2002 MARK MEETING

Pacific Grove, California
Lighthouse Lodge and Suites
April 17-19, 2002

Final Minutes

April 17, 2002

Convened at 1:00 P.M.

1. General Business Items

A. Welcome/Introductions

California Department of Fish and Game (CDFG) was extended a special thanks for hosting the 2002 Mark Meeting. Bob Kano was thanked for his efforts in arranging for hotel reservations and meeting room arrangements, the reception, and a tour of Stanford University's Hopkins Marine Science Laboratory in Pacific Grove. A special thanks was also extended to Guy Thornburgh (CEO, Northwest Marine Technology Inc) for hosting a reception for the Mark Meeting participants and guests.

Mark Committee members and other meeting participants were introduced at the start of the Mark Meeting **(Attachment 1)**. There were no changes in the committee membership. However, Geraldine Vander Haegen (WDFW) was not able to attend because of maternity leave and was represented by Susan Markey. Robert Bayley (NMFS-Portland) and Tim Yesaki (BC Environment) were not able to attend.

Doug Zimmer (USFWS) did not attend the meeting in the role of a facilitator as he had commitments on the East Coast. However, he has travel authorization to facilitate the Mark Meeting next year if his services are needed.

B. Year 2003 Meeting Site and Date

The year 2003 Mark Meeting will be hosted by the Alaska Department of Fish and Game. Ron Josephson indicated that the meeting would be held in Sitka. After some discussion, the decision was made to move the meeting forward one month to **May 21-23, 2003**. The later date will coincide with the opening of the commercial salmon troll fisheries. Ron indicated that he would explore the possibility of arranging a trip on a troller so that the Committee could better understand Alaska's fisheries and tag recovery program.

The 2004 Mark Meeting will be held in Idaho.

C. Proposal to include Other Agencies within a State as Meeting Hosts

Based on her experience of hosting last year's Mark Meeting, Christine Mallette (ODFW) recommended that future Mark Meetings be hosted by all of the agencies in a given state in order to share tasks and any financial cost. In the past, the meeting rotated between the five state agencies (ADFG, WDFW, IDFG, ODFW, CDFG) and Canada (CDFO). She proposed that NMFS, USFWS, NWIFC, CRITFC, and Metlakatla be included in the rotation. One possibility would be to have 'joint hosting' by a federal agency with a tribal agency (e.g. USFWS and NWIFC) in a given state.

Ron Olson (NWIFC) voiced support for 'joint hosting' of the Mark Meeting and noted that it represented two parts. One is the effort in hosting of the meeting, and the second is the costs incurred. He noted that when the Mark Meeting was held in Washington in 2000, he and David Zajac (USFWS) had initially worked with Geraldine Vander Haegen as WDFW was the host agency. However, she proved so efficient that their assistance wasn't later needed. The cost was minimized by finding a hotel that provided the meeting room without charge. That just left the cost of the coffee and 'snacks' for break times.

Marianne McClure (CRITFC) questioned how the rotation would work if all of the other agencies were added. Rodney Duke (IDFG) recommended that the rotation remain on the state/province basis, and that the agencies within a given state or province then work out the arrangements for co-hosting the meeting. Susan Markey (WDFW) concurred and added her support for joint hosting of the annual Mark Meeting.

ACTION: By consensus, it was agreed that the Mark Meeting will continue to rotate on a state/province basis as in the past, with those agencies within the state/province having joint responsibility for hosting the meeting. The rotation for the next seven years will be Alaska (2003), Idaho (2004), British Columbia (2005), Washington (2006), Oregon (2007) and California (2008). It then repeats, beginning with Alaska in 2009.

2. Status of Mark Center Operations

A. "Where's Waldo?" - Update on Jim Longwill's Wanderings

Ken Johnson noted that Jim Longwill (PSMFC), a long time Mark Center employee, was still on extended leave of absence without pay and had been traveling throughout Europe for the past 12 months. He is now back in the USA and is scheduled to return by September, 2002. Needless to say, he has had an unforgettable year as he wandered through Portugal, Spain, the British Isles, France, the Netherlands, Denmark, Sweden, Norway, Poland, Italy and various other countries.

B. Missing Data Sets

Dan Webb briefly reviewed the data status tables for each reporting agency's CWT release, recovery, and catch/sample data files. Attention was focused on existing ‘holes’ and agency plans to report the missing data.

Release Data:

The CWT release data are largely current for all tagging agencies.

Recovery and Catch/Sample Data:

The Recovery and Catch/Sample data files are the best that they have ever been in terms of reported data. Data sets are current for all years up through 2000, with the exception of Idaho (missing years 1999-2000). However, only ODFW and CDFG have reported recovery and catch/sample data for 2001. (Note: CDFG's recovery data is limited to the ocean recovery data. See explanation below on status of their freshwater recoveries).

ADFG: Ron Josephson stated that they were close to reporting their 2001 data. The delay was primarily a result of the delays experienced in Format 4.0 and then ramping up for their internal conversion.

CDFG: California is current for reporting ocean recoveries and catch/sample data. For the past three years, the Ocean Salmon Project staff (Matt Erickson) has been working on reporting the inland recoveries. Progress on the inland recovery data continues to be made but much work remains.

CDFO: Marc Hamer likewise reported that Canada was delayed by the Format 4.0 process and was hopeful that they would soon be able to report the 2001 data.

USFWS: David Zajac commented that USFWS's missing 2001 recovery data are primarily rack returns and thus will be late as is customary for such data.

IDFG: Rodney Duke stated that Idaho is pushing hard to catch up. Chris Harrington had taken a new job last year, with the result that data processing suffered. Glen Sutton has been recently hired to fill the vacancy but is going to need time to learn his duties. Rodney also noted that Idaho had more snouts to process last year than they had seen in 25 years combined.

NWIFC: Ron Olson reported that the 2001 recovery data were from escapement sampling and are still being processed. The data should be available in the fall. All fisheries recoveries are reported through WDFW.

NMFS: Adrian Celewycz projected that the 2001 data would be reported by June at the latest.

ODFW: Current for year 2001.

QDNR: QDNR has hired a new staff person, Shizhen Wang, to process its recovery and catch/sample data. Dan Webb added that he had been working closely with Shizhen in the past two months and that he had made excellent process.

WDFW: Susan Markey stated that WDFW had likewise been delayed by the migration to Format 4.0 but expected to have the 2001 data reported soon. Another complication was that

they had to process 110,000 snouts this year for fish sampled in 2001. This was a huge increase over the 45,000 snouts processed last year for fish sampled in 2000.

ACTION: It was noted that the Data Specifications document states that preliminary Recovery and Catch/Sample data for a given calendar year should be reported no later than January 31st of the following year. The Mark Center was asked to modify the Data Specifications to clarify that this 'deadline' only applied to fisheries. By the nature of escapement, these data will always be reported much later in the year.

3. PSC Version 4.0 Formats for Data Exchange (Dan Webb)

A. Conversion Process from Version 3.2

Dan Webb (PSMFC) discussed the challenges encountered in converting the historical CWT data in Format Version 3.2 to Format 4.0. Previous format upgrades from Version 1.0 through Version 3.2 were not difficult as new fields were always added at the end of the fixed length files. Version 4.0 represents a major departure in that the data will now be exchanged in Commas Separated Value (CSV) format. In addition, some fields have been deleted, others were redefined, many repositioned, and a number of new fields have been added in the appropriate grouping position. Thus migration of Version 3.2 data into Version 4.0 was not a trivial task.

Three separate processes were required to move from Version 3.2 to 4.0 (**Attachment 2**):

1) Database Conversion: The historical Version 3.2 CWT database was converted to Version 4.0 on March 29, 2002 in a *one time* process using SQL statements. No attempt was made to pass the converted data through Version 4.0 data validation as much of the historical data would not be able to meet today's much higher standards.

The Version 3.2 to 4.0 field mapping matrix is available on the Mark Center's web site at 'RMPC Publications' (www.rmis.org/pub/index.html). As noted earlier, not all fields mapped directly across and some assumptions had to be made with fields involving marks. Consequently data managers were advised to check their data on RMIS to verify that the conversion worked correctly for their data.

2) Version 3.2 File Translation: Most agencies are not ready to submit new data in 4.0 Format. Accordingly, any Version 3.2 data files submitted after March 29, 2002 will be translated into Version 4.0 using Perl scripts. The data will then be passed through Version 4.0 data validation to ensure that present data standards are met. Upon passing validation, the data will be added to the CWT 4.0 Database.

3) Version 4.0 Native File: Some agencies have the capability to submit new data files in Version 4.0. These 'native 4.0 files' will be passed directly through Version 4.0 data validation. Upon passing validation, the data will be added to the CWT 4.0 Database.

Dan Webb also pointed out that data managers now have the option of using the RMIS application on the web to select their converted historical data and download it in Version 4.0

format. They then can install the converted data on their computer, make any necessary edits, and then resubmit it as a Version 4.0 file. Upon passing 4.0 data validation, their data will be added to the CWT 4.0 Database.

B. Key Features, including New and Revised Fields

A number of differences and major enhancements in Version 4.0 are summarized below:

1) General Differences in the Data:

- Field Names are synchronized, match database names, and are more descriptive
- Field Sizes are expanded to accommodate longer field values (e.g. agency name acronyms)
- Field Order is standardized across data types and grouped with like fields
- Field Codes have been added (e.g. Tag Type, Release Stage, Mark Codes…)
- Field Formats are modified for use with CSV files (i.e. no implied decimals or fixed length filling with zeros/spaces)

2) Major Enhancements in the Data

All Data Types
- Standardized the first four fields in each file: (Record Code, Format Version, Submission Date, and Reporting Agency)

Locations
- Latitude and Longitude changed to decimal degrees

Releases
- Split Release Dates into two fields
- Tag Reused Flag added to identify reused tag codes
- Tag Loss Rate (3.2 No. Shed CWT) change usage from a count to an average
- New Mark and Mark Count fields
  - CWT 1st Mark (3.2 CWT Mark Id)
  - CWT 1st Mark Count (3.2 No. Released with CWT)
  - CWT 2nd Mark
  - CWT 2nd Mark Count
  - Non CWT 1st Mark (3.2 Non-CWT Mark Id)
    (For conversion, Mark code 0009 changed to 9009)
  - Non CWT 1st Mark Count (3.2 No. Non-CWT Released)
  - Non CWT 2nd Mark (in conversion, filled with CWT Mark Id if No > 0)
  - Non CWT 2nd Mark Count (in conversion, filled No. Shed CWT if > 0)

Recoveries
- Period Type (3.2 Sampling Period) change A to 10 and B to 11
- Recorded Mark (convert 0009 to 9009 for converted data)
- Tag Status (3.2 Status of Tag) added ‘9’ - Pseudo Tag/ Blank wire

Catch Sample

- Period Type (3.2 Sampling Period Type) change A to 10 and B to 11
- Detection Method (3.2 CWT Detection Method) default to 'V' if blank
- New Mark Rate Fields (explained in Section C below)
  - MR 1st Partition Size ("P1")
  - MR 1st Sample Size ("S1")
  - MR 1st Sample Known Ad Status ("K1")
  - MR 1st Sample Obs Adclips ("A1")
  - MR 2nd Partition Size ("P2")
  - MR 2nd Sample Size ("S2")
  - MR 2nd Sample Known Ad Status ("K2")
  - MR 2nd Sample Obs Adclips ("A2")
  - Mark Rate
    (see *www.rmis.org/pub/index.html* for Field Mapping Matrix from 3.2 to 4.0)

C. Mark Sampling: Expanded Explanation

The shift to mass marking and selective fisheries has necessitated a comparable shift in the sampling strategy. Four marking scenarios may now happen at the hatchery that directly impact sampling. Hatchery fish may be:

a) Adipose clipped and CWT (Historical use of the Ad clip as a CWT flag)
b) Adipose clipped and no CWT. (Present use of the Ad clip as a mass mark)
c) No adipose clip and CWT (Double index tagging to represent wild fish)
d) No adipose clip and no CWT (No marks, treated in fisheries as a wild fish)

At the time of recovery, samplers can visually determine if a fish is adipose clipped but can't determine whether or not it contains a CWT. As such, electronic sampling is also required to determine which of the four categories a given fish falls into. Said another way, the presence or absence of the adipose fin (visual sampling) is independent of electronic sampling for CWTs (i.e. signal ['beeps'] versus no signal).

