

**PACIFIC SALMON COMMISSION
JOINT COHO TECHNICAL COMMITTEE**

1986-2009 PERIODIC REPORT
Revised

REPORT TCCOHO (13)-1

February 2013

MEMBERSHIP OF THE JOINT COHO TECHNICAL COMMITTEE

Canadian Members	United States Members
Dr. Arlene Tompkins (Co-Chair), CDFO	Dr. Gary S. Morishima (Co-Chair), QIN
Mr. Steve Baillie, CDFO	Ms. Carrie Cook-Tabor, USFWS
Mr. Michael Chamberlain, CDFO	Mr. Craig Foster, ODFW
Mr. Joel Sawada, CDFO	Mr. Robert A. Hayman, SRSC
Ms. Michelle Walsh, SFC	Mr. Jeff Haymes, WDFW
	Dr. Peter W. Lawson, NMFS
	Mr. James Packer, WDFW
	Mr. Bill Patton, NWIFC
	Dr. Laurie Weitkamp, NMFS
	Dr. Mara Zimmerman, WDFW

LIST OF ACRONYMS WITH DEFINITIONS

ABM	Abundance-Based Management	NWIFC	Northwest Indian Fisheries Commission
B.C.	British Columbia	ODFW	Oregon Department of Fish and Wildlife
CDFO	Canada Department of Fisheries and Oceans	PEF	Production Expansion Factor
COSEWIC	Committee on the Status of Endangered Wildlife in Canada	PFMC	Pacific Fisheries Management Council (U.S.)
CoTC	Coho Joint Technical Committee	PSC	Pacific Salmon Commission
CSAP	Center for Science Advice - Pacific	PST	Pacific Salmon Treaty
CU	Conservation Unit	QIN	Quinault Indian Nation
CWT	Coded Wire Tag	RMIS	Regional Mark Information System
DIT	Double Index Tag	RMISD	Regional Mark Information System Database (U.S.)
ER	Exploitation Rate	RMPC	Regional Mark Processing Center
ESA	U.S. Endangered Species Act	RRTERM	Terminal Area Run Reconstruction Program
ESU	Evolutionarily Significant Unit	SFC	Secwepmc Fisheries Commission
FRAM	Fisheries Regulation Assessment Model	SIT	Single Index Tag
FSC	Food, Social, and Ceremonial	SMZ	Special Management Zone (B.C.)
MSF	Mark-Selective Fishery	SRSC	Skagit River System Cooperative
MSH	Maximum Sustainable Harvest	U.S.	United States
MSM	Mixed-Stock Model	WCVI	West Coast Vancouver Island
MU	Management Unit	WDFW	Washington Department of Fish and Wildlife
NMFS	National Marine Fisheries Service	WSP	Wild Salmon Policy
NT	Non Treaty		

GLOSSARY OF TERMS

Abundance-based management (ABM): A management framework to constrain exploitation rates, based on a categorical abundance forecast (abundant, moderate, low) for naturally-spawning Coho Management Units. Exploitation rate caps are specified in the Pacific Salmon Treaty Southern Coho Agreement.

Base period: The time period selected to represent average temporal and geographic distributions of Coho Salmon originating from each MU for purposes of Coho FRAM. The current base period is 1986-1992.

Break point: A Management Unit-specific ocean age-3 abundance level that determines the categorical status of a stock (i.e., abundant, moderate, low).

Brood year (BY): The year in which eggs were deposited.

Coded wire tag (CWT): A tag containing a numeric code that is inserted into the nasal cartilage of young salmon for the purpose of identifying a specific release group. Each numeric code is associated with release information, including date and location of release, hatchery, stock, fish size, and number of fish with the same code (referred to as a release group). Tags are typically recovered from returning adults through fisheries and escapement sampling.

Cohort: A particular group of fish belonging to the same brood year.

Cohort abundance: See Ocean age-3 abundance.

Cohort analysis: A procedure that estimates MU-specific exploitation rates from a specified set CWT recovery data.

Command files: The files used in the Fisheries Regulation Assessment Model that contain all the necessary input parameters to run the model, such as forecasted abundance estimates and fishery regulations. A separate command file is developed for each FRAM run.

Conservation Unit (CU): Salmon populations that have been identified as distinct units of biodiversity under the Canadian Wild Salmon Policy (*see* Holtby and Ciruna 2007).

Double index tag (DIT): Paired groups of tagged fish, each tagged with separate CWT tag code, used to determine differential exploitation rates on marked and unmarked fish subjected to mark-selective fisheries. Both groups are presumed identical except that one group is externally marked (adipose fin clipped) and one group is unmarked (not adipose fin clipped).

Evolutionarily significant unit (ESU): Under the U.S. Endangered Species Act, a group of Pacific salmon populations that represent an important component of the evolutionary legacy of the species and are therefore treated as a single “species”.

Exploitation rate (ER): Mortality due to landed catch and incidental mortality; expressed as fishing mortality divided by fishing mortality and escapement.

Exploitation rate cap: The maximum exploitation rate an MU can be subjected to given its categorical abundance status. Under the ABM, allowable exploitation rate is shared by Canada and the U.S.

Fishery Management Plan (FMP): The set of fisheries that are planned in order to distribute exploitation rates amongst fisheries and time periods each year. These are termed Integrated Fisheries Management Plans in Canada.

Fisheries Regulation Assessment Model (FRAM): A model used to estimate the MU- and fishery-specific impacts. The Forwards FRAM projects MU-specific mortalities and escapements under proposed fishery regimes given pre-season forecasts. The Backwards Coho FRAM estimates unspecified MU abundances using estimates of escapements and fishing mortalities.

Incidental mortality: Mortality incurred during fishing that is in addition to landed catch. For example, some fish die as a result of being caught and released.

Indicator stock: A coded-wire-tagged surrogate stock that is used to make inferences for a particular MU. For example, a CWT release from a hatchery stock may be used to estimate the distribution and magnitude of fishing mortalities.

January age-3 abundance: The estimated abundance of fish of age-3 (adults) in January prior to the start of any fisheries. January age-3 abundance is estimated as fishing mortality plus escapement plus natural mortality.

Landed catch: Fish that are caught and kept (*see* Incidental mortality).

Management Unit (MU): Under PST Southern Coho agreement, a geographically-based aggregate of salmon populations, that is managed under a single set of exploitation rate caps.

Mark-selective fishery (MSF): Fisheries that require marked fish (i.e., those with adipose fin clips) and unmarked fish (those with intact adipose fins) to be differentially retained (e.g., marked fish kept, unmarked fish released).

Maximum sustainable harvest (MSH): The largest average harvest or exploitation rate for a MU that can be expected to be maintained indefinitely.

Non-retention fisheries: Fisheries in which a particular group of fish are not allowed to be kept (e.g., due to species or external marks) (*see* Retention fisheries).

Non-selective fisheries (NSF): Fisheries that are allowed to retain both marked (adipose fin clipped) and unmarked fish (*see* Mark-selective fishery).

Ocean age-3 abundance: Total number of fish that are harvested (including incidental mortality) plus those that escape to spawn (also referred to as “cohort abundance” or “ocean recruits”). Natural mortality is not included. This abundance status of a Management Unit is based upon this estimate of abundance.

Production expansion factor (PEF): A scalar that represents the number of fish in a population represented by a single CWT recovery.

Retention fisheries: Fisheries in which fish of a particular group are allowed to be kept (*see* Non-retention fisheries).

Return year: The year in which fish would normally return to spawn as adults. For Southern Coho Salmon that mature as 3 year old adults, return year is Brood Year + 3.

RR Term: A program that reconstructs terminal Coho runs using freshwater and terminal area marine fisheries and escapement data for Puget Sound stocks.

Single index tag (SIT): Fish that are tagged as a single group (*see* Double index tag).

Spawning escapement: Adult fish that “escape” fisheries and return to freshwater to spawn.

Special management zone (SMZ): Geographic/temporal areas in B.C. that have special management restrictions.

Voluntary head recovery program (VHRP): A sampling program for recreational fisheries that relies upon anglers voluntarily returning heads from marked salmon so CWTs may be recovered.

TABLE OF CONTENTS

Membership of the Joint Coho Technical Committee	ii
List of Acronyms with Definitions.....	iii
Glossary of Terms	iv
List of Tables	ix
List of Figures.....	x
Executive Summary	xiii
1 Introduction	1
1.1 Canadian Management Units	4
1.2 U.S. Management Units	4
2 Management Model Data Exchange.....	5
2.1 Introduction to the Coho FRAM Model	5
2.2 FRAM Base Period	5
2.3 Pre-Season Estimates of Fishery Impacts.....	5
2.4 Post-Season Estimates of Fishery Impacts	7
3 Coded-Wire-Tag Indicator Stocks.....	9
4 Management Unit Status	13
4.1 Canadian Management Units	13
4.2 U.S. Management Units	15
5 Fisheries Overview	19
5.1 Canadian Fisheries.....	20
5.2 U.S. Fisheries.....	22
6 Forecast Performance	23
6.1 Canadian Management Units	23
6.2 U.S. Management Units	23
6.3 Post-Season Analysis	24
7 Historical Review of MU Exploitation	29
8 Annual Post-Season Estimates of Exploitation Rates	37
9 Mark-Selective Fisheries.....	47
9.1 Brief History of Mark-Selective Fisheries	47
9.2 Mark-Selective Fishery Sampling.....	48
10 Issues Experienced in the Implementation of Coho Abundance-Based Management	51
10.1 Assumption 1: Methods for Assigning MU Status are Established and Available	51

10.2	<i>Assumption 2: Stock and Fishery Assessment Programs are Adequate to Provide the Information Needed to Evaluate the Performance of the Coho ABM Agreement.....</i>	51
10.2.1	Limited or Deteriorating Stock and Fishery Assessment Programs	51
10.2.2	Lack of Coho Indicator Stock Programs in All Management Units	52
10.2.3	Declining Coded-Wire-Tag Releases and Recoveries	52
10.3	<i>Assumption 3: Escapements Estimated for Naturally-Spawning Coho Stocks are Unbiased and of Known Precision</i>	54
10.4	<i>Assumption 4: Harvests Estimated for Naturally-Spawning Coho Stocks are Unbiased and of Known Precision.....</i>	54
10.5	<i>Assumption 5: CWTs are Adequately Sampled in All Fisheries and Escapements</i>	55
10.5.1	Incomplete or Indirect Sampling of Fisheries	55
10.5.2	Incomplete Reporting of Recoveries in Escapement	55
10.6	<i>Assumption 6: CWT Release and Recovery Data are Retrievable from an Accurate, Accessible, and Up-to-Date Database.....</i>	56
10.6.1	Delays in Reporting Recovery Data to Regional Mark Processing Center	56
10.6.2	Inconsistency and Instability in CWT Databases	56
11	References Cited	57
12	Appendices	59
	<i>Appendix A. Coho FRAM Base Period Fishery-Specific Average Exploitation Rates by Time Period for Each Management Unit.....</i>	59
	<i>Appendix B. Coded-Wire-Tag Groups Chosen to Represent Mixed-Stock Model (MSM) Stocks Used to Create the Coho FRAM Base Period, Catch Years 1986-1997.</i>	85
	<i>Appendix C. Double Index Tag Release Groups for Each Management Unit, Brood Years 1995-2008.</i>	99
	<i>Appendix D. Maps of Fishery Management Areas.....</i>	105
	<i>Appendix E. Historical Summary of Exploitation Rates by U.S. and Canada and Escapement Estimates for Each Management Unit.</i>	109
	<i>Appendix F. Historical Summary of Cohort Abundance, Exploitation Rates by Fisheries Type, and Escapement for each Management Unit.....</i>	117
	<i>Appendix G. Method for Determining MU ER caps Based on Cohort Abundance and Status and Summaries of Pre- and Post-Season Cohort Abundance (ocean age-3), PST Status, and Total Exploitation Rates (CAP, Planned, Estimated) by Management Unit, Catch Years 2004-2009.</i>	145

LIST OF TABLES

Table 1.1.	Canadian Management Units and Wild Salmon Policy Conservation Unit components within them.	4
Table 2.1.	Base period and FRAM command files used in pre-season management and post-season assessment of PST Coho Salmon by the U.S. and Canada.	8
Table 3.1.	CWT indicator stocks and brood years with single index tag (SIT) and double index tag (DIT) groups for each Coho Management Unit (MU), brood years 1983-2008.....	11
Table 4.1.	Break points in ocean age-3 abundance associated with Low, Moderate, and Abundant status of naturally-spawning Coho, U.S. Inside Management Units. ..	15
Table 4.2.	Break points in ocean abundance (harvest + escapement) associated with Low, Moderate, and Abundant status of naturally-spawning Coho, Outside U.S. Management Units.	16
Table 6.1.	Pre- and post-season (Appendix G) ocean age-3 abundance for naturally-spawning Coho in each Management Unit (MU), catch years 2004-2010.....	25
Table 8.1.	Exploitation rate review of the 2003 Coho return.	38
Table 8.2.	Exploitation rate review of the 2004 Coho return.	39
Table 8.3.	Exploitation rate review of the 2005 Coho return.	40
Table 8.4.	Exploitation rate review of the 2006 Coho return.	41
Table 8.5.	Exploitation rate review of the 2007 Coho return.	42
Table 8.6.	Exploitation rate review of the 2008 Coho return.	43
Table 8.7.	Exploitation rate review of the 2009 Coho return.	45
Table 9.1.	Estimates of total mortality of marked and unmarked hatchery-origin Coho by Party in all fisheries (non-selective and mark-selective combined).	48

LIST OF FIGURES

Figure 1.1.	Pacific Salmon Treaty Coho Salmon Management Units – Canada.	2
Figure 1.2.	Pacific Salmon Treaty Coho Salmon Management Units – U.S.	3
Figure 2.1.	Procedure used to generate base period data for Coho FRAM.	6
Figure 2.2.	Procedure used to project exploitation rates and fishery impacts in Coho FRAM.	7
Figure 2.3.	Procedure used to estimate exploitation rates and cohort abundances in Backwards Coho FRAM.	8
Figure 4.1.	Estimated ocean age-3 abundances of Southern B.C. Coho Salmon Management Units; catch years 1986-1997 and 2004-2009.	14
Figure 4.2.	Estimated ocean age-3 abundances of U.S. Inside Coho Salmon Management Units; catch years 1986-2009.	17
Figure 4.3.	Estimated ocean age-3 abundances of U.S. Outside Coho Salmon Management Units; catch years 1986-2009.	17
Figure 5.1.	Estimated total fishery mortality of all Management Units combined, by Canada and the U.S. from 1988 to 2009.	19
Figure 7.1.	Lower Fraser MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.	29
Figure 7.2.	Interior Fraser MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.	30
Figure 7.3.	Strait of Georgia Mainland MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.	30
Figure 7.4.	Strait of Georgia Vancouver Island MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.	31
Figure 7.5.	Skagit River MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	31
Figure 7.6.	Stillaguamish MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	32
Figure 7.7.	Snohomish MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	32
Figure 7.8.	Hood Canal MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	33
Figure 7.9.	U.S. Strait of Juan de Fuca MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	33
Figure 7.10.	Quillayute MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	34
Figure 7.11.	Hoh MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	34
Figure 7.12.	Queets MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	35

Figure 7.13.	Grays Harbor MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.	35
Figure 10.1.	Total number of estimated coded-wire-tags (CWT) recovered in mixed-stock fisheries for each country, all Management Units combined, catch years 1986-1997.....	53
Figure 10.2.	Total number of coded-wire-tagged (CWT) fish released from all PST Management Units combined; brood years (BY) 1983-2008.....	53

This page left intentionally blank

EXECUTIVE SUMMARY

This report summarizes information on performance and problems relating to implementation of the Pacific Salmon Treaty Southern Coho Agreement of abundance-based management. Data summaries are provided for the period from return year 1986 to 2009. Topics covered include a description of naturally-spawning Coho Salmon (*Oncorhynchus kisutch*) management units (MUs), data exchange for annual management planning, coded wire tag indicator stocks, determination of MU status, an overview of the conduct of U.S. and Canadian fisheries, MU abundance forecast performance, estimates of exploitation rates relative to constraints established by the Coho Agreement, mark-selective fishing, and a discussion of issues experienced during implementation.

The statistics presented represent the best available information at the time the report was produced. Nonetheless, substantial uncertainty regarding their accuracy remains. Due to limitations of stock and fishery assessment programs, historical pre- and post-season exploitation rates are largely derived from the bilateral planning tool, the Coho Fisheries Regulation Assessment Model (FRAM). These estimates depend upon the assumption that the MU-specific fishery distribution patterns observed during the 1986-1992 FRAM base period are representative of annual distribution patterns. A number of factors have changed substantially during the time period covered by this report and from the FRAM base period. For example, fishery harvest rates and MU survivals have declined, MU distributions have changed (e.g., resident Coho have largely disappeared from the Strait of Georgia), mark-selective fisheries have been extensively implemented, and the ability to maintain robust stock and fishery assessment programs has been diminished. These factors have reduced the ability to independently evaluate the accuracy of FRAM-based estimates of exploitation rates. The section of the report titled *Issues Experienced in the Implementation of Coho Abundance-Based Management* discusses other assumptions that are critical to interpretation of report content.

This page left intentionally blank

1 INTRODUCTION

The Pacific Salmon Commission established a Southern Coho abundance-based management regime in 1999 that set forth an agreement to constrain exploitation rates below maximum levels (caps) on selected management units (MUs of naturally-spawning Coho Salmon in southern British Columbia and Washington/Oregon). When a new Agreement was reached in 2008, modifications were made to the list of specified MUs and the manner in which exploitation rate caps are established. This periodic report only presents information for the MUs identified in the 2008 Agreement.

Chapter 5 of the 2008 Pacific Salmon Treaty Agreement (PST Agreement) between the U.S. and Canada (Parties; PSC 2009) established abundance-based management (ABM) regimes to constrain exploitation rates (ERs) on the following 13 Management Units (MUs) of naturally-spawning Coho Salmon originating in rivers along the Washington/British Columbia (B.C.) border:

Southern B.C. Management Units

Lower Fraser
Interior Fraser (Including Thompson)
Strait of Georgia Mainland
Strait of Georgia Vancouver Island

U.S. Inside Management Units

Skagit
Stillaguamish
Snohomish
Hood Canal
Strait of Juan de Fuca

U.S. Outside Management Units

Quillayute
Hoh
Queets
Grays Harbor

Maps of the Canadian and U.S. MUs are depicted in Figure 1.1 and Figure 1.2. Detailed MU descriptions are in preparation and will soon be available for download at the Pacific Salmon Commission's (PSC) website. Abundance-based management objectives are to maintain each of the MUs at Maximum Sustainable Harvest (MSH) over the long term while maintaining the genetic and ecological diversity of the component populations for the MUs.

This periodic report summarizes information on performance and problems relating to implementation of ABM regimes.

Canadian Coho Management Units

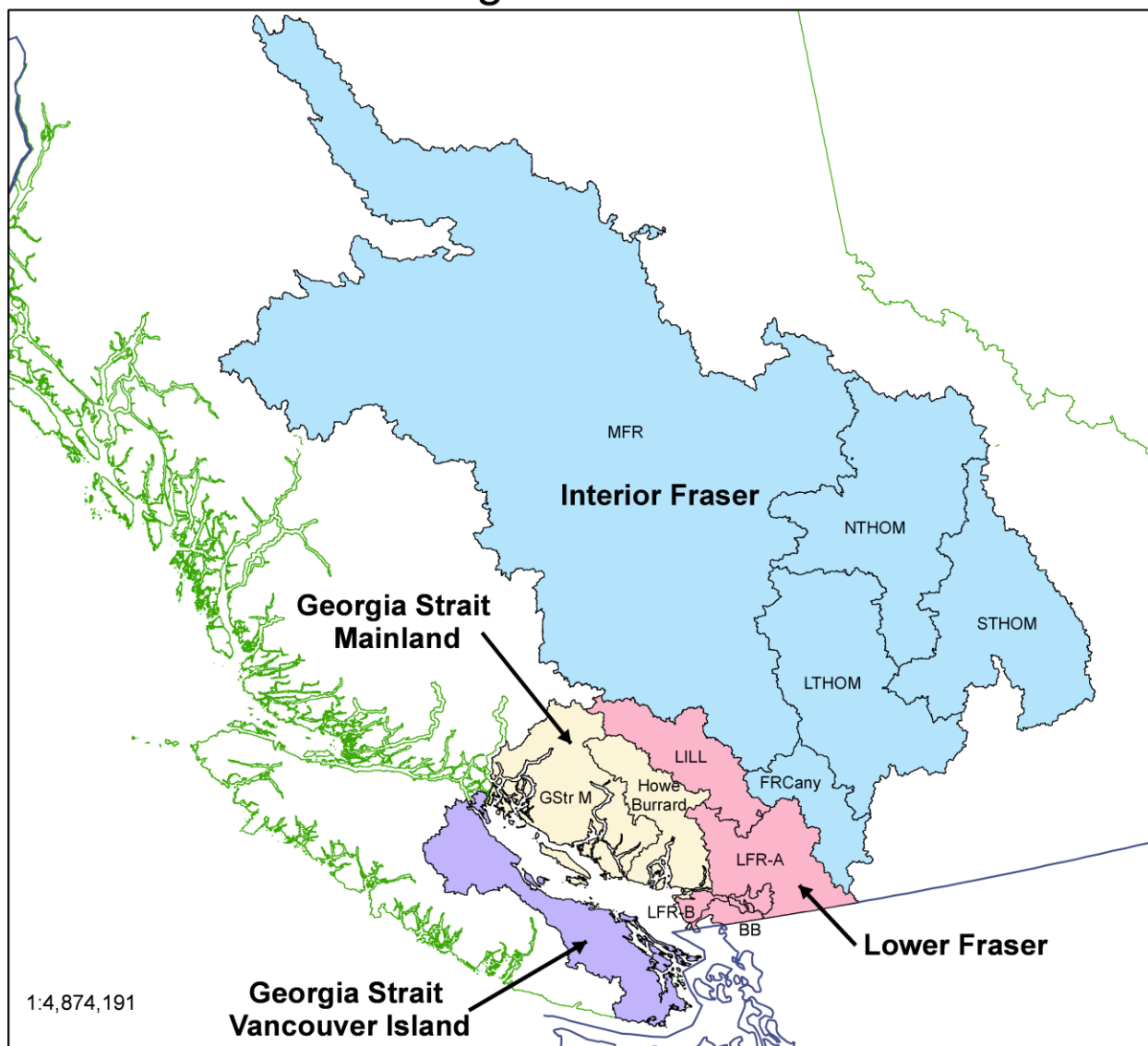


Figure 1.1. Pacific Salmon Treaty Coho Salmon Management Units – Canada. Southern B.C. Coho Salmon Management Units (MUs, bold font) and Wild Salmon Policy Conservation Units (CUs, small font). Current Pacific Salmon Treaty MUs consist of Lower Fraser, Interior Fraser, Strait of Georgia Mainland, and Strait of Georgia Vancouver Island. CUs: GStr M = Georgia Strait Mainland; Howe Burrard = Howe Sound and Burrard Inlet; LILL = Lillooet; LFR-A = Lower Fraser A; LFR-B = Lower Fraser B; BB = Boundary Bay; FRCany = Fraser Canyon; LTHOM = Lower Thompson; STHOM = South Thompson; and NTHOM = North Thompson.



Figure 1.2. Pacific Salmon Treaty Coho Salmon Management Units – U.S.

1.1 Canadian Management Units

The Canadian MUs are comprised of geographical aggregates of naturally-spawning Coho populations (Table 1.1). The four MUs of interest to the Agreement encompass 12 Conservation Units (CU) as determined by Canada's Wild Salmon Policy (WSP; Holtby and Ciruna 2007).

Table 1.1. Canadian Management Units and Wild Salmon Policy Conservation Unit components within them.

Management Unit	WSP Conservation Unit Component
Lower Fraser	Lower Fraser A
	Lower Fraser B
	Lillooet
	Boundary Bay
Interior Fraser	Fraser Canyon
	Middle Fraser
	Lower Thompson
	South Thompson
	North Thompson
Georgia Strait Mainland	Howe Sound – Burrard Inlet
	Georgia Strait Mainland
Georgia Strait Vancouver Island	East Vancouver Island – Georgia Strait

1.2 U.S. Management Units

The U.S. Inside MUs consist of naturally-spawning populations originating in the Skagit, Stillaguamish, Snohomish, and Hood Canal MUs and the Strait of Juan de Fuca. Coho populations in the U.S. Inside MUs belong to the larger Puget Sound/Strait of Georgia Coho Salmon evolutionarily significant unit (ESU; Weitkamp et al. 1995). Only the eastern portion of the Strait of Juan de Fuca MU is in this ESU. An ESU is a Pacific salmon population or group of populations that is substantially reproductively isolated from other conspecific populations and represents an important component of the evolutionary legacy of the species. The ESU policy (56 FR 58612) for Pacific salmon defines the criteria for identifying a Pacific salmon population as a distinct population segment, which can be listed under the U.S. Endangered Species Act of 1973.

The U.S. Outside MUs consist of naturally-spawning populations from the Quillayute, Hoh, Queets, and Grays Harbor Basins. All U.S. Outside MUs, except the Grays Harbor MU, are part of the Olympic Peninsula ESU. Populations from the western portion of the Strait of Juan de Fuca MU are also in this ESU. The Grays Harbor MU is part of the Southwest Washington ESU.

2 MANAGEMENT MODEL DATA EXCHANGE

2.1 Introduction to the Coho FRAM Model

Coho fisheries are evaluated with the Coho Fisheries Regulation Assessment Model (Coho FRAM), a bilaterally developed tool that is employed for both pre-season fishery planning and post-season estimation of escapements and exploitation rates. In simplest terms the Coho FRAM is an accounting model that evaluates X stocks in Y fisheries over Z time periods. It can be used to estimate catch and escapement based on forecast abundance and planned fisheries (forward FRAM) or it can be used to reconstruct ocean abundance from observed escapements and fisheries (backward FRAM). The model is founded on a Base Period (currently 1986 to 1992) and scales it according to current stock abundances and fisheries impacts. The base period is constructed with the aid of two other companion programs, the Mixed Stock Model (MSM) and RRTERM (Terminal Area Run Reconstructions). A complete description of the Coho FRAM model can be found at MEW 2008.

2.2 FRAM Base Period

The base period is constructed from stock-specific ocean distributions by fishery and time period (January to June, July, August, September, and October to December developed from coded-wire-tag (CWT) recoveries in coast wide fisheries between 1986 and 1992. The procedure used to generate base period data is depicted in Figure 2.1. For each base period year, post-season reconstruction of cohort abundances for each Coho MU is based on two different models: the Mixed-Stock Model (MSM) that estimates the Production Expansion Factors for each Production Region and RRTERM program that estimates stock-specific impacts for terminal marine and freshwater fisheries. The MSM uses CWT recoveries for each model stock expanded by the Production Expansion Factors to best describe the total catch in each marine mixed-stock fishery. The MSM/RRTERM cohort analysis has been used for post-season reconstructions for catch years 1986-1997. The base period annual exploitation rates by fishery-month strata are provided in Appendix A. Because escapement estimates were not available for several Canadian MUs for these years, escapement for Canadian MUs (excluding Interior Fraser) was estimated as $\text{catch} \times (1 - \text{ER})$, where ER was the hatchery indicator exploitation rate.

2.3 Pre-Season Estimates of Fishery Impacts

Coho FRAM starts from base period stock-fishery-month exploitation rates and modifies them based on forecast stock abundances and proposed fishery regimes to project fishery impacts and exploitation rates (Figure 2.2). Inputs for each modeled fishery scenario are in the form of “command files” that include forecasted estimates of cohort abundance and specifications for fishery regulations and catch constraints (Figure 2.2).

In practice, Coho FRAM is used by the Pacific Fishery Management Council (PFMC) to model internal US fisheries as well as fisheries of interest to the PSC. Expectations for MU status, cohort abundance, and fishery objectives are exchanged in March of each year for use in pre-season planning processes.

Because the domestic planning processes of the Parties are not synchronous, a single pre-season command file containing expectations for both Canada and the U.S. is not available prior to the conclusion of the Pacific Fisheries Management Council (PFMC) process (U.S. pre-season fishery planning) in April. The pre-season command file used by the PFMC incorporates cohort abundance for both Canadian and U.S. MUs, but planned fishery regulations for U.S. fisheries only. Unless other information is available, Canadian regulations are assumed to be similar to those implemented in the previous year. Subsequent to this process, additional command files are generated to represent the actual Canadian fishing plans. Command files used in pre-season planning from 2004 to 2010 are detailed in Table 2.1. These files contain specific information used at the time to model fisheries along with the pre-season forecasts of stock abundances.

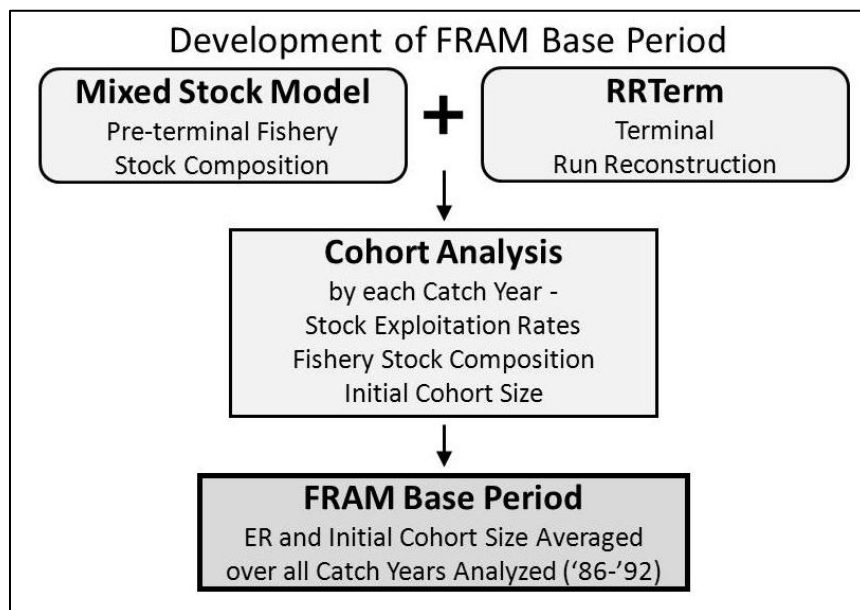


Figure 2.1. Procedure used to generate base period data for Coho FRAM.

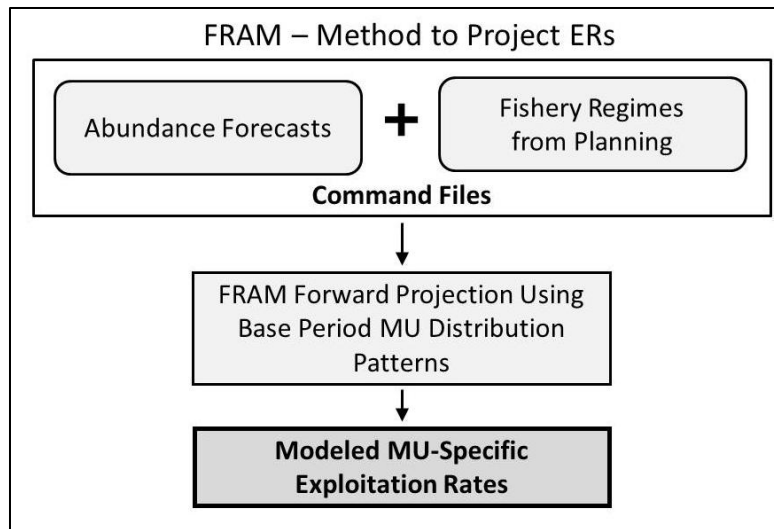


Figure 2.2. Procedure used to project exploitation rates and fishery impacts in Coho FRAM.

2.4 *Post-Season Estimates of Fishery Impacts*

The Coho FRAM can also be used to reconstruct stock abundances from known catch and escapement. In Backwards Coho FRAM, these base period stock-fishery-month exploitation rates are used to estimate annual cohort abundances for post-season evaluation of the performance of the Coho Agreement. The Backwards Coho FRAM provides two estimates of cohort abundance, termed “Ocean age-3” and “January age-3”. Ocean age-3 abundance includes escapement and fishery impacts. January age-3 includes escapement, fishery impacts, and natural mortality. Ocean age-3 is the basis for Pacific Salmon Treaty stock status (see Management Unit Status section) and is therefore the measure provided in the tables and figures in this report.

The Backwards Coho FRAM derives total cohort abundance through an iterative process of estimating the set of stock abundance scalars that best explain observed escapements and reported catches (Figure 2.3). In most cases, total cohort abundance for each MU is derived by summing pre-terminal catch, terminal catch, and escapement for all stocks. Total fishery-related impacts are derived from total catch in each mixed-stock fishery, a stock abundance scalar for a given fishing year relative to the base period, and ocean distributions of each stock during the base period. Figure 2.3 shows how Backwards Coho FRAM generates estimates of post-season exploitation rates.

The Backwards Coho FRAM has been used for post-season reconstructions for catch years 1998 to present. With the exception of the Interior Fraser MU, escapement for Canadian MUs for catch years 1998-2007 have not been estimated and are modeled using the post-season estimates of survival rates for each catch year. Furthermore, data for Canadian MUs between 1998 and 2003 were not compiled because Coho FRAM was not used in the PSC process for those years. Therefore escapement and exploitation rates for Canadian MUs from this time period are not included in this report. This information is being compiled as part of the effort to expand the data available for development of future Base Period data sets, expected to be completed in 2013.

The base period file names and text-based command files used to generate pre-season and post-season estimates of cohort abundance and fishery ERs for catch years 2004 to 2010 are listed in Table 2.1 for historical reference of data sources. Recent modifications and upgrades to Coho FRAM have resulted in a more integrated and streamlined system that documents model inputs and outputs for each catch year in readily accessible database tables indexed by run identification numbers. The current Coho FRAM program utilizes these database tables rather than text-based command files used prior to 2009.

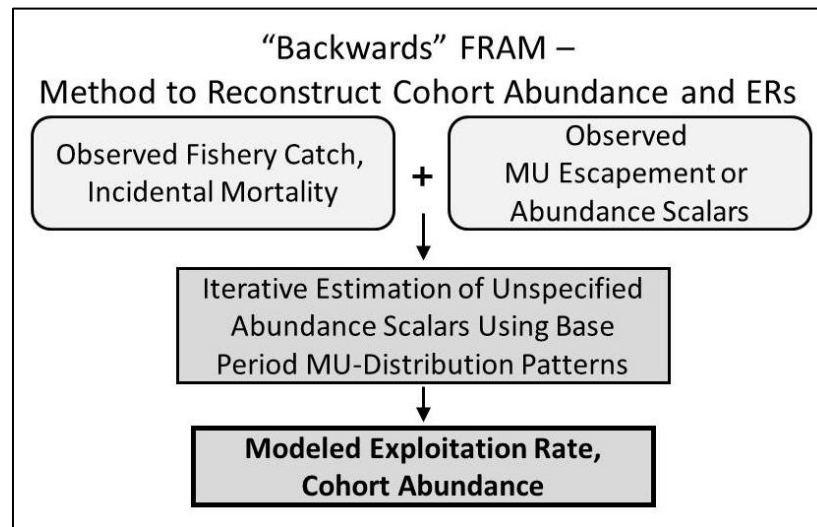


Figure 2.3. Procedure used to estimate exploitation rates and cohort abundances in Backwards Coho FRAM.

Table 2.1. Base period and FRAM command files used in pre-season management and post-season assessment of PST Coho Salmon by the U.S. and Canada.

Catch Year	Base Period Used in FRAM Run	FRAM Command Files			
		Pre-season		Post-season	
		U.S.	Canada	Original	Revised
2004	CohoBase	0425.Cmd	0427.Cmd	04pa.Cmd	BK04.Cmd
2005	CohoBase87917	0519.Cmd	P5at.Cmd	05p9bk.Cmd	BK05.Cmd
2006	CohoBase-86-92-NoUF86-Jan2008	0619.Cmd	0631.Cmd	06p4.Cmd	BK06.Cmd
2007	CohoBase-86-92-NoUF86-Jan2009	0714.Cmd	0714.Cmd	07JH.Cmd	BK07.Cmd
2008	CohoBase-86-92-NoUF86-Feb2008	0824.Cmd	0828.Cmd	BK08.Cmd	BK08.Cmd
2009	CohoBase-86-92-NoUF86-Feb2009	0920.Cmd	0920.Cmd	BK09.Cmd	BK09.Cmd
2010	CohoBase-86-92-NoUF86-Feb2009	1016.Cmd	1016.Cmd		

3 CODED-WIRE-TAG INDICATOR STOCKS

The coded-wire tag (CWT) indicator stock program provides the primary data for predicting, monitoring, and modeling harvest impacts on individual Coho Salmon populations. The Joint Coho Technical Committee (CoTC) uses CWT recoveries from the indicator stocks to reconstruct cohorts coastwide. While a few indicator tag groups are naturally-spawning fish, the vast majority consist of hatchery fish intended to represent each MU. Hatchery indicator stocks are selected on the basis of brood stock, rearing, and release strategies and are assumed to be surrogates for the naturally-spawning fish. The indicator program assumes that tagged and untagged fish experience similar trends in marine survival and similar exploitation patterns. Coastwide, approximately eight million juvenile Coho Salmon are coded-wire tagged annually (Nandor et al. 2010).

Some major changes in the CWT indicator stock program have occurred since the Pacific Salmon Treaty was signed in 1985. One of the most notable changes is the mass marking of hatchery fish in the Pacific Northwest. For many years, an adipose fin clip was used as an external mark to identify fish (natural spawning or hatchery) with a CWT. However, since brood year 1995 in the U.S. and 1996 in Canada, the adipose fin clip has been used as a mass mark to identify hatchery-origin fish and no longer uniquely indicates a coded-wire-tagged fish. With the advent of mark-selective fishing, marked (adipose fin-clipped) and unmarked fish do not have the same patterns of exploitation, violating the fundamental assumption of the indicator tag program. These changes in marking and fishing have resulted in the development and use of double index tag (DIT) releases in the indicator tag programs. The DIT group consists of two groups of hatchery fish, each 100% tagged with its own unique CWT. The two groups are presumed to be identical, except that one tagged group is unmarked and the other group is marked with an adipose fin clip. In a MSF, catches of marked fish will be retained whereas catches of unmarked fish will be released. The difference in return rates to the hatchery reflects the difference in ocean ERs in selective fisheries. A DIT group is recommended when the stock of interest is expected to be exploited by a mark-selective fishery (MSF). Unpaired (non-DIT) tag groups are either marked or unmarked and are considered single index tag (SIT) groups in this document.

To obtain unbiased estimates of fishery-specific impacts on individual stocks, a known proportion of both the catch and escapement must be sampled for CWTs throughout the migratory range of the stock and the proportion sampled must be adequate to produce a statistically reliable expansion of sampled Coho. Mass marking creates the following two additional complexities for sampling of CWTs: (1) DIT stocks are unmarked but contain CWTs; and (2) marked fish do not necessarily contain CWTs. Therefore, all fish, not just marked fish (with an adipose fin-clip), must be sampled for CWTs. Detection of CWTs in unmarked fish requires electronic sampling using wands or tubes. Detection of CWTs in marked fish requires either field-based electronic sampling or collection of snouts for processing in the laboratory. For complete accounting, fish must be sampled throughout their range, in catch and escapement. Electronic sampling of both unmarked and marked Coho places an additional burden of time and expense on agencies

At present, the utility of the DIT program and the CWT program in general for Coho is reduced due to low tagging rates, insufficient MU representation, low recovery rates, and incomplete coastwide coverage of electronic sampling programs (PSC-CWTW 2008). In addition, the CWT program: (1) currently provides overall differences in ocean ERs – can't discriminate individual fisheries; (2) has sample sizes that are generally small, so confidence limits are wide and estimates of differential impacts are imprecise; (3) is expensive and agencies are reluctant to fund tagging programs; and (4) unmarked DIT fish are unavailable for harvest in MSFs.

Most MUs in the U.S. have CWT indicator stocks and DIT programs. However, some of the programs have been eliminated in recent years due to budgetary constraints. Canada currently (2008) has two DIT programs for the four MUs in the treaty (Inch Creek and Quinsam River). The current Coho CWT indicator stocks for each MU and the brood years with DIT groups are listed in Table 3.1. The tag codes used to represent each MU in the MSM for catch years 1986-1997 are listed in Appendix B. All DIT groups released to date for each MU are listed in Appendix C.

Table 3.1. CWT indicator stocks and brood years with single index tag (SIT) and double index tag (DIT) groups for each Coho Management Unit (MU), brood years 1983-2008. Indicator stocks are hatchery-produced Coho unless specified as “Wild” (RMISD 2011). SIT groups may be either marked or unmarked releases of CWT Coho. DIT groups are marked and unmarked pairs of CWT Coho.

Management Unit	Indicator Stock	Brood Year	
		SIT	DIT
<i>Southern B.C. MUs</i>			
Lower Fraser	Inch Creek Hatchery	83-95	96-08
	Salmon River (Wild) ¹	84-01,05-07	NA
	Chilliwack R. Hatchery	83-95	96-02
Interior Fraser	Spilus Cr. Hatchery (Coldwater R.) ²	84-94,96-98	99-02
	Spilus Cr. Hatchery (Salmon R.) ³	95-96,99,01-02,04-05,07	--
	Spilus Cr. Hatchery (Spilus Cr.)	94-96,99-00	97-98
	Eagle R. Hatchery (Salmon R.)	83-93	--
	Eagle R. Hatchery (Eagle River)	83-93	--
	Dunn Cr. Hatchery ⁴ (Dunn Cr.)	83-92,94-95,97-07	--
	Dunn Cr. Hatchery ^d (Lemieux Cr.)	83-86,88-95,97-08	--
	Dunn Cr. Hatchery ^d (Louis Cr.)	88-94,97-07	--
	Eagle River (Wild) ⁵	00-03	NA
	Lemieux Creek (Wild)	92-93	NA
Strait of Georgia	Capilano River Hatchery	83-97,00	--
Mainland	Lang Creek Hatchery	07-08	--
Strait of Georgia	Quinsam River	83-95	96-08
Vancouver Island	Big Qualicum River Hatchery	83-85,87-95,03-08	96-02
	Goldstream River Hatchery	91-94,03-08	96-02
	Puntledge River Hatchery ⁶	83-02	--
	Black Creek (Wild) ⁷	83-07	NA
<i>U.S. Inside MUs</i>			
Skagit	Marblemount Hatchery (Skagit) ⁸	83-94, 99-02	95-08
	Baker River (Wild) ⁹	83-08	NA
Stillaguamish ¹⁰	Wallace River H. (Skykomish)	83-95	96-08
	Bernie Gobin Hatchery ¹¹	83-08	--
	Stillaguamish (Wild)	84-87	NA
Snohomish	Wallace River H. (Skykomish)	83-95	96-08
	Bernie Gobin Hatchery	83-08	--

¹ Brood years 1996-2001 and 2005-07: all tagged releases were unmarked.

² Brood years 1997 and 1998: all tagged releases were unmarked.

³ Brood years 1999, 2001-02, and 2005: all tagged releases were unmarked.

⁴ Beginning BY 1997, all tagged releases were unmarked.

⁵ All tagged releases were unmarked.

⁶ For BYs 1997 and 1999-2000, unmarked CWT fish were released, but not associated with a DIT group in RMIS

⁷ Brood years 1997-2000, 2002-03, and 2005-07: all tagged releases were unmarked. Brood year 2001 unmarked CWT fish were also released, but not associated with a DIT group in RMIS

⁸ Brood year 2004 unmarked CWT fish were also released, but not associated with a DIT group in RMIS.

⁹ Beginning BY 1996, all tagged releases were unmarked.

¹⁰ Bernie Gobin Hatchery tagging program and the Skykomish tagging program at the Wallace River Hatchery are used to represent production in both the Stillaguamish and Snohomish River Basins.

¹¹ Brood years 1997 and 1998: all tagged releases were unmarked.

Table 3.1. (Continued) CWT indicator stocks and brood years with single index tag (SIT) and double index tag (DIT) groups for each Coho Management Unit (MU), brood years 1983-2008. Indicator stocks are hatchery-produced Coho unless specified as “Wild” (RMISD 2011). SIT groups may be either marked or unmarked releases of CWT Coho. DIT groups are marked and unmarked pairs of CWT Coho.

Management Unit	Indicator Stock	Brood Year	
		SIT	DIT
U.S. Inside MUs (continued)			
Hood Canal	Quilcene NFH	87-95	96-07
	Quilcene Bay Sea Pens	88,90,93,95,02-08	96-01
	Port Gamble Bay Pens	83-96,04-08	96-03
	George Adams Hatchery	83-94,96	95, 97-08
	Big Beef Creek (Wild) ¹	83-08	NA
Strait of Juan de Fuca	Lower Elwha Hatchery	86,90-94,98-03	95-08
	Dungeness Hatchery ²	83,86,89,91-94,05-08	--
	Hoko and Salmon Cr. (Wild)	84-87,08	NA
U.S. Outside MUs			
Quillayute	Sol Duc Hatchery ³	83-88,90-95,00,03-04	96-99,01-03,05-06
	Various Tributaries (Wild) ⁴	83-86,88-92,07-08	07-08
Hoh	Chalaat Creek Hatchery	84,86-89	--
	Canyon Springs Pond	86-87	--
	Sol Duc Hatchery	85,87	--
	Hoh River (Wild) ⁵	83-87,03-06	NA
Queets	Quinalt Lake Hatchery	83-84,90-92	--
	Salmon R. Fish Culture ⁶	83-04,06	95-03,05,07-08
	Queets/Clearwater wild ⁷	83-08	NA
Grays Harbor	Bingham Creek Hatchery ⁸	83-94	95-08
	Aberdeen Net Pens	88-90,92	--
	Humptulips Hatchery	83-94,06	95-96
	Bingham Creek (Wild) ⁹	83-08	NA
	Stevens & Scatter Creek (Wild)	83-90,92-93	NA
	Chehalis Upriver (Wild) ¹⁰	83-97,00-08	NA

¹ Beginning BY 1996, all tagged releases were unmarked

² Brood year 2005: unmarked CWT fish were released, but not listed as an associated DIT group in RMIS.

³ Brood years 2000 and 2004: unmarked CWT fish were released, but not listed as an associated DIT group in RMIS.

⁴ Release groups were very small except Solduc BYs 07-08.

⁵ In all years, release groups are very small. Brood years 03-06: tagged releases were unmarked.

⁶ Brood years 2004 and 2006: unmarked CWT fish were released, but not listed as an associated DIT group in RMIS.

⁷ Beginning BY 1996, all tagged releases were unmarked.

⁸ Brood years 95, 04, 06-08 are listed as “Satsop” stock of a “mixed” origin in RMIS.

⁹ Beginning BY 1995, all tagged releases were unmarked.

¹⁰ Brood years 1995-1997 and 2000-2008: tagged releases were unmarked.

4 MANAGEMENT UNIT STATUS

Under the abundance-based management (ABM) regime outlined in the 2008 PST Southern Coho Agreement, exploitation rates (ERs) (defined as total fishing mortality divided by total fishing mortality plus escapement) for each Party's fisheries are to be constrained for each MU, depending on status determinations provided by each Party. Each year, through their domestic processes, the Parties classify the status of each MU as low, moderate, or abundant. For the purpose of planning fisheries, the Parties exchange information pertaining to the status of their respective MUs for consideration in the development of pre-season plans. Annual categorization of status determines the maximum ER (ER Cap) for each MU.

Under the Agreement, the Parties are required to establish escapement goals or ERs that achieve MSH, determine MSH ERs for each MU, and establish ERs for each MU and status category (low, moderate, and abundant). Until such time as the Parties provide the MU ER targets, the 2008 PST Southern Coho Agreement of ABM identifies ER ceilings for the following MU status categories:

Status	Total Exploitation Rate
Low	Up to 20%
Moderate	21% – 40%
Abundant	41% – 65%

Details as to how exploitation rate constraints are established based on the status of MUs under the current Southern Coho Agreement are contained in Annex IV Chapter 5 Section 9.b-c (Canadian exploitation rate caps on inside and outside U.S. MUs) and Section 9.d (U.S. exploitation rate caps on Canadian MUs).

4.1 *Canadian Management Units*

Procedures for determining the pre-season status of Canadian MUs are being developed concurrently with determination of Conservation Unit (CU) status benchmarks required with implementation of the Canada Department of Fisheries and Oceans' (CDFO) Wild Salmon Policy. Methods have been approved through the CDFO's internal peer review process, Center for Scientific Advice – Pacific (CSAP) (Holt et al. 2009). Completion of benchmark determinations for Southern B.C. Coho MUs is scheduled for CSAP review in 2014.

Since 2002, in the absence of benchmarks, the CDFO Stock Assessment staff has provided a categorical outlook for the next year's salmon status. The outlook is intended to provide an objective and consistent context within which to initiate fisheries planning (<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/index-eng.htm>). The category reflects the current interpretation of existing quantitative and qualitative information, including pre-season forecasts if available, and the opinion of CDFO Area stock assessment staff. Where management targets for stocks have not been formally described, interim targets were either based on historical return levels or, if necessary, opinion of local staff.

Canadian Coho Salmon abundance has declined, particularly in southern B.C. Interior Fraser River Coho have been classified as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 2002, but not under the Species at Risk Act. However, the Canadian Minister of Fisheries has established a domestic ER cap of 3% for Canadian fishery impacts on Interior Fraser Coho. The Interior Fraser MU is comprised of five Conservation Units (CU; North Thompson, South Thompson, Lower Thompson, Fraser Canyon, and Upper Fraser). The Interior Fraser River Coho recovery planning process has determined the critical benchmark needed to maintain population viability. Even with the reduction in fisheries exploitation, all Southern B.C. MUs have followed a similar dramatic declining trend in both marine survival and total abundance from the high levels observed in the 1980s and early 1990s (Figure 4.1). Spawning escapements have responded to the decreased exploitation and are within the range observed during the 1970s and 1980s. However, the sustained low marine survival has resulted in a decreased total abundance.

Because of the absence of programs to estimate total abundance and escapement for many Canadian MUs, the bilaterally-developed tool, Backwards Coho FRAM, is relied upon to generate estimates of ocean age-3 cohort abundance and ERs using post-season data. Cohort abundances (catch and escapement) of Canadian MUs, estimated by Backwards Coho FRAM, are depicted in Figure 4.1. Reduced abundances apparent since 1996 were a major consideration that led to the development of ABM regimes for management of southern Coho Salmon.

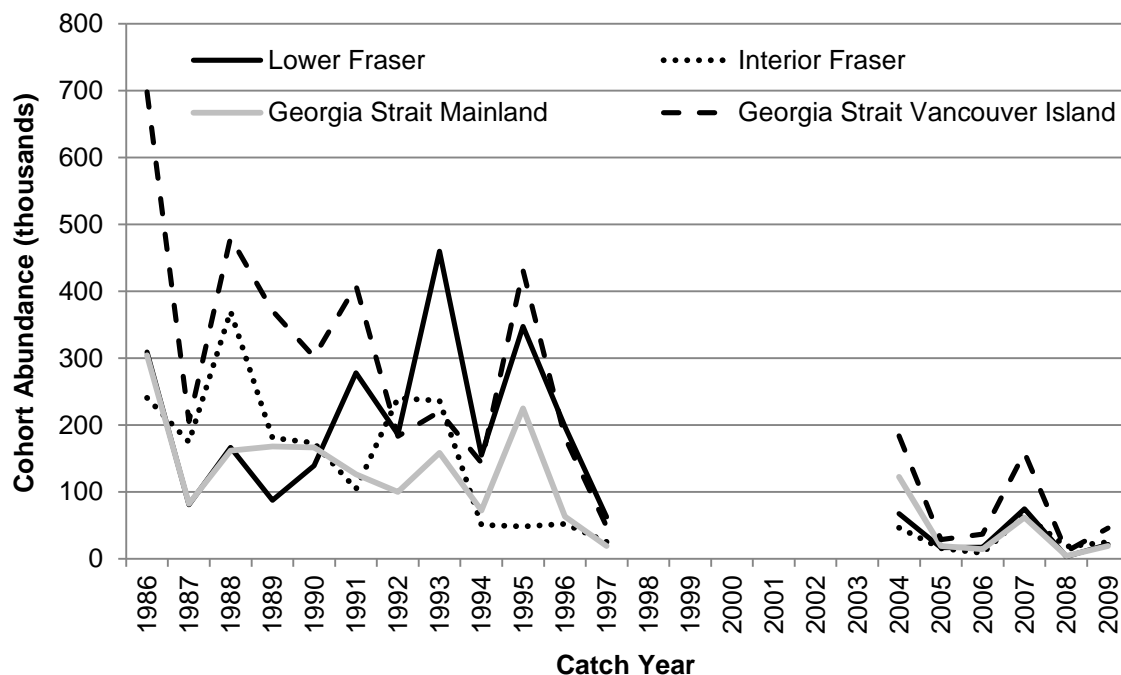


Figure 4.1. Estimated ocean age-3 abundances of Southern B.C. Coho Salmon Management Units; catch years 1986-1997 and 2004-2009.

4.2 U.S. Management Units

The status for U.S. Inside MUs is assigned based on ocean abundance (forecasted or re-constructed). Pre-season estimates of ocean abundance are typically forecasted from measured or modeled smolt production for each MU and multiplied by a marine survival rate predicted for each MU. Marine survival is predicted with a variety of methods including average return rates, correlations between jack and adult return rates, and correlations between environmental variables and historical return rates. Post-season estimates of ocean abundance are estimated using escapement and catch data and the Backwards Coho FRAM. The status of each MU is defined by a series of ocean abundance breakpoints (Table 4.1). Domestic management of Puget Sound naturally-spawning Coho stocks also uses abundance-based, tiered ER objectives defined in the Comprehensive Coho Plan (CCW 1998), that are similar to but not exactly consistent with the PSC guidelines. The identified break points between Low, Moderate, and Abundant status are based on population-specific productivity analyses conducted by the state and tribal co-managers in each river basin.

Table 4.1. Break points in ocean age-3 abundance associated with Low, Moderate, and Abundant status of naturally-spawning Coho, U.S. Inside Management Units (PFMC 2012).

Management Unit	Abundance Category Breakpoints	
	Low/Moderate	Moderate/Abundant
Skagit	22,857	62,500
Stillaguamish	9,385	20,000
Snohomish	51,667	125,000
Hood Canal	19,545	41,000
Strait of Juan de Fuca	11,679	27,445

The status for U.S. Outside MUs is assigned based on the ER ceiling identified annually, ocean abundance, and existing MU escapement goals. Pre- and post-season ocean abundances are estimated with the same approach described for the U.S. Inside MUs. Escapement goals for the U.S. Outside MUs are defined by state and tribal co-managers in each river basin and include escapement ranges in all but one (Grays Harbor) MU. Escapement ranges were originally intended to reflect the range of uncertainty in the MSH escapement goals identified for each of these populations. Unlike the U.S. Inside MUs, escapement goals for the U.S. Outside MUs do not vary with run size. The escapement goals used for PST status determinations are the floor of the designated escapement ranges (Table 4.2). The stock status is “Low” if the ocean abundance is low enough that the ER ceiling falls at or below 20% in order to achieve the bottom end of the escapement range. The stock status is “Moderate” if ocean abundance results in an ER ceiling between 21% and 40%. The stock status is “Abundant” if ocean abundance results in an ER ceiling above 41%.

Table 4.2. Break points in ocean abundance (harvest + escapement) associated with Low, Moderate, and Abundant status of naturally-spawning Coho, Outside U.S. Management Units.

Management Unit	Escapement Goal/Range ¹	Abundance Category Breakpoints	
		Low/Moderate	Moderate/Abundant
Quillayute	6,300 – 15,800	7,875	10,500
Hoh	2,000 – 5,000	2,500	3,333
Queets	5,800 – 14,500	7,250	9,667
Grays Harbor	35,400	44,250	59,000

¹ PFMC 2012.

U.S. MUs belong to three different Coho Salmon evolutionarily significant units (ESU), the Puget Sound/Strait of Georgia, the Olympic Peninsula, and the Southwest Washington ESUs. The Puget Sound/Strait of Georgia Coho ESU is currently a species of concern under the U.S. Endangered Species Act (ESA; NMFS 2009). The Olympic Peninsula ESU was evaluated for listing under the ESA and it was determined to be not warranted (Weitkamp et al. 1995). The Southwest Washington ESU is currently categorized as “undetermined”. The State of Washington considers Coho Salmon statewide to be a State Candidate to be reviewed for possible state listing as Endangered, Threatened, or Sensitive (WDFW 2008).

At the federal level, species of concern do not have formal protection under the ESA. The primary purpose of identifying species of concern is to prevent the need to list them as threatened or endangered under the ESA. This purpose can be achieved by the following actions: (1) identifying species potentially at risk; (2) increasing public awareness about those species; (3) identifying data deficiencies and uncertainties in species’ status and threats; (4) stimulating cooperative research efforts to obtain the information necessary to evaluate species’ status and threats; and, (5) fostering voluntary efforts to conserve the species before listing becomes warranted.

