PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE

REVIEW OF MASS MARKING AND MARK-SELECTIVE FISHERY ACTIVITIES PROPOSED TO OCCUR IN 2015

REPORT SFEC (16)-1

January 2016

MEMBERSHIP OF THE SELECTIVE FISHERY EVALUATION COMMITTEE[1]

Canadian Members	U.S. Members
Dr. Robert Houtman, SFEC Co-Chair, CDFO	Dr. Gary S. Morishima, SFEC Co-Chair, QIN
Ms. Cheryl Lynch, RCWG Co-Chair, CDFO	Mr. Ron Olson, RCWG Co-Chair, NWIFC
Mr. Joel Sawada, SFAWG Co-Chair, CDFO	Dr. Marianna Alexandersdottir, SFAWG Co-Chair, NWIFC
	Mr. Jonathan Carey, SFAWG, WDFW
	Ms. Carrie Cook-Tabor, RCWG, USFWS
	Dr. Ken Johnson, RCWG, ODFW
	Mr. Ron Josephson, RCWG, ADFG
	Mr. Mark Kimbel, RCWG, WDFW
	Mr. Ryan Lothrop, SFAWG, WDFW
	Ms. Marianne McClure, RCWG, CRITFC
	Mr. George Nandor, RCWG, PSMFC
	Dr. Kristen Ryding, SFAWG, WDFW
	Dr. Rishi Sharma, SFAWG, CRITFC
	Ms. Michelle A. Varney, SFAWG, ODFW
Other Steering Committee Members	**Other Steering Committee Members**
Dr. Gayle Brown, CTC Co-Chair, CDFO	Mr. John Carlile, CTC Co-Chair, ADFG
Dr. Arlene Tompkins, CoTC Co-Chair, CDFO	

[1] Past committee members who provided input to this report include: Mr. Kirt Hughes, WDFW; and Ms. Laurie Peterson, WDFW.

LIST OF ACRONYMS WITH DEFINITIONS

ADFG	Alaska Department of Fish and Game	**NWIFC**	Northwest Indian Fisheries Commission
AK	Alaska	**ODFW**	Oregon Department of Fish and Wildlife
BC	British Columbia	**OR**	Oregon
BY	Brood Year	**PS**	Puget Sound
CA	California	**PSC**	Pacific Salmon Commission
CDFO	Canadian Department of Fisheries and Oceans	**PSMFC**	Pacific States Marine Fisheries Commission
CDFW	California Department of Fish and Wildlife	**PST**	Pacific Salmon Treaty
COLR	Columbia River	**QIN**	Quinault Indian Nation
CoTC	Coho Technical Committee	**RMIS**	Regional Mark Information System
CST	Coast	**SFAWG**	SFEC- Analytical Work Group
CTC	Chinook Technical Committee	**SFEC**	Selective Fishery Evaluation Committee
CWT	Coded-Wire Tag	**SFRCWG**	Regional Coordination Work Group
DIT	Double-Index Tag	**SHRP**	Sport Head Recovery Program
ER	Exploitation Rate	**SJDF**	Strait of Juan de Fuca
ETD	Electronic Tag Detection	**TERM**	Terminal Fishery
ID	Idaho	**URB**	Upriver Bright (Fall Chinook)
IDFG	Idaho Department of Fish and Game	**US**	United States
MM	Mass Marking	**VTR**	Voluntary Trip Report
MOU	Memorandum of Understanding	**WA**	Washington
MSF	Mark-Selective Fishery	**WCVI**	West Coast Vancouver Island
MU	Management Unit	**WDFW**	Washington Department of Fish and Wildlife
NSF	Non-Selective Fishery		

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

This report provides a summary of the proposed coastwide plans for mass marking (MM) of coho and Chinook salmon and the conduct of mark-selective fisheries (MSFs) in 2015. Issues with implications for maintenance of the coastwide coded-wire tag program are identified and recommendations are proposed.

Summary of 2015 Mass Marking Proposals

Throughout this report a mass-marked fish refers to a fish with an adipose fin clip and a double-index tag (DIT) group includes two related coded-wire tag (CWT) groups, one marked and one unmarked. The terms 'marked' and 'clipped', and likewise 'unmarked' and 'unclipped', are used interchangeably.

Mass Marking and DIT Programs

Twenty-one proposals (8 for coho and 13 for Chinook) were received for mass marking (MM) occurring in 2015 (Appendix E). Of these, one was received from southern British Columbia (BC) and 20 from southern United States (US). The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Within the MM proposals received from southern BC and southern US, approximately 34 million coho salmon are proposed to be mass-marked in 2015 (Table 2-1; Figure 2-1A), a level comparable to that proposed in 2014. Essentially all hatchery coho production intended for harvest, from southern BC and southern US hatcheries will be mass marked. Currently there are 16 proposed coho salmon DIT groups (Table 2-1; Appendix F), of which two will be released from southern BC, seven from Puget Sound, four from the Washington (WA) coast, and three from the Columbia River Basin. This is two fewer DIT groups than what was proposed in the 2014 proposals.

Approximately 117 million Chinook are proposed to be mass marked in 2015 from southern US Chinook hatcheries (Table 2-1; Figure 2-1B). This is approximately two million less than were proposed for 2014. Most all hatchery Chinook production from southern US hatcheries intended for harvest will be mass marked. Currently there are 14 proposed Chinook salmon DIT groups (Table 2-1, Appendix G), of which seven are from Puget Sound facilities, three from coastal facilities, and four from Columbia River facilities. The number of DIT groups is unchanged from the 2014 proposals; however, ODFW has discontinued the Big Creek Hatchery DIT and WDFW is proposing a DIT at the Naselle Hatchery.

Sampling Programs

Prior to MM, the adipose fin clip was employed as a visual indicator for fish containing a CWT. Consequently, sampling programs which were designed to collect heads from fish with missing adipose fins resulted in samples of heads, all which contained CWTs. With MM, a large number of marked fish do not contain CWTs; further, CWTs must be recovered from both marked and unmarked fish to obtain data for DIT releases to estimate fishery impacts. Electronic tag detection (ETD) equipment has been developed as a means to efficiently identify marked and unmarked fish containing CWTs. However, ETD is not employed coastwide because of

continuing reservations by some agencies regarding the cost, accuracy, and practical feasibility of incorporating this technology into their sampling programs. The Alaska Department of Fish and Game (ADFG), Canadian Department of Fisheries and Oceans (CDFO), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Wildlife (CDFW) all conduct sampling programs which will not recover the unclipped component of DIT programs required to assess impacts of MSFs. Fisheries from which unmarked DIT recoveries should have been observed create gaps in analyses of fishery impacts on unmarked (wild) fish.

Considering sampling programs coastwide, some agencies already implement comprehensive electronic sampling strategies to recover CWTs from sport and commercial fisheries, while other agencies are still working to increase use of ETD. Washington State continues to fully implement electronic sampling statewide and consistently reports CWT recoveries of the unmarked components of DIT groups in recreational marine and some freshwater MSFs, as well as in non-selective fisheries (NSFs). Starting in 2008, Canada also committed to full electronic sampling and reporting of all CWTs in all commercial fisheries for Chinook. Coho salmon in Canadian commercial fisheries are visually sampled, except for heads delivered by northern 'freezer' trollers, which are electronically sampled. Canada continues to rely on the Sport Head Recovery Program (SHRP) to recover CWTs from NSFs and MSFs alike and thus, no unmarked coded-wire-tagged recoveries are available from them. Oregon Department of Fish and Wildlife continues to use visual sampling for fall Chinook and electronic sampling for spring Chinook and coho in the Columbia River. Beginning in 2011, ODFW initiated electronic sampling of all ocean recreational and commercial salmon fisheries off the coast of Oregon (OR).

Encounters of large numbers of mass-marked Chinook are increasingly impacting catch sampling programs in northern fisheries; for example, approximately 73% of the Chinook caught in 2014 in the southeast Alaskan troll fishery with a missing adipose fin did not contain a CWT (Figure 2-3). The increased cost to deal with the additional marked fish (e.g., storage, and shipping to and sorting of heads in the dissection laboratories) are not quantified, but will impact the programs.

Summary of 2015 Mark-Selective Fishery Proposals

Mark-selective fisheries have been prosecuted for coho since 1998 and for Chinook since 2003. For 2015, the SFEC received 63 MSF proposals for coho and Chinook salmon in ADFG, CDFO, WDFW, and ODFW fisheries. The SFEC believes these proposals cover all MSFs planned for 2015 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1. Further details describing the proposed MSFs and comments by the SFEC are provided in Table 3-3.

Nineteen proposals were received for coho salmon MSFs to occur in 2015 and 44 proposals were received for Chinook Salmon MSFs. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

SFEC received one proposal for a new mark-selective fishery for Chinook salmon in the July-August coho salmon troll fishery.

Up until 2008, Chinook MSFs were largely restricted to Puget Sound and Columbia River spring Chinook. Since then, Chinook MSFs have expanded substantially in marine and freshwater areas. In 2007, 12 Chinook MSFs were prosecuted; in 2010, that number doubled to 24 Chinook MSFs and a larger number of indicator stocks are now vulnerable to being encountered in MSFs.

The majority of MSF proposals are for terminal marine or freshwater areas, each of which will impact mature fish of one to several stocks. Multiple MSFs for both coho and Chinook are proposed for ocean areas in 2015 in SEAK, BC, WA (WA ocean areas 1 through 4 and the Columbia River), and OR. These fisheries will impact many stocks and also multiple broods of Chinook. Table 3-4 and Table 3-5 each provide historical information on encounters of tagged and marked fish to identify coho and Chinook tagged stocks that can be expected in these areas with MSFs.

Issues and Concerns

Post-season Reports

Post-season reports on MSFs are required for each MSF prosecuted. One of the basic functions of these reports is to provide a record of how fisheries were actually implemented and whether there were any changes in the way the fisheries and sampling programs were conducted relative to the proposal. These reports are to be submitted in the form of three tables (Appendix H). The first two tables should be submitted by the annual PSC post-season meeting following the year of the fishery. No SFEC MSF post-season report/tables were found in the US or Canadian post-season reports (Jan 2015). Although these SFEC tables are not included in the PSC post-season reports, CDFO and WDFW do provide fishery regulations and preliminary landed catch estimates for mark-selective fisheries in these reports.

Mixed-Bag Regulations

Regulations to implement MSFs are increasingly complex, making analyses to estimate impacts challenging in a number of ways. Different types of mixed bag regulations are part of the MSFs proposed by Canada, Washington, and Oregon for recreational fisheries. As MSFs expand, a variety of types of mixed bag regulations are being proposed. The regulations include a range of rules that specify when and how anglers may retain various combinations of adult and juvenile marked and unmarked fish in their daily bag limits. The SFEC is not aware of reliable methods for estimating impacts on marked and unmarked fish under mixed bag regulations and the agencies proposing these mixed bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

Recommendations and Issues Requiring PSC Direction

Proposal Review Process

It is recommended that the PSC request agencies to submit proposals for all potential 2016 MM and MSFs by November 2015, and for agencies to provide both preliminary and final post-season reports on the conduct of MSFs within the timeframe adopted by the PSC. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner.

Interagency Coordination and Cooperation

Mass marking, double-index tagging, and CWT sampling programs continue to be insufficiently coordinated to support analysis by PSC technical committees. It is also not clear that agencies are collecting adequate and necessary data to permit estimation of unmarked CWT recoveries in fisheries and escapements so that cohort reconstructions can be carried out on the unmarked component of the DIT group releases. With the expansion of Chinook marine MSFs, the geographical range of electronic CWT sampling needs to be expanded and the number of double-index-tagged stocks needs to be increased. Specifically, ETD needs to be implemented by ODFW for Oregon Columbia River fall Chinook fisheries and escapement to recover DIT groups for Chinook indicator stocks. In addition, DIT groups should be added for the following Chinook stocks:

- Lower Columbia River tule fall Chinook (possibly Washougal);
- Columbia River summers (Wells Hatchery);
- Snake River fall subyearlings (Lyons Ferry Hatchery);
- Willamette Spring (reinstate DIT program with electronic terminal sampling);
- North Oregon Coast (Salmon River); and,
- Mid Oregon Coast.

The PSC should continue to support technical and policy processes to develop agreements to clarify responsibilities for maintaining a functional CWT system; these processes should build upon recommendations presented by the CWT Work Group in 2008.

1 INTRODUCTION

The Selective Fishery Evaluation Committee (SFEC) is charged with evaluating potential impacts of mass marking (MM) and mark-selective fisheries (MSFs) on the viability of the coded-wire-tag (CWT) system (Appendix A). The SFEC serves as a clearing house to facilitate coordination and reporting on MM and MSF programs among the Parties to the Pacific Salmon Treaty (PST), affected agencies, and existing coastwide and regional committees established to monitor activities related to the CWT program. The SFEC continues to review procedures and protocols for MM, fishery sampling plans, and the program evaluations developed by the proponents. Where appropriate, the SFEC develops and recommends alternative procedures in consultation with relevant technical committees of the Pacific Salmon Commission (PSC).

In addition, the SFEC has a role in developing and evaluating methods for analyses of CWT data in the presence of MM and MSFs, establishing database requirements, and developing tools for agency use in developing proposals and analyzing data. The SFEC includes two working groups: the Regional Coordination Work Group (RCWG) and the Analytical Work Group (SFAWG). The RCWG is tasked with reviewing MM proposals, and the SFAWG is tasked with reviewing MSF proposals and evaluating post-facto impacts of MSFs.

Beginning in 2002, agencies that intended to engage in MM or MSFs were requested to provide specific information on an annual schedule that would permit the SFEC to provide timely advice to the PSC. Agency proposals for MM plans were requested for all hatchery Chinook and coho stocks expected to be encountered in fisheries affected by PSC regimes. As stated in the *Understanding of the PSC concerning Mass Marking and Selective Fisheries* (Appendix A), proposals for continuing programs are requested no later than November 1 of the year prior to implementation. Proposals for new or substantially changed MM proposals are requested by June 1 of the year prior to implementation. Agencies have been requested to provide their information to the SFEC in provided templates (Appendices B and C). In addition, a Microsoft Excel™ format has been developed as an alternative format for submitting MSF proposals (Appendix D).

The SFEC reviewed proposals for MM activities and MSFs anticipated by agencies to occur in 2015. This report summarizes the results of the review of MM and MSF proposals received between November and December 2014. Issues and concerns identified during the review, and recommended further actions are also provided in this report.

Throughout this report a mass-marked fish refers to a fish with a clipped adipose fin and a double-index-tag (DIT) group refers to two related CWT groups, one marked and one unmarked. The terms ‘marked’ and ‘clipped’, and likewise ‘unmarked’ and ‘unclipped’, are used interchangeably.

2 REVIEW OF MASS MARKING PROPOSALS

2.1 Mass Marking Proposals Received

A total of 21 MM proposals (8 coho and 13 Chinook) were received by the PSC for 2015 marking activities (Appendix E). Of these, one was received from southern British Columbia (BC) and 20 from southern United States (US). All proposals are summarized in Table 2-1. These proposals represent all known MM programs that have international ramifications and/or sampling impacts on other agencies. Proposals were not requested for spring and summer Chinook stocks from the Snake River Basin, because, as identified in previous reviews, there is a lack of marine recoveries from these groups.

2.2 Mass Marking Levels

Approximately 34 million coho are proposed to be mass marked in 2015 from southern BC, Washington, and Oregon (Table 2-1). Although there has been a gradual decline in coastwide coho production since brood year 1997, there have been no significant changes to proposed marking levels from brood year (BY) 2001 to BY 2014. Annual trends in coho MM and total production, for BYs 1997 to 2014, are shown in Figure 2-1A. Geographical details of the fish to be released in 2015, by mark and tag status, are displayed in Figure 2-2A. The vast majority of the coastwide coho production, and essentially all coho intended for harvest, will be mass marked. For the production that are not mass marked, approximately 2.6 million (68% of the unmarked fish) will be tagged and unmarked.

The total BY 2014 southern US Chinook hatchery production from Washington and Oregon, for the area and stocks covered by the 2015 proposals, is projected at approximately 152 million released fish. Annual trends in Chinook MM and total production, for BYs 1997 to 2014, are shown in Figure 2-1B. Geographical details of the proposed BY 2014 releases, by mark and tag status, are displayed in Figure 2-2B.

Approximately 117 million Chinook are proposed to be mass marked from southern US Chinook hatcheries in 2015 (Table 2-1). This is approximately two million less than the number proposed to be marked in 2014. For the production that will not be mass marked, approximately 20.4 million will be both tagged and marked, approximately 7.2 million will be tagged and unmarked, and approximately 6.7 million will be intentionally left unmarked for restoration programs (Figure 2-2B). No mass marking of Chinook is anticipated for hatchery production from CA and BC.

2.3 Double-Index-Tag Groups

Double-index-tag groups provide information necessary for direct estimation of total MSF impacts on unmarked fish. Appendix F and Appendix G list the coho and Chinook salmon PSC indicator stocks, including those that are DIT groups. Currently, there are 16 proposed coho salmon DIT groups (Table 2-1; Appendix F), of which two will be released from southern BC, seven from Puget Sound (PS), four from the Washington (WA) coast, and three from the Columbia River Basin. Chinook Salmon DIT groups currently total 14 (Table 2-1; Appendix G), of which seven are from Puget Sound facilities, three from WA coastal facilities, and one spring

and three fall stocks from Columbia River facilities. A new DIT program at Naselle Hatchery along the coast of Washington has been proposed and the Chinook DIT program at Big Creek Hatchery has been discontinued.