This results in three basic mark sampling types at the time of recovery. These three types are briefly summarized here. The reader is encouraged to review Dan Webb's PowerPoint presentation (**Attachment 3**) for a graphical representation of each mark sampling type, and how the Mark Rate is calculated from the respective sampling partitions, sample sizes, known adipose status (sum of known Ads + No Ads), and number of observed Ad clips.

1) Visual Sampling

The sampler is only checking for the presence or absence of the adipose fin. All fish are examined. Any CWT recoveries could include processing many heads without tags. The Mark Rate is simply the number of observed Ad clips (A1) divided by the total number with a known Ad clip status (K1).

2) Independent Electronic Sampling

In this situation, all of the fish in the sample are examined independently for adipose clips and then electronically sampled for tags (i.e. signal vs no signal). The order of the double sampling does not matter. As in the case of visual sampling, the Mark Rate is simply the number of observed Ad clips (A1) divided by the total number with a known Ad clip status (K1).

3) Dependent Electronic Sampling

Dependent electronic sampling is the common form of sampling today. In this case, the fish are first electronically sampled and divided into two partitions (signal or beeps = P1, and no signal = P2). One or both of these partitions is then sampled (S1 and S2) for Ad clips (A1 and A2, respectively). The S1 and S2 sample sizes may or may not be equal to the partition sizes (P1 and P2, respectively) of the electronic samples.

The Mark Rate is more complicated in this case and the reader is encouraged to review the figures provided in **Attachment 3**. The adipose clips rates in both partitions must be combined and weighted based on the relative sample sizes in the respective 'Signal' (P1) and 'No Signal' (P2) partitions. In abbreviated form: Mark Rate = [(P1 * A1/K1) + (P2 * A2/K2)] / (P1 + P2)

4. Need to Expand Size of 'Number_Untagged' Field to Nine Characters

In the process of the conversion from Format 3.2 to 4.0, the Mark Center found 18 releases where the total number of untagged fish exceeded 99,999,999 and thus did not pass validation. Currently, the 4.0 data specifications only allow eight characters and needs to be expanded to nine characters. Ken Johnson noted that this was really an issue for the PSC Data Standards Working Group (DSWG). However, since many of the DSWG members were either on the Mark Committee or in attendance, it seemed advisable to point out the problem and recommend that DSWG make the necessary change.

ACTION: A recommendation was made that DSWG expand the necessary release fields in the new 4.0 format from eight to nine characters to accommodate releases of untagged fish that are equal to or in excess of 100,000,000 fish. This change would expand format 4.0 field #33 (Non CWT 1st Mark Count) and field number 35 (Non CWT 2nd Mark Count).

5. New Run Code Proposed for Upriver Bright Chinook in the Columbia Basin

Prior to the Mark Meeting, Debbie Milks (WDFW) had asked Ken Johnson to alert the Mark Committee that the Lyons Ferry Hatchery staff were having problems with the run coding for late fall 'Upriver Bright' (URB) chinook. She had noted that WDFW had always used run code '3' (fall) for the Lyons Ferry URB chinook but run code '7' (late fall) was available and should be used. The complication was that the PTAGIS database did not allow for run code '7'. After talking with Debbie Milks further, Dick O'Connor (WDFW) suggested via an email that the Mark Committee consider recommending a new run code be created for the late fall URB chinook, given their importance and distinction. In addition, a new run code would eliminate the current confusion with run code '7' which also means late fall coho. He also predicted that the

PTAGIS data managers would quickly adopt any new run code that was being used by the CWT program in the Columbia Basin.

The Mark Committee concurred that the run code '7' was overloaded and that it would be wise to recommend to the PSC Data Standards Working Group that a new run code '8' be added for late fall URB chinook. Bob Kano (CDFG) added that this would have no impact on use of the run code '7' for late fall chinook in the Sacramento River system.

ACTION: A recommendation was made that DSWG add a new run code '8' in the new Version 4.0 format for late fall URB chinook (Columbia River Basin). Per Dick O'Connor's earlier email, WDFW will revisit their historical release data for URB chinook and re-code the run to code '8' if the new code is approved by DWSG.

6. Reporting Mid-Year CWT Releases: Agencies Requested to Report in Separate File

Ken Johnson noted that there is a valid need for early reporting of incomplete 'mid year' release records as early recoveries can and do occur. However, the incomplete mid-year release records pose a difficult problem for the Mark Center as they fail validation for a large number of fields. This in itself is not a problem as validation requirements can be relaxed for these preliminary records. The problem is that the Mark Center has no reliable way of being able to identify and flag those preliminary mid-year records when they are submitted with complete release records.

Several suggestions were earlier presented to DSWG via the forum, including the preferred option of adding a new field to flag preliminary release records. As such, a reporting agency could report all releases in a single file and specify those that are preliminary. With the flag, preliminary records would then pass thorough a watered down validation loop while all of the rest of the release records would be fully validated.

There was not full support for adding the new field. Therefore, **release agencies will need to submit mid-year release records in a separate file**. The Mark Center will then set an internal flag that the data are preliminary and pass the records through a 'watered down' validation loop. Should preliminary releases records be inadvertently submitted with complete release records, they will fail validation. As such, they will need to be resubmitted as a new file to be able to be routed through the 'relaxed' validation requirements.

ACTION: Mid-year release records (CWT Only) for the current calendar year are to be reported each summer as a separate file. The PSC data submission specifications are:

1) The preliminary mid-year data records should be reported no later than **August 15** of the current calendar year.

2) Preliminary release data must include at a minimum all of the following fields: record_code, format_version, submission_date, reporting_agency, release_agency, coordinator, tag_code_or_release_id, tag_type, species, brood_year, rearing_type, last_release_date, and hatchery_location_code. NOTE: Only the year portion of the last_release_date field is required.

3) Complete release data for the current calendar year should be reported no later than **January 31** of the following year.

7. Update on Five Year Approved Exemption for Adipose-Only Marking Studies

A. Snake River Chinook (IDFG, USFWS): Is it time to treat this marking program equivalent to WDFW and ODFW's?

In 2000, the Mark Committee approved a five year exemption for on-going long term marking programs. The first two approved to use the adipose-only mark were the Snake River chinook and the Quilcene summer chum programs. One of the requirements of this exemption was an annual update on the programs.

Ken Johnson noted that Washington and Oregon had taken a political position on mass marking their chinook a few years earlier. As such, he questioned if it wasn't time to also acknowledge that Idaho was also under the same political constraints to mass mark their chinook.

Marianne McClure (CRITFC) responded that there was a difference in that IDFG and USFWS had come forward to the Mark Committee with proposals and they had been reviewed and approved. In addition, she noted that the Mark Committee had recognized that Oregon's and Washington's chinook stocks has coastwide impact and therefore logically would fall under PSC's review. The Snake River spring chinook, on the other hand, do not have a coastwide impact and thus IDFG's and USFWS' spring chinook marking programs should be reviewed annually.

Rodney Duke (IDFG) emphasized that Idaho was required by the Endangered Species Act to mark all of their hatchery fish. He emphasized that if the fish had not been mass marked, the State would not have been able to have a 40 million dollar fishery on returning stocks this past year. He added that Idaho's decision to mass mark was also a policy level action and thus should not be held to the annual review.

Guy Thornburgh (NMT) recalled that many years ago, Idaho was the first agency to propose mass marking their chinook stocks and the Mark Committee had said no. This led to a meeting of agency directors a few months later in which agreement was reached that Idaho could mass mark as planned. Ron Olson agreed that it was a important precedent setting decision. He also noted that additional information came out of the second meeting that NMFS required Idaho's fish be visually identifiable. The Mark Committee then reviewed the proposal on its technical merits and concluded that the number of mass marked fish and subsequent recoveries in the fisheries would not jeopardize the coastwide CWT system.

Based on the given situation, Ron Olson proposed that this issue be deferred until the new marking plan is developed for the Columbia Basin. At that point the Mark Committee would know what parameters are being placed on Idaho for marking their fish. Marianne McClure then suggested a second option where the Mark Committee would continue to simply review Idaho's marking plan annually as initially agreed. In a straw vote, there was no other voiced support for this option. Susan Markey (WDFW) also noted that the Mark Committee's original concerns

were eliminated with the advent of electronic detection. Marianne agreed in principle but did note that Alaska and California are still visually sampling for CWTs.

Rodney Duke pointed out that for years, Idaho had not been marking fall chinook because the low number of returns. However, with the number of fish coming back, Idaho is getting back into the fall chinook program at the Oxbow facility. Those fish(195,000) will get an adipose only clip. However, there is a strong possibility that Oxbow will have 1.0 million fall chinook by next year if Idaho Power goes ahead and develops that hatchery (per dam re-license agreement). He added that IDFG was looking at discontinuing the Rapid River and McCall spring chinook stocks as U.S./Canada indicator stocks because of almost no recovery data. These stocks could potentially be replaced by the Oxbow fall chinook.

Ron Josephson moved that the Mark Committee give Idaho an exemption until such time that the Mark Committee requests it be brought forward again for review. David Zajac seconded the motion and added that it should be viewed as a late proposal from Idaho with no expected impact on the CWT system. Marianne McClure questioned if this exemption was just for spring and summer chinook, or did it also include fall chinook. David Zajac replied that the fall chinook would have to come before the Mark Committee as a separate proposal next year. He added that given the required marking schedule, the proposal would have to be submitted long before the Mark Meeting.

Marianne McClure then questioned if any of the Oxbow fall chinook be given CWTs if money was available. Rodney Duke did not know as that decision would be decided at a higher level. Marianne then pointed out that the PSC Chinook Technical Committee (CTC) has been constantly scratching for sub-yearling Snake River fall chinook releases to represent Pacific Management Fishery Council (PFMC) stocks. For several years, there wasn't enough production and they had to release everything as yearlings. This resulted in the loss of their PFMC indicator stocks for three or four years. Now that there is finally adequate production of fall chinook and sub-yearling groups are now being tagged again. Therefore, she emphasized that it would be very beneficial if Idaho would tag a representative group of the 195,000 Oxbow sub-yearling fall chinook before release in addition to the adipose clip.

