PACIFIC MARINE FISHERIES COMMISSION

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M E M O R A N D U M

July 28, 1986

TO: Tag Coordinators

FROM: Ken Johnson, Regional Mark Processing Center

SUBJECT: 1986 Mark Meeting Minutes; New Tag Coordinators

1. Mark Meeting Minutes

Enclosed are the draft minutes for the 1986 Mark Meeting. I feel badly that they are so late; however, I was instructed to devote nearly all my time to completing the stock identification study that was started by Roy Wahle in October, 1984. That study proved to be far more time-consuming than initially expected and still is about a month from completion. Therefore, I recently decided to solve the problem by working on an agenda item each day until the minutes were completed. It worked very well and I probably should have opted to do this earlier.

Please review the minutes and give me a call if you find inaccuracies.

2. New Tag Coordinators

Several new tag coordinators have been named since the Mark Meeting. Lin Roberts resigned from ODFW and took a new job with the State of Oregon doing programming work. She has been replaced by Charles Corrarino. Rodney Duke also has accepted new responsibilities with IDFG; his successor is Tim Cochnauer. And lastly, Jim DeShazo (WDG) has assigned Charles Morrill to be his replacement.

I have enjoyed working closely with Lin, Rodney, and Jim over the past several years and will definitely miss their association in the future. On behalf of the Mark Committee, I wish to express thanks for a job very well done and best wishes in the future. I also wish to welcome our new tag coordinators and look forward to working with each of them.

JKJ:mmd

Enclosure: 1986 Mark Meeting Minutes

DRAFT MINUTES OF THE 1986 MARK MEETING

February 11, 1986 -- Portland, Oregon

I. Preliminary Business

A. Introductions

Committee members and other meeting participants introduced themselves and gave a brief statement of work responsibilities (see list of attendees, Attachment 1). Joanne Karlton (CDFG) was introduced as the new California tag coordinator, replacing Ron Pelzman. Vic Palermo (CDFO) represented Canada Department of Fisheries and Oceans in the stead of Margaret Birch who is on maternity leave. In addition, Jerry Lukas (ODFW) filled in for Lin Roberts who recently accepted a new position with the State of Oregon. Terry Wright (NIFC) was unable to attend and was represented by Ken Phillipson.

B. Approval of the 1985 Minutes

The Committee approved the minutes of the 1985 Mark Meeting.

II. Status of CWT Recovery Data

A. Current Status of Finalized Data

The current status of CWT recovery data (as of February, 1986) was reviewed by Ken Johnson (PMFC). Actual or projected dates for data submission, processing, and distribution are summarized in Attachment 2 for 1977 through 1985.

Significant progress was achieved during the past year. The 1983 recovery report was completed and distributed in August 1985, although it lacked Washington's recovery data. In addition, final 1984 data was received and processed for Oregon and California.

On the basis of projected completions by the agencies, it is expected that the 1984 recovery report will be available by August or September 1986. In addition, a substantial number of agencies expect to report their 1985 recovery data before the end of 1986.

Washington, as noted above, has fallen somewhat behind the other agencies. Dick O'Connor (WDF) noted that this has resulted largely from personnel reductions in combination with increased data processing requirements. This problem will be resolved in the near future as a new staff member is now being recruited to assist WDF's CWT data processing needs.

B. Status of Preliminary 1985 Recovery Data

As agreed during the previous Mark Meeting, preliminary 1985 recovery data was submitted to PMFC at the end of 1985 for processing and subsequent distribution. All major recovery agencies participated, thus rendering the effort an unqualified success. The data were distributed in standard PMFC report format to the PFMC Salmon Team members, USFWS staff in the Klamath River basin, and to Quinault fisheries staff.

Since the data are preliminary, guidelines were discussed for distribution of future preliminary data sets. Recommendations included the following:

1) The data should be made available for all pre-season planning.

2) The preliminary data reports should be accompanied by a cover letter which explains the limitations of the various data sets as necessary.

3) Headings and/or footings should be added to the data reports to emphasize the preliminary nature of the data.

C. Processing Rare-Earth Tags

Scott McCutcheon (NMFS-Columbia River) announced that because of high costs for using the X-ray reader equipment at Pullman, Washington (about $100 per tag), NMFS would no longer be decoding rare earth tags. As recoveries are still expected for nine rare earth codes, recovery agencies were instructed to simply label them as unreadable tags when they were recovered.

III. Status of OCZMA Proposal to Ad-clip Coho Hatchery Production in OPI

A. Ad-clipping Proposal

1. Review of Preliminary Analysis in 1984

Chris Carter, economist for ODFW, briefed the Mark Committee on actions taken during the past year regarding the Oregon Coastal Zone Management Association (OCZMA) proposal to adipose clip all hatchery coho in the Oregon Production Index (OPI) area. He noted that at the time of last year's Mark Meeting, a preliminary analysis of the proposal's impacts had just been completed by a combined staff from ODFW and WDF. This analysis found that the marking program was highly sensitive to the number of OPI coho marked. Anything less than 100% marking would result in a reduction of total OPI catch.

The analysis also noted that the program would cost in excess of one million dollars each year. Benefit-cost analyses found that benefits exceeded program costs at medium and maximum stock sizes given the assumption of zero percent adult production loss. However, at minimum stock sizes, the cost of fin clipping exceeded

the net economic benefits. In addition, under all situations, gains to the ocean fisheries were matched by losses to the inland fisheries.

And lastly, the preliminary report emphasized that the regional CWT program would be substantially affected by an adipose clipping program and that all agencies represented on both the Mark Committee and the U.S./Canada Chinook Technical Committee were in consensus that the adipose clip should remain sequestered for identifying CWT marked fish.

Given all of the above preliminary findings, the analysis team concluded that the ultimate benefits of the adipose clipping program could not be fully evaluated until harvest allocation policy for ocean and inland fisheries and treaty and non-treaty fisheries is established. A public hearing was subsequently held by ODFW on February 21, 1985. The ODFW Commissioners decided at that time to defer any decision until several additional economic analyses were carried out.

