

PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE

REVIEW OF MASS MARKING AND
MARK-SELECTIVE FISHERY ACTIVITIES
PROPOSED TO OCCUR IN 2013

REPORT SFEC (15)-1

January 2015

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LIST OF ACRONYMS WITH DEFINITIONS

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

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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 2013. Issues with implications for maintenance of the coastwide coded-wire tag program are identified and recommendations are proposed.

Summary of 2013 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 and 14 for Chinook) were received for mass marking (MM) occurring in 2013 (Appendix E). Of these, 21 were received from southern British Columbia (BC) and southern United States (US) and one proposal was received from Alaska Department of Fish and Game (ADFG) to mass mark 300,000 Chinook released into Cook Inlet. The Selective Fishery Evaluation Committee (SFEC) believes these proposals cover all MM programs of relevance to the Pacific Salmon Commission (PSC).

Within the 21 MM proposals received from southern BC and southern US, approximately 35 million Coho are proposed to be mass-marked in 2013 (Table 2-1; Figure 2-1A), a level comparable to that proposed in 2012. Essentially all hatchery Coho production intended for harvest, from southern BC and southern US hatcheries will be mass marked. Currently there are 18 proposed Coho Salmon DIT groups (Table 2-1), of which two will be released from southern BC, seven from Puget Sound, five from the Washington (WA) coast, and four from the Columbia River Basin.

Approximately 114 million Chinook are proposed to be mass marked in 2013 from southern US Chinook hatcheries (Table 2-1; Figure 2-1B). This is approximately 1 million more than were proposed for 2012. Most all hatchery Chinook production from southern US hatcheries intended for harvest will be mass marked. Currently there are 14 proposed Chinook Salmon DIT groups (Table 2-1, Appendix H), of which seven will be released from Puget Sound facilities, two from coastal facilities, and five from Columbia River facilities.

Sampling Programs

Assuming recent exploitation rates and sampling programs, the SFEC estimates the proposed mass marking of Coho stocks in 2013 will result in annual encounters of untagged marked Coho in sampling programs of approximately 400 Coho in Alaska (AK) and 3,000 Coho in Canada (Table 2-4). For southern US Chinook stocks, annual encounters of untagged marked Chinook in sampling programs are projected to be approximately 9,300 Chinook in AK, 14,000 Chinook in Canada, and 1,300 Chinook in California (Table 2-4).

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 group releases to estimate fishery impacts. Electronic tag detection (ETD) equipment has been developed as a means to efficiently identify marked and unmarked fish containing CWTs. However, ETD is not employed coastwide because of continuing reservations by some agencies regarding the cost, accuracy, and practical feasibility of incorporating this technology into their sampling programs. The Alaska Department of Fish and Game (ADFG), Canadian Department of Fisheries and Oceans (CDFO), Oregon Department of Fish and Wildlife (ODFW), and California Department of Fish and Wildlife (CDFW) all conduct sampling programs which will not recover the unclipped component of DIT programs required to assess impacts of MSFs. Fisheries from which recoveries of the unmarked component of a DIT group should have been observed create gaps in analyses of fishery impacts on unmarked (wild) fish.

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

Encounters of large numbers of mass-marked Chinook are increasingly impacting catch sampling programs in northern fisheries; for example, approximately 63% of the Chinook caught in 2012 in the southeast Alaskan troll fishery with a missing adipose fin did not contain a CWT (Figure 2-3). 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 will impact the programs.

A new type of electronic CWT detection wand, the “T-wand”, is now available. The manufacturer believes the increased sensitivity of these wands should detect all CWTs.

Summary of 2013 Mark-Selective Fishery Proposals

MSFs have been prosecuted for Coho since 1998 and for Chinook since 2003. For 2013, the SFEC received 43 MSF proposals for Coho and Chinook salmon in CDFO, WDFW, and ODFW fisheries. The SFEC believes these proposals cover all MSFs planned for 2013 of relevance to the PSC. The proposals submitted to the SFEC for review are listed in Table 3-1 (also see Appendix F). Further details describing the proposed MSFs and comments by the SFEC are provided in Table 3-2 and Table 3-3.

Fifteen proposals were received for Coho Salmon MSFs to occur in 2013 and 29 proposals were received for Chinook Salmon MSFs. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted on time.

SFEC received five proposals for new mark-selective fisheries. Oregon Department of Fish and Wildlife and WDFW jointly submitted two proposals for commercial fisheries targeting Coho and Chinook in the Lower Columbia River. The remaining three proposals were submitted by WDFW for Chinook sport MSFs on the Snohomish and Lower Grand Ronde rivers and a commercial Chinook fishery in Grays Harbor.

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

The majority of MSF proposals are for terminal marine or freshwater areas, each of which will impact mature fish of one to several stocks. Multiple MSFs for both Coho and Chinook are also expected to occur in ocean areas in 2013 in BC, WA (WA ocean areas 1 through 4 and the Columbia River), and OR. These fisheries will impact many stocks and also multiple broods of Chinook. Table 2-4 provides estimates of projected encounters of fish to be mass marked in 2013 in future regional fishery sampling programs. These estimates are based on the number of mass-marked fish released by each participating agency. Table 3-4 and Table 3-5 each provide historical information on encounters of tagged and marked fish to identify Coho and Chinook tagged stocks that can be expected in these areas with MSFs.

Issues and Concerns

Post-season Reports

Post-season reports on MSFs are required for each MSF prosecuted. One of the basic functions of these reports is to provide a record of how fisheries were actually 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 three tables (Appendix I). The first two tables should be submitted by the annual PSC post-season meeting following the year of the fishery. No SFEC MSF post-season report/tables were found in the US or Canadian post-season reports (Jan 2013). Although these SFEC tables are not included in the PSC post-season reports, CDFO and WDFW do provide fishery regulations and preliminary landed catch estimates for mark-selective fisheries in these reports.

Mixed-Bag Regulations

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

agencies proposing these mixed bag regulations should assist in developing the analytical tools to measure the impacts of these fisheries.

Recommendations and Issues Requiring PSC Direction

Proposal Review Process

It is recommended that the PSC request agencies to submit proposals for all potential 2014 MM and MSFs by November 2013, and for agencies to provide both preliminary and final post-season reports on the conduct of MSFs within the timeframe adopted by the PSC. Agencies need to prioritize these tasks so that proposals and MSF post-season reports are completed and submitted in a timely manner.

Interagency Coordination and Cooperation

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

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

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

1 INTRODUCTION

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

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

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

The SFEC reviewed proposals for MM activities and MSFs anticipated by agencies to occur in 2013. This report summarizes the results of the review of MM and MSF proposals received between November and December 2012. 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 and 14 Chinook) were received by the PSC for 2013 marking activities (Appendix E). Of these, 21 were received from southern British Columbia (BC) and southern United States (US) and one proposal was received from Alaska Department of Fish and Game (ADFG). This proposal is to mass mark 300,000 Chinook in Cook Inlet Alaska. However, the recoveries from this small release are all projected to occur within Alaska, and therefore would not impact other agencies' programs. All BC and southern US proposals are summarized in Table 2-1. These 21 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.

In order to evaluate the impacts of MM proposals on coastwide sampling programs, marking agencies were requested to provide projected fishery encounters of mass marked fish in the proposals. A standardized method of estimating fishery encounters was provided to the agencies and this method is described in the MM proposal template in Appendix B.

2.2 Mass Marking Levels

Approximately 35 million Coho are proposed to be mass marked in 2013 from southern BC, Washington, and Oregon (Table 2-1). Southern BC also plans to release an additional 4 million Coho fry, the majority of which are unclipped. Although there has been a gradual decline in coastwide Coho production since brood year 1997, there have been no significant changes to proposed marking levels from brood year (BY) 2001 to BY 2012. Annual trends in Coho MM and total production, for BYs 1997 to 2012, are shown in Figure 2-1A. Geographical details of the fish to be released in 2013, by mark and tag status, are displayed in Figure 2-2A. The vast majority of the coastwide Coho production, and essentially all Coho intended for harvest, will be mass marked. For the production that will not be mass marked, approximately 3.7 million (85% of the unmarked fish) will be tagged and unmarked.

The total BY 2012 southern US Chinook hatchery production from Washington and Oregon, for the area and stocks covered by the 2013 proposals, is projected at approximately 144 million released fish. Annual trends in Chinook MM and total production, for BYs 1997 to 2012, are shown in Figure 2-1B. Geographical details of the proposed BY 2012 releases, by mark and tag status, are displayed in Figure 2-2B.

Approximately 114 million Chinook are proposed to be mass marked from southern US Chinook hatcheries in 2013 (Table 2-1). This is approximately 1 million more than the number proposed to be marked in 2012. For the production that will not be mass marked, approximately 19.4 million will be both tagged and marked, approximately 6.8 million will be tagged and unmarked, and approximately 2.9 million will be intentionally left unmarked for restoration programs (Figure 2-2B). No MM of Chinook is anticipated for hatchery production from CA and BC.

2.3 Double-Index-Tag Groups

Double-index-tag groups provide information necessary for direct estimation of total MSF impacts on unmarked fish. Appendix G and Appendix H list the Coho and Chinook Salmon PSC indicator stocks, including those that are DIT groups. Currently, there are 18 proposed Coho Salmon DIT groups (Table 2-1), of which two will be released from southern BC, seven from Puget Sound (PS), six from the Washington (WA) coast, and four from the Columbia River Basin. Chinook Salmon DIT groups currently total 14 (Table 2-1, Appendix H), of which seven will be released from Puget Sound facilities, two from WA coastal facilities, and one spring and four fall stocks from Columbia River facilities. WDFW has maintained DIT groups for both species, but the number of DIT groups outside WA has declined in recent years. For example, the fall Chinook DIT program at Chilliwack Hatchery ended with BY 2011. As new MSFs are being proposed both in BC and in areas off the WA coast and in the Columbia River for fall Chinook, further evaluation of the DIT programs is necessary. The following stocks are recommended to be double-index tagged: 1) lower Columbia River tule fall Chinook – Washougal Hatchery; 2) Columbia River summer Chinook – Wells Hatchery; 3) Snake River fall Chinook subyearlings – Lyons Ferry Hatchery; 4) Willamette Spring Chinook (reinstate DIT program with electronic terminal sampling); 5) North Oregon Coast Chinook (Salmon River); and, 6) Mid Oregon Coast Chinook. These recommendations have not been implemented by the associated agencies due to a lack of funding and conflicting marking and evaluation priorities.

Table 2-1. Mass marking of Coho and Chinook salmon and number of DIT groups proposed for 2012 and 2013¹.

