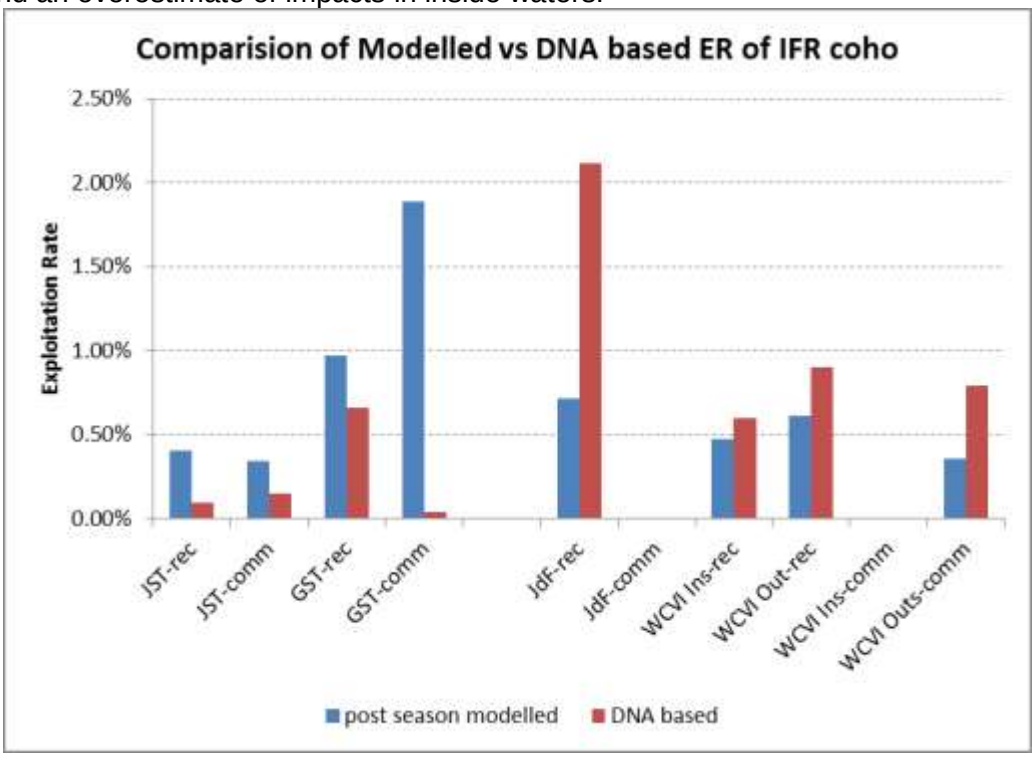


Figure 3. Comparson of post season modelled ER vs DNA based ER for fishing areas in southern BC. The chart suggests a greater outside distribution of IFR coho than the average distribution used in the fishery planning model. That is, an underestimate of impacts off the WCVI and an overestimate of impacts in inside waters.



Appendix 1. Fishery specific sampling guidelines and advice.

Introduction.
In 2014, it has been established that the ER cap on Interior Fraser River (IFR) coho in Canadian fisheries will increase from 3% to 16% in response to improved status and review of the expected fishery impacts on rebuilding.

Assessment of the impact will be conducted using 3 methods, including:

1. Use of CWT to estimate the ER on hatchery coho returning to IFR.
2. Use of historic relationships between ER and effort in specific marine recreational and commercial fisheries.
3. Use of DNA to estimate the number of IFR coho caught in fisheries (as a % of wild or unmarked coho) relative to the total catch plus escapement.

The purpose of this document is to outline the plan for collection of DNA from unmarked coho in marine fisheries to support method 3 (DNA based estimate).

In 2014 all south coast marine fisheries will be sampled to obtain tissue from unmarked 'wild' coho for DNA analysis to determine stock composition of the fishery related mortalities. This method requires an estimate of total catch of wild 'unmarked' coho by fishery and period.

Samples will be collected from a variety of methods and existing programs, such as recreational fishery creel surveys, recreational guide and avid angler data collection, dockside commercial catch monitoring, test fisheries, and First Nations catch monitoring programs. The specific requirements are outlined below.

Sampling Objective:
Collection of a representative sample of DNA from wild 'unmarked' coho in South Coast marine fisheries. The %IFR coho in the wild 'unmarked' coho sample will be applied against the estimate of wild 'unmarked' coho catch in each fishery.

