

PACIFIC SALMON COMMISSION
SELECTIVE FISHERIES EVALUATION COMMITTEE

REVIEW OF 2007 MASS MARKING AND
MARK SELECTIVE FISHERY PROPOSALS
REPORT SFEC (08)-1

September 2008

Selective Fishery Evaluation Committee

Canadian Members	U.S. Members
Dr. Brent Hargreaves (Co-Chair)	Dr. Gary S. Morishima (Co-Chair)
Dr. Gayle Brown (Co-Chair, AWG)	Dr. Marianna Alexandersdottir (Co-Chair, AWG)
Ms. Sue Lehmann (Co-Chair, RCWG)	Ms. Carrie Cook-Tabor (AWG)
Dr. Rick McNicol (Oversight)	Dr. Annette Hoffmann (AWG, Oversight)
Dr. Arlene Tompkins (AWG)	Mr. Ron Josephson (RCWG)
	Mr. Mark Kimbel (RCWG)
	Mr. Ron Olson (Co-Chair, RCWG)
	Mr. Patrick Pattillo (Oversight)
	Dr. Norma Jean Sands (AWG)
	Mr. Rishi Sharma (AWG)
	Mr. Dell Simmons (AWG, Oversight)

Acronyms

CoTC	Coho Technical Committee
CTC	Chinook Technical Committee
CWT	Coded Wire Tag
DIT	Double Index Tagging
ETD	Electronic Tag Detection
MM	Mass Marking
MOU	Memorandum of Understanding
MSF	Mark Selective Fishery
NSF	Non-Selective Fishery
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
SFEC	Selective Fishery Evaluation Committee
SFEC-AWG	Selective Fishery Evaluation Committee - Analytical Work Group
SFEC-RCWG	Selective Fishery Evaluation Committee - Regional Coordination Work Group
<i>sfm</i>	Selective Fishery Release Mortality Rate

Table of Contents

Table of Contents.....	ii
List of Figures.....	iii
List of Tables	iii
Executive Summary	iv
1 Introduction.....	1
2 RCWG Review of Mass Marking Proposals	1
2.1 Review Process for Mass Mark Proposals.....	1
2.2 Results of Review	2
2.2.1 Mass Marking Levels.....	2
2.2.2 Impacts on Sampling Programs	6
2.2.3 Double Index Tagging (DIT) Programs.....	11
3 AWG Review of Mark Selective Fisheries Proposals	11
3.1 Review Process	11
3.1.1 2007 MSF Proposals.....	11
3.2 Major Changes in MSF proposed for 2006.....	12
3.3 Fishery Interactions.....	12
4 Issues, Concerns, and Recommendations	21
4.1 Mass Marking Proposal Process	21
4.2 Mark Selective Fishery Proposal Review Process.....	21
4.2.1 Proposals Not Received by SFEC.....	21
4.2.2 Proposal Format	21
4.3 Post-Fishery Monitoring and Summary Tables	22
4.4 Post Season Evaluation Report	22
4.5 Utility of the CWT System	22
4.6 Coordination of Agencies	23
5 Oversight and Support Function of SFEC	23
6 References.....	27
Appendix A. Understanding of the Pacific Salmon Commission Concerning Mass Marking and Selective Fisheries (Revised February 2004).	28
Appendix B. Mass Marking Proposal Template.	33
Appendix C. Revised Template for Mark-Selective Fishery Proposals.....	36
Appendix D. Status of Mass Marking Proposals Received in 2006 for Mass Marking to Occur in 2007.	38
Appendix E. Criteria for evaluating mass marking proposals.	39
Appendix F. Current PSC Coho CWT Exploitation Rate Indicator Stocks and DIT Groups.	40
Appendix G. Current PSC Chinook CWT Exploitation Rate Indicator Stocks and DIT Groups.	41
Appendix H. Post Season Report Templates.....	42

List of Figures

Figure 1. Number of coho and Chinook salmon mass marked (ad clip only) and released, by region and brood year; 2005 and 2006 broods are proposed numbers.	4
Figure 2. Projected coho and Chinook releases, by region and mark status.	5

List of Tables

Table 1. Proposed mass marking (MM) of coho and Chinook salmon in 2006 and 2007.....	3
Table 2. Fishery sampling methods for tagged coho salmon.	7
Table 3. Fishery sampling methods for coded wire tagged Chinook salmon.	8
Table 4. Projected numbers of mass marked (MM) coho expected in fishery sampling programs.	9
Table 5. Projected numbers of mass marked (MM) brood year 2006 Chinook expected in fishery sampling programs.	10
Table 6. 2007 MSF proposals received by SFEC.	13
Table 7. Mark selective fisheries proposals (P) received, occurrence of fishery (F), and post season report (R) received for 2003 to 2007.	20
Table 8. Coho salmon tag groups that are expected to be present in coho mark-selective fisheries expected in 2007.	24
Table 9. Chinook tagged stocks that have been encountered in freshwater areas with proposed Chinook MSFs for 2007.	25
Table 10. Chinook tagged stocks that have been encountered in marine areas with proposed Chinook MSFs for 2007.	26

Executive Summary

The coast wide coded wire tag (CWT) system is the only means currently available to obtain data necessary to estimate and monitor coast wide exploitation rates on individual stocks of coho and Chinook salmon, as required for implementation of fishing regimes established by the Pacific Salmon Commission (PSC). The PSC established the Selective Fishery Evaluation Committee (SFEC) to assess impacts of mass marking (MM) and mark-selective fishing (MSF) on the viability of the CWT system. Throughout this report, a marked fish refers to an adipose fin clipped fish and a double index tag (DIT) group includes two CWT groups, one marked (adipose fin clipped) and one unmarked.

This report (a) summarizes the results of the SFEC's review process of 2007 proposals for MM and MSF provided to the PSC between October and December 2006, (b) clarifies the oversight function of the SFEC, and (c) presents recommendations for addressing several unresolved issues and concerns.

Review of Mass Marking Proposals

Marking Programs

Twenty proposals (10 coho and 10 Chinook) were received for mass marking activities in 2007 (Appendix D). The SFEC believes these proposals cover all but one MM program with international PSC implications.

Approximately 38 million coho are proposed to be mass marked coast wide in 2007 (Table 1; Figure 1A). This represents no significant change in marking level from 2006 and 2005. Essentially all hatchery coho production intended for harvest, from Southern BC and Southern US hatcheries, is now being mass marked.

Approximately 87 million Chinook are proposed to be mass marked from southern US hatcheries (Table 1; Figure 1B). This is an increase of 17.8 million (25.7%), over actual 2006 marking levels. This is also an increase of 26.4 million (43.6%) from the 2005 proposals (60.6 million proposed). Most of the increase is due to additional marking of fall Chinook from the Washington Coast and the Columbia River, a result of implementing the new federal legislation that requires mass marking of all fish from federally funded facilities. Many of these are far-north migrating stocks. The SFEC is aware that approximately 13.5 million additional Columbia River fall Chinook are available for potential mass marking by WDFW and ODFW in 2008, pending funding. The SFEC was also made aware that an additional group of approximately 4.5 million fall Chinook from the Columbian Basin will likely be marked and released but were not included in a proposal.

Sampling Programs

Assuming recent exploitation rates and sampling programs, the SFEC estimates the proposed mass marking of southern US Chinook stocks in 2007 will result in annual encounters of untagged marked Chinook in sampling programs of approximately 10,000 untagged and marked Chinook in Alaska and 21,000 untagged marked Chinook in Canadian sampling programs (Table

5). Approximately 1,500 untagged and marked coho are projected to be encountered in Alaska and 42,000 untagged marked coho in Canadian sampling programs (Table 4). Neither agency conducts sampling programs which will recover the unclipped component of Double Index Tagging (DIT) programs required to assess impacts of MSFs. Lack of Electronic Tag Detection (ETD) in AK and some BC fisheries results in inefficient recovery of CWTs (due to extra effort required to process marked and untagged fish). This may result in either lower recovery (sampling) rates or higher costs to maintain current recovery rates.

At current MM levels of Chinook and coho, only Washington (WA) is adequately sampling and reporting CWT recoveries of unmarked DIT releases. Representatives of WA agencies have completed initial analyses of estimated impacts for coho MSFs, based on marked and unmarked recoveries of DIT releases. Valuable insight was obtained concerning possible levels of bias and uncertainty in estimated impacts. However, the ability to expand the coho analysis and to conduct analyses of Chinook DIT recoveries and MSF impacts depends on complete sampling and processing of unmarked and tagged fish in harvest and escapement.

Biases in any estimation of exploitation rates for unmarked and tagged fish could be due to:

- the lack of sampling for unmarked CWTs in some fisheries (e.g., coho and Chinook fisheries in AK),
- the lack of processing of heads from unmarked fish with detected CWTs (e.g., most Chinook catches in BC), incomplete reporting of unmarked recoveries to the RMIS database (e.g., from OR fisheries), and
- incomplete or inadequate sampling of escapement where returns of DIT releases are expected.

The SFEC-AWG is considering these issues and plans to provide a separate report to the PSC in 2008.

Review of MSF proposals

No proposals were received for 11 coho salmon MSFs for 2007 (Table 7). No proposals have been received for the Oregon coho fisheries for the last four fishery years.

Nine proposals were received for Chinook salmon MSFs for 2007. WDFW proposals were received for three ongoing marine MSFs and five freshwater MSFs. An ODFW proposal was received for the Willamette spring Chinook.

Issues and Concerns

Lack of proposals.

There were no coho MSF final proposals received, although some draft proposals were given to the SFEC committee at the time of review. Although coho MSFs have been received in the past, it is necessary for agencies to submit proposals annually for review. Although MM proposals were submitted for most all activities, these were not all submitted within the required timeframe. The SFEC is aware that significant new Chinook mass marking of fall Chinook from the Columbia River could occur in 2008.

Post season reports

The SFEC-AWG requested that agencies send post-season reports for each MSF fishery prosecuted. A template was provided for these reports as well as a new template for the MSFs. One post season report has been provided to date.

Utility of the CWT system

Despite the technical concerns introduced by MM and MSFs, for the near future, the coast wide CWT system remains the only method for the Parties of the Pacific Salmon Treaty to estimate and monitor coast wide exploitation rates on individual stocks of coho and Chinook salmon for the near future (Expert Panel, 2005).

The current list of coho and Chinook DIT pairs needs further review by the SFEC-AWG, the CTC, and the CoTC as there may be deficiencies in geographic coverage and tagging levels.

