

PACIFIC SALMON COMMISSION
SELECTIVE FISHERIES EVALUATION COMMITTEE

REVIEW OF 2006 MASS MARKING AND
MARK SELECTIVE FISHERY PROPOSALS
REPORT SFEC (06)-2

September 2006

Selective Fishery Evaluation Committee

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Acronyms

AABM	Aggregate Abundance Based Management (1999 PSC Chinook agreement)
ASFEC	Ad-Hoc Selective Fishery Evaluation Committee
CTC	Chinook Technical Committee
CoTC	Coho Technical Committee
CWT	Coded Wire Tag
CNR	Chinook Non-Retention
DIT	Double Index Tagging
ETD	Electronic Tag Detection
ISBM	Individual Stock Based Management (1999 PSC Chinook agreement)
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

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Executive Summary

The coast wide 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 2006 proposals for MM and MSF provided to the PSC between October and December 2005, (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 two proposals (10 coho and 12 Chinook) were received for mass marking activities in 2006. The SFEC believes these proposals represent a comprehensive list of all MM programs with international PSC implications.

Approximately 37 million coho are proposed to be mass marked coast wide in 2006. There are no significant changes to marking levels from 2005. Essentially all coho production intended for harvest from Southern BC and Southern US hatcheries is now being mass marked.

Approximately 76.6 million Chinook are proposed to be mass marked from southern US Chinook hatcheries. This is an increase of 14.1 million (22%) from 2005 and 41% greater than the number proposed in 2004. Most of the increase is 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. This federal mandate is not fully implemented for all stocks. The SFEC is aware that approximately 25 million additional Columbia River fall Chinook are available for potential mass marking by WDFW and ODFW in 2007, pending funding.

Sampling Programs

Assuming recent exploitation rates and sampling programs, the SFEC estimates the proposed mass marking of southern US Chinook stocks in 2006 will result in annual encounters of untagged marked Chinook in sampling program of approximately 8,500 untagged and marked Chinook in Alaska and 17,500 untagged marked Chinook in Canadian sampling programs. 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 levels of MM 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. 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), incomplete or inadequate sampling of escapement where returns of DIT releases are expected will result in biases in any estimation of exploitation rates for unmarked and tagged fish. The SFEC-AWG is considering these issues and the general question of ‘Can the DIT program work?’ and plans to provide a separate report to the PSC in 2006/2007.

Review of MSF proposals

Six proposals were received for four coho salmon MSFs for 2006. Four proposals were received for BC fisheries; two of these for the Fraser River were new proposals. Two WDFW proposals were received for ongoing marine recreational coho fisheries. No proposals have been received for the Oregon coho fisheries for the last four fishery years

Seven proposals were received for Chinook salmon MSFs for 2006. WDFW proposals were received for two ongoing marine MSFs and several freshwater MSFs. An ODFW proposal was received for the Willamette spring Chinook and one from IDFG for the Snake River spring and summer Chinook

Issues and Concerns

Lack of proposals.

There is concern about a lack of MSF proposals for some fisheries, including freshwater fisheries in Washington and for marine coho MSFs from ODFW. Although MM proposals were submitted for 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 and the coast of Washington is anticipated in 2007 by WDFW.

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. No post season reports were provided.

The SFEC-AWG is aware that the request for proposals and reports went out at a late date (early October for a November 1 deadline), and in future the requests for proposals and reports will be sent out in early September.

Utility of the CWT system.

Despite the technical concerns introduced by mass marking and mark selective fisheries, 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 (Coded Wire Tag Program Review - Final Report of the 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, and what, if any, are the alternatives to DITs. DIT releases for Chinook should be continued to both provide information for this evaluation and to maintain the DIT database.

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, 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 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.

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 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. 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 the appropriate level of 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). Agency proposals for mass marking plans were requested for all hatchery Chinook and coho stocks expected to be intercepted in Pacific Salmon Commission (PSC) fisheries. As stated in the *Understanding of the PSC concerning Mass Marking and Selective Fisheries* (Appendix A), proposals for continuing programs are requested no later than November 1 of the year prior to implementation. Proposals for new or substantially changed MM proposals are requested by June 1 of the year prior to implementation. Templates for MM and MSF proposals were developed in 2002, and agencies were asked to provide their information to the SFEC in this format (Appendices B and C).

This report (a) summarizes the results of the review process of MM and MSF proposals received between October and December 2005, (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 (adipose fin clipped) and one unmarked.

2 RCWG Review of Mass Marking Proposals

2.1 Review Process for Mass Mark Proposals

A total of 22 MM proposals were received by the PSC for 2006 activities (Appendix D). These represent a comprehensive list of all mass marking programs with international ramifications and/or sampling impacts on other agencies. The list included 10 coho and 12 Chinook proposals. Two of the Chinook proposals involve significant increases in marking of fall Chinook from the Washington coast and the Columbia River. Proposals were not requested for spring and summer Chinook stocks from the upper Columbia and Snake River Basins, given 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 are requested to provide projected fishery encounters of mass marked fish in the proposals. A standardized method of estimating fishery encounters was used this year. The estimates are based on actual CWT recoveries of representative CWT groups, averaged from the three most recently completed brood years. This method is described in the MM proposal template in Appendix B.

The RCWG used the criteria developed in 2002 for reviewing the MM proposals (Appendix E). Proposals were reviewed, discussed, and evaluated by RCWG members in December 2005. This initial review identified additional information required for the SFEC to complete its evaluation. SFEC subsequently sent requests for additional information to the proposing agencies. Final review and evaluation of the MM proposals occurred in early 2006. The proposals are summarized in Table 1.

2.2 Results of Review

2.2.1 Mass Marking Levels

Approximately 37 million coho are proposed to be mass marked coast wide (Table 1). There are no significant changes to marking levels from 2005. Essentially all coho production intended for harvest from Southern BC and Southern U.S. hatcheries is being mass marked.

Approximately 76.6 million Chinook are proposed to be mass marked from southern US Chinook hatcheries (Table 1). This is an increase of 14.1 million (22%) from 2005 and 41% greater than the number proposed in 2004 (Figure 1). Most of the increase is 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. This federal mandate is not fully implemented for all stocks. The SFEC is aware that approximately 25 million Columbia River fall Chinook is available and will potentially be mass marked by WDFW and ODFW in 2007, pending funding.

