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2000 MARK MEETING

Silverdale, Washington
April 19-21, 2000

Final Minutes

April 19, 2000
Convene at 1:00 P.M.

1. General Business Items

A. Welcome/Introductions

Ken Johnson (PSMFC) served as chair and extended a special thanks to WDFW for hosting the Mark Meeting. Geraldine Vander Haegen (WDFW) was singled out for her key role in organizing the field trip, taking care of logistics, and assisting in hotel reservations.

Mark Committee members and other meeting participants were introduced at the start of the Mark Meeting **(Attachment 1)**. For the first time in many years, there were no changes in the committee membership.

Four Mark Committee members were not present. Tim Yesaki (BC Environment) was represented by Marc Hamer (CDFO). Steve Leask (MIC) was not present. Jerry Harmon (NMFS-Columbia River) and Robert Bayley (NMFS-Portland) were not present but were represented by Adrian Celewycz (NMFS-AK) for the second consecutive year. Likewise, California was not represented as Bob Kano (CDFG) was unable to get out-of-state travel authorization for the second year in a row.

B. Year 2000 Meeting Site and Date

The year 2001 Mark Meeting will be hosted by Oregon Department of Fish and Wildlife. There is some possibility that the meeting will be in Newport on the central Oregon coast, with a field trip to various research facilities in the area. The meeting is scheduled for April 18-20, 2000.

C. Concern about Missing Committee Members

Considerable concern was raised about those Committee members who regularly miss the Mark Meetings, whether because of work commitments or because of the inability to get travel approval. (Note: this particular discussion occurred as an aside while later discussing the timeliness of CWT release data (Agenda 3.B).

Bob Kano (CDFG), Steven Leask (MIC), and Robert Bayley (NMFS-Portland) were identified as the key individuals who needed to be in attendance annually. It was also noted that Jerry Harmon (NMFS-Col. River) and Tim Yesaki (BC Environment) haven't been to the meeting in years.

Ken Johnson agreed to draft a letter to the respective agency directors and emphasize the need for their participation in order to maintain coastwide coordination. Guy Thornburgh (NMT) also noted that he would act on behalf of NMT and emphasize the same message when he visits with CDFG's director in early May.

2. Status of CWT Data Files and Reporting Backlogs

As is done each year, the status tables were reviewed for each reporting agency's CWT release, recovery, and catch/sample data files. Particular attention was focused on existing 'holes' and agency plans to report the missing data. The review was done 'on-line' by accessing the status tables on PSMFC's website (see agenda item 3).

Release Data:

The CWT release data are largely current for all tagging agencies. There are a few minor holes which involve reporting the tagged releases of the Nez Perce and Yakama tribes. However, Marianne McClure (CRITFC) is serving as the coordinator and actively working on converting their respective release data into Pacific Salmon Commission format for exchange.

Recovery and Catch/Sample Data:

The Recovery and Catch/Sample data files are comparable in terms of missing data sets as might be expected. There are a number of 'holes' at the present time:

USFWS: Tom Kane reported that the Olympia office had experienced delays in getting the 1998 and 1999 data sets reported from the field offices. Nothing had been reported yet for 1999 but work was nearly complete on the 1998 data. *(Note: the 1998 recovery data were validated on May 12, 2000).*

IDFG: Rodney Duke reported that Chris Harrington has been making excellent progress on Idaho's backlog of data for 1999. One of the problems was that the fishery had remained open to the end of the year. He also noted that data processing was a major challenge as Chris also was needed in the field to help manage the tagging and fin clipping trailers.

NIFC: Ken Phillipson stated that the 1999 hatchery rack data for the Tribes will not be ready until this coming fall.

NMFS: Adrian Celewycz noted that he had just gotten the 1998 recovery data from the observer program. It should be reported to the Mark Center within a month. The 1999 recovery data are not expected to be available until next year.

ODFW: John Leppink reported that Oregon's 1996 catch/sample data was still pending validation but that the recovery data had passed validation long ago. The problem was fairly minor and was an oversight that was to be resolved soon. *(Note: The 1996 catch/sample data were validated on May 4th).*

QDNR: The Quinault Nation has not reported its recovery 1999 data, while the 1998 data have not passed validation yet. Ken Johnson noted, however, that Rishi Sharma was hired some months ago and is in the process of working with the Mark Center to understand the data reporting specifications. He is planning on visiting the Mark Center in the near future to expedite reporting.

CDFG: California is current for reporting ocean recoveries and catch/sample data. However, the status tables show that the 1996 data were resubmitted but have not yet passed validation. This actually refers to a first attempt to report inland recoveries, using 1996 as the test year. The inland recovery data did not pass validation and remain in limbo at this point.

ADFG: Ron Josephson noted that Alaska is current on reporting its recovery and catch/sample data. However, Ben Gregg was added to the programming staff in the past year and he is now going back through the older data sets and updating them to include expansion estimates for most random sport recoveries. Work was completed back through 1995. *(Note: As of May, the 1990-1994 recovery data have now been resubmitted and passed validation as well).*

3. Status of RMPC Operations

A. Operations in Progress or Completed

Ken Johnson gave a brief overview of the Mark Center's two year effort to fully convert all of the functionality of the Regional Mark Information System (RMIS) dial-in system (character based; log in required) to the superior web environment. The new web site (www.rmis.org) was formally activated on January 7, 2000.

Jim Longwill expanded on some of the new features and noted that he would be giving a demo as the last agenda item. He also noted that user response to the new RMIS site has been very favorable. New features include the ability to run a report and either send it to the user's browser for immediate review or via email to the user's home computer. In addition, users can now use the 'cut and paste' feature to copy large lists of tag codes from some personal word document and paste the list into a HTLM form that is then used to generate data retrieval queries for either tag release or recovery information.

Another noteworthy accomplishment was use of the Mark Center's web site to provide 'real time' coupling of the data load and validation programs with the data status tables. As such, users can now determine the status of any data set, including data of submission, errors encountered during validation, or date that the data were validated and available on-line.

In the past, the data status tables were manually updated once a data set was fully validated and merged into the on-line data tables for user access. However, there were continual problems in maintaining current data status tables. In addition, there was the problem of rarely knowing if the data were incomplete or complete.

Real time data status was achieved, in part, by using the Data Description file to automatically capture the required 'Submission Date' (field 1) and 'File Status' (field 4). This information is passed to a set of HTML pages/frames on the web page that displays the current status of the data.

B. CWT Release Report: Electronic Version Only in Future

Ken Johnson noted that for years, the Mark Center had distributed an annual hard copy report listing of CWT releases covering the most recent seven years. However, it was now time to terminate that report and have users rely upon electronic copies for future needs.

Three reasons were given for this change in operations. First, the new web-based RMIS system now provides users with a very easy method of obtaining the most current release data. Second, this change will save a minimum of $3,000 in printing and distribution costs annually. And third, Tom Morse (Program Technical Representative for BPA's component of the Mark Center's funding) recently informed the Mark Center that BPA no longer funds hard copy reports.

In the following discussion, Mark Committee members acknowledged that each agency could download specific subsets of release data in standard release report format as needed, and then distribute that information internally. As such, the Mark Center was granted approval to terminate the annual hard copy report.

Mid-Year Reporting Needs:

During subsequent discussion, Lee Blankenship raised concerns about the timeliness of reporting CWT releases as WDFW typically recovers some tags without any release data. Several other tag coordinators likewise noted that they encounter the same situation. Some of the recoveries are found to be miss-reads. However, many turn out to be valid tags that haven't been reported yet.

Lee noted in specific that in the lower U.S., hatchery chinook are often released as yearlings but are tagged the year before. Consequently, they are often taken in the fisheries the same year of their release. To deal with this compressed release/recovery time frame, mid-year reporting had been implemented to provide recovery agencies with the necessary minimum release data (i.e. species, brood year, release agency, hatchery or wild, and tag coordinator).

Ken Johnson responded that the Mark Center has not been enforcing the mid year reporting requirement for the past few years because many of the agencies had gotten into the pattern of updating their release data several times a year as the data were ready. The assumption was that this pattern of reporting was actually more beneficial than the mid year report. However, based

on the input from the Committee members, this wasn't actually the case. He therefore committed to re-implement mid year reporting.

It also was agreed that the mid-year report deadline will be August 1st each year.

Action:
The Mark Committee supported the Mark Center's recommendation that the annual hard copy report be discontinued. Users will obtain the information from the Mark Center's web site (www.rmis.org).

The Mark Committee also agreed that mid year reporting of releases would be resumed. New releases for January to mid July are to be reported to the Mark Center no later than August 1st.

4. Update on PSC Data Standards Activities

Ken Johnson reported on the results of the PSC Data Standards Working Group (DSWG) meeting met in Vancouver, BC on October 20-22, 1999. The primary focus was on upgrading the data specifications from Format Version 3.2 to 4.0 in order to handle new information requirements associated with mass marking and selective fisheries.

In addition, the Data Sharing Committee (parent committee) and the Catch and Effort Working Group met earlier and many of the DSWG members and meeting attendees participated in the earlier meetings as either committee members or observers.

A. Catch and Effort Working Group

During the Data Sharing Committee's meeting, it was agreed that the Catch and Effort Working Group had completed its task of developing a format for exchanging catch and effort data. As a result, DSWG was assigned the tasks of preparation of the final file specifications, implementation of the exchange process, and on-going maintenance of the catch/effort system. One remaining task is to complete a review and update the gear code tables.

B. Inconsistencies in Reporting Double Index Tag Releases

Double index tag (DIT) release groups are to be flagged with a unique DIT identification code. However, with the passage of time, it was realized that some agencies had assigned the "DIT-id" code to both the marked and unmarked components of a DIT release, while other agencies had done this only to the unmarked components. The DSWG determined that the latter method of reporting DIT releases was incorrect. All components of the DIT release, both marked and unmarked, must be flagged as a DIT release group and carry the same "DIT-id".

C. New Regulatory Reporting Database

Data Sharing Committee determined that a regulation reporting system must be developed for the analysis of selective fisheries. In particular, analysts will require ready access to information on the regulations in place during a fishery. This will include time, area and length of the

selective fishery, retention regulations on size, type (i.e. ad clipped hatchery fish only or combination of hatchery plus unmarked fish) and number of fish allowed per fisher. It will also require data on encounter rates, and numbers of target and non-target species released. Data Sharing Committee will be taking the lead on determining exactly which regulatory items are to be collected, and DSWG will then be asked to develop the data reporting formats, etc.

D. New Field Added for Reporting Re-Used Wire

Re-used wire has long been a problem because of the confusion it creates for data management. Historically, when a tagcode was reused, the first release group was changed to a "*1" version while the second release would be coded as the "*2" version. The problem with this approach, unfortunately, was that recoveries of the first release would not likewise be revised by all recovery agencies to the "*1" version. Hence the release and recovery data files became out of synch and legitimate recoveries became invisible to data users querying the Mark Center's recovery database.

During an earlier DSWG meeting, it had been decided that the second use of a tagcode would continue to be reported as a "*2" release, while the first release could remain as either the "plain" version or be modified to the "*1" version (as was the case historically. This decision was revisited as it was not preferred by all agencies. However, DSWG decided to stay with this approach as it did allow recoveries of the first release to stay in synch with the release file (i.e. "plain" version).

In addition, DSWG added a new field in the Release File to warn users of reused tag releases. The new field is a simple flag (one character) indicating the tagcode has been reused. All releases, including the original release, must have the flag set.

E. Study Type (Release File)

The original intent of the 'Study Type' field was to indicate which release groups might be considered for analysis. Possible categories included Experimental (E), Production (P), Both production and experimental (B), Other (O), PSC Key indicator stocks (K), and other Index streams (I). However, DSWG determined that neither the PSC Chinook nor Coho Technical Committees use this field. In addition, there are no coastwide standards and agencies report their releases on the basis of what they consider the categories to represent. Furthermost, the field is overloaded as some releases may be more than one category (e.g. both production and an index stock).

DSWG decided to leave the existing field as it is now since some agencies do use the field to flag their own releases. However, both the Chinook and Coho Technical Committees maintain their own list of release groups that are used as index groups for analyses. Therefore, these lists will be obtained to determine exactly which tagcodes are true index groups. In addition, reporting agencies are to provide their respective definitions of what constitutes each category of study type. Depending on the resultant outcome, a new field may be added to the Release File for flagging index releases.

Rodney Duke (IDFG) commented that all releases from Idaho are currently identified as experimental for political purposes, regardless of whether or not they might be index groups, production, etc.

