

**PACIFIC SALMON COMMISSION
SELECTIVE FISHERIES EVALUATION COMMITTEE**

**REVIEW OF 2005 MASS MARKING AND
MARK SELECTIVE FISHERY PROPOSALS
REPORT SFEC (05)-1**

October 2005

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 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. (Note that throughout this report, a marked fish refers to an adipose fin clipped fish and a double index tag (DIT) group includes two tag groups, one marked (adipose fin clipped) and one unmarked.)

This report (a) summarizes the results of the SFEC's review process of 2005 proposals for MM and MSF provided to the PSC between October and December 2004, (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-three mass marking proposals were received for mass marking activities in 2005. Approximately 37 million coho are proposed to be marked coast wide, a decrease of 7% from marking levels in 2004 due to reduced production. Approximately 64 million Chinook are proposed to be marked from southern U.S. hatcheries, an increase of 21.5 million (48%) from 2004. Most of the increase is for new marking of fall Chinook from the Washington Coast and the Columbia River - a result of implementing the new federal legislation that requires mass marking of all fish from federally funded facilities.

Sampling Programs

The proposed 2005 mass marking of southern U.S. Chinook stocks will potentially result in untagged marked encounters of 6,735 untagged Chinook in Alaskan and 18,584 in Canadian sampling programs (assuming a 25% sample rate). Because agencies in these areas rely upon visual sampling methods to recover CWTs, processing these unmarked fish will increase sampling costs and could possibly reduce CWT recovery rates.

The political climate surrounding MM is confused by conflicting policy positions. On the one hand, Alaskan Congressional representatives have requested that a moratorium be placed on MM of far-north migrating Chinook stocks. On the other hand, U.S. appropriations bills require MM at federal facilities. MM can be expected to increase CWT recovery and fishery sampling costs in Alaska and Canada; these agencies continued to rely upon visual sampling methods to recover CWTs, reducing the ability of southern U.S. agencies to obtain data from DIT release groups to estimate impacts of MSFs. MM, DIT, and CWT sampling programs are no longer synchronized between agencies. The differences in sampling and tagging methodologies have and will continue to impact analysis by PSC technical committees and other evaluation programs until resolved.

Review of Mark Selective Fishery (MSF) Proposals

Proposals to conduct four coho salmon MSFs were received for 2005, all of which have occurred since 2003. Six proposals were received for Chinook salmon MSFs for 2005, down from nine proposals received for 2004 MSFs. The six proposals include a new chinook proposal for a recreational fishery in Puget Sound from October 2005 to April 2006.

All coho salmon DIT stocks will be impacted in the proposed Washington Coast, Puget Sound and Southern B.C. MSFs. These fisheries have been in place for several years. A limited analysis of CWT data for stocks with DIT groups for Washington coho salmon (Puget Sound and coastal) for brood years 1995-1998 has been carried out and will be extended to include DIT groups from Canada and the Columbia River and more brood years. Chinook salmon DIT groups have been released from hatcheries in all U.S. regions except the Washington Coast. With the exception of Puget Sound, however, there are few groups for each region. Concern exists that all natural stocks impacted by these proposed MSFs may not be represented by a tagged group (i.e., unmarked DIT group). In 2005, Southern B.C. and Puget Sound Chinook stocks will potentially be impacted by two MSFs, a limited recreational fishery in the Strait of Juan de Fuca (Area 5/6), which will be in its third year (Table 6) and a new winter MSF in Puget Sound. With fisheries exploiting Chinook stocks over multiple ages and throughout several months, unbiased estimation of the unmarked to marked DIT ratio is unlikely, making estimation of unmarked mortalities problematic.

SFEC Coordination and Oversight Functions

The Double Index Tag (DIT) System

The DIT program was implemented, beginning with brood year 1995 for coho salmon and 1998 for Chinook salmon, to provide indicator tag groups (unmarked) for representation of unmarked natural production when MM and MSF are in place. The adequacy of stock coverage by DIT groups should be reviewed by the agencies, SFEC-Analytical Work Group (SFEC-AWG), Chinook Technical Committee (CTC), and Coho Technical Committee (CoTC). The SFEC should evaluate whether DIT groups can be expected to provide useful information on MSF impacts on Chinook salmon, and if not, what the alternatives may be. The SFEC-AWG proposes to address this and other questions in a technical report to be made available in winter 2005.

Clearinghouse.

The SFEC clearinghouse and oversight functions should allow affected agencies to evaluate the potential implications of MM or MSFs on sampling and tagging programs. For this purpose, the SFEC plans to request that management agencies provide two reports on MSFs. A preliminary report on the actual conduct of their mark-selective fisheries including regulations, timing, effort, mark rate and catch estimates, should be provided in November of the fishery year. A second report should be made available once the data are finalized and analyses of DIT data for MSF impacts are available.

Data Management for Unmarked DIT Mortalities

A joint meeting of the SFEC oversight committee and technical committee chairs was held during the PSC January meeting (1/12/05) to address the question of how estimates of mortalities of unmarked DIT groups in MSFs and unsampled non-selective fisheries would be made available to analysts. It was concluded that estimation of these imputed mortalities is necessary for the analytical work by the coho and Chinook technical committees and this data should be

available on RMIS. A joint workgroup is to develop a plan for accomplishing the goal of providing these imputed mortalities. This plan is to include what information is necessary, how it should be reported to RMIS and how the estimates should be made.

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 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, it is recommended that the SFEC provide a table of indicator stocks and DIT groups by hatchery facility to the agencies with the proposal template each year.

Interagency Coordination and Cooperation

MM, DIT, and CWT sampling programs are not sufficiently coordinated to support analysis by PSC technical committees. U.S. legislation requiring MM at federal facilities will impose increased sampling costs on Alaska and Canada; inadequate representation of stocks of concern and the lack of coastwide electronic tag detection will negatively impact the potential utility of DIT. The PSC should support the establishment of a policy level process to develop formal 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.

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 2004, (b) clarifies the oversight function of the SFEC, (c) identifies several unresolved issues and concerns, and (d) provides recommendations. In this report a marked fish refers to an adipose fin clipped fish and a double index tag (DIT) group includes two tag 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 23 MM proposals were received by the PSC for 2005 activities (Appendix D). These represent a comprehensive list of all mass marking programs with international ramifications and/or sampling impacts on other agencies. These included 10 coho and 13 Chinook proposals. Three of the Chinook proposals were new proposals involving significant numbers 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.

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 2004. 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 2005. The proposals are summarized in Table 1.

2.2 Results of Review

2.2.1 Mass Marking

Approximately 37 million coho are proposed to be mass marked coast wide. This is a reduction of 2.6 million (7%) from last year, due to decreases in production. Approximately 64 million Chinook are proposed to be marked from southern U.S. hatcheries. This is an increase of 21.5 million (48%) from 2004. Most of the increase is for new marking of fall Chinook from the Washington Coast and the Columbia River, a result of implementing the new federal legislation that requires mass marking of all fish from federally funded facilities. The SFEC is also aware that additional fall Chinook mass marking of approximately 25 million is planned in 2006 by WDFW for Columbia River facilities (conditional on funding).