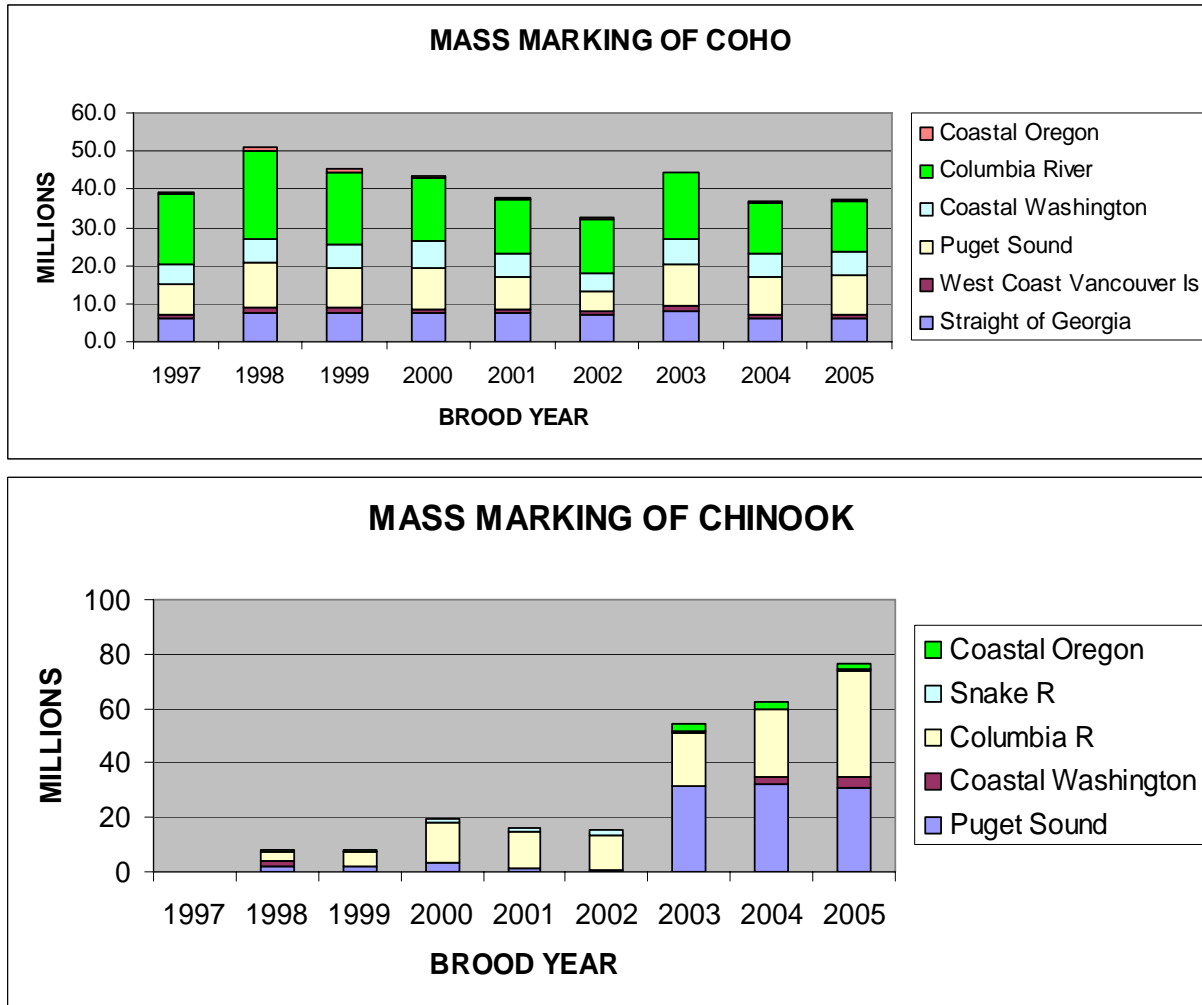


Figure 1. Number of coho and Chinook salmon mass marked and released, by region and brood year, for 1997-2005.

2.2.2 Impacts on Sampling Programs

Electronic tag detection (ETD) has not been implemented throughout the entire geographic range of CWT sampling. 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). 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 British Columbia the situation is more complex: Canada relies on voluntary recoveries of marked coho and Chinook in recreational fisheries, while the current restricted commercial fisheries are electronically or visually sampled depending on species and location. Coho fisheries in northern BC are sampled visually and Chinook fisheries are sampled electronically. South of Cape Caution, electronic sampling is used for both species for the current, restricted fisheries. If commercial fisheries expand there will not be sufficient resources (ETD equipment and infrastructure) to sample all fisheries electronically.

Table 1. 2006 Mass Marking Proposals

Species	Area	Run	Agency	DIT Groups	2005 MM (millions)	2006 MM (millions)	Significant Changes
Coho	Southern BC		CDFO	2	7.0	6.9	
	Puget Sound		WDFW & Tribal	9	9.7	10.3	
			USFWS	1	0.4	0.3	
	WA Coast		USFWS	2	0.7	0.7	
			WDFW & Tribal	4	5.6	5.5	
	Columbia Basin		USFWS	1	0.5	0.5	
			WDFW	2	8.4	8.6	
			ODFW	1	4.0	4.0	
OR Coast		ODFW	1	0.7	0.5		
Total Coho					36.9	37.4	
Chinook	Puget Sound	Spring	WDFW	1		0.4	New proposal
		Summer	WDFW & Tribal	1	2.2	1.8	
		Fall	WDFW & Tribal	7	30.1	28.6	
	WA Coast	Spring	WDFW	0	0.2	0.2	
		Fall	USFWS	0	2.3	2.3	
	WDFW & Tribal		2	0.3	1.9	New proposal for WDFW	
	N. OR Coast	Spring	ODFW	0	0.4	0.3	
	S. OR Coast	Spring	ODFW	1	2.2	2.1	
	Columbia Basin	Spring	ODFW	2	5.4	5.4	
			WDFW	1	3.2	2.5	
		Fall Tule	USFWS	1	14.2	14.2	
			WDFW	2		13.0	Significant New proposal
Fall URB		USFWS	1	1.6	3.3	New marking at Priest Rapids	
Snake R. Fall	IDFG	0	0.4	0.6			
Total Chinook					60.6	76.6	

Table 2 Fishery Sampling Methods for Coded Wire Tagged Coho

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

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 decode
	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 MMed 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	

A summary of projected MM Chinook which could be sampled in agency sampling programs is listed in Table 4. The proposed mass marking of southern US Chinook stocks will result in estimated encounters of approximately 8,500 untagged and marked Chinook in Alaska and 17,500 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 coded-wire tags. 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 4). The Columbia River Tule stocks contribute heavily to Canadian fisheries, as well as Washington and Oregon fisheries (Table 4). These increases 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.

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 7.6% to 26.9% of marked and untagged Chinook caught in the troll fishery since the implementation of mass marking. The increased costs to deal with the additional marked fish are not quantified but will impact the program. Converting to electronic sampling would be much costlier.

Canada employs ETD for sampling for tagged coho and Chinook salmon in the commercial catch. This is currently possible because of restricted 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.

Recovery of tags from recreational fisheries within Canada relies on the Voluntary Salmon Sport Head Recovery Program, with anglers requested to submit heads from all marked fish. As in Alaska, the program has seen an increase in the submission of heads without tags as well as a decrease in the participation rate by anglers. Concerns have been raised regarding the potential bias and representation of the recreational catch of heads submitted to the head recovery program.

There is no electronic tag detection (ETD) in California. However, significant numbers of MM Oregon coho and Oregon south coast spring Chinook are projected to be recovered in California (Table 4), impacting the recovery of Oregon DIT coho and Chinook salmon.

Table 4. Projected numbers of sampled fish in fishery CWT sampling programs, from brood year 2005 MM Chinook releases (actual number of fish encountered in samples will depend upon sampling rates).

Species	Area	Run	Agency	DIT Gps	2005MM	2006MM	Projected Encounters in Samples													
							Alaska		N BC		S BC		Wa (Cst/PS)		Oregon		Columbia		Calif	
							Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt	Com	Spt
Coho	Southern BC		CDFO	2	6,953,000	6,945,000	249	0	429	4,682	676	17,411	6,716	6,299	0	399	0	0	0	0
	Puget Sound		WDFW	9	9,709,000	10,343,000	55		6	11	38	365	40,868	17,941	88	890	2	82		
			USFWS	1	354,000	304,000						39	659	803	7	50				
	Wa Coast		USFWS	2	720,000	720,000	6		5			54	3,359	684	22	250				
			WDFW	4	5,610,000	5,490,000	29		1		1	21	9,579	5,769	266	1,986	27	130		
	Columbia		USFWS	1	450,000	450,000						6	90		256	90	84			
			WDFW	2	8,432,500	8,632,500			12			57	804	15,940	1,178	10,287	15,824	6,206		
			ODFW	1	3,975,000	4,047,000	2	0	0	2	0	2	150	3,061	204	3,253	20,753	3,134		31
Oregon Cst		ODFW	1	682,500	497,000						4	77	8	221	1	13			5	
Total Coho					36,886,000	37,428,500	341		23,812				132,174				46,346		36	
Chinook	Puget Sound	Spring	WDFW	1		350,000	encounters included with falls													
		Summer	WDFW	1	2,150,000	1,840,000	encounters included with falls													
		Fall	WDFW	7	30,086,000	28,600,000	410	0	199	66	6,165	2,300	24,753	4,509	565	18	10			9
	Wa Coast	Spring	WDFW	0	200,000	200,000	encounters included with falls													
		Fall	USFWS	0	2,340,000	2,340,000	234	24	81	58	6	24	247	8						
	WDFW		2	100,000	1,900,000	889	42	383	49	136	18	756	195	5		12	1			
	N Oregon	Spring	ODFW	0	418,000	288,000	14	1	10	0	17	0	11	2	21	7	0	0	0	0
	S Oregon	Spring	ODFW	1	2,164,000	2,054,000	8	0	2	0	35	4	68	37	1,123	143	4	0	1,109	72
	Columbia	Spring	ODFW	2	5,360,990	5,360,000	1,144	64	363	12	854	12	215	83	133	8	1,865	1,987	0	0
			WDFW	1	3,234,000	2,500,000	359	5	107		132	11	80	90	89	15	245	646		
		Fall Tules	USFWS	2	14,200,000	14,200,000					3,782	310	3,255	2,511	13,583	1,974	15,097	961	65	59
			WDFW	2		13,000,000	1,388	94	354	67	1,638	191	1,229	897	543	78	881	583		
		Fall URB	USFWS	0		3,300,000	3,542	275	33	11	82	5	28	21	24		808	82		
Snake	IDFG	0	350,000	600,000	not available															
Total Chinook					60,602,990	76,532,000	8,493		17,517				57,324				23,182		1,314	