Sampling Guidelines and Advice:

1. <u>Sample only unmarked coho</u>. Do NOT sample marked hatchery coho.

2. <u>Sample minimum 100 per period per fishery time and area</u>. Note the colour coded priority of sampling in a following Attachment 1. Please ensure that the red high priority sample strata have the minimum samples.

3. <u>Sample periods</u>. Start a new sampling sheet/book for each week or period sampled. For recreational and FSC fisheries sample in 2 week periods as follows.

Period 1) June 29-July 12
Period 2) July 13-July 26

Period 3) July 27- Aug 9
Period 4) August 10 – August 23
Period 5) August 24 – September 6
Period 6) September 7 – September 20
Period 7) September 21 – October 4

4. **Recreational fishery sampling by creel surveyors: Sample in proportion to the catch.** The samples will be assigned to a catch for a 2 week period and fishing area as shown in the attached table. Samples should be collected throughout the period in proportion to the catch. For example you could sample all the catch you observe for the first day or two… and then adjust your sampling rate based on the catch rate of unmarked or wild coho. For example, if you observe a catch rate which would result in you seeing over 500 coho during the 2 week sample period then sample 1 in 5 of the coho catch observed. The sample rate can be higher, we can subsample at a later date. Also keep in touch with your sampling coordinator. IF there is a commercial sockeye opening you may be asked to take additional samples on that day or surrounding days.

5. **Fishery Officers conducting landing checks/compliance of net fisheries:** When you are conducting compliance checks in the net fishery please take DNA samples from any unmarked 'wild' coho. It doesn't matter if you are on board the fishing vessel at sea, at the dock, or in the plant. Sample opportunistically in any offloads or plant operations you are checking. Use tweezers, knife, pliers to take 2 scales per fish in the scale books supplied. Remember to document the catch location/area/gear/date as well as the sampling location and your name as sampler. Also on the back of the scale book keep tick marks for your observations for that date (e.g. 2 columns – 1 for wild 'unmarked' coho observed and column 2 for hatchery 'marked' coho). It will be important to provide wild 'unmarked' coho cpue for the boats being checked…so try to expand your observation to the total catch for the boat.

6. **Commercial fishery sampling.** JO Thomas will be sampling incidentally retained 'bycatch' unmarked or 'wild' coho at the processing plants and/or on the packers.

- DNA tissue (AFC or tail punch or scale) should be taken from a representative sample of wild coho landed or off-loaded by the vessel. It will be important to ensure that the sample has not gone through any sorting process and that the sample comes from a cross section of the fleet and the fishing area similar to the fishery.
- The sampling objective will be to collect approximately 100 samples by fishery/ stat week / and stat area. If a fishery opening spans more than one statistical week, please try to obtain samples known to be caught within the week being sampled. Samples should represent the catch over the whole period and area of a fishery opening.
- The approximate number of DNA samples to be collected from each offload will be determined by the contractor to distribute the sampling across as many vessels as possible and in proportion to the catch. For example, as a general guide take no more than 10 coho samples per vessel.

- DNA sample collection should be taken from vessels fishing a single area vs vessels fishing more than one stat area. Mixed samples from packers are generally not sampled due to potential mixing across areas.
- Sample effort should be consistent with sector catch validation effort; that is, total coho landed by mark type should be recorded for the vessel (Adipose Fin Clipped or marked or hatchery coho vs adipose fin present or unmarked or wild coho). A total estimate of unmarked coho landed will be required.
- For each shipment of samples, complete the Summary Checklist of Deliverables and deliver with the DNA samples and a hard copy print out of the Sample Inventory Data Sheet. An electronic version of the Sample Inventory Data Sheet is to be emailed concurrently to the coordinator.
- Where fish caught on more than one vessel have been mixed as a result of grading (i.e. 2 boats' fish in 1 tote), these fish can be sampled as long as the boats have fished in the same catch region (NWVI or SWVI) and the areas fished are known.

7. **FSC fishery samplers**: Use the appropriate sample sheet such as Whatman paper or scale book. Remember to start a new sheet or book for each sampling event and period. Document the sampling on the sheet or book, including catch area, location, date, and gear, as well as sampling information such as number of unmarked coho sampled, estimated unmarked coho catch for the vessel(s) sampled, estimated marked coho catch, sample location, sampler.