WDFW has maintained DIT groups for both species, but the number of DIT groups outside WA has declined in recent years. For example, the fall Chinook DIT program at Chilliwack Hatchery ended with BY 2011. As new MSFs are being proposed both in BC and in areas off the WA coast and in the Columbia River for fall Chinook, further evaluation of the DIT programs is necessary. The following stocks are recommended to be double-index tagged: 1) lower Columbia River tule fall Chinook – Washougal Hatchery; 2) Columbia River summer Chinook – Wells Hatchery; 3) Snake River fall Chinook subyearlings – Lyons Ferry Hatchery; 4) Willamette Spring Chinook (reinstate DIT program with electronic terminal sampling); 5) North Oregon Coast Chinook (Salmon River); and, 6) Mid Oregon Coast Chinook. These recommendations have not been implemented by the associated agencies due to a lack of funding and conflicting marking and evaluation priorities.

Table 2-1. Mass marking of coho and Chinook salmon and number of DIT groups proposed for 2014 and 2015.

Species	Area	Run	Agency	DIT Groups	Mass Marking (millions) 2014	Mass Marking (millions) 2015	Significant Changes from 2014
Coho	Strait of Georgia		CDFO	2	4.5	4.5	
	W. Coast of Vanc. Isl.		CDFO	0	0.5	0.3	
	Puget Sound		WDFW/Tribal	6	9.8	10.2	
			USFWS	1	0.3	0.3	
	WA Coast		USFWS	0	0.7	0.8	Quinault DIT discontinued
			WDFW/Tribal	4	4.3	4.3	
	Columbia Basin		USFWS	1	0.4	0.8	
			WDFW	2	8.2	7.5	
			ODFW	0	5.1	5.2	
	OR Coast		ODFW	0	0.5	0.5	
	Total Coho			**16**	**34.2**	**34.3**	
Chinook	BC	L Fraser R	CDFO	0	---		
	Puget Sound	Spring	WDFW/Tribal	1	0.7	0.7	
		Summer	WDFW/Tribal	1	2.7	3.3	
		Fall	WDFW/Tribal	5	30.5	29.7	
	WA Coast	Spr/Sum	WDFW/Tribal	0	0.2	0.2	
		Fall	USFWS	0	2.1	2.5	
			WDFW/Tribal	3	7.9	8.1	Naselle DIT added
	Columbia Basin	Summer	USFWS	0	0.2	0.2	
		Spring	ODFW (Willamette)	0	5.0	5.5	
			ODFW (Col. R)	0	0.6	1.5	
			USFWS	0	3.2	3.4	
			WDFW/Tribal	1	3.4	3.3	
		Fall-Tule	USFWS	1	11.2	9.7	
			WDFW	0	14.1	13.5	
			ODFW	0	9.1	6.9	Big Creek DIT discontinued
		Fall URB	WDFW	1	12.7	12.9	
			ODFW	0	2.4	0.3	
			USFWS	1	5.6	7.4	
		Snake R. Fall	IDFG	0	0.7		Reported by ODFW
			ODFW	0		0.8	Previously reported by IDFG
		Snake R. Spring	ODFW	0	0.3	0.4	
			USFWS	0	1.5	2.0	
			IDFG[1]				
	OR Coast	N. Spring	ODFW	0	0.3	0.4	
		S. Spring	ODFW	0	2.1	2.2	
		Fall	ODFW	0	3.2	2.6	
	Total Chinook			**14**	**119.4**	**117.3**	

[1] Did not request or receive a proposal; however, these stocks are not expected to significantly contribute to PST fisheries.

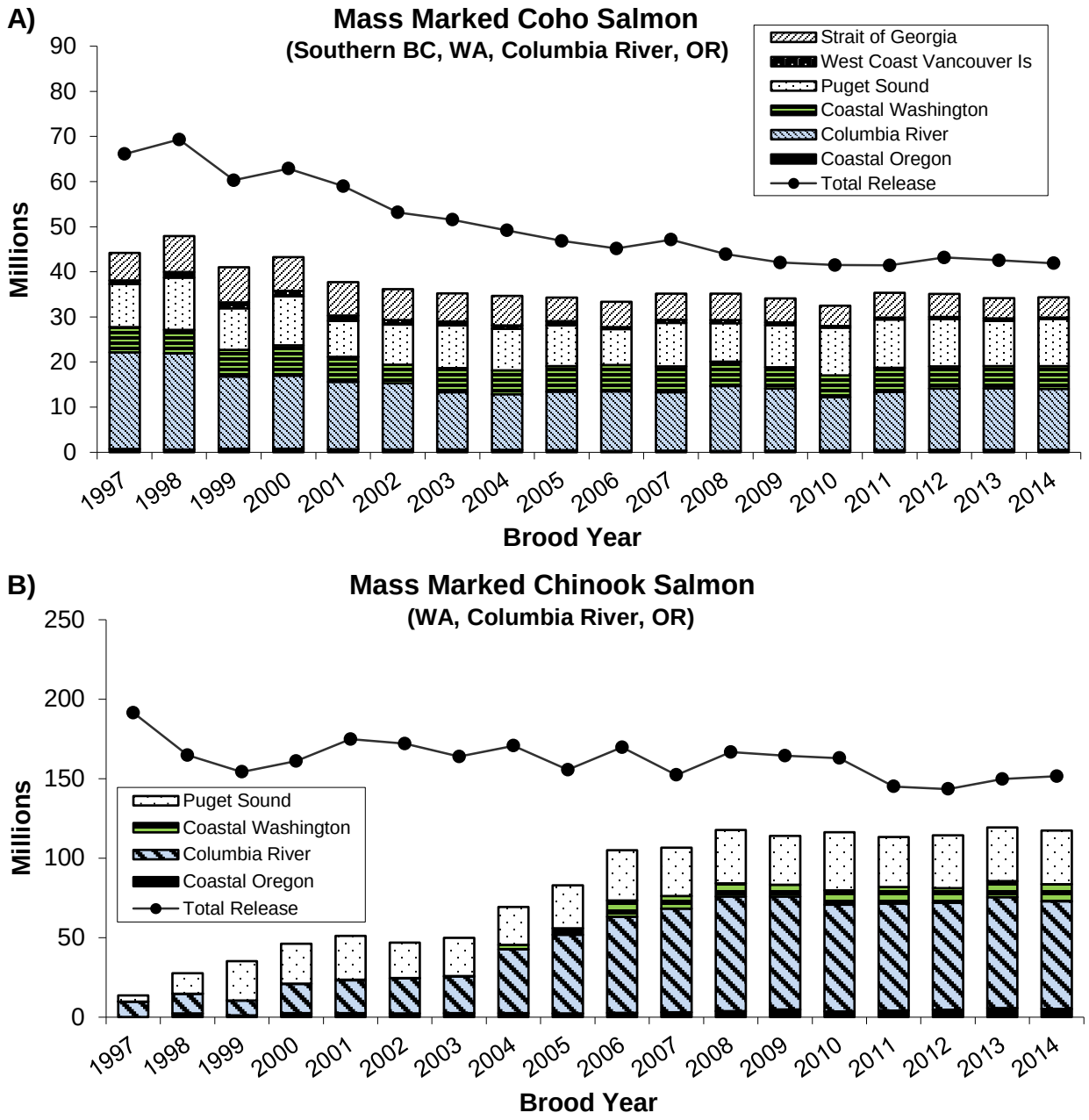

Figure 2-1. Number of mass marked coho (panel A) and Chinook salmon (panel B) released by region and brood year, 1997–2014.

The solid line represents total hatchery releases by brood year with the exception that fry releases of coho are not included. Values used for brood years 1997–2010 are actual release sizes; values for brood years 2011–2014 are proposed release sizes. Releases of spring and summer Chinook into the Snake River by IDFG are not included in this figure for brood years 2011–2014, as no mass mark proposals were received for these programs.

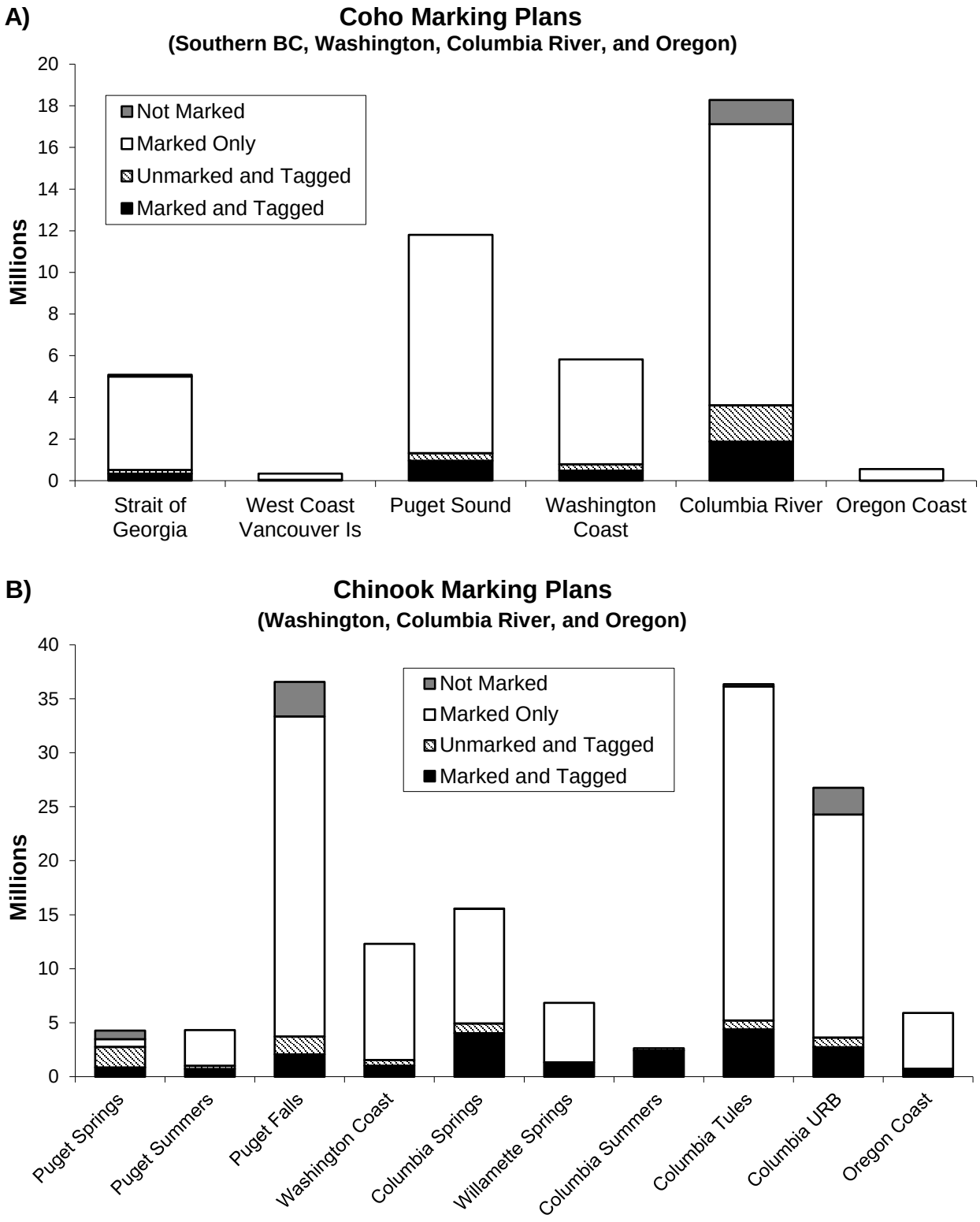

Figure 2-2. Projected coho (panel A) and Chinook (panel B) salmon releases for brood year 2014, by region and mark status.

2.4 Fishery and Escapement Sampling Methods

2.4.1 Current Agency Sampling Methods

Two methods are currently used to detect fish containing CWTs. The traditional visual sampling method relies upon the adipose fin clip as a visual indicator for a CWT. When visual sampling is used, only CWTs from marked fish will be detected. Electronic tag detection (ETD) uses electronic gear (hand-held wand or fixed-position tube) to detect CWTs in marked and unmarked fish. When marked fish are first visually separated in the sample and electronic gear is then used to detect tags in the marked fish, this is considered visual sampling because tags are only recovered from marked and tagged fish. Visual sampling results in a lack of recovery of the unmarked component of DIT release groups, creating data gaps in the analysis of CWT data and increased uncertainty in the estimated impacts on unmarked (wild) fish. These gaps also require indirect estimation procedures to complete them thus making analyses more time consuming and the results more uncertain.

Current coded-wire-tag sampling methods for coho and Chinook are summarized in Table 2-2 and Table 2-3, respectively. Electronic tag detection has not been implemented for all fisheries encountering mass-marked fish. In general, ETD has become the standard CWT sampling method in WA and ID. Visual CWT sampling remains the standard method in AK and CA. In BC and OR the situation is more complex, where sampling methods depend on species, location, and the type of fishery.

Alaska Department of Fish and Game has no plans to convert to ETD sampling although there is growing concern about the large numbers of clipped fish without CWTs encountered in sampling programs. Of the marked Chinook caught in Alaska's troll fishery since the implementation of MM, the proportion of fish with no tags has increased from approximately 7% in 1995 to 73% in 2014 (Figure 2-3). The increased cost to deal with the additional marked fish is not quantified, but impacts the program. Costs to ship all the heads, including those with no CWTs, from sampling locations to the dissection lab are substantial. To remedy this situation and reduce sampling costs, Alaska has been gradually implementing the electronic scanning of marked fish encountered in their sampling programs. Currently this method is being employed in the commercial winter troll Chinook fisheries and has recently been expanded to include the majority of the summer troll Chinook fisheries and approximately half of the seine and gillnet fisheries.

Canada relies on voluntary recoveries of marked coho and Chinook in recreational fisheries (regardless of whether mark-selective or non-selective regulations are used), while the current restricted commercial fisheries are electronically or visually sampled depending on species and location (Table 2-2). As in AK, the DFO SHRP program has seen an increase in the submission of heads without tags as well as a decrease in the submission rate of heads as fewer anglers turn in heads. Since 2008, coho landed by 'ice' or 'day boats' in the northern BC troll fishery are not subject to electronic sampling. In that fishery, coho are sampled visually and CWTs from marked fish only are recovered. Electronic sampling is being used for both species in commercial fisheries South of Cape Caution, located just northward of the northern tip of Vancouver Island on the mainland coastline.

Within the Columbia River, sampling methods depend on species, location, and the type of fishery. Columbia River sport and commercial fisheries are electronically sampled for spring and summer Chinook (January–July) and also coho. Fall Chinook (August–October) fisheries (commercial and sport) are visually sampled (only adipose-clipped fish are wanded to determine if CWT present), except for the Buoy 10 sport fishery in the estuary where electronic sampling has been used in recent years.

Coded-wire-tag sampling in Oregon hatcheries is predominantly electronic; however, CWT sampling at most freshwater traps and on spawning grounds remains visual. Since 2011, ETD has been used to CWT sample both the sport and commercial troll Chinook and coho fisheries that occur off the coast of Oregon. However, the impacts of large abundances forecasted for Sacramento and Klamath River fall Chinook combined with the 25% fractional marking program in CA could affect proposed electronic sampling of the commercial troll fisheries when high-volume loads are encountered by samplers.

The Oregon ocean sport Chinook fishery is mostly non-selective, with the exception of a 2-week season in June between Leadbetter Pt., WA and Cape Falcon, OR. The majority of the sport coho fishery is mark-selective; however, a limited non-selective quota fishery occurs in September from Cape Falcon to Humbug Mountain. Oregon's ocean commercial troll fishery is non-selective for Chinook and mark-selective for coho North of Cape Falcon. From Cape Falcon southward to the OR/CA border, the commercial Chinook fishery is non-selective. Coho retention in the commercial troll fishery is prohibited from Cape Falcon to the OR/CA border.

Some controversy remains regarding the reliability of wands for detecting CWTs in Chinook. CDFO has adopted a policy of not using wands in either fishery or escapement sampling except when a tube detector fails or a Chinook is too large to pass through the tube detector. CDFO carried out a blind study over a 2-year period in the Fraser River Albion Chinook test fishery with trained staff using hand-held wands and found that CWTs were missed when actually present and detected when not present at a rate significantly greater than expected by chance (Parken and Riddell 2007). Most importantly, missed detections and false detections occurred at higher rates in unmarked fish compared to marked fish. However, the results of the Canadian study contradict all other previous blind studies testing the efficacy of wands in detecting CWTs in Chinook, where detection rates ranged from 91 to 99% (Olson 2007). The difference in the results of these studies is disconcerting, and it has yet to be determined whether this difference is due to sampling technique or equipment.

The manufacturer of the wands (Northwest Marine Technology, Inc.) has the ability to test and increase the detection range of wands to a new minimum standard (3.2 cm). Wands that meet this new standard are marked with a silver battery cap. The Northwest Indian Fish Commission (NWIFC) conducted a field test of these newer wands on returning Chinook at three hatcheries in the fall of 2010. The study found high detection rates (99% for all samples combined) with just external wanding. In addition, some of the missed tags were detected with subsequent wanding in the mouth. The technique of "mouth wanding" (wanding the fish both externally on the snout and inside the mouth on the palate) is therefore still recommended with these wands.

