PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE

REVIEW OF MASS MARKING AND MARK-SELECTIVE FISHERY ACTIVITIES PROPOSED TO OCCUR IN 2017 AND 2018

REPORT SFEC (18)-1

December 2018

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[1] Past committee members who provided input to this report include: Dr. Marianna Alexandersdottir, NWIFC; Mr. Jonathan Carey, WDFW; Dr. Ken Johnson, ODFW; and Mr. Mark Kimbel, WDFW.

LIST OF ACRONYMS AND INITIALISMS WITH DEFINITIONS

ADFG	Alaska Department of Fish & Game	**MSF**	Mark-Selective Fishery
AK	Alaska	**MU**	Management Unit
BC	British Columbia	**NFH**	National Fish Hatchery
BY	Brood Year	**NSF**	Non-Selective Fishery
C&S	Ceremonial and Subsistence	**NWIFC**	Northwest Indian Fisheries Commission
CA	California	**ODFW**	Oregon Department of Fish and Wildlife
CDFO	Canadian Department of Fisheries and Oceans	**OR**	Oregon
CDFW	California Department of Fish and Wildlife	**PS**	Puget Sound
COLR	Columbia River	**PSC**	Pacific Salmon Commission
CoTC	Coho Technical Committee	**PSMFC**	Pacific States Marine Fisheries Commission
CRC	Catch Record Card	**PST**	Pacific Salmon Treaty
CRITFC	Columbia River Inter-Tribal Fish Commission	**QIN**	Quinault Indian Nation
CTC	Chinook Technical Committee	**RCWG**	Regional Coordination Work Group
CWT	Coded-Wire Tag	**RMIS**	Regional Mark Information System
CWTIT	Coded Wire Tag Implementation	**SFAWG**	SFEC- Analytical Work Group
DIT	Double-Index Tag	**SFEC**	Selective Fishery Evaluation Committee
ER	Exploitation Rate	**SHRP**	Sport Head Recovery Program
ETD	Electronic Tag Detection	**SJDF**	Strait of Juan de Fuca
FOC	Fisheries and Oceans Canada	**SUS**	Southern United States
FR	Fraser River	**TERM**	Terminal Fishery
GS	Georgia Strait	**ToR**	Terms of Reference
ID	Idaho	**URB**	Upriver Bright (Fall Chinook)
IDFG	Idaho Department of Fish and Game	**VTR**	Voluntary Trip Report
MM	Mass Marking	**WA**	Washington
MOU	Memorandum of Understanding	**WDFW**	Washington Department of Fish and Wildlife

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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 2017 and 2018. Issues with implications for maintenance of the coastwide coded-wire-tag program are identified and recommendations are proposed.

Summary of 2017 and 2018 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 occurring in 2017 and in 2018 (Appendix A). Of these, one was received from southern British Columbia (BC) and 21 from southern United States (SUS) in both years. The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Proposed mass marking of Coho and Chinook salmon, 2016–2018

	Coho (in millions)			Chinook (in millions)		
Agency	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
ADFG	-	-	-	-	-	-
CDFO	4.2	3.9	4.2	-	-	-
USFWS	1.7	1.7	1.7	25.0	25.0	24.2
WDFW/Tribes	22.2	22.5	23.0	71.6	70.9	70.6
ODFW/Tribes	5.5	6.2	6.1	21.2	20.3	19.7
Total	**33.4**	**34.3**	**35.1**	**117.7**	**116.2**	**114.4**

Within the MM proposals received from southern BC and SUS, approximately 34.3 million Coho were proposed to be mass-marked in 2017, approximately 900,000 more than proposed in 2016, and 35.1 million Coho are proposed for 2018 (Table 2-1). Essentially all hatchery Coho production intended for harvest, from southern BC and SUS hatcheries will continue to be mass marked. In both 2017 and 2018, there are 15 proposed Coho Salmon DIT groups (Table 2-1; Appendix B), of which one 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 unchanged from what was proposed for 2016.

Approximately 116.2 million Chinook were proposed to be mass marked in 2017 from SUS Chinook hatcheries, and 114.4 in 2018 (Table 2-1). The 2017 level was approximately 1.5 million less than the number proposed to be mass marked in 2016, and the 2018 level is another 1.8 million less than in 2017. These differences are due to minor changes in production and more coded-wire-tagged fish. Most all hatchery Chinook production from SUS hatcheries intended for

harvest will continue to be mass marked. Currently there are 14 proposed Chinook Salmon DIT groups (Table 2-1, Appendix C), of which seven are from Puget Sound facilities, two from coastal facilities, and five from Columbia River facilities.

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 implement electronic sampling in most locations and 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 committed to full electronic sampling and reporting of all CWTs in all commercial fisheries for Chinook. Coho in Canadian commercial fisheries are electronically or visually sampled, depending on location. 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). Alaska conducts visual sampling; however, uses electronic screening of heads for commercial fisheries and in most ports for sport fisheries, to send tagged heads only to the dissection lab.

Encounters of large numbers of mass marked Chinook Salmon are increasingly impacting catch sampling programs in northern fisheries; for example, approximately 59% of the Chinook sampled in the southeast Alaskan troll fishery and 46% of the Chinook sampled in the sport fishery with a missing adipose fin did not contain a CWT in 2017 (Figure 2-5). The increased costs 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 do impact the programs.

Summary of 2017 and 2018 Mark-Selective Fishery Proposals

Mark-selective fisheries have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003. For 2017, the SFEC received 64 MSF proposals for Coho and Chinook salmon in ADFG, CDFO, WDFW, and ODFW fisheries. For 2018, the SFEC received 68 MSF proposals for Coho and Chinook salmon in Alaska, Canada, Washington, and Oregon fisheries. The SFEC believes these proposals cover all MSFs planned for 2017 and 2018 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1 (also see Appendix D). Further details describing the proposed MSFs and comments made by the SFEC are provided in Table 3-3.

In 2017, 24 proposals were received for Coho Salmon MSFs and 40 proposals were received for Chinook Salmon MSFs. The SFEC received one new Coho proposal from WDFW, and four new Chinook proposals, three from WDFW and one from ODFW for a pre-existing fishery formerly proposed as a joint Coho/Chinook MSF.

In 2018, 25 proposals were received for Coho Salmon MSFs and 43 proposals were received for Chinook Salmon MSFs. The SFEC received one new Coho proposal from WDFW for an existing recreational MSF on the Nooksack River, one new proposal from the Lummi Nation for an existing MSF on the Nooksack River, and two new Chinook proposals from ADFG for a commercial and a recreational MSF in southeast Alaska. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

Proposals received by the SFEC for
Coho and Chinook salmon mark-selective fisheries, 2016–2018

	Coho			Chinook		
Agency	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
ADFG	0	0	0	1	1	3
CDFO	5	5	5	1	1	1
WDFW	10	11	12	24	27	27
ODFW	5	5	5	5	6	6
WDFW/ODFW	3	3	3	5	5	5
IDFG	0	0	0	0	0	0
Lummi	0	0	0	0	0	1
Total	**23**	**24**	**25**	**36**	**40**	**43**

Up until 2008, Chinook MSFs were largely restricted to Puget Sound and Columbia River spring Chinook Salmon. Since then, Chinook MSFs have expanded substantially in both marine and freshwater areas. In 2007, 12 Chinook MSFs were prosecuted; in 2018, that number has more than tripled to 43 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 salmon

are also expected to continue to occur in ocean areas in 2018 in BC, WA, and OR. These fisheries will impact many stocks and also multiple broods of Chinook Salmon.

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 prosecuted (whether they took place) 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 tables (see PSC website for current templates). The first two tables should be submitted by the annual PSC post-season meeting following the year of the fishery. United States and Canadian PSC post-season reports continue to be missing SFEC post-season report/tables for most MSFs. 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. Mixed bag regulations are part of the MSFs proposed by Canada, Washington, and Oregon for recreational fisheries (Figure 4-1 through Figure 4-4). As MSFs expand, a larger variety of mixed bag regulations are now 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. There are no 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 MSFs by November 2018, and for agencies to provide both preliminary and final post-season reports on the conduct of MSFs within the timeframe adopted by the PSC. Proposals for new or substantially changed proposals are requested by June 1 of the year prior to implementation. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner. Beginning in 2018, the SFEC will annually report actual releases as contained in the Regional Mark Information System (RMIS), and review proposals from agencies for any significant changes in production and mark and tag status (e.g., adding or removing DITs).

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 whether 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 may need to be expanded and the number of double-index-tagged stocks may need to be increased, assuming double-index-tagging is providing valid analyses. It is specifically recommended that ODFW and WDFW implement ETD for all Columbia River fall and summer Chinook fisheries. It is unclear why visual sampling continues when there are five Chinook DIT groups released in the Columbia River.

The PSC and Agencies should support technical and policy processes to develop agreements and clarify responsibilities for maintaining a functional CWT system; these processes should build upon recommendations presented by the CWT Work Group in 2008 (PSC-CWTW 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 (see SFEC Feb 2004 Policy Statement and ToR). The SFEC serves as a clearinghouse 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 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 salmon 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* (see SFEC Feb 2004 Policy Statement and ToR), proposals for continuing MM and MSF programs are requested no later than November 1 of the year prior to implementation. Proposals for new or substantially changed 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 Microsoft Word™ templates (see PSC website for current templates). In addition, a Microsoft Excel™ format has been developed as an alternative format for submitting MSF proposals.

The SFEC reviewed proposals for MM activities and MSFs anticipated by agencies to occur in 2017 and 2018. This report summarizes the results of the review of MM and MSF proposals received in November 2016 and 2017. 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 22 MM proposals (8 Coho, 13 Chinook, and 1 Coho/Chinook) were received by the PSC for 2017 marking activities, and 21 proposals were received for 2018 marking activities (Appendix A). In both years, of the proposals received, one was from southern British Columbia (BC) and 21 from southern United States (SUS). 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 34.3 million Coho Salmon were proposed to be mass marked in 2017, and 35.1 million in 2018, from southern BC, Washington, and Oregon (Table 2-1). Although there has been a gradual decline in coastwide Coho Salmon hatchery production since brood year 1997, there have been no significant changes to proposed marking levels from brood year (BY) 2001 to BY 2017. Annual trends in Coho Salmon released as mass marked and the total Coho production from the regions covered by mass marking proposals, for BYs 1997 to 2014, are shown in Figure 2-1A. Geographic details of the fish to be marked in 2017 and 2018, by mark and tag status, are displayed in Figure 2-3 (panels A and B, respectively). The vast majority of the coastwide Coho Salmon production, and essentially all production intended for harvest, will be mass marked. In 2017, of the production that will not be mass marked, approximately 4.5 million will be tagged and marked, 3.7 million will be tagged and unmarked, and approximately 1.8 million will be left untagged and unmarked. In 2018, of the production that will not be mass marked, approximately 4.4 million will be tagged and marked, 3.8 million will be tagged and unmarked, and approximately 1.3 million will be left untagged and unmarked for stock reintroduction programs.

The total SUS Chinook hatchery production from Washington and Oregon for the area and stocks covered by the 2017 proposals, is projected at approximately 152 million fish, and 149 million were included in the 2018 proposals. Annual trends in Chinook Salmon released as mass marked and the total Chinook production from the regions covered by mass marking proposals, for BYs 1997 to 2014, are shown in Figure 2-1B. Geographic details of the proposed 2017 marking, by mark and tag status, are displayed in Figure 2-3A, and proposed 2018 marking by mark and tag status are displayed in Figure 2-3B.

Approximately 116 million Chinook Salmon were proposed to be mass marked from SUS hatcheries in 2017 and 114 million in 2018 (Table 2-1). The 2017 total was approximately 1.5 million less than what was proposed to be marked in 2016, and another 1.8 million fewer were proposed to be mass marked from 2017 to 2018. The differences are due to minor changes in production and more fish being coded-wire tagged. For the production that will not be mass marked in 2017, approximately 22 million will be both tagged and marked, 6.8 million will be tagged and unmarked, and 7 million will be intentionally left unmarked for restoration programs (Figure 2-3A). For the production that will not be mass marked in 2018, approximately 22.2

million will be both tagged and marked, 6.8 million will be tagged and unmarked, and 5.3 million will be intentionally left unmarked for restoration programs (Figure 2-3B). No mass marking of Chinook is anticipated for hatchery production from CA, BC, and AK. SFEC did not receive a proposal from IDFG; however, these Snake River Chinook stocks are not expected to significantly contribute to PST fisheries.

Table 2-1. Mass marking of Coho and Chinook salmon and number of double-index-tagged (DIT) groups proposed for 2016–2018.

