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1994 MARK MEETING

FINAL MINUTES

Olympia, Washington February 17, 1994

I. Preliminary Business

A. Welcome/Introductions

The 1994 Mark Meeting was convened at 8:30 AM, February 17th, at the Northwest Indian Fisheries Commission's (NWIFC) conference center in Olympia, Washington. Mark Committee members and other meeting participants were introduced at the start of the meeting (see **Attachment 1**). Steve Riley (IDFG) was introduced as the new tag coordinator for Idaho, replacing Pete Hassemer. Bryan Ludwig (BC Environment) could not attend but was represented by Neil Williscroft (CDFO). Ron Heintz, coordinator for NMFS-AK was not able to attend the meeting because of illness. Steve Leask, coordinator for Metlakatla, likewise was unable to attend but was available by phone.

B. Agenda

Five new items were added to the agenda since the distribution of the preliminary agenda:

15. Proposal to Change the "Number of Untagged Fish" field in the Release File to read "Number of Unmarked Fish" (NWIFC)
16. New Fields "Other Marks", "Marked, Not Tagged" added to the PSC Release File Format
17. New PSC Standard for Reporting Recoveries of Reused Tag Codes
18. Ongoing Problems with Identifying Tag Coordinator and Reporting Agency
19. Proposal to Establish Formal Data Format for Fin Marks (PSMFC)

The ordering of agenda items 9 and 14 was changed for logistical reasons. The sampling experiment with the hand wand (agenda item 9) was moved up to 11:15 am and was the last item before lunch. This was followed by a presentation on NWIFC's CRAS system (Coded Wire Tag Retrieval and Analysis System) at 12:30 pm so that meeting participants could watch the presentation while finishing up a pizza lunch that was hosted by Northwest Marine Technology, Inc. This in turn was followed at 1:00 pm by NWT's demonstration of the fluorescent visual implant elastomer tags (agenda item 14).

C. Next Annual Meeting Date

The annual Mark Meeting is scheduled for the third Thursday in February each year. This will fall on **February 16th in 1995.**

II. Agenda Items

1. Status of CWT Data Files and Reporting Problems

The current status of each agency's CWT data files (release, recovery, catch/sample) reported in PSC format is summarized in **Tables 1-4** (*updated 02/25/94*).

A. CWT Release Data

All of the release data through 1992 and nearly all of the 1993 releases (**Table 1**) are now available in PSC format. The 1990 CWT Release Report (published in July, 1991) provides a cumulative report of all releases through 1990. The 1992 Release Report was published in December, 1993, and lists all releases for 1986 through 1992, plus the majority of the 1993 releases. Subsequent release reports will follow this latter pattern and only report releases for the last seven years. Users who need older release data will need to either retrieve it from the on-line data base or from the cumulative 1990 CWT Release Report.

B. Recovery and Catch/Sample Data

Nearly all historical recovery and catch/sample data are now reported in PSC format (**Tables 2-3**), including preliminary 1993 data for the major recovery agencies. Changes during the past year include revisions to various sets of data by CDFO, WDF, and NWIFC.

NMFS-AK's progress during this past year was noteworthy as Ron Heintz was able to complete the reporting of NMFS-AK recoveries (including high seas data) for 1980-1990 (**Table 2**). In addition, the 1991 and 1992 NMFS-AK data are in the final phase of preparation and will be reported by April, 1994. This is a major milestone as there are only a few isolated holes now remaining in the data coverage.

Other pre-1993 recovery data sets not yet reported in PSC format include CDFG's 1977 data, ADFG's 1977-79 data, IDFG's 1992-1993 data, and WDW's steelhead data for Columbia River tributaries and Puget Sound (**Table 2**). Karen Crandall (ADFG) reported that no significant progress had been made on ADFG's 1977-79 files because of the lack of both time and funding. Things are looking more optimistic for WDW, however, as they are merging with WDF and will be able to benefit from WDF's data management programs already in place.

The catch/sample data sets (**Table 3**) show a somewhat similar agency pattern to that of the recovery data sets. Missing data sets include WDF (1973-1979), IDFG (1977-1992), ADFG (1977-79), NMFS-AK (1977-92). All of these files should be reported in 1994.

C. Unmarked Hatchery Production Releases

Additional progress was seen in reporting unmarked hatchery production releases during 1992 (**Table 4**). Only CDFG, WDW, and ADFG have not completed this task.

2. Proposed Solution to Remedy Late Release Reports (PSMFC)

It was pointed out that for many years, the CWT Release Report was completed and distributed to users in March or April. However, the report has become later and later in the last 3-4 years, with the 1992 report being distributed in early December, 1993.

Reasons for the growing delays involved both tardy reporting by several reporting agencies and delays in data processing experienced by the Mark Center. During the past two years, the Mark Center was involved in a difficult transition period in migrating to a new software platform (Ingres). By necessity, the software dealing with producing hardcopy release reports had to be given a much lower priority because of the heavy and growing demands on providing recovery data. This was coupled with a heavy flurry of data submissions by various agencies to revise historical release data. Fortunately, the Mark Center's migration is completed and this is no longer a problem.

One solution advocated by the Mark Center was to simply go to press with whatever data are available at the fixed date of April 15th. Therefore, any data not making the deadline would have to wait until the next year's report.

ACTION: The Mark Committee took corrective action and established **March 1 as the "due date"** for agencies to report the previous year's release data, and **April 15th as the Mark Center's cutoff date** for generating the Release Report.

The Mark Committee also reemphasized that *preliminary recovery data for the prior year are due during the first week in January.*

3. Status of RMPC Operations

A. Organization Changes

Ken Johnson (PSMFC) reported that PSMFC's various data management projects had long operated as independent programs that answered directly to the Executive Director. However, because of continual growth, all data management operations at PSMFC were recently restructured and brought under a single "Information Management Services"

(IMS) department. Benefits include greatly improved efficiency in PSMFC's computer center operations and much better coordination between projects as well as with upper management.

Projects included under IMS include the Regional Mark Center (CWT data), PTAGIS (pit tags; Carter Stein, project manager), PacFIN (groundfish/salmon landings; Will Daspit, project manager), the Columbia River Coordinated Information System (fish related data; Stan Allen, project manager), and computer center operations (Terry Shane, manager). Stan was appointed the IMS chief in addition to his CIS responsibilities.

B. Software Development

Jim Longwill (PSMFC) reported that the Mark Center completed an extensive software development and data migration project during the past year to establish the CWT data on a new on-line platform named the "Regional Mark Information System" (RMIS). Users may obtain a variety of release and recovery reports, as well as data records in either raw or aggregated form. Some of the new features of RMIS include:

- Ability to automatically build lists of tag codes from the release data, edit the lists, and then use them to retrieve coastwide tag recoveries.

- Ability to select hatcheries and recovery sites by simply entering the geographic location name rather than the code.

- Much faster file downloading speeds.

- User customizable report formats.

- Access to catch/sample data, and some non-CWT release data.

- Ability to upload PSC formatted files electronically via Kermit file-transfer as either standard files or compressed files (using "PKZIP" for the larger files).

- Ability to have error validation listings posted to the user's account for downloading.

Further RMIS enhancements are underway. These include file compression prior to downloading to further improve file download times, data selection by geographic regions and basins, and improved system help documentation. In addition, efforts are underway to find the necessary funding to connect PSMFC's Data Center to InterNet in order to take full advantage of electronic data transfers at high speeds.

TABLE 1. Status of CWT Release Data

Reporting Agency

02/25/9-

Year	CDFG	ODFW	WDF	WDW	IDFG	CDFO	ADFG	FWS	NMFS (AK)	NMFS (CR)	NWIFC	QDNR	MIC
PRE-1975	V	V	V			V	V	V	V		V	V	
1975	V	V	V			V	V	V	V	V	V	V	
1976	V	V	V		V	V	V	V	V	V	V	V	
1977	V	V	V	V	V	V	V	V	V	V	V	V	
1978	V	V	V	V	V	V	V	V	V	V	V	V	
1979	V	V	V	V	V	V	V	V	V	V	V	V	
1980	V	V	V	V	V	V	V	V	V	V	V	V	V
1981	V	V	V	V	V	V	V	V	V	V	V	V	V
1982	V	V	V	V	V	V	V	V	V	V	V	V	V
1983	V	V	V	V	V	V	V	V	V	V	V	V	V
1984	V	V	V	V	V	V	V	V	V	V	V	V	V
1985	V	V	V	V	V	V	V	V	V	V	V	V	V
1986	V	V	V	V	V	V	V	V	V	V	V	V	V
1987	V	V	V	V	V	V	V	V	V	V	V	V	V
1988	V	V	V	V	V	V	V	V	V	V	V	V	V
1989	V	V	V	V	V	V	V	V	V	V	V	V	V
1990	V	V	V	V	V	V	V	V	V	V	V	V	V
1991	V	V	V	V	V	V	V	V	V	V	V	V	V
1992	V	V	V	V	V	V	V	V	V	V	V	V	V
1993	V	V	V	V	V	V	V	V	V	V	V	V	V

(S = Submitted; I = Mid Year Only; V = Validated)

CDFG = California Department of Fish and Game
ODFW = Oregon Department of Fish and Wildlife
WDF = Washington Department of Fisheries
WDW = Washington Department of Wildlife
IDFG = Idaho Department of Fish and Game
CDFO = Canada Department of Fisheries and Oceans
ADFG = Alaska Department of Fish and Game
FWS = U.S. Fish and Wildlife Service
NMFS(AK) = National Marine Fisheries Service - Alaska
NMFS(CR) = National Marine Fisheries Service - Columbia River
NWIFC = Northwest Indian Fisheries Commission
QDNR = Quinault Department of Natural Resources
MIC = Metlakata Indian Community - Alaska

TABLE 2. Status of CWT Recovery Data

Reporting Agency 02/25/94

Year	CDFG	ODFW	WDF	WDW	IDFG	CDFO	ADFG	FWS	NMFS (AK)	NWIFC	QDNR	MIC
1973			V			V						
1974			V			V						
1975			V			V				V		
1976			V			V				V	V	
1977	-	V	V		V	V	-		-	V	V	
1978	V	V	V		V	V	-		-	V	V	
1979	V	V	V		V	V	-	V		V	V	
1980	V	V	V		V	V	V	V	V	V	V	
1981	V	V	V		V	V	V	V	V	V	V	I
1982	V	V	V	I	V	V	V	V	V	V	V	I
1983	V	V	V	I	V	V	V	V	V	V	V	I
1984	V	V	V	I	V	V	V	V	V	V	V	I
1985	V	V	V	I	V	V	V	V	V	V	V	I
1986	V	V	V	I	V	V	V	V	V	V	V	I
1987	V	V	V	I	V	V	V	V	V	V	V	I
1988	V	V	V	I	V	V	V	V	V	V	V	I
1989	V	V	V	I	V	V	V	V	V	V	V	I
1990	V	V	V	I	V	V	V	V	V	V	V	I
1991	V	V	V	I	V	V	V	V	-	V	V	I
1992	V	V	I	I	-	V	V	V	-	V	V	I
1993	V	V	I	I	-	I	I	-	-	-	-	I

(I = Incomplete but Valid Data Sets; V = Validated)
(S = Submitted but Not Yet Processed; E = Submitted but Unresolved Errors; Dash = Not Yet Reported)

Incomplete Data Sets:

1) WDW's recoveries in the main stem Columbia River have been reported through ODFW. However, recoveries in Columbia River basin tributaries and Puget Sound are unreported.

2) Metlakatla (MIC) has reported recoveries for its fisheries through ADFG. However, hatchery returns are unreported at this time.

3) WDF's 1992 and 1993 recoveries are incomplete for Puget Sound and hatchery/spawning ground returns.

TABLE 3. Status of CWT Catch/Sample Data

Reporting Agency 02/25/94

Year	CDFG	ODFW	WDF	WDW	IDFG	CDFO	ADFG	FWS	NMFS (AK)	NWIFC	QDNR	MIC
1973			-									
1974			-									
1975			-			V				V		
1976			-			V				V	V	
1977	-	V	-		-	V	-		-	V	V	
1978	V	V	-		-	V	-		-	V	V	
1979	V	V	-		-	V	-	V	-	V	V	
1980	V	V	V		-	V	V	V	-	V	V	
1981	V	V	V	I	-	V	V	V	-	V	V	
1982	V	V	V	I	-	V	V	V	-	V	V	I
1983	V	V	V	I	-	V	V	V	-	V	V	I
1984	V	V	V	I	-	V	V	V	-	V	V	I
1985	V	V	V	I	-	V	V	V	-	V	V	I
1986	V	V	V	I	-	V	V	V	-	V	V	I
1987	V	V	V	I	-	V	V	V	-	V	V	I
1988	V	V	V	I	-	V	V	V	-	V	V	I
1989	V	V	V	I	-	V	V	V	-	V	V	I
1990	V	V	V	I	-	V	V	V	-	V	V	I
1991	V	V	V	I	-	V	V	V	-	V	V	I
1992	V	V	V	I	-	V	V	V	-	V	V	I
1993	V	V	V	I	-	V	V	-	-	-	-	-

(I = Incomplete but Valid Data Sets; V = Validated)
(S = Submitted; Dash = Not Yet Reported)

TABLE 4. Status of Unmarked Hatchery Production Releases

Reporting Agency 02/25/94

Year	CDFG	ODFW	WDF	WDW	IDFG	CDFO	ADFG	FWS	NMFS [1](AK)	NWIFC	QDNR	MIC
1965 - 72			V			V		V				
1973			V			V		V			V	
1974			V			V		V		V	V	
1975	-	U	V	-		V	-	V	NA	V	V	
1976	-	U	V	-	V	V	-	V	NA	V	V	
1977	-	U	V	-	V	V	-	V	NA	V	V	
1978	-	U	V	-	V	V	-	V	NA	V	V	
1979	-	U	V	-	V	V	-	V	NA	V	V	
1980	-	U	V	-	V	V	-	V	NA	V	V	
1981	-	U	V	-	V	V	-	V	NA	V	V	V
1982	-	V	V	-	V	V	-	V	NA	V	V	V
1983	-	V	V	-	V	V	-	V	NA	V	V	V
1984	-	V	V	-	V	V	-	V	NA	V	V	V
1985	-	V	V	-	V	V	-	V	NA	V	V	V
1986	-	V	V	-	V	V	-	V	NA	V	V	V
1987	-	V	V	-	V	V	-	V	NA	V	V	V
1988	-	V	V	-	V	V	-	V	NA	V	V	V
1989	-	V	V	-	V	V	-	V	V	V	V	V
1990	-	V	V	-	V	V	-	V	NA	V	V	V
1991	-	V	V	-	V	V	-	V	NA	V	V	V
1992	-	V	V	-	V	V	-	V	NA	V	V	V
1993	-	V	V	-	V	V	-	V	NA	V	V	V

(U = Unavailable; I = Incomplete but Valididated Data Sets; V = Validated)
(NA = Not Applicable; S = Submitted; Dash = Not Yet Reported)

[1]Note: Except for 1989, all NMFS-AK's hatchery production has been represented by CWT studies.

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C. RMPC Funding Review

Ken Johnson reported that the Mark Center's funding for FY1994 was still a little uncertain. The U.S. Section Budget Committee (PSC) approved $210,000 for the Mark Center for FY1994 that was subsequently referenced by Congress to come from the USFWS budget. However, because of other severe cutbacks in the USFWS program, only $140,000 has been made available as pass through funds. Negotiations with USFWS are underway in an attempt to have the full funding restored.