2.2.2 Impacts on Sampling Programs

In order to evaluate the impacts of MM proposals on coast wide sampling programs, marking agencies are requested to provide projected fishery encounters in the proposals. A summary of these projections for Chinook is listed in Table 2. The proposed 2005 mass marking of southern U.S. Chinook stocks will potentially result in the recovery of 6,735 untagged marked Chinook in Alaskan sampling programs, and the recovery of 18,584 untagged marked Chinook in Canadian sampling programs (assuming a 25% sample rate). These untagged recoveries are noted in these areas because of the dependence on visual sampling programs to recover CWTs. Compared to previous marking levels, the additional marking in 2005 is expected to result in an increase of 4,029 untagged marked Chinook that will be sampled in Alaska (149% increase over the current level) and 12,800 in Canada (221 % increase over the current level). 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 2). The Columbia River Tule stocks contribute heavily to Canadian fisheries, as well as Washington and Oregon fisheries (Table 2). Processing these unmarked fish will increase the sampling effort and financial burden on these agencies, and possibly reduce CWT recovery rates.

Table 1. Summary of 2005 mass-marking proposals.

Species	Area	Agency	DIT Groups	Number to be Mass Marked	New Proposals	Significant Changes / Issues for CWT System
Coho	Southern BC	CDFO	2	6,953,000		Marking reduction of 1.4M due to production reduction. DIT groups reduced from 7 to 2.
	Puget Sound	WDFW ¹	9	9,709,000		
		USFWS	1	354,000		
	WA Coast	USFWS	2	720,000		
		WDFW	4	5,610,000		
	Columbia River	USFWS	1	450,000		Reduction of 1.2M due to discontinuation of Willard coho program.
		WDFW	2	8,432,500		
		ODFW	1	3,975,000		Only 1 DIT group of 25,000
Oregon Coast	ODFW	1	682,500			
Total Coho				36,886,000		
Spring Chinook	Columbia River	WDFW	1	3,234,000		
		ODFW	2	5,360,990		
	WA Coast	WDFW	0	200,000		
	N. Oregon Coast	ODFW	0	418,000		The need for a DIT group from this region should be assessed.
	S. Oregon Coast	ODFW	1	2,164,000		
Summer Chinook	Puget Sound	WDFW ¹	1	2,150,000		New marking of 1.4M proposed for Bernie Gobin Hatchery
Fall Chinook	Puget Sound	WDFW ¹	8	30,086,000		New marking planned for Hood Canal hatcheries. Proposed last year, but only 1.5 out of 6.0M actually marked.
		WA Coast	Tribal	1	300,000	√
	USFWS		0	2,340,000	√	New marking at Makah and Quinault NFHs. Far-north migrating stocks, encounters mostly in BC and Alaska.
	Columbia River	USFWS	2	17,500,000	√	New marking at 4 hatcheries. Mixture of Tules and far-north migrating stocks. Significant Alaskan and BC encounters.
		IDFG	0	350,000		The need for a DIT group from this region should be assessed.
Total Chinook				64,102,990		

¹ Includes mass marking programs at tribal facilities

Alaska currently has no plans to convert to electronic sampling. They are concerned about the large numbers of fish without tags in their sampling programs. There has been a 25% increase of marked troll caught Chinook without tags 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.

Electronic sampling for tagged coho and Chinook salmon in the commercial catch in Canada 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. The program will require an infusion of capital to maintain electronic sampling capability.

Recovery of tags from recreational fisheries within Canada relies on the Voluntary Salmon Sport Head Recovery Program, with anglers submitting heads from adipose clipped fish. As in Alaska, the program has seen an increase in the number of heads without tags being submitted. This impacts the program costs, due to additional processing, and may decrease the participation rate by anglers.

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 2) impacting the sampling program. These actions may also compromise the use of the Oregon DIT groups to assess the impact of MSFs.

In reviewing MM proposals it is obvious that marking and CWT sampling programs are no longer synchronized among agencies. U.S. mass marking initiatives are in conflict with sampling programs in California, Alaska and Canada. For example, large increases are planned for mass marking northern migrating Chinook stocks from the southern US. In addition, Washington and Oregon have extensive DIT programs (both coho and Chinook) and there are numerous conservation groups being tagged without an adipose clip. At the same time, Alaska has no plans to convert its visual CWT sampling program to electronic sampling, and Canada has altered its CWT sampling program to exclude recovery of non-marked CWT recoveries due to budget constraints. These differences in sampling and tagging methodologies will impact analyses by PSC technical committees and other evaluation programs. The resulting issues and concerns are further described below.

Table 2. Projected Numbers of Fishery Encounters of Mass Marked Chinook from Proposed Brood Year 2004 Releases (actual number of fish encountered will depend on sampling rates).¹

Area / Run	Agency	Alaska	Canada	Oregon	Washington	In-River	California
Puget Fall	WDFW/Tribal	815	14,585	355	50,871		
Puget Summer	WDFW/Tribal	52	882	0	536		
WA Coastal Fall	USFWS	7,638	7,471	0	2,436	2,910	0
	WDFW/Tribal	42	82	16	9	45	
WA Coastal Fall Total		7,680	7,554	16	2,445	2,955	0
Oregon Coast Spring	ODFW	150	110	100	100	400	
SW Oregon Spring	ODFW	0	20	6,100	40	0	7,600
Columbia Tules	USFWS	121	39,741	15,993	29,078	79,966	363
Willamette Spring	ODFW	8,800	6,800	500	500	25,000	
Columbia Springs	WDFW	861	616	448	4,747		
Columbia URB Fall	USFWS	8,314	3,907	366	732	21,128	91
	WDFW	0	0	0	0		
	Idaho	147	123	130	490	641	
Columbia URB Fall Total		8,461	4,030	495	1,222	21,768	91
Grand Total		26,940	74,337	24,008	89,539	130,089	8,055

¹ Note: methods of estimating fishery encounters were not standardized between agencies.

2.2.3 DIT Programs

With the advent of 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 directly estimate exploitation of natural or unmarked stocks in the presence of MSFs. DIT tagging was introduced to circumvent this problem. The double index tag (DIT) pair consists of two tag groups, one marked, and the other unmarked. The latter group (tagged and unmarked) will be released in a MSF fishery as will all unmarked natural production. As such, the relationship between marked and unmarked DIT tag group provides a means to estimate encounters of the unmarked group in MSFs.

The current list of DIT groups is primarily based on the discretion of individual agencies. The geographic distribution of these groups is not comprehensive (Table 1, Appendices F and G), and has not been evaluated 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.

2.2.4 Electronic CWT Sampling

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 3 and Table 4, 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 in B.C. Coho fisheries in the north are currently being sampled by visual means and all Chinook are sampled electronically. All fisheries south of Cape Caution will require electronic sampling regardless of the species. If commercial fisheries expand in the south to include coho as well as Chinook, or if Chinook fisheries expand coast wide, there will not be sufficient resources (ETD equipment and infrastructure) to sample all fisheries electronically.