F. Specifications for Format Version 4.0

Work is continuing on the future implementation of Format Version 4.0. At this point, a number of specifications have been determined. Some of the key features are listed below:

1) Comma separated values (CSV) format will be implemented to exchange data sets.
2) All non-null dates will be enclosed in quotes and zero padded.
3) Version 3.2 field numbers will be retained, with new fields added to the end.
4) Any fields that are linked to a lookup table or used to "join" to another table may not be reported carrying a null (i.e. comma comma) value. The code "U" is to be used where a reporting agency does not know the values (e.g. release rearing type). If the field is required but not applicable (e.g. tag code on a status 2 (no tag) recovery), the code "-" is to be used to indicate a null value.
5) The various date fields (Date First Release, Date Last Release, Date of Recovery) were each split into three fields (year, month, day) because the dates are often incomplete (e.g. day may be unknown).
6) The repeating series number (formerly known as the embedded replicate number) will be dropped from the release and recovery files because of the inherent problems of the data.

DSWG hopes to complete its work on Format Version 4.0 this fall, with implementation to follow as soon as possible.

5. PSC Report on Mass Marking and Selective Fisheries

Marianna Alexandersdottir (NWIFC) reported on the PSC Selective Fishery Evaluation Committee (SFEC) recently completed report on mass marking and selective fisheries (see *1998 Annual Report, SFEC(99)-1*) . It focused on four areas: (1) chinook; (2) coho; (3) electronic tag detection capabilities; and (4) work schedules for the SFEC analysis and regional coordination work groups. A copy of the report was provided to the Committee.

She noted that the SFEC first focused on coho salmon because of the simpler life cycle. Using the double index tagging (DIT) approach, they have been able to estimate total selective fishery mortality for unmarked coho tag groups. However, the task still remains to find a method to allocate that mortality to the individual fisheries. The committee is currently working on this task in conjunction with some of the related work on chinook and selective fisheries.

The report notes that 1998 was the first year that there were some selective fisheries held and the first DIT recoveries were made. The data largely verified that the unmarked DIT group (no adipose clip) returned in essentially the same proportions as the marked DIT group (adipose clipped) when the fish weren't subjected to selective fisheries (i.e. they were subject to the same exploitation). Tables 14, 15 and 16 present those data in the report. While there were a few unexplainable quirks in the recovery data, Marianna emphasized that the results are just based on the very first year of recovery data and thus must be viewed as preliminary.

One problem was found to be misidentified marks in sampling of fisheries and hatcheries (i.e. known unmarked fish identified as marked, and vice versa). In one hatchery, the misidentified error rate was 13%. While most hatchery error rates were much lower, it demonstrated the need for higher data quality control during sampling and/or tagging. In addition, Marianna stressed that if anything in hatchery handling or release is different between the DIT marked and unmarked groups, it will violate the assumption that the two groups are identical.

Unfortunately, the coho techniques for estimating total unmarked mortalities in selective fisheries using DIT groups will not work for chinook. Natural mortality in coho is assumed to be negligible relative to mortality in the fisheries since they come back the same year. In contrast, chinook come back over a period of four years and natural mortality can not be assumed to be negligible across multiple age classes. In addition, there is the second problem, common to coho, of partitioning mortality across multiple selective fisheries.

At the present time, alternative methods for chinook are under investigation. The SFEC is now focusing on the estimation of brood year cumulative impacts of selective fisheries for chinook by combining DIT marking with a method develop by Pete Lawson and Rich Comstock (PM method). This method uses results of a cohort analysis on the marked tag group to estimate mortalities for the associated unmarked tag group.

Given the existing uncertainties, the SFEC is unable at this point to provide a definitive answer as to whether or not the viability of the CWT system for chinook can be preserved under mass marking and selective fisheries.

Questions and Answers:
Further clarification was requested on why the DIT technique doesn't work for chinook. Marianna replied that unsampled mortality has always been present and includes natural mortality and different kinds of incidental mortality such as fish thrown back for reasons other than selective fisheries. These sources of mortality are generally small compared to landed mortality (catch). The Chinook Technical Committee (CTC) has developed ways to estimate the unsampled mortality using the landed mortality as a place to start. In contrast, there is no way to estimate unsampled mortality in selective fisheries as fish that are thrown back and die obviously aren't sampled. Therefore, with the Double Index Tag groups, marked fish sampled in the selective fishery are used to estimate mortalities for those unmarked fish.

For coho, that approach works fine because natural mortality is relatively small and therefore ignored. The only source of incidental mortality that is not estimated from sampled tag recoveries is that of unmarked fish released in selective fisheries. Using DIT groups it is estimated by first summing all of the recovered marked and unmarked tags separately. Then using the tag ratio at the time of the DIT groups' release, one can estimate the unsampled mortality for the unmarked group. The basic assumption is that the difference in survival between the marked and unmarked groups is due to the selective fisheries.

The problem with chinook, however, is that natural mortality happens between years and is fairly large. Using the coho approach (or any other direct method), some of that large natural mortality

gets shunted over to mortality from selective fisheries. In short, there is no way with the coho method to separate the natural mortality from the selective fishery mortality.

Ron Olson (NWIFC) asked Marianna if she was more optimistic this year that the PM method would work out for chinook selective fisheries and preserve the integrity of the CWT system. She responded that the Selective Fisheries Analytical Working Group built a simulated tag data base where the natural mortality and selective fisheries mortality values are known. With refinement of the PM method using optimization techniques, it appears that total (all ages combined) selective fisheries mortality for chinook can be estimated just about as well as for coho in the simple world (and hopefully in the more complicated world). But this will not be useful for chinook as mortalities occur over several age classes and these need to be separated.

The PM method doesn't resolve the problem of allocating the total mortality to the individual age classes or to individual selective fisheries. This is equally a problem for coho for multiple selective fisheries. At this point, the PSC committees haven't specifically defined just what it means to preserve the integrity of the CWT system for chinook. But at a minimum, the CWT system will be impacted in cases where chinook must pass through multiple selective fisheries.

Geraldine Vander Hagen (WDFW) questioned if one needed individual estimates of natural mortality and selective fisheries mortality for each selective fishery, or was it even possible to get estimates of total selective fishery mortality and natural mortality for chinook. Marianna responded that the simulation runs using the PM method clearly appears to solve the problem of separating the two sources of mortality in the simulation tests for estimates of total mortality. To give a simple example, a set of selective fisheries for chinook was evaluated using the same natural mortality structure as that used for the Chinook Technical Committee's cohort analysis. One half of the fisheries were run as selective fisheries. Using the coho method, total selective fisheries mortality was over estimated by 100%. In contrast, the PM method resulted in a bias of less than 2%. She noted, however, that there hadn't been any discussion yet by the Selective Fisheries Analytical Work Group (SFAWG) on these results or what was required for chinook given the more complex life history.

Marianne McClure (CRITFC) questioned further if it was possible to estimate mortality within an individual selective fishery. Marianna replied that it was not possible for unmarked fish at this time.

Lee Blankenship asked what was wrong with taking a more simplistic approach. As an example, assume that there are three selective fisheries, each using a different gear. Given an estimate of total selective fisheries mortality, and estimates of encounter rates and mortality rates for each gear, then one should be able to simply partition the total mortality across the three fisheries. Lee argued that this type of approach shouldn't be far off from reality and therefore questioned why it wouldn't be a more reasonable approach over the PM model. Marianna did not take a position on his conclusion but did acknowledge that there were lots of different ways to approach the problem. She stressed that the SFAWG needed to become more active and evaluate the various approaches.

Susan Bates (CDFO) noted that the SFAWG seemed to be working on whether these various issues can be resolved, given perfect data from the field. However, she stressed that perfect data was not coming from the field. CDFO samplers, for example, are not delivering the same proportion of unmarked tags as marked tags, even when fisheries are non-selective. Unfortunately only preliminary conclusions can be drawn because CDFO's coho fishery has been so constricted and there is only one year of sampling data.

Samplers at Robertson Creek Hatchery, for example, saw three times as many marked fish as unmarked fish. The difference was attributed to seasoned samplers having the mind set that clipped fish have a tag and unclipped fish are untagged. In addition, samplers tend to spend more time wanding a clipped fish that an unclipped fish just because they "know" there should be a tag in the clipped fish. Susan noted that this was a serious problem since all mass marked production of a hatchery would be evaluated against the unmarked tags sampled. If samplers are not finding the tags in unmarked fish at the same rate as marked fish, survival estimates are biased downward.

Marianna agreed that data quality was a problem and recommended improved training and monitoring in order to correct the sampling problems. Lee Blankenship also noted that in the past, CWT samplers were shown to have missed adipose clips. However, there was no backup check as in this case. Ron Olson (NWIFC) also commented that when Washington began electronic sampling of coho, a major effort was made to get all of the samplers trained together. It was an interagency effort with separate workshops held for commercial samplers and for hatchery samplers. He concluded that the effort was very successful and will be followed by a similar training effort next year for electronic sampling chinook.

6. Update on Mass Marking and Selective Fisheries

Updates were provided on the status of mass marking hatchery coho and chinook, and plans for selective fisheries (where applicable) in Oregon, Washington and British Columbia.

A. Hatchery Coho and Chinook in Oregon

Christine Mallette (ODFW) reported that hatchery mass marking plans for the 1999 brood do not significantly differ from the 1998 brood marking strategy (~~Attachment 2~~).

Coho: For coho, this includes mass marking all coastal hatchery production and all hatchery production in the Columbia Basin below Bonneville Dam. Over five million 1999 brood coho will be marked in 2000 with the adipose only - no CWT mark. Of those, 4.2 million juveniles will be marked in the Columbia Basin below Bonneville Dam, and 837,000 will be marked at coastal facilities.

Chinook: Approximately five million spring chinook will be marked in the Willamette basin with the adipose only mark. An additional one million fish on Oregon's coast will be marked with the adipose only clip.

Selective Fisheries: ODFW plans to continue selective coho fisheries in freshwater where mass marked hatchery coho are present in adequate numbers. Areas include the Columbia, Nehalem, Salmon, Coquille, North Umqua, and Rogue rivers, Tillamook Bay and Coos Bay.

Oregon ocean salmon fisheries recently adopted by PFMC include the following:

- Sport fishery for chinook and coho: From Cape Falcon, OR to Leadbetter Point, WA (July 10-Sept. 30 or 37,500 ad clipped coho quota)
- Sport fishery for chinook and coho: From Cape Falcon, OR to Humbug Mountain, OR (July 1-31 or 20,000 ad clipped coho quota)
- Sport fishery for chinook only: From Humbug Mountain, OR to Horse Mountain, CA (May 26-July 6 and July 29 to September 10)
- Buoy 10 (mouth of Columbia River): coho catch expectation of 65,000 with 55,000 ad clipped fish retained.

B. Hatchery Coho and Chinook in Washington

WDFW: Lee Blankenship reported that approximately 27 million adipose-only marked coho (1998 brood) were released in 1999. Details are provided in the PSC Selective Fishery Evaluation Committee's report (see agenda 5). This total will increase to 34 million coho released in 2000 as marking agreements have now been worked out with most of the Tribes. It represents essentially all of the statewide coho production.

In 1999, two million spring chinook in the lower Columbia River and 10 million chinook from Puget Sound were released with the adipose only mark. Approximately two million lower Columbia River spring chinook will be again marked and released in 2000. However, in Puget Sound, the total release will triple to 30 million as various cooperative marking agreements have been worked out with the Tribes. Only the Hood Canal and Skykomish summer chinook will not be mass marked.

Selective fisheries for coho in 2000 will be similar to that in 1999, including ocean recreational fisheries on the Washington coast (Willapa Bay, Grays Harbor, Area 1 and Buoy 10) plus the Strait of Juan de Fuca and Area 13 in South Puget Sound. No mark selective fisheries are anticipated for chinook in 2000.

Tribes: Ron Olson (NWIFC) commented further that the Tribes operate 12 coho production facilities in Washington. The production of four of the 12 facilities is now being mass marked in cooperation with WDFW. Similarly, the Tribes operate seven major chinook production facilities. Five of those facilities are participating in mass marking their production. Ron also noted that the reasons for non-participation by the eight coho and two chinook facilities were varied. Some hinge on the fact that a number of quantitative issues surrounding the CWT system haven't been satisfactorily resolved yet.

USFWS: David Zajac distributed a summary table which summarized USFWS's mass marking of 1998 brood coho last year at six hatcheries (**Attachment 3**). Most of the fish were adipose only marked (with some Ad+CWT marked fish) at the Makah, Quilcene, Eagle Creek and Willard hatcheries.