ACTION: Two final recommendations were approved by the Mark Committee:

1) Idaho and USFWS Snake River hatcheries were given approval for their marking programs for hatchery spring and summer chinook until such time that changes necessitate that it be brought forward again for review. Marianne McClure voiced the only opposing comment and stressed that the Tribes oppose mass marking.

2) Snake River fall chinook marking will require a separate proposal next year.
   a) Given the required marking schedule, the proposal will need to be submitted several months before the next Mark Meeting in May, 2003.
   b) A representative subset of the sub-yearling fall chinook at Idaho's Oxbow Hatchery should be tagged with CWTs to provide valuable information for PFMC harvest modeling and regulation purposes, etc.

c) The proposal is required to include an estimate of the Oxbow fall chinook survival rates back to the rack and potential impact on the fisheries.

B. Cultus Lake Sockeye (CDFO)

This agenda item was not considered necessary to review as there is no regional sampling program for sockeye. In addition, the number of marked fish (2,000-3,000) would not have an impact even if there was a regional sampling plan.

8. Update on Mass Marking, Selective Fisheries, and Electronic Detection in 2002 (Chinook and Coho)

ADFG: Alaska is not involved in mass marking for the purpose of selective fisheries, and will continue to use visual sampling only to recover CWTs in their various fisheries

CDFO: Marc Hamer reported that releases in 2001 were comparable to those in 2000. The summary table **(Attachment 4)** does not include unassociated releases. The combined chinook and coho releases included 5 million Ad only, 657,000 CWT only, 4.6 million Ad+CWT, and 32.8 million unmarked (no CWT, no Ad clip) but associated fish. The majority of the Ad only marks (454,000) were on mass marked coho.

Chinook were not mass marked. However, there were two Double Index Tagged (DIT) groups (100,000 each) marked in the lower Fraser River (Chilliwack Hatchery) and Thompson River. These groups were done to assist WDFW in their chinook marking program.

In 2001, CDFO had recreational selective fisheries opened in August on coho in the northern Johnston Strait (Campbell River area) and also off the west coast of Vancouver Island. Recreational selective fisheries in 2002 are expected to be similar to last year. In addition, there is some discussion about having a commercial selective coho fishery (almost terminal: Area 23A) on the West Coast of Vancouver Island. Likewise, there is some discussion about a similar terminal commercial selective fishery on coho on the East Coast of Vancouver Island. Nothing has been formalized at this point.

CDFO did not have commercial coho fisheries in 2001. However, all of the chinook fisheries were electronically sampled for CWTs. On the South Coast, the creel samplers also used wands to detect CWTs.

WDFW: Susan Markey reported that WDFW projected mass marking 41.2 million hatchery chinook in 2002. This includes nearly 35 million 'zeros' (brood 2001) and 2.4 million yearlings (brood 2000) in Puget Sound, Hood Canal, and the Straits of Juan de Fuca **(Attachment 5)**. This is an increase of about seven million over last year as addition stocks are now being marked. On the coast, 200,000 yearling chinook will be mass marked at Sol Duc Hatchery. In the Columbia Basin, 200,000 zeros (Klickitat Hatchery) and approximately 3.5 million yearling chinook will be mass marked.

WDFW will also be mass marking 29.2 million yearling coho in 2002. This includes 7.8 million coho in Puget Sound, Hood Canal, and the Straits of Juan de Fuca, 6.6 million coho on the coast, and 14.7 million in the Columbia River basin.

In 2001, Washington had selective fisheries for coho in ocean sport and troll in Grays Harbor, Willapa Bay and the Buoy 10 fishery at the mouth of the Columbia River. In Puget Sound, selective fisheries for coho were opened in Areas 5, 6, and 7 (Straits of Juan de Fuca and the San Juan Islands) and also in South Puget Sound (Area 13). There was also a selective reef net fishery on coho around the San Juan Islands.

Selective fisheries for coho in 2002 are expected to be the same. With respect to chinook, this year, there were both recreational and commercial selective fisheries in the lower Columbia River for spring chinook earlier this year. There is also some potential for a selective chinook fishery in some limited terminal areas such as the Skykomish River but that hasn't been determined yet.

WDFW electronically sampled chinook in all of the ocean fisheries in 2001: troll and sport. The Grays Harbor and Willapa Bay non-treaty net chinook fisheries were visually sampled. In Puget Sound, the chinook were electronically sampled in the marine sport fishery and the commercial net fishery. Electronic detection was used to sample coho in all of WDFW's fisheries, including Puget Sound sport and net, ocean sport and troll, coastal net, and hatchery rack returns. Plans for electronically sampling in 2002 are the same, with the possibility of expanding the coverage at some hatcheries.

NWIFC: Ron Olson reported that in general, the Tribes are mass marking about 2/3 of their hatchery chinook and coho production in Puget Sound **(Attachment 6)** with the Adipose only clip. On the coast, there is no mass marking of either species, with the exception of 50,000 chinook at Educket Creek in coop with USFWS. Overall mass marking plans include 5.1 million chinook (brood 2001) and 3.8 million coho (brood 2000).

The tribes do not have any selective fisheries.

With regard to electronic CWT detection, the Tribes are sampling 100% of their chinook, with the exception of two coastal rivers where the fish were not mass-marked and there aren't any double index tagged groups. Coho have been 100% electronically sampled for three years now.

USFWS: David Zajac referred committee members to handouts **(Attachment 7)** and noted that marking and sampling was status quo for 2002. Nearly all coho production was either mass marked or given a CWT (with or without the Ad clip). Returns were 100% electronically sampled at all hatcheries. There were no fisheries.

Out of a total production of 1.6 million coho, 800,000 were mass marked with the Ad clip, 410,000 were Ad+CWT marked, and 650,000 were double index tagged (CWT only). Only one small group of 110,000 fish from the Quilcene Bay net pens operated by the Skokomish Tribe were released with no mark or tag.

In the Columbia River, 3.75 million coho will be released. Of those, 2.3 million will be mass marked with the Ad clip, 205,000 will receive the Ad+CWT mark, and 835,000 will be double index tagging groups (CWT only). Only 430,000 coho released into Idaho's Clearwater River will not receive any mark.

USFWS spring chinook production (brood 2001) in the Columbia Basin is projected at 7.4 million fish. Most will be mass marked (4.3 million) or receive the Ad+CWT mark (2.6 million). Only one double index group will be released (315,000 at Winthrop Hatchery). Only 5% of the production will not be marked in some manner.

When asked if the electronic sampling was working well, David Zajac replied that it was. However it was also creating a lot more work and the hatcheries were not happy about it.

ODFW: Christine Mallette noted that Oregon has been using electronic detection equipment since 1997 and the hatcheries have now adjusted to the expanded work requirements. Electronic sampling was at 100% in both the fisheries and at the hatcheries. (Note: Fall chinook harvested on the coast were not electronically sampled.)

With respect to mass marking, there was little change from last year's marking program **(Attachment 8)**. On the coast, 671,500 coho and 2.5 million spring chinook will be mass marked in 2002. In the Columbia Basin, 6.2 million coho and 8.8 million spring chinook will be Ad clipped as well. No fall chinook are being mass marked. However, in the Columbia Basin, 1.5 million will be tagged (Ad+CWT), 430,000 will be given a blank CWT, and 2.1 million will be given an LV clip.

Steve King (ODFW) provided Christine Mallette with a summary of the projected 2002 Columbia River fish runs and fisheries outlook **(Attachment 9)**. A selective sport fishery is underway on the Willamette Spring Chinook, with an expected Ad clip rate of 96% on returning fish. Only marked fish can be retained.

A strong upriver spring chinook return is also forecast for 2002, with an expected Ad clip rate of 43%. A selective sport fishery on marked fish will be held in both the mainstem and tributaries. Summer chinook returns are expected to be too low again for any fishery (closed since 1965).

The 2002 ocean fisheries are expected to include a limited selective fishery on Ad clipped hatchery coho in July. In addition, the Buoy 10 fishery is expected to harvest about 20,000 marked coho.

CRITFC: Marianne McClure reported that tribal hatchery production in the Columbia Basin is not being mass marked with the Ad only clip.

IDFG: Rodney Duke shared a table **(Attachment 10)** outlining IDFG's plans for mass marking nearly all of Idaho's 2001 brood hatchery chinook. Out of 11.5 million fish (expected production), 9.3 million will be adipose-only clipped. In addition, 1.4 million will receive a CWT with no fin mark. Another 588,000 will receive a LV or RV mark, and a small fraction of

this group will also be given a pit tag. Idaho uses 100% electronic sampling in the sport fisheries and at the hatcheries.

CDFG: Bob Kano commented that California uses visual sampling only at this point. However, a project is currently underway to mark approximately 18% of the production of Coleman, Nimbus, and Feather River hatcheries. The goal of the fractional marking program is to identify the challenges and logistic problems of mass marking large numbers of hatchery fish in California.

Melodie Palmer-Zwahlen (CDFG) also pointed out that there is no retention of coho in California's ocean fisheries. This is to protect the Oregon Coast Natural coho stocks (OCN) that are in trouble.

9. Mass Marking Hatchery Spring Chinook in the Columbia River Basin (USFWS, ODFW)

As background, Ken Johnson noted that during last year's Mark Meeting, it was pointed out that the Tribes did not agree that USFWS and ODFW were required by NMFS to mass mark spring chinook in the Columbia Basin. The Mark Committee chose not to take a position as USFWS and ODFW's decision to go ahead with the mass marking had already been elevated to a policy level.

In recognition of the political status of the marking, Ken Johnson asked if there were any technical concerns that the Mark Committee wished to forward on to the given agencies. After limited discussion, it was concluded that the spring chinook mass marking was not an issue to the integrity of the CWT program. Most adult recoveries will occur in fisheries where electronic sampling is used to recover CWTs.

ACTION: None taken. It was acknowledged that the current effort to develop a coordinated basin wide marking plan in the Columbia Basin will have to include recommendations on marking the spring chinook.

10. Final Tweaks to Regional Agreements on Marking and Tagging Pacific Salmonids

A. Title of Agreements Document

During the last Mark Meeting, consensus was reached on all major aspects of the Mark Committee's regional agreements on marking. A subcommittee was then tasked to complete the final word smithing. That task proved to be an easy one, with the exception of the title. There was some concern voiced that the protocol or guidelines for marking and tagging weren't truly regional agreements. This led to a flurry of emails within the subcommittee in trying to find a more suitable title for the document, but consensus could not be reached. Therefore, this issue was brought back to the full committee.

David Zajac started the discussion by proposing that the original title be retained. Marianne McClure responded that she had been uncomfortable about the agreements on the use of the

adipose only mark. She noted that her basic concerns had been met with the insertion of qualifying language that specified where the adipose only clip was indeed approved and where its use remains unresolved.

After additional supporting discussion, Susan Markey proposed that the title be retained and that the entire document be approved. This was seconded by Christine Mallette. There was some additional discussion that clarified that the document had actually been approved during the last Mark Meeting. There was no dissenting position.