Species	Area	Run	Agency	DIT Groups	Mass Marking (millions)		Significant Changes from 2012
					2012	2013	
Coho	Strait of Georgia		CDFO	2	5.5	5.1	
	W. Coast of Vanc. Isl.		CDFO	0	0.4	0.5	
	Puget Sound		WDFW/Tribal	6	10.5	10.2	
			USFWS	1	0.3	0.3	
	WA Coast		USFWS	1	0.8	0.7	Dropped DIT program at Makah
			WDFW/Tribal	4	4.5	4.3	
	OR Coast		ODFW	0	0.5	0.5	
	Columbia Basin		USFWS	1	0.3	0.5	Includes production previously unreported
WDFW			2	7.6	7.9		
ODFW			1	4.9	5.1		
Total Coho				18	35.3	35.1	
Chinook	BC	L Fraser R	CDFO				Dropped with BY 2011
	Puget Sound	Spring	WDFW/Tribal	1	0.4	0.7	Dropped Nooksack Spring DIT program
		Summer	WDFW/Tribal	1	2.4	2.7	
		Fall	WDFW/Tribal	5	28.9	29.8	
	WA Coast	Spr/Sum	WDFW/Tribal	0	0.2	0.2	
		Fall	USFWS	0	2.3	1.0	
			WDFW/Tribal	2	7.9	8.2	
	OR Coast	N. Spring	ODFW	0	0.4	0.4	
		S. Spring	ODFW	0	2.1	2.1	
		Fall	ODFW	0	1.4	2.0	
	Columbia Basin	Spring	ODFW (Willamette)	0	4.2	5.3	Includes production previously unreported
			ODFW (Col. R)	0	0.5	0.6	
			USFWS	0	--	3.2	
			WDFW	1	3.9	3.6	
		Fall-Tule	USFWS	1	11.2	11.2	
			WDFW	0	20.0	16.7	
			ODFW	1	7.9	7.9	
		Fall URB	WDFW	1	8.8	8.8	
	ODFW		0	7.6	4.3		
	USFWS		1	1.6	3.1		
Snake R. Fall	IDFG	0	0.6	-- ²			
	ODFW	0	0.6	0.6			
Snake R. Spring	ODFW	0	0.5	0.5	Includes production previously unreported		
USFWS	0	--	1.5				
Total Chinook				14	113.3	114.4	

¹ Does not include ADFG's proposal to mass mark 300,000 Chinook in Cook Inlet.

² Did not receive a proposal.

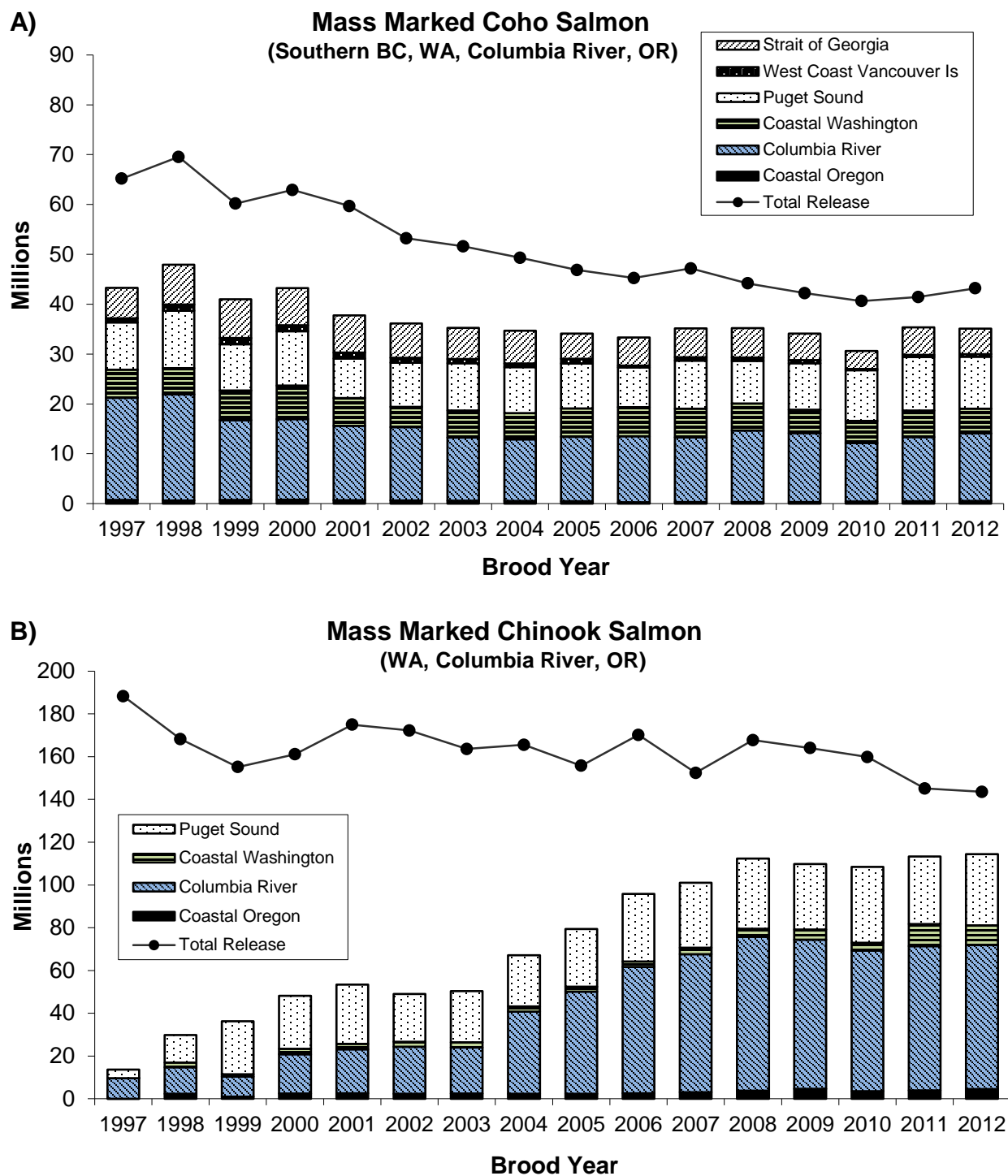


Figure 2-1. Number of mass marked Coho (panel A) and Chinook salmon (panel B) released by region and brood year, 1997–2012. The solid line represents total hatchery releases by brood year with the exception that fry releases of Coho are not included. Values used for brood years 1997–2010 are actual release sizes; values for brood years 2011 and 2012 are proposed release sizes.

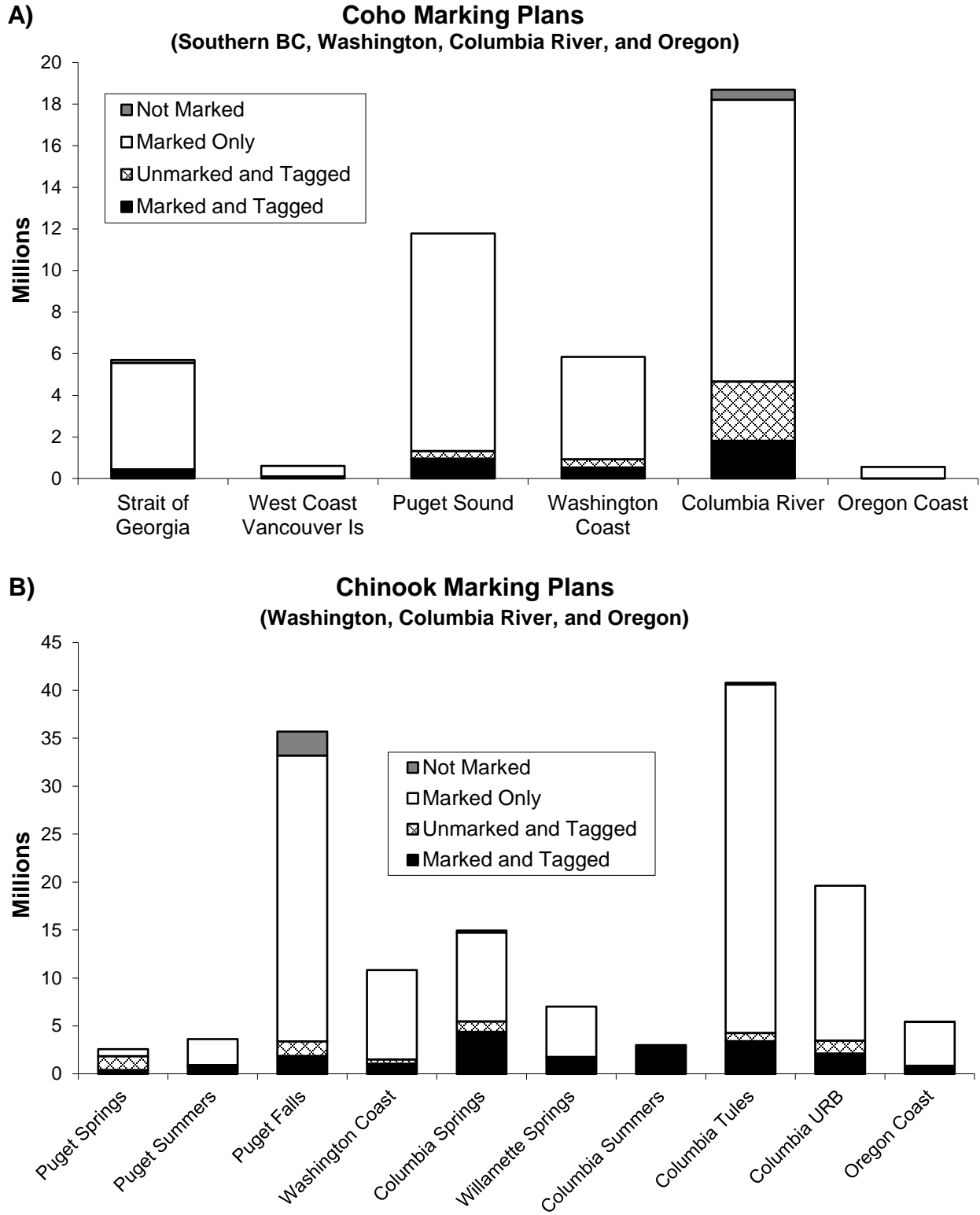


Figure 2-2. Projected Coho (panel A) and Chinook (panel B) salmon releases for brood year 2012, by region and mark status.

2.4 Fishery and Escapement Sampling Methods

2.4.1 Current Agency Sampling Methods

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

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

Alaska Department of Fish and Game has no plans to convert to ETD sampling although there is growing concern about the large numbers of clipped fish without CWTs encountered in sampling programs. Of the marked Chinook caught in Alaska's troll fishery since the implementation of MM, the proportion of fish with no tags has increased from approximately 7% to 65% (Figure 2-3). The increased cost to deal with the additional marked fish is not quantified, but impacts the program. Costs to ship all the heads, including those with no CWTs, from sampling locations to the dissection lab are substantial.

California does not employ ETD. However, approximately 1,300 mass-marked Chinook are projected to be encountered annually in CA (Table 2-4), which could impact CA's sampling program.

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

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

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

Columbia River sport and commercial fisheries are electronically sampled for spring and summer Chinook (January–July) and also Coho. Fall Chinook (August–October) fisheries (commercial and sport) are visually sampled by Oregon (only adipose-clipped fish are wanted to determine if CWT present), except for the Buoy 10 sport fishery in the estuary where electronic sampling has been used in recent years.

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

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

Table 2-2. Proposed fishery sampling methods for tagged Coho Salmon in 2013.

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

Table 2-3. Proposed fishery sampling methods for tagged Chinook Salmon in 2013.

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

In November of 2011 Northwest Marine Technology (NMT) announced the availability of a “T-wand”. T-wands are more sensitive than the previous wands with a detection range of 5.5 cm. Field tests indicate that for most Coho and Chinook, CWTs can be readily detected with a single quick up and down swipe on the top of the snout. However, for large fish, particularly male Chinook or Coho > 1 m in length, three up and down swipes on the snout are recommended - one down the middle and one on each side of the snout. The manufacturer believes that if used correctly, these wands should detect all tags. An advantage of these wands is that mouth wanding is not required on large Chinook. These wands are now being sold to agencies and ADFG, WDFW, and ODFW all purchased wands with 2012 Coded Wire Tag Improvement Funds.