Sample sizes could be up to 100 per sample…but don't worry if you can't achieve 100 as we can or will combine any commercial or FSC samples you get with recreational samples in the same area. It is very important that you estimate and report the total number of unmarked and marked coho observed. It is useful, if you have time, to document how you expanded your observations to the total catch for the vessel(s) being sampled.

8. Sample priority depends on risk in the fishery. The following table provides an preseason view on the priority given to each fishery, depending on the expected incidence of IFR coho and the effort and catch in the fishery. You should understand the risk in your fishery so that you understand the importance of your sampling effort in that fishery area.

Area is defined as PFMA statistical area, the minimum time period is day of the fishery but samples should be collated within a Statistical Week. The gear is by licence area (B, D, E, G, H). The fisheries are specified in the following table along with color coding for priority.

9. **Sampling protocols.**

Discuss with your coordinator how tissue samples should be taken and prepared. Tissue samples include scales or tissue placed on supplied Whatman sheets, vials, or scale books. For commercial fisheries tissue plugs are to be collected and stored on Whatman Paper.

Label all samples appropriately. Please make sure that date, period, sampler, statistical area, fishery (sport, FSC, commercial gillnet/seine/troll), and location of sampling are recorded.

For South Coast fisheries sample supplies are available through Lee Kearey in Nanaimo (250-756-7116). Supplies are also available from the Molecular Genetics Laboratory (MGL), Pacific Biological Station, Nanaimo, B.C. Please familiarize yourself with sampling protocols later in this sampling plan or which can be found on the MGL website at http://www.pac.dfo-mpo.gc.ca/science/facilities-installations/pbs-sbp/mgl-lgm/samp-echant/index-eng.html

At the end of each 2 week period collate all your sampling and send to Lee Kearey for cataloging, sub-sampling, and liason with the DNA lab.

- Using a hand-held standard paper punch, take the DNA plug from the thinnest part of the caudal (tail) fin that contains the least amount of bone.
- It is important to wipe down the tissue site on the fish prior to sampling. This reduces cross-contamination caused by the slime between fish.
- It is also important to rinse the sampling tools between fish to avoid contamination.
- The sample should be placed in the center of each of the squares printed on the paper. The paper will absorb all the water in the tissue sample causing it to adhere to the paper.
- For the best results the tissue must be applied immediately after punch is taken.
- To restrict cross-contamination, try not to get too much liquid (slime) on the sheet or allow any liquid to run between squares.
- Keep the sheet as dry as possible and avoid bending which might cause the samples to fall off.
- Once the paper is completely dry it can be gently placed in the provided sleeves with the wax paper covering the samples. This can then be placed in padded or stay-flat envelopes and shipped using regular mail.
- All data fields on the Whatman Sheet are to be filled out.
- Samples and inventory/data sheets are to be submitted weekly or monthly; check with your coordinator.
- General rule: DNA sample collection should be taken from as many vessels as possible.
- General rule: Ensure DNA plugs can be identified as being from unclipped fish as plugs are placed into the cells on the Whatman Sheet.
- General rule: If sampling logistics do not allow placement of DNA plugs directly onto Whatman Sheets, plugs may temporarily (until the end of the sampling event) be placed into bulk vials with water to keep them hydrated. In this case, the bulk vials

should be clearly labelled so as to keep plugs from clipped and unclipped fish separate.

10. Data recording requirements on EACH VIAL and on DNA Sample Inventory Data Sheets:

- Stat Area (PFMA)
- Date (use 1-Apr-11 format)
- Lead sampler's initials
- Vial # (corresponding to the accompanying data sheet)
- Gear (TR for troll)
- Species (CN for Chinook)
- Indicate clipped or unclipped (referring to whether or not the Chinook was adipose fin clipped or not)
- # plugs per vial (approximate is okay)

11. <u>Communication.</u> Communicate with the coordinator or designate if there is any doubt on appropriate sample times, locations and sample amounts. Sampling rate will be dictated by the incidence of coho in a fishery.

12. **<u>Lee Kearey will coordinate the program</u>**, including 1) distributing sample supplies to fishery leads, 2) catalogue samples from those leads, 3) prioritize sample readings and liaise with the DNA lab, and 4) work with the fishery leads / catch coordinators to sub-sample if required and assign catch to samples.

Other contacts include:

- Fishery sampling advice: Matt Mortimer for Area B sampling (250-286-5814) or the relevant fishery manager.
- Wilf Luedke (250-756-7222) for questions related to overall sampling rationale in any southern BC marine area fishery.