Table 3 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	

Table 4. 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	
	Sport	Visual	
Columbia River	Commercial	Electronic	
	Sport	Electronic	

2.3 Issues and Concerns Raised by the Review of the Mass Marking Proposals

2.3.1 Process

Mass marking proposals were received for all anticipated MM activities. These included new proposals 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. The SFEC is aware that significant new Chinook mass marking of fall Chinook from the Columbia River and the coast of Washington by WDFW is anticipated in 2006. Many of these fish are far-north migrating stocks.

It should also be noted that in the mass marking proposals, the methods of estimating fishery encounters were not standardized between agencies, which may result in significant differences in projected impacts by comparable marking programs. A standardized method will be recommended in future proposal templates.

Mass Marking programs for federally funded facilities in the U.S. are now being directed largely by federal legislation. However, the SFEC has been made aware of some apparently conflicting language. In 2003, Congressman Norm Dicks secured legislation mandating the mass-marking of all Chinook and coho in federally-funded programs. Conversely, Senator Ted Stevens has specifically requested in the 2004 congressional record that fall Chinook proposed to be marked by the USFWS this year not be marked. An excerpt from the congressional record, which is expected to be acted upon, reads as follows:

“...The conferees recommend that if mass marking is implemented, it should be done for Puget Sound and Columbia River Tule Chinook and not implemented for Columbia Upriver Bright or Washington Coastal Chinook salmon....In addition, the conferees recommend that the U.S. Fish and Wildlife Service work with the State of Alaska and the United States Section of the Pacific Salmon Commission to ensure that the system of mass marking does not interfere significantly with data collection, salmon management programs, or the implementation of abundance-based management under the treaty. The conferees direct the U.S. Fish and Wildlife Service to ensure that changes in fishery and stock assessment programs needed to maintain the reliability of those programs are identified and that funding is secured for implementation of the changes made by this section.”

2.3.2 Impacts to Sampling Programs

The proposed 2005 mass marking of all southern U.S. Chinook stocks will potentially result in untagged marked encounters of 6,735 Chinook in Alaskan and 18,584 in Canadian sampling programs (assuming a 25% sample rate), 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 possibly reduce CWT recovery rates.

2.3.3 DIT Program and Variable Sampling Techniques

The annual cost of DIT tagging and associated sampling in escapement and fisheries is high. Uncertainties also remain regarding the utility of DIT groups to accurately estimate fishery and age specific exploitation rates for indicator stock cohorts (see section 3.5.4). Post-season DIT data for coho and Chinook indicator stocks is currently being analyzed by the SFEC-AWG to assess the method's efficacy. Consensus is needed on the future standardization and implementation of this technique.

If the DIT program is determined to be necessary, 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 as there may be 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 proposed 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. Additionally, the adequacy of the number of tags per DIT group has not been reviewed by the SFEC-AWG, the CTC or the CoTC. Agencies are currently tagging at different levels, for a given species, within a region. An analysis of Washington coho DIT groups for brood years 1995-1997 (Joint Coho DIT Analysis Workgroup, 2003) found few DIT groups where the MSF impacts were sufficiently large to be detected at current tagging levels.

Sampling in Alaska and California continues to rely on visual sampling, so there will be no recoveries of unmarked and tagged fish. Recent changes in Canadian sampling programs will further significantly 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 relies 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 are 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. The impact on NSF ER estimates may be small if the Canadian fisheries occur before any MSFs, and recoveries of the marked DIT tag group can be used to estimate recoveries of the unmarked DIT pair.

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, and without Canadian data, it will not be possible to estimate exploitation rates, survival rates, and fishery distributions. This would require new evaluation techniques for these wild stocks. Additionally, the cost incurred to tag these unmarked groups would be lost.

The lack of uniformity in sampling methods continues to raise questions and issues regarding the impact of MM on CWT data integrity. A complete coast wide conversion to ETD would solve many issues regarding the impact of MM and MSFs on the CWT program. However, due to the extensive cost involved in converting to ETD, as well as numerous other logistical reasons, no further agency conversions are projected. As previously mentioned, Canada has also discontinued some of its ETD activities, and has reverted to visual sampling and voluntary CWT recoveries for their recreational fisheries. The ramifications of these sampling changes, along with the consequences of the lack of ETD in U.S. regions (e.g. Alaska), need to be reviewed by the SFEC AWG and the CTC.

For the previous scope of MM programs, 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. Assumptions 2 and 3 have not been thoroughly investigated by the SFEC and are probably no longer valid under the current sampling scenarios. As previously mentioned, the lack of complete ETD coverage also limits the ability to use tag groups with no mark (i.e., tag groups with no adipose fin clip that are not part of a DIT pair).

2.4 Summary of Mass Marking Proposal Review

2.4.1 Marking Programs

Twenty-three proposals were received for mass marking activities in 2005. These represent a comprehensive list of all mass marking programs with international ramifications.

Approximately 37 million coho are proposed to be marked coast wide. This is a reduction of 2.6 million (7%) from last year, due to reduced production. Approximately 64 million Chinook are

proposed to be marked from southern U.S. hatcheries, an increase of 21.5 million (34%) from 2004. Most of the increase is for new marking of fall Chinook from the Washington Coast and the Columbia River as a result of implementing the new federal legislation that requires mass marking of all fish from federally funded facilities. The SFEC is also aware that mass marking of approximately 25 million additional Columbia River and Washington Coast fall Chinook is likely to occur in 2006, conditional on funding.

The proposed 2005 mass marking of all southern U.S. Chinook stocks will potentially result in untagged marked encounters of 6,735 untagged Chinook in Alaskan and 18,584 in Canadian sampling programs (assuming a 25% sample rate). We have emphasized these untagged recoveries in these fisheries because of the dependence on visual sampling programs to recover CWTs. Compared to previous levels, the additional marking in 2005 is expected to result in an increase of approximately 4,000 marked and unmarked fish that will be sampled in Alaska (an increase of approximately 149% over the current level) and 12,800 in Canada (an increase of approximately 221% over the current level). Processing these unmarked fish will impact the sampling programs of these agencies.

A moratorium on mass marking far-north migrating Chinook stocks has been requested by Alaska. This would reduce impacts to Alaskan and Canadian sampling programs until coordination issues can be resolved. As recommended in the original PSC Ad-Hoc SFEC report (ASFEC, 1995):

“mass marking of hatchery fish by removing adipose fins should not be permitted until assurances are received from substantially affected jurisdictions that CWTs will be electronically sampled...” page xvi

However, such a moratorium conflicts with U.S. legislation requiring MM at federal facilities, and it would not address the Canadian budget problems impacting their sampling programs. These issues need to be addressed at the PSC policy level.

2.4.2 Sampling Programs

Mass marking programs, DIT programs, and CWT sampling programs are no longer synchronized between agencies. For example, in the southern U.S. there are plans to increase the mass marking of far north migrating Chinook, there are proposals to expand the number of Chinook MSFs, there is an extensive DIT program (both coho and Chinook), and there are numerous tagged conservation stocks without an adipose mark. At the same time, Alaska has no plans to convert its current visual CWT sampling to electronic sampling and Canada (due to budget cuts) has altered its CWT sampling program to exclude recovery of CWTs from non adipose-marked fish. These differences in sampling and tagging methodologies will impact analyses by PSC technical committees and other evaluation programs.