Table 2-2. Proposed fishery sampling methods for tagged coho salmon in 2015.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial Sport	Visual Visual	
Northern BC	Commercial	Electronic/Visual	Some terminal areas are not sampled. Freezer troll is sampled electronically; other catches are sampled visually.
	Sport	Visual (Voluntary)	Anglers are encouraged to turn in heads from marked coho only; therefore, tag recoveries of unmarked coho are not expected (fisheries are non-selective).
West Coast Vancouver Island	Commercial	Electronic	Incidental recoveries in fisheries on other species; non-retention of unmarked coho.
	Sport	Visual (Voluntary)	Anglers are encouraged to turn in heads from marked coho only; therefore, tag recoveries of unmarked coho are not expected (fisheries are mostly mark-selective).
Strait of Georgia	Commercial	Electronic	Incidental recoveries in fisheries on other species; non-retention of unmarked coho.
	Sport	Visual (Voluntary)	Anglers are encouraged to turn in heads from marked coho only; therefore, tag recoveries of unmarked coho are not expected (fisheries are mostly mark-selective).
Puget Sound	Commercial Sport	Electronic Electronic	
Washington Coast	Commercial Sport	Electronic Electronic	
Oregon Coast	Commercial	Electronic	The only commercial coho fishery on the Oregon coast proposed to occur is North of Cape Falcon and is mark-selective; therefore, recoveries of unmarked coho are not expected.
	Sport	Electronic	The ocean sport fishery is mark-selective except for a non-selective season during the first few weeks of September. Tag recoveries from unmarked coho are anticipated in September.
Columbia River	Commercial Sport	Electronic Electronic	
California	Commercial Sport	Visual Visual	

Table 2-3. Proposed fishery sampling methods for tagged Chinook salmon in 2015.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial Sport	Visual Visual	
Northern BC	Commercial Sport	Electronic Visual (Voluntary)	All Chinook are now electronically sampled and all tags are decoded (this has been the case since 2007). Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
West Coast Vancouver Island	Commercial Sport	Electronic Visual (Voluntary)	Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
Strait of Georgia	Commercial Sport	Electronic Visual (Voluntary)	Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
Puget Sound	Commercial Sport	Electronic Electronic	
Washington Coast	Commercial Sport	Electronic Electronic	
Oregon Coast	Commercial Sport	Electronic Electronic	CWTIT funds are used to implement current electronic sampling programs.
Columbia River	Commercial Sport	Electronic/Visual Electronic/Visual	Spring and Summer Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. CWT recoveries from unmarked fall Chinook will be incomplete. Spring and Summer Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. CWT recoveries from unmarked fall Chinook will be incomplete. The Buoy 10 fishery is electronically sampled.
California	Commercial Sport	Visual Visual	

In November of 2011, Northwest Marine Technology (NMT) announced the availability of a "T-wand". T-wands are more sensitive than the previous wands with a detection range of 5.5 cm. Field tests indicate that for most coho and Chinook, CWTs can be readily detected with a single quick up and down swipe on the top of the snout. However, for large fish, particularly male Chinook or coho > 1 m in length, three up and down swipes on the snout are recommended - one down the middle and one on each side of the snout. The manufacturer believes that if used correctly, these wands should detect all tags. An advantage of these wands is that mouth wanding is not required on large Chinook. These wands are now being sold to agencies and ADFG, WDFW, and ODFW all purchased wands with 2012 Coded Wire Tag Improvement Funds and CDFO carried out testing of these wands in 2013. Prior to the fish entering the processing plants, ADFG has begun to use these wands in Alaska to identify tagged fish in the marked fish that were visually sampled; thus, reducing the number of heads removed and sent to the CWT lab. NMT also believes T-wands are very durable. Of the 300 wands sold to-date, only 5 have been returned for repairs. Because of the increased sensitivity of the T-wands, WDFW and ODFW have reported that there are a few sites where they were not useable due to interference from metal structures or equipment. The manufacturer has conveyed that the sensitivity could be turned down if this was desired by the agencies.

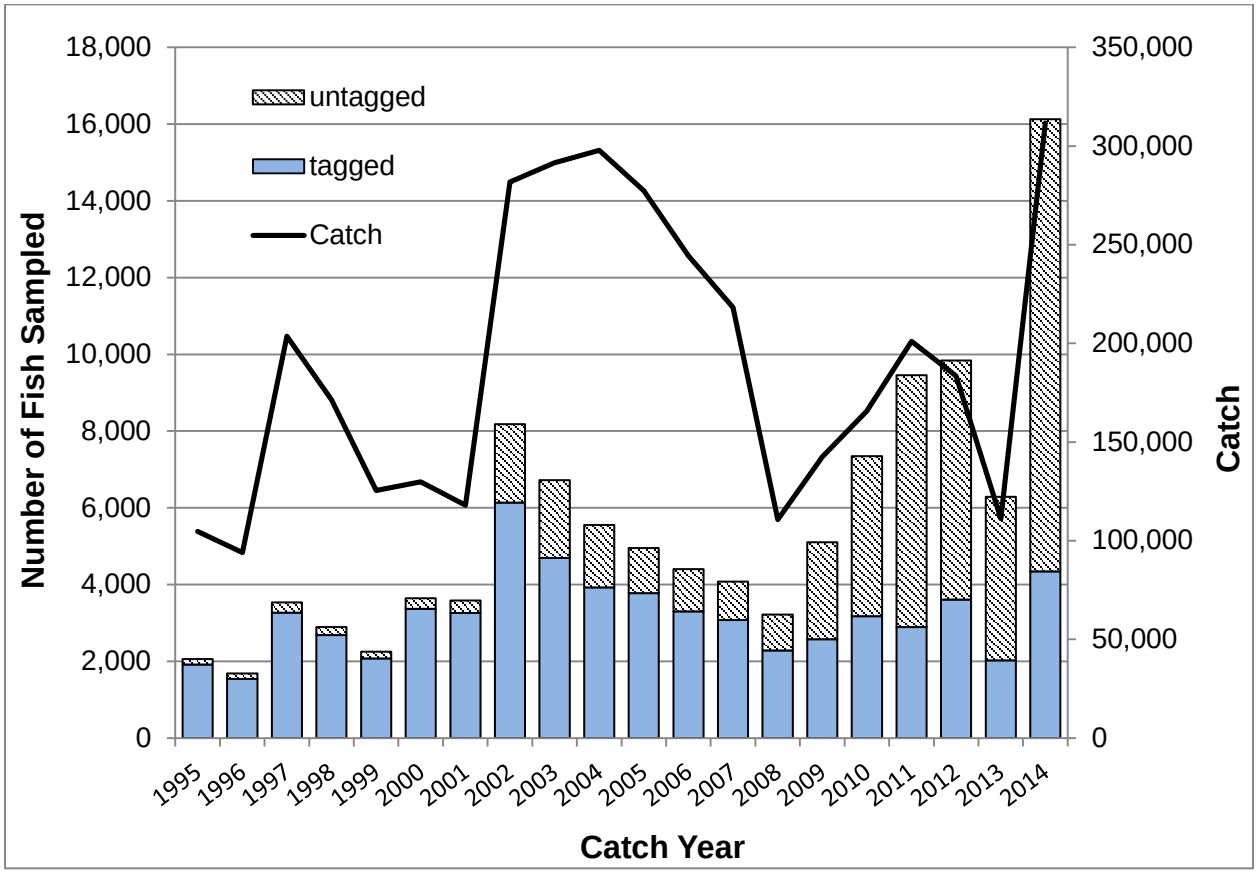

Figure 2-3. Numbers of marked Chinook salmon sampled in Alaska's troll fishery by untagged and tagged status, with catch numbers, 1995–2014.

3 REVIEW OF MARK-SELECTIVE FISHERY PROPOSALS

In 2006, the SFEC simplified the format of the template for MSF proposals to focus on the description of the fishery and the sampling plan and to identify the stocks likely to be impacted by the fishery (see templates in Appendix C and Appendix D). The information to be provided in the proposal template is required to estimate mortalities of unmarked fish.

3.1 Mark-Selective Fishery Proposals Received

Mark-selective fisheries have been prosecuted for coho since 1998 and for Chinook since 2003 (Table 3-1). For the 2015 fishery season, the SFEC received a total of 63 MSF proposals for coho and Chinook salmon in CDFO, WDFW, ODFW, and IDFG fisheries. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted in time for the annual review meeting by the SFEC. ADFG submitted one proposal for new mark-selective fisheries. Mixed bag regulations were again proposed for several of the MSFs (e.g., Oregon recreational marine and freshwater fisheries, WDFW recreational freshwater fisheries, and Canadian marine recreational fisheries).

3.1.1 Coho Salmon MSFs

Nineteen proposals were received for coho salmon MSFs occurring in 2015 (Table 3-1). The SFEC received 4 proposals from CDFO for ongoing coho MSFs in Canadian waters, including 2 in the lower Fraser River and 2 in southern BC; each proposal contained a variety of fishery openings distinguished by regulation variations. A total of 11 coho MSF proposals were submitted from WA, all representing ongoing fisheries. Of these WA, 7 were for freshwater locations and 4 for marine waters. SFEC believes that proposals have now been submitted for all ongoing coho MSF in WA. SFEC received one ODFW/WDFW joint coho MSF proposal for an ongoing sport fishery (since 1999) from Hood River downstream to the mouth of the Columbia River. One additional coho MSF proposal was received from ODFW for the OR coast, an ongoing fishery since 2003.

3.1.2 Chinook Salmon MSFs

Forty-four proposals were received for Chinook Salmon MSFs occurring in 2015 (Table 3-1). These included a new proposal for a MSF from ADFG, and 2 proposals from Canada (CDFO), 26 from Washington (WDFW), 8 submitted jointly by Oregon and Washington (ODFW and WDFW), and 7 from Oregon (ODFW). One Canadian proposal was for an ongoing (since 2008) sport fishery located in the Strait of Juan de Fuca subareas, the second in WCVI. Of the 26 WDFW proposals, the number of proposals include 2 in the marine waters off the WA coast; 3 in Willapa Bay or its tributaries; 1 commercial MSF in Grays Harbor (areas 2A, 2B, 2C, and 2D); 2 ongoing MSFs in WA coastal river systems (Hoh and Quillayute rivers); and 6 in the Columbia River system. In addition, 8 Chinook MSF proposals were submitted jointly by WDFW and ODFW for fisheries planned in the Columbia River; of these, three proposals were for ongoing MSFs that have occurred since 2003. One joint ODFW-WDFW proposal was for a sport MSF on fall Chinook (proposal received each year since 2009) that was actually implemented for the first time in 2011. A MSF proposal for a commercial seine fishery in the lower Columbia River (Buoy 10 to Beacon Rock) was also received. Although the target species for this MSF is Chinook, incidental catch of marked coho is allowed. Oregon submitted 7 proposals for Chinook MSFs – two ongoing in the Willamette River (started in 2003)

Table 3-1. Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2015.

"P" indicates the MSF proposal was submitted to the PSC-SFEC by the requested deadline. "F" indicates the MSF was conducted. "R" indicates the post-season report summarizing MSF results was submitted successfully to the PSC-SFEC. An "O" (third character) indicates that the post-season MSF report is still outstanding (i.e., SFEC has not yet received the report). An "X" indicates that a MSF proposal was not submitted to SFEC (first character) or the MSF was not conducted (second character). Finally, "-" indicates the MSF was neither proposed nor conducted in a given year.

Fishery Name	**Catch Year**												
(SFEC Proposal ID)	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Coho Salmon													
Sport, Southern BC marine and freshwater (MSF-FOC-02)	PFR	PFR	PFR	PFR	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
FSC, Lower Fraser R (MSF-FOC-03)	-	-	-	PFR	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Southern BC marine (MSF-FOC-05)	-	PX	PFR	PFR	XFO	PFO	PX	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Fraser R (MSF-FOC-06)	XFR	XFR	XFR	PFR	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, BC South Coast Freshwater												F	P
Sport, Puget Sound Areas 5-13 (MSF-WDFW-07)	XFR	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	P
Sport, Nooksack R (MSF-WDFW-18)	XFO	XFO	XFO	XFO	XFO	XFO	PFR	PFO	PFO	-	-	-	-
Sport, Skagit R (MSF-WDFW-40)	-	-	-	-	-	-	-	-	-	-	XFO	PFO	P
Sport, Samish R (MSF-WDFW-41)	-	-	-	-	-	-	XFO	XFO	XFO	-	-	PXO	P
Sport, WA Areas 1-4 and Buoy 10 (MSF-WDFW-06)	PF	PF	PF	PF	PF	PF	PF	PFR	PFR	PFR	PFR	PFR	P
Commercial, WA Areas 1-4 (MSF-WDFW-15)	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport Quillayute R (MSF-WDFW-31)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	P
Sport, Grays Harbor tributaries (MSF-WDFW-24)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Grays Harbor Area 2C (MSF-WDFW-30)	-	-	-	-	-	-	XFO	XFO	PX	-	-	-	-
Sport, Grays Harbor Area 2.2 (MSF-WDFW-23)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa tributaries (MSF-WDFW-22)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-29) [1]	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Columbia R (MSF-ODFW/WDFW-04)	XFR	XFR	XFO	XFO	XFO	PFO	PFO	PFR	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (MSF-ODFW/WDFW-06)	-	-	-	-	-	-	-	-	-	-	PFO	PFO[2]	P

[1] Prior to September, MSFs within the Willapa Bay are included in the MSF-WDFW-06.
[2] Submitted as a joint WDFW/ODFW proposal for 2014 fisheries.
[5] Proposal submitted by ODFW for 2015 fisheries but MSFs were conducted prior to proposal submission.
[6] Prior MSF-ODFW-03 split into a north area (ODFW-12) and south area (ODFW -10) proposals in 2015 because of different strata.

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2015.

Fishery Name	**Catch Year**												
(SFEC Proposal ID)	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Coho Salmon (cont.)													
Commercial, North Oregon coast (MSF-ODFW-08)[5]	-	-	-	-	-	-	-	-	-	-	-	XFR	P
Sport, Willamette R and Sandy R (MSF-ODW-05, and -06)[5]	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	P
Sport, Oregon coast, NOF and SOF (MSF-ODFW-12 and -10)[6]	XFR	XFR	XFO	XFO	XFO	XFO	XFO	PFR	PFR	PFR	PFR	PFR	P
Chinook Salmon													
Commercial, SE Alaska													P
Sport, Strait of Juan de Fuca subareas, BC (MSF-FOC-07)	-	-	-	-	-	XFO	PFO	PFR	PFO	PFO	PFO	PFO	P
Sport, WCVI subareas, mainly inside (MSF-FOC-08)	-	-	-	-	-	-	PX	-	PX	-	-	-	-
Sport, Puget Sound Areas 5&6, summer (MSF-WDFW-02)	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	-	-	-	-
Sport, Puget Sound Areas 9-13, summer (MSF-WDFW-11)	-	-	-	-	PFR	PFR	PFR	PFR	PFR	-	-	-	-
Sport, Puget Sound Areas 5-13, summer (MSF-WDFW-35; combines proposals 02 and 11 as of 2012)	-	-	-	-	-	-	-	-	-	PFR	PFR	PFR	P
Sport, Puget Sound Areas 5-13, winter (MSF-WDFW-36)	-	-	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Nooksack R (fall run) (MSF-WDFW-13)	-	PFO	PFO	PFO	PFO	PFO	PFR	PFR	PFO	PFO	PFO	PFO	P
Sport, Upper Skagit R (spring run) (MSF-WDFW-12)	-	-	XFO	XFO	PFO	PFO	PFO	PFR	PFO	PFO	PFO	PFO	P
Sport, Skykomish R (summer run) (MSF-WDFW-01)	PFO	PFO	XFO	XFO	PFO	PFO	PFR	PFR	PFO	PFO	PFO	PFO	P
Sport, Snohomish R (summer run) (MSF-WDFW-37)	-	-	-	-	-	-	-	-	-	-	PX	PX	P
Sport, Carbon & Puyallup R (fall run) (MSF-WDFW-09)	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Nisqually R (fall run) (MSF-WDFW-14)	-	-	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Skokomish R (fall run) (MSF-WDFW-20)	-	-	-	-	-	-	PX	PFO	PFO	PFO	PFO	PFO	P
Sport, WA areas 1-4 (MSF-WDFW-19)	-	-	-	-	-	-	PX	PFR	PFR	PFR	PFR	PFR	P
Troll, WA areas 1-4 (MSF-WDFW-21)	-	-	-	-	-	-	PX	PX	-	-	-	-	-
Sport, Quillayute R (spring/summer run) (MSF-WDFW-32)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	P
Sport, Hoh R (MSF-WDFW-33)	-	-	-	-	-	XFO	XFO	XFO	PFO	PFO	PFO	PFO	P
Commercial, Grays Harbor areas 2A,2B,2C,2D (MSF-WDFW-38)	-	-	-	-	-	-	-	-	-	-	PFO	PFO	P
Commercial, Willapa Bay (MSF-WDFW-25)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-26)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2015.