Species	Area	Run	Agency	DIT Groups	Mass Marking (millions) 2016	2017	2018
Coho	Strait of Georgia		CDFO	1	4.0	3.4	3.7
	W. Coast of Vanc. Isl.		CDFO	-	0.4	0.5	0.5
	Puget Sound		USFWS	1	0.3	0.3	0.3
			WDFW/Tribal	6	10.3	10.6	11.1
	WA Coast		USFWS	-	0.8	0.6	0.6
			WDFW/Tribal	4	4.3	4.3	4.4
	Columbia Basin		USFWS	1	0.3	0.8	0.8
			WDFW/Tribal	2	7.6	7.6	7.5
			ODFW	-	5.0	5.8	5.7
	OR Coast		ODFW	-	0.5	0.4	0.4
	Total Coho			**15**	**33.4**	**34.3**	**35.1**
Chinook	BC		CDFO	-	---	---	---
	Puget Sound	Spring	WDFW/Tribal	1	0.7	0.7	0.7
		Summer	WDFW/Tribal	1	3.3	3.2	3.2
		Fall	WDFW/Tribal	5	29.4	27.8	28.5
	WA Coast	Spr/Sum	WDFW/Tribal	-	0.2	0.2	0.2
		Fall	USFWS	-	2.5	2.5	1.7
			WDFW/Tribal	2	8.1	7.2	7.2
	Columbia Basin	Summer	USFWS	-	0.2	0.2	0.2
		Spring	ODFW (Willamette)	-	5.0	4.4	4.4
			ODFW (Col. R)	-	2.6	2.4	2.5
			USFWS	-	3.4	3.4	3.4
			WDFW/Tribal	1	3.2	3.4	3.2
		Fall-Tule	USFWS	1	9.7	9.7	9.7
			WDFW	-	12.1	14.1	13.3
			ODFW	-	6.9	7.0	6.0
		Fall URB	WDFW	2	13.0	12.8	12.8
			ODFW	-		0	0.3
			Yakima	-	1.5	1.5	1.5
			USFWS	1	7.4	7.4	7.4
		Snake R. Fall	ODFW	-	1.0	0.8	0.8
		Snake R. Spring	ODFW	-	0.5	0.6	0.6
			USFWS	-	1.8	1.8	1.8
	OR Coast	N. Spring	ODFW	-	0.4	0.5	0.6
		S. Spring	ODFW	-	2.2	2.1	2.1
		Fall	ODFW	-	2.7	2.6	2.6
	Total Chinook			**14**	**117.7**	**116.2**	**114.4**

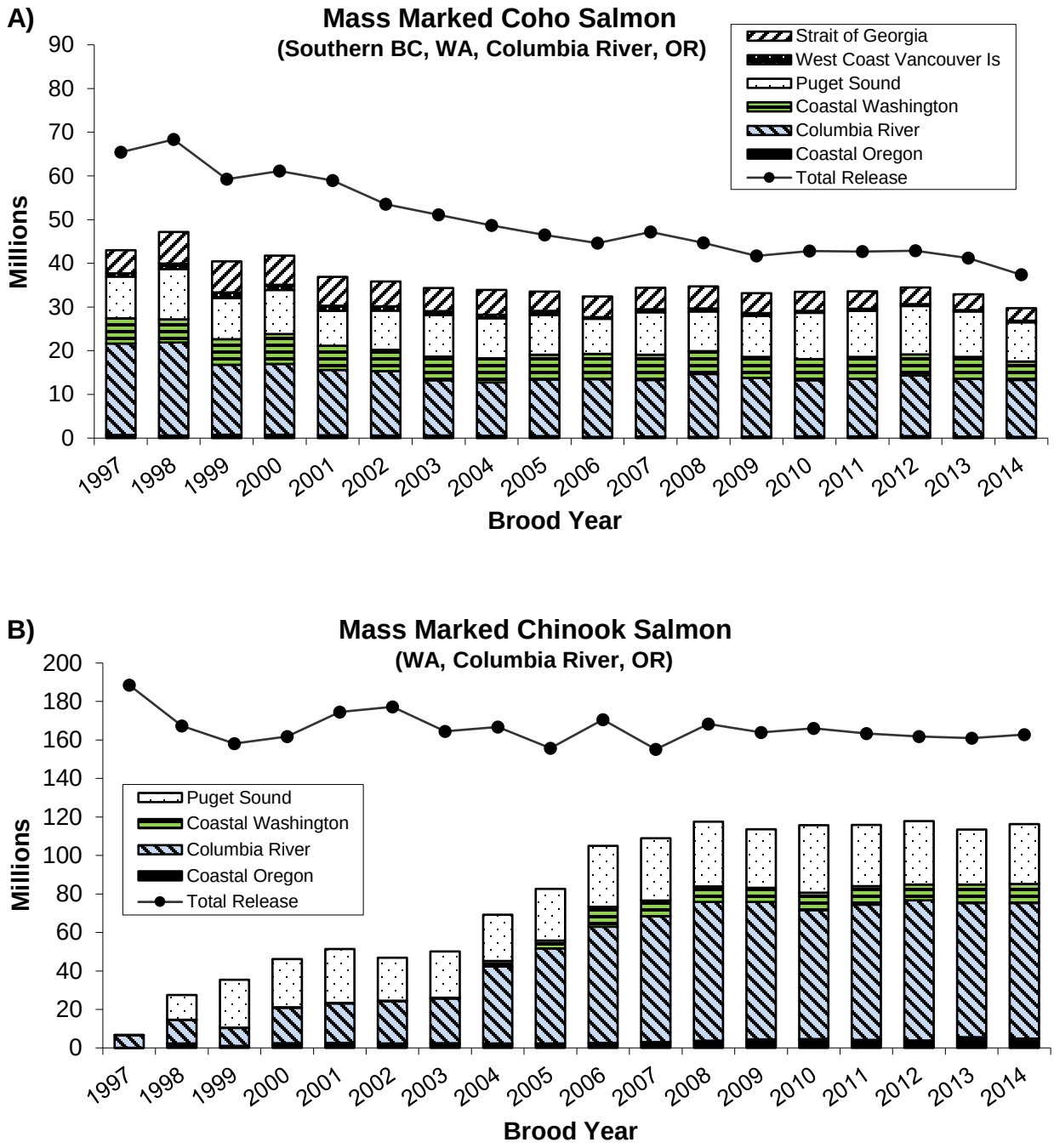

Figure 2-1. Number of mass marked Coho (panel A) and Chinook salmon (panel B) released by region, brood years 1997–2014. The solid line represents total hatchery releases by brood year with the exception that fry releases of Coho are not included. Data downloaded from RMIS on May 15, 2018.

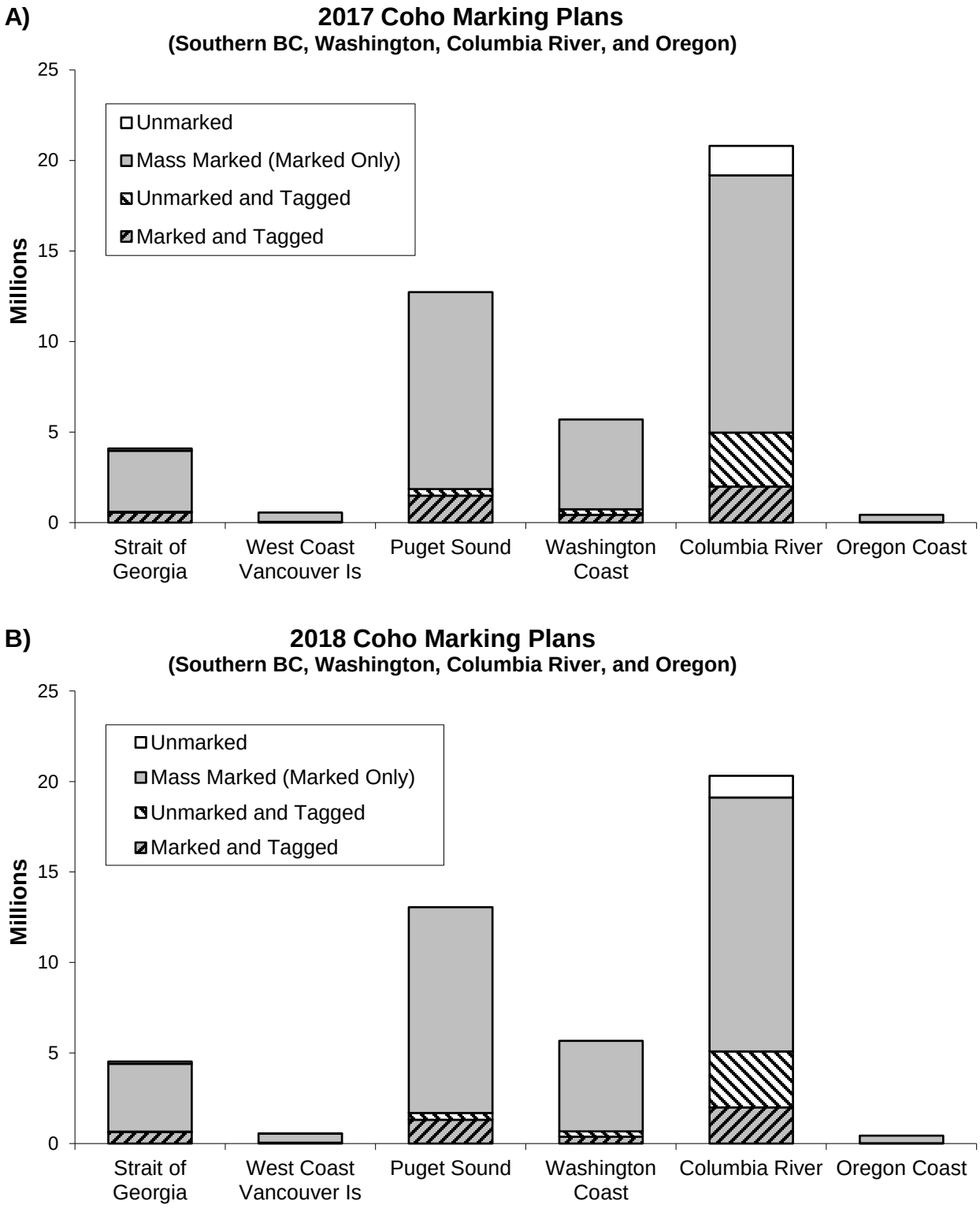

Figure 2-2. Projected Coho Salmon marking plans, by region and mark status, for 2017 (Panel A) and 2018 (Panel B).

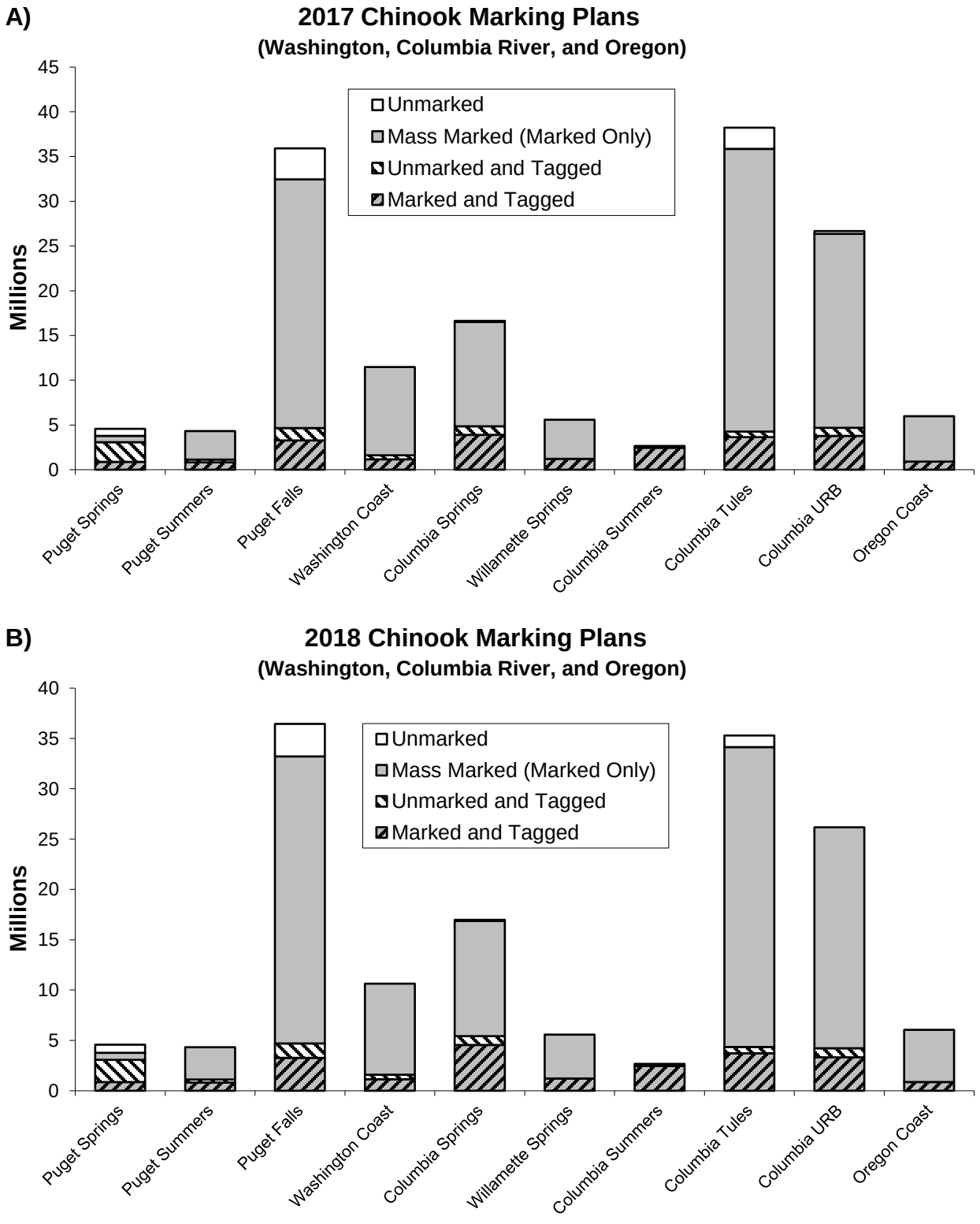

Figure 2-3. Projected Chinook Salmon marking plans, by region and mark status, for 2017 (Panel A) and 2018 (Panel B).