The SFEC-AWG has developed methods for using the DIT data to estimate unmarked mortalities (SFEC-AWG, 2002). However, concerns persist about whether the DIT system will yield useable estimates of unmarked exploitation rates in mark-selective fisheries for Chinook salmon. The multiple age distribution and far-ranging nature of Chinook salmon stocks increases the potential for biased estimates of mortalities using DITs. The SFEC is currently evaluating the utility of DIT for Chinook salmon. DIT releases for Chinook should be continued to both provide information for this evaluation.

Tag recovery reporting strata

Methods to estimate mortalities of unmarked and tagged DIT fish in MSFs differ markedly from the methods used to estimate mortalities in non-selective fisheries. In non-selective fisheries, when ETD is used, observed tag recoveries are available from sampling for both marked and unmarked tagged fish, whereas in MSFs only marked tagged recoveries are available. For this reason, tag recoveries and their sample expansions must be reported separately for MSFs and non-selective fisheries.

Mixed bag regulations

Proposals for some coho and Chinook salmon MSFs include mixed bag regulations, where some unmarked fish may be retained along with marked fish in a mark-selective fishery. Under such a regulation it is no longer possible to use any of the methods currently proposed to estimate unmarked encounters of a DIT pair from marked encounters. Methods need to be developed to make estimates in these situations.

Coordination of agency programs

Mass marking programs, DIT programs, and CWT sampling programs are no longer adequately synchronized between agencies. For example, the southern US plans to increase the mass marking of far north migrating Chinook, expand the number of Chinook MSFs, implement an extensive DIT program (both coho and Chinook), and continue to tag numerous conservation stocks without an adipose mark. At the same time, Alaska has no plans to convert from visual sampling to electronic sampling and Canada does not plan to increase ETD capability. These differences in sampling and tagging methodologies will impact analyses by PSC technical

committees, eliminate the ability to conduct CWT-only studies, and degrade the ability to assess the impacts of MSFs.

Recommendations and Issues Requiring PSC Direction

Proposal Review Process

- It is recommended that the Commission reissue its' call to agencies for proposals for all potential 2008 MM and MSFs, and for agencies to provide preliminary and final reports on the conduct of MSFs.
- In order to assist the agencies in achieving this goal, the SFEC will provide agencies a table of indicator stocks and DIT groups with the proposal templates each year.

Interagency Coordination and Cooperation

MM, DIT, and CWT sampling programs are not sufficiently coordinated to support analysis by PSC technical committees. The PSC should continue to support technical and policy processes to develop agreements to clarify responsibilities for maintaining a functional CWT system.

Representation on SFEC

All agencies that are proposing MSFs should be represented on the SFEC. ODFW does not currently have any representative on SFEC. These representatives should be provided with adequate time to assist with completing the SFEC assignments.

1 Introduction

The Selective Fisheries 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 coast wide clearinghouse to facilitate coordination and reporting on MM and MSF programs among the Parties, affected agencies, and existing coast wide and regional committees established to monitor activities related to the coast wide CWT program. The SFEC continues to review procedures and protocols for marking, sampling, and evaluation developed by the proponent(s) and, if appropriate, develop and recommend alternative procedures in consultation with relevant PSC technical committees.

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 agencies to use in developing proposals and analyzing data. The SFEC includes two working groups: the Regional Coordination Work Group (RCWG) and the Analytical Work Group (AWG). The RCWG is tasked with reviewing MM proposals, and the AWG is tasked with reviewing MSF proposals.

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 Pacific Salmon Commission (PSC). Templates for MM and MSF proposals were first developed in 2002, and agencies have been annually requested to provide their information to the PSC in this format (Appendices B and C). SFEC requested agency proposals for MSFs where CWT indicator stocks are expected to be impacted. Agency proposals for mass marking plans were requested for all hatchery Chinook and coho stocks expected to be intercepted in PSC fisheries. As stated in the *Understanding of the PSC concerning Mass Marking and Selective Fisheries* (Appendix A), proposals for continuing programs are requested to be submitted to the PSC no later than November 1 of the year prior to implementation.

This report (a) summarizes the results of the review process of MM and MSF proposals received between October and December 2006, (b) identifies several unresolved issues and concerns, and (c) provides recommendations. In this report a marked fish refers to an adipose-fin clipped fish and a double index tag (DIT) group includes two CWT groups, one marked and one unmarked.

2 RCWG Review of Mass Marking Proposals

2.1 Review Process for Mass Mark Proposals

A total of 20 MM proposals (10 coho and 10 Chinook) were received by the PSC for 2007 activities (Appendix D). The proposals are summarized in Table 1. Two of the Chinook proposals involve significant increases from previous years in marking of fall Chinook from the Washington coast and the Columbia River. Submitted proposals represent all but one mass marking program with international ramifications and/or sampling impacts on other agencies. No proposal was submitted for ODFW's Big Creek Hatchery program on the lower Columbia

River, where in 2007 approximately 4.5 million fall Chinook were marked and released from this facility.

Proposals were not requested for spring and summer Chinook stocks from the upper Columbia and Snake River Basins. This is based on the lack of marine CWT recoveries from these groups identified in previous reviews.

In order to evaluate the impacts of MM proposals on coast wide 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.

The RCWG used the criteria developed in 2002 (Appendix E) for reviewing all MM proposals received. Proposals were reviewed, discussed, and evaluated by RCWG members in December 2006.

2.2 Results of Review

2.2.1 Mass Marking Levels

Approximately 38 million coho are proposed to be mass marked in 2007 coast wide (Table 1). There are no significant changes to marking levels from BY 2005 to BY 2006. Temporal trends, BYs 1997 to 2006, in the geographical distribution and the total level of the actual (1997 to 2004) and proposed (2005 to 2006) mass marking are shown in Figure 1A. Geographical details of the proposed releases by mark and tag status for BY 2006 are displayed in Figure 2A. A vast majority of the coho production, and essentially all coho intended for harvest, from Southern BC and Southern US hatcheries is being mass marked. The few million fish that are not marked or tagged, the majority of which are Columbia River stocks, are primarily restoration or supplementation programs, and intentionally unmarked.

The total BY 2006 southern US Chinook hatchery production, for the stocks covered by the 2007 proposals, is projected at approximately 143 million. Based on proposals received to date, temporal trends, BYs 1997 to 2006, in the geographical distribution and the total level of the actual (1997 to 2004) and proposed (2005 to 2006) mass marking are shown in Figure 1B. Geographical details of the proposed releases by mark and tag status for BY 2006 are displayed in Figures 2B. As previously stated, no proposal was submitted for the ODFW's Big Creek Hatchery program on the lower Columbia River, where in 2007 approximately 4.5 million BY 2006 fall Chinook were marked and released from this facility. This group had not been previously marked and impacts from this new marking program were not included in this analysis.

Approximately 87 million Chinook are proposed to be mass marked from southern US Chinook hatcheries (Table 1). This is an increase of 10.4 million (13.6%) from the 2006 proposals and an increase of 26.4 million (43.6%) from the 2005 proposals (60.6 million proposed). The increases are due to additional marking of fall Chinook on the Washington Coast and the Columbia River, while Puget Sound and Oregon Coast proposed marking levels remained unchanged (Table 1). There is no proposed mass marking of Chinook in BC. Of the remaining production (non mass

marked), approximately 19 million are tagged and marked, approximately 6 million are tagged and unmarked, and approximately 13 million are intentionally left unmarked for restoration programs (Figure 2B). This leaves approximately 13.5 million Columbia River fall Chinook, both Tule and URB stocks, available for potential future mass marking.

Table 1. Proposed mass marking (MM) of coho and Chinook salmon in 2006 and 2007.

Area	Run	Agency	DIT Groups	Mass Marking (millions)		Significant Changes from 2006
				2006	2007	
Coho						
Southern BC		CDFO	2	6.9	7.5	
Puget Sound		WDFW/Tribal	7	10.3	10.7	
		USFWS	1	0.3	0.3	
WA Coast		USFWS	2	0.7	0.7	
		WDFW/Tribal	4	5.5	5.3	
Columbia Basin		USFWS	1	0.5	0.5	
		WDFW	2	8.6	8.7	
OR Coast		ODFW	1	4.0	4.0	
		ODFW	1	0.5	0.5	
Total Coho				37.4	38.2	
Chinook						
Puget Sound	Spring	WDFW	2	0.4	0.4	
	Summer	WDFW/Tribal	1	1.8	2.0	
	Fall	WDFW/Tribal	6	28.6	29.4	
WA Coast	Spring	WDFW	0	0.2	0.2	
	Fall	USFWS	0	2.3	2.1	
		WDFW/Tribal	2	1.9	8.7	Significant Increase
N. OR Coast	Spring	ODFW	0	0.3	0.4	
S. OR Coast	Spring	ODFW	1	2.1	1.9	
Columbia Basin	Spring	ODFW	2	5.4	5.3	
		WDFW	1	2.5	3.0	
	Fall	USFWS	2	14.2	14.2	
	Tule ¹	WDFW	0	13.0	17.9	Significant Increase - only 5.6M actually marked in 2006
	Fall	USFWS	0	3.3	1.6	No marking at Priest Rapids
	Snake River Fall	IDFG	0	0.6	0.0	Broodstock shortage
Total Chinook				76.6	87.0	

¹ Does not include 4.5 million MM fall Tule production released from ODFW's Big Creek Hatchery.