ACTION: The document, "*Regional Coordination and Agreements on Marking and Tagging Pacific Salmonids*", was approved in full with no changes to its contents or title **(Attachment 11)**. A copy of the document will be forwarded to the Agency Directors by Ken Johnson. In addition, the document will be placed on the Mark Center's web site.

B. Does Blank/Agency Only Wire Tagging Require a Marking Variance Request? (New Agenda Item)

Christine Mallette noted that the *Regional Coordination and Agreements on Marking and Tagging Pacific Salmonids* **(Attachment 11)** specify that use of blank wire or agency only wire requires a proposal (see Section III.3: Request for a Marking Variance) to the Mark Committee. She then pointed out that the summary of ODFW's marking plans for 2002 **(Attachment 8)** identified ODFW's intent to tag 430,000 fall chinook in the Columbia Basin with blank wire. As such, she asked if the latter document was sufficient to meet the intent of the required proposal for using blank wire or did ODFW need to submit a separate request.

In the ensuring discussion, Ron Olson clarified that the intent of the Marking Variance Request **(Attachment 12)** was to deal with exemptions for such things as the use of blank/agency only wire as there was potential for impact on other agencies and the CWT program. Marianne McClure pointed out the Tribes will not agree to submit this request as they disagree with the required marking by the NMFS. As such, ODFW and WDFW will need to submit the necessary requests.

Susan Markey emphasized that the marking agency needs to only provide fairly basic information such as number of fish tagged, species, run, brood year, stock, hatchery of release and predicted number of observed recoveries in the various fisheries.

ACTION: The Mark Committee concurred that the existing protocol for use of blank and agency only wire is to be followed (see Regional Coordination and Agreements Document). The Marking Variance Request form is to be submitted prior to release of the fish.

Post Meeting Update: *On June 6, 2002, Susan Markey submitted separate WDFW proposals for using agency only wire (code 63) to mark 1,800,000 brood 2001 fall chinook hatchery stock (**Attachment 13**) and 78,158 coho (unknown brood; wild stock) (**Attachment 14**). These two proposals were distributed to the Mark Committee by email with a request for comments if there were concerns. (ODFW has not yet been submitted a similar proposal for its planned use of agency only wire in the Columbia Basin.)*

Ron Josephson (ADFG) responded by email and expressed some concern about the impact of WDFW's fall chinook agency only marking project. He noted that based on the proposed number of agency only tags and the average recovery rate in Alaska, this release would result in 247 agency only tags recovered at ADFG's lab if they were sampling electronically. The projected cost for sampling and tag recovery would be somewhere on the order of $10,000. He noted further that at some time in the future, ADFG would likely go to electronic detection, and thus this marking approach, along with other like marking projects, would represent a significant cost to Alaska with marginal benefits. He concluded that he was not very supportive of the proposal but would accept it this year. However, if it is going to be an on-going project, he will request an expanded discussion at the 2003 Mark Meeting.

He did not have an objection to WDFW's coho agency only wire marking proposal.

Rodney Duke (IDFG) also responded and acknowledged Ron Josephson's concerns in terms of both recovery costs and minimal information. However, he noted that it does represent a lower cost version of meeting the NMFS requirements, and that some agencies may be 'between a rock and a hard spot' in making these types of decisions in the future.

There was no other discussion forwarded by Mark Committee members.

6:10 pm. Meeting adjourned
6:45 pm. Reception hosted by NW Marine Technology, Inc
Site: Lighthouse Lodge and Suites

April 18: (8:00 am- 5:00 pm)

11. Report on California's Marine and Freshwater CWT Recovery Programs (Melodie Palmer-Zwahlen and Matt Erickson, CDFG)

A. CDFG's Ocean Salmon Project

Melodie Palmer-Zwahlen (CDFG) gave a presentation on California's "Ocean Salmon Project" (OSP) which is involved in the sampling and recovery of CWT data. Since 1962, dockside catch and effort data has collected from California sport and commercial ocean salmon fisheries. During the last several years, the fisheries have only been able to target chinook salmon due to the recent decline of both California and Oregon coastal coho. The retention of coho salmon has been prohibited in California's fisheries since 1995.

For sampling purposes, the California coast is divided into five major port areas which are further subdivided into several minor port areas: Crescent City (2 areas), Eureka (4 areas), Fort Bragg (3 areas), San Francisco (5 areas), and Monterey (2 areas). In most years, Monterey consists of Morro Bay/Avila and Monterey proper. However, depending on the southern distribution of salmon, as in 1995 and again this year, sampling is expanded to include the Santa Barbara and Ventura sub major port areas. Sampling is stratified into half-month periods.

Minor ports for the recreational skiff fishery are generally launch ramps or hoists where private skiffs are launched and landed. Minor ports for the charterboat fishery are the docks within a port area where charterboats return to unload salmon anglers. At least one project sampler is assigned to each minor port.

When sampling the private skiff fishery, minor ports in each major port area are randomly selected for both weekday and weekend/holidays strata sampling at a 20%+ level. The OSP sampler interviews all anglers on each private skiff that lands at the launch ramp during the assigned sample day. Information collected includes if the vessel was fishing for salmon, number of anglers fishing for salmon, number of salmon landed, number of sublegal salmon released and the number of hooked salmon lost to pinnipeds before the angler could land the fish.

Basic bycatch information is also collected for the following categories: rockfish, halibut, lingcod and "other." The sampler also visually checks each salmon landed to identify species and to determine if it's tagged (denoted by a missing adipose fin). Tagged salmon are measured (fork length) to the nearest millimeter and the head is then cut off right behind the gill plate. Each head is given a unique headtag number that links it to a specific fishery, minor port, and half month period.

At several minor ports, it is impossible to sample 100% of the private skiffs landing in a minor port due to the presence of private marinas nearby or skiffs not returning to the launch ramp by nightfall. These "unknown boats" are expanded based on the ratio of salmon to non-salmon boats encountered during the sample day at the sample site. The number of salmon landed by these unknown boats in the port area for the sample day is then estimated using the following equation:

$$NU = BU \times (BS/(BS+BN)) \times NS/BS$$

where:
NU = number of chinook salmon landed by unknown boats
NS = number chinook salmon sampled
BU = number of unknown boats
BS = number of salmon boats sampled
BN = number of non salmon boats sampled (not fishing for salmon)

Using the number of anglers, sublegal contacts, pinnipeds interactions, and bycatch sampled on salmon boats, this same treatment can be used to expand for anglers fishing, sublegal contacts, pinniped interactions, and bycatch on "unknown" boats.

To determine the total number of salmon landed by the private skiff fishery within a given time period *j*, port *k*, and sampling stratum *l*, the following equation is used:

$$N_{ijk} = (NS + NU) \times (PD_{jki}/pd_{jki})$$

where:
N_{ijk} = total number chinook salmon landed by skiff fishery in stratum *i* during time period *j* and port *k*

NS = number salmon sampled
NU = number of salmon landed by unknown boats
PD*jki* = total port-days possible for sampling in stratum *i*
(i.e. 5 weekend days x 3 minor ports = 15 port days possible)
pd*jki* = total port-days sampled

Identical treatment is used to determine the total number of anglers fishing, sublegal contacts, pinniped interactions, and bycatch for each stratum in a given time *j* and port *k*. The totals from each stratum are then summed to obtain the totals for port *k* during time period i for fishery *f*.

In the commercial passenger fishing vessel (CPFV) fishery, each salmon CPFV trip constitutes a sample. The OSP sampler must sample at least 20 percent of all CPFV trips made in their assigned port during each sampling time and port stratum. For example, if there were 50 salmon CPFV trips made out of the Sausalito Marina during the first half of July, the sampler would have to sample at least 10 CPFVs. Sampling is spread out throughout the half month period.

To determine the total number of salmon landed by the CPFV fishery in a given time period *j*, port *k*, and sampling stratum *i*, the following equation is used:

N*ijk* = (NS) x (B*jk*/b*jk*)
where:
N*fjk* = total number of chinook salmon landed by CPFV fishery c during
time period *j* in major port *k*
NS = number salmon sampled
B*jk* = total CPFVs fishing for salmon during time period *j* and port *k*
(i.e. 5 weekend days x 3 minor ports = 15 port days possible)
b*jk* = total salmon CPFVs sampled during time period *j* in port *k*

At the end of the season, all OSP CPFV data are compared directly to the logbooks submitted by CPFV operators. Inseason CPFV counts are directly compared to activity reported on the logbooks. During the last several years, logbook compliance has been around 60%; thus OSP creel census data are used to estimate the catch and effort estimates for the CPFV industry.

In the commercial fishery, each commercial landing is a sample. The sampling goal is to sample 20%+ by weight of all salmon landed in the port area during each half month period. For example, if 100,000 pounds are landed in a port area, at least 20,000 pounds must be sampled. During commercial sampling, 100 percent of the salmon unloaded by each vessel must be observed and counted by the sampler. As the fish are unloaded, the heads from all CWT salmon are removed and tagged. The OSP sampler records the total number of salmon landed, the commercial vessel identification number, the dealer number, and the exact weight of each landing. The troller is then interviewed for other pertinent fishery information such as the area fished, number of days fished, number of sublegal and coho salmon released, and number of salmon lost to marine mammals.

All CWT heads are processed in the project's Healdsburg laboratory. Project staff dissect each head using a cylinder metal detector to recover the CWT. Each CWT is then read under a

microscope by two project staff (independently) to determine its code. If their “codes” disagree, a third read is conducted. The 6- and 10-digit codes are then entered into a database (data entry is conducted twice and databases compared to ensure proper data entry). Once the database is complete, it is compared to the Pacific States Marine Fisheries Commission Master CWT Release File to ensure that all codes are valid. An additional check is made for the codes of endangered or threatened species. All CWTs with these codes are read an additional time to ascertain that these CWTs are indeed from stocks of special concern. After final review, all CWTs are then merged into a database that includes all the pertinent fishery information collected in the field.

At this point, there is no electronic sampling of salmon in California's ocean fisheries. Melodie, noted, however, that it would prove to be a challenge at their main ports of landing. For example, the total catch in 1995 was over a million salmon, and about 400,000 in 2000. As such, the boats at the dock can stack up, putting great pressure on the samplers to 'hurry up!".

B. CDFG's Freshwater CWT Recovery Program (Central Valley)

Matt Erickson presented an overview of the freshwater recovery program in California's Central Valley. Funding for his position comes from Water Resources as they want the CWT data available for water management purposes. CWT recovery data exist from the present back to 1975. The historical catch/sample data are being complied now but are very hard to get because of personnel changes and incomplete records.

Basic catch/sample data collected include an assigned sample id number, location, date, species, run, method of recovery (e.g.; hatchery trap, creel survey, etc), and the CWT code. For the carcass surveys and creel surveys, they also try to obtain information on the number of fish observed, the number of 'paper' tagged fish processed, and if possible, a count of the number of adipose clipped fish not processed., sampling period, and location.