2.3 Double-Index-Tag Groups

Double-index-tag groups provide information necessary for direct estimation of total MSF impacts on unmarked fish. Appendix B and Appendix C list the Coho and Chinook salmon PSC indicator stocks, including those that are DIT groups. Currently, there are 15 proposed Coho Salmon DIT groups (Table 2-1), of which one 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), of which seven are from Puget Sound facilities, two from WA coastal facilities, and one spring and three fall stocks from Columbia River facilities.

Washington Department of Fish and Wildlife has maintained DIT groups for both species, but the number of DIT groups outside WA has declined over the years (Figure 2-4). As new MSFs are being proposed both in BC and in the Columbia River for fall Chinook, further evaluation of the DIT programs is needed.

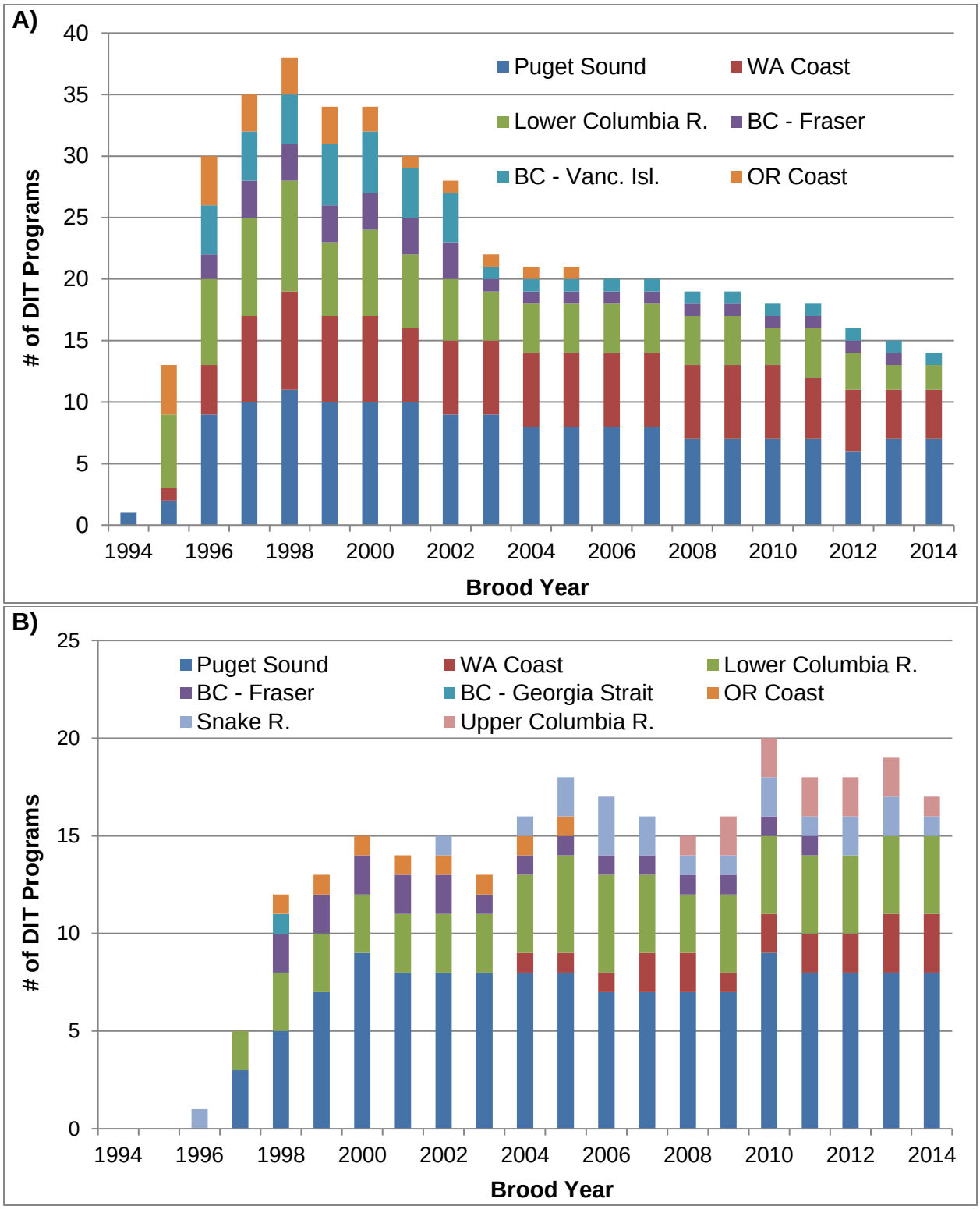

Figure 2-4. Total number of Coho (panel A) and Chinook (panel B) salmon CWT DIT programs by region, over brood years 1994–2014. Data pulled from RMIS May15, 2018.

2.4 Fishery and Escapement 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 and large numbers of heads without tags will be processed unnecessarily in non-selective fisheries. 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 CWT sampling methods for Coho and Chinook salmon 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. However, ADFG plans to sample unmarked fish for CWTs at a rate of 10% for troll fisheries in 2017 and 2018 and begin sampling unmarked fish for CWTs in the sport fishery. In BC, OR, and the Columbia River the situation is complex, where sampling methods depend on species, location, and the type of fishery.

Table 2-2. Proposed fishery sampling methods for tagged Coho Salmon in 2017 and 2018.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial	Electronic/ Visual	
	Sport	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	Electronic	
	Sport	Electronic	
Washington Coast	Commercial	Electronic	
	Sport	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	Electronic	
	Sport	Electronic	
California	Commercial	Visual	
	Sport	Visual	

Table 2-3. Proposed fishery sampling methods for tagged Chinook Salmon in 2017 and 2018.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial	Electronic/Visual	Plans to sample unmarked fish for CWTs at a rate of 10% for troll fisheries in 2016.
	Sport	Visual	Plans to test the feasibility of sampling unmarked fish for CWTs in 2017 in selected ports and expand coverage in 2018.
Northern BC	Commercial	Electronic	All Chinook are now electronically sampled and all tags are decoded (this has been the case since 2007).
	Sport	Visual (Voluntary)	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	Electronic	
	Sport	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	Electronic	
	Sport	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	Electronic	
	Sport	Electronic	
Washington Coast	Commercial	Electronic	
	Sport	Electronic	
Oregon Coast	Commercial	Electronic	
	Sport	Electronic	
Columbia River	Commercial	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.

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Table 2-3. (Page 2 of 2) Proposed fishery sampling methods for tagged Chinook Salmon in 2017 and 2018.

Region	Fishery	Type of Sampling	Comments
Columbia River	Sport	Electronic/Visual	Spring Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. Fall and Summer Chinook are visually sampled by Washington. CWT recoveries from unmarked Fall and Summer Chinook will be incomplete. The Buoy 10 fishery is electronically sampled.
California	Commercial Sport	Visual Visual	

Alaska Department of Fish and Game continues to be concerned about the large numbers of marked 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 a high of 70% in 2014 (Figure 2-5). The increased cost to deal with the additional marked fish is not quantified, but impacts the Alaska CWT 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 implemented the electronic screening of marked fish encountered in their sampling programs. Currently this method is being employed in the commercial troll Chinook fisheries and has recently been expanded to include the sport fishery and approximately half of the seine and gillnet fisheries.

Canada relies on voluntary recoveries of marked Coho and Chinook salmon 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 and Table 2-3). As in AK, the CDFO Sport Head Recovery Program 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 Salmon landed by ice or day boats in the northern BC troll fishery are not subject to electronic sampling. In that fishery, Coho Salmon 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 Chinook and Coho salmon. Fall Chinook Salmon (August–October) fisheries (commercial and sport) are visually sampled (only adipose-fin clipped fish are electronically screened to determine if CWT are present), except for the Buoy 10 sport fishery in the estuary where electronic sampling has been implemented.

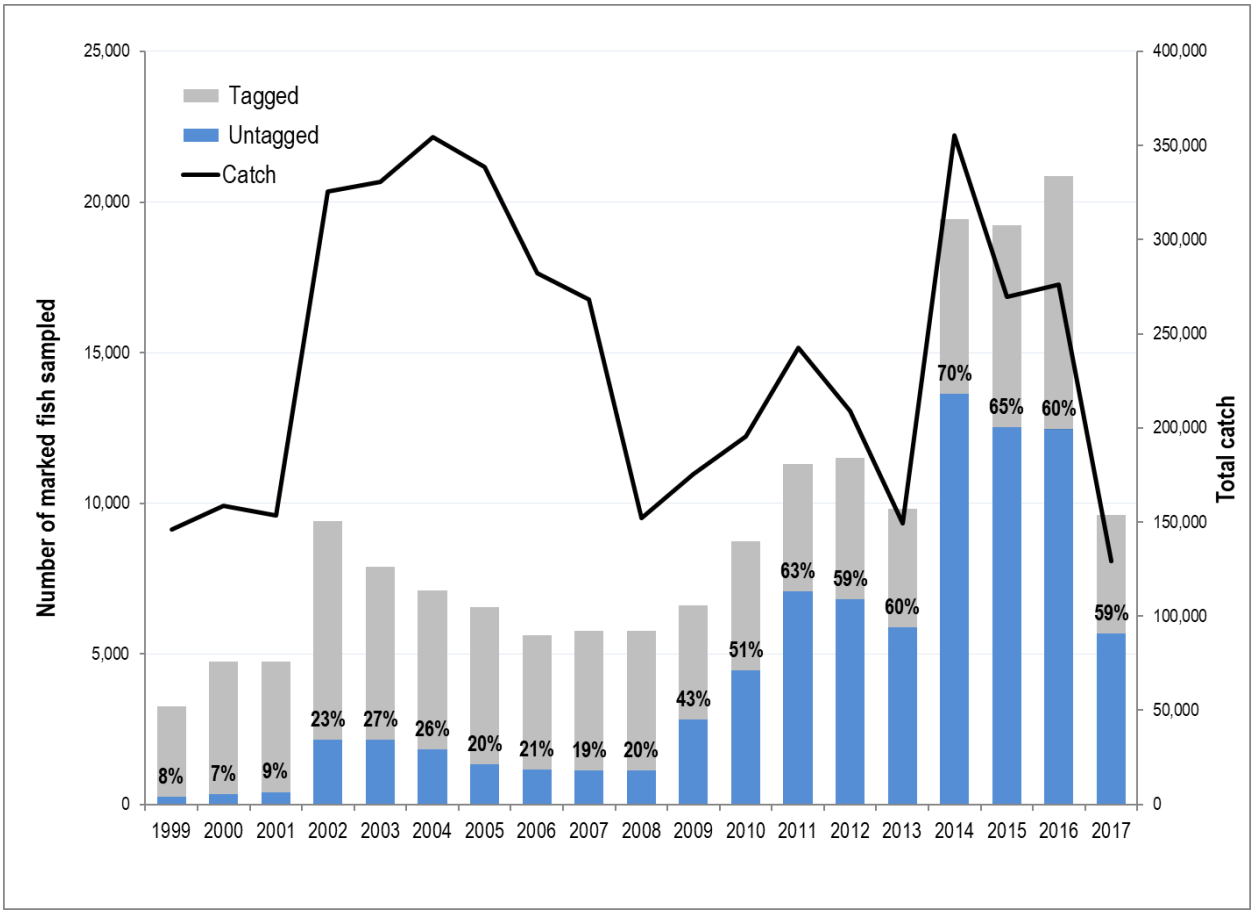

Figure 2-5. Numbers of marked Chinook Salmon sampled in Alaska's troll fishery and annual catch, 1999–2017. The bars represent the untagged (blue) and tagged (gray) marked fish sampled (left vertical axis) and the black line represents the number of fish caught (right vertical axis).

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 sample CWTs in both the sport and commercial troll Chinook and Coho salmon fisheries that occur off the coast of Oregon. In the event of large returns of Sacramento and Klamath River fall Chinook Salmon, combined with the 25% fractional marking program in CA, electronic sampling of the southern commercial troll fisheries could be impacted and visual sampling may be implemented in lieu of decreasing the overall sample rate.

The Oregon ocean sport Chinook Salmon 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 Salmon 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 Salmon and mark-selective for Coho Salmon North of Cape Falcon. From Cape Falcon southward to the OR/CA border, the commercial Chinook Salmon fishery is non-selective. Coho Salmon retention in the commercial troll fishery is prohibited from Cape Falcon to the OR/CA border.

3 REVIEW OF MARK-SELECTIVE FISHERY PROPOSALS

3.1 Mark-Selective Fishery Proposals Received

Mark-selective fisheries (MSFs) have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003 (Table 3-1; Appendix D). For the 2017 fishery season, the SFEC received a total of 64 MSF proposals for Coho and Chinook salmon. For the 2018 fishery season, the SFEC received a total of 68 MSF proposals for Coho and Chinook salmon. 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. Five new MSFs were proposed for 2017 and an additional four new MSFs were proposed for 2018. 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; Figure 4-1 through Figure 4-4).