2.2.3 Double Index Tagging (DIT) Programs

With the advent of MSF using the adipose clip as a mass mark, Ad+CWT marked groups (tagged and adipose fin clipped) 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 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, but does not process or decode the unmarked CWTs in all fisheries. However, WDFW has decoded unclipped CWTs from commercial fisheries collected using ETD by the Canadian sampling program for the 2005 season. 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 the Mark Selective Fisheries Proposals

3.1 Review Process

Given SFEC's limited ability to assess the potential impacts of proposed MSFs prior to the completion of the domestic planning processes of the Parties, the SFEC-AWG focused its review of MSF proposals on providing advice to agencies to ensure that monitoring systems are designed to produce data and information required to evaluate MSF impacts post-facto. In support of the new role, 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 2006 MSF Proposals

Six proposals were received for four coho salmon MSFs for 2006 (Table 5). Four proposals were received for B.C. fisheries, two of these for the Fraser River were new proposals. Two WDFW proposals were received for ongoing marine recreational coho fisheries (Tables 5). One coho freshwater fishery in the Nooksack River has occurred in the past but no proposal was received for 2006 (Table 6). No proposals have been received for the Oregon coho fisheries for the last four fishery years (Table 6).

Seven proposals were received for Chinook salmon MSFs for 2006 (Tables 5). WDFW proposals were received for two ongoing marine MSFs, and for a new fishery in Puget Sound Area 9 (Table 5), that was subsequently dropped from consideration. Proposals were also received for freshwater fisheries in Puget Sound in the Carbon and the Puyallup in Puget Sound. In addition, Chinook MSFs are anticipated for the Skykomish, Nooksack, and Yakima rivers in Washington, but no proposals have been received, nor were they received last year (Table 6). 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 (Table 6). An ODFW proposal was received for the Willamette spring chinook and one from IDFG for the Snake River spring and summer Chinook (Table 5).

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 is only being prosecuted in Areas 8.1 and 8.2.

There continue to be concerns about the lack of sampling for unmarked and tagged DIT fish in Canadian fisheries. When a DIT stock contributes to Puget Sound MSFs, and non-selective fisheries in Canada that are not sampled, the uncertainty in the estimation of exploitation rates for the unmarked tag group increases. This impact depends on the impact of the MSFs on the stocks. Estimates of exploitation rates on unmarked and tagged DIT groups in MSFs in Puget

Sound sport fisheries for 2003 and 2004 range from 0 to 1.3% (CTC 2006), and if MSFs remain at such low levels the impact of the Canadian sampling will remain low.

The SFEC has previously recommended that any indicator stock that is likely to be impacted by a MSF should be a DIT pair. If the indicator stock is not a DIT pair, then additional assumptions must be made to estimate the MSF exploitation rate for the unmarked fish. It is necessary for the SFEC, CTC and CoTC to review the indicator stock system and sampling programs and, given the proposed MSFs, determine the size and distribution of DIT stocks.

3.3 Fishery Interactions.

Multiple MSFs are taking place in British Columbia, Washington and Oregon. Tables 7 and 8 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 7 for coho salmon indicates that all DIT stocks will be impacted in the Washington ocean, Puget Sound and Southern B.C. MSFs listed in the table. In 2006, Southern B.C. and Puget Sound Chinook stocks will potentially be impacted by two MSFs, the Area 5/6 fishery which will be in its fourth year (Table 6) and the winter MSF in Puget Sound that is currently in place. The winter fishery impacts Chinook stocks which are present in Puget Sound throughout the year.

Table 5. 2006 MSF proposals received by SFEC.

Location	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 June 1- Dec 31.	Daily bag of 2 adipose clipped coho greater than 30 cm fork length. Barbless hooks	Lists tagged coho recoveries in 1986-1991	<p>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>Mixed bag fishery will likely be prosecuted</p>
			Fraser River Mid-Oct-Dec. 31.	Further regulations depend on maximum ER for interior Fraser River coho. May have mixed bags.		
BC statistical areas 11-29, outer areas of 121-127.	CDFO	Commercial and First Nation fisheries (included in recreational proposal)	Execution of this MSF depends on ER of upper Fraser River coho. No details were provided.			
Fraser River (new)	CDFO	First Nations	Oct-Nov	Chum targeted fishery, unmarked coho can be retained.	Tagged stocks listed. No indication of DITS (Y?N)	<p>Voluntary CWT program. Not well established.</p> <p>Question 8. "A mortality rate is applied to ...release...". How is release estimated? What is</p>

Table 5. 2006 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
						release mortality rate? Does not provide info on how tagged estimates would be made (see discusseion on proposal template changes)
Fraser River (new)	CDFO	Recreational	Table provided showing periods by specific area	Table provided showing bags by specific area	Tagged stocks listed. No indication of DITS (Y?N)	Creel surveys conducted. No detail are included. Are total catch estimates made from creel surveys? How are CWTs recovered (by samplers, voluntary)? Are all the rivers in table subject to creel survey? Question 8. "A mortality rate is applied to ...release...". How is release estimated? What is release mortality rate? Does not provide info on how tagged estimates would be made (see discussion on proposal template changes)
Washington Puget Sound Areas 5-7 and 13	WDFW Continuing fishery	Recreational	July-Sep	2 salmon per day. Coho must be ad clipped. For Chinook regulations see Chinook proposal below.	Lists WA coho indicator stocks and WA DIT stocks.	Non-WA DIT and indicator stocks likely to be impacted by these fisheries needs to be included in the proposal. Same comment. Does not include tagged stocks encountered and

Table 5. 2006 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
						info on which are DIT stocks. Please get this info from 2005 Review report (SFEC 05-1).
Washington Coastal Areas 1-4 and Buoy 10	WDFW Continuing fishery	Recreational	July-Sep	2 fish bag limit. Coho must be ad-clipped. All Chinook may be retained. Managed as catch area quotas.	Lists WA coho indicator stocks and WA DIT stocks.	Non-WA DIT and indicator stocks likely to be impacted by these fisheries needs to be included in the proposal. Same comment. Does not include tagged stocks encountered and info on which are DIT stocks. Please get this info from 2005 Review report (SFEC 05-1).
Chinook proposals received.						
Washington Puyallup & Carbon Rivers	WDFW New proposal Continuing fishery	Recreational fishery –	Puyallup River: Aug 1- Dec 31 Carbon River Aug/Sep 1-Nov 30	Bag limit 6 salmon, 2 adult salmon, release unmarked adult Chinook Bag 6 salmon, 4 adults, no more than 2 marked Chinook. Release chum and wild adult Chinook	No CTC indicator stocks likely to be impacted, but there is a tagged Voigts River group.	The regulation of 6 salmon, 2 adult is unclear. An adult fish is one over 24 inches. Under 24 inches the fish is a jack and all jacks, marked and unmarked, may be kept. A mixed bag regulation makes the estimation process difficult. Post-season estimation method proposed needs clarification to reflect this, if mixed bag fishery is proposed.