2. Additional Analyses in 1985

Carter noted that the additional analyses were completed in the latter part of 1985. The study included an analysis of the impacts of the proposal on community personal income based on the previous effects of catch, and also a closer look at the basic assumption of 30% hooking mortality.

After considering all factors, the analysis team recommended that the fin clipping proposal <u>not</u> be adopted for selective ocean harvest at this time. Factors influencing this recommendation included:

1) risks and uncertainties of both marking and hooking mortality waste;

2) high cost of implementation;

3) preliminary indication of non-support by other coho producing agencies; and

4) delays necessary to implement the program.

This recommendation was accepted by the Oregon Department of Fish and Wildlife Commission on January 24, 1986.

B. <u>Other Hooking Mortality Research</u>

1. Literature Review on Hooking Mortality

Larry Six (PMFC) reviewed two other recent PMFC coordinated projects designed to gather additional information on hooking mortality of salmonids.

The first project was an extensive survey of all available published and unpublished information on the general subject of hooking mortality of Pacific salmonids. The study was carried out under contract by Dr. Howard Horton (Oregon State University) with the intent that it be an independent study which could be used in evaluating the OCZMA proposal. This review has now been completed and can be obtained from PMFC.

2. Hooking Mortality Workshop

PMFC also sponsored a one-day workshop on the subject of salmon hooking mortality because of its general importance to all fishery management agencies on the West Coast. The workshop was held in association with PMFC's October 1985 Annual Meeting which was held in Juneau, Alaska. The workshop report is now completed and is available from PMFC.

IV. Update on CWT Statistical Research

A. Frank de Libero's Ph.D. Dissertation

Frank de Libero (WDF) was unable to attend the Mark Meeting, but furnished a detailed outline of the various chapters of his Ph.D. dissertation. The outline was reviewed by Ken Johnson to familiarize Committee members with the focus of de Libero's statistical research on CWT usage.

de Libero's research has been completed for some time and he is now writing full time. Several chapters have been completed, including Chapter II ("The CWT Data") which was distributed at the Mark Meeting. Completion of the study was projected for April, 1986.

Note: de Libero completed his dissertation in June, 1986 and it clearly represents a major advancement in CWT statistical knowledge, particularly in the area of replication. The study is entitled: "A Statistical Assessment of the Use of the Coded-Wire Tag for Chinook and Coho Studies". Copies may be obtained from either de Libero or PMFC.

B. Robert Vreeland's Masters Thesis

Robert Vreeland, NMFS-Portland tag coordinator, also took a few minutes and discussed his statistical research involving coded wire tagging. The purpose of this project is to detail procedures for conducting hatchery contribution studies and suggest statistical procedures for evaluating the results. The study design is based on determining the contribution of a given hatchery to all Pacific Coast salmon fisheries rather than contribution to a specific fishery.

Vreeland noted that he was in the final writing stages and advised the Committee members that draft copies would shortly be forwarded for their review and editorial comments.

Note: This CWT project is now completed and is an outstanding contribution to the specialized field of hatchery evaluation. The title of the thesis is: "The Experimental and Statistical Design of Conservation Studies for Salmonid Hatcheries". Copies may be obtained from Vreeland.

V. Status of Coastwide Stock Identification Study

Ken Johnson reviewed progress on the coastwide stock identification study that was begun in 1983-1984 by Roy Wahle. He reported that work had largely been completed on transforming Wahle's detailed north to south inventory of chinook and coho stocks (from Alaska to California) into production areas and management units. This process required the development of 135 pages of new inventory tables. In addition, streams were organized by hierarchial indentation wherever possible within the tables to show tributary relationships.

In addition, major review chapters had been written on the strengths and weaknesses of Genetic Stock Identification (GSI) and Scale Pattern Analysis (SPA) procedures. Both techniques have proven valuable for stock identification work, particularly so for wild stocks, and can be expected to be used on an increasing basis in the future on either a stand-alone basis or in combination with CWT studies.

Work yet to be completed included a description of all production areas, management units, and fishing management areas. In addition, chapters on current stock identification efforts and key indicator stocks needed to be completed. These latter chapters will be used to identify regional gaps where indicator stocks are either not being marked or are being marked, but at inadequate levels.

Johnson noted that he had been assigned to work virtually full-time on the project until it is done and therefore would not be able to respond quickly to many data requests. (These late minutes are a by-product of this effort!). Because of the size of the project, completion of the stock identification project was not expected until mid-1986.

VI. NMFS 1985 High Seas Sampling Program

Frank Thrower (NMFS-Alaska) reported that tag extractions were nearly completed for fish sampled by NMFS observers during 1985. Total tag recoveries were approximately half that recovered in 1984. He further noted that even fewer high seas recoveries were expected in 1986 because of the substantially reduced pollack fishery in the Gulf of Alaska.

The observer program presently has nearly 100% coverage on high seas directed salmon fisheries, with observers on the motherships. Coverage of the joint venture fisheries is approximately 50%. It was noted, however, that the observer program would be impacted by federal budget cuts in the future. The effect of these cuts remains to be seen.

Thrower also noted that the observer program does not include the foreign landbased salmon fisheries or the squid fisheries. The reason is that the fisheries are primarily conducted beyond U.S. controlled waters and the foreign governments have not agreed to voluntarily participate in an U.S. observer program. Some preliminary evidence from a 1985 cruise, however, suggests that the squid fishery has few salmon interceptions.

VII. Proposed Change to Policy on Ad-Clipping Columbia Basin Steelhead

The current regional agreements on Ad-clipping Columbia Basin steelhead (Item II.B.1.a) specify that the Adipose clip "is reserved (effective 9/83) to identify harvestable fish and is no longer a flag indicating a CWT." It is also stated in Item II.B.1.c that hatchery fish may be released without the Adipose clip if the stock is considered non-harvestable.

Terry Wright (NIFC) requested a review of this policy since the wording implied that all hatchery stocks are to be marked with the Adipose clip if they were healthy and harvestable. He proposed that the policy be changed to state only that the Adipose clip has been desequestered and not specify its use.