3.1.1 Coho Salmon MSFs

In 2017, 24 proposals were received for Coho Salmon MSFs, of which one was new. In 2018, 25 proposals for Coho Salmon MSFs were received, of which one was new (Table 3-1; Appendix D). The SFEC received five proposals from CDFO for ongoing Coho Salmon MSFs in Canadian waters, including two in the lower Fraser River and four in southern BC; each proposal contained a variety of fishery openings distinguished by regulation variations. A total of 11 Coho Salmon MSF proposals were submitted from WDFW for 2017 with an additional proposal submitted in 2018. Of the 12 proposals that WDFW submitted for 2018, seven were for freshwater locations and five for marine waters. There were five Coho proposals from ODFW in both 2017 and 2018, including three marine and two freshwater fisheries. Three ODFW/WDFW joint Coho Salmon MSF proposals for the Columbia River were also received.

3.1.2 Chinook Salmon MSFs

Forty proposals were received for Chinook Salmon MSFs occurring in 2017 (Table 3-1; Appendix D). These included one proposal from Alaska (ADFG), one proposal from CDFO, 27 from WDFW, six from ODFW, and five submitted jointly by ODFW and WDFW. Forty-three proposals were received for Chinook Salmon MSFs occurring in 2018. These included three proposals from Alaska (ADFG) of which two were new, one proposal from CDFO, 27 from WDFW, one new proposal from Lummi Nation, five submitted jointly by ODFW and WDFW, and six from ODFW. No proposals were received from Idaho (IDFG) for 2017 or 2018. The Canadian proposal was for an ongoing (since 2008) sport fishery located in the Strait of Juan de Fuca subareas. Of the 27 WDFW proposals, the number of proposals per WA location were as follows: eight in the freshwater systems of Puget Sound; two in Puget Sound marine waters; one in the marine waters off the WA coast; three in Willapa Bay or its tributaries; one commercial and two sport MSFs in Grays Harbor or its tributaries; two ongoing MSFs in WA coastal river systems (Hoh and Quillayute rivers); two in the Snake River; one in the Columbia River between Priest Rapids and Chief Joseph dams; and one each in the Yakima, the lower Grand Ronde, Wenatchee, Entiat, and Chelan river. In addition, five Chinook Salmon MSF proposals were submitted jointly by WDFW and ODFW for fisheries planned in the Columbia River. Lummi Nation submitted a new proposal for a Treaty net fishery on the Nooksack River. Oregon submitted six proposals for Chinook Salmon MSFs – two ongoing in the Willamette River and four coastal fisheries.

Table 3-1. Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for catch years 2014 through 2018.

"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 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, blank cells indicate the MSF was neither proposed nor conducted in a given year.

Fishery Name	SFEC Proposal ID	Catch Year[1, 2]				
		2014	2015	2016	2017	2018
Coho Salmon						
Sport, Southern BC marine	MSF-FOC-02	PFR	PFO	PFO	PFO	P
FSC, Lower Fraser R	MSF-FOC-03	PFR	PFO	PFO	PFO	P
Commercial, Southern BC marine	MSF-FOC-05	PFR	PFO	PFO	PFO	P
Sport, Lower Fraser R	MSF-FOC-06	PFR	PFO	PFO	PFO	P
Sport, BC South Coast Freshwater	MSF-FOC-09	XFO	PFO	PFO	PFO	P
Sport, WA Areas 1–4 and Buoy 10	MSF-WDFW-06	PFR	PFR	PFR	PFO	P
Sport, Puget Sound Areas 5–13	MSF-WDFW-07	PFO	PFO	PFO	PFO	P
Commercial, WA Areas 1–4	MSF-WDFW-15	PFR	PFR	PX	PFO	P
Sport, Nooksack R	MSF-WDFW-18			XFO	XFO	P
Sport, Willapa tributaries	MSF-WDFW-22	PFO	PFO	PFO	PFO	P
Sport, Grays Harbor Area 2.2	MSF-WDFW-23	PFO	PFO	PFO	PFO	P
Sport, Grays Harbor tributaries	MSF-WDFW-24	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1	MSF-WDFW-29	PFO	PFO	PFO	PFO	P
Sport Quillayute R	MSF-WDFW-31a	PFO	PFO	PFO	PFO	P
Sport Solduc R	MSF-WDFW-31b				PFO	P
Sport, Skagit R	MSF-WDFW-40	PFO	PFO	PFO	PX	P
Sport, Samish R	MSF-WDFW-41	PX	PFO	PFO	PFO	P
Sport, Oregon Coast[4]	MSF-ODFW-03	PFR				
Sport, below Willamette Falls	MSF-ODFW-05	OFR	PFR	PFR	PFO	P
Sport, Sandy River and tributaries to mouth of Salmon River	MSF-ODFW-06	XFO	PFR	PFR	PFO	P
Commercial, Leadbetter Pt to Cape Falcon	MSF-ODFW-08	XFO	PFR	PFR	PFO	P
Sport, Cape Falcon to the OR/CA border[3]	MSF-ODFW-10		PFR	PFR	PFO	P
Sport, Leadbetter Pt to Cape Falcon[3]	MSF-ODFW-12		PFR	PFR	PFO	P
Sport, Lower Columbia R	MSF-ODFW/WDFW-04	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) tangle net	MSF-ODFW/WDFW-06	PFO	PFO	PFO	PX	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) seine	MSF-ODFW/WDFW-08	PX	PFO	PFO	PX	P

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Table 3–1. (Page 2 of 3) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for catch years 2014 through 2018.

Fishery Name	SFEC Proposal ID	Catch Year[1, 2]				
		2014	2015	2016	2017	2018
Chinook Salmon						
Commercial, Coho-directed, SE Alaska	MSF-ADFG-01		PX	PFR	PFR	P
Commercial, Chinook-directed, SE Alaska	MSF-ADFG-02					P
Sport, SE Alaska	MSF-ADFG-03					P
Sport, Strait of Juan de Fuca subareas, BC	MSF-FOC-07	PFO	PFO	PFO	PFO	P
Sport, Skykomish R (summer run)	MSF-WDFW-01	PFO	PX	PFO	PFO	P
Sport, Yakima R (spring run)	MSF-WDFW-03	PFO	PFO	PFO	PFO	P
Sport, Lower Snake R (fall run)	MSF-WDFW-05	PFO	PFO	PFO	PFO	P
Sport, Carbon & Puyallup R (fall run)	MSF-WDFW-09	PFO	PFO	PFO	PFO	P
Sport, Upper Skagit R (spring run)	MSF-WDFW-12	PFO	PFO	PFO	PFO	P
Sport, Nooksack R (fall run)	MSF-WDFW-13	PFO	PFO	PFO	PFO	P
Sport, Nisqually R (fall run)	MSF-WDFW-14	PFO	PFO	PFO	PFO	P
Sport, WA areas 1-4	MSF-WDFW-19	PFR	PFR	PX	PX	P
Sport, Skokomish R (fall run)	MSF-WDFW-20	PFO	PFO	PX	PX	P
Commercial, Willapa Bay	MSF-WDFW-25	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1	MSF-WDFW-26	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay tributaries (fall run)	MSF-WDFW-27	PFO	PFO	PFO	PFO	P
Sport, Snake R (spring run)	MSF-WDFW-28	PFO	PFO	PFO	PFO	P
Sport, Quillayute R (spring/summer run)	MSF-WDFW-32	PFO	PFO	PFO	PFO	P
Sport, Hoh R	MSF-WDFW-33	PFO	PFO	PX	PX	P
Sport, Puget Sound Areas 5–13, summer[4]	MSF-WDFW-35	PFR	PFR	PFR	PFO	P
Sport, Puget Sound Areas 5–13, winter[5]	MSF-WDFW-36	PFR	PFR	PFR	PFO	P
Sport, Snohomish R (summer run)	MSF-WDFW-37	PX	PX	PX	PX	P
Commercial, Grays Harbor areas 2A,2B,2C,2D	MSF-WDFW-38	PFO	PFO	PFO	PFO	P
Sport, Lower Grand Ronde R (spring run)	MSF-WDFW-39	PX	PX	PX	PX	P
Sport, Columbia R., Priest Rapids Dam upstream to Chief Joseph Dam	MSF-WDFW-42			PFO	PFO	P
Sport, Wenatchee R., mouth to Leavenworth	MSF-WDFW-43			PFO	PFO	P
Sport, Entiat R., mouth to Entiat NFH	MSF-WDFW-44			PFO	PFO	P
Sport, Chelan R., mouth to powerhouse	MSF-WDFW-45			PFO	PFO	P
Sport, Grays Harbor	MSF-WDFW-46				PX	P
Sport, Grays Harbor tributaries	MSF-WDFW-47				PFO	P
Sport, Green R (fall run)	MSF-WDFW-48				PX	P

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Table 3–1. (Page 3 of 3) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for catch years 2014 through 2018.

Fishery Name	SFEC Proposal ID	Catch Year[1, 2]				
		2014	2015	2016	2017	2018
Chinook Salmon (continued)						
Sport, Willamette R (spring run)[6]	MSF-ODFW-01	PFR	-	-	-	-
Sport, Oregon coast (fall run)	MSF-ODFW-02	PFR	PFR	PFR	PFO	P
Sport, Willamette R (spring run)[6]	MSF-ODFW-04	PFO	PFO	PFO	PFO	P
Sport, Sandy R (spring run)	MSF-ODFW-07	XFO	PFO	PFO	PFO	P
Commercial, Oregon coast (spring run)	MSF-ODFW-09	XFO	PFO	PFO	PFO	P
Sport, Oregon coast (spring run)	MSF-ODFW-11	XFO	PFO	PFO	PFO	P
Sport, Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries[6]	MSF-ODFW-13			PFR	PFO	P
Sport, Lower Columbia R (spring run)	MSF-ODFW/WDFW-01	PFO	PFO	PFO	PFO	P
Sport, Columbia R (summer run)	MSF-ODFW/WDFW-02	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (spring run)	MSF-ODFW/WDFW-03	PFO	PFO	PFO	PX	P
Sport, Columbia R (fall run)	MSF-ODFW/WDFW-05	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock)	MSF-ODFW/WDFW-07	PFX	PFX	PFX	PX	P
Treaty net, Nooksack R. (Spring Run)	MSF-LUMM-01	XFO	XFO	XFO	XFO	P
Sport, Snake R (fall run)	MSF-IDFG-04	PFO	PFO	XFO	XFO	-
Treaty net, Puget Sound Area 13		-	XFO	-	-	-
Treaty net, Nisqually River		XFO	XFO	-	-	-

[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] MSF-ODFW-10 and MSF-ODFW-12 replaced proposal MSF-ODFW-03 in 2015.

[4] MSF-WDFW-35; combines proposals MSF-WDFW-02 and -11 as of 2012.

[5] MSF-WDFW-36; replaces MSF-WDFW-16 as of 2012; old proposal 08 [Area 8-1/8-2 Winter MSF] combined into 16 in 2007

[6] Proposals MSF-ODFW-13 and MSF-ODFW-04 replaced MSF-ODFW- 01 in 2015 because of differing regulations above and below Willamette Falls.

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.	

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Table 3-2. (Page 2 of 4) 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.

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Table 3-2. (Page 3 of 4) 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 made.		

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Table 3-2. (Page 4 of 4) 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.		

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Table 3-3. Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons, for which proposals were submitted by agencies in 2016 and 2017 (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
Coho Salmon												
MSF-FOC-02	BC Management Areas 11–29, outer areas of 121–127	Pre-terminal and Terminal Sport (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 Sport (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. This is an issue in mixed bag fisheries where unmarked fish can be retained. 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-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 non-viable 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 23–27, 121–127	Pre-terminal Commercial (MSF)	1	1	2	1	1	1	1	1		Total catch is from fisher reported log books and phone-in catch reports.

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Table 3-3. (Page 2 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-FOC-06	BC South Coast Freshwater	Terminal Sport (MSF)	1	2	2	1	2	2,4	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. Low CWT submission rates.	Total catch using creel surveys in some areas and times. No catch estimate for area/times with no creel.
MSF-FOC-09	BC South Coast Freshwater	Terminal Sport (Mixed Bag)	3	2	2	1	1	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. This is an issue in mixed bag fisheries where unmarked fish can be retained. Low CWT submission rates.	Total catch using creel surveys in some areas and times. No catch estimate for area/times with no creel.
MSF-WDFW-06	Ocean Areas 1–4 & Col R Buoy 10	Sport	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	Sport	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.

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Table 3-3. (Page 3 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-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-18	Nooksack R	Sport	1	3	NA	3	2	2	3	0	New proposal for 2018. Indirect CWT sampling via electronic sampling of escapement.	Total retained 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-22	Willapa Tributaries including North,Smith Creek, Willapa, Niawiakum, Palix, Nemah, Naselle, Bear	Sport	3	3	1	3	2	2	0	0	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Indirect CWT sampling via electronic sampling of escapement.	Total retained 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-23	Grays Harbor, Marine Area 2.2	Sport	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 retained catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery.