A number of difficult problems have been encountered in developing this database. Matt noted that when he was hired in 1997, he was given the 1996 database (several thousand records) and found many data fields empty. Even worse, hundreds of records lacked the headtag number and thus couldn't be correlated with the respective sampling information (i.e. where and when sampled, etc). There was no way to go to a separate data sheet to resolve such discrepancies. He also found that the paper tags (headtag number) were handed out without regard to sequence. As such, hatchery and carcass survey recoveries were often mixed up because of wrong assumptions based on the headtag number. In other cases, the headtag labels weren't secured to the head sample but just placed in the plastic bag . Subsequent tears in frozen bags resulted in the mixing of headtag labels as all of the samples (four hatchery surveys and the carcass and creel surveys) were stored in the same freezer storage bin. Lastly, a lot of the projects collect CWT data as a secondary consideration when time permits.

Efforts to resolve these problems have included memos written to the various projects in an attempt to establish a sampling protocol. This was followed up by hatchery visits to develop rapport with the staff personnel and to explain the importance of better procedures for handling

samples. He is also working on developing a standardized sampling protocol for the entire Central Valley, including user friendly data recording forms.

The 2000 recoveries for the Feather River Hatchery were just submitted in March, 2002 and represent reporting the first Central Valley recoveries. He is now working on the 2001 and 1999 recovery data, with the intent of slowly working back to 1975.

CDFG's Central Valley freshwater recovery data includes spawning carcass surveys plus all heads recovered at four hatcheries (Feather River, Nimbus, Mokelumne River, and Merced). Some volunteer heads have also been turned in.

12. Northwest Marine Technology (Guy Thornburgh)

A. General Overview of NMT's Operations

Guy Thornburgh began his comments by introducing Jamie Smith as NMT's new chief financial officer. In addition to purchasing, sales, shipping and accounting tasks, he is specifically tasked with taking care of all CWT orders. Guy also noted that Lee Blankenship recently retired from WDFW and now works for NMT. He works 3/4 time in their Tumwater facility and the other 1/4 time on the Hatchery Reform work now moving forward in Washington. Jim Webber is no longer with NMT and has relocated to Wisconsin. Guy also noted that Dr. Keith Jefferts remains very active in the company and particularly involved in ongoing research and development efforts.

NMT has grown to the point that 33 employees are on the payroll. Seven staff members work in the area of marketing and fisheries issues, seven work in administration and sales, seven in R&D, and twelve in production.

Research and development remains a high priority and represents approximately 20% of the annual budget. This past year, work started on the automatic vaccination of juvenile salmon by making enhancements to the Marking and Tagging System (MATS). Other work also continues on improvements to MATS. NMT is also making an entirely new R series of tag detectors (R3500 and R12000). He also noted that NMT jumped into the Pit Tag arena this past year after years of encouragement to try and build a smaller tag. However that effort has been terminated based on the conclusion that it was neither cost effective nor technologically feasible to do what they wanted to do in terms of reduced size and corresponding effective detection range. Even so, NMT continually is looking to develop the perfect tag. Work also continues on improvements to the laser machine used to produce decimal tags. A new QCD diverter gate has also been developed. Lastly, Dr. Jefferts has been very active in developing a new generation of tag detector.

Guy Thornburgh also stressed that a significant portion of NMT's annual budget is devoted to working for hatchery reform and fisheries reform. Part of the justification for NMT is that in some cases reform can favorably impacts sales. However, NMT also has a three decade commitment to doing what it can do to support changes that benefit the aquatic environment. Guy noted that NMT staff have played a significant role in working with the federal, states and

tribal agencies in the hatchery reform underway in the state of Washington. In addition, staff are looking at ways to encourage and promote fishery reform. Examples of these efforts include projects to mark pen reared Atlantic salmon on the east coast, tag Russian and Korean salmon this year, and improvements in marking sturgeon stocks.

About 10% of NMT's budget goes for administrative purposes. As noted previously, Jaime Smith has been hired to expedite CWT orders. In the near future, on-line orders will be possible. Small orders (e.g. needles) will be shipped directly, while larger more complicated orders will be verified by a phone call.

The remaining 50% of the budget is devoted to production. Guy stressed that NMT remains committed to improving both customer service and quality of its products. In particular, work has focused on improvements in tag detection equipment and the quality of decimal coded wire tags.

B. Detection of Coded Wire Tags

1) Improper use of hand wands by some agencies for detection of CWTs

Guy Thornburgh noted that electronic detection of tags was now an essential component of sampling for most of the recovery agencies, and that there were large numbers of wands now being used. However, he stressed that he was absolutely convinced that tags were being missed…not because of the failure of the wand…but because of improper wanding procedures. As evidence, he cited viewing a video taken of a sampling operation in which the sampler obviously missed the majority of any tags present. The problem was that the sampler was basically waving the wand around the head of the fish. The required procedure is to rub the detection surface of the wand against the surface of the head (top and sides).

The wands may also malfunction on occasion. Guy noted that if the signal is either weak or delayed, the cause was likely a faulty battery. However, if the signal was intermittent, the wand should be returned to NMT for servicing.

The type of tag (i.e. length) is also a factor in detection efficiency, with the largest tags being the easiest to detect. A length and a half tag (1.5 mm) can be detected at depths up to 3.8 cm. The standard length (1.0 mm) tags can be detected to 2 cm depth, while the half length tag is detected up to 1.3 cm depth.

2) New Video to demonstrate proper wand use

Better training is the key answer to proper technique in using a wand. Therefore NMT has developed an eight minute video to demonstrate proper wand use. The new video will be supplied with the purchase of a new wand. It is also available for those who need it but don't need to buy additional wands at this time. The video was presented to the Mark Committee.

3) Titanium tips for existing wands

Work has not gone as well as hoped on providing titanium shields for the tips of wands so that wanding can also be done inside of the mouth of larger adults. To date, no manufacturer has shown any interest in providing titanium tips. As a result, the decision has been made to switch to stainless steel and have a mold built to expedite production. No delivery date or cost is known at this point in time.

4) Plans for a new type of QCD (the R3500)

Guy Thornburgh acknowledged that the R series of tube detectors had not been stable and that most units had been back to the shop for servicing on one or more occasions. He apologized for the poor performance and noted that the R series had been hurriedly designed to meet new sampling needs at the time. New R3500 and R12000 models are under development to resolve existing performance problems, with delivery date of this fall for the R3500 model.

5) Newly developed diverter gate for the existing QCD

NMT has also developed a much improved diverter gate for the existing QCD.

C. Decimal Coded Wire Tags

1) "Readability" of decimal tags and quality of the decimal numerals

The decimal coded-wire tag (DCWT) is a stable product now and the latest documentation was distributed March 21, 2000. It is available online at NWT's website.

Guy noted that the primary design goal was data reliability in terms of data replication. NMT had the ability to place the laser etched tag code on either one, two, three, or all four sides of the wire. All four sides were chosen to provide the greatest amount of replication. This provides the greatest odds that tags can be decoded even if the etched code is substandard during production or perhaps damaged by a bad cutter bar during actual tag insertion.

The second goal of design was ease of readability. A lot of time was spent developing the structure of the coding and the etching process to ensure readability. The third goal was compatibility with the data design used for binary tags, and that there is no replication of codes.

When the tags are being made, every millimeter of wire is inspected for magnetic quality. Guy stressed that only NMT possesses the necessary technology to do this continuous inspection for magnetic quality. In addition, NMT inspects both ends of the wire for quality of the coding. The current standard required three of the four sides to be perfectly etched (formerly only two sides required to be legible).

There had been some problems encountered with reading the first decimal tags made as these tags are now being recovered. Lynn Anderson (WDFW) forwarded a batch of 65 decimal tags that were hard to read. Guy acknowledged that the tags were indeed difficult to read. In a

breakdown of the problem tags, NMT found that 41% of the tags were damaged during the tagging process:

2 (3%) were length and a half wire cut to standard length
15 (23%) were the result of bad cutters
10 (15%) were scratched for some reason.

In terms of readability of the four sides was found to be:

4 sides ok = 23 (35%)
3 sides ok = 25 (39%)
2 sides ok - 11 (17%)
1 side ok = 6 (9%)
Unreadable = 0

Guy Thornburgh readily acknowledged that there were problems with the quality of the laser etching of the codes and made three conclusions based on their findings:

1) Some tags were indeed below NMT's standard of three legible sides.
2) All of the tags were below NMT's standard of "Great"
3) Even so, all were readable (but took a lot of time).

The problem with the laser etching has now been corrected. Using a PowerPoint presentation, Guy demonstrated the difference in etching quality of decimal tags made on February 12, 2001 and those made on April 11, 2002. The improvement in quality was striking, with the characters being both deeper and the 'dots' forming the characters being much closer together so that it looked more like a continuous etch.

2) Demo of new lighting system for use in reading the recovered tags

The effect of lighting is more important for reading decimal tags than it was for binary tags. Guy demonstrated an improved jig light. In addition, he demonstrated a camera light system for magnifying the wire. Both were very effective.

3) 2002 prices for coded wire tags

NMT raised its price of decimal coded wire tags on January 1, 2002 to $67.50 per thousand tags for orders of one+ million tags. This price increase is larger than the annual rate of inflation. However, it was pointed out that NMT held prices constant in periods since 1984 and in 1995, prices were drastically slashed with a savings of $4 million for customers that year. NMT did not recoup that loss in subsequent years. The current price is now at a level that keeps pace with the average inflation rate and allows NMT to maintain its services as well as continue its R&D work on new technologies and product enhancements for improving fisheries research and management.

4) Use of 1.5 length tags

Guy Thornburgh also showed a few PowerPoint slides of 1.5 length wire that had been cut to standard length. In the given example, there was no way to distinguish between tag codes

050171 and 210171 that had been released in the same geographical region. The counsel given was that 1.5 length wire can not be cut to standard length to get more tags it messes up the code.

D. MATS/SATS/VATS

1) NMT now selling the MATS systems (World Mark Inc. dissolved)

NMT has changed course and has dissolved World Mark, Inc. in favor of selling the MATS systems rather than the original plan of doing the mass marking/tagging for the agencies on a fee basis. Guy emphasized that NMT's preference is to develop and manufacture the technology for automated mass marking.

Two of World Mark's MATS trailers have been sold to WDFW. In addition, IDFG and ODFW are each leasing a trailer. In the future, NMT will develop trailers to the specifications of the agencies.

2) Proposal by Oregon, Washington and Idaho to purchase 10 trailers

A joint funding proposal for 10 MATS trailers has also been submitted by Oregon, Washington and Idaho for inclusion in the Congressional Budget. The outcome of this $10 million proposal remains unknown at this point.

3) 3-year grant received to develop a system to vaccinate live juvenile salmon

NMT has received a thee year grant to modify the MATS system in order to also vaccinate juvenile salmon as they are being mass marked and/or tagged. The primary goal is to meet the needs of vaccinating Pacific coast salmon.

Guy also noted that work is continuing on improving the through put of the MATS system, both in terms of increased numbers of fish marked/day and decreasing the size minimum from 65 mm down to 55 mm.

E. Customer service issues (including concerns about reliability of hand wands)

NMT also is working hard to resolve customer service issues. Guy noted, for example, that rumors are circulating that the wands don't work well. Another rumor cited was that the MATS system kills fish and the adipose fins grow back.