Contact the sample coordinator (Lee Kearey) to arrange delivery of the samples.

Samples should be delivered to Lee Kearey at Fisheries & Oceans Canada, South Coast Area office, 3225 Stephenson Point Road, Nanaimo, V9T 1K3, or may be picked up at an agreed upon location by Fisheries & Oceans Canada staff. If required, DFO will pay for samples to be shipped to the Nanaimo Fisheries & Oceans Canada office (to be pre-arranged with the coordinator).

Discuss modifications to procedures with the coordinator and incorporate modifications if necessary. If additional contract costs will be incurred, discuss modifications to procedures and cost estimate with Scientific Authority.

A listing of sampling coordinators within DFO is attached.

Return all samples and data to:

Lee Kearey lee.kearey@dfo-mpo.gc.ca
Fisheries & Oceans Canada
3225 Stephenson Point Road
Nanaimo, B.C. V9T 1K3
(250) 756-7116 (office); (250)

Catch estimation requirement.

Fishery Managers, recreational catch coordinators, First Nations fishery managers: For each sample period please produce separate catch estimates for unmarked coho kept, unmarked coho released, marked hatchery coho kept; marked hatchery coho released. The creel survey already develops these catch estimates for the recreational fishery. Those responsible for FSC and commercial fisheries catch reporting must also develop these separate estimates.

SUMMARY checklist OF DELIVERABLES

- ❑ DNA Sample (Whatman Paper or vials) labelled with:
  - Stat Area (PFMA)
  - Date (use 1-Apr-11 format)
  - Lead sampler's initials
  - Vial # (corresponding to the accompanying data sheet)
  - Gear (TR for troll)
  - Species (CN for Chinook)
  - Indicate clipped or unclipped (referring to whether or not the Chinook was adipose fin clipped or not)
  - # plugs per vial (approximate is okay)

- ❑ If vials are used then check there is no more than 1/3 samples **:** 2/3 ethanol by volume in each vial.

- ❑ DNA Sample Inventory Data Sheets (to accompany DNA samples). The data sheet should be provided in hard copy along with the DNA samples AND emailed to lee.kearey@dfo-mpo.gc.ca.

- ❑ Document any sampling issues (relevant to the sample collection randomness) that arose during the collection of the samples being submitted (i.e. communications with processing plants and fishers, effects of travel/staffing/weather on sample collection, etc.).

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Coho DNA sample inventory data sheet for commercial sampling

Appendix 2. Fishery mortalities and sample rates.

Catch (kept and released) and total mortalities, sample sizes, sample rates, and allocation to lab based on identified risk (combination of total mortality and effort related to general understanding of IFR coho distribution and migration timing). Note that Fraser River catches are reviewed in a different report and so should not be used in isolation to determine exploitation rate. Also note that the catches were not adjusted for species mis-identification (see results section for level of mis-id). Also note that 0 catches may not be zero; in most cases a zero indicates that no catch monitoring was conducted. This is not a significant issue since coho don't significantly become vulnerable to fisheries until late May – early June.