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Table 3-3. (Page 4 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-24	Grays Harbor tributaries	Sport	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 retained 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	Sport	1	1	1	1	1	2	1	1	CWT estimation issues are similar to those of MSF regular.	Angler surveys and VTRs to get mark rate and sublegal proportion. Direct electronic sampling for CWTs.
MSF-WDFW-31a	Quillayute R system (Bogachiel, Calawah, Dickey, Quillayute, Sol Duc)	Sport February through August.	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-31b	Quillayute R system (Bogachiel, Calawah, Dickey, Quillayute, Sol Duc)	Sport September through November. Mixed bag.	3	3	1	3	3	2	1	1	New for 2017. 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.

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Table 3-3. (Page 5 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-40	Skagit River	Sport (Four fish no more than two may be wild)	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 River	Sport (2 fish release wild Coho)	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-03	Oregon Coast from Leadbetter Pt to CA border	Sport	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.

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Table 3-3. (Table 6 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-05	Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries	Sport	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	Sport	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.

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Table 3-3. (Page 7 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-10	From Cape Falcon, OR to the OR/CA border.	Sport	1	1	1	1	1	2	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.
MSF-ODFW-12	From Leadbetter Pt, WA to Cape Falcon, OR	Sport	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.
MSF-ODFW / WDFW-04	Columbia R, Mouth upstream to Hood R Bridge, includes Buoy 10	Sport	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.
MSF-ODFW / WDFW-06	Columbia R, Mouth upstream to Bonneville Dam	Commercial Tanglenet	1	1	1	1	1	2	1	1	There is a question of how total releases are estimated and where reported.	Random onboard monitoring will record encounters by mark and size status. Retained catch estimates from fish tickets.
MSF-ODFW / WDFW-08	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.	

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Table 3-3. (Page 8 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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												
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-ADFG-02	Southeast Alaska areas normally open during summer CNR fishery	Commercial Troll	1	1	2	1	1	2	1	1	New for 2018. 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-ADFG-03	Southeast Alaska	Sport	1	1, 3	2	1, 2	1	2	1	1	New for 2018. Creel sampling will only cover peak fishing period; the unsampled portion of the year is of concern to SFEC. SFEC would recommend the use of ETD in NSFs.	Estimated by catch sampling/creel survey program
MSF-FOC-07	BC Strait of Juan de Fuca and WCVI, Areas 19–1 to 6, 18–4 and 20–5	Pre-terminal Sport (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

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Table 3-3. (Page 9 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-01	Skykomish River (mouth to Wallace River)	Sport	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.
MSF-WDFW-03	Yakima River	Sport	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)	Sport	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	Sport	1	3	1	2	1	2	NA	NA	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.

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Table 3-3. (Page 10 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-12	Upper Skagit River (Spring Chinook)	Sport	1	3	1	2	1	2	1	1	Due to lack of direct sampling CWT, ETD sampling at hatchery will be used for indirect estimates of CWTs impacted. If CWTs are surveyed in the fishery, then a direct estimate would be made using CRC estimates. Release by anglers interviewed 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	Sport	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.
MSF-WDFW-14	Nisqually River	Sport	1	3	1	2	1	2	1	1	Creel surveys were conducted for 3 years but are no longer funded. 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	Sport	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) and day type (weekend or weekdays). On-water encounter rates (by mark status/size) obtained from charter ride-along trips and VTRs.

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Table 3-3. (Page 11 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-20	Skokomish River	Sport	1	3	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.
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	Sport (Mixed bag)	3	1,3	1	3	3	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. Sampling will not cover the whole period of the fishery

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Table 3-3. (Page 12 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-27	Willapa Tributaries (Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Sport (Mixed bag)	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.	Catch estimates from CRC. Mark rates and tag ratios from hatchery and spawning ground data.
MSF-WDFW-28	Lower Snake R (spring)	Sport	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)	Sport (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.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.
MSF-WDFW-33	Hoh River system	Sport (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.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.

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Table 3-3. (Page 13 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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)	Sport	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 Sound Areas 5–13 (winter)	Sport	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.)	Sport	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.
MSF-WDFW-38	Grays Harbor 2A, 2B, 2C, 2D	Commercial	1	1	1	1	1	1	1	1	Live boxes are used. Onboard observers record, the species, mark status and the condition of released fish as well as the retained catch by species.	Catch from fish tickets. Standard CWT estimates.

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Table 3-3. (Page 14 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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.	Sport	1	1	1	1	1	1	1	NA		Catch and mark rate estimated using creel survey. Sampling for CWTs using ETD; standard CWT estimation methods.
MSF-WDFW-42	Columbia R., Priest Rapids Dam upstream to Chief Joseph Dam	Sport	1	1	1	1	2	2	1	NA	Fishery was previously contained in MSF-WDFW/ODFW-02	Mark rate to be determined based upon a proxy at Bonneville and Wells Dam. Creel survey and CRC provide estimate of catch and CWT recoveries in fishery.
MSF-WDFW-43	Wenatchee R., mouth to Leavenworth	Sport	1	1	1	1	1	2	NA	NA		Mark rate to be determined based upon a proxy at Bonneville and Wells Dam. Creel survey and CRC provide catch estimates.
MSF-WDFW-44	Entiat R., mouth to ENFH	Sport	1	1	1	1	1	2	NA	NA		Mark rate to be determined based upon a proxy at Bonneville and Wells Dam. Creel survey and CRC provide catch estimates.
MSF-WDFW-45	Chelan R., mouth to powerhouse	Sport	1	1	1	1	1	2	NA	NA		Mark rate to be determined based upon a proxy at Bonneville and Wells Dam. Creel survey and CRC provide catch estimates.

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Table 3-3. (Page 15 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-46	Grays Harbor Marine Area 2.2	Sport	3	1,3	1	3	2	2	1	1	New for 2017. 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 retained catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery.
MSF-WDFW-47	Grays Harbor Tributaries including Chehalis, Humptulips, and Satsop	Sport	3	3	1	3	2	2	1	1	New for 2017. 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 retained 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-48	Green River	Sport	1	3	1	3	1	2	1	1	New for 2017. 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.	Total retained catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery.

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Table 3-3. (Page 16 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-02	Ocean Terminal areas (within 3 miles of the river mouth) Tillamook, Elk, and Chetco	Sport (fall run)	2	1	1	1	2	2	1	1	Mark mixed bag regulations present problems in estimating CWT mortalities. Fishery proposed for several years but not implemented.	At landing all fish are sampled as one stratum, MSF terminal and NSF cannot be separated.
MSF-ODFW-04	Willamette River and tributaries upstream of Willamette Falls to Dexter Dam	Sport (spring run)	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	Sport (spring run)	1	3	NA	3	1	3	1	NA	No CWT sampling, no creel, no count of released fish.	Catch estimates from CRCs. CWT composition from hatchery.

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Table 3-3. (Page 17 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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 (spring run)	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 (spring run)	1	1	1	1	1	1	1	1	Coho non-retention, mark and size selective for Chinook Salmon.	Dockside electronic sampling for CWTs and release information and catch estimation.
MSF-ODFW-13	Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries	Recreational (spring run)	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.
MSF-ODFW / WDFW-01	Columbia R, Mouth upstream to McNary Dam, and Ringold Hatchery Area	Sport (spring run)	1	1	1	1	1	2	1	1	Creel survey 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 above McNary Dam.	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.

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Table 3-3. (Page 18 of 18) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2017 and 2018 fishery seasons (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-02	Columbia R, Mouth upstream to Priest Rapids Dam	Recreational (summer run)	1	1	1	1	1	2	1	1	Inconsistent estimate of released fish throughout fishery.	Creel survey and CRC provide estimates of retained 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 Tangle net (spring run)	1	1	1	1	1	1	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.
MSF-ODFW / WDFW-05	Columbia R, Mouth upstream to McNary Dam, includes Buoy 10	Recreational (fall run)	1	1	1	1	1	2	1	1	Inconsistent count of released fish throughout fishery.	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-Lummi-01	Nooksack River	Tangle net C&S (spring run)	1	1	1	1	1	1	2	3	New proposal for 2018 for an on-going fishery. More detail requested in future proposals. Retaining all hatchery fish (marked and unmarked, but tagged fish). SFEC is concerned about the release mortality rate.	Standard methods used for CWT estimates.

3.3 Expected Encounters of CWT Indicator Stocks in MSFs

For 2018, MSFs are expected to occur in BC, WA, and OR at rates similar to recent years. Additional MSFs have been proposed for southeast AK sport and troll fisheries. Most, if not all, Coho Salmon indicator stocks from Southern BC, WA, OR, and the Columbia River are expected to be caught in proposed MSFs. For example, Figure 3-1 presents historical information on recoveries of marked Coho Salmon indicator stocks that have been encountered in previous MSFs. Mark-selective fisheries in terminal areas largely exploit local stocks. However, tagged fish from all regions are encountered in MSFs in the Strait of Juan de Fuca, southern BC, and WA and OR coastal areas.

In recent years, Chinook Salmon MSFs have occurred in the marine waters of southeast AK, BC, PS, WA, and OR coastal areas, and freshwater areas in Puget Sound and in the Columbia River; thus, a large number of indicator stocks are likely to be encountered in fisheries proposed for 2017 and 2018. Figure 3-2 presents a summary of CWT recoveries of BY 2001–2012 marked Chinook Salmon indicator stocks in MSFs. Stocks from Puget Sound and the Columbia River had the highest rate of CWT recoveries in MSFs, on average.

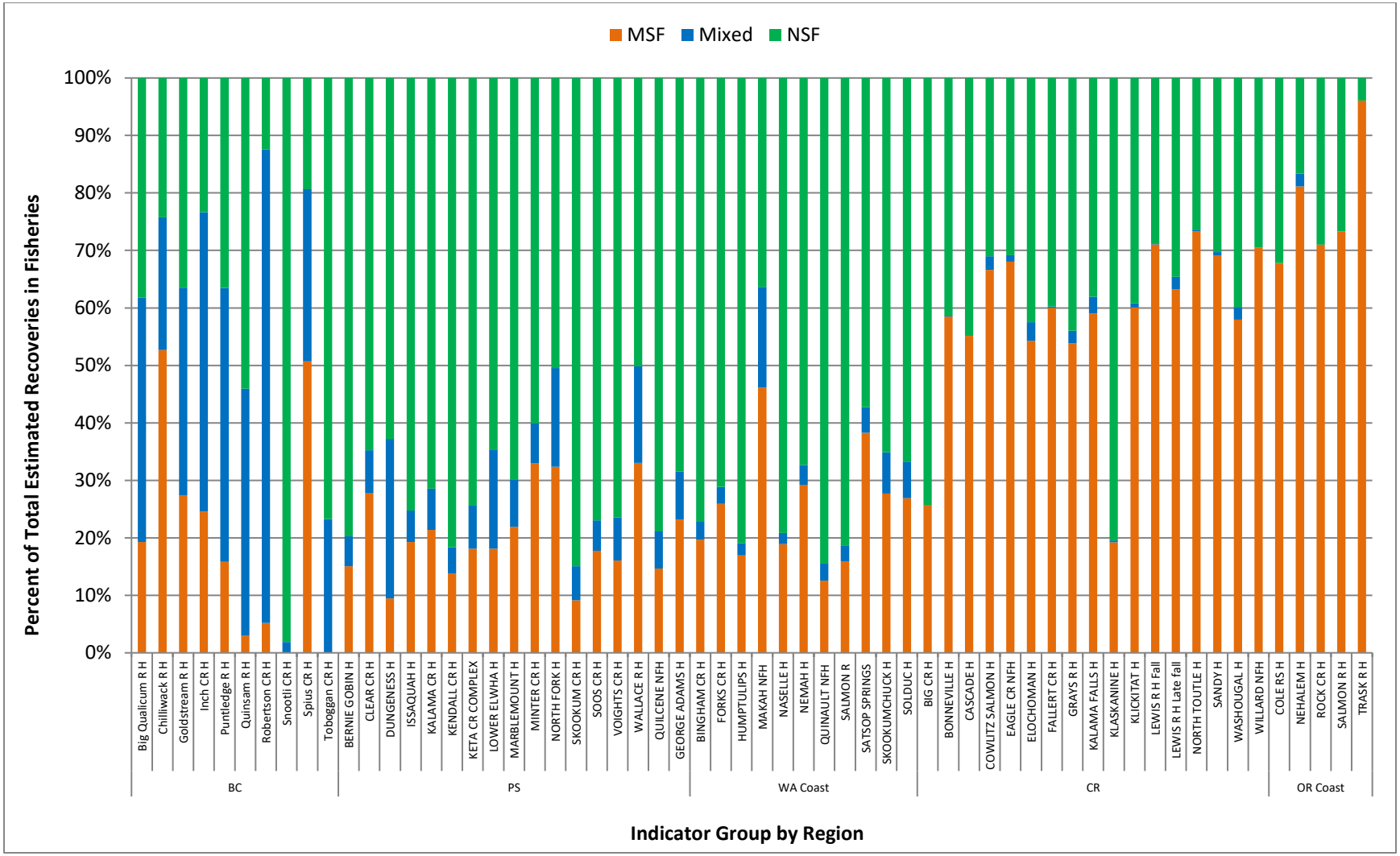

Figure 3-1. Proportion of total estimated CWT recoveries in fisheries from the marked component of Coho Salmon DIT groups by release hatchery that occurred in mark-selective fisheries (MSF), mixed-regulation fisheries (mixed), and non-selective fisheries(NSF) 1998–2012.