Consensus is needed on the utility and scope of the DIT program for evaluating MSFs and maintaining the PSC Exploitation Rate Indicator Stock Program. Additional assessments of this technique may be available this summer from ongoing reviews by both the PSC CWT Expert Panel and the SFEC AWG. 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.

2.4.3 Current Utility of CWT System

Despite the technical concerns introduced by mass marking and mark selective fisheries, the coast wide CWT system still remains the only method currently available for the Parties of the Pacific Salmon Treaty for estimating and monitoring coast wide exploitation rates on individual stocks of coho and Chinook salmon. The current CWT system is still functional for providing CWT data for tagging studies where the fish are marked. The 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.

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. 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 2005 MSF Proposals

Three proposals were received for four coho salmon MSFs for 2005 (Table 5). All three recreational coho fisheries proposed have occurred since 2003 (Tables 5 and 6). Execution of a new proposed commercial MSF in Southern B.C. will depend upon the allowable exploitation rate of upper Fraser River coho. In addition, coho MSFs are anticipated for Washington Areas 1-4 troll, Oregon coastal recreational, and Canadian freshwater areas, but no proposals have been received.

Six proposals were received for Chinook salmon MSFs for 2005, down from nine proposals received in 2004 (Tables 5 and 6). The Columbia River recreational and commercial spring Chinook MSFs proposals received in 2003 included the 2004 and 2005 fishing years. No modifications to these fisheries were provided to the SFEC this year. All proposed Chinook fisheries have occurred in previous years, except the Puget Sound winter recreational fishery, targeting marked Puget Sound fall fingerling and fall yearling hatchery stocks. In addition,

Chinook MSFs are anticipated for the Skykomish, Nooksack, and Yakima rivers, but no proposals have been received.

Table 3. 2005 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
Coho proposals received						
BC statistical areas 12-20, outer areas of 21-27 and 121-127 and 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	Proposal does not provide a list of DIT groups that could be impacted. 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. Post-season estimation methods are not provided.
			Fraser River Mid- Oct- Dec. 31.	Further regulations depend on maximum ER for interior Fraser River coho. May have mixed bags.		
BC statistical areas 12-20, outer areas of 21-27 and 121-127	CDFO	Commercial (included in recreational proposal)	Execution of this MSF depends on ER of upper Fraser River coho. No details were provided, so no review could be provided.			
Washington Puget Sound Areas 5-7 and 13	WDFW New proposal Continuing fishery	Recreational	July- Septem ber	2 salmon per day. Coho must be ad clipped. In Areas 5 and 6 marked Chinook may be retained in Chinook mark-selective fishery period. In areas 7 and 13 Chinook may be	Lists 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.

Table 3. 2005 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
				retained.		
Washington Coastal Areas 1-4 and Buoy 10	WDFW New proposal Continuing fishery	Recreational	July-September	2 fish bag limit. Coho must be ad-clipped. All marked Chinook may be retained. Managed as catch area quotas.	Lists 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.
Chinook proposals received						
Washington Puyallup & Carbon Rivers	WDFW New proposal Continuing fishery	Recreational fishery –	Puyallup River: Aug 1- Dec 31	Bag limit 6 salmon, 2 adult salmon, release unmarked adult Chinook	No CTC indicator stocks likely to be impacted.	The regulations (bag limits) for the Puyallup and Carbon, as described, are unclear. 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.
			Carbon River Aug/Sept 1-Nov 30	Bag 6 salmon, 4 adults, no more than 2 marked Chinook. Release chum and wild adult Chinook		
Washington Areas 5-13	WDFW New proposal	Recreational fishery	October 2005 to April 2006	2 hatchery fish (clipped). Chinook, minimum size limits 22 inches, 18-20 inches being considered. Other species follow normal structure for areas/months.	Some indicator stocks are not DITs	This fishery will be impacting CTC indicator stocks of concern that are not DIT: Hupp Springs Rearing and Stillaguamish summer/falls. The catches in the included proposal describe discontinuous time periods and a non-selective

Table 3. 2005 MSF proposals received by SFEC.

Location	Agency	Fishery Type	Period	Regulation	Indicator stocks Impacted	Concerns
						status, and may not be comparable to expectations with a 7 month continuous fishery with a mark-selective status.
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.
Columbia River: Willamette River and tributaries	ODFW Continuing fishery	Recreational	Jan July	Daily bag limit of 2 adipose clipped Chinook (>24 inches total length) and 5 fin clipped jack Chinook (15-24 inches).	Lists tagged hatchery fish with tag codes for broods 1997-2002, DIT (Y/N) and number released	The fishery proposed takes place in a terminal area. The SFEC-AWG suggests that thought be given to using terminal method described in SFEC-AWG (2002).

Table 4. Mark selective fishery proposals and their years of actual occurrence of fishery.

Fishery, location, target stock	2003		2004		2005	
	proposal	fishery	proposal	fishery	proposal	fishery
Coho						
Sport, Southern BC, on hatchery coho	yes	yes	yes	yes	yes	
Commercial, Southern BC, on hatchery coho	-	-	yes	no	yes-new	
Sport, BC freshwater, on hatchery coho	-	yes		yes	No proposal	
Sport, Washington coast, on hatchery coho	yes	yes	yes	yes	yes	yes
Commercial, WA areas 1-4, on hatchery coho	-	yes		yes	No proposal	yes
Sport, Puget Sound, on hatchery coho MCA 5,6 13	no	yes	yes	yes	yes	yes
Sport, Nooksack River, hatchery coho		yes		yes		yes
Sport, Oregon coast, on hatchery coho	-	-			No proposal	
Chinook						
Sport summer, WA area 5&6, on hatchery chinook	yes	yes	yes	yes	yes	yes
Sport winter, WA area 8-1 & 8-2, on hatchery chinook					yes-new	yes
Sport, Nooksack R, on hatchery chinook	-		yes-new	yes	Annual ²	yes
Sport, Skykomish R, on hatchery chinook	yes	yes	yes	yes	No proposal	yes
Sport, Carbon R, on hatchery chinook	no	yes	no	yes	yes-new	yes
Sport, Puyallup R, on hatchery chinook	-	-		yes	yes-new	yes
Sport, Columbia R, on hatchery Columbia summer Chinook	yes	yes	yes	yes	2004 ¹	limited
Sport, Columbia R, on hatchery spring Chinook	yes	yes	yes-multi	yes	2004 ¹	yes
Commercial, Columbia R, on hatchery spring Chinook	yes	yes	yes-multi	yes	2004 ¹	yes
Sport, Yakima R, on hatchery Yakima spring Chinook			yes-new	yes	No proposal	no
Sport, Snake R, on hatchery fall Chinook	-		yes-new	no	No proposal	no
Sport, Willamette R, on hatchery Willamette spring Chinook	yes	yes	yes	yes	yes	yes

¹ Submitted in 2004 as a multi-year proposal.