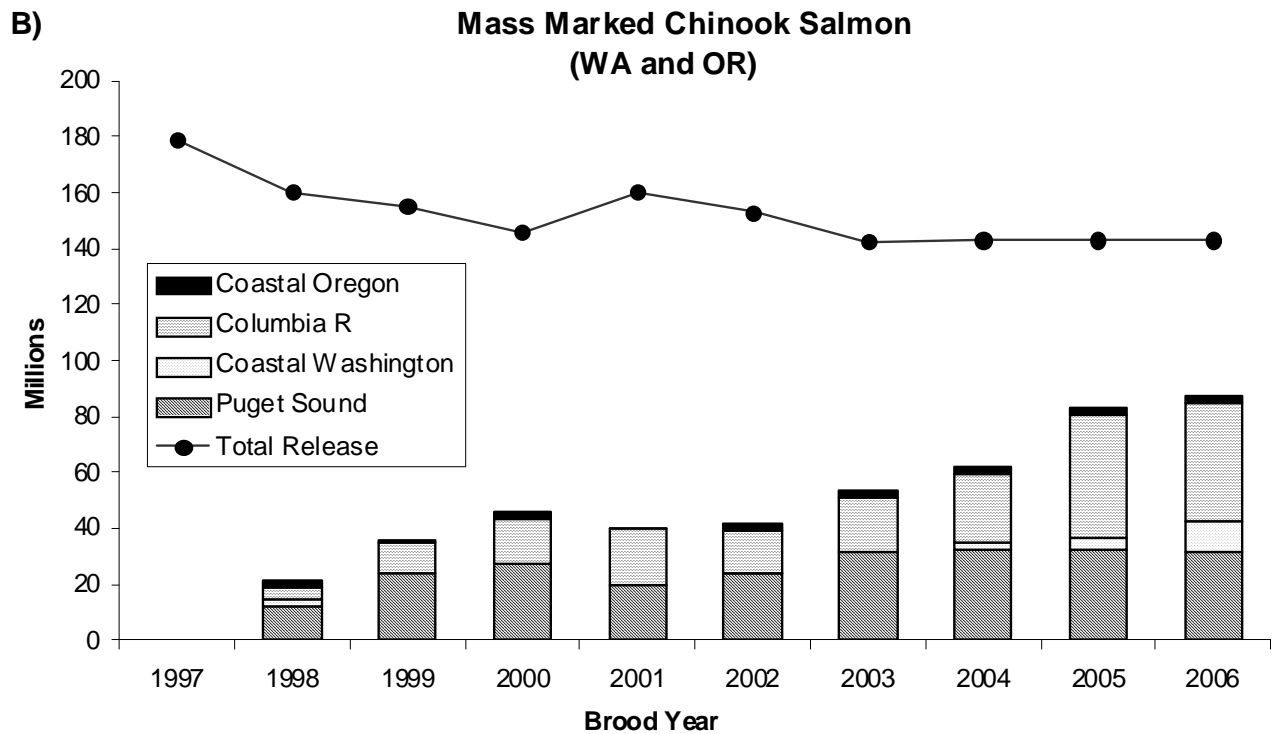
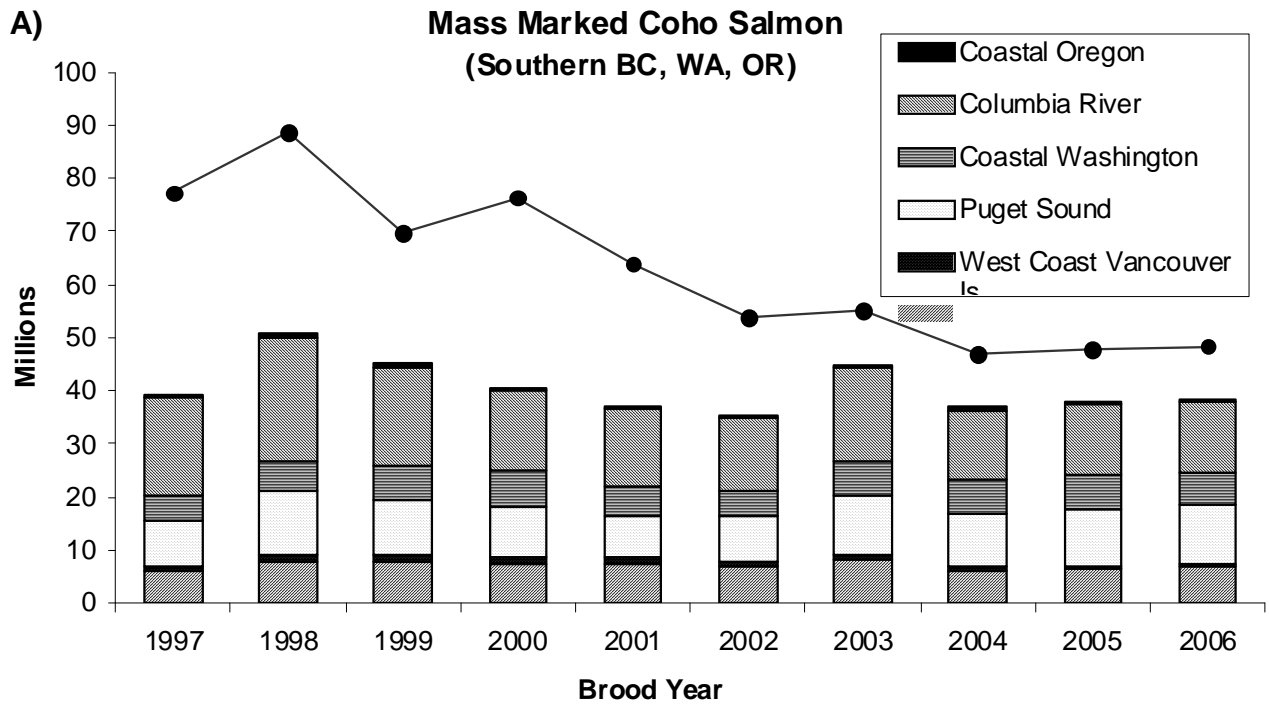


Figure 1. Number of coho and Chinook salmon mass marked (ad clip only) and released, by region and brood year; 2005 and 2006 broods are proposed numbers. Bars do not include coded-wire-tagged fish. The line represents total hatchery releases.

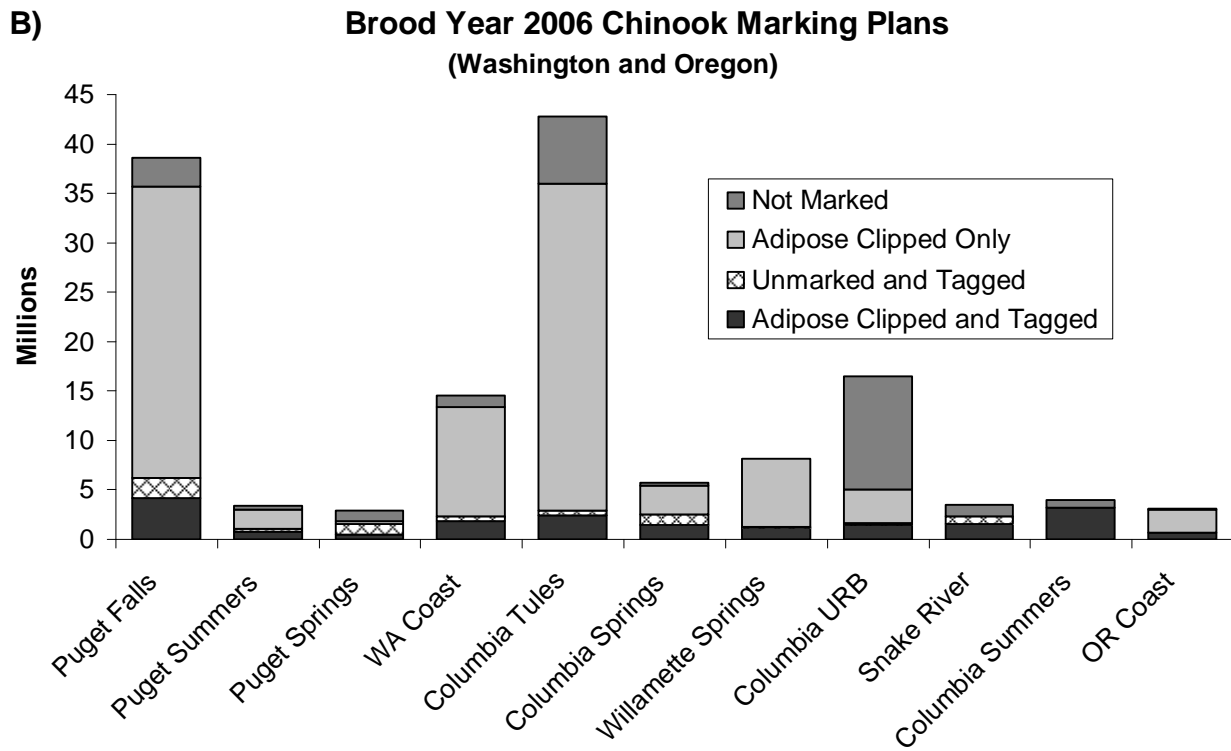
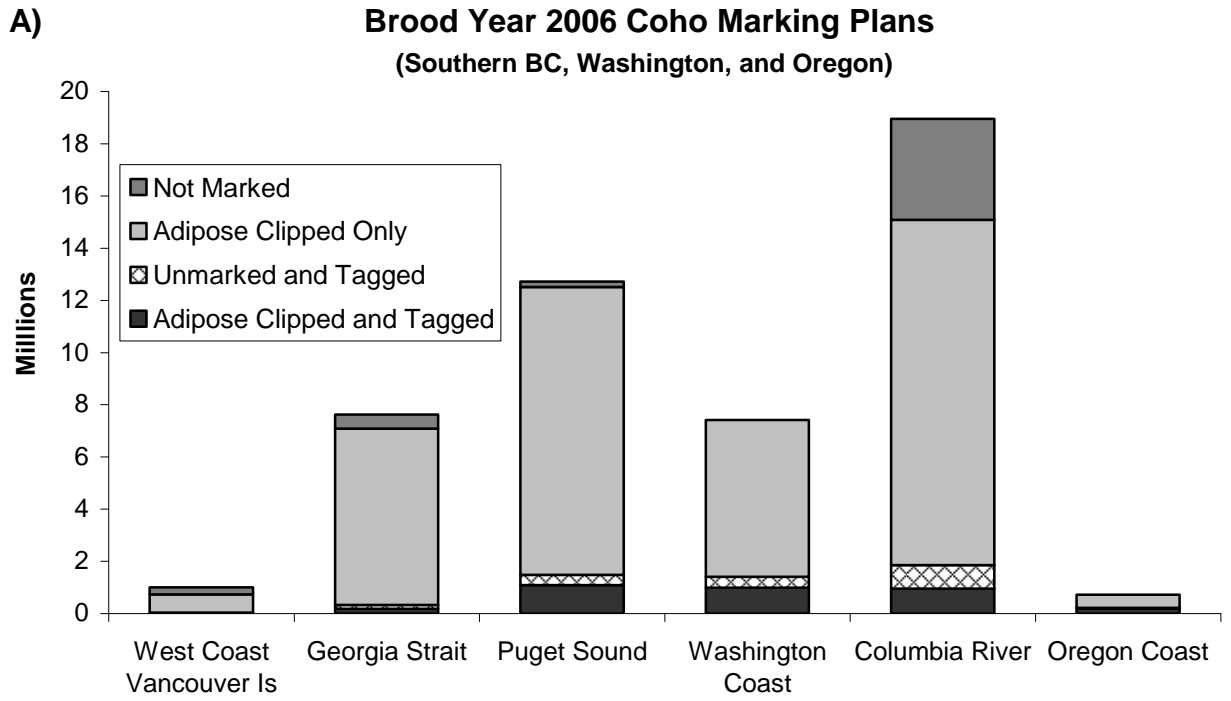


Figure 2. Projected coho and Chinook releases, by region and mark status.