Table 5. 2006 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
Washington Areas 5-13	WDFW	Recreational fishery	October 2006 to April 2007	2 hatchery fish (clipped). Chinook, minimum size limits 22 inches, 18-20 inches being considered. Other species follow normal structure for areas/months.	List of tagged stocks with DITs indicated	This fishery will be impacting CTC indicator stocks of concern that are not clipped or DIT: Hupp Springs Rearing and Stillaguamish summer/falls. Area 8.1 and 8.2 sampling plan is attached and provides good detail. These were the areas fished in 2005_2006, which is still ongoing. No other areas are currently open for Chinook.
Washington Areas 5 and 6	WDFW Continuing fishery	Recreational	July and August	Keep clipped Chinook fish, 2 fish bag limit, 22 inch limit on retained Chinook	Lacking list of tagged hatchery groups including a list of DIT groups expected to be encountered.	There is no DIT group information included in projected tagged encounters. There should be a description of the sampling plans, or a reference to the sampling operational plan.
Washington Puget Sound Area 9	WDFW New Fishery	Recreational	July 1, 2006 through Sep 30, 2006.t	Keep clipped Chinook fish, 2 fish bag limit, 22 inch limit on retained Chinook	Lacking list of tagged hatchery groups including a list of DIT groups expected to be encountered.	There is no DIT group information included in projected tagged encounters. There should be a description of the sampling plans, or a reference to the sampling operational plan.
Columbia River: Willamette River and	ODFW Continuing fishery	Recreational	Jan - July	Daily bag limit of 2 adipose clipped Chinook (>24 inches total length)	Lists tagged hatchery fish with tag codes for broods 1997-2002,	The fishery proposed takes place in a terminal area. The SFEC-AWG suggests that thought be given to using terminal method

Table 5. 2006 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
tributaries				and 5 fin clipped jack Chinook (15-24 inches).	DIT (Y/N) and number released. Willamette tagged fish are the only tagged fish encountered in this fishery.	described in SFEC-AWG (2002). Used old template again for this year. Please use new template intended for 2006_2007 fisheries next year.
Snake River	IDFG	Recreational	Apr-Aug. Dependent on available surplus	Report attached includes harvest info, dates of fishing and info on mortalities due to release.	List of tagged fish with and without clips. No DIT groups.	Proposal should have a concise description of regulations that are known; e.g., information on whether all unmarked fish released, any difference due to size, what are bag limits, any mixed bag. This was not clearly available from attached report.

Table 6. Summary of Chinook and coho salmon mark selective fisheries (MSF) proposed for period from 2003 to 2006. In the “proposal” column, a check mark (√) indicates that a proposal was submitted to the PSC prior to the MSF while an (x) mark indicates that a proposal was not submitted to the PSC prior to the MSF. In the “Fishery” column, a check mark (√) indicates that the MSF occurred while an (x) mark indicates that it did not. Note that some MSF proposals cover more than a single MSF.

Fishery, location, target stock	2003		2004		2005		2006
	Proposal	Fishery	Proposal	Fishery	Proposal	Fishery	Proposal
Coho							
Sport, Southern BC, on hatchery coho	√	√	√	√	√	√	√
Commercial, Southern BC, on hatchery coho			√	x	√	√	√
Sport, Lower Fraser freshwater, on hatchery coho	x	√	x	√	x	√	√
FSC, Lower Fraser freshwater, on hatchery coho							√
Sport, Washington coast, on hatchery coho	√	√	√	√	√	√	√
Commercial, WA areas 1-4, on hatchery coho	x	√	x	√	x	√	x
Sport, Puget Sound, on hatchery coho	x	√	√	√	√	√	√
Sport, Nooksack River, hatchery coho	x	√	x	√	x	√	x

Table 6. Summary of Chinook and coho salmon mark selective fisheries (MSF) proposed for period from 2003 to 2006. In the “proposal” column, a check mark (√) indicates that a proposal was submitted to the PSC prior to the MSF while an (x) mark indicates that a proposal was not submitted to the PSC prior to the MSF. In the “Fishery” column, a check mark (√) indicates that the MSF occurred while an (x) mark indicates that it did not. Note that some MSF proposals cover more than a single MSF.

Fishery, location, target stock	2003		2004		2005		2006
	Proposal	Fishery	Proposal	Fishery	Proposal	Fishery	Proposal
Sport, Lower Columbia R on hatchery coho (since 1999)	x	√	x	√	x	√	x
Commercial troll, Oregon coast on hatchery coho (since 1999)	x	√	x	√	x	√	x
Sport, Oregon coast, on hatchery coho	x	√	x	√	x	√	x
Total coho number	2	9	4	9	4	10	6
Chinook							
Sport summer, WA area 5&6, on hatchery Chinook	√	√	√	√	√	√	√
Sport, summer, WA area 9, on hatchery Chinook							√
Sport winter, WA area 5-13, on hatchery Chinook					√	√	√
Sport, Nooksack R, on hatchery Chinook			√	√	x	√	x
Sport, Skykomish	√	√	√	√	x	√	x

Table 6. Summary of Chinook and coho salmon mark selective fisheries (MSF) proposed for period from 2003 to 2006. In the “proposal” column, a check mark (√) indicates that a proposal was submitted to the PSC prior to the MSF while an (x) mark indicates that a proposal was not submitted to the PSC prior to the MSF. In the “Fishery” column, a check mark (√) indicates that the MSF occurred while an (x) mark indicates that it did not. Note that some MSF proposals cover more than a single MSF.

Fishery, location, target stock	2003		2004		2005		2006
	Proposal	Fishery	Proposal	Fishery	Proposal	Fishery	Proposal
R, on hatchery Chinook							
Sport, Carbon R, on hatchery Chinook	x	√	x	√	√	√	√
Sport, Puyallup R, on hatchery Chinook			x	√	√	√	√
Sport, Columbia R, on hatchery Columbia summer Chinook	√	√	√	√	√	√	x
Sport, Lower Columbia R, on hatchery spring Chinook	√	√	√	√	√	√	x
Commercial, Lower Columbia R, on hatchery spring Chinook (tangle net)	√	√	√	√	√	√	x
Commercial, Lower Columbia R, on hatchery spring Chinook (large net))	x	√	x	√	x	√	x
Sport, Upper Columbia	x	√	x	√	x	√	x

Table 6. Summary of Chinook and coho salmon mark selective fisheries (MSF) proposed for period from 2003 to 2006. In the “proposal” column, a check mark (√) indicates that a proposal was submitted to the PSC prior to the MSF while an (x) mark indicates that a proposal was not submitted to the PSC prior to the MSF. In the “Fishery” column, a check mark (√) indicates that the MSF occurred while an (x) mark indicates that it did not. Note that some MSF proposals cover more than a single MSF.

Fishery, location, target stock	2003		2004		2005		2006
	Proposal	Fishery	Proposal	Fishery	Proposal	Fishery	Proposal
R tribs, on hatchery spring Chinook (Deschutes, Umatilla, Klickitat, Wenatchee, Grand Ronde, Imnaha)							
Sport, Yakima R, on hatchery Yakima spring Chinook			√	√	x	x	x
Sport, Snake R, on hatchery fall Chinook			√	x	x	x	x
Sport, Snake R, on hatchery spring & summer Chinook	x	√	x	√	x	x	√
Sport, Willamette R, on hatchery Willamette spring Chinook	√	√	√	√	√	√	√
Total Chinook number	6	10	9	13	9	12	8

Table 7 Coho salmon tag groups that are expected to be present in mark-selective fisheries proposed for 2006 ¹. Based on presence of tag groups in past years.

Region	Hatchery	DIT	Marked (adipose fin clip) and tagged							Unmarked and Tagged					
			Area 1	Buoy 10	Area 2	Area 3	Area 4	Area 5	SBC	Area 1	Buoy 10	Area 2	Area 3	Area 4	Area 5
British Columbia	H-BIG QUALICUM R	N			x	x	x	x	x						
	H-CHILLIWACK R	N													
	H-GOLDSTREAM R	N	x	x	x	x	x	x	x						
	H-INCH CR	Y	x		x	x	x	x	x	x		x	x	x	x
	H-PUNTLEDGE R	N													
	H-QUINSAM R	Y	x		x	x	x	x	x	x		x	x	x	x
	H-ROBERTSON CR	N	x		x	x	x	x	x						
	H-SPIUS CR	N	x	x	x	x	x	x	x						
Columbia River	COWLITZ SALMON HATCH	N	x	x	x	x	x	x	x						
	ELOCHOMAN HATCHERY	N	x												
	KALAMA FALLS HATCHRY	N	x	x	x	x	x	x	x						
	NEHALEM HATCHERY	N	x	x	x	x		x							
	NORTH TOUTLE HATCHRY	N	x												
	STEAMBOAT SL NETPENS	N	x	x	x	x									
	WILLARD NFH	Y	x	x	x		x			x	x	x		x	
	WINTHROP NFH	N								x	x	x			
	<i>BIG CR HATCHERY</i>	N	x	x	x	x	x								
	<i>CASCADE HATCHERY</i>	N	x	x	x	x									
	<i>DEEP R NP - LOWER</i>	N	x	x	x	x	x								
	<i>DEEP R NP - UPPER</i>	N	x	x	x		x								
	<i>EAGLE CR NFH</i>	Y	x	x	x	x	x	x		x	x	x	x	x	x
	FALLERT CR HATCHERY	N	x	x	x	x	x								
	<i>KLICKITAT HATCHERY</i>	N	x	x	x	x	x								
	<i>ROCK CR HATCHERY</i>	N	x	x	x	x									
	<i>RUSHINGWATER AC POND</i>	N	x		x	x	x	x	x						
	TRASK R HATCHERY	N	x	x	x		x								
	WASHOUGAL HATCHERY	N	x	x	x	x	x	x	x						
	Hood Canal	GEORGE ADAMS HATCHRY	D	x		x	x	x	x	x	x		x	x	x
PORT GAMBLE BAY PENS		D	x		x	x	x	x	x	x		x	x	x	x
QUILCENE BAY SEA PEN		D	x		x	x	x	x	x						
Puget Sound	QUILCENE NFH	D	x		x	x	x	x	x	x		x	x	x	x
	BERNIE GOBIN HATCH	N	x	x	x	x	x	x	x						

¹ Proposals for the Washington Areas 5-7 and 13 and Areas 1-4 and Buoy 10 included a table of Washington DIT stocks that would be potentially impacted by these fisheries. However stocks from British Columbia and Oregon would also be expected to be impacted.