BPA has provided an additional $58,400 for data processing costs for FY1994. Other sources of funding for FY1994 include Anadromous Grant (NMFS pass through: $67,750) and PSMFC's 2:1 matching funds ($33,500) for a total budget of $365,000. The $70,000 shortfall of USFWS funding reduces the budget to $295,000, and will negatively impact the development of a catch/effort PSC database in 1994.

4. Decision by Ad Hoc Policy Committee on Mass Marking Issues

This agenda item was included as background material for Agenda Item 5 below.

During the 1993 Mark Meeting (Feb. 16, 1993), the Mark Committee again considered IDFG, ODFW, and USFWS's proposal (initially rejected in 1992) to mass mark Snake River hatchery chinook with the adipose only mark. Out of 12 possible votes, eight agencies voted in favor, while four agencies (CDFO, NWIFC, BC Environment, and CRITFC) voted against the proposal. (Approval required 75% or greater yes votes).

Unfortunately, this action by the Mark Committee did not resolved the Snake River issue nor widespread concerns about the growing pressures for mass marking hatchery stocks. Recognizing the political impasse and the growing frustration of program managers in the Snake River basin, PSMFC convened a meeting (April 27, 1993) of policy level personnel from affected agencies to deal with the Idaho problem as well as address other mass marking concerns.

After considerable discussion, most of the 'Ad Hoc Policy Committee' reached agreement on a draft "Policy Resolution #1" granting approval for a one year variance to IDFG, ODFW, and USFWS for marking the 1992 brood in the spring of 1993 and release in 1994. The resolution also required that all Adipose only release groups be represented by Adipose+CWT marked groups.

The Ad Hoc Policy Committee also agreed in principle to "Policy Resolution #2" that called for a workshop and/or working group to investigate all aspects of mass marking and the impact of selective fisheries. (Note: A draft version of Resolution #2 was later developed by NWIFC and distributed for comments. A consensus on final wording was not attempted or required, however, because the Pacific Salmon Commission had just initiated a rigorous study to evaluate selective fisheries and the impact on the CWT system.)

"Policy Resolution #1" was subsequently signed by the directors of ADFG, Metlakatla, BC Environment, CDFG, IDFG, NMFS, NWIFC, ODFW, USFWS, WDF and WDW. CRITFC declined to sign the resolution because of fundamental disagreements with the entire concept of mass marking and with the NMFS's approach to rebuilding runs in the Columbia Basin. CDFO also declined to sign the resolution, primarily because there was no formal process established for resolving politically sensitive marking issues.

Following this action, Idaho marked approximately 3.8 million spring and summer hatchery chinook fish (1992 brood) for release in 1994. USFWS likewise marked a total of 800,000 chinook at Dworshak NFH and Kooskia NFH. Oregon opted to mark all of their chinook at Lookingglass Hatchery with the adipose plus CWT.

DISCUSSION:

Ron Olson (NWIFC) emphasized that his agency had switched its position from 'No' to 'Yes' at the "Policy Meeting" because IDFG had brought new information regarding NMFS's requirement that all of the Snake River hatchery chinook had to be mass marked. In addition, NWIFC strongly endorsed "Policy Resolution #2" which called for an in-depth analysis of selective fisheries and mass marking.

Pete Hassemer (IDFG) concurred with Ron Olson's point and noted that the Endangered Species Act is now influencing how Idaho marks its fish. The current permits for the hatcheries now require Idaho to mark all of its spring and summer hatchery chinook. He later affirmed that even if not required by the NMFS, Idaho would still want to mark all of its fish for a few more years even because of the need for broodstock management.

5. Request to Mass Mark Snake River Chinook with the Adipose-only Clip

IDFG, USFWS, and ODFW requested permission to mark a major portion of their Snake River hatchery spring and summer chinook (1993 brood) with the adipose only mark in the spring of 1994, and release in 1995. IDFG projected marking 3.5 million fish (down from 3.8 million in 1993), while USFWS projected releasing 1.5 million fish (up from 800,000 in 1993). ODFW's request was for 580,000 fish at Lookingglass Hatchery (Imnaha stock) but there remained uncertainty whether the mark would be used even if approved.

All adipose only groups will have representative Ad+CWT tagged groups. There are also plans to increase the tagging level of some groups as well. Idaho, for example, will be tagging a total of 1.8 million fish (up from 1.2 million in 1993).

Pete Hassemer also stressed that Idaho is not looking at the adipose only marking program as a long term ad infinitum solution for marking stocks and rebuilding programs. IDFG views this as a short term, variable program, with marking needs reevaluated annually. In the future, assuming wild stocks rebound, IDFG does not want to be in a position of having to maintain an expensive large scale marking program for all of its hatchery fish.

Discussion:

The question was posed as to why IDFG could not use the ventral clip for the mass mark, given some of the positive results seen by both WDFW and USFWS (see Agenda Item 8B). In response, Pete Hassemer noted that Idaho was already involved in a large scale ventral fin clip study, with fish going out again this year. Jacks are due back in 1994, age 2-ocean back in 1995, and age 3-ocean back in 1996. As such, the mark isn't available until the experiment is completed in the fall of 1996. He also stressed that the issue of increased mortality was another reason why the ventral mark was unacceptable to Idaho at this point.

Ken Johnson noted again the events surrounding the eventual approval of the Snake River proposals last year and voiced the opinion that this was really a policy issue that had been taken out of the hands of the Mark Committee by the Ad hoc Policy Committee. As such, a policy precedent had been established. Given there were no significant differences from last year's proposals, he argued that the onus was on the Mark Committee to show why this year's marking was not acceptable at a technical level.

He further emphasized that even with the intervention of the Ad Hoc Policy Committee last year, there was a high probability that the Mark Committee would still treat the issue on the political level and that it could again be voted down this year. If that happened, he argued, it would erode the credibility of the Mark Committee and weaken its ability to forge consensus on regional marking issues. He therefore raised the question if it was even necessary for the Mark Committee to vote on the issue since the proposals had already been approved last year by the Ad Hoc Policy Committee.

The question of whether to vote or not generated considerable discussion! With only one exception, committee members were united in insisting on taking a vote. It was agreed that the lines were blurred between technical merits and policy making. However, it was stressed that the Snake River proposals approved for last year were very specific, including the stipulation of a one year only variance, with the requirement that any subsequent proposals would be brought to the Mark Committee for review.

Prior to taking the vote, it was agreed that the same "sideboard" restrictions imposed for 1993 would be required for any 1994 marking if the proposals were approved.

Voting Results:		<u>Agency</u>	<u>Vote</u>
Canada:	Federal	CDFO	No
	Province	BC-Environment	No
States:	Alaska	ADFG	Yes
	Washington	WDFW	Yes
	Oregon	ODFW	Yes

	Idaho	IDFG	Yes
	California	CDFG	Yes
Federal:	NMFS	Alaska Region	
		Northwest Region	Yes
		NWAFC (Seattle)	
	USFWS	Region wide	Yes
Tribal:	S.E. Alaska	MIC	Yes**
	Western Washington	NWIFC	Yes
	Columbia River	CRITFC	No
		Total Yes Votes	9
		Total No Votes	3
		% Yes	75%

** Steve Leask (MIC) was contacted by phone and voted 'yes'. He also forwarded a letter (see **Attachment 2**) to document MIC's vote.

ACTION: **Proposals Approved** (75% Yes vote required for approval).

Approval was given to IDFG, USFWS, and ODFW to mark a major portion of their Snake River hatchery spring and summer chinook (1993 brood) with the adipose only mark in the spring of 1994, and release in 1995. Restrictions included the following:

1) Snake River hatcheries only, as identified in marking proposals
2) Spring and summer chinook only (1993 brood; out-migration year: 1995)
3) All marked releases will include Ad+CWT representative groups
4) One year approval (renewable by annual review of the Mark Committee)
5) Commitment to continue the investigation of the ventral clip as:
    a) a potential flag for the CWT,
    b) and as a flag to identify hatchery fish.
6) Commitment to support other studies on mass marking.

These restrictions were readily agreed to by Idaho, USFWS, and Oregon. Pete Hassemer also noted that most of the restrictions were already identified in the mass marking proposals.

Explanations were provided by CDFO, BC Environment, and CRITFC for their dissenting votes:

CDFO and BC Environment both cast a 'no' vote because of concerns about setting a precedent for escalating the movement for desequestering the adipose clip and thus impacting the integrity of the existing CWT system now heavily relied upon by both Canada and the U.S. for harvest management and resource allocations.

Vic Palermo (CDFO) also voiced concern that this had the potential to lead into areas of selective fisheries and that the technical analyses have not yet been completed on whether or not selective fisheries can be used to help impacted wild stocks rebound. He noted that various research efforts (outside of the current PSC project) had shown that in some situations, selective fisheries could actually harm rather than help stocks as intended. Therefore, until these technical questions are answered, Canada is not in a position to vote 'yes'.

CRITFC provided the following explanation of its dissenting vote:

- NMFS's definition of species and position on use of hatchery fish to rebuild runs are both technically flawed. For example, the genetic differences being used to forbid interbreeding may not reflect local adaptations. The greater risk to some populations may be demographic and genetic risks associated with small population size, rather than genetic risks associated with interbreeding closely related hatchery and wild fish. The marking allows NMFS to implement policies which may have an overall detrimental effect on Snake River chinook populations.

- These proposals also have policy implications for Columbia River Treaty tribes. The extra mortality associated with 100% marking exacerbates the chronic failure to reach Lower Snake River Compensation Plan mitigation goals.

- As with CDFO, CRITFC is also concerned with taking steps towards selective fisheries before the technical merit of such fisheries are investigated, and is concerned that such fisheries are just an "opiate of the masses" while habitat degradation continues.

6. Update on Legislative Efforts involving Mass Marking

A brief report was given on the current status of the Oregon and California legislative initiatives on mass marking. The information for Oregon was previously provided to the Mark Committee but was covered for the benefit of others in attendance at the Mark Meeting.

A. Oregon

Two resolutions and one legislative bill were introduced during Oregon's 67th Oregon Legislative Assembly (1993) requiring the mandated use of adipose fin clipping to mark all hatchery reared salmon, steelhead, and trout. The two resolutions were passed by both the House and the Senate, but lacked any means of enforcement. The legislative bill did not pass for funding and timing reasons discussed below. However, it is important to emphasize that the political interest in this issue is far from dead in Oregon!

A summary of the three Oregon legislative measures is provided below:

1) House Joint Memorial 11 **Status: Passed**

House Joint Memorial 11 requests the governors of Alaska, California, Idaho, and Washington, the Premier of British Columbia, the Executive Director of PSMFC, and the administrator of the NMFS to agree to mark all hatchery fish with the adipose clip, and to desequester the clip as a mark for fish carrying a CWT.

2) House Joint Resolution 35 **Status: Passed**

House Joint Resolution 35 requires ODFW to implement the adipose fin mass marking plan for all hatchery salmon, steelhead, and trout, and to report to the Oregon legislature on its success. In addition, the governor is requested to encourage the cooperation of the States of Alaska, California, Idaho, and Washington, the Province of British Columbia, and the Northwest Indian Treaty Tribes in establishing a region-wide program of mass marking hatchery salmonids with the adipose only clip.

3) House Bill 2986 **Status: Failed**

House Bill 2986 would have required ODFW to remove the adipose fin from all hatchery reared salmon, steelhead, and trout released into state waters after July 1, 1997. ODFW opposed this bill because of the specified date of July 1, 1997 for implementation. The proposed mass marking plan will require major expenditures, and ODFW did not want to be placed in the position of having to implement it at the expense of other existing programs. In addition, ODFW does not want to violate the spirit of the existing U.S./Canada Salmon Treaty with respect to maintaining a reliable CWT program.

It is important to emphasize, however, that while House Bill 2986 bill failed, ODFW remains fully committed to the concept of mass marking hatchery stocks. This is particularly true for coho hatchery stocks.

B. California

Management regulations to protect the declining Klamath River wild chinook stocks have resulted in a severe impact on the Northern California salmon fishery. Given the crisis, Congressman Dan Hamburg (D-California, 1st District; Merchant Marine and Fisheries Committee) has been exploring for the past year mass marking of hatchery fish as a potential solution for protecting wild stocks and increasing the utilization of the hatchery fish in the fishery. One option being seriously evaluated involves legislation to mandate mass marking in the Rogue, Klamath, and Sacramento River basins.

A number of fishery conservation groups in California have also been pressing hard during the past two years for mass marking hatchery stocks of chinook. Many of these groups are represented by the Salmonid Restoration Federation (SRF; formerly California Salmon, Steelhead, and Trout Restoration) which has taken an active advocacy role for implementing a mass marking program. SRF is advocating federal legislation to create a coastwide mass marking program for chinook and coho using the adipose clip as the mark for hatchery reared fish. Coastwide implementation would be contingent on the successful completion of a five year pilot program mass marking all hatchery chinook produced in the Rogue, Klamath, and Sacramento River basins. The plan also calls for evaluation of gear types to reduce catch and release mortality, and modeling of selective fisheries on wild stock escapement.

Ken Johnson also reported that just prior to the Mark Meeting, Congressman Hamburg's office again contacted PSMFC and indicated that they wanted to move forward on the mass marking issue and federal legislation. The proposed five year pilot program for adipose clipping all hatchery chinook in the Rogue, Klamath, and Sacramento systems (approximately 40-50 million fish) is seen as a realistic and responsible approach for evaluating mass marking for both selective fisheries and protecting wild stocks. However, because of the key role of the adipose clip to the coastwide fisheries community for CWT identification, Congressman Hamburg is seeking direction from a coastwide committee of fisheries experts. Key questions that need answering include costs for marking and projected impact on CWT sampling programs north of Oregon's Rogue River. In addition, guidance is being sought on necessary tests to evaluate gear changes and hook/release survival rates.

Randy Fisher, the new Executive Director for PSMFC, has agreed to chair this ad-hoc committee. Committee members will be sought from both industry and fisheries agencies to ensure adequate coverage of viewpoints.

ACTION: The Mark Committee expressed some concern that this process was moving forward without waiting for the PSC evaluation of selective fisheries and mass marking to be completed this fall. Therefore, the Committee requested that a **letter be sent to Congressman Hamburg to urge patience until the PSC process is completed** to avoid the potential waste of funds and to be able to better define feasible alternatives.

7. PSC Evaluation of Selective Fisheries for Harvesting Marked Hatchery Fish and Potential Impacts on CWT Program

Ken Johnson reported that the PSC assessment of selective fisheries was now organized and underway. The goal is to complete the evaluation by this coming fall. Other key goals include interim progress reports in April, 1994 and completed assignments by May, 1994. This would be followed by a workshop in the fall of 1994 to share finds with the fisheries community at large. This schedule is very ambitious and will require significant staff time from all agencies involved. If this is not possible, or if agencies aren't willing to assign this project a high priority, then the project will slide on into 1995 before being completed.