2.4.2 Estimated Sampling Encounters

A summary of projected mass-marked Coho and Chinook salmon that may occur in agency CWT sampling programs is provided in Table 2-4.

Coho Salmon

Estimates of the number of mass-marked fish projected to be encountered in future CWT sampling programs for Coho Salmon that are mass marked in 2013 are much lower than the numbers projected for previous years and reflect a change in survival rates, exploitation rates, and sample rates of the new broods assessed, 2005–2007. Planned MM in 2013 will likely result in estimated future encounters of approximately 400 untagged and marked recoveries in AK and no encounters of untagged and marked Coho Salmon in CA – the two geographical areas where Coho are not mass marked or electronically sampled. It is also projected that approximately 3,000 untagged and mass-marked Coho recoveries will occur in Canadian fisheries, some of which are visually sampled.

Chinook Salmon

Like Coho, these estimates of the number of mass-marked fish projected to be encountered in future CWT sampling programs for Chinook Salmon mass marked in 2013 are lower in total than the numbers projected for previous years and reflect a change in survival rates, exploitation rates, and sample rates of the new broods assessed, 2003–2005. Planned MM of southern US Chinook stocks will result in estimated mass-marked encounters of approximately 9,300 Chinook in AK, 14,000 Chinook in Canada, and 1,300 Chinook in CA, assuming recent exploitation rates and sampling programs. We emphasize these regions because agencies in these areas rely partially or completely on visual sampling to recover CWTs (Table 2-3). For example, in Alaskan troll fisheries where visual sampling is employed, the proportion of marked Chinook Salmon encountered that is untagged has been much greater in recent years (Figure 2-3).

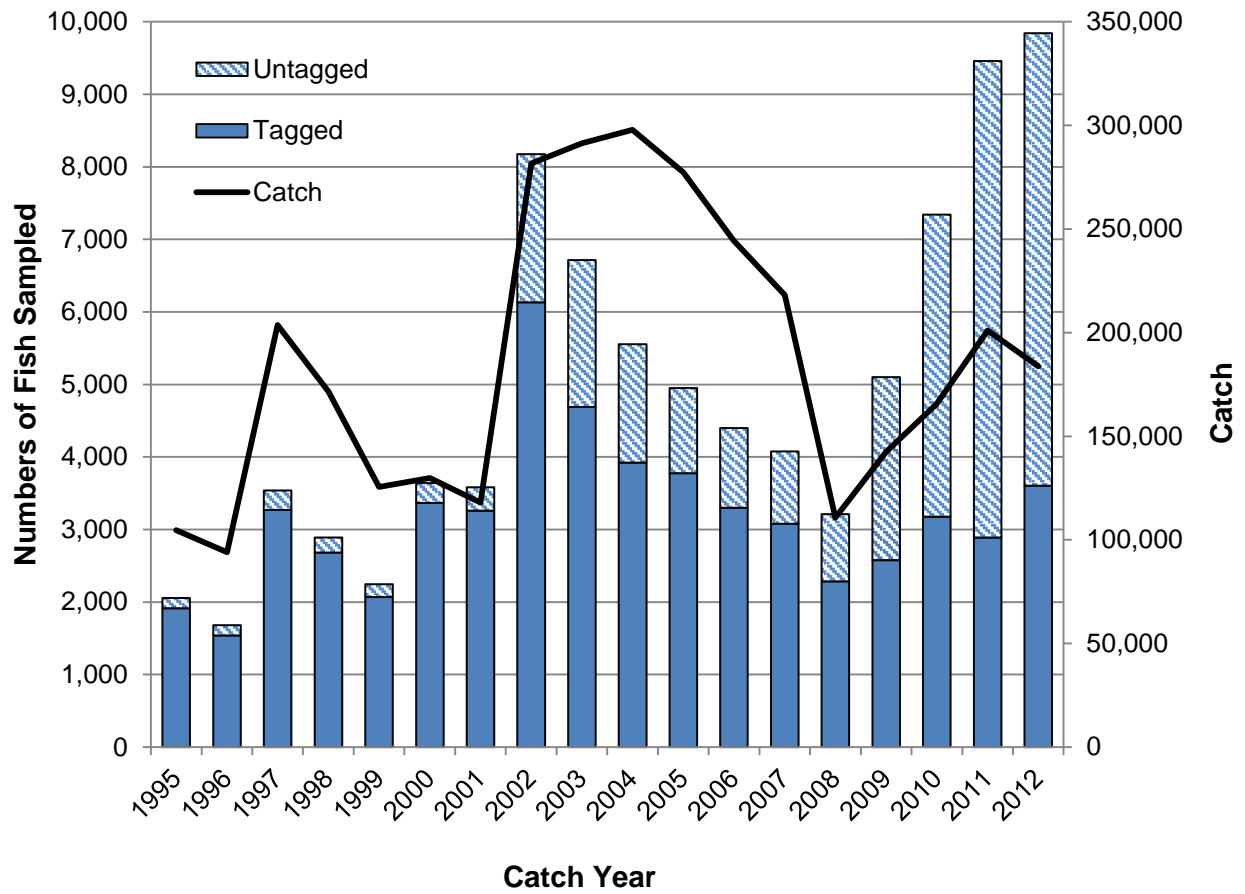


Figure 2-3. Numbers of marked Chinook Salmon sampled in Alaska’s troll fishery by untagged and tagged status, with catch numbers, 1995–2012.

Table 2-4. Numbers of mass-marked Coho and Chinook projected to be encountered in future CWT sampling programs (actual number of fish encountered in samples will depend on survival rates, exploitation rates, and sampling rates). For this analysis, CWT recoveries from the following brood years were used: 2005–2007 for Coho and 2003–2005 for Chinook. Tribal hatchery mass-marked production in WA is included in the WDFW numbers.

Species	Area/Run		Agency	2013 MM	Estimated Encounters in Future Fishery Sampling Programs														
					Alaska		NBC		SBC		WA (CST/PS)		Columbia R.		OR Coast		California		
					Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	
Coho	Strait of Georgia		CDFO	5,125,000	170	5	111	35	11	379	287	285	0	0	0	27	0	0	
	W. Coast of Vanc. Island		CDFO	510,000	12	0	58	5	149	529	29	99	0	0	0	5	0	0	
	Puget Sound		WDFW	10,192,992	72	0	54	18	0	1,061	37,788	8,903	0	0	30	330	0	0	
			USFWS	256,000	0	0	0	0	0	18	1,476	199	0	0	0	11	0	0	
	WA Coast		USFWS	685,000	4	0	21	4	0	57	4,506	770	0	4	11	124	0	0	
			WDFW	4,250,000	121	0	89	22	10	175	7,493	4,656	0	40	96	818	0	0	
	OR Coast		ODFW	535,000	1	0	0	0	0	1	18	101	0	3	34	364	0	0	
	Columbia River		USFWS	540,000	0	0	0	0	0	0	24	209	88	161	8	257	0	0	
			WDFW	7,863,000	7	0	7	4	4	200	994	9,032	9,689	3,124	322	5,954	0	0	
			ODFW	5,149,000	0	0	0	0	0	13	203	1,916	9,231	1,938	78	2,388	0	0	
Total				35,105,992	392	428	2,607	78,988	24,278	10,857	0	0	0	0	0	0	0		
Chinook	Puget Sound		Spring	WDFW	735,500	28	1	5	2	131	92	59	38	0	0	0	0	0	
			Summer	WDFW	2,700,000	15	0	5	0	68	171	100	338	0	0	0	0	0	0
			Fall	WDFW	29,805,000	119	7	139	57	57	3,277	26,908	6,738	0	0	372	9	0	0
	WA Coast		Spr/Sum	WDFW	170,000	44	3	3	0	3	0	3	0	0	0	0	0	0	
			Fall	USFWS	1,000,000	35	1	48	11	1	10	8	3	0	0	0	0	0	0
				WDFW	8,150,000	3,164	421	1,889	599	65	122	2,263	189	0	0	0	11	0	0
	OR Coast		N. Spr.	ODFW	438,000	39	0	10	0	31	5	46	2	0	0	12	36	0	0
			S. Spr.	ODFW	2,124,000	5	0	0	0	56	0	65	28	0	0	159	33	182	56
			Fall	ODFW	2,017,100	569	31	522	68	129	33	239	41	2	2	360	978	37	10
	Columbia River		Spring	ODFW	5,863,000	1,168	92	205	72	348	102	215	51	4,793	4,343	41	10	0	0
				WDFW	3,559,215	57	2	16	2	84	18	89	81	82	133	18	11	0	0
				USFWS	3,150,000	1	0	2	0	0	0	1	0	490	573	1	0	0	0
			Summer	USFWS	200,000	34	3	7	3	24	6	11	3	47	24	4	0	0	0
				USFWS	11,190,000	0	0	0	8	684	346	727	634	4,148	228	270	34	0	8
			Fall-Tule	WDFW	13,230,000	432	45	439	83	864	311	432	326	326	242	68	45	0	0
				ODFW	7,900,000	0	0	0	0	222	74	519	297	10,974	1,780	2,002	297	593	371
URB		ODFW	4,300,000	275	29	166	40	120	52	92	98	505	80	11	11	0	0		
		USFWS	3,100,000	804	67	338	123	56	26	41	10	758	92	10	5	0	0		
		WDFW	12,177,100	1,582	157	941	152	170	121	117	76	1,739	323	22	9	0	0		
Snake River		Fall	ODFW	600,000	48	3	22	27	77	83	110	122	305	54	67	11	3	5	
		Spring	ODFW	510,500	0	0	0	0	1	0	3	1	29	21	2	0	0	0	
			USFWS	1,480,000	0	0	0	0	0	0	0	0	182	498	0	0	0	0	
Total				114,401,415	9,281	6,004	8,040	41,124	32,773	4,919	1,265	0	0	0	0	0			

3 REVIEW OF MARK-SELECTIVE FISHERY PROPOSALS

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

3.1 Mark-Selective Fishery Proposals Received

Mark-selective fisheries have been prosecuted for Coho since 1998 and for Chinook since 2003 (Table 3-1; Appendix F). For the 2013 fishery season, the SFEC received a total of 43 MSF proposals for Coho and Chinook salmon in CDFO, WDFW, and ODFW fisheries. Agencies provided the majority of the requested information in each of the proposals and the proposals were submitted in time for the annual review meeting by the SFEC. Agencies submitted five proposals for new mark-selective fisheries. Oregon Department of Fish and Wildlife submitted two proposals for commercial fisheries targeting Coho and Chinook in the Lower Columbia River. The remaining three proposals were submitted by WDFW for Chinook sport MSFs on the Snohomish and Lower Grand Ronde rivers and a commercial Chinook fishery in Grays Harbor. Mixed bag regulations were again proposed for several of the MSFs (e.g., Oregon recreational marine and freshwater fisheries, WDFW recreational freshwater fisheries, and Canadian marine recreational fisheries).