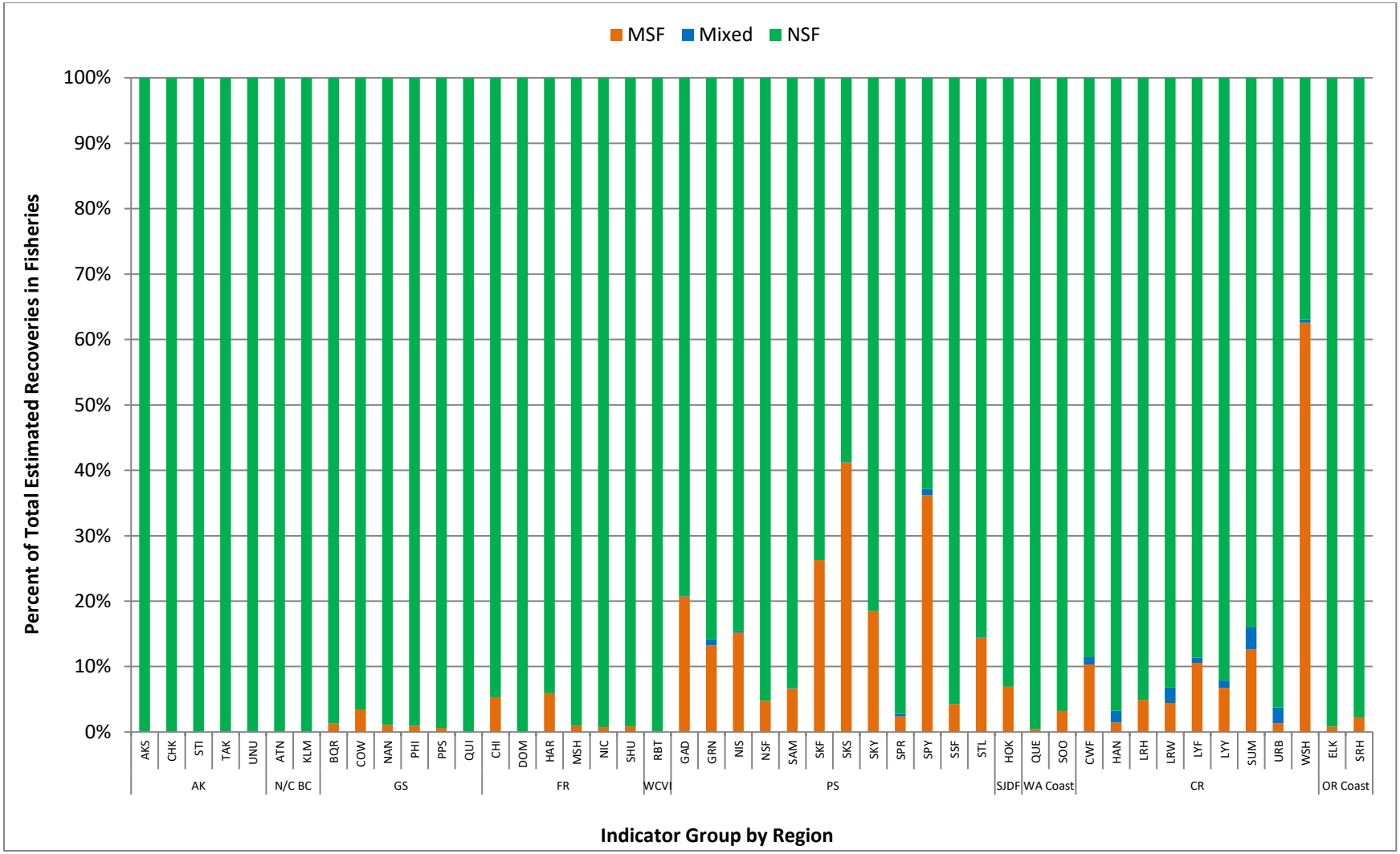

Figure 3-2. Proportion of total estimated CWT recoveries from the marked component of Chinook Salmon DIT groups by indicator group that occurred in mark-selective fisheries (MSF), mixed-regulation fisheries (mixed), non-selective fisheries(NSF), and escapement for brood years 2001–2012. See Appendix C for indicator stock names.

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, 2018 for fisheries proposed to occur in 2019. Although final decisions on fisheries are generally made by agencies after this time period (e.g., January–April of 2019 for 2019 fisheries), agencies should continue to submit MSF proposals 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. 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 tables on MSFs (see PSC website for current table templates). The first table should provide information on sampling methods used to recover CWTs in all fisheries and escapement locations, not just in the MSFs. This table has not typically been received. 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 second table provides post-fishery information on MSFs that have occurred, where and when they occurred, fishery regulations, what sampling occurred, and final estimates for both retained and released catch by mark status and size class. The information in these tables should be completed by the PSC post-season meeting of the year following the fishery year. For instance, reports on fisheries occurring in 2017–2018 should be available by the post-season meeting in 2019. This information has only been received for some fisheries, such as Puget Sound, Oregon Coastal, Lower Columbia River, and SE Alaska, but not for others.

Total fish retained and total mortalities by stock, fishery, and age are needed for estimating stock-specific impacts of MSFs. These data are also required by the MOU and have been requested each year for MSFs. This stock specific post-season information has only been provided for recreational Chinook MSFs in Puget Sound to date.

SFEC representatives have been stepping up efforts in recent years to coordinate with key staff within the agencies in order to meet these reporting requirements. Although the information may be available in larger agency reports, the SFEC needs agencies to submit the post-season MSF information using the report templates provided (see PSC website for current table templates), 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 B and Appendix C). 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 tripled in number since 2007, with new areas and stocks being fished under mark-selective regulations. It is recommended that agencies review their indicator stock programs in light of these newer 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 Salmon is reduced due to low tagging rates, insufficient Management Unit (MU) CWT 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 included in Figure 3-1. Several Coho Salmon MUs do not have DIT groups to permit independent estimation of impacts of MSFs (Appendix B). For example, Canada currently has a single DIT program (Quinsam River) for the four MUs in the treaty. Even where DIT programs have been implemented, the reliability of results is affected by low tagging rates, exploitation rates, and sample rates, as well as the lack of electronic tag detection throughout the migratory ranges of the MUs (CoTC 2013). Estimation of ERs or effects of MSFs on natural stocks requires the collection of CWTs from marked and unmarked DIT groups. Recoveries of unmarked and tagged fish have often been too low to provide statistically-robust estimates of non-landed mortalities in MSFs. In addition, 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 Salmon indicator stocks that have been encountered in mark-selective fisheries are illustrated in Figure 3-2. Many of these stocks encountered are currently double-index tagged (Appendix C). However, with the expansion of MSFs, additional DIT CTC indicator stock representation may be needed.

4.4 Chinook Salmon MSFs and Sampling Methods

Electronic tag detection (ETD) is necessary for detecting unmarked and tagged fish in fisheries and escapement. 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 implemented in Puget Sound where ETD is used for all fisheries. Electronic tag detection was not used consistently by CDFO in northern fisheries until 2007. In 2017 and 2018, Alaska intends to sample approximately 10% of unmarked fish from troll fisheries for CWTs and in selected ports for sport fisheries. As Puget Sound DIT groups were historically 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 widespread MSFs these indirect methods are no longer as reliable.

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. Mark-selective fisheries 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 continue to be proposed (see fishery regulation details in Table 3-2; and Figure 4-1 through Figure 4-4). 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.

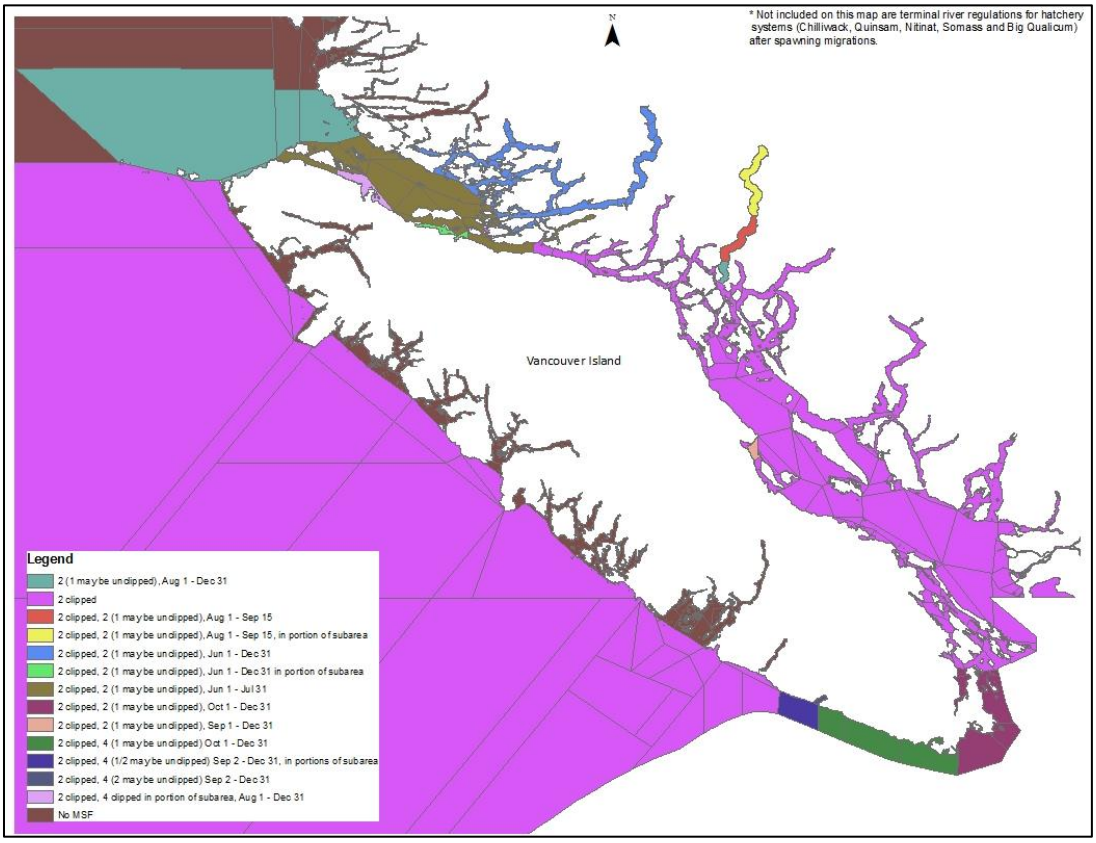

Figure 4-1. Proposed 2017 and 2018 bag limits for southern British Columbia Coho Salmon recreational fishery by PFMC Sub Area.

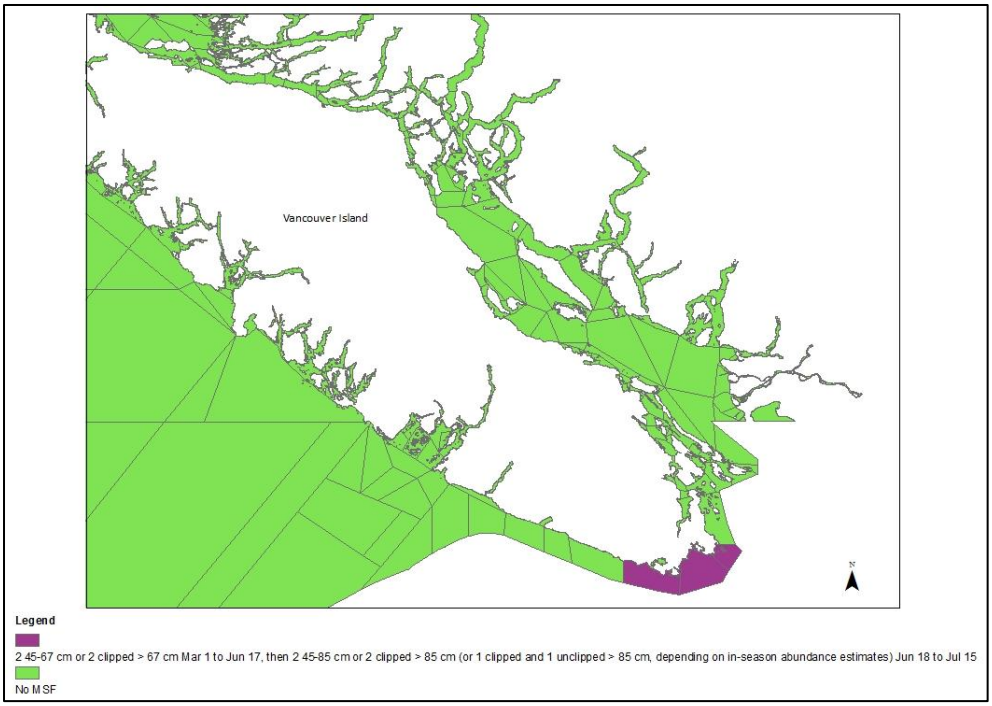

Figure 4-2. Proposed 2017 and 2018 bag limits for southern British Columbia Chinook Salmon recreational fishery by PFMC Sub Area.