Citing a recent situation on the Oregon coast, fishery regulations were abruptly changed and ODFW's ocean sampling program only had a few days to gear up. In the process, five wands were found to not work. NMT immediately shipped five loaners. When the five defective wands arrived for servicing, only one was found to have a faulty switch. Two others had dead batteries, and two fully checked out as ready for service. Christine Mallette verified Guy's comments and added that ODFW has 70 wands, of which only two required service in 2001.

Complaints about the high sensitivity of many of the new wands were legitimate, however. Guy noted that the early production of the new wands did not allow enough time for the epoxy to fully cure. Unknowingly, the machines were calibrated too earlier, and as the epoxy finished shrinking, the sensitivity calibrations were subsequently altered. That problem has been fully resolved now.

A strong recommendation was also provided about keeping fresh batteries in the wands. In addition, the voltage of batteries should always be checked before being installed. A **minimum** voltage of 7.2 is required and 9.2 volts is optimal. A check of batteries purchased 'off the shelf' revealed a wide range in voltage, with many much less than the stated 9.2 volts. Rodney Duke concurred and emphasized the importance of keeping fresh batteries in the wands as there is a pronounced decrease in performance long before it is apparent to the sampler.

Lastly, Guy ended his comments by urging agencies to immediately contact NMT if they perceive a problem with equipment. NMT fully recognizes the importance of its relationship to both the Mark Committee and in having satisfied customers. NMT also prides itself on prompt attention to problems.

Ron Olson added that in interim of waiting for new stainless steel shields for the wands, he recommended that the fish be 'tubed' when there are a large number of fish to process. Where the number of fish is much lower, even with the abrasion problem, he urged that the larger fish be mouth wanded. The reason being that there is a very good correlation between missed tags and the size of the fish. Smaller fish need not be mouth wanded.

13. Report on MATS Trailer Use in Oregon (Christine Mallette, ODFW)

Christine Mallette noted that ODFW has had three years of experience with the MATS trailers. In 2000, a MATS trailer and a manual tagging trailer were used at the Umatilla Hatchery to mark three million Upriver Bright chinook (URB). The manual trailer was primarily used to tag representative groups with CWTs, while the MATS trailer was used to mass mark the rest of the production by inserting a blank wire tag. The MATS trailer's average marking rate was 15,000 fish/shift, considerably less than the projected 25,000/shift. Part of the decrease was attributed to problems with high hatchery pond walls that hindered moving fish into the trailer. A considerable amount of time was also spent on fine tuning the equipment.

In 2001, a MATS trailer was used at Bonneville Hatchery to mark one million URBs with blank wire (no fin clip). Production per shift increased to 27,000 fish. The MATS trailer was then moved to the Willamette Hatchery in the upper headwaters of the Willamette River where spring chinook were marked with an Ad clip and/or blank wire. Production increased to an average of 29,000/shift. The ten best shifts ranged from 42,000 to 54,000 marked fish.

Christine Mallette stressed that they had excellent tag placement and retention, and very good quality of Ad clips. She also noted that the MATS trailer eliminated the uncertainty of size. Fish in a raceway typically exhibit a wide range in size. Manual marking trailers typically don't do much size sorting, nor is the head mold changed very often. As such, there is a much wider range of tag placement seen for a manual marking trailer.

For this 2002 season, ODFW has leased a 'four line' MATS trailer for Ad+CWT marking at Bonneville Hatchery. By September, Christine expects to be able to provide an analysis of cost comparisons for the MATS trailer versus the manual tagging trailers.

In terms of regional needs, Christine emphasized there are over 100 million chinook that need to be marked yearly in the Columbia Basin. In terms of ODFW's needs, they are dealing with a decreasing labor pool and ever increasing Ad clip and CWT marking requirements.

As noted earlier by Guy Thornburgh, ODFW, WDFW and IDFG have submitted a $10 million funding proposal (supported by PSMFC) to purchase 10 MATS trailers. Funding is being sought through Congressional appropriations.

The 2000 *operational* marking costs of MATS trailer were $22/1000 fish cheaper than the manual trailers:

Manual Marking Trailer

Ad+CWT mark:	$55/1000 fish (cost of tags and startup costs not included)
Ad only	$25/1000 fish

MATS Trailer

Ad+CWT mark	$33/1000 fish (cost of tags and startup costs not included)
Ad only	$26/1000 fish

The difference between these two automated marks was higher labor costs. It slows down the system a little when CWTs are included in the processing.

14. Coordination of Elastomer Marks in the Columbia Basin

Ken Johnson noted that there have been some salmon stock identification problems caused by duplicated elastomer marks used in the upper Columbia Basin **(**see Michelle DeHart memo: **Attachment 15)**. As such, he raised the question if this was an area of coordination that the Mark Committee could provide some assistance.

He also noted that he had just spoken with Michele DeHart a few days earlier and learned that the Fish Passage Center was continuing to maintain a database for all recoveries of both freeze brands and elastomer marks encountered in outmigrant salmonids. She indicated, however, that the Fish Passage Center was not providing any coordination of marks as volunteered in May, 2001. The marking agencies had not shown any interest in coordination of marks because the marks were only intended for use when the fish return as adults to terminal areas.

Rodney Duke concurred that most elastomer marks applied in Idaho are only intended for terminal areas. He did agree, however, that Idaho should be doing a better job of coordinating mark use with Oregon to minimize the stock identification problems encountered at Lyons Ferry Hatchery and Lower Granite Dam trap.

ACTION: No action was taken. This was seen as a logical task for the comprehensive marking strategy now being developed for salmon and steelhead in the Columbia Basin.

15. Conflicting Marks at Lower Granite Trap and Lyons Ferry Hatchery (Columbia River)

Ken Johnson also reported on very recent conversation with Debbie Milks (WDFW: Lyons Ferry Hatchery). She recounted a number of confounding mark schemes on fall chinook (other than elastomers) that they were seeing at Lower Granite trap.

1) No Ad Clip and Wire in the Snout

The Nez Perce Tribe is releasing CWT only (no Ad clip) that look externally like Klickitat fish strays (Blank Wire only; no Ad clip) and Umatilla strays (Blank Wire only; no Ad clip). The Umatilla fall chinook are no longer being marked with Blank Wire only (1999 brood; 2001 release is the last group to go out with the Blank Wire only). However, Klickitat is still using Blank Wire only.

The problem is that all three groups are hauled to Lyons Ferry as strays where they are killed for brood stock. Upon dissection of the CWTs, the Nez Perce fish can be recognized. Unfortunately these fish should be passed on up the river at Lower Granite. The extra Nez Perce fish are also impacting the Lyons Ferry operation by requiring extra trips to haul them from Lower Granite, extra fish to spawn, and extra tags to dig out and read.

2) Release of Groups of Fish with No Associated Mark

The Nez Perce Tribe has also released several groups of fish which have no associated marks nor tags. In 2000, some of the fish were given a PIT tag but the numbers aren't sufficient to determine SAR (smolt/adult ratio) survivals or determine their component in run reconstruction. If these fish can't be estimated at return, they may be mistaken as wild fish.

3) Adipose Only Mark (no wire tag)

Idaho Power and IDFG are planning on releasing one million fall chinook (Lyons Ferry stock) from Oxbow Hatchery. These fish are expected to cause a problem with the run reconstruction at Lower Granite Dam. The problem is that they will be seen at the window of the dam as an Ad clipped hatchery fish but they will not be sampled at the Lower Granite Dam adult trap as they won't have a wire tag. As such, Debbie Milks questioned how these fish can be accounted for as "Snake River/Lyons Ferry" returns.

4) Adipose + CWT + Elastomer

Nez Perce Tribe is also marking some fish with the Ad+CWT+Elastomer mark. Upon return as adults, they are to be passed upriver of the Lower Granite Trap. Debbie Milks noted that it will be hard to estimate composition of return of these fish as only the site of release can be determined. A secondary problem is that elastomer loss does occur and prevent many of the fish from being recognized. As such, the 'missed fish' also get hauled to Lyons Ferry and killed instead of passing upriver.

5) Trapping at Lower Granite Dam (All wire tagged fish are trapped)

NMFS requires that all strays be removed from the Snake River. However, large runs of returning steelhead has made it difficult for the trap to only shunt tagged fish into the trap without also getting several 'oops' fish which may not have had wire in them. Debbie noted that there was no way to process all of the fish diverted into the trap in one day. In addition, holding space is limited at Lower Granite Trap for hauling 'unknown origin' fish to Lyons Ferry.

Furthermore, in 2001, sampling at Lower Granite Trap had to be adjusted during the peak of the steelhead run (Sept. 20-Oct. 16). During this period, the trap was in operation all night (as normal) but only every other hour during the daylight hours. Hence, "strays" are going up the river. In addition, this confounds the run reconstruction at Lower Granite Dam.

ACTION: No action was taken. After considerable discussion, the Mark Committee concurred that they didn't have enough information to make any recommendations. However, there was consensus that these conflicting marks also need to be addressed by the committee that is developing the comprehensive marking strategy for salmon and steelhead in the Columbia Basin.

16. Update on Basin-wide Coordinated Marking Plan in the Columbia River System

Action Item 174 of the 2000 Biological Opinion calls for the development and implementation of a comprehensive marking strategy for all salmon and steelhead artificial production programs in the Columbia River basin. Funding was to be provided in part by Bonneville Power Administration. The marking plan was to be implemented by the end of 2001 but this ambitious goal has not been achieved yet.

Ken Johnson reported that he had spoken with Larry Rutter (NMFS) the day before and learned that a policy level committee was active and moving forward on developing the coordinated plan. Members on the policy level committee include:

Larry Rutter (NMFS)	Guy Norman (ODFW)
Bob Foster (NMFS)	Bill Tweite (WDFW)
Tim Roth (USFWS)	Sharon Kefer (IDFG)
Mike Matylewich (CRITFC)	John Skidmore (BPA - Contract Monitor)
Steve Parker (Yakama Nation)	

In addition, two consulting firms have been hired to develop various aspects of the regional plan. The two firms are S.P. Cramer & Associates (Ray Beamesderfer, project lead) and Mori-Ko, LLC (Gary Morishima, project lead).

ACTION: It was agreed that the Mark Committee wanted to be involved in reviewing the planning reports of the regional marking plan for the Columbia Basin.

17. High Seas Sampling Results for 2000 (Adrian Celewycz, NMFS)

Adrian Celewycz (NMFS-Alaska) presented his annual review of the high seas sampling program for CWT marked fish, including fisheries sampled and new range extensions for North American salmonid species. His complete report is provided below:

High-seas coded-wire tag (CWT) recoveries in 2000
Adrian Celewycz, NMFS, Auke Bay Laboratory
Presented to Annual Meeting of the Regional Mark Committee,
Pacific States Marine Fisheries Commission, Pacific Grove, CA, April 18, 2002

In 2000, observers on US domestic groundfish vessels in three trawl fisheries on the high seas in the North Pacific Ocean, Gulf of Alaska, and Bering Sea recovered 307 CWTs from a total of over 49,000 salmonids examined for tags. Chinook salmon comprised 99% of tagged fish recovered in these commercial trawl fisheries. All salmon are considered prohibited species in these three high seas trawl fisheries and are harvested only as bycatch.