The framework includes a Steering Committee to guide and coordinate the efforts of three Work Groups and to organize the workshop to present the findings on selective fisheries. The three Work Groups and their specific assignments are:

a) Modeling and Analysis Work Group

   Function: Assess effects of selective fisheries, particularly on the viability of the CWT program and stock conservation.

b) Management Capabilities Work Group

   Function: Assess impacts of selective fisheries on management tools such as the CWT program, cohort analysis, harvest management planning models, and methodologies for estimating stock composition. Also evaluate alternative models for overcoming adverse impacts.

c) Implementation and Evaluation Work Group

   Function: Describe programs and quantify costs of implementation and post-fishery evaluation (marking, regulation, monitoring). Also evaluate potential public awareness and issues involving hatchery production relative to selective fisheries regulations.

The Steering Committee organized the Work Groups in December, 1993 and instructed them to develop a work plan by mid January, 1994 for evaluating their respective tasks. This goal was largely completed on time.

Lee Blankenship (WDFW) commented, however, that the Work Groups were having serious problems in getting time commitments from a number of those assigned to the three Work Groups. This point was questioned by David Zajac (USFWS) and Ron Olson (NWIFC) in regards to the Implementation and Evaluation Work Group. David said that he had not been given the "go ahead" to be directly involved by his supervisor but that he had been given authorization to help as a reviewer. However, no further follow up had occurred. Ron Olson also mentioned that NWIFC had assisted with the draft study outline but their representatives had not been contacted since then. Ken Johnson agreed that there was some need for better coordination but noted that the Steering Committee recently discussed the same problem for all levels of this project. Part of the problem is that most workers are already overloaded with other PSC assignments in addition to their normal within-agency duties.

ACTION: The Mark Committee expressed considerable concern about the reports of inadequate agency support for evaluating selective fisheries and the corresponding link to the CWT system. Therefore, Ken Johnson was directed to **draft a letter to the Pacific Salmon Commission and the fisheries agencies expressing this concern and urging**

that a high priority be given the project because of its key importance for the CWT program and for future fisheries management strategies.

8. Update on Experiments to Evaluate Potential Mass Marks

A. Laser Marking (Lee Blankenship, WDFW)

Bonneville Power Administration provided $250,000 to WDF in September, 1992 for the first year of a five year project on the potential use of the laser mark for mass marking salmonids. Results during 1993 showed that an excellent light colored mark could be made on the fish's surface. Unfortunately, the marks fade within 5-6 months because of a massive invasion of dark melanophores that results in hyper- pigmentation.

Work in 1994 is continuing on studying pigmentation changes with the help of cellular biologists. However, the primary emphasis has been shifted to evaluating the laser as a tool for fin clipping fish. Preliminary results to date indicate that the laser works well in this capacity to either notch the fin or completely cut it off. One direct benefit is that the wound is cauterized in the process, thus greatly reducing the potential of subsequent infection, and possibly preventing any fin regeneration as well.

In addition, WDF has subcontracted with Northwest Marine Technology, Inc. to start development of a mass marking delivery system for fish. The design calls for a system that picks up the fish and positions it for receiving a mass mark of some type. Plans call for a prototype delivery system in two years and a working model in three years.

B. Ventral Clips as Potential Mass Marks

1) WDFW Study

Lee Blankenship reported on first year returns of a WDFW study that involved 1990 brood coho at the Green River, Puyallup, and George Adams hatcheries (**Attachment 3**). Comparable numbers were marked at age-1 with either the Ad+CWT or LV+CWT mark. Recoveries were made in the commercial terminal net fisheries plus at the hatchery rack.

Recoveries were similar for both marks in the commercial fisheries and also at the hatchery racks (with the exception of Green River), implying comparable mortality rates:

Fishery/Hatchery	# Adipose recov.	# Ventral recov.
Green/Duwamish Terminal Net:	41	41
Puyallup Terminal Net	56	46
Puyallup Hatchery	1,418	1,339
George Adams Hatchery	119	105
Green River Hatchery	304	245

The significant discrepancy between adipose and ventral recoveries at Green River Hatchery was attributed to an inexperienced crew as the on-site supervisor repeatedly expressed concern that marks were being missed by the crew.

Some interesting observations were also made on fin clip quality (**Attachment 3**). Approximately 0.5% of the adipose clipped fish were not recognizable by trained samplers as containing a CWT, as compared to 3-4% for the ventral fin clip. In addition, approximately 95% of the adipose clips were rated as good (versus bad, marginal, or no mark), while approximately 60% of the ventral fins were rated as good, 20-27% rated as bad, and 12-17% rated as marginal.

Blankenship summarized by stating the keys to this type of study are good, experienced samplers (i.e. minimize sampling error) and well designed studies with proper control groups. He also concluded that the evidence points to comparable survival rates associated with the adipose and ventral fin clips. Even when the problematic Green River data are included, the difference in survival rates is only 8.5%.

2) USFWS Study

Doug Olson (USFWS) was not able to be present to discuss the results of the USFWS ventral fin clip study at Warm Springs NFH but kindly provided a summary of the data for the Mark Committee (see **Attachment 4**). Results are presented for the 1987, 1988, and 1989 brood years of Warm Springs NFH spring chinook release groups. The 1987 and 1988 brood returns are completed, while the 1989 brood will be complete after run year 1994.

The ventral fin clip study was nested within a BKD diet study (KD moist and KD dry) using four ponds. Juvenile fish in two ponds were fed moist diet, while the other two ponds had a dry diet provided. Each year, approximately 25,000 Ad+CWT and 25,000 ventral fin (LV or RV) clipped fish were marked in each pond. (See **Attachment 4**, page 2 for further study details).

Returns are summarized below for the Warm Springs NFH spring chinook:

	1987 Brood		1988 Brood		1989 Brood	
	# Returns	% Returns	# Returns	% Returns	# Returns	% Returns
Ad+CWT	32	0.036	56	0.060	10	0.010
Ventral	33	0.034	61	0.059	19	0.019

The results are comparable with that found by WDFW in that the Adipose+CWT fish and the ventral fin clipped fish returned at approximately equal rates. The consistency of the Warm Springs Hatchery data is quite remarkable, particularly when one considers that the

data span jack returns through age five returns for the 1987 and 1988 broods and through age four returns for the 1989 brood. Only the 1989 brood shows some discrepancy, though it may well smooth out when the age five returns are added.

3) ODFW Study

ODFW also carried out a study comparing the survival differences between Adipose and Left Ventral marked fish. The study was done with 1990 and 1991 brood coho from Cole Rivers Hatchery on the Rogue River. Mike Evenson, project coordinator, was not present to discuss the study but also provided a summary of return data (**Attachment 5**). In a cover memo, Evenson cautioned that the 1990 brood data should be interpreted with caution since the marked groups were marked at difference times (i.e. Sept. 1991 for the Ad+CWT groups; March, 1991 for the LV group). In addition, the fish groups were reared in different ponds. In addition, all of the 1991 brood fish with the LV clip were tagged as well (i.e., LV+CWT).

Returns were more variable than that seen in the WDFW and USFWS studies. The 1990 brood data are complete, while the 1991 brood results only pertain to jack returns at this point. The pattern is the same for both years, however, as the adipose clipped fish had a 34-38% greater survival rate than the ventral clipped fish (see also **Attachment 5**):

	Mark	# Released	# Returns	% Returns	% Difference
1990 Brood Coho	Ad+CWT	27,154	107	0.39	38.4%
	LV	74,980	182	0.24	
1991 Brood Coho	Ad+CWT	26,269	101	0.38	34.5%
	LV+CWT	26,224	66	0.25	

In discussing the differences between this study and the WDFW and USFWS studies, several committee members concurred with Mike Evenson's cautionary note regarding the results of the 1990 brood because of the irregular study design. The 1991 brood study was much better designed to test differences in survival but the jack returns are too preliminary yet to safely draw any conclusions.

Vic Palermo (CDFO) added that the study may still have confounding factors because it lacks a true control group. He noted that this is the major flaw of most marking experiments. For example, one study might indicate no significant difference between two treatments. Yet without a proper control, one can not be certain if it is because of: 1) chance; 2) one treatment is suppressed by the other one; or 3) neither treatment is effective. Similarly, if one does see a significant effect but lacks a proper control, one can not be certain if the difference is because of: 1) the treatments have a synergistic effect; 2) the treatments have a suppressing effect; or 3) the results are due to chance.

He concluded that without a well designed control, one can't really say much about any given study. He also offered to provide an expanded explanation of how to design marking experiments correctly so that one could be confident in interpreting the observed survival rates. This explanation is provided in **Attachment 6** and is written in non-technical terms so that one doesn't have to be a statistician to follow the reasoning.

9. Sampling Experiment with the Hand Held Wand Detector

A. Tag Depth and Location

Lee Blankenship (WDFW) and Richard Bailey (CDFO) reported on their independent studies of tag location and depth in coho snouts. Results for WDFW hatchery rack coho are presented in **Attachment 7**. Comparable results were found by Richard Bailey in his study.

A total of 250 hatchery rack coho returns were measured by WDWF for tag depth and placement. The mean depth was 14.1 mm, with a minimum of 2.0 mm and a maximum of 30.0 mm. A second batch of 270 fish were also measured and found to have a mean depth of 14.1 mm and a range of 4.0 mm to 26.0 mm.

Tag placement was found to occur in four areas of the head: 1) between the nares (target area); 2) tip of nose; 3) between the eyes; and 4) around the eyes. However, 94% of the tags were found in the target area between the nares. Another 4.8% was found in the tip of the nose. The remainder of the tags were found between the eyes (1.2%) and around the eyes (0.4%).

B. Sampling Experiment with Wand

A sampling experiment with the wand detector was carried out in NWIFC's back parking lot, using a tote of 96 adult coho (**Attachment 8**). The coho had been previously marked with visual implant tags in the transparent adipose eyelid area, thus allowing for individual identification. In addition, 71 of the adults were tagged, with the tags being placed in one of the four areas of the head (see above) and at various depths. The mean depth was 19.9 mm and ranged from 8.0 mm to a maximum depth of 30.0 mm. The other 25 fish were not tagged with a CWT.

The experiment was carried out by removing a fish from the tote and then identifying it by the VI tag number. Without being told of the status of the fish (i.e, tagged or untagged), Lynn Anderson (WDFW) then checked the fish for a CWT with the wand. The results were very encouraging **as all 71 fish were correctly identified as having a tag, regardless of tag position or depth.** (Note: one fish was initially thought to have been missed but it turned out to be a misidentification because of a transposed id number on the worksheets).

The question was asked why this experiment was 100% successful in identifying all tagged fish when a similar study done at Cowlitz Hatchery last year missed approximately 20% of the tags, all of which were in large female coho. The difference was attributed to the use of the new wire now being used by NWT as it has much better magnetic properties than the "old" wire that was originally used to tag the coho sampled at Cowlitz Hatchery.

Lee Blankenship also noted that he had done some experimental work with "length and a half" wire in coho and found 100% success at tag detection, regardless of depth. The extra wire was more than enough to ensure detection. He also reported that one could likely accomplish the same thing by using "length and a quarter" wire. "Length and a half" wire can be used to safely tag juvenile coho up to 100/lb.
Lee Blankenship and Richard Bailey concluded their presentation by arguing that **the technology is already available to tag coho for subsequent electronic detection by wand.** Unfortunately, chinook are typically much smaller when tagged and thus the "length and a half" wire would not work for chinook. Further work remains to be done on the chinook.

Dr. Keith Jefferts (NMT) also added that his company had found a reliable source of "new new" wire that had even better magnetic properties than the "new" wire now being shipped to users. As such, he **predicted another 20% or so improvement in detection by using the "new new" wire. This might be enough to make the necessary difference for reliably detecting tags in the larger adult chinook.**

10. Agency Reports on Tagging Plans for 1994

As requested, each tag coordinator provided a summary table of projected tagging plans for 1994, and actual tags released in 1993. The tagging summaries were exchanged during the meeting and are not provided herein. However, **Table 5** (following page) provides an overview of all tagging projected for 1994.

Overall tagging levels projected for 1994 total 47.4 million fish. This represents a 8% decrease from 1993 when 51.8 million fish were tagged. Most agencies projected minor changes from 1993 tagging levels. However, USFWS is a notable exception with the 1993 tagging level decreasing by approximately 1.2 million fish in the Columbia Basin. Similarly, NMFS tagging in the Columbia Basin will undergo a 10 fold decrease from 1.6 million fish in 1993 to 0.17 million in 1994.

ACTION: It was agreed that **this annual agenda item would be dropped for next year's Mark Meeting** because of its limited usefulness. The original intent was to alert tag recovery agencies of large increases in tagging levels. One problem was that with only two years of data for comparison, large scale increases could occur over several years and yet not be readily apparent in a two year review if each year's increase was modest.

Table 5. Comparison of Agency Tagging Levels (X 1000)

State/Region	Reporting Agency	1993	1994
Alaska	ADFG (+PNP)	4,650	5,350
	Metlakatla	451	208
	NMFS-AK	210	190
British Columbia	CDFO	7,746	7,800
	BCFW	43	43
Washington	WDF	10,930	10,220
	WDW	350	350
	NWIFC	2,690	2,790
Idaho	IDFG	2,662	1,954
Oregon	ODFW	8,870	8,550
California	CDFG	2,475	3,275
Regional			
NMFS	Columbia Basin	1,632	167
USFWS	Columbia River	6,380	5,120
	Puget Sound + Washington Coast	870	670
	California	1,440	680
TOTAL:		51,778	47,367

11. Update on 1993 High Seas Sampling Program (Deleted)

This item was deleted as Ron Heintz (NMFS-AK) was not able to attend because of illness.

12. Update on Activities of PSC Working Group on Data Standards

The PSC Working Group on Data Standards met in Vancouver, B.C. on February 8-9, 1991 to consider a number of proposed changes to the PSC Format Version 3.0. The goal was to address and correct some of the shortcomings experienced in sharing CWT data in Format Version 3.0. One of the key issues was whether or not to open the formats and make a major upgrade to Version 4.0, or to make minor changes and upgrade to Version 3.1. The meeting was intense and focused by necessity, having 44 agenda items and fifty plus pages of supporting information. All agenda items were covered during the two days.

It was agreed at the beginning of the meeting that all agenda items would be first reviewed on the basis of their respective merits, regardless of whether approval meant going to Version 4.0 or just expanding the current formats and upgrading to Version 3.1. Following the last agenda item, a review was made of the agreed upon changes. **Consensus was then reached on upgrading to Format Version 3.1 at this time.** Additional major changes were flagged for evaluation at a future date when the formats will be opened for a major move to Version 4.0.

The new changes approved for Version 3.1 are summarized below. Details are provided in **Attachment 9**. *(Note: the new field 30, 'Marked, Not Tagged', had been tentatively agreed to in concept by CDFO during the PSC Data Standards meeting, but they had requested additional time to evaluate it. CDFO subsequently approved the new field a few days after the Mark Meeting. As such, the new field was discussed during the Mark Meeting as only a potential field but is reported below as an approved field.)* See also Agenda Item 16.

A. Release File:

1. Add new Field 29: 'Other Marks' Parameters to be determined
2. Add new Field 30: 'Marked, Not Tagged': 9 chars. Right Just. Numeric
3. Add new Field 31: 'Reporting Agency' 4 chars Required Alpha
4. Add new code 'M' to Release Stage (Field 10).
5. Changes to Release Field 11: 'Rearing Type'
   a) Add new code 'U' (Unknown) to handle those situations when rearing type is not known.
   b) Expand the definition for code 'M' (Mixed) to include both downstream migrants and *marine tagging*.