Table 7 Coho salmon tag groups that are expected to be present in mark-selective fisheries proposed for 2006 ¹. Based on presence of tag groups in past years.

Region	Hatchery	DIT	Marked (adipose fin clip) and tagged						Unmarked and Tagged									
			Area 1	Buoy 10	Area 2	Area 3	Area 4	Area 5	SBC	Area 1	Buoy 10	Area 2	Area 3	Area 4	Area 5	SBC		
Washington Coast	ELLIOTT BAY TRIBAL NP	N	x		x	x	x	x	x									
	LUMMI SEA PONDS	N	x	x	x	x	x	x	x									
	MARBLEMOUNT HATCHERY	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	MINTER HATCHERY	N	x					x	x	x								
	NISQUALLY HATCHERY	N	x					x	x									
	SKOOKUM CR HATCHERY	D	x	x	x	x	x	x	x									
	SOOS CREEK HATCHERY	D	x		x	x	x	x	x	x		x	x	x	x			
	SOUTH SOUND NET PENS	N	x	x	x	x	x	x										
	VOIGHTS CR HATCHERY	D	x		x	x	x	x	x	x		x	x	x	x			
	WALLACE R HATCHERY	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	<i>CEDC YOUNGS BAY NET</i>	N	x	x	x	x												
	BINGHAM CR HATCHERY	D	x	x	x	x	x		x			x	x	x				
	FORKS CREEK HATCHERY	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	MAKAH NFH ON SOOES R	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	QUINULT NFH -COOK C	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	SALMON R FISH CULTUR	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	SALMON R HATCHERY	N	x		x	x	x											
	SOLDUC HATCHERY	D	x	x	x	x	x	x	x	x	x	x	x	x	x			
	<i>GRAYS RIVER HATCHERY</i>	N	x	x	x	x												

Table 8. Chinook salmon tag groups that are expected to be present in mark-selective fisheries proposed for 2006². Based on presence of tag groups in past years.¹.

Region	Tagged hatchery groups	DIT?	Willamette MSF Marked	Willamette MSF Unmarked	Area 5 and 6 Summer Marked	Area 5 and 6 Summer Unmarked	Winter Area 5-13 Marked	Winter Area 5-13 Unmarked
Canada								
Fraser	Chehalis River	N			x		x	
	Chilliwack Hatchery	Y			x	x	x	x
Lower Georgia Strait	Shuswap River	Y			x	x		
	Capilano Hatchery	N						
	Big Qualicum River	N			x		x	
	Chemainus Hatchery	N			x		x	
	Cowichan Hatchery	N			x		x	
	Little Qualicum River	N			x			
	Nanaimo Hatchery	N			x		x	
BC Central Coast	Snootli Creek	N			x			
WCVI	Conuma River	N			x			
	Robertson Creek	N			x			
Columbia River								
Columbia River Summer	Carlton Rearing Pond	N						
	Dryden Pond	N						
	Eastbank Hatchery	N						
	Similkameen Hatchery	N			x			
	Turtle Rock Hatchery	N			x		x	x
	Wells Hatchery	N					x	
Upriver Bright	BONNEVILLE HATCHERY	N			x			
	PRIEST RAPIDS HATCH.	N						
Willamette Spring	Clackamas	Y	x	x	x	x		
	Dexter	N	x				x	

² Proposals for the Washington Areas 5-7 and 13 and Areas 1-4 and Buoy 10 included a table of Washington DIT stocks that would be potentially impacted by these fisheries. However stocks from British Columbia and Oregon would also be expected to be impacted.

Table 8. Chinook salmon tag groups that are expected to be present in mark-selective fisheries proposed for 2006 ². Based on presence of tag groups in past years. ¹.

Region	Tagged hatchery groups	DIT?	Willamette	Willamette	Area 5	Area 5	Winter	Winter
			MSF Marked	MSF Unmarked	and 6 Summer Marked	and 6 Summer Unmarked	Area 5- 13 Marked	Area 5-13 Unmarked
Columbia River Tule	Marion Forks Hatchery	N	x				x	
	McKenzie Hatchery	N	x	x			x	x
	S. Santiam	N	x					
	Willamette	N	x					
	BIG CR HATCHERY	N			x		x	
	Cowlitz Hatchery	N			x			
	Elochoman Hatchery	N						
	Fallert Creek Hatchery	N					x	
	Kalama Falls Hatchery	N			x			
	KLASKANINE HATCHERY	N						
	LEWIS RIVER HATCHERY	Y			x	x		
	North Toutle Hatchery	N						
	SPRING CR NFH	N			x	x	x	x
	Washougal Hatchery	N			x			
	Historical minor contributor	N						
Oregon coast	SALMON R HATCHERY	N			x			
	TRASK R HATCHERY	N			x			
Snake River Fall	LYONS FERRY HATCHERY	N			x	x	x	
Washington Puget Sound and Hood Canal								
Nooksack Spring	Kendall Creek Hatchery	Y			x	x	x	x
PS Fall Yearling	Icy Creek Hatchery	N						
PS Fall Yearling	Tumwater Falls Hatchery	N						
Skagit Spring	Marblemount Hatchery	Y			x	x	x	x
Snohomish Summer/Fall Wild	Wallace Hatchery	Y			x		x	
Stillaguamish Summer/Fall Wild	Whitehorse Pond	N			x	x	x	x
White River Spring	Hupp Springs Rearing Pond	N				x		x
	White River Hatchery (not ad clip)	N				x		x
Hood Canal	George Adams Hatchery	Y			x	x	x	x
	Hoodsport Hatchery	N			x		x	

Table 8. Chinook salmon tag groups that are expected to be present in mark-selective fisheries proposed for 2006 ². Based on presence of tag groups in past years. ¹.

Region	Tagged hatchery groups	DIT?	Willamette MSF Marked	Willamette MSF Unmarked	Area 5 and 6 Summer Marked	Area 5 and 6 Summer Unmarked	Winter Area 5-13 Marked	Winter Area 5-13 Unmarked
North Puget Sound	Bernie Gobin Hatchery	N			x			
	Lummi Net Pens	N			x		x	
South Puget Sound	Samish Hatchery	Y			x	x	x	x
	Chambers Creek Hatchery	N						
	Grovers Creek Hatchery	Y			x	x	x	x
	Issaquah Hatchery	N			x			
	Kalama Creek Hatchery	Y			x		x	
	Minter Hatchery	N						
	Nisqually Hatchery	Y			x	x	x	x
	Portage Bay (UW)	N					x	
	Puyallup Tribal Hatchery	N					x	
	Soos Creek Hatchery	Y			x	x	x	x
	Voights Creek Hatchery	N					x	
	Str. Juan de Fuca	Dungeness Hatchery	Y					
Elwha Hatchery		Y						
HOKO FALLS HATCHERY		N			x			
Hurd Creek Hatchery		N						
Washington coast								
Washington coast	MAKAH NFH ON SOOES R	N			x			
	QUINAULT LAKE HATCH.	N						
	QUINAULT NFH -COOK C	N			x			
	SALMON R FISH CULTUR	N			x			
California								
Central Valley	COLEMAN NFH	N			x		x	
	FEATHER R HATCHERY	N			x		x	

¹ To calculate mortalities, multiply encounters of unmarked group by release mortality rate.