Fishery Name	**Catch Year**[1,2]												
(SFEC Proposal ID)	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Chinook Salmon (cont.)													
Sport, Willapa Bay tributaries (fall run) (MSF-WDFW-27)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Grand Ronde R (spring run) (MSF-WDFW-39)	-	-	-	-	-	-	-	-	-	-	PX	PX	P
Sport, Yakima R (spring run) (MSF-WDFW-03)	-	PFO	-	-	-	PFR	PX	PFR	PFO	PFO	PFO	PFO	P
Sport, Snake R (fall run) (MSF-IDFG-04)	-	-	-	-	-	-	XFO	XFO	XFO	PFO	PFO	PFO	P
Sport, Snake R (spring run) (MSF-WDFW-28)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Snake R (fall run) (MSF-WDFW-05)	-	-	-	-	-	XFO	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Columbia R (spring run) (MSF-ODFW/WDFW-01)	PFO	PFO	PFO	XFO	XFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, Columbia R (summer run) (MSF-ODFW/WDFW-02)	PFO	PFO	PX	XFO	-	PFO	PX	PFO	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (spring run) (MSF-ODFW/WDFW-03)	PFO	PFO	PFO	XFO	XFO	PFO	PFR	PFO	PFO	PFO	PX	PX	P
Sport, Columbia R (fall run) (MSF-ODFW/WDFW-05)	-	-	-	-	-	-	PX	PX	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) (MSF-ODFW/WDFW-07) [3]	-	-	-	-	-	-	-	-	-	-	PX	PX	P
Sport, Willamette R (spring run) (MSF-ODFW-13 / -04 in 2015)	PFR	PFR	PFO	PFO	XFO	PFR	PFR	PFR	PFO	PFO	PFO	PFO	P
Sport, Sandy R (spring run) (MSF-ODFW-07)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	P
Sport, Oregon coast (spring run) (MSF-ODFW-09 and -11)	-	-	-	-	-	XFO	XFO	XFO	XFO	XFO	XFO	XFO	P
Sport, Oregon coast (fall run) (MSF-ODFW-02)	-	-	-	-	-	XFO	PFO	PFR	PFR	PFR	PFR	PFR	P

[1] Catch year 2003 was the first year SFEC received requested MSF proposals from agencies. Some Coho MSFs began as early as 1998.
[2] Summary of MSFs are available for many of these fisheries for catch years 2005–2009 in SFEC 2012 (http://www.psc.org/pubs/SFEC12-1.pdf)
[3] Reported as MSF-ODFW-04 in previous years.

3.2 Evaluating MSF Proposals

The SFEC-AWG employs a two-stage approach to summarize the results of its evaluation of MSF proposals. First, each proposal is characterized in regard to the following eight categories (Table 3-2):

1) Fishery regulation
2) CWT sampling method
3) CWT detection method
4) CWT composition estimation method
5) Alignment of time/area strata boundaries of regulations and catch estimation and CWT sampling programs
6) Catch estimation by size/mark/retention status
7) Indicator stocks expected to be impacted by the fishery
8) DIT release groups expected to be impacted by the fishery

Alternative characteristics for each category are listed by codes and described in Table 3-2. For example, Table 3-2 lists three possible characteristics for the first category (Fishery Regulation) including "MSF", "Mark-mixed bag", and "Mark and size-mixed bag".

Second, each MSF proposal is assigned a Green-Yellow-Red level of concern for each characteristic (green- no concern, yellow- moderate concern, red- major concern). Table 3-3 presents the results of the evaluation. Each colored cell contains codes referencing the descriptions of characteristics provided in Table 3-2. For instance, if a particular proposal involved a Mark-mixed bag fishery, then for the category Fishery Regulation, the numeric index for that characteristic (2) was entered in the column labeled Fishery Regulation. Further, since Mark-mixed bag fisheries generally pose challenges for estimation of fishery impacts, the cell would be colored yellow or red, the chosen color depending on other qualifiers such as the magnitude of the fishery. Table 3-3 also includes narrative columns to provide additional information regarding the nature of concerns identified by SFEC.

Table 3-2. List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

Subject Category	Characteristic	How the Characteristic Influences Evaluation of MSF Impacts	Concern for Evaluation of Fishery Impacts on Indicator Stocks
Fishery Regulation: mark-bag limit type	1) MSF (i.e., for mark-selective species, only marked fish can be retained)	The regulation influences what method needs to be used to estimate mortalities by size and mark status.	Note that SFEC has not been able to develop direct means to allocate non-landed mortalities under mixed-bag regulations.
	2) Mark-mixed bag limit (i.e., for mark-selective species, a portion of total bag limit can be unmarked)		
	3) Mark and size-mixed bag limit (size-range-specific allowances for retention of unmarked fish)		
CWT Sampling Method	1) Direct sample in creel surveys and dockside sampling programs.	Direct sampling programs are statistically designed programs in which technicians collect information.	If sample expansions are not available due to lack of total catch estimates in direct sampling no estimate of CWTs recovered by fishery can be made.
	2) Voluntary Recovery Program - fishers submit heads, e.g., in BC sport fishers send in heads from clipped fish.	For the voluntary recovery program it is necessary to estimate the total CWT recoveries from an estimated submission rate.	Submission rate estimation depends on a catch estimation program that estimates total clipped catch. If this is unavailable, submission rates from other areas or periods have to be used, potentially biasing estimates of CWT recoveries.
	3) No CWT sampling	Proxy will be needed.	

Table 3-2. (Continued) List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

Subject Category	Characteristic	How the Characteristic Influences Evaluation of MSF Impacts	Concern for Evaluation of Fishery Impacts on Indicator Stocks
CWT Detection Method	1) Electronic detection will be implemented. All fish (marked and unmarked) will be checked for CWT using electronic gear (wands, tube detectors)	Electronic detection will result in recoveries of all tagged fish in the sample, both unclipped and clipped.	
	2) Visual detection will be implemented. All adipose fin-clipped (marked) fish in sample are checked for tags, but unmarked fish in the sample are not.	Visual detection results in recoveries of tagged and marked fish only. Any unmarked and tagged fish will not be detected.	Unmarked and tagged fish in the fishery will not be sampled and estimates of total CWT recoveries will be biased. (Affects recoveries of both unmarked but tagged DIT and conservation groups).
CWT Composition Estimation Method	1) Standard method using CWTs sampled from fishery.	Estimates of CWT recoveries in fisheries and escapement are used for cohort analysis, estimation of exploitation rates and other stock parameters	
	2) Non-standard or Indirect, using CWT ratios from proxy (i.e., hatchery or fishery, where relationship has been established)		If estimates of total CWT recoveries are biased all CWT based estimates will also be biased
	3) Non-standard or Indirect, with poorly or unestablished proxy		
	4) None proposed		If no CWT estimates are made all CWT based estimates will be biased.

Table 3-2. (Continued) List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

Subject Category	Characteristic	How the Characteristic Influences Evaluation of MSF Impacts	Concern for Evaluation of Fishery Impacts on Indicator Stocks
Alignment of time/area strata boundaries of regulations and catch estimation and CWT sampling programs.	1) Common strata boundaries across fishery regulations and catch estimation and CWT sampling programs.	Estimating total catch and sampling fractions require that sampling strata and regulation strata align. Without such alignment, estimates of CWT recoveries will be biased. Information on strata employed enables interpretation of the extent of such biases.	For example, if one sample stratum includes both NSF and MSF regulations in different areas and/or periods, then separate estimates of CWTs recovered in the different regulations cannot be made without additional assumptions.
	2) Lack of alignment between fishery regulation and sampling/catch estimation strata boundaries.		
	3) Strata boundaries are unclear or undefined for the sampling program and/or fishery regulations.		
Catch estimation by size / mark / retention status.	1) Will provide separate estimates of catch in all size category-clip status combinations for both kept and released catch. May include bias correction (e.g., Conrad and McHugh 2008) method for estimating encounters, if applicable.	Need to estimate exploitation rate by stock using CWT indicators, which requires estimates of fishery-total encounters and associated impacts, including landed mortalities as well as handling-and-release mortalities by size/mark category.	SFEC postseason reports request that total retained and released fish in MSFs are estimated and reported by size (legal or sublegal) and mark category (marked [adipose fin-clipped] or unmarked [adipose fin intact])
	2) Will provide separate estimates of catch for all size category-clip status combinations for kept catch but not released catch.		
	3) Did not describe catch estimation.		
	4) No catch estimates will be done.		

Table 3-2. (Continued) List of characteristics that describe proposed MSFs, organized by Subject Category. This table is used as a reference table by Table 3-3.

Subject Category	Characteristic	How the Characteristic Influences Evaluation of MSF Impacts	Concern for Evaluation of Fishery Impacts on Indicator Stocks
Are CWT indicator stocks expected to be impacted in the fishery?	0) No, CWT indicator stocks are not expected.	Estimate anticipated stock-age-specific encounters of coded-wire-tagged fish in the fishery. Determine potential significance of MSF to indicator stocks.	Lack of information to determine potential significance of MSF to indicator stocks.
	1) Yes, CWT indicator stocks are expected, and a complete list of indicator stocks was provided.		
	2) Yes, CWT indicator stocks are expected, and an incomplete list of indicator stocks was provided.		
	3) Yes, CWT indicator stocks are expected, but a list of indicator stocks was not provided.		
Are double-index-tagged (DIT) fish expected to be impacted in the fishery?	0) No, DIT stocks are not expected.	Estimate anticipated stock-age-specific encounters of DIT fish in the fishery. Determine potential significance of MSF to DIT stocks.	Lack of information to determine potential significance of MSF to DIT indicator stocks.
	1) Yes, DIT stocks are expected, and a complete list of DIT stocks was provided.		
	2) Yes, DIT stocks are expected, and an incomplete list of DIT stocks was provided.		
	3) Yes, DIT stocks are expected, but a list of DIT stocks was not provided.		

Table 3-3. Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Color coding key:

#	Of least concern to SFEC as an issue in the MSF proposal
#	Of moderate concern to SFEC as an issue in the MSF proposal
#	Of most concern to SFEC as an issue in the MSF proposal

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook & Coho Salmon												
MSF-ODFW / WDFW-07	Columbia R, Mouth upstream to Bonneville Dam. (Fall)	Commercial Purse seine & Beach seine	1	1	1	1	1	1	1	1	Directed MSF Chinook fishery with incidental MSF coho retention.	Random onboard monitoring will record encounters by mark and size status. Catch estimates from fish tickets. Electronic sampling of landings for CWTs.
Coho Salmon												
MSF-FOC-02	BC Management Areas 11-29, outer areas of 121-127.	Pre-terminal and Terminal Recreational (MSF)	1	2	2	1	2	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook
MSF-FOC-02	BC Management Areas 11-29	Pre-terminal and Terminal Recreational, (Mixed Bag)	2	2	2	1	2	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon												
MSF-FOC-03	Lower Fraser River	Terminal, First Nations (Mixed Bag)	1	3	2	4	1	2	1	0,1	This fishery is mixed bag because unmarked coho that are mortally wounded or dead can be retained. Low CWT submission rates. Numbers of ad-clipped and unclipped coho are reported in some fisheries.	Total catch estimate using creel survey or census.
MSF-FOC-05	BC Management Areas 23-29, 121-127	Pre-terminal Commercial (MSF)	1	1	1	1	1	1	1	1		Total catch is from fisher reported log books and phone-in catch reports.
MSF-FOC-06	BC South Coast Freshwater	Terminal Recreational (MSF)	1	2	2	1	2	2	1	0,1	Voluntary submission of samples from clipped fish, but fishery is fully mark selective. Creel surveys and awareness factors for some times and areas.	Catch estimates from creel surveys. CWT estimation for areas/times with no catch estimation program relies on submission rates in other strata.
MSF-FOC-09	BC South Coast Freshwater	Terminal Recreational (Mixed Bag)	3	2	2	1	1	2	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery.	