Region	Month	Sum of Revised coho kept (marked)	Sum of Revised coho kept (unmarked)	Sum of Revised coho rel (marked)	Sum of Revised coho rel (unmarked)	Sum of Revised total mortality coho unmarked	Samples Unmarked by Area	Revised total mortalities	Sample Rate	# Samples to Process	# Samples Processed	Processed Rate
Fraser	August	0	2	0	33	22	3	22	13.8%	3	3	13.8%
	September	14	53	378	1,341	857	41	857	4.8%	41	40	4.7%
	October	15	60	418	1,671	1,063	20	1,063	1.9%	20	24	2.3%
Fraser Total		**29**	**115**	**796**	**3,045**	**1,942**	**64**					
GST	May	0	0	4	26	3	1	3		0		
	June	384	390	122	1,338	524	37	524	7.1%	37	34	6.5%
	July	1,801	2,963	247	1,183	3,081	203	3,081	6.6%	203	199	6.5%
	August	2,458	5,290	549	5,752	6,098	205	6,098	3.4%	205	198	3.2%
	September	1,487	3,362	274	3,278	4,089	171	4,089	4.2%	171	156	3.8%
	October	203	694	24	1,197	1,099	50	1,099	4.5%	50	48	4.4%
GST Total		**6,334**	**12,698**	**1,220**	**12,773**	**14,893**	**667**					
JST	June	51	313	18	12	314	18	314	5.7%	0		
	July	193	4,597	4	907	4,718	245	4,718	5.2%	200	197	4.2%
	August	244	5,798	1,612	14,344	12,125	818	12,125	6.7%	400	340	2.8%
	September	41	431	200	7,838	3,886	644	3,886	16.6%	200	193	5.0%
	October	96	380	0	3,131	1,591	137	1,591	8.6%	100	13	0.8%
JST Total		**623**	**11,521**	**1,834**	**26,232**	**22,635**	**1862**					
SWVI - Inshore	May	0	0	0	2	0	0					
	June	118	1,026	0	356	1,067	0	1,067	0.0%	0	0	
	July	1,357	5,374	149	2,324	5,611	76	5,611	1.4%	76	75	1.3%
	August	1,618	3,449	44	1,370	3,586	59	3,586	1.6%	59	56	1.6%
	September	606	1,718	0	672	1,785	32	1,785	1.8%	32	32	1.8%
SWVI - Inshore Total		**3,699**	**11,567**	**192**	**4,725**	**12,049**	**167**					
NWVI - Inshore	May	0	0	0	0	0	0			0		
	June	23	346	0	0	346	17	346	4.9%	17	16	4.6%
	July	230	2,131	4	1,239	2,254	143	2,254	6.3%	143	133	5.9%
	August	191	1,757	16	600	1,818	82	1,818	4.5%	82	80	4.4%
	September	132	312	3	9	313	0					
NWVI - Inshore Total		**576**	**4,546**	**23**	**1,848**	**4,731**	**242**					
NWVI - Offshore	May	0	0	0	3,010	452	0	452	0.0%	0		
	June	3	51	0	0	51	13	51	25.5%	13	11	21.6%
	July	802	2,420	1,281	6,048	3,259	335	3,259	10.3%	200	166	5.1%
	August	1,496	3,948	484	5,419	4,600	364	4,600	7.9%	364	357	7.8%
	September	359	1,890	502	2,717	2,296	150	2,296	6.5%	150	133	5.8%
	October	0	0	0	0	0	0			0		
NWVI - Offshore Total		**2,660**	**8,309**	**2,267**	**17,193**	**10,657**	**862**					
SWVI - Offshore	May	0	0	0	247	37	0	37	0.0%	0		
	June	1,132	147	72	1,577	305	0	305	0.0%	0		
	July	1,990	1,670	152	6,069	2,277	26	2,277	1.1%	26	21	0.9%
	August	2,991	3,758	291	7,823	4,555	72	4,555	1.6%	72	73	1.6%
	September	7,609	16,392	106	1,283	16,525	545	16,525	3.3%	228	224	1.4%
	October	1,772	8,650	0	0	8,650	594	8,650	6.9%	200	196	2.3%
SWVI - Offshore Total		**15,494**	**30,617**	**621**	**16,999**	**32,350**	**1237**					
JDF - WCVI	June	7	4	0	142	18	1	18	5.5%	0	0	0.0%
	July	75	27	0	296	57	8	57	14.1%	0	0	0.0%
	August	586	69	38	818	151	2	151	1.3%	0	0	0.0%
	September	640	812	0	634	875	55	875	6.3%	55	53	6.1%
JDF - WCVI Total		**1,308**	**912**	**38**	**1,890**	**1,101**	**66**					
SWVI - Area 21/12	June	89	75	0	167	92	3	92	3.3%	0		0.0%
	July	581	481	0	744	555	36	555	6.5%	36	16	2.9%
	August	1,464	1,372	10	592	1,431	101	1,431	7.1%	101	94	6.6%
	September	174	183	0	453	228	4	228	1.8%	0		0.0%
SWVI - Area 21/121 Total		**2,308**	**2,111**	**10**	**1,956**	**2,307**	**144**					
JDF - GST	July	1,508	2	84	4,373	439		439	0.0%	0		
	August	2,166	145	39	2,795	424	0	424	0.0%	93	93	21.9%
	September	3,598	5,147	962	6,483	5,795	93	5,795	1.6%	127	126	2.2%
	October	3,064	4,607	72	10,514	5,658	127	5,658	2.2%	127	126	2.2%
JDF - GST Total		**10,336**	**9,901**	**1,157**	**24,165**	**12,318**	**220**					
Grand Total		**43,368**	**92,296**	**8,156**	**110,828**	**114,982**	**5531**	114,669	4.8%	3704	3400	3.0%

Appendix 3. Coded Wire Tags

Table A3-1. Coded wire tag recoveries of IFR hatchery coho in 2014.