2.2.2 Impacts on Sampling Programs

Current Agency Sampling Methodologies

Two methods of tag detection are currently in use. The traditional visual sampling uses the adipose fin clip as an external indicator for a CWT and when this method is used by samplers only CWTs from clipped fish will be detected. Electronic tag detection (ETD) uses electronic gear (wand or tube) to detect CWTs and results in detection of CWTs in clipped and unclipped fish¹.

ETD has not been implemented for all fisheries encountering mass marked fish. A summary of CWT sampling methods for coho and Chinook are listed in Table 2 and Table 3, respectively. In general, ETD has become the standard CWT sampling method in Washington, Idaho, and Oregon (except for Oregon coast fall Chinook fisheries, where fish are sampled visually). Traditional visual CWT sampling (using the adipose fin clip as an external sign of the presence of a tag) remains the standard method in Alaska and California. In BC the situation is more complex, where sampling methods depend on species, location, and the type of fishery.

Alaska has no plans to convert to electronic sampling and is concerned about the large numbers of clipped fish without tags in their sampling programs. There has been an increase from approximately 7% to 30% of marked and untagged Chinook caught in the troll fishery since the implementation of mass marking. This increases the cost of processing the heads in comparison to pre-Chinook mass marking.

Canada relies on CWT recovery through voluntary submission of heads from marked coho and Chinook in recreational fisheries, while the current restricted commercial fisheries are electronically or visually sampled, depending on species and location. The voluntary program has seen an increase in the proportion of heads without tags and at the same time a decrease in the submission of coho salmon heads by anglers. Commercial coho fisheries in northern BC are sampled visually and Chinook fisheries are sampled electronically. South of Cape Caution on the Central Coast, electronic sampling is used for both species for the current commercial fisheries. If commercial fisheries expand, in area or magnitude, the equipment and infrastructure presently in place will be inadequate to support electronic sampling. DFO estimates a cost of approximately \$500k to fully implement ETD in commercial fisheries.

Electronic tag detection is not used to sample fish in California fisheries. However, significant numbers of MM Oregon south coast spring Chinook are projected to be recovered in California (see discussion below), impacting the recovery of Oregon DIT Chinook salmon.

Estimated Sampling Encounters

Summaries of projected MM Chinook and coho which could be sampled in agency sampling programs are listed in Tables 4 and 5. The proposed mass marking of southern BC and southern US coho stocks will result in an estimated 1,569 encounters of untagged and marked coho in Alaska and 41,996 untagged marked coho in Canadian sampling programs (Table 4). The proposed mass marking of southern US Chinook stocks will result in estimated encounters of

¹ Note that when clipped fish are first separated in the sample and then electronic gear are used to detect tags in these clipped fish this must be defined as **visual sampling**, as only clipped and tagged fish are detected.

approximately 10,245 untagged and marked Chinook in Alaska and 21,295 untagged marked Chinook in Canadian sampling programs, assuming recent exploitation rates and sampling programs. We emphasize these regions because agencies in these two areas rely on visual sampling to recover CWTs. These increases are due to the migratory patterns of the stocks in the new proposals – Washington Coast and Columbia River fall Chinook. Some of these stocks are classified as “far-north” migrating (Washington coast fall Chinook and Columbia River Up-River Brights) and contribute heavily to both Alaskan and Canadian fisheries (Table 5). The Columbia River Tule stocks contribute heavily to Canadian fisheries, as well as Washington and Oregon fisheries (Table 5). These projected increases in encounters of untagged fish may result in either lower sampling rates, or higher costs to maintain current recovery rates, because of the additional effort required to process marked fish without tags.

Table 2. Fishery sampling methods for tagged coho salmon.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial	Visual	
	Sport	Visual	
Northern BC	Commercial	Visual	Some terminal areas are unsampled.
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked coho; therefore tag recoveries of unmarked coho are not expected.
West Coast Vancouver Island	Commercial	Electronic	Incidental recoveries in fisheries on other species; non-retention of unmarked coho.
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked coho; therefore tag recoveries of unmarked coho are not expected.
Strait of Georgia	Commercial	Electronic	Incidental recoveries in fisheries on other species; non-retention of unmarked coho.
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked coho; therefore tag recoveries of unmarked coho are not expected.
Puget Sound	Commercial	Electronic	
	Sport	Electronic	
Washington Coast	Commercial	Electronic	
	Sport	Electronic	
Oregon Coast	Commercial	Electronic	
	Sport	Electronic	
Columbia River	Commercial	Electronic	
	Sport	Electronic	
California	Commercial	Visual	
	Sport	Visual	

Table 3. Fishery sampling methods for coded wire tagged Chinook salmon.

Region	Fishery	Type of Sampling	Comments
Alaska	Commercial	Visual	
	Sport	Visual	
Northern BC	Commercial	Electronic	Tags from unmarked fish, except those recovered from freezer boats, are not decoded.
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked Chinook; therefore tag recoveries of unmarked Chinook are not expected.
West Coast Vancouver Island	Commercial	Electronic	Tags from unmarked fish, except those recovered from freezer boats, are not decoded.
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked Chinook; therefore tag recoveries of unmarked Chinook are not expected.
Strait of Georgia	Commercial	Electronic	Unmarked tags not decoded
	Sport	Voluntary (Visual)	Anglers encouraged to turn in heads only from marked Chinook; therefore tag recoveries of unmarked Chinook are not expected.
Puget Sound	Commercial	Electronic	
	Sport	Electronic	
Washington Coast	Commercial	Electronic	
	Sport	Electronic	
Oregon Coast	Commercial	Visual	Marine fisheries target fall Chinook, which are not MM in Oregon. CWTs from unmarked Chinook from other regions will not be recovered.
	Sport	Visual	
Columbia River	Commercial	Electronic	
	Sport	Electronic	
California	Commercial	Visual	
	Sport	Visual	

Table 4. Projected numbers of mass marked (MM) coho expected in fishery sampling programs. These projections are based upon average recovery rates in fisheries and the proposed releases of brood year 2006 MM coho (actual number of fish encountered in samples will depend upon survival and sampling rates). For this analysis the following brood years were used: 2001-2003 CDFO; 1999-2001 WDFW; 2000-2002 ODFW; 1999-2003 USFWS.

Area	Agency	DITs	Projected Encounters in Samples														
			MM Coho	Alaska		N. BC		S. BC		Wa. (Coast/PS)		Columbia River		Or. Coast		California	
			BY 2006	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt
Southern BC	CDFO	2	7,455,500	888	85	527	7,668	1,700	30,499	3,273	7,499			38	308		
Puget Sound	WDFW	9	10,730,000	443		136	68	49	936	65,414	26,008		189	330	2,301		
	USFWS	1	304,000						30	709	671			3	57		
Wa Coast	USFWS	2	720,000	6	1	11	3	4	49	2,255	938	1	10	17	221		
	WDFW	4	5,275,000	146		108			130	8,116	5,425	29	96	171	2,430		
Columbia	USFWS	1	450,000							2	60	54	32	1	47		
	WDFW	2	8,732,500			12			58	813	16,124	16,007	6,278	1,192	10,406		
	ODFW	1	4,047,000						8	103	3,333	9,728	2,096	96	3,595	4	15
Or Coast	ODFW	1	497,000							14	157	1	6	15	220		8
Total Coho			38,211,000	1,569		8,533		33,463		140,914		34,527		21,448		27	

Table 5. Projected numbers of mass marked (MM) brood year 2006 Chinook expected in fishery sampling programs. These projections are based upon average recovery rates of brood year 1997-1999 tagged releases in fisheries and the proposed releases of brood year 2006 MM Chinook (actual number of fish encountered in samples will depend upon survival and sampling rates).

Area	Run	Agency	DITs	Projected Encounters in Samples															
				MM		Alaska		N. BC		S. BC		Wa. (Coast/PS)		Columbia R.		Or. Coast		California	
				BY 2006		Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt
Puget Sound	Spring	WDFW	1	350,000	encounters included with falls														
	Summer	WDFW	1	2,010,000	encounters included with falls														
	Fall	WDFW	7	29,413,500	409		198	66	6,155	2,296	24,700	4,502	10		564	18	9		
WA Coast	Spring	WDFW	0	200,000	10		23	1	4	4	21	3		4					
	Fall	USFWS	0	2,140,000	439	58	177	28	20	12	639	9					2		
		WDFW	2	8,700,000	2,100	345	1,666	310	162	268	1,049	839	258	262		255			
N. OR Coast	Spring	ODFW	0	388,000	285	8	123	13	81		53	15	2	2	95	75	2		
S. OR Coast	Spring	ODFW	1	1,904,000	4		4		34	8	69	57	4		1,175	221	1,105	87	
Columbia River	Spring	ODFW	2	5,261,000	1,583	81	390	16	693	8	201	131	1,919	2,322	134	3			
		WDFW	1	2,972,000	530	9	153		190	18	111	149	342	445	133	24			
	Fall Tules	USFWS	2	14,200,000	977	61	34	17	3,708	300	3,490	2,227	14,964	955	3,496	461	10	28	
		WDFW	2	17,850,000	2,600	391	678	372	2,000	324	2,335	2,010	1,413	1,146	1,391	363			
		ODFW	1	4,500,000					609	84	594	1,298	7,590	1,750	4,171	724	788	33	
URB	USFWS	0	1,600,000	347	8	8		24	16	8	8	379		8					
Total Chinook				91,488,500	10,245	4,277	17,018	44,518	33,763	13,315	2,064								

2.2.3 Double Index Tagging (DIT) Programs

With the advent of MSF using the adipose clip as a mass mark, CWT and marked groups no longer represent unmarked groups and cannot be used to estimate exploitation of natural or unmarked stocks in the presence of MSFs. DIT releases were introduced to circumvent this problem. The DIT release consists of paired tag groups, one marked, and the other unmarked. The relationship between marked and unmarked groups in a DIT pair provides a means to estimate encounters of the unmarked group in MSFs. The tagged and unmarked fish will be released in a MSF fishery, as will all unmarked natural production, to provide a representative for natural production.

The current list of DIT groups is not comprehensive with respect to geographic distribution (Table 1, Appendices F and G). Further, the list of DIT groups has not been reviewed by the PSC Chinook and Coho Technical Committees to ensure that all stocks potentially encountered in proposed MSFs are adequately represented by DIT groups. This situation is partly due to the cost of tags and agency funding issues, and also to a lack of consensus on the utility of the DIT program.