Questions about the proposed change could not be answered since Wright was not able to attend the Mark Meeting because of other responsibilities. However, a lively discussion followed and Idaho, Oregon, and Washington were unanimous in opposing any change to the wording. Duke (IDFG) emphasized, for example, that Idaho has Ad-clipped all their healthy steelhead stocks for the past three years with the understanding that they would be harvestable while giving protection to the weaker wild stocks. A change in that policy, therefore, would seriously undermine IDFG's effort.

Swartz (ODFW) also noted Oregon was opposed to changing the language in that the change would provide an opportunity for an agency to shelter their fish from traditional downstream fisheries until they returned back into the agency's own management area. DeShazo (WDG) concurred with both statements and further noted that NIFC's concerns probably dwelt more with what might happen in coastal Washington and Puget Sound streams. However, he noted that WDG was moving in the direction of a state-wide policy that all releases of healthy steelhead stocks be Ad-clipped for selective harvest management.

Duke and Swartz also emphasized that the Ad-clipping policy for Columbia Basin steelhead had been established in 1983 through agreement of the directors of IDFG, ODFW, and WDG. As such, it involves fisheries management policy and lies outside the scope of the Mark Committee's responsibilities.

Given this input, the Mark Committee left the policy intact without language changes.

VIII. Histological Effects of Coded Wire Tagging Salmon

John Morrison (USFWS-Abernathy) used highly convincing color slides of histological cross sections through tagged juvenile salmon snouts to illustrate his findings of olfactory and brain damage caused by coded wire tagging. He reported that a preliminary look at the effects of tagging was done by examining chum salmon tagged with half length tags at 700/lb. The fish were sampled from a typical field tagging operation rather than a specifically designed study. Forty-four fish were examined and 18 of them (41%) were found to have main-stem olfactory nerve damage directly corresponding with tag misplacement (see Attachment 3 for draft report and pictures). Progressive degeneration of nervous tissue was observed surrounding these improperly placed tags, and in some cases appeared to have rendered the nerve non-functional.

The problem appeared most acute in fish tagged at very small sizes (e.g. 500-2,000 range) since the cartilaginous target area is so small and easily missed. This was aptly demonstrated by a third pilot study in which an experienced tagger attempted to correctly place tags in chinook that were 1,200/lb. Even though considerable care was taken, consistent and proper tag placement was not achieved for a large percentage of the tags.

Morrison emphasized that these observations should be of considerable concern to the tagging community, particularly given the well documented role of olfaction in salmonid behavior and the current trend to tag fish as small as 2,000-2,200/lb. In addition, deeper tag placement is common in small fish because of poorer tag retention. He also emphasized that he was not critical of the use of coded wire tags as they are invaluable for stock identification work. Rather, his work was intended to highlight areas that need technique or mechanical refinement. Regardless of tagging size, he recommended that tagging supervisors should be concerned about:

1) experience of the tagging crew;

2) depth of tag implantation; and

3) proper fitting head molds to minimize nervous tissue damage.

No specific USFWS projects are currently underway to further examine CWT caused tissue damage. However, Morrison expressed confidence that further research would continue on an opportunistic basis.

IX. Improved Accountability Needed for Use of an Agency's Tag Codes by Other Agencies

The recent unreported use of agency 10 tag codes in a University of Idaho experiment at Eagle Creek NFH (USFWS) in Oregon served as an example in discussing how tag codes occasionally are used and released without the knowledge of the tag coordinator. It was noted that Northwest Marine Technology (NMT) also was concerned about this type of tag usuage and was willing to sell tags only through the appropriate tag coordinators or other authorized individuals.

During the ensuing discussion, it became apparent that unreported use of tags likely cannot be avoided totally because of personnel changes and other breakdowns in communication. However, several agencies (CDFO, WDF, USFWS and others) reported that they had greatly minimized the potential for this type of problem by individually working out arrangements with NMT to sell tags only to authorized persons.

It was not felt that the Mark Committee had to take any action in attempting to standardize who should be authorized to order the tags since each agency had different needs to meet. It was concurred, however, that all agencies should establish tight controls over tag purchases and then advise NMT who the authorized person(s) are. Dr. Fralick (NMT) expressed a willingness on the part of NMT to work with each agency on an individualized basis, but reiterated that the agencies must advise NMT of their preferences first before any action can be taken.

Dick O'Connor (WDF) also noted that tag coordinators ought to consider whether or not the non-reporting problem is an education problem with the tagging trailer supervisors. One suggestion was to have the tagging supervisors forward a copy of all tagging records to the tag coordinator.

X. NMFS-Seattle Request to Tag Spring Chinook and Steelhead with Identical Tag Codes

Scott McCutcheon presented a NMFS-Seattle request to mark replicated lots (groups of 5,000) of spring chinook and steelhead at Lower Granite Dam (Columbia Basin) in the spring of 1986 with identical tag codes in order to keep tagging costs down. Tags would cost $7,000 if purchased in code lots of less than 10,000, while lots of 10,000 cost $4,000 (30-day schedule price). The small group sizes were controlled by the Fish Passage Center and could not be increased. Furthermore, problems with the federal procurement system prevented taking advantage of lower tag prices on a 90-day or longer schedule.

Committee members recognized the problem with funding costs, but were unanimous in not approving the proposal. Rather, the Committee again went on record as strongly rejecting any duplicated use of tag codes for difference species at the same time or the same species in different years. Vreeland (NMFS-Portland) emphasized that the primary reason was that duplicated codes cause tremendous problems for data analysis.

Johnson (PMFC) concurred with Vreeland's statement and illustrated one example of how the historical data base is adversely impacted when a tag code is reused at a later time. When this happens, all the earlier tag recoveries must be selected from the various data files and edited by adding a suffix to the tag code to ensure that the computer can recognize the difference between the first and second releases. At best, the editing requires loading and sorting a lot of files and considerable time to accomplish the task. In addition, there is substantial chance for either overlooking recoveries or making mistakes. The best option is simply not to reuse tag codes.

Two alternative solutions were recommended to NMFS as ways to keep their costs down. Jan Kallshian (NMT) offered the first and described a similar situation in Alaska where small lots were needed, but the cost was a factor. An agreement was therefore worked out where NMT reduced its price for small lots, but asked that a large number of lots be ordered. Kallshian therefore recommended that agencies work with NMT directly when costs are a factor as compromises may be possible.

