PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE

REVIEW OF MASS MARKING AND MARK-SELECTIVE FISHERY ACTIVITIES PROPOSED TO OCCUR IN 2016

REPORT SFEC (17)-1

March 2017

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LIST OF ACRONYMS WITH DEFINITIONS

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

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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 2016. Issues with implications for maintenance of the coastwide coded-wire-tag program are identified and recommendations are proposed.

Summary of 2016 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-two proposals (8 for Coho, 13 for Chinook, and 1 Coho/Chinook) were received for mass marking (MM) occurring in 2016 (Appendix A). Of these, one was received from southern British Columbia (BC) and 21 from southern United States (US). The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Within the MM proposals received from southern BC and southern US, approximately 33.4 million Coho Salmon are proposed to be mass marked in 2016 (Table 2-1; Figure 2-1A), approximately 900,000 less than proposed in 2015. Essentially all hatchery Coho Salmon production intended for harvest, from southern BC and southern US hatcheries will be mass marked. Currently there are 15 proposed Coho Salmon DIT groups (Table 2-1; Appendix C), 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 2015.

Approximately 118 million Chinook Salmon are proposed to be mass marked in 2016 from southern US hatcheries (Table 2-1; Figure 2-1B). This level is approximately 400,000 more than the number proposed to be mass marked in 2015. Most all hatchery Chinook Salmon production from southern US hatcheries intended for harvest will be mass marked. Currently there are 14 proposed Chinook Salmon DIT groups (Table 2-1, Appendix D), of which seven are from Puget Sound facilities, three from coastal facilities, and four from Columbia River facilities. The number of DIT groups is unchanged from the 2015 proposals.

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. 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) conduct some fishery 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 the use of ETD equipment. 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 Salmon. Coho Salmon in Canadian commercial fisheries are visually sampled, except for heads delivered by northern freezer trollers, which are electronically sampled. Canada continues to rely on the Sport Head Recovery Program (SHRP) to recover CWTs from recreational 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 Salmon and electronic sampling for spring Chinook and Coho salmon 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, they electronically screen heads in most locations to send tagged heads only to the dissection lab. Alaska Department of Fish and Game plans to sample unmarked fish for CWTs at a rate of 10% for troll fisheries in 2016.

Encounters of large numbers of mass marked Chinook Salmon are increasingly impacting catch sampling programs in northern fisheries; for example, approximately 74% of the Chinook caught in 2015 in the southeast Alaskan troll fishery with a missing adipose fin did not contain a CWT (Figure 2-4). 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 2016 Mark-Selective Fishery Proposals

Mark-selective fisheries have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003. For 2016, the SFEC received 59 MSF proposals for Coho and Chinook salmon in ADFG, CDFO, WDFW, and ODFW fisheries. The SFEC believes these proposals cover all MSFs planned for 2016 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1 (also see Appendix B). Further details describing the proposed MSFs and comments made by the SFEC are provided in Table 3-3.

Twenty-two proposals were received for Coho Salmon MSFs to occur in 2016, 36 proposals were received for Chinook Salmon MSFs, and one proposal was received for a joint Coho and Chinook MSF. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

SFEC received six proposals for new Chinook Salmon mark-selective sport fisheries. Five of these were for fisheries within the Columbia River Basin and one was for a MSF along the Oregon Coast.

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 2016, that number has tripled to 36 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 2016 in BC, WA, and OR. These fisheries will impact many stocks and also multiple broods of Chinook Salmon. Table 3-4 and Table 3-5 each provide historical information on encounters of tagged and marked fish to identify Coho and Chinook salmon tagged stocks that can be expected in these areas with MSFs.

Issues and Concerns

Post-Season Reports

Post-season reports on MSFs are required for each MSF prosecuted. One of the basic functions of these reports is to provide a record of how fisheries were actually 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. US or 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. The SFEC is not aware of reliable methods for estimating impacts on marked and unmarked fish under mixed bag regulations and the agencies proposing these mixed bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

Recommendations and Issues Requiring PSC Direction

Proposal Review Process

It is recommended that the PSC continue to issue a request to the agencies to submit proposals for all potential MM and MSFs by November 1 each year as per the MOU, and for agencies to provide both preliminary and final post-season reports on the conduct of MSFs within the timeframe adopted by the PSC. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner.

Interagency Coordination and Cooperation

Mass marking, double-index tagging, and CWT sampling programs continue to be insufficiently coordinated to support analysis by PSC technical committees. It is also not clear that agencies are collecting adequate and necessary data to permit estimation of unmarked CWT recoveries in fisheries and escapements so that cohort reconstructions can be carried out on the unmarked component of the DIT group releases. With the expansion of Chinook Salmon marine MSFs, the geographic 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.

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.

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 clearing house to facilitate coordination and reporting on MM and MSF programs among the Parties to the Pacific Salmon Treaty (PST), affected agencies, and existing coastwide and regional committees established to monitor activities related to the CWT program. The SFEC continues to review procedures and protocols for MM, fishery sampling plans, and the program evaluations developed by the proponents. Where appropriate, the SFEC develops and recommends alternative procedures in consultation with relevant technical committees of the Pacific Salmon Commission (PSC).

In addition, the SFEC has a role in developing and evaluating methods for analyses of CWT data in the presence of MM and MSFs, establishing database requirements, and developing tools for agency use in developing proposals and analyzing data. The SFEC includes two working groups: the Regional Coordination Work Group (RCWG) and the Analytical Work Group (SFAWG). The RCWG is tasked with reviewing MM proposals, and the SFAWG is tasked with reviewing MSF proposals and evaluating 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 2016. This report summarizes the results of the review of MM and MSF proposals received between November and December 2015. 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 2016 marking activities (Appendix A). Of these, one was received from southern British Columbia (BC) and 21 from southern United States (US). All proposals are summarized in Table 2-1. These proposals represent all known MM programs that have international ramifications and/or sampling impacts on other agencies. Proposals were not requested for spring and summer Chinook stocks from the Snake River Basin, because, as identified in previous reviews, there is a lack of marine recoveries from these groups.

2.2 Mass Marking Levels

Approximately 33.4 million Coho Salmon are proposed to be mass marked in 2016 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 2015. Annual trends in Coho Salmon MM and total production, for BYs 1997 to 2015, are shown in Figure 2-1A. Geographic details of the fish to be released in 2016, by mark and tag status, are displayed in Figure 2-2A. The vast majority of the coastwide Coho Salmon production, and essentially all production intended for harvest, will be mass marked. For the production that will not be mass marked, approximately 4.5 million will be tagged and marked, 3.9 million will be tagged and unmarked, and approximately 2.1 million will be left untagged and unmarked.

The total BY 2015 southern US Chinook hatchery production from Washington and Oregon, for the area and stocks covered by the 2015 proposals, is projected at approximately 154 million released fish. Annual trends in Chinook MM and total production, for BYs 1997 to 2015, are shown in Figure 2-1B. Geographic details of the proposed BY 2015 releases, by mark and tag status, are displayed in Figure 2-2B.

Approximately 118 million Chinook Salmon are proposed to be mass marked from southern US hatcheries in 2016 (Table 2-1). This number is approximately 400,000 more than proposed to be marked in 2015. For the production that will not be mass marked, approximately 21 million will be both tagged and marked, 8 million will be tagged and unmarked, and 7 million will be intentionally left unmarked for restoration programs (Figure 2-2B). No mass marking of Chinook is anticipated for hatchery production from CA and BC.

Table 2-1. Mass marking of Coho and Chinook salmon and number of DIT groups proposed for 2015 and 2016.

Species	Area	Run	Agency	DIT Groups	Mass Marking (millions) 2015	Mass Marking (millions) 2016	Significant Changes from 2015
Coho	Strait of Georgia		CDFO	1	4.5	4.0	
	W. Coast of Vanc. Isl.		CDFO	-	0.3	0.4	
	Puget Sound		WDFW/Tribal	6	10.2	10.3	
			USFWS	1	0.3	0.3	
	WA Coast		USFWS	-	0.8	0.8	
			WDFW/Tribal	4	4.3	4.3	
	Columbia Basin		USFWS	1	0.8	0.3	
			WDFW/Tribal	2	7.5	7.6	
			ODFW	-	5.2	5.0	
	OR Coast		ODFW	-	0.5	0.5	
	Total Coho			**15**	**34.2**	**33.4**	
Chinook	BC		CDFO	-	---	---	
	Puget Sound	Spring	WDFW/Tribal	1	0.7	0.7	
		Summer	WDFW/Tribal	1	3.3	3.3	
		Fall	WDFW/Tribal	5	29.7	29.4	
	WA Coast	Spr/Sum	WDFW/Tribal	-	0.2	0.3	
		Fall	USFWS	-	2.5	2.5	
			WDFW/Tribal	3	8.1	8.0	
	Columbia Basin	Summer	USFWS	-	0.2	0.2	
		Spring	ODFW (Willamette)	-	5.5	5.0	
			ODFW (Col. R)	-	1.5	2.6	
			USFWS	-	3.4	3.4	
			WDFW/Tribal	1	3.3	3.2	
		Fall-Tule	USFWS	1	9.7	9.7	
			WDFW	-	13.5	12.1	
			ODFW	-	7.2	6.9	
		Fall URB	WDFW	1	12.9	13.0	
			ODFW	-			Reported by WDFW
			Yakima	-	---	1.5	
			USFWS	1	7.4	7.4	
		Snake R. Fall	IDFG	-			Reported by ODFW
			ODFW	-	0.8	0.8	Previously reported by IDFG
		Snake R. Spring	ODFW	-	0.4	0.5	
			USFWS	-	2.0	1.8	
			IDFG [1]				
	OR Coast	N. Spring	ODFW	-	0.4	0.4	
		S. Spring	ODFW	-	2.2	2.2	
		Fall	ODFW	-	2.6	2.7	
	Total Chinook			**14**	**117.3**	**117.7**	

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

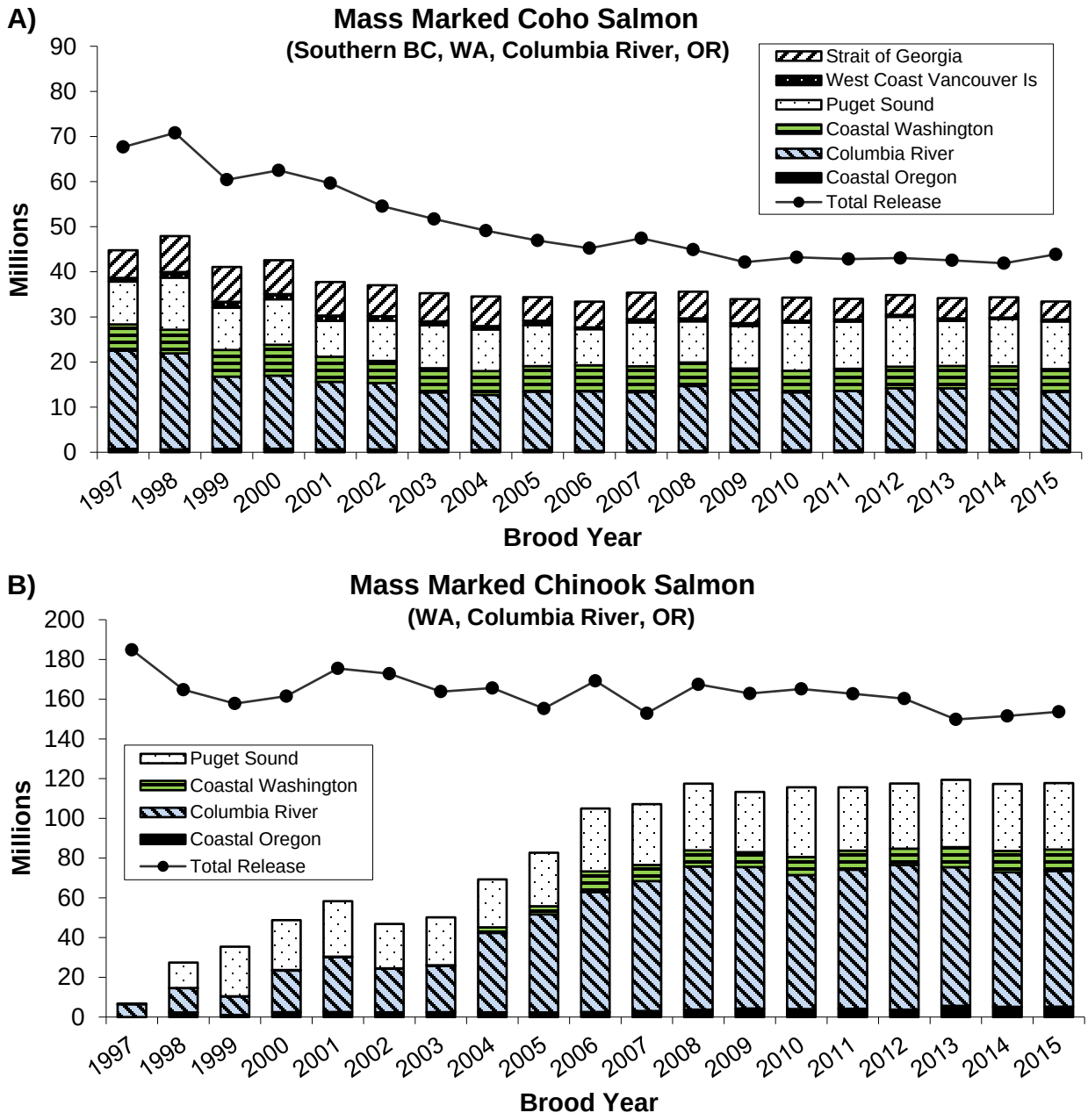

Figure 2-1. Number of mass marked Coho (panel A) and Chinook salmon (panel B) released by region and brood year, 1997–2015. The solid line represents total hatchery releases by brood year with the exception that fry releases of Coho are not included. Values used for brood years 1997–2012 are actual release sizes; values for brood years 2013–2015 are proposed release sizes. Releases of spring and summer Chinook Salmon into the Snake River by IDFG are not included in this figure for brood years 2013–2015, as no mass mark proposals were received for these programs.