Alaska and Canada continue to utilize visual sampling programs to recover tags and will not recover the unmarked component of DIT programs required to directly assess impacts of mark selective fisheries. Canada employs ETD for Chinook commercial fisheries. For 2005, Canada provided unmarked CWTs to WDFW for decoding. In 2006, Canada decoded unmarked CWTs. Canada employs a voluntary recovery program for Chinook and coho salmon recreational fisheries with anglers returning heads from marked salmon. No CWTs from unmarked fish are recovered in the recreational fisheries. There is incomplete reporting of unmarked recoveries to the RMIS database from Oregon fisheries and in all regions there is incomplete or inadequate sampling of escapement where returns of DIT releases are expected. These factors all compromise the ability to utilize DIT to determine the impact of MSF on unmarked stocks and will impact analyses by PSC technical committees and other evaluation programs.

3 AWG Review of Mark Selective Fisheries Proposals

3.1 Review Process

SFEC revised the template for 2005 MSF proposals, simplifying the form substantially to focus on the description of the fishery and the sampling plan and to identify the stocks impacted by the fishery (Appendix C.). The intent of revising the proposal template was to reduce complexity, focus on pertinent information to review the proposed MSFs and identify potential interactions between MSFs on indicator stocks. The information requested was used to identify major changes in operation of MSFs and sampling from year to year, to flag any potential issues, new or ongoing, and provide advice to proposal proponents.

3.1.1 2007 MSF Proposals

Coho MSFs were expected in BC, Washington and Oregon and draft proposals were received for three BC coho MSFs for 2007 by the SFEC committee at the time of the proposals were reviewed (Table 6). However, no final coho 2007 proposals were received either by the SFEC or by the PSC office (Table 7). Coho MSFs occurred in 2006 in 11 fisheries (Table 7) including;

sport and commercial in southern BC, sport and First Nations in the Lower Fraser, sport and commercial off the WA coast and in Puget Sound, in the Nooksack River, a sport fishery in the Lower Columbia River, and sport and commercial coho fisheries on the Oregon coast.

Nine proposals were received for Chinook salmon MSFs for 2007 (Tables 6). Proposals were received for six freshwater Chinook salmon MSFs, but three of these previously did not have proposals (Table 7). There is a new proposal for a spring and summer Chinook fishery in Puget Sound (Areas 6, 9, 10, 11 and 13). There is also a proposal for a winter MSF in Areas 6-13 in Puget Sound. This proposal was received in 2006, but the winter fishery only occurred in 2006 in Areas 8.1 and 8.2. The Columbia River recreational and commercial spring Chinook MSFs proposals received in 2003 included the 2004 and 2005 fishing years, but no proposals were received for 2006 or 2007 (Table 7). An ODFW proposal was received for the Willamette spring Chinook (Table 6).

3.2 Major Changes in MSF proposed for 2006

A new pre-terminal Chinook MSF was proposed for Puget Sound and Strait of Juan de Fuca (WA areas 5-13) for October to April of 2005-2006, but was only prosecuted in Areas 8.1 and 8.2. This proposal was also submitted for 2006-2007, but only for areas 6-13. There is also a new spring and summer MSF proposal for Puget Sound areas for 2007.

3.3 Fishery Interactions.

Multiple MSFs are taking place in British Columbia, Washington and Oregon. Tables 8 through 10 were constructed to illustrate where coho and Chinook salmon will encounter MSFs. They were constructed using historical information on encounters of tagged fish in the fishery areas and time periods of the MSFs. Table 8 for coho salmon indicates that all DIT stocks will be impacted in the Washington ocean, Puget Sound, and Southern BC MSFs listed in the table. The freshwater fisheries in Puget Sound can be expected to largely encounter tagged fish from local hatcheries, but evaluation of tagged fish encountered in sampling of fisheries and escapement over the past five years in these rivers show that some non-local strays can be expected to be encountered (Table 9). In 2007 Southern BC and Puget Sound Chinook stocks will potentially be impacted by three marine Chinook MSFs; the Area 5/6 summer fishery which will be in its fifth year (Table 7), the summer and winter MSFs proposed for Puget Sound, and the winter fishery which impacts Chinook stocks present in Puget Sound throughout the year.

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
Coho proposals received						
BC statistical areas 11-29, outer areas of 121-127. Tidal portions of Fraser River.	CDFO	Recreational	Coastal waters Jun 1- Dec 31.	Daily bag limit of 2 marked coho greater than 30 cm fork length. Barbless hooks. Further regulations depend on maximum ER for interior Fraser River coho. May have mixed bags.	Lists tagged coho recoveries in 1986-1991. Good table, but could benefit from indication of DIT groups.	<p>This proposal was received by the SFEC in preliminary form, but not submitted to the PSC. Proposal still does not identify which of the stocks encountered in the SBC fisheries are tagged indicator stocks and which are DIT stocks.</p> <p>There is no direct creel sampling of CWTs. Catch is estimated by creel survey methods and CWT recoveries will be estimated from CWTs obtained via a voluntary head recovery program.</p> <p>Voluntary recovery programs will not provide recoveries of unmarked and tagged fish in any fishery, MSF, NSF or in mixed bag fisheries.</p> <p>Mixed bag fishery will likely be prosecuted.</p>

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
			Fraser River Mid-Oct to Dec 31.			
Cluxewe and Quatse Rivers, Vancouver Island	CDFO	Recreational	Jan-Dec	Daily bag limit of 2 marked coho.	None are likely to be encountered.	This proposal was received by the SFEC in preliminary form, but not submitted to the PSC. No sampling of fisheries proposed. Not intending to estimate unmarked mortalities.
Washington Areas 6,7,8-1,8- 2,9,10,11,13 (MSF-WDFW-08)	WDFW	Recreational	Oct 2007 to Apr 2008	Daily bag limit of 2 marked salmon. Chinook minimum size limit of 22 inches, 18-20 inches being considered. Other species follow normal structure for areas/months.	List of tagged stocks with DITs indicated. Stocks listed are Puget Sound stocks only. No list of BC stocks that are likely to be encountered.	This fishery will be impacting CTC indicator stocks of concern that are not clipped or DIT: White River tag groups being the main concern. No sampling plan is attached. Note that Sampling plan for 8.1 and 8.2 will need to be expanded to indicate how the additional areas will be sampled.
Washington Areas 5 and 6 (MSF-WDFW-02)	WDFW	Recreational	Jul-Aug, 2007	Daily bag limit of 2 marked salmon. Chinook minimum size limit of 22	Note Chilliwack is a DIT stock.	There is no sampling plan or description of monitoring methods.

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
				inches, 18-20 inches being considered.		
Puget Sound areas 6, 9, 10, 11 and 13 (MSF-WDFW-11)	WDFW	Recreational	Jun – Sep 2007	Daily bag limit of 2 marked salmon.	List limited to PS stocks, need info on all CWT stocks likely to be encountered	Need a sampling plan.
Nooksack River (MSF-WDFW-13)	WDFW	Recreational	Sep 1- Dec 31, 2007	2 marked adults	Indicates Samish fall as possible strays.	<p>The description of regulation is inadequate. Daily bag limit of 2 marked adults. Release wild (unmarked) Chinook and coho. Minimum size 12 inches.</p> <p>The description of tagged stocks that could be encountered is inadequate. See Table 9 for a complete list of tagged stocks encountered in sampling in the river.</p> <p>Information on sampling incorrect. There was creel survey in 2005 and 2006 with angler interviews and CWT sampling. Need more detailed sampling plans (general comment for freshwater MSFs)</p>

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
Skykomish River (MSF-WDFW-01)	WDFW	Recreational	Jun 1 – Jul 31	Daily bag limit of 2 marked Chinook only, 12 inch minimum size.	Description of local marked and tagged hatchery Chinook.	<p>The description of regulation is inadequate.</p> <p>Complete regulation : Daily bag limit of 2 marked adults. Release wild (unmarked) Chinook and coho. Minimum size 12 inches.</p> <p>The description of tagged stocks that could be encountered is inadequate. See Table 9 for a complete list of tagged stocks encountered in sampling in the river.</p> <p>Need more detailed sampling plans (general comment for freshwater MSFs)</p>
Upper Skagit River (MSF-WDFW-12)	WDFW	Recreational	Jun 1 - Jul 15	Daily bag limit of 2 marked Chinook only	Description of local marked and tagged hatchery Chinook	<p>New proposal, fishery occurred last year</p> <p>The description of regulation is inadequate.</p> <p>Complete regulation : Daily bag limit of 2 marked adults. Release wild (unmarked) Chinook and coho. Minimum size 12 inches.</p>

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
						<p>The description of tagged stocks that could be encountered is inadequate. See Table 9 for a complete list of tagged stocks encountered in sampling in the river.</p> <p>Need more detailed sampling plans (general comment for freshwater MSFs)</p>
Washington Puyallup & Carbon Rivers (MSF-WDFW-09)	WDFW	Recreational	Puyallup River: Aug 1- Dec 31	2 adult salmon	No CTC indicator stocks likely to be impacted, but there is a tagged Voights River group.	<p>Regulation description has been over-simplified. Complete description should be given, including minimum limits and mixed bag information.</p> <p>SFEC is aware that the Puyallup regulation states: “Daily bag limit of 6 salmon, 2 adult salmon, release unmarked adult Chinook “</p>
			Carbon River Aug/Sep 1-Nov 30	2 adult salmon	No CTC indicator stocks likely to be impacted, but there is a tagged Voights River group.	<p>Carbon River regulation states: “Daily bag limit of 6 salmon, 4 adults, no more than 2 marked Chinook. Release chum and wild adult Chinook”</p> <p>The description of tagged stocks that could be encountered is inadequate. See Table 9 for a complete list of</p>

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
						<p>tagged stocks encountered in sampling in the river.</p> <p>Sampling description implies a sampling of fishery for CWTs and possibly a creel. Please give more information.</p>
Nisqually River (MSF-WDFW-14)	WDFW	Recreational	Jul 1, 2007 to Jan 31, 2008	Daily bag limit of 2 marked Chinook.	Description of local marked and tagged hatchery Chinook	<p>New proposal, fishery ongoing for 2005 and 2006.</p> <p>Need to be specific about regulations, i.e. describe total bag and mixed bag and marked adults vs marked jacks.</p> <p>The description of tagged stocks that could be encountered is inadequate. See Table 9 for a complete list of tagged stocks encountered in sampling in the river.</p> <p>Need more detailed sampling plans (general comment for freshwater MSFs)</p>
Columbia River: Willamette River and tributaries (MSF-ODFW-01)	ODFW	Recreational	Jan -July	Daily bag limit of 2 marked Chinook (>24 inches total length) and 5 marked jack	Lists tagged hatchery fish with tag codes for broods	Evaluation of the Willamette MSF using the Willamette DIT groups by CTC in 2006 revealed that escapement of unmarked and tagged

Table 6. 2007 MSF proposals received by SFEC.