B. Recovery File

1. Add new Field 35 'Run Year': Cols 112-115 4 chars (YYYY) Required Numeric

2. Modified definitions of Sampling Types '1' and '5' (Recovery Field 25)

3. Add new Sample Type '7' for adult "selective" (pass-through) sampling

4. New policy on handling recoveries of reused tagcodes (*1, *2 , etc)

   A new policy was adopted that allows **recovery agencies the option to report recoveries of reused tagcodes with the appropriate *1, *2, etc, and as Status '1's if they are able to make the correct assignment.** Those that can not be assigned with confidence will continue to be reported as Status '7's (unresolved). Similarly, recovery agencies have the option to report all recoveries of reused codes as status '7's if they so chose.

   This action changes the former requirement that all recoveries of reused tag codes be reported as status '7's. The decision of whether or not to assign a recovery of a reused code to the appropriate release code or leave it as 'Unresolved' is the responsibility of the recovery agency.

5. Add new codes to 'Sampling Period Type' (Recovery Field 5) to accommodate weekend and weekday sampling.

6. Standard established for handling expansions for recoveries having Tag Status 3, 4, and 8.

C. Catch/Sample File

1. Add new Field 32: 'Escapement Estimation Method'

2. Add new codes to 'Sampling Period Type' (Catch/Sample File Field 8) to accommodate weekend and weekday sampling.

3. Change 'File Creation Date' (Field 5) in the Catch/Sample file to 'Record Creation Date'.

D. Locations File

1. Add new Field 7: 'Region' Parameters to be determined yet

2. Add new Field 8: 'Basin' Parameters to be determined yet

3. Add new Field 9: 'EPA Reach Code' Parameters to be determined yet

4. Solution developed for preventing orphaned location codes in the database.

E. PSC Fishery Codes

1. Add new PSC Fishery Code '57' for 'Mixed Wild Broodstock and Hatchery Returns'

F. New 'Data Description File'

A new 'Data Description File' was added as a required file accompanying any file submitted to the Mark Center. The intent of the file is to provide a concise summary of the data file. Fields include:

'Submission Date'
'File Type'
'Reporting Agency'
'File Year'
'Line Number'
'Data Description'

The new file is designed to allow up to 99 lines of text in the 'Data Description field'. This will provide users with a clear idea of file contents, as well as significant changes from an earlier data set if it has been resubmitted.

13. Indirect Evidence for the Regeneration of the Adipose Fin

Ken Phillipson (NWIFC) raised the issue of "bad" fin clips and expressed his personal view that if any part of the fin is left, it will turn into a stub. He noted that samplers are doing an excellent job in identifying tagged fish. However, what does this imply for mass marking programs when the skill levels will be lower for clipping fins and identifying marked fish?

Lee Blankenship agreed that it is a serious question that needs to be answered and that WDFW had a study underway at Simpson Salmon Hatchery to evaluate if poorly excised adipose fins do regenerate. Dan Thompson (WDFW) presented a brief report on the work to date. The study consists of three groups of adipose clipped coho. The control group had perfectly excised adipose fins. A second group had the top 2/3 of the adipose fin removed. while the third group had the back 2/3 of the adipose fin removed. (Diagrams of the two partial cuts are provided in **Attachment 10**).

The juvenile fish were checked for tag loss and clip quality at 28-32 days after tagging. No regeneration was seen in either the control group or the group with the top 2/3 of the adipose removed. However, there was definite evidence of adipose fin regeneration in fish that had the back 2/3 of the adipose removed. The returning adults will be sampled in the fall of 1994 at Simpson Salmon Hatchery for further evidence of regeneration.

Vic Palermo (CDFO) also commented that sampling crews in British Columbia are trained to recognize regenerate adipose fin clips, and that the incidence of regenerated fin is kept as a data item by the sampler. Although this data is outside the mainstream CWT data base, it is

available from CDFO's sampling contractor. Since the early 1980's, this data has been collected. Over time, the incidence of "stubby" or regenerate adipose fin clips has been relatively stable. On average, 2.7% of the chinook and 3.2% of the coho sampled coastwide in B.C. exhibit regenerated adipose fin clips. Of these totals, 68.3% of the heads removed from chinook and 43.5% from coho with the "stubby" adipose fin yield a CWT.

14. Advances in Coded Wire Tag Technology

Dr. Keith Jefferts (NMT) updated the Mark Committee on a number of developments during the past year.

a) New Employee

Guy Thornburgh, formerly the Executive Director of PSMFC, has entered private industry and has joined NMT's staff.

b) "New New" Wire

Dr. Jefferts reported that NMT has been able to find a reliable source for even better wire that has a higher magnetic dipolarity than that currently being distributed. The current new wire is approximately 44% better than the old standard wire that was used for many years. The "new new" wire is, on the same comparison, 75% better than the old wire. This will improve the depth of tag detection when sampling with a hand wand.

c) Sequential Wire

Changes have been made to provide sequential tags only in increasing order on the spool. In the past, the tags were shipped in some cases with the highest numbered codes at the start of the spool, and this posed problems for the tagging programs.

d) Elastomer Tags

Richard Fralick (NMT) reported that significant strides had been made with the technology to deliver elastomer tags to fish. The fluorescence material is injected in a liquid state under the clear adipose eye tissue, and it then hardens within 20 minute to 24 hours. Work is continuing on determining an optimal cure time.

A different marketing strategy will be used for the elastomer tags. Agencies will be provided adequate supplies of elastomer material and free use of the tagging hardware which will be periodically rotated for maintenance or replacement. The cost will be for the tags used to mark fish. Accounting will be done by providing a "chip" with the tagging machine that automatically debits each tag from the total number purchased. The projected cost per tag is approximately 6 cents. This drops to 5.1 cents per tag when purchasing a million tags.

The possibility of the fluorescent mark leading to increased predation has been a key concern of many. However, results to date do not indicate that it is a problem. Large numbers of fish have been marked at Lyons Ferry with the elastomer, and of these, only one fish was seen with its eye pecked out. Likewise, no differential mortality has been found on a Hawaiian fish that is being routinely marked with the elastomer.

e) Archival Tags

NMT has also developed an impressive "archival" tag that can store up to 10 years of environmental data. By necessity, the tags are relatively large, about the size of a stubby cigar, and thus designed for highly pelagic fish such as tuna. The tag has a battery life of seven years, and samples every 10 seconds. Location (i.e. long./latitude) is determined from a combination of light levels, pressure, and temperature. It is hoped that the size of the archival tags can be reduced by at least half for the second generation. Further information on successful field tests is available from NMT.

15. Proposal to Change the "Number of Untagged Fish" field in the Release File to read "Number of Unmarked Fish" (NWIFC)

This item was included in the agenda primarily for the sake of information exchange. The proposal, as stated above, was previously discussed but not approved by the PSC Data Standards Working Group. The original intent was to establish a standard way for handling bad adipose clips when reporting numbers of fish marked. However, it was learned that many agencies do not check for fin clip quality. Of those agencies that do, most add bad adipose clips to the untagged group. In some cases, bad adipose clipped fish are also included with fish released with a CWT or with those that shed a CWT.

ACTION: No action required. It was recommended, however, that appropriate comments be added to the Specifications and Validation document to indicate how most agencies are reporting bad adipose clipped fish as part of the untagged portion of a release group.

16. New Fields "Other Marks" and 'Marked, Not Tagged' added to PSC Release File Format

Dick O'Connor (WDFW) reported that the PSC Data Sharing Committee had addressed the issue of capturing other fish mark information in May, 1993 and concurred that the information should be captured in the Release File. Specifications for the new field were referred to Data Standards to work out. The following are general specifications for the field :

- *The field is not be to used to report the Adipose only mark on any salmon species.* (CDFO required this restriction because of its strong opposition to the release of adipose only marked chinook in the Snake River system.)

  Any salmon released with the Adipose only clip (e.g. Snake River) must be reported in Release Field 15 (No. of Untagged Fish). The Comments field can be used to indicate the use of the Adipose only clip in those cases.

- *Adipose only marked steelhead are an exception and can be reported under 'Other Marks' since the Adipose has been desequestered coastwide for this species.*

  This change corrects the special case where untagged representative steelhead marked with the Adipose only (no CWT) had to be reported in 'Number of Untagged Fish'.

Dick O'Connor (WDFW) and Jim Longwill (PSMFC) are currently working on the specifications for the new field, including a list of codes for all of the existing fin marks and other types of marks such as otoliths, brands, visual implants, pit tags, etc.

A second new field, 'Marked, Not Tagged' (Field 30) was also approved by Data Standards for use with the new Field 29 'Other Marks' (*see note in italics on Agenda Item 12; page 24). It is to be used to report the number of marked fish that are not part of a CWT release group. It will also be useful in reporting non-representative release groups that carry marks.

It is hoped that PSC Format 3.1 can be finalized by the end of April, 1994 so that this information can begin to be reported. It was emphasized, however, that these two new fields are not required fields. Therefore, agencies are not required to go back and report historical mark data if they chose not to.

***** Development during Review of Preliminary Minutes *****

Karen Crandall (ADFG) noted that the final minutes of the Data Standards Meeting (May 25-26, 1993) indicate that Data Sharing Committee agreed that *"....a new field should be added to the Release File for reporting "Other Marks" used in association with the with the Adipose+CWT mark."* The more recent decisions from the Data Standards Working Group (see above), however, clearly indicate that the new field, 'Other Marks' and the additional field, 'Marked, Not Tagged', also includes untagged, non-representative releases. As such, she emphasized that the scope of the intended reporting has changed and expanded without the benefit of adequate agency input. She also noted that this change was not trivial for ADFG since their database system is not designed to easily provide the new information.

Since this was an informational agenda item only for the Mark Committee, Karen intends to raise the issue of the change in scope of the new fields with the PSC Data Sharing Committee. If this is the intent of Data Sharing, then additional work will be required of ADFG to meet the new reporting specifications. If it is not the intent of Data Sharing, then the new fields could conceivably be dropped since there would not be consensus on the U.S. side.

17. New PSC Standard for Reporting Recoveries of Reused Tag Codes

Ken Johnson reported that Data Standards had resolved a recent problem with recoveries of reused tag codes. It had been agreed a number of years ago that recoveries of reused tagcodes (*1, *2's, etc) would be given a status of '7' (i.e.unresolved discrepancy), with no attempt to assign the correct *1, *2, etc. However, a sizeable number of historical recoveries in the RMPC's database still carry a status 1 and the *1 or *2, etc. This is also true for files recently resubmitted by CDFO since they were able to resolve many of the recoveries. Others that weren't resolvable were reported as tag status '7'.

There was some concern over CDFO's new procedure, particularly since both the Mark Committee and Data Standards had earlier taken a firm stand that all recoveries of reused tag codes should be reported as status '7's. However, after discussing the issue, Data Standards agreed that recovery agencies should have the right whether or not to assign the reused codes to the appropriate release if they felt that they could. Therefore, Data Standards elected to support CDFO's position and **allow recovery agencies the option to report recoveries of reused tagcodes with the appropriate *1, *2, etc, and as Status '1's if they are able to make the correct assignment.** Those that can not be assigned with confidence will continue to be reported as status '7's. Similarly, recovery agencies have the option to report all recoveries of reused codes as status '7's if they so chose.

DISCUSSION:

Karen Crandall (ADFG) questioned how a recovery agency could go back and assign with confidence historical recoveries of reused tag codes to the correct release group. Dick O'Connor agreed that it would be very difficult in many cases, and probably would work only for agencies recovering their own tags. The other recoveries would best be left as Status '7's.

Frank Fisher (CDFG) reported that to his chagrin, California was recently guilty of releasing a reused tag code (065902) through a communication mixup of sorts. Fortunately, the first use had been over 20 years ago and it will be easy to correctly assign any new recoveries of the tag code. He noted, however, that California did not want to have the recoveries of the first (and legitimate) release now assigned to Status '7's just because of someone's recent mistake.

Ken Johnson agreed and noted that penalizing recoveries of the first release has always been the unfair part of the policy to report all recoveries of reused tags as Status '7's. He emphasized, however, that even with the new reporting policy in place, agencies that release reused tag codes will be penalized simply because recovery agencies still have the option of either reporting such recoveries as Status '7's or identifying them to the correct release group. As a result, any on-line data retrieval from the Mark Center's data base will yield incomplete data for reused tag codes since the reports list only valid Status '1' type recoveries.

Karen Crandall stressed that Alaska would continue to report all such recoveries as Status '7's because of strong disagreement with any reuse of tag codes.

18. Ongoing Problems with Identifying Tag Coordinator and Reporting Agency

Reporting problems have continued to crop up for tagged groups that involve more than one agency. The classic example happened this past year when WDFW tags (agency 63) were used to mark fish at Carson NFH (USFWS facility). Many of the fish were later transported by ODFW to the care of the Umatilla Tribe who then released into the Umatilla River. The problem arose when the tag release data were not reported by any of the four agencies because of a breakdown in communications.

Steve Pastor (USFWS) argued forcibly that the best way to prevent this type of reporting problem was to establish a specific guideline that would be included in the Regional Marking Agreements. He recommended that a rule be established where the agency releasing the fish would have to report the tag release data, regardless of who might have reared the fish or "owned" the tagcodes, etc. The reason for this is that they would be in the best position to know final release numbers. Said in another way, a hatchery would be responsible for reporting any CWT release data for tagged fish that it released. If the tagged fish were taken off station by another agency or group before being released, he proposed that that agency would be responsible for reporting the data.

A considerable discussion followed Steve Pastor's comments, and for a time, the consensus of the Committee seemed to favor his proposal. However, as the discussion continued, more and more examples were brought up that didn't fit the proposed rule very well.

ACTION: The final conclusion was that **no "universal" reporting rule could be established that would work for all types of tag releases.** In some cases, it is logical for the "owner" of the tags to be the reporting agency, and in other cases, it might be the releasing agency since they typically have the best numbers.

It was therefore agreed that **the tag coordinator is ultimately responsible** for seeing that any tag codes shared with another agency(ies) are reported, **regardless of which agency ends up doing the reporting.**

19. Proposal to Establish Formal Data Format for Fin Marks (PSMFC)

Ken Johnson noted that the fin mark release data have been historically reported as **projected** releases. In addition, fin mark requests have been typically reported via hand written data sheets that often are in "free style" and often difficult to work with. As such, the finmark data have been of questionable value beyond that for regional coordination of recent and proposed fin mark usage.

The importance of fin marks, however, is rapidly growing as efforts intensify to identify and protect natural and wild stocks. As such, it is time to formalize the exchange of both proposed and actual fin mark releases, similar to that now functioning for CWT data.

He noted that an Ingres application for fin marks had been recently completed by the Mark Center. Therefore, with a modest amount of additional effort, the tedious manual reporting and data entry/editing could be easily replaced by establishing a format data format for reporting via magnetic media.

He also reported that the concept had been strongly endorsed by the Data Standards Working Group. However, the issue was referred to the Mark Committee since the data do not fall under the data exchange requirements of the Pacific Salmon Treaty. Therefore the question was posed to the Mark Committee as the tag coordinators were the ones responsible for reporting the fin mark data.

ACTION: The project was also **endorsed strongly by the Mark Committee.**

In addition, Frank Fisher (CDFG) recommended that the **Mark Center develop a software package that runs on PCs for loading the fin mark data into standard exchange format.** This software could then be provided to those agencies who have problems getting new programming done and could use the help in quickly reporting data in the established exchange format.