3.2 MSF Proposal Assessment

The SFEC reviewed MSF proposals for completeness and provided comments back to the agency proponents in December of 2004. Comments included requests for additional information on indicator stocks likely to be impacted, description of sampling strategies and advice on methods to estimate post-fishery mortality. The current status of the proposals received to date is listed in Appendix H.

3.3 Major Changes in MSF proposed for 2005

A new pre-terminal Chinook MSF has been proposed for Puget Sound and Strait of Juan de Fuca (WA areas 5-13) that will be conducted from October to April. Previous pre-terminal MSFs for Chinook have been for smaller areas and shorter time periods with numeric restraints on catch, making impacts easier to predict. There are also 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 to non-selective fisheries in Canada that are not sampled, the uncertainty in the estimation of exploitation rates for the unmarked tag group increases. This uncertainty will be highest for stocks with high Canadian contribution rates.

As additional selective fisheries are being introduced, more of the indicator stocks are being impacted by selective fisheries. If the DIT system is to be used to estimate mortalities of unmarked fish, 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 an assumption-based approach will have to be used to estimate the MSF exploitation rate for the wild, unmarked fish. It is necessary for the SFEC, CTC and CoTC to review the indicator stock system and sampling programs and, given the proposed and agreed to MSFs, determine the size and distribution of DIT stocks.

3.4 Fishery Interactions.

With multiple MSFs taking place in British Columbia, Washington and Oregon, some stocks will be impacted by multiple MSFs. Tables 7 and 8 were constructed to illustrate where this is likely to occur for coho and Chinook, respectively. The expected impacts are included in the tables for marked and unmarked tagged indicator stocks. For the unmarked coho salmon the impacts are mortalities (Table 7). For chinook salmon (Table 8) the impacts given are encounters prior to the application of a release mortality rate, which varies by size of fish and fishery (e.g. gear and location).

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. The impact of the MSFs on all DIT stocks should be estimated, extending the analysis completed for Washington coho DIT stocks (Joint Coho DIT Workgroup 2003).

Table 5. Expected mortalities of coho salmon tag groups in mark-selective fisheries proposed for 2005 ¹.

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
British Columbia	H-BIG QUALICUM R	N			13.3	6.7	11.8	31.8	183.6			1.9	1.0	1.7	4.6	26.4
	H-CHILLIWACK R	N	7.2		12.2	6.9	14.3	46.6	219.9	1.0		1.6	0.9	1.9	6.2	29.2
	H-GOLDSTREAM R	N	5.5	6.0	5.7	6.1	17.7	32.0	402.3	0.8	0.9	0.8	0.9	2.6	4.7	59.5
	H-INCH CR	Y	4.0		11.9	4.9	14.4	36.6	594.5	0.6		1.8	0.7	2.2	5.5	85.8
	H-PUNTLEDGE R	N	4.0				8.6	10.1	40.2	75.4						
	H-QUINSAM R	Y	12.1		27.3	4.1	11.9	26.0	414.3	1.2		2.7	0.4	1.2	2.6	41.5
	H-ROBERTSON CR	N	3.9		10.7	4.5	17.4	18.9	1,059.8	0.6		1.6	0.7	2.6	2.9	159.8
	H-SPIUS CR	N	14.5	3.2	18.9	9.3	17.4	36.3	54.4	4.3	1.0	5.6	2.8	5.2	10.8	16.2
Columbia River	COWLITZ SALMON HATCH	N	372.4	102.0	161.7	20.1	24.1	34.3	119.3							
	ELOCHOMAN HATCHERY	N	0.1													
	KALAMA FALLS HATCHRY	N	52.5	8.8	15.4	1.8	1.7	3.8	5.0							
	NEHALEM HATCHERY	N	33.8	9.0	8.6	4.0		9.5								
	NORTH TOUTLE HATCHRY	N	0.1													
	STEAMBOAT SL NETPENS	N	75.2	119.8	16.4	3.0										
	WILLARD NFH	Y	15.3	20.6	4.6		10.4			2.2	3.0	0.7		1.5		
	WINTHROP NFH	N								35.3	44.0	15.1				
	<i>BIG CR HATCHERY</i>	N	34.3	56.0	14.3	4.1	5.1									
	<i>CASCADE HATCHERY</i>	N	10.3	13.1	2.7	2.7				0.0						
	<i>DEEP R NP - LOWER</i>	N	39.0	38.5	17.0	3.1	3.1									
	<i>DEEP R NP - UPPER</i>	N	38.6	41.3	6.8		3.0									
	<i>EAGLE CR NFH</i>	Y	49.8	100.4	17.6	3.4	5.6	5.8		2.5	5.0	0.9	0.2	0.3	0.3	
	FALLERT CR HATCHERY	N	19.2	32.5	5.5		0.9									
	<i>KLICKITAT HATCHERY</i>	N	59.0	15.5	16.5	0.9	5.4									
	<i>ROCK CR HATCHERY</i>	N	17.2	13.8	11.5	2.8										
	<i>RUSHINGWATER AC POND</i>	N	4.4		8.9	1.0	11.3	55.7	21.6							
TRASK R HATCHERY	N	37.3	17.3	12.4		5.7										
WASHOUGAL HATCHERY	N	6,204.7	843.6	3,075.4	142.4	431.1	21.2	1,549.1								
Hood Canal	GEORGE ADAMS HATCHRY	D	7.3		10.6	3.4	27.9	82.1	10.1	1.1		1.7	0.5	4.3	12.8	1.6
	PORT GAMBLE BAY PENS	D	11.1		14.6	1.9	27.2	68.4	17.3	1.7		2.2	0.3	4.1	10.3	2.6
	QUILCENE BAY SEA PEN	D	13.5		39.4	4.5	98.5	209.2	33.2							
	QUILCENE NFH	D	8.5		13.4	7.3	32.4	107.6	64.3	1.3		2.1	1.1	5.1	16.9	10.1

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 5. Expected mortalities of coho salmon tag groups in mark-selective fisheries proposed for 2005 ¹.