3.1.1 Coho Salmon MSFs

Fifteen proposals were received for Coho Salmon MSFs occurring in 2013 (Table 3-1; Appendix F). The SFEC received four proposals from CDFO for ongoing Coho MSFs in Canadian waters, including two in the lower Fraser River and two in southern BC; each proposal contained a variety of fishery openings distinguished by regulation variations. A total of eight Coho MSF proposals were submitted from WA, all representing ongoing fisheries. For 2013 WA did not submit two Coho MSF proposals that SFEC had received in past years – the Nooksack River sport and Grays Harbor Area 2C commercial MSFs were dropped starting in 2012. Of the eight proposals that WA submitted for 2013, three were for freshwater locations and five for marine waters. Six of the fisheries have been occurring since 1999 and two since 2010. SFEC believes that proposals have now been submitted for all ongoing Coho MSF in WA. SFEC received one ODFW/WDFW joint Coho MSF proposal for an ongoing sport fishery (since 1999) from Hood River downstream to the mouth of the Columbia River and one new joint ODFW/WDFW proposal for a commercial tangle net fishery in the lower Columbia River (Buoy 10 to Beacon Rock). One additional Coho MSF proposal was received from ODFW for the OR coast, an ongoing fishery since 2003.

3.1.2 Chinook Salmon MSFs

Twenty-eight proposals were received for Chinook Salmon MSFs occurring in 2013 (Table 3-1; Appendix F). These included one proposal from Canada (CDFO), 20 from Washington (WDFW), five submitted jointly by Oregon and Washington (ODFW and WDFW), and two from Oregon (ODFW). We did not receive one 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 20 WDFW proposals, the number of proposals per WA location were as

follows: seven in the freshwater systems of Puget Sound, including a new proposal for the Snohomish River sport Chinook MSF; two in Puget Sound marine waters; one in the marine waters off the WA coast; three in Willapa Bay or its tributaries; one new 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 Yakima River; and one new fishery in the lower Grand Ronde River. Starting in 2012, WDFW's proposals for recreational Chinook MSFs in Puget Sound (marine areas 5-13) were consolidated into one overall summer MSF proposal (MSF-WDFW-35; combines former proposals 02 and 11; see Table 3-1) and one overall winter MSF proposal (MSF-WDFW-36; replaces proposal 16; see Table 3-1). In addition, five Chinook MSF proposals were submitted jointly by WDFW and ODFW for fisheries planned in the Columbia River; of these, three proposals were for ongoing MSFs that have occurred since 2003. One joint ODFW-WDFW proposal was for a sport MSF on fall Chinook (proposal received each year since 2009) that was actually implemented for the first time in 2011. The fifth MSF proposal was for a new commercial seine fishery in the lower Columbia River (Buoy 10 to Beacon Rock). Although the target species for this MSF is Chinook, incidental catch of marked Coho is allowed. Oregon submitted two proposals for Chinook MSFs – one ongoing in the Willamette River (started in 2003) and the other, started in 2008, is an ocean terminal area bubble fishery for fall Chinook, adjacent to the mouths of the Tillamook, Elk, and Chetco rivers.

Table 3-1. Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013.

“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 (SFEC Proposal ID)	Catch Year ^{1,2}										
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>Targeting Marked Coho</i>											
Sport, Southern BC marine and freshwater (MSF-FOC-02)	PFR	PFR	PFR	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
FSC, Lower Fraser R (MSF-FOC-03)	-	-	-	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
Commercial, Southern BC marine (MSF-FOC-05)	-	PX	PFR	PFR	XFO	PFO	PX	PFO	PFO	PFO	P
Sport, Lower Fraser R (MSF-FOC-06)	XFR	XFR	XFR	PFR	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Puget Sound Areas 5-13 (MSF-WDFW-07)	XFR	PFR	PFR	PFR	XFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Nooksack R (MSF-WDFW-18)	XFO	XFO	XFO	XFO	XFO	XFO	PFR	PFO	PFO	-	-
Sport, WA Areas 1-4 and Buoy 10 (MSF-WDFW-06)	PFR	PFR	PFR	PFR	XFR	PFR	PFR	PFR	PFR	PFR	P
Commercial, WA Areas 1-4 (MSF-WDFW-15)	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	PFO	PFO	P
Sport Quillayute R (MSF-WDFW-31)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	P
Sport, Grays Harbor tributaries (MSF-WDFW-24)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	P
Commercial, Grays Harbor Area 2C (MSF-WDFW-30)	-	-	-	-	-	-	XFO	XFO	PXO	-	-
Sport, Grays Harbor Area 2.2 (MSF-WDFW-23)	-	-	-	-	-	-	-	PFO	PFO	PFO	P
Sport, Willapa tributaries (MSF-WDFW-22)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-29) ³	-	-	-	-	-	-	-	PFO	PFO	PFO	P
Sport, Lower Columbia R (MSF-ODFW/WDFW-04)	XFR	XFR	XFO	XFO	XFO	PFO	PFO	PFR	PFO	PFO	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) (MSF-ODFW/WDFW-06)	-	-	-	-	-	-	-	-	-	-	P
Sport, Oregon coast (MSF-ODFW-03)	XFR	XFR	XFO	XFO	XFO	XFO	XFO	PFR	PFR	PFR	P

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

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

³ Prior to September, MSFs within the Willapa Bay are included in the MSF-WDFW-06.

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013.

Fishery Name (SFEC Proposal ID)	Catch Year ¹²										
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>Targeting Marked Chinook</i>											
Sport, Strait of Juan de Fuca subareas, BC (MSF-FOC-07)	-	-	-	-	-	XFO	PFO	PFR	PFO	PFO	P
Sport, WCVI subareas, mainly inside (MSF-FOC-08)	-	-	-	-	-	-	PX	-	PX	-	-
Sport, Puget Sound Areas 5&6, summer (MSF-WDFW-02)	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	-	-
Sport, Puget Sound Areas 9-13, summer (MSF-WDFW-11)	-	-	-	-	PFR	PFR	PFR	PFR	PFR	-	-
Sport, Puget Sound Areas 5-13, summer (MSF-WDFW-35; combines proposals 02 and 11 as of 2012)	-	-	-	-	-	-	-	-	-	PFR	P
Sport, Puget Sound Areas 5-13, winter (MSF-WDFW-36; replaces 16 as of 2012; old proposal 08 [Area 8-1/8-2 Winter MSF] combined into 16 in 2007)	-	-	PFR	PFR	PFR	PFR	PFR	PFR	PFR	PFR	P
Sport, Nooksack R (fall run) (MSF-WDFW-13)	-	PFO	PFO	PFO	PFO	PFO	PFR	PFR	PFO	PFO	P
Sport, Upper Skagit R (spring run) (MSF-WDFW-12)	-	-	XFO	XFO	PFO	PFO	PFO	PFR	PFO	PFO	P
Sport, Skykomish R (summer run) (MSF-WDFW-01)	PFO	PFO	XFO	XFO	PFO	PFO	PFR	PFR	PFO	PFO	P
Sport, Snohomish R (summer run) (MSF-WDFW-37)	-	-	-	-	-	-	-	-	-	-	P
Sport, Carbon & Puyallup R (fall run) (MSF-WDFW-09)	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Nisqually R (fall run) (MSF-WDFW-14)	-	-	XFO	XFO	PFO	PFO	PFO	PFO	PFO	PFO	P
Sport, Skokomish R (fall run) (MSF-WDFW-20)	-	-	-	-	-	-	PX	PFO	PFO	PFO	P
Sport, WA areas 1-4 (MSF-WDFW-19)	-	-	-	-	-	-	PX	PFR	PFR	PFR	P
Troll, WA areas 1-4 (MSF-WDFW-21)	-	-	-	-	-	-	PX	PX	-	-	-
Sport, Quillayute R (spring/summer run) (MSF-WDFW-32)	XFO	XFO	XFO	XFO	XFO	XFO	XFO	XFO	PFO	PFO	P
Sport, Hoh R (MSF-WDFW-33)	-	-	-	-	-	XFO	XFO	XFO	PFO	PFO	P
Commercial, Grays Harbor areas 2A,2B,2C,2D (MSF-WDFW-38)	-	-	-	-	-	-	-	-	-	-	P
Commercial, Willapa Bay (MSF-WDFW-25)	-	-	-	-	-	-	-	PFO	PFO	PFO	P
Sport, Willapa Bay Area 2.1 (MSF-WDFW-26)	-	-	-	-	-	-	-	PFO	PFO	PFO	P
Sport, Willapa Bay tributaries (fall run) (MSF-WDFW-27)	-	-	-	-	-	-	-	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>)

Table 3-1. (Continued) Status of mark-selective fishery (MSF) proposals, fishery implementation, and post-fishery reporting for years 2003 through 2013.

Fishery Name (SFEC Proposal ID)	Catch Year ¹²											
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
<i>Targeting Marked Chinook (continued)</i>												
Sport, Lower Grand Ronde R (spring run) (MSF-WDFW-39)	-	-	-	-	-	-	-	-	-	-	-	P
Sport, Yakima R (spring run) (MSF-WDFW-03)	-	PFO	-	-	-	PFR	PX	PFR	PFO	PFO	PFO	P
Sport, Snake R (fall run) (MSF-IDFG-04)	-	-	-	-	-	-	XFO	XFO	XFO	XFO	PFO	-
Sport, Snake R (spring run) (MSF-WDFW-28)	-	-	-	-	-	-	-	PFO	PFO	PFO	PFO	P
Sport, Lower Snake R (fall run) (MSF-WDFW-05)	-	-	-	-	-	XFO	PFR	PFO	PFO	PFO	PFO	P
Sport, Lower Columbia R (spring run) (MSF-ODFW/WDFW-01)	PFO	PFO	PFO	XFO	XFO	PFO	PFR	PFO	PFO	PFO	PFO	P
Sport, Columbia R (summer run) (MSF-ODFW/WDFW-02)	PFO	PFO	PX	XFO	-	PFO	PX	PFO	PFO	PFO	PFO	P
Commercial, Lower Columbia R (spring run) (MSF-ODFW/WDFW-03)	PFO	PFO	PFO	XFO	XFO	PFO	PFR	PFO	PFO	PFO	PFO	P
Sport, Columbia R (fall run) (MSF-ODFW/WDFW-05)	-	-	-	-	-	-	PX	PX	PFO	PFO	PFO	P
Commercial, Lower Columbia R (Buoy 10 to Beacon Rock) (MSF-ODFW/WDFW-07)	-	-	-	-	-	-	-	-	-	-	-	P
Sport, Willamette R (spring run) (MSF-ODFW-01)	PFR	PFR	PFO	PFO	XFO	PFR	PFR	PFR	PFO	PFO	PFO	P
Sport, Oregon coast (fall run) (MSF-ODFW-02)	-	-	-	-	-	XFO	PFO	PFR	PFR	PFR	PFR	P

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

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

3.2 SFEC's New Approach for 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 <u>complete</u> list of indicator stocks was provided.		
	2) Yes, CWT indicator stocks are expected, and an <u>incomplete</u> list of indicator stocks was provided.		
	3) Yes, CWT indicator stocks are expected, but a list of indicator stocks was <u>not</u> 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 <u>complete</u> list of DIT stocks was provided.		
	2) Yes, DIT stocks are expected, and an <u>incomplete</u> list of DIT stocks was provided.		
	3) Yes, DIT stocks are expected, but a list of DIT stocks was <u>not</u> provided.		