With respect to the 1999 brood coho, 100% of the coho production (1999 brood) of the Makah and Quinault national fish hatcheries were either tagged or marked, and 83% of the Quilcene NFH production (**Attachment 4**).

C. Hatchery Coho in British Columbia

Marc Hamer (CDFO) reported that Canada's mass marking of 1999 brood hatchery coho was about the same as that seen for the past three years for the inside stocks (**Attachment 5**). Approximately six million fish will be adipose only marked, while another three million will be released unmarked and untagged. The major difference for the 1999 brood is that mass marking will be discontinued on the outside stocks. There is no mass marking of chinook.

There are no plans yet for directed selective fisheries on marked coho. However, there are some very small selective fisheries (e.g. mouth of the Capilano and Campbell rivers) that are basically terminal fisheries.

D. Hatchery Chinook in Idaho

Rodney Duke (IDFG) distributed a table (**Attachment 6**) outlining IDFG's plans for mass marking nearly all of the 1999 brood hatchery chinook. Out of 3.4 million fish (expected production), 3.1 million will be adipose clipped. In addition, a significant number will also be given a CWT and/or a pit tag. Only 266,000 will receive a LV or RV mark in addition to a pit tag.

Likewise, David Zajac reported that the USFWS will be marking 100% of the 1999 brood chinook production at Kooskia, Dworshak, and Rapid River with either the adipose only or adipose + CWT mark (**Attachment 7**). Total production for the three hatcheries is projected at 450,000 fish.

E. WDFW Plans for Testing Commercial Selective Fisheries Gear

Geraldine Vander Haegen (WDFW) began her presentation by noting that the move towards selective fisheries in the past few years has resulted in a parallel effort to evaluate gear modifications in an effort to minimize the take of non-targeted species. In particular, she cited the leadership of Canada in investing over 20 million dollars in research on commercial selective fishing gear. The result has been an excellent spirit of cooperation between CDFO and the tribal and non-tribal fishers.

There are two general approaches to improving the effectiveness of selective fisheries. The first may be defined as 'Avoidance'. By-catch is reduced by time/area closures and/or gear restrictions. While often effective, it reduces or eliminates opportunities for fishing.

The second general approach is 'Live Capture', and favored by the United Nations. Most but not all by-catch is expected to survive capture. It also allows fishers to release specific by-catch, including non-targeted species, age classes (e.g. juveniles), and even stocks in some cases. The

compelling feature of live capture is increased opportunities for fishing, including reopening closed fisheries.

Canadian research has shown that tooth tangle nets and drift floating traps have particular promise. The tooth tangle net literally snags the fish by the teeth rather than the gills, and as such, minimizes the damage to the fish. The drift floating traps are long and deep fishing nets that are too heavy to pull by the two small boats at either end of the net. Instead, the net is allowed to drift with the current. Fish enter the net and pass through successively smaller openings into a holding bay where they then can be dipped out one by one for either release or harvest. Geraldine noted that one fisher had successfully targeted chum and was earning $2.10/lb Canadian vs the normal rate of 10-20 cents/lb because of the high quality of the fish.

She noted that WDFW several WDFW experiments planned for this fall on testing these two tests of gear for commercial selective fishing gear. Specific goals include an evaluation of catch efficient versus the traditional gillnets, and how well the fish survive following release to compete their life cycle. Local fishers will be contracted to first build the experimental nets. Then every fish captured will be brought on board to take biological data. Each fish will also be tagged (likely jaw tags). The fish will then be placed in special holding boxes that have baffles to orient the fish into the flow of water and thus oxygenate the gills. Previous work has shown that these boxes are very successful in reviving even fish that were almost moribund. The test research will be carried out in two areas of Puget Sound (coop studies with the Suquamish and Squaxin Tribes) and in Willapa Bay.

7. NMFS Views and Policies on Mass Marking and Selective Fisheries

The Mark Committee discussed William Robinson's recent letter to WDFW (and copied to CDFO) in which he outlined NMFS' views and policies on mass marking and selective fisheries (**Attachment 8**). The intent of NMFS was to avoid surprises or misunderstandings on this matter. Particular attention was given to ensuring that the CWT program is not unduly compromised in the process.
The discussion was quite limited as it was observed that the letter spoke for itself. However, Lee Blankenship emphasized that it was an important document as NMFS has now taken a clear position that separates mass marking from selective fisheries. In addition, NMFS agrees that the adipose clip is the mark of choice for mass marking hatchery fish, and that most hatchery fish need to be marked to evaluate management strategies and stock interactions, etc.

Ron Olson (NWIFC) also commented that NMFS' letter also highlights the fact that there remains a lot of work that still needs to be done on various aspects of mass marking and selective fisheries in order to protect the integrity of the CWT system. As such, it should serve as an incentive for agencies to commit the necessary staff and resources to get the research and analyses done.

8. Review of Special Requests to use the Adipose Only Clip (No CWT) for Mass Marking

A. IDFG/USFWS: Mass Mark Snake River Chinook with the Adipose Only Clip
(2nd Year Review of five year approval granted in 1999)

Rodney Duke reported that Idaho was looking at very low numbers of fish this year, coming off very poor adult returns two years ago. Many of the hatcheries will be marking 100% of their production with a CWT and no fin clip (**Attachment 6**). This is also the case for the Nez Perce hatchery production. He was not certain if the wire would be blank or coded, but expressed great hope that the political decision would be to use coded wire in order to obtain coastwide recovery information.

Susan Bates (CDFO) questioned why the Mark Committee was reviewing Idaho's mass marking program for chinook given that Oregon and Washington were mass marking chinook now without review by the Mark Committee. Lee Blankenship replied that while the observation was true, Idaho's annual review was part of the agreement last year when a five year extension was approved.

B. USFWS: Adipose only mark 200,000 Quilcene summer chum
(Approval granted prior to meeting)
See Agenda Item 9 regarding request for approval for five year 'extension'.

C. ADFG: Adipose only mark 30,000 pink fry (Approval granted prior to meeting)

D. ODFW: Adipose only mark 10,000 kokanee from Lake Billy Chinook to evaluate their potential return to the Deschutes River as sockeye
(Approval granted prior to meeting)

E. CDFO: Adipose only mark 1200 Cultus Lake sockeye
(Approval granted prior to meeting)

F. CDFO: Adipose only mark 174,000 Yukon River spring chinook for release in June, 2000 from Whitehorse Hatchery
(*Proposal withdrawn by CDFO as the fish will be marked with CWTs*)

9. Proposed Five Year Approval Recommended for On-going Special Exemption Marking Studies (David Zajac, USFWS)

David Zajac explained that he initially intended to just request a five year extension for the Quilcene summer chum study (Agenda item 8.B). However, since the Mark Committee is reviewing the small scale mass marking programs (Idaho's chinook marking being a noted exception), he therefore proposed that any such long term marking program be considered for a five year approval.

The discussion shifted to the basic question as to why the Mark Committee wanted to review the smaller mass marking proposals. Ken Johnson commented that one key reason was to be able to monitor whether a number of small scale programs could collectively impact the CWT sampling system (see Agenda item 10). Marianna McClure (CRITFC) noted that it wasn't clear what the difference was between an annual review/approval and a five year extension approval with annual review. Lee Blankenship responded that the review process (in either scenario) was to see if significant changes had occurred in a given program since it was originally approved. David Zajac added that if there were significant changes, then it was a new proposal and subject to the review/approval process again.

Marianna also suggested, in terms of Agenda item 10, that it would be more informative if the original proposal specified the expected number of years for the mass marking program. This recommendation was readily agreed to by the Committee.

Action: The Mark Committee agreed that long term mass marking proposals will be approved for a five year period (following the initial review and approval), with an annual review for purposes of monitoring significant changes in the marking program over time. The original proposal is to specify the expected duration of the marking program.

10. Proposed Tracking of Long Term Marking Programs (Marc Hamer, CDFO)

Marc Hamer (CDFO) had earlier noted that individual programs typically have little to no impact on CWT sampling. However, there is the possibility that collectively they could have an impact. The information is difficult to extract because of the limitations of the current release reporting rules with respect to releases not associated with a CWT. As such, he had suggested that a standing summary report be developed. He also recommended that specifications be developed for the data to be exchanged within the existing PSC system, similar to that for CWT data exchange.

Discussion was limited on this proposal, in large part because it was the end of the day and in part because it had pulled into the discussion for Agenda item 9. However, there was strong support to move forward with this proposal. Ron Olson noted that the database would be simple, easy to maintain, and very helpful in providing a historical record of mass marking programs.

Action: Approval was given to develop data format specifications for exchanging mass marking proposals. The data would be exchanged between Canada and the U.S. through the established PSC data exchange system. Marc Hamer, Chris Harrington (IDFG), and Ken Johnson will serve as a working group to develop a draft format for the new database.

5:25 P.M. Adjourn for the day

April 20, 2000 (Thursday)

8:30 A.M. Reconvene

11. Use of Blank Wire in Columbia River Upriver Brights (Chinook)

By way of background, Ken Johnson explained that large numbers of fall chinook (upriver brights) in the Columbia River have been tagged with blank wire by ODFW and WDFW in the past few years. None of the releases have been adipose clipped. Under the 'old days' of visual sampling, this would not be a problem. However, with the future advent of electronic sampling, these fish may be sampled and provide no information at the expense of the recovery agency. At this point, there is no formal regional agreement that blank wire can't be used on non-adipose clipped chinook and coho. As such, the use of blank wire needs to be evaluated to determine whether or not it should be eliminated, modified or allowed to continue with not change.

Norma Sands (NMFS) asked for more details on why the fall chinook were being marked with blank wire. Lee Blankenship replied that it is a requirement of NMFS to mark these fish. Christine Mallette (ODFW) added that the wire tag is used primarily to mark fish that have high stray rates (e.g. Umatilla stock). An electronic detector device at Lower Granite Dam is used to check all upriver bound adult fish. Fish carrying a CWT are diverted and not allowed to pass in order to maintain genetic integrity of the stocks in the upper Snake River. Use of the adipose only mark would not be adequate to identify the straying fish at the Lower Granite Dam Trap.

The cost of blank wire is about $25 per 1,000 tags, versus $55 for coded wire. This difference in cost results in significant savings as approximately six million fall chinook are marked yearly with blank wire. Marking levels in 1999 were 2.1 million fish at Umatilla Hatchery, 1.0 million at Washougal Hatchery, 1.3 million at Bonneville Hatchery, and 1.3 million at Klickitat Hatchery. Adrian Celewycz noted that the downside of this marking is that future recoveries prior to electronic sampling). Lee agreed but emphasized that representative releases of these same stocks were already marked with CWTs. Hence there is no need to mark all 5-6 million fish with coded tags.

David Zajac questioned why blank wire tagging was a concern since Oregon and Washington were both willing to handle the cost of processing blank wire. Lee Blankenship replied that these stocks are also taken in Canadian and Alaskan waters. He agreed that it wasn't a problem at this time since neither Canada nor Alaska is now using electronic sampling for chinook. But that likely could change in the future.

Ron Olson agreed that there appeared to be good justification for this type of marking. However, he questioned why a proposal was never brought before the Mark Committee. Lee Blankenship responded that the use of blank wire had started before the shift to electronic detection. No proposal was deemed necessary since the fish weren't adipose clipped and thus wouldn't be sampled. He also stressed that WDFW did not want to do this marking because of the added cost. However, WDFW has conceded each year because it is a NMFS requirement for a Tribal program.

Ron Olson noted that since the agencies are on the verge of moving to electronic sampling of chinook, this scale of blank wire tagging will have some impact on the sampling programs up and down the coast. Therefore, he argued that at least the basic marking information should be presented to the Mark Committee in the same format that other mass marking proposals now are. David Zajac agreed that this type of marking clearly falls within the mass marking realm, and argued that the proposals should include project recoveries by Canada and Alaska. Lee Blankenship concurred but emphasized that this should be the responsibility of CRITFC since WDFW does the marking for Tribal purposes at the request of NMFS. He noted that there were basically three options to meet the NMFS requirement: a) tag the fish with blank wire; b) tag the fish with CWTs; or c) don't release the fish. He further stressed that NMFS didn't really care if the fish have a CWT or a blank tag.