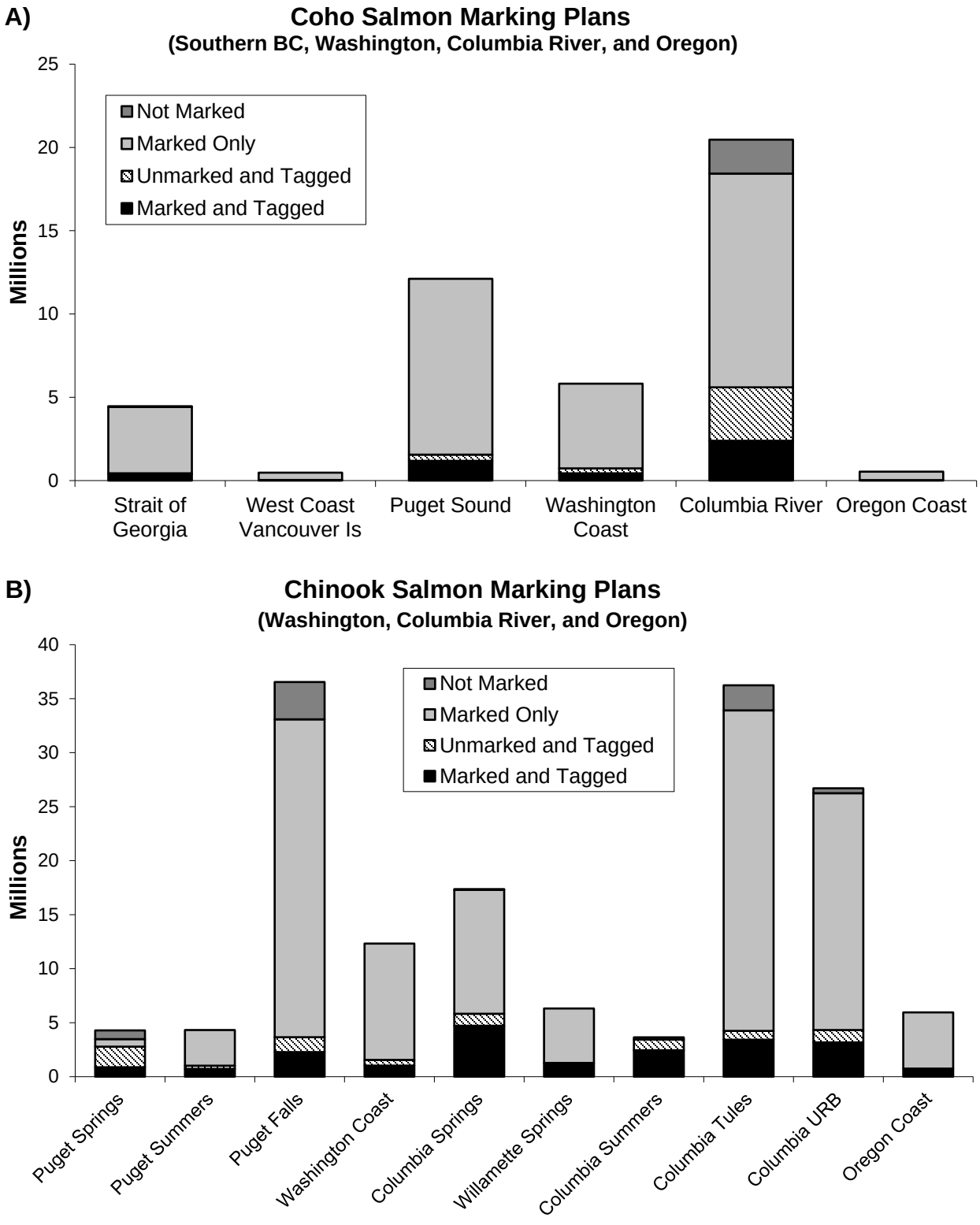

Figure 2-2. Projected Coho (panel A) and Chinook (panel B) salmon releases for brood year 2015, by region and mark status.

2.3 Double-Index-Tag Groups

Double-index-tag groups provide information necessary for direct estimation of total MSF impacts on unmarked fish. Appendix C and Appendix D 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, Appendix D), of which seven are from Puget Sound facilities, three 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 2-3). 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 and is currently being undertaken by SFEC (Alexandersdottir, *in prep*). When this evaluation has been completed, recommendations can be made to direct tagging needed to support future management decisions.

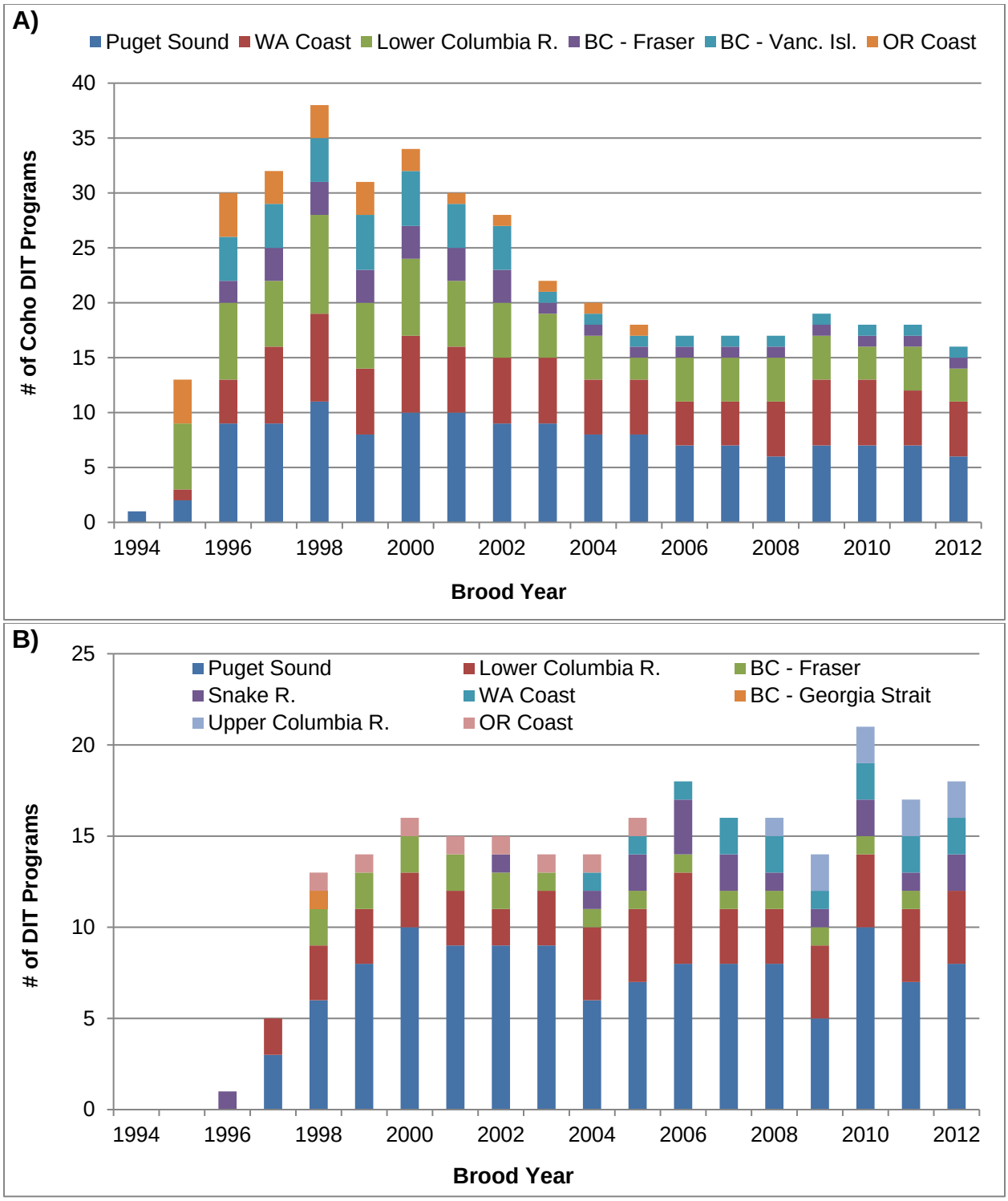

Figure 2-3. Total number of Coho (panel A) and Chinook (panel B) salmon CWT DIT programs released by region, over brood years 1994–2012.

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. 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 2016. 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 2016.

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 2016.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial Sport	Electronic/Visual Visual	Plans to sample unmarked fish for CWTs at a rate of 10% for troll fisheries in 2016.
Northern BC	Commercial Sport	Electronic Visual (Voluntary)	All Chinook are now electronically sampled and all tags are decoded (this has been the case since 2007). Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
West Coast Vancouver Island	Commercial Sport	Electronic Visual (Voluntary)	 Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
Strait of Georgia	Commercial Sport	Electronic Visual (Voluntary)	 Anglers are encouraged to turn in heads from marked Chinook only; therefore, tag recoveries of unmarked Chinook are not expected.
Puget Sound	Commercial Sport	Electronic Electronic	
Washington Coast	Commercial Sport	Electronic Electronic	
Oregon Coast	Commercial Sport	Electronic Electronic	
Columbia River	Commercial Sport	Electronic/Visual Electronic/Visual	Spring and Summer Chinook fisheries are electronically sampled. Fall Chinook are visually sampled by Oregon. CWT recoveries from unmarked fall Chinook will be incomplete. Spring 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 clipped fish without CWTs encountered in sampling programs. Of the marked Chinook Salmon 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 74% in 2015 (Figure 2-4). The increased cost to deal with the additional marked fish is not quantified, but impacts the program. Costs to ship all the heads, including those with no CWTs, from sampling locations to the dissection lab are substantial. To remedy this situation and reduce sampling costs, Alaska has implemented the electronic screening of marked fish encountered in their sampling programs. Currently this method is being employed in the commercial winter troll Chinook Salmon fisheries and has recently been expanded to include the majority of the summer troll Chinook Salmon fisheries and approximately half of the seine and gillnet fisheries.

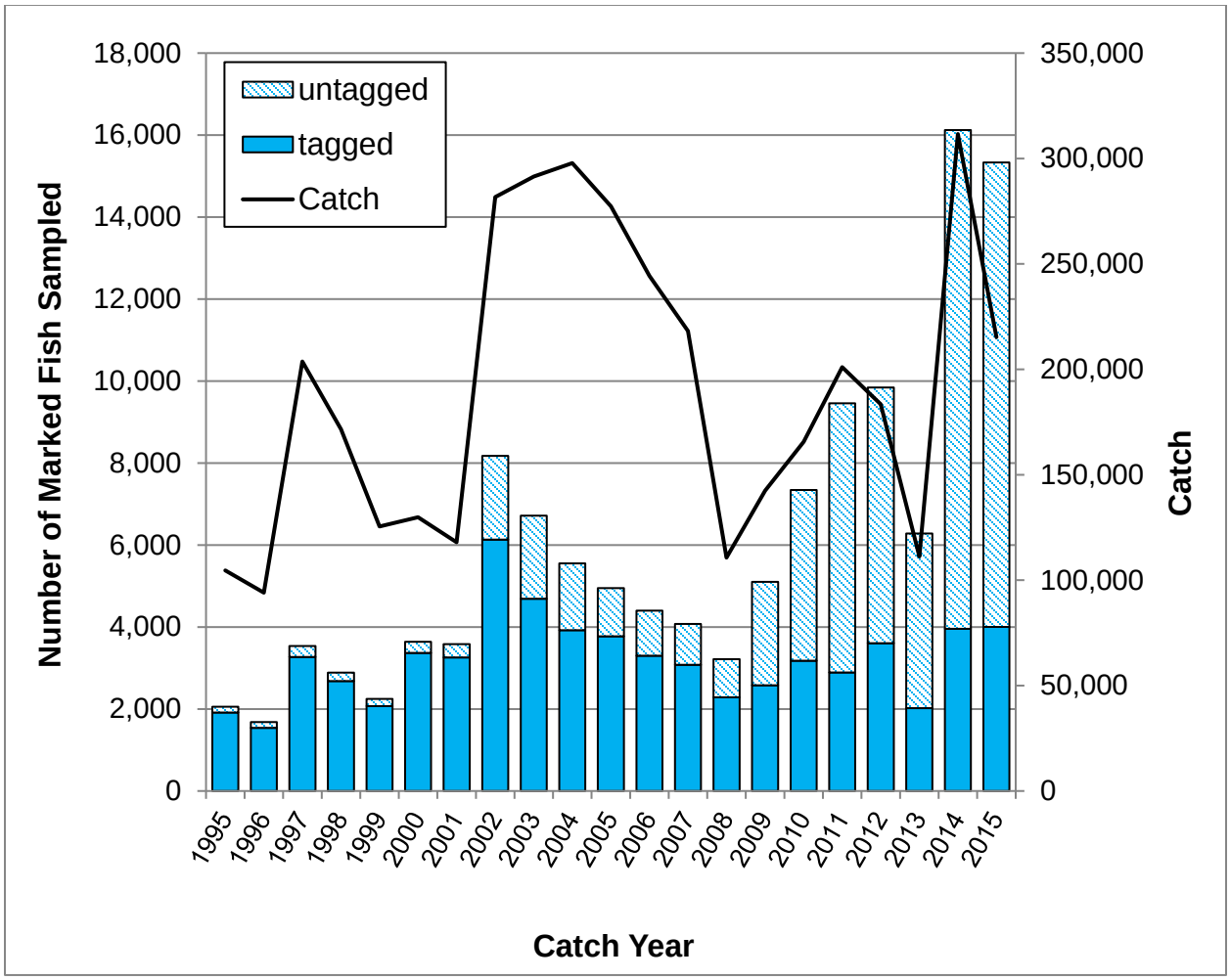

Figure 2-4. Numbers of marked Chinook Salmon sampled in Alaska's troll fishery and annual catch, 1995–2015. The bars represent the untagged (hashed) and tagged (solid

blue) marked fish sampled on the Y1 axis and the black line represents the number of fish caught on the Y2 axis.