In the 2000 trawl fishery targeting whiting in the North Pacific Ocean off Washington-Oregon-California, chinook salmon and coho salmon were the only species with CWT recoveries. Of the total of 1919 salmon examined for CWTs, 99% were chinook salmon, with coho salmon, pink salmon, and chum salmon comprising the other 1%. Of the 1906 chinook salmon examined, 215 CWTs were recovered, for a tag occurrence rate of 11.3% . Of the 4 coho salmon examined, 3 CWTs were recovered, for a tag occurrence rate of 75%. The 215 CWT chinook salmon recovered in this fishery in 2000 represent an almost fourfold increase over the 55 CWT chinook recovered in this fishery in 1999. Because the total bycatch of chinook in this fishery was 8207, a rate of 4.3 can be applied to the 215 CWT recoveries to come up with an approximation of 925 CWT chinook salmon in the total bycatch of chinook salmon in the 2000 whiting fishery off Washington-Oregon-California. This approximation of 1557 CWT chinook salmon is 4.3 times the approximate number of CWT chinook salmon in this fishery in 1999. This approximation should not be considered an “expansion”,however, because a true expansion would be calculated on a vessel-by-vessel basis in this fishery and would take into account the ratio of marked-to-unmarked fish released for each tag code. This approximation is calculated simply by multiplying the number of CWT chinook recovered by the ratio of total chinook captured over the number of chinook examined for CWTs.

In the 2000 trawl fishery in the Gulf of Alaska, chinook salmon was the only species with CWT recoveries. Of the total of 8382 salmonids examined for CWTs, 80% were chinook salmon and 18% were chum salmon. Of the 6589 chinook salmon examined, 84 CWTs were recovered for a tag occurrence rate of 1.3% for chinook salmon. This tag occurrence rate was lower than the tag occurrence rate of 2.0% in 1999. Because the total bycatch of chinook in this fishery was 26,676, a rate of 4.0 can be applied to the 84 CWT recoveries to come up with an approximation of 336 CWT chinook salmon in the total bycatch of chinook salmon in the trawl fishery in the Gulf of Alaska in 2000. This approximation of 336 CWT chinook salmon is about half the approximate number of CWT chinook salmon in this fishery in 1999.

In the 2000 trawl fishery in the Bering Sea-Aleutian Islands, chinook salmon and chum salmon were the only species with CWT recoveries. Of the 38,778 salmon examined for tags, 92% were chum salmon, with chinook salmon comprising the remaining 8%. Of the 3090 chinook salmon examined, 4 CWTs were recovered for a tag occurrence rate of 0.1%, the same tag occurrence rate as in 1999. Because the total bycatch of chinook salmon in this fishery was 7469, a rate of

2.4 can be applied to the 4 CWT recoveries to come up with an approximation of 9 CWT chinook salmon in the total bycatch of chinook salmon in the trawl fishery in the Bering Sea-Aleutian Islands in 2000, about half of the approximate number of 17 CWT chinook in 1999 and a sharp decrease from the approximate number of 114 CWT chinook salmon in this fishery in 1998.

In the recent past, numerous chinook salmon stocks have been listed as endangered or threatened under the Endangered Species Act (ESA). Listed Evolutionarily Significant Units (ESUs) include Snake River Fall and Spring/Summer Chinook, Upper Willamette River Chinook, Lower Columbia River Chinook, Puget Sound Chinook, Upper Columbia River Spring Chinook, California Central Valley Spring Chinook, and California Coastal Chinook. These ESUs are comprised of not only endangered wild stocks, but also hatchery stocks considered representative as surrogates or indicators of endangered wild stocks. The number of hatchery/stock/runtype combinations in each ESU range from 2 to 30. In published Biological Opinions, the NMFS (National Marine Fisheries Service) has concluded that neither the whiting trawl fishery off Washington-Oregon-California, nor the Gulf of Alaska trawl fishery, nor the Bering Sea-Aleutian Islands trawl fishery could be considered likely to jeopardize continued existence of threatened or endangered species.

Information was presented on the historical (1981-2000) abundance of these recently-listed chinook salmon ESUs in these 3 high seas trawl fisheries. Historically, most of the high seas bycatch of these current ESA-listed ESUs has occurred in the whiting fishery off Washington-Oregon-California, with the highest bycatch occurring mostly in the mid-1980s, when foreign vessels dominated this fishery. Bycatch of current ESA-listed ESUs has generally decreased since these fisheries became 100% domestic in the early 1990s.In 2000, however, bycatch of ESA-listed ESUs in the whiting fishery off Washington-Oregon-California increased to the highest number yet. This increase was due to large increases in the bycatch of the California Central Valley Spring Chinook ESU, the lower Columbia River ESU, and the Snake River ESU in this fishery in 2000. Of the ESA-listed ESUs, only the Upper Willamette River chinook had a predominantly northward migration pattern that led to the majority of bycatch being harvested in the Gulf of Alaska trawl fishery rather than the whiting fishery off Washington-Oregon-California.

Recovery of CWTs in 2 high seas research programs was also described. First, juvenile salmon were captured in trawl surveys on the Bering Sea by the Ocean Carrying Capacity (OCC) program, cooperative research conducted by NMFS and the Fisheries Research Institute (FRI) of the University of Washington School of Aquatic and Fishery Science, and supported by the North Pacific Anadromous Fish Commission (NPAFC). Out of 164 chinook salmon and 822 coho salmon examined, 4 CWT chinook salmon and 16 CWT coho salmon were recovered. Over 9000 pink salmon, 3035 chum salmon, and 2670 sockeye salmon were also examined, but no CWTs were recovered from these species. Second, in Fisheries Agency of Japan gillnet research on the high seas, 5 CWT coho salmon and 1 CWT steelhead were recovered.

Several range extensions were also reported. First, a British Columbia chinook salmon recovered at 52°56'N, 156°48'W is a southern range extension for British Columbia chinook salmon in the western Gulf of Alaska. Two CWT recoveries at 58°42'N, 150°35'W and 59°42'N, 149°22'W are westward extensions of the known ocean range of juvenile (ocean age-.0) Oregon chinook salmon in the coastal Gulf of Alaska. A CWT recovery at 56°11'N, 166°21'W is a northwestern range extension for southeastern Alaska chum salmon in the Bering Sea (only two previous recoveries). Two CWT recoveries at 58°22'N, 150°16'W and 59°17'N, 148°55'W are a western range extension for juvenile (ocean age-.0) southeastern Alaska coho salmon in the coastal Gulf of

Alaska. Four CWT recoveries (59°00'N, 150°49'W, 58°51'N, 150°42'W, 58°32'N, 150°25'W, and 59°17'N, 148°55'W) are western range extensions for juvenile Washington coho salmon in the coastal Gulf of Alaska. For more information, see Myers et al. (2001).

A short history of the processing of high seas CWTs was also presented. In the late 1970s, the Auke Bay Laboratory (ABL) in Alaska began reporting recoveries of high seas CWTs. Initially all CWT recoveries were from International North Pacific Fisheries Commission (INPFC) research cruises. In 1980, ABL began processing CWTs collected by observers on foreign vessels in high seas trawl fisheries. The ABL, under the Alaska Fisheries Science Center (AFSC) of NMFS has never had a funding source dedicated to processing high seas CWTs. Beginning in 2002, ABL will still process CWTs collected by AFSC observers in the Gulf of Alaska and Bering Sea-Aleutian Islands trawl fisheries. The Northwest Region of NMFS will begin managing the observer program and CWT processing from the whiting and the groundfish fisheries off Washington-Oregon-California.

Literature cited

Myers, K.W., A.G. Celewycz, and E.V. Farley, Jr. 2001. High seas salmonid coded-wire tag recovery data, 2001. (NPAFC Doc. 557.) SAFS-UW–0111. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA. 15 p.

18. Report on PSC Selective Fisheries Evaluation Committee (SFEC) (Ron Olson, NWIFC)

Ron Olson began his comments by noting that the Pacific Salmon Treaty obliges the parties to maintain a statistically valid CWT program for stock assessment and fishery evaluation purposes. Because of the obvious impact of mass marking and selective fisheries, the PSC was concerned about both the technical and political issues. As such, PSC opted to get involved in evaluating mass marking and selective fishery proposals. This was done by creating a Selective Fishery Evaluation Committee (SFEC) to facilitate and coordinate selective fisheries and mass marking programs of the member agencies. The SFEC established two working groups: the Analysis Work Group (AWG) and the Regional Coordination Work Group (RCWG). SFEC's specific duties and those of the working groups are outlined in the "Understanding of the Pacific Salmon Commission concerning Mass Marking and Selective Fisheries" **(Attachment 16)**.

A. Analysis Work Group (AWC)

Ron Olson noted that the AWC had been very busy during the past two years. As there was no representative at the Mark Meeting, he distributed a memo provided by the AWC for an update on their progress. This memo is reproduced below because of its importance.

TO: Ron Olson
FROM: Selective Fisheries Evaluation Committee - Analysis Working Group
DATE: April 2, 2002
SUBJECT: Update for Mark Committee on progress of the SFEC-AWG

Published Report:

The Selective Fisheries Evaluation Committee - Analysis Work Group (SFEC-AWG) recently published a report, "Investigations of methods to estimate mortalities of unmarked salmon in mark-

selective fisheries through the use of double index tag groups" (a PDF version of the report can be accessed through the Pacific Salmon Commission's website at http://www.psc.org/Pubs/SFEC02-1.pdf). The report discusses four analytical methods designed to estimate mortalities associated with non-retention of unmarked fish in mark-selective fisheries. The methods only address release mortality; they do not address losses due to drop-off, mark-recognition error, or non-retention error.

In non-selective fisheries, both marked and unmarked landed catch mortalities can be sampled at the dock. In selective fisheries, unmarked fish are released, but not all released fish will survive due to handling mortality. Indirect estimates of these mortalities are required since they can not be observed directly.

Double index tagging (DIT was developed by the Ad-Hoc SFEC as a means to infer mortalities of unmarked fish by comparing coded-wire tag (CWT) recovery patterns of two groups of tagged releases, identical except that one group is marked and the other is unmarked. All of the methods discussed in the report depend on the ratio between the unmarked and marked DIT groups. These methods were classified into two categories: *(i)* total methods and *(ii)* fishery-specific methods.

The total methods:

- estimate the total impact of all mark-selective fisheries combined (i.e., they only produce fishery-specific estimates if there is only one mark-select fishery):
- estimate mortalities of the unmarked DIT group by subtracting the number of fish that can be accounted for (in either escapement or in non-selective fisheries) from an initial abundance estimate; and
- for chinook, can only be used in terminal areas (areas containing only mature fish).

Stock-fishery-specific exploitation rates are required for assessing compliance with treaty obligations with Canada regarding the harvest of coho and chinook salmon. The total methods fall short of meeting this requirement if there are multiple mark-selective fisheries.

In contrast, the fishery-specific methods:

- estimate unmarked mortalities in individual mark-selective fisheries; and
- estimate mortalities of the unmarked DIT group by applying a selective fishery hook and release mortality rate, sfm, to an estimate of the number of encounters of the unmarked DIT group in the mark-selective fishery.