(RC) Species Name	(RL) Brood Year	(RL) Hatchery Site Code-Name	(RL) Release Site Name	(RC) Tagcode	(RC) Recovery Date	(RC) Catch Region Acronym	(RC) Catch Region Name	(RC) Observed Number	(RC) Estimated Number
Coho	2011	0160-Spius Creek H	Coldwater R	186341	01/09/2014	GSPTS	Georgia Strait Sport South	1	46.22
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	JFSPT	Juan de Fuca Sport	1	10.92
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	JFSPT	Juan de Fuca Sport	1	10.92
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	JFSPT	Juan de Fuca Sport	1	10.92
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	JFSPT	Juan de Fuca Sport	1	10.92
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	JFSPT	Juan de Fuca Sport	1	10.92
Coho	2011	0160-Spius Creek H	Eagle R	181780	01/07/2014	WSPT	West Coast Vancouver Is S	1	9.57
Coho	2011	0160-Spius Creek H	Coldwater R	186341	01/08/2014	WSPT	West Coast Vancouver Is S	1	6.41
Coho	2011	0160-Spius Creek H	Coldwater R	186341	01/08/2014	WSPT	West Coast Vancouver Is S	1	6.41
Coho	2011	0160-Spius Creek H	Coldwater R	181781	01/09/2014	WSPT	West Coast Vancouver Is S	1	2.55
Coho	2011	0160-Spius Creek H	Coldwater R	186341	20/09/2014	SWTR	Southwest Vancouver Is Tr	1	4.71
Coho	2011	0160-Spius Creek H	Coldwater R	181781	02/08/2014	NTR	Northern Troll	1	6.57
							Sub-total Canada	12	137
Coho	2011	0160-Spius Creek H	Eagle R	181780	16/09/2014	ODFW	Oregon Dept of Fish and W	1	0
Coho	2011	0160-Spius Creek H	Coldwater R	181781	27/07/2014	ODFW	Oregon Dept of Fish and W	1	0
Coho	2011	0160-Spius Creek H	Coldwater R	181781	14/07/2014	ODFW	Oregon Dept of Fish and W	1	0
Coho	2011	0160-Spius Creek H	Eagle R	181780	28/06/2014	WDFW	Washington Dept of Fisher	1	3.3
Coho	2011	0160-Spius Creek H	Eagle R	181780	29/07/2014	WDFW	Washington Dept of Fisher	1	3.64
Coho	2011	0160-Spius Creek H	Coldwater R	181781	22/09/2014	WDFW	Washington Dept of Fisher	1	1.98
Coho	2011	0160-Spius Creek H	Eagle R	181780	02/07/2014	WDFW	Washington Dept of Fisher	1	1.82
Coho	2011	0160-Spius Creek H	Eagle R	181780	25/09/2014	WDFW	Washington Dept of Fisher	1	1.98
Coho	2011	0160-Spius Creek H	Coldwater R	186341	25/09/2014	WDFW	Washington Dept of Fisher	1	1.98
Coho	2011	0160-Spius Creek H	Coldwater R	181781	25/09/2014	WDFW	Washington Dept of Fisher	1	1.98
Coho	2011	0160-Spius Creek H	Coldwater R	181781	25/09/2014	WDFW	Washington Dept of Fisher	1	1.98
Coho	2011	0160-Spius Creek H	Coldwater R	186341	09/08/2014	WDFW	Washington Dept of Fisher	1	1.74
Coho	2011	0160-Spius Creek H	Coldwater R	186341	06/08/2014	WDFW	Washington Dept of Fisher	1	3.84
Coho	2011	0160-Spius Creek H	Coldwater R	186341	21/06/2014	WDFW	Washington Dept of Fisher	1	2.29
Coho	2011	0160-Spius Creek H	Coldwater R	186341	14/08/2014	WDFW	Washington Dept of Fisher	1	3.04
Coho	2011	0160-Spius Creek H	Coldwater R	186341	26/06/2014	WDFW	Washington Dept of Fisher	1	3.3