This led to a discussion on sampling costs to the recovery agencies since the 5-6 million tags released yearly would result in increased recoveries. David Zajac stressed that the cost would be borne by either the recovery agencies processing blank wire (i.e. no information) or releasing agencies would have to pay extra and use coded tags. Rodney Duke concurred that the cost to the recovery agencies would be the same regardless if the tags were blank or coded. Marc Hamer agreed that the costs don't change but noted that in terms of real data, a blank tag was literally a non recovery and thus a loss of valuable resources. The concept of a charge back system came up if ODFW and WDFW used agency only wire in the place of blank wire. Guy Thornburgh (NMT) responded that agency only wire was about $10 cheaper than tagged wire. Given the administrative costs of 'charge back', he recommended against implementing a 'cost charge back' system. Others on the Mark Committee were more favorable to the concept but did not make a recommendation. Therefore, the subject was dropped.

Guy Thornburgh added a side note on recovery costs. In California, CAL FED (water regulatory agency) is considering a proposal to mass mark all chinook coming out of the Sacramento River system. The ten year contract calls for adipose only marking all 35 million production yearly, with 16 million of those fish also given a CWT. The goal is to allow the separation of wild and hatchery production, and to provide a means of evaluating if the wild runs are being restored. He also stressed that substantial recoveries would be in seen in Oregon and less so in Canada.

Rodney Duke raised a second issue of data tracking. He noted that IDFG was now having to also track fin quality on the groups of fish being released from Idaho. However, they are struggling for a way to connect a recovery to a particular release when there is no code on the wire.

Ken Phillipson (NWIFC) also questioned where the data fits in the database. Currently there is no good way to identify blank wire releases with either the tag type or mark type. He stated that he was unclear whether the blank wire was a mark or a tag, and urged further discussion to determine how this information can be captured in the PSC data exchange formats. Lee Blankenship concurred that this would allow users to determine the scale of blank wire marking and how big the problem is. Marc Hamer agreed that it would help recovery agencies to independently estimate the impact of blank wire on their respective recovery programs.

Action: 1) There was consensus that a mass marking proposal is necessary for the blank wire tagging program of Columbia River fall chinook (Upriver Brights), and that CRITFC would be responsible for preparing it using the mass mark proposal format. Marianne McClure will develop the proposal with the help of Lee Blankenship and Christine Mallette.

2) Blank wire was also recognized as a new mark. PSC Data Standards will be asked to handle the data management issues in order to capture both release and recovery information.

3) It was also agreed that blank wire tagging guidelines need to be incorporated into the Regional Mark Agreements.

4) Rather than establish a subcommittee, it was decided that an informal meeting of the Mark Committee will be convened in October, 2000 to overlap with the scheduled meeting of PSC Data Standards in Gladstone, OR. Interested committee members will convene to work out details of capturing blank wire release and recovery data with Data Standards.

12. Review of Regional Agreements

At the recommendation of David Zajac, this Agenda Item was combined with Agenda Item 14 (Mark Committee Charter). Discussion and action provided with Item 14.

Facilitator Recommendation:

David Zajac also observed that Ken Johnson juggles several tasks while serving as the chair, including taking notes, participating in the discussions, thinking about possible solutions, and facilitating the entire discussion. He therefore recommended that the Mark Committee consider using a agency meeting facilitator to conduct next year's Mark Meeting. This would expedite the overall meeting as well as allow Ken to participate more effectively in the discussion of the issues. He also noted that a trained USFWS co-worker had volunteered to help facilitate next year if the Mark Committee was interested.

Ken Johnson concurred with David's comments and stressed that he often felt unable to participate fully in the meetings because of the other tasks during chairing. Therefore, he welcomed the suggestion.

Action: The Mark Committee agreed to use a meeting facilitator for the 2001 Mark Meeting on a one year evaluation basis. David Zajac will determine if the USFWS meeting facilitator can attend the Mark Meeting in Oregon during April, 2001.

13. Problems Encountered in Determining the Number of Adipose Clipped Fish Being Released

Ken Johnson prefaced the discussion by noting that with the growing importance of mass marking, some users are now trying to determine how many adipose clipped fish are being released into the system. The number of adipose clips can be extracted from the release file.

However, it requires the user to do summations of various fields and isn't necessarily easy to understand.

Susan Markey (WDFW) then took lead of the discussion and gave a demonstration of how to use the Mark Center's RMIS to obtain counts of total adipose clipped fish released. Using a well designed handout (**Attachment 9**), she described how she queried for all 1996 brood coho releases in 1998 from Voights Creek Hatchery in Washington. The key, she stressed, was not to pull the data by tagcode alone as that would miss the untagged release groups. The reason is that the Mark Center currently keeps the tagged releases and the untagged releases (! or "bang" releases) in separate tables for data management reasons that were more pertinent a few years ago . *(Note: Following the Mark Meeting, it was decided that these two tables will be merged into a single table by early fall, 2000 to expedite data retrieval of adipose only information).*

Using two queries, she obtained totals for the number of CWTs, shed CWTs, and untagged fish in each tagged and untagged release group. In addition, the queries provided information on the type of external fin mark associated with both the CWT marked fish and the non-CWT marked fish. Using these data, she then calculated the total number of AD+CWT, no AD/CWT, AD/ no CWT, and no AD/no CWT fish for each release group and for the combined release.

Marc Hamer noted that CDFO had some concerns because records for some untagged release groups indicate that a given number of marked fish were released but also have a comment stating that only part of the release was marked. In this case, the fields carry a double meaning. He recommended that the appropriate solution would be to split that type of release into two records. Susan acknowledged that that would be the correct way to handle such releases rather than try to condense them into the fewest possible release records.

Ron Olson questioned if the problem was mainly people reporting the data incorrectly rather than the format. Susan agreed and stated that the mechanism for reporting the data was sound. To help reduce reporting problems, it was agreed that Susan's table (**Attachment 9**) would be added to the documentation for PSC Format Version 4.0.

A recommendation also was made that the Mark Center develop a new report that provides users with a summary of the calculated number of AD+CWT, no AD/CWT, AD/no CWT, and no AD/no CWTs. Jim Longwill agreed that this could be done. However, Ken Johnson added that this would not solve the problem of those users who download subsets of the data and have to do the calculations themselves. One possible solution would be for RMIS to add a new release field for internal use that provides a count of total adipose clips in the given release group.

The question came up as to how one determines what releases are 'associated' with a given tagged group. Prior to the advent of mass marking, directly associated releases were easily identified as those that were untagged but treated the same as the CWT marked fish. This continues to be true. The Releasing Agency is in the best position to determine which untagged fish can be associated with a CWT. However, if researchers need to get the total count of adipose marks that are directly or indirectly associated as a given release group, then the "!" releases must be considered as well. In many cases, Susan Markey noted, it is appropriate to include all releases from a hatchery. She stressed further that to be sure all relevant release

groups are captured, users must query the database using release year and brood year rather than tag code alone. In short, this latter type of query now depends totally on how the user defines the 'release group'.

Action: 1) The Mark Center was asked to develop a report that does the necessary calculations to provide users with the number of AD+CWT, no AD/CWT, AD/no CWT, and no AD/no CWTs in a release group. Another field, 'Total Adipose Clips' could be added to simplify the summation of fish with the adipose mark, regardless of whether or not the fish were tagged or carried other marks.

2) To help reduce reporting problems, it was agreed that Susan Markey's example table (**Attachment 9**) would be added to the documentation for PSC Format Version 4.0.

3) The Mark Committee recommended that the PSC Data Sharing Committee (or Data Standards Working Group) be asked to examine the entire issue of 'associated' releases. One example given was the so-called "whoops" fish that are associated but escaped before being marked.

14. Revised 'Charter' for the Mark Committee (and updated Regional Agreements)

During the 1999 Mark Meeting, the Mark Committee reached consensus that it was unrealistic to expect all agencies to sign a formal charter for the Mark Committee. One problem is that agency signatures can be construed to be a transfer of power to the Mark Committee. It was also recognized that the Regional Agreements now in place serve as an effective charter. As such, the two documents overlap and should be meshed into a single document.

The past few years also have seen a lot of changes in marking procedures with the shift to mass marking in order to identify hatchery fish for various reasons. This has also impacted the use of the adipose clip that once was exclusively reserved as the external flag for CWT marked salmonids. Therefore, it is necessary to review the existing Regional Agreements on Marking and modify them as required

David Zajac concurred that there was a need to upgrade the Regional Agreements and blend them with the so-called 'Charter' into a single document. However, he stressed that there was far too much work to be able to accomplish this task during the course of the Mark Meeting. Therefore he recommended that a subcommittee be assigned to complete this merge for presentation at the 2001 Mark Meeting.

Marianne McClure agreed that a subcommittee was the way to proceed, and recommended that the subcommittee start with the issue of resolving the marking agreements for blank wire (Agenda Item 11). She also noted that the current regional agreements state that *'coho may now be mass marked with the adipose only mark*' (Section II.A.1: exception 2). However, she argued that that wasn't truly a regional agreement reached by the Mark Committee but rather a political decision by Washington, Oregon and eventually British Columbia. Ken Johnson agreed and explained that he had added that language to reflect political reality but didn't know how to mesh the Mark Committee's actions on marking with current political reality. It was recommended that this was a good task for the subcommittee to resolve. Susan Bates (CDFO) also argued that

the Mark Committee's overall goal should remain that of preserving the integrity of the CWT system, regardless of what the political reality might be.

Marc Hamer (CDFO) also noted that Canada would address contentious marking issues through the Pacific Salmon Commission forum because of the voting structure of nation to nation (i.e. one of two votes versus two out of 12 votes on the Mark Committee). He volunteered, however, to forward any draft marking agreements to CDFO's internal Mark Users Committee for review and comments.

Action: It was agreed that a subcommittee would undertake the task of merging the Regional Agreements and the Charter into a single document. No attempt will be made to obtain agency signatures.

Members of the subcommittee are: Rodney Duke (IDFG), Marianne McClure (CRITFC), Ron Olson (NWIFC), Ken Johnson (PSFMC), and David Zajac (USFWS). A September meeting in Lewiston is tentatively planned. CDFO's Mark Users Committee will assist by reviewing drafts and providing recommended changes.

15. Electronic Detection of CWT's in Adult Salmon and Steelhead

A. General Discussion of Last Year's Results

ODFW: A field test was carried out last year with the R95 tube detector and the hand wand on spring chinook in the Willamette River. Christine Mallette reported that a total of 166 and 260 fish (25-98 cm fork length) were sampled at two facilities, respectively. The fish were split into two size categories: 'small' (25-59 cm fkl) and large (60-98 cm fkl).

Overall detection was acceptable by both the wand and tube detector.

Wand:	96.4%	1.1% false negatives	2.7% false positives
Tube:	97.5%	0.5% " "	2.4% " "

Detection in the smaller fish (25-59 cm fkl) was unexpectedly much lower.

Wand:	91.2%	0% false negatives
Tube:	91.7%	1.0% " "

Christine did not have an explanation for the unexpected results in the smaller fish but felt that it was likely a learning curve problem as the staff was new. ODFW is planning on continuing the sampling study. A draft report of the 1999 results will be available this fall for review by tag coordinators.

NWIFC: Ron Olson reported that they had no complaints with the effectiveness of the tube detectors in sampling their commercial coho fisheries last year. However there still were some complaints by samplers about the hypersensitivity of the wands.

CDFO: Doug Herriott reported that technicians missed 39% of the tagged chinook on the Chilliwack River during last year's electronic dead pitch tag recovery program. He didn't have an explanation for this high rate of missed tags but likewise suspected staff performance as well

as the possibility of equipment failures. However he was not informed of any problems until after the program was finished and was not able to suggest solutions or correct the situation. The results from the Chilliwack River deadpitch are as follows:

Readings

CWT Present/ Positive Audio and Visual response	70
CWT Present/Negative Response from Wand	62
No CWT/ Positive Audio and Visual response	3
No CWT/Negative Response from Wand	23
CWT Present/not wanded	44
Total number of recoveries	202

Dismissing 44 recoveries because they were not wanded leaves 158 samples that involved the use of electronic detection. The 62 negative responses (*i.e. no response*) represents 39% of the recoveries. However, when the 3 false positives that indicated the presence of a tag are added, the percentage increases to a 41% margin of error.

The following is a break down of the Post Orbital Hypurial lengths from the 62 recoveries where there was a negative response from the wand.

Post orbital Length (cm)	Frequency	Post orbital Length (cm)	Frequency
450-500	1	701-750	8
501-550	2	751-800	2
551-600	4	801-850	2
601-650	23	851-900	1
651-700	19		

The table below is a break down of the lengths from samples that had coded-wire tags and resulted in a positive response from the wand.