The fishery-specific methods are more precise than the total methods, but also require more assumptions and are there fore more prone to bias problems.

The recent SFEC report discusses two fishery-specific methods. The first, called the Terminal Method, is only applicable in an extreme terminal area. The second method, the Paired-Ratio method, can be applied in both preterminal and terminal areas, provided that the ratio of unmarked to marked fish in the DIT group can be accurately estimated for the mark-selective fishery (e.g., from a "paired" non-selective fishery occurring in the same time/area stratum). In practice, finding suitable fishery pairs is often not easy.

In general, the SFEC-AWG has not been able to identify a single method that can be expected to generate unbiased estimates of unmarked stock-specific mortalities in all situations. The ability of these methods to provide precise, unbiased estimates is situational, depending on several factors, including the species involved, the location, number, and magnitude of the mark-selective fishery(ies), stock-specific migration patterns, the number of CWTs released and the number of

tagged fish surviving to enter the fishery, as well as the adequacy of catch and escapement sampling programs. Regardless of the method used to estimate unmarked mortalities in mark-selective fisheries, there will be a general loss of information since these mortalities cannot be directly observed. Given the complexity of the problem and the need to insure that the CWT program is not significantly compromised by increased uncertainty in these mortality estimates, the Pacific Salmon Commission has requested that the SFEC review proposals for mass marking programs and mark-selective fisheries.

Proposal Template:

Currently, the SFEC is working to develop a template that will contain all essential pieces of information necessary to evaluate proposed mark-selective fisheries for their impact on the CWT program. Agencies proposing mark-selective fisheries will be asked to submit proposals (following this template) prior to implementation.

Analysis of coho DIT data:

Selective fisheries have been implemented on coho stocks from Washington and Oregon since 1998. CWT data from double index tag stocks impacted by these fisheries are now available for brood years 1995-1997. This past fall, a workgroup consisting of three members of the SFEC-AWG as well as Washington State and Tribal biologists was formed and charged with the task of analyzing these data for hatcheries in Washington State. The group expects to report on its analyses later this summer, addressing the following questions:

- Is it possible to reliably estimate mortalities of unmarked fish in mark-selective fisheries using the analytical methods developed by the SFEC-AWG and discussed in their recent report? Are the assumptions of the methods likely to be met: How precise are the estimates?
- Have the mark-selective fisheries resulted in lower impacts on unmarked fish than marked fish?

In the preliminary analyses, several problems were encountered by workgroup members attempting to analyze the CWT data. In particular, the groups identified several difficulties with obtaining reliable estimates of escapement and total catch in all fisheries impacting the DIT groups. Other problems with data quality were identified including

- Recoveries recorded as having been sampled visually;
- Potential marking error or mark recognition error recognized through inconsistencies between the mark status of fish recorded at release and the mark status of the same fish recorded by samplers; and
- Inconsistent sampling across marked and unmarked DIT groups (e.g.; sampling unmarked fish with the wand and marked fish with a tube detector).

---------- End of Memo----------

B. Regional Coordination Work Group (RCWG)

Ron Olson noted that he was now serving as the U.S. chair of the Regional Coordination Work Group. Currently there are two key vacancies for ODFW and WDFW on the work group. It is hoped that this will soon be resolved in order to keep the work moving forward.

The annual RCWG report for 1999 has now been finalized and is available on PSC's website. The report includes information on the recommendation to wand large adults in the mouth. In

addition, the report contains a list of the coho and chinook DIT tagged groups **(Attachment 17)**, and detailed monitoring reports by Oregon and Washington on their selective fisheries that were held in 1999.

The 2000 and 2001 annual reports are presently in draft form and awaiting Oregon and Washington's input. Doug Herriott and Sue Lehmann (CDFO) have played a key role in this work. The two years will be combined into a single report when finalized.

The basic purpose of the annual reports is to document what has been mass marked, and what the future mass marking plans are. In addition, information on the DIT groups will be listed. He noted, for example, that the existing information shows that there are no DIT groups for the upper Columbia River system and queried if this was a problem. Another intent is to document CWT sampling (both proposed and what occurred). Analysts can then reference what sampling occurred electronically and visually. This information will allow better determination of where and when electronic sampling needs to occur, a concern primarily for DIT marked chinook stocks. Lastly, the reports will provide monitoring summaries for the given selective fisheries.

The RCWG has also been involved in some research. The focus has been primarily on electronic detection, with work on coho a few years ago, and chinook mouth wanding the last two years. That work is basically done. With the 'double wanding' for chinook, there is now a method for detecting CWTs at a high rate. There is also on-going work on comparisons of the MATS trailers with the traditional manual marking trailers.

The RCWG recognizes the need to continue to coordinate with the Mark Committee and other PSC technical committees. Fortunately this coordination is helped by a fair amount of overlap between membership on the Mark Committee, the PSC Regional Coordination Work Group, and the PSC Data Standards Work Group.

Lastly, the PSC wants to review mass marking and selective fisheries proposals to see if there are significant impacts. As such, the RCWG is charged with coming up with a new template in 2003. The intent, in part, is to have the agencies determine and report where the mass marked fish will show up, and where/when electronic sampling is needed.

At this point, the primary concerns for CWT impacts are not so much with the current selective fisheries (i.e. coho and listed chinook). However, with the expected proposals for chinook selective fish4ries in marine areas, there may be some significant challenges.

19. Visual Implant Tags: Standards Needed for Numbers of Tags to Release (Christine Mallette, ODFW)

Christine Mallette reported that ODFW has been using VI implants in mainly coho and steelhead for the past four years. During this period, the groups ranged in size from 20,000 to 40,000 fish. She noted that there are no guidelines for how many fish to mark with VI tags. However, in view of very low observed recovery rates (23% average) in returning jack and adult coho, she questioned the wisdom of marking small groups. The low recovery rates are in part the result of

the gradual growth of the fish (i.e. dissipation of the mark) and combined with some breakdown of the color.

(Note: Following the Mark Meeting, Dan Thompson (NMT) forwarded a memo to clarify that the low recovery rate also was associated with jaw tagging as opposite to the more successful adipose eyelid tagging. Further details are provided below in Dan Thompson's memo and Christine Mallette's response memo.)

Guy Thornburgh reminded the Mark Committee that blue VI marks are hard is see in natural sunlight but yellow glasses work wonders. He also recommended that all marking programs switch over to NMT's new LED black light as the halogen bulbs began to degrade after just a few hours. Rodney added that hatchery managers have a problem if they can't see a mark.

Ken Johnson asked Christine Mallette if she was looking for action by the Mark Committee. She said no as that she had only meant to air the concern. Susan Markey commented that the number of fish given VI marks is really the choice of each agency. David Zajac concurred with this position and emphasized that without a regional marking and sampling program, agencies can mark any number of fish as it fits their needs.

<u>Dan Thompson's Memo</u>:

May 6, 2002

To: Mark Committee
From: Dan Thompson
Northwest Marine Technology

During the 2002 annual Mark Meeting in Monterey California it was reported by Christine Mallette (ODFW) that they were observing approximately 20% of Visible Implant Elastomer (VIE) marks in returning jack and adult coho.

It is important to realize that the study she was referring to and results stated, was from VIE placed in the lower jaw of coho, <u>not</u> the adipose eyelid. It was a research project looking for alternate sites for VIE placement for stock identification.

Christine’s results to date, were similar to a study I conducted while at WDFW placing VIE in the lower jaw of spring chinook. Again, I was looking for an alternate site for stock identification. The results were less than promising on returning adults so we abandoned the technique as a possible location.

However, after one year, retention and visibility in juvenile salmon was quite good with approximately 95% visible. For short-term retention and visibility this may be a viable technique.

- -

Response from Christine Mallette:

!6 May 2002

Subject: Re: VIE Information
From: Christine Mallette
To: Dan Thompson

Dan,

The distribution of your memo to the Mark Coordinators is fine with me. I guess I should have been more precise in terms of making the distinction in mark location. The actual overall retention rate for VIE jaw tags in precocious and adult cod salmon is 23 percent, ranging from zero to 71 percent. This fall's adult return will be my last data point. Generally speaking, retention in precocious males is much better than in adult coho.

I leave it up to Ken as to whether or not to send the memo as an appendix to the minutes or as a stand alone document.

Sorry about the confusion.

Christine Mallette
Supervising Fish & Wildlife Biologist
Oregon Dept. of Fish and Wildlife
Fish Division - Fish Stock Identification

20. Agency Reports on Tagging and Marking Plans for 2002

Only a few agencies noted major changes in marking programs.

ADFG:	Stable; no mass marking **(Attachment 18)**
Metlakatla	Stable
CDFO:	Stable **(Attachment 4)**
NMFS:	Stable
WDFW:	Increase of 2.6 million CWT marked salmonids to 17.6 million in 2002 **(Attachment 19)** DIT groups are listed in **Attachment 20**
NWIFC:	Stable **(Attachment 6)**
ODFW	Marginal changes **(Attachment 8)**
USFWS	Stable **(Attachment 7)**
IDFG	Increases for both Ad clips and CWTs as all hatcheries filled to capacity for the first time ever **(Attachment 10)** (Note: the Nez Perce marking is included in Idaho's totals)
CDFG	Stable
CRITFC	Expanding program (see IDFG's **Attachment 10**)

April 19, 2002 (Friday)

Field Trip: Stanford University's Hopkins Marine Science Center, Pacific Grove, CA.

Attachment 1

Mark Committee Meeting -- April 17-19, 2002

Name	Agency	Mailing Address/ Telephone/E-mail Address
Anderson, Lynn	WDFW	600 Capitol Way, North; Olympia, WA 98501-1091 Tel: (530) 527-3043 E-mail: anderlma@dfw.wa.gov
*Celewycz, Adrian	NMFS	NMFS-Auke Bay Lab, 11305 Glacier Hiway, Juneau, AK 99801 Tel: (907) 789-6032 E-mail: adrian.celewycz@noaa.gov
Cox, Brodie	WDFW	600 Capitol Way, North; Olympia, WA 98501-1091 Tel: (360) 902-2776 E-mail: coxpbc@dfw.wa.gov
*Duke, Rodney	IDFG	1540 Warner Ave, Lewiston, ID 83501 Tel: (208) 799-3475 ext 4 E-mail: rduke@idfg.state.id.us
Erickson, Matt	CDFG	1528 Healdsburg Ave., Healdsburg, CA 95448 Tel: (707) 431-2951 E-mail: merickson@dfg2.ca.gov
*Hamer, Marc	CDFO	Pacific Biol. Station, Hammond Bay Road, Nanaimo, B.C. V9R 5K6 Tel: (250) 758-8742 E-mail: hamerm@pac.dfo-mpo.gc.ca
Herriott, Doug	CDFO	440A - 555 West Hastings, Vancouver, B.C. V6B 5G3 Tel: (604) 666-6192 E-mail: herriottd@pac.dfo-mpo.gc.ca
Hudson, Richard	MIC	P.O. Box 8, Metlakatla, AK 99926 Tel: (907) 886-7187
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