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon (continued)												
MSF-WDFW-06	Ocean Areas 1-4 & Col R Buoy 10	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel surveys, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates and mark rates obtained from charter ride-along trips and voluntary trip reports (VTRs).
MSF-WDFW-07	Puget Sound Areas 5-13	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from CRCs, and creel surveys in some areas. On-water encounter rates and mark rates obtained from VTRs and dockside samplers.
MSF-WDFW-15	Ocean Areas 1-4	Commercial Troll	1	1	1	1	1	2	1	1	No direct estimates of encounters or mark rate, but the sport fishery estimates are used instead	Catch estimates from fish tickets.
MSF-WDFW-22	Willapa tributaries (North, Smith, Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational	3	1,3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside sampling for CWTs in September only; therefore, CWT sampling and estimation is not uniform across fishery regulation period.	Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimate.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon (continued)												
MSF-WDFW-23	Grays Harbor, Marine Area 2.2	Recreational	3	1,3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside biological sampling Sept-Oct but none in Nov-Jan. CRC for effort estimates.	Total catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery.
MSF-WDFW-24	Grays Harbor tributaries (Chehalis, Elk, Hoquiam, Humptulips, Johns, Newaukum, Satsop, Wynoochee, Skookumchuch, Van Winkle, Wishkah, Quigg Lake)	Recreational	3	3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Some direct sampling in Lower Chehalis only; indirect CWT sampling via electronic sampling of escapement.	Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimates.
MSF-WDFW-29	Willapa Bay, Marine Area 2.1	Recreational	3	1	1	1	1	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation.	Angler surveys and VTRs to get mark rate and sublegal proportion. Direct electronic sampling for CWTs.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
coho Salmon (continued)												
MSF-WDFW-31	Quillayute R system (Bogachiel, Calawah, Dickey, Quillayute, Sol Duc)	Recreational	3	3	1	3	3	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Lack of direct sampling; instead CWT composition from electronic sampling in tribal net fishery and hatchery is used.	Total catch is estimated using CRCs. Mark rate estimates obtained from tribal net fishery.
MSF-WDFW-40	Skagit R	Recreational	2	3	1	3	1	2	1	1	Due to mark mixed-bag regulations, current methods of CWT estimation do not apply. Proposal proposes to use CWT composition estimated from hatchery to estimate CWT impacts in fishery. No evaluation has been performed for this method for coho.	Catch estimates from CRCs. Indirect estimates of CWTs via electronic sampling at hatchery.
MSF-WDFW-41	Samish R	Recreational	1	3	NA	4	1	2	0	0	No sampling for CWTs is planned and estimates of CWT impacts will not be made. There will be no opportunity to estimate mark rates or CWT impacts.	
MSF-ODFW / WDFW-04	Columbia R, Mouth upstream to Hood R Bridge, includes Buoy 10	Recreational	1	1	1	1	1	1	1	1		Creel survey and CRCs provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Observed mark rates at Bonneville Dam for upriver stocks.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon (continued)												
MSF-ODFW / WDFW-06	Columbia R, Mouth upstream to Bonneville Dam	Commercial Tanglenet	1	1	1	1	1	1	1	1		Random onboard monitoring will record encounters by mark and size status. Catch estimates from fish tickets.
MSF-ODFW-03	Oregon coast from Leadbetter Pt to CA border	Recreational	2	1	1	1	2	2	1	1	coho ocean fishery sampled at boat docks for CWTs and total landed catch estimated from survey information. All release assumed unmarked and legal size (over 16") which allows estimate of mark rate in fishery.	Effort estimated using boat counts and CPUE estimates from angler interviews. Released fish number used to determine mark rate.
MSF-ODFW-05	Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries	Recreational	1	3	0	4	1	2	1	0	No creel or CWT sampling conducted in the fall.	Catch estimates from CRCs. No estimate of number released and total encounters
MSF-ODFW-06	Sandy River and tributaries up to mouth of Salmon River	Recreational	1	3	2	2	2	2	1	0	No creel. CWT recoveries occur at Sandy River Hatchery.	Catch estimates from CRCs. No estimate of number released and total encounters
MSF-ODFW-08	Leadbetter Pt,. WA to Cape Falcon, OR	Commercial Troll	1	1	1	1	1	2	1	1	Sampled at port of landing. No information on released fish is collected.	Fish tickets for total catch estimates.
MSF-ODFW-10	From Cape Falcon, OR to the OR/CA border.	Recreational	1	1	1	1	1	2	1	1	Assume all releases unclipped. No information on size status of releases.	Numbers of released fish are estimated from dockside sampling.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon (continued)												
MSF-ODFW-12	From Leadbetter Pt, WA to Cape Falcon, OR	Recreational	1	1	1	1	1	1	1	1	coho sampled at boat docks for CWTs and total landed catch estimated from surveys. Assume all releases unmarked and legal size (over 16") to estimate mark rate in fishery.	Effort estimated from boat counts and CPUE estimates from angler interviews. Number released used to determine mark rate.
Chinook Salmon												
MSF-ADFG-01	Southeast Alaska areas normally open during summer CNR fishery	Commercial Troll	1	1	2	1	1	2	1	1	This MSF will allow retention of legal-sized marked Chinook during the Jul-Sep CNR. This will potentially impact the ratio of unmarked to marked in DIT stocks and impact the estimation of unmarked exploitation rates, depending on the number of fish retained. SFEC would recommend the use of ETD in NSFs.	Fisher interviews will provide estimates of legal unmarked and total sublegal releases.
MSF-FOC-07	BC Strait of Juan de Fuca and WCVI, Areas 19-1 to 6, 18-4 and 20-5	Pre-terminal Recreational (Mixed Bag)	3	2	2	1	2	2	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook
MSF-WDFW-01	Skykomish River (mouth to Wallace River)	Recreational	1	3	1	3	1	2	1	1	The "indirect" method using hatchery tag compositions to estimate CWTs caught in the MSFs was evaluated by CWTIT funding. Results indicate that the direct estimates made using fishery sampling were significantly different from the "indirect" estimates. Recommend a sampling program which samples CWTs.	Catch estimates from catch record cards. Indirect estimates of CWTs via electronic sampling at hatchery & associated tribal net fisheries.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-03	Yakima River	Recreational	1	1	1	1	1	1	NA	NA	This is a MSF impacting Yakima R. experimental tag groups in the Yakima R.	Catch is estimated using creel survey information and standard methods used for CWTs.
MSF-WDFW-05	Lower Snake River (Fall)	Recreational	1	1	1	1	1	1	1	1		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-09	Puyallup / Carbon River	Recreational	1	3	1	2	1	2	1	1	Lack of direct sampling; only indirect CWT estimates, via electronic sampling at hatchery. These are substantial Chinook freshwater sport fisheries, averaging 1,000 and 400 fish in Puyallup and the Carbon.	Catch estimates from catch record cards. Indirect estimates of CWTs via electronic sampling at hatchery & associated tribal net fisheries.
MSF-WDFW-12	Upper Skagit River (Spring Chinook)	Recreational	1	3	1	2	1	2	1	1	Due to lack of direct sampling CWT electronic sampling at hatchery will be used for indirect estimates of CWTs impacted in fishery. If there is a CWT survey in the fishery, then a direct estimate would be made using CRC estimates. Also release by anglers interviewed would be available to estimate mark rate and total encounters..	Catch estimates from catch record cards. Some angler interviews for CWT sampling and biological data.
MSF-WDFW-13	Nooksack River	Recreational	1	3	1	3	1	2	1	1	Lack of direct sampling. This is a small fishery, with a five year average of 50 fish kept.	Catch estimates from CRCs. Estimate number of Samish fall Chinook using % hatchery from spawning grounds and tag rate from hatchery.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-14	Nisqually River	Recreational	1	1	1	1	1	2	1	1	Creel surveys were conducted for 3 years but are no longer funded. CWT sampling is conducted in the Nisqually MSF. As this is an indicator and a DIT it is recommended that CWT sampling continue, even if the creel survey for total estimates is not implemented.	Catch estimates from CRC.
MSF-WDFW-19	Ocean Areas 1-4	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel survey, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates (by mark status/size) obtained from charter ride-along trips and VTRs.
MSF-WDFW-20	Skokomish River	Recreational	1	1	1	1	1	2	1	1	Creel surveys were conducted for 3 years but are no longer funded. CWT sampling is conducted in the Skokomish MSF. As this is an indicator and a DIT it is recommended that CWT sampling continue, even if the creel survey for total estimates is not implemented.	Catch estimates from CRC.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-25	Willapa Bay 2K,2M,2N,2R,2T, 2U - (new area designations for 2G, 2H, 2J, 2K, and 2M)	Commercial	1	1	1	1	1	1	1	1	Live boxes are used and the condition of released unmarked and marked Chinook and coho are recorded.	Catch from fish tickets. Standard CWT estimates.
MSF-WDFW-26	Willapa Bay MA2.1	Recreational (Mixed bag)	3	1	1	1	2	2	1	2	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. There is a mismatch between fishery regulation and sampling/catch estimation strata boundaries.	Catch estimates from CRCs. Angler surveys provide data needed to estimate CWT ratios and mark rates; additionally, VTRs provide data to estimate size/mark status of encounters.
MSF-WDFW-27	Willapa Tributaries (Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational (Mixed bag)	3	1	1	1	1	1	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation.	Catch estimates from CRC. Mark rates and tag ratios from hatchery and spawning ground data.
MSF-WDFW-28	Lower Snake R (spring)	Recreational	1	1	1	1	1	1	1	1		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-32	Quillayute River system (Bogachiel, Calawah, Dickey, Quillayute, and Sol Duc)	Recreational (Mixed bag)	3	3	1	3	3	2	NA	NA	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Estimates of CWTs are made using hatchery and tribal net estimates of CWT composition. There are no data evaluating this method.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-35	All Puget Sound Areas 5–13 (summer)	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status.
MSF-WDFW-36	All Puget Snd Areas 5–13 (winter)	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status.
MSF-WDFW-37	Snohomish River (mouth to confluence of Skykomish and Snoqualmie rivers, including all channels.)	Recreational	1	1	1	1	1	1	1	1	This fishery has not been conducted, although it has been proposed for the two years	Creel surveys will estimate releases by size and mark status.
MSF-WDFW-38	Grays Harbor 2A, 2B, 2C, 2D	Commercial	1	1	1	1	1	1	1	1	Live boxes are used and the condition of released unmarked and marked Chinook and coho are recorded.	Catch from fish tickets. Standard CWT estimates.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-39	Lower Grande Ronde R	Recreational	1	1	1	1	1	1	1	NA		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-ODFW / WDFW-01	Columbia R, Mouth upstream to McNary Dam, and Ringold Hatchery Area	Recreational	1	1	1	1	1	2	1	1	There is no information on whether and how release number, mark and size status will be obtained.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW / WDFW-02	Columbia R, Mouth upstream to Chief Joseph Dam	Recreational	1	1	1	1	2	2	1	1	Creel census below McNary does not cover the whole fishery, which extends to Priest Rapids; therefore, effort estimate will be underestimated. There is no information on whether and how release number, mark and size status will be obtained.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW / WDFW-03	Columbia R, Mouth upstream to Bonneville Dam	Commercial Gillnet / Tanglenet	1	1	1	1	1	2	1	1		Catch from fish tickets. Biological sampling of landed catch at processing plants, plus random on-board monitoring. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-ODFW / WDFW-05	Columbia R, Mouth upstream to McNary Dam, includes Buoy 10	Recreational	1	1	1	1	1	2	1	1	There is no information on whether and how release number, mark and size status will be obtained.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW-02	Ocean Terminal areas (within 3 miles of the river mouth) Tillamook, Elk, and Chetco	Recreational	2	1	1	1	2	2	1	1	Mark and size-mixed bag regulations present problems in estimating CWT mortalities. Fishery proposed for several years but not implemented.	
MSF-ODFW-04	Willamette River and tributaries upstream of Willamette Falls to Dexter Dam	Recreational	1	3	2	3	2	2	1	1	No creel conducted above the falls, hatchery recoveries used for proxy. Sublegal proportions based on window counts.	Catch estimates from CRCs used upstream of the falls.
MSF-ODFW-07	Sandy River and tributaries up to mouth of Salmon River	Recreational	1	3	0	3	1	3	1	0	No CWT sampling, no creel, no count of released fish.	Catch estimates from CRCs. CWT composition from hatchery.

Table 3-3. (Continued) Summary of SFEC's evaluation of coho and Chinook MSFs proposed for the 2015 fishery season, for which proposals were submitted by agencies in 2014 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-ODFW-09	Tillamook bubble fishery within 15 fathom curve off Tillamook Bay	Commercial Troll	2	1	1	1	3	3	1	1	Fish from ocean area and Tillamook bubble area landed as one. No release information collected. Approximately 20-30% of total catch is sampled but separate estimates for MSF are not available.	Catch estimates from fish tickets
MSF-ODFW-11	Leadbetter Pt, WA to Cape Falcon, OR	Recreational	1	1	1	1	1	1	1	1	Coho non-retention, mark and size selective. Dockside electronic sampling for CWTs and release information.	
MSF-ODFW-13	Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries	Recreational	1	1	1	1	1	2	1	1	Released fish all assumed to be unclipped, used to determine mark rate below the falls; sublegal estimates based on window counts.	Catch estimates from creel/angler interviews downstream of Willamette Falls; CRCs used upstream of the falls.

3.3 Expected Encounters of CWT Indicator Stocks in MSFs

Multiple MSFs are expected to occur during 2015 in BC, WA, and OR. Table 3-4 and Table 3-5 were constructed using historical information on encounters of tagged and marked fish to identify tagged stocks of coho (brood years 2003–08; Table 3-4) and Chinook (catch years 2006–10; Table 3-5) that can be expected to be encountered in these areas with MSFs.

Tagged coho stocks expected to be encountered are included in Table 3-4, all of which are used by the CoTC for their analyses. Mark-selective fisheries in Puget Sound (PS) and Hood Canal largely exploit local stocks. However, tagged fish from all regions are encountered in MSFs in the Strait of Juan de Fuca (SJDF), throughout southern BC, and WA and OR coastal areas.

In 2007, there were 12 Chinook MSFs that occurred and they were largely restricted to PS and to the Columbia River with spring Chinook as the targeted group. Since then, Chinook MSFs have expanded substantially in marine and freshwater areas, with the number of Chinook MSFs more than doubling to 29 (Table 3-1). From 2010 to 2014, additional Chinook MSFs occurred and have been proposed in the marine waters of BC, PS, WA ocean areas, and freshwater areas in PS and Columbia River. Further, Chinook MSFs that target later run fish have been added. Prior to 2008, the indicator stocks encountered in MSFs were largely of PS origin or were Columbia River spring stocks. With the additional fisheries now proposed for Alaskan and Canadian waters, WA ocean areas, and Columbia River, a larger number of indicator stocks are likely to be encountered in MSFs (Table 3-5). In addition, MSFs have expanded substantially in PS, both geographically and temporally, with concomitant increases in catch in MSFs for Chinook salmon (Figure 3-1).

MSFs proposed for SE Alaska and WCVI will affect the ability to analyze CWT data and estimate impacts on natural stocks. This depends on the size of the MSFs as the distributions of the unmarked stocks will change relative to the marked CWT indicator stocks that are used as representatives of natural stocks. Estimates of unmarked exploitation rates that are dependent on marked CWTs will be biased, and the size of this bias will depend on the numbers of impacts occurring in MSFs

In order to monitor the impacts of these expanding MSFs, Chinook DIT programs must be expanded to represent the new stocks that will be encountered. Agencies, however, have been discontinuing rather than expanding their DIT programs. Agencies should reevaluate their DIT programs and consider expanding DIT groups, not discontinuing the programs. The CTC is now struggling to analyze the fishing mortalities attributed to Chinook MSFs because more DIT groups are needed.

Table 3-4. Number of tagged and marked coho salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008.

Some estimates are based on less than six years of data because some stocks were not tagged in all years. Coho Salmon escapements are not available in the Regional Mark Information System (RMIS) database for BC stocks; therefore, percentages shown for BC are only for fishery recoveries.

Region		Hatchery / Release Location	# Years Tagged	Mark-Selective Fisheries										Non-Selective Fisheries				Escapement		Total	
				BC		Puget Sound		WA Coast		Columbia R		OR Coast		Commercial		Sport					
				Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	Est
BC	Nass R - Skeena	Toboggan Creek H	6	10	17%	-	-	-	-	-	-	-	-	152	67%	16	16%	-	-	177	672
	Coastal BC	Snootli Creek H	4	1	2%	-	-	-	-	-	-	-	-	84	61%	15	37%	-	-	99	367
		McLaughlin Bay SP	1	-	-	-	-	-	-	-	-	-	-	23	23%	6	77%	-	-	29	306
	Johnstone Strait	Quinsam River H	6	6	47%	-	-	1	1%	-	-	-	-	9	23%	2	28%	-	-	18	120
		Johnston Est Seapen	2	1	1%	-	-	-	-	-	-	-	-	29	25%	23	74%	-	-	52	220
	Georgia Strait	Big Qualicum River H	6	1	35%	1	8%	1	4%	-	-	-	-	4	31%	<1	22%	-	-	7	36
		Goldstream River H	6	3	34%	4	17%	4	13%	-	-	-	-	6	19%	1	15%	-	-	17	74
		Lang Creek H	2	24	50%	4	4%	3	2%	-	-	-	-	22	13%	11	30%	-	-	64	310
	W Vancouver Isl	Robertson Creek H	6	44	83%	2	1%	7	3%	-	-	-	-	22	11%	1	1%	-	-	76	578
	Fraser R -	Inch Creek H	6	13	66%	4	8%	6	6%	-	-	1	1%	11	15%	1	4%	-	-	36	227
	Thompson R	Spius Creek H	6	4	26%	5	21%	11	24%	-	-	2	6%	9	22%	<1	1%	-	-	31	105
WA	Strait of Juan de Fuca	Dungeness H	4	7	15%	2	2%	5	2%	-	-	-	-	53	32%	2	1%	192	47%	260	432
		Lower Elwha H	6	2	9%	2	3%	4	4%	-	-	-	-	11	25%	1	1%	94	56%	113	182
	Puget Sound North	Bernie Gobin H	6	4	5%	18	6%	22	4%	-	-	3	1%	230	71%	18	8%	38	4%	333	1106
		Glenwood Springs	1	-	-	-	-	-	-	-	-	-	-	2	100%	-	-	-	-	2	7
		Kendall Creek H	5	4	4%	5	2%	8	2%	-	-	-	-	171	72%	1	<1%	101	18%	289	735
		Lummi Sea Ponds	4	7	12%	4	2%	8	3%	-	-	2	1%	170	69%	3	6%	44	7%	237	613
		Skookum Creek H	6	6	4%	10	3%	17	3%	-	-	3	<1%	340	77%	2	<1%	183	13%	560	1,403
		Wallace R H	6	8	5%	13	3%	21	3%	-	-	4	1%	39	8%	13	4%	860	76%	959	1,661
		Marblemount H	6	8	5%	15	3%	23	3%	-	-	2	<1%	177	21%	39	6%	642	62%	906	1,793
	Puget Sound Mid	Elliott Bay TR NP	4	9	3%	31	4%	33	3%	-	-	3	<1%	597	79%	42	9%	53	2%	768	2,795
		Voights Creek H	6	9	8%	23	6%	17	3%	-	-	1	<1%	191	45%	26	11%	187	27%	454	1,288
		Keta Creek	3	13	4%	39	4%	36	3%	-	-	4	<1%	397	41%	62	9%	847	39%	1,399	3,292
		Soos Creek H	6	6	4%	16	3%	15	2%	-	-	3	<1%	171	38%	16	4%	524	48%	750	1,715
		Cowskull	3	5	4%	25	10%	14	3%	-	-	1	<1%	211	68%	35	13%	62	2%	353	1,114
		Crisp Creek Rearing	3	11	3%	40	4%	34	2%	-	-	4	<1%	413	41%	30	4%	1,690	47%	2,222	4,172

Table 3-4. (Continued) Number of tagged and marked coho salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008.

Region		Hatchery / Release Location	# Years Tagged	Mark-Selective Fisheries										Non-Selective Fisheries				Escapement		Total	
				BC		Puget Sound		WA Coast		Columbia R		OR Coast		Commercial		Sport					
				Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	Est
WA	Puget Sound South	Minter Creek H	2	2	4%	3	4%	6	4%	-	-	1	<1%	30	28%	4	4%	186	55%	230	337
		Clear Creek H	1	2	16%	2	4%	5	5%	-	-	-	-	50	63%	2	2%	19	10%	80	188
		Kalama Creek H	6	1	3%	7	9%	3	2%	-	-	1	<1%	41	39%	5	7%	122	40%	178	311
		South Sound Net Pens	6	4	4%	10	5%	13	4%	-	-	1	<1%	211	79%	16	8%	2	<1%	257	864
	Hood Canal	George Adams H	6	4	3%	9	3%	13	3%	-	-	1	<1%	74	23%	9	4%	662	65%	771	1,206
		Quilcene Bay Sea Pen	6	10	5%	23	4%	21	2%	-	-	2	<1%	219	52%	14	5%	425	31%	713	1,901
		Quilcene NFH	6	6	4%	20	4%	17	3%	-	-	2	<1%	186	53%	7	4%	375	31%	613	1,501
		Port Gamble Bay Pens	6	4	6%	13	7%	11	4%	-	-	1	<1%	123	76%	7	6%	11	2%	169	650
	N. WA Coast	Makah NFH	6	3	3%	3	1%	22	6%	-	-	6	2%	26	3%	2	1%	309	84%	370	961
		Quinault NFH	6	8	2%	5	<1%	120	6%	-	-	27	2%	606	53%	1	<1%	479	37%	1,246	4,632
		Salmon R Fish Culture	6	2	1%	2	<1%	50	8%	-	-	12	2%	263	57%	1	<1%	204	31%	534	1,573
		Solduc H	6	9	3%	5	1%	124	10%	-	-	30	3%	61	6%	6	1%	1,206	76%	1,440	2,796
	Grays Harbor	Bingham Creek H	6	2	1%	1	<1%	41	5%	-	-	7	1%	51	7%	12	3%	939	83%	1,052	2,362
		Friends Landing NP	3	1	2%	1	<1%	49	17%	-	-	6	2%	102	51%	16	10%	129	18%	304	940
		Satsop Springs Ponds	5	<1	1%	1	1%	8	9%	-	-	3	2%	11	8%	2	1%	209	78%	234	402
		Humptulips H	1	3	2%	1	<1%	53	13%	-	-	11	3%	161	48%	4	2%	320	31%	553	1,086
		Skookumchuck H	3	1	1%	3	<1%	64	11%	-	-	9	1%	87	13%	15	5%	1,093	69%	1,271	1,869
	Willapa	Forks Creek H	6	3	2%	1	<1%	56	7%	1	<1%	21	3%	126	27%	6	2%	652	59%	865	1,879
		Naselle H	6	2	2%	1	<1%	46	12%	-	-	14	4%	131	73%	2	1%	84	9%	279	994
		Nemah H	4	3	2%	2	<1%	76	14%	-	-	28	7%	110	41%	1	1%	412	35%	632	1,278
CR	Mid and Upper	Oxbow H	4	-	-	-	-	8	3%	5	2%	6	3%	36	18%	1	<1%	445	73%	500	610
		Klickitat H	6	1	1%	1	1%	90	40%	8	4%	42	21%	61	26%	4	5%	2	<1%	208	510
		Cascade H	5	-	-	-	-	27	9%	14	5%	21	8%	198	65%	1	<1%	102	13%	362	819
		Washougal H	6	2	1%	2	1%	89	24%	10	5%	43	14%	64	19%	2	1%	286	35%	498	840
		Wells H	2	-	-	-	-	3	1%	1	<1%	-	-	103	95%	1	<1%	26	4%	133	622

Table 3-4. (Continued) Number of tagged and marked coho salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008.