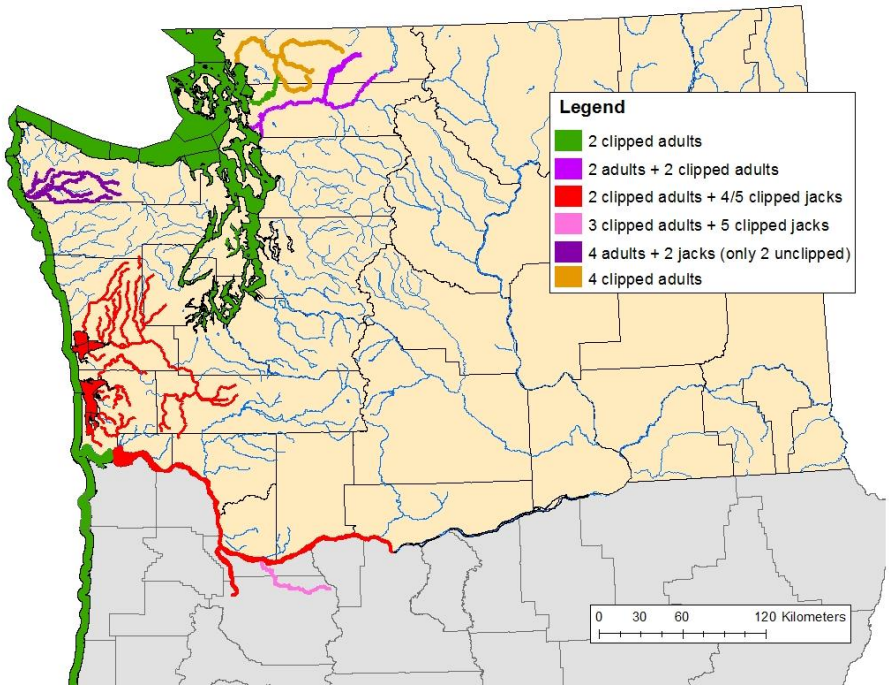

Figure 4-3. Proposed 2017 and 2018 bag limits for Coho Salmon mark-selective recreational fisheries in Washington and Oregon. Nooksack River mark-selective fishery was proposed in 2018 only. Quillayute River begins with a 2 clipped + 4 clipped jack

bag limit from February to August and switches to the displayed bag limits from September to December.

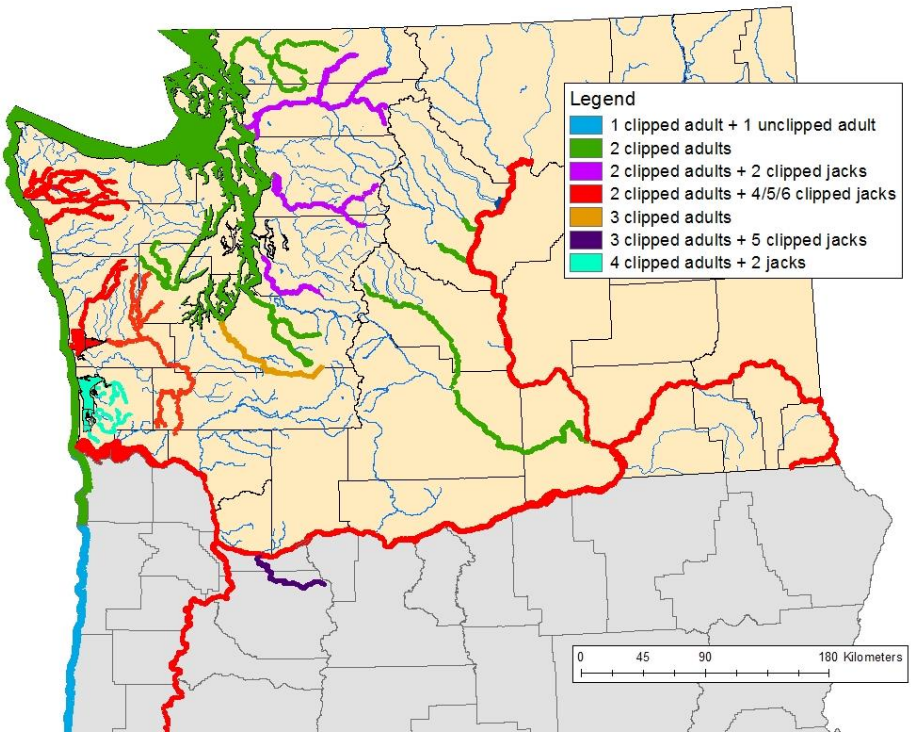

Figure 4-4. Proposed 2017 and 2018 bag limits for Chinook Salmon mark-selective recreational fisheries in Washington and Oregon. Bubble fisheries along the Oregon coast are small in area and not contiguous as is indicated in the figure.

4.6 Recommendations

Currently, annual post-season MSF data are only available directly from agencies and final estimates for past years are only being published for a few MSFs (e.g., Chinook MSFs in WDFW marine catch reporting areas 1-13 and Coho MSFs in marine areas 1–4). There is a need to make the information more readily available. A prototype online database with impact estimates and summarized CWT data for Chinook MSFs conducted in WDFW marine areas 1–13 was developed jointly by WDFW and the NWIFC. This database is no longer being maintained. To facilitate compilation and accessibility of post-season MSF data, SFEC recommends the PSC develop and maintain a similar database for both Coho and Chinook MSFs coastwide.

The SFEC recommends that agencies review their sampling methods with respect to the current expansion of MSFs into coastal fisheries. It is specifically recommended that ODFW and WDFW implement ETD for Columbia River fall Chinook to recover DIT release groups for Chinook exploitation rate indicator stocks.

5 REFERENCES

Alexandersdottir, M. *In prep*. Analyses of coho salmon DIT data for brood years 1998–2011.

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. Manuscript Series Report 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: http://www.rmpc.org/mass-marking-and-selective-fisheries-presentation.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: http://www.rmpc.org/mass-marking-and-selective-fisheries-presentation.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/download/44/selective-fishery-evaluation-technical-committee/2323/sfec12-1.pdf (May 2012).

6 APPENDICES

Appendix A. Status of Mass Marking Proposals Received in 2016 and 2017 for Mass Marking to Occur in 2017 and 2018.

Description of Proposal and Agency	New or Continuation Proposal	SFEC Proposal Number
Coho Salmon		
Southern BC Coho – CDFO	Continuation	MM-FOC-01-2017/8
Puget Sound Coho – WDFW/Tribal	Continuation	MM-WDFW-01-2017/8
Washington Coast Coho – WDFW/Tribal	Continuation	MM-WDFW-04-2017/8
Washington Columbia River Coho – WDFW/Tribal	Continuation	MM-WDFW-05-2017/8
Columbia River Coho – USFWS	Continuation	MM-USFWS-04-2017/8
Puget Sound and WA Coast Coho – USFWS	Continuation	MM-USFWS-18-2017/8
Columbia River Coho – ODFW	Continuation	MM-ODFW-04-2017/8
Oregon Coast Coho – ODFW	Continuation	MM-ODFW-05-2017/8
Chinook Salmon		
Columbia River Chinook – USFWS	Continuation	MM-USFWS-17-2017/8
WA Coast Fall Chinook – USFWS	Continuation	MM-USFWS-19-2017/8
Willamette River Spring Chinook – ODFW	Continuation	MM-ODFW-01-2017/8
OR North Coast Spring Chinook – ODFW	Continuation	MM-ODFW-02-2017/8
OR South Coast Spring Chinook – ODFW	Continuation	MM-ODFW-03-2017/8
Columbia River Fall Chinook – ODFW	Continuation	MM-ODFW-06-2017/8
OR Coast Fall Chinook – ODFW	Continuation	MM-ODFW-07-2017/8
Mid-Columbia R Spring Chinook – ODFW	Continuation	MM-ODFW-08-2017/8
Snake River Fall Chinook – ODFW[1]	Continuation	MM-ODFW-09-2017/8
Snake River Spring Chinook – ODFW	Continuation	MM-ODFW-10-2017/8

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

Puget Sound Chinook – WDFW/Tribal	Continuation	MM-WDFW-02-2017/8
Columbia R. Chinook – WDFW/CRITFC	Continuation	MM-WDFW-03-2017/8
Washington Coastal Chinook – WDFW/Tribal	Continuation	MM-WDFW-06-2017/8

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

Region	Stock Representation	Indicator Stocks	DIT (BY)
BC North Coast	North Coast Wild	Zolzap	
	Skeena	Toboggan	
Interior Fraser	Thompson River	Coldwater (Spius Hatchery) Eagle River	 (1997–2002)
Georgia Basin	East Coast Vancouver Island	Big Qualicum Goldstream River[1]	(1996–2002) (1996–2002)
	Lower Fraser	Chilliwack River (not indicator)	(1996–2002)
		Inch Creek	(1996–2013)
	North Vancouver Island	Quinsam River	(1996–current)
	North Vancouver Island Wild	Keogh	
West Coast Van Is.	West Coast Vancouver Island	Robertson Creek	(1996–2002)
Puget Sound	North Fork Nooksack R	Kendall Creek H Skookum Creek H. Lummi Bay Ponds	(1996–2007)
	Skagit	Skagit (Marblemount H.) Baker River Wild	(1994–current)
	Stillaguamish/Snohomish	Skykomish (Wallace River) Tulalip Bay (Bernie Gobin)	(1996–current)
	Mid Puget Sound	Green River (Soos Creek H.)	(1996–current)
	South Puget Sound	Puyallup (Voights Creek H.) Peale Pass (Squaxin Net Pens) Nisqually (Kalama Creek H.)	(1997–current)
	Hood Canal Wild	Big Beef Creek	
	North Hood Canal	Quilcene NFH Quilcene Net Pens Port Gamble Net Pens	(1996–current) (1996–2001) (1996–2003)
	South Hood Canal	George Adams H.	(1997–current)
	Dungeness	Dungeness H.	
	Strait of Juan de Fuca	Lower Elwha H.	(1995–current)
Washington Coast	North Coast	Makah NFH Solduc (fall run)	(1996–2010) (1996–current)
	North Central Coast	Queets Wild (Salmon River H.) Queets (Salmon R. Fish Culture)	 (1995–current)
	Quinault	Quinault NFH	(1996–2012)
	Grays Harbor	Chehalis R. Wild Satsop Springs Ponds Satsop (Bingham Cr. H, late) Satsop (Bingham Cr. H., early)	 (1997–current)
	Willapa Bay	Forks Creek H. (late fall run) Forks Creek H. Nemah River. H.	 (1997–current)
Columbia Basin	Lower Columbia River	Lewis River (Type N & Type S) Eagle Creek Sandy River Bonneville/Tanner Cr. Youngs Bay Net Pens Willard NFH	(1994/98–current) (1995–current) (1995–2008) (1996–2011) (1997–2001) (1996–2002)
Oregon Coast	Oregon South Coast	Rogue River (Cole Rivers)	(1995–2005)
		Rock Creek H.	(1995–1999)
	Oregon North Coast	Nehalem H.	(1995–2000)

[1] This stock has not been tagged since BY 2011.

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

Area	Natural/Unmarked Stock Representation	Exploitation Rate Indicator Stocks (CTC code)	Run Type	DIT (BY)
S.E. Alaska	Southeast Alaska	Taku (TAK) Stikine (STI) AK Hatcheries (AKS) Chilkat (CHK) Unuk (UNU)	Spring Spring Spring Spring Spring	
British Columbia	North/Central BC	Kitsumkalum (KLM) Atnarko (ATN)	Summer Summer	
	West Coast Vancouver Is	Robertson Creek (RBT)	Fall	
	Upper Georgia Strait	Quinsam (QUI) Phillips River (PHI)	Fall Fall	
	Lower Georgia Strait	Cowichan (COW) Nanaimo (NAN) Big Qualicum (BQR) Puntledge (PPS)	Fall Fall Fall Summer	(1998)
	Fraser River Early	Middle Shuswap (MSH) Lower Shuswap (SHU) Nicola (NIC) Dome (DOM)	Summer Summer Spring Spring	(1998–2002)
	Fraser River Late	Chehalis (Harrison Stock)[1] (CHI) Chilliwack (Harrison Stock) (HAR)	Fall Fall	 (1998–2011)
Puget Sound	North Puget Sound	Nooksack Spring Fingerling (NSF) Nooksack Spring Yearling (NKS) Samish Fall Fingerling (SAM) Skagit Spring Fingerling (SKF) Skagit Spring Yearling (SKS) Skagit Summer Fingerling (SSF) Skykomish Summer Fingerlings[2] (SKY) Stillaguamish Fall Fingerling (STL)	Spring Spring Summer/Fall Spring Spring Summer Summer Fall	(1998–2010) (1999–current) (1998–current) (1998–2010) (2000–current)
	Central Puget Sound	Green River Fall Fingerling (GRN)	Fall	(1997–current)
	Hood Canal	George Adams Fall Fingerling (GAD)	Fall	(1998–current)
	South Puget Sound	South Puget Sound Fall Fingerling (SPS) South Puget Sound Fall Yearling (SPY) White River Spring Yearling[3] (WRY) Nisqually Fall Fingerling (NIS)	Fall Fall Spring Fall	(1999–current) (1998–current)
Juan de Fuca	Juan de Fuca	Hoko Fall Fingerling (HOK)	Fall	
Washington Coast	North Washington Coast	Tsoo-Yess Fall Fingerling (SOO) Queets Fall Fingerling (QUE) Quinault Lake Fall Fingerling[2]	Fall Fall Fall	 (2004–current)
	Willapa Bay	Forks Creek Fall Fingerlings[2] Naselle River[2] Nemah River[2]	Fall Fall Fall	(2007–2015) (2013–2015) (2016–current)

~Continued~

[1] These stocks are CWT-tagged, but there is no quantitative CWT escapement data, useful for distribution only.