This proposal was also endorsed by the Mark Committee and the Mark Center promised to undertake the project as soon as the dust clears from current projects.

20. Fin Mark Allocation for 1994

A listing of 1994 fin mark requests was provided for review. Tag coordinators were asked to report any errors once they had an opportunity to review the document.

Attachment 1

1994 Mark Meeting Attendees

February 17, 1994

	Kevin Aitkin	USFWS - Olympia, WA
	Stan Allen	PSMFC - Portland, OR
	Lynn Anderson	WDFW - Olympia, WA
	Richard Bailey	CDFO - Vancouver, B.C.
	Jerry Bauer	BPA - Portland, OR
*	Lee Blankenship	WDFW - Olympia, WA
	Larry Brown	WDFW - Olympia, WA
*	Karen Crandall	ADFG - Juneau, AK
	Jay DeLong	NWIFC - Olympia, WA
	Robert Donnelly	UW - Seattle, WA
*	Frank Fisher	CDFG - Red Bluff, CA
	Richard Fralick	NMT - Shaw Island, WA
*	Jerry Harmon	NMFS - Pomeroy, WA
*	Pete Hassemer	IDFG - Boise, ID
	Doug Herriott	CDFO - Vancouver, B.C.
	Meloney Hause	NWIFC - Olympia, WA
*	Dennis Isaac	ODFW - Clackamas, OR
	Keith Jefferts	NMT - Shaw Island, WA
	Randall Jeric	Makah Nation, WA
*	Ken Johnson	PSMFC - Portland, OR
*	Marianne Johnson	CRITFC - Portland, OR
	Tom Kane	USFWS - Olympia, WA
	Bill Kinney	WDFW - Olympia, WA
	Darren Lay	WDFW - Olympia, WA
	Jim Longwill	PSMFC - Portland, OR
	Susan Markey	WDFW - Olympia, WA
	Kenneth McIntyre	NMFS - Pomeroy, WA
*	Charles Morrill	WDFW - Olympia, WA
	Bill Murray	ODFW - Clackamas, OR
	Dick O'Connor	WDFW - Olympia, WA
	Steven Olhausen	USFWS - Vancouver, WA
*	Ron Olson	NWIFC - Olympia, WA
*	Vic Palermo	CDFO - Vancouver, B.C.
	Steve Pastor	USFWS - Vancouver, WA
	Ken Phillipson	NWIFC - Olympia, WA
*	Steve Riley	IDFG - Boise, ID
	Ralph B. Roseberg	USFWS - Orofino, ID
	Dan Thompson	WDFW - Olympia, WA
*	Robert Z. Smith	NMFS - Portland, OR
	Guy Thornburgh	NMT - Shaw Island, WA
	Jim Webster	NMT - Olympia, WA
	Neil Williscroft	CDFO - Vancouver, B.C.
	Terry Wright	NWIFC - Olympia, WA
*	David Zajac	USFWS - Olympia, WA

* Mark Committee Member

Attachment 2

COUNCIL ANNETTE ISLANDS RESERVE

METLAKATLA INDIAN COMMUNITY

CASEY D. NELSON, SR., MAYOR
BEVERLY J. GUTHRIE, SECRETARY
BARBARA J. FAWCETT, TREASURER

ESTABLISHED 1887

POST OFFICE BOX 8
METLAKATLA, ALASKA 99926
PHONE (907) 886-4441
FAX (907) 886-7997

Tamgas Creek Fish Hatchery
P.O. Box 410
Metlakatla, AK 99926
(907) 886-3150

February 18, 1994

Mr. Ken Johnson, R.M.C.
P.S.M.F.C.
45 S.E. 82nd Ave., Suite 100
Gladstone, OR 97027-2522

Dear Ken,

The Metlakatla Indian Community (MIC) votes yes to Idaho Department of Fish & Games (IDFG) proposal to the Mark Committee. Any questions, please feel free to contact me at the above phone number.

Respectfully,
METLAKATLA INDIAN COMMUNITY

Steven D. Leask, T.C.H. Mgr.

WDFW Study

Attachment 3

Ventral Clip Study
Commercial Fisheries Recoveries

Green/Duwamish

41 Adipose Recoveries $\bar{x}$ length 52.2 cm Std.Dev. 6.9 cm
41 Ventral Recoveries $\bar{x}$ length 51.5 cm Std.Dev. 5.1 cm

Clip Quality

Adipose Clips		Ventral Clips	
Good	40 = 97.6%	Good	20 = 48.8%
Bad	1 = 2.4%	Bad	11 = 26.8%
Marginal	0 = 0.0%	Marginal	7 = 17.1%
No Mark	0 = 0.0%	No Mark	3 = 7.3%
No Tags = 8		No Tags = 1	
Lost = 2		Lost = 1	
45,696 released		44,333 released	
Tag loss at release = .7%		Tag loss at release .9%	

1 recovery with adipose clip but ventral tag code

Puyallup

56 Adipose Recoveries $\bar{x}$ length 48.5 cm Std.Dev. 4.2 cm
46 Ventral Recoveries $\bar{x}$ length 49.1 cm Std.Dev. 5.8 cm

Clip Quality

Adipose Clips		Ventral Clips	
Good	54 = 96.4%	Good	25 = 54.3%
Bad	0 = 0.0%	Bad	12 = 26.1%
Marginal	1 = 1.8%	Marginal	8 = 17.4%
No Mark	1 = 1.8%	No Mark	1 = 2.2%
No Tags = 4		No Tags = 0	
Lost = 2		Lost = 1	
46,751 released		46,974 released	
Tag loss at release = .4%		Tag loss at release = .4%	

2 recoveries with adipose clip but ventral tag code
1 recovery with ventral clip but adipose tag code

Puyallup Hatchery
Hatchery Rack Sampling

1,418 Adipose Recoveries x-forklength = 47.3 cm Std. Dev. = 4.7 cm
1,339 Ventral Recoveries x-forklength = 46.7 cm Std. Dev. = 4.7 cm

Adipose Recoveries = 51.4% Population
Ventral Recoveries = 48.6% Population
= 5.4% Differential Survival

Clip Quality

Adipose Clips		
Good	1,371	= 91.6%
Bad	8	= 0.6%
Marginal	36	= 2.5%
No Mark	3	= 0.2%

Ventral Clips		
Good	861	= 64.3%
Bad	260	= 19.4%
Marginal	191	= 14.3%
No Mark	27	= 2.0%

19 Recovery with Adipose Clip but with Ventral Clip Tagcode
4 Recoveries with Ventral Clip but with Adipose Clip Tagcode

Release Information

Adipose Clips	Ventral Clips
46,751 Released	46,974 Released
0.4% Tag Loss	0.4% Tag Loss
NA % Natural Adipose	NA % Natural Vents
NA % Bad Marks	NA% Bad Marks

Hatchery Rack Sampling Numbers	Males	Females	Total
	22,902	10,788	33,690

George Adams Hatchery
Hatchery Rack Sampling

119 Adipose Recoveries x-forklength = 47.3 cm Std. Dev. = 4.1 cm
105 Ventral Recoveries x-forklength = 47.5 cm Std. Dev. = 3.9 cm

Adipose Recoveries = 53.1% Population
Ventral Recoveries = 46.9% Population
= 11.7% Differential Survival

Clip Quality

Adipose Clips			Ventral Clips		
Good	109	= 91.6%	Good	61	= 58.1%
Bad	5	= 4.2%	Bad	25	= 23.8%
Marginal	3	= 3.4%	Marginal	13	= 12.4%
No Mark	1	= 0.9%	No Mark	6	= 5.7%

1 Recovery with Adipose Clip but with Ventral Clip Tagcode
2 Recoveries with Ventral Clip but with Adipose Clip Tagcode

Release Information

Adipose Clips	Ventral Clips
44,218 Released	44,264 Released
1.4% Tag Loss	0.6% Tag Loss
0.6% Natural Adipose	NA % Natural Vents
1.3% Bad Marks	0.5% Bad Marks

Hatchery Rack Sampling Numbers	Males	Females	Total
	1,700	885	2,555

1,371 Adults Not Sampled

Green River Hatchery
Hatchery Rack Sampling

304 Adipose Recoveries x-forklength = 51.5 cm Std. Dev. = 4.3 cm
245 Ventral Recoveries x-forklength = 51.3 cm Std. Dev. = 3.6 cm

Adipose Recoveries = 55.4% Population
Ventral Recoveries = 44.6% Population
= 19.5% Differential Survival

Clip Quality

Adipose Clips			Ventral Clips		
Good	281	= 92.4%	Good	150	= 61.2%
Bad	10	= 3.3%	Bad	61	= 24.9%
Marginal	13	= 4.3%	Marginal	24	= 9.8%
No Mark	0	= 0.0%	No Mark	10	= 4.1%

8 Recovery with Adipose Clip but with Ventral Clip Tagcode
0 Recoveries with Ventral Clip but with Adipose Clip Tagcode

Release Information

Adipose Clips	Ventral Clips
45,696 Released	44,333 Released
0.7% Tag Loss	0.9% Tag Loss
0.3 % Natural Adipose	.009 % Natural Vents
0.1 % Bad Marks	0.1% Bad Marks

Hatchery Rack Sampling Numbers	Males	Females	Total
	9,102	9,935	19,037

All Hatcheries Combined
Hatchery Rack Sampling

1,841 Adipose Recoveries = 52.2% Population
1,689 Ventral Recoveries = 47.8% Population
= 8.4% Differential Survival

Attachment 4

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Lower Columbia River Fishery Resource Office
9317 Highway 99, Suite I
Vancouver, Washington 98665

MEMORANDUM

January 27, 1994

TO: PSMFC Mark Committee
ATTN: Dave Zajac (USFWS)
Western Washington Fishery Resource Office
Olympia, Washington

FROM: Fishery Management Biologist
Lower Columbia River Fishery Resource Office
Vancouver, Washington

SUBJECT: Ventral Fin Clip Study Results at Warm Springs NFH

Enclosed for your information are the current results of the Ventral Fin Clip Study at Warm Springs NFH. A description of pertinent release groups is also included.

The tables are a summary of returns to the hatchery and does not include recoveries in the Deschutes River fishery. After run year 1994, the 1989 broodyear will be complete. A 1987-89 broodyear report will be appropriate and published at that time.

I look forward to talking with you more on February 17 and presenting this information at the 1994 Mark Meeting.

Doug

Douglas E. Olson

cc: Warm Springs NFH (Mike Paiya)
USFWS Region 1 Fisheries (Dan Diggs)
USFWS Lower Columbia River Fish Health Center (Phyllis Barney)
Warm Springs Tribe DNR (Jim Griggs)
Oregon Dept. Fish & Wildlife (Jim Newton)

Warm Springs NFH Spring Chinook Release Group / Study Descriptions

1987, 1988, and 1989 Broods (Coded-Wire-Tag Groups)

Fall and Spring Release Groups

Starting with the 1979 brood, juveniles were passively graded beginning in September. The larger fish (> 140 mm) were released in early October. The remaining fish were weighed to determine the number released in the fall. The smaller fish were kept till spring then given an OTC feed to mark their vertebrae. Returning adults were then identified as either spring release or fall release returns. Because some fish (probably less than 15%) did not keep the OTC mark, the return estimates represent an index value on the return of fall release fish and likely overestimates survival of fall returns.

BKD Diet Study (KDdry and KDmoist) Release Groups (200,000 fish release)

Tag groups of fish with similar BKD incidence rates were reared on dry diet and released in the fall (KDdryF) and spring (KDdryS) versus a wet diet released in the fall (KDmoistF) and spring (KDmoistS). Their BKD incidence will be compared throughout rearing and upon adult return by USFWS, Lower Columbia River Fish Health staff. Return rates will also be compared. This study is nested with the ventral clip mortality study described below.

Ventral Clip Mortality (KDdryV and KDmoistV) Release Groups (100,000 of the above 200,000 fish release)

Within the BKD study certain tag codes were associated with diet and a ventral (pelvic) fin clip. Juvenile fish were distributed between four ponds. Two ponds were fed dry diet and two ponds were fed moist diet. Approximately 25,000 AdCWT and 25,000 Ventral fin clipped fish were marked in each pond. For all three broodyears a left ventral fin clip was associated with the dry diet and a right ventral fin clip was associated with the moist diet. Fish were released in the fall and spring as described above. Within a diet treatment group, fish with an Ad-CWT will be compared to fish with a ventral clip to ascertain clip related mortality.

Table 1. 1987 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip study.

Study Group	Marked Release	Jack Returns	Age Four Returns	Age Five Returns	Total Return	Percent Return
AdCWT	89,047	1	21	10	32	0.036%
Ventral	97,397	7	23	3	33	0.034%

Table 2. 1988 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip study.

Study Group	Marked Release	Jack Returns	Age Four Returns	Age Five Returns	Total Return	Percent Return
AdCWT	93,290	4	43	9	56	0.060%
Ventral	102,962	2	49	10	61	0.059%

Table 3. 1989 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip study.

Study Group	Marked Release	Jack Returns	Age Four Returns	Age Five Returns	Total Return	Percent Return
AdCWT	95,260	0	10	—	10	0.010%
Ventral	101,291	0	19	—	19	0.019%

FN:VENSUM.WK1 01/11/94

SOURCE: Doug Olson, USFWS, Lower Columbia River Fisheries Resource Office, 9317 Highway 99, Suite I, Vancouver, Washington 98665 (206) 696-7605.

Table 4. 1987 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip / diet study.

Study Group	Release Date	Mark	#/lb.	Marked Release a/	Jack Returns b/	Age Four Returns b/	Age Five Returns b/	Total Return	Percent Return
KDdryA	05/06/88	AdCwT	66.0	5,319	--	--	--		0.000%
KDdryA	05/06/88	LV	66.0	5,762	--	--	--		0.000%
KDdryF	09/30/88	AdCwT	10.3	17,706	0	1	1 (1)	2	0.011%
KDdryS	04/05/89	AdOTC	15.4	23,546	1	4 (3)	2 (1)	7	0.030%
total		AdCWT		41,252	1	5	3	9	0.022%
KDdryFV	09/30/88	LV	10.3	19,622	1 (0)	2	0	3	0.015%
KDdrySV	04/05/89	LVOTC	15.4	26,024	1 (0)	2	1	4	0.015%
total		LV		45,646	2	4	1	7	0.015%
KDdry Total				97,979	3	9	4	16	0.016%
KDmoistF	09/30/88	AdCwT	11.2	22,753	0	1	0	1	0.004%
KDmoistS	04/05/89	AdOTC	15.4	25,042	0	15	7 (5)	22	0.088%
total		AdCWT		47,795	0	16	7	23	0.048%
KDmoistFV	09/30/88	RV	11.2	24,677	5	6	1	12	0.049%
KDmoistSV	04/05/89	RVOTC	15.4	27,074	0	13	1	14	0.052%
total		RV		51,751	5	19	2	26	0.050%
KDmoist Total				147,341	5	51	9	65	0.044%

a/ Excludes "untagged" fish based on tag retention sampling.
b/ Sampling was 100% except where indicated in parentheses.

FN:CWTVEN87.WK1 01/27/94
SOURCE: Doug Olson, USFWS, Lower Columbia River Fishery Resource Office, Vancouver, Washington.

Table 5. 1988 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip / diet study.