The second solution proposed was that NMFS not adipose clip the steelhead since ocean recoveries were not likely anyway. Another fin clip and/or brand could be used for recoveries back at the hatchery. In addition, the fish could be tagged with replicate codes used for the chinook so long as the adipose or left ventral clip were not used and the tagging was not reported for inclusion into the regional data base.

XI. Update on Advances in Microtag Technology

A. Binary Tags

1. Embedded Tag Code Replication

Dr. Keith Jefferts (NMT) reported that in response to the high level of interest in being able to tag statistically undistinguishable groups of fish from one larger group, his firm had developed the capability to produce embedded tag code replication on a single spool of wire. He noted that while several schemes could be used for accomplishing this, the best solution (and fewest difficulties) was to use the parity bits for replicate numbers rather than as the customary error check bits. The reason given was that parity bits are rarely used and probably could be sacrificed in the case of replicated tag codes.

The proposed replication method (see Attachment 4) had the following features:

(a) The present master word, 0 0 1 1 1 111 becomes 0 0 1 0 1 111 to indicate the presence of replicate coding.

(b) The parity bits are now interpreted as replicate numbers and range from 1 to 7.

(c) The parity bits or replication numbers should be read in a clockwise fashion with the Master Word, Data 1, Agency, and Data 2, Rows, equivalent to values 0, 1, 2, and 4 (see example in Attachment 2).

(d) For tags bearing two different replicate codes as a result of random cutting, the rule would be to read the right-most one with the tag in normal orientation (see Attachment 2).

(e) Aside from the meaning of the parity bits, and the new master word, nothing else changes. The same agency code is retained. Therefore, users could choose to ignore the replicate coding and still decode the tag code properly.

Jefferts noted that no comparable scheme was available for half length tags. The cost of the replicate tags would be the same as standard length tags.

In the discussion that followed, some apprehension was expressed about the need for the parity bits. However, the Committee was unanimous in approving the format and requested NMT commence producing replicate tags as soon as possible for use in 1986 tagging.

Some discussion also centered on how the new tags would be reported and maintained on the computer data bases. It was agreed that replicated codes would be distinguished by the suffix, R, followed by the appropriate replicate number (for example, 635821R1, 635821R2,...635821R7). All agencies with computerized CWT data bases will have to modify existing software in order to be able to deal with replicated tags both on an individualized replicate basis and collectively as a single tag code as the case may require.

2. Other Northwest Marine Technology Developments

NMT recently completed work on upgrading their tagging machine. The new machine has a LED window for displaying counts and a microprocessor which can be easily accessed to change functions. The machine is corrosion resistant and has adjustable needle penetration and tag placement depth.

3. Advisability of Ordering Tag Codes by Consecutive Tag Numbers

The question was briefly addressed whether or not it was advisable for agencies to order new tags by consecutively increasing tag code numbers. Some agencies already do this, while others tend to order tags by specific codes to match intra-agency code assignments. The subject was dropped, however, since there was no compelling reason to recommend one method over the other.

B. Update on Passive Integrated Transponder (PIT) Tags

Scott McCutcheon (NMFS-Columbia River) presented a summary of PIT tagging results in the upper Columbia River during 1985. Research results using a closed system indicated a 98% detectability level as the tagged fish swam through the monitoring system.

In another study, branded fish were monitored at a success rate of 7%. In contrast, PIT tagged fish were monitored at close to a 100% rate. NMFS staff have concluded, therefore, that 400 PIT tagged fish can provide the same amount of information as 4,000 branded fish. Hence, fewer fish are needed, with the added bonus that each fish is uniquely identified with PIT tags.

Consideration is now being given to installing a detection system that uses both PIT tags and jaw tags. For example, microtagged fish with a brand can be intercepted at the monitoring station and then PIT tagged and jaw tagged, with the PIT tag either inside the body cavity or inside the jaw tag. The fish can then be monitored without further handling at other dam sites, as it moves upstream.

C. Update on Smith-Root, Inc.

David Smith (S-R) briefly reviewed the display of various CWT equipment and fish detector systems that he had earlier set up in PMFC's conference room. He noted that the S-R tag injector offered many of the same features as the NMT machine, and included features such as self-threading, different lengths and sized wire, smaller injection needle, and long-lasting cutter bars.

S-R also offers 3-inch, 4-inch and 6-inch cylinder detectors for recovering CWTs from snouts. The detectors can be set at the desired angle.

Color coded tags have been improveed by using a thinner paint which results in a smaller tag diameter. In addition, the tags are sandblasted before being painted. The etched surface plus a background pastel paint help to accent the colors. While acknowledging that the tags aren't approved for ocean recoveries, Smith noted that they could be used for freshwater research.

XII. Review of New "Brood Report" Capability of the Mark Center

The Mark Center now has the capability of providing summary reports of total tag recoveries of a given tag code across all agencies, fisheries, areas, and years. These summary reports constitute brood reports and are available in three different time periods: a) in statistical two-week periods; b) calendar months; and c) on a seasonal basis.

In each case, total observed and estimated recoveries are provided by fishery and year. The mean length and number of fish measured is included (if available in standard fork length). Area of catch also is provided for the two-week and monthly formats.

Examples of these reports were provided for discussion. Availability of the data via tape or on-line access via modem was also discussed.

XIII. Proposed Changes to the CWT Release and Recovery Data Bases

A. Proposal to Report Complete Date of Release

The Mark Center's current CWT release data base only contains the month and year of release. However, there have been numerous requests in the past few years for the complete date. Therefore, it was proposed that the first and last days of release be provided to PMFC for inclusion in the release data base.

While there was no disagreement as to the value of the information, few Committee members felt that the actual day(s) of release was needed in the CWT release report. The reason given was that those who need to know the full dates typically need the information before the report is available anyway. Thus, they still have to work with each agency.

Johnson (PMFC) offered a compromise and said he would modify the Mark Center data base so that those who wished to could report the full date. However, only the month and year would be required for the time being. In addition, the CWT release report would maintain the present month/year format.