Location (Proposal ID)	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
				Chinook (15-24 inches).	1997-2002, DIT (Y/N) and number released. Willamette fish are the only tagged fish encountered in this fishery.	fish was not properly sampled. This should be reviewed by ODFW. Used old template again. Please use the new template (third version) for future proposals.

Table 7. Mark selective fisheries proposals (P) received, occurrence of fishery (F), and post season report (R) received for 2003 to 2007. A check (√) indicates that proposal or report was received or fishery took place; an “x” indicates not received.

		2003			2004			2005			2006			2007
Proposal ID		P	F	R	P	F	R	P	F	R	P	F	R	P
Targeting Hatchery Coho														
Sport, Southern BC	MSF-FOC-02	√	√	√	√	√	√	√	√	x	√	√	x	x
Commercial, Southern BC	MSF-FOC-05				√	x		√	√	x	√	√	x	x
Sport, Lower Fraser freshwater	MSF-FOC-06	x	√	√	x	√	√	x	√	x	√	√	x	x
FSC, Lower Fraser freshwater	MSF-FOC-03										√	√	x	x
Sport, Washington coast	MSF-WDFW-06	√	√	x	√	√	x	√	√	x	√	√	x	x
Commercial, WA areas 1-4	MSF-WDFW-15	x	√	x	x	√	x	x	√	x	x	√	x	x
Sport, Puget Sound	MSF-WDFW-07	x	√	x	√	√	x	√	√	x	√	√	x	x
Sport, Nooksack River		x	√	x	x	√	x	x	√	x	x	√	x	x
Sport, L Columbia River (since 1999)		x	√	√	x	√	√	x	√	x	x	√	x	x
Commercial troll, Oregon coast (since 1999)		x	√	√	x	√	√	x	√	x	x	√	x	x
Sport, Oregon coast		x	√	√	x	√	√	x	√	x	x	√	x	x
Total number for coho		2	9	5	4	9	5	4	10	0	6	11	0	0
Targeting Hatchery Chinook														
Sport summer, WA area 5&6	MSF-WDFW-02	√	√		√	√	x	√	√	x	√	√	x	√
Sport summer, WA area 6,9,10,11,13	MSF-WDFW-11													√
Sport winter, WA area 5-13 (actual areas vary with year)	MSF-WDFW-08							√	√	x	√	√	x	√
Sport, Nooksack River	MSF-WDFW-13				√ ¹	√	x	√	√	x	√	√	x	√
Sport, Skykomish River	MSF-WDFW-01	√	√	x	√	√	x	x	√	x	x	√	x	√
Sport, Carbon & Puyallup River	MSF-WDFW-09	x	√	x	x	√	x	√	√	x	√	√	x	√
Sport, Upper Skagit River	MSF-WDFW-12							x	√	x	x	√	x	√
Sport, Nisqually River, Jul-Jan	MSF-WDFW-14							x	√	x	x	√	x	√
Sport, Columbia River (on summer run)		√	√	x	√ ¹	√	x	√	√	x	x	√	x	x
Sport, L Columbia River (on spring run)		√	√	x	√ ¹	√	x	√	√	x	x	√	x	x
Commercial, L Columbia R (on spring run with tangle net)		√	√	x	√ ¹	√	x	√	√	x	x	√	x	x
Commercial, L Columbia R (on spring run with large net)		x	√	x	x	√	x	x	√	x	x	√	x	x
Sport, Yakima River (on spring run)					√	√	x	x	x		x	x		x
Sport, Willamette River (on spring run)	MSF-ODFW-01	√	√	√	√	√	√	√	√	x	√	√	x	√
Total number for Chinook		6	8	1	8	10	1	8	12	0	5	12	0	8
Total		8	17	6	12	19	6	12	22	0	11	23	0	11
1 Submitted in 2004 as a multi-year proposal for fisheries. Continuing fisheries, since 2006, are required to have annual proposals.														

4 Issues, Concerns, and Recommendations

4.1 Mass Marking Proposal Process

Mass marking proposals were received for all but one MM groups. In general, all information requested in the proposals was supplied. These included proposals by WDFW for marking significant additional fall Chinook from the Washington Coast and the Columbia River Basin. Many of these fish are far-north migrating stocks.

4.2 Mark Selective Fishery Proposal Review Process

A new template was supplied for MSF proposals. Very few proposals were received by the deadline of November 15th, and many were not received by December 5th, when the SFEC met to review the proposals. Unfortunately, the template versions sent to agencies were in Adobe format.

4.2.1 Proposals Not Received by SFEC

Proposals were not received for some MSFs that are expected to occur during 2007 (Table 7). The purpose of MSF proposals is to provide a means to review agency plans for monitoring, sampling, and reporting to determine if modifications are necessary to provide the data necessary to estimate MSF impacts. Although some fisheries may be the same as previous years, it is still necessary for a proposal to be received, particularly where improvements have been requested for the fishery proposal.

4.2.2 Proposal Format

A new, simplified format was instituted for 2007 MSF proposals. However, in some cases the information provided for 2007 fisheries was further simplified by agencies. Descriptions of regulation, tag groups impacted by fisheries, and of sampling plans were inadequate for evaluation of monitoring and reporting. The information required includes:

1. Location and time of fishery.
2. Gear type and target species of fishery.
3. Regulations for size limits, number of marked fish allowed, whether bag limits are mixed. Descriptions should be complete as this information is needed to decide on methods of estimation of impacts on unmarked DIT fish.
4. Tagged impacts by the fishery. This section should include the tagged groups expected to be encountered in the proposed fishery and whether these tag groups are DIT stocks. This information is necessary for Tables 8, 9, and 10 above, for evaluation of which stocks are likely to be subject to multiple MSFs.
5. In season management. This section should describe in adequate detail the sampling program for the MSF for estimation of CWTs, mark rates and encounter rates and template sections 5a) to 5d) are specific questions that provide the information required to evaluate whether the monitoring will be adequate. A sampling plan can be attached to replace answers to these questions, if this sampling plan clearly answers all of the questions listed. Information on the sampling methods is required for analysis of tagged data and evaluation of MSFs.

6. Other information. This section provides an opportunity for agencies to include information that may be helpful in estimation of impacts of unmarked fish in MSFs, e.g., test fisheries that may provide information on unmarked to marked ratios for DITS, or encounters of unmarked fish in the MSF area/time.

4.3 Post-Fishery Monitoring and Summary Tables

The SFEC-AWG requested that agencies provide these post-season report tables for fisheries prosecuted in 2006 and provided templates (see Appendix H). The SFEC intends that these report tables be incorporated in the PSC annual report for reporting of MSFs, and it was requested that they be provided prior to the post season meeting in January. The first table (Appendix Table H1) provides information on CWT sampling in all fishery and escapement locations, not just the MSFs. This is needed as the estimation of impacts in non-selective fisheries using DIT data depends on the method of sampling (electronic or visual) and the CWT processing protocol. The second table (Appendix Table H2) provides further information on monitoring in mark-selective fisheries for CWTs, mark rates and compliance. The third table (Appendix Table H3) should be provided once final results are available for the mark-selective fisheries, e.g. total harvest and mark rate.

4.4 Post Season Evaluation Report

The SFEC terms of reference also request that the agencies provide reports evaluating MSF impacts. At this time few post season evaluation reports have been provided to SFEC (Table 7). Reports have been provided for only 12 of the 43 fisheries proposed from 2003-2006.

4.5 Utility of the CWT System

Despite the technical concerns introduced by mass marking and mark selective fisheries, the coast wide CWT system currently remains the only method for the Parties of the Pacific Salmon Treaty to estimate and monitor coast wide exploitation rates on individual stocks of coho and Chinook salmon for the near future (Expert Panel, 2005). The current CWT system is still functional for providing CWT data for tagging studies where the fish are adipose marked. This system continues to provide the data necessary for a variety of fisheries management needs including the following: evaluating enhancement programs, conducting comparative experiments, monitoring variations in ocean survival, providing data for fishery models, and evaluating numerous parameters of domestic fishery management.

The SFEC is working on the report evaluating the efficacy of DIT for evaluating the total impact of MSFs on natural stocks and allocating the impacts to individual fisheries for coho and fishery-ages for Chinook.

The DIT coverage proposed for coho and Chinook salmon for 2007 is the same as for 2006. There is some concern whether there is adequate DIT coverage for the expanded mass marking of Chinook and this question should be reviewed as a joint project of the SFEC and the CTC and CoTC.

4.6 Coordination of Agencies

Mass marking programs, DIT programs, and CWT sampling programs are no longer adequately synchronized between agencies. For example, the southern U.S. plans to increase the mass marking of far north migrating Chinook, expand the number of Chinook MSFs, implement an extensive DIT program (both coho and Chinook), and tag numerous conservation stocks without an adipose mark. At the same time, Alaska has no plans to convert from visual sampling to electronic sampling and Canada does not plan to increase ETD capability or decode CWTs from non adipose-marked fish. These differences in sampling and tagging methodologies will impact analyses by PSC technical committees, eliminate the ability to conduct CWT-only studies, and degrade the ability to assess the impacts of MSFs.

A CWT workgroup established in 2006 by the PSC reviewed of the CWT system in response to the first four recommendations of the Expert Panel report, specifically focusing on data quality assurance and control and issues of sample design and uncertainty (PSC-CWT Workgroup, 2008). This report provides recommendations on where agencies can address the issue of coordination and how best to maintain the quality of the CWT system for meeting management needs.

5 Oversight and Support Function of SFEC

The oversight function of the SFEC provides a means to track actual vs. planned mass marking levels and to ensure that regional CWT databases are informed of MM and MSF activities. The SFEC is accomplishing this through the production of the proposal review report and the annual SFEC report. However, the SFEC has not received MSF proposals for all fisheries known to be taking a place, and some proposals did not provide all the information requested. There is a need for agencies to provide these proposals in a timely manner with all the information included. In addition, there is a need to improve the post season reporting of fishery activities.