Post orbital Length (cm)	Frequency	Post orbital Length (cm)	Frequency
450-500	0	701-750	9
501-550	2	751-800	5
551-600	5	801-850	0
601-650	30	851-900	0
651-700	27		

While the size of the fish might be a contributing factor for negative results when using wands to detect tags, the tables seem to indicate that other circumstances should also be considered. In order to determine the reason or reasons, it is hopeful that a study will be completed during the fall/winter of the year 2000 on the Chilliwack River.

He also noted that the wands seem to develop a unique personality. There were also some problems with continual beeping because water had gotten inside. This was cured by opening the wand, drying out the components and then resealing the wand.

B. New Technique for Wanding Large Chinook

Geraldine Vander Haegen reported on a WDFW study to evaluate the technique of sampling large chinook for CWTs by placing the wand inside the mouth (**Attachment 10**). Previous studies have shown that the wand can detect over 90% of tags in chinook using the normal wanding technique. However, there is a bias towards missing tags in the largest chinook, particularly when the wand is used improperly.

Sampling was carried out on 304 marked chinook at Soos Creek Hatchery. CWTs were detected in 272 fish using the normal wanding technique. However, an additional 21 CWTs (7.2%) were subsequently recovered using the mouth wanding technique. Geraldine noted that they had expected to find improved detection in the larger chinook only but a number of the missed tags came from smaller chinook. Given that the samplers were seasoned, the missed tags in smaller fish was not likely from poor wanding technique.

This study also confirmed previous studies that the wand can detect more than 99% of 1.5 mm length tags in chinook. However, missed detections of the standard 1.1 mm length tags in chinook can be significant using external wanding. Therefore, she argued that this is a compelling reason to consider requiring samplers to wand chinook in the mouth if no tag is detected by the normal technique.

WDFW will be continuing further studies in 2000 to determine if mouth wanding should be the only technique used for chinook, and what its use may be for coho with 1.1 mm tags. As an interim recommendation, she advised mouth wanding chinook that are 80 cm or larger.

16. Minimum Standards for Tag Magnetic Quality: Follow Up

Ken Johnson introduced the agenda item by noting that it had generated considerable discussion during the 1999 Mark Meeting but no consensus was reached on what constituted appropriate standards and how they could be enforced. He suggested that the desired effect was at least partially accomplished without having to formally establish standards. In specific, he noted that Smith-Root, Inc. had delayed introduction of its version of laser etched alphanumeric tags until they can match or exceed the magnetic moment of NMT's tags.

Lee Blankenship commented that it would be wise for agencies to verify the quality of tags from a new vendor prior to ordering production lots. He reminded the Committee that MicroMark had claimed that they had quality wire but that turned out to be not true.

Ron Josephson questioned how agencies could carry out this type of test since it is so specialized. He noted that he also understood that it requires special handling of the tags to

avoid contamination (i.e. kept away from tweezers, etc). Guy Thornburgh (NMT) responded that there is a company in the midwest that does this type of analysis for $100-200/sample. NMT is willing to provide the name of this company and instructions on how to use shrink tubing to protect the wire from magnetic contamination.

Marc Hamer asked what the minimum detection ability was of the sampling equipment. Guy responded that any tagged fish should be detected when passed through a tube detector. Wands are listed as detecting tags to 20 mm depth. He emphasized that this is the absolute minimum depth, and that most wand detect tags much deeper. However, the wands can not be guaranteed to detect tags in the largest chinook heads. Guy further stressed that the quality of the wire is a function of both the magnetic moment of the wire and the effectiveness of the Mark IV injector in putting a full magnetic charge on the tag.

Ron Olson asked if it wasn't possible to get a good field check on the quality of magnetism using the Quality Control Device (QCD). Guy agreed that that should work. Ken Phillipson noted that the Tribes use 15-20 injectors during the tagging season. It is likely that the injectors don't necessarily perform the same in the field as in the lab setting in magnetizing the tags. He then described his method for setting the level of magnetic quality. To do this, the settings on the QCD are adjusted so that it accepts only 50% of the tags going through. The settings are a bit variable and range between 150 to 170 units. From there, the settings are backed down 20% and then range between 120 and 135 units. Ken stressed that he didn't know if the approach was valid but felt that it increased the probability that the tags leaving the injector were adequately magnetized. He also acknowledged that he got more rejects this way, and that some fish may get two tags (first tag subtracted from the counter).

This led to a discussion of just what the standard should be for tag quality. Geraldine Vander Haegen noted that if the standard detection depth of the wand is said to be 20 mm but actually is 30 mm, then a competitor could introduce wire that is detectable up to 20 mm maximum depth. That would lead to a lot of missed tags. Guy Thornburgh agreed and stated that NMT could state that the detection level is 30 mm. However, he emphasized that the true standard is still magnetic moment and not depth of detection as that is the information that would be provided by any company that evaluates the wire.

17. MicroMark Tag Codes

Ron Olson (NWIFC) voiced concern that the tag codes distributed during MicroMark's brief existence could possibly be re-issued by NMT in the future. He noted that some agencies have total control over the tagcodes that are ordered and thus have no concerns. However, other agencies, including NWIFC, do not have control over the tagcodes that are ordered. As such, there is a real possibility that the MicroMark tag codes could be re-issued to the detriment of the database.

Ken Johnson noted that MicroMark had forwarded their lists of tag codes to the Mark Center for the purpose of avoiding duplication. However, he felt that it was probable that this reporting system broke down during the company's final year of existence. Christine Mallette concurred as she noted that ODFW's list of tagcodes (forwarded by Ken Johnson) was about 10 million tag codes low.

Guy Thornburgh responded that NMT would be willing to black out any tag codes that were sold by MicroMark. However, he stressed that NMT could not be responsible for any used MicroMark codes that the agencies did not advise them about.

Action: Ken Johnson was asked to check with each agency and verify if the lists of MicroMark tag codes sold to each agency are accurate or need revisions. NMT will then update their tables and block out all codes used by MicroMark.

18. Northwest Marine Technology

A. NMT Research and Development

Guy Thornburgh reported that NMT is currently focusing all of its 'R & D' energies on the automated 'Marking and Tagging System' (MATS). He also noted that some problems were recently encountered with the laser system, thus delaying production of tags for two weeks. After two failed attempts by the manufacturer to ship the laser without in-transit damage, a unit was hand delivered. NMT plans to purchase a backup laser machine to ensure production can be sustained.

B. Decimal Coded Wire Tags

Approximately 16 million decimal tags have already been sold by NMT, with many already in fish. As such, Guy suggested that the Committee should add decimal tags as approved tags in the Regional Marking Agreements.

A handout was distributed on how to correctly illuminate and view decimal CWTs (**Attachment 11**). Guy noted that good illumination and viewing conditions are particularly important for decimal CWTs as the etched dots making up the decimal characters are smaller than the marks used on binary CWTs.

C. World Mark, Inc.

The new company, 'World Mark, Inc.' was created to specialize in the application of the automated MATS technology for tagging salmon and steelhead. Guy Thornburgh introduced David Knutzen to the Mark Committee and explained that he will be overseeing the marking and tagging activities of World Mark, Inc.

David Knutzen took the floor and explained that World Mark now has four trailers in operation. Two of them are presently located at Umatilla Hatchery during the blank wire mass marking for ODFW. The other two are at Soos Creek Hatchery and Samish Hatchery. Two more trailers will be available by September, with a total of 10 expected by early 2001. A tentative marking schedule (**Attachment 12**) was distributed.

The MATS technology is still continually to be developed. Current production is over 25,000 fish per shift, with fish no smaller than 62 mm total length. David also noted that the Umatilla marking started slow but has gained speed as adjustments were made. After the shakedown

week, the two trailers have been averaging 30,000 fish per shift/day or a overall total 120,000 fish/day (two 8 hr shifts per trailer). The record production to date was 40,000 fish for a shift.

Christine Mallette commented that as the ODFW supervisor responsible for the Umatilla marking, she had anticipated that the new marking process would prove to be a major adjustment. However, this was not found to be true. She emphasized that the contract work had been easy to complete, and that the MATS trailer fit into the hatchery environment with minimal impact.

Rodney Duke raised the issue of fish disease. He noted that Idaho is very concern about bringing trailers in from out of state because of the possibility of diseases being transmitted as the trailers move from hatchery to hatchery. Guy Thornburgh responded that World Mark guarantees in their contract that the trailer will be thoroughly disinfected to the highest standards possible prior to 'watering up' at the next hatchery.

Marianna McClure asked what the cost was to mark the fish. Guy responded that World Mark charges $25/1000 fish to adipose clip the fish, or $45/1000 fish to clip and tag the fish (cost of tags not included). He stressed that profit isn't the main concern at this point but rather getting the MATS technology fully operational. As such, prices are expected to increase once this goal is accomplished.

19. Smith-Root, Inc.

David Smith, President, was not able to attend as expected. However, per his request, the Mark Committee was informed that his company is continuing to push forward in their development of laser etched alpha-numeric CWTs that meet current magnetic moment standards as specified in last year's Mark Meeting. He expects to have samples ready by late summer, 2000.

20. Update on 1999 High Seas Sampling Program

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 1998
by Adrian Celewycz, NMFS, Auke Bay Laboratory
Presented to Regional Mark Committee, Pacific States Marine Fisheries Commission

In 1998, 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 a total of 175 cwts from over 55,000 salmonids examined. Chinook salmon comprised 99% of tagged fish recovered in the commercial trawl fishery.

In the 1998 trawl fishery targeting whiting in the North Pacific Ocean off Washington, Oregon, and California, chinook salmon and coho salmon were the only species with cwt recoveries. Of the total of 1133 salmon examined for cwts, 93% were chinook salmon, with coho salmon, pink salmon, and chum salmon comprising the other 7%. Of the 1059 chinook salmon examined, 37 cwts were recovered, for a tag occurrence rate of 3.5% for chinook . Of the 60 coho salmon examined, 1 cwt was recovered, for a tag occurrence rate of 1.7% for coho. The 37 cwt chinook salmon recovered in this fishery in 1998

represented a 31% decrease from the 54 cwt chinook that were recovered in this fishery in 1997, but this number of cwts was similar to the 38 cwt chinook recovered in this fishery in 1996. Because the total bycatch of chinook in this fishery was 3563, a rate of 3.4 can be applied to the 37 cwt recoveries to come up with an approximation of 125 cwt chinook salmon in the total catch of chinook salmon in the 1997 whiting fishery off Washington, Oregon, and California. This approximation should not be considered an "expansion", 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 1998 trawl fishery in the Gulf of Alaska, chinook salmon was the only species with cwt recoveries. Of the total of 7526 salmonids examined for cwts (a three-fold increase over the number of fish examined for tags in 1997), 59% were chinook salmon, 37% were chum salmon, and the remaining 4% were pink, coho, and sockeye salmon. Of the 4432 chinook salmon examined, 96 cwts were recovered for a tag occurrence rate of 2.2% for chinook salmon. This tag occurrence rate was 3.5 times greater than the tag occurrence rate in 1997. Because the total bycatch of chinook in this fishery was 16,941, a rate of 3.8 can be applied to the 96 cwt recoveries to come up with an approximation of 367 cwt chinook salmon in the total catch of chinook salmon in the trawl fishery in the Gulf of Alaska in 1998. This approximation of 367 cwt chinook salmon is 4.3 times the number of CWT chinook salmon recovered in this fishery in 1997. In the 1998 trawl fishery in the Bering Sea-Aleutian Islands, chinook salmon was the only species with cwt recoveries. Of the 46,711 salmon examined for tags, 54% were chum salmon, 45% were chinook salmon, with pink, coho, and sockeye salmon comprising the remaining 1%. Although over 6 times as many chinook salmon were examined for cwts in the Bering Sea-Aleutian Islands trawl fishery than in the North Pacific and Gulf of Alaska trawl fisheries combined, only 24% of the total cwt chinook salmon recovered were from the Bering Sea-Aleutian Islands. Of the 21,248 chinook salmon examined, 41 cwts were recovered for a tag occurrence rate of 0.2%. Because the total bycatch of chinook salmon in this fishery was 58,967, a rate of 2.8 can be applied to the 41 cwt recoveries to come up with an approximation of 114 cwt chinook salmon in the total catch of chinook salmon in the trawl fishery in the Bering Sea-Aleutian Islands in 1998. For comparison, in this fishery in 1997, 58 cwt chinook salmon were recovered.

In the recent past, numerous chinook salmon stocks have been listed as endangered or threatened under the ESA (Endangered Species Act). Listed ESUs (Evolutionarily Significant Units) 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. 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. Salmon are harvested as bycatch in these fisheries.