B. ADFG Proposals Regarding Length Measurements

1. Proposal to Discontinue Routine Measurements of Heads Recovered from Select (Voluntary) Samples

Karen Crandall (ADFG) noted that ADFG has routinely collected length data on heads recovered from select (voluntary) samples. Chinook head lengths were measured from the tip of the snout to the furtherest point of the operculum, while other species were measured from the "mid-eye to the furthest point of the operculum". Since 1982, however, Alaska's CWT sampling program has met or exceeded sampling goals in most sampled strata. As a result, ADFG staff interest in select recoveries has greatly diminished. ADFG therefore proposed that length data no longer be collected on the select heads recovered in Alaska. All other information, however, would continue to be recorded.

This action was approved by the Committee since there was little regional interest in the length data for "select" heads. However, Alaska was requested to continue reporting select recoveries to PMFC since the data are often useful. Frank Thrower (NMFS-Alaska) commented, for example, that they often were more interested in the observed recoveries than the expansion.

2. ADFG Proposal to Adopt "Mid-eye to Fork" as New Standard Length Measurement for CWT Recoveries in Alaska

Crandall also explained that ADFG has been collecting standard length measurements (tip of snout to fork) for all species sampling for CWTs. However, since 1978, ADFG samplers have also been recording "mid-eye to fork" length measurements for all State projects. The rationale for using this length measurement is that the snout undergoes pronounced changes as the fish move into freshwater. Hence, given the expanded emphasis of including all recoveries (marine and freshwater) in the recovery data base, it is important to have a measurement that is consistent during all phases of a salmon's life cycle.

The result of having two different length measurements, however, has resulted in an unknown degree of error as port samplers switch back and forth between various sampling projects. Therefore, to

eliminate the problem, ADFG proposed to only take mid-eye to fork measurements on all sampled fish. Existing or experimentally derived conversion factors would then be used to transform chinook lengths into the standard length measurement for the coastwide data base. However, coho, sockeye, pink, and chum salmon mid-eye to fork lengths would be reported to PMFC without change unless acceptable conversion factors already existed.

The resulting discussion was lively and of the general consensus that the error associated with the standard tip of snout to fork measurement was relatively small as the fish sexually mature. Palermo (CDFO) noted that his agency had several internal documents which supported this view. Therefore, he argued it was not worth the trouble for the small gain in accuracy. He also commented that most mark/recapture studies need data on the frequency of length and age, with age being the primary interest. Therefore, lacking scales, length is used as a means of obtaining age. Duke (IDFG) further commented that such length data is most important for ocean recoveries when changes in head morphology are not a problem.

The consensus of the Committee was that Alaska was welcome to use the mid-eye to fork measurement. However, a strong statement was made that the regional standard should remain "tip of snout to fork". In addition, Alaska was asked to first develop the necessary regression equations before making any changes. Crandall agreed to this and noted that length data on chinook would be gathered in 1986 from mixed stock fisheries. In addition, no change will be made unless the regressions prove adequate.

C. More Specific Area Information Desired for Columbia River Tag Recoveries

Scott McCutcheon (NMFS) requested that a closer look be given to how recovery areas are reported for tags recovered in the Columbia River system. At the present time, Columbia Basin tag recoveries in the regional data base only specify the recovery area on a broad geographic basis (e.g. Zone 1, Zone 6, etc.). NMFS' data base, however, specifies tag recoveries by the river mile. Therefore, Scott would like river miles to be used (when known) so that the data can be compatible with their data base. Otherwise, they are forced to search out the specific area information for each individual recovery.

No satisfactory solution emerged to NMFS' need for specific river mile recovery area information. Palermo (CDFO) noted that it basically is an issue of strata, i.e. how fine of resolution is practical. Johnson (PMFC) also noted that too fine of area resolution would make the summary recovery reports almost unreadable. Duke (IDFG) also commented that it is hard to determine river miles in Idaho and therefore river sections are used. This is also true for many recoveries sampled in the lower Columbia fisheries.

XIV. Appraisal of Current Practice of Reporting Steelhead Fin Marks in June

At the recommendation of ODFW a couple of years ago, it was agreed that steelhead fin mark requests would be reported in June rather than in January as for other species because the planning wasn't completed that early. Two years of experience with the new reporting system, however, has resulted in numerous cases of fin marks being either reported in both January and June, or not reported at all. Therefore, because of the additional confusion and hassle with steelhead fin marks, ODFW recommended that the agencies return to the former practice of requesting all fin marks in January.

The proposal was approved with the understanding that late steelhead requests could be accommodated (i.e. by phone or distributed by mail) if agencies found it necessary to delay final planning until egg takes were known.

XV. Fin Mark Allocations for 1986

A list of fin mark requests was distributed to the Committee for review. All requested fin marks were approved.

JKJ:mmd

1986 Mark Meeting Attendees
(Incomplete Listing)

	Walt Ambrogetti	USFWS--Vancouver, WA
*	Lee Blankenship	WDF--Olympia, WA
	Richard Comstock	USFWS--Olympia, WA
*	Karen Crandall	ADFG--Juneau, AK
*	Jim DeShazo	WDG--Olympia, WA
*	Rodney Duke	IDFG--Lewiston, ID
	Phil Ekstrom	NMT--Shaw Island, WA
	Richard Fralick	NMT--Shaw Island, WA
	Andrew Hickerson	CEDC--Astoria, OR
	Keith Jefferts	NMT--Shaw Island, WA
*	Ken Johnson	PMFC--Portland, OR
	Jan Kallshian	NMT--Shaw Island, WA
*	Joanne Karlton	CDFG--Rancho Cordova, CA
	David Leith	USFWS--Abernathy, WA
+	Jerry Lukas	ODFW--Portland, OR
	Mike Matylewich	CRITFC--Portland, OR
	Scott McCutcheon	NMFS--Pasco, WA
	John Morrison	USFWS--Olympia, WA
	Bill Murray	ODFW--Clackamas, OR
	Dick O'Connor	WDF--Olympia, WA
	Steven Olhausen	USFWS--Vancouver, WA
+	Vic Palermo	CDFO--Vancouver, BC
+	Ken Phillipson	NIFC--Olympia, WA
+	Dan Romey	MIC--Metlakatla, AK
	Larry Six	PMFC--Portland, OR
	David Smith	Smith-Root, Inc.--Vancouver, WA
	Don Swartz	ODFW--Portland, OR
*	Frank Thrower	NMFS--Auke Bay, Ak
	Robert Vreeland	NMFS--Portland
	Neil Williscroft	CDFO--Vancouver, BC
	David Zajac	USFWS--Olympia, WA

*Mark Committee Members

+Proxies for absent Committee members

PMFC 2/11/86

Table 1. Status of finalized CWT recovery data submitted to the Regional Mark Processing Center. Projected dates are in parentheses.