[2] DIT group not currently a CTC indicator stock.

[3] No longer adipose-fin clipped.

Appendix C. (Page 2 of 2) Current PSC Chinook Salmon CWT Exploitation Rate Indicator Stocks and DIT Groups.

Area	Natural/Unmarked Stock Representation	Exploitation Rate Indicator Stocks (CTC code)	Run Type	DIT (BY)
Columbia Basin	Falls	Cowlitz Tule (CWF)	Fall Tule	
		Spring Creek Tule (SPR)	Fall Tule	(2004–current)
		Little White Salmon[2]	Fall Bright	(2005–current)
		Lewis River Wild (LRW)	Fall Bright	
		Lower River Hatchery (LRH)	Fall Tule	(2006–2013)
		Mid-Columbia Brights (MCB)	Fall Bright	
		Lyons Ferry Fingerling (LYF)	Fall Bright	(2004–current)
		Lyons Ferry Yearling (LYY)	Fall Bright	
		Hanford Wild (HAN)	Fall Bright	
		Priest Rapids H (URB)	Fall Bright	(2009–current)
	Summers	Columbia Summers (SUM)	Summer	
	Springs	Willamette Spring (WSH)	Spring	(1997–2006)
		Lewis River Spring[2]	Spring	(1998–current)
Oregon Coast	North Oregon Coast	Salmon River (SRH)	Fall	
	Mid-Oregon Coast	Elk River Hatchery (ELK)	Fall	

Appendix D. Status of Annual Pre-season Proposals for Mark-Selective Fisheries.

Fishery, Location, Target Hatchery Stock by Agency[1]	Proposal ID[2]	Most Recent Proposal[3]	Years with MSF since 2003[4]
Alaska Department of Fish and Game			
Commercial, Coho-directed, SE Alaska	MSF-ADFG-01	2018	2016–2017
Commercial, Chinook-directed, SE Alaska	MSF-ADFG-02	2018	**New**
Sport, SE Alaska	MSF-ADFG-03	2018	**New**
Fisheries and Oceans Canada			
Sport, Southern BC, Coho	MSF-FOC-02	2018	2003–2017
FSC, Lower Fraser freshwater, Coho	MSF-FOC-03	2018	2006–2017
Commercial, Southern BC, Coho	MSF-FOC-05	2018	2005–2017
Sport, Lower Fraser freshwater, Coho	MSF-FOC-06	2018	2003–2017
Sport, Strait of Juan de Fuca, Chinook	MSF-FOC-07	2018	2009–2017
Sport, WCVI, selected subareas, mainly inside, Chinook	MSF-FOC-08	2011	none
Sport, BC South Coast Freshwater, Coho	MSF-FOC-09	2018	2014–2017
Washington Department of Fish and Wildlife			
Sport, Skykomish R, Chinook	MSF-WDFW-01	2018	2003–2014, 2016–2017
Sport, Yakima River, spring Chinook	MSF-WDFW-03	2018	2004, 2008, 2010–2015
Sport, L Snake River, fall Chinook	MSF-WDFW-05	2018	2008–2017
Sport, Washington coast areas 1-4 & Col R Buoy 10, Coho	MSF-WDFW-06	2018	2003–2017
Sport, Puget Sound, Coho	MSF-WDFW-07	2018	2003–2017
Sport, Carbon & Puyallup R, Chinook	MSF-WDFW-09	2018	2003–2017
Sport, Puget Sound Areas 9-13, summer Chinook	MSF-WDFW-11	2011	2007–2011
Sport, Upper Skagit R summer Chinook	MSF-WDFW-12	2018	2005–2017
Sport, Nooksack R, Chinook	MSF-WDFW-13	2018	2004–2017
Sport, Nisqually R, Chinook, Jul-Jan	MSF-WDFW-14	2018	2005–2017
Commercial, WA areas 1-4, Coho	MSF-WDFW-15	2018	2003–2015, 2017
Sport, Nooksack River, Coho	MSF-WDFW-18	2018	2003–2010, 2016–2017
Sport, WA Coast Area 1-4, fall Chinook	MSF-WDFW-19	2018	2010–2015
Sport, Skokomish River, Chinook	MSF-WDFW-20	2018	2010–2015
Troll, WA areas 1-4, Chinook	MSF-WDFW-21	2010	never
Sport, Willapa Bay, tributaries, Coho	MSF-WDFW-22	2018	2003–2017
Sport, Grays Harbor, Marine Area 2.2, Coho	MSF-WDFW-23	2018	2007–2017
Sport, Grays Harbor, tributaries, Coho	MSF-WDFW-24	2018	2003–2017
Commercial, Willapa Bay, Chinook	MSF-WDFW-25	2018	2010–2017
Sport, Willapa Bay, Marine Area 2.1, Chinook	MSF-WDFW-26	2018	2010–2017
Sport, Willapa Bay, tributaries, Chinook	MSF-WDFW-27	2018	2010–2017

Fishery, Location, Target Hatchery Stock by Agency[1]	Proposal ID[2]	Most Recent Proposal[3]	Years with MSF since 2003[4]
Sport, Snake River, spring Chinook	MSF-WDFW-28	2018	2010–2017
Sport, Willapa Bay, Marine Area 2.1, Coho	MSF-WDFW-29	2018	2010–2017
Commercial, Grays Harbor, Marine Area 2C, Coho	MSF-WDFW-30	2011	2009-2010
Sport, Quillayute River, Coho	MSF-WDFW-31	2018	2003–2017
Sport, Quillayute River system, spring summer Chinook	MSF-WDFW-32	2018	2003–2017
Sport, Hoh River, spring Chinook	MSF-WDFW-33	2018	2008–2015
Sport summer, WA areas 5-13, Chinook[5]	MSF-WDFW-35	2018	2003–2017[6]
Sport winter, WA areas 5-13, Chinook[7]	MSF-WDFW-36	2018	2005–2017[8]
Sport, Snohomish R., Chinook	MSF-WDFW-37	2018	never
Commercial, Grays Harbor areas 2A,2B,2C,2D, Chinook	MSF-WDFW-38	2018	2013–2017
Sport, Lower Grand Ronde, spring Chinook	MSF-WDFW-39	2018	never
Sport, Skagit R, Chinook	MSF-WDFW-40	2018	2013–2016
Sport, Samish R, Chinook	MSF-WDFW-41	2018	2009–2011, 2015–2017
Sport, Columbia R., Priest Rapids Dam to Chief Joseph Dam, Chinook	MSF-WDFW-42	2018	2016–2017
Sport, Wenatchee R., mouth to Leavenworth, Chinook	MSF-WDFW-43	2018	2016–2017
Sport, Entiat R., mouth to ENFH, Chinook	MSF-WDFW-44	2018	2016–2017
Sport, Chelan R., mouth to powerhouse, Chinook	MSF-WDFW-45	2018	2016–2017
Sport, Grays Harbor, Chinook	MSF-WDFW-46	2018	**New**
Sport, Grays Harbor tributaries, Chinook	MSF-WDFW-47	2018	2017
Sport, Green R, Chinook (fall run)	MSF-WDFW-48	2018	**New**
Oregon and Washington Departments of Fish and Wildlife (jointly for Columbia River)			
Sport, Lower Columbia R, spring Chinook	MSF-ODFW/WDFW-01	2018	2003–2017
Sport, Columbia R, summer Chinook	MSF-ODFW/WDFW-02	2018	2003–2017
Commercial, L. Columbia R, spring Chinook (large & tangle net)	MSF-ODFW/WDFW-03	2018	2003–2016
Sport, Lower Columbia R, Coho (since 1999)	MSF-ODFW/WDFW-04	2018	2003–2017
Sport, Columbia R., fall Chinook	MSF-ODFW/WDFW-05	2018	2011–2017
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), Coho[9]	MSF-ODFW/WDFW-06	2018	2013–2016
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), Chinook (Coho, secondarily)[10]	MSF-ODFW/WDFW-07	2018	2014–2016
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) seine, Coho	MSF-ODFW/WDFW-08	2018	2015–2016
Oregon Department of Fish and Wildlife			
Sport, Willamette R, Willamette spring Chinook[11]	MSF-ODFW-01	2014	2003–2014
Sport, Oregon Coast, fall Chinook	MSF-ODFW-02	2018	2008–2017
Sport, Oregon coast, Coho	MSF-ODFW-03	2014	2003–2014
Sport, upstream of Willamette Falls, spring Chinook	MSF-ODFW-04	2018	2015–2017
Sport, downstream of Willamette Falls, Coho	MSF-ODFW-05	2018	2003–2017

Fishery, Location, Target Hatchery Stock by Agency[1]	Proposal ID[2]	Most Recent Proposal[3]	Years with MSF since 2003[4]
Sport, Sandy River to mouth of Salmon River, Coho	MSF-ODFW-06	2018	2003–2017
Sport, Sandy R, spring Chinook	MSF-ODFW-07	2018	2003–2017
Commercial, Leadbetter Pt., WA to Cape Falcon, OR, Coho	MSF-ODFW-08	2018	2010–2017
Commercial, Leadbetter Pt, WA to Cape Falcon, OR, spring Chinook	MSF-ODFW-09	2018	2008–2017
Sport, Cape Falcon, OR to the OR/CA border, Coho	MSF-ODFW-10	2018	2003–2017
Sport, Leadbetter Pt, WA to Cape Falcon, OR, spring Chinook	MSF-ODFW-11	2018	2010–2017
Sport, From Leadbetter Pt, WA to Cape Falcon, OR, Coho	MSF-ODFW-12	2018	2003–2017
Sport, Willamette R. below Willamette Falls, Chinook	MSF-ODFW-13	2018	2016–2017
Idaho Department of Fish and Game			
Sport, Snake River, on fall Chinook	MSF-IDFG-04	2015	2009–2017
Lummi Nation			
Treaty net, Nooksack R. (Spring Run)	MSF-LUMM-01	2018	??–2017
Nisqually Indian Tribe			
Treaty net, Puget Sound Area 13	-	-	2015
Treaty net, Nisqually River	-	-	??–2015

1. Fishery, location, target stock for each Agency: Name of fishery, its location, and which stock is targeted under mark-selective fishery regulations.
2. Proposal ID: The proposal number assigned by the PSC secretariat on receipt of pre-season MSF proposal from agency. This ID number remains the same for MSFs that are conducted with little change every year.
3. Most recent MSF proposal: Most recent year that a proposal was received from the agency for this particular MSF.
4. This indicates the years (after 2002, the year SFEC began requested proposals from agencies) that each MSF actually occurred and, therefore, a post-season report is required to be submitted to SFEC. Some Coho Salmon MSFs began as early as 1998.
5. Proposals **MSF-WDFW-02** (Areas 5 and 6) and **MSF-WDFW-11** (Areas 9, 10, 11 and 13) were both incorporated into **MSF-WDFW-35** in 2012. This proposal covers all summer sport MSFs for Puget Sound (Areas 5-13).
6. Actual implementation of summer MSFs for Chinook Salmon in Puget Sound was step-wise over time, with areas added over the years as follows: Areas 5 and 6 summer sport MSF began in 2003 (proposal ID: **MSF-WDFW-02)**; Areas 9, 10, 11, and 13 began in summer 2007 (proposal ID: **MSF-WDFW-11**). Each of these MSFs has continued each summer thereafter.
7. Proposal **MSF-WDFW-36** beginning in 2012 covers all sport MSF areas of Puget Sound (Areas 5-13) during the winter time period (October–April); whereas, in previous years (2005–2011) of WDFW's equivalent winter sport MSF proposal for Puget Sound (proposal ID number: **MSF-WDFW-16**), fewer marine areas were included – i.e., limited to areas 6, 7, 8-1, 8-2, 9 & 10.
8. Actual implementation of winter MSFs for Chinook Salmon in Puget Sound was step-wise over time, with areas added over the years as follows: Areas 8-1 and 8-2 winter sport MSF began in October 2005–April 2006 (proposal ID: **MSF-WDFW-08**); Area 10 began in December 2007–January 2008; Area 7 began in February 2008; and Area 9 began in January 16–April 15, 2008. Each of these MSFs has continued each winter thereafter.
9. Proposal **MSF-ODFW/WDFW-06** was originally submitted as **MSF-ODFW-05** in 2013 but the proposal ID was changed to continue the joint proposal numbering sequence

10. Proposal **MSF-ODFW/WDFW-07** was originally submitted as **MSF-ODFW-04** in 2013 but the proposal ID was changed to continue the joint proposal numbering sequence.
11. Proposal **MSF-ODFW-01** (spring Chinook Salmon) originally included the entire Willamette River, both below and above Willamette Falls. The proposal was split into two MSF proposals for 2015, **MSF-ODFW-04** upstream of Willamette Falls and **MSF-ODFW-13** downstream of Willamette Falls.