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	
Puget Sound	BERNIE GOBIN HATCH	N	19.9	24.9	32.9	7.0	26.5	65.9	6.4								
	ELLIOTT BAY TRIBAL NP	N	16.1		71.9	14.8	132.1	359.4	185.1								
	LUMMI SEA PONDS	N	10.6	5.3	20.4	1.8	21.7	60.2	70.9								
	MARBLEMOUNT HATCHERY	D	66.3	11.6	119.0	21.1	149.2	466.3	631.9	2.7	0.5	4.8	0.8	6.0	18.7	25.3	
	MINTER HATCHERY	N	24.4				29.3	151.4	307.5								
	NISQUALLY HATCHERY	N	2.8				1.0	5.6									
	SKOOKUM CR HATCHERY	D	9.4	1.7	17.6	2.6	28.8	61.5	73.1								
	SOOS CREEK HATCHERY	D	38.8		75.4	13.3	85.3	406.0	111.8	2.6		5.1	0.9	5.7	27.3	7.5	
	SOUTH SOUND NET PENS	N	65.3	66.4	60.6	27.0	83.0	192.0									
	VOIGHTS CR HATCHERY	D	6.8		17.9	4.0	28.6	73.6	100.2	1.0		2.7	0.6	4.3	11.0	15.0	
	WALLACE R HATCHERY	D	24.6	6.0	46.1	10.7	42.1	143.6	122.3	3.7	0.9	6.9	1.6	6.3	21.6	18.4	
	<i>CEDC YOUNGS BAY NET</i>	N	42.5	71.3	14.8	3.9											
	Washington Coast	BINGHAM CR HATCHERY	D	30.6	4.5	20.4	7.0	1.1		66.6	4.6	0.7	3.0	1.0	0.2		10.0
		FORKS CREEK HATCHERY	D	110.8	13.4	141.6	11.4	13.9	7.3	43.0	15.5	1.9	19.7	1.6	1.9	1.0	6.0
MAKAH NFH ON SOOES R		D	18.7	50.7	28.6	16.1	18.6	26.4	28.6	2.9	7.9	4.4	2.5	2.9	4.1	4.4	
QUINULT NFH -COOK C		D	292.6	69.7	652.4	57.4	69.3	62.5	37.5	13.9	3.3	30.9	2.7	3.3	3.0	1.8	
SALMON R FISH CULTUR		D	85.2	22.9	112.3	14.1	17.7	59.8	52.4	8.1	2.2	10.6	1.3	1.7	5.7	5.0	
SALMON R HATCHERY		N	6.3		8.3	3.3	4.7										
SOLDUC HATCHERY		D	51.1	6.5	61.4	21.6	18.1	7.6	56.6	7.8	1.0	9.4	3.3	2.8	1.2	8.7	
<i>GRAYS RIVER HATCHERY</i>		N	60.5	99.4	20.0	1.5											

Table 6. Expected encounters of Chinook salmon tag groups in mark-selective fisheries proposed for 2005 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			16.6		41.6	
	Chilliwack Hatchery	Y			10.1	10.0	64.3	63.8
	Shuswap River	Y			21.6	12.4		
Lower Georgia Strait	Capilano Hatchery	N						
	Big Qualicum River	N			24.2		54.7	
	Chemainus Hatchery	N			10.5		20.8	
	Cowichan Hatchery	N			16.6		105.5	
	Little Qualicum River	N			12.9			
BC Central Coast	Nanaimo Hatchery	N			7.6		36.6	
	Snootli Creek	N			46.7			
WCVI	Conuma River	N			4.5			
	Robertson Creek	N			25.6			
Columbia River								
Columbia River Summer	Carlton Rearing Pond	N						
	Dryden Pond	N						
	Eastbank Hatchery	N						
	Similkameen Hatchery	N			0.7			
	Turtle Rock Hatchery	N			4.2		116.8	29.5
	Wells Hatchery	N					8.8	
Upriver Bright	BONNEVILLE HATCHERY	N			28.7			
	PRIEST RAPIDS HATCH.	N						
Willamette Spring	Clackamas	Y	354.4	274.5	13.9	4.2		
	Dexter	N	115.3				7.1	
	Marion Forks Hatchery	N	78.6				1.4	
	McKenzie Hatchery	N	268.2	102.4			16.0	10.1
	S. Santiam	N	372.6					

Table 6. Expected encounters of Chinook salmon tag groups in mark-selective fisheries proposed for 2005 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	
Columbia River Tule	Willamette	N	163.2						
	BIG CR HATCHERY	N				30.0		10.9	
	Cowlitz Hatchery	N				42.7			
	Elochoman Hatchery	N							
	Fallert Creek Hatchery	N						2.2	
	Kalama Falls Hatchery	N				5.4			
	KLASKANINE HATCHERY	N							
	LEWIS RIVER HATCHERY	Y				4.3	4.9		
	North Toutle Hatchery	N							
	SPRING CR NFH	N				40.9	4.4	116.8	29.5
	Washougal Hatchery	N				2.1			
Oregon coast	Historical minor contributor	N							
	SALMON R HATCHERY	N			13.2				
	TRASK R HATCHERY	N			4.5				
Snake River Fall	LYONS FERRY HATCHERY	N			83.8	2.8	9.6		
Washington Puget Sound and Hood Canal									
Nooksack Spring	Kendall Creek Hatchery	Y			4.4	5.1	106.0	113.5	
PS Fall Yearling	Icy Creek Hatchery	N							
PS Fall Yearling	Tumwater Falls Hatchery	N							
Skagit Spring	Marblemount Hatchery	Y			11.2	5.2	234.5	69.9	
Snohomish Summer/Fall Wild	Wallace Hatchery	Y			2.5		44.7		
Stillaguamish Summer/Fall Wild	Whitehorse Pond	N			0.8	1.7	21.0	54.6	
White River Spring	Hupp Springs Rearing Pond	N				12.3		202.2	
	White River Hatchery (not ad clip)	N				2.7		148.2	
	Hood Canal	George Adams Hatchery	Y		21.1	20.4	101.3	98.3	
North Puget Sound	Hoodsport Hatchery	N			27.9		174.4		
	Bernie Gobin Hatchery	N			17.9				
	Lummi Net Pens	N			26.4		41.1		
South Puget Sound	Samish Hatchery	Y			20.8	20.8	80.7	77.9	
	Chambers Creek Hatchery	N							

Table 6. Expected encounters of Chinook salmon tag groups in mark-selective fisheries proposed for 2005 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
Str. Juan de Fuca	Grovers Creek Hatchery	Y			19.5	19.3	136.6	134.2
	Issaquah Hatchery	N			6.8			
	Kalama Creek Hatchery	Y			7.5		73.0	
	Minter Hatchery	N						
	Nisqually Hatchery	Y			12.7	13.6	189.3	198.5
	Portage Bay (UW)	N					28.8	
	Puyallup Tribal Hatchery	N					11.3	
	Soos Creek Hatchery	Y			20.9	20.4	78.2	75.6
	Voights Creek Hatchery	N					25.9	
	Dungeness Hatchery	Y						
	Elwha Hatchery	Y						
HOKO FALLS HATCHERY	N			45.0				
Hurd Creek Hatchery	N							
Washington coast								
Washington coast	MAKAH NFH ON SOOES R	N			15.5			
	QUINALT LAKE HATCH.	N						
	QUINALT NFH -COOK C	N			4.3			
	SALMON R FISH CULTUR	N			2.9			
California								
Central Valley	COLEMAN NFH	N			36.5		26.5	
	FEATHER R HATCHERY	N			137.1		448.6	

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

For Chinook salmon MSFs proposed in Washington (Table 8), tagged indicator stocks from many regions are expected to be encountered. DIT groups have been released from hatcheries in all U.S. regions except Washington coast. But, with the exception of Puget Sound, there are few DIT groups for each region. There is concern that all natural stocks impacted by these proposed MSFs may not be represented by a tagged group (i.e., unmarked DIT group). In 2005, 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 third year (Table 6) and a new winter MSF in Puget Sound proposed by WDFW. This second fishery will impact Chinook stocks which are present in Puget Sound through-out the year. The location and time of this fishery affects the estimation of mortality of Chinook salmon using DITs. Estimation methods rely on knowledge of the unmarked to marked ratio of the DIT groups. However, with the fisheries exploiting Chinook stocks over multiple ages and through-out several months, unbiased estimation of this ratio may not be possible.