Agency	Status	Recovery Report Year					
		1977-1980	1981	1982	1983	1984	1985
ADFG	Submitted	S	(3/86)	S	S	(3/86)	(12/86)
	Processed	P		P	P		*
	Distributed	D		D	D	(7/86)	
WDF	Submitted	S	S	S	(2/86)	(6/86)	(2/87)
	Processed	P	P	P			*
	Distributed	D	D	D		(7/86)	
ODFW	Submitted	S	S	S	S	S	(6/86)
	Processed	P	P	P	P	P	*
	Distributed	D	D	D	D	(7/86)	
CDFG	Submitted	S	S	S	S	S	(6/86)
	Processed	P	P	P	P	P	*
	Distributed	D	D	D	D	(7/86)	
IDFG	Submitted						(7/86)
	Processed						
	Distributed						
NMFS [1/] (Alaska)	Submitted		S	S	S	S	(6/86)
	Processed		P	P	P	(3/86)	
	Distributed		D	D	D	(7/86)	
NMFS (Seattle)	Submitted	S	S	S	S	No	No
	Processed	P	P	P	P	Sampling	Sampling
	Distributed	D	D	D	D		
NIFC[2/]	Submitted	S	S	S	S	(4/86)	(6/86)
	Processed	P	P	P	P		
	Distributed	D	D	D	D	(7/86)	
USFWS[3/]	Submitted	S	S	S	S	S	(4/86)
	Processed	P	P	P	P	(3/86)	
	Distributed	D	D	D	D	(7/86)	
CANADA[4/]	Processed	P	P	P	P	P	(4/86)
	Distributed						*
	A) CDFO	D	D	D	D	D	
	B) PMFC	D	D	D	D		

*Preliminary 1985 data reported for use by Salmon Teams.

[1/] NMFS (Alaska) data series commences with 1980 recoveries.

[2/] NIFC assumed responsibility in 1983 for reporting tribal recoveries for years 1979 onward. WDF reported tribal recoveries (primarily Quinault) for 1977 and 1978.

[3/] USFWS data series commences with 1979 recoveries.

[4/] Canadian recovery data are published by CDFO, and only included in the season summary section of the PMFC reports at this time. However, revised data for 1979-1982 are now available and will be added to the "brood report" files in the near future.

Attachment 3

Draft

7-28-86

A Histologic Effect of Coded-Wire Tagging in Chum Salmon

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Ken -

Here's a copy of the paper we submitted to the N.A. Journal of Fisheries Management.

John

The standard length (1.0mm x 0.25mm) binary-coded, wire tag (CWT) described by Jefferts, et al, 1963, has been successfully used during the past 20 plus years to specifically identify various experimental groups and populations of Pacific salmon and steelhead trout. In recent years, the need to tag increasing numbers of fry and emergent migrating salmonids has promoted the development of the half-length CWT (0.5mm x 0.25mm). Reports of successfully tagging pink salmon, Oncorhynchus gorbuscha as small as 4000 fish per kilogram have been described (Thrower and Smoker 1984), yet to date the use of the half tag appears most satisfactory when fish are 1100 - 1300 fish per kilogram or larger (Blankenship 1981, Opdycke and Zajac 1981, Moberly, et al 1977). The following is a case report of the histologic effects of half-length, coded-wire tagging on chum salmon, Oncorhynchus keta.

Chum salmon, that had been half length coded-wire tagged at approximately 1500 fish per kilogram, in a typical production tagging situation, were sampled for histologic examination on days 1, 4, 7, 11, 14, 22, and 28 post tagging. A control, untagged group was also sampled on day 1. All specimens were processed by standard histologic methods and embedded in paraffin. Tags were carefully dissected from paraffin embedded snouts utilizing a dissecting microscope, and microdissecting knives and forceps. Tag placement was noted and a sketch made. After the tags had been carefully removed, 5μm thick sections were cut, stained with hematoxylin and eosin, and examined microscopically.

Histologic examination revealed that tagging causes an initial physically induced injury with associated hemorrhage followed by an inflammatory response in the tagged area. At approximately 10 days post tagging, the

inflammatory response was usually subsided. This response is a normal host response to injury and in itself should be of little concern. However, in 41% of the fish examined (18/44) substantial mainstem olfactory nerve damage was identified. This was evidenced by degeneration and atrophy of one of the paired olfactory nerves (many small nerves originating in the olfactory sensory epithelium join to form the bilateral mainstem olfactory nerves. (Figures 1 & 2). In all cases the observed nerve damage corresponded directly with tag placement or misplacement, i.e. if the left mainstem olfactory nerve was damaged, the tag was recovered from the left side of the snout.

The mainstem olfactory nerve damage observed in these tagged salmon demonstrates impairment that should be of particular concern, since the role of olfaction in salmonid behavior is well documented (Doving, et al 1985, Hasler and Scholz 1983, and Hoar and Randall 1971).

One final note: Observations made by the authors (Morrison and Zajac) when experimentally coded-wire tagged chinook salmon, Oncorhynchus tshawytscha (tagged at 2600 fish per kilogram) were examined, suggested that nerve damage is probably more related to tagging technique (tagger experience) or mechanical adjustment (headmold fit, tag implanting depth) than the unsuitability of equipment for tagging small fish.

ACKNOWLEDGEMENTS

Special thanks to the staff at the Tulalip Tribal Salmon Hatchery, Marysville, WA for their cooperation and assistance.