Estimated ocean age-3 cohort abundances for Inside and Outside U.S. MUs are depicted in Figure 4.2 and Figure 4.3, respectively. Abundances for inside MUs tend to be synchronous, with above- or below-average abundances occurring in the same years (e.g., high in 2001, low in 2006). Outside MUs are less synchronous and years with high abundances for Grays Harbor don’t necessarily correspond to high abundances for other MUs.

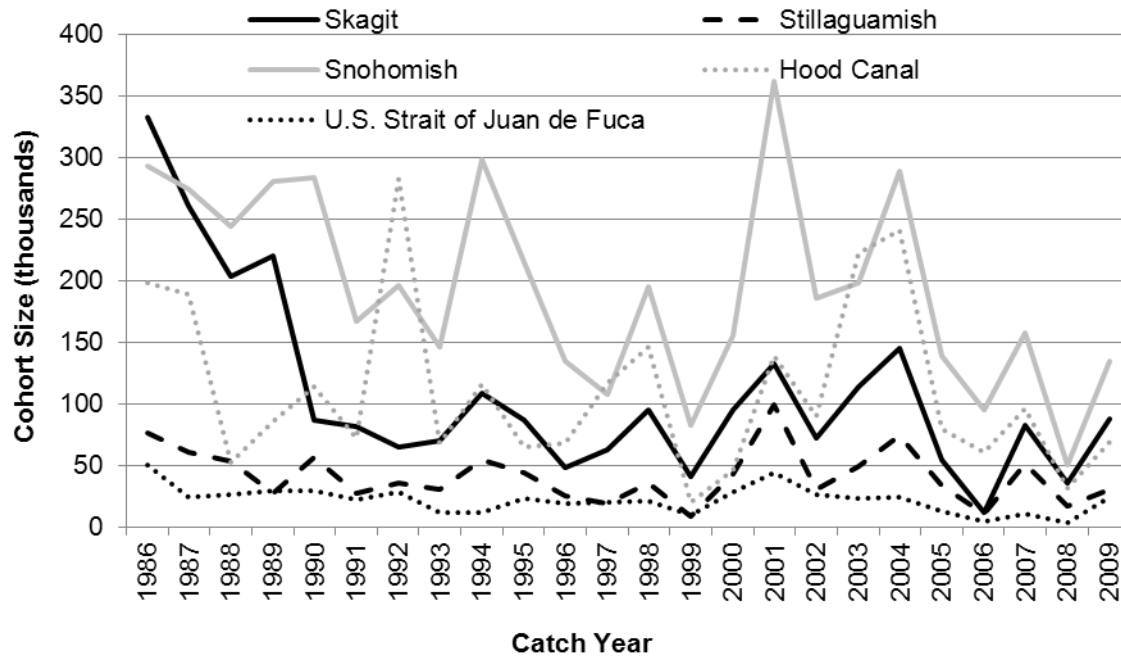


Figure 4.2. Estimated ocean age-3 abundances of U.S. Inside Coho Salmon Management Units; catch years 1986-2009.

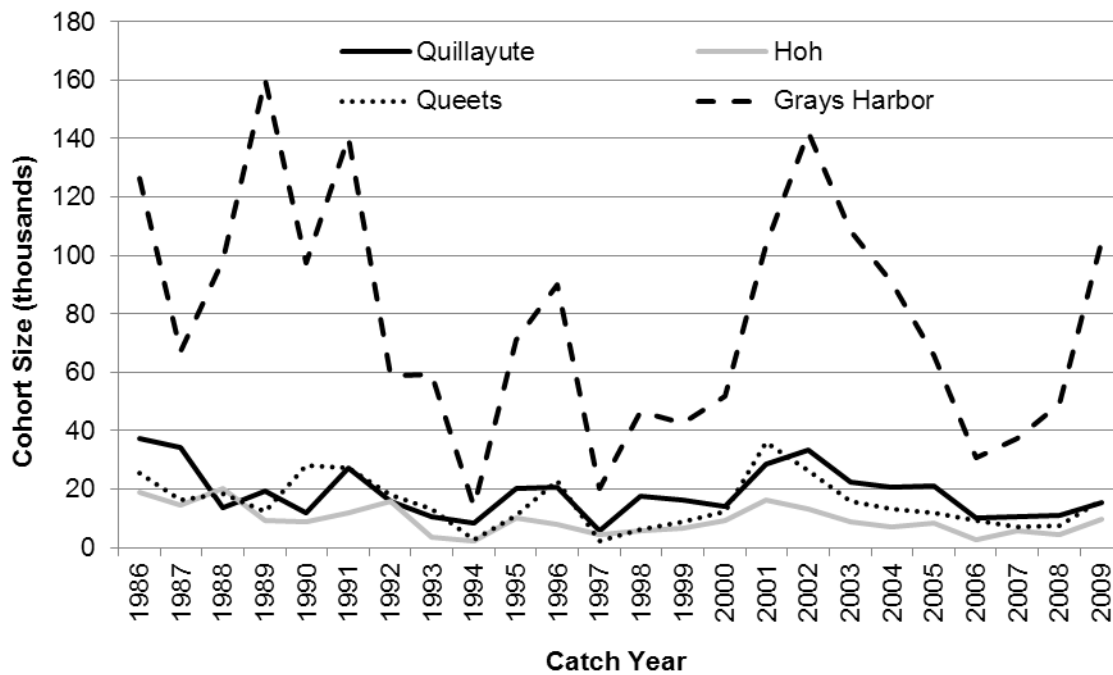


Figure 4.3. Estimated ocean age-3 abundances of U.S. Outside Coho Salmon Management Units; catch years 1986-2009.

This page left intentionally blank

5 FISHERIES OVERVIEW

Under the ABM regime, each Party is required to regulate its fisheries so as not to exceed exploitation rate (ER) constraints on MUs. Fisheries and changes in management objectives during the reporting period are summarized below. Total fishery mortality of all Management Units combined, by Canada and the U.S. from 1986 to 2009 is depicted in Figure 5.1. Maps showing Fishery Management Areas for British Columbia, Washington, and Oregon are included in Appendix D.

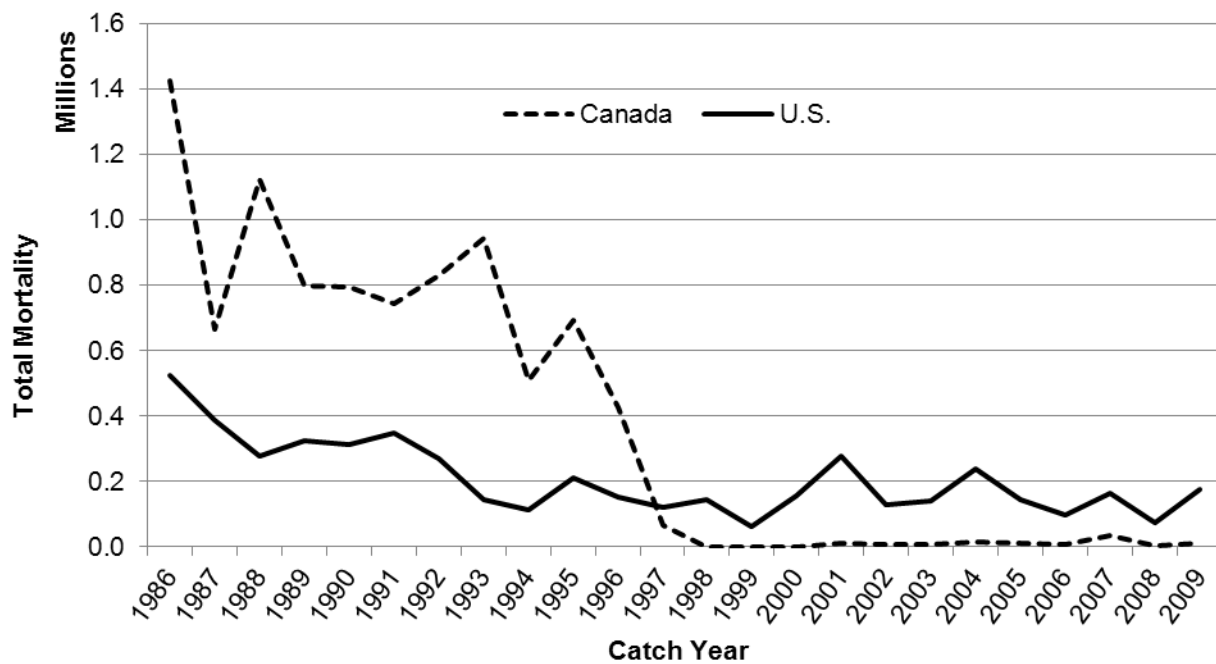


Figure 5.1. Estimated total fishery mortality of all Management Units combined, by Canada and the U.S. from 1988 to 2009.

5.1 *Canadian Fisheries*

Southern B.C. Coho Salmon are caught in First Nations, recreational, and commercial troll and net fisheries. Since Coho Salmon rear in areas near the coast they are readily caught in directed fisheries and as bycatch in fisheries targeting other species. As a result, Coho are harvested in mixed-stock fisheries, creating many challenges for the assessment and management of the species.

Coho catches on the south coast of B.C. have declined since the mid-1980s, initially due to declining abundance and more recently because of severe conservation measures in response to the declining abundance. Total fishery ERs in Canada were reduced from a range of 75 to 80% in the mid-1980s to 60% in 1995, 37% in 1997, 5% in 1998, and are currently estimated by Backwards Coho FRAM at less than 10%.

Historically 89% of the commercial Coho catch on the south coast of B.C. was taken by the troll sector with the remainder harvested by commercial net fisheries. The west coast of Vancouver Island (WCVI) troll fishery was the single largest commercial harvester, taking an average of 1.5 million Coho in the 10-year period before 1997, when major fishing restrictions were imposed. This fishery intercepted stocks from the U.S., Strait of Georgia, and WCVI. Since 2001, average catch retained in the WCVI troll fishery has been 725 Coho, due primarily to the timing and non-retention restrictions in place for this fishery. Historically, catch in the Strait of Georgia troll fishery, comprised predominantly of Strait of Georgia stocks, was much smaller than the WCVI troll fishery (1986-1995 averaged 150,000 Coho, annually). The Strait of Georgia troll fishery has not been permitted to retain Coho Salmon since 1995.

Net fisheries in Johnstone Strait, Strait of Juan de Fuca and the Strait of Georgia harvest Coho incidentally during directed fisheries on Sockeye (*O. nerka*), Pink (*O. gorbuscha*), and Chum (*O. keta*) Salmon. Net fisheries have been curtailed in recent years due to low returns of the target species and concerns for Chinook (*O. tshawytscha*) and Coho Salmon bycatch.

While the First Nations' harvest of Coho is small compared with other salmon species, several First Nations harvest Coho for food, social, and ceremonial (FSC) purposes. Coho are caught in hook and line, net, and spear fisheries in or near their local streams. They are also caught incidentally in other First Nations' salmon fisheries directed on other species, such as Sockeye and Chum Salmon.

Recreational fishing for Coho in B.C. tidal waters continues to be important to residents and visitors. Until the recent decline in Coho abundance and subsequent severe fishing restrictions, 70% of tidal recreational fishing took place within the Strait of Georgia. Since 1995, most Coho recreational fishery effort and catch has shifted from the Strait of Georgia to the WCVI, in part due to low abundance of Coho inside Vancouver Island. Overall, the proportion of Coho harvested by the recreational fishery has increased as commercial harvest has been significantly reduced as a result of the timing and non-retention harvest restrictions, as well as domestic allocation considerations in Canada that were implemented in response to the low abundance of Coho.

Due to conservation concerns, most notably for the Interior Fraser MU, Canadian Coho Salmon fisheries have seen unprecedented restrictions since 1997. In 1998 and 1999, no directed fisheries on naturally-spawning stocks of Coho were permitted; mandatory non-retention and non-possession of incidentally caught Coho was implemented in all areas, with the exception of some terminal hatchery locations. In the Pacific Region, (i.e., all marine waters of B.C.), barbless hooks became required for all salmon-directed commercial and recreational hook and line gear in 1998, a regulation that remains in effect. Pacific Region waters were classified as red or yellow zones. In red zones, areas where Thompson River Coho were known to be prevalent, fishing was restricted to very limited experimental selective fisheries, as well as some limited First Nations' fisheries to meet food, social, and ceremonial requirements. Red zones included inshore waters of Victoria to Barkley Sound and offshore waters of Barkley Sound to Quatsino Sound, from June to September. Special management zones (SMZs), areas of mandatory Coho non-retention with special restrictions, were identified with the intent to avoid Coho encounters. Fisheries were only permitted in locations and times when Thompson River Coho could be avoided or released unharmed. These areas were subject to in-season adjustments, including time and area closures for all sectors. Fisheries conducted in these SMZs were monitored to ensure Coho encounter rates did not become too high, and tissue samples were taken for stock identification. In yellow zones, where endangered stocks were not prevalent, a selective fishing strategy was implemented for all commercial and recreational fisheries. These fisheries were required to release any live Coho that were caught during operations. Mandatory logbooks and an onboard observer program were initiated in commercial fisheries. Limited Coho retention was allowed only for First Nations and recreational fisheries.

Since 2000, fisheries impacting naturally-spawning Coho from southern B.C., Washington State, and Oregon have been managed under the Pacific Salmon Treaty ABM regime. The ABM plan constrains total fishery exploitation on key stock MUs in B.C. For each MU, annual limits of fishing mortality are established based on the categorical level of abundance and the health of the naturally-spawning stocks. In Canada, low status of Interior Fraser Coho has constrained southern B.C. fisheries for the last decade. The Southern U.S. has been limited to 10% ER on Coho originating from the Interior Fraser MU. Southern B.C. fisheries, in waters south of Cape Caution where Interior Fraser Coho are prevalent, have been managed to a maximum 3% total fishing mortality rate on the Interior Fraser Coho MU. Non-retention of naturally-spawning Coho is generally in effect except for First Nations FSC opportunities in specific terminal systems where abundance permits and where retention of by-catch during fisheries for other species is permitted. Release of unmarked Coho Salmon during periods when Interior Fraser Coho may be caught is required in all Canadian commercial and recreational fisheries.

5.2 *U.S. Fisheries*

Current U.S. fisheries are constrained by domestic and PST conservation objectives. For the Puget Sound MUs, the 2008 PST Southern Coho Agreement of ABM uses the thresholds and stepped harvest rate goals from the Comprehensive Coho Agreement (CCW 1998), developed by Washington State and the Puget Sound tribes, and adopted by the Pacific Fishery Management Council as Fishery Management Plan conservation objectives in November 2009. Actual ER constraints for Canadian fisheries on U.S. Coho MUs are determined by formulas that specify sharing of allowable total ERs and a “composite rule”. The composite rule adjusts constraints for Canadian fishery ERs based on the number of U.S. MUs that fall in a given category. For example, if only one Washington coastal Coho MU is in low status, Canadian fisheries are constrained to a total ER on that unit of 12%; if two or more Washington coastal MUs are in low status, the constraint becomes 10%. The most restrictive ER limit for Canadian fishery impacts on U.S. Coho MUs is 10%.

Fisheries between Cape Falcon, Oregon and the U.S./Canada Border are constrained by four factors: (1) management objectives and treaty Indian obligations for individual stock U.S. MUs; (2) treaty Indian/non-Indian and ocean/in-river sharing agreements; (3) stocks listed under the ESA; and (4) requirements of the PST. The starting point for implementing these constraints is the forecasted January age-3 abundance and the modeled ocean distribution of each Coho stock.

Coho-directed recreational fisheries have been mark-selective since 1999 with the exception of a nine day fishery between the mouth of the Queets River and Leadbetter Point, Washington in 2004. Non-Indian commercial troll fisheries have been mostly restricted to mark-selective Coho retention since 2000. Treaty Indian fisheries are not restricted to mark-selective retention of Coho Salmon.

6 FORECAST PERFORMANCE

Implementation of the ABM regime depends critically upon the reliability of cohort abundance forecasts and reconstructions as well as the pre-season status determinations. Bilateral pre- and post-season assessments for Coho were initiated in catch year 2004. Table 6.1 provides pre- and post-season cohort abundances for each of the 13 Pacific Salmon Treaty MUs.

6.1 *Canadian Management Units*

Forecasts for southern British Columbia Coho MUs rely on information from CWT indicator stocks and are provided as either marine survival or escapement. Marine survival is defined as the proportion of smolts that return as adults. Adults are calculated as the sum of the number of adults entering freshwater to spawn and the number caught in commercial, recreational, and First Nations harvest activities. Marine exploitation is estimated using an effort-based model with a base period of 1987-1997. For the Interior Fraser MU and Carnation Creek (WCVI), the entire escapement is forecast. For stock groups in Pacific Fisheries Management Areas 12 and 13, the escapement to a select group of creeks is forecast. The forecast for other hatchery (Robertson, Quinsam, Big Qualicum, Inch, and Goldstream) and naturally-spawning (Black and Myrtle creeks) indicators is presented as an expected marine survival.

Several correlation models are used to develop the forecasts, with the best performing model used for each stock. The models include a group of time-series models based on the relative change of estimated marine survival over the near term (1 or 3 years) and a set of biologically-based models based on jack-to-adult ratios (Robertson Hatchery), euphausiid density (Carnation Creek), marine catch per unit effort index (Strait of Georgia hatcheries), and first marine summer growth rates (Carnation Creek). The forecasting strength of these models is compared using similar time periods.

Post-season cohort abundances are not provided for Canadian MUs except for Interior Fraser where total escapement is estimated. For the other Canadian MUs, an abundance index is determined by monitoring escapement to an indicator stream within the MU. Since the monitoring programs do not assess entire Canadian MUs, post-season assessments of forecast performance are largely derived from the use of Backwards Coho FRAM

6.2 *U.S. Management Units*

Forecasts of naturally-spawning U.S. Coho stocks are based on smolt production and predicted marine survival for each PST MU. Smolt abundance is measured in juvenile trapping studies conducted throughout Puget Sound and the Washington Coast. In watersheds where trapping programs are not conducted, smolt abundance is estimated based on an assumed smolt capacity adjusted by environmental variables specific to a given year. Long-term data sets have provided insight into the environmental variables correlated with Coho smolt production at a regional scale (e.g., summer low flows, Pink Salmon abundance [Seiler 2006; Zimmerman 2011]). Marine survival is predicted based on a number of variables identified as useful by state and tribal co-managers. These variables include jack-to-adult return rates from naturally-spawning indicator stocks at Big Beef Creek (Hood Canal) and Bingham Creek (Grays Harbor) and metrics

of ocean conditions (e.g., Pacific Decadal Oscillation, spring transition, Coho densities in fall ocean sampling).

6.3 *Post-Season Analysis*

Post-season cohort abundance is based on escapement estimates and catch for each PST MU. Escapement is estimated from spawner surveys and fish ladder counts. Spawner survey methods vary among watersheds and include a combination of redd and live count data. With the exception of the Interior Fraser MU, escapement for complete Canadian MUs for catch years 1998-2007 has not been estimated and instead was generated using the Backwards Coho FRAM. Catch for each MU is estimated from total fishery catches and the proportion of each stock for each fishery and time period according to the FRAM base period (catch years 1986-1992).

Pre- and post-season ocean age-3 abundance for naturally-spawning Coho in each MU is listed in Table 6.1 for catch years 2004-2010. In some instances, there are substantial differences between pre-season forecasts of abundance and post-season abundance estimated by Backwards Coho FRAM (Appendix G). The principal contributing factors to these differences include, but are not limited to: uncertainty in abundance forecasts; the conduct of fisheries differed from expectations (pre-season values reflect regimes established during the PFMC planning process, but only general expectations for Canadian fisheries), and limited escapement monitoring data for Canadian MUs. Abundance estimates produced by Backwards FRAM are the best available given data limitations.

Table 6.1. Pre- and post-season (Appendix G) ocean age-3 abundance for naturally-spawning Coho in each Management Unit (MU), catch years 2004-2010. Abundance status of each MU is provided in parentheses where available, Low (L), Moderate (M), or Abundant (A). Difference is the (pre-season – post-season)/pre-season shown as a percentage.

Management Unit	Catch Year	Cohort Abundance (Status of MU)				
		Pre-Season		Post-Season		Difference
Southern B.C. MUs						
Lower Fraser	2004	5,619		67,382		-1099.3%
	2005	13,108		16,843		-28.5%
	2006	5,615		17,386		-209.6%
	2007	5,615		74,840		-1232.9%
	2008	14,518		3,471		76.1%
	2009	1,167		21,561		-1747.5%
	2010	10,237		26,647		-160.3%
Interior Fraser	2004	34,509	(L)	46,354	(L)	-34.3%
	2005	30,806	(L)	15,966	(L)	48.2%
	2006	18,297	(L)	8,799	(L)	51.9%
	2007	14,225	(L)	66,045	(L)	-364.3%
	2008	14,031	(L)	18,016	(L)	-28.4%
	2009	15,703	(L)	25,041	(L)	-59.5%
	2010	22,025	(L)	31,341	(L)	-42.3%
Strait of Georgia Mainland	2004	129,967		122,503		5.7%
	2005	64,952		19,230		70.4%
	2006	43,271		14,366		66.8%
	2007	81,647		61,757		24.4%
	2008	12,905		4,307		66.6%
	2009	10,725		19,182		-78.9%
	2010	29,649		23,676		20.1%
Strait of Georgia Vancouver Island	2004	194,800		183,909		5.6%
	2005	93,769		28,907		69.2%
	2006	65,032		36,852		43.3%
	2007	122,674		158,796		-29.4%
	2008	30,954		11,054		64.3%
	2009	25,712		45,924		-78.6%
	2010	70,962		56,766		20.0%

Table 6.1. (Continued) Pre- and post-season (Appendix G) ocean age-3 abundance for naturally-spawning Coho in each Management Unit (MU), catch years 2004-2010. Abundance status of each MU is provided in parentheses where available, Low (L), Moderate (M), or Abundant (A). Difference is the (pre-season – post-season)/pre-season shown as a percentage.

		Cohort Abundance (Status of MU)				
Management Unit	Catch Year	Pre-Season		Post-Season		Difference
U.S. Inside MUs						
Skagit	2004	156,648	(A)	145,283	(A)	7.3%
	2005	62,093	(M)	54,034	(M)	13.0%
	2006	107,051	(A)	11,521	(L)	89.2%
	2007	26,928	(M)	83,037	(A)	-208.4%
	2008	61,992	(M)	35,502	(M)	42.7%
	2009	33,551	(M)	87,545	(A)	-160.9%
	2010	96,295	(A)	62,013	(M)	35.6%
Stillaguamish	2004	38,263	(A)	73,935	(A)	-93.2%
	2005	57,020	(A)	33,880	(A)	40.6%
	2006	45,231	(A)	10,808	(M)	76.1%
	2007	69,592	(A)	51,708	(A)	25.7%
	2008	34,589	(A)	16,892	(M)	51.2%
	2009	13,456	(M)	30,849	(A)	-129.3%
	2010	25,997	(A)	16,646	(M)	36.0%
Snohomish	2004	193,446	(A)	288,890	(A)	-49.3%
	2005	242,965	(A)	139,047	(A)	42.8%
	2006	140,226	(A)	94,782	(M)	32.4%
	2007	99,462	(M)	157,388	(A)	-58.2%
	2008	108,470	(M)	49,733	(L)	54.2%
	2009	67,286	(M)	134,310	(A)	-99.6%
	2010	99,778	(M)	53,928	(M)	46.0%
Hood Canal	2004	99,598	(A)	240,822	(A)	-141.8%
	2005	99,816	(A)	78,979	(A)	20.9%
	2006	59,957	(A)	60,643	(A)	-1.1%
	2007	42,919	(A)	96,565	(A)	-125.0%
	2008	30,212	(M)	31,385	(M)	-3.9%
	2009	50,314	(A)	69,145	(A)	-37.4%
	2010	33,618	(M)	14,778	(L)	56.0%
U.S. Strait of Juan de Fuca	2004	41,800	(A)	23,753	(M)	43.2%
	2005	22,778	(M)	13,075	(M)	42.6%
	2006	32,300	(A)	4,622	(L)	85.7%
	2007	33,942	(A)	10,238	(L)	69.8%
	2008	26,399	(M)	3,856	(L)	85.4%
	2009	21,323	(M)	24,705	(M)	-15.9%
	2010	10,276	(L)	21,507	(M)	-109.3%

Table 6.1. (Continued) Pre- and post-season (Appendix G) ocean age-3 abundance for naturally-spawning Coho in each Management Unit (MU), catch years 2004-2010. Abundance status of each MU is provided in parentheses where available, Low (L), Moderate (M), or Abundant (A). Difference is the (pre-season – post-season)/pre-season shown as a percentage.

Management Unit	Catch Year	Cohort Abundance (Status of MU)				Difference
		Pre-Season		Post-Season		
U.S. Outside MUs						
Quillayute	2004	21,378	(A)	20,757	(A)	2.9%
	2005	18,667	(A)	20,971	(A)	-12.3%
	2006	14,702	(A)	9,929	(M)	32.5%
	2007	10,878	(A)	10,740	(A)	1.3%
	2008	10,588	(A)	11,104	(A)	-4.9%
	2009	19,357	(A)	15,578	(A)	19.5%
	2010	22,156	(A)	17,082	(A)	22.9%
Hoh	2004	8,159	(A)	6,984	(A)	14.4%
	2005	7,656	(A)	8,200	(A)	-7.1%
	2006	6,419	(A)	2,736	(M)	57.4%
	2007	5,434	(A)	5,889	(A)	-8.4%
	2008	4,383	(A)	4,309	(A)	1.7%
	2009	9,568	(A)	9,530	(A)	0.4%
	2010	7,658	(A)	11,666	(A)	-52.3%
Queets	2004	18,619	(A)	13,404	(A)	28.0%
	2005	17,232	(A)	12,026	(A)	30.2%
	2006	8,393	(M)	9,311	(M)	-10.9%
	2007	13,635	(A)	7,242	(L)	46.9%
	2008	10,391	(A)	7,380	(M)	29.0%
	2009	31,686	(A)	16,069	(A)	49.3%
	2010	22,028	(A)	19,277	(A)	12.5%
Grays Harbor	2004	116,148	(A)	91,075	(A)	21.6%
	2005	89,654	(A)	66,051	(A)	26.3%
	2006	66,230	(A)	30,743	(L)	53.6%
	2007	58,434	(M)	37,201	(L)	36.3%
	2008	44,142	(L)	49,118	(M)	-11.3%
	2009	59,424	(A)	104,858	(A)	-76.5%
	2010	68,128	(A)	130,857	(A)	-92.1%

This page left intentionally blank

7 HISTORICAL REVIEW OF MU EXPLOITATION

Historical summaries of exploitation rates (ERs) by country, total ERs, and escapement abundances by MU for catch years 1986 to 2009 are depicted in Figure 7.1 to Figure 7.13. Exploitation rates for catch years 1986 to 1997 were estimated using CWT recoveries and the Mixed-Stock Model cohort reconstruction. Exploitation rates for catch years 1998 to 2009 were estimated using the Backwards Coho FRAM assessment. Cohort reconstructions cannot be completed for the Canadian MUs between 1998 and 2003 due to the lack of suitable escapement estimates and CWT tagging and recovery data.

These figures show a general decline in the total ERs for both Canadian and U.S. MUs from highs in the 1980s and 1990s. Reductions in U.S. fisheries beginning in the 1980s are due to river by river, run by run sharing requirements to comply with Indian treaty fishing rights. Other factors contributing to the decline in US fishery impacts include the ESA listing of Oregon coastal Coho in 1998 and of the lower Columbia River Coho in 2005. Declines in Canadian fisheries beginning in the mid-1990s are due to actions taken in response to conservation concerns for Interior Fraser coho. Data for these figures are included in Appendix E. Tables of the historical distribution of exploitation by fishery type and catch year are included in Appendix F.

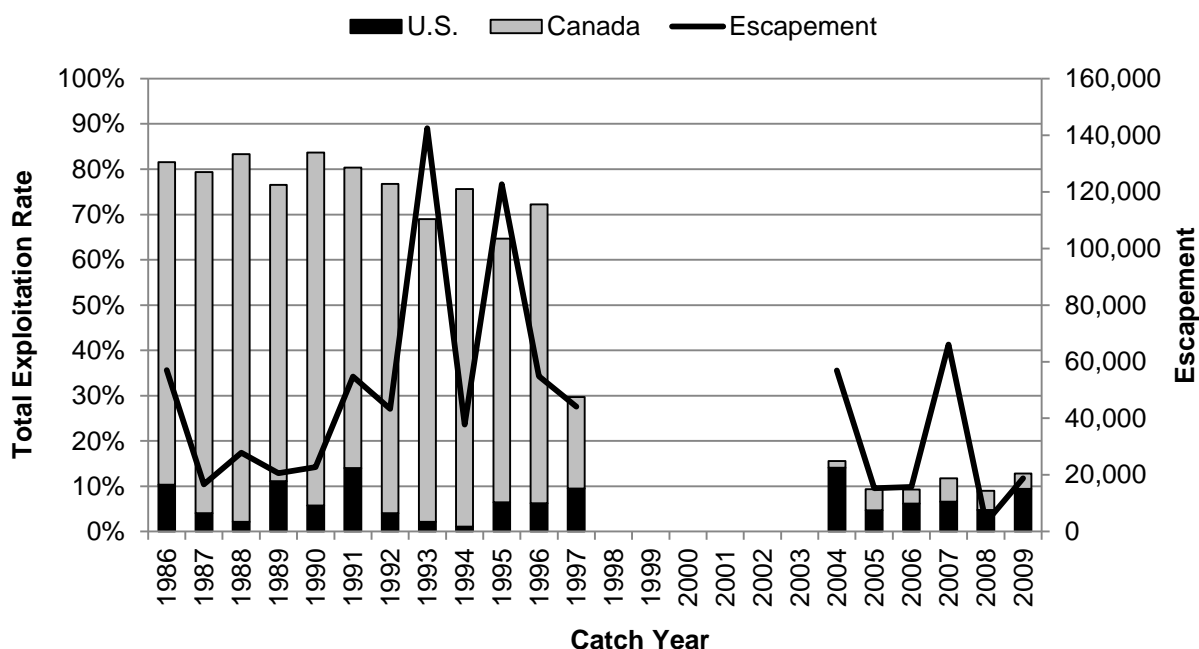


Figure 7.1. Lower Fraser MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.

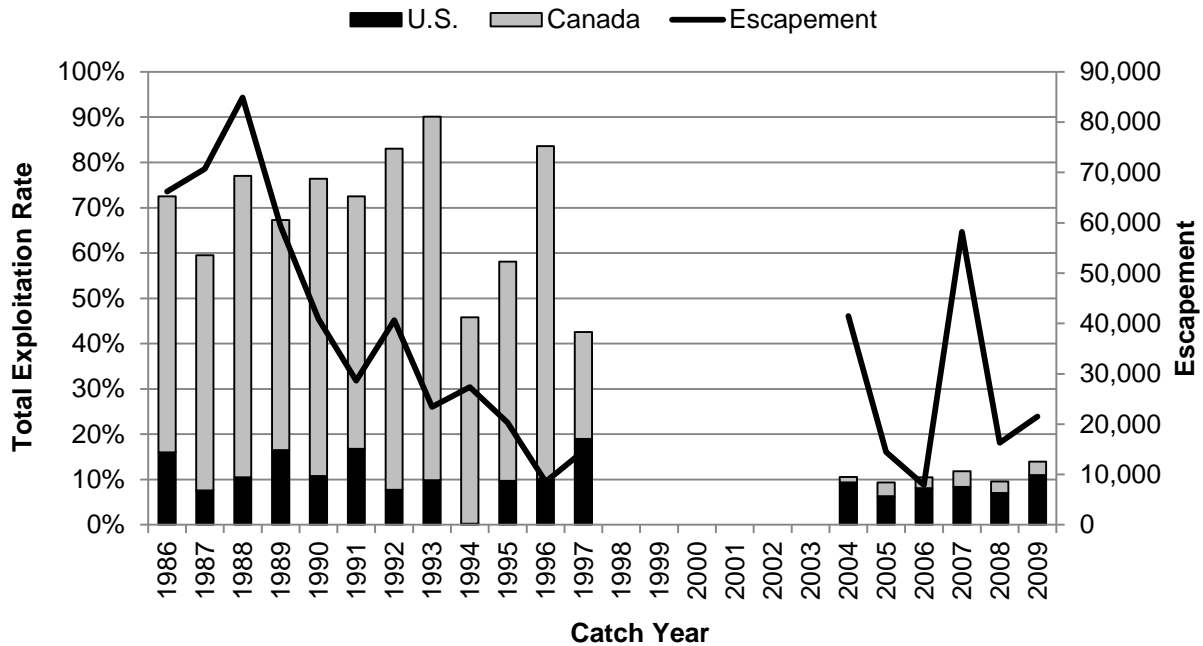


Figure 7.2. Interior Fraser MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.

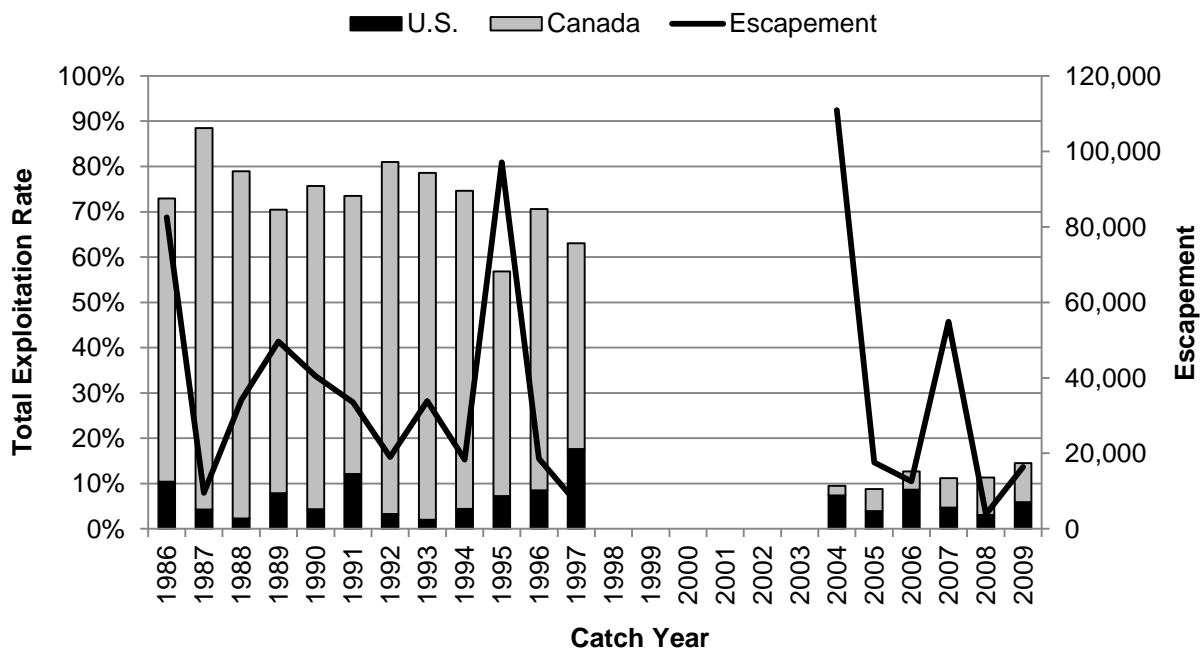


Figure 7.3. Strait of Georgia Mainland MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.

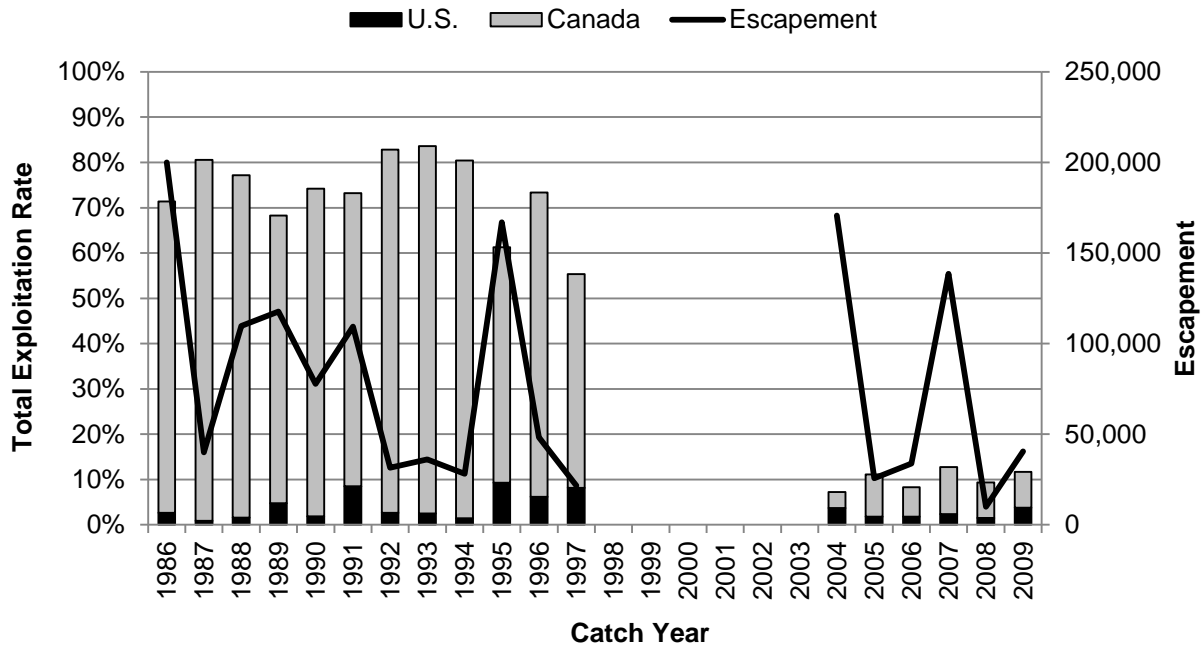


Figure 7.4. Strait of Georgia Vancouver Island MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-1997 and 2004-2009.

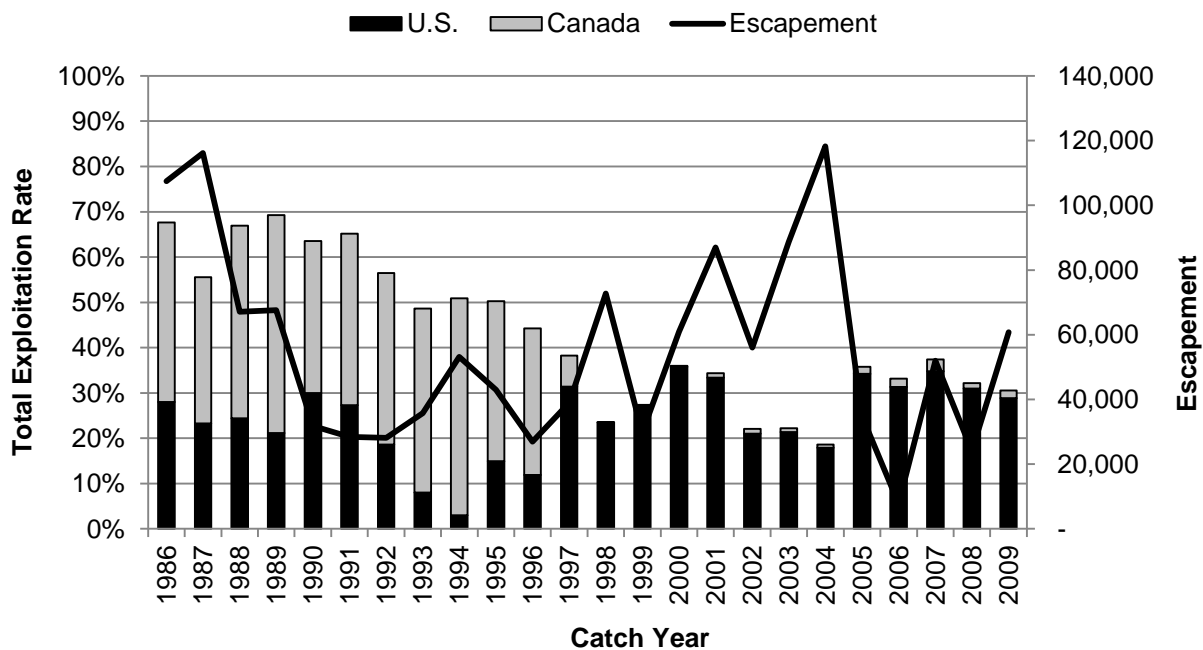


Figure 7.5. Skagit River MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

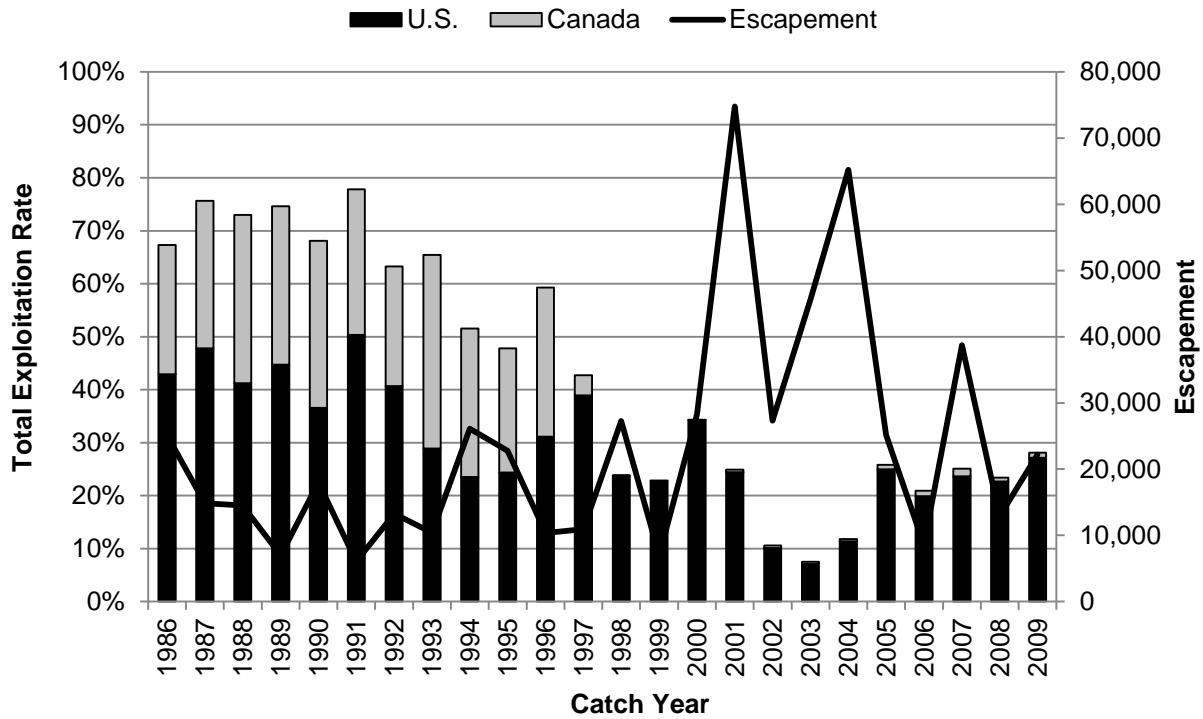


Figure 7.6. Stillaguamish MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

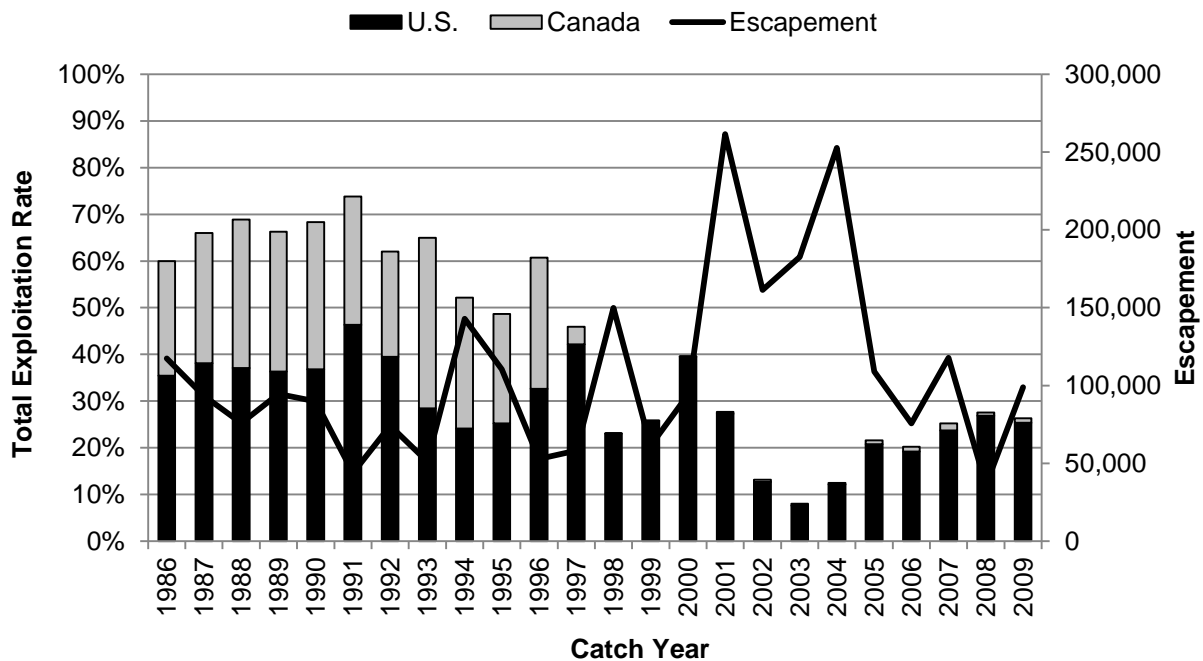


Figure 7.7. Snohomish MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

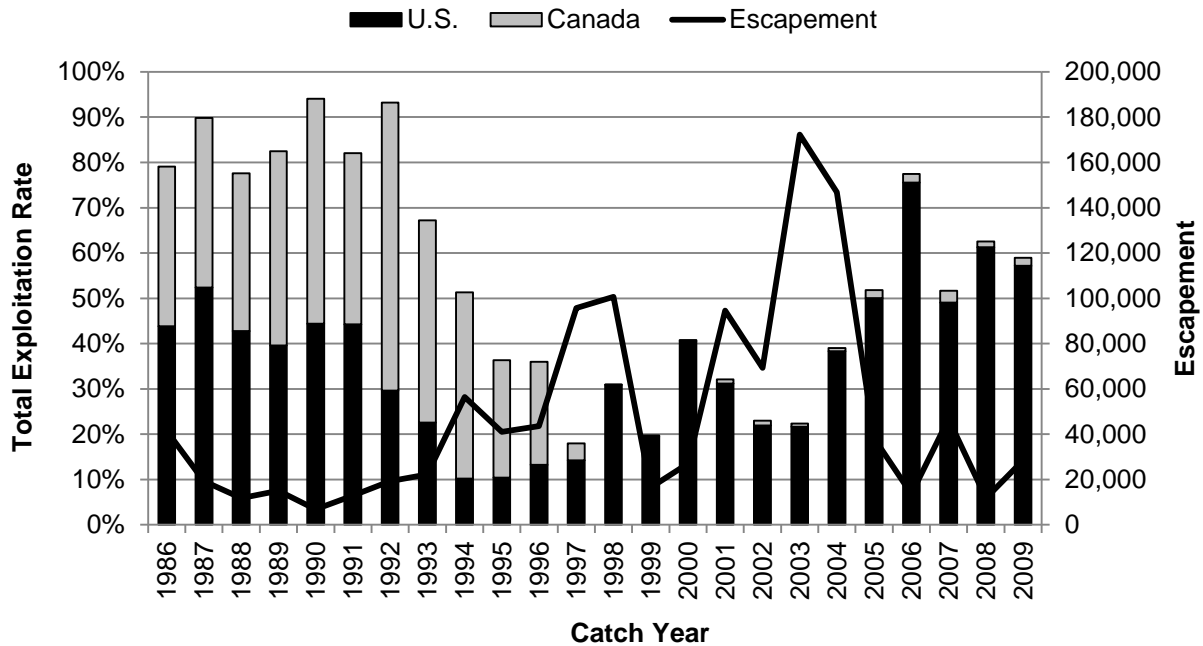


Figure 7.8. Hood Canal MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

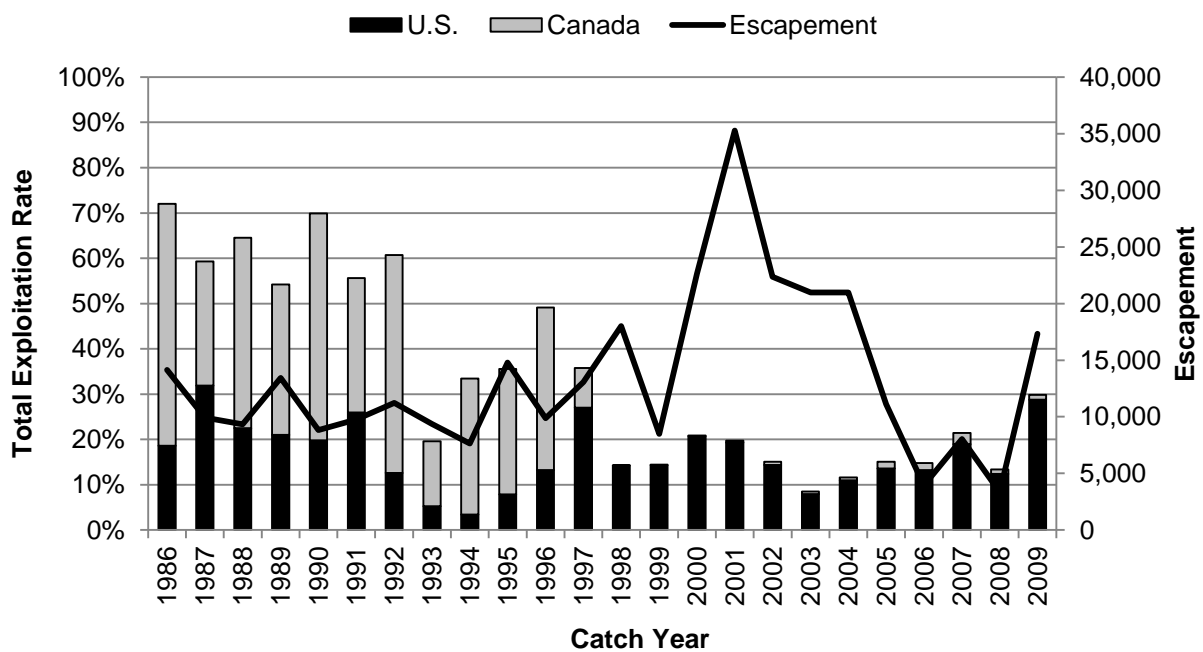


Figure 7.9. U.S. Strait of Juan de Fuca MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

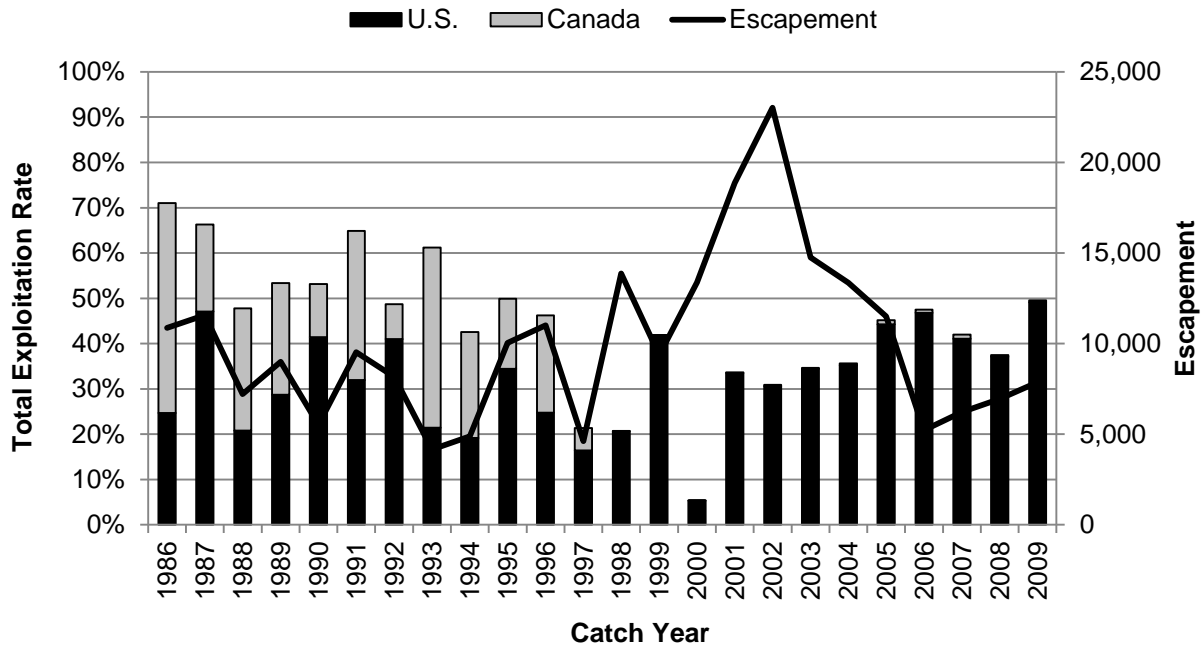


Figure 7.10. Quillayute MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

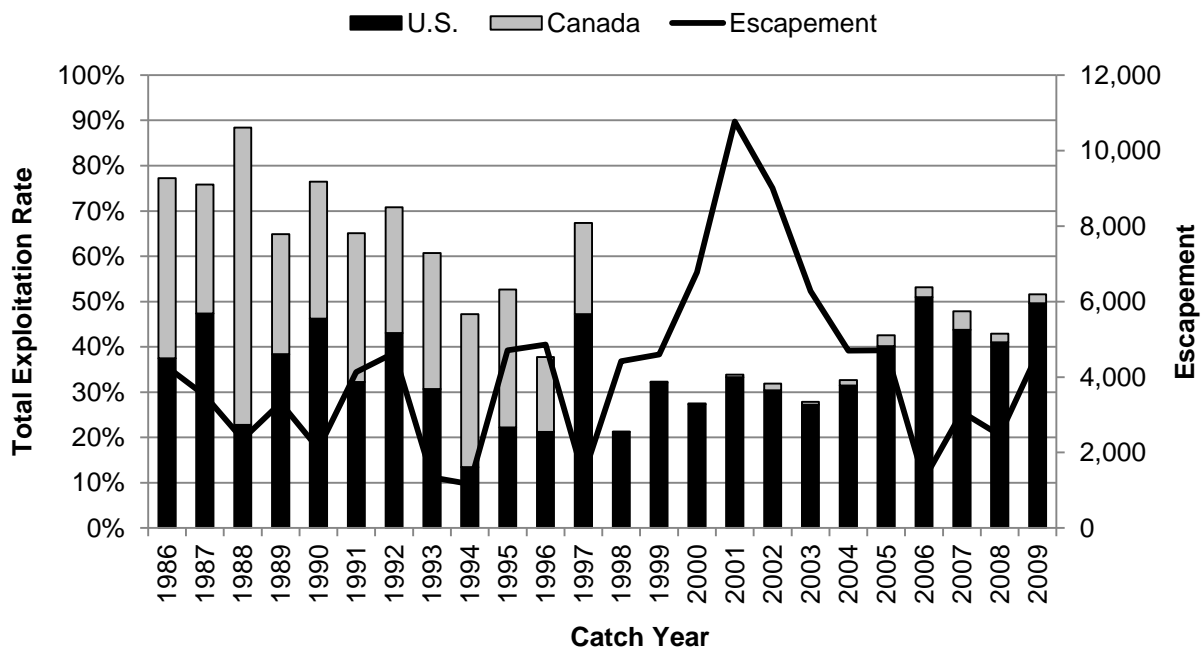


Figure 7.11. Hoh MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

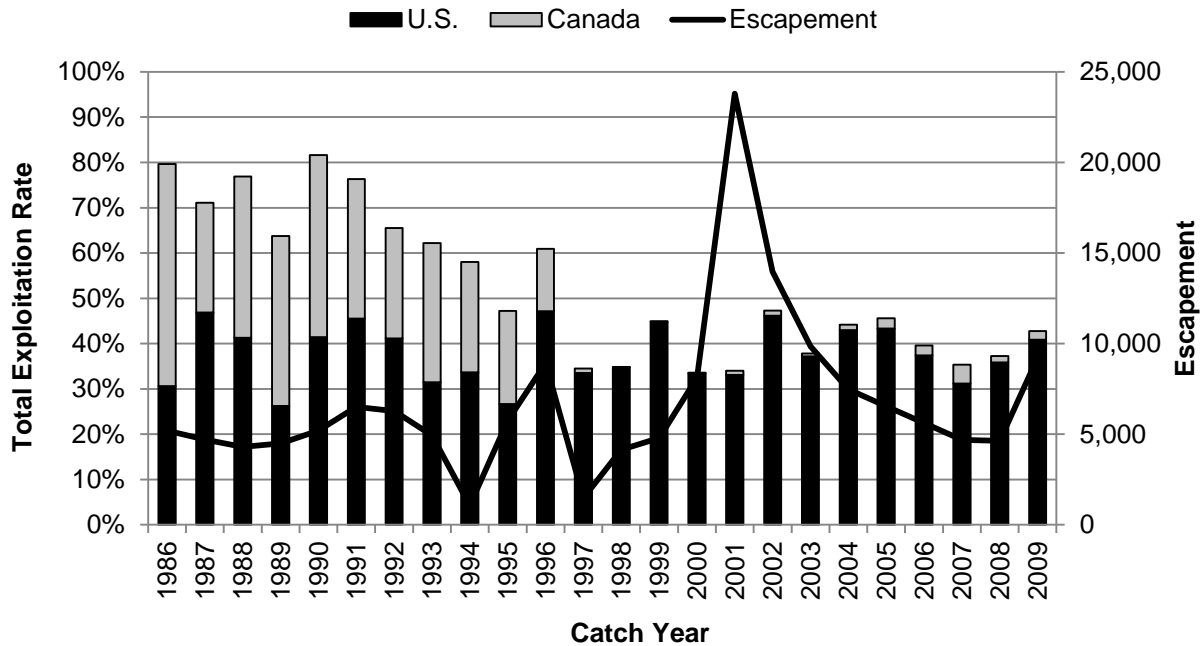


Figure 7.12. Queets MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

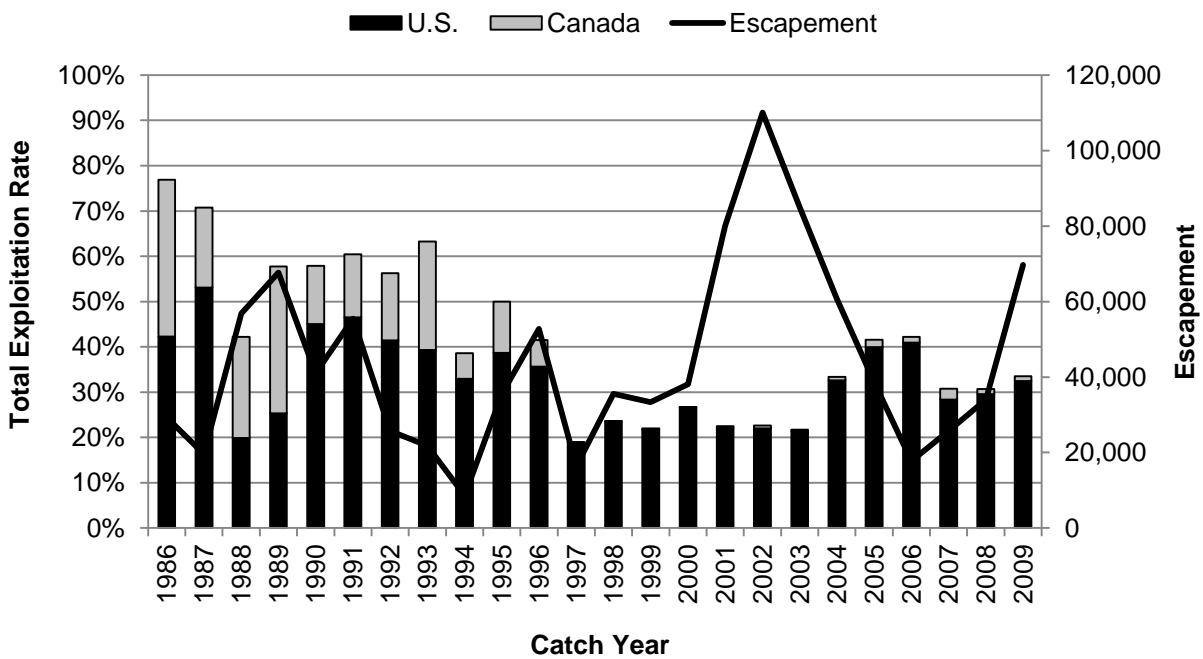


Figure 7.13. Grays Harbor MU: Exploitation rate by country, total exploitation rate, and escapement for catch years 1986-2009.