Information was presented on the historical (1981-1997) abundance of these recently-listed chinook salmon ESUs in these 3 high seas trawl fisheries. Historically, most of the bycatch of most of these currently ESA-listed stocks occurred in the whiting fishery off Washington-Oregon-California, and mostly in the mid-1980s, when foreign vessels dominated this fishery. Bycatch of currently ESA-listed stocks has decreased since this fishery became 100% domestic in the early 1990s. Of these ESA-listed stocks, 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.

Lastly, in a range extension, in 1998 the first 2 recoveries of California-origin chinook salmon in the Bering Sea were reported. These 95-brood year Sacramento River Basin chinook were recovered just north of Unimak Pass in the Bering Sea-Aleutian Islands trawl fishery.

21. Agency Reports on Tagging and Marking Plans for 2000

The intent of this agenda item was to highlight significant changes in marking programs. Only a few agencies noted major changes:

Nez Perce Tribe:	400,000 Lyons Ferry fall chinook 600.000 AD+CWT coho 120,000 AD only coho
WDFW:	Increase from 27 to 34 million coho mass marked " " 10 to 30 million chinook mass marked (P. Sound) Decrease from 16 to 14 million CWT marked salmonids
NWIFC:	Increase from 3.5 to 4.0 million CWTs out
ODFW	25 million fish tagged and/or clipped

22. New Look of the Regional Mark Information System (RMIS)

Jim Longwill used the final 45 minutes or so of the meeting to present an on-line demonstration of the new capabilities of RMIS following its complete port to the web environment. The new web application has a number of powerful features that represent a major advance in utility and functionality for both data managers and data users. A number of favorable comments were received following Jim's presentation.

5:00 P.M. Mark Meeting Concluded

April 21, 2000 (Friday)

Field Trip Stops:

1) **NMFS's Manchester Lab** (9:00 -11:00 am)

2) **WDFW's Soos Creek Hatchery** (1:00 - 3:30 pm)

- observe NMT's automated tagging trailer in action.

Attachment 1`

Mark Committee Meeting -- April 19-20, 2000

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* Mark Committee members		

Enclosure

PROPOSED OLYMPIC PENINSULA NATIONAL FISH HATCHERY
COHO MASS MARKING PLANS - BROOD 1999
(U.S. FISH AND WILDLIFE SERVICE)

Hatchery	Production Tagged or Marked	Release Location	Total Production	Number CWT/Clip	Numbe CWT/
Makah	100%	On-station	250,000	40,000	
		Educket Creek	50,000	0	
Quilcene	83%	On-station	450,000	45,000	
		Quilcene Bay	200,000	45,000	
Quinault	100%	On-station	660,000	180,000	

Note: All the above numbers are production goals or tagging estimates. Egg take overrun affect production numbers. Tag overrun, equipment problems, or disease outbreak numbers.

RECD JUN 23 2005

Ron,
after chatting with Bob Kano & Christine Mallette, I realized that Attachment 2 never did get included for Boyne Resorts. Hence mystery solved! Thanks again for your help though.
Ken

ATTACHMENT 3

USFWS COHO MASS MARKING
BROOD YEAR 1998

HATCHERY	RELEASE SITE	TOTAL PROD	# AD CLIP	# CWT/AD CLIP	# CWT/NO CLIP	NO TAG/CLIP
Makah	Sooes R. (Wa)	250,000	170,000	40,000	40,000	0
	Waatch R. (Wa)	30,000	30,000	0	0	0
Quinault	Cook Cr. (Wa)	660,000	50,000	170,000	150,000	290,000 1/
Quilcene	Quilcene R. (Wa)	400,000	310,000	45,000	45,000	0
	Quilcene Bay (Wa)	200,000	0	45,000	45,000	110,000 2/
Eagle Cr.	Eagle Cr. (Or)	1,200,000	1,150,000	25,000	25,000	0
	Youngs Bay (Or)	1,000,000	950,000	50,000	0	0
Willard	L. W. Salmon R (Wa)	2,100,000	1,300,000	50,000	750,000 3/	0
	Clearwater R (Id)	550,000	0	60,000	60,000	430,000 4/
Winthrop	Methow R (Wa)	150,000	0	0	150,000 3/	0

1/ This figure should be zero for brood 99. The brood 98 program was not agreed to until after marking had already begun and fish were no longer accessible for mass marking. We also had some fish that were relatively unhealthy and decided not to handle them.

2/ Transfer to Skokomish Tribe and they object to current mass mark program.

3/ Mostly transfer to Yakima Tribal restoration program. Need protection from harvest.

4/ Transfer to Nez Perce Tribal restoration program. Need protection from harvest.

ATTACHMENT 4

Table 6. Planned Mass Marking of 1999 Brood Coho at Canadian Hatcheries

1999 Brood Canadian Stocks Which will be Mass Marked for Release in 2001

Area	Hatchery	Tagged		Untagged		Total
		Ad Clipped	Unclipped	Ad Clipped	Unclipped	
GSMN	Capilano River	40,000		485,000		525,000
	Chapman Creek			75,000		75,000
	Horseshoe Bay			10,000		10,000
	Reed Point/Ioco			10,000		10,000
	Sechelt			100,000		100,000
	Trans Mountain			10,000		10,000
GSVI	Big Qualicum River	40,000	40,000	820,000	1,250,000	1,250,000
	Puntledge River	40,000		532,000	800,000	800,000
JNST	Quinsam River	40,000	40,000	800,000	1,200,000	1,200,000
LWFR	Chehalis River	40,000		967,000		1,007,000
	Chilliwack River	40,000	40,000	1,870,000		1,950,000
	Inch Creek	70,000	40,000	520,000		630,000
TOTAL		310,000	160,000	6,199,000		7,567,000

Table 1. Actual Releases of 1997 Brood Coho by Canadian Hatcheries

Canadian Releases of 1997 Brood Coho 1999 (not including small scale enhancement projects operated by schools and community groups)

Area	Hatchery	Tagged		Untagged		Total
		Ad Clipped	Unclipped	Ad Clipped	Unclipped	
GSMN	Bedwell Bay			11252		11252
	Capilano River	39679		488905		528584
	Chapman Creek			70000	31400	101400
	Horseshoe Bay			9800		9800
	Mossom Creek				8000	8000
	Powell River				58887	58887
	Reed Pt/Ioco			7500		7500
	Richards Creek				200	200
	Sechelt			108647		108647
	Seymour R	29946		303	34429	64678
	Sliammon R	21902				21902
	Tenderfoot Cr		35438		202320	237758
	Terminal Cr				5000	5000
GSMS	L Campbell R				25381	25381
	Serpentine Enh				25000	25000
GSVI	Big Qualicum R	37806	40367	808971	739	887883
	Cowichan River				100862	100862
	Goldstream R	29825	30203	200	48089	108317
	Little R/GSVI				25000	25000
	Malaspina Coll				21718	21718
	Nanaimo River	30196			140795	170991
	Oyster River	30261			25000	55261
	Puntledge R	39907		540790	178199	758896
JNST	Quinsam River	62912	39955	870544	629441	1602852
LWFR	Alouette River	20120			12900	33020
	Chehalis River	34362		1042914		1077276
	Chilliwack R	82059	93963	1789085	23069	1988176
	Inch Creek	80257	20193	381076	176685	658211
	Kanaka Creek				97700	97700
	Stave Valley				15000	15000
TOMF	Thompson R N	28537		187	38412	67136
TOMM	Deadman River				33850	33850
	Spius Creek	9215	40605	812	27274	77906
NWVI	Conuma R	39676		40283		79959
NWVI	Marble R				4990	4990
NWVI	Tahsis R				25000	25000
SWVI	Nitinat R	42438		258	82113	124809
SWVI	Robertson Cr	40499	40668	761505	0	842672
SWVI	San Juan R	30200		0	0	30200
SWVI	Sooke R				39628	39628
SWVI	Thornton Cr				48340	48340
TOTAL						

Broodyear 1999 chinook production – DRAFT for planning – (last revised April 13, 2000)

Status	Hatchery	Stock	Est. Smolt Number	Mark	Rel. Site/ Comment
U	Rapid River	Rapid R/ Lookingg.	599,200	100% AD; 300K CWT; 45K PIT	Rapid River; IPC
U	Clearwater	Lookingglass	155,500	100% CWT, no finclip	Lolo Cr.; NPTH
U	Clearwater	Lookingglass	155,500	100% CWT, no finclip	Newsome Cr.;NPTH
U	Clearwater	Lookingglass	62,400	100% CWT, no finclip	Powell Pond; NPT
U	Clearwater	Powell	89,000	100% AD 300 PIT	Powell Pond; LSRCP
U	Clearwater	Lookingglass	62,400	100% CWT, no finclip	Crooked R. Pond;NPT
U	Clearwater	South Fork Cl.	15,800	100%AD 300 PIT; see Powell note	Crooked R. Pond;LSRCP
U	Clearwater	Lookingglass	106,250	RV 600 PIT	Crooked R. pond, acc. presmolt; ISS
U	Clearwater	Lookingglass	80,000	LV 600 PIT	Red R. pond, acc. presmolt; ISS
U	McCall	SFSR	120,000	100%AD+ CWT (see note); 2000 PIT	Weir to Mirror Cr.; presmolt; NPT Reserve group
U	McCall	SFSR	1,021,500	100% AD; 300K CWT; 45K PIT	Knox Br.; LSRCP Reserve group
L	McCall	SFSR	80,000	LV; 600 PIT	Knox Br.; ISS
L	McCall	SFSR	50,000	100%CWT,no fin-clip; 600 PIT	Stolle Pond; parr; ISS
L	Sawtooth	USR	58,600	100% CWT, no fin-clip; 500 PIT	Sawtooth; ISS
L	Saw/Pah	Pahsimeroi	70,100	100% CWT, no fin-clip; 500 PIT	Pahsimeroi; ISS

ATTACHMENT 6

U	Saw/Pah	Pahsimeroi	219,800	100%AD; 500 PIT	Pahsimeroi; IPC
U	Dworshak	Dworshak/ Lookingglas	333,000	100% AD 48K PIT	Dworshak; LSRCP
U	Kooskia	Kooskia	94,300	100% AD	Clear Cr.; COE

Note – Lookingglass stock is Rapid River stock, designates adults were destined to Lookingglass FH.

Kim Apperson PIT McCall ISS fish. Will have to hold fish inside to get PITted before ponding at McCall FH.

JPW (Jody Walters) tag coordinator ID for all other ISS groups, but Rodney PIT unless otherwise notified?

~~Pete Hassemer~~ Kurtis Plaster (KLP) tag coordinator ID for chinook LSRCP groups, but Rodney PIT unless otherwise notified?

?????????? tag coordinator ID for all steelhead and IPC chinook (non-ISS) but Rodney PIT unless otherwise notified?

Larry Basham tag coordinator ID for CSS study at Rapid River and McCall.

For Lolo, Newsome, NPT will provide wire and pay for Rodney marking

For McCall presmolts for NPT, CWT will need to be different code than U.S. Canada

For Pahsimeroi, small HI BKD groups will be combined to comprise progeny of both reserve and supplementation, to be marked as supplementation

ATTACHMENT 7

USFWS MASS MARK SNAKE RIVER CHINOOK
(Brood year - 1999)

STOCK	TOTAL PRODUCTION	AD CLIP ONLY	CWT AND CLIP
Kooskia	100,000	0	100,000
Dworshak	220,000	160,000	60,000
Rapid River	130,000	70,000	60,000

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sustainable Fisheries Division
7600 Sand Point Way N.E., Bldg. #1
Seattle, Washington 98115-0070

ATTACHMENT 8

Dr. Jeffery P. Koenings, Director
Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091

Dear ~~Dr. Koenings~~:

In light of the discussions at the Pacific Salmon Commission (PSC) annual meeting in Vancouver last month, I believe it would be constructive to review recent events and the current situation as it involves mass marking and selective fisheries. I would like also to clarify the views and policies of the National Marine Fisheries Service (NMFS) on these matters, and thereby avoid any misunderstandings or surprises that may exist or arise regarding our approach to this issue. While recognizing that not all issues have been resolved even for coho salmon, NMFS' focus is primarily on chinook salmon, due to the fact that many populations of chinook are now listed under to the Endangered Species Act (ESA) and their life history is so much more complex.