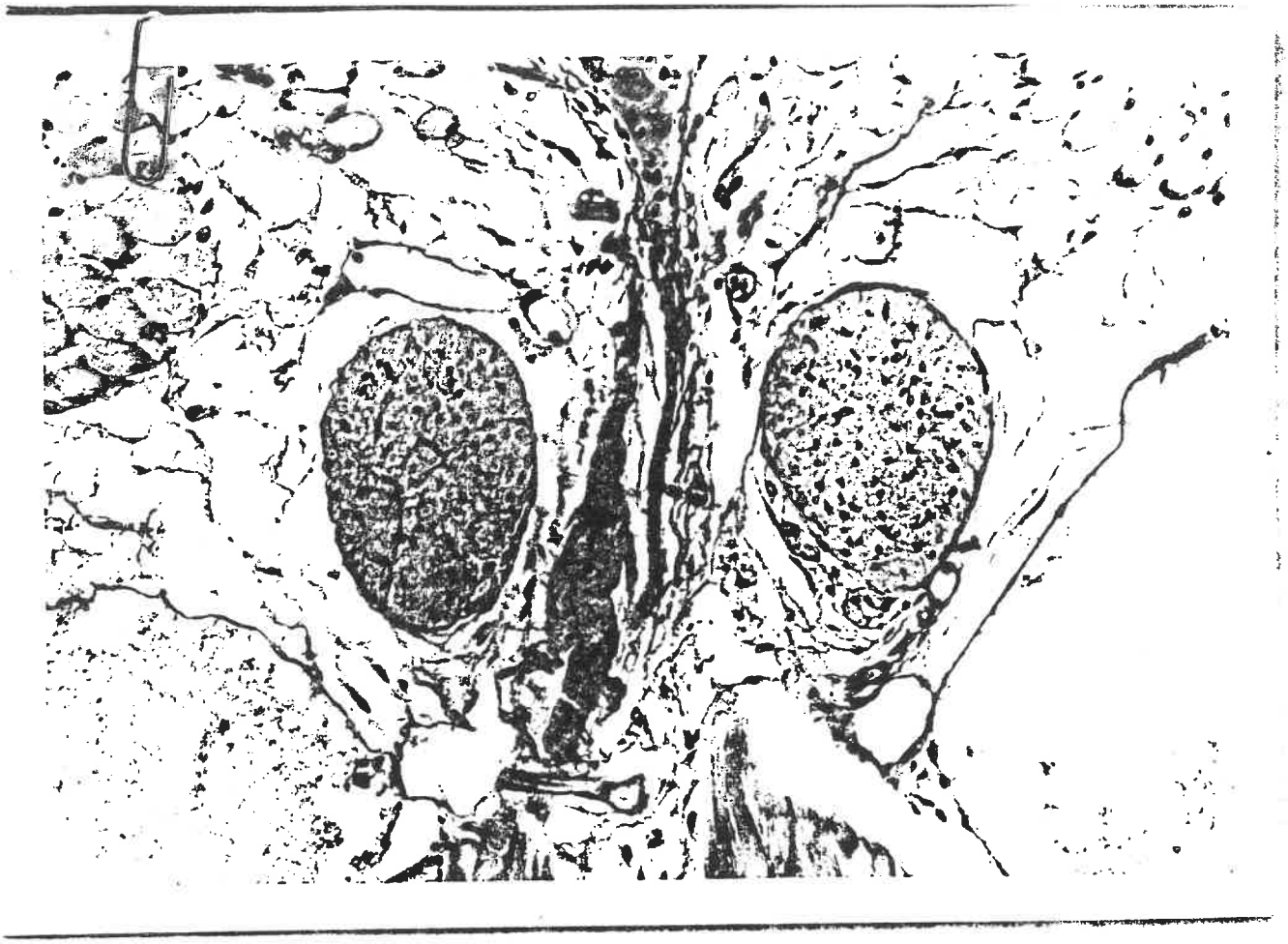

Figure 1. Chum Salmon. Healthy, undamaged, paired mainstem olfactory nerves. x 160.