This page left intentionally blank

8 ANNUAL POST-SEASON ESTIMATES OF EXPLOITATION RATES

The CoTC produces post-season estimates of ERs by MU on an annual basis. These estimates are generated using the Backwards Coho FRAM as described in the Management Model Data Exchange section. Beginning in 2003, pre- and post-season ER estimates were compiled into an annual report table by the CoTC at the PSC's Annual Meetings in February and distributed to the Southern Panel and Coho Working Group at these meetings (Table 8.1 through Table 8.7). Currently, these annual report tables are produced a year and a half after the season has been completed (For example, estimates for catch year 2009 were generated in February of 2011) when reliable catch and escapement data become available. The information in these tables should be considered preliminary and is included as a historical record. Updated information on ERs and escapement is provided in other sections of this report.

Due to the discrepancy in the timing of U.S. and Canadian fishery planning processes, the "Pre-season" ERs included in these tables are those modeled at the end of the U.S. PFMC process and do not include the actual fishery plans subsequently determined in the Canadian pre-season process (see Management Model Data Exchange section for more details).

Table 8.1. Exploitation rate review of the 2003 Coho return.

Exploitation rates (ER) are presented as percentages. Values are from post-season FRAM, command file 03p7.cmd, with catches and escapements updated. Catches and escapements are preliminary.

Management Unit	Total ER		Canadian ER		U.S. ER		Pre-season Status	Post-season Status	Wild Escapement
	Pre	Post	Pre	Post	Pre	Post			
Lower Fraser	7.1	16.2	1.5	10.1	5.5	6.1	Low	Low	27,600
Interior Fraser	9.4	9.6	1.0	3.2	8.4	6.5	Low	Low	15,100
GSML	9.4	10.7	3.4	7.1	6.1	3.5	Low	Low	54,600
GSVI	5.7	7.9	2.9	6.2	2.8	1.7	Low	Low	82,000
Skagit	36.3	34.4	0.5	1.1	35.8	33.4	Abundant	Abundant	69,200
Stillaguamish	39.7	17.1	0.4	1.0	39.3	16.0	Abundant	Abundant	45,700
Snohomish	35.7	16.9	0.4	1.0	35.3	15.8	Abundant	Abundant	182,600
Hood Canal	47.8	24.1	0.5	1.2	47.3	22.9	Moderate	Abundant	170,300
Strait JDF	14.4	11.2	0.3	1.2	14.1	10.0	Moderate	Moderate	17,400
Quillayute	45.8	33.3	0.4	0.8	45.4	32.4	Abundant	Abundant	14,800
Hoh	44.2	15.7	0.2	0.9	43.9	14.8	Abundant	Abundant	6,500
Queets	35.7	14.9	0.2	0.8	35.5	14.2	Abundant	Moderate	9,600
Grays Harbor	40.4	19.2	0.2	0.9	40.2	18.2	Abundant	Abundant	83,900

Pre = modeled ER generated by pre-season Coho FRAM run; Post = estimated ER from post-season FRAM run.

The “Pre-season” ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Table 8.2. Exploitation rate review of the 2004 Coho return.

Exploitation rates (ER) are presented as percentages. Values are from post-season FRAM, command file 04z5.cmd, that was run at 5:04 PM on Wednesday, February 15, 2006. Exploitation rates are listed in percentage points. This table corrects the table distributed on January 11, 2006, from command file 04pa.cmd. That FRAM run used incorrect terminal area catches in Puget Sound terminal areas, particularly in Bellingham/Samish Bays, Hood Canal, and Port Gardner Bay. All changes from the previous table are due to changes in the modeled Puget Sound terminal area catches.

Management Unit	Total ER				Canadian ER			U.S. ER			Status		Wild Escapement
	Pre	Post	Cap		Pre	Post	Cap	Pre	Post	Cap	Pre	Post	
Lower Fraser	12.2	15.5			3.2	3.5		9.0	12.0				41,400
Interior Fraser	12.7	13.6			2.3	2.9		10.5	10.7	10	L	L	35,600
GSML	11.9	10.5			6.0	3.8		5.9	6.7				75,200
GSVI	7.3	10.5			5.0	7.6		2.2	2.9				113,000
Skagit	35.8	29.2	60	60	0.8	0.9	25.2	35.0	28.2		A	A	138,700
Stillaguamish	38.8	28.1	55	55	1.1	1.3	23.8	37.7	26.8		A	A	58,100
Snohomish	34.8	29.8	60	60	1.1	1.3	25.2	33.7	28.6		A	A	252,800
Hood Canal	34.7	41.6	65	65	1.8	1.7	27.1	32.9	39.9		A	A	146,900
Strait JDF	13.0	11.4	60	40	1.3	1.5	17.6	11.7	9.9		A	M	21,000
Quillayute	40.1	33.8	25-70	11-64	0.9	1.4	26.7	39.2	32.4		M	M	10,600
Hoh	47.0	22.2	38-75	43-77	1.2	1.9	31.7	45.8	20.4		M	A	4,700
Queets	40.4	33.0	22-72	12-65	1.0	1.6	27.1	39.5	31.4		M	M	9,800
Grays Harbor	51.4	28.1	70	NA	1.1	1.9	NA	50.3	26.2		A	NA	NA

Cap is the ER ceiling for the Management Unit.

Pre = modeled ER generated by pre-season Coho FRAM run; Post = estimated ER from post-season FRAM run.

Status = A (Abundant), M (Moderate), L (Low).

The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Table 8.3. Exploitation rate review of the 2005 Coho return.

Exploitation rates (ER) are presented as percentages. Values are from post-season FRAM, command file 05p9bk.cmd, that was run at 10:42 AM on Wednesday, February 14, 2007.

Management Unit	Total ER				Canadian ER			U.S. ER			Status		Wild Escapement
	Pre	Post	Cap		Pre	Post	Cap	Pre	Post	Cap	Pre	Post	
Lower Fraser	12.5	6.9			3.8	3.4		8.7	3.5				NA ^a
Interior Fraser	12.6	8.2			2.8	2.9		9.8	5.3	10	L	L	11,261 ^b
GSML	11.5	7.8			4.9	5.3		6.6	2.5				NA ^b
GSVI	10.0	9.8			7.7	8.8		2.3	1.0				NA ^b
Skagit	34.2	37.0	35	35	0.9	0.8	17.0	33.3	36.2		M	M	34,658
Stillaguamish	42.8	22.0	55	55	1.2	1.3	23.8	41.6	20.7		A	A	25,784
Snohomish	39.4	23.3	60	60	1.2	1.3	25.2	38.2	22.0		A	A	109,020
Hood Canal	35.2	35.8	65	65	1.6	2.0	27.1	33.6	33.8		A	A	38,066
Strait JDF	12.2	7.1	40	NA	1.5	1.7	NA	10.7	5.4		M	NA	NA
Quillayute	41.2	43.4	15-66	21-68	1.5	1.6	27.1	39.7	41.8		^c	^c	11,264
Hoh	43.1	24.2	34-73	40-76	1.9	2.6	27.1	41.2	21.5		^c	^c	6,352
Queets	38.3	26.1	15-70	53	1.7	1.9	22.5	36.6	24.2		^c	^c	9,045
Grays Harbor	42.0	36.9	61	NA	2.0	2.1	NA	39.9	34.8		^c	^c	NA

Cap is the ER ceiling for the Management Unit.

Pre = modeled ER generated by pre-season Coho FRAM run; Post = estimated ER from post-season FRAM run.

Status = A (Abundant), M (Moderate), L (Low).

The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

^a Modeled as post-season abundance scalars, relative to the 1986-91 base period. No absolute escapement numbers, however, are available.

^b Thompson River only.

^c Washington Coastal MUs are managed for an escapement range, and status levels have not yet been defined.

Table 8.4. Exploitation rate review of the 2006 Coho return.

Exploitation rates (ER) are presented as percentages. Values are from post-season FRAM, command file 06p4.cmd (out file CohoBase-86-92-NoUF86-Jan2008.Out), that was run at 5:15 PM on Tuesday, February 12, 2008.

Management Unit	Total ER				Canadian ER			U.S. ER			Status		Wild Escapement
	Pre	Post	Cap		Pre	Post	Cap	Pre	Post	Cap	Pre	Post	
Lower Fraser	12.0	9.0		NA	3.1	3.3		8.9	5.6	NA		NA	NA
Interior Fraser	12.1	9.9	13	13	2.8	2.6		9.3	7.3	10	L	L	6,337
GSML	10.6	12.8		NA	3.9	6.0		6.7	6.8	NA		NA	NA
GSVI	11.3	9.3		NA	9.0	7.7		2.3	1.6	NA		NA	NA
Skagit	35.4	37.0	60	20	1.0	1.4	25.2	34.4	35.7		A	L	14,000
Stillaguamish	40.2	21.1	55	35	1.6	0.9	23.8	38.6	20.2		A	M	8,549
Snohomish	38.7	18.9	60	40	1.6	0.8	25.2	37.2	18.1		A	M	75,630
Hood Canal	37.3	76.0	65	65	2.5	1.5	27.1	34.8	74.5		A	A	13,269
Strait JDF	11.7	7.2	40	NA	1.6	1.2	17.6	10.0	6.0		M	NA	NA
Quillayute	49.2	48.6	15-66	15-43	1.7	0.6	18.7	47.4	48.0		MA	M	5,642
Hoh	44.5	38.8	34-73	15	3.0	1.8	10	41.6	36.9		MA	L	1,282
Queets	35.5	36.5	15-70	NA	2.3	1.6	NA	33.2	34.9		MA	NA	NA
Grays Harbor	48.1	42.3	61	15	2.4	1.1	10	45.7	41.2		A	L	14,401

Cap is the ER ceiling for the Management Unit.

Pre = modeled ER generated by pre-season Coho FRAM run; Post = estimated ER from post-season FRAM run.

Status = A (Abundant), M (Moderate), L (Low).

The "Pre-season" ERs are those modeled at the end of the PPMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Table 8.5. Exploitation rate review of the 2007 Coho return.

Exploitation rates (ER) are presented as percentages. Values are from post-season FRAM, command file BK07.cmd (out file CohoBase-86-92-NoUF86-Jan2009.Out), that was run at 12:33 PM on Wednesday, February 11, 2009.

Management Unit	Total ER				Canadian ER			U.S. ER			Status		Wild Escapement
	Pre	Post	Cap		Pre	Post	Cap	Pre	Post	Cap	Pre	Post	
Lower Fraser	11.1	9.0			1.9	3.5		9.2	5.6				
Interior Fraser	11.6	9.9	13	13	1.6	2.3	3.0	10.0	7.5	10.0	L	L	58,104
GSML	8.0	10.8			2.4	7.0		5.6	3.8				
GSVI	7.5	9.6			5.3	7.7		2.3	1.9				
Skagit	33.7	35.9	35	60	0.6	1.6	25.2	33.1	34.3		M	A	51,972
Stillaguamish	38.5	24.2	50	50	0.9	0.8	23.8	37.7	23.3		A	A	38,732
Snohomish	39.0	24.3	40	60	0.9	0.8	25.2	38.2	23.4		M	A	117,736
Hood Canal	45.7	51.4	65	65	1.1	1.6	27.1	44.6	49.9		A	A	46,658
Strait JDF	11.8	NA	40	NA	1.1	NA	NA	10.6	NA		M	NA	NA
Quillayute	40.0	43.5	42	36	1.1	0.5	16.1	38.8	42.9		A	M	5,609
Hoh	45.4	35.1	63	58	1.4	2.4	24.4	44.1	32.7		A	A	3,072
Queets	32.9	30.1	57	20	1.2	2.0	10.0	31.7	28.1		A	L	4,600
Grays Harbor	37.1	28.7	39	20	1.4	1.4	10.0	35.7	27.3		M	L	22,595

Cap is the ER ceiling for the Management Unit and, unless otherwise noted, is the post-season ER Cap.

Pre = modeled ER generated by pre-season Coho FRAM run; Post = estimated ER from post-season FRAM run.

Status = A (Abundant), M (Moderate), L (Low).

The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Table 8.6. Exploitation rate review of the 2008 Coho return.

Exploitation Rates (ER) are presented as percentages. Unused exploitation rate is the portion of the ER cap that was not harvested by a country, or in total.

Pre-season Cmd File: 0824.cmd Outfile: CohoBase-86-92-NoUF86-Jan2009.Out Date: April 11, 2008, 12:18 pm
 Post-season Cmd File: BK08.cmd Outfile: CohoBase-86-92-NoUF86-Jan2009.Out Date: February 10, 2010, 12:44 pm

Management Unit	U.S. Exploitation Rate						Canadian Exploitation Rate ^a					
	Pre-season			Post-season			Pre-season			Post-season		
	Cap	Model	Unused	Cap	Estd	Unused	Cap	Model	Unused	Cap	Estd	Unused
Lower Fraser		12.8			4.8			4.9			3.7	
Interior Fraser	10.0	8.3	1.7	10.0	7.4	2.6	10.0 ^b	3.1	6.9	10.0 ²	1.6	8.4
GSML		6.8			3.4			5.0			8.8	
GSVI		3.6			1.9			7.1			5.6	
Skagit	33.2	28.3	4.9	34.3	31.1	3.2	17.0	1.8	15.1	17.0	0.7	16.3
Stillaguamish	49.0	36.8	12.2	34.6	22.6	11.9	22.4	1.0	21.4	17.0	0.4	16.5
Snohomish	39.0	33.5	5.5	19.6	26.8	-7.3	17.6	1.0	16.6	11.0	0.4	10.6
Hood Canal	42.9	42.6	0.3	44.2	42.6	1.6	21.0	2.1	18.9	21.0	0.8	20.2
U.S. Strait JDF	38.5	9.5	29.0	19.0	8.2	10.9	17.6	1.5	16.1	11.0	1.0	10.0
Quillayute ^c	41.5	40.1	1.4	38.5	38.0	0.6	18.4	0.7	17.7	17.2	0.4	16.8
Hoh	52.1	49.3	2.8	47.8	38.4	9.5	23.1	2.3	20.8	21.4	2.1	19.3
Queets	46.9	33.2	13.6	19.5	35.4	-15.9	20.9	1.8	19.1	10.5	1.7	8.8
Grays Harbor ^d	10.4	32.8	-22.4	32.1	28.0	4.1	10.0	1.3	8.7	15.3	1.9	13.4

Cap is the ER ceiling for the MU; Model = modeled ER generated by the pre-season FRAM run; Estd = estimated ER from the post-season FRAM run; Status= A (Abundant), M (Moderate), L (Low). The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

^a FRAM does not estimate impacts in Canadian freshwater fisheries; thus, these rates do not cover the same fisheries modeled in the Canadian domestic management process.

^b 10% is the cap under the PSC Coho Agreement. For domestic management, Canada has imposed a ceiling of 3%.

^c Washington Coastal Coho are managed for an escapement range (or for Grays Harbor, an escapement goal), not an exploitation rate. The cap rates shown here were calculated by using the escapement floor as the target, and are the maximum rates allowed under the escapement goal range.

^d In 2008, State and Tribal co-managers did not reach agreement on the abundance forecast for Grays Harbor naturally-spawning Coho; consequently, conservative abundance forecasts were employed for pre-season planning of the ER caps. Subsequently, agreement was reached on a higher forecast, resulting in a higher allowable ER for US fisheries than the cap indicated in this table. Ultimately, the 2008 spawning escapement exceeded the escapement goal for this MU.

Table 8.6. (Continued) Exploitation rate (ER) review of the 2008 Coho return.

Management Unit	Total Exploitation Rate						Escapement		Recruitment	
	Pre-season ^a			Post-season						
	Status	Cap	Model	Status	Cap	Estd	Pre	Post	Pre	Post
Lower Fraser			17.7			8.5				
Interior Fraser	L	20.0	11.5	L	20.0	9.0	12,425	14,275	14,032	15,694
GSML			11.8			12.2				
GSVI			10.7			7.5				
Skagit	M	35.0	30.1	M	35.0	31.8	42,946	24,093	61,462	35,322
Stillaguamish	A	50.0	37.8	M	35.0	23.1	21,550	12,938	34,638	16,817
Snohomish	M	40.0	34.5	L	20.0	27.3	71,113	35,817	108,641	49,248
Hood Canal	M	45.0	44.7	M	45.0	43.4	16,173	11,756	29,254	20,770
U.S. Strait JDF	M	40.0	11.0	L	20.0	9.1	21,600	3,339	24,276	3,675
Quillayute	A	42.2	40.8	M	39.0	38.4	6,453	6,358	10,891	10,322
Hoh	A	54.4	51.6	A	49.9	40.4	2,122	2,378	4,383	3,992
Queets	A	48.6	35.0	M	21.2	37.1	7,338	4,629	11,291	7,363
Grays Harbor	L	11.7	34.1	M	34.0	29.9	26,415	37,600	40,077	53,655

Cap is the ER ceiling for the MU;

Model = modeled ER generated by the pre-season FRAM run;

Estd = estimated ER from the post-season FRAM run;

Status= A (Abundant), M (Moderate), L (Low).

Recruitment is the sum of fishing mortality and spawning escapement, and does not include natural mortalities.

^a The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Table 8.7. Exploitation rate review of the 2009 Coho return.

Exploitation rates (ER) are presented as percentages. Cap is the ER ceiling for the Management Unit. Unused ER is the portion of the ER cap that was not harvested by a country, or in total. Recruitment (Ocean age-3 abundance) is the sum of fishing mortality and spawning escapement, and does not include natural mortalities.

FRAM command files and output files utilized to generate these estimates include:

Pre-season Cmd File: 0920.cmd Outfile: CohoBase-86-92-NoUF86-Jan2009.Out Date: April 2009
 Post-season Cmd File: BK09 Outfile: CohoBase-86-92-NoUF86-Jan2009.Out Date: February 15, 2011; 12:40 pm

Management Unit	U.S. Exploitation Rate						Canadian Exploitation Rate ^a					
	Pre-season			Post-season			Pre-season			Post-season		
	Cap ^b	Model	Unused	Cap ^b	Estd	Unused	Cap ^b	Model	Unused	Cap ^b	Estd	Unused
Lower Fraser		18.8			8.7			5.8			3.4	
Interior Fraser ^c	10.0	10.1	-0.1	10.0	11.1	-1.1	10.0	3.3	6.9	10.0	3.0	7.0
Strait of Georgia ML		9.2			5.7			5.0			8.6	
Strait of Georgia VI		4.4			3.6			7.1			8.0	
Skagit ^d	33.2	29.3	3.9	58.3	28.9	29.4	4.7	1.8	15.1	16.9	1.7	15.2
Stillaguamish ^d	39.0	27.9	11.1	54.0	27.2	26.8	5.3	1.0	21.4	15.5	1.0	14.5
Snohomish ^d	39.0	20.5	18.5	59.0	25.4	33.6	5.3	1.0	16.6	16.9	1.0	15.9
Hood Canal ^d	62.9	42.7	20.2	63.3	56.7	6.5	24.7	2.1	18.9	24.7	1.7	23.0
U.S. Strait JDF ^d	38.5	8.4	30.1	39.0	14.1	24.9	5.3	1.5	16.1	11.3	1.0	10.3
Quillayute ^d	66.6	42.2	24.4	48.9	33.0	15.9	28.0	0.7	17.7	21.1	0.4	20.7
Hoh ^d	76.7	52.7	24.0	81.3	43.2	38.1	32.4	2.3	20.8	34.0	1.9	32.1
Queets ^d	79.8	34.6	45.2	66.9	41.4	25.5	33.4	1.7	19.1	28.6	1.9	26.6
Grays Harbor ^d	39.0	33.9	5.1	67.6	37.4	30.2	17.7	1.2	8.7	28.5	1.1	27.4

Model = modeled ER generated by the pre-season FRAM run.

The "Pre-season" ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Estd = estimated ER from the post-season FRAM run.

^a FRAM does not estimate impacts in Canadian freshwater fisheries; therefore, these rates do not cover the same fisheries modeled in the Canadian domestic management process.

^b Cap for Canadian exploitation on U.S. stocks and U.S. exploitation on Canadian stocks is according to the PST and based on stock status.

^c 10% is the cap for each country under the PSC Coho Agreement. For domestic management, Canada has imposed a ceiling of 3%.

^d Cap on U.S. exploitation of U.S. stocks is the PST cap based on stock status minus the modeled Canadian exploitation rate.

Table 8.7. (Continued) Exploitation rate review of the 2009 Coho return.

Management Unit	Total Exploitation Rate						Escapement		Recruitment (Ocean age-3)	
	Pre-season			Post-season					Pre	Post
	Status	Cap	Model	Status	Cap	Estd	Pre	Post	Pre	Post
Lower Fraser ^a			24.6			12.1				
Interior Fraser	L	20	13.4	L	20	14.1	13,589	21,544	15,631	24,953
Strait of Georgia ML ^b			14.2			14.3				
Strait of Georgia VI ^b			11.5			11.6				
Skagit	M	35	31.1	A	60	30.6	23,105	60,798	33,381	87,155
Stillaguamish	M	40	28.9	A	55	28.2	9,573	22,179	13,401	30,686
Snohomish	M	40	21.5	A	60	26.4	52,822	98,945	67,005	133,566
Hood Canal	A	65	44.8	A	65	58.5	28,302	28,407	50,873	68,437
U.S. Strait JDF	M	40	9.9	M	40	15.1	18,863	17,340	21,248	24,637
Quillayute Fall ^b	A	67.3	42.0	A	49.3	33.4	11,180	8,362	19,261	12,429
Hoh ^c	A	78.9	54.7	A	83.2	45.1	4,305	6,595	9,497	11,943
Queets ^c	A	81.5	35.8	A	68.9	43.3	20,158	10,612	31,405	18,620
Grays Harbor ^c	A	40.2	35.1	A	68.7	38.4	38,540	69,733	59,234	112,980

Model = modeled ER generated by the pre-season FRAM run.

The “Pre-season” ERs are those modeled at the end of the PFMC process in the United States, and do not reflect changes subsequently made in the Canadian pre-season process.

Estd = estimated ER from the post-season FRAM run.

Status = A (Abundant), M (Moderate), L (Low).

^a No absolute escapements are available. Escapements for these stocks are modeled as pre- and post-season abundance scalars relative to the 1986-92 base period.

^b Domestic management of Washington Coast Coho is based on an escapement range (or for Grays Harbor, an escapement goal) and not an exploitation rate. The cap exploitation rates for coastal stocks the difference between the ocean age-3 abundance and the floor of the escapement goal, and are the maximum rates allowed under the escapement goal range. Status of coastal stocks was assigned based on the calculated cap exploitation rates.

9 MARK-SELECTIVE FISHERIES

9.1 Brief History of Mark-Selective Fisheries

As a result of conservation concerns for naturally-spawning Coho Salmon, both countries have explored alternative management approaches that provide for harvest opportunities while not impeding the conservation and rebuilding of naturally-spawning salmon stocks. Both countries have supported large investments in hatchery production of salmon and implementation of mark-selective fisheries (MSFs) that allow retention of marked hatchery fish while requiring release of unmarked fish. Coho MSFs have been executed since catch year 1998 in U.S. waters (WDFW 2011) and since 1999 in British Columbia waters.

The CWT program is currently the only method the Parties have for directly estimating and monitoring fishery impacts on individual stocks of Coho Salmon. Since the mid-1970s, a CWT indicator stock program and a coastwide sampling program have been conducted. Agencies have inferred ERs of unmarked naturally-spawning stocks based on the assumption that ERs on indicator groups (primarily hatchery fish) are similar to that of the naturally-spawning stocks. However, marked and unmarked fish are subjected to different fishing pressures in a MSF; fish without an adipose fin are retained while some or all fish with adipose fins are released. Therefore the assumption of equal ERs of marked and unmarked fish is violated in a MSF.

Currently, impacts of MSFs on Coho MUs are assessed using the Coho FRAM, which generates estimates of catch and ER for each MU. Coho FRAM accounts for retention differences in MSFs by modeling catches of marked and unmarked fish separately. However, Coho FRAM evaluates MSFs relative to fishery impacts in a base period that included naturally spawned Coho retention. Analyses of more recent catch years with MSFs have been complicated by relatively low stock abundances, low total catch and encounter numbers, lack of escapement estimates for most Canadian MUs, inconsistent use of DIT and electronic tag detection, and low numbers of CWT recoveries. Low recoveries are due to a combination of factors, including lower fishery harvest rates resulting from increased stock conservation concerns, fewer CWT releases in certain regions, and consistently low marine survival rates. Furthermore, validation tests of the Backwards Coho FRAM (post-season) are needed to ensure that the outputs provide a reasonable representation of fisheries and stocks.

Estimates are also made of U.S. and Canadian interceptions of hatchery fish in all FRAM fisheries (Table 9.1) based on Backwards Coho FRAM. These estimates of interceptions include retention and incidental (non-catch) mortalities from release and drop-off (Lawson and Sampson 1996, Yuen and Conrad 2011).

Table 9.1. Estimates of total mortality of marked and unmarked hatchery-origin Coho by Party in all fisheries (non-selective and mark-selective combined).

Year	U.S. Catch of Canadian		Canadian Catch of U.S.	
	Marked	Unmarked	Marked	Unmarked
1998	5,061	914	75	8
1999	5,599	609	614	61
2000	6,753	774	1,216	135
2001	10,575	1,684	7,487	906
2002	11,154	1,588	5,368	864
2003	11,831	1,029	18,190	338
2004	21,294	7,674	22,990	739
2005	7,156	2,083	32,464	616
2006	4,411	1,416	17,626	914
2007	8,233	2,931	33,249	151
2008	2,794	5,363	16,844	189
2009	11,883	3,554	66,504	760

An alternative to the use of Backwards Coho FRAM for assessing fishery impacts of MSFs is the MSM. Use of the MSM for post-season assessment of naturally-spawning Coho cohorts for each catch year with MSFs (1998 to present) is underway, but not yet completed. Cohort analysis relies upon representative CWT groups and catch and escapement estimates for all stocks of interest. For all catch years with MSFs, estimates of stock-specific mortalities of unmarked fish in these MSFs are needed. Beginning as early as 1995, double index tag (DIT) groups representing most PST MUs have been released (Table 3.1, Appendix C). Methods described by the PSC's Selective Fisheries Evaluation Committee – Analysis Work Group (SFEC-AWG 2002) will likely be used to estimate the number of unmarked DIT fish encountered in MSFs and these estimates will be used in the cohort analyses underway.

9.2 *Mark-Selective Fishery Sampling*

Fishery sampling activities during the Coho MSF emphasize data collection needs for the estimation of the following data: (1) the mark rate of the targeted Coho population; (2) the total number of Coho harvested by mark status, including an estimate of angler compliance rate with Coho MSF regulations; (3) the total number of Coho released (by size and mark status); (4) the CWT stock composition of landed Coho; and, (5) the total mortality of marked and unmarked Coho.

Washington Department of Fish and Wildlife (WDFW) conducts a comprehensive monitoring program at all ocean ports during the Coho MSF seasons in Washington Ocean Areas 1-4. The collected data are used to estimate key fishery parameters characterizing the ocean mark-selective fisheries and associated impacts on unmarked salmon. Sampling activities have included dockside angler interviews (with catch sampling), total boat counts via exit or entrance

counts at each major coastal port, direct on-the-water observations of salmon encounters during charter ride-along trips, and voluntary trip reports of completed trips provided by the angling public.

In Canada, wands are used to sample non-retention fish that are accidentally landed in commercial fisheries during non-retention periods. Recreational anglers in all areas of B.C. are requested to submit heads from adipose-fin-clipped fish to the Voluntary Head Recovery Program. Recreational Coho fisheries in southern B.C. were sampled by Creel Survey staff for effort and mark rate at a 10% sample rate from 2005 to 2009. However, creel survey coverage is incomplete and not all MSFs were surveyed.

This page left intentionally blank

10 ISSUES EXPERIENCED IN THE IMPLEMENTATION OF COHO ABUNDANCE-BASED MANAGEMENT

Successful implementation of the Coho ABM plan is based on the following assumptions:

- (1) Methods for assigning MU status are established and available;
- (2) Stock and fishery assessment programs are adequate to provide the information needed to evaluate the performance of the Coho ABM Agreement;
- (3) Escapements estimated for naturally-spawning Coho stocks are unbiased and of known precision;
- (4) Harvests estimated for naturally-spawning Coho stocks are unbiased and of known precision;
- (5) CWTs are adequately sampled in all fisheries and escapements; and,
- (6) CWT release and recovery data are retrievable from an accurate, accessible, and up-to-date database.

10.1 Assumption 1: Methods for Assigning MU Status are Established and Available

Methods to determine the status of Canadian MUs and pre-defined rules for maximum limits on ERs have not been exchanged. This analysis is anticipated to be completed in 2014. The ABM regime relies upon the determination of MU status and associated allowable ERs. U.S. fishery managers have expressed concern over the lack of information and resulting impacts on their ability to harvest co-mingled stocks of Coho and other species. This issue is becoming an increasing concern as the ability to implement fisheries for Pink and Chum Salmon can be affected.

For U.S. MUs, methods for assigning MU status are available but the rationale for harvest break points or MU escapement goals has not been compiled into an easily accessible document. Furthermore, the status assignment for each Coho MU relies on the accuracy of cohort abundances provided by forecasts and cohort reconstructions. Uncertainty of forecasted abundances is not quantified or included in the harvest management process. Post-season, current methods do not provide an assessment of either bias or precision of the harvest and escapement estimates.

10.2 Assumption 2: Stock and Fishery Assessment Programs are Adequate to Provide the Information Needed to Evaluate the Performance of the Coho ABM Agreement

10.2.1 Limited or Deteriorating Stock and Fishery Assessment Programs

The ability to maintain stock and fishery assessment programs in both Canada and the United States is of increasing concern as fiscal constraints grow more severe. Exploitation rate CWT indicator and escapement indicator stocks are costly and difficult to sustain. In addition, the

numbers of released CWT and the intensity of sampling programs are insufficient under current marine survival rates (PSC-CWTW 2008) and are under threat of reduction or elimination. Demands for finer and more precise management are occurring while the information base is deteriorating.

10.2.2 Lack of Coho Indicator Stock Programs in All Management Units

The ability to monitor implementation of the Agreement is limited by the lack of a complete set of corresponding indicator stocks. Some MUs are not adequately represented by CWT indicators and others are represented only by hatchery stocks. Parties largely rely upon CWT releases from hatcheries to estimate fishery impacts on associated naturally-spawning stocks. The CoTC relies upon this relationship to generate estimates of production expansion factors for Coho MUs in the Mixed-Stock Model procedures. Lack of consistent representation by indicator stocks increases reliance on indirect methods, such as the Backwards Coho FRAM, to reconstruct cohort abundance. In addition, the use of hatchery CWT indicator groups to monitor ERs on naturally-spawning populations is problematic if the ocean distribution or timing differs between the indicator stocks and the naturally-spawning populations they are intended to represent. Substantial differences have also been observed in marine survival of hatchery and naturally-spawning stocks (J. Haymes, WDFW, personal communication). Results from a recent study of CWTs from Puget Sound and Washington Coastal stocks indicate that in some systems the hatchery releases did not have the same catch distribution among fisheries as the naturally-spawning CWT releases from the same brood year (Hayman 2009).

10.2.3 Declining Coded-Wire-Tag Releases and Recoveries

Coded-wire-tag recovery data from fisheries and spawning escapements are used in cohort reconstruction and in stock-recruit analysis to estimate productivity of Coho MUs. Regional planning models for southern Coho rely on the assumption that CWT release and recovery data accurately represent the inter-annual variability in distribution, ER patterns, and marine survival rates of individual MUs. Adequate recoveries of CWTs in each fishery are required in order to derive statistically robust estimates of catch in retention fisheries and non-landed mortalities.

Current CWT recoveries are inadequate to provide reliable estimates of ERs, particularly during periods of decreased marine survival and reduced fishery ERs (PSC-CWTW 2008). For example, although the Mixed-Stock Model (MSM) was used to reconstruct Coho cohorts in catch years 1992-97, few MSM stocks had adequate CWT recoveries in the majority of the fishery and time strata in which they were impacted (Figure 10.1). The recovery of tagged Coho in each fishery is dependent on the number of Coho that are tagged, their marine survival rate, and the sampling effort for each fishery. Since 1998, tagging rates (Figure 10.2) and marine survival have declined further. As a result, the number of CWT recoveries in mixed-stock fisheries is inadequate to allow for robust analyses of stock-specific impacts in mixed-stock fisheries. This inadequacy increases uncertainty in both cohort reconstructions and estimates of total ERs. Low tagging numbers relative to the total number of fish in each MU also results in high Production Expansion Factors (PEFs, the production represented by individual CWT recoveries), which increases statistical uncertainties of ERs and cohort abundances.

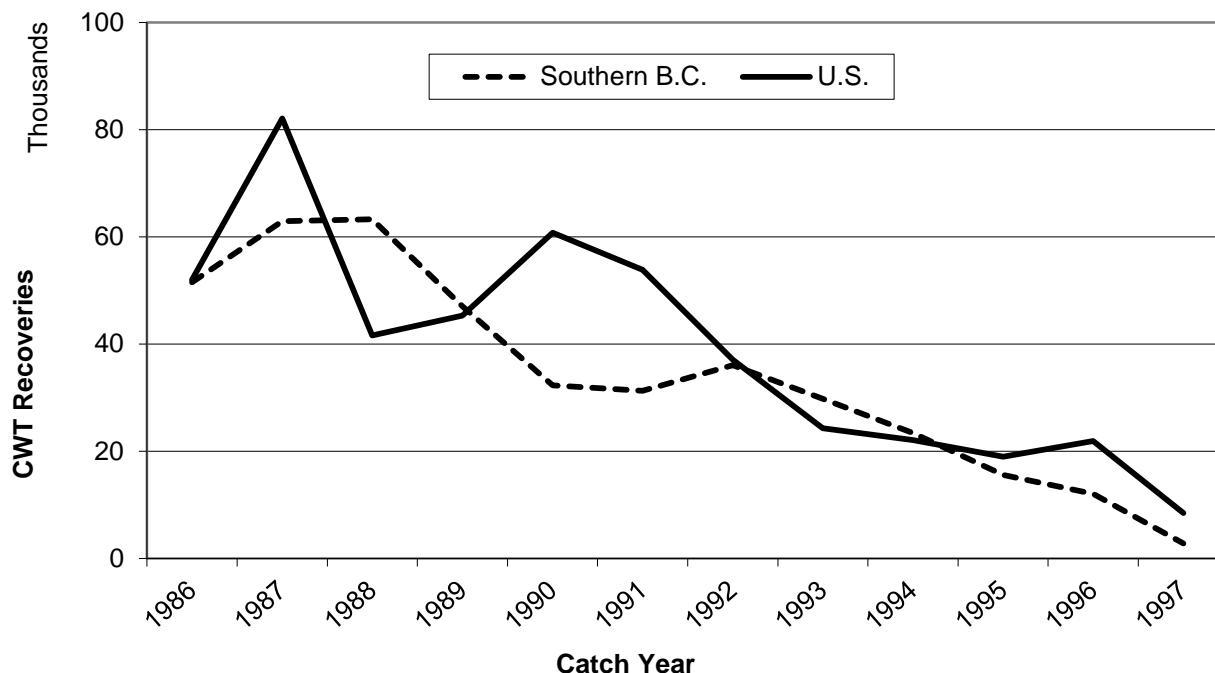


Figure 10.1. Total number of estimated coded-wire-tags (CWT) recovered in mixed-stock fisheries for each country, all Management Units combined, catch years 1986-1997.

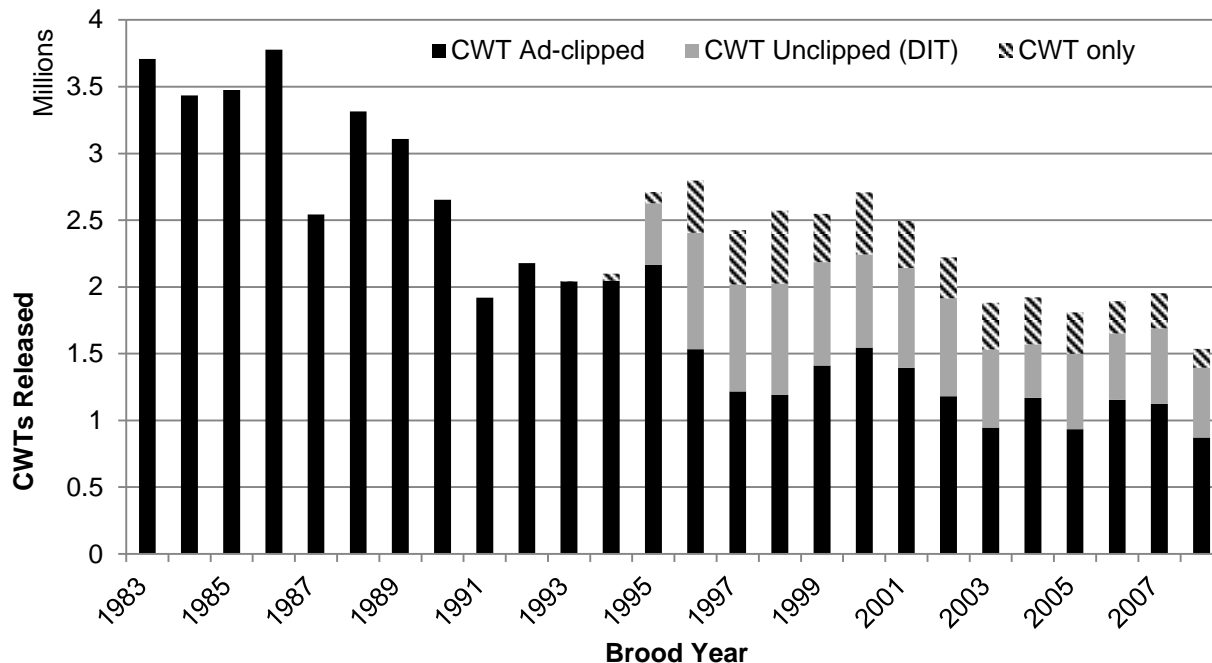


Figure 10.2. Total number of coded-wire-tagged (CWT) fish released from all PST Management Units combined; brood years (BY) 1983-2008 (RMIS data summary February 9, 2011). CWT only releases are not associated with a CWT adipose-fin-clipped release group. Not all BY 2008 releases may have been reported.

10.3 Assumption 3: Escapements Estimated for Naturally-Spawning Coho Stocks are Unbiased and of Known Precision

Coho spawning escapements are primarily estimated from surveys of index reaches that are expanded to a basin-wide estimate. These methods do not allow for the bias of the estimate to be assessed or for the precision of the estimate to be quantified. Alternate survey methods, such as mark-recapture, are designed to provide unbiased estimates and to estimate the certainty (or precision) of the estimate (Schwarz et al. 1993; Schwarz and Taylor 1998). In addition, spawning escapement estimates are not available for some Coho MUs. In these cases, the CoTC generates estimates of escapements based on estimates of fishery contributions of a Coho MU and estimates of ERs of selected hatchery indicator stocks. However, independent escapement estimates (e.g., from spawner or redd surveys) are more desirable as inputs to the model, due to potential bias of model-generated estimates.

10.4 Assumption 4: Harvests Estimated for Naturally-Spawning Coho Stocks are Unbiased and of Known Precision

Mortality attributed to harvest is based on analyses of CWT data. Mass marking and MSFs have increased uncertainty in CWT-based analyses, and potentially may have introduced new bias. Two sources of this bias are underestimation of the harvest of naturally-spawning stocks and unknown rates of mortality associated with non-retention of unmarked fish in MSFs.

The harvest of naturally-spawning stocks will be underestimated if their fishery encounters are not fully documented by existing sampling programs. Under MSFs, fishery-induced mortalities on natural stocks can no longer be directly estimated using recoveries of marked hatchery stocks. Several MUs do not have DIT groups to permit independent estimation of impacts of MSFs. For example, Canada currently has two DIT programs in the four treaty MUs. Even where DITs have been implemented, the reliability of results is affected by the lack of electronic tag detection throughout the migratory ranges of the MUs. In addition, DIT tagging levels are not high enough to provide sufficient numbers of recoveries for statistically-robust estimates of non-landed mortalities in MSFs. Estimation of ERs or effects of MSFs on natural stocks requires the collection of CWTs from marked and unmarked DIT groups. The lack of direct sampling and electronic tag detection in intercepting fisheries throughout the stock migration, results in biased ERs. Further, MSM methods, which use CWTs to estimate PEFs under non-selective fishing, cannot be used to allocate mortalities in the presence of substantial MSFs.

Total mortality attributed to harvest also includes some level of mortality related to non-retention of catch. For example, part of the protocol established by the PSC for MSFs requires the agencies conducting MSFs to provide estimates of incidental mortalities of affected DIT groups, i.e., “imputed recoveries”. The Regional Mark Information System (RMIS) does not contain estimates of imputed recoveries of CWTs. With the growing prevalence of Coho non-retention or MSFs, it is becoming increasingly important to account for unreported CWT mortalities in stock and fishery assessments.

10.5 Assumption 5: CWTs are Adequately Sampled in All Fisheries and Escapements

10.5.1 Incomplete or Indirect Sampling of Fisheries

Additional difficulties in assessing the harvest of naturally-spawning Coho include difficulties with sampling, reporting, tag detection, and the increasingly complex nature of fisheries regulations. For some fisheries, catch is estimated, but no CWT recoveries are reported. In other fisheries, CWT recoveries are reported but without corresponding catches. For some recreational fisheries, direct sampling does not occur. Instead, CWTs are recovered from voluntarily head submission. In some instances, submission rates are based on creel census programs for corresponding time-area strata, in others, they are based on average awareness factors that are generated for other times and areas. The reliability of estimates of CWT recoveries based on voluntary recoveries is uncertain.

The detection of CWTs is an additional concern in some sampling programs. Not all fisheries where PST Coho MUs are encountered are sampled electronically and some studies have found inconsistencies in tag detection capabilities of CWT wand detectors and problems with sampler use (G. Brown, CDFO, personal communication).

The CWT sampling, expansion, and reporting programs have not kept pace with the complex retention regulations of MSFs. In the past, daily quotas, size limits, and retainable components of the Coho catch (i.e., hatchery or naturally-spawning) were the same within catch regions. However, in recent years, there are often two or more sets of regulations in some fisheries occurring within the same time period or catch region and the creel surveys do not occur at the same resolution. As a result, catch and CWT recoveries under multiple regulations are often being reported together.

10.5.2 Incomplete Reporting of Recoveries in Escapement

The mark and tag status of Coho spawners is required to accurately determine ERs. Coded-wire-tag recoveries in hatchery rack returns, river trap returns, and from the spawning grounds are inconsistently reported and are often not available in an easily-accessible form. In many instances, CWT recoveries in escapements are incompletely reported to RMIS so the CoTC must obtain these data directly from local or hatchery managers. In addition, CWTs in the escapement may be under-reported if significant hatchery straying occurs to the spawning grounds. Hatchery strays that spawn near the hatchery are not well sampled because index streams surveyed for naturally-spawning escapement are often selected to be far from hatcheries. In addition, while surveyors routinely count the live and dead fish, carcasses are not always sampled for marks and CWTs.

10.6 Assumption 6: CWT Release and Recovery Data are Retrievable from an Accurate, Accessible, and Up-to-Date Database

There are separate U.S. and Canadian CWT reporting databases. The Canadian system, Mark Recovery Program, is maintained by CDFO (Nandor et al. 2010). The U.S. system, RMIS, is maintained by the Regional Mark Processing Center (RMPC) of the Pacific States Marine Fisheries Commission. In 1988, the RMPC was selected by the U.S. Section of the PSC to house and maintain the CWT database in the U.S. and to be the designated site for sharing data with Canada (PSC-JTCDS 1989). The RMPC is the central repository for all coded-wire-tagged and otherwise associated release, catch, sample, and recovery data regarding anadromous salmonids in the greater Pacific Coast Region of the United States of America.

10.6.1 Delays in Reporting Recovery Data to Regional Mark Processing Center

The RMPC maintains the databases for CWT releases, recoveries, locations, and catch and effort data, and disseminates reports of these data in electronic or printed form when requested. These databases are known collectively as the RMIS. Data are often not reported by agencies to the RMPC in a timely manner and analyses that rely upon complete recoveries of CWTs cannot be undertaken for two or more years after a season has been completed. Late submissions of data are often due to the extended process of reading CWTs and developing catch sample expansion factors in order to estimate the total number of tag recoveries from observed recoveries.

10.6.2 Inconsistency and Instability in CWT Databases

The CoTC has encountered situations where the data contained in RMIS differ from that maintained in internal databases employed by agencies for various purposes. When this occurs, extraordinary efforts are required to identify the source of this inconsistency so as to eliminate confusion and conflicting interpretation of CWT analyses. A related issue arises when CWT data are revised in occasional updates to RMIS; because the data housed in RMIS may change, CWT analysts need to identify the date when the data were extracted for analyses.

11 REFERENCES CITED

- CCW (Comprehensive Coho Workgroup). 1998. Comprehensive coho Management Plan: second interim report. Prepared by Puget Sound Treaty Tribes and Washington Department of Fish and Wildlife. Dated May 5, 1998.
- Hayman, R. A. 2009. Hatchery vs. wild CWT distribution for Puget Sound and Washington coastal coho. Skagit River System Cooperative. Progress Report No. (09)-1, Final Project Performance Report, Southern Fund Project #SF-2007-I-26.
- Holt, C. A., A. Cass, B. Holtby, and B. Riddell. 2009. Indicators of status and benchmarks for conservation units in Canada's Wild Salmon Policy. Canadian Science Advisory Secretariat, Research Document 2009/058.
- Holtby, L. B., and K. A. Ciruna. 2007. Conservation units for Pacific Salmon under the Wild Salmon Policy. Canadian Science Advisory Secretariat, Research Document 2007/070
- MEW (Model Evaluation Workgroup). 2008. Fishery regulation assessment model (FRAM): technical documentation for coho and Chinook – v. 3.0. Pacific Fishery Management Council, Portland, Oregon.
- Lawson, P. W., and D. B. Sampson. 1996. Gear-related mortality in ocean salmon fisheries. *North American Journal of Fisheries Management* 16:512–520.
- Nandor, G. F., J. R. Longwill, and D. L. Webb. 2010. Overview of the coded wire tag program in the Greater Pacific Region of North America. Pages 5-46 *in* K. S. Wolf, and J. S. O’Neal, editors. PNAMP Special Publication: tagging, telemetry and marking measures for monitoring fish populations—a compendium of new and recent science for use in informing technique and decision modalities. Pacific Northwest Aquatic Monitoring Partnership Special Publication 2010-002.
- NMFS (National Marine Fisheries Service). 2009. Endangered Species Act status of West Coast salmon and steelhead. www.nwr.noaa.gov Updated July 1, 2009.
- PSC-CWTW (Pacific Salmon Commission Coded Wire Tag Workgroup). 2008. An action plan in response to coded wire tag (CWT) expert panel recommendations. Pacific Salmon Commission Technical Report No. 25: 170 p.
- PSC-JTCDS (Pacific Salmon Commission Joint Technical Committee on Data Sharing, Joint Working Group on Mark Recovery Databases). 1989. Information content and data standards for a coastwide coded-wire tag database: Report TCDS (89)–1, July 1989.
- PSC (Pacific Salmon Commission). 2009. Pacific Salmon Treaty. Pacific Salmon Commission, Vancouver, British Columbia.

- RMISD (Regional Mark Information System Database [online database]). Continuously since 1977. Regional Mark Processing Center, Pacific States Marine Fisheries Commission Portland, Oregon. URL:<<http://www.rmpc.org>>.
- Schwarz, C. J., R. E. Bailey, J. R. Irvine, and F. C. Dalziel. 1993. Estimating salmon escapement using capture-recapture methods. *Canadian Journal of Fisheries and Aquatic Sciences* 50:1181–1197.
- Schwarz, C. J., and G. G. Taylor. 1998. The use of stratified-Petersen estimator in fisheries management: estimating pink salmon (*Oncorhynchus gorbuscha*) on the Frazier River. *Canadian Journal of Fisheries and Aquatic Sciences* 55:281–297.
- Seiler, D. 2006. Statewide wild coho forecasts for 1996. Advisory document to the Washington Department of Fish and Wildlife. Online: http://wdfw.wa.gov/conservation/research/projects/wild_coho/
- SFEC-AWG (Selective Fisheries Evaluation Committee - Analytical Workgroup). 2002. Pacific Salmon Commission, Joint Selective Fisheries Evaluation Committee Report, Investigation of methods to estimate mortalities of unmarked salmon in mark-selective fisheries through the use of double index tag groups. TCSFEC (02)-1, February 2002.
- WDFW (Washington Department of Fish and Wildlife). 2008. Priority habitats and species lists. Online: <http://wdfw.wa.gov/conservation/phs/list/>
- WDFW. 2011. 2010 ocean selective fishery sampling report. Washington Department of Fish and Wildlife, Olympia, Washington. Draft dated 2/14/2011.
- Weitkamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. U.S. Department of Commerce, NOAA Technical Memo NMFS-NWFFSC-24, 268 p.
- Yuen, H., and R. Conrad. 2011. Bias in the estimation of impacts of simultaneous mark-selective and nonselective fisheries on ocean salmon. *North American Journal of Fisheries Management* 31:1043–1051.
- Zimmerman, M. S. 2011. Wild coho forecasts for Puget Sound, coastal Washington, and the lower Columbia. Advisory document to the Washington Department of Fish and Wildlife. Online: http://wdfw.wa.gov/conservation/research/projects/wild_coho/

12 APPENDICES

Appendix A. Coho FRAM Base Period Fishery-Specific Average Exploitation Rates by Time Period for Each Management Unit.

The coded-wire tags used to represent these MUs and reconstruct the cohorts are listed in Appendix B.