4 Issues, Concerns and Recommendations

4.1 Mass Marking Proposal Process

Mass marking proposals were received for all anticipated MM activities. These included new proposals by WDFW for marking significant numbers of fall Chinook from the Washington Coast and the Columbia River. These new proposals, however, were not submitted in the requested time frame. As stated in the Understanding of the PSC concerning Mass Marking and Selective Fisheries, agencies are requested to submit new or substantially changed MM and MSF project proposals by June 1 of the year prior to implementation (Appendix A). The SFEC is aware that significant new Chinook mass marking of fall Chinook from the Columbia River and the coast of Washington is anticipated in 2007 by WDFW. Many of these fish are far-north migrating stocks.

4.2 Mark Selective Fishery Proposal Review Process

The SFEC-AWG requested that agencies send post-season reports for each fishery prosecuted and provided a template for these reports as well as a new template for the MSFs. Proposals were not received for all fisheries and no post season reports were provided. The SFEC-AWG is aware that the request for proposals and reports went out at a late date (early October for a November 1 deadline), and in future the requests for proposals and reports will be send out in early September.

The intent of the proposals and post-fishery reports is to provide information that the SFEC can use to produce the Annual Review Report and for PSC post-season reports. The SFEC Annual Review report should be able to provide for the Commission:

1. Documentation of MSFs proposed for the upcoming year
2. Documentation of MSFs implemented in the past year (e.g., catch, mark rate).
3. Information on location, time, regulation and sampling information (e.g., random/voluntary, ETD/visual) required by analysts for use of tag data for estimation of exploitation rates for unmarked stocks.
4. Review of sampling information as to its utility for estimation of unmarked tagged mortality and exploitation rates.

The SFEC relies on the fishery agencies to provide us with the information needed to conduct these assessments. For 2007 the proposal template will be altered to further clarify what information the SFEC-AWG is looking for (see Appendix C).

4.3 Proposals not received by SFEC

There are MSFs being prosecuted for which we have not received proposals. The purpose of these 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. It should be noted that the SFEC-AWG should receive proposals for all MSFs, including freshwater fisheries. We hope that by sending out proposal requests in early

September, with better follow-up by agency representatives on the SFEC, we can assist the agencies in completing their proposals.

4.4 Post-fishery reports

Request for information on the results of MSFs (report template sent out in 2005) did not generate any response. SFEC intends to further change the process to iterate and underline the need for this information. Again the request for information will be sent in early September requesting information on fisheries prosecuted (see templates in Appendix H). In 2006, the SFEC will request post-season reports for 2005 and 2006 MSFs.

The intent of the post-fishery reports is to provide information for the SFEC to monitor the conduct of MSFs and provide data to help estimate impacts on unmarked fish. For this purpose, 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. 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 for the unmarked group 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. 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.

4.5 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 (Coded Wire Tag Program Review - Final Report of the 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.

4.5.1 DIT

The DIT provides a tool to achieve two objectives. The first is to monitor the total impact of MSFs on unmarked fish through comparison of unmarked and marked DIT group returns to the hatchery. The second is to provide a tool for estimation of mortalities and exploitation rates of unmarked fish in MSFs. When MSFs are instituted, marked and unmarked fish are no longer treated identically and the DIT system provides a tagged group that continues to be the representative of unmarked natural production. Estimates of mortalities of these unmarked and tagged fish in MSFs can be made using the relationship between the unmarked and marked tagged pair in the DIT. The annual cost of DIT tagging and associated sampling in escapement and fisheries is high. The utility of DIT groups to accurately monitor total impacts and to estimate fishery and age specific exploitation rates for indicator stock cohorts is under investigation by the SFEC. Post-season DIT data for coho and Chinook indicator stocks is

currently being analyzed by the SFEC-AWG and CTC AWG to assess the method's efficacy. Consensus is needed on the future standardization and implementation of this technique.

4.5.1.1 Coverage of DIT

If the DIT program is determined to be effective, the current list of coho and Chinook DIT pairs (Appendices F and G) needs further review by the SFEC-AWG, the CTC and the CoTC for deficiencies in geographic coverage and tagging levels. For example, there are no DIT groups for Chinook indicator stocks in the upper Columbia or the Snake River. Only one of six Canadian indicator stocks potentially vulnerable to the MSF in Washington Area 5/6 has DIT groups and Electronic Tag Detection (ETD) sampling in the escapement. The previous list of Oregon coho DIT groups has also been reduced from seven to two.

4.5.1.2 Evaluation of use of DITs

The SFEC-AWG has developed methods for using the DIT data to estimate unmarked mortalities (SFEC-AWG, 2002). Some coho DIT data for Puget Sound and the Washington coastal stocks (Joint coho DIT workgroup, 2003) has been analyzed using these methods. This analysis indicated that, for coho salmon, DIT can provide information on impacts of MSFs on unmarked fish. However, for estimation of individual fishery impacts additional assumptions over those needed for non-selective fishery estimation are required. It also indicated that the estimates of fishery and age specific exploitation rates on unmarked DIT groups in MSFs will potentially be biased, but for coho the size and direction of the bias can be evaluated.

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, and what, if any, are the alternatives to DITs. DIT releases for Chinook should be continued to both provide information for this evaluation and to maintain the DIT database.

The SFEC-AWG will address this and other issues in a technical report focusing on a review of the indicator stock program and use of DIT. An outline of the report is as follows:

1. What are the major objectives of DIT?
 - a. Estimation of unmarked mortalities in MSFs for use in exploitation rate analysis.
 - b. Estimation of differential return rates between unmarked and marked fish at hatchery escapement for monitoring the total impact of mark-selective fisheries.
2. What methods can be used to achieve these objectives, in particular objective 1(a). The SFEC is evaluating several marking systems and analytical approaches for estimating mortalities and/or exploitation rates in MSF with respect to bias and precision. What have we learned from analyses of DITs to date? Can DIT pairs be expected to provide information for estimating the impacts of MSFs on Chinook salmon? What are alternatives to DIT? What are the technical consequences of each alternative to the management of coho and Chinook salmon natural stocks with MM and MSF?
3. An update on the analysis of all coho DIT data available through BY 2000 as well as an analysis of all Chinook DIT data for the same time period.
4. Development of biological reference points to help determine what constitutes a significantly large mark-selective fishery.

Consensus is needed on the utility and scope of the DIT program for evaluating MSFs for Chinook and coho salmon. After consensus is achieved, agency tagging and sampling programs will probably need to be adjusted to accomplish any new goals. Additional funding will likely be required to accomplish these changes.

4.5.1.3 Tag reporting strata and MSFs

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, 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. This means that the strata used for reporting catch-sample and tag recovery data to the PSMFC RMIS database must correspond with regulations. Each stratum should only cover a single regulation type, e.g., when a regulation changes from coho retention to coho mark-selective, the reporting of tags recovered and their expansion must be reported separately to RMIS. This can be a change within a fishery area over time, or within a statistical area where two sub-areas have different regulations. In order to correctly apply expansion factors, and provide data for estimation in MSFs and non-selective fisheries separately, it is critical that attention be paid to how fishery sampling is stratified. In the new template for 2007, questions 1 and 2 provide for this information.

4.5.1.4 Mixed bag management

Proposals for some coho and Chinook salmon MSFs include mixed bag regulations (Table 5), 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. There are several freshwater and marine fisheries with this type of regulation. The CoTC model work group (Bill Gazey) has developed methods to estimate mortalities of unmarked fish in mixed bag MSF sport fisheries. The data necessary to make these estimates, however, are not readily available in the US

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.

4.6.1 Impacts to Sampling Programs due to expansion of MM program beyond Puget Sound.

The proposed 2006 mass marking of all southern U.S. Chinook stocks will potentially result in untagged marked encounters of 16 thousand Chinook in Alaskan and 32 thousand in Canadian

sampling programs (assuming current sampling rates), both of which depend on visual sampling programs to recover CWTs. Some of these stocks are classified as “far-north” migrating (Washington Coast fall Chinook and Columbia River Up-River Brights) and contribute heavily to Alaskan and Canadian fisheries. Processing these unmarked fish will increase the sampling effort and financial burden on these agencies, and probably reduce CWT recovery rates.

4.6.2 Variable sampling

Sampling in Alaska and California continues to rely on visual sampling, so there will be no recoveries of unmarked and tagged fish. Commercial sampling programs of Chinook in Northern BC presently use hand held wands to detect CWTs as there is insufficient infrastructure to implement R9500 electronic detection equipment. The ability to achieve representative samples using wands is only possible when fisheries are constrained and catches are small. Canada is not implementing MSFs for Chinook and has not committed to ETD for Chinook.