For background, recall that the 1985 Pacific Salmon Treaty was accompanied by a Memorandum of Understanding. Among other things, that MOU obligated the parties to maintain a coded wire tag (CWT) and recapture program designed to provide statistically reliable data for stock assessments and fishery evaluations. With the advent of new mass marking technologies in recent years, and in recognition of the potential of mass marking and selective mark fisheries to affect the viability of the CWT program, the PSC adopted a new policy in February of 1998 to address this issue. A process was agreed upon whereby agency proposals would be submitted annually to a newly formed PSC committee known as the Selective Fishery Evaluation Committee (SFEC). Although the PSC lacks authority to prohibit mass marking or selective fisheries, the clear intent of the bilateral policy is to provide advice to the PSC and the cooperating agencies regarding their mass marking and selective fishery programs, all with a view toward ensuring the continued viability of the coastwide CWT program. The SFEC already has contributed substantially to these ends by developing standard analytical techniques, procedures for use of double index tagging methodology, modifications of sampling programs using electronic tag detection technology, and facilitating inter-agency coordination. Thanks largely to the work of the SFEC, most of the issues involving mass marking and selective fisheries for coho salmon seem to have been adequately addressed. Several U.S. jurisdictions and Canada are now actively engaged in coho mass marking and selective fisheries.

In both 1998 and 1999, the states of Washington and Oregon submitted mass marking plans in accordance with the agreed PSC process. In addition to coho, those plans included mass marking of large numbers of hatchery chinook salmon. Although no selective fisheries

specifically have been proposed yet for chinook salmon in marine waters, there understandably exists the expectation that selective fisheries proposals will be forthcoming, as that clearly is the motivation underlying the substantial public investment in the development and application of the new mass marking technology.

Unfortunately, despite the agreed schedule outlined in the PSC's policy and the good faith intentions of all parties, the SFEC was unable to conclude its review of the states' current mass marking proposals for chinook salmon prior to the PSC's annual meeting in February 2000, due largely to competing time demands and insufficient committee resources. Thus, the SFEC was unable to provide a committee recommendation to the PSC or the management agencies regarding those proposals. Although some members of the SFEC have expressed their individual views and concerns, there is no consensus within the entire SFEC on several key issues.

In light of this situation, the PSC neither endorsed nor objected to the proposals submitted by Washington and Oregon. Instead, representatives of the various U.S. and Canadian management agencies engaged in a candid exchange of views in executive session. The PSC then issued a bilateral statement reiterating the need to maintain the integrity and reliability of the CWT program, noting especially its importance to implementation of the newly agreed abundance-based chinook management regime. Although a range of unreconciled scientific opinions still exists regarding certain technical matters, the PSC's bilateral statement represents a firm policy commitment by all parties to maintain the basic viability of the CWT program. Given the timing of the PSC's meetings and domestic management processes, it now falls mostly to the relevant domestic management agencies to grapple with and address the technical problems in a manner that comports with their international and domestic commitments.

During the PSC discussion, Washington/Oregon's PSC Commissioner, Curt Smitch, made a particularly constructive observation. In response to concerns expressed by Canada that its scientific experts are already over-committed to work on other priorities, Mr. Smitch opined that the jurisdictions most strongly pursuing selective fisheries should take lead responsibility for providing the resources to solve the technical problems so that their programs can be successful and the CWT program kept viable. NMFS applauds this suggestion and, recognizing that Washington already has provided equipment and other assistance to bring this technology to fruition, encourages the state to dedicate additional resources to address the remaining analytical issues. NMFS stands ready to offer whatever assistance we can in this regard.

As noted above, NMFS seeks to avoid surprises or misunderstandings on this topic. To that end, allow me to take this opportunity to restate and clarify our policy stance on a number of the relevant issues.

Mass marking. From an ESA perspective, several obvious and significant benefits derive from applying a visual mark to hatchery chinook, most notably the ability to easily monitor and manage hatchery stray rates, and to differentiate hatchery fish from natural fish for broodstock management and stock assessment purposes. Our inability to distinguish the relative proportions

of hatchery and natural recruits in escapement data bases introduces significant uncertainty in NMFS' ongoing assessments of extinction risks for many natural stocks; mass marking will go a long way toward addressing this problem. Using the new mechanized technology for mass marking, these benefits can now be achieved on a massive scale in a very cost-effective and efficient manner.

By enabling selectivity, mass marking may also provide the means for sustainable fisheries, clearly a very important objective. However, because a number of critical technical issues remain unsolved, as noted above, NMFS shares the view of its comanagers that decisions made now to mass mark hatchery chinook are separate from decisions to be made later regarding selective fisheries. Even in cases where NMFS has required that a hatchery's production be mass marked because of ESA concerns, this does not imply that a selective fishery subsequently will be endorsed.

Please note that it is not NMFS policy that all hatchery production must be mass marked. Rather, NMFS policy is that mass marking must be decided on a case-by-case basis, taking into account, among other things, the specific objectives of the hatchery production, the intended purposes of the mark (e.g, study objectives; selective fisheries, etc.), and the effects of the hatchery production on fish listed under the Endangered Species Act (ESA). Because hatchery straying is ubiquitous, the need to monitor and/or control straying will be an issue common to hatchery programs operated for harvest augmentation. In most cases, the only available choices are to discontinue (or reduce) the hatchery production, or to mark the fish. The most practical means to mark the hatchery production will be with the new mass marking technology. Thus, NMFS anticipates that the application of its ESA policies frequently — but not always — will result in mass marking using the adipose fin clip. For these reasons, NMFS fully anticipates that many if not most Hatchery and Genetic Management Plans approved by NMFS will require mass marking, and that the mass mark of choice will often, though not always, be the adipose fin clip.

In some cases it will be counterproductive to visually mark hatchery fish with the adipose fin clip. For example, an adipose fin clip may be inappropriate when the hatchery fish are produced for conservation purposes. In such cases, the goal may be to pass the (unmarked) fish through mark-selective mixed stock fisheries. A similar strategy may apply when the production is intended specifically to contribute to treaty Indian fisheries in terminal areas.

Selective fisheries. The coastwide CWT program plays an essential and currently irreplaceable role in resource assessment programs and fishery management for chinook salmon. As noted in the PSC's statement, the CWT program provides information essential to implementation of the new abundance-based fishery regimes embodied in the 1999 Pacific Salmon Treaty agreement. The data it provides forms the informational background for much of the recovery effort for ESA-listed species.

As noted above, the management agencies have not yet reached a consensus as to whether risks to the viability of the chinook salmon CWT program can be managed within acceptable limits,

thereby unlocking the potential benefits of mark-selective fisheries. The problem is compounded by the fact that there is not a commonly shared understanding of what it specifically means to maintain the viability of the CWT program. While all parties are hopeful that further technical analysis will clarify the degree of risk, it is quite possible that insufficient time is available to solve the technical problems before decisions must be made regarding selective chinook fisheries. The potential for policy conflict is very real.

In case this happens, I want NMFS' position to have been understood well in advance. NMFS will, of course, consider all relevant information and the views of all the comanagers involved, especially including Canada, as the issues and analysis unfold. That said, NMFS will not support mark-selective fisheries in any area where the CWT program is unduly compromised. Given NMFS' particular interest in maintaining its ability to assess the incidental impacts of fisheries on listed species, our national obligation under the PST to maintain the viability of the coastwide CWT program, and the essential role of the program in implementing the new PST chinook salmon regime, it would make no sense for NMFS to take any other position.

I hope that this letter helps to clarify our position on these most important matters. Upon your request, my staff and I stand ready to discuss these issues fully and address any remaining ambiguities. More importantly, we are willing and anxious to discuss means by which NMFS can assist further in addressing the outstanding issues.

Sincerely,

William L. Robinson
Assistant Regional Administrator for
Sustainable Fisheries

cc: Patrick S. Chamut, Canada DFO

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 4

To Ken Johnson	From R Bayley
Dept./Agency	Phone #
Fax # 650-5426	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Using Regional Mark Information System (RMIS) Release Records to Determine Adipose Clipped Fish

---- Example Query ----

Files Accessed: Tagged Releases
Untagged Releases

Example Query Criteria:

Brood Year	=	1996
Release Year	=	1998
Species	=	2 (Coho)
Hatchery Short Name	=	Voights Cr Hatchery

Results:

RMIS Release File Fields (+ Mark Names)								Calculated Items			
Tag or Release ID	No. Release w/ CWT	No. Shed CWT	No. Untagged Fish	CWT Mark ID	CWT Mark Name	Non-CWT Mark ID	Non-CWT Mark Name	AD + CWT	no AD / CWT	AD / no CWT	no AD / no CWT
63 63/55	20,077	40	0	0000	Unmarked				20,077		40
63 63/56	20,760	197	0	0000	Unmarked				20,760		197
63 63/57	19,927	85	434,718	5000	Ad Clip	5000	Ad Clip	19,927		434,803	
63 63/58	20,106	80	218,414	5000	Ad Clip	5000	Ad Clip	20,106		218,494	
!04980012955	0	0	236,283			0000	Unmarked				236,283
!04980012974	0	0	24,813			0000	Unmarked				24,813
								======	======	======	======
								40,033	**40,837**	**653,297**	**261,333**

= Records from Untagged Release File

= Records from Tagged Release File

S.Markey WDFW 4/19/2000

ATTACHMENT 9

Detecting Coded Wire Tags with the Hand-held Wand Detector: An Alternate Technique

Geraldine Vander Haegen and Lee Blankenship
WA Dept. of Fish and Wildlife, 600 Capitol Way North, Olympia, WA 98501-1091
February, 2000

Introduction

Using the standard technique suggested by Northwest Marine Technology (NMT), previous tests of the hand-held wand detector showed that it can reliably detect over 90% of tags in chinook (Blankenship et al. 1999; Olson et al. 1999). However, those studies also suggested a bias toward lower detection rates in larger fish, particularly when the wand was used improperly. The failure to detect a tag probably results from the depth of the embedded tag surpassing the range of the wand. While working within the present range limits of the wand, we hypothesized that sampling inside the mouth of the fish with the wand would improve its ability to detect tags because the distance between a deeply embedded tag and the wand would be shorter. Here, we report on some initial tests of this method and our recommendations for its use and further study.

Methods

Chinook - Soos Creek Hatchery

Coded-wire tagged chinook returning to Soos Creek Hatchery in 1999 were recognizable by the absence of the adipose fin. These fish were visually separated from unmarked fish by the hatchery crew during normal spawning and sorting activities. Knowing these fish were likely to have CWTs, we attempted to electronically detect the tags using the standard wanding technique described by NMT (wanding only outside the snout). If no tag was detected, we then tried detecting the tag by sampling inside the mouth. In this method, the fish is held by the gills so that the mouth gapes open. The wand is inserted vertically into the fish's mouth with the long axis of the wand parallel to the spine. The most sensitive side of the wand (the side with the arrows) is placed against the roof of the mouth and moved up and down several times over the entire surface of the roof of the mouth. The fish were thus sorted into three groups: fish with tags that could be detected using the standard technique only, fish with tags which could only be detected by sampling in the mouth, and fish with undetectable tags. The fork length of each fish was measured, and all snouts were collected along with an indication of which wanding method was used.

Coho - Solduc Hatchery

Coho returning to Solduc Hatchery in 1999 could not be distinguished by visual means; all of the hatchery fish in this brood year were mass marked. As the fish were removed from the adult pond for spawning, the hatchery crew used the standard wanding technique to detect tags. All tagged fish were set aside, then the fish in which no tag was detected were re-sampled by wanding in the mouth.

Results

We sampled 304 marked chinook for CWTs (figure 1) at Soos Creek Hatchery. Tagged fish

ranged from 46 cm to 107 cm (FL), with either 1.0 mm or 1.5 mm CWTs. CWTs were detected in 272 fish using the normal wanding technique. All 1.5 mm CWTs were detected using the normal wanding technique. Using the normal wanding technique, we missed 21 CWTs (7.2%), all of which were detected by wanding in the mouth, and all of which were 1.0 mm CWTs. Fish with tags that were detected only by wanding in the mouth did not show a particular bias towards larger fish, rather they spanned range of lengths seen. Eleven marked fish in which no tag could be detected by either method were later shown by dissection to have no tag; we did not miss any CWTs using the combined methods.

Some fish with CWTs detected using the standard method were also wanded in the mouth. In every case, we could still detect the CWT. If the signal was weak with the standard wanding procedure, wanding in the mouth produced a strong signal from the wand. The number and lengths of these fish were not recorded, and will be the subject of future studies.