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 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.

Coded-wire-tag sampling in Oregon hatcheries is predominantly electronic; however, CWT sampling at most freshwater traps and on spawning grounds remains visual. Since 2011, ETD has been used to CWT sample both the sport and commercial troll Chinook and Coho salmon fisheries that occur off the coast of Oregon. In the event of large returns of Sacramento and Klamath River fall Chinook, 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

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

3.1 Mark-Selective Fishery Proposals Received

Mark-selective fisheries have been prosecuted for Coho Salmon since 1998 and for Chinook Salmon since 2003 (Table 3-1; Appendix B). For the 2016 fishery season, the SFEC received a total of 59 MSF proposals for Coho and Chinook salmon in CDFO, WDFW, and ODFW. 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. Agencies submitted six proposals for new mark-selective Chinook Salmon sport fisheries. Mixed bag regulations were again proposed for several of the MSFs (e.g., Oregon recreational marine and freshwater fisheries, WDFW recreational freshwater fisheries, and Canadian marine recreational fisheries; Figure 4-1 through Figure 4-4).

3.1.1 Coho Salmon MSFs

Twenty-two proposals were received for Coho Salmon MSFs occurring in 2016 (Table 3-1; Appendix B), all of which were proposed in previous years. The SFEC received five proposals from CDFO for ongoing MSFs in Canadian waters, including two in the lower Fraser River and three in southern BC; each proposal contained a variety of fishery openings distinguished by regulation variations. A total of ten Coho Salmon MSF proposals were submitted from WDFW, all representing ongoing fisheries. Of the ten proposals that WA submitted for 2016, five were for freshwater locations and five for marine waters. SFEC believes that proposals have now been submitted for all ongoing Coho Salmon MSFs in WA. There were five Coho proposals from ODFW, including three marine and two freshwater fisheries. SFEC received two ODFW/WDFW joint Coho Salmon MSF proposals for the Columbia River. There was also a joint ODFW/WDFW Chinook/Coho proposal for a pilot seine fishery below Bonneville in the Columbia River (Buoy 10 to Beacon Rock).

3.1.2 Chinook Salmon MSFs

Thirty-seven proposals were received for Chinook Salmon MSFs occurring in 2016 (Table 3-1; Appendix B). These included one proposal from Alaska (ADFG), one proposal from CDFO, 24 from WDFW, five submitted jointly by ODFW and WDFW (one was a joint Chinook/Coho proposal mentioned above), and six from ODFW. No proposals were received from Idaho (IDFG) this year. The Canadian proposal was for an ongoing (since 2008) sport fishery located in the Strait of Juan de Fuca subareas. Of the 24 WDFW proposals, the number of proposals per WA location were as follows: seven 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 MSF in Grays Harbor (areas 2A, 2B, 2C, and 2D); 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, four Chinook Salmon MSF proposals were submitted jointly by WDFW and ODFW for fisheries planned in the Columbia River. Oregon submitted six proposals for Chinook Salmon MSFs – one ongoing in the Willamette River, one new one in the Willamette, and four coastal fisheries.

Table 3-1. Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2007 through 2016.

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

Fishery Name	**Catch Year**[1,2]									
(SFEC Proposal ID)	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Targeting Marked Coho Salmon										
Sport, Southern BC marine and freshwater (MSF-FOC-02)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
FSC, Lower Fraser R (MSF-FOC-03)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Southern BC marine (MSF-FOC-05)	XFO	PFO	PX	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Fraser R (MSF-FOC-06)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, BC South Coast Freshwater (MSF-FOC-09)	-	-	-	-	-	-	-	XFO	PFO	P
Sport, WA Areas 1-4 and Buoy 10 (MSF-WDFW-06)	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Puget Sound Areas 5-13 (MSF-WDFW-07)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, WA Areas 1-4 (MSF-WDFW-15)	XFO	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Nooksack R (MSF-WDFW-18)	XFO	XFO	PFR	PFO	PFO	-	-	-	-	-
Sport, Willapa tributaries (MSF-WDFW-22)	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Grays Harbor Area 2.2 (MSF-WDFW-23)	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Grays Harbor tributaries (MSF-WDFW-24)	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-29)	-	-	-	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Grays Harbor Area 2C (MSF-WDFW-30)	-	-	XFO	XFO	PX	-	-	-	-	-
Sport Quillayute R (MSF-WDFW-31)	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Skagit R (MSF-WDFW-40)	-	-	-	-	-	-	XFO	PFO	PFO	P
Sport, Samish R (MSF-WDFW-41)	-	-	XFO	XFO	XFO	-	-	PXO	PFO	P
Sport, Lower Columbia R (MSF-ODFW/WDFW-04)	XFO	PFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	P
Commercial, L. Columbia R (Buoy 10–Beacon Rock) (MSF-ODFW/WDFW-06)[3]	-	-	-	-	-	-	PFO	PFO	PFO	P

[1] Catch year 2003 was the first year SFEC received requested MSF proposals from agencies. Some Coho MSFs began as early as 1998

[2] Summary of MSFs are available for many of these fisheries for catch years 2005–2009 in SFEC 2012 (http://www.psc.org/pubs/SFEC12-1.pdf)

[3] Submitted as a joint WDFW/ODFW proposal beginning with the 2014 fishery.

Table 3–1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2007 through 2016.

Fishery Name	**Catch Year**[1,2]									
(SFEC Proposal ID)	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Targeting Marked Coho Salmon										
Sport, Oregon coast (MSF-ODFW-03) [4]	XFO	XFO	XFO	PFR	PFR	PFR	PFR	PFR	-	-
Sport, below Willamette Falls (MSF-ODFW-05)	XFO	XFO	XFO	XFR	XFR	XFR	XFR	XFR	PFR	P
Sport, Sandy River to mouth of Salmon River (MSF-ODFW-06)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	P
Commercial, Leadbetter Pt., WA to Cape Falcon, OR (MSF-ODFW-08)	-	-	-	XFR	XFR	XFR	XFR	XFR	PFR	P
Sport, From Cape Falcon, OR to the OR/CA border (MSF-ODFW-10)	-	-	-	-	-	-	-	-	PFR	P
Sport, From Leadbetter Pt, WA to Cape Falcon, OR (MSF-ODFW-12)	-	-	-	-	-	-	-	-	PFR	P
Targeting Marked Chinook Salmon										
Commercial, SE Alaska (MSF-ADFG-01)	-	-	-	-	-	-	-	-	PX	P
Sport, Strait of Juan de Fuca subareas, BC (MSF-FOC-07)	-	XFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, WCVI subareas, mainly inside (MSF-FOC-08)	-	-	PX	-	PX	-	-	-	-	-
Sport, Skykomish R (summer run) (MSF-WDFW-01)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PX	P
Sport, Yakima R (spring run) (MSF-WDFW-03)	-	PFR	PX	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, Lower Snake R (fall run) (MSF-WDFW-05)	-	XFO	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Carbon & Puyallup R (fall run) (MSF-WDFW-09)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Puget Sound Areas 9-13, summer (MSF-WDFW-11)	PFR	PFR	PFR	PFR	PFR	-	-	-	-	-
Sport, Upper Skagit R (spring run) (MSF-WDFW-12)	PFO	PFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, Nooksack R (fall run) (MSF-WDFW-13)	PFO	PFO	PFR	PFR	PFO	PFO	PFO	PFO	PFO	P
Sport, Nisqually R (fall run) (MSF-WDFW-14)	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, WA areas 1-4 (MSF-WDFW-19)	-	-	PX	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Skokomish R (fall run) (MSF-WDFW-20)	-	-	PX	PFO	PFO	PFO	PFO	PFO	PFO	P
Troll, WA areas 1-4 (MSF-WDFW-21)	-	-	PX	PX	-	-	-	-	-	-
Commercial, Willapa Bay (MSF-WDFW-25)	-	-	-	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-26)	-	-	-	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Willapa Bay tributaries (fall run) (MSF-WDFW-27)	-	-	-	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Snake R (spring run) (MSF-WDFW-28)	-	-	-	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Quillayute R (spring/summer run) (MSF-WDFW-32)	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Hoh R (MSF-WDFW-33)	-	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P

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

Table 3–1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2007 through 2016.

Fishery Name	**Catch Year**[1,2]									
(SFEC Proposal ID)	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Targeting Marked Chinook Salmon (continued)										
Sport, Puget Sound Areas 5-13, summer (MSF-WDFW-35) [5]	-	-	-	-	-	PFR	PFR	PFR	PFR	P
Sport, Puget Sound Areas 5-13, winter (MSF-WDFW-36) [6]	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Snohomish R (summer run) (MSF-WDFW-37)	-	-	-	-	-	-	PX	PX	PX	P
Commercial, Grays Harbor areas 2A,2B,2C,2D (MSF-WDFW-38)	-	-	-	-	-	-	PFO	PFO	PFO	P
Sport, Lower Grand Ronde R (spring run) (MSF-WDFW-39)	-	-	-	-	-	-	PX	PX	PX	P
Sport, Columbia R., Priest Rapids Dam to Chief Joseph Dam (MSF-WDFW-42)										P
Sport, Wenatchee R., mouth to Leavenworth (MSF-WDFW-43)										P
Sport, Entiat R., mouth to ENFH (MSF-WDFW-44)										P
Sport, Chelan R., mouth to powerhouse (MSF-WDFW-45)										P
Sport, Snake R (fall run) (MSF-IDFG-04)	-	-	XFO	XFO	XFO	PFO	PFO	PFO	PFO	X
Sport, Lower Columbia R (spring run) (MSF-ODFW/WDFW-01)	XFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Columbia R (summer run) (MSF-ODFW/WDFW-02)	-	PFO	PX	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (spring run)(MSF-ODFW/WDFW-03)	XFO	PFO	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Columbia R (fall run) (MSF-ODFW/WDFW-05)	-	-	PX	PX	PFO	PFO	PFO	PFO	PFO	P
Sport, Willamette R. (spring run) (MSF-ODFW-01)	XFO	XFO	XFO	XFR	XFR	XFR	XFR	PFR	-	-
Sport, Oregon coast (fall run) (MSF-ODFW-02)	-	XFO	PFO	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, upstream of Willamette Falls (spring run) (MSF-ODFW-04)	-	-	-	-	-	-	-	-	PFR	P
Sport, Sandy R (spring run) (MSF-ODFW-07)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	P
Commercial, Leadbetter Pt, WA to Cape Falcon, OR (spring run) (MSF-ODFW-09)	-	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	P
Sport, Leadbetter Pt, WA to Cape Falcon, OR, (spring run) (MSF-ODFW-11)										P
Sport, Willamette R. below Willamette Falls (spring run) (MSF-ODFW-13)[7]									PFR	P
Targeting Marked Chinook and Coho salmon										
Commercial, L. Columbia R (Buoy 10–Beacon Rock) (MSF-ODFW/WDFW-07)							PX	PX	PX	P

[5] Proposal combines proposals 02 and 11 as of 2012.
[6] Proposal replaces 16 as of 2012; old proposal 08 [Area 8-1/8-2 Winter MSF] combined into 16 in 2007.
[7] Proposals ODFW-13 and ODFW-04 replaced MSF-ODFW- 01 in 2015 because of differing regulations above and below Willamette Falls.