3.5 Issues, Concerns and Recommendations

As the SFEC-AWG reviewed the MSF proposals several issues and concerns were identified that require the attention of the Commission and the agencies.

3.5.1 Proposal Review Process

- The time frame outlined in the SFECs template was established in 2002 to provide the PSC with the opportunity to comment prior to implementation of MSFs each year. However, this time frame precedes the completion of the annual domestic fishery planning processes. This increases the difficulty of assessing impacts to the CWT system since the total regulation package is not yet known. **Tables 7 and 8 provide an overview of potential encounters given the fisheries proposed. If the final regulation package does not include the set of MSFs as proposed, these tables will not apply.**
- Some proposals were received after the November 1 deadline, leaving limited time for review and analysis. There are two different kinds of proposals, new and continuing fisheries, and the new ones are to be received by June and the continuing ones by November prior to implementation of the fishery. **It is recommended that the Commission reissue its call to agencies for proposals for all potential MSFs in accordance with schedule (i.e. June and November).**
- Some MSF proposals were incomplete, lacking information on projected impacts for all tagged indicator stocks. All tagged indicator stocks, including DIT stocks, vulnerable to the fishery need to be identified in order to evaluate the MSF. **In order to assist the agencies in achieving this goal, it is recommended that the SFEC provide a table of indicator stocks and DIT groups by hatchery facility to the agencies with the proposal template each year (see Appendices F and G).**
- All agencies that are proposing MSFs should participate in the SFEC. Currently not all of these agencies are represented on the SFEC.

3.5.2 Mixed Bag Management

Proposals for some coho 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. This complicates the process of estimating mortalities of unmarked tagged fish.

The Coho Technical Committee has been addressing this issue for use in Coho FRAM mixed bag fisheries. **It is recommended that the SFEC work with the CoTC to identify data and fishery sampling requirements and evaluate whether these methods can be used for post-season estimation.**

3.5.3 Sampling and CWT Expansion Strata

Methods to estimate mortalities of unmarked and tagged DIT fish differ markedly from the methods used to estimate mortalities where observed tag recoveries are available from sampling. For the purposes of reporting, sample strata (e.g., Puget Sound Area 5, week 38) should not include more than one fishery regulation type (e.g., a selective fishery Monday through Friday and a non-selective fishery on Saturday). Area-periods with mark-selective fisheries must be reported as separate strata, i.e., the total catch and the number sampled must be reported for the mark-selective fishery separately from any other fishery in the same area and/or period. Sample and CWT expansion strata must correspond with regulations. **Therefore, it is recommended that agencies ensure that the sample and CWT expansion strata match the regulation package.**

3.5.4 Double Index Tag (DIT) System

The DIT program that was implemented beginning with brood year 1995 for coho salmon and 1998 for Chinook salmon should be reviewed by the agencies, SFEC-Analytical Work Group (SFEC-AWG), Chinook Technical Committee (CTC), and Coho Technical Committee (CoTC).

The SFEC-AWG has developed methods for using the DIT data to estimate unmarked mortalities (SFEC-AWG, 2002) and 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 unmarked impacts when MSFs are prosecuted. It also indicated that the estimates of 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. There is still concern as to the ability of the DIT system to provide useable estimates of unmarked exploitation rates in mark-selective fisheries for Chinook salmon. The multiple-age and far-ranging nature of Chinook salmon stocks complicates the potential for biased estimates of mortalities using DITs, and the size of this bias will be relative to the time and geographic location of the MSFs.

The SFEC should further evaluate if DIT pairs can be used for Chinook salmon, and what, if any, are the alternatives to DITs. The SFEC-AWG proposes to address these outstanding questions and several others in a technical report focusing on:

1. Review of the indicator stock program and use of DIT.
 - a. What are the major objectives of DIT?

- i. Estimation of unmarked mortalities in MSFs for use in exploitation rate analysis.
 - ii. Estimation of differential return rates between unmarked and marked fish at hatchery escapement for monitoring the impact of mark-selective fisheries.
- 2. What about sampling programs that are being decreased, changed or lost?
- 3. Are natural stocks potentially encountered in MSFs adequately represented by DIT groups? For stocks that are not represented, exploitation rates will need to be assessed using additional assumptions.
- 4. Should DIT be continued? What have we learned from analyses of DITs to date? What are alternatives? What are the technical consequences of each alternative to the management of coho and Chinook salmon natural stocks with MM and MSF?

4 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.

4.1 Post season reporting of MSFs.

Information on the implementation of MSFs that have been proposed is necessary for the SFEC to fulfill its role of reviewing MSFs and providing a clearinghouse function. For this purpose the SFEC plans to request that management agencies provide two reports on MSFs. A preliminary report on the actual conduct of their mark-selective fisheries including regulations, timing, effort, mark rate and catch estimates, should be provided in November. A second final report should be made available once the data are finalized and analyzed. The SFEC will review these reports, provide recommendations for changes and improvements, and summarize all reports received for inclusion in the PSC post-season annual report.

In September of the fishery year the SFEC will send letters to the agencies with MSF proposals requesting the following preliminary information:

- PSC Proposal tracking number
- Season information – time, area
- Regulations, selective, bag limits
- Sampling program
- Preliminary catch
- Mark rate if available
- For MSFs carried out without a proposal, please provide all of the above information.

The agencies will be asked to return this information in November of the same year, so that the information can be included in the SFEC report to the Commission.

4.2 Advisory Function of SFEC

The SFEC proposes that it should provide advice and assistance to agencies in:

1. Developing and evaluating methods to assess the impacts of selective fisheries.
2. Developing tools for agencies to use in preparing proposals and post-season estimation
3. Structuring sampling programs conducive to estimating mortalities in MSFs.

The intent of this function is to provide agencies with the technical support they will need to meet the challenge of managing natural stocks with the presence of MM and MSFs.

4.3 Imputed Unmarked Mortalities and Reporting to RMIS - Joint Meeting of SFEC and Technical Committee Co-chairs

Estimates of incidental mortalities are necessary for cohort and exploitation rate analysis. Additional CWT data reporting requirements are needed, such as a description of fishery regulations and methods used to estimate imputed CWT recoveries of unmarked fish in MSFs or in areas with visual sampling. These imputed mortality estimates for DIT tags are needed to estimate (1) the incidental mortality on the indicator stock and naturally produced salmon in mark selective fisheries, and (2) the direct mortalities of indicator stocks in non-selective fisheries where visual sampling is used or unmarked fish are not processed for tags. A joint meeting of the SFEC oversight committee and technical committee chairs held during the PSC January meeting (1/12/05) concluded that estimation of these imputed mortalities is necessary for the analytical work by the Coho and Chinook technical committees and that these mortalities should be available on RMIS.