Region		Hatchery / Release Location	# Years Tagged	Mark-Selective Fisheries										Non-Selective Fisheries				Escapement		Total	
				BC		Puget Sound		WA Coast		Columbia R		OR Coast		Commercial		Sport					
				Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	% of Est	Obs	Est
CR	Lower CR	Big Creek H	6	-	-	-	-	18	6%	5	3%	15	7%	70	32%	1	1%	317	51%	424	632
		Bonneville H	5	-	-	-	-	47	7%	16	3%	46	8%	26	5%	2	<1%	1418	77%	1,555	1,856
		CEDC Youngs Bay Net	4	-	-	-	-	32	8%	11	4%	27	8%	293	80%	1	<1%	16	1%	379	1,118
		Cowlitz Salmon H	6	8	2%	4	<1%	374	28%	40	6%	163	15%	178	13%	19	2%	792	34%	1,578	2,893
		Deep River NP	6	-	-	-	-	16	6%	5	2%	15	6%	225	83%	-	-	20	2%	281	728
		Eagle Creek NFH	6	-	-	-	-	15	7%	6	4%	17	11%	22	27%	-	-	104	51%	165	481
		Elochoman H	5	<1	2%	-	-	23	14%	3	2%	18	14%	38	22%	1	1%	159	44%	243	369
		Faller Creek H	6	-	-	-	-	22	12%	7	8%	18	12%	11	10%	-	-	252	57%	310	431
		Grays River H	6	1	1%	1	<1%	34	18%	8	5%	31	18%	44	26%	1	<1%	180	31%	298	495
		Kalama Falls H	6	1	2%	1	<1%	40	13%	5	7%	23	9%	51	16%	1	1%	351	52%	472	694
		Klaskanine H	3	-	-	-	-	7	6%	2	2%	5	5%	42	56%	-	-	95	31%	151	312
		Klaskanine S FK Pond	3	-	-	-	-	28	9%	10	4%	21	7%	140	63%	1	<1%	141	16%	341	908
		Lewis River H	6	3	1%	6	<1%	261	12%	61	9%	148	8%	174	8%	4	<1%	2,507	62%	3,164	5,055
		North Toutle H	6	-	-	-	-	34	11%	15	11%	30	12%	14	6%	1	<1%	414	60%	508	810
		Sandy H	6	1	<1%	1	<1%	49	11%	16	5%	38	10%	75	16%	2	<1%	665	58%	845	1,174
OR	OR Coast North	Nehalem H	4	1	<1%	-	-	12	2%	-	-	20	5%	3	1%	1	<1%	1,023	91%	1,060	1,129
		Salmon River H	3	-	-	-	-	4	5%	-	-	5	11%	1	1%	1	3%	110	80%	121	139
		Trask River H	2	-	-	2	<1%	18	4%	-	-	65	14%	4	1%	1	<1%	1,102	81%	1,191	1,379
	OR Coast South	Butte Falls H	1	-	-	1	2%	8	13%	-	-	11	24%	5	21%	2	15%	23	24%	50	98
		Cole Rivers H	6	-	-	-	-	-	-	-	-	1	2%	-	-	1	1%	182	97%	185	187
		Rock Creek H	3	-	-	-	-	4	9%	-	-	32	76%	1	5%	2	7%	2	2%	42	113

Table 3-5. Number of tagged and marked Chinook salmon sampled (Obs) and percent of total estimated CWTs (% of Est) in fisheries or in escapement averaged over brood years 2001–2006.

		Mark-Selective Fisheries										Non-Selective Fisheries							
		PS		WA CST		COLR		TERM		Total		Commercial		Sport		Escapement		Total	
Region	Stock	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	Est
British Columbia	Atnarko Summer	-	-	-	-	-	-	-	-	-	-	52	36%	12	18%	19	46%	83	352
	Big Qualicum	1	1%	-	-	-	-	-	-	1	1%	23	21%	20	32%	44	46%	88	305
	Chehalis (Harrison Fall Stock)	2	1%	3	1%	-	-	-	-	5	2%	58	24%	26	17%	11	56%	99	704
	Chilliwack (Harrison Fall Stock)	5	1%	5	1%	-	-	-	-	11	2%	116	20%	67	25%	18	53%	212	1,725
	Cowichan Fall	1	1%	<1	<1%	-	-	-	-	1	1%	27	28%	25	46%	28	24%	81	297
	Dome Creek Spring	-	-	-	-	-	-	-	-	-	-	1	52%	1	30%	2	18%	4	24
	Kitsumkalum Summer	-	-	-	-	-	-	-	-	-	-	91	30%	48	27%	17	43%	156	820
	Nanaimo River Fall	-	-	-	-	-	-	-	-	-	-	8	9%	19	33%	8	58%	35	259
	Nicola River Spring	<1	<1%	1	<1%	-	-	-	-	1	1%	10	12%	16	14%	12	73%	39	346
	Puntledge Summer	-	-	-	-	-	-	-	-	-	-	12	19%	12	27%	28	54%	52	171
	Quinsam Fall	-	-	-	-	-	-	-	-	-	-	37	28%	20	29%	48	43%	105	344
	Robertson Creek	-	-	-	-	-	-	-	-	-	-	200	46%	97	33%	44	21%	341	1,356
	Lower Shuswap River Summers	-	-	<1	<1%	-	-	-	-	<1	<1%	99	36%	57	29%	22	34%	178	899
WA Puget Sound	George Adams Fall Fingerling	20	7%	9	3%	-	-	5	2%	34	12%	99	36%	37	21%	706	30%	876	1,026
	Green River Fall Fingerling	15	5%	5	2%	-	-	-	-	20	7%	208	51%	32	16%	510	25%	770	862
	Grovers Creek Fall Fingerling	30	9%	10	3%	-	-	-	-	40	12%	118	28%	46	18%	1,047	42%	1,251	1,133
	Nisqually Fall Fingerling	28	6%	7	2%	-	-	1	1%	36	9%	333	61%	31	10%	686	20%	1,086	1,604
	Nooksack Spring Fingerling	4	3%	1	1%	-	-	1	0%	6	4%	65	38%	28	31%	146	27%	245	543
	Samish Fall Fingerling	15	4%	9	2%	-	-	-	-	24	6%	326	59%	57	22%	264	13%	671	1,385
	Skagit Spring Fingerling	8	2%	2	1%	-	-	107	23%	117	26%	162	22%	40	19%	758	32%	1,078	1,155
	Skagit Spring Yearling	9	7%	1	1%	-	-	58	32%	68	40%	50	15%	20	22%	251	23%	389	463
	Skykomish Fall Fingerling	5	4%	2	2%	-	-	-	-	7	7%	30	24%	15	22%	385	47%	437	385
	South Puget Sound Fall Yearling	9	23%	1	1%	-	-	-	-	10	25%	16	24%	10	35%	63	16%	99	165
	Skagit Summer Fingerling	1	1%	1	1%	-	-	-	-	2	1%	145	40%	19	15%	80	43%	246	655
	Stillaguamish Fall Fingerling	8	5%	2	1%	-	-	-	-	10	7%	51	24%	24	27%	177	42%	262	513
	White River Spring Fingerling	4	12%	<1	2%	-	-	-	-	4	14%	17	39%	7	30%	39	16%	67	101

Table 3-5. (Continued) Number of tagged and marked Chinook salmon sampled (Obs) and percent of total estimated CWTs (% of Est) in fisheries or in escapement averaged over years 2006–2010.

		Mark-Selective Fisheries										Non-Selective Fisheries							
		PS		WA CST		COLR		TERM		Total		Commercial		Sport		Escapement		Total	
Region	Stock	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	%Est	Obs	Est
WA Coast	Hoko Fall Fingerling	-	-	1	1%	-	-	-	-	1	1%	36	33%	11	17%	161	49%	209	311
	Queets Fall Fingerling	-	-	-	-	-	-	-	-	-	-	188	66%	37	12%	20	22%	244	947
	Sooes Fall Fingerling	-	-	1	1%	-	-	-	-	1	1%	23	38%	9	20%	117	41%	149	173
Columbia R	Cowlitz Fall Tule	-	-	1	2%	<1	<1%	-	-	1	2%	22	30%	12	23%	193	45%	228	187
	Hanford Wild	-	-	-	-	-	-	-	-	-	-	52	59%	12	26%	13	16%	76	261
	Columbia Lower R. H.	<1	<1%	3	3%	-	-	-	-	4	3%	65	60%	23	21%	150	16%	242	403
	Lewis River Wild	-	-	-	-	-	-	-	-	-	-	27	43%	7	30%	49	27%	83	175
	Lyons Ferry	-	-	5	1%	-	-	-	-	5	1%	185	39%	74	16%	280	44%	545	1,564
	Lyons Ferry Yearling	-	-	23	2%	1	<1%	-	-	24	2%	567	44%	233	20%	1,168	34%	1,992	4,125
	Spring Creek Tule	3	<1%	7	2%	-	-	-	-	10	2%	290	70%	61	14%	256	14%	616	1,480
	Columbia Summers	-	-	1	<1%	5	<1%	-	-	5	1%	304	55%	84	24%	478	21%	870	1,749
	Upriver Brights	-	-	1	<1%	-	-	-	-	1	<1%	135	53%	36	23%	428	23%	601	807
	Willamette Spring	-	-	2	<1%	43	5%	142	35%	187	40%	236	22%	56	11%	955	27%	1,433	2,100
OR Coast	Elk River	-	-	-	-	-	-	-	-	<1	<1%	241	35%	164	25%	913	40%	1,318	2,032
	Salmon River	-	-	-	-	-	-	-	-	-	-	180	35%	156	46%	155	19%	491	1,460

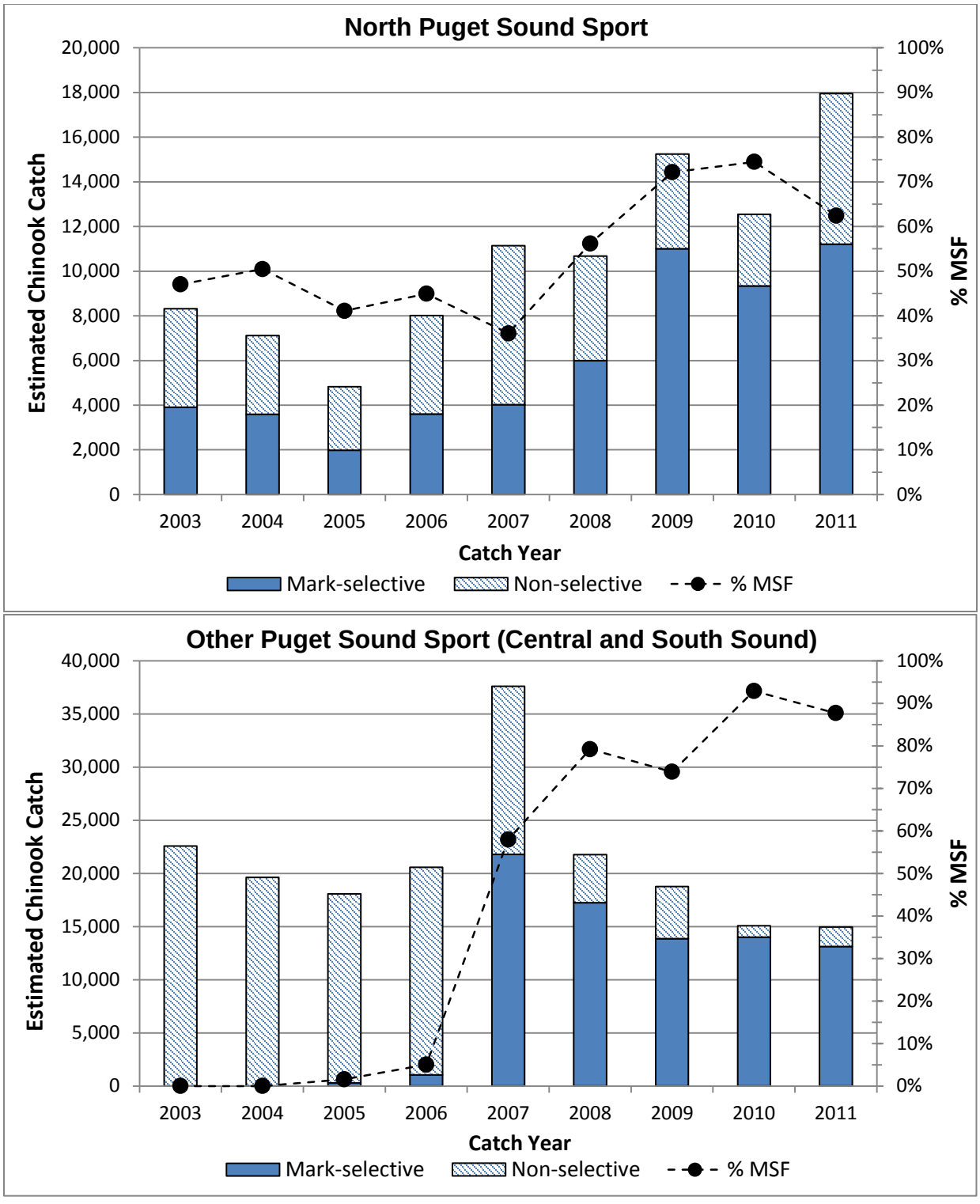

Figure 3-1. Total landed catch in MSFs and NSFs in Puget Sound and the percent of catch in Chinook Salmon MSFs for catch years 2003–2011.

4 ISSUES, CONCERNS, AND RECOMMENDATIONS

4.1 Submissions of Mark-Selective Fishery Proposals

Proposals are due by November 1 of the year before the MSFs being proposed; e.g., November 1, 2014 for fisheries proposed to occur in 2015–2016. Although final decisions on fisheries are generally made by agencies after this time period (e.g., January–April of 2015 for 2015 fisheries), MSF proposals should be submitted for any fisheries that are planned and should include information or options known at that point in time. SFEC believes that most MSFs now being implemented are represented by proposals, although some Columbia River MSFs may still not be represented. The SFEC recommends that agencies prioritize the task of developing proposals in a timely manner for any planned MSF in marine or freshwater. Timely submission of proposals allows for timely identification of issues which can be conveyed to the PSC and to agencies while the annual fishery planning activities are occurring.

4.2 Status of Mark-Selective Fishery Reports

The PSC has requested that management agencies provide SFEC with two reports on MSFs that have been prosecuted. The first is a table (Appendix Table H.1) that provides information on sampling methods used to recover CWTs in all fisheries and escapement locations, not just in the MSFs. Information on sampling procedures is needed because estimating impacts for the unmarked group encountered in MSFs depends on the method of sampling (electronic or visual) and the CWT processing protocol (i.e., are all tagged fish sampled also processed for CWT extraction in the lab). The first table should be completed by the PSC post-season meeting of the year following the fishery year. For instance, reports on fisheries occurring in 2011–2012 should be available by the post-season meeting in 2013. The post-season annual reports produced by the U.S. and Canadian sections for PSC's 2013 post-season review meeting did not include this information for most MSFs.

The second report is also in table format (Table H.2) and provides post-fishery information on MSFs that have occurred, where and when they occurred, fishery regulations, and what sampling took place. This table also provides final results on the estimated total mortalities and mark rates in these MSFs. This information is required for evaluation of the fishery. For Chinook salmon, the PSC Chinook Technical Committee (CTC) requires that total fish retained and total mortalities are reported for MSFs for use in the PSC Chinook Model. It should be noted that the template provided in Appendix Table H.2 was new in 2007, and the previous template should not be used as it was inadequate for CTC needs. Using estimates from the WDFW draft multi-year report for the summer MSFs in Washington Areas 5/6, an example of this report template is provided in Appendix Table H.1.