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3.2 Evaluating MSF Proposals

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

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

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

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

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

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

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

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

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

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

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

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

Table 3-3. Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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 Recreational (MSF)	1	2	2	1	2	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook.
MSF-FOC-02	BC Management Areas 11–29	Pre-terminal and Terminal Recreational (Mixed Bag)	2	2	2	1	2	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. 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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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 Recreational (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 Recreational (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	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel surveys, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates and mark rates obtained from charter ride-along trips and voluntary trip reports (VTRs).
MSF-WDFW-07	Puget Sound Areas 5–13	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from CRCs, and creel surveys in some areas. On-water encounter rates and mark rates obtained from VTRs and dockside samplers.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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-22	Willapa tributaries (North, Smith, Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational	3	3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Indirect CWT sampling via electronic sampling of escapement.	Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimate.
MSF-WDFW-23	Grays Harbor, Marine Area 2.2	Recreational	3	1,3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside biological sampling Sept–Oct but none in Nov–Jan. CRC for effort estimates.	Total 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-24	Grays Harbor tributaries	Recreational	3	3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Some direct sampling in Lower Chehalis only; indirect CWT sampling via electronic sampling of escapement.	Total retained catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimates.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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-29	Willapa Bay, Marine Area 2.1	Recreational	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-31	Quillayute R system (Bogachiel, Calawah, Dickey, Quillayute, Sol Duc)	Recreational (MSF for February through December)	3	3	1	3	3	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Lack of direct sampling; instead CWT composition from electronic sampling in tribal net fishery and hatchery is used.	Total catch is estimated using CRCs. Mark rate estimates obtained from tribal net fishery.
MSF-WDFW-40	Skagit River	Recreational (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	Recreational (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.	

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Coho Salmon (continued)												
MSF-ODFW / WDFW-04	Columbia R, Mouth upstream to Hood R Bridge, includes Buoy 10	Recreational	1	1	1	1	1	1	1	1		Creel survey and CRCs provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Observed mark rates at Bonneville Dam for upriver stocks.
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-05	Willamette R. below Willamette Falls (including Multnomah Ch.) and tributaries	Recreational	1	3	0	4	1	2	1	0	No creel or CWT sampling conducted in the fall.	Catch estimates from CRCs. No estimate of number released and total encounters
MSF-ODFW-06	Sandy River and tributaries up to mouth of Salmon River	Recreational	1	3	2	2	2	2	1	0	No creel. CWT recoveries occur at Sandy River Hatchery.	Catch estimates from CRCs. No estimate of number released and total encounters
MSF-ODFW-08	Leadbetter Pt., WA to Cape Falcon, OR	Commercial Troll	1	1	1	1	1	2	1	1	Sampled at port of landing. No information on released fish is collected.	Fish tickets for total catch estimates.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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.	Recreational	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	Recreational	1	1	1	1	1	1	1	1	Coho sampled at boat docks for CWTs and total landed catch estimated from surveys. Assume all releases unmarked and legal size (over 16") to estimate mark rate in fishery.	Effort estimated from boat counts and CPUE estimates from angler interviews. Number released used to determine mark rate.
Chinook Salmon												
MSF-ADFG-01	Southeast Alaska areas normally open during summer CNR fishery	Commercial Troll	1	1	2	1	1	2	1	1	This MSF will allow retention of legal-sized marked Chinook during the Jul–Sep CNR. This will potentially impact the ratio of unmarked to marked in DIT stocks and impact the estimation of unmarked exploitation rates, depending on the number of fish retained. SFEC would recommend the use of ETD in NSFs.	Fisher interviews will provide estimates of legal unmarked and total sublegal releases.
MSF-FOC-07	BC Strait of Juan de Fuca and WCVI, Areas 19–1 to 6, 18–4 and 20–5	Pre-terminal Recreational (Mixed Bag)	3	2	2	1	2	2	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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)	Recreational	1	3	1	3	1	2	1	1	The indirect method using hatchery tag compositions to estimate CWTs caught in the MSFs was evaluated by CWTIT funding. Results indicate that the direct estimates made using fishery sampling were significantly different from the indirect estimates. Recommend a sampling program which samples CWTs.	Catch estimates from catch record cards. Indirect estimates of CWTs via electronic sampling at hatchery & associated tribal net fisheries.
MSF-WDFW-03	Yakima River	Recreational	1	1	1	1	1	1	NA	NA	This is a MSF impacting Yakima R. experimental tag groups in the Yakima R.	Catch is estimated using creel survey information and standard methods used for CWTs.
MSF-WDFW-05	Lower Snake River (Fall)	Recreational	1	1	1	1	1	1	1	1		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-09	Puyallup / Carbon River	Recreational	1	3	1	2	1	2	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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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)	Recreational	1	3	1	2	1	2	1	1	Due to lack of direct sampling CWT, electronic sampling at hatchery will be used for indirect estimates of CWTs impacted in fishery. If CWTs are surveyed in the fishery, then a direct estimate would be made using CRC estimates. Release by anglers interviewed would be available to estimate mark rate and total encounters.	Catch estimates from catch record cards. Some angler interviews for CWT sampling and biological data.
MSF-WDFW-13	Nooksack River	Recreational	1	3	1	3	1	2	1	1	Lack of direct sampling. This is a small fishery, with a five year average of 50 fish kept.	Catch estimates from CRCs. Estimate number of Samish fall Chinook using % hatchery from spawning grounds and tag rate from hatchery.
MSF-WDFW-14	Nisqually River	Recreational	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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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-19	Ocean Areas 1–4	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel survey, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates (by mark status/size) obtained from charter ride-along trips and VTRs.
MSF-WDFW-20	Skokomish River	Recreational	1	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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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-26	Willapa Bay MA2.1	Recreational (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
MSF-WDFW-27	Willapa Tributaries (Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational (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)	Recreational	1	1	1	1	1	1	1	1		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-32	Quillayute River system (Bogachiel, Calawah, Dickey, Quillayute, and Sol Duc)	Recreational (Mixed bag)	3	3	1	3	3	2	NA	NA	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.
MSF-WDFW-33	Hoh River system	Recreational (Mixed bag)	3	3	1	3	3	2	NA	NA	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-35	All Puget Sound Areas 5–13 (summer)	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status.
MSF-WDFW-36	All Puget Sound Areas 5–13 (winter)	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from creel surveys and CRCs. On-water Chinook encounter rates, estimated via test fisheries and/or VTRs, provide estimates of encounters by size and mark status.
MSF-WDFW-37	Snohomish River (mouth to confluence of Skykomish and Snoqualmie rivers, including all channels.)	Recreational	1	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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-WDFW-39	Lower Grande Ronde R.	Recreational	1	1	1	1	1	1	1	NA		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-42	Columbia R., Priest Rapids Dam upstream to Chief Joseph Dam	Recreational	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	Recreational	1	1	1	1	1	2	NA	NA	New for 2016.	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	Recreational	1	1	1	1	1	2	NA	NA	New for 2016.	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	Recreational	1	1	1	1	1	2	NA	NA	New for 2016.	Mark rate to be determined based upon a proxy at Bonneville and Wells Dam. Creel survey and CRC provide catch estimates.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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-01	Columbia R, Mouth upstream to McNary Dam, and Ringold Hatchery Area	Recreational (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.
MSF-ODFW / WDFW-02	Columbia R, Mouth upstream to Priest Rapids Dam	Recreational (summer run)	1	1	1	1	2	2	1	1	Area reduced from previous years because area upstream of Priest Rapids Dam became WDFW-42	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW / WDFW-03	Columbia R, Mouth upstream to Bonneville Dam	Commercial Tanglenet (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.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (see Table 3-2 for definitions of numeric codes).

Proposal ID	Location	Fishery Type	Regulations	CWT Sampling Method	CWT Detection Method	CWT Composition Estimation Method	Alignment	Catch Estimation	Indicator Stocks	DIT Stocks	Comments and Concerns	Methods of Estimation
Chinook Salmon (continued)												
MSF-ODFW / WDFW-05	Columbia R, Mouth upstream to McNary Dam, includes Buoy 10	Recreational (fall run)	1	1	1	1	1	2	1	1	No count of released fish.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW-02	Ocean Terminal areas (within 3 miles of the river mouth) Tillamook, Elk, and Chetco	Recreational (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	Recreational (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	Recreational (spring run)	1	3	0	3	1	3	1	0	No CWT sampling, no creel, no count of released fish.	Catch estimates from CRCs. CWT composition from hatchery.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook salmon MSFs proposed for the 2016 fishery season, for which proposals were submitted by agencies in 2015 (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.
Chinook and Coho Salmon												
MSF-ODFW / WDFW-07	Columbia R, Mouth upstream to Bonneville Dam (Fall)	Commercial Purse seine & Beach seine (fall run)	1	1	1	1	1	1	1	1	Directed MSF Chinook fishery with incidental MSF Coho retention.	Random onboard monitoring will record encounters by mark and size status. Catch estimates from fish tickets. Electronic sampling of landings for CWTs.

3.3 Expected Encounters of CWT Indicator Stocks in MSFs

Multiple MSFs are expected to occur during 2016 in BC, WA, and OR. Table 3-4 and Table 3-5 were constructed using historical information on encounters of tagged and marked fish to identify tagged stocks of Coho (brood years 2003–08; Table 3-4) and Chinook salmon (catch years 2006–10; Table 3-5) that can be expected to be encountered in these areas with MSFs.

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

In 2007, there were 12 Chinook Salmon MSFs that occurred and they were largely restricted to PS and to the Columbia River with spring Chinook Salmon as the targeted group. Since then, Chinook Salmon MSFs have expanded substantially in marine and freshwater areas, with the number of MSFs tripling to 36 (Table 3-1). Chinook Salmon MSFs now occur in the marine waters of BC, PS, WA ocean areas, and freshwater areas in PS and Columbia River. Further, Chinook Salmon MSFs that target later run fish have been added. Prior to 2008, the indicator stocks encountered in MSFs were largely of PS origin or were Columbia River spring stocks. With the additional fisheries now occurring in Canadian waters, WA ocean areas, and Columbia River, a larger number of indicator stocks are likely to be encountered in MSFs (Table 3-5). In addition, the expansion of MSFs in PS, both geographically and temporally, have resulted in increases in the percent of total catch harvested in MSFs for Chinook Salmon (Figure 3-1).

Table 3-4. Number of tagged and marked Coho Salmon sampled (Obs) and percent of total estimated tags (expanded for the sample rate) in fisheries or in escapement, averaged over brood years 2003–2008. Some estimates are based on less than six years of data because some stocks were not tagged in all years. Coho Salmon escapements are not available in the Regional Mark Information System (RMIS) database for BC stocks; therefore, percentages shown for BC are only for fishery recoveries.

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

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

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

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

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

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

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

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

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

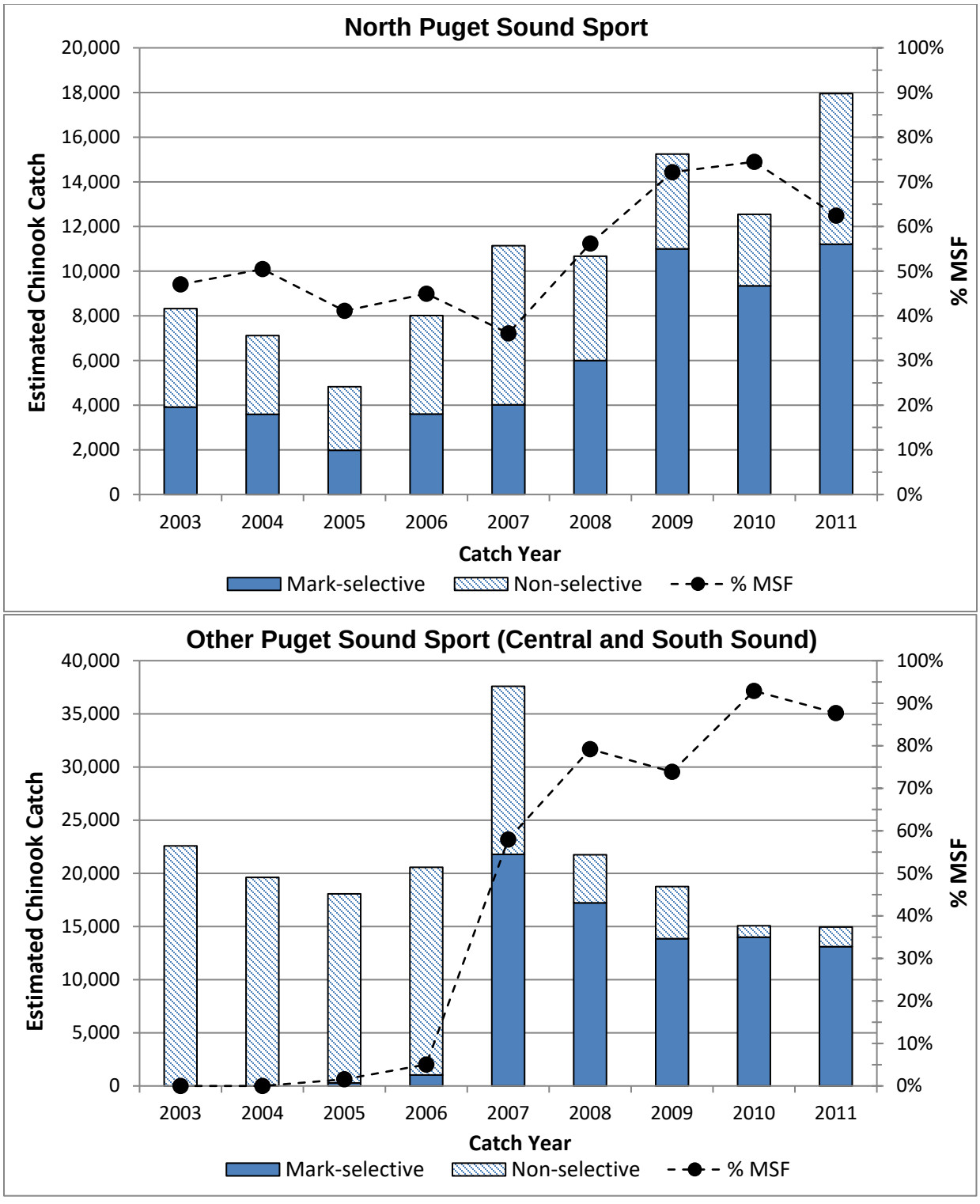

Figure 3-1. Total landed catch in MSFs and NSFs in Puget Sound and the percent of catch in MSFs for catch years 2003–2011.