Table 3-3. Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Coho Salmon</i>												
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	Terminal Recreational, (Mixed Bag)	2	2	2	1	2	2,4	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook
MSF-FOC-03	Lower Fraser River	Terminal, First Nations (Mixed Bag)	1	3	2	4	1	2	1	0,1	This fishery is mixed bag because unmarked Coho that are mortally wounded or dead can be retained. Low CWT submission rates. Numbers of ad-clipped and unclipped Coho are reported in some fisheries.	Total catch estimate using creel survey or census.
MSF-FOC-05	BC Management Areas 23-27, 121-127	Pre-terminal Commercial (MSF)	1	1	1	1	1	1	1	1		Total catch is from fisher reported log books and phone-in catch reports.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Coho Salmon (continued)</i>												
MSF-FOC-06	Lower Fraser River	Terminal Recreational (MSF)	1	2	2	1	2	2	1	0,1	Voluntary submission of samples from clipped fish, but fishery is fully mark selective. Creel surveys and awareness factors for some times and areas.	Catch estimates from creel surveys. CWT estimation for areas/times with no catch estimation program relies on submission rates in other strata.
MSF-WDFW-06	Ocean Areas 1-4 & Col R Buoy 10	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel surveys, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates and mark rates obtained from charter ride-along trips and voluntary trip reports (VTRs).
MSF-WDFW-07	Puget Sound Areas 5-13	Recreational	1	1	1	1	1	1	1	1		Total catch estimates from CRCs, and creel surveys in some areas. On-water encounter rates and mark rates obtained from VTRs and dockside samplers.
MSF-WDFW-15	Ocean Areas 1-4	Commercial Troll	1	1	1	1	1	2	1	1	No estimates of encounters or mark rate.	Catch estimates from fish tickets.

Table 3-3. (Continued) Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Coho Salmon (continued)</i>												
MSF-WDFW-22	Willapa tributaries (North, Smith, Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational	3	1,3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside sampling for CWTs in September only; therefore, CWT sampling and estimation is not uniform across fishery regulation period.	Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimate.
MSF-WDFW-23	Grays Harbor, Marine Area 2.2	Recreational	3	1,3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Dockside biological sampling Sept-Oct but none in Nov-Jan. CRC for effort estimates.	Total catch is estimated from CRCs. Estimate mark rate from VTRs and commercial fishery. CWT estimates depend on tag ratios from commercial fishery.
MSF-WDFW-24	Grays Harbor tributaries (Chehalis, Elk, Hoquiam, Humptulips, Johns, Newaukum, Satsop, Wynoochee, Skookumchuch, Van Winkle, Wishkah, Quigg Lake)	Recreational	3	3	1	3	2	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. Some direct sampling in Lower Chehalis only; indirect CWT sampling via electronic sampling of escapement.	Total catch is estimated using CRCs. Mark rates obtained from estimates of total escapement. CWT estimates depend on tag ratios and total escapement estimates.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Coho Salmon (continued)</i>												
MSF-WDFW-29	Willapa Bay, Marine Area 2.1	Recreational	3	1	1	1	1	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation.	Angler surveys and VTRs to get mark rate and sublegal proportion. Direct electronic sampling for CWTs.
MSF-WDFW-31	Quillayute R system (Bogachiel, Calawah, Dickey, Quillayute, Sol Duc)	Recreational	3	3	1	3	3	2	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Lack of direct sampling; instead CWT composition from electronic sampling in tribal net fishery is used.	Total catch is estimated using CRCs. Mark rate estimates obtained from commercial fishery.
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	Lower Columbia River (Buoy 10 upstream to Beacon Rock)	Commercial	1	1	1	1	1	2	1	1	Tangle Net, test fishery.	Potential for random on-board monitoring. Biological sampling of landed catch at processing plants. Release mortality rate 5%

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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-03	Oregon coast from Leadbetter Pt to CA border	Recreational	2	1	1	1	2	2	1	1	Coho ocean fishery sampled at boat docks for CWTs. Total landed catch estimated from survey information. All releases assumed unmarked and legal size (over 16") which allows estimate of mark rate in fishery.	Effort estimated using boat counts and CPUE estimates from angler interviews. Released fish number used to determine mark rate.
Chinook Salmon												
MSF-FOC-07	BC Strait of Juan de Fuca and WCVI, Areas 19-1 to 6, 18-4 and 20-5	Pre-terminal Recreational (Mixed Bag)	3	2	2	1	2	2	1	1	Voluntary recovery program will not provide recoveries of unmarked and tagged fish in any fishery. Low CWT submission rates.	Total catch using creel surveys in some areas and times and log books from lodges. No catch estimate for area/times with no creel or lodge logbook
MSF-WDFW-01	Skykomish River (mouth to Wallace River)	Recreational	1	3	1	3	1	2	1	1	The "indirect" method using hatchery tag compositions to estimate CWTs caught in the MSFs was evaluated using CWTIT funding. Results indicate that the direct estimates made using fishery sampling were significantly different. 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	0	0	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.

Table 3-3. (Continued) Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Chinook Salmon (continued)</i>												
MSF-WDFW-09	Puyallup / Carbon River	Recreational	1	3	1	2	1	2	1	1	Lack of direct sampling; only indirect CWT estimates, via electronic sampling at hatchery. These are substantial Chinook freshwater sport fisheries, averaging 1,000 and 400 fish in Puyallup and the Carbon.	Catch estimates from catch record cards. Indirect estimates of CWTs via electronic sampling at hatchery & associated tribal net fisheries.
MSF-WDFW-12	Upper Skagit River (Spring Chinook)	Recreational	1	3	1	2	1	2	1	1	Due to lack of direct sampling CWT electronic sampling at hatchery will be used for indirect estimates of CWTs impacted in fishery. If there is a CWT survey in the fishery, then a direct estimate would be made using CRC estimates. Also release by anglers interviewed would be available to estimate mark rate and total encounters.	Catch estimates from catch record cards. Some angler interviews for CWT sampling and biological data.
MSF-WDFW-13	Nooksack River	Recreational	1	3	1	3	1	2	1	1	Lack of direct sampling. This is a small fishery, with a five year average of 50 fish kept.	Catch estimates from CRCs. Estimate number of Samish fall Chinook using % hatchery from spawning grounds and tag rate from hatchery.
MSF-WDFW-14	Nisqually River	Recreational	1	1	1	1	1	2	1	1	Creel surveys were conducted for 3 years but are no longer funded. CWT sampling is conducted in the Nisqually MSF. As this is an indicator and a DIT program, it is recommended that CWT sampling continued.	Catch estimates from CRC.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Chinook Salmon (continued)</i>												
MSF-WDFW-19	Ocean Areas 1-4	Recreational	1	1	1	1	1	1	1	1		Catch estimate from creel survey, based on an effort/CPUE survey with boat exit counts and exit interviews. Stratified by boat type (private or charter boats) and day type (weekend or weekdays). On-water encounter rates (by mark status/size) obtained from charter ride-along trips and VTRs.
MSF-WDFW-20	Skokomish River	Recreational	1	1	1	1	1	2	1	1	Creel surveys were conducted for 3 years but are no longer funded. CWT sampling is conducted in the Skokomish MSF. As this is an indicator and a DIT program, it is recommended that CWT sampling continue, even if the creel survey for total estimates is not implemented.	Catch estimates from CRC.
MSF-WDFW-25	Willapa Bay 2K,2M,2N,2R,2T,2U - (new area designations for 2G, 2H, 2J, 2K, and 2M)	Commercial	1	1	1	1	1	1	1	1	Live boxes are used and the condition of released unmarked and marked Chinook and Coho are recorded.	Catch from fish tickets. Standard CWT estimates.
MSF-WDFW-26	Willapa Bay MA2.1	Recreational	3	1	1	1	2	2	1	2	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation. There is a mismatch between fishery regulation and sampling/catch estimation strata boundaries.	Catch estimates from CRCs. Angler surveys provide data needed to estimate CWT ratios and mark rates; additionally, VTRs provide data to estimate size/mark status of encounters.

Table 3-3. (Continued) Summary of SFEC's evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Chinook Salmon (continued)</i>												
MSF-WDFW-27	Willapa Tributaries (Willapa, Niawiakum, Palix, Nemah, Naselle, Bear)	Recreational	3	1	1	1	1	1	1	1	There will be a problem in estimating CWT composition of mortalities due to mark and size-mixed bag regulation.	Catch estimates from CRC. Mark rates and tag ratios from hatchery and spawning ground data.
MSF-WDFW-28	Lower Snake R (spring)	Recreational	1	1	1	1	1	1	1	1		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.
MSF-WDFW-32	Quillayute River system (Bogachiel, Calawah, Dickey, Quillayute, and Sol Duc)	Recreational	3	3	1	3	3	2	0	0	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Estimates of CWTs are made using hatchery and tribal net estimates of CWT composition. There are no data evaluating this method for the coastal fisheries.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.
MSF-WDFW-33	Hoh River system	Recreational	3	3	1	3	3	2	0	0	There will be a problem in estimating CWT composition of mortalities due to mark and size mixed bag regulation. Estimates of CWTs are made using hatchery and tribal net estimates of CWT composition. There are no data evaluating this method for the coastal fisheries.	Catch estimates from CRC. CWT ratios and mark rates from tribal net fishery.

Table 3-3. (Continued) Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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	DTT Stocks	Comments and Concerns	Methods of Estimation
<i>Chinook Salmon (continued)</i>												
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	1	1	1	Lack of direct sampling; only indirect CWT estimates, via electronic sampling at hatchery. No study indicating quality of proxy.	Creel surveys will estimate releases by size and mark status.
MSF-WDFW-38	Grays Harbor 2A, 2B, 2C, 2D	Commercial	1	1	1	1	1	1	1	1	Live boxes are used and the condition of released unmarked and marked Chinook and Coho are recorded.	Catch from fish tickets. Standard CWT estimates.
MSF-WDFW-39	Lower Grande Ronde R	Recreational	1	1	1	1	1	1	1	0		Catch and mark rate estimated using creel survey. Sampling for CWTs using electronic tag detection; standard CWT estimation methods.

Table 3-3. (Continued) Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Chinook Salmon (continued)</i>												
MSF-ODFW / WDFW-01	Columbia R, Mouth upstream to McNary Dam, and Ringold Hatchery Area	Recreational	1	1	1	1	1	2	1	1	There is no information on whether and how release number, mark, and size status will be obtained.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW / WDFW-02	Columbia R, Mouth upstream to Chief Joseph Dam	Recreational	1	1	1	1	2	2	1	1	Creel census below McNary does not cover the whole fishery, which extends to Priest Rapids; therefore, effort estimate will be underestimated. There is no information on whether and how release number, mark, and size status will be obtained.	Creel survey and CRC provide estimates of catch. Aerial surveys provide effort counts. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.
MSF-ODFW / WDFW-03	Columbia R, Mouth upstream to Bonneville Dam	Commercial Gillnet / Tangelnet	1	1	1	1	1	2	1	1	Spring Chinook	Catch from fish tickets. Biological sampling of landed catch at processing plants, plus random on-board monitoring. Standard methods used for CWT estimates. Mark rates are observed at Bonneville Dam, after the lower river fishery.