Agencies have not consistently provided these reports in the format requested by SFEC, and by the requested deadline; however, SFEC representatives have been stepping up efforts in recent years to coordinate with key staff within the agencies in order to acquire these post-season reports. Reports for Puget Sound Chinook salmon MSFs are available due to a database developed by WDFW and NWIFC staff. Although the information may be available in larger agency reports, the SFEC needs agencies to submit the post-season MSF information directly to SFEC using the report templates provided (Appendix H), which will enable more efficient dissemination of post-season data to PSC's technical committees such as the CTC and CoTC. It is recommended that agencies prioritize this task and work with their SFEC representatives to develop these reports annually and provide them to the PSC in the required time frame.

4.3 Incomplete Representation of CWT Indicators by DIT Groups

A DIT group is needed for each PSC indicator stock in order to evaluate the impacts of MSFs on each natural stock represented by an indicator stock (Appendix F and Appendix G). Comparison of the escapement of the unmarked and marked components of a DIT group provides a measure of the total impact of MSFs. Mark-selective fisheries have more than doubled in number since 2007; new areas and stocks are being fished under mark-selective regulations. It is recommended that agencies review their indicator stock programs in light of these new MSFs and any other new MSFs likely to be proposed in future years and evaluate the need for including additional DIT groups

4.3.1 Coho Salmon Double-Index-Tag Groups

At present, the utility of the DIT program and the CWT program in general for coho is reduced due to low tagging rates, insufficient Management Unit (MU) representation, low recovery rates, and incomplete coastwide coverage of electronic sampling programs (PSC-CWTW 2008; CoTC 2013). Indicator stocks that have been encountered in mark-selective fisheries are listed in Table 3-4. Several coho MUs do not have DIT groups to permit independent estimation of impacts of MSFs (Appendix F). For example, Canada currently has two DIT programs for the four MUs in the treaty (Inch Creek and Quinsam River). Even where DIT programs have been implemented, the reliability of results is affected by the lack of electronic tag detection throughout the migratory ranges of the MUs (CoTC 2013). In addition, tagging levels of DIT groups 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 estimates of ERs.

4.3.2 Chinook Salmon Double-Index-Tag Groups

Chinook indicator stocks that have been encountered in WA mark-selective fisheries are listed in Table 3-5. Some of these stocks are currently double-index tagged (Appendix G), but many are not. The SFEC continues to recommend that consideration be given to implementing more DIT programs.

4.4 Chinook MSFs and Sampling Methods

Electronic tag detection (ETD) is necessary for sampling fisheries and escapement where unmarked and tagged fish are present in the samples. In order to carry out exploitation rate analysis for unmarked stocks, aside from estimation of unmarked mortalities in MSFs, it is necessary to have estimates of harvest of unmarked and tagged DIT groups in NSFs. This requires ETD be used in NSFs, where unmarked and tagged fish are present, in particular if the stock has been subjected to MSFs in other areas or periods. Until 2008, MSFs for Chinook salmon were largely prosecuted in PS where ETD is used for all fisheries. Electronic tag detection was not used consistently by CDFO in northern fisheries until 2007 and has not been used at all by ADFG. As Puget Sound DIT groups taken in these fisheries were unlikely to have been subject to preceding MSFs (either the same year or at younger ages), indirect methods (other than direct sampling with ETD) could be used for achieving unbiased estimates of unmarked encounters from marked landings. However, with MSFs within the Strait of Juan de Fuca and off of the WA coast (WA Ocean Areas 1–4) it is no longer reasonable to assume that fish taken in NSFs in all northern coastal areas have not been subject to prior MSFs. The SFEC recommends that agencies review their sampling methods with respect to the current expansion of MSFs into coastal fisheries. In 2011, Oregon began using ETD for ocean sampling of both sport and commercial fisheries. It is specifically recommended that ODFW implement ETD in 2015 for Columbia River fall Chinook to recover DIT release groups for Chinook exploitation rate indicator stocks.

4.5 Mixed-Bag Regulations in MSFs

Regulations to implement MSFs for recreational fisheries have become more complex. We continue to be concerned about monitoring, sampling, and estimation methods keeping pace with increases in regulation complexity. MSFs continue to be proposed for much finer time/area strata than are being used for CWT expansions which will result in an inability to separate impacts in MSFs and NSFs.

Different types of mixed bag regulations have been part of the MSFs proposed by Canada and Oregon. In most cases this is a mixed bag, where only marked adults may be kept but marked and unmarked juveniles may be retained (Table 4-1). In addition, beginning in 2009, BC proposed two variations of the ‘standard’ mixed bag. For the SJDF fishery, both marked and unmarked Chinook could be retained within slot limits (45–67 cm) but marked only at sizes above the upper limit of the slot. For the WCVI fishery, marked fish of any size above 45 cm can be retained but the daily bag limit of two Chinook can include one unmarked fish between 45 and 77 cm. In Oregon there is a seasonal limit on unmarked Chinook salmon in certain ocean areas. These mixed bag regulations present a problem in estimating mortalities of unmarked DIT groups and associated wild stocks. The agencies proposing these mixed regulations should assist in developing the analytical tools to measure the impacts of these fisheries or provide documentation if methods have been developed and employed.

Table 4-1. Types of mixed bag regulations proposed for Chinook MSFs.

Regulation Type	Examples	Location
Mixed bag, marked only above maximum size	2/day, keep all between 45–67 cm, only marked over 67 cm	BC Strait of Juan de Fuca
Mixed bag, adults only marked and juveniles marked or unmarked	Bag limit of 6, up to 2 adults (≥24"), which must be marked. Minimum size limit of 12". *OR Coast*: Some areas are partially MSF, where an angler may retain 1unmarked Chinook Salmon as part of the 2 fish daily bag limit. Adjacent areas may be non-selective or entirely mark selective. *OR Coast al rivers*: variable because of a seasonal limit of 10 unmarked Chinook. These regulations do not apply to Chinook jacks (15"-24").	Snake River fall Chinook, and Oregon coastal
Regulations differ between states in mixed bags of adults and juveniles	The daily limit for adult Chinook is the same between the states, but the daily limit on jack Chinook is different. *Washington* sport daily limit of 6 salmon, of which only 2 may be adults (marked only), minimum size limit of 12". *Oregon* sport daily limit is 2 marked adult Chinook (>24" total length) and 5 marked jacks (15"-24" total length).	Columbia River Chinook sport fisheries
Seasonal limit on unmarked fish	Seasonal limits for unmarked fish may range from 1-10 unmarked Chinook depending on the river system. The catch of marked Chinook has no seasonal limit.	Oregon coastal Chinook

5 REFERENCES

Conrad, R., and P. McHugh. 2008. Assessment of two methods for estimating total Chinook Salmon encounters in Puget Sound/Strait of Juan de Fuca mark-selective Chinook fisheries. Northwest Fishery Resource Bulletin. Manusc. Ser. Rep. No 2.

CoTC (Joint coho Technical Committee). 2013. 1986-2009 Periodic Report, revised. Pacific Salmon Commission. TCCOHO (13) – 1.

Olson, R. 2007. Logistics and technology of mass marking and electronic CWT recovery in Pacific Salmon. Presentation at AFS Annual Meeting. Available from: www.rmpc.org/mass-marking-and-selective-fisheries-presentations.html (May 2008).

Parken, C., and B. Riddell. 2007. Operational issues with mass marking and mark-selective fisheries. Presentation at AFS Annual Meeting. Available from: www.rmpc.org/mass-marking-and-selective-fisheries-presentations.html. (May 2008).

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.

SFEC (Selective Fishery Evaluation Committee). 2012. Summary of mass marking and mark selective fisheries conducted by Canada and the United States, 2005–2009. Pacific Salmon Commission, Selective Fishery Evaluation Committee, Regional Coordination Workgroup. SFEC (12) – 1. Available from: http://www.psc.org/pubs/SFEC12-1.pdf (May 2012).

6 APPENDICES

Appendix A. Understanding of the Pacific Salmon Commission Concerning Mass Marking and Selective Fisheries (Revised February 2004).

Understanding of the
Pacific Salmon Commission
Concerning
Mass Marking and Mark Selective Fisheries

February 2004 Policy Statement

The Pacific Salmon Treaty's Memorandum of Understanding (MOU) obliges the Parties to, among other things, "maintain a coded-wire-tag and recapture program designed to provide statistically reliable data for stock assessment and fishery evaluation." The Pacific Salmon Commission (PSC) recognizes that the selective fisheries for marked hatchery coho and Chinook salmon can impact the coastwide coded-wire-tag (CWT) program. For the sole purpose of fulfilling this MOU obligation, the PSC has established the following policies and procedures. This policy does not preclude the PSC from evaluating the impacts of, and making recommendations concerning, mass marking or selective fishery plans as they affect the negotiation and establishment of Treaty annex provisions**.**

It shall be the policy of the PSC to review proposals for mass marking and selective fisheries to determine consistency with the Parties' commitment to the MOU provisions regarding the reliability of data needed for management of salmon fisheries within the jurisdiction and management area of the Treaty, including whether they impose substantial cost increases for agencies to conduct required data collecting programs.

The PSC shall establish a Selective Fishery Evaluation Committee (SFEC) to perform the activities set forth in the attached Terms of Reference.

To facilitate the SFEC review, the Parties shall do their utmost to ensure that their domestic managers submit all proposals for mass marking (MM) and mark-selective fisheries (MSF) which could potentially affect stocks or fisheries of concern to the PSC in accordance with the following schedule:

1. Not later than June 1 of each year. Provide early notice containing the agency's plans to consider conducting MSFs over the next 3-5 years.
2. Not later than June 1 of the year prior to implementation. Provide new or substantially changed MM or MSF project proposals.
3. Not later than November 1 of the year prior to implementation. Provide proposals for MM or MSF programs that are anticipated to continue annually without substantive change.
4. Upon completion of domestic fishery planning processes, agencies conducting MSFs are to provide final selective fishery plans.

5. Upon completion of MM programs, agencies are to report the number of fish that were actually mass marked and the extent to which releases are (single and double index) tagged for assessment.
6. Agencies shall report results of MSFs conducted during a season in the annual post-season report provided, using a format specified by the SFEC.
7. Not later than November 30 of the year following conduct of MSFs. Agencies are to report fishery and stock-age-specific estimates of mortalities for unmarked fish impacted by MSFs to the PSC technical committees

- The PSC shall consider, by the annual February PSC meeting, the SFEC reviews of proposals for MM and MSFs and discuss potential actions to address concerns related to any MM or MSF proposals that the SFEC determines will significantly and adversely affect the CWT program.
- The Parties will do their utmost to ensure that MM and MSF proposals are developed in consultation with domestic co-management agencies or processes, and that proposing agencies or entities provide information required by the SFEC and adhere to reporting requirements to enable the PSC technical committees to complete their assignments in a timely manner.
- After the occurrence of a selective fishery and when the data are available, the PSC shall review the management agency report on the actual conduct of the fishery with respect to its impact on the CWT program, and recommend changes and improvements.

Terms of Reference for the Selective Fishery Evaluation Committee

I. Reporting and Committee Structure: The Selective Fishery Evaluation Committee (SFEC) will report to the PSC and will be comprised of a Steering Committee and two working groups: the Regional Coordination Working Group (RCWG) and the Analytical Working Group (SFAWG). All official members of the Steering Committee and working groups will be considered members of the SFEC.

A. Steering Committee: The Steering Committee will be comprised of:
   1. the co-chairs of the PSC Coho Technical Committee, Chinook Technical Committee, and Data Sharing Technical Committee;
   2. the co-chairs of the two working groups;
   3. agency mass-marking/selective-fishery coordinators; and
   4. additional agency representatives approved by the responsible Party.

B. Regional Coordination Working Group (RCWG): The RCWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All RCWG members should contribute actively to the work of this group.

C. Selective Fishery Analysis Working Group (SFAWG): The SFAWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All SFAWG members should contribute actively to the work of this group.

II. Duties of the SFEC

A. Serve as a coastwide clearinghouse to facilitate the appropriate level of coordination and reporting on MM and MSF programs among the Parties, affected agencies, and existing coastwide and regional committees established to monitor activities related to the coastwide CWT program;
B. Provide advice to the PSC regarding potential adverse impacts of MM and MSFs on the CWT program;
C. Assess and monitor the cumulative impacts of MSFs on stocks of concern to the PSC;
D. Provide MM or MSF project proponents with information regarding concerns for potential impacts of their projects on the CWT program.
E. Receive and review MM and MSF proposals from the proponent(s) as early in the planning process as possible to identify potential issues and concerns regarding impacts on the CWT program.
F. Establish a technical evaluation process that will:
    1. Review proposed mass-marking/selective-fisheries initiatives developed by the proponent(s) and identify potential impacts on other jurisdictions and the CWT program;
    2. Review, in consultation with relevant PSC technical committees, procedures and protocols for marking, sampling, and evaluation developed by the proponent(s) and, if appropriate, develop and recommend alternative procedures to address potential concerns or measures that could be taken to mitigate for adverse impacts on the CWT program;
    3. Establish standard formats and reporting requirements for agencies conducting MSFs to use when providing post-season information. Review post-season agency evaluations of the performance of MSFs and their estimates of mortalities on stocks of concern to the PSC;
    4. Identify information needs or request modifications of proposals to meet concerns regarding impacts on the CWT program; and
    5. Conduct, at agreed intervals, technical evaluations of mass marking and selective fishery programs in order to assist the Parties to maintain the integrity of the CWT program.
G. Work with PSC Technical Committees to establish formal standards and objectives for a viable CWT program to enable more precise evaluation of potential impacts of MM and MSFs on the viability of the coastwide CWT program and to guide the development of mitigation measures.
H. Specific duties of the Steering Committee include being responsible for overall coordination and prioritization of the activities for the working groups and being the focal point for reporting to the PSC. The agency mass-marking/selective-fishery coordinators should ensure that mass marking and selective fishery proposals are provided to the SFEC in a timely manner.

III. Specific duties of the RCWG, among other related activities, include:

A. Coordinate and report on continuing research on electronic detection and mass marking technologies;
B. Collate and share information on CWT sampling procedures and programs; suggest modifications to sampling and monitoring programs to proponents;
C. Review MM proposals to determine potential impacts on sampling and tagging programs;
D. Provide agencies with a list of MM and MSF proposals received by the SFEC;
E. Provide the necessary liaison with the Data Standards Working Group of the Data Sharing Technical Committee to ensure that necessary modifications are made to PSC data exchange formats to maintain the integrity of the CWT system; and
F. Prepare an annual report summarizing mass marking statistics, index tag groups, and sampling programs for marks and CWTs.

IV. Specific duties of the SFAWG, among other related activities, include:

A. Design marking and sampling strategies that will achieve desired precision for CWT-based estimates;
B. Develop analytical tools for the evaluation, by the SFEC and MSF proponents, of MM programs and MSFs and their potential impacts on the coastwide CWT program;
C. Provide the necessary technical liaison with agencies and other coastwide committees working on selective fishery evaluation models;
D. Review and recommend parameter values for assessing impacts of MSFs;
E. Develop analytical tools for estimating the impacts of MSFs on escapements and exploitation rates for naturally spawning coho and Chinook stocks based on post-season information;
F. Review MSF proposals and provide advice to the proponents regarding the design of MSFs and the conduct of sampling and monitoring programs; and
G. Recommend guidelines, procedures, and/or time frames necessary to evaluate the success of MSFs in conserving naturally spawning stocks.

L. Cassidy J. Davis
Chair Chair

Appendix B. Mass Marking Proposal Template.

Template for Mass Marking Proposals

Mass Marking Proposal ID #
Date Received

PROPOSAL TITLE:

This template is intended for proposals to mark any release group from a hatchery complex or area that meets all of the following conditions:

1) Chinook or coho Salmon;
2) 100,000 or more fish in release group
3) fish are marked with an adipose clip, but untagged; and
4) expected to be intercepted in Pacific Salmon Commission fisheries.

CONTACT INFORMATION

Proposing Agency	
Contact Person	
Mailing Address	
Phone Number	
Fax	
Email	

IS THE PROPOSAL:

New	
substantially changed	
or a continuation of a previous proposal	

PROPOSED MARKING AND TAGGING

1. **Purpose of Mass Marking**
    a. Provide a brief description of the goals and objectives of the proposal (e.g., to obtain information on hatchery straying to wild spawning grounds, to increase fishing opportunities, or to identify hatchery/wild compositions in fisheries).

    b. If this is not a new proposal, list the Mass Marking Proposal ID number(s) (assigned by the PSC Executive Secretary) corresponding to the previous proposal. In addition, **describe any significant differences from previous proposals** (i.e., additions or deletions of mass marked stocks or DIT groups).

    c. Identify potential mark-selective fisheries that your agency may pursue in the future that will target these proposed mass marked stocks.

2. **Proposed 2015 Marking and Tagging Levels**

   List all proposed mass marking and DIT plans (see example format below), including the following fields: area/region, hatchery, stock, number of fish to be tagged with and without fin clip, number of fish to be untagged with and without fin clip, and prior marking status.

   Example format for proposed mass marking and tagging plans. Identify all DIT groups with an asterisk (*).

   ***Species**:*
   ***Brood Year**:*
   ***Release Year**:*

Area or Region	Hatchery	Stock	Number to be Tagged (CWTs)		Number to be Untagged		Marked Last Brood Year? (Y/N)
			Ad+CWT	CWT Only	Ad Only	No Clip	
Total for Region							

3. **Concerns Regarding the Proposal**
   a. **List any known reviews of the mass marking proposal** that have been conducted (e.g., by the Mark Committee) and the outcome of those reviews. List any marking programs/agreements that this proposal may conflict with and briefly describe the possible conflict.

   b. **List any issues of concern previously identified** by the SFEC, PSMFC Mark Committee, or fishery management forums related to this mass marking proposal; and describe how those concerns have been addressed

Appendix C. Mark-Selective Fishery Proposal Template.