Table A.1. Lower Fraser MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northeast Troll	-	-	0.0005%	-	-	0.0005%
SEAK Northwest Troll	-	0.0139%	0.0029%	0.0009%	-	0.0176%
SEAK Southeast Troll	-	0.0007%	0.0015%	-	-	0.0021%
Southeast Alaska Net	-	-	0.0063%	0.0004%	-	0.0067%
SEAK Southwest Troll	-	0.0059%	0.0020%	-	-	0.0079%
BC Northern Net	-	0.0065%	-	-	-	0.0065%
BC Northern Troll	0.0019%	0.1002%	0.0387%	0.0103%	-	0.1512%
BC North Central Troll	0.4599%	0.2070%	0.1279%	0.0333%	-	0.8281%
BC Central Net	-	0.0810%	0.0269%	-	-	0.1078%
BC Central Sport	-	0.0536%	-	0.0248%	-	0.0784%
BC South Central Troll	0.3264%	1.6039%	0.2499%	0.0810%	-	2.2612%
Johnstone Strait Sport	0.0250%	0.1068%	0.0458%	-	-	0.1776%
Johnstone Strait Troll	0.3075%	1.3461%	0.2494%	0.1811%	-	2.0840%
Johnstone Straits Net	-	0.0223%	0.5933%	0.2876%	0.2733%	1.1765%
Georgia Straits Net	-	-	0.0954%	0.0131%	0.0529%	0.1614%
Georgia Straits Troll	0.6880%	5.8625%	1.2403%	0.7498%	0.1399%	8.6805%
North Georgia Straits Sport	8.5028%	5.1698%	2.9155%	1.0139%	0.1219%	17.7238%
South Georgia Straits Sport	3.1938%	0.6258%	0.3363%	0.2441%	0.1625%	4.5623%
Fraser R Gill Net	-	-	0.0310%	0.2050%	1.0768%	1.3128%
Lower Fraser R Term Catch	-	-	-	-	1.8302%	1.8302%
BC Juan de Fuca Net	-	0.1932%	2.1081%	0.9913%	0.1861%	3.4788%
BC Juan de Fuca Sport	0.2123%	0.6964%	0.1805%	0.4904%	0.5774%	2.1570%
BC Juan de Fuca Troll	-	0.0005%	0.0004%	0.0019%	-	0.0028%
West Coast Vanc Is Sport	0.1565%	0.0744%	0.0217%	0.0116%	-	0.2642%
NW Vancouver Island Troll	0.3554%	4.9985%	1.6550%	0.8346%	-	7.8436%
SW Vancouver Island Net	0.0069%	-	-	0.0897%	0.0249%	0.1215%
SW Vancouver Island Troll	0.7869%	11.8189%	5.8376%	1.5142%	-	19.9575%
WA Area 7 Sport	0.0256%	0.0504%	0.0415%	0.0285%	0.0919%	0.2380%
WA Area 7-7A Treaty Net	-	-	0.0538%	0.4502%	0.9434%	1.4474%
WA Area 7-7A Non-Treaty Net	-	-	0.0498%	0.2612%	0.4819%	0.7929%
WA Area 7B-7C-7D Treaty Net	-	-	0.0232%	0.0677%	0.0544%	0.1453%
WA Area 7B-7C-7D NT Net	-	-	0.0016%	0.0475%	0.0408%	0.0899%

Table A.1. (Continued) Lower Fraser MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 6 Sport	0.0092%	0.0567%	0.0187%	0.0814%	0.0478%	0.2139%
WA Area 5-6-6C Troll	0.0005%	0.0024%	0.0010%	0.0241%	0.0054%	0.0334%
WA Area 5 Sport	0.0775%	0.3224%	0.5344%	0.5346%	0.1353%	1.6042%
WA Area 4B-5-6C Treaty Net	-	0.0650%	0.1094%	0.1261%	0.3329%	0.6333%
WA Area 4B-5-6C NT Net	-	0.0011%	0.0044%	0.0110%	0.0034%	0.0199%
WA Area 8 Non-Treaty	-	-	-	0.0006%	-	0.0006%
WA Area 8 Treaty Net	-	-	-	0.0017%	-	0.0017%
WA Area 8A Non-Treaty Net	-	-	-	-	0.0025%	0.0025%
WA Area 8A Treaty Net	-	-	-	-	0.0037%	0.0037%
WA Area 9 Sport	0.0069%	-	-	-	0.0023%	0.0093%
WA Area 10 Non-Treaty Net	-	-	-	0.0193%	0.0221%	0.0414%
WA Area 10 Sport	-	0.0058%	-	-	0.0018%	0.0076%
WA Area 10 Treaty Net	-	-	-	0.0113%	0.0128%	0.0241%
WA Area 11 Non-Treaty Net	-	-	-	0.0036%	0.0026%	0.0062%
WA Area 11 Treaty Net	-	-	-	0.0004%	0.0003%	0.0007%
Area 12-12B Hood Canal NT Net	-	-	-	0.0010%	0.0010%	0.0020%
Area 12-12B Hood Canal T Net	-	-	-	0.0010%	0.0013%	0.0023%
WA Area 4/4B Treaty Troll	0.0433%	0.3881%	0.2707%	0.0438%	0.0132%	0.7591%
WA Area 4/4B Non-Treaty Troll	0.0004%	0.0250%	0.1562%	0.0116%	0.0021%	0.1954%
WA Area 4 Sport	-	0.1300%	0.1931%	0.0615%	-	0.3845%
WA Area 3 Treaty Troll	0.0242%	0.0750%	0.0757%	0.0428%	-	0.2176%
WA Area 3 Sport	0.0003%	0.0127%	0.0061%	-	-	0.0192%
WA Area 3 Non-Treaty Troll	0.0182%	0.0040%	0.0212%	0.0241%	-	0.0675%
WA Area 2 Treaty Troll	0.0014%	0.0227%	0.0068%	0.0001%	-	0.0311%
WA Area 2 Sport	0.0184%	0.1017%	0.0375%	0.0111%	-	0.1686%
WA Area 2 Non-Treaty Troll	0.0014%	0.0090%	0.0080%	0.0001%	-	0.0185%
WA Area 1 & Astoria Troll	0.0023%	0.0287%	0.0303%	-	-	0.0612%
WA Area 1 & Astoria Sport	-	0.0192%	0.0143%	0.0034%	-	0.0368%
Col. River Buoy 10 Sport	-	-	0.0130%	0.0067%	-	0.0196%
Tillamook Sport	-	0.0041%	0.0012%	-	-	0.0052%
Tillamook Troll	0.0040%	0.0435%	0.0050%	0.0008%	-	0.0533%
Newport Sport	0.0075%	0.0125%	-	-	-	0.0200%
Newport Sport	0.0075%	0.0125%	-	-	-	0.0200%
Newport Troll	0.0321%	0.0432%	0.0064%	0.0013%	-	0.0830%
Newport Troll	0.0321%	0.0432%	0.0064%	0.0013%	-	0.0830%
Coos Bay Sport	0.0025%	0.0020%	-	-	-	0.0045%
Coos Bay Sport	0.0025%	0.0020%	-	-	-	0.0045%
Coos Bay Troll	0.0204%	0.0155%	0.0015%	0.0003%	-	0.0377%
Total	15.3%	34.4%	17.5%	8.7%	6.6%	82.5%

Table A.2. Interior Fraser MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northeast Troll	-	-	0.0122%	-	-	0.0122%
SEAK Northwest Troll	-	0.0152%	0.0479%	0.0024%	-	0.0654%
SEAK Southeast Troll	-	-	0.0166%	-	-	0.0166%
Southeast Alaska Net	-	-	0.0164%	-	-	0.0164%
SEAK Southwest Troll	-	-	0.0130%	0.0068%	-	0.0198%
BC Northern Net	-	0.0234%	0.0419%	-	-	0.0653%
BC Northern Troll	-	0.0807%	0.1045%	0.0048%	-	0.1900%
BC North Central Troll	-	0.0624%	0.0288%	0.0690%	-	0.1602%
BC Central Net	-	0.0379%	0.0130%	-	-	0.0509%
BC Central Sport	-	0.0522%	-	-	-	0.0522%
BC South Central Troll	0.0306%	1.1972%	0.3682%	0.0498%	-	1.6458%
Johnstone Strait Sport	0.0113%	0.2200%	0.1470%	-	-	0.3783%
Johnstone Strait Troll	0.0308%	0.3373%	0.0942%	0.0561%	-	0.5184%
Johnstone Straits Net	-	0.0666%	0.7320%	0.3280%	0.0175%	1.1442%
Georgia Straits Net	-	-	0.0315%	0.0250%	0.0029%	0.0593%
Georgia Straits Troll	0.1395%	2.2230%	0.4130%	0.2359%	-	3.0114%
North Georgia Straits Sport	4.1162%	2.2619%	1.2879%	0.3445%	0.0147%	8.0252%
South Georgia Straits Sport	2.5159%	1.2219%	1.0159%	0.1625%	0.1004%	5.0165%
Fraser R Gill Net	-	-	0.0915%	0.4379%	0.3132%	0.8426%
Upper Fraser R Term Catch	-	-	-	-	1.2180%	1.2180%
BC Juan de Fuca Net	-	0.1691%	2.3261%	1.6948%	-	4.1900%
BC Juan de Fuca Sport	0.4399%	0.8528%	0.2592%	0.8451%	0.1526%	2.5497%
BC Juan de Fuca Troll	-	0.0002%	0.0021%	0.0029%	-	0.0052%
West Coast Vanc Is Sport	-	0.0550%	0.0680%	0.0222%	-	0.1452%
NW Vancouver Island Troll	0.0963%	6.2579%	1.9928%	0.6905%	-	9.0375%
SW Vancouver Island Net	-	-	-	0.0412%	0.0052%	0.0464%
SW Vancouver Island Troll	0.1023%	13.5276%	9.1867%	2.0269%	-	24.8434%
WA Area 7 Sport	-	-	0.0680%	0.1804%	0.1136%	0.3620%
WA Area 7-7A Treaty Net	-	-	0.0123%	1.5441%	0.0044%	1.5608%
WA Area 7-7A Non-Treaty Net	-	-	0.0114%	0.8959%	0.0022%	0.9095%
WA Area 7B-7C-7D Treaty Net	-	-	0.0336%	0.2259%	0.0333%	0.2928%
WA Area 7B-7C-7D NT Net	-	-	0.0023%	0.1585%	0.0250%	0.1858%
WA Area 6 Sport	0.0326%	0.0928%	0.0425%	0.2804%	0.0519%	0.5002%
WA Area 5-6-6C Troll	0.0025%	0.0014%	0.0130%	0.0100%	0.0005%	0.0275%
WA Area 5 Sport	0.2047%	0.6235%	0.8631%	0.8937%	0.0475%	2.6326%
WA Area 4B-5-6C Treaty Net	-	0.0230%	0.0835%	0.1487%	0.0163%	0.2716%
WA Area 4B-5-6C NT Net	-	0.0004%	0.0034%	0.0129%	0.0002%	0.0169%
WA Area 8 Non-Treaty Net	-	-	-	0.0014%	-	0.0014%
WA Area 8 Treaty Net	-	-	-	0.0039%	-	0.0039%

Table A.2. (Continued) Interior Fraser MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 8A Non-Treaty Net	-	-	-	0.0033%	0.0056%	0.0089%
WA Area 8A Treaty Net	-	-	-	0.0052%	0.0084%	0.0136%
WA Area 9 Sport	0.0060%	-	-	0.0169%	0.0035%	0.0264%
WA Area 10 Non-Treaty Net	-	-	-	0.1399%	0.0253%	0.1652%
WA Area 10 Sport	-	-	-	0.0047%	0.0060%	0.0108%
WA Area 10 Treaty Net	-	-	-	0.0819%	0.0147%	0.0966%
WA Area 10E Non-Treaty Net	-	-	-	-	0.0002%	0.0002%
WA Area 10E Treaty Net	-	-	-	-	0.0024%	0.0024%
WA Area 11 Non-Treaty Net	-	-	-	0.0132%	0.0054%	0.0186%
WA Area 11 Sport	-	0.0027%	-	-	0.0062%	0.0089%
WA Area 11 Treaty Net	-	-	-	0.0015%	0.0006%	0.0022%
WA Area 4/4B Treaty Troll	0.1391%	0.3985%	0.6130%	0.2313%	-	1.3819%
WA Area 4/4B Non-Treaty Troll	0.0014%	0.0257%	0.3538%	0.0611%	-	0.4420%
WA Area 4 Sport	-	0.2693%	0.3213%	0.0623%	-	0.6529%
WA Area 3 Treaty Troll	0.0820%	0.1010%	0.1166%	0.0091%	-	0.3088%
WA Area 3 Sport	-	0.0262%	0.0017%	0.0069%	-	0.0347%
WA Area 3 Non-Treaty Troll	0.0619%	0.0054%	0.0327%	0.0051%	-	0.1051%
WA Area 2 Treaty Troll	0.0136%	0.0612%	0.0529%	0.0041%	-	0.1317%
WA Area 2 Sport	0.0479%	0.2764%	0.1708%	0.0322%	-	0.5274%
WA Area 2 Non-Treaty Troll	0.0136%	0.0242%	0.0624%	0.0023%	-	0.1025%
WA Area 1 & Astoria Troll	0.0020%	0.0402%	-	-	-	0.0422%
WA Area 1 & Astoria Sport	0.0204%	0.0872%	0.0729%	-	-	0.1806%
Col. River Buoy 10 Sport	-	-	0.1024%	-	-	0.1024%
Tillamook Sport	0.0066%	0.0157%	0.0163%	-	-	0.0386%
Tillamook Troll	0.0288%	0.3387%	0.0671%	0.0050%	-	0.4396%
Newport Sport	0.0284%	0.0947%	0.0406%	0.0047%	-	0.1684%
Newport Troll	0.0857%	0.2303%	0.0563%	0.0028%	-	0.3750%
Coos Bay Sport	0.0257%	0.0237%	0.0150%	-	-	0.0645%
Coos Bay Troll	0.0286%	0.0929%	0.0142%	0.0008%	-	0.1365%
Brookings Sport	-	0.0039%	-	-	-	0.0039%
KMZ Sport	0.0057%	-	-	-	-	0.0057%
Total	8.3%	31.5%	21.6%	12.1%	2.2%	75.7%

Table A.3. Strait of Georgia Mainland MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northeast Troll	-	0.0043%	0.0016%	-	-	0.0058%
SEAK Northwest Troll	-	0.0276%	0.0280%	0.0027%	-	0.0582%
SEAK Southeast Troll	0.0030%	0.0091%	0.0236%	-	-	0.0356%
Southeast Alaska Net	-	0.0022%	0.0429%	-	-	0.0451%
SEAK Southwest Troll	-	0.0073%	0.0102%	-	-	0.0175%
BC Northern Net	-	0.0309%	0.0171%	0.0005%	-	0.0485%
BC Northern Sport	-	-	-	0.0001%	-	0.0001%
BC Northern Troll	-	0.2364%	0.1038%	0.0067%	-	0.3469%
BC North Central Troll	-	0.1838%	0.0698%	0.0152%	-	0.2687%
BC Central Net	-	0.2867%	0.1148%	0.0589%	-	0.4603%
BC Central Sport	0.0095%	0.1564%	0.4212%	0.1304%	-	0.7175%
BC South Central Troll	0.3653%	0.9196%	0.2093%	0.0392%	-	1.5333%
Johnstone Strait Sport	0.1063%	0.1475%	0.1123%	-	-	0.3661%
Johnstone Strait Troll	0.1821%	0.8530%	0.1528%	0.0231%	-	1.2110%
Johnstone Straits Net	-	0.0470%	1.2204%	0.2818%	0.1243%	1.6734%
Georgia Straits Net	-	0.0823%	0.2936%	0.0596%	0.0248%	0.4603%
Georgia Straits Troll	0.5254%	4.1086%	0.5575%	0.1977%	0.0256%	5.4149%
North Georgia Straits Sport	12.7661%	9.2850%	4.5830%	0.9232%	0.0633%	27.6206%
South Georgia Straits Sport	4.9467%	2.0693%	1.6058%	0.6684%	0.1185%	9.4087%
Fraser R Gill Net	-	0.0946%	0.5833%	0.1309%	0.0284%	0.8372%
BC Juan de Fuca Net	0.0068%	0.2229%	2.7828%	0.7563%	0.0171%	3.7858%
BC Juan de Fuca Sport	0.9235%	1.2809%	0.2926%	0.3129%	0.0970%	2.9069%
BC Juan de Fuca Troll	-	0.0027%	0.0019%	0.0030%	-	0.0076%
West Coast Vanc Is Sport	0.2231%	0.2570%	0.0344%	0.0596%	-	0.5741%
NW Vancouver Island Troll	0.1728%	2.9969%	0.9449%	0.2065%	-	4.3211%
SW Vancouver Island Net	0.0433%	0.0114%	-	0.0235%	0.0109%	0.0892%
SW Vancouver Island Troll	0.4902%	6.9922%	2.7101%	0.4664%	-	10.6589%
WA Area 7 Sport	0.0050%	0.1669%	0.1549%	0.0084%	0.0740%	0.4092%
WA Area 7-7A Treaty Net	-	0.0659%	0.3337%	0.4712%	0.2482%	1.1189%
WA Area 7-7A Non-Treaty Net	-	0.0574%	0.3091%	0.2734%	0.1268%	0.7666%
WA Area 7B-7C-7D Treaty Net	-	-	0.0092%	0.0482%	0.0298%	0.0873%
WA Area 7B-7C-7D NT Net	-	-	0.0006%	0.0338%	0.0223%	0.0568%
WA Area 6 Sport	0.0246%	0.0990%	0.0515%	0.0682%	0.0238%	0.2670%
WA Area 5-6-6C Troll	0.0312%	0.0073%	0.0131%	0.0002%	0.0005%	0.0524%
WA Area 5 Sport	0.1951%	0.4059%	0.2615%	0.1829%	0.0165%	1.0618%
WA Area 4B-5-6C Treaty Net	0.0095%	0.1401%	0.2724%	0.1450%	0.1176%	0.6845%
WA Area 4B-5-6C NT Net	0.0027%	0.0025%	0.0110%	0.0126%	0.0012%	0.0299%
WA Area 8 Non-Treaty Net	-	-	0.0079%	-	-	0.0079%
WA Area 8 Treaty Net	-	-	0.0059%	-	-	0.0059%

Table A.3. (Continued) Strait of Georgia Mainland MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 8A Non-Treaty Net	-	-	-	-	0.0028%	0.0028%
WA Area 8A Treaty Net	-	-	-	-	0.0042%	0.0042%
WA Area 10 Non-Treaty Net	-	-	-	0.0220%	0.0140%	0.0360%
WA Area 10 Sport	-	-	0.0073%	-	-	0.0073%
WA Area 10 Treaty Net	-	-	-	0.0129%	0.0081%	0.0210%
WA Area 11 Sport	-	-	0.0044%	-	-	0.0044%
WA Area 4/4B Treaty Troll	0.0173%	0.2946%	0.1897%	0.0747%	-	0.5763%
WA Area 4/4B Non-Treaty Troll	0.0002%	0.0190%	0.1095%	0.0197%	-	0.1484%
WA Area 4 Sport	0.0033%	0.2575%	0.0479%	0.0053%	-	0.3140%
WA Area 3 Treaty Troll	0.0213%	0.0422%	0.0323%	0.0045%	-	0.1003%
WA Area 3 Sport	-	0.0282%	0.0034%	-	-	0.0316%
WA Area 3 Non-Treaty Troll	0.0161%	0.0022%	0.0091%	0.0025%	-	0.0299%
WA Area 2 Treaty Troll	0.0003%	0.0083%	0.0113%	-	-	0.0199%
WA Area 2 Sport	0.0294%	0.1214%	0.0309%	-	-	0.1817%
WA Area 2 Non-Treaty Troll	0.0003%	0.0033%	0.0134%	-	-	0.0169%
WA Area 1 & Astoria Troll	0.0020%	0.0362%	0.0228%	-	-	0.0610%
WA Area 1 & Astoria Sport	-	0.0132%	0.0072%	-	-	0.0205%
Col. River Buoy 10 Sport	-	-	0.0103%	0.0041%	-	0.0144%
Tillamook Sport	-	0.0037%	-	-	-	0.0037%
Tillamook Troll	0.0017%	0.0647%	0.0027%	0.0008%	-	0.0699%
Newport Sport	0.0063%	0.0043%	0.0013%	-	-	0.0119%
Newport Troll	0.0014%	0.0141%	0.0001%	0.0000%	-	0.0156%
Coos Bay Sport	0.0028%	-	-	-	-	0.0028%
Coos Bay Troll	0.0023%	0.0225%	0.0013%	0.0003%	-	0.0264%
Brookings Troll	-	0.0027%	0.0007%	-	-	0.0034%
Total	21.1%	32.2%	18.9%	5.8%	1.2%	79.1%

Table A.4. Strait of Georgia Vancouver Island MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northeast Troll	-	0.0067%	-	-	-	0.0067%
SEAK Northwest Troll	-	0.0139%	0.0203%	-	-	0.0342%
SEAK Southeast Troll	-	0.0066%	0.0307%	0.0125%	-	0.0498%
Southeast Alaska Net	-	0.0091%	0.1096%	-	-	0.1186%
SEAK Southwest Troll	-	0.0193%	0.0358%	0.0157%	-	0.0708%
BC Northern Net	-	0.0829%	0.0527%	0.0001%	-	0.1357%
BC Northern Troll	-	0.4372%	0.3198%	0.0289%	-	0.7859%
BC North Central Troll	-	1.1677%	0.3280%	0.1052%	-	1.6010%
BC Central Net	-	0.7269%	0.1869%	0.1204%	-	1.0341%
BC Central Sport	0.0035%	0.0838%	-	-	-	0.0874%
BC South Central Troll	1.9280%	5.7778%	1.4046%	0.3120%	-	9.4224%
Johnstone Strait Sport	0.1437%	0.5397%	0.3127%	-	-	0.9960%
Johnstone Strait Troll	0.1223%	1.6855%	0.4995%	0.1463%	0.0357%	2.4893%
Johnstone Straits Net	-	0.0954%	3.4440%	2.0416%	0.6384%	6.2194%
Georgia Straits Net	-	-	0.0663%	0.0081%	1.0363%	1.1107%
Georgia Straits Troll	0.4152%	2.6088%	0.6708%	0.7029%	0.1890%	4.5867%
North Georgia Straits Sport	7.8737%	4.8517%	3.2837%	2.1116%	0.5240%	18.6446%
South Georgia Straits Sport	1.5053%	0.1254%	0.1647%	0.0909%	0.0962%	1.9825%
Fraser R Gill Net	-	0.0004%	0.0083%	0.0181%	-	0.0268%
BC Juan de Fuca Net	0.0037%	0.1168%	1.5988%	0.5968%	-	2.3160%
BC Juan de Fuca Sport	0.2648%	0.4717%	0.2230%	0.3402%	0.2270%	1.5268%
BC Juan de Fuca Troll	-	0.0004%	-	0.0007%	-	0.0012%
West Coast Vanc Is Sport	0.2715%	0.1493%	0.0481%	0.0110%	-	0.4800%
NW Vancouver Island Net	-	-	-	-	0.0021%	0.0021%
NW Vancouver Island Troll	0.3270%	7.4107%	2.4827%	1.0653%	-	11.2858%
SW Vancouver Island Net	0.0052%	0.0017%	-	0.0254%	0.0229%	0.0552%
SW Vancouver Island Troll	0.4436%	5.5916%	2.9646%	0.4859%	-	9.4857%
WA Area 7 Sport	-	-	-	0.0528%	0.0312%	0.0840%
WA Area 7-7A Treaty Net	-	0.0010%	0.0209%	0.4984%	0.1829%	0.7032%
WA Area 7-7A Non-Treaty Net	-	0.0008%	0.0194%	0.2892%	0.0934%	0.4028%
WA Area 7B-7C-7D Treaty Net	-	-	-	0.0133%	0.0021%	0.0155%
WA Area 7B-7C-7D NT Net	-	-	-	0.0093%	0.0016%	0.0110%
WA Area 6 Sport	0.0232%	0.0310%	0.0098%	0.0350%	0.0288%	0.1277%
WA Area 5-6-6C Troll	0.0009%	0.0005%	0.0014%	0.0011%	0.0004%	0.0044%
WA Area 5 Sport	0.0393%	0.2125%	0.2703%	0.1939%	0.0485%	0.7645%
WA Area 4B-5-6C Treaty Net	-	0.0388%	0.0707%	0.0798%	0.1162%	0.3055%
WA Area 4B-5-6C NT Net	-	0.0007%	0.0028%	0.0069%	0.0012%	0.0116%
WA Area 8A Non-Treaty Net	-	-	-	-	0.0023%	0.0023%
WA Area 8A Treaty Net	-	-	-	-	0.0034%	0.0034%

Table A.4. (Continued) Strait of Georgia Vancouver Island MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 9 Sport	-	-	-	0.0048%	-	0.0048%
WA Area 10 Non-Treaty Net	-	-	-	0.0145%	0.0034%	0.0180%
WA Area 10 Sport	-	-	-	0.0043%	-	0.0043%
WA Area 10 Treaty Net	-	-	-	0.0085%	0.0020%	0.0105%
WA Area 4/4B Treaty Troll	0.0127%	0.0941%	0.0949%	-	-	0.2017%
WA Area 4/4B Non-Treaty Troll	0.0001%	0.0061%	0.0548%	-	-	0.0610%
WA Area 4 Sport	-	0.1012%	0.0563%	0.0051%	-	0.1627%
WA Area 3 Treaty Troll	-	0.0012%	0.0076%	-	-	0.0088%
WA Area 3 Sport	-	0.0065%	-	-	-	0.0065%
WA Area 3 Non-Treaty Troll	-	0.0001%	0.0021%	-	-	0.0022%
WA Area 2 Sport	-	0.0335%	0.0220%	-	-	0.0555%
WA Area 1 & Astoria Troll	-	-	0.0051%	-	-	0.0051%
WA Area 1 & Astoria Sport	-	0.0020%	0.0035%	-	-	0.0055%
Col. River Buoy 10 Sport	-	-	0.0039%	-	-	0.0039%
Tillamook Sport	-	0.0023%	0.0050%	-	-	0.0073%
Tillamook Troll	0.0003%	0.0179%	0.0002%	0.0002%	-	0.0187%
Newport Sport	0.0052%	0.0022%	0.0024%	-	-	0.0098%
Newport Troll	0.0283%	0.0071%	0.0035%	0.0002%	-	0.0392%
Coos Bay Sport	0.0028%	-	0.0042%	-	-	0.0070%
Total	13.4%	32.5%	18.9%	9.5%	3.3%	77.6%

Table A.5. Skagit MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Southwest Troll	-	0.0019%	-	-	-	0.0019%
BC Northern Net	-	0.0172%	-	-	-	0.0172%
BC Northern Troll	-	0.0195%	0.0094%	0.0073%	-	0.0362%
BC North Central Troll	-	0.0929%	0.0050%	-	-	0.0979%
BC Central Net	-	0.0138%	0.0028%	-	-	0.0166%
BC South Central Troll	0.1380%	0.3863%	0.0519%	0.0127%	-	0.5890%
Johnstone Strait Sport	0.0174%	0.0271%	0.0121%	-	-	0.0567%
Johnstone Strait Troll	0.0383%	0.1250%	0.0100%	0.0011%	-	0.1744%
Johnstone Straits Net	-	0.0076%	0.1361%	0.0355%	0.0036%	0.1827%
Georgia Straits Net	-	-	0.0148%	-	0.0009%	0.0158%
Georgia Straits Troll	0.1383%	0.5243%	0.0728%	0.0237%	-	0.7591%
North Georgia Straits Sport	1.4132%	0.8226%	0.4089%	0.0833%	0.0019%	2.7300%
South Georgia Straits Sport	0.7089%	0.1239%	0.1123%	0.0136%	0.0178%	0.9765%
Fraser R Gill Net	-	-	0.0172%	0.0130%	-	0.0302%
BC Juan de Fuca Net	0.0157%	0.2797%	3.7547%	2.0846%	-	6.1346%
BC Juan de Fuca Sport	0.6274%	1.0195%	0.3463%	0.4923%	0.1009%	2.5866%
BC Juan de Fuca Troll	-	0.0011%	0.0008%	0.0018%	-	0.0037%
West Coast Vanc Is Sport	0.0211%	0.1877%	0.0733%	0.0016%	-	0.2836%
NW Vancouver Island Troll	0.1786%	3.1618%	1.1030%	0.3276%	-	4.7710%
SW Vancouver Island Net	0.0085%	0.0016%	-	0.1241%	0.0806%	0.2148%
SW Vancouver Island Troll	0.8422%	12.1748%	6.6090%	1.3400%	-	20.9660%
WA Area 7 Sport	0.0367%	0.0573%	0.0682%	0.0851%	0.0116%	0.2589%
WA Area 7-7A Treaty Net	-	0.0011%	0.0719%	0.3030%	0.0658%	0.4418%
WA Area 7-7A Non-Treaty Net	-	0.0009%	0.0666%	0.1758%	0.0336%	0.2769%
WA Area 7B-7C-7D Treaty Net	-	-	0.0116%	0.1247%	0.1083%	0.2446%
WA Area 7B-7C-7D NT Net	-	-	0.0008%	0.0875%	0.0811%	0.1694%
WA Area 6 Sport	0.0641%	0.3048%	0.2261%	0.4851%	0.1966%	1.2768%
WA Area 5-6-6C Troll	0.0029%	0.0057%	0.0115%	0.0948%	0.0022%	0.1171%
WA Area 5 Sport	0.2664%	0.9703%	1.3849%	1.1765%	0.0830%	3.8811%
WA Area 4B-5-6C Treaty Net	-	0.0930%	0.2860%	0.4334%	0.2126%	1.0249%
WA Area 4B-5-6C NT Net	-	0.0016%	0.0115%	0.0377%	0.0021%	0.0530%
WA Area 8 Non-Treaty Net	-	-	0.1130%	0.3437%	0.7932%	1.2499%
WA Area 8 Treaty Net	-	-	0.0849%	0.9943%	1.5588%	2.6380%
WA Area 8.1 Sport	-	-	0.2881%	0.0209%	0.0573%	0.3663%
WA Area 8.2 Sport	-	-	0.0511%	0.0476%	-	0.0987%
Skagit R Net	-	-	-	-	0.9340%	0.9340%
Skagit R Sport	-	-	-	-	0.3181%	0.3181%
Skagit River Test Net	-	-	-	-	0.6112%	0.6112%
WA Area 8A Non-Treaty Net	-	-	-	0.7440%	0.6312%	1.3752%

Table A.5. (Continued) Skagit MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 8A Treaty Net	-	-	-	1.1700%	0.9414%	2.1115%
WA Area 9 Sport	0.1967%	0.2303%	0.2265%	0.3789%	0.1272%	1.1597%
Area 9/9A Non-Treaty Net	-	-	-	0.0000%	0.0001%	0.0001%
Area 9/9A Treaty Net	-	-	-	0.0004%	0.0138%	0.0142%
WA Area 10 Non-Treaty Net	-	-	-	0.4092%	0.1087%	0.5178%
WA Area 10 Sport	0.1545%	0.0904%	0.0663%	0.0577%	0.0215%	0.3904%
WA Area 10 Treaty Net	-	-	-	0.2395%	0.0631%	0.3025%
WA Area 10E Non-Treaty Net	-	-	-	0.0000%	-	0.0000%
WA Area 10E Treaty Net	-	-	-	0.0004%	-	0.0004%
WA Area 10F-G Treaty Net	-	-	0.0296%	-	-	0.0296%
WA Area 11 Non-Treaty Net	-	-	-	0.0992%	0.0230%	0.1222%
WA Area 11 Sport	0.0418%	0.0039%	0.0088%	0.0027%	0.0032%	0.0604%
WA Area 11 Treaty Net	-	-	-	0.0115%	0.0027%	0.0142%
WA Area 13 Marine Sport	0.0124%	-	-	0.0035%	0.0028%	0.0187%
Area 12 Marine Sport	-	-	-	-	0.0019%	0.0019%
Area 12-12B Hood Canal NT Net	-	-	-	0.0073%	0.0089%	0.0162%
Area 12-12B Hood Canal T Net	-	-	-	0.0074%	0.0117%	0.0190%
WA Area 4/4B Treaty Troll	0.1989%	0.6239%	0.5995%	0.2125%	0.0204%	1.6552%
WA Area 4/4B Non-Treaty Troll	0.0020%	0.0402%	0.3460%	0.0561%	0.0033%	0.4476%
WA Area 4 Sport	0.0160%	0.4341%	0.3389%	0.0624%	-	0.8513%
WA Area 3 Treaty Troll	0.0614%	0.1348%	0.1358%	0.0452%	-	0.3772%
WA Area 3 Sport	0.0007%	0.0380%	0.0138%	-	-	0.0525%
WA Area 3 Non-Treaty Troll	0.0463%	0.0071%	0.0381%	0.0254%	-	0.1170%
Hoh R Net	-	-	-	-	0.0012%	0.0012%
WA Area 2 Treaty Troll	0.0107%	0.0942%	0.0482%	0.0067%	-	0.1597%
WA Area 2 Sport	0.0330%	0.3268%	0.1524%	0.0116%	-	0.5238%
WA Area 2 Non-Treaty Troll	0.0107%	0.0372%	0.0568%	0.0038%	-	0.1085%
Willapa Bay & FW Trib Net	-	-	-	-	0.0023%	0.0023%
WA Area 1 & Astoria Troll	0.0074%	0.0904%	0.0525%	0.0434%	0.0062%	0.1999%
WA Area 1 & Astoria Sport	0.0026%	0.0613%	0.0516%	-	-	0.1154%
Col. River Buoy 10 Sport	-	-	0.0535%	0.0045%	-	0.0580%
Tillamook Sport	0.0076%	0.0297%	0.0181%	0.0027%	-	0.0581%
Tillamook Troll	0.0067%	0.1668%	0.0441%	0.0040%	-	0.2216%
Newport Sport	0.0190%	0.0506%	0.0306%	-	-	0.1003%
Newport Troll	0.0478%	0.1245%	0.0319%	0.0014%	-	0.2055%
Coos Bay Sport	0.0181%	0.0216%	0.0046%	0.0062%	-	0.0505%
Coos Bay Troll	0.0228%	0.0335%	0.0025%	0.0003%	-	0.0592%
Brookings Sport	-	0.0022%	-	-	-	0.0022%
Brookings Troll	0.0029%	0.0038%	0.0024%	0.0008%	-	0.0099%
Total	5.4%	23.1%	17.8%	12.6%	7.3%	66.1%

Table A.6. Stillaguamish MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
BC Northern Net	-	0.0038%	0.0009%	-	-	0.0047%
BC Northern Troll	-	0.0284%	0.0043%	0.0009%	-	0.0335%
BC North Central Troll	-	0.0054%	0.0054%	0.0039%	-	0.0147%
BC Central Net	-	0.0184%	-	0.0021%	-	0.0205%
BC Central Sport	-	0.0048%	-	-	-	0.0048%
BC South Central Troll	0.0844%	0.3806%	0.0640%	0.0107%	-	0.5397%
Johnstone Strait Sport	0.0008%	0.0055%	0.0056%	-	-	0.0119%
Johnstone Strait Troll	-	0.0159%	0.0059%	0.0009%	-	0.0227%
Johnstone Straits Net	-	-	0.0380%	0.0133%	0.0025%	0.0538%
Georgia Straits Troll	0.0066%	0.0227%	0.0033%	0.0045%	-	0.0371%
North Georgia Straits Sport	0.0892%	0.0567%	0.0100%	0.0085%	-	0.1645%
South Georgia Straits Sport	0.0411%	0.0210%	0.0034%	0.0039%	-	0.0693%
Fraser R Gill Net	-	0.0005%	0.0025%	-	-	0.0029%
BC Juan de Fuca Net	0.0116%	0.2411%	2.3453%	0.9989%	0.0358%	3.6327%
BC Juan de Fuca Sport	0.1548%	0.4350%	0.1580%	0.1562%	0.0295%	0.9335%
BC Juan de Fuca Troll	-	0.0006%	0.0154%	0.0008%	-	0.0168%
West Coast Vanc Is Sport	0.0203%	0.1008%	0.0592%	0.0007%	-	0.1810%
NW Vancouver Island Troll	0.2585%	4.3138%	1.2289%	0.3871%	-	6.1883%
SW Vancouver Island Net	0.0271%	-	-	0.1008%	0.0338%	0.1618%
SW Vancouver Island Troll	0.4857%	10.0556%	5.5392%	0.9161%	-	16.9967%
WA Area 7 Sport	0.0020%	0.0149%	-	0.0273%	0.0140%	0.0582%
WA Area 7-7A Treaty Net	-	0.0026%	0.0167%	0.0604%	0.0033%	0.0829%
WA Area 7-7A Non-Treaty Net	-	0.0022%	0.0154%	0.0351%	0.0017%	0.0544%
WA Area 7B-7C-7D Treaty Net	-	-	0.0007%	0.0155%	0.0092%	0.0254%
WA Area 7B-7C-7D NT Net	-	-	0.0001%	0.0108%	0.0069%	0.0178%
WA Area 6 Sport	0.0440%	0.1257%	0.1240%	0.4058%	0.1178%	0.8173%
WA Area 5-6-6C Troll	0.0490%	0.0267%	0.0370%	0.0392%	0.0074%	0.1593%
WA Area 5 Sport	0.1678%	0.4491%	0.7524%	1.2307%	0.1552%	2.7551%
WA Area 4B-5-6C Treaty Net	-	0.1011%	0.2871%	0.3193%	0.1556%	0.8631%
WA Area 4B-5-6C NT Net	-	0.0018%	0.0116%	0.0278%	0.0016%	0.0427%
WA Area 8 Non-Treaty Net	-	-	-	0.0022%	0.0024%	0.0046%
WA Area 8 Treaty Net	-	-	-	0.0064%	0.0046%	0.0110%
WA Area 8.1 Sport	-	-	0.0337%	-	-	0.0337%
WA Area 8.2 Sport	0.0129%	-	-	1.4310%	0.5300%	1.9739%
Stillaguamish R Net	-	-	-	-	7.2162%	7.2162%
Stillaguamish R Sport	-	-	-	-	0.2663%	0.2663%
WA Area 8A Non-Treaty Net	-	-	-	2.0797%	2.8766%	4.9563%
WA Area 8A Treaty Net	-	-	-	3.2706%	4.2902%	7.5608%
WA Area 8D Non-Treaty Net	-	-	-	0.1819%	0.6752%	0.8572%

Table A.6. (Continued) Stillaguamish MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 8D Treaty Net	-	-	-	1.3763%	3.8978%	5.2741%
WA Area 9 Sport	0.1174%	0.0899%	0.1113%	0.5253%	0.1347%	0.9786%
Area 9/9A Non-Treaty Net	-	-	-	0.0001%	0.0003%	0.0004%
Area 9/9A Treaty Net	-	-	-	0.0064%	0.0283%	0.0347%
WA Area 10 Non-Treaty Net	-	-	-	0.4457%	0.1484%	0.5941%
WA Area 10 Sport	0.0319%	0.0291%	0.0214%	0.0343%	-	0.1167%
WA Area 10 Treaty Net	-	-	-	0.2608%	0.0862%	0.3470%
WA Area 10F-G Treaty Net	-	-	0.0164%	0.0033%	0.0055%	0.0252%
WA Area 11 Non-Treaty Net	-	-	-	0.1324%	0.0287%	0.1611%
WA Area 11 Sport	0.0105%	0.0093%	0.0083%	0.0040%	-	0.0321%
WA Area 11 Treaty Net	-	-	-	0.0153%	0.0033%	0.0187%
WA Area 13 Marine Sport	0.0007%	-	0.0054%	-	-	0.0062%
Area 12-12B Hood Canal NT Net	-	-	-	0.0074%	0.0086%	0.0160%
Area 12-12B Hood Canal T Net	-	-	-	0.0075%	0.0113%	0.0188%
WA Area 4/4B Treaty Troll	0.0894%	0.3863%	0.4350%	0.1923%	-	1.1031%
WA Area 4/4B Non-Treaty Troll	0.0009%	0.0249%	0.2511%	0.0508%	-	0.3276%
WA Area 4 Sport	0.0208%	0.2296%	0.1887%	0.0412%	-	0.4803%
WA Area 3 Treaty Troll	0.0424%	0.0736%	0.1396%	0.0452%	-	0.3008%
WA Area 3 Sport	0.0015%	0.0487%	0.0139%	0.0024%	-	0.0665%
WA Area 3 Non-Treaty Troll	0.0320%	0.0039%	0.0392%	0.0254%	-	0.1005%
Hoh R Net	-	-	-	-	0.0008%	0.0008%
Queets R Net	-	-	-	0.0007%	-	0.0007%
WA Area 2 Treaty Troll	0.0350%	0.0971%	0.0362%	0.0033%	-	0.1716%
WA Area 2 Sport	0.0289%	0.2816%	0.1072%	0.0362%	-	0.4539%
WA Area 2 Non-Treaty Troll	0.0350%	0.0384%	0.0427%	0.0019%	-	0.1180%
WA Area 1 & Astoria Troll	0.0082%	0.1149%	0.0310%	0.0089%	-	0.1630%
WA Area 1 & Astoria Sport	0.0028%	0.0878%	0.0315%	-	-	0.1221%
Col. River Buoy 10 Sport	-	0.0366%	0.0424%	0.0010%	-	0.0800%
Tillamook Sport	0.0056%	0.0415%	0.0200%	0.0057%	-	0.0729%
Tillamook Troll	0.0123%	0.1935%	0.0358%	0.0031%	-	0.2447%
Newport Sport	0.0239%	0.0655%	0.0383%	-	-	0.1277%
Newport Troll	0.0367%	0.1713%	0.0317%	0.0014%	-	0.2412%
Coos Bay Sport	0.0070%	0.0281%	0.0121%	-	-	0.0472%
Coos Bay Troll	0.0108%	0.0320%	0.0113%	0.0006%	-	0.0548%
Brookings Troll	0.0007%	0.0036%	0.0012%	-	-	0.0055%
KMZ Sport	0.0043%	-	-	-	-	0.0043%
Total	2.0%	18.5%	12.4%	15.0%	20.8%	68.8%

Table A.7. Snohomish MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
BC Northern Net	-	0.0038%	0.0009%	-	-	0.0047%
BC Northern Troll	-	0.0284%	0.0043%	0.0009%	-	0.0336%
BC North Central Troll	-	0.0054%	0.0054%	0.0039%	-	0.0147%
BC Central Net	-	0.0184%	-	0.0021%	-	0.0206%
BC Central Sport	-	0.0048%	-	-	-	0.0048%
BC South Central Troll	0.0845%	0.3809%	0.0640%	0.0107%	-	0.5402%
Johnstone Strait Sport	0.0008%	0.0055%	0.0057%	-	-	0.0119%
Johnstone Strait Troll	-	0.0159%	0.0059%	0.0009%	-	0.0227%
Johnstone Straits Net	-	-	0.0381%	0.0133%	0.0024%	0.0538%
Georgia Straits Troll	0.0067%	0.0227%	0.0033%	0.0045%	-	0.0372%
North Georgia Straits Sport	0.0893%	0.0568%	0.0100%	0.0086%	-	0.1647%
South Georgia Straits Sport	0.0411%	0.0210%	0.0034%	0.0039%	-	0.0693%
Fraser R Gill Net	-	0.0005%	0.0025%	-	-	0.0029%
BC Juan de Fuca Net	0.0116%	0.2416%	2.3477%	1.0013%	0.0352%	3.6374%
BC Juan de Fuca Sport	0.1549%	0.4355%	0.1581%	0.1564%	0.0304%	0.9353%
BC Juan de Fuca Troll	-	0.0006%	0.0155%	0.0008%	-	0.0168%
West Coast Vanc Is Sport	0.0204%	0.1009%	0.0593%	0.0007%	-	0.1813%
NW Vancouver Island Troll	0.2588%	4.3174%	1.2301%	0.3872%	-	6.1934%
SW Vancouver Island Net	0.0271%	-	-	0.1011%	0.0333%	0.1615%
SW Vancouver Island Troll	0.4863%	10.0679%	5.5452%	0.9165%	-	17.0158%
WA Area 7 Sport	0.0020%	0.0149%	-	0.0274%	0.0138%	0.0580%
WA Area 7-7A Treaty Net	-	0.0026%	0.0167%	0.0605%	0.0032%	0.0830%
WA Area 7-7A Non-Treaty Net	-	0.0022%	0.0155%	0.0351%	0.0016%	0.0545%
WA Area 7B-7C-7D Treaty Net	-	-	0.0007%	0.0155%	0.0090%	0.0253%
WA Area 7B-7C-7D NT Net	-	-	0.0001%	0.0109%	0.0068%	0.0177%
WA Area 6 Sport (Port Angeles)	0.0441%	0.1258%	0.1242%	0.4063%	0.1164%	0.8167%
WA Area 5-6-6C Troll	0.0490%	0.0267%	0.0370%	0.0393%	0.0073%	0.1593%
WA Area 5 Sport (Sekiu)	0.1679%	0.4494%	0.7532%	1.2322%	0.1535%	2.7561%
WA Area 4B-5-6C Treaty Net	-	0.1013%	0.2874%	0.3199%	0.1543%	0.8629%
WA Area 4B-5-6C NT Net	-	0.0018%	0.0116%	0.0278%	0.0016%	0.0427%
WA Area 8 Non-Treaty Net	-	-	-	0.0022%	0.0025%	0.0048%
WA Area 8 Treaty Net	-	-	-	0.0064%	0.0050%	0.0114%
WA Area 8.1 Sport	-	-	0.0337%	-	-	0.0337%
WA Area 8.2 Sport	0.0129%	-	-	1.6876%	0.6387%	2.3392%
Snohomish R Net	-	-	-	-	0.1650%	0.1650%
Snohomish R Sport	-	-	-	-	0.3403%	0.3403%
WA Area 8A Non-Treaty Net	-	-	-	2.3429%	3.1192%	5.4621%
WA Area 8A Treaty Net	-	-	-	3.6844%	4.6520%	8.3364%
WA Area 8D Non-Treaty Net	-	-	-	0.1820%	0.6641%	0.8461%

Table A.7. (Continued) Snohomish MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 8D Treaty Net	-	-	-	1.3767%	3.8336%	5.2103%
WA Area 9 Sport	0.1175%	0.0900%	0.1114%	0.5260%	0.1335%	0.9784%
Area 9/9A Non-Treaty Net	-	-	-	0.0001%	0.0003%	0.0003%
Area 9/9A Treaty Net	-	-	-	0.0064%	0.0278%	0.0342%
WA Area 10 Non-Treaty Net	-	-	-	0.4462%	0.1482%	0.5944%
WA Area 10 Sport	0.0319%	0.0291%	0.0214%	0.0343%	-	0.1167%
WA Area 10 Treaty Net	-	-	-	0.2611%	0.0860%	0.3472%
WA Area 10F-G Treaty Net	-	-	0.0164%	0.0033%	0.0054%	0.0252%
WA Area 11 Non-Treaty Net	-	-	-	0.1327%	0.0282%	0.1609%
WA Area 11 Sport	0.0105%	0.0093%	0.0083%	0.0040%	-	0.0321%
WA Area 11 Treaty Net	-	-	-	0.0154%	0.0033%	0.0187%
WA Area 13 Marine Sport	0.0007%	-	0.0055%	-	-	0.0062%
Area 12-12B Hood Canal NT Net	-	-	-	0.0074%	0.0087%	0.0160%
Area 12-12B Hood Canal T Net	-	-	-	0.0075%	0.0113%	0.0188%
WA Area 4/4B Treaty Troll	0.0896%	0.3868%	0.4354%	0.1927%	-	1.1044%
WA Area 4/4B Non-Treaty Troll	0.0009%	0.0249%	0.2513%	0.0509%	-	0.3280%
WA Area 4 Sport	0.0209%	0.2298%	0.1889%	0.0413%	-	0.4809%
WA Area 3 Treaty Troll	0.0425%	0.0736%	0.1397%	0.0453%	-	0.3011%
WA Area 3 Sport	0.0015%	0.0487%	0.0139%	0.0024%	-	0.0665%
WA Area 3 Non-Treaty Troll	0.0320%	0.0039%	0.0392%	0.0255%	-	0.1006%
Hoh R Net	-	-	-	-	0.0009%	0.0009%
Queets R Net	-	-	-	0.0007%	-	0.0007%
WA Area 2 Treaty Troll	0.0350%	0.0972%	0.0363%	0.0033%	-	0.1718%
WA Area 2 Sport	0.0289%	0.2818%	0.1073%	0.0362%	-	0.4542%
WA Area 2 Non-Treaty Troll	0.0350%	0.0384%	0.0428%	0.0019%	-	0.1181%
WA Area 1 & Astoria Troll	0.0082%	0.1151%	0.0310%	0.0090%	-	0.1633%
WA Area 1 & Astoria Sport	0.0028%	0.0878%	0.0315%	-	-	0.1222%
Col. River Buoy 10 Sport	-	0.0366%	0.0424%	0.0010%	-	0.0800%
Tillamook Sport	0.0056%	0.0416%	0.0200%	0.0057%	-	0.0729%
Tillamook Troll	0.0123%	0.1937%	0.0358%	0.0031%	-	0.2449%
Newport Sport	0.0240%	0.0655%	0.0383%	-	-	0.1278%
Newport Troll	0.0368%	0.1715%	0.0317%	0.0014%	-	0.2414%
Coos Bay Sport	0.0070%	0.0282%	0.0120%	-	-	0.0472%
Coos Bay Troll	0.0108%	0.0320%	0.0113%	0.0006%	-	0.0548%
Brookings Troll	0.0007%	0.0036%	0.0012%	-	-	0.0055%
KMZ Sport	0.0043%	-	-	-	-	0.0043%
Total	2.0%	18.5%	12.5%	15.9%	14.4%	63.4%

Table A.8. Hood Canal MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
Southeast Alaska Net	-	-	0.0129%	-	-	0.0129%
SEAK Southwest Troll	-	-	0.0049%	-	-	0.0049%
BC Northern Net	-	-	0.0041%	-	-	0.0041%
BC Northern Troll	-	0.0696%	0.0413%	0.0013%	-	0.1122%
BC North Central Troll	-	0.1070%	0.0021%	-	-	0.1091%
BC Central Net	-	0.0144%	-	-	-	0.0144%
BC South Central Troll	0.0555%	0.4409%	0.0209%	0.0060%	-	0.5232%
Johnstone Strait Sport	0.0116%	0.0244%	0.0043%	-	-	0.0403%
Johnstone Strait Troll	-	0.0623%	-	-	-	0.0623%
Johnstone Straits Net	-	-	0.0601%	0.0243%	0.0110%	0.0954%
Georgia Straits Net	-	-	0.0164%	-	-	0.0164%
Georgia Straits Troll	-	0.0381%	0.0413%	0.0135%	-	0.0929%
North Georgia Straits Sport	0.0849%	0.0585%	0.0068%	0.0107%	-	0.1610%
South Georgia Straits Sport	0.0265%	0.0325%	0.0077%	-	-	0.0666%
Fraser R Gill Net	-	-	0.0191%	-	-	0.0191%
BC Juan de Fuca Net	0.0219%	0.2887%	4.1962%	1.4336%	0.0131%	5.9536%
BC Juan de Fuca Sport	0.4122%	0.7923%	0.4378%	0.3292%	0.1223%	2.0939%
BC Juan de Fuca Troll	-	0.0012%	0.0006%	0.0010%	-	0.0027%
West Coast Vanc Is Sport	0.1589%	0.0663%	0.0967%	0.0104%	-	0.3324%
NW Vancouver Island Troll	0.3055%	5.9284%	1.6748%	0.9302%	-	8.8389%
SW Vancouver Island Net	0.0044%	0.0156%	-	0.1096%	0.0235%	0.1532%
SW Vancouver Island Troll	0.6872%	15.3783%	8.8035%	2.5948%	-	27.4638%
WA Area 7 Sport	-	0.0273%	0.0086%	0.0238%	-	0.0598%
WA Area 7-7A Treaty Net	-	0.0259%	0.0122%	0.0632%	0.0145%	0.1157%
WA Area 7-7A Non-Treaty Net	-	0.0226%	0.0113%	0.0366%	0.0074%	0.0778%
WA Area 7B-7C-7D Treaty Net	-	-	0.0005%	0.0032%	0.0046%	0.0084%
WA Area 7B-7C-7D NT Net	-	-	0.0000%	0.0023%	0.0035%	0.0058%
WA Area 6 Sport	0.0700%	0.3994%	0.3829%	0.5442%	0.3282%	1.7247%
WA Area 5-6-6C Troll	0.0035%	0.0060%	0.0534%	0.0586%	0.0092%	0.1307%
WA Area 5 Sport	0.3573%	1.2358%	1.6506%	1.7874%	0.2753%	5.3064%
WA Area 4B-5-6C Treaty Net	0.0050%	0.1649%	0.4311%	0.4964%	0.5726%	1.6700%
WA Area 4B-5-6C NT Net	0.0014%	0.0029%	0.0173%	0.0432%	0.0058%	0.0706%
WA Area 8 Non-Treaty Net	-	-	-	0.0010%	-	0.0010%
WA Area 8 Treaty Net	-	-	-	0.0028%	-	0.0028%
WA Area 8.2 Sport	-	-	0.1717%	-	-	0.1717%
WA Area 8A Non-Treaty Net	-	-	-	0.0507%	0.0276%	0.0783%
WA Area 8A Treaty Net	-	-	-	0.0797%	0.0411%	0.1208%
WA Area 9 Sport	0.0921%	0.2186%	0.3003%	0.8618%	0.4304%	1.9031%
Area 9/9A Non-Treaty Net	-	-	-	0.0053%	0.0178%	0.0230%
Area 9/9A Treaty Net	-	-	-	0.5213%	1.7600%	2.2813%
WA Area 10 Non-Treaty Net	-	-	-	3.1046%	1.6800%	4.7845%
WA Area 10 Sport	0.0306%	0.0374%	0.1516%	0.3985%	0.3147%	0.9327%
WA Area 10 Treaty Net	-	-	-	1.8168%	0.9754%	2.7922%

Table A.8. (Continued) Hood Canal MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 10E Non-Treaty Net	-	-	-	0.0036%	0.0062%	0.0098%
WA Area 10E Treaty Net	-	-	-	0.0409%	0.0716%	0.1125%
WA Area 10F-G Treaty Net	-	-	-	0.0038%	0.0109%	0.0148%
WA Area 11 Non-Treaty Net	-	-	-	0.2851%	0.2205%	0.5055%
WA Area 11 Sport	0.0024%	0.0026%	0.0251%	0.0282%	0.0137%	0.0720%
WA Area 11 Treaty Net	-	-	-	0.0330%	0.0257%	0.0587%
Area 13 Non-Treaty Net	-	-	-	-	0.0002%	0.0002%
Area 13 Treaty Net	-	-	-	-	0.0231%	0.0231%
WA Area 13 Marine Sport	-	0.0092%	-	-	0.0218%	0.0310%
Area 12 Marine Sport	-	-	0.0069%	0.1045%	0.1294%	0.2408%
12, 12B Trib FW Sport	-	-	-	-	0.0124%	0.0124%
Area 12-12B Hood Canal NT Net	-	-	0.0142%	1.1534%	1.7955%	2.9630%
Area 12-12B Hood Canal T Net	-	-	0.0193%	1.1697%	2.3527%	3.5417%
12A Trib FW Sport	-	-	-	-	0.0369%	0.0369%
Area 12A Non-Treaty Net	-	-	-	0.1367%	0.0315%	0.1683%
Area 12A Treaty Net	-	-	-	1.2708%	0.2907%	1.5614%
Quilcene R Net	-	-	-	-	0.0869%	0.0869%
Area 12C-12D Non-Treaty Net	-	-	-	0.1063%	0.1488%	0.2551%
Area 12C-12D Treaty Net	-	-	-	0.5372%	0.6934%	1.2306%
12C, 12D Trib FW Sport	-	-	-	-	0.0608%	0.0608%
Skokomish R Net	-	-	-	-	0.7778%	0.7778%
Skokomish R Sport	-	-	-	-	0.0242%	0.0242%
WA Area 4/4B Treaty Troll	0.1438%	0.6890%	0.6298%	0.1294%	-	1.5920%
WA Area 4/4B Non-Treaty Troll	0.0015%	0.0444%	0.3635%	0.0342%	-	0.4435%
WA Area 4 Sport	-	0.4418%	0.4228%	0.0499%	-	0.9146%
WA Area 3 Treaty Troll	0.1354%	0.2292%	0.1644%	0.0076%	-	0.5365%
WA Area 3 Sport	-	0.0607%	0.0132%	0.0171%	-	0.0910%
WA Area 3 Non-Treaty Troll	0.1021%	0.0121%	0.0461%	0.0043%	-	0.1647%
Hoh R Net	-	-	-	0.0008%	-	0.0008%
WA Area 2 Treaty Troll	0.0416%	0.0940%	0.0289%	0.0129%	-	0.1773%
WA Area 2 Sport	0.0512%	0.4580%	0.1741%	0.0107%	-	0.6940%
WA Area 2 Non-Treaty Troll	0.0416%	0.0371%	0.0340%	0.0073%	-	0.1200%
Grays Harbor Estuary Net	-	-	-	-	0.0020%	0.0020%
WA Area 1 & Astoria Troll	0.0051%	0.0720%	0.0804%	0.0194%	-	0.1769%
WA Area 1 & Astoria Sport	0.0152%	0.1244%	0.0582%	-	-	0.1978%
Col. River Buoy 10 Sport	-	0.0584%	0.0118%	0.0222%	-	0.0924%
Tillamook Sport	0.0015%	0.0366%	0.0473%	-	-	0.0854%
Tillamook Troll	0.0289%	0.3516%	0.0790%	0.0148%	-	0.4743%
Newport Sport	0.0359%	0.0758%	0.0656%	-	-	0.1772%
Newport Troll	0.0467%	0.1814%	0.0580%	0.0035%	-	0.2895%
Coos Bay Sport	0.0158%	0.0354%	-	-	-	0.0512%
Coos Bay Troll	0.0286%	0.0898%	0.0071%	0.0008%	-	0.1263%
Brookings Troll	-	0.0118%	0.0034%	-	-	0.0152%
Total	3.0%	28.6%	21.0%	20.6%	13.5%	86.6%