The SFEC support function provides the tools to affected agencies to evaluate the potential implications of MM or MSFs on sampling and tagging programs. There is a need to improve the reporting of data to the RMIS release and recovery databases. Some of the fields added after the establishment of MM and MSF are not validated. These should be part of the validation process. The SFEC is working with the Data Sharing Committee and the Data Standards Workgroup on this issue. In addition, SFEC and the technical committees need to develop algorithms for estimation of mortalities of unmarked tagged DIT salmon for inclusion as tools available in RMIS.

Table 8. Coho salmon tag groups that are expected to be present in coho mark-selective fisheries expected in 2007. This table is based on presence of tag groups in past catch years. An “X” indicates one or more tags have been encountered in samples in fisheries and years summarized.

Region	Hatchery or Release Site	DIT? ¹	Mark-Selective Fishery Areas						
			Area 1	Buoy 10	Area 2	Area 3	Area 4	Area 5	SBC
British Columbia	Quinsam R	√	X		X	X	X	X	X
	Big Qualicum R				X	X	X	X	X
	Goldstream R		X	X	X	X	X	X	X
	Puntledge R				Discontinued in 2002				
	Chilliwack R				Discontinued in 2002				
	Inch Cr	√	X		X	X	X	X	X
	Spius Cr		X	X	X	X	X	X	X
Robertson Cr		X		X	X	X	X	X	
Puget Sound	Bernie Gobin Hatchery		X	X	X	X	X	X	X
	Elliott Bay Tribal NP		X		X	X	X	X	X
	Lummi Sea Ponds		X	X	X	X	X	X	X
	Marblemount Hatchery	√	X	X	X	X	X	X	X
	Minter Hatchery		X				X	X	X
	Nisqually Hatchery		X				X	X	
	Skookum Cr. Hatchery		X	X	X	X	X	X	X
	Soos Creek Hatchery	√	X		X	X	X	X	X
	South Sound Net Pens		X	X	X	X	X	X	
	Voights Cr Hatchery	√	X		X	X	X	X	X
Wallace R Hatchery	√	X	X	X	X	X	X	X	
Hood Canal	George Adams Hatch.	√	X		X	X	X	X	X
	Port Gamble Bay Pens	√	X		X	X	X	X	X
	Quilcene Bay Sea Pens	√	X		X	X	X	X	X
	Quilcene NFH	√	X		X	X	X	X	X
Washington Coast	Bingham Cr. Hatchery	√	X	X	X	X	X		X
	Forks Creek Hatchery	√	X	X	X	X	X	X	X
	Makah NFH (Sooes R)	√	X	X	X	X	X	X	X
	Quinault NFH -Cook C	√	X	X	X	X	X	X	X
	Salmon R. Fish Culture	√	X	X	X	X	X	X	X
	Solduc Hatchery	√	X	X	X	X	X	X	X
Columbia River	Cowlitz Salmon Hatch.		X	X	X	X	X	X	X
	Elochoman Hatchery		X						
	Kalama Falls Hatchery		X	X	X	X	X	X	X
	North Toutle Hatchery		X						
	Steamboat Sl. Netpens		X	X	X	X			
	Willard NFH	√	X	X	X		X		
	Winthrop NFH								
	Big Creek Hatchery		X	X	X	X	X		
	Cascade Hatchery		X	X	X	X			
	Deep R. NP - Lower		X	X	X	X	X		
	Deep R. NP - Upper		X	X	X	X	X		
	Eagle Creek NFH	√	X	X	X	X	X	X	
	Fallert Cr. Hatchery		X	X	X		X		
	Klickitat Hatchery		X	X	X	X	X		
	Rushingwater AC Pond		X		X	X	X	X	X
	Grays River Hatchery		X	X	X	X			
	Washougal Hatchery		X	X	X	X	X	X	X
CEDC Youngs Bay Net		X	X	X	X				
Oregon Coast	Salmon R. Hatchery		X		X	X	X		
	Trask R. Hatchery		X	X	X		X		
	Rock Creek Hatchery		X	X	X	X			
	Nehalem Hatchery		X	X	X	X		X	
	Cole Rivers Hatchery	√	X	X	X	X	X		

¹ DIT programs proposed to be implemented in 2007.

Table 9. Chinook tagged stocks that have been encountered in freshwater areas with proposed Chinook MSFs for 2007. This table is based on a summary of tagged groups encountered in fisheries and escapement for catch years 2000-2004. A star (*) indicates one tag has been encountered in samples for all fisheries and years summarized. An “X” indicates that two or more tags have been encountered in samples.

Release Region	Hatchery	Run Type	DIT? ¹	Mark-Selective Fishery Locations in Freshwater Areas				
				Nisqually	Skykomish	Upper	Nooksack	Puyallup
BC	H-Shuswap R	Summer					*	
	H-Chemainus R	Fall				*		
	H-Cowichan R	Fall		X		*	X	
	H-L Qualicum R	Fall				*		
	H-Nanaimo R	Fall				*		
Nooksack	Kendall Cr Hatchery	Spring	√		*	X	X	
	Lummi Sea Ponds	Fall				X	X	
Sammish	Fidalgo Bay Net Pens	Fall				X		
	Samish Hatchery	Fall	√			X	X	
Skagit	Marblemount Hatchery	Spring	√		X	X	X	*
	County Line Ponds	Summer			X	X		
	Marblemount Hatchery	Summer			X	X		
	Marblemount Hatchery	Fall				X		
	Oak Harbor Net Pens	Fall				X		
Stillaguamish and Snohomish	Battle Cr Hatchery	Spring			X			
	Bernie Gobin Hatchery	Spring			X			
	Wallace R. Hatchery	Summer	√		X			
	Whitehorse Pond	Summer			X	X		
	Bernie Gobin Hatch	Summer			X	*		X
	NWSSC-Mukilteo Pen	Fall			X			
Bernie Gobin Hatch	Fall			X	*		*	
Nisqually	Kalama Creek Hatch.	Fall		X				*
	McAllister Hatchery	Fall		X				
	Nisqually Hatchery	Fall	√	X				
Puyallup	Clearwater + Cripple	Spring						X
	White River Hatchery	Spring			X			X
	Clarks Creek Hatchery	Fall						X
	Cowskull & Rushwater	Fall						X
	Cowskull Acc. Pond	Fall						X
	Puyallup Tribal Hatch.	Fall				*		X
	Voights Cr Hatchery	Fall						X
Mid and South Puget Sound	Hupp Springs Rearing	Spring	√	*				*
	Chambers Cr. + Garrison	Fall						X
	Chambers Creek Hatchery	Fall						X
	Fox Island Net pens	Fall		X				X
	Garrison Hatchery	Fall			*			
	Grovers Creek Hatchery	Fall	√	X				X
	Icy Creek Hatchery	Fall						*
	Issaquah Hatchery	Fall						*
	Soos Creek Hatchery	Fall	√			X		X
	South Sound Net Pens	Fall		X				
Tumwater Falls Hatch	Fall						*	
Hood Canal	George Adams Hatchery	Fall	√	X				X
	Hoodsport Hatchery	Fall		*				*
Columbia River WA Coast	Lyons Ferry Hatchery	Fall						*
	Salmon R. Fish Culture	Fall						*

¹ DIT programs proposed to be implemented in 2007.

Table 10. Chinook tagged stocks that have been encountered in marine areas with proposed Chinook MSFs for 2007. This table is based on a summary of tagged groups encountered in fisheries in catch years 2000-2004. A star (*) indicates one tag has been encountered in samples for all fisheries and years summarized. An "X" indicates that two or more tags have been encountered in samples.

Release Region	Hatchery	Run Type	DIT?	Area 5-6 summer	Area 6,9, 10,11,13 summer	Area 5-13 winter
BC	H-Shuswap R	Summer				
	H-Chemainus R	Fall				
	H-Cowichan R	Fall		*		*
	H-L Qualicum R	Fall				
	H-Nanaimo R	Fall				
Nooksack	Kendall Cr. Hatchery	Spring	√	*	*	*
	Lummi Sea Ponds	Fall				
Samish	Fidalgo Bay Net Pens	Fall				
	Samish Hatchery	Fall	√	X	*	X
Skagit	Marblemount Hatchery	Spring	√	X	X	X
	County Line Ponds	Summer				*
	Marblemount Hatchery	Summer		*	*	*
	Marblemount Hatchery	Fall				
	Oak Harbor Net Pens	Fall				
Stillaguamish and Snohomish	Battle Cr Hatchery	Spring				
	Bernie Gobin Hatchery	Spring				
	Wallace R. Hatchery	Summer	√	*	*	X
	Whitehorse Pond	Summer				*
	Bernie Gobin Hatchery	Summer				
	NWSSC-Mukilteo N Pen	Fall				
Nisqually	Bernie Gobin Hatchery	Fall				
Nisqually	Kalama Cr. Hatchery	Fall				
	McAllister Hatchery	Fall				
	Nisqually Hatchery	Fall	√	X	X	X
Puyallup	Clearwater + Cripple	Spring				
	White River Hatchery	Spring				
	Clarks Creek Hatchery	Fall				
	Cowskull & Rushwater Ponds	Fall				
	Cowskull Acclimation Pond	Fall				
	Puyallup Tribal Hatchery	Fall				
	Voights Cr. Hatchery	Fall				
Mid and South Puget Sound	Hupp Springs Rearing	Spring	√		X	X
	Chambers Cr + Garrison	Fall				
	Chambers Cr Hatchery	Fall				
	Fox Island Net Pens	Fall				
	Garrison Hatchery	Fall				
	Grovers Cr Hatchery	Fall	√	X	X	X
	Icy Cr Hatchery	Fall				
	Issaquah Hatchery	Fall				
	Soos Creek Hatchery	Fall	√	X	X	X
	South Sound Net PENS	Fall			X	X
Tumwater Falls Hatchery	Fall			*	X	
Hood Canal	George Adams Hatchery	Fall	√	X	X	X
	Hoodsport Hatchery	Fall				
Columbia River	Lyons Ferry Hatchery	Fall				
WA Coast	Salmon R Fish Culture	Fall				

6 References

- Expert Panel, 2005. *Report of the expert panel on the future of the coded wire tag recovery program for pacific salmon*. Prepared for the Pacific Salmon Commission, November 2005.
- PSC-CWT Workgroup, 2008. *An action plan in response to coded wire tag (CWT) Expert Panel recommendations*. Pacific Salmon Commission Technical Report No. 25, March 2008.
- SFEC-AWG, 2002. *Investigation of Methods to Estimate Mortalities of Unmarked Salmon in Mark-Selective Fisheries through the use of Double Index Tag Groups*. Joint Selective Fisheries Evaluation Committee Report. Pacific Salmon Commission Report TCSFEC (02)-1, February 2002.