4 ISSUES, CONCERNS, AND RECOMMENDATIONS

4.1 Submissions of Mark-Selective Fishery Proposals

Proposals are due by November 1 of the year before the MSFs being proposed; e.g., November 1, 2016 for fisheries proposed to occur in 2017. Although final decisions on fisheries are generally made by agencies after this time period (e.g., January–April of 2016 for 2016 fisheries), MSF proposals should be submitted for any fisheries that are planned and should include information or options known at that point in time. SFEC believes that most MSFs now being implemented are represented by proposals. 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 2011–2012 should be available by the post-season meeting in 2013.This information has only been received for some fisheries, such as Puget Sound, but not for others.

Total fish retained and total mortalities by stock, fishery and age are also required by the MOU and have been requested each year for MSFs, because the data are needed for estimating stock-specific impacts of MSFs. This stock specific post-season information has only been provided by 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 C and Appendix D). 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 almost 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 new MSFs and any other new MSFs likely to be proposed in future years and evaluate the need for including additional DIT groups.

4.3.1 Coho Salmon Double-Index-Tag Groups

At present, the utility of the DIT program and the CWT program in general for Coho 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 listed in Table 3-4. Several Coho Salmon MUs do not have DIT groups to permit independent estimation of impacts of MSFs (Appendix C). 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 WA mark-selective fisheries are listed in Table 3-5. Most of these stocks encountered are currently double-index tagged (Appendix D). 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 2016, Alaska intends to experiment with implementing ETD on approximately 10% of unmarked fish during the troll fisheries. As Puget Sound DIT groups were unlikely to have been subject to preceding MSFs (either the same

year or at younger ages), indirect methods (other than direct sampling with ETD) could be used for achieving unbiased estimates of unmarked encounters from marked landings. However, with MSFs within the Strait of Juan de Fuca and off of the WA coast (WA Ocean Areas 1–4) it is no longer reasonable to assume that stocks taken in NSFs in all northern coastal areas have not been subject to prior MSFs.

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 mixed bag 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.

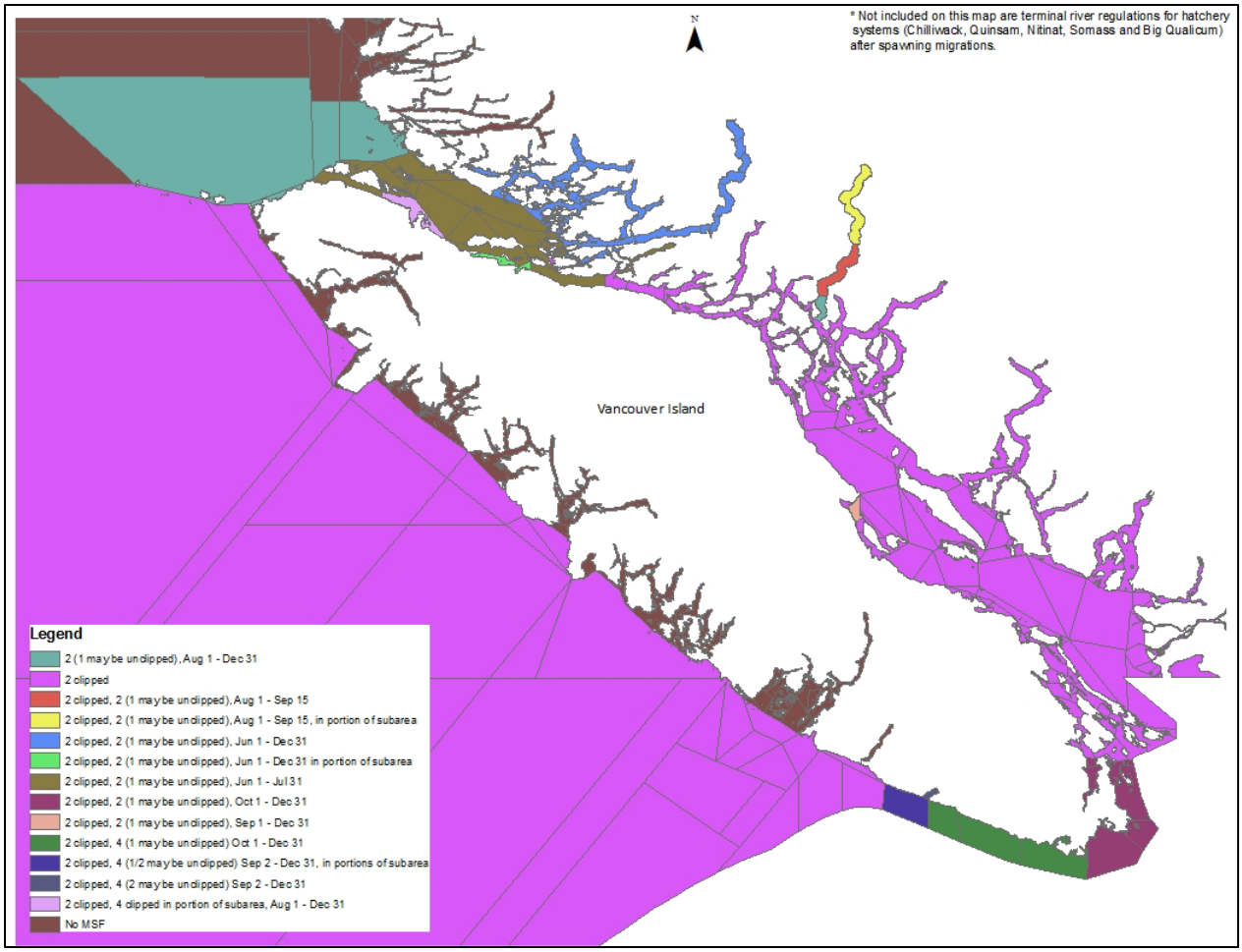

Figure 4-1. Proposed 2016 bag limits for southern British Columbia Coho Salmon recreational fishery by PFMC Sub Area.

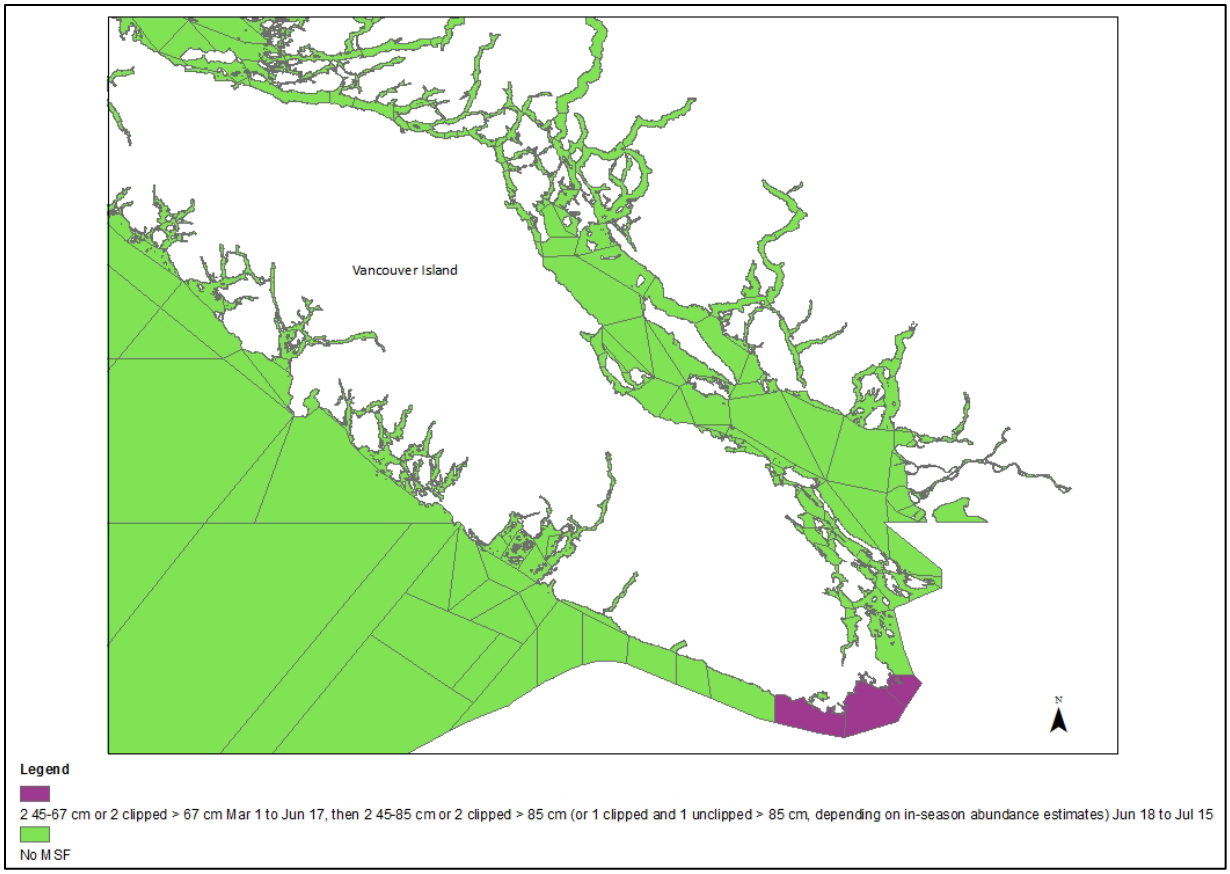

Figure 4-2. Proposed 2016 bag limits for southern British Columbia Chinook Salmon recreational fishery by PFMC Sub Area.

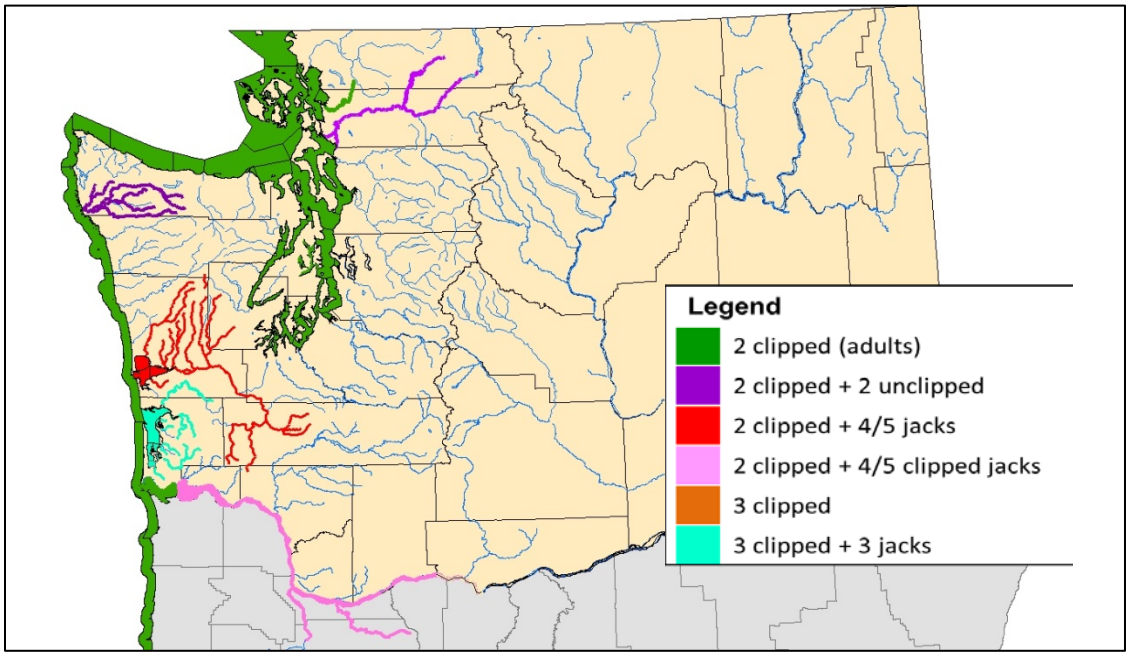

Figure 4-3. Proposed 2016 bag limits for Coho Salmon mark-selective fisheries in Washington and Oregon.