Table A.9. Strait of Juan de Fuca MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northwest Troll	-	0.0450%	0.1477%	0.0435%	-	0.2362%
Southeast Alaska Net	-	-	0.0826%	-	-	0.0826%
SEAK Southwest Troll	-	-	0.0202%	0.0255%	-	0.0457%
BC Northern Net	-	0.0374%	0.0338%	-	-	0.0712%
BC Northern Sport	-	-	-	0.0002%	-	0.0002%
BC Northern Troll	-	0.0664%	0.1039%	-	-	0.1703%
BC North Central Troll	-	0.0055%	0.0614%	-	-	0.0669%
BC Central Net	-	-	-	0.0240%	-	0.0240%
BC South Central Troll	0.1357%	0.7580%	0.3010%	0.1226%	-	1.3173%
Johnstone Strait Sport	-	0.0046%	0.0637%	-	-	0.0682%
Johnstone Straits Net	-	0.0074%	0.0230%	0.0469%	0.0375%	0.1148%
Georgia Straits Net	-	-	-	-	0.0018%	0.0018%
Georgia Straits Troll	-	0.0272%	-	-	-	0.0272%
North Georgia Straits Sport	0.0583%	0.1134%	0.0291%	-	0.0019%	0.2027%
South Georgia Straits Sport	0.0103%	-	-	-	-	0.0103%
BC Juan de Fuca Net	-	0.1775%	1.7169%	0.8466%	0.0359%	2.7769%
BC Juan de Fuca Sport	0.0103%	0.5543%	0.1892%	0.2640%	0.1435%	1.1613%
West Coast Vanc Is Sport	-	0.0945%	0.0326%	0.0020%	-	0.1291%
NW Vancouver Island Troll	0.4929%	5.9880%	2.9478%	1.2930%	-	10.7217%
SW Vancouver Island Net	-	-	-	0.0836%	0.0385%	0.1221%
SW Vancouver Island Troll	1.0189%	15.0849%	7.9131%	1.6563%	-	25.6733%
WA Area 7 Sport	0.0031%	-	-	-	-	0.0031%
WA Area 7-7A Treaty Net	-	0.0041%	0.0062%	0.0426%	0.0586%	0.1114%
WA Area 7-7A Non-Treaty Net	-	0.0035%	0.0057%	0.0247%	0.0299%	0.0639%
WA Area 6 Sport	0.0038%	0.2237%	0.2220%	0.7130%	0.2808%	1.4434%
6D Non-Treaty Net	-	-	-	0.4666%	1.2392%	1.7058%
6D Treaty Net	-	-	-	0.2641%	0.6098%	0.8739%
Dungeness R Sport	-	-	-	-	0.1994%	0.1994%
Elwha R Net	-	-	-	-	1.1643%	1.1643%
Elwha R Sport	-	-	-	-	0.0872%	0.0872%
WA Area 5-6-6C Troll	-	0.0017%	0.0049%	0.0781%	0.0532%	0.1380%
WA Area 5 Sport	0.2020%	0.5042%	1.1113%	2.3592%	0.5566%	4.7334%
West JDF Straits Trib Sport	-	-	-	-	0.0315%	0.0315%
West JDF Straits Trib Net	-	-	-	-	0.1758%	0.1758%
WA Area 4B-5-6C Treaty Net	-	0.0534%	0.2175%	0.3080%	3.6563%	4.2352%
WA Area 4B-5-6C NT Net	-	0.0009%	0.0088%	0.0268%	0.0369%	0.0734%
WA Area 8A Non-Treaty Net	-	-	-	-	0.0129%	0.0129%
WA Area 8A Treaty Net	-	-	-	-	0.0193%	0.0193%
WA Area 9 Sport	-	-	0.0044%	0.0409%	0.0089%	0.0542%
Area 9/9A Non-Treaty Net	-	-	-	0.0002%	0.0006%	0.0009%

Table A.9. (Continued) Strait of Juan de Fuca MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
Area 9/9A Treaty Net	-	-	-	0.0211%	0.0641%	0.0851%
WA Area 10 Non-Treaty Net	-	-	-	0.0960%	0.1095%	0.2055%
WA Area 10 Sport	-	-	-	0.0073%	0.0301%	0.0374%
WA Area 10 Treaty Net	-	-	-	0.0562%	0.0636%	0.1198%
WA Area 10E Non-Treaty Net	-	-	-	0.0002%	0.0009%	0.0011%
WA Area 10E Treaty Net	-	-	-	0.0020%	0.0106%	0.0127%
WA Area 11 Non-Treaty Net	-	-	-	0.0036%	0.0499%	0.0535%
WA Area 11 Treaty Net	-	-	-	0.0004%	0.0058%	0.0062%
Area 12-12B Hood Canal NT Net	-	-	-	-	0.0395%	0.0395%
Area 12-12B Hood Canal T Net	-	-	-	-	0.0518%	0.0518%
WA Area 4/4B Treaty Troll	0.0927%	0.4382%	0.5636%	0.1664%	-	1.2609%
WA Area 4/4B Non-Treaty Troll	0.0009%	0.0282%	0.3253%	0.0440%	-	0.3984%
WA Area 4 Sport	-	0.1303%	0.1000%	0.0183%	-	0.2485%
WA Area 3 Treaty Troll	-	0.0209%	0.1149%	0.0578%	-	0.1936%
WA Area 3 Sport	-	0.0021%	0.0215%	-	-	0.0236%
WA Area 3 Non-Treaty Troll	-	0.0011%	0.0322%	0.0325%	-	0.0658%
Hoh R Net	-	-	-	-	0.0009%	0.0009%
WA Area 2 Treaty Troll	0.0070%	0.2687%	0.0273%	0.0007%	-	0.3036%
WA Area 2 Sport	0.0633%	0.3650%	0.1551%	-	-	0.5833%
WA Area 2 Non-Treaty Troll	0.0070%	0.1062%	0.0322%	0.0004%	-	0.1457%
Grays Harbor Estuary Net	-	-	-	-	0.0015%	0.0015%
WA Area 1 & Astoria Troll	0.0082%	0.1490%	0.0740%	0.0230%	-	0.2542%
WA Area 1 & Astoria Sport	-	0.1559%	0.0610%	-	-	0.2169%
Col. River Buoy 10 Sport	-	-	0.0492%	-	-	0.0492%
Tillamook Sport	0.0011%	0.0644%	0.0037%	-	-	0.0692%
Tillamook Troll	0.0183%	0.5808%	0.2115%	0.0182%	-	0.8287%
Newport Sport	0.0036%	0.1149%	0.0827%	0.0997%	-	0.3008%
Newport Troll	0.1502%	0.2486%	0.0092%	0.0056%	-	0.4136%
Coos Bay Sport	0.0346%	0.0637%	0.0180%	-	-	0.1164%
Coos Bay Troll	0.0038%	0.0524%	0.0039%	0.0008%	-	0.0609%
Brookings Sport	0.0023%	0.0274%	-	-	-	0.0297%
Brookings Troll	0.0036%	-	0.0014%	0.0007%	-	0.0058%
KMZ Sport	0.0071%	-	-	-	-	0.0071%
KMZ Troll	0.0432%	-	-	-	-	0.0432%
Total	2.4%	26.6%	17.1%	9.4%	8.9%	64.4%

Table A.10. Quillayute MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northwest Troll	-	0.0088%	-	-	-	0.0088%
SEAK Southeast Troll	-	0.0076%	0.0250%	-	-	0.0326%
SEAK Southwest Troll	-	0.0238%	-	-	-	0.0238%
BC Northern Net	-	0.0220%	-	-	-	0.0220%
BC Northern Troll	-	0.1461%	0.0871%	0.0900%	-	0.3233%
BC North Central Troll	-	-	0.0043%	0.0519%	-	0.0562%
BC South Central Troll	0.0700%	0.3612%	0.0944%	0.0685%	-	0.5941%
Johnstone Strait Troll	-	-	-	0.0049%	-	0.0049%
Johnstone Straits Net	-	0.0378%	0.0346%	-	-	0.0724%
Georgia Straits Troll	-	0.0201%	-	-	-	0.0201%
North Georgia Straits Sport	-	0.0095%	-	-	-	0.0095%
BC Juan de Fuca Net	-	0.1079%	0.5795%	0.2130%	0.0438%	0.9442%
BC Juan de Fuca Sport	-	0.0415%	0.1435%	0.0867%	0.0808%	0.3525%
West Coast Vanc Is Sport	-	0.0265%	0.0076%	-	-	0.0341%
NW Vancouver Island Troll	0.0906%	2.9535%	2.5785%	0.3971%	-	6.0197%
SW Vancouver Island Net	-	-	-	0.0059%	0.3287%	0.3346%
SW Vancouver Island Troll	0.6434%	8.3588%	6.6480%	1.9205%	-	17.5706%
WA Area 7 Sport	-	-	-	0.0345%	-	0.0345%
WA Area 7-7A Treaty Net	-	-	-	0.0084%	-	0.0084%
WA Area 7-7A Non-Treaty Net	-	-	-	0.0049%	-	0.0049%
WA Area 6 Sport	-	-	0.0146%	0.0079%	-	0.0225%
WA Area 5-6-6C Troll	-	0.0016%	0.0003%	-	0.0023%	0.0043%
WA Area 5 Sport	0.0358%	0.3605%	0.2654%	0.1731%	0.2782%	1.1130%
WA Area 4B-5-6C Treaty Net	-	0.0119%	0.0539%	0.0646%	0.2392%	0.3695%
WA Area 4B-5-6C NT Net	-	0.0002%	0.0022%	0.0056%	0.0024%	0.0104%
WA Area 4/4B Treaty Troll	0.1514%	0.5165%	0.5102%	0.0717%	0.1124%	1.3622%
WA Area 4/4B Non-Treaty Troll	0.0015%	0.0333%	0.2945%	0.0189%	0.0181%	0.3663%
WA Area 4 Sport	-	0.0909%	0.1904%	0.0131%	-	0.2944%
WA Area 3 Treaty Troll	0.3735%	0.5245%	0.3850%	0.0937%	-	1.3767%
WA Area 3 Sport	-	0.0773%	0.0252%	-	-	0.1026%
WA Area 3 Non-Treaty Troll	0.2817%	0.0278%	0.1080%	0.0527%	-	0.4703%
Quillayute R C&S	-	-	-	-	0.3792%	0.3792%
Quillayute R Net	-	-	-	5.3871%	11.3064%	16.6935%
Quillayute R Sport	-	-	-	-	1.7046%	1.7046%
Hoh R Net	-	-	-	0.0453%	0.2725%	0.3178%
Queets R Net	-	-	-	-	0.0039%	0.0039%
WA Area 2 Treaty Troll	0.0377%	0.2110%	0.1154%	0.0730%	-	0.4371%
WA Area 2 Sport	-	0.5314%	0.5135%	-	-	1.0448%
WA Area 2 Non-Treaty Troll	0.0377%	0.0834%	0.1361%	0.0411%	-	0.2983%
Quinault R Net	-	-	-	0.0120%	-	0.0120%

Table A.10. (Continued) Quillayute MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 1 & Astoria Troll	0.0098%	0.1943%	0.4369%	-	-	0.6409%
WA Area 1 & Astoria Sport	-	0.2487%	0.2749%	0.0136%	-	0.5372%
Col. River Buoy 10 Sport	-	-	0.1393%	0.0412%	0.0049%	0.1854%
Tillamook Sport	0.0255%	0.2224%	0.0221%	-	-	0.2699%
Tillamook Troll	0.0415%	1.2123%	0.3029%	0.0573%	-	1.6140%
Newport Sport	0.0683%	0.3177%	0.1422%	-	-	0.5282%
Newport Troll	0.3604%	0.7945%	0.2434%	0.0141%	-	1.4125%
Coos Bay Sport	0.0512%	0.0703%	0.0331%	-	-	0.1546%
Coos Bay Troll	0.1178%	0.3903%	0.1212%	0.0078%	-	0.6372%
Brookings Sport	0.0089%	0.0048%	0.0057%	-	-	0.0194%
Brookings Troll	0.0000%	-	0.0012%	-	-	0.0012%
KMZ Sport	0.0084%	-	-	-	-	0.0084%
KMZ Troll	0.0111%	-	-	-	-	0.0111%
Fort Bragg Sport	-	0.0142%	0.0005%	-	-	0.0147%
So Calif. Troll	0.0131%	-	-	-	-	0.0131%
Total	2.4%	18.1%	14.5%	9.1%	14.8%	58.9%

Table A.11. Hoh MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northwest Troll	-	0.0886%	0.0892%	-	-	0.1779%
Southeast Alaska Net	-	-	0.1243%	-	-	0.1243%
BC Northern Net	-	0.1036%	-	-	-	0.1036%
BC Northern Troll	-	0.1930%	0.4225%	0.0341%	-	0.6496%
BC North Central Troll	-	0.5396%	0.0719%	-	-	0.6116%
BC South Central Troll	-	0.2158%	0.0688%	0.1870%	-	0.4715%
Johnstone Strait Sport	-	0.0850%	0.0282%	-	-	0.1132%
Johnstone Strait Troll	-	-	0.0108%	-	-	0.0108%
Johnstone Straits Net	-	-	0.0938%	-	0.0203%	0.1140%
Georgia Straits Troll	-	-	0.0817%	-	-	0.0817%
North Georgia Straits Sport	-	-	-	0.0587%	-	0.0587%
BC Juan de Fuca Net	0.0368%	0.0396%	0.4334%	0.1344%	-	0.6442%
BC Juan de Fuca Sport	-	-	0.0576%	0.1433%	-	0.2009%
West Coast Vanc Is Sport	-	-	0.1841%	-	-	0.1841%
NW Vancouver Island Troll	0.2756%	6.2651%	3.8378%	1.2271%	-	11.6056%
SW Vancouver Island Net	-	-	-	-	0.0442%	0.0442%
SW Vancouver Island Troll	0.2141%	10.2549%	10.0868%	2.7810%	-	23.3367%
WA Area 6 Sport	-	-	-	0.0851%	0.0757%	0.1607%
WA Area 5-6-6C Troll	-	-	0.0010%	-	0.1286%	0.1297%
WA Area 5 Sport	-	0.0430%	0.7864%	0.2982%	0.1886%	1.3161%
WA Area 4B-5-6C Treaty Net	-	0.0140%	0.0518%	0.0151%	0.5291%	0.6100%
WA Area 4B-5-6C NT Net	-	0.0002%	0.0021%	0.0013%	0.0053%	0.0090%
WA Area 10 Non Treaty Net	-	-	-	0.0065%	-	0.0065%
WA Area 10 Treaty Net	-	-	-	0.0038%	-	0.0038%
WA Area 11 Sport	-	-	-	0.0223%	-	0.0223%
WA Area 4/4B Treaty Troll	0.2956%	1.3941%	0.9682%	0.3202%	-	2.9782%
WA Area 4/4B Non-Treaty Troll	0.0030%	0.0898%	0.5588%	0.0846%	-	0.7362%
WA Area 4 Sport	-	0.1349%	0.4446%	0.0321%	-	0.6117%
WA Area 3 Treaty Troll	0.1623%	0.2915%	0.7761%	0.3586%	-	1.5884%
WA Area 3 Sport	-	0.0796%	0.0823%	0.0215%	-	0.1834%
WA Area 3 Non-Treaty Troll	0.1224%	0.0155%	0.2177%	0.2017%	-	0.5573%
Hoh R C&S	-	-	-	-	0.1787%	0.1787%
Hoh R Net	-	-	-	0.6426%	11.7433%	12.3859%
Hoh R Sport	-	-	-	-	0.9671%	0.9671%
Queets R Net	-	-	-	0.0610%	0.1532%	0.2142%
WA Area 2 Treaty Troll	0.0312%	0.4519%	0.3111%	0.1086%	-	0.9028%
WA Area 2 Sport	0.0780%	0.5913%	1.4373%	0.4108%	-	2.5174%
WA Area 2 Non-Treaty Troll	0.0312%	0.1785%	0.3671%	0.0611%	-	0.6380%
Quinault R Net	-	-	-	-	0.0994%	0.0994%
Grays Harbor Estuary Net	-	-	-	-	0.0251%	0.0251%

Table A.11. (Continued) Hoh MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 1 & Astoria Troll	0.0325%	0.2973%	0.7329%	0.1114%	-	1.1740%
WA Area 1 & Astoria Sport	0.0943%	0.4160%	0.2627%	0.0497%	-	0.8227%
Col. River Buoy 10 Sport	-	0.1215%	0.2167%	0.0366%	-	0.3747%
Tillamook Sport	-	0.1105%	0.3064%	-	-	0.4169%
Tillamook Troll	0.0768%	1.5589%	0.3755%	0.0642%	-	2.0754%
Newport Sport	0.0454%	0.5529%	0.2555%	0.0503%	-	0.9041%
Newport Troll	0.2030%	2.3024%	0.5688%	0.0529%	-	3.1271%
Coos Bay Sport	-	0.2541%	0.1146%	0.0269%	-	0.3955%
Coos Bay Troll	0.1080%	0.3954%	0.1302%	0.0128%	-	0.6464%
Brookings Troll	0.0255%	-	-	-	-	0.0255%
Total	1.8%	27.1%	24.6%	7.7%	14.2%	75.3%

Table A.12. Queets MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northwest Troll	-	0.0093%	0.0218%	0.0127%	-	0.0437%
SEAK Southeast Troll	-	-	0.0043%	-	-	0.0043%
Southeast Alaska Net	-	0.0080%	-	-	-	0.0080%
SEAK Southwest Troll	-	0.0601%	0.0184%	-	-	0.0785%
BC Northern Net	-	0.0558%	0.0427%	-	-	0.0985%
BC Northern Troll	-	0.4618%	0.3267%	0.0144%	-	0.8029%
BC North Central Troll	-	0.0270%	0.0884%	0.0114%	-	0.1268%
BC Central Net	-	0.0779%	-	-	-	0.0779%
BC South Central Troll	0.1170%	0.5255%	0.2329%	0.0737%	-	0.9491%
Johnstone Strait Sport	-	0.0152%	0.0245%	-	-	0.0396%
Johnstone Strait Troll	-	0.0065%	-	0.0032%	-	0.0097%
Johnstone Straits Net	-	-	0.1202%	0.0048%	0.0101%	0.1351%
Georgia Straits Troll	-	-	0.0179%	-	-	0.0179%
North Georgia Straits Sport	-	0.0165%	-	-	0.0029%	0.0194%
Fraser R Gill Net	-	-	0.0104%	-	-	0.0104%
BC Juan de Fuca Net	-	0.1042%	0.8901%	0.1407%	-	1.1350%
BC Juan de Fuca Sport	-	0.0617%	0.0798%	0.0509%	-	0.1924%
West Coast Vanc Is Sport	-	0.1697%	0.0841%	0.0289%	-	0.2827%
NW Vancouver Island Troll	0.0974%	4.5224%	4.0802%	0.8836%	-	9.5835%
SW Vancouver Island Net	-	-	-	-	0.0039%	0.0039%
SW Vancouver Island Troll	0.5188%	10.2652%	9.5729%	1.7924%	-	22.1493%
WA Area 7-7A Treaty Net	-	-	-	0.0155%	-	0.0155%
WA Area 7-7A Non-Treaty Net	-	-	-	0.0090%	-	0.0090%
WA Area 7B-7C-7D Treaty Net	-	-	0.0068%	0.0187%	-	0.0255%
WA Area 7B-7C-7D NT Net	-	-	0.0005%	0.0131%	-	0.0136%
WA Area 6 Sport	0.0129%	0.0518%	-	0.0119%	0.0172%	0.0938%
WA Area 5-6-6C Troll	0.0012%	0.0001%	0.0012%	-	0.0003%	0.0028%
WA Area 5 Sport	0.0581%	0.1884%	0.4273%	0.1830%	0.0186%	0.8753%
WA Area 4B-5-6C Treaty Net	-	0.0341%	0.0635%	0.0598%	0.1313%	0.2887%
WA Area 4B-5-6C NT Net	-	0.0006%	0.0026%	0.0052%	0.0013%	0.0097%
WA Area 8 Non-Treaty Net	-	-	-	-	0.0005%	0.0005%
WA Area 8 Treaty Net	-	-	-	-	0.0010%	0.0010%
WA Area 8A Non-Treaty Net	-	-	-	0.0346%	-	0.0346%
WA Area 8A Treaty Net	-	-	-	0.0543%	-	0.0543%
WA Area 9 Sport	0.0175%	-	-	-	-	0.0175%
WA Area 10 Non-Treaty Net	-	-	-	0.0251%	0.0089%	0.0340%
WA Area 10 Sport	-	-	-	-	0.0208%	0.0208%
WA Area 10 Treaty Net	-	-	-	0.0147%	0.0052%	0.0198%
Area 12-12B Hood Canal NT Net	-	-	-	-	0.0298%	0.0298%
Area 12-12B Hood Canal T Net	-	-	-	-	0.0391%	0.0391%

Table A.12. (Continued) Queets MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
WA Area 4/4B Treaty Troll	0.3037%	0.7341%	0.6200%	0.2924%	-	1.9501%
WA Area 4/4B Non-Treaty Troll	0.0031%	0.0473%	0.3578%	0.0772%	-	0.4854%
WA Area 4 Sport	-	0.3074%	0.3221%	0.0262%	-	0.6557%
WA Area 3 Treaty Troll	0.2498%	0.5380%	0.5135%	0.0207%	-	1.3221%
WA Area 3 Sport	0.0064%	0.1251%	0.0491%	0.0253%	-	0.2058%
WA Area 3 Non-Treaty Troll	0.1885%	0.0285%	0.1441%	0.0117%	-	0.3727%
Hoh R Net	-	-	-	0.1867%	0.4229%	0.6096%
Queets R C&S	-	-	-	-	1.0058%	1.0058%
Queets R Net	-	-	0.0569%	3.0130%	5.2796%	8.3495%
Queets R Sport	-	-	-	-	0.9268%	0.9268%
Salmon R Sport	-	-	-	-	0.0281%	0.0281%
Clearwater R Sport	-	-	-	-	0.3684%	0.3684%
WA Area 2 Treaty Troll	0.2306%	0.6893%	0.2591%	0.0677%	-	1.2467%
WA Area 2 Sport	0.2201%	1.6244%	1.5202%	0.7280%	-	4.0926%
WA Area 2 Non-Treaty Troll	0.2306%	0.2724%	0.3057%	0.0381%	-	0.8468%
Quinalt R Net	-	-	0.0216%	0.8317%	1.0139%	1.8672%
Grays Harbor Estuary Net	-	-	-	-	0.1799%	0.1799%
Grays Harbor Sport (2.2)	-	-	0.1633%	0.0230%	-	0.1863%
Willapa Bay & FW Trib Net	-	-	-	0.0046%	-	0.0046%
WA Area 1 & Astoria Troll	0.0368%	0.6421%	0.6590%	0.2409%	0.0253%	1.6042%
WA Area 1 & Astoria Sport	0.1245%	0.7673%	0.7257%	0.0858%	-	1.7034%
Col. River Buoy 10 Sport	-	0.2038%	0.4837%	0.0510%	0.0131%	0.7516%
Tillamook Sport	0.0398%	0.4039%	0.3932%	0.0371%	-	0.8740%
Tillamook Troll	0.1116%	2.2614%	0.8306%	0.0881%	-	3.2917%
Newport Sport	0.1869%	0.7099%	0.4243%	0.0365%	-	1.3576%
Newport Troll	0.4932%	1.7575%	0.6574%	0.0323%	-	2.9404%
Coos Bay Sport	0.1045%	0.6461%	0.2335%	-	-	0.9841%
Coos Bay Troll	0.2222%	0.5752%	0.2116%	0.0107%	-	1.0197%
Brookings Sport	0.0221%	-	0.0172%	-	-	0.0392%
Brookings Troll	0.0000%	-	0.0007%	-	-	0.0007%
KMZ Sport	0.0131%	-	-	-	-	0.0131%
KMZ Troll	0.0298%	-	-	-	-	0.0298%
Fort Bragg Sport	-	0.0249%	0.0004%	-	-	0.0253%
Fort Bragg Troll	0.0083%	-	-	-	-	0.0083%
Total	3.6%	29.0%	25.1%	9.4%	9.6%	76.7%

Table A.13. Grays Harbor MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
SEAK Northeast Troll	-	-	0.0076%	-	-	0.0076%
SEAK Northwest Troll	-	0.0177%	0.0971%	0.0418%	-	0.1567%
SEAK Southeast Troll	-	0.0054%	0.0228%	-	-	0.0282%
Southeast Alaska Net	-	0.0107%	0.0949%	-	-	0.1056%
SEAK Southwest Troll	-	0.0136%	0.0521%	0.0029%	-	0.0686%
BC Northern Net	-	0.0373%	0.0226%	-	-	0.0599%
BC Northern Sport	-	-	0.0067%	0.0011%	-	0.0078%
BC Northern Troll	-	0.2132%	0.3906%	0.1402%	-	0.7439%
BC North Central Troll	-	0.3395%	0.0290%	0.0085%	-	0.3770%
BC Central Net	-	0.0768%	-	-	-	0.0768%
BC Central Sport	-	-	0.0043%	-	-	0.0043%
BC South Central Troll	0.0927%	0.4856%	0.2374%	0.0712%	-	0.8869%
Johnstone Strait Sport	-	0.0080%	0.0208%	-	-	0.0288%
Johnstone Strait Troll	-	0.0008%	0.0052%	0.0029%	-	0.0089%
Johnstone Straits Net	-	-	0.1345%	0.0229%	0.0096%	0.1670%
Georgia Straits Troll	-	0.0107%	-	-	-	0.0107%
North Georgia Straits Sport	0.0070%	-	-	0.0216%	-	0.0286%
South Georgia Straits Sport	-	0.0133%	-	-	-	0.0133%
Fraser R Gill Net	-	-	0.0093%	-	-	0.0093%
BC Juan de Fuca Net	0.0037%	0.0820%	0.3266%	0.0778%	-	0.4902%
BC Juan de Fuca Sport	-	-	0.0277%	0.0347%	0.0710%	0.1334%
West Coast Vanc Is Sport	0.1748%	0.0331%	0.0161%	0.0166%	-	0.2406%
NW Vancouver Island Troll	0.2278%	2.7563%	2.5035%	1.1229%	-	6.6105%
SW Vancouver Island Net	-	-	-	0.0118%	0.0118%	0.0236%
SW Vancouver Island Troll	0.4225%	6.2081%	4.8875%	1.0087%	-	12.5267%
WA Area 7-7A Treaty Net	-	-	-	0.0047%	0.0057%	0.0105%
WA Area 7-7A Non-Treaty Net	-	-	-	0.0027%	0.0029%	0.0057%
WA Area 6 Sport	-	0.0005%	0.0047%	0.0020%	0.0047%	0.0119%
WA Area 5-6-6C Troll	-	0.0004%	0.0010%	0.0032%	0.0111%	0.0157%
WA Area 5 Sport	0.0075%	0.0266%	0.1668%	0.1650%	0.0694%	0.4353%
WA Area 4B-5-6C Treaty Net	-	0.0490%	0.0288%	0.0056%	0.1392%	0.2227%
WA Area 4B-5-6C NT Net	-	0.0009%	0.0012%	0.0005%	0.0014%	0.0039%
WA Area 10 Non-Treaty Net	-	-	-	0.0147%	0.0045%	0.0191%
WA Area 10 Treaty Net	-	-	-	0.0086%	0.0026%	0.0112%
WA Area 11 Non-Treaty Net	-	-	-	-	0.0051%	0.0051%
WA Area 11 Treaty Net	-	-	-	-	0.0006%	0.0006%
WA Area 4/4B Treaty Troll	0.0487%	0.1862%	0.3916%	0.5917%	0.0211%	1.2393%
WA Area 4/4B Non-Treaty Troll	0.0005%	0.0120%	0.2260%	0.1563%	0.0034%	0.3982%
WA Area 4 Sport	-	0.0557%	0.0862%	0.0244%	-	0.1662%
WA Area 3 Treaty Troll	0.0457%	0.0697%	0.1491%	0.0844%	-	0.3489%
WA Area 3 Sport	-	0.0091%	0.0245%	0.0022%	-	0.0357%
WA Area 3 Non-Treaty Troll	0.0344%	0.0037%	0.0418%	0.0475%	-	0.1275%
Hoh R Net	-	-	-	0.0008%	-	0.0008%

Table A.13. (Continued) Grays Harbor MU average annual and time period specific exploitation rate used in the current FRAM base period.

Fishery	Time Period					Total
	Jan-Jun	Jul	Aug	Sept	Oct-Dec	
Queets R Net	-	-	-	0.0034%	0.0040%	0.0074%
WA Area 2 Treaty Troll	0.0208%	0.1136%	0.1392%	0.0740%	-	0.3476%
WA Area 2 Sport	0.0186%	0.2659%	0.8040%	1.7710%	-	2.8596%
WA Area 2 Non-Treaty Troll	0.0208%	0.0449%	0.1643%	0.0416%	-	0.2716%
Quinalt R Net	-	-	-	0.0089%	0.0929%	0.1019%
Grays Harbor Estuary Net	0.0849%	-	-	0.6296%	6.5158%	7.2303%
Grays Harbor Sport (2.2)	-	-	0.0436%	0.5468%	0.1727%	0.7631%
Chehalis R Sport	-	-	-	-	0.9801%	0.9801%
Hoquiam R Sport	-	-	-	-	0.0727%	0.0727%
Humtulpis R Net	-	-	-	-	3.1452%	3.1452%
Humtulpis R Sport	-	-	-	-	0.4934%	0.4934%
Lower Chehalis R Net	-	-	-	0.4594%	11.3545%	11.8139%
Upper Chehalis R Net	-	-	-	-	1.2652%	1.2652%
Satsop R Sport	-	-	-	-	0.8113%	0.8113%
Wishkah R Sport	-	-	-	-	0.1421%	0.1421%
Wynoochee R Sport	-	-	-	-	0.1592%	0.1592%
Willapa Bay & FW Trib Net	-	-	-	0.1838%	0.4689%	0.6527%
WA Area 1 & Astoria Troll	0.0153%	0.1209%	0.3816%	0.6067%	0.0698%	1.1943%
WA Area 1 & Astoria Sport	0.0141%	0.2616%	0.3666%	0.0930%	-	0.7353%
Col. River Buoy 10 Sport	-	0.0825%	0.1780%	0.0987%	-	0.3593%
Tillamook Sport	0.0106%	0.1152%	0.2010%	0.0625%	-	0.3893%
Tillamook Troll	0.0175%	0.5216%	0.5377%	0.0593%	-	1.1360%
Newport Sport	0.0524%	0.2295%	0.2975%	0.0268%	-	0.6062%
Newport Troll	0.0733%	0.5768%	0.2405%	0.0235%	-	0.9142%
Coos Bay Sport	0.0170%	0.1588%	0.0905%	0.0223%	-	0.2886%
Coos Bay Troll	0.0847%	0.2955%	0.0945%	0.0192%	-	0.4938%
Brookings Sport	0.0029%	0.0041%	0.0119%	-	-	0.0190%
Brookings Troll	0.0119%	0.0111%	0.0047%	-	-	0.0276%
KMZ Sport	0.0009%	-	-	-	-	0.0009%
KMZ Troll	-	-	0.0016%	-	-	0.0016%
Fort Bragg Troll	0.0015%	0.0007%	-	-	-	0.0022%
Total	1.5%	13.5%	13.6%	8.4%	26.1%	63.2%

Appendix B. Coded-Wire-Tag Groups Chosen to Represent Mixed-Stock Model (MSM) Stocks Used to Create the Coho FRAM Base Period, Catch Years 1986-1997.

Table B.1. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
Lower Fraser						
	022211	022851	022851	023938	024640	020834
	022450	022924	023138	023947	024649	020835
	022462	022927	023216	023949	024650	020836
	022542	022930	023450	023950	024820	024649
	022606	023004	023457	024632	024832	025236
	022607	023035	023458	024851	025033	025237
	022609	023139	023506	024852	025036	025238
	022614	023140	023938	024853	025038	025725
	022627	023141	023939	024854	025137	025932
	022721	023216	023940	024855	025138	025933
	022832	023420	023941	024938	025139	025934
	022907	023448	023944	025033	025140	025935
	022908	023449	023945	025034	025141	025936
	022909	023450	023946	025035	025725	025937
	022924	023451	023947	025036	026322	025938
	022925	023457	023948	025037		025939
	022926	023458	023949	025038		025940
	022927	023459	023950	025039		025945
	022928	023460	023951	025113		025946
	022929	023461	023952	025114		025947
	022930	023462	023953			026322
	022942	023463	023954			
	022947	023506	023955			
	022948	023811	023956			
	022956	023812	420121			
	022961	023813				
	023003	023814				
	023004	023816				
	023005	420121				
	023420					
Interior Fraser						
	022461	022752	022856	023106	024322	020721
	022630	022829	023047	023647	024328	024808
	022828	022842	023104	023649	024602	025242
	022829	022848	023106	023650	024608	025243
	022830	022856	023148	024005	024609	025244
	022842	023045	023227	024010	024807	025245
	022848	023046	023263	024039	024808	025307

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Interior Fraser (continued)</i>						
	022850	023047	023301	024040	024848	025308
	023045	023058	023309	024044	024849	025309
	023046	023102	023331	024046	024850	025403
	023301	023104	023413	024054	024907	025558
	023331	023110	023646	024132	024932	025726
	023332	023114	023647	024133	025040	025727
		023118	023648	024134	025058	025728
		023148	023649	024137	025059	025730
		023163	023650	024147	025127	025860
		023263	023715	024148	025128	025861
		023301	023850	024232	025129	025862
		023309	023851	024322	025403	025863
		023331	023914	024328	025404	025903
		023332	023922	024329	025405	025905
		023413	023935	024330	025406	025911
		023649	023936	024343	025412	026012
		023715	023937	024344	025413	026013
		023851	024004	024508	025414	026024
		023922	024005	024602	025433	026025
		024010	024006	024603	025434	026026
		024011	024008	024604	025454	026027
		024012	024009	024608	025506	026037
			024010	024609	025513	026038
			024011	024708	025860	026335
			024012	024709	025861	026336
			024039	024823	025862	026338
			024040	024907	025863	
			024043	024930		
			024044	024931		
			024045	024932		
			024046	024933		
			024053	025032		
			024054	025403		
			024137	025404		
			024322			
			024343			
			024608			
			024609			
<i>Strait of Georgia Mainland</i>						
	022445	022445	022854	023115	024417	021018
	022502	022811	023115	023958	024418	021116
	022629	022854	023447	024116	024548	025051

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Strait of Georgia Mainland (continued)</i>						
	022640	022862	023452	024117	024713	025052
	022641	022935	023455	024242	024903	025053
	022642	023061	023456	024243	025051	025057
	022649	023062	023817	024246	025052	025918
	022651	023137	023818	024417	025053	025919
	022808	023339	023942	024418	025055	025920
	022809	023340	023943	024439	025056	025921
	022810	023447	023957	024548	025057	026130
	022811	023452	023958	024713	025116	026131
	022845	023453	023959	024903	025455	026132
	022853	023454	024116	024904	025553	026140
	022862	023455	024117	024905	025554	026141
	022932	023456	024118	024906	025633	026142
	022933	023518	024242	024927	025634	026143
	022934	023817	024243	025115	025636	026144
	022935	023818	024246	025116	025639	026207
	022936	023819	082409	025117		026208
	023008	023820	420122	025118		026251
	023009	023821				
	023056	023943				
	023061	082250				
	023062	082409				
	023137	420122				
	082250					
<i>Strait of Georgia Vancouver Island</i>						
	022455	022801	023152	023530	024621	020138
	022456	022904	023154	023532	024719	020254
	022644	022905	023156	023534	025234	020255
	022645	022906	023233	023915	025235	020811
	022723	023120	023446	023916	025321	020812
	022762	023121	023530	023918	025323	020840
	022763	023152	023532	024125	025415	020841
	022801	023153	023533	024628	025443	025136
	022902	023154	023534	024629	025444	025239
	022903	023155	023655	024630	025445	025321
	022904	023156	023815	024631	025501	025322
	022905	023231	023825	024638	025502	025323
	022906	023232	023915	024639	025508	025416
	022912	023233	023916	024717	025724	025729
	022913	023443	023918	024719	081606	025941
	022914	023444	023919	024721	081609	025942
	022915	023445	023920	025102	081610	025943

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Strait of Georgia Vancouver Island (continued)</i>						
	022943	023446	023921	025111	081611	025949
	022944	023530	024058	025112	082454	025950
	022945	023712	024060	025443	082459	025951
	022946	023815	024124	025444	082463	025952
	022957	023823	024125	025445	082505	026238
	022958	023824	024126	082429	082507	026355
	022959	023825	024130	082431	082511	026356
	022960	023841	024131	082435	082513	081607
	023119	023918	024144	082436	082514	081608
	023120	023919	024145	082437	082516	082463
	023121	023920	024146	082438	082613	082650
	023155	024058	024149	082439	082617	082651
	023231	024060	024150	082440	082618	082652
	023233	081602*1	024151	082441	082620	082653
	082252	081603*1	024440	082442	082623	082654
		081604*1	024441	082443	082628	082655
		082407	024442	082446	082631	082656
			024443	082447	082638	082658
			024638	082448	082639	082660
			024717	082449	082640	082661
			024719	082450	082641	082662
			024721	082451	082642	082663
			081602*1	082459	082643	082703
			082411	082460	082644	082704
			082421	082461	082645	082705
			082422	082462	082646	082706
			082423	082503		082708
			082424			082709
			082425			082711
			082426			082712
			082427			082713
			082429			082714
			082431			082720
			082432			082721
			082438			082722
						082723
						082724
						082725
						082726

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Skagit</i>						
	211703	211702	211804	212508	212521	211838
	211704	211731	212132	212659	213162	211839
	211705	211732	212135	212661	213201	211840
	632755	211758	212137	212662	213202	211841
	632756	420119	212138	212801	213242	211842
	632757	633149	212141	212802	213244	211843
	632758	633150	212142	212804	630149	211852
	633154	633151	212238	212807	630216	213247
	633155	633206	633622	212808	630219	213249
		633207	633623	212811	630221	213502
		633603	633651	212813	630222	213504
		633604	633652	633711	635055	213707
		633605	633653	633712	635056	630747
			633654	633713	635522	631425
			634225	633717	635525	631426
				633916		631428
				634711		631431
				634713		
				634928		
<i>Stillaguamish/Snohomish</i>						
	211634	211662	211927	212261	212531	213149
	633051	211663	211930	212631	213208	631147
	633141	211701	211942	212632	213211	
	633203	211922	212144	212635	213213	
	633429	211923	212147	212637	213214	
	633430	211924	212149	212638	213216	
		211925	212150	212641	213219	
		211926	212152	212642	213221	
		211928	212155	212644	213222	
		211929	212156	212647	213225	
		211931	212159	212649	213226	
		633618	212161	212650	213228	
		633619	212162	212652	213231	
		633620	212201	212655	213232	
		634142	212202	212656	213235	
			212241	634701	630155	
			212242	633337	635519	
			212244			
			212247			
			212249			
			634228			

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Hood Canal</i>						
	632751	211909	212225	212814	052107	052253
	632752	633355	633361	633718	052108	052254
	632832	633356	633617	633719	052111	052255
	632833	633357	633621	633720	211729	213150
	633034	633358	634226	634231	630159	630438
		633359	634241	635041	630432	631141
		633360			634761	631142
		633614				631144
		633615				633312
		633616				
		634144				
<i>U.S. Strait of Juan de Fuca</i>						
	B10408	211913	211941	212256	211728	213159
	B10409	211914	212222	212821	212532	631321
	B10410		212226	634728	213237	
	B10411			634731	213238	
	B10412				213514	
	B10414					
	B10415					
	B10508					
	B10509					
	B10510					
<i>Quillayute</i>						
	633255	633052	633549	633861	634762	211844
	633256	633053	633550	633862	635511	630459
	633257	633136	633551	634232		
	633258	633137	633552	634235		
	633417	633441	633553	634444		
	633418	633839	633554	634456		
			633555	634459		
			633556	635025		
			633557			
			633558			
			633559			
			634244			

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Hoh</i>						
	211638	211736	211735	211813	213250	213516
	211639	211737	211762	211814	213252	
	211640	211738	211763	211815	634904	
		632511	211801	211816	634907	
			211802	211817	634908	
			211803	212837		
			211811	633858		
			211812	633859		
				633906		
				634154		
				634237		
				634428		
<i>Queets</i>						
	211642	211719	211955	212252	212562	211655
	211643	211743	211956	212255	212601	211848
	211648	211744	212104	212514	212602	211849
	211710	211747	212107	212516	212604	211851
	211711	211748	212111	212559	212849	213114
	211713	211749	212113	212561	212850	213508
	211714	211750	212114	212608	212856	213511
	211715	211751	212116	212611	212859	213513
	211718	211752	212119	212613	212861	213531
		211753	212121	212614	212862	213537
		211754	212122	212616	213101	213538
		211755	212125	212619	213102	213542
		211757	212126	212621	213104	213544
		211933	212237	212622	213107	213547
			212250	212625	213108	213549
			632512	212626	213111	213550
			633245	212831	213113	213552
				212832	213116	213555
				634461	213119	213556
				634462	213122	213561
					213125	213562
					213126	213701
					213128	213702
					213131	
					213259	
					213261	
					213507	
					635513	
					635514	

Table B.1. (Continued) Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1986-1991.

MSM Stock	Catch Year					
	1986	1987	1988	1989	1990	1991
<i>Grays Harbor</i>						
	632817	633138	633110	634449	630252	630259
	632818	633139	633655	634452	630428	630437
	632819	633163	633656	634901	634749	630721
	632823	633201	633657	635021	635255	630728
	632824	633540	633660	635022	635521	630752
	632825	633541	633661	635032		630816
	632826	633542	633662			630828
	632827	634131	634238			630831
	632828	634137	634425			630832
	632829	634141	634426			630837
	632830		634438			631335
	632831					631337
	633010					631338
	633035					631341
	633209					631342
	633345					631344
	633346					631438
	633347					
	633348					
	633423					
	633424					
	633425					
	633443					
	633444					

Table B.2. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1992-1997.

MSM Stock	Catch Year					
	1992	1993	1994	1995	1996	1997
<i>Lower Fraser</i>						
	020158	020229	020134	180652	082909	023245
	020160	020551	020135	180653	181555	181308
	020218	020917	026352	180654	181760	181309
	020219	020919	026353	180655	181761	182112
	020220	020920	180136	180656	181801	182113
	020221	020921	180157	180657	181802	182114
	020228	021412	180158	180659	181844	182301
	020318	021413	180646	180660	181845	182302
	020544	021414	180647	180661	181846	182305
	020849	180113	180648	180662	181847	182431
	020850	180118	180939	180663	181848	182601
	020851	180119	180940	181616	181849	182603
			180941	181617	181850	
			180942	181619	181851	
			180943	181627	181854	
				181628	181855	
				181635	181962	
				181636	181963	
				181637	182001	
					182002	
					182003	
<i>Interior Fraser</i>						
	020651	020745	020510	020137	021103	181257
	020718	020761	020862	021338	025948	181262
	020719	020762	020931	021339	181249	181263
	020720	020852	020932	021447	181254	181301
	020721	020853	020933	025926	181255	181513
	020722	020854	020934	180649	181310	182243
	020723	020855	021047	180650	181559	182244
	020724	020856	180126	180952	181639	
	020725	020857	180205	180953	181757	
	020726	020858		181207	181758	
	020737	020859		181219	181852	
	025953	020860		181220		
	025954	021538				
	025955	021539				
	026218	180257				
	026219	180258				
	026220	180307				
	026221	180308				
	026222	180331				
	026223					
	026224					

Table B.2. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1992-1997.

MSM Stock	Catch Year					
	1992	1993	1994	1995	1996	1997
<i>Interior Fraser (continued)</i>						
	026225					
	026226					
	026227					
	026335					
	026336					
	026337					
	026338					
<i>Strait of Georgia Mainland</i>						
	020617	021046	021046	180757	180720	181134
	021018	021124	021311	180758	181107	181302
	021027	021125	021351	180759	181108	181303
	021028	021126	021353	180760	181638	181806
	021111	021219	021354	180944	181743	182101
	021116	021224	025213	180945	181744	182102
	021117	180101	025214	181601	181745	182103
	026162	180102	180128	181602	181806	182104
	026207	180103	180129	181603	181958	182107
	026208	180104	180130	181604	181959	182108
	026228	180109	180131	181605	181960	
	026229	180110	180604	181606	181961	
	026230	180111	180739	181607	182101	
	026233	180112	180740	181608	182102	
	026360	180237	180741	181609	182103	
	026361	180238	180742	181610	182104	
	026362					
	026363					
<i>Strait of Georgia Vancouver Island</i>						
	020812	021008	020839	080145	080150	080813
	021019	021040	080141	080147	080707	080814
	021020	021151	080142	080148	080810	181940
	021021	021225	080143	080149	080811	181941
	021023	021226	080144	080154	080812	181942
	021024	021227	080145	080155	080813	181943
	021025	080123	080147	080156	181251	182012
	021026	080134	080148	080157	181252	182013
	021040	080142	080149	080158	181253	182054
	021152	081007	080156	080160	181747	182109
	026154	081008	080159	080810	182004	182110
	026201	081009	081834	080812	182005	
	026202	081010	081835	180736	182006	
	026203	081011	081836	180737	182007	

Table B.2. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1992-1997.

MSM Stock	Catch Year					
	1992	1993	1994	1995	1996	1997
<i>Strait of Georgia Vancouver Island (continued)</i>						
	080804	081832	180127	180946	182008	
	081001	081833	180559	180947	182009	
	081002	081834	180560	180948	182010	
	081003	081836	180724	181618	182011	
	081004	180114	181003	181620		
	081005	180115	181004	181621		
	081006	180116		181624		
	081007	180117		181625		
	081008	180120		181626		
	081009	180121		181634		
	081010	180122		181746		
	081011	180123		182005		
	082715			182006		
	082717					
	180120					
	180121					
	180122					
	180123					
<i>Skagit</i>						
	212008	212036	212151	212148	635130	635909
	212009	212038	212312	634910	635254	635910
	212033	212041	212313	635128	635345	635927
	212034	212063	212316	635401	635745	635946
	212035	212103	212318			
	212037	212140	212319			
	212039	212143	212320			
	212040	212145	634715			
	631355	634536	634717			
	634011		634820			
			634846			
<i>Stillaguamish/Snohomish</i>						
	211824	212023	212022	212333	212224	212633
	631362	634436	212301	634958	212534	212926
			634804		212536	212927
					635453	212928
						212929
						635735
						635811
<i>Hood Canal</i>						
	052451	052613	052450	053418	053746	054058
	052452	052614	052910	053419	053747	054059
	052453	052615	052911	053420	053748	054060

Table B.2. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1992-1997.

MSM Stock	Catch Year					
	1992	1993	1994	1995	1996	1997
<i>Hood Canal (continued)</i>						
	211823	211825	053140	212334	053749	054061
	633934	634018	634445	634963	212458	212460
	633935	634352	634828	635304	635455	634334
	633936	634415		635658	635744	635653
	633937	634439		635660		635818
	634310	634650				
<i>U.S. Strait of Juan de Fuca</i>						
	211858	212047	212220	212406	212423	212454
	633340	634302	634821	212409	212458	212460
	634316		634822	212410	212510	212620
	634317					
<i>Quillayute</i>						
	211854	212050	212304	212422	635337	635854
	211855	212248	212405	635333		
		634230	634729			
<i>Hoh</i>						
	213516	212050	212304	212422	635337	635854
	631322	212248	212405			
	631325					
	631416					
<i>Queets</i>						
	211936	212056	B50814	212415	212543	212935
	212007	212057				
	211943	212031	212336	212346	212433	212846
	211945	212032	212338	212352	212438	212901
	211946	212105	212341	212353	212443	212904
	211948	212109	212342	212354	212445	212906
	211951	212110	212343	212356	212446	212908
	211953	212112	212345	212357	212447	212909
	211954	212118	212347	212358	212448	212912
	211957	212123	212348	212360	212848	212915
	211958	212124		212361	212851	212916
	211960	212127		212362	212853	213005
	211963	212129		212363	212854	213006
	212001	212130		212430	212857	213007
	212002	212133		212431	212863	213008
	212003	212134		212434	212902	213009
	212004	212136		212435	212903	213010
	212005	212139		212436	212905	213011
	212030			212440	212913	213012
	213541			212442		213014
						213015

Table B.2. Coded-wire-tag groups chosen to represent Mixed-Stock Model (MSM) stocks for catch years 1992-1997.

MSM Stock	Catch Year					
	1992	1993	1994	1995	1996	1997
<i>Queets (continued)</i>						
	633925	634524	633732	212417	212512	212523
		634525	634410	212418	212515	212932
				212419	212517	
				212420	212518	
					212520	
					212524	
<i>Grays Harbor</i>						
	633403	634258	634712	634753	635115	635430
	633917	634307	634718	634906	635116	635456
	633918	634308	634733	635060	635403	635746
	633919	634345	634734	635102	635404	635747
	633920	634346	634808	635103	635447	635803
	633921	634347	634809	635212	635503	635804
	633942	634348	634829	635215	635505	635853
	633943	634349	634838	635402	635636	635929
	633946	634350	634839	635411	635726	635933
	633947	634359		635412	635727	635945
	633961	634360			635743	635954
	634009	634453				636010
	634010	634454				
	634033	634532				
	634157					

This page left intentionally blank

Appendix C. Double Index Tag Release Groups for Each Management Unit, Brood Years 1995-2008.

Table C.1. Hatchery double index tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each southern B.C. Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Stock	Brood Year	DIT Group ID	# Released		Release λ
			Marked	Unmarked	
Lower Fraser Management Unit					
Chilliwack	1996	031998H00000365	37,282	38,316	1.03
	1997	031999H00000364	44,418	43,624	0.98
	1998	032000H00000363	36,976	37,406	1.01
	1999	032001H00000362	42,795	42,643	1.00
	2000	032002H00000361	38,726	38,821	1.00
	2001	032003H00000360	35,162	35,207	1.00
	2002	032004H00000370	35,923	31,851	0.89
	Discontinued				
Inch Creek	1996	031998H00000779	41,918	43,569	1.04
	1997	031999H00000780	40,206	40,300	1.00
	1998	032000H00000781	40,201	40,098	1.00
	1999	032001H00000782	39,911	40,090	1.00
	2000	032002H00000783	39,998	40,157	1.00
	2001	032003H00000789	39,819	39,509	0.99
	2002	032004H00000784	39,595	39,709	1.00
	2003	032005H00000778	39,986	39,986	1.00
	2004	032006H00000788	39,724	40,058	1.01
	2005	032007H00000786	39,035	39,270	1.01
	2006	032008H00000792	40,117	40,117	1.00
	2007	032009H00000785	40,306	40,235	1.00
	2008	032010H00002485	39,197	39,161	1.00
Interior Fraser Management Unit					
Coldwater (Spius Creek Hatchery)	1997	031998H00001939	26,816	26,306	0.98
		031999H00002487	9,215	12,006	1.30
	1998	031999H00001940	33,805	34,719	1.03
		032000H00001938	36,313	36,957	1.02
	1999	032001H00001979	36,590	38,193	1.04
	2000	032002H00001978	39,490	31,303	0.79
	2001	032003H00001977	35,838	39,524	1.10
	2002	032004H00001976	42,530	42,442	1.00
		Discontinued			

Table C.1. (Continued) Hatchery double index tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each southern B.C. Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Hatchery/Net Pen	Brood Year	Group ID	# Released		Release λ
			Marked	Unmarked	
Strait of Georgia Mainland Management Unit					
-	-	-	-	-	-
Strait of Georgia Vancouver Island Management Unit					
Quinsam River	1996	031998H00001462	39,813	40,078	1.01
	1997	031999H00001463	39,322	39,955	1.02
	1998	032000H00001464	42,352	41,485	0.98
	1999	032001H00001465	42,996	43,160	1.00
	2000	032002H00001466	42,665	42,972	1.01
	2001	032003H00001473	42,914	53,886	1.26
	2002	032004H00001467	65,085	43,456	0.67
	2003	032005H00001460	37,998	59,725	1.57
	2004	032006H00001468	32,742	32,755	1.00
	2005	032007H00001469	32,956	34,431	1.04
	2006	032008H00001470	44,270	43,813	0.99
	2007	032009H00001471	44,600	45,030	1.01
	2008	032010H00002484	43,394	43,990	1.01
Big Qualicum	1996	031998H00000047	40,331	41,355	1.03
	1997	031999H00000056	37,806	40,367	1.07
	1998	032000H00002364	40,836	41,657	1.02
	1999	032001H00000048	40,596	40,211	0.99
	2000	032002H00000037	41,978	41,260	0.98
	2001	032003H00000049	42,566	42,471	1.00
	2002	032004H00000050	38,940	37,275	0.96
	Discontinued				
Goldstream River	1996	031998H00000699	29,912	29,910	1.00
	1997	031999H00000706	29,825	30,203	1.01
	1998	032000H00000708	30,095	30,179	1.00
	1999	032001H00000705	30,004	30,213	1.01
	2000	032002H00000704	19,556	19,874	1.02
	2001	032003H00000703	19,346	19,664	1.02
	2002	032004H00000702	20,176	19,893	0.99
	Discontinued				

Table C.2. Hatchery Double Index Tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each U.S. Inside Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Hatchery/Net Pen	Brood Year	Group ID	# Released		Release
			Marked	Unmarked	λ
Skagit Management Unit					
Marblemount H.	1995	0419970301	42,489	42,566	1.00
	1996	0419970321	43,347	45,089	1.04
	1997	0419970336	42,298	41,907	0.99
	1998	0419970304	40,398	40,525	1.00
	1999	0420012077	45,831	45,052	0.98
	2000	0419970316	32,226	32,892	1.02
		0420011019	10,777	10,988	1.02
	2001	0420031080	40,974	32,421	0.79
	2002	0419970337	39,634	42,726	1.08
	2003	0420051022	46,348	46,823	1.01
	2004	0420061062	47,305	41,300	0.87
	2005	0420071076	43,100	43,575	1.01
	2006	0420081101	47,072	47,206	1.00
	2007	0420091219	44,174	44,604	1.01
	2008	0420101210	43,359	43,568	1.00
Stillaguamish & Snohomish Management Units					
Wallace River	1996	0419970362	46,251	45,718	0.99
	1997	0419991331	45,004	45,091	1.00
	1998	0420001009	20,665	23,049	1.12
		0420001014	22,346	22,524	1.01
	1999	0419991050	47,762	42,852	0.90
	2000	0420051047	39,558	39,344	0.99
	2001	0419970360	39,607	43,640	1.10
	2002	0420041051	46,452	46,659	1.00
	2003	0420051068	43,217	43,575	1.01
	2004	0420061054	30,182	30,300	1.00
	2005	0420021031	46,804	48,378	1.03
	2006	0420081005	44,693	45,883	1.03
	2007	0420081118	45,603	45,311	0.99
	2008	0420101217	42,319	42,076	0.99

Table C.2. (Continued) Hatchery Double Index Tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each U.S. Inside Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Hatchery/Net Pen	Brood Year	Group ID	# Released		Release λ
			Marked	Unmarked	
<i>Hood Canal Management Unit</i>					
Port Gamble Bay Pens	1996	1419989004	50,017	49,500	0.99
	1997	141999D105	49,420	52,593	1.06
	1998	142000DI03	49,346	49,077	0.99
	1999	142001DI05	44,146	45,375	1.03
	2000	142002DI05	44,707	45,664	1.02
	2001	142003DI05	44,779	45,159	1.01
	2002	142004DI04	45,343	45,397	1.00
	2003	142005DI04	43,342	43,110	0.99
	Discontinued				
Quilcene Bay Pens	1996	1419989006	42,377	44,859	1.06
	1997	141999D102	48,875	45,788	0.94
	1998	142000DI06	48,023	48,640	1.01
	2000	142002DI04	46,542	45,880	0.99
	2001	142003DI04	23,000	20,000	0.87
Discontinued					
Quilcene NFH	1996	071998WC15	45,411	40,861	0.90
	1997	071999WC35B2	12,570	11,736	0.93
		071999WC35B5	12,234	11,305	0.92
		071999WC35B8	11,789	11,451	0.97
		071999WC35D7	11,820	11,743	0.99
	1998	072000WC50B3	12,031	11,602	0.96
		072000WC50B5	12,061	10,843	0.90
		072000WC50B7	11,978	9,900	0.83
		072000WC50D5	12,123	12,271	1.01
	1999	072001WC25B3	12,468	9,387	0.75
		072001WC25B5	10,611	12,971	1.22
		072001WC25B7	11,113	9,020	0.81
		072001WC25D5	12,077	10,551	0.87
	2000	072002WC80B3	12,564	12,435	0.99
		072002WC80B5	11,659	11,863	1.02
		072002WC80B8	12,596	11,870	0.94
		072002WC80D6	12,494	12,625	1.01
	2001	072003UILB40440	11,449	12,790	1.12
		072003UILB60440	11,640	12,017	1.03
		072003UILB80440	12,148	12,158	1.00
	2002	0720040500	43,113	45,081	1.05

Table C.2. (Continued) Hatchery Double Index Tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each U.S. Inside Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Hatchery/Net Pen	Brood Year	Group ID	# Released		Release λ
			Marked	Unmarked	
<i>Hood Canal Management Unit (Continued)</i>					
Quilcene NFH (Continued)	2003	072005QL550B2	11,221	11,145	0.99
		072005QL550B4	10,143	10,117	1.00
		072005QL550B7	10,404	10,272	0.99
		072005QL550D6	9,239	7,043	0.76
	2004	0720060600	47,794	49,091	1.03
	2005	0720070635	41,580	40,529	0.97
	2006	0720080680	34,139	34,347	1.01
	2007	0720090775	36,467	38,948	1.07
George Adams H.	1995	0419971601	45,067	45,242	1.00
	1996	-			
	1997	0419970308	22,281	22,312	1.00
		0419970312	20,817	21,728	1.04
	1998	0420001036	42,495	41,288	0.97
	1999	0420011049	49,403	51,405	1.04
	2000	0420011053	43,687	43,518	1.00
	2001	0419970343	44,099	43,644	0.99
	2002	0420041019	43,678	43,881	1.00
	2003	0420051019	41,584	41,626	1.00
	2004	0420061058	44,965	44,879	1.00
	2005	0420062004	43,785	43,193	0.99
	2006	0420081006	45,482	53,098	1.17
	2007	0420081121	45,669	45,669	1.00
	2008	0420101215	44,615	45,371	1.02
<i>Strait of Juan de Fuca Management Unit</i>					
Lower Elwha	1995	1419979001	78,150	72,909	0.93
	1996	1419989002	78,862	75,203	0.95
	1997	141999D103	74,940	77,378	1.03
	1998	142000DI04	79,438	76,733	0.97
	1999	142001DI06	62,465	61,865	0.99
	2000	142002DI06	70,742	71,362	1.01
	2001	142003DI06	72,867	73,722	1.01
	2002	142004DI05	74,683	75,185	1.01
	2003	142005DI05	63,274	51,084	0.81
	2004	142006D104	77,661	78,779	1.01
	2005	142007D1004	76,159	76,246	1.00
	2006	142008D1001	78,303	79,887	1.02
	2007	142009000005	78,972	79,013	1.00
	2008	142010elwha0	79,575	79,897	1.00

Table C.3. Hatchery Double Index Tag (DIT) release groups, showing unmarked-to-marked ratio (λ) at release for each U.S. Outside Management Unit, for 1995-2008 broods. (RMIS data pull 2/9/2011)

Hatchery/Net Pen	Brood Year	Group ID	# Released		Release λ
			Marked	Unmarked	
Quillayute Management Unit					
-	-	-	-	-	-
Hoh Management Unit					
-	-	-	-	-	-
Queets Management Unit					
Salmon River	1995	1419979002	98,204	71,275	0.73
	1996	1419989003	73,905	98,473	1.33
	1997	141999D104	72,236	68,208	0.94
	1998	142000DI05	68,440	72,008	1.05
	1999	142001DI07	69,441	72,796	1.05
	2000	142002DI07	72,257	71,602	0.99
	2001	142003DI07	72,882	73,408	1.01
	2002	142004DI06	74,207	74,440	1.00
	2003	142005DI06	70,869	74,130	1.05
	2004	-			
	2005	142007srCoho	73,041	81,321	1.11
	2006	-			
	2007	142009QUINC	68,967	75,056	1.09
	Grays Harbor Management Unit				
Bingham Creek	1995	0419972203	72,016	74,919	1.04
		0419972204	71,970	72,340	1.01
	1996	0419970332	63,981	65,229	1.02
		0419970364	59,914	61,023	1.02
	1997	0419990310	75,449	74,744	0.99
	1998	0420000304	65,986	72,076	1.09
	1999	0420011050	69,344	67,861	0.98
	2000	0420021034	71,665	71,016	0.99
	2002	0419970320	69,454	71,462	1.03
	2003	0420051017	72,242	72,242	1.00
	2004	0420061065	72,621	71,973	0.99
	2005	0420071079	71,290	71,752	1.01
	2006	0420081004	73,728	73,371	1.00
	2007	0420081114	73,833	73,327	0.99
	2008	0420101220	71,766	72,181	1.01
	Humptulips	1995	0419972201	79,072	79,142
1996		0419981001	79,321	74,509	0.94

Pacific Fisheries Management Areas (PFMA)

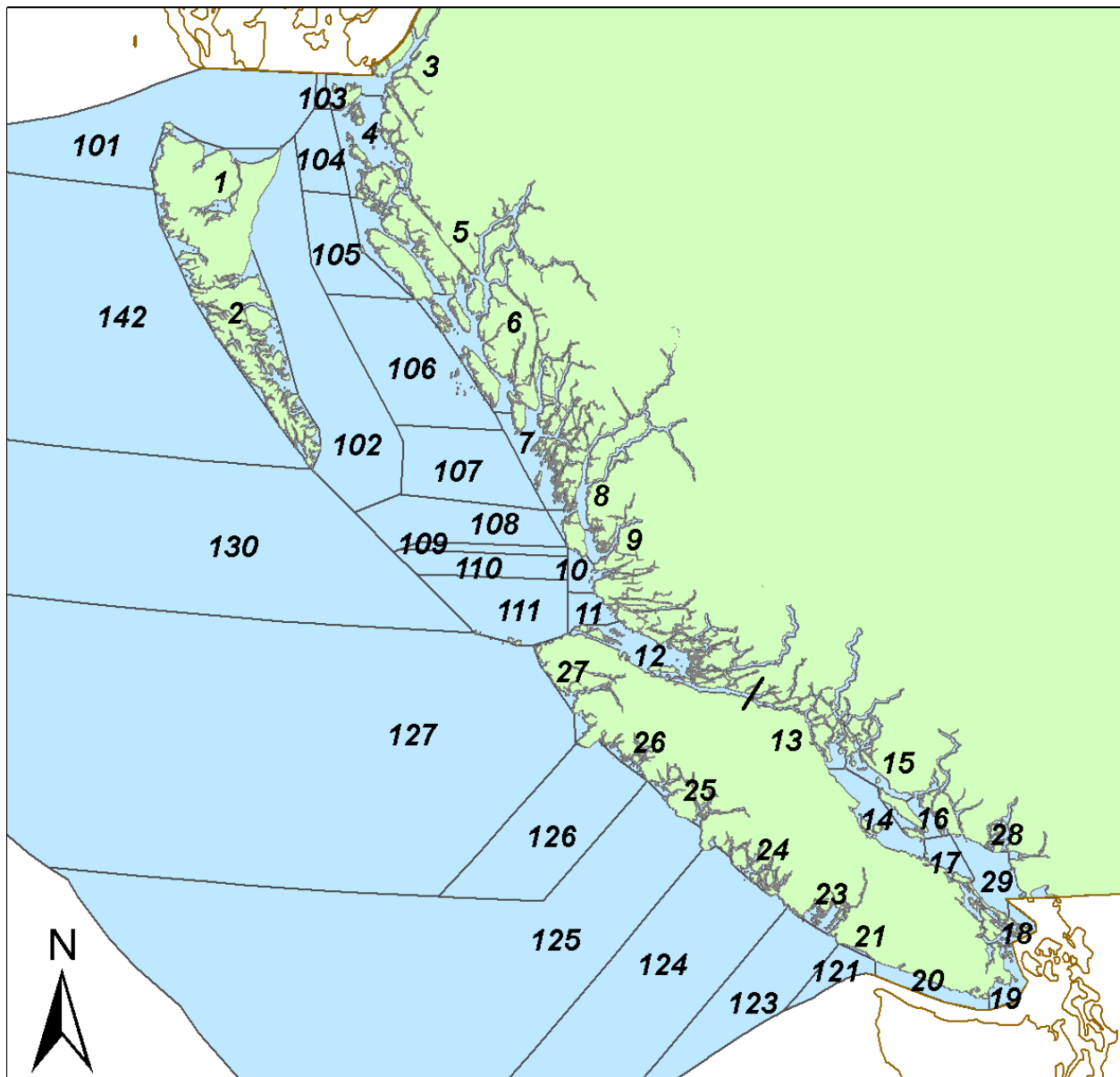


Figure D.1 Canadian DFO Southern BC Pacific Fisheries Management Areas.