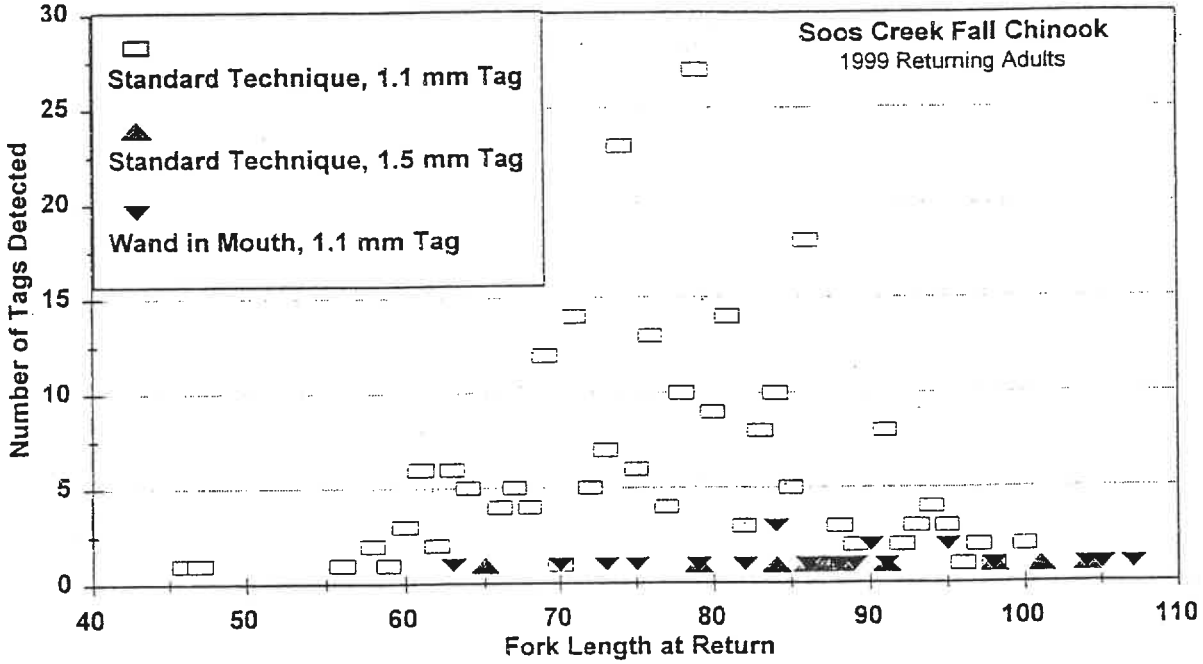


Figure 1: Frequency of tags detected in Soos Creek fall chinook by fork length using the standard wanding technique only ("Standard Technique") or the standard wanding technique followed by wanding in mouth ("Wand in Mouth").

At Solduc Hatchery, we re-sampled 400 coho salmon by wanding in the mouth, but did not recover any more tags. All CWTs recovered were 1.5 mm.

Discussion

We demonstrated that 7% more tags could be detected by sampling chinook in the mouth. We had expected that sampling in the mouth would improve detection only in the larger chinook, but our results showed otherwise. Because trained samplers were used, and because those samplers already had the expectation of finding a tag, we can not attribute the missed tags in the smaller fish to poor wanding technique. rather, more effort than usual was used to find tags by the standard method. All of the missed tags were 1.1 mm tags, and in several cases, a 1.5

mm tag in a fish of the same length was detected with the standard wanding technique.

No 1.5 mm tags were missed in coho at Solduc Hatchery using the standard wanding technique. This result is expected given that coho are generally smaller than chinook. However, the coho at Solduc are on the high end of the size range of adults returning to Washington State; the largest fish we sampled was 1 m long.

Based on these results, we are not proposing to change the wanding technique for coho, but feel that further examination on fish returning with 1.1 mm tags is necessary. We support the continued use of 1.5 mm tags given that coho are usually tagged at a reasonably large size, that the survival is not reduced compared to 1.1 mm tags (Vander Haegen and Blankenship 1999) and that the wands can reliably detect 1.5 mm tags even in large coho.

In this and previous studies, we have shown the wand can detect more than 99% of 1.5 mm tags in chinook, and therefore continue to support the use of 1.5 mm tags. However, the present study suggests that the rate of detections of 1.1 mm tags can be as high if chinook in which no tag was detected using the standard wanding method are then wanded in the mouth. This is a compelling reason to consider requiring samplers to wand chinook in the mouth if they have not detected a tag by the standard wanding method, or if they are not positive that the wand beeps indicate a tag is present. Ideally, we would like to require only a single sampling method to increase the speed with which fish could be sampled for CWTs. Some cursory examinations suggest that we may be able to detect all tags by sampling only in the mouth, but we will not adopt this method until further studies are completed in fall, 2000. Obviously, fish with mouths too small to accommodate the wand at all would be sampled outside the snout, but in such small fish, all tags would be well within the detection range of the wand. Sampling in the mouth is approximately as fast as the standard sampling technique, and we feel that it would leave less room for sampling error. A second advantage of wanding in the mouth is that it may decrease the number of false positive detections that result from dirt on the skin of the fish - the inside of the mouth is generally clear of debris.

In conclusion, we presently recommend wanding chinook in the mouth if no tag was detected using the standard wanding method. In fall 2000, we will conduct further studies to determine if this should be the only technique used for chinook, and what its use may be for coho with 1.1 mm tags.

References

Olson, R., K. Phillipson, and D. Zajac. 1999. Detection of coded wire tags in chinook salmon with the "wand" detector. Pp. 54-58 in Selective Fishery Evaluation Committee, 1998 Annual Report. Pacific Salmon Commission SFEC (99)-1.

Blankenship, H.L., D. Thompson, and G. Vander Haegen. 1999. Returns of chinook salmon coded wire tagged with 1.1 mm and 1.5 mm coded wire tags and adult electronic detection. Pp 59-63 in Selective Fishery Evaluation Committee, 1998 Annual Report. Pacific Salmon Commission SFEC (99)-1.

Illuminating and Viewing Coded Wire Tags

TGV NMT 2000 Apr 14

Code Wire Tags (CWTs) must be illuminated properly for good contrast between the background and the code marks in order to ensure easiest reading. Good viewing conditions are especially important for Decimal CWTs, since the dots making up the decimal characters are smaller than the marks used on binary CWTs.

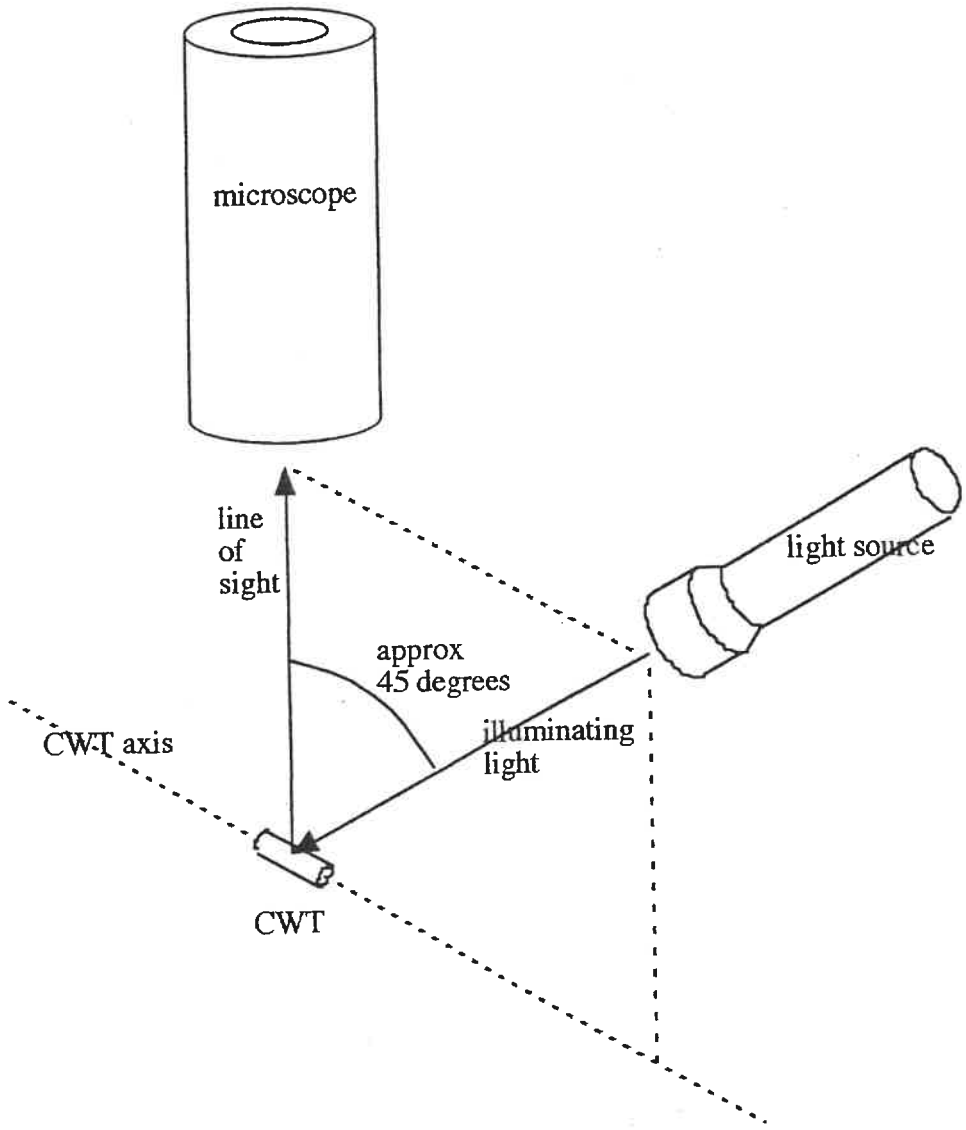
The most important idea to keep in mind when viewing CWTs is that the unmarked surface of the wire acts approximately like a smooth, curved mirror, while the marked dots act approximately like dimples with frosty, roughened surfaces. The goal is to make the smooth, mirror-like background look black, and the frosty dimples look white.

A mirror looks black if whatever is being reflected in the mirror is black. You can be in a well-lit room, and look in a mirror at the reflection of a black wall, for example, and the mirror will look black even though the rest of the room is light. Even if someone shines a flashlight at the mirror from the side, as long as you can't see an image of the flashlight in the mirror it will continue to look as dark as the black wall.

On the other hand, a white surface --- such as a piece of white tape stuck on the mirror --- will look white nomatter what direction light is coming from.

So if a mirror with a piece of white tape on it is angled so that you are looking through the mirror at a black wall, but someone is shining a flashlight from the side onto the mirror, the piece of white tape will be prominant and easily visible on the mirror. But if you look through the same mirror with the same piece of white tape at a white wall, the piece of tape will be much less prominant, because both the tape and the background (as seen by your eye) are white.

This is the basic idea used to optimize lighting for viewing CWTs. The only complicating factor is that the "mirror" --- the surface of the CWT --- is curved. A good arrangement of illuminating light and viewing direction is illlustrated in the following figure.


microscope
line
of
sight
light source
approx
45 degrees
illuminating
light
CWT axis
CWT

World Mark, Inc.

"We mark the masses"

World Mark, Inc. contracts out to West Coast Hatcheries to mass mark and snout tag salmonids using technology developed by Northwest Marine Technologies (NMT). Automated trailers sort and mark fish with one trailer supervisor and one technician. Currently, we have four trailers with two additional trailers available in the Fall of 2000. A total of ten trailers will be marking and tagging fish in the Spring 2001 season.

The ability to machine sort and mark salmonids is continually being developed. Future developments will focus on increasing the speed or output of fish being marked and improve the ability to handle smaller fish. Current production is over 25K per shift with fish no smaller than 62mm total length.

World Mark Schedule 2000

Hatchery	Species	Number	Mark Type	Start Date	Number Completed
Washington					
Puget Sound					
Soos Creek	Fall Chinook	400,000	DIT	April 17, 2000	40,000
		1,200,000	AD	May 1, 2000	
Samish	Fall Chinook	400,000	DIT	May 1, 2000	
		800,000	AD	May 15, 2000	
Skookum Creek	Coho	2,100,000	AD	June 12, 2000	
Marblemount	Coho	90,000	DIT	June 12, 2000	
		450,000	AD	June 15, 2000	
Columbia River					
Klickitat	Fall Chinook	1,000,000	Blank Wire	May 2, 2000	
Washougal	Fall Chinook	1,000,000	Blank Wire	May 2, 2000	
Priest Rapids	Fall Chinook	200,000	AD+CWT	June 5, 2000	
Wells	Summer Chinook	400,000	AD+CWT	June 5, 2000	
Oregon					
Columbia River					
Umitilla	Fall Chinook	2,200,000	Blank Wire	April 3, 2000	1,100,000

Total	Number
AD Only	4,550,000
CWT Only	4,645,000
AD + CWT	1,045,000
Total	10,240,000

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