Study Group	Release Date	Mark	#/lb.	Marked Release a/	Jack Returns	Age Four Returns b/	Age Five Returns b/	Total Return	Percent Return
KDdryF	09/27/89	Ad	8.2	16,450	2	0 (0)	1 (1)	3	0.018%
KDdryS	04/11/90	AdOTC	21.2	32,260	1	9 (3)	4 (3)	14	0.043%
total		AdCWT		48,710	3	9	5	17	0.035%
KDdryFV	09/27/89	LV	8.2	17,372	0	5 (5)	1 (1)	6	0.035%
KDdrySV	04/11/90	LVOTC	21.2	34,349	1	10 (9)	3 (2)	14	0.041%
total		LV		51,721	1	15	4	20	0.039%
KDdry Total				100,431	4	24	9	37	0.037%
KDmoistF	09/27/89	Ad	8.9	11,987	0	5 (2)	0 (0)	5	0.042%
KDmoistS	04/11/90	AdOTC	21.3	32,593	1	29 (11)	4 (2)	34	0.104%
total		AdCWT		44,580	1	34	4	39	0.087%
KDmoistFV	09/27/89	RV	8.9	13,920	0	8 (7)	3 (2)	11	0.079%
KDmoistSV	04/11/90	RVOTC	21.3	37,321	1	26 (23)	3 (2)	30	0.080%
total		RV		51,241	1	34	6	41	0.080%
KDmoist Total				95,821	2	68	10	80	0.083%

a/ Excludes 'untagged' fish based on tag retention sampling sampling.
b/ Sampling was 100% except where indicated in parentheses.

FN:CWTVEN88.WK1 01/27/94
SOURCE: Doug Olson, USFWS, Lower Columbia River Fishery Resource Office, Vancouver, Washington.

Table 6. 1989 brood spring chinook salmon returns to Warm Springs NFH for the ventral fin clip / diet study.

Study Group	Release Date	Mark	#/lb.	Marked Release a/	Jack Returns	Age Four Returns b/	Age Five Returns b/	Total Return	Percent Return
KDdryF	09/26/90	Ad	8.1	16,748	0	4 (2)		4	0.024%
KDdryS	04/17/91	AdOTC	17.1	30,323	0	6 (3)		6	0.020%
total		AdCWT		47,071	0	10	--	10	0.021%
KDdryFV	09/26/90	LV		17,889	0	9 (3)		9	0.050%
KDdrySV	04/17/91	LVOTC		32,543	0	3 (1)		3	0.009%
total		LV		50,432	0	12	--	12	0.024%
KDdry Total				97,503	0	22	--	22	0.023%
KDmoistF	09/26/90	Ad	10.5	10,479	0	0 (2)		0	0.000%
KDmoistS	04/17/91	AdOTC	15.5	37,710	0	0 (11)		0	0.000%
total		AdCWT		48,189	0	0	--	0	0.000%
KDmoistFV	09/26/90	RV		11,043	0	5 (3)		5	0.045%
KDmoistSV	04/17/91	RVOTC		39,816	0	2 (1)		2	0.005%
total		RV		50,859	0	7	--	7	0.014%
KDmoist Total				99,048	0	7	--	7	0.007%

a/ Excludes 'untagged' fish based on tag retention sampling sampling.
b/ Sampling was 100% except where indicated in parentheses.

FN:CWTVEN89.WK1 01/27/94
SOURCE: Doug Olson, USFWS, Lower Columbia River Fishery Resource Office, Vancouver, Washington.

Attachment 5

MEMORANDUM

OREGON DEPARTMENT OF FISH AND WILDLIFE

Date: February 9, 1994

To: Charlie Corrarino and Bernie Bohn

From: Mike Evenson

Subject: Preliminary results from coho salmon release groups comparing survival differences between adipose and left ventral fin marks

I've attached a table showing a comparison of return data to Cole Rivers Hatchery for test groups of coho salmon released in 1992 and 1993 (1990 and 1991 broods).

The results for the 1990 brood should be interpreted with caution because the groups were marked at different times (September 1991 for the AD-CWT group and March for the LV group) and they were reared in different ponds.

The 1991 brood groups were marked at the same time (August 1993) from the same pond of fish, and both groups were reared in the same pond from the time of marking until release. Both AD and LV mark groups also received coded wire tags; while for the 1990 brood test groups, only the AD group was coded wire tagged. Thus, the only varible in the 1991 groups was the fin mark.

Feel free to call me if you have any questions.

ODFW

Summary of release and return data for coho salmon mark groups released from Cole Rivers Hatchery, 1990-91 broods.

Brood yr.	Fish/kg Release date	No. released Fin mark	Percentage return by age (N) 2	3	Total	Total % difference	Adults/100 kg smolts by age 2	3	Total	Total % difference
1990	24.5 4/30/92	27,154 AD-CWT	0.03% (8)	0.36% (99)	0.39% (107)	38.40%	0.72	8.92	9.64	40.62%
1990	23.8 4/30/92	74,980 LV	0.01% (11)	0.23% (171)	0.24% (182)		0.35	5.38	5.73	
1991	21.4 4/28/93	26,269 AD-CWT	0.38% (101)	—	0.38% (101)	34.54%	8.22	—	8.22	34.54%
1991	21.4 4/28/93	25,224 LV-CWT	0.25% (66)	—	0.25% (66)		5.38	—	5.38	

Returns are for numbers observed at Cole Rivers Hatchery.

All groups, except the age 2 returns for the 1990 brood, are significantly different at the 95% level of confidence.

ODFW - 2/1/94 - Mike Evanson,

Attachment 6

Experimental Design of Ventral Fin Mortalities

Vic Palermo (CDFO)

The following is rewritten from a paper I wrote last spring regarding the experimental design of ventral fin clip mortalities. It does not go into the sampling of return data or the quality of fin clips, but it does describe the major flaw of most of the mark experiments I have seen, namely, the lack of a true control group. I offer one possible solution to the problem while keeping the math to a minimum.

There has always been an assumption that CWT (coded-wire tagged) mark application has little or no effect on mortality while ventral fin clipping marks cause large mortalities. Unfortunately, there have been few studies to assess these assumptions, and those few studies are often contradictory. Further, many of these studies either employed incorrect experimental designs, or sampling levels or errors that make the analysis suspect. The most common type of experiment is that between two groups.

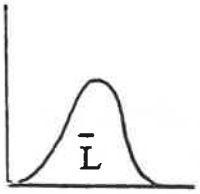
The null hypothesis: The design null hypothesis is usually stated as (Ho:): There is no significant difference in mortality between the two groups (i.e., the application of marks does not effect survival). The alternative, though not often stated, is that (H1:): There is no significant difference in mortality between the marked groups.

The two mark groups are CWT-AD and CWT-AD-V. This design is a conceptual flawed as shown by the following example. Let's pretend that you are a doctor and you have a number of sick patients. You also have two drugs to try to affect a cure, i.e. treatments. You set up your null hypothesis of no difference in treatments and the alternative of some significant difference in treatment. After randomly splitting the group into two, you give one group drug A (CWT-AD), and the other group, drug A and drug B (CWT-AD and V). The problem of course is that the treatments are confounded. One group has drug A and the other has drug A and B. We cannot make any statement regarding the outcome of the experiment because of this confounding. For example, if we found no difference in groups, is it because of: 1) chance, 2) A is suppressed by B or vice versa, 3) neither A or B is effective.

If there is a significant difference and the null hypothesis is rejected, you still cannot make any conclusions. Is there a significant difference because: 1) A and B have a synergistic effect, 2) A and B have a suppressing effect, or 3) is the result due to chance.

I often hear the argument that since we are simply measuring the relative survival of the different tag groups, then it should be sufficient to simply measure the difference in their survival. This argument would only be true if we were measuring natural traits that were subject to random variation. In our case, we are measuring for treatment effects. Let me make this clear with an example of measuring natural traits.

For example, you are studying two populations of beetles and hypothesize, based on previous information, that there is a difference in the carapace length. Assuming that the variance in carapace length (L) is randomly distributed, a random sample from each population would yield a normal distribution, i.e.

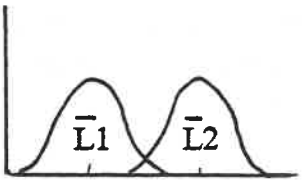


The null hypothesis is that there is no difference in mean length L for the carapace. The alternative is that the mean carapace length is different between population.

Ho: $\bar{L}1 = \bar{L}2$ or $\bar{L}1 - \bar{L}2 = 0$

H1: $\bar{L}1 * \bar{L}2$ $\bar{L}1 - \bar{L}2 <> 0$

As stated above this assumes equal variances. Pictorially, if there is a significant difference between populations you might expect a graph such as this:



The greater the distance between means $\bar{L}1$ and $\bar{L}2$, given equal randomness of the trait in the population, the greater the probability that the populations differ significantly in the measured trait. Each length measurement of the population can be re-written as:

$$L1 = \bar{L}1 + EL1 \qquad (1)$$

i.e. each measure is the average length of the population plus the effect of the error term EL1. Because the error effects are normally distributed and random (i.e. the effect could be genetic, environmental etc.), the mean length is the sum of all the observed lengths divided by the sample size n

$$\bar{L}1 = \text{sum } (L1) \ /n \qquad (2)$$

and as n increases, $\bar{L}1$ gets closer to ML, the true mean of the population. The estimate of the error term is the squared deviations divided by the sample size -1.

$$E^2 = \text{sum } (L1 - \bar{L}1)^2 / (n-1) \qquad (3)$$

This is the familiar variance equation. Returning to equation 1, you can see that if we assume equal variances then the null hypothesis formulation of $\overline{L1} - \overline{L2} = 0$ can be re-written as

$$\overline{L1} - \overline{L2} = (\overline{L1} + EL1) - (\overline{L2} + EL2) \qquad (4)$$

The variance terms can be dropped because of the assumption of equality. This is the basis of all Fisherian hypothesis testing. Going back to the treatment example of drug A and B, let's say that the trait in question is mean survival S under the different treatments. The null hypothesis then would be

$$Ho: \; S1 = S2 \qquad or \qquad S1 - S2 = 0$$

However, the equation describing each measure now is for equation

$$S1 = S1 + A + ES1 \qquad (5)$$

The A term is the effect of drug A. The A is considered to be the additive effect or component of treatment A to the mean Survival. It is not a natural trait but an application of a treatment by the experimenter.

Similarly, as we had designed our experiment, the equation describing each measure of our second group can be written as

$$S2 = S2 + A + B = ES2 \qquad (6)$$

As you can see, we immediately have a problem. A and B are now combined additive treatments. There is no way to distinguish the additive effect of the combined treatment.

Going back, if we had a 3rd group to which no treatment was given, then we could write that equation as

$$Sc = Sc + ESc \qquad (7)$$

Assuming equal variances and means, then, if we compare this third group to our first one for example

$$S1 = S1 + A + ES2$$
$$Sc = Sc + ESc$$

The resultant difference can be attributed to the additive component effect of treatment A. You can see that the addition of the third group allowed us to measure this effect. This third group is the control group. The procedure can be easily extended to several groups and the process of calculating the effects of treatment components is the foundation of Analysis of Variance. (See Sokal and Rohlf, 1982 for a complete explanation)

These principles lead us to properly construct the experiment in the first place. Returning to our simple two drug treatment example, the proper experimental design would be as follows:

The null hypothesis is that there is no significant difference in survivals due to treatment effect.

Ho: Sc = SA = SB = SAB
Hi: Sc < > SB < > SAB

The alternative is that there are significant differences in mean survival. The group is divided into 4 sub groups, with a control sub-group. One group receives the A treatment, one receives the B treatment and the last receives the A and B treatment. This last group tests for any interaction effect between the two treatments. The question of sample size and replication, and a posteriori comparisons are also important and can be now addressed.

It should now be clear that the experimental design to detect survival differences in matched groups of fish as previously proposed is flawed. Clearly, like our drug example, the marking experiment needs to incorporate a control group.

Ideally, the experiment should be structured as follows (this can be considered a minimum and a template)

Control group

Mark group:	CWT-AD	
	LV or RV	(ventral fin clip)
	CWT_AD = LV (or RV)	

Under each group, replicate subgroups can easily be (and should be) added. The replication could also include different hatcheries.

The most difficult problem has been the formation of a control group. I believe that we can easily designate a control group in two ways using the effect of temperature variation to mark otoliths. The groups with marked otoliths can be considered the control group. The first method involves the random sampling of the pre-marked fry from the pond or channel from which all subsequent mark groups will be chosen for the above experiment. The fish are randomly sampled (n > 100) and the otoliths are extracted. The banding frequency for the sample is recorded. This banding will be a function of the natural temperature variation experienced by the fry and will be a common feature through the entire population. Upon return to the hatchery, the otoliths from untagged fish could be sampled to assess the survival of the control group.

The second method involves the application of temperature variation to induce a fixed pattern on the otoliths of the selected population from which all marks and control groups will be selected. This is a pseudo-treatment in that (1) all members of the population will be subjected to the temperature variation treatment prior to any of the treatments of marking so that if there is any effect of the temperature variation to lay down an otolith pattern, that effect will be randomly spread through the entire population and should not effect the measure of the imposed mark treatments. (2) There does not appear to be any added mortalities due to the temperature variation technique to induce a proscribed pattern to the otoliths. The temperature variation needed to induce the desired pattern is also within the normal temperature ranges experienced by the incubating eggs. (AFS Marking Techniques Symposium papers present a number of papers discussing otolith marking issues).

A related concern is how the control and tagged groups are chosen from the population. There are two ways that this could be done but either require that adequate and accurate accounting of the numbers chosen be made with as little error as possible. The following illustrates the method I think should be used. The numbers of all groups need to be known. And of course, to avoid confounding effects in the analysis, there should be no differential fishing mortality in marks for the duration of the experiment.