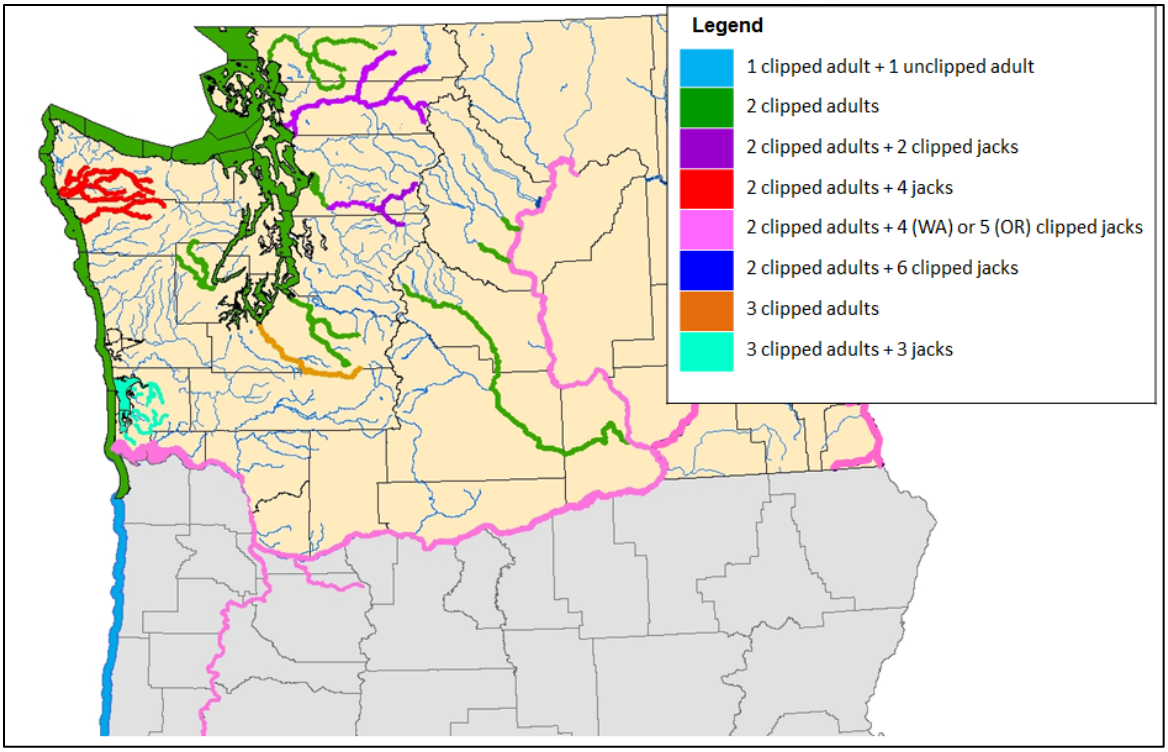

Figure 4-4. Proposed 2016 bag limits for Chinook Salmon mark-selective fisheries in Washington and Oregon. Bubble fisheries along the Oregon coast are small in area and not contiguous as is indicated in the figure.

4.6 Recommendations

Currently, the annual post-season MSF data is available from SFEC co-chairs or online in a database at NWIFC. The final estimates for past years are not being reported in any publications. There is a need to make the information more readily available. A pilot database exists that contains post-season estimates of Chinook Salmon MSFs that have occurred in Puget Sound and coastal Washington waters. This Recreational Angling Impact Database (RAID) is currently maintained by the NWIFC and is available at http://access.nwifc.org/webapps/index.asp. To facilitate compilation and accessibility of post-season MSF data, SFEC recommends the expansion of this database to accommodate these data as they are provided by agencies potentially by coordinating with Data Sharing and Data Standards.

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.

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6 APPENDICES

Appendix A. Status of Mass Marking Proposals Received in 2015 for Mass Marking to Occur in 2016.

Description of Proposal and Agency	New or Continuation Proposal	SFEC Proposal Number
Coho Salmon		
Southern BC Coho – CDFO	Continuation	MM-FOC-01-2016
Puget Sound Coho – WDFW/Tribal	Continuation	MM-WDFW-01-2016
Washington Coast Coho – WDFW/Tribal	Continuation	MM-WDFW-04-2016
Washington Columbia River Coho – WDFW/Tribal	Continuation	MM-WDFW-05-2016
Columbia River Coho – USFWS	Continuation	MM-USFWS-04-2016
Puget Sound and WA Coast Coho – USFWS	Continuation	MM-USFWS-18-2016
Columbia River Coho – ODFW	Continuation	MM-ODFW-04-2016
Oregon Coast Coho – ODFW	Continuation	MM-ODFW-05-2016
Chinook Salmon		
Columbia River Chinook – USFWS	Continuation	MM-USFWS-17-2016
WA Coast Fall Chinook – USFWS	Continuation	MM-USFWS-19-2016
Willamette River Spring Chinook – ODFW	Continuation	MM-ODFW-01-2016
OR North Coast Spring Chinook – ODFW	Continuation	MM-ODFW-02-2016
OR South Coast Spring Chinook – ODFW	Continuation	MM-ODFW-03-2016
Columbia River Fall Chinook – ODFW	Continuation	MM-ODFW-06-2016
OR Coast Fall Chinook – ODFW	Continuation	MM-ODFW-07-2016
Mid-Columbia R Spring Chinook – ODFW	Continuation	MM-ODFW-08-2016
Snake River Fall Chinook – ODFW[1]	Continuation	MM-ODFW-09-2016
Snake River Spring Chinook – ODFW	Continuation	MM-ODFW-10-2016
Puget Sound Chinook – WDFW/Tribal	Continuation	MM-WDFW-02-2016
Columbia R. Chinook – WDFW/CRITFC	Continuation	MM-WDFW-03-2016
Washington Coastal Chinook – WDFW/Tribal	Continuation	MM-WDFW-06-2016
Coho and Chinook Salmon		
Mid-Columbia Spring Chinook – YNF	New	MM-YNF-01-2016

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

Appendix B. 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, SE Alaska, Chinook	MSF-ADFG-01	2016	**New**
Fisheries and Oceans Canada			
Sport, Southern BC, Coho	MSF-FOC-02	2016	2003–2015
FSC, Lower Fraser freshwater, Coho	MSF-FOC-03	2016	2006–2015
Commercial, Southern BC, Coho	MSF-FOC-05	2016	2005–2015
Sport, Lower Fraser freshwater, Coho	MSF-FOC-06	2016	2003–2015
Sport, Strait of Juan de Fuca, Chinook	MSF-FOC-07	2016	2009–2015
Sport, WCVI, selected subareas, mainly inside, Chinook	MSF-FOC-08	2011	none
Washington Department of Fish and Wildlife			
Sport, Skykomish R, Chinook	MSF-WDFW-01	2016	2003–2014
Sport, Yakima River, spring Chinook	MSF-WDFW-03	2016	2004,2008, 2010–2015
Sport, L Snake River, fall Chinook	MSF-WDFW-05	2016	2008–2015
Sport, Washington coast areas 1-4 & Col R Buoy 10, Coho	MSF-WDFW-06	2016	2003–2015
Sport, Puget Sound, Coho	MSF-WDFW-07	2016	2003–2015
Sport, Carbon & Puyallup R, Chinook	MSF-WDFW-09	2016	2003–2015
Sport, Puget Sound Areas 9-13, summer Chinook	MSF-WDFW-11	2011	2007–2011
Sport, Upper Skagit R summer Chinook	MSF-WDFW-12	2016	2005–2015
Sport, Nooksack R, Chinook	MSF-WDFW-13	2016	2004–2015
Sport, Nisqually R, Chinook, Jul-Jan	MSF-WDFW-14	2016	2005–2015
Commercial, WA areas 1-4, Coho	MSF-WDFW-15	2016	2003–2015
Sport, Nooksack River, Coho	MSF-WDFW-18	2011	2003–2011
Sport, WA Coast Area 1-4, fall Chinook	MSF-WDFW-19	2016	2010–2015
Sport, Skokomish River, Chinook	MSF-WDFW-20	2016	2010–2015
Troll, WA areas 1-4, Chinook	MSF-WDFW-21	2010	never
Sport, Willapa Bay, tributaries, Coho	MSF-WDFW-22	2016	2003–2015
Sport, Grays Harbor, Marine Area 2.2, Coho	MSF-WDFW-23	2016	2007–2016
Sport, Grays Harbor, tributaries, Coho	MSF-WDFW-24	2016	2003–2015
Commercial, Willapa Bay, Chinook	MSF-WDFW-25	2016	2010–2015
Sport, Willapa Bay, Marine Area 2.1, Chinook	MSF-WDFW-26	2016	2010–2015
Sport, Willapa Bay, tributaries, Chinook	MSF-WDFW-27	2016	2010–2015
Sport, Snake River, spring Chinook	MSF-WDFW-28	2016	2010–2015
Sport, Willapa Bay, Marine Area 2.1, Coho	MSF-WDFW-29	2016	2010–2015
Commercial, Grays Harbor, Marine Area 2C, Coho	MSF-WDFW-30	2011	2009-2010
Sport, Quillayute River, Coho	MSF-WDFW-31	2016	2003–2015

Fishery, Location, Target Hatchery Stock by Agency[1]	Proposal ID[2]	Most Recent Proposal[3]	Years with MSF since 2003[4]
Sport, Quillayute River system, spring summer Chinook	MSF-WDFW-32	2016	2003–2015
Sport, Hoh River, spring Chinook	MSF-WDFW-33	2016	2008–2015
Sport summer, WA areas 5-13, Chinook[5]	MSF-WDFW-35	2016	2003–2015[6]
Sport winter, WA areas 5-13, Chinook[7]	MSF-WDFW-36	2016	2005–2015[8]
Sport, Snohomish R., Chinook	MSF-WDFW-37	2016	never
Commercial, Grays Harbor areas 2A,2B,2C,2D, Chinook	MSF-WDFW-38	2016	2013–2015
Sport, Lower Grand Ronde, spring Chinook	MSF-WDFW-39	2016	never
Sport, Skagit R, Chinook	MSF-WDFW-40	2016	2013–2015
Sport, Samish R, Chinook	MSF-WDFW-41	2016	2009–2011, 2015
Sport, Columbia R., Priest Rapids Dam to Chief Joseph Dam, Chinook	MSF-WDFW-42	2016	**New**
Sport, Wenatchee R., mouth to Leavenworth, Chinook	MSF-WDFW-43	2016	**New**
Sport, Entiat R., mouth to ENFH, Chinook	MSF-WDFW-44	2016	**New**
Sport, Chelan R., mouth to powerhouse, Chinook	MSF-WDFW-45	2016	**New**
Oregon and Washington Departments of Fish and Wildlife (jointly for Columbia River)			
Sport, Lower Columbia R, spring Chinook	MSF-ODFW/WDFW-01	2016	2003–2015
Sport, Columbia R, summer Chinook	MSF-ODFW/WDFW-02	2016	2003–2015
Commercial, L. Columbia R, spring Chinook (large & tangle net)	MSF-ODFW/WDFW-03	2016	2003–2015
Sport, Lower Columbia R, Coho (since 1999)	MSF-ODFW/WDFW-04	2016	2003–2015
Sport, Columbia R., fall Chinook	MSF-ODFW/WDFW-05	2016	2011–2015
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), Coho[9]	MSF-ODFW/WDFW-06	2016	2013–2015
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), Chinook (Coho, secondarily)[10]	MSF-ODFW/WDFW-07	2016	2014–2015
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	2016	2008–2015
Sport, Oregon coast, Coho	MSF-ODFW-03	2014	2003–2014
Sport, upstream of Willamette Falls, spring Chinook	MSF-ODFW-04	2016	2015
Sport, downstream of Willamette Falls, Coho	MSF-ODFW-05	2016	2003–2015
Sport, Sandy River to mouth of Salmon River, Coho	MSF-ODFW-06	2016	2003–2015
Sport, Sandy R, spring Chinook	MSF-ODFW-07	2016	2003–2015
Commercial, Leadbetter Pt., WA to Cape Falcon, OR, Coho	MSF-ODFW-08	2016	2010–2015
Commercial, Leadbetter Pt, WA to Cape Falcon, OR, spring Chinook	MSF-ODFW-09	2016	2008-2015
Sport, Cape Falcon, OR to the OR/CA border, Coho	MSF-ODFW-10	2016	2003–2015
Sport, Leadbetter Pt, WA to Cape Falcon, OR, spring Chinook	MSF-ODFW-11	2016	2010–2015
Sport, From Leadbetter Pt, WA to Cape Falcon, OR, Coho	MSF-ODFW-12	2016	2003–2015

Fishery, Location, Target Hatchery Stock by Agency[1]	Proposal ID[2]	Most Recent Proposal[3]	Years with MSF since 2003[4]
Sport, Willamette R. below Willamette Falls, Chinook	MSF-ODFW-13	2016	2015
Idaho Department of Fish and Game			
Sport, Snake River, on fall Chinook	MSF-IDFG-04	2015	2009–2015

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.