Coho	2011	0160-Spius Creek H	Coldwater R	186341	14/08/2014	WDFW	Washington Dept of Fisher	1	1.92
Coho	2011	0160-Spius Creek H	Coldwater R	186341	23/08/2014	WDFW	Washington Dept of Fisher	1	1.75
Coho	2011	0160-Spius Creek H	Coldwater R	186341	06/07/2014	WDFW	Washington Dept of Fisher	1	1.64
Coho	2011	0160-Spius Creek H	Coldwater R	186341	24/07/2014	WDFW	Washington Dept of Fisher	1	3.38
Coho	2011	0160-Spius Creek H	Coldwater R	186341	27/08/2014	WDFW	Washington Dept of Fisher	1	3.16
Coho	2011	0160-Spius Creek H	Coldwater R	186341	26/07/2014	WDFW	Washington Dept of Fisher	1	2.01
Coho	2011	0160-Spius Creek H	Coldwater R	181781	26/07/2014	WDFW	Washington Dept of Fisher	1	3.38
Coho	2011	0160-Spius Creek H	Coldwater R	186341	14/08/2014	WDFW	Washington Dept of Fisher	1	1.92
Coho	2011	0160-Spius Creek H	Coldwater R	186341	14/08/2014	WDFW	Washington Dept of Fisher	1	1.92
Coho	2011	0160-Spius Creek H	Coldwater R	186341	17/06/2014	WDFW	Washington Dept of Fisher	1	2.29
Coho	2011	0160-Spius Creek H	Coldwater R	186341	31/08/2014	WDFW	Washington Dept of Fisher	1	
Coho	2011	0160-Spius Creek H	Coldwater R	181781	14/09/2014	WDFW	Washington Dept of Fisher	1	2.29
Coho	2011	0160-Spius Creek H	Coldwater R	181781	18/07/2014	WDFW	Washington Dept of Fisher	1	2.41
Coho	2011	0160-Spius Creek H	Coldwater R	181781	23/07/2014	WDFW	Washington Dept of Fisher	1	1.72
Coho	2011	0160-Spius Creek H	Coldwater R	181781	22/06/2014	WDFW	Washington Dept of Fisher	1	4.45
Coho	2011	0160-Spius Creek H	Coldwater R	181781	26/07/2014	WDFW	Washington Dept of Fisher	1	1.82
Coho	2011	0160-Spius Creek H	Coldwater R	181781	06/08/2014	WDFW	Washington Dept of Fisher	1	1.74
Coho	2011	0160-Spius Creek H	Coldwater R	181781	11/08/2014	WDFW	Washington Dept of Fisher	1	1.41
Coho	2011	0160-Spius Creek H	Coldwater R	181781	14/08/2014	WDFW	Washington Dept of Fisher	1	1.92
Coho	2011	0160-Spius Creek H	Coldwater R	181781	06/09/2014	WDFW	Washington Dept of Fisher	1	1.88
Coho	2011	0160-Spius Creek H	Coldwater R	181781	27/07/2014	WDFW	Washington Dept of Fisher	1	3.38
Coho	2011	0160-Spius Creek H	Coldwater R	181781	26/07/2014	WDFW	Washington Dept of Fisher	1	3.38
Coho	2011	0160-Spius Creek H	Coldwater R	181781	16/08/2014	WDFW	Washington Dept of Fisher	1	1.97
Coho	2011	0160-Spius Creek H	Coldwater R	181781	16/09/2014	WDFW	Washington Dept of Fisher	1	4.35
							Sub-total US	40	89

Table A3-2. Hatchery releases from 2011 brood year of IFR coho.

BROOD_YEAR	STOCK_NAME	RELEASE_SITE_NAME	RELEASE_CODE	CLIP_TYPE_CODE	CWT_FLAG	SumOfRELEASE_COUNT
2011	Coldwater R	Coldwater R	181781	5000	Yes	43865
2011	Coldwater R	Coldwater R	186341	5000	Yes	19940
2011	Eagle R	Eagle R	181780	5000	Yes	39009
					subtotal	**102814**
2011	Coldwater R	Coldwater R	181781	0	none	922
2011	Eagle R	Eagle R	181780	0	none	4536
					subtotal	**5458**
2011	Eagle R	Eagle R	181780	5000	Shed	308
2011	Coldwater R	Coldwater R	186341	5000	Shed	269
2011	Coldwater R	Coldwater R	181781	5000	Shed	593
					subtotal	1170