1. Overall control group that is otolith marked with an identifiable pattern.
2. From the above group, randomly select fish for marking with:

    a) RV or LV
    b) CWT-AD
    c) CWT-AD + RV or LV

The groups do not need to have the same numbers, but should be sufficiently large to adequate returns to the hatchery.

rmpc/ventral.fin

Tag Depth and Placement For Washington Department of Fisheries Hatchery Rack Coho

250 Hatchery Rack Returns Measured for Depth and Placement

Fork-length		Tag Depth	
mean	= 59.8 cm	mean	= 14.1 mm
Std.Dev.	= 15.1 cm	Std. Dev.	= 5.9 mm
Minimum	= 25.0 cm	Minimum	= 2.0 mm
Maximum	= 82.0 cm	Maximum	= 39.0 mm

Tag Placement

Between Nares N = 234 = 94.0% of sample

Fork-length		Tag Depth	
mean	= 59.2 cm	mean	= 14.2 mm
Std. Dev.	= 15.2 cm	Std. Dev.	= 5.7 mm
Minimum	= 25.0 cm	Minimum	= 2.0 mm
Maximum	= 81.0 cm	Maximum	= 30.0 mm

Tip of Nose N = 12 = 4.8% of sample

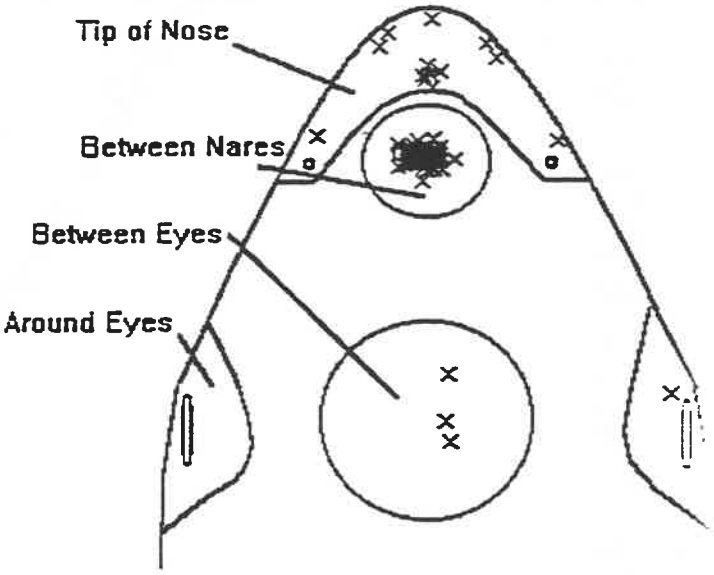
Fork-length		Tag Depth	
mean	= 67.0 cm	mean	= 10.7 mm
Minimum	= 32.0 cm	Minimum	= 3.0 mm
Maximum	= 78.0 cm	Maximum	= 18.0 mm

Between Eyes N = 3 = 1.2% of sample

Fork-length		Tag Depth	
mean	= 71.5 cm	mean	= 23.5 mm
Minimum	= 61.0 cm	Minimum	= 8.0 mm
Maximum	= 82.0 cm	Maximum	= 39.0 mm

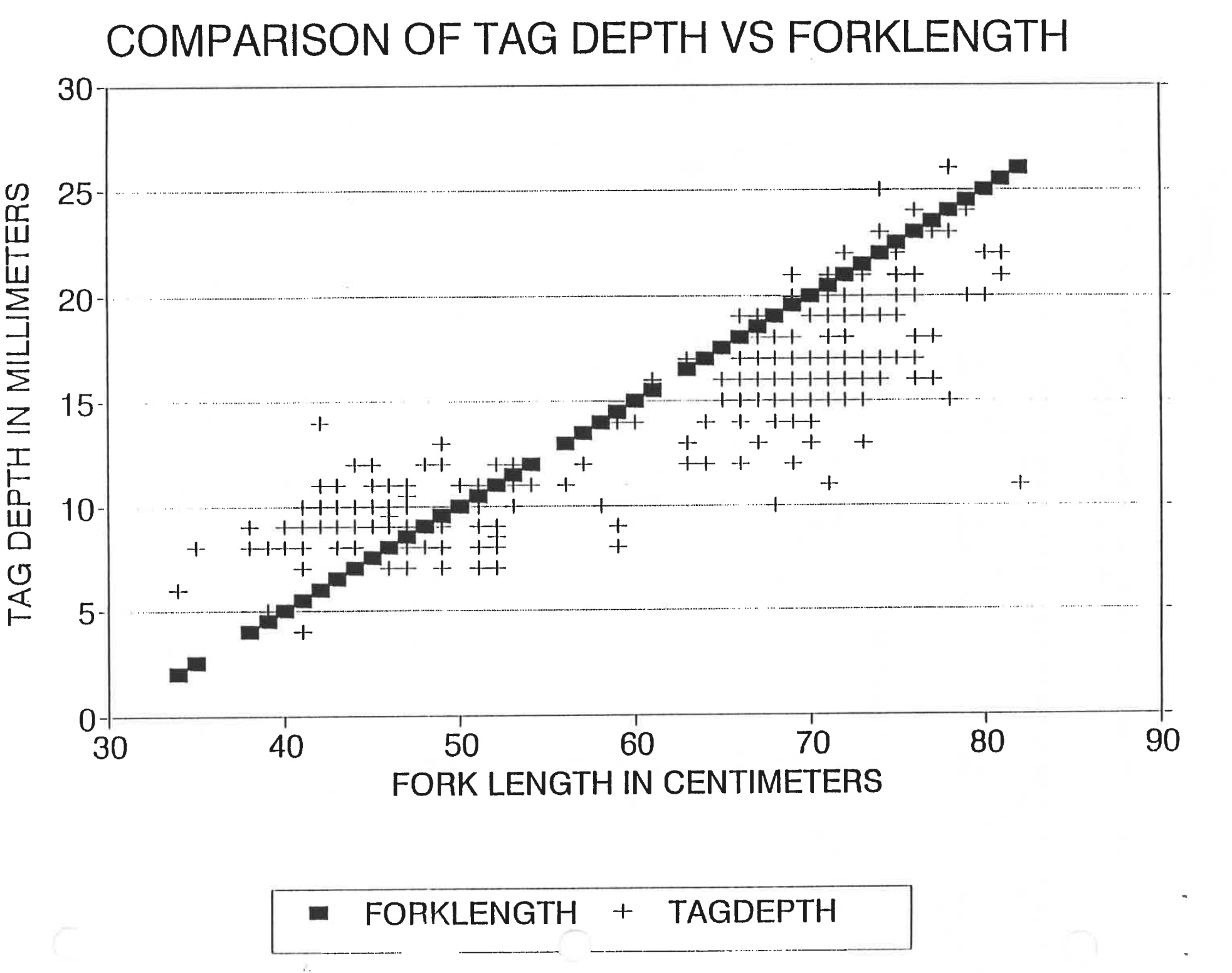
Around Eyes N = 1 = .4% of sample

Fork-length	Tag Depth
= 69.0 cm	= 13.0 mm



270 Hatchery Rack Returns Measured for Tag Depth Only

Fork-length		Tag Depth	
mean	= 61.0 cm	mean	= 14.1 mm
Minimum	= 34.0 cm	Minimum	= 4.0 mm
Maximum	= 82.0 cm	Maximum	= 26.0 mm


COMPARISON OF TAG DEPTH VS FORKLENGTH
TAG DEPTH IN MILLIMETERS
0
5
10
15
20
25
30
30
40
50
60
70
80
90
FORK LENGTH IN CENTIMETERS
FORKLENGTH
TAGDEPTH

Summary of Tag Location and Depth For Wand Demonstration

71 Tags
25 No Tags

Average Depth = 19.9 mm
Standard Dev. = 4.6 mm
Minimum depth = 8.0 mm
Maximum Depth = 30.0 mm

Tag Location	# of Specimens	% of Specimens
Between Nares	27	38.0 %

x Depth = 21.5 mm
Std Dev = 4.3 mm
Minimum = 10 mm
Maximum = 30 mm

Tag Location	# of Specimens	% of Specimens
Tip of Nose	23	32.4 %

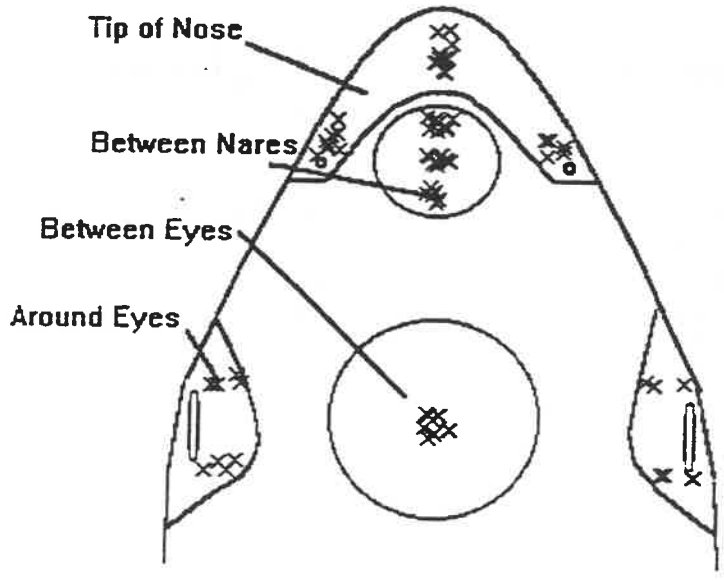
x Depth = 18.0 mm
Std Dev = 5.4 mm
Minimum = 8 mm
Maximum = 25 mm

Tag Location	# of Specimens	% of Specimens
Around Eyes	13	18.3 %

x Depth = 18.9 mm
Std Dev = 2.9 mm
Minimum = 10 mm
Maximum = 20 mm

Tag Location	# of Specimens	% of Specimens
Between Eyes	8	11.3 %

x Depth = 21.9 mm
Std Dev = 2.4 mm
Minimum = 20 mm
Maximum = 25 mm



Location and Depth of Coded Wire Tags For Wand Demonstration

V.I. #		Tag Depth in mm	Tag Location
A63		25	Between Nares
A64		10	Tip of Nose
A65		25	Between Nares
A66	Blue	25	Between Eyes
A67	Blue	20	Left Nares
A66	Yellow	20	Tip of Nose
A67	Yellow	No Tag	
A68	Yellow	20	Left Nares
A69		20	Left Eye
A70		20	Right Eye
A71		20	Behind Nares
A72		15	Behind Nares
A73		20	Between Eyes
A74		No Tag	
A75		20	Left Nares
A76		20	Tip of Nose
A77		15	Right Nares
A78		20	Behind Left Eye
A80		20	Between Nares
A81		15	Front of Left Eye
A83		20	Between Eyes
A84		15	Behind Nares
A86		No Tag	
A88		No Tag	
X00		25	Front of Nares
X01		25	Front of Nares
X02		25	Front of Nares
X03		10	Behind Left Eye
X04		No Tag	
X05		No Tag	
X06		No Tag	
X07		No Tag	
X08		No Tag	
X09		25	Between Nares
X10		20	Front of Left Eye
X11		No Tag	
X12		No Tag	
X13		20	Between Nares
X14		25	Between Eyes
X16		20	Rear Right Eye
X17		No Tag	
X18		25	Front of Nares
X19		10	Tip of Nose
X21		15	Between Nares
X22		No Tag	
X23		25	Left Nares

V.I. #	Tag Depth in mm	Tag Location
X24	25	Between Nares
X25	20	Left Nares
X26	25	Front of Nares
X28	10	Tip of Nose
X29	No Tag	
X30	25	Front of Nares
X31	No Tag	
X32	25	Front of Nares
X33	No Tag	
X34	10	Tip of Nose
X35	20	Behind Nares
X37	No Tag	
X38	No Tag	
X39	30	Front of Nares
X40	25	Left Nares
X41	20	Between Nares
X44	20	Behind Nares
X45	20	Between Nares
X46	8	Tip of Nose
X47	No Tag	
X48	20	Right Nares
X49	No Tag	
X69	20	Left Eye
X71	20	Right Eye
X73	25	Between Eyes
SZ0	20	Tip of Nose
NM0	20	Right Eye
NM1	25	Left Nares
NM2	20	Behind Nares
NM3	25	Right Nares
NM4	20	Between Eyes
NM5	20	Tip of Nose
NM6	No Tag	
NM7	No Tag	
NM8	20	Between Eyes
NM9	20	Between Nares
TM5	10	Tip of Nose
TM6	20	Between Nares
TM7	20	Right Eye
TM8	20	Left Eye
TM9	20	Between Eyes
TZ0	No Tag	
TZ1	No Tag	
TZ3	20	Left Nares
TZ4	20	Right Nares
TZ5	2[illegible]	Tip of [illegible]se
TZ6	1[illegible]	Between [illegible]ares
TZ7	20	Between [illegible]ares
TZ8	No Tag	
TZ9	20	Left Eye

PACIFIC STATES MARINE FISHERIES COMMISSION
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PSC WORKING GROUP ON DATA STANDARDS

February 8-9, 1994
Vancouver, B.C.

SUMMARY OF MEETING ACTIONS RE PSC DATA FORMATS

I. Meeting Overview

The PSC Working Group on Data Standards met in Vancouver, B.C. on February 8-9, 1991 to consider a number of proposed changes to the PSC Format Version 3.0. The goal was to address and correct some of the shortcomings experienced in sharing CWT data in Format Version 3.0. One of the key issues was whether or not to open the formats and make a major upgrade to Version 4.0, or to make minor changes and upgrade to Version 3.1. The meeting was intense and focused by necessity, having 44 agenda items and fifty plus pages of supporting information. All agenda items were covered during the two days.

Meeting participants included:

Stan Allen (PSMFC)*	Bill Kinney (WDF)*
Brenda Atkins (CDFO)*	Louis Lapi (CDFO)
Susan Bates (CDFO)*	Sue Lehmann (CDFO)
John E. Clark (ADFG)*	Jim Longwill (PSMFC)*
Charlie Corrarino (ODFW)	Susan Markey (WDF)*
Barbara Haar (ADFG)	Dick O'Connor (WDF)
Marc Hamer (CDFO)	Ron Olson (NWIFC)
Ken Johnson (PSMFC)	Ken Phillipson (NWIFC)*
Tom Kane (USFWS)*	(*Observers)

It was agreed at the beginning of the meeting that all agenda items would be first reviewed on the basis of their respective merits, regardless of whether approval meant going to Version 4.0 or just expanding the current formats and upgrading to Version 3.1. Following the last agenda item, a review was made of the agreed upon changes. **Consensus was then reached on upgrading to Format Version 3.1 at this time.** Additional major changes were flagged for evaluation at a future date when the formats will be opened for a major move to Version 4.0.

The new changes approved for Version 3.1 are listed below in Section II.

II. Approved Changes for Format Version 3.1 Upgrade

A. Release File:

1. Add new Field 29: 'Other Marks' Parameters to be determined

There are now a number of studies in which CWT marked fish have been released with other marks as well. This includes the visual implant tags and ventral clips (e.g., Ad+CWT+VI and Ad+LV+CWT). There are several others that could be included in this list. The PSC Data Sharing Committee addressed this issue and instructed Data Standards to add the new field 'Other Marks' to report any identifiers other than the Adipose clip in salmon releases.

- *The field is not be to used to report the Adipose only mark on any salmon species.* (CDFO required this restriction because of its strong opposition to the release of adipose only marked chinook in the Snake River system.)

  Any salmon released with the Adipose only clip (e.g. Snake River) must be reported in Release Field 15 (No. of Untagged Fish). The Comments field can be used to indicate the use of the Adipose only clip in those cases.

- *Adipose only marked steelhead are an exception and can be reported under 'Other Marks' since the Adipose has been desequestered coastwide for this species.*

  This change corrects the special case where untagged representative steelhead marked with the Adipose only (no CWT) had to be reported in 'Number of Untagged Fish' (Release Field 15).

2. Add new Field 30: 'Marked, Not Tagged': 9 chars. Right Just. Numeric

This new field was added for use with the new Field 29 'Other Marks'. It will be used to report the number of marked fish that are not part of a CWT release group. It would be particularly useful in reporting non-representative release groups that carry marks.

The format is identical to Field 15 'No. of Untagged Fish':

3. Add new Field 31: 'Reporting Agency' 4 chars Required Alpha

The 'Reporting Agency' is that agency that actually reports the release data to PSMFC, regardless of who the Tag Coordinator might be, and which agency actually tagged the fish. It is needed to maintain data integrity when loading new and revised release data sets.

4. Add new code 'M' to Release Stage (Field 10).

A new code for "Release Stage" was added in order to better identify multiple releases stages (as defined by each agency). These non-standard releases will be identified by the letter "M" for MIXED in the "Release Stage" field. As such, it will be a red flag that the release group was not representative of standard production.

5. **Changes to Release Field 11: 'Rearing Type'**

   a) **Add new code 'U' (Unknown)** to handle those situations when rearing type is not known.

   b) **Expand the definition for code 'M' (Mixed)** to include both downstream migrants and *marine tagging*.