Appendix C. 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	(1996-2002)
		Goldstream River	(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	(1996-2007)
		Skookum Creek H.	
		Lummi Bay Ponds	
	Skagit	Skagit (Marblemount H.)	(1994-current)
		Baker River Wild	
	Stillaguamish/Snohomish	Skykomish (Wallace River)	(1996-current)
		Tulalip Bay (Bernie Gobin)	
	Mid Puget Sound	Green River (Soos Creek H.)	(1996-current)
	South Puget Sound	Puyallup (Voights Creek H.)	(1997-current)
		Peale Pass (Squaxin Net Pens)	
		Nisqually (Kalama Creek H.)	
	Hood Canal Wild	Big Beef Creek	
	North Hood Canal	Quilcene NFH	(1996-current)
		Quilcene Net Pens	(1996-2001)
		Port Gamble Net Pens	(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	(1996-2010)
		Solduc (fall run)	(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.	(1997-current)
		Nemah River. H.	
Columbia Basin	Lower Columbia River	Lewis River (Type N/Type S)	(1994/98-current)
		Eagle Creek	(1995-current)
		Sandy River	(1995-2008)
		Bonneville/Tanner Cr.	(1996-2011)
		Youngs Bay Net Pens	(1997-2001)
		Willard NFH	(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)

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

Area	Natural/Unmarked Stock Representation	Exploitation Rate Indicator Stocks	Run Type	DIT (BY)
S.E. Alaska	Southeast Alaska	Alaska Spring	Spring	
British Columbia	North/Central BC	Kitsumkalum	Summer	
	West Coast Vancouver Is	Robertson Creek	Fall	
	Georgia Strait	Puntledge Quinsam Big Qualicum Cowichan	Summer Fall Fall Fall	
	Lower Fraser River	Chehalis (Harrison Stock)[1] Chilliwack (Harrison Stock)	Fall Fall	 (1998-2011)
	Upper Fraser	Shuswap River	Fall	(1998-2002)
Puget Sound	North Puget Sound	Nooksack Spring Fingerling Samish Fall Fingerling	Spring Fall	(1998-2010) (1999-current)
	Central Puget Sound	Skagit Spring Yearling Skagit Spring Fingerling Skagit Summer Fingerling Skykomish Summer Fingerlings[2] Stillaguamish Summer/Fall Fingerling	Spring Spring Summer Fall Fall	(1998-2010) (1998-current) (2000-current)
	Hood Canal	George Adams Fall Fingerling	Fall	(1998-current)
	South Puget Sound	White River Spring Yearling[3] Green River Fall Fingerling Grovers Creek Fall Fingerling Nisqually Fall Fingerling South Puget Sound Fall Yearling	Spring Fall Fall Fall Fall	 (1997-current) (1999-current) (1998-current)
	Strait of Juan de Fuca	Hoko Fall Fingerling	Fall	
Washington Coast	North Wash. Coast	Sooes Fall Fingerling Queets Fall Fingerling Quinault Lake Fall Fingerling[2]	Fall Fall Fall	 (2004-current)
	Willapa Bay	Forks Creek Fall Fingerlings[2] Naselle River[2]	Fall Fall	(2007-current) (2013-current)
Columbia Basin	Columbia R. (WA)	Cowlitz Tule Spring Creek Tule Little White Salmon[2] Columbia Summers	Fall Tule Fall Tule Fall Bright Summer	 (2004-current) (2005-current)
	Columbia River (OR)	Columbia Lower River Hatchery	Fall Tule	(2006-2013)
	Upper Columbia R.	Columbia Upriver Bright Hanford Wild Priest Rapids	Fall Bright Fall Bright Bright	 (2009-current)
	Lower Columbia R.	Lewis River Wild Willamette Spring Lewis River Spring[2]	Fall Bright Spring Spring	 (1997-2006) (1998-current)
	Snake River	Lyons Ferry[2]	Fall Bright	(2004-current)
Oregon Coast	North Oregon Coast	Salmon River	Fall	

[1] These stocks are coded-wire-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 E. Hatchery Fish Proposed to be Released in 2016, by Mark and Tag Status, for Southern B.C., Washington, Columbia River, Snake River, and Oregon Coast.

These summaries include only stocks listed in mass mark proposals; therefor, Chinook Salmon releases in B.C. are not listed below. * denotes a DIT program.

				Number to be Tagged		Number to be Untagged	
Region	**Sub-Area**	**Hatchery**	**Stock**	**Ad+CWT**	**CWT Only**	**Ad Only**	**No Clip**
Coho Salmon							
Strait of Georgia	Johnstone St	P Hardy/Quatse	Cluxewe R	0	0	100,000	0
		Quinsam R	Quinsam R *	40,000	40,000	320,000	0
			Quatse R	0	0	100,000	0
	Georgia Basin East	Capilano R	Capilano R	0	0	500,000	10,000
		Chapman Cr	Chapman Cr	0	0	50,000	0
		Mossom Cr	Mossom Cr	0	0	4,000	0
		Noons Cr	Noons Cr	0	0	10,000	0
		Poco Hatchery	Coquitlam R	0	0	25,000	0
		Seymour R	Seymour R	0	0	55,000	0
		Tenderfoot Cr	Mamquam R	0	0	50,000	0
			Tenderfoot Cr	0	0	100,000	0
	Georgia Basin West	Big Qualicum R	Big Qualicum R	80,000	0	320,000	0
		Fanny Bay	Coal Cr	0	0	10,000	0
		Goldstream R	Goldstream R	0	0	100,000	0
		Little R	Little R	0	0	30,000	0
		Nanaimo R		0	0	84,000	0
		Oyster R	Oyster R	0	0	40,000	0
			Rosewall Cr	0	0	100,000	0
	Interior Fraser	Spius Cr	Coldwater R	65,000	0	0	0
		Thompson R N	Dunn Cr	0	0	0	20,000
			Deadman R	0	0	0	15,000
			Eagle R	60,000	0	0	0
			Salmon R	0	0	65,000	0
	Lower Fraser	Alouette R	Alouette R S	0	0	25,000	0
		Chehalis R	Chehalis R	0	0	700,000	0
		Chilliwack R	Chilliwack R	0	0	800,000	0
		Hoy Cr	Hoy Cr	0	0	5,000	0
		Hyde Cr/LWFR	Hyde Cr/LWFR	0	0	5,000	0
		Inch Cr	Inch Cr	150,000	0	0	0
			L Campbell R	0	0	40,000	0
			Nicomekl R	0	0	50,000	0
			Norrish Cr	0	0	100,000	0
			Serpentine R	0	0	50,000	0
			Stave R	0	0	75,000	0
		Kanaka Cr	Kanaka Cr	0	0	30,000	0
		L Campbell R	L Campbell R	0	0	40,000	0
West Coast Vancouver Is	NW Vancouver Is	Conuma R	Conuma R	0	0	62,000	0
		P Hardy/Quatse	Waukwaas Cr	0	0	100,000	0
		Nitinat R	Nitinat R	0	0	110,000	0
		Robertson Cr	Robertson Cr	40,000	0	160,000	0
Puget Sound	N. Puget Sound	Baker Lake	Baker River	0	0	65,000	0
		Bernie Gobin	Skykomish	70,000	0	930,000	0
		Harvey Creek	Fortson Creek	60,000	0	0	0
		Lummi Bay Sea Pens	Lummi Bay	50,000	0	950,000	0
		Marblemount	Skagit *	45,000	45,000	160,000	0
		NWSSC - Eagle Cr	Skykomish	0	0	54,000	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Coho Salmon							
		Skookum Creek	Skookum Creek	50,000	0	950,000	0
		Wallace River	Skykomish *	45,000	45,000	60,000	0
	Mid-Puget Sound	Elliott Bay Net Pens	Green River	50,000	0	400,000	0
		Everett SS Club	Skykomish	0	0	20,000	0
		Issaquah	Issaquah Creek	50,000	0	400,000	0
		Keta / Crisp Creek	Green River	50,000	0	450,000	0
		Laebugten Net Pens	Issaquah Creek	0	0	25,000	0
		Marine Tech Center	MTC / Soos Creek	0	0	10,000	0
		Puyallup	Puyallup	100,000	0	200,000	0
		Puyallup Tribal	Puyallup	100,000	0	0	0
		Soos Creek	Green River *	45,000	45,000	510,000	0
		TU- Des Moines	Green River	0	0	30,000	0
		Voights Creek	Puyallup *	45,000	45,000	690,000	0
	S. Puget Sound	Clear Creek	Clear Creek	50,000	0	250,000	0
		Garrison Springs	Minter Creek	0	0	100,000	0
		Kalama Creek	Kalama Creek	50,000	0	250,000	0
		Minter Creek	Minter Creek	0	0	500,000	0
		Squaxin Net Pens	Skykomish	50,000	0	1,750,000	0
	Hood Canal	George Adams	George Adams *	45,000	45,000	210,000	0
		Port Gamble Net Pens	Big Quilcene R	45,000	0	355,000	0
		Quilcene	Big Quilcene R*	72,000	72,000	256,000	0
		Quilcene Bay Net Pen	Big Quilcene R	40,000	0	110,000	0
	Strait of Juan de Fuca	Dungeness	Dungeness	0	0	500,000	0
		L Elwha H. of Salmon	Elwha River *	75,000	75,000	275,000	0
WA Coast	N. WA Coast	Educket Creek	Sooes River	0	0	40,000	0
		Hoko Falls	Hoko River	0	0	95,000	0
		Makah NFH	Makah+	55,000	0	185,000	0
		Quinault	Quinault	80,000	0	580,000	0
		Salmon River	Salmon River*	75,000	75,000	500,000	0
		Solduc	Solduc summers	0	0	100,000	0
			Solduc falls*	75,000	75,000	250,000	0
	Grays Harbor	Bingham Creek	Satsop Lates	0	0	150,000	0
			Satsop River*	75,000	75,000	0	0
		Buzzard Creek	Wishkah River	0	0	25,000	0
		Carlisle Lake	Satsop lates	0	0	50,000	0
			Satsop River	0	0	50,000	0
		Eight Creek	Satsop lates	0	0	100,000	0
		Friends Landing	Satsop River	0	0	25,000	0
		Humptulips	Humptulips	0	0	400,000	0
			Humptulips lates	0	0	100,000	0
		Lake Aberdeen	Van Winkle	0	0	30,000	0
WA Coast	Grays Harbor	Mayr Brothers	Wishkah River	0	0	300,000	0
		Satsop Springs	Satsop River	0	0	450,000	0
		Skookumchuck	Satsop lates	0	0	50,000	0
			Satsop River	0	0	50,000	0
		Westport Net Pens	Humptulips River	0	0	100,000	0
	Willapa	Forks Creek	Willapa lates	0	0	100,000	0
		Forks Creek	Willapa River *	75,000	75,000	50,000	0
		Naselle	Naselle R	0	0	1,200,000	0
			Naselle R lates	0	0	200,000	0
Columbia River	Snake River		Clearwater River	0	30,000	0	245,000
				0	30,000	0	245,000
	Upper Columbia R.	Cascade Hatchery	Wenatchee	0	301,000	0	216,000
		Twisp Acc. Pond	Mid-Col. Type S	0	90,000	0	0
		Winthrop NFH	Wenatchee	0	250,000	0	0
	Mid-Columbia R.	Beaver Cr Acc. Pond	Mid-Col. Type S	0	70,000	0	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Coho Salmon							
		Big Creek	Big Creek 13	25,000	0	510,000	0
		Bonneville	Tanner 14	0	0	545,000	0
		Butcher Pond	Mid-Col. Type S	0	148,000	0	0
		Cascade	Tanner 14	105,000	0	1,680,000	0
		Cascade	Umatilla 91	0	100,000	400,000	0
		Coulter Pond	Mid-Col. Type S	0	125,000	0	0
		Gold Cr Acc. Pond	Mid-Col. Type S	0	0	0	50,000
		Herman Creek Pond	Tanner 14	50,000	0	0	0
		Nason Wetlands	Mid-Col. Type S	0	105,000	0	0
		Rolfings Pond	Mid-Col. Type S	0	100,000	0	0
		Salmon River	Big Creek 13	0	0	175,000	0
		Sandy River	Sandy 11	50,000	0	350,000	0
		Wolf Cr Acc. Pond	Mid-Col. Type S	0	70,000	0	0
		Yakima	Yakima	0	1,500,000	0	1,000,000
			Eagle Cr/ Yakima R	500,000	0	0	0
	L. Columbia R	Clackamas River	Tanner 14	25,000	0	0	0
		Clatsop Co. Fisheries	Tanner 14	25,000	0	0	0
		Cowlitz	Cowlitz-Type N	0	0	1,200,000	0
		Cowlitz	Cowlitz-Type N (w)	978,000	0	0	0
		Deep River Net Pens	Type S	90,000	0	710,000	0
		Eagle Creek NFH	Eagle Creek *	25,000	25,000	300,000	0
		Grays River	Grays R-Type N	45,000	0	105,000	0
		Kalama Falls	Kalama F-Type N	45,000	0	255,000	0
		Klaskanine	Big Creek 13	25,000	0	725,000	0
		Klickitat	Klickitat-Type N	45,000	0	955,000	0
		Lewis River	Lewis R-Type N *	75,000	75,000	750,000	0
		Lewis River	Lewis R-Type S *	75,000	75,000	950,000	0
		Lower Herman Pond	Tanner 14	25,000	0	0	0
		N Toutle	Toutle - Type S	45,000	0	105,000	0
		Oxbow	Tanner 14	25,000	0	585,000	0
		Washougal	Washougal-Type N	45,000	0	105,000	0
		Washougal	Washougal-Type N	70,000	0	2,430,000	0
		Willard NFH	Wenatchee	0	110,000	0	280,000
OR Coast	North Coast	Nehalem	Fishhawk Lake 99	0	0	100,000	0
		Nehalem	Nehalem 32	0	0	100,000	0
		Nehalem	Trask River 34	0	0	100,000	0
	South Coast	Cole Rivers	Rogue River 52	25,000	0	150,000	0
		Rock Creek	Cow Cr (S. Ump)	0	0	60,000	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Fall Chinook Salmon							
Puget Sound	N. Puget Sound	Brenner Creek	SF Stillaguamish	45,000	0	0	0
		Glenwood Springs	Glenwood Spr falls	100,000	0	450,000	0
		Lummi Bay Sea Ponds	Samish R falls	0	0	500,000	0
		Samish	Samish R falls *	200,000	200,000	3,600,000	0
		Whatcom Creek	Samish R falls	0	0	500,000	0
	Mid-Puget Sound	Gorst Creek	Grovers Cr falls	0	0	1,580,000	0
		Grovers Creek	Grovers Cr falls *	200,000	200,000	25,000	0
		Hupp Springs	Minter Cr falls 1+	75,000	0	45,000	0
		Icy Creek	Big Soos falls 1+	100,000	0	200,000	0
		Issaquah	Issaquah Cr falls	0	0	2,000,000	0
		Palmer	Big Soos Cr falls	0	0	0	1,000,000
		Soos Creek	Big Soos Cr falls *	200,000	200,000	2,800,000	0
		Voights Creek	Voights Cr falls	90,000	0	1,510,000	0
	S. Puget Sound	Chambers Creek	Chambers Cr	0	0	400,000	0
		Clarks Creek	Puyallup R falls	0	0	900,000	0
		Clear Creek	Clear Cr falls*	200,000	200,000	2,900,000	0
		Garrison Springs	Garrison Springs falls	90,000	0	360,000	0
		Kalama Creek	Kalama Creek falls	0	150,000	0	0
		McAllister Springs	Clear Creek falls	100,000	0	400,000	0
		Minter Creek	Minter Creek falls 0+	0	0	1,400,000	0
		Tumwater Falls	Deschutes River falls	0	0	3,800,000	0
	Hood Canal	George Adams	George Adams falls *	225,000	225,000	3,350,000	0
		Hoodsport	Hoodsport falls	200,000	0	2,600,000	0
			Hoodsport falls 1+	0	0	120,000	0
	SJDF	Elwha	Elwha River falls	250,000	0	0	2,250,000
			Elwha River falls 1+	0	200,000	0	0
WA Coast	N. WA Coast	Educket Creek	Sooes River falls	0	0	100,000	0
		Hoko Falls	Hoko River falls	200,000	0	0	200,000
		Makah NFH	Sooes River	200,000	0	2,500,000	0
		Quinault Lake	Quinault R falls *	200,000	200,000	300,000	0
		Salmon River	Queets River falls	200,000	0	0	0
	Grays Harbor	Bingham Creek	Satsop River falls	0	0	200,000	0
		Humptulips	Humptulips R falls	0	0	500,000	0
		Lake Aberdeen	Van Winkle Cr falls	0	0	50,000	0
		Satsop Springs	Satsop River falls	0	0	300,000	0
		Wishkah (Mayr Bros)	Wishkah River falls	0	0	200,000	0
	Willapa	Forks Creek	Willapa R falls *	200,000	200,000	2,800,000	0
		Naselle	Naselle R falls *	75,000	75,000	350,000	0
		Nemah	Nemah River falls	0	0	3,300,000	0
Columbia River	Snake River	Irrigon	1Snake River 97	0	0	200,000	200,000
	Snake River	Irrigon	1Snake River 97	200,000	0	800,000	0
	L. Columbia R	Beaver Creek	Elochoman (W) Falls	0	190,000	0	0
		Big Creek	Big Creek Tule 13	250,000	0	4,950,000	0
		Big Creek	Rogue 52	25,000	0	0	725,000
		Bonneville	Tanner Cr Tule 14	215,000	0	1,985,000	0
		Cowlitz	Cowlitz - Falls	1,100,000	0	0	0
		Cowlitz	Cowlitz - Falls	100,000	0	2,300,000	0
		Deep River Net Pens	Elochoman - Falls	90,000	0	910,000	0
		Fallert Creek	Kalama - Falls	125,000	0	3,375,000	0
		Kalama Falls	Kalama - Falls	125,000	0	3,375,000	0
		Lewis River	Lewis R-Falls (wild)	100,000	0	0	0
		N Toutle	Toutle - Falls	100,000	0	1,300,000	0
		S.Fk. Klaskanine	Rogue 52	30,000	0	0	670,000
		Spring Creek -	Tule Falls *	405,000	405,000	9,690,000	0
		Washougal	Washougal - Falls	100,000	0	800,000	0
		Youngs Bay	Rogue 52	25,000	0	0	725,000