Table 3-3. (Continued) Summary of SFEC’s evaluation of Coho and Chinook MSFs proposed for the 2013 fishery season, for which proposals were submitted by agencies in 2012 (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
<i>Chinook Salmon (continued)</i>												
MSF-ODFW / WDFW-05	Columbia R, Mouth upstream to McNary Dam, includes Buoy 10	Recreational	1	1	2	1	1	2	1	1	There is no information on whether and how release number, mark and size status will be obtained. Fall Chinook are generally visually sampled by ODFW.	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-07	Lower Columbia River (Buoy 10 upstream to Beacon Rock)	Commercial	1	1	1	1	1	2	1	1	Limited to beach and purse seines. Gear specifics to be determined. The original ID of this proposal was MSF-ODFW-04.	Potential for random on-board monitoring. Biological sampling of landed catch at processing plants. Release mortality rate 5%
MSF-ODFW-01	Willamette River	Recreational	2	3	1	3	3	3	1	1	Problems due to: mixed bag by size, lack of information in creel survey downstream where releases are reported for adults, jacks, marked and unmarked combined, no sampling of harvest upstream. Punch cards do not require recording of jacks or releases. Therefore, encounters by size and mark status cannot be estimated for either location (down or upstream).	Catch estimates from creel/angler interviews downstream of Willamette Falls; catch record cards used upstream of the falls. Upstream estimates of mark rate, jacks and adults calculated from window counts.
MSF-ODFW-02	Ocean Terminal areas (within 3 miles of the river mouth) Tillamook, Elk, and Chetco	Recreational	2	1	1	1	2	2	1	1	Mark and size-mixed bag regulations present problems in estimating CWT mortalities. Not able to separate terminal Chinook fishery catch from non-terminal ocean fishery. Fishery proposed for several years but not implemented.	All fish landed/sampled as one stratum. Angler recall of released fish used to determine mark rate; no sublegal estimates.

3.3 Expected Encounters of CWT Indicator Stocks in MSFs

Multiple MSFs are expected to occur during 2013 in BC, WA, and OR. Table 3-4 and Table 3-5 were constructed using historical information on encounters of tagged and marked fish to identify tagged stocks of Coho (brood years 2003–08; Table 3-4) and Chinook (catch years 2006–10; Table 3-5) that can be expected to be encountered in these areas with MSFs.

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

In 2007, there were 12 Chinook MSFs that occurred and they were largely restricted to PS and to the Columbia River with spring Chinook as the targeted group. Since then, Chinook MSFs have expanded substantially in marine and freshwater areas, with the number of Chinook MSFs more than doubling to 29 (Table 3-1). From 2010 to 2013, additional Chinook MSFs occurred and have been proposed in the marine waters of BC, PS, WA ocean areas, and freshwater areas in PS and Columbia River. Further, Chinook MSFs that target later run fish have been added. Prior to 2008, the indicator stocks encountered in MSFs were largely of PS origin or were Columbia River spring stocks. With the additional fisheries now proposed for Canadian waters, WA ocean areas, and Columbia River, a larger number of indicator stocks are likely to be encountered in MSFs (Table 3-5). In addition, MSFs have expanded substantially in PS, both geographically and temporally, with concomitant increases in catch in MSFs for Chinook Salmon (Figure 3-1).

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

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

Region	Hatchery / Release Location	# Years Tagged	Mark-Selective Fisheries											Non-Selective Fisheries				Escapement		Total		
			BC		Puget Sound		WA Coast		Columbia R		OR Coast		Commercial		Sport		Obs	% of Est	Obs	Est		
			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	Est	
			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
		Quinalt 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	Est	
			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.

Region	Stock	Mark-Selective Fisheries										Non-Selective Fisheries				Escapement		Total	
		PS		WA CST		COLR		TERM		Total		Commercial		Sport		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.

Region	Stock	Mark-Selective Fisheries										Non-Selective Fisheries				Escapement		Total	
		PS		WA CST		COLR		TERM		Total		Commercial		Sport		Obs	%Est	Obs	Est
		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

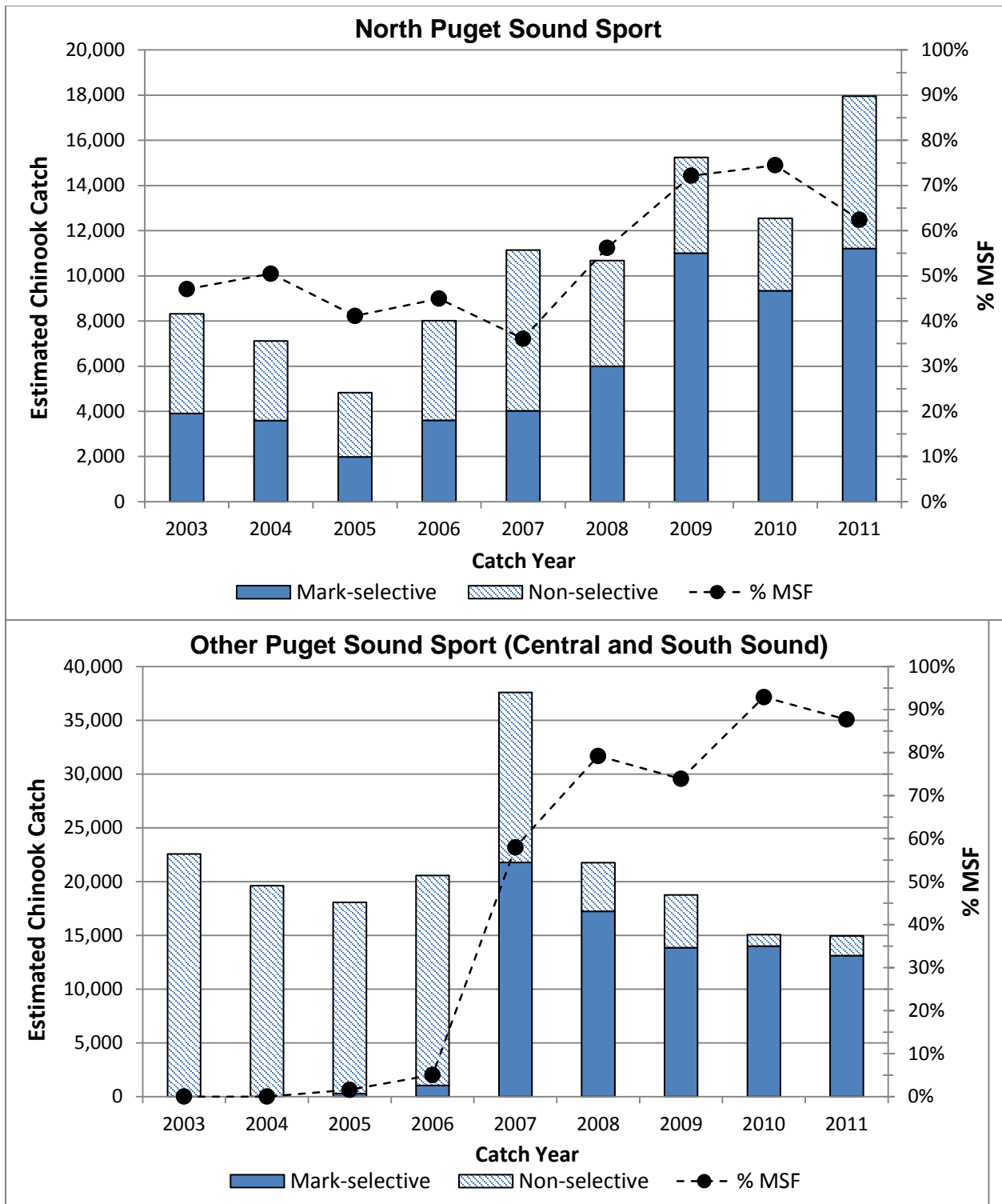


Figure 3-1. Total landed catch in MSFs and NSFMs in Puget Sound and the percent of catch in MSFs for catch years 2003–2011.

4 ISSUES, CONCERNS, AND RECOMMENDATIONS

4.1 Timeliness of Mark-Selective Fishery Proposals

Proposals are due by November 1 of the year before the MSFs being proposed; e.g., November 1, 2012 for fisheries proposed to occur in 2013–2014. Although final decisions on fisheries are generally made by agencies after this time period (e.g., January–April of 2013 for 2013 fisheries), MSF proposals should be submitted for any fisheries that are planned and should include information or options known at that point in time. SFEC believes that most MSFs now being implemented are represented by proposals, although some Columbia River MSFs may not be represented. The SFEC recommends that agencies prioritize the task of developing proposals in a timely manner for any planned MSF in marine or freshwater. Timely submission of proposals allows for timely identification of issues which can be conveyed to the PSC and to agencies while the annual fishery planning activities are occurring.

4.2 Status of Mark-Selective Fishery Reports

The PSC has requested that management agencies provide SFEC with three reports on MSFs. The first is a table (Appendix Table I.1) that provides information on sampling methods used to recover CWTs in all fisheries and escapement locations, not just in the MSFs. Information on sampling procedures is needed because estimating impacts for the unmarked group encountered in MSFs depends on the method of sampling (electronic or visual) and the CWT processing protocol (i.e., are all tagged fish sampled also processed for CWT extraction in the lab). The second report is a table (Appendix Table I.2) that provides post-fishery information on MSFs that have occurred, where and when they occurred, fishery regulations, and what sampling occurred. This table provides the information on whether MSFs that were proposed did actually occur and how these fisheries were sampled. These first two 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. The post-season annual reports produced by the U.S. and Canadian sections for PSC's 2012 post-season review meeting did not include this information for most MSFs.

The third report is also in table format (Appendix Table I.3) and is intended to provide final results on the estimated total mortalities and mark rates in MSFs that have been prosecuted. This information is required for evaluation of the fishery. For Chinook Salmon, the PSC Chinook Technical Committee (CTC) requires that total fish retained and total mortalities are reported for MSFs for use in the PSC Chinook Model. It should be noted that the template provided in Appendix Table I.3 was new in 2007, and the previous template should not be used as it was inadequate for CTC needs. Using estimates from the WDFW draft multi-year report for the summer MSFs in Washington Areas 5/6, an example of this report template is provided in Appendix Table I.3.

Agencies have generally not provided these reports in the format requested by SFEC, and by the requested deadline; however, SFEC representatives have been stepping up efforts in recent years to coordinate with key staff within the agencies in order to acquire these post-season reports. Although the information may be available in larger agency reports, the SFEC needs agencies to submit the post-season MSF information directly to SFEC using the report templates provided (Appendix I), 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 G and Appendix H).

Comparison of the escapement of the unmarked and marked components of a DIT group provides a measure of the total impact of MSFs. MSFs have more than doubled in number since 2007; new areas and stocks are being fished under mark-selective regulations. It is recommended that agencies review their indicator stock programs in light of these new MSFs and any other new MSFs likely to be proposed in future years and evaluate the need for including additional DIT groups. In 2011, to improve the CWT system while under declining budgets, Northwest Marine Technology offered free CWTs to agencies. Analyses of coded-wire tagging levels were completed by CoTC and CTC members for many of the indicator stocks and recommendations for increased tagging were made for some of these stocks. Subsequently, a few agencies requested and received free tags from Northwest Marine Technology.