B. Recovery File

1. **Add new Field 35 'Run Year':** Cols 112-115 4 chars (YYYY) Required Numeric

   Definition: "Same year in which the catch/sample is reported. Where there is no catch/sample, use year in which the majority of the run returns."

   This new field resolves the problem of having recoveries span two years in a single file and thus not able to identify run year from the Recovery Date field (YYMMDD).

2. **Modified definitions of Sampling Types '1' and '5'** (Recovery Field 25)

   Additional clarification was added to indicate that Sample Type '1' is also to be used for reporting catch with no CWT sampling. The new definition is:

   Sample Type '1' "In-sample recoveries from a sampled fishery with known catch; Estimation value is non-zero. (If sample size is zero (0), estimation value is blank); *Also use Sample Type '1' for unsampled catches.*"

   The definition for Sample Type '5' was modified to include select recoveries and delete the reference to the confusing term 'Non-Destructive Samples'. (Note: These latter samples are now referred to as 'Pass-Through Samples' and are assigned to the new Sample Type '7' discussed below). The new definition is:

   Sample Type '5' "Voluntary *or select recoveries* from a sampled fishery with known catch and no awareness estimates available; Use of these recoveries leads to double counting; Estimation value is zero (0) only (e.g., commercial voluntary recoveries)."

3. **Add new Sample Type '7' for adult "selective" (pass-through) sampling**

   A new Sample Type '7' (Recovery Field 25) was added for reporting select recoveries from populations that are later subjected to destination sampling. The definition of the new Sample Type '7' and revised comment #3 under Sample Type are:

Sample Type '7': 'Pass-Through' Sample

"Recoveries that are selectively removed from certain sampling programs. The unmarked fish are subject to subsequent destination sampling. Estimation value is one (1) only. See also Note #3 below."

Sample Type Note #3: 'Pass-Through' Sampling (Sample Type '7')

"In certain sampling programs, unmarked fish are released while marked fish are killed and snouts removed. The unmarked fish are subject to subsequent destination sampling and the lack of reporting would result in underestimation of the tag codes. Such tag recoveries should therefore be reported as Sample Type '7' with no catch/sample record provided. Sampled fish are selectively removed with an estimation value of one (1)."

4. **New policy on handling recoveries of reused tagcodes (*1, *2 , etc)**

A new policy was adopted that allows **recovery agencies the option to report recoveries of reused tagcodes with the appropriate *1, *2, etc, and as Status '1's if they are able to make the correct assignment.** Those that can not be assigned with confidence will continue to be reported as Status '7's (unresolved). Similarly, recovery agencies have the option to report all recoveries of reused codes as status '7's if they so chose.

This action changes the former requirement that all recoveries of reused tag codes be reported as status '7's. The decision of whether or not to assign a recovery of a reused code to the appropriate release code or leave it as 'Unresolved' is the responsibility of the recovery agency.

5. **Add new codes to 'Sampling Period Type'** (Recovery Field 5) to accommodate weekend and weekday sampling.

Two new codes 'A' and 'B' were added to 'Sampling Period Type' (Recovery Field 5, Catch/Sample Field 8) to accommodate weekend and weekday sampling. In addition, a new code '9' for daily sampling was reserved for future use.

'A'	=	Weekend (Saturday, Sunday, and observed holidays)
'B'	=	Weekday (Monday through Friday, excluding holidays)
'9'	=	Daily *(*reserved for future use)*

The associated 'Sampling Period Number' for both 'A' and 'B' is: n='01-54'.

These new codes allow reporting of certain catch sampling programs (e.g. Deschutes River, OR) where tag recoveries are routinely expanded on a finer scale than weekly.

6. **Standard established for handling expansions for recoveries having Tag Status 3, 4, and 8.**

   The estimated number field should be blank for tag recoveries assigned to Tag Status 3 (lost tag), 4 (unreadable tag), and 8 (no snout taken) if the recoveries have already been used to adjust the estimated number of other tag recoveries.

C. Catch/Sample File

1. **Add new Field 32: 'Escapement Estimation Method'**

   This new field is needed to identify the methodology used to estimate the spawning escapement (similar in purpose to the "Counting Method" field in the Release file. The parameters of the new field 32 will be determined in the near future by a subcommittee of Data Standards.

2. **Add new codes to 'Sampling Period Type'** (Catch/Sample File Field 8) to accommodate weekend and weekday sampling.

   Two new codes 'A' and 'B' were added to 'Sampling Period Type' (Recovery Field 5, Catch/Sample Field 8) to accommodate weekend and weekday sampling. In addition, a new code '9' for daily sampling was reserved for future use.

'A'	=	Weekend (Saturday, Sunday, and observed holidays)
'B'	=	Weekday (Monday through Friday, excluding holidays)
'9'	=	Daily *(*reserved for future use)*

   The associated 'Sampling Period Number' for both 'A' and 'B' is: n='01-54'.

   These new codes allow reporting of certain catch sampling programs (e.g. Deschutes River, OR) where tag recoveries are routinely expanded on a finer scale than weekly.

3. **Change 'File Creation Date' (Field 5) in the Catch/Sample file to 'Record Creation Date'.**

   'File Creation Date' (Field 5) in the Catch/Sample file has been changed to 'Record Creation Date'. It will represent the date when the individual Catch/Sample records were last updated. The field will remain a required field. *It will also require that the entire Catch/Sample file be submitted each time.* This was done to provide analysts with a better means of tracking changes in the catch/sample data.

D. Locations File

1. **Add new Field 7:** **'Region'** Parameters to be determined yet

2. **Add new Field 8:** **'Basin'** Parameters to be determined yet

Both of these fields will be used to map the 19 character location codes into broader areas, thus enhancing the use of the coding for those users who need CWT data aggregated by either region or basin. It is one of the final links needed to make the CWT data unified on a coastwide basis.

3. **Add new Field 9:** **'EPA Reach Code'** Parameters to be determined yet

There is considerable interest in mapping the U.S. freshwater 19 character PSC location codes to the EPA hydrological units and river reach codes. The University of Washington has already made a major step in this direction by mapping all of the Oregon and Washington codes for the Columbia basin to the equivalent EPA coding. In addition, a significant number of agencies in the Columbia Basin, including BPA, NWPPC, ODFW, and IDFG, are already using the EPA coding as a standard for their work. In addition, the Columbia River Coordinated Information System (CIS) being developed in the Columbia Basin (Stan Allen, PSMFC; Program Manager) and the Pit Tag Information System (Carter Stein, PSMFC; Program Manager) both have incorporated the EPA coding as an integral part of their respective location coding schemes.

There are two major benefits to mapping to the corresponding EPA codes:

- The first is that EPA has established the coding for the entire U.S., including Alaska. In addition, drainage maps are available for determining the appropriate coding at both regional and local levels of resolution.

- The second is that longitude and latitude can be carried with the codes in a cross reference table, thus providing additional computing power for any future venture into Geographic Information System (GIS) analyses.

4. **Solution for orphaned location codes in the database**

Historical Release, Recovery, or Catch/Sample records in the database must not refer to locations which are no longer in use and do not exist in the location file (i.e.; prevent "orphaned" data records). At the same time, the Locations file needs to be kept free of obsolete location records. Thus, the Locations file must always contain only those location codes that are valid and in use by each reporting agency. The challenge, therefore, is how to prevent orphaned location codes when, by necessity, code changes continue to be made to meet new situations or to correct errors.

The problem with orphaned codes can be resolved by following two procedures:

1) Submit all locations only as a full set.

2) The 'File Creation Date' in the Locations file dataset *must be the same value for all records.* The validation specification for Locations, field 4 will be modified by adding line: "Must be the same value for all records."

E. PSC Fishery Codes

1. Add new PSC Fishery Code '57' for 'Mixed Wild Broodstock and Hatchery Returns'

Some hatchery programs supplement hatchery escapement (Fishery code #50) with wild broodstock collections from other streams (Fishery code #53). If these fish cannot be kept separate prior to sampling, nether code accurately reflects the source of the fish. Likewise, if the "imported" broodstock included CWT marked fish, it could give the false impression that these fish had strayed into the hatchery. It was therefore agreed that a new fishery code (#57) would be added for "Mixed Wild Broodstock and Hatchery Returns" **as a warning flag that the fish were not standard hatchery returns.**

This new code is not intended to replace the situations where fish holding in the river near the hatchery rack, and assumed to be hatchery returns, are reluctantly recruited into the hatchery (e.g. gaffed or netted). These fish would still be best represented by code #50. Code 57 is also not intended to replace the existing coding for wild broodstocking where the fish are sampled separately.

F. New 'Data Description File'

A new 'Data Description File' was added as a required file accompanying any file submitted to the Mark Center. The intent of the file is to provide a concise summary of the data file. Fields include:

	# Columns
'Submission Date'	8
'File Type'	2
'Reporting Agency'	4
'File Year'	4
'Line Number'	2
'Data Description'	60

The new file is designed to allow up to 99 lines of text in the Data Description field. This will provide users with a clear idea of file contents, as well as significant changes from an earlier data set if it has been resubmitted.

File specifications and validation rules are attached on the following page.

II. DATA SET SPECIFICATION AND VALIDATION .....

F. Data Description File -- Main Text

DATA DESCRIPTION No	PSC Format name	Cols	Reqd	Just	Fill	Format	Validation..... DATA DESCRIPTION
1	Submission Date (Cols. 1 - 8)	8	Yes	D	NA	YYYYMMDD	This date refers to the date the Reporting Agency submitted the data description Must be uniform for all records in Data Description File Must be a legal date of the form 'YYYYMMDD' Must not be greater than today
2	File Type (Cols. 9 - 10)	2	Yes	D	NA	'RL' 'RC' 'CS' 'LC'	Type of data file to which Data Description (field 6) pertains Must match one of the following: =Release (tagged and/or untagged) =Recovery =Catch/Sample =Location
3	Reporting Agency (Cols. 11 - 14)	4	Yes	L	Blank	Alpha	Must contain a code defined in chapter IV, section B
4	File Year (Cols. 15 - 18)	4	No	D	NA	YYYY	Required if File Type (field 2) is 'RC' or 'CS' Must contain Run Year (Recovery field 35) if File Type is 'RC' Must contain Catch Year (Catch / Sample field 3) if File Type is 'CS'
5	Line Number (Cols. 19 - 20)	2	Yes	R	Zero	Numeric	Line (record) number of current Data Description (field 6) Must begin with the value '01' for the current Data Description
6	Data Description (Cols. 21 - 80)	60	Yes	L	Blank	Alpha-Numeric	Textual description to further explain meaning of data for one File Type (field 2). May span multiple lines (up to 99) in which case fields 1 - 4 must be repeated for each line

Adipose Fin Regeneration Study

Due to discussions amongst various fishery agencies as to what constitutes a "bad" adipose clip and whether or not clipped adipose fins regenerate, the Washington Department of Fisheries (WDF) began conducting a study to determine if poorly excised adipose fins regenerate.

The study was conducted at the Simpson Salmon Hatchery located on the East Fork Satsop River at river mile 17.6 using 1991 brood coho salmon (Oncorhynchus kisutch). A WDF coded wire tagging trailer (Schurman and Thompson 1990) was used for the tagging and marking procedure.

The study is comprised of three groups. The control group consists of 79,328 coho with perfectly excised adipose fins. The second group has 10,716 fish with the top 2/3 of the adipose fin excised. The third group has 10,584 juveniles with the back 2/3 of the adipose fin excised (Figure 1). All three groups were coded wire tagged with unique codes.

To ensure maximum quality control for this study, every fish was double checked for the quality of adipose clip. For each group, temporary fish markers would make the original excision and experienced WDF biologists would double check the adipose clip. For the control group biologists would clean up any clip that were not perfect. For the second group biologists would determine if the top 2/3 of the fin had been removed. If the fin had not been excised properly, the biologist would either make the precise cut or remove the rest of the fin and tag the fish with the control group tag code. For the third group the biologists would determine if the back 2/3 of the fin had been removed. Again, if the fin had not been excised properly the biologist would either mark the fin correctly or remove the rest of the fin and tag the fish with the control group tag code.

Photographs were taken of random specimens to show the quality and consistency of the adipose marks during coded wire tagging and fin marking of the groups

From the control group, 561 fish were checked for coded wire tag loss and clip quality at 32 days from the end of tagging.

Coded wire tag loss was 0.3% and there were 0.0% bad or regenerated clips. From the second group (top 2/3 of adipose fin excised), 457 fish were checked and tag loss was 0.3% and there was no evidence of adipose fin regeneration after 28 days.

From the third group (back 2/3 of adipose fin excised), 445 fish were sampled after 29 days and coded wire tag loss was 0.0% and there was definite adipose fin regeneration. The adipose fin had not completely regenerated but the newly regenerated portion of the fin was translucent and growing into the normal or expected shape of an adipose fin.

Adult Sampling Procedure

During the fall of 1994 100% of the Simpson coho hatchery rack will be sampled for the presence of a coded wire tag using a Northwest Marine Technology field sampling detector. If a coded wire tag is detected, the snout will be removed and the size and shape of the adipose fin will be recorded. After the coded wire tags have been dissected and read, the data will be summarized as to which groups have or have not regenerated and to what extent.

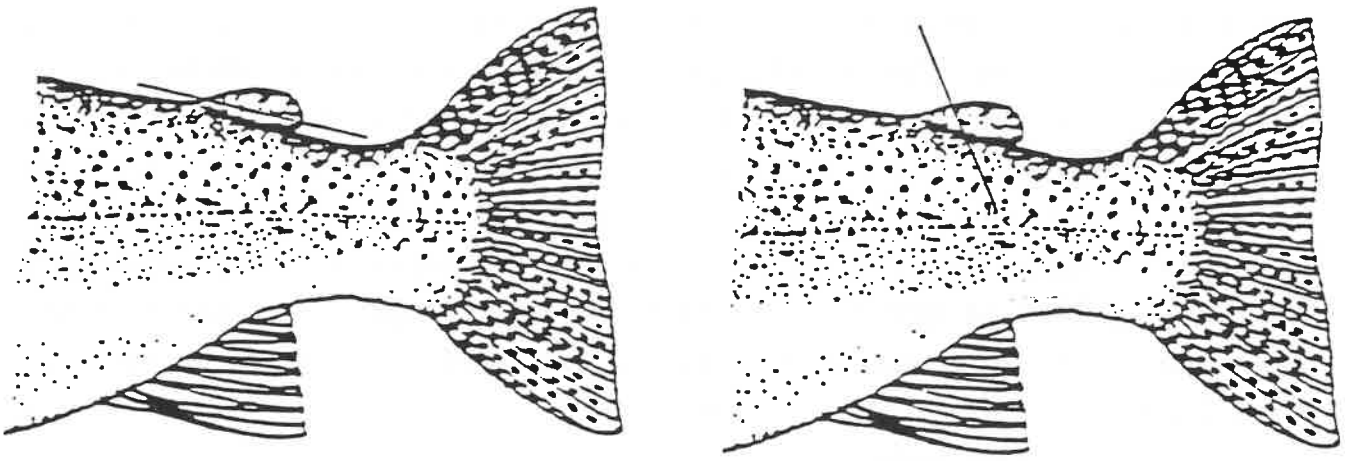

Figure 1. Examples Of The Adipose Clips Used