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Fall Chinook Salmon							
OR Coast	North Coast	Salmon River	Salmon R 36	200,000	0	0	0
		Trask River	Trask R 34	30,000	0	146,000	0
	South Coast	Bandon	Coos River 37	0	0	547,500	0
		Cole Rivers	Coos River 37	30,000	0	170,000	0
		Cole Rivers	Coquille 44	0	0	154,600	0
		Elk River	Chetco R 96	0	0	200,000	0
		Elk River	Elk River 35	255,000	0	20,000	0
		Indian Creek	Lower Rogue 61	0	0	90,000	0
		Millicoma	Coos River 37	30,000	0	70,000	0
		Morgan Creek	Coos River 37	30,000	0	615,000	0
		Noble Creek	Coos River 37	30,000	0	570,000	0
		Rock Creek	Smith River 151	0	0	70,000	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
URB Chinook Salmon							
Columbia River	Snake River	Lyons Ferry	Lyons Ferry - Falls	200,000	0	0	0
		Lyons Ferry	Lyons Ferry-Falls 1+	225,000	225,000	0	0
	Mid-Columbia R	Hanford Reach	Hanford - Wild	200,000	0	0	0
		Priest Rapids	Priest Rapids - URBs	600,000	600,000	6,099,543	0
		Prosser	URBs	0	250,000	0	0
		Ringold	URBs	200,000	0	3,300,000	0
		Yakima	Yakima	170,000	0	1,530,000	0
	L. Columbia R	Bonneville	Umatilla 91	900,000	0	0	0
		Klickitat	Klickitat - falls	450,000	0	3,600,000	0
		Little White Salmon	URB Falls *	200,000	200,000	4,100,000	0
			URB Falls	100,000	100,000	1,800,000	0
				200,000	0	1,500,000	0
		Umatilla	Umatilla 91	150,000	0	0	450,000

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Spring Chinook Salmon							
Puget Sound	N. Puget Sound	Kendall Creek	NF Nooksack springs	200,000	0	600,000	0
		Marblemount	Skagit R springs *	277,500	200,000	110,000	0
		Skookum Creek	SF Nooksack springs	0	1,000,000	0	0
	Mid-Puget Sound	Hupp Springs	White River springs	400,000	0	0	0
		Puyallup	White River springs	0	100,000	0	800,000
		White River	White River springs	0	340,000	0	0
		White River	White River springs 1+	0	55,000	0	0
	SJDF	Dungeness	Dungeness R springs	0	50,000	0	0
		Greywolf Acclimation	Dungeness R spr 0+	0	50,000	0	0
		Hurd Creek	Dungeness R spr 1+	0	50,000	0	0
		Up Dungeness Acc Pd	Dungeness R spr 0+	0	50,000	0	0
Columbia River	Snake River	Dworshak	- Spr 1+	120,000	0	1,380,000	0
		Kooskia	- Spr 1+	100,000	0	450,000	50,000
		Lookingglass	Catherine Cr 201	100,000	0	50,000	0
			Imnaha R 29	324,000	0	166,000	0
			Lookingglass 81	125,000	0	125,000	0
			Lostine R 200	125,000	0	125,000	0
			Up.Grande Rhonde	125,000	125,000	0	0
		Tucannon	Tucannon - spr 1+	0	225,000	0	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Spring Chinook Salmon							
	Upper Columbia R.	Chewuch Acc Pond	Methow - spr 1+	0	60,000	0	0
		Chiwawa Pond	Chiwawa - springs 1+	0	144,000	0	0
		Cle Elum	Yakima River 1+	810,000	0	0	0
		Leavenworth	- Springs 1+	200,000	0	1,000,000	0
		Methow	Methow - springs 1+	0	135,000	0	0
		Methow	- Springs 1+	415,000	0	0	0
		Twisp	Twisp - springs 1+	0	30,000	0	0
	Mid-Columbia R	Cascade	Sandy R 11	132,000	0	0	0
		Nason Creek	Nason Cr- spr1+	223,670	0	0	0
		Round Butte	Deschutes 66	264,000	0	0	0
		Round Butte	Hood River 50	0	0	80,000	0
		Umatilla	Umatilla 91	90,000	150,000	570,000	0
		Warm Springs	- Springs 1+	140,000	0	0	0
	L. Columbia R	Big Creek	Clackamas 19	25,000	0	225,000	0
		Big Creek	Clackamas 19	25,000	0	225,000	0
		Bonneville	Clackamas 19	100,000	0	545,000	0
		Carson	- Springs 1+	75,000	0	1,045,000	0
		Carson	- Springs 1+	50,000	0	200,000	0
		Cathlamet Chan NP	Cowlitz - springs 1+	250,000	0	0	0
		Clear Creek Acc Pond	Lewis R - springs 1+	0	35,000	0	0
		Cowlitz	Cowlitz - springs 1+	200,000	0	1,041,899	0
		Cowlitz	Cowlitz - springs fall	100,000	0	400,000	0
		Crab Cr Acc Pond	Lewis R - springs 1+	0	0	0	15,000
		Eagle Creek	Clackamas 19	40,000	0	200,000	0
		Fallert Creek	Kalama - springs 1+	100,000	0	400,000	0
		Friends of the Cowlitz	Cowlitz - springs 1+	0	0	55,000	0
		Gnat Creek	McKenzie 23	25,000	0	125,000	0
		Gnat Creek	S.Fk. Santiam 24	75,000	0	875,000	0
		Gnat Creek	South Santiam 24	25,000	0	125,000	0
		Klickitat	Klickitat - springs 1+	140,000	0	460,000	0
		Lewis River	Lewis R - spr 1+ *	150,000	150,000	950,000	0
		Little White Salmon	- Springs 1+	75,000	0	925,000	0
		Marion Forks	N.Fk. Santiam 21	80,000	0	405,000	0
		McKenzie	McKenzie 23	300,000	0	305,000	0
		Muddy R Acc Pond	Lewis R - springs 1+	0	50,000	0	0
		South Santiam	S.Fk. Santiam 24	50,000	0	250,000	0
		Willamette	S.Fk. Santiam 24	30,000	0	391,000	0
		Willamette	Willamette 22	575,000	0	1,839,000	0
		Willamette	– Springs 1+	25,000	0	215,000	0
		Youngs By & Blind	South Santiam 24	50,000	0	750,000	0
		Youngs By &Tongue P	North Santiam 21	75,000	0	675,000	0
OR Coast	North Coast	Cedar Creek	Nestucca 47	25,000	0	205,000	0
		Trask River	Trask 34	30,000	0	183,000	0
	South Coast	Cole Rivers	Rogue River 52	90,000	0	1,818,350	0
		Rock Creek	Umpqua R 55	0	0	342,000	0

Region	Sub-Area	Hatchery	Stock	Number to be Tagged		Number to be Untagged	
				Ad+CWT	CWT Only	Ad Only	No Clip
Summer Chinook Salmon							
Puget Sound	N. Puget Sound	Bernie Gobin	Skykomish R sum	100,000	100,000	2,200,000	0
		Marblemount	Skagit River summers	200,000	0	0	0
		Wallace River	Skykomish R sum 1+	0	0	500,000	0
		Wallace River	Skykomish R sum *	200,000	200,000	600,000	0
		Whitehorse	NF Stillaguamish R sum	220,000	0	0	0
WA Coast	N. WA Coast	Bear Springs	SolDuc summers	0	50,000	0	0
		SolDuc	SolDuc summers 0+	70,000	0	0	0
		SolDuc	SolDuc summers 1+	80,000	0	170,000	0
Columbia River	Upper Columbia R.	Carlton Pond	Methow/Okanogan sum 1+	200,000	0	0	0
		Chelan Falls	Wells - summers 1+	576,000	0	0	0
		Entiat -	Summers 1+	200,000	0	200,000	0
		Similkameen Pd	Methow / Okanogan - sum 1+	167,000	0	0	0
	Mid-Columbia R	Dryden Pond	Wenatchee - summers 1+	500,000	0	0	0
		Prosser	Wells 0+	0	1,000,000	0	0
		Wells	Wells - summers	484,000	0	0	0
		Wells	Wells - summers 1+	320,000	0	0	0