Recent changes in Canadian sampling programs limit the recovery of unmarked and tagged fish. Recreational catches in 2000-2002 were sampled through a combination of voluntary recoveries and direct sampling in the creel survey. The Voluntary Head Recovery Program was found to be more cost effective and provide more recoveries than direct sampling. Since 2003, Canada has relied exclusively on voluntary submissions of heads from adipose fin clipped fish in order to obtain CWTs in coho and Chinook recreational fisheries. If fisheries are not mark-selective or have mixed-bag regulations, this adipose-only sampling will affect DIT evaluations since there will be no recoveries of unmarked and tagged fish.

CDFO has also altered its tag recovery procedures for commercial Chinook fisheries due to budget constraints. Beginning in 2004, tags were not recovered from Chinook without an adipose mark (i.e. even if the presence of a tag is indicated, the head is not removed for tag recovery unless the fish is adipose fin clipped). An exception is freezer troll caught Chinook, where all heads are retained by harvesters when fish are frozen at sea. This change in sampling protocol, combined with the lack of ETD in U.S. regions, has significant implications for the Chinook DIT program and other U.S. Chinook CWT programs. Specific impacts include the following:

1. The ability to use the unmarked DIT tag group to represent natural stocks. The lack of recoveries of unmarked DIT groups may severely compromise the utility of DIT to estimate unmarked exploitation rates (ER) in all fisheries, including MSFs, where DIT tag groups are heavily impacted by these Canadian fisheries. Prior to mass marking of the far-north migrating Chinook stocks, and the change in Canadian protocols, the marking agencies had considered the data impacts of variable sampling acceptable because of the following assumptions regarding the distribution and migration of the marked stocks: 1) The marked stocks were not significantly harvested in the areas without ETD; and/or 2) the number of fish of an unmarked DIT group recovered in these areas can be estimated by extrapolation of recoveries from the associated marked DIT group; and 3) fish that were subjected to a MSF were unlikely to be subsequently harvested in an area without ETD. Assumption 1 is not valid for far-north or far-south migrating stocks and assumptions 2 and 3 may not hold under the Canadian sampling scenario.

2. The ability to evaluate U.S. hatchery rebuilding programs of ESA listed/depressed stocks. The lack of recoveries of unmarked CWT Chinook will also impact many on-going CWT research projects focused on evaluating rebuilding programs. There are currently 14 non-DIT groups of Washington Chinook that are tagged but unmarked. These groups were tagged in this manner to avoid being directly harvested in selective fisheries, and because of the assumed recovery of tags through electronic CWT sampling. These ongoing studies currently lack Alaskan recoveries but historically were not recovered in Alaska in great numbers. However, without Canadian data, it is not possible to estimate exploitation rates, survival rates, and fishery distributions as the stocks do distribute into Southern B.C. This would require new evaluation techniques for these wild stocks. Additionally, the cost incurred to tag these unmarked groups would be lost.

5 Summary of Development of MM and MSFs since 1995.

Over the past 10 years MM and MSFs have been introduced for hatchery coho and Chinook salmon. The changes to marking, tagging and sampling programs have occurred in stages. At each stage, changes have presented a challenge in program coordination and for the use of CWTs for analytical purposes by the PSC technical committees. The changes to marking, tagging and sampling programs are documented in SFEC annual reports (SFEC 2002, SFEC 2003a, SFEC 2003b, SFEC 2004), but it is perhaps useful to provide an overview of the development and the consequences of each of the changes.

1. Coho MM and MSFs: Coho were first mass marked in Washington, Oregon and Southern BC for brood year 1995. In Canada, mass marking using an adipose clip began with 1996 brood, as 1995 Brood coho were mass marked with a ventral (pelvic) clip. Beginning with brood year 2004 almost all hatchery production of coho from these three regions has been mass marked. Coho MSFs have been in place since 1998. ETD was used for all Washington, Oregon and SBC fisheries and in hatcheries and on spawning grounds for coho salmon. DITs were also instituted with brood years 1995 to provide unmarked and tagged group as representative for natural production. Limited analysis of coho DIT data has indicated that mortalities of unmarked coho can be estimated using DITs, but that additional assumptions must be made to estimate fishery and age specific exploitation rates (Joint Coho DIT Workgroup 2003). In this analysis, lack of recoveries in Alaska and NBC fisheries was not considered to introduce bias, as few mass marked southern coho salmon are recovered in the northern fisheries and marked DIT recoveries could be used to estimate unmarked mortalities without bias using the ratio of unmarked to marked ratio at release.
2. Chinook MM and MSFs: MM of Puget Sound fall Chinook and Columbia River spring Chinook began with brood year 1998. MSFs started on spring Chinook in the Columbia River in 200?, MSFs started for Chinook in Puget Sound Areas 5/6 and 13 in July/August in 2003 and a winter MSF started in Puget Sound in 2005. There are also various freshwater MSFs for Chinook salmon. Puget Sound and Willamette Chinook DITs were also instituted with brood year 1998. ETD for Chinook was initiated in Washington and Columbia River fisheries and escapement locations, and in SBC commercial and recreational fisheries, in 2001. ETD was the standard sampling method in most all of these locations by 2002. Limited analysis of data for brood year 1998 and

1999 indicate that impacts in current MSFs represented such a small proportion of the total exploitation of CTC DIT stocks from Puget Sound that no significant difference can be detected in hatchery escapements (M.Alexandersdottir, pers.comm.). If Chinook MSFs remained at these levels (on mature fish during summer migrations in near terminal areas), the CWT indicator stocks can continue to provide the information needed for exploitation rate analysis - provided all fisheries and escapement in SBC, Washington and Oregon are sampled with ETD and all tagged fish are processed. DIT groups were released for Willamette spring Chinook, but lack of complete escapement sampling has negated the usefulness of this group in analysis.

3. Changes in sampling: Historically, sport recoveries in BC were from the Voluntary Head Recovery Program. From 2000 to 2002, with the implementation of MSF, sport recoveries in Southern BC of tagged salmon were obtained through a mix of voluntary and direct sampled recoveries. Northern BC sport fisheries continued to rely on voluntary recoveries only. Since 2002, the Voluntary Head Program, in which anglers are requested to submit all heads from marked coho and Chinook, is the only source of CWT recoveries in recreational fisheries. Direct sampling was discontinued in recreational fisheries after 2002, due to low recoveries. While the program depends on the assumption that a random and representative sample of heads will be submitted by the angling population, concerns have been raised that this assumption may not be met. Although ETD is used in BC commercial fisheries not all unmarked and tagged fish are processed. This introduces a potential problem in using DIT for estimation of exploitation rates, since unmarked and tagged fish representing natural production will not have complete coverage in sampling and reporting. Estimates of cohort size will be biased and use of the marked and tagged recoveries would not provide unbiased estimates of unmarked and tagged mortalities in non-selective fisheries as the release unmarked to marked ratio (λ^{release}) cannot be assumed to be an unbiased estimate of the unmarked to marked ratio in the MSF (λ^{MSF}). The extent of this bias will depend on the size of the MSFs on stocks impacted in BC fisheries.
4. Expansion of Chinook MM: Since 2005 MM has increased to WA coastal and Columbia River fall Chinook under the federal mandate to mass mark all hatchery Chinook. This represents several further challenges for the use of the CWT for exploitation rate analysis by the CTC.
 - a. ETD would need to be used coast wide for sampling of CWT'd salmon to recover tagged fish in all fisheries efficiently. However, Alaska has no intention of converting to ETD and CDFO also has no intention of expanding their use of ETD. The increase in mass marked Chinook represents a logistic and financial burden for both agencies, who are presented with increased sampling costs due to the increase in adipose fin clipped fish where visual sampling is used. Due to the extensive cost involved in converting to ETD, as well as numerous other logistical reasons, no further agency conversions to ETD are projected.
 - b. A potential expansion of Chinook MSFs beyond current levels, and to areas outside Puget Sound or terminal fisheries, presents an analytical problem. The SFEC and CTC have not resolved the issues of the use of DIT for exploitation rate analysis and calibration of the CTC model. However, any methods developed will require that all indicator stocks exposed to MSFs be represented by a DIT pair, which is currently not the case.

- c. ETD would be needed to recover unmarked tagged fish in all fisheries to provide complete coverage for analysis of DIT data for exploitation rate analysis.