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:

- 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.
- Not later than June 1 of the year prior to implementation. Provide new or substantially changed MM or MSF project proposals.
- 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.

- Upon completion of domestic fishery planning processes, agencies conducting MSFs are to provide final selective fishery plans.
 - 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.
 - Agencies shall report results of MSFs conducted during a season in the annual post-season report provided, using a format specified by the SFEC.
 - 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 (AWG). 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
Chair

J. Davis
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	<input type="checkbox"/>
substantially changed	<input type="checkbox"/>
or a continuation of a previous proposal	<input type="checkbox"/>

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 ($\# \text{ recoveries} / \# \text{ releases}$), using the following three brood years: Coho = BYs 1999-2001, Chinook = BYs 1997-1999
 - Multiply the $\#$ of proposed MM fish, by production region, by this recovery rate, for the appropriate indicator stock
 - Apportion the MM 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. Revised Template for Mark-Selective Fishery Proposals.

Mark-Selective Fishery Proposal ID #
Date Received

TEMPLATE 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	<input type="checkbox"/>
substantially changed	<input type="checkbox"/>

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:

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

3. Gear to be used:
4. Other regulation details (e.g., size restrictions, bag limits):

Projected impacts BY the fishery

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

In-season management

6. 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.

7. 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. Status of Mass Marking Proposals Received in 2006
for Mass Marking to Occur in 2007.**

Description of Proposal and Agency	New ¹ or Continuation Proposal	SFEC Proposal Number
Coho		
Southern BC Coho - CDFO	Continuation	MM-FOC-01-2006
Puget Sound Coho – WDFW/Tribal	Continuation	MM-WDFW-01-2006
Washington Coast Coho – WDFW/Tribal	Continuation	MM-WDFW-04-2006
Washington Columbia River Coho - WDFW	Continuation	MM-WDFW-05-2006
Makah NFH Coho - USFWS	Continuation	MM-USFWS-01-2006
Quilcene NFH Coho - USFWS	Continuation	MM-USFWS-02-2006
Quinault NFH Coho - USFWS	Continuation	MM-USFWS-03-2006
Eagle Creek NFH Coho - USFWS	Continuation	MM-USFWS-04-2006
Columbia River Coho - ODFW	Continuation	MM-ODFW-04-2006
Oregon Coast Coho - ODFW	Continuation	MM-ODFW-05-2006
Chinook		
Little White Salmon R. NFH Fall Chinook - USFWS	Continuation	MM-USFWS-10-2006
Makah NFH Fall Chinook – USFWS	Continuation	MM-USFWS-12-2006
Quinault NFH Fall Chinook - USFWS	Continuation	MM-USFWS-14-2006
Spring Cr. NFH Fall Chinook - USFWS	Continuation	MM-USFWS-15-2006
Willamette Spring Chinook - ODFW	Continuation	MM-ODFW-01-2006
Oregon N. Coast Spring Chinook - ODFW	Continuation	MM-ODFW-02-2006
Oregon S. Coast Spring Chinook - ODFW	Continuation	MM-ODFW-03-2006
Puget Sound Spring, Summer, Fall Chinook – WDFW/Tribal	New/ Continuation	MM-WDFW-02-2006
Columbia R. Spring, Summer, Fall Chinook - WDFW	New/ Continuation	MM-WDFW-03-2006
Washington Coast, Fall, Spring Chinook – WDFW/Tribal	New/ Continuation	MM-WDFW-06-2006

¹ First time mass marking program proposal has been submitted for SFEC review.

Appendix E. Criteria for evaluating mass marking proposals.

PROPOSED MARKING AND TAGGING

- 1) *Has the purpose of the mass-marking proposal been adequately described? If increasing fishing opportunities is an objective of the mass-marking proposal, have future potential mark-selective fisheries been identified?*
- 2) *DIT coverage*
 - a) *Does the proposal contain a list of relevant DIT groups previously identified by the SFEC for that agency?*
 - b) *Are there additional groups that should be DITed, if there is an associated MSF?*
- 3) *Coordination*
 - a) *Does the proposed marking comply with the other regional agreements on marking (from PSMFC Mark Committee and agency mark coordinators)?*
 - b) *Are there any unresolved regional marking policy issues associated with this proposal?*
- 4) *Technical Issues*
 - a) *Have previously identified issues with this marking been resolved?*
 - b) *Do the proposed changes raise any new issues?*

FISHERY DISTRIBUTION AND CWT SAMPLING

- 5) *Fisheries*
 - a) *Is the information provided on distribution of the marked stocks, and their occurrence in fisheries, adequately described?*
 - b) *Is electronic sampling adequate in all fisheries?*
 - c) *If not, identify the impacts on the current assessment methods or programs and methods to eliminate or mitigate for those impacts.*

SUMMARY

Summarize concerns related to the mass-marking proposal and its effect on the viability of the CWT system.

RECOMMENDATIONS

What additional information is required to evaluate the mass-marking proposal?

Provide recommendations for program modifications that might avoid, or mitigate for negative impacts on the viability of the CWT system.

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

Region	Exploitation Rate Indicator Stocks	Natural/Unmarked Stock Representation	DIT
North Coast	Lachmach Toboggan	North Coast Wild Skeena	
Interior Fraser	Coldwater Salmon Dunn/Louis/Lemieux	Thompson River Thompson River Thompson River	
Georgia Basin	Big Qualicum Goldstream River Black Creek Inch Creek Salmon River Quinsam River	East Coast Vancouver Island East Coast Vancouver Island East Coast Vancouver Island Wild Lower Fraser Lower Fraser Wild North Vancouver Island	√ √
West Coast Vancouver Island	Robertson Creek	West Coast Vancouver Island	
Puget Sound	Nooksack Skookum Creek Lummi Bay Ponds Skagit Skykomish Bernie Gobin Green River Puyallup Kalama Creek (Nisqually) Quilcene Quilcene Quilcene George Adams Elwha	Nooksack Nooksack Nooksack Skagit Stillaguamish/Snohomish Stillaguamish/Snohomish Mid Puget Sound South Puget Sound South Puget Sound North Hood Canal Quilcene Net Pens (Hood Canal) Port Gamble Net Pens (Hood Canal) South Hood Canal Strait of Juan de Fuca	√ √ √ √ √ √ √ √ √ √ √ √ √ √
Washington Coast	Makah ¹ Solduc Queets Wild ² Quinault Satsop Forks Creek	North Coast North Coast North Central Coast Quinault Grays Harbor Willapa Bay	√ √ √ √ √ √
Columbia Basin	Lewis River Sandy River	Lower Columbia River Lower Columbia River	√ √
Oregon Coast	Salmon River Rogue River	Oregon North Coast Oregon South Coast	 √

¹ DIT group not currently an indicator stock.

² DIT group for Queets Wild is from Salmon River Hatchery.

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

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

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

² DIT group not currently an indicator stock.

³ No longer adipose fin clipped.

Appendix H. Post Season Report Templates.

The SFEC has requested that management agencies provide three reports on MSFs. Two of these would be provided by the post-season meeting following the fishery year for inclusion in the PSC post-season annual report. Templates of tables with examples were provided to the agencies to assist them in completing the three reports on MSFs that were requested. The first table (Appendix Table H1) provides information on CWT sampling in all fisheries and escapement locations, not just the MSFs. This is needed as the estimation of impacts of non-selective fisheries on the unmarked group depends on the method of sampling (electronic or visual) and the processing protocol (all tagged fish sampled, just clipped fish sampled, only males processed). The second table (Appendix Table H2) provides further information on monitoring in mark-selective fisheries. The third table (Appendix Table H3), which includes total harvest and mark rate, should be provided once final results are available for the mark-selective fisheries.

Templates with examples are provided below in Appendix Tables H1, H2, and H3.

Appendix Table H1. Sampling for CWTs (all fisheries and escapement locations)(example).

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 H2. MSF fishery sampling and monitoring employed (example).

Region	Fishery Area	Fishery Period	Regulations	Sampling & Monitoring Conducted				
				CWT	Encounter	Observers	Mortality	Compliance
Species								
Alaska	No MSF							
Canada	St of Georgia Sport			Creel & voluntary	Creel, guide logbook, test fishing	No	No	No
	WCVI sport			Creel & voluntary	Creel, guide logbook, test fishing	No	No	No
Puget Sound	Area 5,6 sport coho			Creel @ 22.6%	Creel, test fishing	No	No	Yes
	Area 7 sport coho			Creel @ 15.2%	Creel	No	No	Yes
	Area 7 Reefnet coho			Creel @ 0%	No	No	No	Yes
	Area 13 sport coho			Creel @ 11.3%	Creel	No	No	Yes
Coastal Washington	Area 1 sport coho			Creel @47%	Creel, observers	Yes	No	Yes
	Area 2 sport coho			Creel @ 45%	Creel, observers	Yes	No	Yes
	Area 3 sport coho			Creel @73%	Creel, logbooks	No	No	Yes
	Area 4 sport coho			Creel # 42%	Creel, test fishing, observers	Yes	No	Yes
	Area 1 troll coho			Creel @ 42%	Creel	No	No	Yes
Coastal Oregon	Sport			Electronic	Observer & Creel	Yes	Yes	Yes
	Troll			Electronic	Observer & Creel	No	No	No
Columbia River	Columbia R			Electronic	Creel	No	Yes	Yes
	Buoy 10 sport coho			Creel @ 38%	Creel, observer	Yes	No	Yes

Appendix Table H3. MSF fishery results (example).

Region	Fishery	Fishery Period	Regulations	Estimated Catch (retention)	Estimated Mark Rate*
Species					
West Coast Vancouver Island	Westcoast Vancouver Island (Area 21, outer portions of 23-27, Area 121, Areas 123-127)	Effective July 1	2 clipped coho		
	Northern Alberni Inlet (23A)	Effective August 1	4 coho, x may be unclipped		
East Coast Vancouver Island	Queen Charlotte Sound, Queen Charlotte St & Johnstone St (11-1, 11-2, 12-1:12-19, 12-21, 12-22, 12-24, 12-26, 12-38:12-41, 13-1:13:20, 13-23:13-36, 13-39:13-41)	Effective July 1	2 clipped coho		
	St of Georgia (14-19, 28,29) excl. Fraser	Effective July 1	2 clipped coho		
	Juan de Fuca (20)	July 1	2 clipped coho		
	Terminal Georgia Strait (portions of 14, 16, 29)	Jun 1-Dec 31	2 clipped coho		

* Mark rate of total legal sized coho encountered.