4.3.1 Coho Salmon Double-Index-Tag Groups

At present, the utility of the DIT program and the CWT program in general for Coho is reduced due to low tagging rates, insufficient Management Unit (MU) representation, low recovery rates, and incomplete coastwide coverage of electronic sampling programs (PSC-CWTW 2008; CoTC 2013). Indicator stocks that have been encountered in mark-selective fisheries are listed in Table 3-4. Several Coho MUs do not have DIT groups to permit independent estimation of impacts of MSFs (Appendix G). For example, Canada currently has two DIT programs for the four MUs in the treaty (Inch Creek and Quinsam River). Even where DIT programs have been implemented, the reliability of results is affected by the lack of electronic tag detection throughout the migratory ranges of the MUs (CoTC 2013). In addition, tagging levels of DIT groups are not high enough to provide sufficient numbers of recoveries for statistically-robust estimates of non-landed mortalities in MSFs. Estimation of ERs or effects of MSFs on natural stocks requires the collection of CWTs from marked and unmarked DIT groups. The lack of direct sampling and electronic tag detection in intercepting fisheries throughout the stock migration results in biased estimates of ERs.

4.3.2 Chinook Salmon Double-Index-Tag Groups

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

4.4 Chinook MSFs and Sampling Methods

Electronic tag detection (ETD) is necessary for sampling fisheries and escapement where unmarked and tagged fish are present in the samples. In order to carry out exploitation rate analysis for unmarked stocks, aside from estimation of unmarked mortalities in MSFs, it is necessary to have estimates of harvest of unmarked and tagged DIT groups in NSFs. This requires ETD be used in NSFs, where unmarked and tagged fish are present, in particular if the stock has been subjected to MSFs in other areas or periods. Until 2008, MSFs for Chinook Salmon were largely prosecuted in PS where ETD is used for all fisheries. Electronic tag detection was not used consistently by CDFO in northern fisheries until 2007 and has not been used at all by ADFG. As Puget Sound DIT groups taken in these fisheries were unlikely to have been subject to preceding MSFs (either the same year or at younger ages), indirect methods (other than direct sampling with ETD) could be used for achieving unbiased estimates of unmarked encounters from marked landings. However, with MSFs within the Strait of Juan de Fuca and off of the WA coast (WA Ocean Areas 1–4) it is no longer reasonable to assume that fish taken in NSFs in all northern coastal areas have not been subject to prior MSFs. The SFEC recommends that agencies review their sampling methods with respect to the current expansion of MSFs into coastal fisheries. In 2011, Oregon began using ETD for ocean sampling of both sport and commercial fisheries. It is specifically recommended that ODFW implement ETD in 2013 for Columbia River fall Chinook to recover DIT release groups for Chinook exploitation rate indicator stocks.

4.5 Mixed-Bag Regulations in MSFs

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

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

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

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

5 REFERENCES

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6 APPENDICES

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

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

February 2004 Policy Statement

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

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

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

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

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

5. Upon completion of MM programs, agencies are to report the number of fish that were actually mass marked and the extent to which releases are (single and double index) tagged for assessment.
 6. Agencies shall report results of MSFs conducted during a season in the annual post-season report provided, using a format specified by the SFEC.
 7. Not later than November 30 of the year following conduct of MSFs. Agencies are to report fishery and stock-age-specific estimates of mortalities for unmarked fish impacted by MSFs to the PSC technical committees
- The PSC shall consider, by the annual February PSC meeting, the SFEC reviews of proposals for MM and MSFs and discuss potential actions to address concerns related to any MM or MSF proposals that the SFEC determines will significantly and adversely affect the CWT program.
 - The Parties will do their utmost to ensure that MM and MSF proposals are developed in consultation with domestic co-management agencies or processes, and that proposing agencies or entities provide information required by the SFEC and adhere to reporting requirements to enable the PSC technical committees to complete their assignments in a timely manner.
 - After the occurrence of a selective fishery and when the data are available, the PSC shall review the management agency report on the actual conduct of the fishery with respect to its impact on the CWT program, and recommend changes and improvements.

Terms of Reference for the Selective Fishery Evaluation Committee

- I. Reporting and Committee Structure: The Selective Fishery Evaluation Committee (SFEC) will report to the PSC and will be comprised of a Steering Committee and two working groups: the Regional Coordination Working Group (RCWG) and the Analytical Working Group (SFAWG). All official members of the Steering Committee and working groups will be considered members of the SFEC.
 - A. Steering Committee: The Steering Committee will be comprised of:
 1. the co-chairs of the PSC Coho Technical Committee, Chinook Technical Committee, and Data Sharing Technical Committee;
 2. the co-chairs of the two working groups;
 3. agency mass-marking/selective-fishery coordinators; and
 4. additional agency representatives approved by the responsible Party.
 - B. Regional Coordination Working Group (RCWG): The RCWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All RCWG members should contribute actively to the work of this group.
 - C. Selective Fishery Analysis Working Group (SFAWG): The SFAWG may be comprised of members of the Steering Committee and other PSC technical committees and of the agency representatives approved by the responsible Party. All SFAWG members should contribute actively to the work of this group.

II. Duties of the SFEC

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

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

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

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

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

L. Cassidy J. Davis
Chair Chair

Appendix B. Mass Marking Proposal Template.

Mass Marking Proposal ID # _____
Date Received _____

TEMPLATE FOR ADIPOSE FIN MASS MARKING PROPOSALS

This template is intended for proposals to mass mark any release group of more than 100,000 fish from a hatchery complex or area that involves the following:

- 1) Chinook or Coho Salmon,
- 2) mass marked with an adipose clip, but untagged, and
- 3) expected to be intercepted in Pacific Salmon Commission fisheries.

PROPOSAL TITLE:

Contact information

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

Is the proposal:

new _____
 substantially changed _____
 or a continuation of a previous proposal _____

Proposed Marking and Tagging

1. Purpose of mass marking:
 - a. Provide a brief description of the goals and objectives of the proposal (e.g. to obtain more information on hatchery straying to wild spawning grounds, to increase fishing opportunities, or to identify hatchery/wild compositions in fisheries).
 - b. If the proposal is not a new proposal, list the Mass Marking Proposal ID number(s) (assigned by the PSC Executive Secretary) corresponding to the previous proposal. In addition, describe any significant differences from previous proposals (i.e., additions or deletions of mass marked stocks or DIT groups).
 - c. Identify potential mark-selective fisheries targeting the proposed mass marked stocks that your agency might pursue in the future.

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

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

Species:

Brood:

Release Year:

<i>Area or Region</i>	<i>Hatchery</i>	<i>Stock</i>	<i>Number to be Tagged</i>		<i>Number Untagged</i>		<i>Proposed to be Marked This Brood Year (Y/N)</i>	<i>Marked Last Brood Year (Y/N)</i>
			<i>Ad Clipped</i>	<i>Unclipped</i>	<i>Ad Clipped</i>	<i>Unclipped</i>		
		<i>Total</i>						

- List any known reviews of the mass marking proposal that have been conducted (e.g., by the Mark Committee) and the outcome of those reviews. List any marking programs/agreements that this proposal may conflict with and briefly describe the possible conflict.
- List any issues of concern previously identified by the SFEC related to this mass marking proposal and describe how those concerns have been addressed.

FISHERY DISTRIBUTION AND CWT SAMPLING

- Provide estimates of the anticipated number of mass marked fish that will be encountered in fishery CWT sampling programs using the format below. In order to standardize estimates between agencies, we would prefer the following methods be used:
 - Use actual CWT recoveries from representative CWT groups (e.g., key or indicator stocks from each region) as basis of estimate
 - Calculate the average recovery rate of tags (# recoveries / # releases), using the following three brood years: Coho = BYs 2005-2007, Chinook = BYs 2003-2005
 - Multiply the # of proposed mass marked fish, by production region, by this recovery rate, for the appropriate indicator stock
 - Apportion the mass marked fish to the region/fisheries (see table below) based on the average distribution for the indicator codes
 - The PSMFC RMIS will provide a standardized report that summarizes recoveries in the requested region/fisheries. Simply provide them with a vertical text listing of the tag codes.

Region	Fishery	Estimated number of marked fish that will be encountered in fishery sampling programs.	Electronic sampling currently in place Y/N?
Alaska	Commercial		
	Sport		
Northern BC	Commercial		
	Sport		
Southern BC	Commercial		
	Sport		
Washington (Coast & PS)	Commercial		
	Sport		
Columbia Basin	Commercial		
	Sport		
Oregon Coast	Commercial		
	Sport		
California	Commercial		
	Sport		

Describe the source/data and methods used to make the estimates – if different than the preferred method. Provide other information, if relevant, on the distribution, run timing and migration routes of the stocks proposed for marking and/or tagging.

Appendix C. Mark-Selective Fishery Proposal Template.

Mark-Selective Fishery Proposal ID #
Date Received _____

TITLE FOR MARK-SELECTIVE FISHERY PROPOSALS

Contact information

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

Is the proposal:

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

Purpose/management objective

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

Location and time of the proposed mark-selective fishery

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

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

Other information about the fishery:

3. Target species/stocks (including nontarget PSC species/stocks of concern):
4. Gear to be used:
5. Other regulation details (e.g., size restrictions, bag limits, mixed bag information):

Projected impacts BY the fishery

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

In-season management

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

Other information

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

Appendix D. Mark-Selective Fishery Proposal Spreadsheet Template.

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

Appendix E. Status of Mass Marking Proposals Received in 2012 for Mass Marking to Occur in 2013.

Description of Proposal and Agency	New or Continuation Proposal	SFEC Proposal Number
<i>Coho Salmon</i>		
Southern BC Coho – CDFO	Continuation	MM-FOC-01-2013
Puget Sound Coho – WDFW/Tribal	Continuation	MM-WDFW-01-2013
Washington Coast Coho – WDFW/Tribal	Continuation	MM-WDFW-04-2013
Washington Columbia River Coho – WDFW	Continuation	MM-WDFW-05-2013
Columbia River Coho – USFWS	Continuation	MM-USFWS-04-2013
Puget Sound and WA Coast Coho – USFWS	Continuation	MM-USFWS-18-2013
Columbia River Coho – ODFW	Continuation	MM-ODFW-04-2013
Oregon Coast Coho – ODFW	Continuation	MM-ODFW-05-2013
<i>Chinook Salmon</i>		
Alaska Cook Inlet Chinook - ADFG	Continuation	MM-ADFG-01-2013
Columbia River Chinook – USFWS	Continuation	MM-USFWS-17-2013
WA Coast Fall Chinook – USFWS	Continuation	MM-USFWS-19-2013
Willamette River Spring Chinook – ODFW	Continuation	MM-ODFW-01-2013
OR North Coast Spring Chinook – ODFW	Continuation	MM-ODFW-02-2013
OR South Coast Spring Chinook – ODFW	Continuation	MM-ODFW-03-2013
Columbia River Fall Chinook – ODFW	Continuation	MM-ODFW-06-2013
OR Coast Fall Chinook – ODFW	Continuation	MM-ODFW-07-2013
Mid-Columbia R Spring Chinook – ODFW	Continuation	MM-ODFW-08-2013
Snake River Fall Chinook – ODFW	Continuation	MM-ODFW-09-2013
Snake River Spring Chinook – ODFW	Continuation	MM-ODFW-10-2013
Puget Sound Chinook – WDFW/Tribal	Continuation	MM-WDFW-02-2013
Columbia R. Chinook – WDFW/CRITFC	Continuation	MM-WDFW-03-2013
Washington Coastal Chinook – WDFW/Tribal	Continuation	MM-WDFW-06-2013