In November of 2005, at a joint meeting of the SFEC and Data Standards committees, it was recommended that a data file be added to the RMIS database to store information on imputed mortalities and the parameters used to make the estimates, including the unmarked to marked ratio of the DIT tag group and the mark selective fishery mortality rate. A joint workgroup is to develop a plan for accomplishing the goal of providing these imputed mortalities. This plan is to include what information is necessary, how it should be reported to RMIS and how the estimates should be made.

The workgroup is to evaluate the following recommendations:

- 1. The SFEC-AWG provides the methods and algorithms needed to develop programs to make the estimates.**
- 2. Programs should reside on RMIS for analysts to use to make estimates of unmarked mortalities in MSFs and in fisheries where unmarked tagged fish are not sampled or not processed.**
- 3. The release agencies would be responsible for providing data on release information for DITs. Recovery agencies would be responsible for providing the following data for each fishery: information on regulations, sampling methods, and whether unmarked fish were processed. Agencies would provide updated information when available.**

References

- ASFEC, 1995. *Pacific Salmon Commission Selective Fishery Evaluation*. Ad-hoc Selective Fishery Evaluation Committee. Pacific Salmon Commission, June 1995.
- SFEC-AWG, 2002. *Investigation of Methods to Estimate Mortalities of Unmarked Salmon in Mark-Selective Fisheries through the use of Double Index Tag Groups*. Joint Selective Fisheries Evaluation Committee Report. Pacific Salmon Commission Report TCSFEC (02)-1, February 2002.
- Joint Coho DIT Analysis Workgroup, 2003. *Analysis of Coho Salmon Double Index Tag (DIT) Data for the Brood Years 1995-1997*. Northwest Fishery Resource Bulletin. Project Report Series No. 12, November 2003.
- SFEC, 2003. *Mass Marking and Mark-Selective Fisheries for 2000 and 2001 and Planned Activities for 2002*. Report of the Regional Coordination Working Group of the Selective Fishery Evaluation Committee. Pacific Salmon Commission Report SFEC (03)-1, June 2003.
- SFEC, 2003. *2003 Review of Mass Marking and Mark-Selective Fishery Proposals*. Report of the Regional Coordination Working Group of the Selective Fishery Evaluation Committee. Pacific Salmon Commission Report TCSFEC (03)-2, September 2003.
- SFEC, 2004. *Mass Marking and Mark-Selective Fisheries for 2002*. Report of the Regional Coordination Working Group of the Selective Fishery Evaluation Committee. Pacific Salmon Commission Report (in press).

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.

Contact information

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

Is the proposal:

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

Proposed Marking and Tagging

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

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.

Fishery Distribution and CWT Sampling

5. Provide estimates of the anticipated number of mass marked fish that will be encountered using the Table below.

Fishery/Region	Anticipated number of marked fish that will be encountered	Electronic sampling currently in place Y/N?
List....		

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

Example Format for Marking and Tagging Information (Question 2)

List all proposed mass marking and tagging plans including the following information. Identify all DIT groups with an asterix (*).

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						

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.

Description of the proposed mark-selective fishery

1. Location of the fishery:
2. Year and month(s) when the fishery is proposed to occur:
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 CWT stocks likely to be encountered in this fishery (including individual tag codes if available), whether those stocks were Double Index Tagged (DIT), how many were released, and describe method used to identify those stocks.

In-season management

- 7. Describe, as applicable, plans to sample/monitor the fishery for the following information: (1) CWT recoveries, (2) estimates of retained catch by species and by marked and unmarked components, and (3) mark rate for target species encountered.**

Estimation of impacts Post-season

Describe how the post-season estimates of unmarked mortalities (or unmarked exploitation rates) for stocks of concern (including unmarked DIT groups and unmarked natural stocks represented by an indicator stock) in the mark-selective fishery will be made.

Appendix D. Status of 2005 Mass Marking proposals.

Description	New¹ or Continuation Proposal	SFEC Proposal Number
Southern BC Coho - CDFO	Cont.	MM-FOC-01-2004
Puget Sound Coho - WDFW	Cont.	MM-WDFW-01-2004
Washington Coast Coho - WDFW	Cont.	MM-WDFW-04-2004
Washington Col. R. Coho - WDFW	Cont.	MM-WDFW-05-2004
Makah NFH Coho - USFWS	Cont.	MM-USFWS-01-2004
Quilcene NFH Coho - USFWS	Cont.	MM-USFWS-02-2004
Quinault NFH Coho - USFWS	Cont.	MM-USFWS-03-2004
Eagle Creek NFH Coho - USFWS	Cont.	MM-USFWS-04-2004
Columbia River Coho - ODFW	Cont.	MM-ODFW-04-2004
Oregon Coast Coho - ODFW	Cont.	MM-ODFW-05-2004
Snake R. Fall Chinook – IDFG	Cont.	MM-IDFG-01-2004
Little White Salmon R. NFH Fall Chinook - USFWS	New.	MM-USFWS-11-2004
Makah NFH Fall Chinook – USFWS	New.	MM-USFWS-12-2004
Priest Rapids NFH Fall Chinook - USFWS	New.	MM-USFWS-13-2004
Quinault NFH Fall Chinook - USFWS	New	MM-USFWS-14-2004
Spring Cr. NFH Fall Chinook - USFWS	New	MM-USFWS-15-2004
Willard NFH – USFWS	New	MM-USFWS-16-2004
Willamette Spring Chinook - ODFW	Cont.	MM-ODFW-01-2004
Oregon North Coast Spring Chinook - ODFW	Cont.	MM-ODFW-02-2004
Oregon South Coast Spring Chinook - ODFW	Cont.	MM-ODFW-03-2004
Puget Sound Spring, Summer, Fall Chinook - WDFW	New/Cont.	MM-WDFW-02-2004
Columbia R. Spring, Summer, Fall Chinook - WDFW	New/Cont.	MM-WDFW-03-2004
Washington Coast, Spring Chinook - WDFW	New	MM-WDFW-06-2004

¹ New 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	
Georgia Basin	Dunn/Louis/Lemieux	Thompson River	
	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. Status of 2005 MSF proposals received.

SFEC Proposal Number	Selective Fishery Description	Proposal Received in	Initial Review Letter Sent in	Additional Information Received in
MSF-FOC-02-2004	Recreational Coho Southern British Columbia	November	January	
	Commercial Coho Southern British Columbia		January	
MSF-WDFW-02-2004	Recreational Chinook in Statistical Areas 5 & 6	December	January	
MSF-WDFW-06-2004	Recreational Coho Washington Ocean	December	January	
MSF-WDFW-07-2004	Recreational Coho Puget Sound	December	January	
MSF-WDFW-08-2004	Recreational Chinook Puget Sound	November	January	
MSF-WDFW-09-2004	Recreational Chinook Puyallup and Carbon Rivers	December	January	
			January	
MSF-ODFW-01-2004	Recreational Spring Chinook in Willamette River	October	January	
	Recreational Spring Chinook Columbia River	2003	2003	
	Commercial Spring Chinook Columbia River	2003	2003	