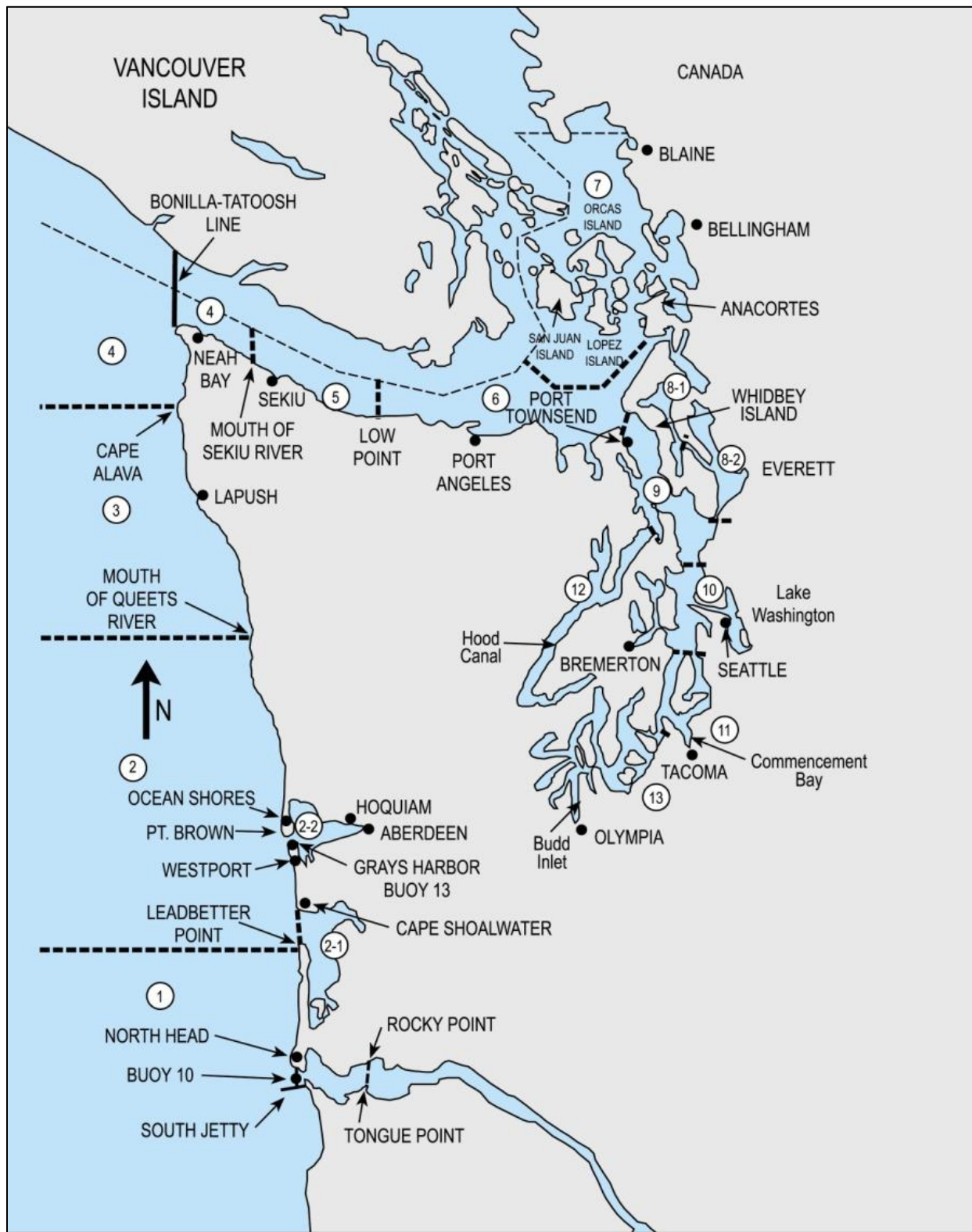


Figure D.2. Washington Coast and Puget Sound Marine Fishery Areas.

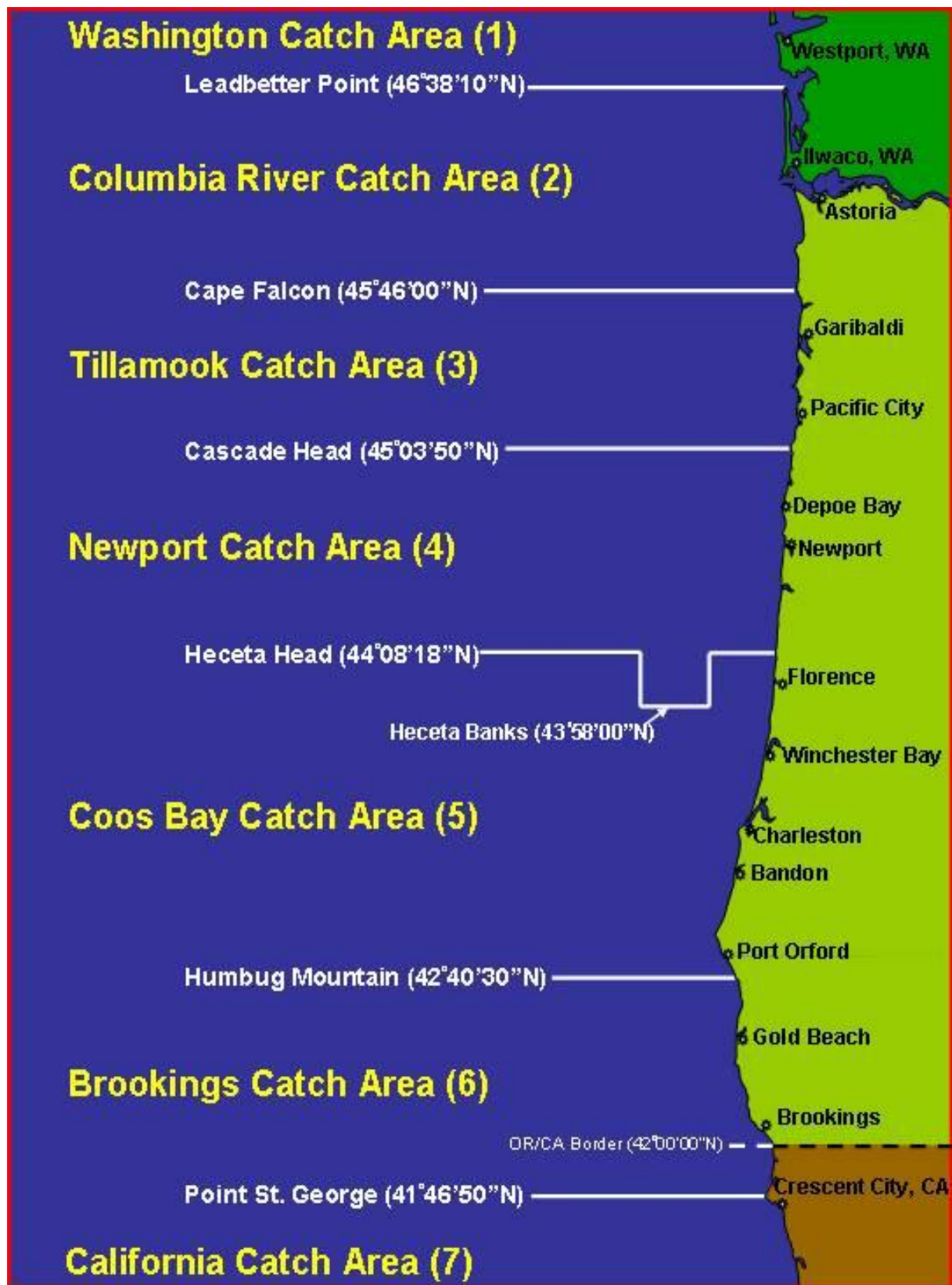


Figure D.3. Oregon Ocean Salmon Management Areas and Major Port Locations.

This page left intentionally blank

Appendix E. Historical Summary of Exploitation Rates by U.S. and Canada and Escapement Estimates for Each Management Unit.

Exploitation rates for catch years 1986 to 1997 were estimated using CWT analysis with the Mixed-Stock Model cohort reconstruction. Exploitation rates for catch years 1998 to 2009 were estimated using the post-season FRAM assessment technique. Cohort reconstructions have not been completed for the Canadian MUs between 1998 and 2003. Other than Interior Fraser MU, Canadian escapements are estimated using the Backwards FRAM. Actual escapement estimates are listed for all U.S. MUs.

Table E.1. Lower Fraser MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	81.6%	10.3%	71.2%	57,035
1987	79.4%	4.1%	75.3%	16,638
1988	83.3%	2.2%	81.1%	27,863
1989	76.6%	11.1%	65.5%	20,583
1990	83.6%	5.7%	77.9%	22,739
1991	80.3%	14.0%	66.3%	54,734
1992	76.7%	4.1%	72.7%	43,308
1993	69.0%	2.2%	66.9%	142,461
1994	75.7%	1.1%	74.5%	37,787
1995	64.7%	6.5%	58.2%	122,717
1996	72.3%	6.3%	66.0%	54,840
1997	29.7%	9.5%	20.2%	44,123
1998	---	---	---	---
1999	---	---	---	---
2000	---	---	---	---
2001	---	---	---	---
2002	---	---	---	---
2003	---	---	---	---
2004	15.6%	14.1%	1.5%	56,894
2005	9.3%	4.7%	4.6%	15,271
2006	9.3%	6.1%	3.2%	15,770
2007	11.7%	6.6%	5.1%	66,059
2008	9.0%	4.8%	4.2%	3,158
2009	12.8%	9.4%	3.4%	18,791

Table E.2. Interior Fraser MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	72.5%	16.0%	56.5%	66,211
1987	59.5%	7.6%	51.9%	70,736
1988	77.0%	10.5%	66.5%	84,878
1989	67.3%	16.5%	50.8%	59,277
1990	76.4%	10.8%	65.6%	40,894
1991	72.5%	16.8%	55.8%	28,665
1992	83.1%	7.7%	75.4%	40,643
1993	90.1%	9.8%	80.3%	23,434
1994	45.8%	0.2%	45.6%	27,370
1995	58.1%	9.7%	48.4%	20,326
1996	83.6%	10.2%	73.4%	8,550
1997	42.5%	18.9%	23.6%	14,652
1998	---	---	---	---
1999	---	---	---	---
2000	---	---	---	---
2001	---	---	---	---
2002	---	---	---	---
2003	---	---	---	---
2004	10.6%	9.4%	1.2%	41,452
2005	9.3%	6.3%	3.0%	14,477
2006	10.5%	8.1%	2.4%	7,878
2007	11.9%	8.4%	3.5%	58,216
2008	9.6%	7.0%	2.6%	16,293
2009	14.0%	11.0%	3.0%	21,544

Table E.3. Strait of Georgia mainland MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	72.9%	10.4%	62.5%	82,525
1987	88.4%	4.3%	84.2%	9,528
1988	78.9%	2.3%	76.6%	34,098
1989	70.5%	7.9%	62.6%	49,661
1990	75.7%	4.4%	71.3%	40,480
1991	73.5%	12.1%	61.4%	33,551
1992	81.0%	3.3%	77.7%	19,049
1993	78.6%	2.0%	76.6%	33,862
1994	74.6%	4.4%	70.3%	18,320
1995	56.8%	7.3%	49.6%	97,062
1996	70.6%	8.5%	62.1%	18,611
1997	63.0%	17.6%	45.5%	6,994
1998	---	---	---	---
1999	---	---	---	---
2000	---	---	---	---
2001	---	---	---	---
2002	---	---	---	---
2003	---	---	---	---
2004	9.5%	7.4%	2.1%	110,881
2005	8.8%	3.9%	4.9%	17,541
2006	12.7%	8.6%	4.0%	12,545
2007	11.2%	4.7%	6.5%	54,845
2008	11.3%	3.1%	8.2%	3,820
2009	14.5%	5.9%	8.6%	16,395

Table E.4. Strait of Georgia Vancouver Island MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	71.3%	2.7%	68.7%	200,062
1987	80.5%	0.8%	79.7%	39,940
1988	77.2%	1.6%	75.6%	109,801
1989	68.3%	4.8%	63.5%	117,624
1990	74.2%	1.8%	72.4%	77,843
1991	73.2%	8.5%	64.7%	109,376
1992	82.8%	2.7%	80.2%	31,458
1993	83.6%	2.5%	81.1%	36,042
1994	80.4%	1.4%	79.0%	28,106
1995	61.3%	9.3%	52.0%	166,994
1996	73.4%	6.2%	67.2%	48,314
1997	55.4%	8.2%	47.2%	21,595
1998	---	---	---	---
1999	---	---	---	---
2000	---	---	---	---
2001	---	---	---	---
2002	---	---	---	---
2003	---	---	---	---
2004	7.2%	3.7%	3.5%	170,607
2005	11.1%	1.8%	9.4%	25,684
2006	8.3%	1.8%	6.5%	33,790
2007	12.7%	2.4%	10.3%	138,569
2008	9.3%	1.5%	7.8%	10,021
2009	11.7%	3.8%	8.0%	40,543

Table E.5. Skagit MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	67.7%	28.0%	39.7%	107,417
1987	55.5%	23.3%	32.2%	116,119
1988	66.9%	24.4%	42.5%	67,091
1989	69.3%	21.2%	48.1%	67,608
1990	63.5%	30.0%	33.5%	31,794
1991	65.1%	27.3%	37.9%	28,381
1992	56.4%	18.6%	37.8%	28,125
1993	48.6%	8.0%	40.6%	35,768
1994	50.9%	3.0%	47.9%	53,112
1995	50.2%	15.0%	35.3%	42,976
1996	44.2%	11.9%	32.4%	26,948
1997	38.2%	31.4%	6.8%	38,998
1998	23.5%	23.5%	0.0%	72,734
1999	27.4%	27.2%	0.2%	29,699
2000	36.0%	35.8%	0.2%	60,960
2001	34.3%	33.3%	1.0%	87,017
2002	22.1%	21.0%	1.1%	55,968
2003	22.2%	21.4%	0.8%	88,712
2004	18.6%	17.9%	0.8%	118,220
2005	35.8%	34.2%	1.5%	34,713
2006	33.2%	31.4%	1.8%	7,702
2007	37.4%	34.8%	2.6%	51,972
2008	32.1%	31.0%	1.2%	24,092
2009	30.6%	28.9%	1.7%	60,798

Table E.6. Stillaguamish MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	67.3%	42.9%	24.4%	25,080
1987	75.6%	47.8%	27.8%	14,853
1988	73.0%	41.2%	31.8%	14,508
1989	74.6%	44.7%	29.9%	6,991
1990	68.1%	36.6%	31.5%	17,997
1991	77.8%	50.4%	27.5%	6,065
1992	63.3%	40.7%	22.6%	13,245
1993	65.4%	28.9%	36.5%	10,399
1994	51.5%	23.5%	28.0%	26,115
1995	47.8%	24.4%	23.4%	22,761
1996	59.3%	31.2%	28.1%	10,368
1997	42.7%	38.9%	3.8%	10,922
1998	23.7%	23.7%	0.0%	27,271
1999	22.8%	22.7%	0.1%	6,996
2000	34.3%	34.3%	0.1%	28,293
2001	24.9%	24.4%	0.4%	74,773
2002	10.6%	10.1%	0.5%	27,305
2003	7.5%	7.1%	0.4%	45,691
2004	11.8%	11.4%	0.4%	65,228
2005	25.8%	25.0%	0.8%	25,141
2006	20.9%	19.9%	1.0%	8,549
2007	25.1%	23.6%	1.5%	38,732
2008	23.4%	22.7%	0.7%	12,938
2009	28.1%	27.2%	0.9%	22,179

Table E.7. Snohomish MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	59.9%	35.5%	24.5%	117,354
1987	66.0%	38.1%	27.9%	93,277
1988	68.9%	37.1%	31.8%	75,848
1989	66.3%	36.3%	30.0%	94,509
1990	68.3%	36.8%	31.5%	89,791
1991	73.8%	46.3%	27.5%	43,802
1992	62.1%	39.5%	22.6%	74,300
1993	64.9%	28.4%	36.5%	51,263
1994	52.2%	24.2%	28.0%	142,826
1995	48.7%	25.2%	23.4%	110,320
1996	60.8%	32.6%	28.1%	52,906
1997	46.0%	42.1%	3.8%	58,188
1998	23.0%	23.0%	0.0%	149,984
1999	25.9%	25.8%	0.1%	61,282
2000	39.6%	39.5%	0.1%	94,093
2001	27.7%	27.3%	0.4%	261,550
2002	13.2%	12.7%	0.5%	161,441
2003	8.0%	7.6%	0.4%	182,599
2004	12.5%	12.1%	0.4%	252,767
2005	21.6%	20.8%	0.8%	109,023
2006	20.2%	19.2%	1.0%	75,630
2007	25.2%	23.7%	1.5%	117,736
2008	27.6%	26.9%	0.7%	36,015
2009	26.3%	25.4%	1.0%	98,945

Table E.8. Hood Canal MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	79.0%	43.8%	35.2%	41,475
1987	89.8%	52.4%	37.4%	19,247
1988	77.6%	42.8%	34.8%	11,726
1989	82.5%	39.6%	42.9%	15,022
1990	94.0%	44.4%	49.6%	6,799
1991	82.1%	44.3%	37.8%	12,851
1992	93.2%	29.6%	63.6%	19,302
1993	67.2%	22.6%	44.7%	22,293
1994	51.3%	10.2%	41.1%	56,481
1995	36.4%	10.4%	25.9%	41,074
1996	36.0%	13.2%	22.8%	43,606
1997	18.0%	14.2%	3.7%	95,760
1998	30.9%	30.9%	0.0%	100,711
1999	19.7%	19.4%	0.3%	16,430
2000	40.8%	40.6%	0.2%	27,094
2001	32.1%	31.2%	0.9%	94,579
2002	23.0%	21.9%	1.1%	69,296
2003	22.4%	21.6%	0.8%	172,345
2004	39.0%	38.3%	0.7%	146,873
2005	51.8%	50.0%	1.8%	38,063
2006	77.5%	75.6%	1.9%	13,665
2007	51.7%	49.1%	2.6%	46,657
2008	62.5%	61.3%	1.2%	11,755
2009	58.9%	57.2%	1.7%	28,407

Table E.9. U.S. Strait of Juan de Fuca MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	72.0%	18.6%	53.5%	14,149
1987	59.3%	31.9%	27.4%	9,924
1988	64.5%	22.5%	42.0%	9,347
1989	54.2%	21.0%	33.2%	13,424
1990	69.9%	19.8%	50.1%	8,833
1991	55.6%	26.0%	29.7%	9,764
1992	60.7%	12.6%	48.1%	11,234
1993	19.6%	5.3%	14.4%	9,352
1994	33.5%	3.4%	30.1%	7,641
1995	35.6%	7.9%	27.7%	14,791
1996	49.1%	13.2%	35.9%	9,880
1997	35.7%	27.0%	8.8%	13,064
1998	14.2%	14.2%	0.0%	18,021
1999	14.4%	14.3%	0.1%	8,485
2000	20.8%	20.7%	0.1%	22,654
2001	19.7%	19.3%	0.4%	35,274
2002	15.1%	14.4%	0.7%	22,375
2003	8.5%	7.9%	0.6%	20,991
2004	11.6%	11.0%	0.7%	20,987
2005	15.1%	13.6%	1.5%	11,105
2006	14.8%	13.2%	1.6%	3,940
2007	21.4%	18.9%	2.5%	8,045
2008	13.4%	12.4%	1.0%	3,339
2009	29.8%	28.8%	1.0%	17,340

Table E.10. Quillayute MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	71.0%	24.6%	46.4%	10,862
1987	66.3%	47.1%	19.2%	11,579
1988	47.8%	20.8%	27.0%	7,218
1989	53.3%	28.7%	24.6%	8,995
1990	53.1%	41.4%	11.7%	5,512
1991	64.9%	31.9%	33.0%	9,532
1992	48.7%	41.0%	7.7%	8,170
1993	61.2%	21.4%	39.7%	4,165
1994	42.5%	19.2%	23.3%	4,881
1995	49.9%	34.4%	15.4%	10,035
1996	46.3%	24.7%	21.5%	11,009
1997	21.3%	16.4%	4.9%	4,623
1998	20.6%	20.6%	0.0%	13,869
1999	41.8%	41.8%	0.0%	9,365
2000	19.3%	19.3%	0.0%	13,345
2001	33.7%	33.5%	0.1%	18,876
2002	30.9%	30.6%	0.3%	23,016
2003	34.6%	34.4%	0.2%	14,756
2004	35.7%	35.2%	0.4%	13,354
2005	45.2%	44.3%	0.9%	11,501
2006	47.5%	46.8%	0.8%	5,210
2007	42.0%	41.0%	0.9%	6,232
2008	37.4%	37.1%	0.3%	6,947
2009	49.5%	49.1%	0.4%	7,863

Table E.11. Hoh MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	77.3%	37.4%	39.8%	4,270
1987	75.9%	47.3%	28.5%	3,516
1988	88.4%	22.8%	65.7%	2,350
1989	64.8%	38.4%	26.5%	3,321
1990	76.5%	46.2%	30.2%	2,094
1991	65.1%	32.2%	32.9%	4,129
1992	70.8%	43.1%	27.7%	4,639
1993	60.7%	30.7%	30.0%	1,345
1994	47.2%	13.5%	33.8%	1,161
1995	52.6%	22.2%	30.4%	4,710
1996	37.7%	21.2%	16.5%	4,857
1997	67.3%	47.2%	20.1%	1,386
1998	21.2%	21.2%	0.0%	4,418
1999	32.3%	32.1%	0.2%	4,594
2000	27.5%	27.3%	0.2%	6,774
2001	33.8%	33.3%	0.6%	10,773
2002	31.9%	30.4%	1.5%	9,009
2003	27.9%	27.3%	0.6%	6,273
2004	32.7%	31.5%	1.2%	4,702
2005	42.6%	40.2%	2.4%	4,711
2006	53.1%	50.9%	2.2%	1,282
2007	47.8%	43.8%	4.1%	3,072
2008	42.9%	41.0%	1.9%	2,461
2009	51.6%	49.7%	1.9%	4,615

Table E.12. Queets MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	79.6%	30.6%	49.0%	5,200
1987	71.1%	46.9%	24.2%	4,700
1988	76.9%	41.3%	35.6%	4,300
1989	63.7%	26.2%	37.5%	4,500
1990	81.6%	41.4%	40.2%	5,200
1991	76.3%	45.5%	30.8%	6,500
1992	65.5%	41.2%	24.4%	6,276
1993	62.2%	31.4%	30.7%	4,937
1994	58.0%	33.7%	24.4%	1,059
1995	47.2%	26.7%	20.5%	5,730
1996	60.9%	47.1%	13.8%	8,926
1997	34.5%	33.5%	0.9%	1,480
1998	34.8%	34.8%	0.0%	4,134
1999	45.0%	44.7%	0.2%	4,795
2000	33.6%	33.4%	0.2%	8,104
2001	34.0%	33.1%	0.9%	23,793
2002	47.3%	46.2%	1.1%	13,968
2003	37.8%	37.2%	0.7%	9,846
2004	44.2%	43.0%	1.2%	7,484
2005	45.6%	43.4%	2.3%	6,539
2006	39.6%	37.4%	2.2%	5,626
2007	35.4%	31.1%	4.2%	4,680
2008	37.3%	35.9%	1.4%	4,629
2009	42.7%	40.8%	1.9%	9,200

Table E.13. Grays Harbor MU historical summary.

Catch Year	Estimated Exploitation Rates			Escapement
	Total	U.S. Tot	Can Tot	
1986	76.9%	42.3%	34.6%	29,255
1987	70.7%	53.1%	17.6%	19,627
1988	42.2%	19.9%	22.3%	56,839
1989	57.7%	25.3%	32.4%	67,707
1990	57.9%	45.0%	12.9%	40,981
1991	60.4%	46.5%	13.9%	55,516
1992	56.3%	41.4%	14.9%	25,748
1993	63.3%	39.3%	24.0%	21,787
1994	38.6%	32.9%	5.7%	8,632
1995	49.9%	38.7%	11.3%	35,497
1996	41.5%	35.6%	5.8%	52,746
1997	19.0%	18.9%	0.1%	16,416
1998	23.5%	23.5%	0.0%	35,550
1999	22.0%	21.8%	0.2%	33,346
2000	26.7%	26.7%	0.0%	38,054
2001	22.5%	22.1%	0.4%	80,100
2002	22.7%	22.0%	0.6%	110,066
2003	21.7%	21.4%	0.4%	84,952
2004	33.4%	32.6%	0.8%	60,690
2005	41.6%	39.9%	1.7%	38,585
2006	42.2%	40.9%	1.3%	17,767
2007	30.8%	28.4%	2.4%	25,756
2008	30.7%	29.5%	1.1%	34,054
2009	33.5%	32.4%	1.1%	69,734

This page left intentionally blank

Appendix F. Historical Summary of Cohort Abundance, Exploitation Rates by Fisheries Type, and Escapement for each Management Unit.

The 1986-1997 exploitation rates (ERs) were generated using CWT recoveries and the Mixed-Stock Model (MSM) cohort reconstruction. The 1998-2009 ERs were generated using the Backwards Coho FRAM. Canadian escapements for 1986-1997 were estimated as $\text{catch} \times (1 - \text{ER})$, where ER is hatchery indicator exploitation rate. With the exception of the Interior Fraser MU, catch year 1998-2009 escapement estimates for Canadian MUs have not been estimated for cohort analysis purposes.

Two measures of cohort size are reported in these tables, Ocean age-3 and January age-3 abundances. Ocean age-3 abundance includes the escapement and fishery impacts (landed catch and indirect mortalities). January age-3 abundance includes the escapement, fishery impacts, and natural mortality. Pacific Salmon Treaty stock status is based on ocean age-3 pre-fishing abundance.

Table F.1. Lower Fraser MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	5.32%	7.28%	5.45%	4.47%	1.67%	7.49%	0.22%	4.48%	3.18%	0.48%	0.95%	0.26%	0.24%
BC No/Cent Net	0.11%	0.18%	0.06%	0.04%	0.07%	0.22%	0.00%	0.22%	0.06%	0.01%	0.28%	0.05%	0.14%
BC No/Cent Sport	0.08%	0.05%	0.00%	0.00%	0.00%	0.31%	0.00%	0.17%	0.00%	0.00%	0.00%	0.42%	0.00%
BC WCVI Troll	27.80%	29.87%	23.74%	15.96%	23.18%	26.63%	51.05%	24.72%	9.19%	50.01%	50.34%	54.49%	0.01%
BC WCVI Net	0.12%	0.01%	0.14%	0.05%	0.58%	0.01%	0.02%	0.05%	0.01%	0.12%	0.00%	0.00%	0.00%
BC WCVI Sport	0.26%	0.00%	0.22%	0.00%	0.19%	0.04%	0.34%	0.05%	0.00%	0.35%	0.36%	0.26%	0.73%
BC JnstStr Net & Trl	1.18%	1.00%	0.92%	1.49%	0.99%	1.78%	0.30%	1.14%	0.63%	0.17%	0.28%	0.20%	1.05%
BC JnstStr Sport	0.18%	0.06%	0.12%	0.24%	0.10%	0.14%	0.07%	0.48%	0.33%	0.24%	0.57%	1.29%	0.34%
BC GeoStr Spt & Trl	30.56%	25.43%	35.85%	53.84%	23.22%	33.32%	1.06%	34.21%	48.90%	11.98%	0.15%	1.90%	0.25%
BC GeoStr Net	0.16%	0.17%	0.38%	0.04%	0.05%	0.21%	0.00%	0.22%	0.28%	0.03%	0.00%	0.00%	0.00%
BC JDF Sport	2.16%	0.76%	1.46%	0.74%	2.31%	1.95%	5.86%	2.92%	2.59%	3.18%	2.60%	4.41%	10.98%
BC JDF Net & Troll	3.48%	2.32%	3.65%	0.47%	5.81%	2.85%	4.86%	1.67%	0.12%	4.73%	1.50%	0.17%	0.59%
BC Fraser Net & Spt	3.55%	4.09%	3.29%	3.80%	7.32%	2.97%	2.57%	2.33%	1.55%	3.24%	1.16%	2.56%	5.87%
BC Sub-Total	74.97%	71.24%	75.30%	81.13%	65.46%	77.92%	66.33%	72.65%	66.85%	74.53%	58.19%	65.99%	20.21%
SEAK All	0.03%	0.06%	0.04%	0.01%	0.02%	0.00%	0.04%	0.08%	0.09%	0.08%	0.15%	0.47%	0.14%
WA Ocn Troll	1.35%	1.10%	1.21%	0.35%	1.63%	1.41%	2.56%	0.92%	0.51%	0.00%	2.25%	1.89%	1.34%
WA Ocn Sport	0.61%	0.39%	0.31%	0.16%	0.70%	0.76%	1.43%	0.51%	0.58%	0.00%	1.04%	1.54%	0.71%
SOF All	0.20%	0.32%	0.06%	0.24%	0.06%	0.00%	0.69%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	2.50%	2.64%	1.59%	0.81%	2.48%	3.20%	6.03%	1.15%	0.61%	0.26%	2.42%	2.08%	4.91%
SanJnIsl Net	2.48%	5.26%	0.51%	0.14%	5.99%	0.20%	2.77%	1.06%	0.16%	0.70%	0.35%	0.05%	1.14%
SanJnIsl Sport	0.24%	0.31%	0.28%	0.38%	0.16%	0.11%	0.14%	0.28%	0.19%	0.07%	0.24%	0.24%	1.28%
PS Sport (8-13)	0.02%	0.04%	0.02%	0.01%	0.00%	0.00%	0.04%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.09%	0.18%	0.06%	0.04%	0.07%	0.05%	0.25%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%
FW Net & Sport	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.06%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	7.54%	10.32%	4.08%	2.16%	11.10%	5.73%	14.00%	4.08%	2.16%	1.12%	6.48%	6.27%	9.52%
TOTAL ER	82.51%	81.56%	79.38%	83.28%	76.56%	83.65%	80.33%	76.73%	69.01%	75.65%	64.67%	72.26%	29.73%
Escapement	31,235	57,035	16,638	27,863	20,583	22,739	54,734	43,308	142,461	37,787	122,717	54,840	44,123
Cohort (Ocean age-3)	178,541	309,259	80,688	166,672	87,798	139,057	278,246	186,080	459,709	155,190	347,312	197,675	62,791
Cohort (Jan age-3)	210,648	365,330	95,324	195,570	104,382	163,666	331,030	219,230	542,940	183,606	414,282	236,742	76,718

Table F.1. (Continued) Lower Fraser MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	---	---	---	---	---	---	0.40%	0.69%	0.34%	1.70%	0.69%	0.08%
BC No/Cent Net	---	---	---	---	---	---	0.05%	0.11%	0.02%	0.17%	0.10%	0.03%
BC No/Cent Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.43%	0.20%
BC WCVI Troll	---	---	---	---	---	---	0.07%	0.32%	0.62%	0.28%	0.16%	0.13%
BC WCVI Net	---	---	---	---	---	---	0.03%	0.22%	0.22%	0.39%	0.35%	0.01%
BC WCVI Sport	---	---	---	---	---	---	0.24%	0.64%	0.62%	0.89%	0.28%	0.83%
BC InstStr Net & Trl	---	---	---	---	---	---	0.18%	1.01%	0.61%	0.11%	0.44%	0.68%
BC InstStr Sport	---	---	---	---	---	---	0.00%	0.00%	0.01%	0.02%	0.38%	0.20%
BC GeoStr Spt & Trl	---	---	---	---	---	---	0.07%	0.07%	0.10%	0.33%	0.12%	0.17%
BC GeoStr Net	---	---	---	---	---	---	0.00%	0.03%	0.00%	0.00%	0.00%	0.01%
BC JDF Sport	---	---	---	---	---	---	0.31%	0.49%	0.40%	0.69%	0.12%	0.45%
BC JDF Net & Troll	---	---	---	---	---	---	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	---	---	---	---	---	---	0.15%	1.04%	0.22%	0.54%	1.18%	0.63%
B.C. Sub-Total	---	---	---	---	---	---	1.49%	4.64%	3.16%	5.11%	4.25%	3.42%
SEAK All	---	---	---	---	---	---	0.03%	0.02%	0.02%	0.07%	0.06%	0.06%
WA Ocean Troll	---	---	---	---	---	---	2.03%	1.04%	2.32%	2.35%	0.53%	2.41%
WA Ocean Sport	---	---	---	---	---	---	0.50%	0.21%	0.25%	0.40%	0.09%	0.34%
S of Falcon All	---	---	---	---	---	---	0.02%	0.01%	0.01%	0.02%	0.00%	0.02%
U.S. JDF All	---	---	---	---	---	---	1.68%	0.97%	1.02%	2.10%	1.94%	2.98%
San Juan Isl Net	---	---	---	---	---	---	9.57%	2.12%	2.44%	1.56%	2.08%	3.52%
San Juan Isl Sport	---	---	---	---	---	---	0.21%	0.29%	0.03%	0.09%	0.05%	0.06%
PS Sport (8-13)	---	---	---	---	---	---	0.01%	0.01%	0.03%	0.02%	0.01%	0.01%
PS Net (8-13)	---	---	---	---	---	---	0.02%	0.01%	0.02%	0.01%	0.01%	0.01%
FW Net & Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
U.S. Sub-Total	---	---	---	---	---	---	14.08%	4.69%	6.14%	6.62%	4.78%	9.42%
Total ER	---	---	---	---	---	---	15.57%	9.33%	9.30%	11.73%	9.02%	12.84%
Escapement	---	---	---	---	---	---	56,894	15,271	15,770	66,059	3,158	18,791
Cohort (Ocean age-3)	---	---	---	---	---	---	67,382	16,843	17,386	74,840	3,471	21,561
Cohort (Jan age-3)	---	---	---	---	---	---	82,795	20,696	21,349	91,811	4,266	26,468

Table F.2. Interior Fraser MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	2.51%	1.30%	3.49%	2.41%	0.80%	3.17%	0.16%	4.08%	0.88%	0.15%	3.22%	0.27%	0.00%
BC No/Cent Net	0.12%	0.00%	0.08%	0.15%	0.15%	0.08%	0.00%	0.20%	0.00%	0.05%	0.21%	0.00%	0.08%
BC No/Cent Sport	0.05%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	33.88%	31.53%	25.54%	27.98%	27.43%	33.65%	38.95%	43.19%	24.85%	32.37%	39.89%	62.73%	0.00%
BC WCVI Net	0.05%	0.00%	0.00%	0.01%	0.34%	0.00%	0.00%	0.01%	0.00%	0.18%	0.00%	0.00%	0.00%
BC WCVI Sport	0.15%	0.00%	0.00%	0.00%	0.09%	0.09%	0.28%	0.30%	0.10%	0.14%	0.40%	0.51%	0.49%
BC InstStr Net & Trl	1.14%	0.76%	1.24%	0.89%	1.16%	1.42%	0.56%	1.20%	1.16%	0.00%	0.27%	0.13%	1.17%
BC InstStr Sport	0.38%	0.00%	0.19%	0.06%	0.04%	1.09%	0.15%	0.66%	0.57%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Spt & Trl	13.86%	6.83%	13.34%	21.46%	7.54%	17.66%	0.54%	20.62%	43.28%	4.50%	0.28%	0.62%	0.09%
BC GeoStr Net	0.06%	0.00%	0.11%	0.01%	0.00%	0.14%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	2.55%	1.58%	1.70%	1.59%	2.43%	2.93%	3.74%	3.10%	8.74%	3.64%	1.83%	8.62%	21.57%
BC JDF Net & Troll	4.20%	4.11%	2.47%	0.85%	9.04%	3.83%	4.05%	1.53%	0.06%	3.93%	1.82%	0.11%	0.00%
BC Fraser Net & Spt	4.26%	10.39%	3.78%	11.13%	1.77%	1.30%	7.32%	0.38%	0.43%	0.65%	0.50%	0.42%	0.19%
B.C. Sub-Total	63.20%	56.51%	51.94%	66.55%	50.78%	65.59%	55.76%	75.36%	80.26%	45.61%	48.43%	73.40%	23.58%
SEAK All	0.13%	0.00%	0.00%	0.05%	0.03%	0.04%	0.25%	0.32%	0.33%	0.04%	2.14%	0.11%	0.00%
WA Ocean Troll	2.51%	3.15%	2.61%	1.99%	2.77%	3.54%	1.47%	1.49%	0.91%	0.00%	3.08%	1.95%	1.89%
WA Ocean Sport	1.40%	0.47%	0.78%	0.75%	0.74%	1.46%	2.12%	1.82%	1.98%	0.00%	1.18%	1.29%	2.02%
S of Falcon All	1.23%	0.34%	0.97%	3.12%	1.07%	0.00%	1.50%	0.46%	0.02%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	3.45%	5.13%	1.43%	2.48%	3.24%	4.48%	5.61%	2.79%	3.56%	0.00%	1.14%	6.23%	9.55%
San Juan Isl Net	2.95%	6.24%	1.06%	0.54%	8.05%	0.68%	4.98%	0.19%	0.00%	0.17%	0.90%	0.63%	4.60%
San Juan Isl Sport	0.36%	0.00%	0.19%	0.68%	0.14%	0.29%	0.34%	0.39%	2.61%	0.00%	0.98%	0.00%	0.89%
PS Sport (8-13)	0.05%	0.00%	0.07%	0.15%	0.07%	0.00%	0.00%	0.02%	0.42%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.31%	0.64%	0.33%	0.55%	0.36%	0.28%	0.42%	0.05%	0.00%	0.00%	0.29%	0.00%	0.00%
FW Net & Sport	0.10%	0.00%	0.12%	0.19%	0.00%	0.00%	0.07%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	12.49%	15.97%	7.56%	10.50%	16.47%	10.77%	16.77%	7.71%	9.84%	0.21%	9.70%	10.21%	18.95%
Total ER	75.69%	72.48%	59.50%	77.05%	67.25%	76.37%	72.52%	83.07%	90.10%	45.83%	58.13%	83.61%	42.53%
Escapement	50,365	66,211	70,736	84,878	59,277	40,894	28,665	40,643	23,434	27,370	20,326	8,550	14,652
Cohort (Ocean age-3)	207,170	240,601	174,655	369,791	181,010	173,030	104,316	240,064	236,614	50,524	48,543	52,154	25,493
Cohort (Jan age-3)	245,694	287,252	209,004	438,028	216,174	204,774	124,326	281,864	276,322	60,750	58,160	62,120	30,912

Table F.2. (Continued) Interior Fraser MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	---	---	---	---	---	---	0.33%	0.40%	0.19%	0.74%	0.24%	0.11%
BC No/Cent Net	---	---	---	---	---	---	0.05%	0.11%	0.03%	0.40%	0.04%	0.02%
BC No/Cent Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.38%	0.18%
BC WCVI Troll	---	---	---	---	---	---	0.02%	0.23%	0.43%	0.22%	0.06%	0.11%
BC WCVI Net	---	---	---	---	---	---	0.01%	0.08%	0.08%	0.15%	0.14%	0.01%
BC WCVI Sport	---	---	---	---	---	---	0.30%	0.53%	0.66%	1.02%	0.42%	0.93%
BC InstStr Net &Trl	---	---	---	---	---	---	0.12%	0.81%	0.48%	0.04%	0.06%	0.53%
BC InstStr Sport	---	---	---	---	---	---	0.00%	0.00%	0.02%	0.04%	0.75%	0.39%
BC GeoStr Spt &Trl	---	---	---	---	---	---	0.02%	0.03%	0.03%	0.11%	0.05%	0.07%
BC GeoStr Net	---	---	---	---	---	---	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	---	---	---	---	---	---	0.33%	0.40%	0.34%	0.58%	0.11%	0.44%
BC JDF Net & Troll	---	---	---	---	---	---	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	---	---	---	---	---	---	0.04%	0.37%	0.09%	0.16%	0.32%	0.19%
B.C. Sub-Total	---	---	---	---	---	---	1.22%	3.02%	2.36%	3.46%	2.58%	2.96%
SEAK All	---	---	---	---	---	---	0.30%	0.20%	0.18%	0.27%	0.23%	0.19%
WA Ocean Troll	---	---	---	---	---	---	3.62%	2.03%	4.25%	3.08%	1.53%	3.46%
WA Ocean Sport	---	---	---	---	---	---	0.86%	0.39%	0.42%	0.71%	0.17%	0.61%
S of Falcon All	---	---	---	---	---	---	0.11%	0.04%	0.07%	0.11%	0.01%	0.08%
U.S. JDF All	---	---	---	---	---	---	2.00%	1.11%	1.06%	2.74%	2.24%	2.08%
San Juan Isl Net	---	---	---	---	---	---	2.04%	2.06%	2.01%	1.23%	2.66%	4.23%
San Juan Isl Sport	---	---	---	---	---	---	0.31%	0.36%	0.05%	0.14%	0.03%	0.14%
PS Sport (8-13)	---	---	---	---	---	---	0.05%	0.08%	0.04%	0.08%	0.06%	0.14%
PS Net (8-13)	---	---	---	---	---	---	0.05%	0.03%	0.03%	0.03%	0.05%	0.02%
FW Net & Sport	---	---	---	---	---	---	0.01%	0.00%	0.00%	0.01%	0.00%	0.03%
U.S. Sub-Total	---	---	---	---	---	---	9.35%	6.30%	8.11%	8.39%	6.98%	11.00%
Total ER	---	---	---	---	---	---	10.58%	9.33%	10.47%	11.85%	9.56%	13.96%
Escapement	---	---	---	---	---	---	41,452	14,477	7,878	58,216	16,293	21,544
Cohort (Ocean age-3)	---	---	---	---	---	---	46,354	15,966	8,799	66,045	18,016	25,041
Cohort (Jan age-3)	---	---	---	---	---	---	56,886	19,604	10,798	80,985	22,125	30,698

Table F.3. Strait of Georgia Mainland MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	3.36%	4.29%	3.81%	1.86%	0.78%	4.45%	1.82%	3.82%	2.50%	1.23%	0.26%	1.24%	1.04%
BC No/Cent Net	0.51%	0.34%	0.82%	0.32%	0.06%	0.30%	0.00%	1.36%	0.25%	0.38%	0.43%	0.01%	0.08%
BC No/Cent Sport	0.72%	0.00%	2.50%	0.00%	0.00%	1.94%	0.00%	0.16%	0.12%	0.00%	0.00%	0.00%	0.84%
BC WCVI Troll	14.98%	12.49%	15.12%	7.34%	14.53%	12.02%	35.82%	10.73%	6.04%	26.83%	37.89%	35.46%	0.00%
BC WCVI Net	0.09%	0.09%	0.05%	0.01%	0.10%	0.00%	0.09%	0.01%	0.05%	0.19%	0.00%	0.00%	0.00%
BC WCVI Sport	0.57%	0.00%	0.47%	0.00%	0.51%	0.14%	1.28%	0.05%	0.07%	0.23%	0.97%	0.46%	1.94%
BC InstStr Net & Trl	1.67%	0.83%	1.65%	0.68%	1.37%	2.02%	2.96%	2.20%	0.89%	0.75%	0.23%	0.16%	2.67%
BC InstStr Sport	0.37%	0.05%	0.33%	0.11%	0.10%	0.31%	0.41%	1.20%	0.31%	0.00%	0.21%	1.47%	9.38%
BC GeoStr Spt & Trl	42.35%	36.63%	51.76%	64.09%	31.96%	44.09%	6.20%	52.53%	62.61%	30.91%	1.51%	7.16%	2.12%
BC GeoStr Net	0.46%	0.35%	0.70%	0.01%	0.31%	0.41%	0.23%	0.47%	0.67%	0.14%	0.00%	0.00%	0.00%
BC JDF Sport	2.91%	1.38%	2.69%	1.77%	3.80%	1.86%	6.00%	3.47%	2.65%	4.93%	5.82%	15.57%	27.03%
BC JDF Net & Troll	3.79%	4.28%	3.55%	0.35%	7.03%	2.70%	5.83%	1.62%	0.05%	4.56%	2.15%	0.54%	0.35%
BC Fraser Net & Spt	0.93%	1.71%	0.72%	0.10%	2.05%	1.09%	0.78%	0.05%	0.36%	0.10%	0.08%	0.00%	0.00%
B.C. Sub-Total	72.71%	62.45%	84.18%	76.64%	62.60%	71.32%	61.41%	77.67%	76.58%	70.26%	49.56%	62.06%	45.45%
SEAK All	0.16%	0.04%	0.07%	0.08%	0.00%	0.00%	0.35%	0.54%	1.17%	1.77%	1.19%	1.27%	0.25%
WA Ocean Troll	0.95%	0.94%	0.99%	0.30%	0.21%	1.30%	2.24%	0.53%	0.21%	0.00%	1.70%	4.34%	2.03%
WA Ocean Sport	0.55%	0.42%	0.43%	0.26%	0.39%	0.23%	2.17%	0.21%	0.20%	0.00%	0.60%	1.20%	1.09%
S of Falcon All	0.13%	0.16%	0.22%	0.09%	0.05%	0.00%	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	2.10%	3.18%	1.66%	0.59%	2.24%	2.48%	3.43%	1.01%	0.43%	2.31%	2.36%	0.93%	4.14%
San Juan Isl Net	2.03%	4.83%	0.35%	0.08%	4.72%	0.25%	2.80%	0.78%	0.00%	0.30%	1.23%	0.14%	5.54%
San Juan Isl Sport	0.41%	0.84%	0.44%	0.77%	0.21%	0.11%	0.27%	0.20%	0.00%	0.00%	0.17%	0.65%	3.66%
PS Sport (8-13)	0.01%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.88%
PS Net (8-13)	0.08%	0.03%	0.03%	0.08%	0.06%	0.00%	0.30%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	0.01%	0.00%	0.00%	0.05%	0.00%	0.00%	0.05%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	6.43%	10.44%	4.27%	2.30%	7.88%	4.37%	12.08%	3.30%	2.03%	4.38%	7.26%	8.52%	17.59%
Total ER	79.15%	72.90%	88.45%	78.94%	70.48%	75.69%	73.48%	80.97%	78.61%	74.64%	56.83%	70.58%	63.05%
Escapement	33,153	82,525	9,528	34,098	49,661	40,480	33,551	19,049	33,862	18,320	97,062	18,611	6,994
Cohort (Ocean age-3)	158,976	304,513	82,480	161,898	168,206	166,513	126,533	100,096	158,298	72,236	224,813	63,261	18,927
Cohort (Jan age-3)	186,924	360,530	96,580	189,084	198,970	196,084	150,056	117,160	185,654	85,148	268,616	75,404	22,608

Table F.3. (Continued) Strait of Georgia Mainland MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	---	---	---	---	---	---	0.42%	0.69%	0.38%	1.58%	0.56%	0.18%
BC No/Cent Net	---	---	---	---	---	---	0.33%	0.46%	0.09%	0.91%	0.44%	0.14%
BC No/Cent Sport	---	---	---	---	---	---	0.00%	0.00%	0.01%	0.01%	4.97%	3.99%
BC WCVI Troll	---	---	---	---	---	---	0.04%	0.12%	0.21%	0.11%	0.08%	0.06%
BC WCVI Net	---	---	---	---	---	---	0.01%	0.07%	0.07%	0.12%	0.10%	0.00%
BC WCVI Sport	---	---	---	---	---	---	0.73%	1.54%	1.74%	2.53%	0.70%	2.32%
BC InstStr Net &Trl	---	---	---	---	---	---	0.21%	1.12%	1.03%	0.09%	0.24%	0.82%
BC InstStr Sport	---	---	---	---	---	---	0.00%	0.00%	0.01%	0.03%	0.62%	0.32%
BC GeoStr Spt &Trl	---	---	---	---	---	---	0.08%	0.11%	0.13%	0.48%	0.37%	0.33%
BC GeoStr Net	---	---	---	---	---	---	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	---	---	---	---	---	---	0.29%	0.46%	0.34%	0.62%	0.09%	0.44%
BC JDF Net & Troll	---	---	---	---	---	---	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	---	---	---	---	---	---	0.01%	0.08%	0.03%	0.02%	0.04%	0.03%
B.C. Sub-Total	---	---	---	---	---	---	2.12%	4.85%	4.04%	6.52%	8.21%	8.64%
SEAK All	---	---	---	---	---	---	0.52%	0.44%	0.32%	0.44%	0.33%	0.30%
WA Ocean Troll	---	---	---	---	---	---	1.70%	0.87%	2.12%	1.84%	0.63%	1.84%
WA Ocean Sport	---	---	---	---	---	---	0.39%	0.22%	0.24%	0.30%	0.07%	0.27%
S of Falcon All	---	---	---	---	---	---	0.01%	0.00%	0.00%	0.01%	0.00%	0.01%
U.S. JDF All	---	---	---	---	---	---	1.10%	0.53%	0.78%	1.04%	0.76%	0.94%
San Juan Isl Net	---	---	---	---	---	---	3.40%	1.57%	5.06%	0.88%	1.14%	2.38%
San Juan Isl Sport	---	---	---	---	---	---	0.18%	0.27%	0.05%	0.11%	0.14%	0.14%
PS Sport (8-13)	---	---	---	---	---	---	0.03%	0.02%	0.05%	0.05%	0.02%	0.02%
PS Net (8-13)	---	---	---	---	---	---	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%
FW Net & Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
U.S. Sub-Total	---	---	---	---	---	---	7.36%	3.93%	8.63%	4.67%	3.10%	5.89%
Total ER	---	---	---	---	---	---	9.49%	8.78%	12.67%	11.19%	11.31%	14.53%
Escapement	---	---	---	---	---	---	110,881	17,541	12,545	54,845	3,820	16,395
Cohort (Ocean age-3)	---	---	---	---	---	---	122,503	19,230	14,366	61,757	4,307	19,182
Cohort (Jan age-3)	---	---	---	---	---	---	150,446	23,599	17,599	75,686	5,281	23,487