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

Fishery, Location, Target Stock by Agency¹	Proposal ID²	Most Recent Proposal³	Years with MSF since 2003⁴
Fisheries and Oceans Canada			
Sport, Southern BC, on hatchery Coho	MSF-FOC-02	2013	2003-2012
FSC, Lower Fraser freshwater, on hatchery Coho	MSF-FOC-03	2013	2006-2012
Commercial, Southern BC, on hatchery Coho	MSF-FOC-05	2013	2005-2012
Sport, Lower Fraser freshwater, on hatchery Coho	MSF-FOC-06	2013	2003-2012
Sport, Strait of Juan de Fuca, on hatchery Chinook	MSF-FOC-07	2013	2009-2012
Sport, WCVI, selected subareas, mainly inside, Chinook	MSF-FOC-08	2009	none
Oregon Department of Fish and Wildlife			
Sport, Willamette R, on hatchery Willamette spring Chinook	MSF-ODFW-01	2013	2003-2012
Sport, Oregon Coast, on hatchery fall Chinook Salmon	MSF-ODFW-02	2013	2008-2012
Sport, Oregon coast, on hatchery Coho	MSF-ODFW-03	2013	2003-2012
Washington Department of Fish and Wildlife			
Sport, Skykomish R, on hatchery Chinook	MSF-WDFW-01	2013	2003-2012
Sport, Yakima River, spring Chinook	MSF-WDFW-03	2013	2004,2008, 2010-2012
Sport, L Snake River, hatchery fall Chinook	MSF-WDFW-05	2013	2008-2012
Sport, Washington coast areas 1-4 & Col R Buoy 10, on hatchery Coho	MSF-WDFW-06	2013	2003-2012
Sport, Puget Sound, on hatchery Coho	MSF-WDFW-07	2013	2003-2012
Sport, Carbon & Puyallup R, on hatchery Chinook	MSF-WDFW-09	2013	2003-2012
Sport, Upper Skagit R on hatchery Chinook, summer	MSF-WDFW-12	2013	2005-2012
Sport, Nooksack R, on hatchery Chinook	MSF-WDFW-13	2013	2004-2012
Sport, Nisqually R on hatchery Chinook, Jul-Jan	MSF-WDFW-14	2013	2005-2012
Commercial, WA areas 1-4, on hatchery Coho	MSF-WDFW-15	2013	2003-2012
Sport, Nooksack River, hatchery Coho	MSF-WDFW-18	2011	2003-2011
Sport, WA Coast Area 1-4, hatchery fall Chinook	MSF-WDFW-19	2013	2010-2012
Sport, Skokomish River, hatchery Chinook	MSF-WDFW-20	2013	2010-2012
Sport, Willapa Bay, tributaries, Coho	MSF-WDFW-22	2013	2003-2012
Sport, Grays Harbor, Marine Area 2.2, Coho	MSF-WDFW-23	2013	2007-2012
Sport, Grays Harbor, tributaries, Coho	MSF-WDFW-24	2013	2003-2012
Commercial, Willapa Bay, Chinook	MSF-WDFW-25	2013	2010-2012
Sport, Willapa Bay, Marine Area 2.1, Chinook	MSF-WDFW-26	2013	2010-2012
Sport, Willapa Bay, tributaries, Chinook	MSF-WDFW-27	2013	2010-2012
Sport, Snake River, spring Chinook	MSF-WDFW-28	2013	2010-2012
Sport, Willapa Bay, Marine Area 2.1, Coho	MSF-WDFW-29	2013	2010-2012
Commercial, Grays Harbor, Marine Area 2C, Coho	MSF-WDFW-30	2013	2009-2012
Sport, Quillayute River, Coho	MSF-WDFW-31	2013	2003-2012

Fishery, Location, Target Stock by Agency¹	Proposal ID²	Most Recent Proposal³	Years with MSF since 2003⁴
Sport, Quillayute River system, hatchery spr/sum Chinook	MSF-WDFW-32	2013	2003-2012
Sport, Hoh River, hatchery spring Chinook	MSF-WDFW-33	2013	2008-2012
Sport summer, WA areas 5-13, on hatchery Chinook ⁵	MSF-WDFW-35	2013	2003-2012 ⁶
Sport winter, WA areas 5-13, on hatchery Chinook ⁷	MSF-WDFW-36	2013	2005-2012 ⁸
Sport, Snohomish R., on hatchery Chinook	MSF-WDFW-37	2013	New
Commercial, Grays Harbor areas 2A,2B,2C,2D, Chinook	MSF-WDFW-38	2013	New
Sport, Lower Grand Ronde, spring Chinook	MSF-WDFW-39	2013	New
Oregon and Washington Departments of Fish and Wildlife (jointly for Columbia River)			
Sport, Lower Columbia R, on hatchery spring Chinook	MSF-ODFW/WDFW-01	2013	2003-2012
Sport, Columbia R, on hatchery Columbia sum Chinook	MSF-ODFW/WDFW-02	2013	2003-2012
Commercial, Lower Columbia R, on hatchery spring Chinook (large and tangle net)	MSF-ODFW/WDFW-03	2013	2003-2012
Sport, Lower Columbia R on hatchery Coho (since 1999)	MSF-ODFW/WDFW-04	2013	2003-2012
Sport, Columbia R., on hatchery fall Chinook	MSF-ODFW/WDFW-05	2013	2011-2012
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), on hatchery Coho ⁹	MSF-ODFW/WDFW-06	2013	New
Commercial, Lower Columbia River (from Buoy 10 upstream to Beacon Rock), on hatchery Chinook (Coho, secondarily) ¹⁰	MSF-ODFW/WDFW-07	2013	New
Idaho Department of Fish and Game			
Sport, Snake River, on fall Chinook	MSF-IDFG-04	2012	2009-2012

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 fisheries 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 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** 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 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.

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

Region	Stock Representation	Indicator Stocks	DIT
BC North Coast	North Coast Wild	Lachmach	
	Skeena	Toboggan	
Interior Fraser	Thompson River	Coldwater (Spius Hatchery) Salmon Lemieux	
Georgia Basin	East Coast Vancouver Island	Big Qualicum Goldstream River	
	East Coast Vancouver Island Wild	Black Creek	
	Lower Fraser	Inch Creek	√
	Lower Fraser Wild	Salmon River	
	North Vancouver Island	Quinsam River	√
West Coast Van Is.	West Coast Vancouver Island	Robertson Creek	
Puget Sound	Nooksack	Skookum Creek H. Lummi Bay Ponds	
	Skagit	Skagit (Marblemount H.) Baker River Wild	√
	Stillaguamish/Snohomish	Skykomish (Wallace River) Tulalip Bay (Bernie Gobin)	√
	Mid Puget Sound	Green River (Soos Creek H.)	√
	South Puget Sound	Puyallup (Voights Creek H.) Peale Pass (Squaxin Net Pens) Nisqually (Kalama Creek H.)	√
	Hood Canal Wild	Big Beef Creek	
	North Hood Canal	Quilcene NFH Quilcene Net Pens Port Gamble Net Pens	√
	South Hood Canal	George Adams H.	√
	Dungeness	Dungeness H.	
	Strait of Juan de Fuca	Lower Elwha H.	√
	Washington Coast	North Coast	Makah NFH Solduc (fall run)
North Central Coast		Queets Wild (Salmon River H.) Queets (Salmon R. Fish Culture)	√
Quinalt		Quinalt NFH	√
Grays Harbor		Chehalis R. Wild Satsop Springs Ponds Satsop (Bingham Cr. H, late) Satsop (Bingham Cr. H., early)	√
Willapa Bay		Forks Creek H. (late fall run) Forks Creek H. Nemah R. H. Naselle H.	√
Columbia Basin	Lower Columbia River	Lewis River (Type N and S)	√
		Eagle Creek	√
		Sandy River	
		Tanner Cr.	√ new in 2012
Oregon Coast	Oregon South Coast	Rogue River (Cole Rivers)	

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

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

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

² DIT group not currently an indicator stock.

³ No longer adipose-fin clipped.

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

Templates with examples are provided below in Appendix Tables I.1, I.2, and I.3.

Appendix Table I.1. Sampling methods and processing of tags in all fisheries and escapement locations. This information is required for choice of estimation of impacts on unmarked fish.

Region	Sampling Location	CWT Sample Method	Detection Method	Tags Processed
North	Net	Direct	Electronic	All
	Troll	Direct	Electronic	All
	Sport	Voluntary	Visual	All
Outside	Net	Direct	Electronic	All
	Troll	Direct	Electronic	All
	Sport	Voluntary	Visual	All
Inside	Net	Direct	Electronic	All
	Troll	Direct	Electronic	All
	Sport	Voluntary	Visual	All

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

Region	Fishery Area	Fishery Period	Regulations	Sampling and Monitoring Conducted to Estimate:			
				CWTs	Encounters	Unmarked Mortality	Compliance
<i>Species</i>							
Alaska	No MSF						
Canada	St of Georgia Sport WCVI sport			Creel & voluntary	Creel, guide logbook, test fishing	No	No
Puget Sound	Area 5,6 sport Coho			Creel & voluntary	Creel, guide logbook, test fishing	No	No
	Area 7 sport Coho			Creel @ 22.6%	Creel, test fishing	No	Yes
	Area 7 Reef net Coho			Creel @ 15.2%	Creel	No	Yes
	Area 13 sport Coho			Creel @ 0%	No	No	Yes

Region	Fishery Area	Fishery Period	Regulations	Sampling and Monitoring Conducted to Estimate:			
				CWTs	Encounters	Unmarked Mortality	Compliance
<i>Species</i>							
Coastal Washington	Area 1 sport Coho			Creel @ 11.3%	Creel	No	Yes
	Area 2 sport Coho			Creel @47%	Creel, observers	No	Yes
	Area 3 sport Coho			Creel @ 45%	Creel, observers	No	Yes
	Area 4 sport Coho			Creel @73%	Creel, logbooks	No	Yes
	Area 1 troll Coho			Creel @ 42%	Creel, test fishing, observers	No	Yes
Coastal Oregon	Sport Troll			Creel @ 42%	Creel	No	Yes
Columbia R	Columbia R			Electronic	Observer & Creel	Yes	Yes
				Electronic	Creel	No	No
Columbia River	Buoy 10 sport Coho			Electronic	Creel	Yes	Yes
				Creel @ 38%	Creel , observer	No	Yes

Appendix Table I.3. Estimated catch, encounters, and mortalities by size and mark status in MSF.

Region	Fishery	Year	Retained Marked Fish	Retained Unmarked fish	Encounters Marked	Encounters Unmarked	% Marked	Legal-sized Marked fish Landed & Release Mortalities	Legal-sized Unmarked fish Landed & Release Mortalities	Sub-Legal-sized Marked fish Landed & Release Mortalities	Sub-Legal-sized Unmarked fish Landed & Release Mortalities
WA	Area 5/6	2003	3,417	76	5,327	8,626	38%	3,287	140	225	0
WA	Area 5/6	2004	3,571	5	5,102	6,365	44%	3,476	477	366	385
WA	Area 5/6	2005	2,024	53	3,412	3,237	51%	1,981	373	351	237
WA	Area 5/6	2006	3,641	25	5,008	5,095	50%	3,546	63	199	15
WA	Area 5/6	2007	3,971	124	5,784	3,839	60%	3,794	432	540	301