TEMPLATE FOR MARK-SELECTIVE FISHERY PROPOSALS (WORD VERSION)

Mark-Selective Fishery Proposal ID #_____
Date Received _____

MARK-SELECTIVE FISHERY PROPOSALS - TITLE

Contact information

Proposing Agency:	
Contact Person:	
Mailing Address:	
Phone Number:	
Fax:	
Email:	

Is the proposal:

new or not yet reviewed by PSC-SFEC _____
substantially changed _____

Purpose/management objective

Describe the management objective of the proposed mark-selective fishery.

Location and time of the proposed mark-selective fishery

Please **include any information when there are breaks or changes in regulations that might impact sampling stratification (see Question 7b below)**

1. **Location of the fishery:**

2. **Year and month(s) when the fishery is proposed to occur:**

Other information about the fishery:

3. **Target species/stocks (including nontarget PSC species/stocks of concern):**

4. **Gear to be used:**

5. **Other regulation details (e.g., size restrictions, bag limits, mixed bag information):**

Projected impacts BY the fishery

6. **Identify all (coast wide) CWT stocks likely to be encountered in this fishery (including individual tag codes if available), whether those stocks were Double Index Tagged (DIT). Appendices F and G provide tables of tagged indicator stocks for coho and Chinook for your convenience. Please note we are interested in tagged impacts alone, untagged hatchery production should not be included.**

In-season management

7. **Describe your sampling program for sampling for: CWTs, marks and estimation of total catch. Attach your sampling plan if available. At a minimum, include descriptions for the following:**
    a. **CWT recoveries.**
        i. **Will there be *random* sampling of CWTs (i.e., fishers exiting fisheries contacted for biological sampling of harvest) or will you be using voluntary programs?**
        ii. **If *random* will there be ETD or visual identification of tagged fish?**
        iii. **If ETD in *random* samples, will all tagged fish (marked and unmarked) be processed?**
        iv. **If *random* what is the expected sample rate for CWTs?**
        v. **If voluntary programs are used, how is the awareness factor estimated?**
    b. **Monitoring for retained catch by sample strata for sample expansions. The sample strata and the strata of catch estimation must match the location/time/regulation strata (i.e., whenever there is a change in regulation such as from MSF to non-selective, or change in bag limits, the sampling strata should also change).**
    c. **Monitoring of mark rate in the MSF (this is the total mark rate, percent marked in the harvest from the fishery).**
    d. **Other information, e.g., retained unmarked fish (mixed bag fisheries, or mark recognition error in MSF)**

Other information.

8. **Please include any other information that will be useful for estimation of unmarked tagged mortalities in your MSF. For instance, sources of estimates of unmarked to marked ratios for DIT tagged groups (e.g., in a test fishery, nearby hatchery, non-selective fishery). Please provide any input you wish on methods to estimate the unmarked tagged mortalities for DIT groups, or for appropriate release mortality rates to be used.**

Appendix D. Mark-Selective Fishery Proposal Spreadsheet Template.

Template 2 for MSF Proposals Year 2015

Fishery Information						Other regulations			CWT stocks		Sampling program						Other sources of info for estimation of unmarked mortalities and mark ratios
Agency	Contact Information	Region and Fishery Area	Period (Yr/Mon)	Fishery type (EO, FSC, Com, Rec) and Gear	Species (Target and Mark-selective)	Bag limits adult and juvenile by mark status	Lower Size Limit	Other regulations comments (e.g., upper limits, gear restrictions, mesh size)	Hatchery and Stock Name	Indicator or DIT	CWT sampling method (direct or voluntary)	Tag Detection method	Are All Tags Processed?	Mark Rate	Legal / Sublegal	Other sampling (release mortality rate, compliance)	

Appendix E. Status of Mass Marking Proposals Received in 2014 for Mass Marking to Occur in 2015.

Description of Proposal and Agency	New or Continuation Proposal	SFEC Proposal Number
coho Salmon		
Southern BC Coho – CDFO	Continuation	MM-FOC-01-2015
Puget Sound Coho – WDFW/Tribal	Continuation	MM-WDFW-01-2015
Washington Coast Coho – WDFW/Tribal	Continuation	MM-WDFW-04-2015
Washington Columbia River Coho – WDFW/Tribal	Continuation	MM-WDFW-05-2015
Columbia River Coho – USFWS	Continuation	MM-USFWS-04-2015
Puget Sound and WA Coast Coho – USFWS	Continuation	MM-USFWS-18-2015
Columbia River Coho – ODFW	Continuation	MM-ODFW-04-2015
Oregon Coast Coho – ODFW	Continuation	MM-ODFW-05-2015
Chinook Salmon		
Columbia River Chinook – USFWS	Continuation	MM-USFWS-17-2015
WA Coast Fall Chinook – USFWS	Continuation	MM-USFWS-19-2015
Willamette River Spring Chinook – ODFW	Continuation	MM-ODFW-01-2015
OR North Coast Spring Chinook – ODFW	Continuation	MM-ODFW-02-2015
OR South Coast Spring Chinook – ODFW	Continuation	MM-ODFW-03-2015
Columbia River Fall Chinook – ODFW	Continuation	MM-ODFW-06-2015
OR Coast Fall Chinook – ODFW	Continuation	MM-ODFW-07-2015
Mid-Columbia R Spring Chinook – ODFW	Continuation	MM-ODFW-08-2015
Snake River Fall Chinook – ODFW[1]	Continuation	MM-ODFW-09-2015
Snake River Spring Chinook – ODFW	Continuation	MM-ODFW-10-2015
Puget Sound Chinook – WDFW/Tribal	Continuation	MM-WDFW-02-2015
Columbia R. Chinook – WDFW/CRITFC	Continuation	MM-WDFW-03-2015
Washington Coastal Chinook – WDFW/Tribal	Continuation	MM-WDFW-06-2015

[1] This proposal includes production and releases from Irrigon Hatchery, which has been included in IDFG's MM proposals in past years.

Appendix F. Current PSC Coho CWT Exploitation Rate Indicator Stocks and DIT Groups.

Region	Stock Representation	Indicator Stocks	DIT
BC North Coast	North Coast Wild	Zolzap	
	Skeena	Toboggan	
Interior Fraser	Thompson River	Coldwater (Spius Hatchery) Eagle River	
Georgia Basin	East Coast Vancouver Island	Big Qualicum Goldstream River	
	Lower Fraser	Inch Creek	√
	North Vancouver Island	Quinsam River	√
	North Vancouver Island Wild	Keogh	
West Coast Van Is.	West Coast Vancouver Island	Robertson Creek	
Puget Sound	Nooksack	Skookum Creek H. Lummi Bay Ponds	
	Skagit	Skagit (Marblemount H.) Baker River Wild	√
	Stillaguamish/Snohomish	Skykomish (Wallace River) Tulalip Bay (Bernie Gobin)	√
	Mid Puget Sound	Green River (Soos Creek H.)	√
	South Puget Sound	Puyallup (Voights Creek H.) Peale Pass (Squaxin Net Pens) Nisqually (Kalama Creek H.)	√
	Hood Canal Wild	Big Beef Creek	
	North Hood Canal	Quilcene NFH Quilcene Net Pens Port Gamble Net Pens	√
	South Hood Canal	George Adams H.	√
	Dungeness	Dungeness H.	
	Strait of Juan de Fuca	Lower Elwha H.	√
Washington Coast	North Coast	Makah NFH Solduc (fall run)	**(dropped)** √
	North Central Coast	Queets Wild (Salmon River H.) Queets (Salmon R. Fish Culture)	 √
	Quinault	Quinault NFH	**(dropped)**
	Grays Harbor	Chehalis R. Wild Satsop Springs Ponds Satsop (Bingham Cr. H, late) Satsop (Bingham Cr. H., early)	 √
	Willapa Bay	Forks Creek H. (late fall run) Forks Creek H. Nemah R. H. Naselle H.	 √
Columbia Basin	Lower Columbia River	Lewis River (Type N and Type S) Eagle Creek Sandy River Tanner Cr.	**√(2)** √ **(dropped)**
Oregon Coast	Oregon South Coast	Rogue River (Cole Rivers)	

Appendix G. Current PSC Chinook CWT Exploitation Rate Indicator Stocks and DIT Groups.

Area	Natural/Unmarked Stock Representation	Exploitation Rate Indicator Stocks	Run Type	DIT
S.E. Alaska	Southeast Alaska	Alaska Spring	Spring	
British Columbia	North/Central BC	Kitsumkalum	Summer	
	West Coast Vancouver Is	Robertson Creek	Fall	
	Georgia Strait	Puntledge	Summer	
		Quinsam	Fall	
		Big Qualicum	Fall	
		Cowichan	Fall	
	Lower Fraser River	Chehalis (Harrison Stock)[1]	Fall	
		Chilliwack (Harrison Stock)	Fall	**dropped**
Puget Sound	North Puget Sound	Nooksack Spring Fingerling	Spring	**dropped**
		Samish Fall Fingerling	Fall	√
	Central Puget Sound	Skagit Spring Yearling	Spring	√
		Skagit Spring Fingerling	Spring	
		Skagit Summer Fingerling	Summer	
		Skykomish Summer Fingerlings[2]	Fall	√
		Stillaguamish Summer/Fall Fingerling	Fall	
	Hood Canal	George Adams Fall Fingerling	Fall	√
	South Puget Sound	White River Spring Yearling[3]	Spring	
		Green River Fall Fingerling	Fall	√
		Grover Creek Fall Fingerling	Fall	√
		Nisqually Fall Fingerling	Fall	√
		South Puget Sound Fall Yearling	Fall	
	Strait of Juan de Fuca	Hoko Fall Fingerling	Fall	
Washington Coast	North Wash. Coast	Sooes Fall Fingerling	Fall	
		Queets Fall Fingerling	Fall	
		Quinault Lake Fall Fingerling[2]	Fall	√
	Willapa Bay	Forks Creek Fall Fingerlings[2]	Fall	√
		Naselle H.[2]	Fall	√
Columbia Basin	Columbia R. (WA)	Cowlitz Tule	Fall Tule	
		Spring Creek Tule	Fall Tule	√
		Little White Salmon[2]	Fall Bright	√
		Columbia Summers	Summer	
	Columbia River (OR)	Columbia Lower River Hatchery	Fall Tule	**dropped**
	Upper Columbia R.	Columbia Upriver Bright	Fall Bright	
		Hanford Wild	Fall Bright	
		Priest Rapids		√
	Lower Columbia R.	Lewis River Wild	Fall Bright	
		Willamette Spring	Spring	**dropped**
		Lewis River Spring[2]	Spring	√
	Snake River	Lyons Ferry	Fall Bright	
Oregon Coast	North Oregon Coast	Salmon River	Fall	

[1] These stocks are CWT-tagged, but there is no quantitative CWT escapement data, useful for distribution only.
[2] DIT group not currently an indicator stock.
[3] No longer adipose-fin clipped.

Appendix H. Mark-Selective Fishery Post-Season Report Templates.

Templates with examples are provided below in Appendix Tables H.1 and H.2 and are available to download at http://www.psc.org/info_sfec.htm.

Appendix Table H.1. CWT sampling in both non-selective and mark selective fisheries.

SECTION 1. GENERAL SAMPLING PROGRAMS

		Chinook Salmon			Coho Salmon		
Region	**Sector**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**

SECTION 2. EXCEPTIONS

		Chinook Salmon			Coho Salmon		
Region	**Sector**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**

Notes:

1. Sampling information is to be provided in two sections. The sampling programs described in Section 1 are presumed to apply, unless specifically noted in Section 2.
2. See sheets 'Table 1 Instructions' and Example Table 1' for further information on completing Table 1

Table H.1 Instructions -- Sampling information is to be provided in two sections. The sampling programs described in Section 1 are presumed to apply, unless specifically noted in Section 2.

Column	Description
Region	Fishery Reporting Region
Sector	Troll
	Sport
	Net
	First Nations
	Personal Use
CWT Sampling Method	Direct
	Voluntary
	None
CWT Detection Method	Visual
	Electronic
Heads Processed	All
	Only Marked Fish
	Other (describe)

One entry per region and fishery sector as appropriate

Example Table H.1 --

Agency **WDFW** **Year** **2011**

		Chinook Salmon			Coho Salmon		
Region	**Sector**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**	**CWT Sampling Method**	**CWT Detection Method**	**Heads Processed**
Ocean	Troll	Direct	Electronic	All	Direct	Electronic	All
Strait of Juan De Fuca	Troll	Direct	Electronic	All	Direct	Electronic	All
Puget Sound	Net	Direct	Electronic	All	Direct	Electronic	All
Area 8/8A	Sport	Direct	Electronic	All	Direct	Electronic	All
Freshwater	Sport	None	None	NA	None	None	NA
Freshwater	Net	Direct	Electronic	All	Direct	Electronic	All

Appendix Table H.2. Information on MSFs that have occurred, locations, periods and locations and what sampling and monitoring was conducted to recover CWTs and estimate total encounters and unmarked mortality and compliance in these MSFs. Compliance includes estimation of mark recognition error (marked fish released) and unmarked retention error (unmarked fish retained and landed). This table provides information on actual implementation of MSFs proposed for season.

Agency (B2)						Year (F2)					Estimate Type (I2)															
Fishery Information						MSF Regulations					Sampling program						Estimated Catches and Releases								Release Mortality Rates	
																	Marked Fish				Unmarked Fish					
Contact Information	Fishery Area	Fishery type	Start Date (MM/DD/YY)	End Date (MM/DD/YY)	Target Species for Fishery	MSF Species	Bag limits adult and juvenile by mark status	Lower Size Limit	Upper Size Limit	Other	CWT sampling method	CWT Detection method	Heads Processed	Mark Rate	Method for Catch Estimation	Method for Release Estimation	Retained	Legal Sized Fish Released	Sub-Legal Sized Fish Released	Extra-Legal Sized Fish Released	Retained	Legal Sized Fish Released	Sub-Legal Sized Fish Released	Extra-Legal Sized Fish Released	Legal and Extra-Legal Sized Fish	Sub-Legal Sized Fish

Note: See sheet 'Table 2 Instructions' for further details on how to complete Table 2.

Table H.2 Instructions

Cell	Description
B2	Enter Agency Name
F2	Enter Fishing Year
I2	Preliminary
	Final

One entry per each MSF regulation (e.g., revision in retention or gear restrictions)

FISHERY INFORMATION	
Column	**Description**
Contact Information	Name, phone number, email address for additional information
Fishery Area	Area covered by MSF regulation
Sector	Troll
	Sport
	Gillnet
	Seine
	Personal Use
	Other
Start Date (MM/DD/YY)	Starting date for MSF regulation
End Date (MM/DD/YY)	Ending Date for MSF Regulation
Target Species for Fishery	Chinook
	Coho
	Other
MSF REGULATIONS	
Column	**Description**
MSF Species	Chinook
	Coho
	Other
Bag limits adult and juvenile by mark status	Describe retention limits (e.g., marked fish only, marked only adults, 1 marked adult, 2 jacks regardless of mark status)
Minimum Size Limit	Minimum size limit for retention. Specify unit of measurement (inches, centimeters) and type of measurement (e.g., total length, fork length)
Maximum Size Limit	Maximum size limit for retention if applicable). Specify unit of measurement (inches, centimeters) and type of measurement (e.g., total length, fork length)
Other regulations	Enter information on other applicable restrictions (e.g., barbless hooks, live boxes, tangle nets, mesh size)

CWT SAMPLING	
Column	**Description**
CWT Sampling Method	Direct
	Voluntary
	None
CWT Detection Method	Visual
	Electronic
Heads Processed	All
	Only Marked Fish
	Other (describe)
Mark Rate	Enter method to estimate mark rate (None, Observer, Angler interviews, Samplers)
Method For Catch Estimation	Enter method to estimate catches (None, Catch Slips/Tickets, Phone survey, Observer, Angler interviews, Creel Census, Catch Record Card, Log Books)
Method For Release Estimation	Enter method to estimate releases (None, Catch Slips/Tickets, Phone survey, Observer, Angler interviews, Creel Census, Catch Record Card, Log Books)
(UN)MARKED FISH	
Column	**Description**
Retained	Number of fish retained (if unavailable, enter NA)
Legal Sized Fish Released	Number of legal-sized fish released (if unavailable, enter NA)
Sub-Legal Sized Fish Released	Number of Sub-Legal Sized fish released (if unavailable, enter NA)
Extra-Legal Sized Fish Released	Number of fish above the maximum size limit released (as applicable, (if unavailable, enter NA).
Extra-Legal Sized Fish Released	Number of fish above the maximum size limit released (as applicable, (if unavailable, enter NA).
RELEASE MORTALITY RATES	
Column	**Description**
Legal and Extra Legal Sized Fish	Assumed total mortality rate for fish larger than the minimum size limit that are released (immediate and delayed)
Sub-Legal	Assumed total mortality rate for fish smaller than the minimum size limit that are released (immediate and delayed)