6 Oversight and Clearinghouse function of SFEC.

The SFEC clearinghouse and oversight functions should provide the tools to affected agencies to evaluate the potential implications of MM or MSFs on sampling and tagging programs. It should provide a means to track actual vs. planned mass marking levels and to ensure that regional CWT databases are informed of MM and MSF activities.

6.1 Estimation of Unmarked Mortalities and Reporting to RMIS

The PSC fishery regimes for Chinook and coho salmon are designed to conserve natural stocks. Estimates of incidental mortalities are necessary for cohort and exploitation rate analysis. Under MSFs, additional CWT data reporting requirements are needed to estimate impacts on unmarked natural stocks (e.g., a description of fishery regulations, and methods used to estimate imputed CWT recoveries of unmarked fish in MSFs or in areas with visual sampling).

In 2004-2005, it was decided that a joint workgroup should develop a plan for providing these estimates of mortalities of unmarked stocks in MSFs. This plan was to include what information is necessary, how it should be reported to RMIS and how the estimates should be made (SFEC 2005)³. This work has not been started as it is currently considered premature. Members of SFEC AWG and the CTC AWG are evaluating approaches for incorporating DIT data into the CTC exploitation rate analysis for estimation of exploitation rates for unmarked fish. This will provide the experience necessary to ensure that the approach used for reporting the data to RMIS meets the needs of the technical committees.

³ SFEC, 2005. **REVIEW OF 2005 MASS MARKING AND MARK SELECTIVE FISHERY PROPOSALS. PSC REPORT SFEC (05)-1. PP. 43**

7 References

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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:

1. 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"/>

2. 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.
2. 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:

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

3. 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.
4. List any issues of concern previously identified by the SFEC related to this mass marking proposal and describe how those concerns have been addressed.

3. Fishery Distribution and CWT Sampling

1. Provide estimates of the anticipated number of mass marked fish that will be encountered in fishery CWT sampling programs using the format below. In order to standardize estimates between agencies, we would prefer the following methods be used:

- Use actual CWT recoveries from representative CWT groups (e.g. key or indicator stocks from each region) as basis of estimate
- Calculate the average recovery rate of tags (# recoveries / # releases), using the following three brood years: Coho = BYs 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:

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

Projected impacts BY the fishery

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

In-season management

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

Other information.

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

Appendix D. Status of 2006 Mass Marking proposals.

Description	New¹ or Continuation Proposal	SFEC Proposal Number
Southern BC Coho - CDFO	Cont.	MM-FOC-01-2005
Puget Sound Coho – WDFW/Tribal	Cont.	MM-WDFW-01-2005
Washington Coast Coho – WDFW/Tribal	Cont.	MM-WDFW-04-2005
Washington Col. R. Coho - WDFW	Cont.	MM-WDFW-05-2005
Makah NFH Coho - USFWS	Cont.	MM-USFWS-01-2005
Quilcene NFH Coho - USFWS	Cont.	MM-USFWS-02-2005
Quinault NFH Coho - USFWS	Cont.	MM-USFWS-03-2005
Eagle Creek NFH Coho - USFWS	Cont.	MM-USFWS-04-2005
Columbia River Coho - ODFW	Cont.	MM-ODFW-04-2005
Oregon Coast Coho - ODFW	Cont.	MM-ODFW-05-2005
Snake R. Fall Chinook – IDFG	Cont.	MM-IDFG-04-2005
Little White Salmon R. NFH Fall Chinook - USFWS	Cont.	MM-USFWS-10-2005
Makah NFH Fall Chinook – USFWS	Cont.	MM-USFWS-12-2005
Priest Rapids NFH Fall Chinook - USFWS	Cont.	MM-USFWS-13-2005
Quinault NFH Fall Chinook - USFWS	Cont.	MM-USFWS-14-2005
Spring Cr. NFH Fall Chinook - USFWS	Cont.	MM-USFWS-15-2005
Willamette Spring Chinook - ODFW	Cont.	MM-ODFW-01-2005
Oregon North Coast Spring Chinook - ODFW	Cont.	MM-ODFW-02-2005
Oregon South Coast Spring Chinook - ODFW	Cont.	MM-ODFW-03-2005
Puget Sound Spring, Summer, Fall Chinook – WDFW/Tribal	New/Cont.	MM-WDFW-02-2005
Columbia R. Spring, Summer, Fall Chinook - WDFW	New/Cont.	MM-WDFW-03-2005
Washington Coast, Fall, Spring Chinook – WDFW/Tribal	New/Cont.	MM-WDFW-06-2005

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

¹ DIT group not currently an indicator stock

² DIT group for Queets Wild is at 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	North/Central BC	Summer	
	Robertson Creek	West Coast Vancouver Is	Fall	
	Quinsam	Georgia Strait	Fall	
	Puntledge	Georgia Strait	Summer	
	Big Qualicum	Georgia Strait	Fall	
	Cowichan	Georgia Strait	Fall	
	Chehalis (Harrison Stock) ¹	Lower Fraser River	Fall	
	Chilliwack (Harrison Stock)	Lower Fraser River	Fall	√
Puget Sound	Skagit Spring Fingerling	Central Puget Sound	Spring	
	Skagit Spring Yearling	Central Puget Sound	Spring	√
	Nooksack Spring Fingerling	North Puget Sound	Spring	√
	White River Spring Yearling ³	South Puget Sound	Spring	
	Skagit Summer Fingerling	Central Puget Sound	Summer	
	<i>Skykomish Summer Fingerlings</i> ²	<i>Central Puget Sound</i>	<i>Summer/Fall</i>	√
	Stillaguamish Fall Fingerling	Central Puget Sound	Summer/Fall	
	George Adams Fall Fingerling	Hood Canal	Summer/Fall	√
	Samish Fall Fingerling	North Puget Sound	Summer/Fall	√
	Green River Fall Fingerling	South Puget Sound	Summer/Fall	√
	Grover Creek Fall Fingerling	South Puget Sound	Summer/Fall	√
	Nisqually Fall Fingerling	South Puget Sound	Summer/Fall	√
	South Puget Sound Fall Yearling	South Puget Sound	Summer/Fall	
	Elwha Fall Fingerling	Strait of Juan de Fuca	Summer/Fall	
Hoko Fall Fingerling	Strait of Juan de Fuca	Summer/Fall		
Washington Coast	Sooes Fall Fingerling	North Wash. Coast	Fall	
	Queets Fall Fingerling	North Wash. Coast	Fall	
Columbia River	Cowlitz Tule	Columbia R. (WA)	Fall Tule	
	Spring Creek Tule	Columbia R. (WA)	Fall Tule	√
	<i>Little White Salmon</i> ²	<i>Columbia R. (WA)</i>	<i>Fall Bright</i>	√
	Columbia Lower River Hatchery	Columbia River (OR)	Fall Tule	
	Columbia Upriver Bright	Upper Columbia R.	Fall Bright	
	Hanford Wild	Upper Columbia R.	Fall Bright	
	Lewis River Wild	Lower Columbia R.	Fall Bright	
	Lyons Ferry	Snake River	Fall Bright	
	Willamette Spring	Lower Columbia R.	Spring	√
	<i>Lewis River Spring</i> ²	<i>Lower Columbia R.</i>	<i>Spring</i>	√
	Columbia Summers	Columbia R. (WA)	Summer	
Oregon Coast	Salmon River	North Oregon Coast	Fall	
	<i>Rogue River</i> ²	<i>South Coast</i>	<i>Springs</i>	√

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. The first table (Appendix Table H1) provides information on CWTs sampling in all fisheries and escapement locations not just the MSFs. This is needed as the estimation of impacts in non-selective fisheries for 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) should be provided once final results are available for the mark-selective fisheries, total harvest and mark rate.

Templates with examples are provided below in Appendix Tables I1, I2 and I3.

Appendix Table H1. Planned sampling for CWTs (all fisheries and escapement locations).

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. Planned MSF fishery sampling.

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 Troll			Electronic	Observer & Creel	yes no	yes no	yes no
Columbia R	Columbia R			Electronic	Creel	No	yes	yes
Columbia River	Buoy 10 sport coho			Creel @ 38%	Creel , observer	Yes	no	yes

Appendix Table H3. MSF fishery results.

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 Snd, 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 StST (portions of 14, 16, 29)	Jun 1-Dec 31	2 clipped coho		

* mark rate from total legal sized coho encountered