Table F.4. Strait of Georgia Vancouver Island MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	14.30%	24.91%	15.07%	12.04%	5.80%	13.65%	2.10%	15.30%	5.86%	3.00%	5.13%	2.47%	4.99%
BC No/Cent Net	1.17%	0.86%	2.74%	0.67%	1.37%	0.75%	0.28%	1.52%	0.59%	0.22%	1.41%	0.06%	0.40%
BC No/Cent Sport	0.09%	0.01%	0.47%	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	20.77%	15.29%	15.89%	17.41%	16.83%	16.93%	42.42%	20.98%	5.81%	43.25%	36.86%	47.55%	0.00%
BC WCVI Net	0.06%	0.02%	0.00%	0.03%	0.20%	0.01%	0.08%	0.03%	0.01%	0.26%	0.01%	0.00%	0.00%
BC WCVI Sport	0.48%	0.00%	0.31%	0.02%	0.21%	0.08%	0.86%	0.10%	0.00%	0.36%	0.92%	0.58%	0.81%
BC InstStr Net & Trl	6.22%	6.40%	5.38%	5.60%	8.77%	7.46%	4.03%	6.45%	4.22%	2.19%	1.61%	0.66%	8.04%
BC InstStr Sport	1.00%	0.30%	0.47%	0.43%	0.55%	0.96%	1.28%	2.96%	1.96%	1.78%	1.51%	7.15%	7.75%
BC GeoStr Spt & Trl	25.19%	17.19%	34.59%	38.01%	23.60%	28.05%	3.35%	28.23%	60.50%	16.34%	0.78%	4.22%	1.92%
BC GeoStr Net	1.11%	1.67%	2.35%	0.51%	0.79%	1.06%	0.99%	0.72%	0.62%	0.08%	0.00%	0.00%	0.00%
BC JDF Sport	1.53%	0.57%	0.83%	0.51%	1.54%	1.55%	3.68%	2.56%	1.46%	5.75%	2.85%	4.36%	23.27%
BC JDF Net & Troll	2.32%	1.40%	1.57%	0.35%	3.79%	1.76%	5.60%	1.15%	0.06%	5.73%	0.88%	0.16%	0.00%
BC Fraser Net & Spt	0.05%	0.06%	0.00%	0.00%	0.07%	0.12%	0.04%	0.02%	0.05%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	74.28%	68.70%	79.69%	75.57%	63.51%	72.38%	64.69%	80.16%	81.13%	78.96%	51.96%	67.20%	47.18%
SEAK All	0.28%	0.03%	0.06%	0.17%	0.24%	0.20%	0.34%	0.84%	1.17%	0.80%	6.49%	3.66%	0.51%
WA Ocean Troll	0.28%	0.19%	0.03%	0.15%	0.11%	0.33%	0.73%	0.47%	0.19%	0.00%	0.52%	0.58%	0.84%
WA Ocean Sport	0.23%	0.24%	0.15%	0.15%	0.12%	0.09%	0.56%	0.34%	0.32%	0.00%	0.58%	0.78%	0.60%
S of Falcon All	0.08%	0.11%	0.00%	0.13%	0.02%	0.00%	0.26%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	1.21%	1.10%	0.47%	0.85%	1.54%	1.01%	3.16%	0.73%	0.38%	0.38%	1.21%	1.11%	2.22%
San Juan Isl Net	1.13%	0.89%	0.00%	0.04%	2.56%	0.00%	3.37%	0.19%	0.00%	0.06%	0.30%	0.00%	1.94%
San Juan Isl Sport	0.08%	0.10%	0.14%	0.00%	0.09%	0.19%	0.05%	0.05%	0.43%	0.19%	0.08%	0.05%	2.06%
PS Sport (8-13)	0.01%	0.00%	0.00%	0.00%	0.04%	0.03%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%
PS Net (8-13)	0.03%	0.00%	0.00%	0.07%	0.09%	0.00%	0.08%	0.02%	0.00%	0.00%	0.06%	0.00%	0.00%
FW Net & Sport	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	3.35%	2.65%	0.85%	1.58%	4.79%	1.85%	8.54%	2.66%	2.49%	1.43%	9.32%	6.18%	8.17%
Total ER	77.62%	71.35%	80.53%	77.16%	68.30%	74.23%	73.23%	82.82%	83.62%	80.40%	61.27%	73.38%	55.35%
Escapement	84,866	200,062	39,940	109,801	117,624	77,843	109,376	31,458	36,042	28,106	166,994	48,314	21,595
Cohort (Ocean age-3)	379,266	698,203	205,182	480,644	371,091	302,063	408,532	183,160	219,977	143,382	431,199	181,485	48,366
Cohort (Jan age-3)	448,356	827,446	242,332	566,936	441,942	357,772	486,860	215,208	257,580	169,312	514,786	216,706	58,336

Table F.4. (Continued) Strait of Georgia Vancouver Island MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	---	---	---	---	---	---	1.37%	2.98%	1.28%	5.46%	2.42%	0.55%
BC No/Cent Net	---	---	---	---	---	---	0.59%	0.95%	0.19%	1.69%	0.78%	0.26%
BC No/Cent Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.65%	0.31%
BC WCVI Troll	---	---	---	---	---	---	0.04%	0.24%	0.60%	0.13%	0.11%	0.08%
BC WCVI Net	---	---	---	---	---	---	0.03%	0.07%	0.12%	0.11%	0.10%	0.02%
BC WCVI Sport	---	---	---	---	---	---	0.44%	1.12%	1.15%	1.64%	0.52%	1.46%
BC InstStr Net &Trl	---	---	---	---	---	---	0.74%	3.60%	2.70%	0.32%	1.04%	3.63%
BC InstStr Sport	---	---	---	---	---	---	0.00%	0.00%	0.04%	0.09%	1.92%	1.01%
BC GeoStr Spt &Trl	---	---	---	---	---	---	0.12%	0.11%	0.14%	0.48%	0.19%	0.21%
BC GeoStr Net	---	---	---	---	---	---	0.00%	0.02%	0.06%	0.01%	0.01%	0.15%
BC JDF Sport	---	---	---	---	---	---	0.21%	0.28%	0.24%	0.40%	0.07%	0.28%
BC JDF Net & Troll	---	---	---	---	---	---	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	---	---	---	---	---	---	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	---	---	---	---	---	---	3.54%	9.38%	6.52%	10.35%	7.83%	7.96%
SEAK All	---	---	---	---	---	---	0.44%	0.26%	0.21%	0.52%	0.37%	0.40%
WA Ocean Troll	---	---	---	---	---	---	0.54%	0.28%	0.51%	0.59%	0.07%	0.61%
WA Ocean Sport	---	---	---	---	---	---	0.19%	0.09%	0.09%	0.13%	0.03%	0.12%
S of Falcon All	---	---	---	---	---	---	0.01%	0.01%	0.01%	0.01%	0.00%	0.01%
U.S. JDF All	---	---	---	---	---	---	0.65%	0.37%	0.40%	0.76%	0.66%	1.06%
San Juan Isl Net	---	---	---	---	---	---	1.74%	0.64%	0.55%	0.31%	0.35%	1.47%
San Juan Isl Sport	---	---	---	---	---	---	0.09%	0.10%	0.01%	0.04%	0.01%	0.04%
PS Sport (8-13)	---	---	---	---	---	---	0.02%	0.02%	0.01%	0.02%	0.02%	0.05%
PS Net (8-13)	---	---	---	---	---	---	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
FW Net & Sport	---	---	---	---	---	---	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	---	---	---	---	---	---	3.69%	1.77%	1.79%	2.39%	1.52%	3.76%
Total ER	---	---	---	---	---	---	7.23%	11.15%	8.31%	12.74%	9.35%	11.72%
Escapement	---	---	---	---	---	---	170,607	25,684	33,790	138,569	10,021	40,543
Cohort (Ocean age-3)	---	---	---	---	---	---	183,909	28,907	36,852	158,796	11,054	45,924
Cohort (Jan age-3)	---	---	---	---	---	---	226,016	35,465	45,239	194,497	13,563	56,336

Table F.5. Skagit MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	0.90%	1.75%	0.44%	1.04%	0.35%	0.51%	0.12%	1.19%	0.67%	0.40%	0.00%	0.00%	0.00%
BC No/Cent Net	0.03%	0.08%	0.04%	0.03%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	25.74%	26.74%	21.24%	28.63%	26.98%	22.79%	29.58%	20.77%	16.65%	37.35%	29.66%	25.93%	0.01%
BC WCVI Net	0.21%	0.47%	0.03%	0.02%	0.66%	0.01%	0.00%	0.03%	0.01%	0.17%	0.00%	0.00%	0.00%
BC WCVI Sport	0.28%	0.00%	0.11%	0.01%	0.59%	0.11%	0.44%	0.23%	0.00%	0.24%	0.76%	0.41%	0.53%
BC InstStr Net & Trl	0.18%	0.27%	0.08%	0.26%	0.30%	0.17%	0.00%	0.15%	0.20%	0.05%	0.00%	0.02%	0.25%
BC InstStr Sport	0.06%	0.01%	0.00%	0.07%	0.00%	0.17%	0.00%	0.15%	0.16%	0.08%	0.00%	0.53%	0.00%
BC GeoStr Spt & Trl	4.46%	4.22%	2.68%	8.83%	4.55%	4.54%	0.04%	5.77%	17.33%	1.77%	0.00%	0.11%	0.10%
BC GeoStr Net	0.02%	0.01%	0.04%	0.00%	0.00%	0.02%	0.02%	0.03%	0.08%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	2.59%	0.72%	1.57%	2.22%	3.14%	1.26%	3.76%	5.49%	5.19%	3.62%	2.89%	5.17%	5.75%
BC JDF Net & Troll	6.14%	5.34%	5.99%	1.38%	11.43%	3.83%	3.90%	4.00%	0.20%	4.22%	1.98%	0.18%	0.13%
BC Fraser Net & Spt	0.04%	0.04%	0.01%	0.02%	0.03%	0.12%	0.00%	0.01%	0.11%	0.02%	0.00%	0.00%	0.00%
B.C. Sub-Total	40.64%	39.66%	32.24%	42.51%	48.11%	33.53%	37.86%	37.82%	40.59%	47.90%	35.29%	32.35%	6.79%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.20%	0.02%	0.00%	0.00%	0.00%
WA Ocean Troll	3.07%	2.45%	2.78%	1.70%	4.21%	2.86%	2.39%	2.55%	0.84%	0.00%	2.80%	1.51%	1.08%
WA Ocean Sport	1.54%	1.02%	1.30%	1.34%	1.10%	1.25%	2.98%	1.51%	1.58%	0.00%	1.39%	2.02%	1.32%
S of Falcon All	0.71%	0.74%	0.54%	2.14%	0.27%	0.01%	0.76%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	6.35%	6.59%	4.25%	4.27%	5.41%	6.48%	10.22%	5.33%	2.05%	0.18%	4.36%	2.96%	5.70%
San Juan Isl Net	1.13%	1.63%	0.61%	0.59%	2.35%	0.25%	0.71%	0.47%	0.47%	0.06%	0.24%	0.32%	0.35%
San Juan Isl Sport	0.26%	0.65%	0.03%	0.18%	0.41%	0.10%	0.09%	0.24%	0.09%	0.40%	0.21%	0.31%	3.79%
PS Sport (8-13)	2.10%	0.93%	1.95%	1.67%	1.30%	1.30%	2.85%	2.14%	0.90%	0.57%	1.72%	2.82%	11.78%
PS Net (8-13)	8.41%	12.88%	11.43%	10.98%	5.67%	15.92%	3.95%	0.65%	0.09%	0.12%	0.70%	0.05%	0.49%
FW Net & Sport	1.92%	1.12%	0.40%	1.56%	0.43%	1.80%	3.30%	5.48%	1.80%	1.66%	3.54%	1.89%	6.91%
U.S. Sub-Total	25.49%	27.99%	23.29%	24.43%	21.17%	29.99%	27.27%	18.62%	8.03%	3.01%	14.95%	11.88%	31.42%
Total ER	66.14%	67.66%	55.53%	66.94%	69.28%	63.52%	65.13%	56.44%	48.62%	50.91%	50.24%	44.24%	38.21%
Escapement	60,487	107,417	116,119	67,091	67,608	31,794	28,381	28,125	35,768	53,112	42,976	26,948	38,998
Cohort (Ocean age-3)	178,618	332,111	261,093	202,907	220,046	87,154	81,398	64,568	69,613	108,191	86,373	48,324	63,114
Cohort (Jan age-3)	213,782	397,120	314,582	242,590	262,494	104,848	97,510	77,332	83,420	129,886	103,982	58,516	76,936

Table F.5. (Continued) Skagit MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.00%	0.02%	0.01%	0.03%	0.04%	0.03%	0.13%	0.06%	0.01%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.01%	0.05%	0.01%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.16%	0.23%	0.16%	0.11%	0.09%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.07%	0.17%	0.03%	0.19%	0.22%	0.33%	0.31%	0.01%
BC WCVI Sport	0.00%	0.15%	0.12%	0.62%	0.56%	0.26%	0.40%	0.66%	0.98%	1.46%	0.51%	1.14%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.09%	0.07%	0.00%	0.01%	0.05%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.04%
BC GeoStr Spt & Trl	0.01%	0.00%	0.01%	0.18%	0.05%	0.01%	0.00%	0.01%	0.01%	0.03%	0.01%	0.02%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.01%	0.01%	0.05%	0.19%	0.37%	0.40%	0.22%	0.32%	0.24%	0.44%	0.07%	0.32%
BC JDF Net & Troll	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.03%	0.17%	0.19%	1.00%	1.07%	0.85%	0.76%	1.52%	1.80%	2.60%	1.17%	1.70%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WA Ocean Troll	0.51%	1.43%	0.15%	2.13%	1.44%	0.84%	3.34%	1.81%	3.98%	3.52%	1.19%	3.68%
WA Ocean Sport	1.07%	0.34%	0.96%	0.54%	0.46%	0.81%	0.88%	0.41%	0.51%	0.69%	0.17%	0.62%
S of Falcon All	0.02%	0.03%	0.03%	0.03%	0.03%	0.07%	0.07%	0.02%	0.04%	0.07%	0.01%	0.05%
U.S. JDF All	3.50%	0.66%	0.57%	3.18%	1.82%	1.92%	2.36%	1.33%	1.28%	2.99%	2.32%	2.43%
San Juan Isl Net	0.72%	0.77%	0.91%	0.74%	0.78%	0.74%	1.39%	0.79%	1.51%	0.63%	1.22%	1.18%
San Juan Isl Sport	0.26%	0.10%	0.20%	0.19%	0.14%	0.08%	0.05%	0.05%	0.02%	0.04%	0.05%	0.08%
PS Sport (8-13)	4.24%	2.61%	3.14%	5.38%	1.97%	2.77%	1.44%	2.02%	1.76%	2.61%	1.37%	3.01%
PS Net (8-13)	1.53%	2.16%	5.10%	2.09%	3.12%	1.32%	2.05%	1.44%	2.01%	1.15%	3.13%	3.19%
FW Net & Sport	11.66%	19.14%	24.71%	19.08%	11.26%	12.83%	6.27%	26.35%	20.24%	23.12%	21.51%	14.62%
U.S. Sub-Total	23.51%	27.23%	35.78%	33.35%	21.02%	21.39%	17.87%	34.23%	31.35%	34.82%	30.97%	28.86%
Total ER	23.54%	27.40%	35.97%	34.35%	22.09%	22.24%	18.63%	35.76%	33.15%	37.41%	32.14%	30.55%
Escapement	72,734	29,699	60,960	87,017	55,968	88,712	118,220	34,713	7,702	51,972	24,092	60,798
Cohort (Ocean age-3)	95,128	40,908	95,209	132,539	71,836	114,082	145,283	54,034	11,521	83,037	35,502	87,545
Cohort (Jan age-3)	116,731	50,267	117,015	162,512	88,217	140,087	178,225	66,345	14,123	101,703	43,603	107,263

Table F.6. Stillaguamish MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	0.61%	0.85%	0.45%	1.08%	0.30%	0.32%	0.05%	0.78%	0.51%	0.00%	0.00%	0.00%	0.24%
BC No/Cent Net	0.03%	0.05%	0.01%	0.00%	0.07%	0.05%	0.00%	0.00%	0.07%	0.01%	0.09%	0.00%	0.01%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	23.18%	19.20%	22.88%	27.55%	22.12%	25.64%	23.02%	18.57%	27.76%	24.60%	21.94%	22.68%	0.00%
BC WCVI Net	0.16%	0.18%	0.03%	0.07%	0.60%	0.00%	0.00%	0.01%	0.00%	0.07%	0.00%	0.00%	0.00%
BC WCVI Sport	0.18%	0.00%	0.11%	0.03%	0.37%	0.04%	0.37%	0.05%	0.07%	0.14%	0.08%	0.70%	0.22%
BC InstStr Net &Trl	0.05%	0.05%	0.08%	0.06%	0.05%	0.08%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.07%
BC InstStr Sport	0.01%	0.00%	0.03%	0.00%	0.00%	0.04%	0.00%	0.02%	0.20%	0.07%	0.04%	0.00%	0.68%
BC GeoStr Spt &Trl	0.27%	0.25%	0.15%	0.83%	0.09%	0.25%	0.04%	0.25%	1.00%	0.06%	0.00%	0.05%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.93%	0.42%	0.70%	0.42%	1.39%	1.71%	0.80%	1.13%	6.71%	0.90%	0.70%	4.69%	2.41%
BC JDF Net & Troll	3.65%	3.45%	3.42%	1.73%	4.90%	3.36%	3.20%	1.68%	0.13%	2.18%	0.60%	0.03%	0.20%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	29.09%	24.44%	27.85%	31.77%	29.90%	31.52%	27.48%	22.56%	36.52%	28.02%	23.44%	28.15%	3.83%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.04%	0.00%	0.00%	0.05%
WA Ocean Troll	2.28%	1.45%	2.75%	1.43%	1.88%	3.76%	1.30%	1.28%	1.54%	0.00%	1.01%	1.41%	1.08%
WA Ocean Sport	1.12%	0.75%	1.32%	0.73%	0.69%	1.51%	1.13%	1.31%	3.06%	0.00%	1.48%	2.42%	1.72%
S of Falcon All	0.80%	0.94%	0.49%	2.07%	0.29%	0.05%	0.78%	0.80%	0.08%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	4.64%	4.22%	4.26%	3.11%	4.45%	6.91%	5.39%	1.75%	3.59%	0.06%	2.78%	4.61%	3.28%
San Juan Isl Net	0.18%	0.06%	0.07%	0.19%	0.39%	0.02%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%
San Juan Isl Sport	0.06%	0.11%	0.00%	0.11%	0.09%	0.10%	0.00%	0.00%	0.13%	0.00%	0.00%	0.01%	0.87%
PS Sport (8-13)	3.14%	1.87%	2.31%	1.91%	1.34%	2.55%	1.84%	0.49%	4.09%	0.43%	1.66%	3.22%	11.46%
PS Net (8-13)	19.88%	25.48%	26.22%	27.02%	26.76%	13.80%	34.95%	33.04%	15.25%	22.96%	16.93%	19.43%	19.99%
FW Net & Sport	7.56%	8.00%	10.38%	4.65%	8.83%	7.89%	4.62%	2.02%	1.07%	0.03%	0.52%	0.07%	0.28%
U.S. Sub-Total	39.67%	42.88%	47.80%	41.23%	44.72%	36.58%	50.35%	40.69%	28.92%	23.52%	24.39%	31.16%	38.91%
Total ER	68.76%	67.32%	75.65%	72.99%	74.62%	68.10%	77.83%	63.26%	65.44%	51.54%	47.83%	59.31%	42.73%
Escapement	13,257	25,080	14,853	14,508	6,991	17,997	6,065	13,245	10,399	26,115	22,761	10,368	10,922
Cohort (Ocean age-3)	42,432	76,751	60,994	53,717	27,548	56,422	27,357	36,045	30,089	53,892	43,631	25,477	19,073
Cohort (Jan age-3)	51,160	92,674	73,594	64,774	33,288	67,866	32,952	43,660	36,058	65,280	52,840	30,812	23,232

Table F.6. (Continued) Stillaguamish MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.03%	0.02%	0.07%	0.03%	0.01%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.02%	0.01%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.20%	0.12%	0.09%	0.07%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.02%	0.12%	0.12%	0.22%	0.20%	0.01%
BC WCVI Sport	0.00%	0.10%	0.08%	0.37%	0.37%	0.15%	0.24%	0.42%	0.59%	0.89%	0.33%	0.71%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.00%	0.02%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.01%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.02%	0.07%	0.11%	0.14%	0.07%	0.10%	0.08%	0.16%	0.02%	0.11%
BC JDF Net & Troll	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.01%	0.11%	0.10%	0.45%	0.53%	0.42%	0.40%	0.83%	1.03%	1.48%	0.73%	0.95%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WA Ocean Troll	0.26%	0.79%	0.09%	1.44%	1.10%	0.65%	2.24%	1.26%	2.77%	2.27%	0.86%	2.41%
WA Ocean Sport	0.58%	0.23%	0.67%	0.34%	0.32%	0.53%	0.53%	0.25%	0.35%	0.42%	0.12%	0.41%
S of Falcon All	0.02%	0.03%	0.03%	0.03%	0.03%	0.07%	0.08%	0.02%	0.04%	0.07%	0.01%	0.06%
U.S. JDF All	1.88%	0.45%	0.42%	2.35%	1.32%	1.36%	1.81%	0.98%	1.18%	2.25%	1.89%	2.06%
San Juan Isl Net	0.07%	0.07%	0.08%	0.06%	0.07%	0.06%	0.11%	0.09%	0.21%	0.06%	0.11%	0.14%
San Juan Isl Sport	0.08%	0.02%	0.07%	0.06%	0.05%	0.03%	0.02%	0.02%	0.00%	0.01%	0.01%	0.02%
PS Sport (8-13)	5.52%	4.10%	6.96%	6.09%	3.04%	3.69%	1.87%	2.41%	1.17%	2.91%	1.39%	4.97%
PS Net (8-13)	12.21%	16.33%	24.82%	13.89%	4.01%	0.70%	4.71%	11.71%	11.55%	11.43%	17.98%	13.88%
FW Net & Sport	3.12%	0.71%	1.10%	0.18%	0.13%	0.01%	0.01%	8.22%	2.60%	4.20%	0.31%	3.22%
U.S. Sub-Total	23.73%	22.74%	34.25%	24.44%	10.09%	7.10%	11.38%	24.97%	19.86%	23.62%	22.68%	27.16%
Total ER	23.75%	22.85%	34.35%	24.89%	10.62%	7.51%	11.78%	25.79%	20.90%	25.09%	23.41%	28.11%
Escapement	27,271	6,996	28,293	74,773	27,305	45,691	65,228	25,141	8,549	38,732	12,938	22,179
Cohort (Ocean age-3)	35,764	9,068	43,097	99,550	30,550	49,401	73,935	33,880	10,808	51,708	16,892	30,849
Cohort (Jan age-3)	43,848	11,114	52,728	122,075	37,541	60,714	90,783	41,588	13,247	63,361	20,711	37,763

Table F.7. Snohomish MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	0.61%	0.86%	0.46%	1.08%	0.30%	0.32%	0.05%	0.78%	0.51%	0.00%	0.00%	0.00%	0.24%
BC No/Cent Net	0.03%	0.05%	0.01%	0.00%	0.07%	0.05%	0.00%	0.00%	0.07%	0.01%	0.09%	0.00%	0.01%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	23.21%	19.22%	22.92%	27.57%	22.16%	25.64%	23.04%	18.57%	27.76%	24.59%	21.93%	22.66%	0.00%
BC WCVI Net	0.16%	0.18%	0.03%	0.07%	0.61%	0.00%	0.00%	0.01%	0.00%	0.07%	0.00%	0.00%	0.00%
BC WCVI Sport	0.18%	0.00%	0.11%	0.03%	0.37%	0.04%	0.37%	0.05%	0.07%	0.14%	0.08%	0.70%	0.22%
BC InstStr Net & Trl	0.05%	0.05%	0.08%	0.06%	0.05%	0.08%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.07%
BC InstStr Sport	0.01%	0.00%	0.03%	0.00%	0.00%	0.04%	0.00%	0.02%	0.20%	0.07%	0.04%	0.00%	0.67%
BC GeoStr Spt & Trl	0.27%	0.25%	0.15%	0.83%	0.09%	0.25%	0.04%	0.25%	1.00%	0.06%	0.00%	0.05%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.94%	0.42%	0.70%	0.42%	1.39%	1.71%	0.80%	1.13%	6.71%	0.90%	0.69%	4.68%	2.40%
BC JDF Net & Troll	3.65%	3.45%	3.42%	1.73%	4.91%	3.36%	3.20%	1.68%	0.13%	2.18%	0.60%	0.03%	0.20%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	29.12%	24.48%	27.90%	31.79%	29.95%	31.52%	27.50%	22.56%	36.52%	28.01%	23.43%	28.13%	3.82%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.04%	0.00%	0.00%	0.05%
WA Ocean Troll	2.29%	1.45%	2.76%	1.43%	1.89%	3.76%	1.30%	1.28%	1.54%	0.00%	1.01%	1.41%	1.08%
WA Ocean Sport	1.12%	0.75%	1.32%	0.73%	0.69%	1.51%	1.13%	1.31%	3.06%	0.00%	1.48%	2.41%	1.72%
S of Falcon All	0.80%	0.95%	0.49%	2.07%	0.29%	0.05%	0.78%	0.80%	0.08%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	4.64%	4.23%	4.26%	3.12%	4.46%	6.91%	5.40%	1.75%	3.59%	0.06%	2.78%	4.61%	3.28%
San Juan Isl Net	0.18%	0.06%	0.07%	0.19%	0.39%	0.02%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%
San Juan Isl Sport	0.06%	0.11%	0.00%	0.11%	0.09%	0.10%	0.00%	0.00%	0.13%	0.00%	0.00%	0.01%	0.87%
PS Sport (8-13)	3.51%	1.99%	2.62%	1.98%	1.45%	2.54%	2.07%	0.49%	4.11%	0.43%	1.67%	3.22%	11.47%
PS Net (8-13)	21.09%	25.51%	26.26%	27.04%	26.80%	21.78%	34.98%	33.04%	15.25%	22.95%	16.92%	19.41%	19.96%
FW Net & Sport	0.59%	0.41%	0.34%	0.40%	0.24%	0.15%	0.31%	0.81%	0.55%	0.67%	1.37%	1.56%	3.54%
U.S. Sub-Total	34.27%	35.46%	38.14%	37.08%	36.31%	36.81%	46.30%	39.49%	28.43%	24.15%	25.24%	32.63%	42.13%
Total ER	63.39%	59.94%	66.03%	68.87%	66.26%	68.33%	73.80%	62.05%	64.95%	52.16%	48.67%	60.76%	45.95%
Escapement	77,907	117,354	93,277	75,848	94,509	89,791	43,802	74,300	51,263	142,826	110,320	52,906	58,188
Cohort (Ocean age-3)	212,796	292,958	274,616	243,618	280,115	283,508	167,185	195,808	146,245	298,572	214,914	134,815	107,661
Cohort (Jan age-3)	256,510	353,728	331,334	293,756	338,472	340,704	201,368	237,172	175,258	361,668	260,278	163,050	131,142

Table F.7. (Continued) Snohomish MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.03%	0.02%	0.07%	0.03%	0.01%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.02%	0.01%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.20%	0.12%	0.09%	0.07%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.02%	0.12%	0.12%	0.22%	0.20%	0.01%
BC WCVI Sport	0.00%	0.10%	0.08%	0.37%	0.37%	0.15%	0.24%	0.42%	0.59%	0.89%	0.33%	0.71%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.00%	0.02%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.01%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.02%	0.07%	0.11%	0.14%	0.07%	0.10%	0.08%	0.16%	0.02%	0.11%
BC JDF Net & Troll	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.01%	0.11%	0.10%	0.45%	0.54%	0.42%	0.40%	0.83%	1.04%	1.48%	0.73%	0.95%
SEAK All	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WA Ocean Troll	0.26%	0.79%	0.09%	1.44%	1.10%	0.65%	2.25%	1.27%	2.77%	2.27%	0.86%	2.41%
WA Ocean Sport	0.58%	0.23%	0.68%	0.34%	0.32%	0.53%	0.53%	0.25%	0.35%	0.42%	0.12%	0.41%
S of Falcon All	0.02%	0.03%	0.03%	0.03%	0.03%	0.07%	0.08%	0.02%	0.04%	0.07%	0.01%	0.06%
U.S. JDF All	1.88%	0.45%	0.42%	2.35%	1.33%	1.36%	1.81%	0.98%	1.18%	2.25%	1.90%	2.05%
San Juan Isl Net	0.07%	0.07%	0.08%	0.06%	0.07%	0.06%	0.11%	0.09%	0.21%	0.06%	0.12%	0.14%
San Juan Isl Sport	0.08%	0.02%	0.06%	0.06%	0.05%	0.03%	0.02%	0.02%	0.00%	0.01%	0.01%	0.02%
PS Sport (8-13)	6.15%	4.63%	8.07%	6.71%	3.44%	4.12%	2.07%	2.66%	1.25%	3.17%	1.47%	5.48%
PS Net (8-13)	12.43%	16.68%	25.59%	13.99%	4.45%	0.77%	5.23%	11.96%	11.82%	11.72%	18.76%	14.68%
FW Net & Sport	1.53%	2.86%	4.46%	2.30%	1.87%	0.01%	0.01%	3.52%	1.54%	3.74%	3.62%	0.13%
U.S. Sub-Total	23.01%	25.76%	39.49%	27.27%	12.66%	7.60%	12.10%	20.76%	19.17%	23.71%	26.85%	25.38%
Total ER	23.02%	25.87%	39.59%	27.72%	13.20%	8.02%	12.50%	21.59%	20.21%	25.19%	27.58%	26.33%
Escapement	149,984	61,282	94,093	261,550	161,441	182,599	252,767	109,023	75,630	117,736	36,015	98,945
Cohort (Ocean age-3)	194,837	82,671	155,760	361,841	185,983	198,510	288,890	139,047	94,782	157,388	49,733	134,310
Cohort (Jan age-3)	238,835	101,316	190,500	443,665	228,522	243,949	354,686	170,666	116,168	192,838	60,968	164,372

Table F.8. Hood Canal MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	0.81%	1.43%	0.67%	0.00%	0.44%	0.89%	0.11%	1.81%	0.71%	0.04%	0.00%	0.12%	0.16%
BC No/Cent Net	0.02%	0.00%	0.00%	0.00%	0.10%	0.03%	0.00%	0.00%	0.24%	0.03%	0.00%	0.00%	0.01%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	36.30%	29.16%	30.81%	31.79%	27.96%	40.70%	30.78%	49.26%	34.56%	33.46%	23.55%	18.70%	0.00%
BC WCVI Net	0.15%	0.01%	0.05%	0.05%	0.73%	0.02%	0.00%	0.08%	0.04%	0.11%	0.00%	0.00%	0.00%
BC WCVI Sport	0.33%	0.00%	0.22%	0.00%	0.24%	0.01%	0.51%	0.29%	0.14%	0.19%	0.38%	0.20%	0.32%
BC InstStr Net & Trl	0.10%	0.01%	0.10%	0.06%	0.12%	0.02%	0.00%	0.23%	0.39%	0.17%	0.00%	0.00%	0.00%
BC InstStr Sport	0.04%	0.00%	0.01%	0.00%	0.05%	0.00%	0.02%	0.20%	0.10%	0.00%	0.00%	0.15%	0.13%
BC GeoStr Spt & Trl	0.32%	0.20%	0.10%	0.99%	0.00%	0.35%	0.01%	0.54%	1.80%	0.09%	0.12%	0.08%	0.01%
BC GeoStr Net	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.07%	0.10%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	2.09%	0.33%	1.12%	0.28%	2.84%	2.19%	1.75%	5.59%	6.35%	2.24%	1.00%	3.44%	2.94%
BC JDF Net & Troll	5.96%	4.07%	4.32%	1.65%	10.38%	5.29%	4.61%	5.47%	0.24%	4.77%	0.88%	0.10%	0.15%
BC Fraser Net & Spt	0.02%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.03%	0.00%	0.02%	0.00%	0.00%	0.00%
B.C. Sub-Total	46.16%	35.20%	37.41%	34.83%	42.86%	49.60%	37.78%	63.56%	44.66%	41.10%	25.94%	22.79%	3.71%
SEAK All	0.02%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.06%	0.44%	0.00%	0.04%	0.15%	0.08%
WA Ocean Troll	3.21%	2.12%	3.17%	2.18%	2.72%	3.95%	2.95%	3.17%	1.81%	0.00%	1.68%	0.69%	0.89%
WA Ocean Sport	1.90%	0.96%	1.39%	1.96%	1.39%	1.70%	2.11%	2.92%	3.90%	0.00%	0.95%	1.25%	0.86%
S of Falcon All	1.22%	1.46%	1.05%	3.51%	0.12%	0.00%	1.07%	0.99%	0.27%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	8.90%	6.89%	7.54%	6.97%	9.04%	11.86%	12.06%	7.64%	5.31%	0.00%	1.72%	4.48%	3.85%
San Juan Isl Net	0.21%	0.13%	0.05%	0.00%	0.36%	0.10%	0.25%	0.25%	0.05%	0.00%	0.02%	0.00%	0.00%
San Juan Isl Sport	0.06%	0.00%	0.00%	0.00%	0.19%	0.14%	0.00%	0.09%	1.02%	0.00%	0.00%	0.00%	1.47%
PS Sport (8-13)	3.35%	2.08%	2.85%	4.27%	1.58%	1.69%	2.83%	5.80%	4.61%	0.14%	0.49%	0.48%	2.61%
PS Net (8-13)	20.53%	29.32%	31.70%	23.29%	21.68%	23.87%	22.80%	8.53%	5.05%	10.01%	5.50%	6.15%	4.18%
FW Net & Sport	1.09%	0.89%	4.64%	0.60%	2.52%	1.07%	0.20%	0.15%	0.10%	0.04%	0.03%	0.00%	0.32%
U.S. Sub-Total	40.49%	43.84%	52.39%	42.78%	39.61%	44.42%	44.28%	29.61%	22.56%	10.19%	10.42%	13.21%	14.25%
Total ER	86.64%	79.05%	89.81%	77.61%	82.47%	94.02%	82.06%	93.18%	67.22%	51.29%	36.35%	36.00%	17.96%
Escapement	18,934	41,475	19,247	11,726	15,022	6,799	12,851	19,302	22,293	56,481	41,074	43,606	95,760
Cohort (Ocean age-3)	141,772	197,935	188,868	52,371	85,682	113,774	71,648	282,855	68,011	115,957	64,534	68,137	116,719
Cohort (Jan age-3)	168,920	237,280	226,348	62,804	102,490	135,204	85,710	332,600	81,072	139,564	78,116	82,812	142,918

Table F.8. (Continued) Hood Canal MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.00%	0.05%	0.04%	0.07%	0.11%	0.07%	0.25%	0.09%	0.04%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%	0.03%	0.01%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.06%	0.29%	0.51%	0.28%	0.14%	0.12%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.07%	0.17%	0.02%	0.18%	0.17%	0.32%	0.30%	0.01%
BC WCVI Sport	0.00%	0.29%	0.14%	0.65%	0.63%	0.20%	0.36%	0.87%	0.88%	1.32%	0.54%	1.20%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.03%	0.00%	0.01%	0.04%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.04%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.01%	0.01%	0.06%	0.19%	0.34%	0.35%	0.20%	0.26%	0.22%	0.41%	0.07%	0.28%
BC JDF Net & Troll	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.03%	0.30%	0.20%	0.85%	1.09%	0.77%	0.73%	1.77%	1.89%	2.63%	1.24%	1.73%
SEAK All	0.03%	0.03%	0.04%	0.04%	0.03%	0.01%	0.02%	0.01%	0.01%	0.02%	0.01%	0.02%
WA Ocean Troll	0.41%	1.24%	0.13%	2.07%	1.49%	1.00%	3.59%	1.96%	4.12%	3.89%	1.07%	3.99%
WA Ocean Sport	1.37%	0.58%	1.24%	0.67%	0.59%	0.92%	1.06%	0.52%	0.52%	0.85%	0.21%	0.76%
S of Falcon All	0.03%	0.06%	0.03%	0.03%	0.05%	0.10%	0.11%	0.03%	0.06%	0.11%	0.01%	0.12%
U.S. JDF All	4.79%	0.99%	0.94%	5.05%	2.87%	2.96%	3.80%	2.08%	2.13%	4.76%	4.16%	4.83%
San Juan Isl Net	0.03%	0.03%	0.04%	0.03%	0.05%	0.08%	0.15%	0.12%	0.14%	0.04%	0.05%	0.14%
San Juan Isl Sport	0.07%	0.02%	0.05%	0.04%	0.02%	0.02%	0.01%	0.01%	0.00%	0.01%	0.02%	0.03%
PS Sport (8-13)	9.85%	4.77%	8.67%	12.43%	5.03%	6.12%	4.46%	6.92%	5.66%	5.85%	3.59%	7.44%
PS Net (8-13)	13.44%	10.93%	20.47%	7.85%	9.42%	8.27%	20.87%	36.13%	53.20%	31.14%	46.68%	35.73%
FW Net & Sport	0.90%	0.77%	9.00%	3.00%	2.38%	2.13%	4.21%	2.26%	9.72%	2.38%	5.50%	4.13%
U.S. Sub-Total	30.92%	19.43%	40.60%	31.21%	21.93%	21.61%	38.28%	50.04%	75.57%	49.05%	61.31%	57.19%
Total ER	30.95%	19.73%	40.80%	32.07%	23.02%	22.38%	39.01%	51.81%	77.47%	51.68%	62.55%	58.92%
Escapement	100,711	16,430	27,094	94,579	69,296	172,345	146,873	38,063	13,665	46,657	11,755	28,407
Cohort (Ocean age-3)	145,845	20,468	45,767	139,222	90,018	222,030	240,822	78,979	60,643	96,565	31,385	69,145
Cohort (Jan age-3)	178,554	25,124	56,131	170,380	110,404	272,265	294,972	96,360	73,850	117,900	38,421	84,204

Table F.9. U.S. Strait of Juan de Fuca MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	1.55%	2.98%	0.36%	1.94%	0.58%	2.14%	0.00%	1.84%	0.00%	0.00%	0.00%	0.37%	0.69%
BC No/Cent Net	0.10%	0.00%	0.00%	0.00%	0.12%	0.41%	0.00%	0.12%	0.00%	0.11%	0.00%	0.00%	0.07%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	36.39%	46.49%	25.14%	36.30%	25.91%	44.77%	24.76%	40.71%	12.89%	25.10%	26.41%	31.39%	0.00%
BC WCVI Net	0.12%	0.00%	0.00%	0.06%	0.60%	0.03%	0.00%	0.15%	0.08%	0.00%	0.00%	0.00%	0.00%
BC WCVI Sport	0.13%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.61%	0.00%	0.00%	0.00%	0.15%	0.95%
BC InstStr Net & Trl	0.11%	0.03%	0.00%	0.00%	0.25%	0.15%	0.08%	0.22%	0.00%	0.21%	0.00%	0.05%	0.16%
BC InstStr Sport	0.07%	0.00%	0.00%	0.00%	0.03%	0.43%	0.00%	0.00%	0.00%	0.00%	0.00%	0.95%	0.55%
BC GeoStr Spt & Trl	0.24%	0.14%	0.00%	0.73%	0.12%	0.58%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	1.16%	0.54%	0.00%	2.62%	1.29%	0.55%	1.39%	1.90%	1.38%	1.33%	0.99%	2.93%	6.03%
BC JDF Net & Troll	2.78%	3.29%	1.89%	0.32%	4.13%	1.06%	3.44%	2.42%	0.00%	3.32%	0.28%	0.08%	0.32%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	42.66%	53.46%	27.39%	41.97%	33.17%	50.11%	29.67%	48.09%	14.35%	30.06%	27.68%	35.92%	8.77%
SEAK All	0.36%	0.40%	0.00%	0.00%	0.20%	0.14%	0.00%	1.72%	0.00%	0.00%	0.48%	0.88%	0.13%
WA Ocean Troll	2.62%	1.01%	3.14%	1.80%	2.26%	4.14%	1.67%	2.26%	0.45%	0.00%	1.34%	0.61%	1.11%
WA Ocean Sport	1.07%	0.40%	1.50%	1.29%	0.48%	0.97%	1.76%	0.92%	0.97%	0.01%	0.92%	1.72%	1.30%
S of Falcon All	1.88%	1.73%	1.06%	5.94%	0.78%	0.00%	2.68%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	14.86%	12.88%	26.20%	13.27%	15.04%	14.32%	19.71%	6.30%	3.85%	3.26%	4.94%	9.99%	9.70%
San Juan Isl Net	0.18%	0.06%	0.00%	0.00%	0.78%	0.05%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.32%
PS Sport (8-13)	0.09%	0.19%	0.00%	0.00%	0.23%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	2.84%
PS Net (8-13)	0.61%	1.84%	0.00%	0.22%	1.21%	0.18%	0.00%	0.52%	0.00%	0.14%	0.19%	0.00%	7.34%
FW Net & Sport	0.05%	0.08%	0.00%	0.00%	0.02%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. Sub-Total	21.73%	18.58%	31.91%	22.52%	21.03%	19.80%	25.95%	12.59%	5.27%	3.41%	7.87%	13.21%	26.98%
Total ER	64.38%	72.05%	59.30%	64.49%	54.20%	69.91%	55.63%	60.68%	19.62%	33.47%	35.55%	49.14%	35.75%
Escapement	10,713	14,149	9,924	9,347	13,424	8,833	9,764	11,234	9,352	7,641	14,791	9,880	13,064
Cohort (Ocean age-3)	30,079	50,617	24,381	26,324	29,306	29,358	22,004	28,571	11,634	11,486	22,952	19,426	20,332
Cohort (Jan age-3)	36,046	60,214	29,462	31,538	35,340	35,086	26,468	34,220	14,192	13,918	27,798	23,548	24,748

Table F.9. (Continued) U.S. Strait of Juan de Fuca MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.00%	0.16%	0.10%	0.21%	0.40%	0.17%	0.78%	0.25%	0.09%
BC No/Cent Net	0.00%	0.00%	0.01%	0.00%	0.01%	0.00%	0.05%	0.07%	0.03%	0.27%	0.00%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.08%	0.30%	0.60%	0.25%	0.19%	0.14%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.05%	0.11%	0.02%	0.13%	0.14%	0.22%	0.20%	0.01%
BC WCVI Sport	0.00%	0.06%	0.06%	0.30%	0.26%	0.12%	0.19%	0.30%	0.46%	0.68%	0.23%	0.53%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.11%	0.03%	0.01%	0.03%	0.05%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.06%	0.03%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.01%	0.04%	0.11%	0.21%	0.21%	0.11%	0.14%	0.13%	0.26%	0.04%	0.16%
BC JDF Net & Troll	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.02%	0.08%	0.10%	0.43%	0.69%	0.56%	0.68%	1.46%	1.56%	2.48%	1.02%	1.02%
SEAK All	0.55%	0.64%	0.63%	0.69%	0.50%	0.32%	0.51%	0.39%	0.30%	0.55%	0.40%	0.40%
WA Ocean Troll	0.27%	0.86%	0.12%	1.85%	1.25%	0.65%	2.78%	1.52%	3.12%	2.79%	0.92%	3.04%
WA Ocean Sport	0.51%	0.21%	0.81%	0.31%	0.33%	0.40%	0.39%	0.21%	0.22%	0.41%	0.10%	0.37%
S of Falcon All	0.03%	0.07%	0.03%	0.04%	0.08%	0.15%	0.16%	0.06%	0.16%	0.16%	0.01%	0.14%
U.S. JDF All	12.54%	12.27%	18.84%	15.99%	11.99%	6.08%	6.67%	11.01%	9.01%	14.64%	10.71%	24.24%
San Juan Isl Net	0.00%	0.00%	0.00%	0.01%	0.06%	0.12%	0.28%	0.07%	0.08%	0.04%	0.04%	0.12%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.20%	0.13%	0.11%	0.26%	0.09%	0.13%	0.08%	0.12%	0.07%	0.12%	0.09%	0.22%
PS Net (8-13)	0.08%	0.15%	0.16%	0.10%	0.08%	0.05%	0.09%	0.22%	0.24%	0.23%	0.12%	0.25%
FW Net & Sport	0.02%	0.01%	0.01%	0.03%	0.00%	0.01%	0.01%	0.00%	0.00%	0.01%	0.01%	0.02%
U.S. Sub-Total	14.22%	14.33%	20.73%	19.28%	14.37%	7.92%	10.96%	13.61%	13.21%	18.94%	12.39%	28.80%
Total ER	14.24%	14.41%	20.83%	19.71%	15.07%	8.48%	11.65%	15.06%	14.76%	21.42%	13.41%	29.81%
Escapement	18,021	8,485	22,654	35,274	22,375	20,991	20,987	11,105	3,940	8,045	3,339	17,340
Cohort (Ocean age-3)	21,013	9,913	28,616	43,932	26,344	22,937	23,753	13,075	4,622	10,238	3,856	24,705
Cohort (Jan age-3)	25,807	12,188	35,162	53,946	32,381	28,195	29,166	16,066	5,674	12,552	4,738	30,304

Table F.10. Quillayute MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	0.98%	2.93%	0.73%	0.69%	0.46%	0.32%	0.44%	0.33%	1.79%	0.00%	0.00%	0.21%	2.74%
BC No/Cent Net	0.02%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%	0.00%	0.00%	0.35%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%
BC WCVI Troll	23.59%	41.23%	18.04%	26.02%	22.24%	10.44%	29.24%	6.62%	37.96%	19.85%	15.43%	20.71%	0.00%
BC WCVI Net	0.33%	1.25%	0.00%	0.05%	0.03%	0.00%	0.05%	0.01%	0.00%	0.00%	0.02%	0.00%	0.00%
BC WCVI Sport	0.03%	0.00%	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.37%	0.92%
BC InstStr Net & Trl	0.07%	0.12%	0.00%	0.08%	0.11%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Spt & Trl	0.03%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.35%	0.00%	0.00%	0.00%	0.22%	0.00%	1.59%	0.45%	0.00%	1.11%	0.00%	0.00%	0.00%
BC JDF Net & Troll	0.94%	0.71%	0.46%	0.14%	1.32%	0.98%	1.60%	0.11%	0.00%	1.77%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	26.36%	46.39%	19.23%	26.98%	24.63%	11.74%	32.96%	7.66%	39.74%	23.33%	15.45%	21.52%	4.90%
SEAK All	0.07%	0.05%	0.17%	0.00%	0.00%	0.00%	0.24%	0.00%	0.28%	0.25%	0.97%	0.24%	0.00%
WA Ocean Troll	4.95%	3.49%	2.36%	2.59%	9.57%	2.19%	6.65%	1.97%	6.68%	0.00%	2.63%	2.91%	1.18%
WA Ocean Sport	1.98%	2.14%	1.42%	1.07%	1.64%	1.70%	4.99%	0.66%	6.24%	0.00%	4.71%	4.92%	8.14%
S of Falcon All	4.68%	5.27%	3.37%	9.28%	3.70%	1.21%	7.86%	1.11%	2.04%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	1.52%	0.91%	0.94%	0.74%	1.23%	0.83%	4.66%	0.30%	0.00%	0.00%	0.41%	0.40%	1.54%
San Juan Isl Net	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
San Juan Isl Sport	0.03%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	19.30%	12.79%	38.83%	7.13%	12.36%	35.46%	7.49%	36.99%	6.20%	18.95%	25.73%	16.26%	5.58%
U.S. Sub-Total	32.54%	24.65%	47.09%	20.81%	28.72%	41.40%	31.95%	41.03%	21.43%	19.20%	34.44%	24.74%	16.44%
Total ER	58.90%	71.04%	66.32%	47.80%	53.34%	53.14%	64.91%	48.69%	61.18%	42.53%	49.89%	46.26%	21.35%
Escapement	9,374	10,862	11,579	7,218	8,995	5,512	9,532	8,170	4,165	4,881	10,035	11,009	4,623
Cohort (Ocean age-3)	22,810	37,507	34,379	13,827	19,280	11,763	27,162	15,924	10,728	8,494	20,025	20,483	5,877
Cohort (Jan age-3)	27,510	44,692	41,616	16,662	23,190	14,354	32,586	19,476	12,888	10,340	24,392	24,948	7,188

Table F.10. (Continued) Quillayute MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.02%	0.14%	0.08%	0.22%	0.25%	0.12%	0.42%	0.13%	0.12%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.01%	0.04%	0.00%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.05%	0.15%	0.23%	0.16%	0.08%	0.08%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.07%	0.19%	0.05%	0.05%	0.01%
BC WCVI Sport	0.00%	0.01%	0.01%	0.07%	0.06%	0.03%	0.05%	0.07%	0.11%	0.17%	0.06%	0.13%
BC InstStr Net & Trl	0.00%	0.01%	0.00%	0.02%	0.01%	0.01%	0.02%	0.26%	0.04%	0.01%	0.01%	0.01%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.02%	0.04%	0.08%	0.05%	0.04%	0.04%	0.04%	0.08%	0.02%	0.05%
BC JDF Net & Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.01%	0.02%	0.03%	0.15%	0.30%	0.19%	0.43%	0.88%	0.75%	0.93%	0.34%	0.40%
SEAK All	0.14%	0.07%	0.03%	0.13%	0.12%	0.08%	0.07%	0.04%	0.03%	0.14%	0.12%	0.08%
WA Ocean Troll	0.41%	1.59%	0.49%	1.51%	1.81%	1.08%	2.98%	1.62%	3.38%	3.52%	1.02%	3.82%
WA Ocean Sport	1.10%	0.40%	1.55%	0.57%	0.46%	0.69%	0.67%	0.34%	0.40%	0.75%	0.15%	0.72%
S of Falcon All	0.09%	0.22%	0.11%	0.11%	0.21%	0.38%	0.42%	0.14%	0.20%	0.38%	0.02%	0.33%
U.S. JDF All	0.51%	0.10%	0.10%	0.54%	0.33%	0.36%	0.41%	0.32%	0.28%	0.47%	0.55%	1.73%
San Juan Isl Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
San Juan Isl Sport	0.07%	0.02%	0.05%	0.02%	0.02%	0.02%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%
PS Sport (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	18.32%	39.39%	16.97%	30.64%	27.69%	31.81%	30.67%	41.82%	42.48%	35.77%	35.24%	42.41%
U.S. Sub-Total	20.64%	41.80%	19.28%	33.53%	30.63%	34.43%	35.24%	44.28%	46.78%	41.04%	37.10%	49.12%
Total ER	20.64%	41.82%	19.31%	33.67%	30.93%	34.62%	35.67%	45.16%	47.53%	41.98%	37.44%	49.52%
Escapement	13,869	9,365	13,345	18,876	23,016	14,756	13,354	11,501	5,210	6,232	6,947	7,863
Cohort (Ocean age-3)	17,477	16,097	16,539	28,460	33,324	22,570	20,757	20,971	9,929	10,740	11,104	15,578
Cohort (Jan age-3)	21,488	19,792	20,346	34,988	40,949	27,736	25,497	25,743	12,180	13,182	13,657	19,121

Table F.11. Hoh MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	1.74%	2.01%	4.79%	2.25%	0.25%	0.00%	0.96%	1.64%	0.00%	0.00%	0.00%	0.16%	11.22%
BC No/Cent Net	0.10%	0.00%	0.00%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.43%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%
BC WCVI Troll	34.94%	37.81%	23.75%	62.02%	23.34%	30.23%	27.25%	24.05%	30.02%	33.78%	30.35%	15.89%	0.00%
BC WCVI Net	0.04%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%
BC WCVI Sport	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%	0.00%	0.00%	0.29%	3.78%
BC InstStr Net & Trl	0.11%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%	3.65%
BC InstStr Sport	0.11%	0.00%	0.00%	0.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Spt & Trl	0.14%	0.00%	0.00%	0.48%	0.00%	0.00%	0.00%	0.43%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	1.66%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Net & Troll	0.64%	0.00%	0.00%	0.07%	1.81%	0.00%	1.38%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	38.23%	39.83%	28.53%	65.67%	26.47%	30.23%	32.86%	27.71%	30.02%	33.78%	30.43%	16.51%	20.08%
SEAK All	0.30%	0.00%	0.00%	0.60%	0.00%	0.63%	0.00%	0.88%	0.00%	0.00%	2.08%	0.18%	0.00%
WA Ocean Troll	8.57%	3.73%	6.56%	3.93%	8.76%	12.65%	7.24%	10.81%	2.29%	0.00%	6.10%	2.23%	4.85%
WA Ocean Sport	4.14%	1.15%	1.95%	2.71%	2.42%	6.14%	4.15%	9.78%	3.59%	0.00%	6.27%	3.78%	33.35%
S of Falcon All	7.59%	14.93%	5.28%	11.31%	4.50%	2.37%	2.18%	10.37%	0.00%	0.00%	0.00%	0.00%	0.00%
U.S. JDF All	2.23%	0.00%	1.56%	2.08%	1.01%	0.00%	7.64%	1.28%	0.00%	0.00%	0.00%	0.31%	6.30%
San Juan Isl Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.01%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	14.25%	17.62%	31.99%	2.13%	21.58%	24.46%	11.02%	9.78%	24.79%	13.47%	7.76%	14.72%	2.74%
U.S. Sub-Total	37.11%	37.43%	47.33%	22.76%	38.37%	46.25%	32.23%	43.07%	30.66%	13.47%	22.21%	21.22%	47.25%
Total ER	75.34%	77.26%	75.86%	88.43%	64.84%	76.48%	65.09%	70.78%	60.69%	47.24%	52.64%	37.73%	67.33%
Escapement	3,512	4,270	3,516	2,350	3,321	2,094	4,129	4,639	1,345	1,161	4,710	4,857	1,386
Cohort (Ocean age-3)	14,238	18,778	14,566	20,315	9,446	8,902	11,828	15,876	3,420	2,201	9,946	7,800	4,241
Cohort (Jan age-3)	17,018	22,342	17,512	23,960	11,368	10,688	14,232	19,028	4,142	2,664	11,996	9,530	5,074

Table F.11. (Continued) Hoh MU: Historical summary of exploitation rates (ER), escapement, and cohort.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.03%	0.52%	0.35%	0.66%	1.14%	0.54%	2.10%	0.71%	0.34%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.10%	0.05%	0.20%	0.00%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.30%	0.59%	0.26%	0.11%	0.13%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.04%	0.01%	0.01%	0.00%
BC WCVI Sport	0.00%	0.22%	0.19%	0.49%	0.88%	0.20%	0.41%	0.77%	0.90%	1.42%	0.76%	1.26%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.05%	0.00%	0.02%	0.02%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.24%	0.13%
BC GeoStr Spt & Trl	0.00%	0.00%	0.01%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.01%	0.02%	0.09%	0.05%	0.04%	0.03%	0.03%	0.05%	0.02%	0.04%
BC JDF Net & Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.00%	0.23%	0.21%	0.56%	1.51%	0.62%	1.19%	2.40%	2.21%	4.06%	1.86%	1.92%
SEAK All	0.67%	0.52%	0.51%	0.79%	0.51%	0.31%	0.38%	0.16%	0.21%	0.52%	0.39%	0.42%
WA Ocean Troll	0.89%	3.23%	1.17%	4.07%	4.14%	1.99%	6.64%	3.46%	8.10%	7.88%	2.51%	8.61%
WA Ocean Sport	3.28%	1.16%	2.72%	1.26%	1.16%	1.48%	1.57%	0.80%	0.87%	1.62%	0.39%	1.66%
S of Falcon All	0.20%	0.44%	0.14%	0.12%	0.29%	0.56%	0.59%	0.15%	0.36%	0.69%	0.05%	0.68%
U.S. JDF All	1.66%	0.26%	0.22%	1.05%	0.70%	0.66%	1.03%	0.56%	0.50%	1.00%	1.04%	2.07%
San Juan Isl Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.18%	0.11%	0.11%	0.16%	0.05%	0.09%	0.06%	0.04%	0.04%	0.06%	0.02%	0.10%
PS Net (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	14.31%	26.39%	22.39%	25.83%	23.57%	22.17%	21.21%	34.99%	40.85%	32.00%	36.62%	36.11%
U.S. Sub-Total	21.19%	32.10%	27.27%	33.28%	30.41%	27.26%	31.48%	40.15%	50.93%	43.77%	41.03%	49.65%
Total ER	21.19%	32.34%	27.48%	33.84%	31.92%	27.87%	32.67%	42.55%	53.14%	47.83%	42.89%	51.57%
Escapement	4,418	4,594	6,774	10,773	9,009	6,273	4,702	4,711	1,282	3,072	2,461	4,615
Cohort (Ocean age-3)	5,606	6,789	9,340	16,282	13,233	8,697	6,984	8,200	2,736	5,889	4,309	9,530
Cohort (Jan age-3)	6,883	8,336	11,477	19,988	16,240	10,683	8,559	10,067	3,351	7,198	5,295	11,661

Table F.12. Queets MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance .

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	1.89%	4.03%	2.47%	0.87%	0.82%	3.31%	0.21%	0.79%	0.97%	1.20%	0.66%	0.16%	0.44%
BC No/Cent Net	0.18%	0.54%	0.00%	0.29%	0.00%	0.18%	0.00%	0.21%	0.00%	0.00%	0.10%	0.00%	0.00%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	0.00%
BC WCVI Troll	31.73%	43.75%	20.43%	34.15%	32.84%	35.50%	27.73%	21.29%	28.91%	22.13%	19.48%	13.17%	0.00%
BC WCVI Net	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%
BC WCVI Sport	0.28%	0.01%	0.00%	0.05%	0.65%	0.00%	0.61%	0.40%	0.11%	0.00%	0.00%	0.00%	0.00%
BC InstStr Net & Trl	0.14%	0.00%	0.31%	0.02%	0.40%	0.05%	0.00%	0.22%	0.00%	0.00%	0.05%	0.02%	0.50%
BC InstStr Sport	0.04%	0.00%	0.00%	0.00%	0.11%	0.16%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Spt & Trl	0.04%	0.00%	0.00%	0.12%	0.12%	0.00%	0.02%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.19%	0.00%	0.00%	0.00%	0.19%	0.39%	0.85%	0.00%	0.40%	0.62%	0.18%	0.26%	0.00%
BC JDF Net & Troll	1.14%	0.70%	1.02%	0.11%	2.34%	0.60%	1.41%	1.37%	0.10%	0.41%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	35.63%	49.03%	24.24%	35.62%	37.48%	40.18%	30.82%	24.37%	30.74%	24.35%	20.53%	13.79%	0.94%
SEAK All	0.13%	0.42%	0.00%	0.06%	0.21%	0.17%	0.00%	0.06%	0.31%	0.00%	0.83%	0.60%	0.00%
WA Ocean Troll	7.83%	3.23%	5.24%	5.31%	6.21%	11.59%	7.74%	6.41%	9.70%	0.00%	3.07%	2.21%	0.70%
WA Ocean Sport	6.66%	3.14%	2.64%	3.03%	4.15%	9.67%	6.62%	14.57%	10.81%	0.00%	6.17%	4.46%	7.45%
S of Falcon All	10.58%	8.30%	7.20%	23.59%	3.86%	5.11%	12.68%	11.52%	1.44%	0.00%	0.14%	0.02%	0.02%
U.S. JDF All	1.27%	0.42%	1.11%	0.66%	1.37%	1.21%	2.58%	1.69%	0.53%	0.00%	0.10%	0.42%	1.71%
San Juan Isl Net	0.06%	0.00%	0.38%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.04%	0.00%	0.29%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.21%	0.90%	0.00%	0.05%	0.12%	0.10%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	14.28%	14.20%	30.01%	8.52%	10.34%	13.59%	15.63%	6.92%	8.63%	33.69%	16.37%	39.43%	23.66%
U.S. Sub-Total	41.07%	30.61%	46.87%	41.29%	26.24%	41.45%	45.49%	41.16%	31.43%	33.69%	26.67%	47.14%	33.54%
Total ER	76.70%	79.64%	71.11%	76.91%	63.73%	81.63%	76.31%	65.53%	62.17%	58.04%	47.20%	60.93%	34.48%
Escapement	4,890	5,200	4,700	4,300	4,500	5,200	6,500	6,276	4,937	1,059	5,730	8,926	1,480
Cohort (Ocean age-3)	20,987	25,540	16,268	18,620	12,406	28,299	27,441	18,209	13,049	2,523	10,852	22,844	2,259
Cohort (Jan age-3)	25,002	30,278	19,608	22,098	14,828	33,630	32,786	21,786	15,688	3,060	13,148	27,828	2,760

Table F.12. (Continued) Queets MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.02%	0.45%	0.31%	0.62%	1.05%	0.52%	2.02%	0.62%	0.34%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.15%	0.05%	0.39%	0.04%	0.02%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.25%	0.48%	0.19%	0.08%	0.12%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC WCVI Sport	0.00%	0.20%	0.18%	0.88%	0.64%	0.29%	0.45%	0.76%	1.04%	1.57%	0.57%	1.35%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.06%	0.00%	0.01%	0.03%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.03%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.01%	0.03%	0.05%	0.04%	0.03%	0.02%	0.03%	0.05%	0.01%	0.03%
BC JDF Net & Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.01%	0.20%	0.19%	0.93%	1.14%	0.65%	1.21%	2.27%	2.18%	4.24%	1.40%	1.92%
SEAK All	0.19%	0.12%	0.12%	0.23%	0.14%	0.13%	0.10%	0.11%	0.06%	0.20%	0.18%	0.14%
WA Ocean Troll	0.80%	2.77%	1.05%	3.15%	3.76%	2.45%	5.36%	3.27%	6.92%	5.62%	2.46%	6.13%
WA Ocean Sport	3.44%	1.54%	4.77%	2.04%	1.88%	2.27%	2.34%	1.25%	1.25%	2.44%	0.62%	2.47%
S of Falcon All	0.35%	0.65%	0.28%	0.29%	0.49%	0.97%	1.04%	0.30%	0.57%	1.22%	0.10%	1.00%
U.S. JDF All	0.90%	0.15%	0.12%	0.70%	0.44%	0.42%	0.51%	0.30%	0.29%	0.64%	0.52%	0.60%
San Juan Isl Net	0.10%	0.11%	0.13%	0.11%	0.11%	0.06%	0.13%	0.08%	0.12%	0.07%	0.19%	0.12%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.03%	0.01%	0.03%	0.03%	0.01%	0.02%	0.01%	0.02%	0.02%	0.01%	0.01%	0.01%
PS Net (8-13)	0.06%	0.07%	0.17%	0.04%	0.06%	0.02%	0.09%	0.14%	0.13%	0.16%	0.18%	0.32%
FW Net & Sport	28.91%	39.32%	26.75%	26.48%	39.28%	30.86%	33.38%	37.89%	28.04%	20.79%	31.61%	30.05%
U.S. Sub-Total	34.79%	44.75%	33.42%	33.07%	46.17%	37.18%	42.96%	43.36%	37.40%	31.15%	35.87%	40.83%
Total ER	34.79%	44.95%	33.60%	34.00%	47.31%	37.83%	44.16%	45.62%	39.58%	35.38%	37.27%	42.75%
Escapement	4,134	4,795	8,104	23,793	13,968	9,846	7,484	6,539	5,626	4,680	4,629	9,200
Cohort (Ocean age-3)	6,340	8,711	12,206	36,051	26,509	15,838	13,404	12,026	9,311	7,242	7,380	16,069
Cohort (Jan age-3)	7,783	10,650	14,964	44,148	32,429	19,402	16,375	14,699	11,374	8,849	9,062	19,676

Table F.13. Grays Harbor MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Base	Catch Year											
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
BC No/Cent Troll	2.02%	5.42%	1.01%	2.17%	2.27%	0.75%	0.67%	0.92%	0.77%	1.08%	2.05%	0.40%	0.00%
BC No/Cent Net	0.14%	0.00%	0.06%	0.00%	0.24%	0.04%	0.01%	0.62%	0.04%	0.26%	0.01%	0.00%	0.00%
BC No/Cent Sport	0.01%	0.00%	0.00%	0.00%	0.00%	0.04%	0.03%	0.00%	0.04%	0.00%	0.00%	0.18%	0.00%
BC WCVI Troll	19.14%	28.87%	15.59%	19.98%	27.93%	11.68%	11.96%	12.02%	22.70%	3.86%	8.94%	5.25%	0.00%
BC WCVI Net	0.02%	0.00%	0.00%	0.02%	0.06%	0.00%	0.05%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%
BC WCVI Sport	0.24%	0.00%	0.18%	0.00%	0.15%	0.00%	0.21%	0.05%	0.00%	0.00%	0.00%	0.00%	0.08%
BC InstStr Net & Trl	0.17%	0.05%	0.21%	0.09%	0.34%	0.06%	0.05%	0.33%	0.06%	0.11%	0.03%	0.00%	0.00%
BC InstStr Sport	0.03%	0.00%	0.05%	0.00%	0.00%	0.00%	0.02%	0.14%	0.06%	0.00%	0.07%	0.00%	0.00%
BC GeoStr Spt & Trl	0.05%	0.02%	0.00%	0.00%	0.10%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.13%	0.04%	0.26%	0.00%	0.14%	0.00%	0.59%	0.00%	0.29%	0.00%	0.12%	0.00%	0.05%
BC JDF Net & Troll	0.49%	0.21%	0.28%	0.06%	1.19%	0.24%	0.33%	0.52%	0.00%	0.40%	0.03%	0.00%	0.00%
BC Fraser Net & Spt	0.01%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	22.45%	34.61%	17.64%	22.32%	32.43%	12.89%	13.92%	14.86%	23.97%	5.70%	11.25%	5.83%	0.13%
SEAK All	0.37%	0.22%	0.17%	0.37%	0.15%	0.44%	0.15%	1.13%	0.78%	0.54%	1.08%	0.15%	0.13%
WA Ocean Troll	3.93%	2.28%	0.61%	1.55%	4.11%	5.58%	3.52%	2.30%	7.56%	0.00%	1.17%	0.99%	0.16%
WA Ocean Sport	3.80%	1.08%	0.83%	0.54%	1.62%	6.01%	1.89%	9.77%	6.15%	0.00%	3.88%	2.54%	3.29%
S of Falcon All	3.88%	4.56%	2.63%	5.74%	4.07%	3.58%	1.20%	4.37%	0.43%	0.00%	0.03%	0.00%	0.00%
U.S. JDF All	0.69%	0.34%	0.38%	0.53%	0.82%	0.56%	1.85%	0.30%	0.41%	0.00%	0.10%	0.08%	0.00%
San Juan Isl Net	0.02%	0.00%	0.00%	0.00%	0.02%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.02%	0.00%
PS Net (8-13)	0.04%	0.02%	0.07%	0.02%	0.06%	0.00%	0.03%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	28.00%	33.75%	48.40%	11.10%	14.45%	28.83%	37.80%	23.49%	23.96%	32.38%	32.37%	31.86%	15.27%
U.S. Sub-Total	40.71%	42.25%	53.09%	19.86%	25.31%	45.00%	46.51%	41.41%	39.30%	32.92%	38.70%	35.64%	18.85%
Total ER	63.16%	76.86%	70.74%	42.18%	57.74%	57.89%	60.44%	56.27%	63.27%	38.62%	49.95%	41.47%	18.98%
Escapement	39,417	29,255	19,627	56,839	67,707	40,981	55,516	25,748	21,787	8,632	35,497	52,746	16,416
Cohort (Ocean age-3)	106,991	126,442	67,067	98,310	160,197	97,308	140,329	58,883	59,314	14,062	70,921	90,115	20,262
Cohort (Jan age-3)	129,566	151,952	81,704	119,304	192,766	118,422	171,328	71,486	72,052	17,256	86,506	110,524	24,886

Table F.13. (Continued) Grays Harbor MU: Historical summary of exploitation rates (ER), escapement, and cohort abundance.

Fishery	Catch Year											
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC No/Cent Troll	0.00%	0.00%	0.00%	0.04%	0.42%	0.27%	0.55%	0.85%	0.41%	1.50%	0.47%	0.32%
BC No/Cent Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.03%	0.21%	0.04%	0.02%
BC No/Cent Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.31%	0.06%
BC WCVI Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.16%	0.36%	0.11%	0.08%	0.07%
BC WCVI Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.02%	0.02%	0.02%	0.02%	0.00%
BC WCVI Sport	0.00%	0.19%	0.04%	0.37%	0.18%	0.08%	0.13%	0.48%	0.37%	0.51%	0.15%	0.52%
BC InstStr Net & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.06%	0.00%	0.01%	0.04%
BC InstStr Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
BC GeoStr Spt & Trl	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC GeoStr Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC JDF Sport	0.00%	0.00%	0.01%	0.01%	0.03%	0.01%	0.01%	0.02%	0.02%	0.03%	0.01%	0.02%
BC JDF Net & Troll	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BC Fraser Net & Spt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
B.C. Sub-Total	0.00%	0.19%	0.05%	0.43%	0.64%	0.38%	0.78%	1.67%	1.26%	2.40%	1.12%	1.06%
SEAK All	0.49%	0.56%	0.53%	0.58%	0.47%	0.30%	0.45%	0.32%	0.25%	0.48%	0.37%	0.35%
WA Ocean Troll	0.21%	0.65%	0.47%	2.22%	1.65%	0.71%	2.65%	1.40%	3.53%	1.86%	1.76%	2.10%
WA Ocean Sport	1.61%	0.53%	1.40%	0.93%	0.53%	0.84%	1.06%	0.50%	0.51%	0.93%	0.24%	1.14%
S of Falcon All	0.13%	0.21%	0.09%	0.09%	0.16%	0.32%	0.35%	0.10%	0.21%	0.46%	0.04%	0.40%
U.S. JDF All	0.31%	0.06%	0.06%	0.32%	0.20%	0.18%	0.29%	0.14%	0.15%	0.30%	0.30%	0.53%
San Juan Isl Net	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%
San Juan Isl Sport	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Sport (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PS Net (8-13)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FW Net & Sport	20.80%	19.75%	24.12%	17.95%	19.01%	18.99%	27.75%	37.45%	36.29%	24.33%	26.83%	27.90%
U.S. Sub-Total	23.54%	21.77%	26.68%	22.09%	22.02%	21.36%	32.58%	39.92%	40.95%	28.36%	29.55%	32.44%
Total ER	23.54%	21.96%	26.73%	22.52%	22.66%	21.74%	33.36%	41.58%	42.21%	30.77%	30.67%	33.50%
Escapement	35,550	33,346	38,054	80,100	110,066	84,952	60,690	38,585	17,767	25,756	34,054	69,734
Cohort (Ocean age-3)	46,496	42,730	51,939	103,380	142,309	108,553	91,075	66,051	30,743	37,201	49,118	104,858
Cohort (Jan age-3)	57,188	52,568	63,888	127,104	174,995	133,517	111,920	81,196	37,768	45,680	60,397	128,842

This page left intentionally blank

Appendix G. Method for Determining MU ER caps Based on Cohort Abundance and Status and Summaries of Pre- and Post-Season Cohort Abundance (ocean age-3), PST Status, and Total Exploitation Rates (CAP, Planned, Estimated) by Management Unit, Catch Years 2004-2009.

Determining MU ER Caps Based on Cohort Abundance and Status

Individual MU ER caps are determined based on status as determined by ocean age-3 abundance.

Canadian MUs:

Coho salmon from the Interior Fraser MU were designated as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2002. The low status of the Interior Fraser MU has not changed. The next review by COSEWIC is planned in 2013. Therefore, the ER cap of 20% (as stated in the Agreement) is used. For all other Canadian MUs, benchmarks to establish status are currently under development.

US MUs:

Inside MUs

Step 1: Determine the categorical status based on ocean age-3 abundance and the breakpoints depicted in Table 4.1 for the selected MU. Breakpoints are from the PFMC Fishery Management Plan (PFMC 2012).

Table 4.1. Break points in ocean age-3 abundance associated with Low, Moderate, and Abundant status of naturally-spawning Coho, U.S. Inside Management Units.

Management Unit	Abundance Category Breakpoints	
	Low/Moderate	Moderate/Abundant
Skagit	22,857	62,500
Stillaguamish	9,385	20,000
Snohomish	51,667	125,000
Hood Canal	19,545	41,000
Strait of Juan de Fuca	11,679	27,445

Step 2: Set CAP exploitation rate defined as total allowable MSY exploitation rate in the PFMC Fishery Management Plan (PFMC 2012). The following exploitation rate CAPs are defined as total allowable MSY exploitation rate in the PFMC Fishery Management Plan (PFMC 2012):

Management Unit	Low	Moderate	Abundant
Skagit	20%	35%	60%
Stillaguamish	20%	35%	50%
Snohomish	20%	40%	60%
Hood Canal	20%	45%	65%
Strait of Juan de Fuca	20%	40%	60%

Outside MUs

Step 1: Determine the categorical status based on Ocean age-3 abundance and the breakpoints depicted in Table 4.2 for the selected MU.

Table 4.2. Breakpoints in ocean abundance (harvest + escapement) associated with Low, Moderate, and Abundant status of naturally spawning Coho, Outside U.S. Management Units.

Management Unit	Escapement Goal/Range ^a	Abundance Category Breakpoints	
		Low/Moderate	Moderate/Abundant
Quillayute	6,300 – 15,800	7,875	10,500
Hoh	2,000 – 5,000	2,500	3,333
Queets	5,800 – 14,500	7,250	9,667
Grays Harbor	35,400	44,250	59,000

^a PFMC 2012.

Step 2: Calculate CAP exploitation rates based on the difference between ocean age-3 (OA3) cohort abundance and the escapement goal for each MU. For the Quillayute, Hoh, and Queets MUs, the lower escapement goal (LEG) is used for this calculation. The minimum exploitation rate cap is 20%.

For the Grays Harbor MU, set the cap at the upper end of the Total Exploitation Rate for the appropriate categorical status (i.e., 20% for Low, 40% form Moderate, and 65% for Abundant) OR alternatively, compute the cap as:

$$ERCap = MAX\left(\frac{OA3 - 35,400}{OA3}, 20\%\right)$$

For the other Outside MUs, set the cap using the following formula:

$$ERCap = MAX\left(\frac{OA3 - LEG}{OA3}, 20\%\right)$$

Where OA3 = ocean age-3 abundance and LEG = lower end of the escapement goal range.

Example: If OA3 abundance is 9,500 for the Quillayute MU, the ER cap would be 34% $(=(9500-6300)/9500)$.

Summaries of Cohort Abundance, PST Status, and Total Exploitation Rates

The following tables and figures provide summaries of pre- and post-season cohort abundance (ocean age-3), PST status, and total exploitation rates (CAP, Planned, and Estimated) by Management Unit, catch years 2004-2009. Exploitation rates represent the total of US and Canadian fishery impacts.

“CAP” ERs represent the maximum fishery impacts allowable under the Coho Agreement of the Pacific Salmon Treaty. CAP ERs are not available for three of the four Canadian MUs because the method for assigning these values is yet to be established. For U.S. Inside MUs, CAP ERs are based on MU status as determined through the pre-season planning process and the total allowable MSY exploitation rate as defined in the PFMC Fishery Management Plan (PFMC 2012). For U.S. Outside MUs, CAP ERs in this Appendix are calculated as the difference between the ocean age-3 cohort abundance and the escapement goal for each MU. Three of the Outside U.S. MUs (Quillayute, Hoh, and Queets) have a range of escapement goals (see Tables 8.2 to 8.7) and the CAP ER is calculated from the lower escapement goal.

“Planned” ERs represent the expected ERs following the pre-season fishery planning process.

“Estimated” ERs represent the ERs calculated post-season using the Backwards Coho FRAM. Preliminary estimated ERs were presented in Annual Reports to the Southern Panel (2004 to 2009 reports are available in Tables 8.2 to 8.7). Updated estimated ERs were calculated for this Periodic Report (see Appendix F).

Table G.1. Lower Fraser MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009. Status and CAP ERs are yet to be determined for this MU.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP	Planned ER	Abundance	Status	CAP	Preliminary ER	Updated ER
2004	5,619	---	---	12%	67,382	---	---	16%	16%
2005	13,108	---	---	13%	16,843	---	---	7%	9%
2006	5,615	---	---	12%	17,386	---	---	9%	9%
2007	5,615	---	---	11%	74,840	---	---	9%	12%
2008	14,518	---	---	18%	3,471	---	---	9%	9%
2009	1,167	---	---	25%	21,561	---	---	12%	13%

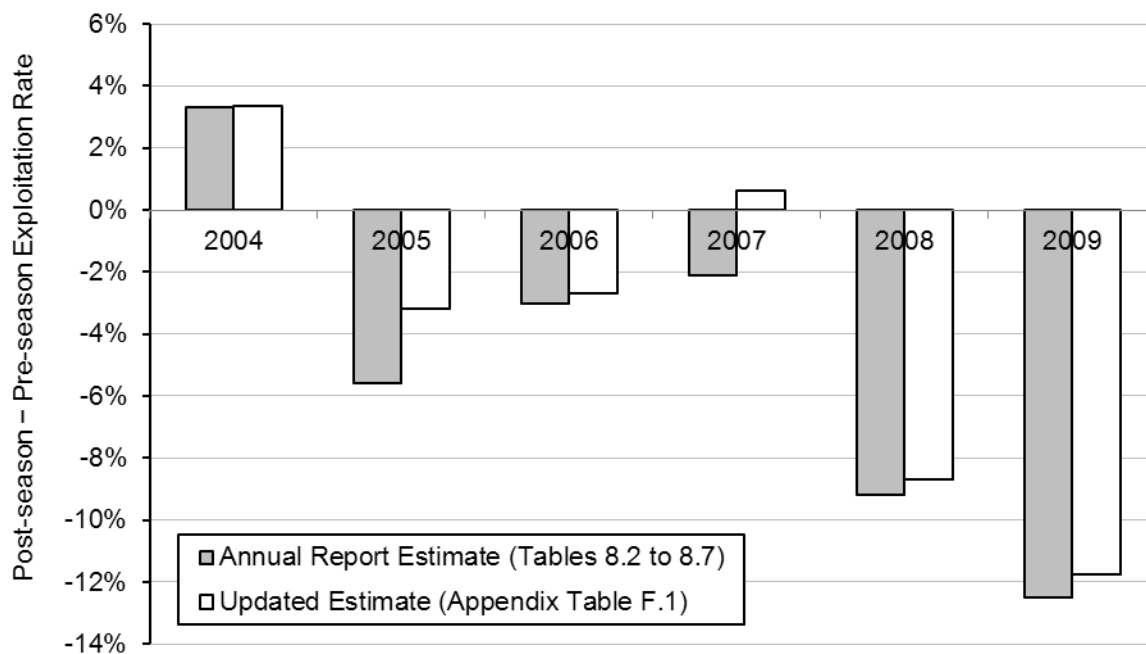


Figure G.1. Lower Fraser MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.2. Interior Fraser MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	34,509	L	13%	13%	46,354	L	13%	14%	11%
2005	30,806	L	13%	13%	15,966	L	13%	8%	9%
2006	18,297	L	13%	12%	8,799	L	13%	10%	10%
2007	14,225	L	13%	12%	66,045	L	13%	10%	12%
2008	14,031	L	13%	12%	18,016	L	13%	9%	10%
2009	15,703	L	13%	13%	25,041	L	13%	14%	14%

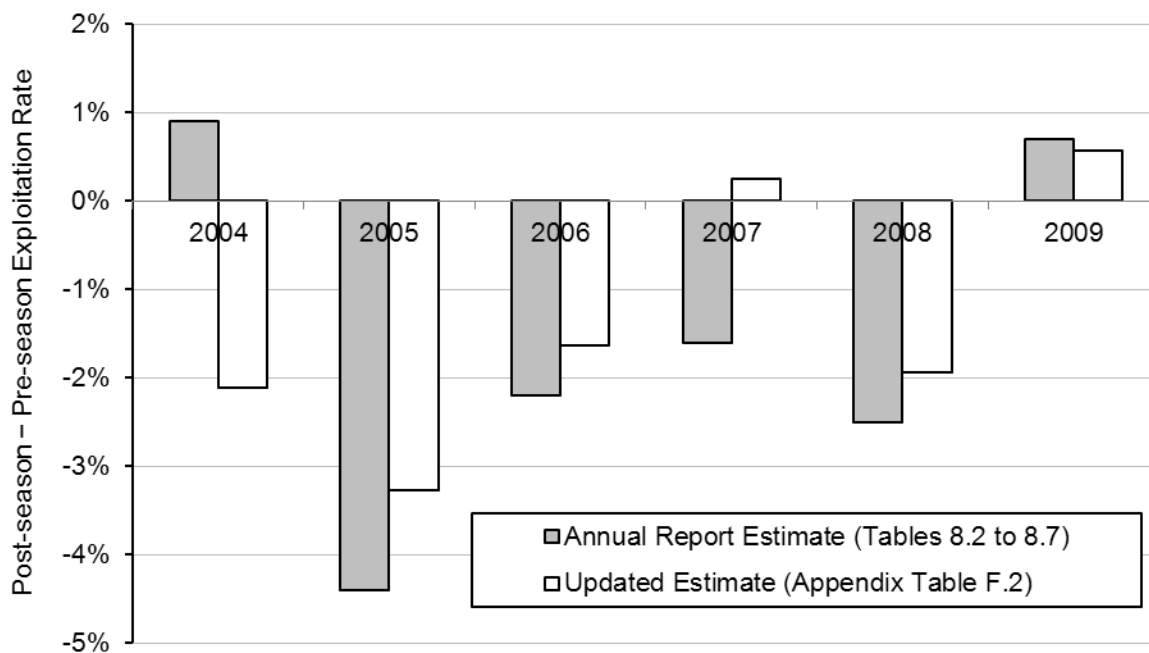


Figure G.2. Interior Fraser MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.3. Strait of Georgia Mainland MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009. Status and Cap ERs are yet to be determined for this MU.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	129,967	---	---	12%	122,503	---	---	11%	9%
2005	64,952	---	---	12%	19,230	---	---	8%	9%
2006	43,271	---	---	11%	14,366	---	---	13%	13%
2007	81,647	---	---	8%	61,757	---	---	11%	11%
2008	12,905	---	---	12%	4,307	---	---	12%	11%
2009	10,725	---	---	14%	19,182	---	---	14%	15%

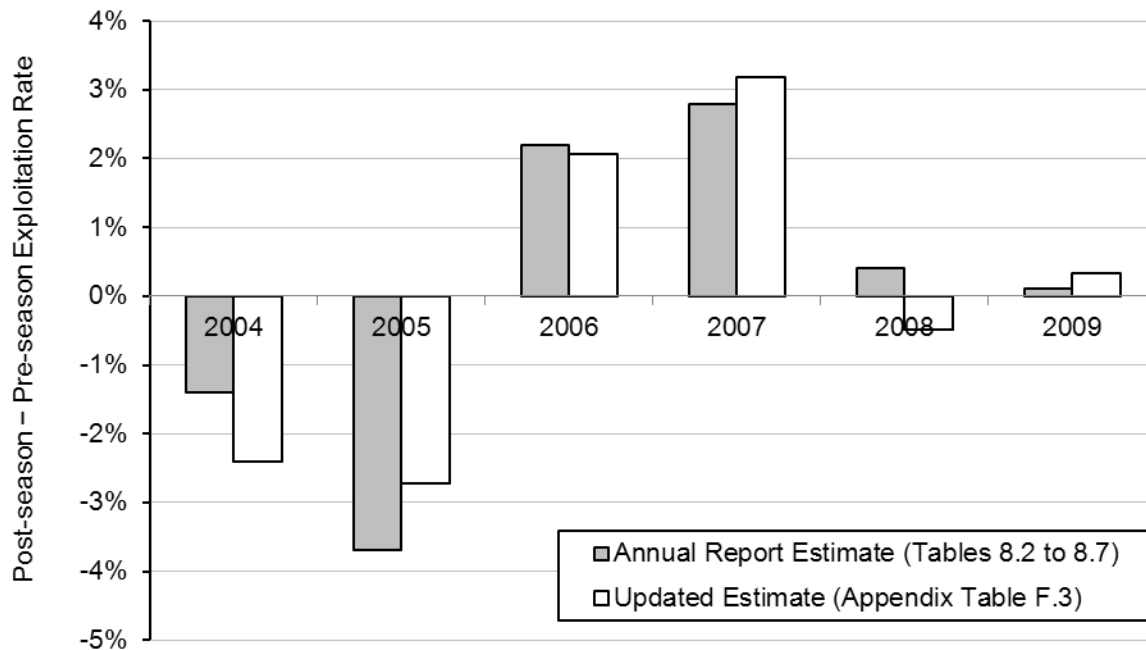


Figure G.3. Strait of Georgia Mainland MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.4. Strait of Georgia Vancouver Island MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009. Status and Cap ERs are yet to be determined for this MU.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	194,800	---	---	7%	183,909	---	---	11%	7%
2005	93,769	---	---	10%	28,907	---	---	10%	11%
2006	65,032	---	---	11%	36,852	---	---	9%	8%
2007	122,674	---	---	8%	158,796	---	---	10%	13%
2008	30,954	---	---	11%	11,054	---	---	8%	9%
2009	25,712	---	---	12%	45,924	---	---	12%	12%

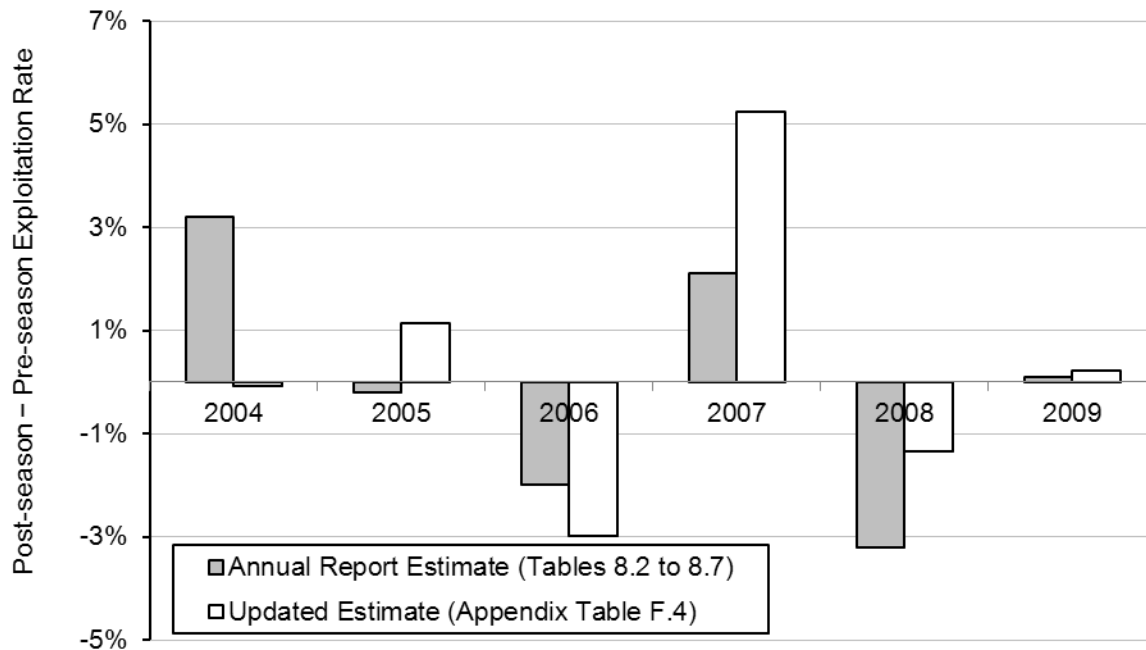


Figure G.4. Strait of Georgia Vancouver Island MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.5. Skagit MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	156,648	A	60%	36%	145,283	A	60%	29%	19%
2005	62,093	M	35%	34%	54,034	M	35%	37%	36%
2006	107,051	A	60%	35%	11,521	L	20%	37%	33%
2007	26,928	M	35%	34%	83,037	A	60%	36%	37%
2008	61,992	M	35%	30%	35,502	M	35%	28%	32%
2009	33,551	M	35%	31%	87,545	A	60%	32%	31%

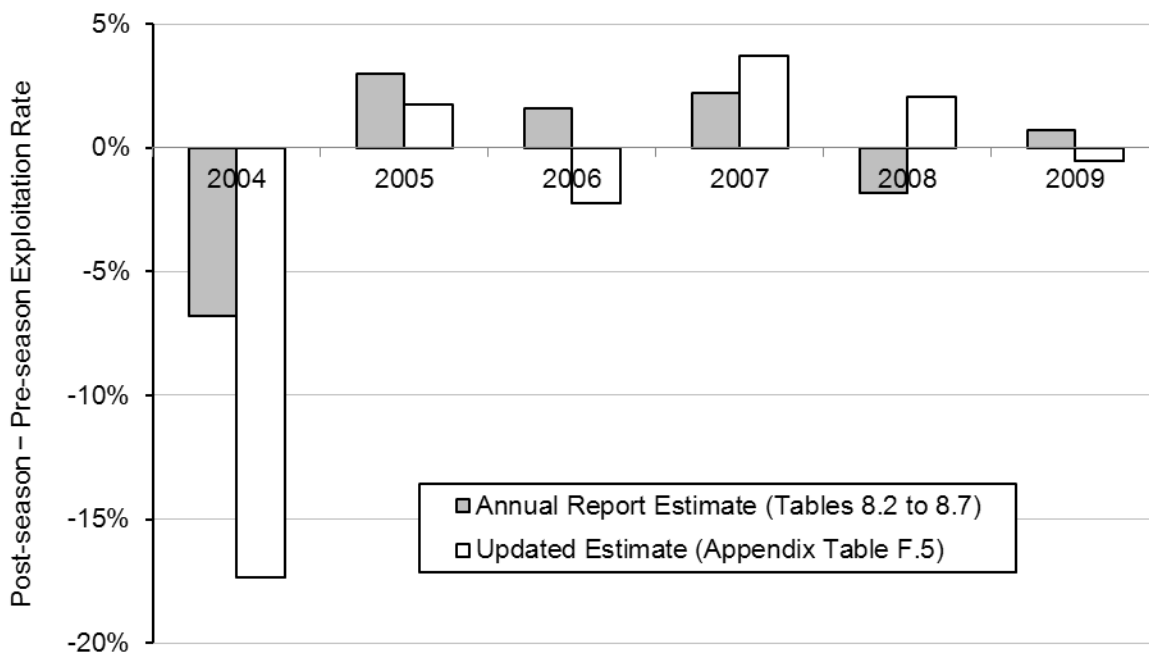


Figure G.5. Skagit MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.6. Stillaguamish MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	38,263	A	55%	39%	73,935	A	55%	28%	12%
2005	57,020	A	55%	43%	33,880	A	55%	22%	26%
2006	45,231	A	55%	40%	10,808	M	35%	21%	21%
2007	69,592	A	50%	39%	51,708	A	50%	24%	25%
2008	34,589	A	50%	38%	16,892	M	35%	23%	23%
2009	13,456	M	40%	29%	30,849	A	55%	28%	28%

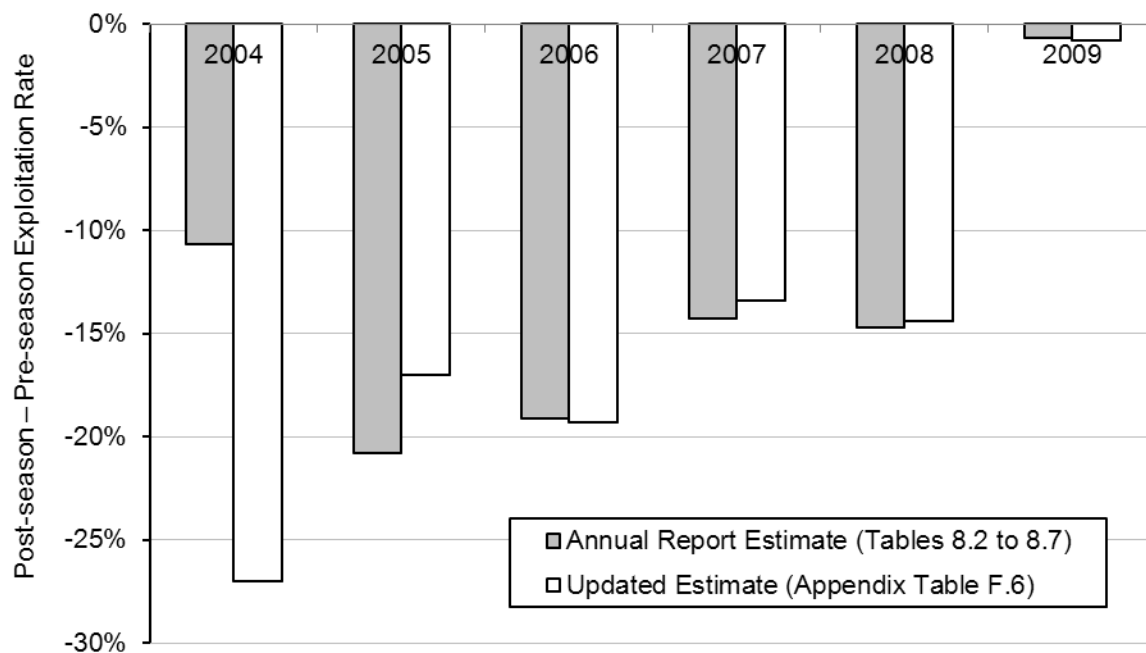


Figure G.6. Stillaguamish MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.7. Snohomish MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	193,446	A	60%	35%	288,890	A	60%	30%	13%
2005	242,965	A	60%	39%	139,047	A	60%	23%	22%
2006	140,226	A	60%	39%	94,782	M	40%	19%	20%
2007	99,462	M	40%	39%	157,388	A	60%	24%	25%
2008	108,470	M	40%	35%	49,733	L	20%	27%	28%
2009	67,286	M	40%	22%	134,310	A	60%	26%	26%

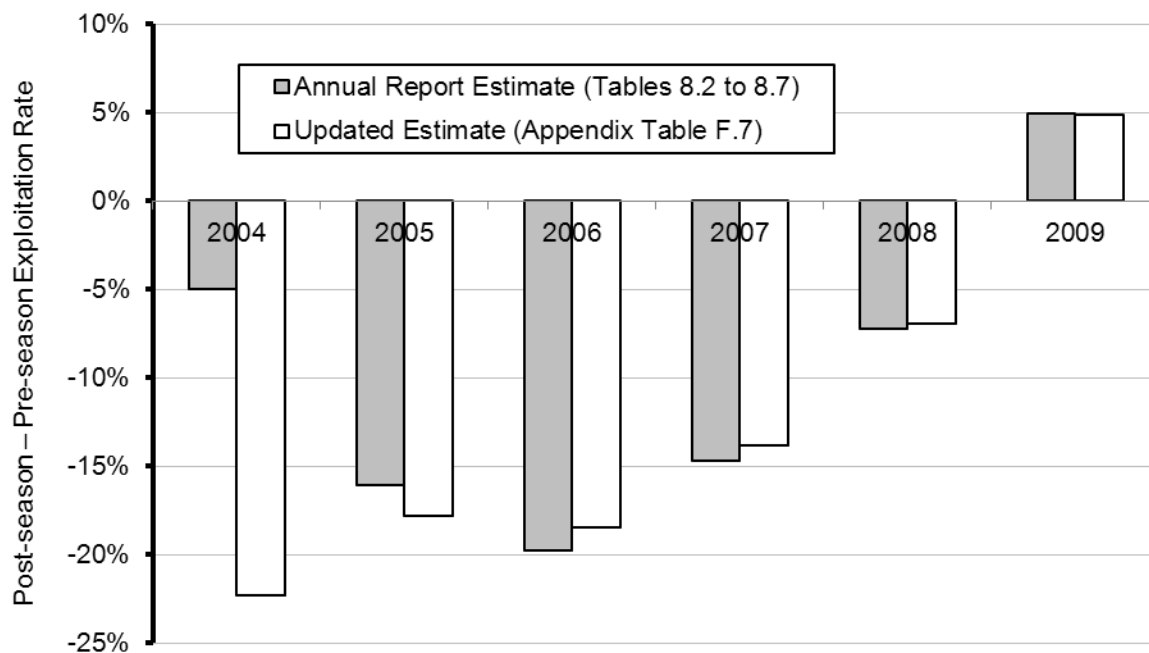


Figure G.7. Snohomish MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.8. Hood Canal MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	99,598	A	65%	35%	240,822	A	65%	42%	39%
2005	99,816	A	65%	35%	78,979	A	65%	36%	52%
2006	59,957	A	65%	37%	60,643	A	65%	76%	77%
2007	42,919	A	65%	46%	96,565	A	65%	51%	52%
2008	30,212	M	45%	45%	31,385	M	45%	43%	63%
2009	50,314	A	65%	45%	69,145	A	65%	59%	59%

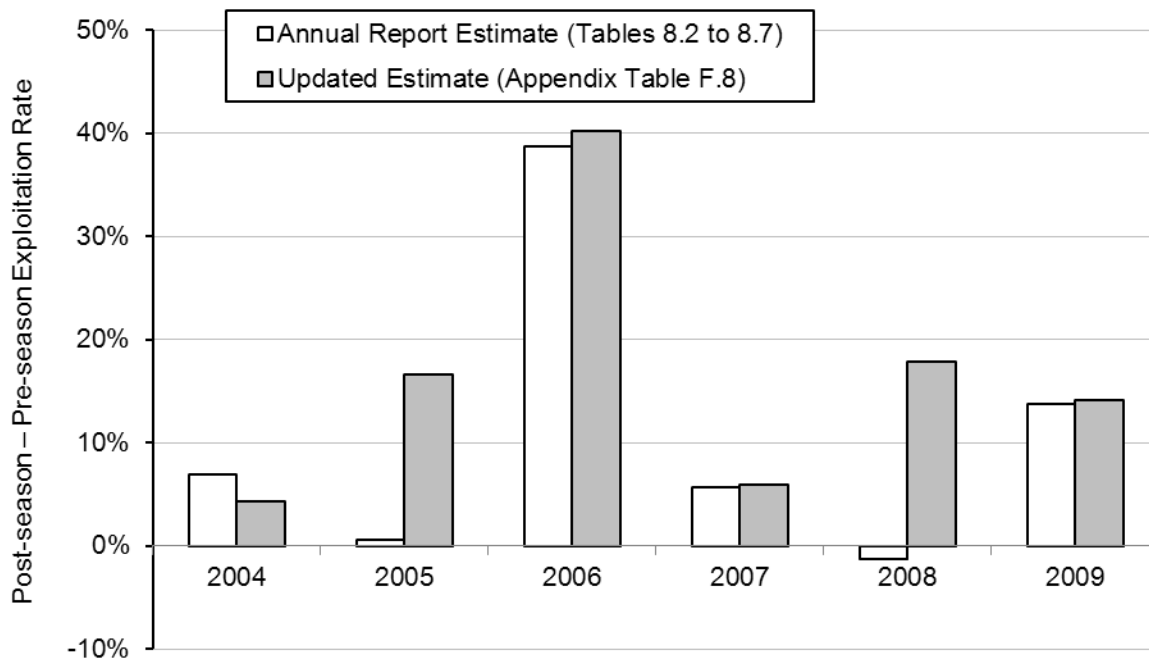


Figure G.8. Hood Canal MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.9. U.S. Strait of Juan de Fuca MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	41,800	A	60%	13%	23,753	M	40%	11%	12%
2005	22,778	M	40%	12%	13,075	M	40%	7%	15%
2006	32,300	A	40%	12%	4,622	L	20%	7%	15%
2007	33,942	A	40%	12%	10,238	L	20%	NA	21%
2008	26,399	M	40%	11%	3,856	L	20%	9%	13%
2009	21,323	M	40%	10%	24,705	M	40%	15%	30%

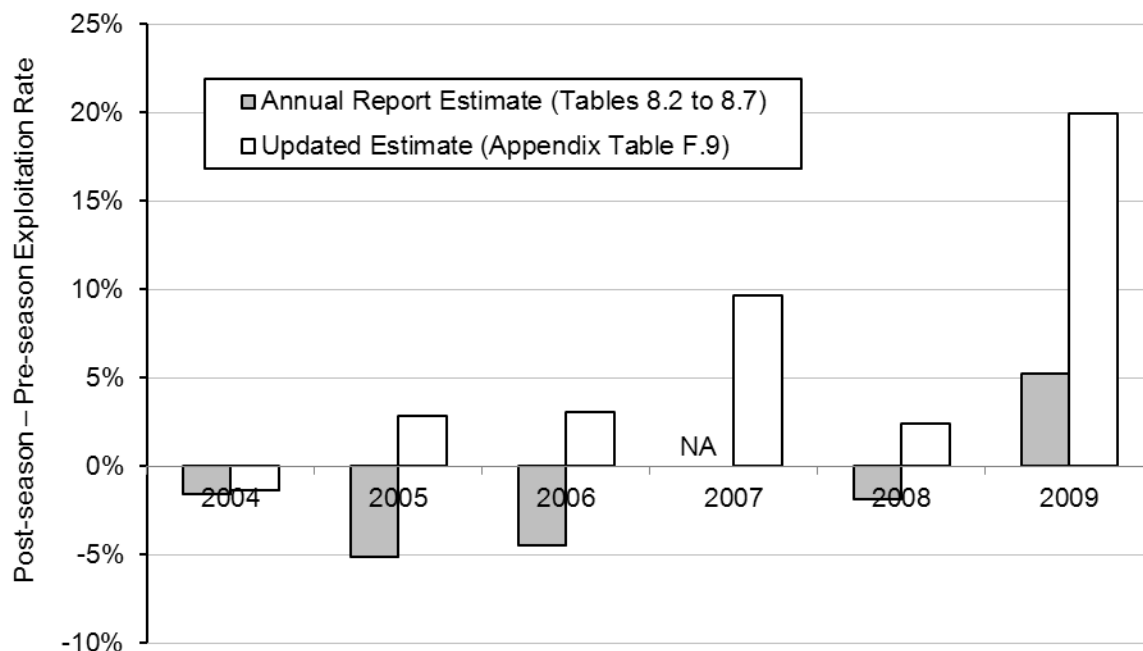


Figure G.9. U.S. Strait of Juan de Fuca MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.10. Quillayute Fall MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	21,378	A	71%	40%	20,757	A	70%	34%	36%
2005	18,667	A	66%	41%	20,971	A	70%	43%	45%
2006	14,702	A	57%	49%	9,929	M	37%	49%	48%
2007	10,878	A	42%	40%	10,740	A	41%	44%	42%
2008	10,588	A	40%	42%	11,104	A	43%	41%	37%
2009	19,357	A	67%	42%	15,578	A	60%	33%	50%

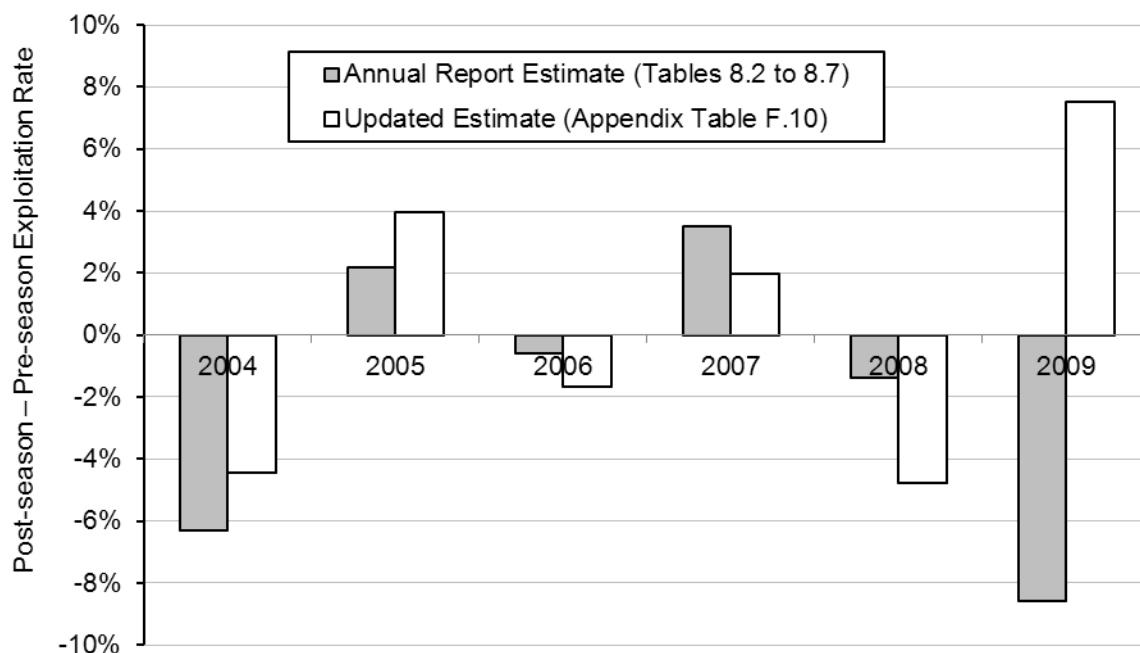


Figure G.10. Quillayute Fall MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.11. Hoh MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	8,159	A	75%	47%	6,984	A	71%	22%	33%
2005	7,656	A	74%	43%	8,200	A	76%	24%	43%
2006	6,419	A	69%	45%	2,736	M	27%	39%	53%
2007	5,434	A	63%	45%	5,889	A	66%	35%	48%
2008	4,383	A	54%	52%	4,309	A	54%	40%	43%
2009	9,568	A	79%	55%	9,530	A	79%	45%	52%

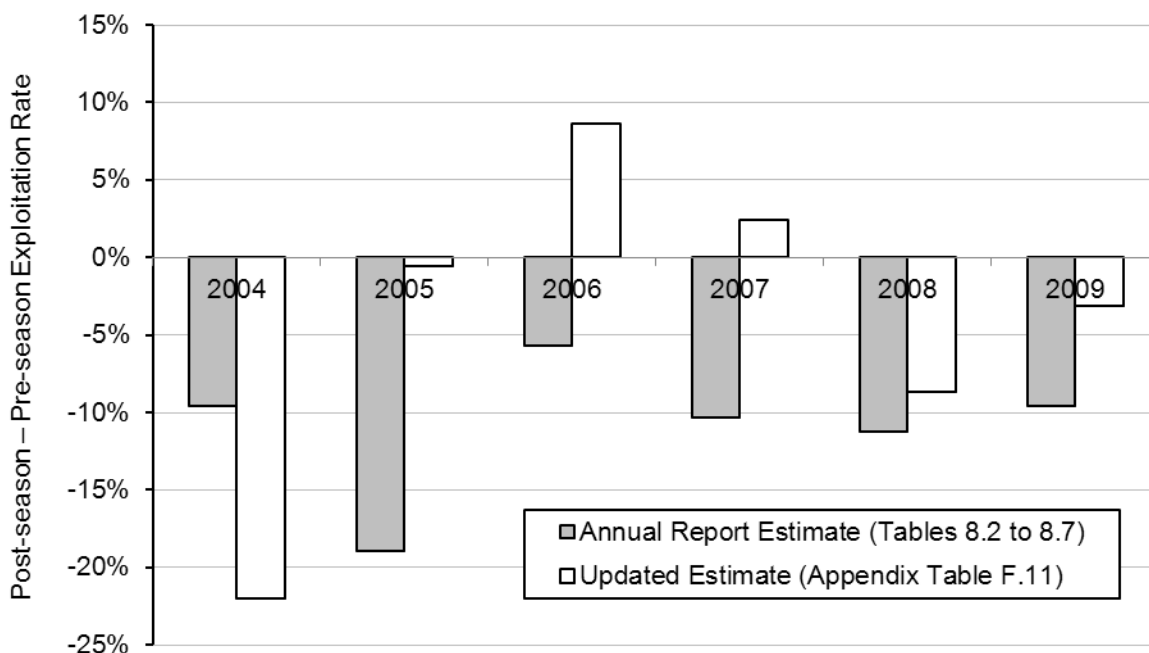


Figure G.11. Hoh MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.12. Queets MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	18,619	A	69%	40%	13,404	A	57%	33%	44%
2005	17,232	A	66%	38%	12,026	A	52%	26%	46%
2006	8,393	M	31%	36%	9,311	M	38%	37%	40%
2007	13,635	A	57%	33%	7,242	L	20%	30%	35%
2008	10,391	A	44%	35%	7,380	M	21%	37%	37%
2009	31,686	A	82%	36%	16,069	A	64%	43%	43%

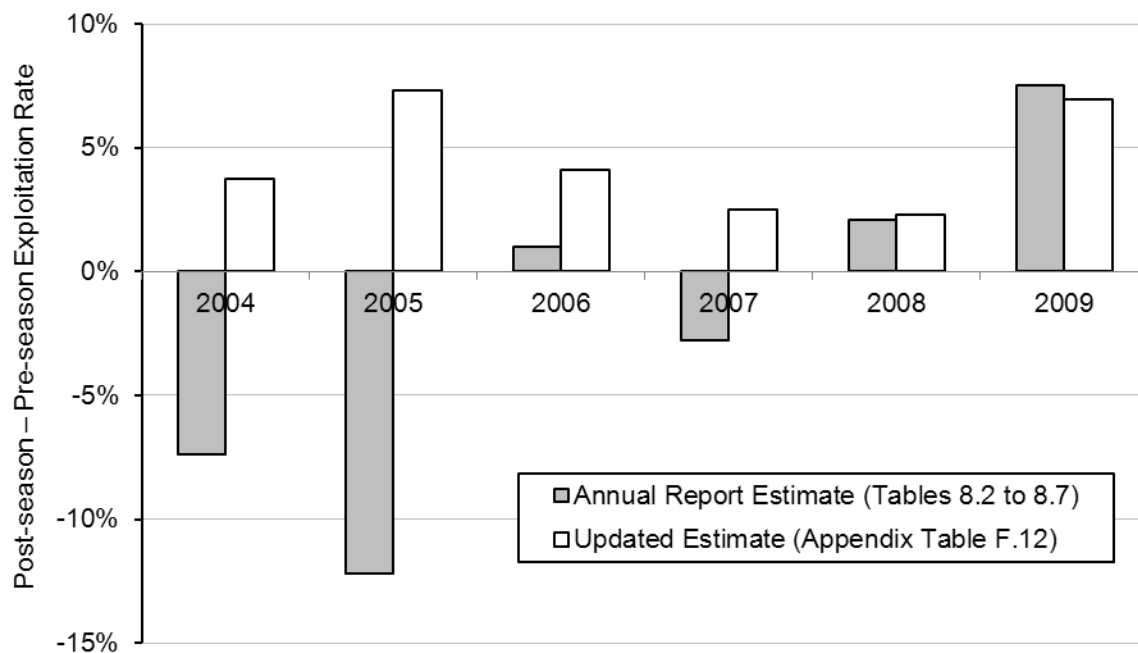


Figure G.12. Queets MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Table G.13. Grays Harbor MU: Pre- and post-season summary of cohort abundance (ocean age-3), PST status, and total exploitation rates for catch years 2004-2009.

Catch Year	Pre-Season				Post-Season				
	Abundance	Status	CAP ER	Planned ER	Abundance	Status	CAP ER	Preliminary ER	Updated ER
2004	116,148	A	70%	51%	91,075	A	61%	28%	33%
2005	89,654	A	61%	42%	66,051	A	46%	37%	42%
2006	66,230	A	47%	48%	30,743	L	20%	42%	42%
2007	58,434	M	39%	37%	37,201	L	20%	29%	31%
2008	44,142	L	20%	34%	49,118	M	28%	30%	31%
2009	59,424	A	40%	35%	104,858	A	66%	38%	34%

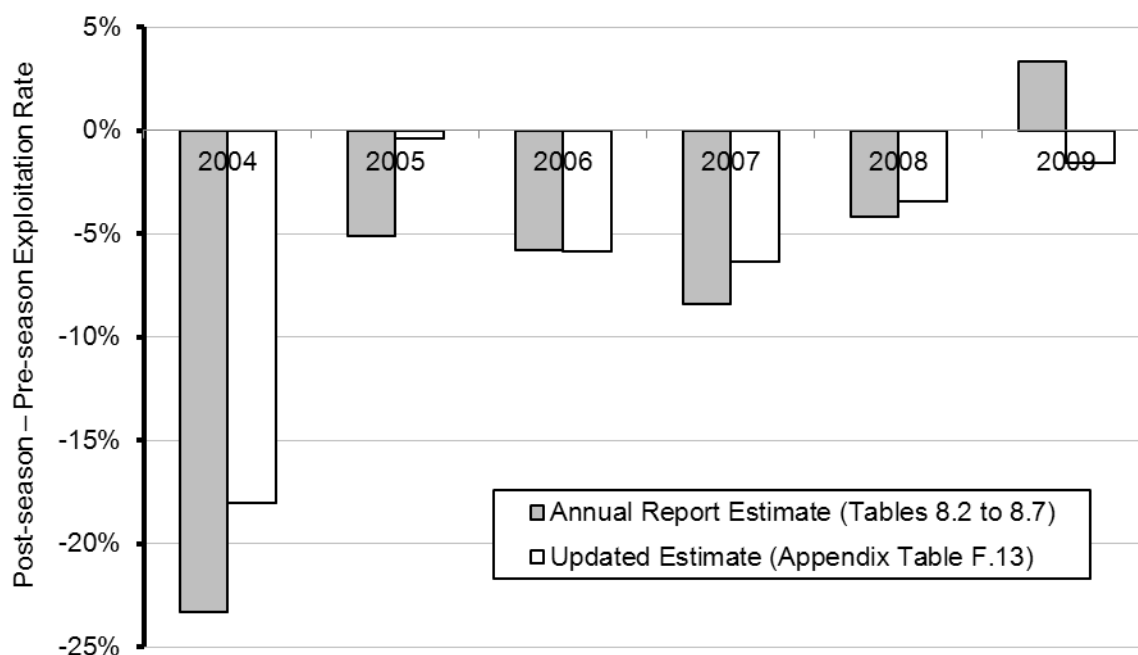


Figure G.13. Grays Harbor MU: Comparison of preliminary (annually reported) and updated post-season estimates of exploitation rates versus pre-season total exploitation rates for catch years 2004-2009. A positive value indicates that fishery impacts were greater than planned. A negative value indicates that fishery impacts were less than planned.

Appendix G References:

PFMC (Pacific Fishery Management Council). 2012. Pacific Coast salmon fishery management plan for commercial and recreational salmon fisheries off the coasts of Washington, Oregon, and California as revised through Amendment 16. PFMC, Portland, OR. 90 p.