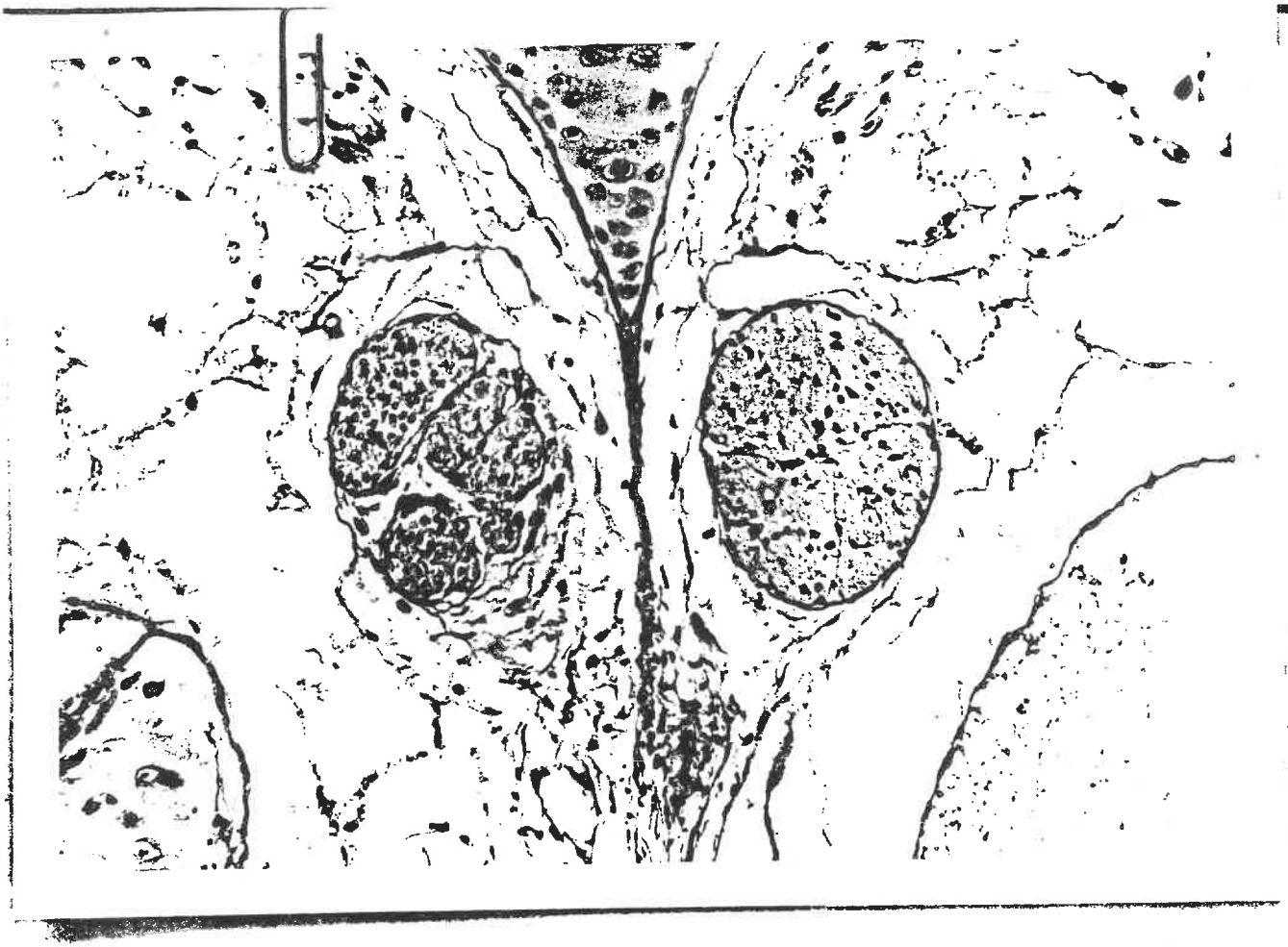

Figure 2. Chum Salmon. Olfactory nerve on the left has degenerated and atrophied as a result of tagging. x 160.

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Proposed Replication Method - 11 February 1986

There is currently significant interest in methods for producing several statistically indistinguishable groups of tagged fish from one larger group. One method for accomplishing this is to produce tags in which the numbers assigned to the groups are arranged in cyclic order.

For example, if one wished to produce three such groups, or replicates, the tags would be numbered in order, 1,2,3, 1,2,3,------. It should be clear that the tags might also carry another number, to identify the whole set of replicates.

We propose to accomplish replicate coding in the following manner:

1) Modify the Master Word to indicate the presence of replicate coding.

The present Master Word, 0 0 1 1 1 111

becomes 0 0 1 0 1 111

to indicate the presence of replicate coding.

2) If the Master Word is modified as shown, then the parity bits are no longer error check bits. They are to be interpreted as a 3-bit binary number, (range 0-7) which identifies the replicate number, with the following convention:

Word	D_2	A	D_1		Decimal	
Parity Bit	0	0	1	=	1	
	0	1	0	=	2	
	1	0	0	=	4	etc.

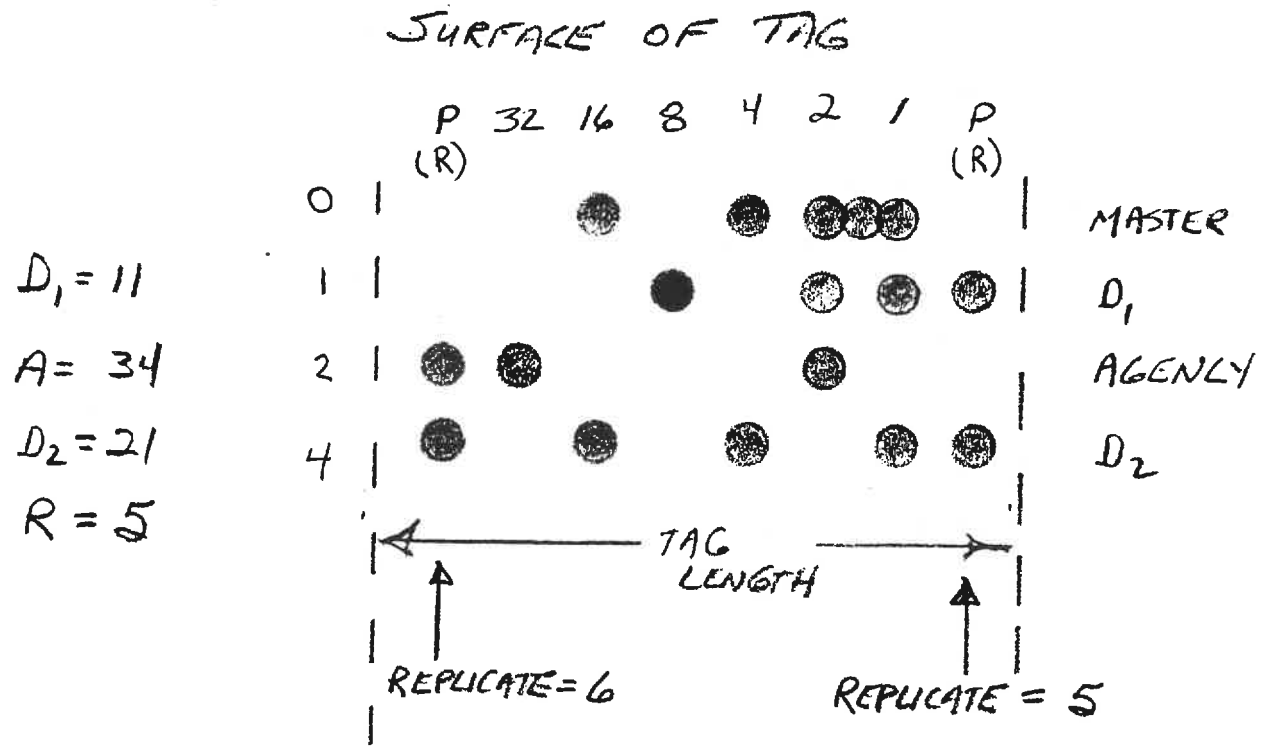
Barring good reason to the contrary, we propose to avoid the use of the replicate index number 0 = 000. This allows for a maximum of 7 replicate codes.

3) Note that aside from the meaning of the parity bits, nothing else changes. The same agency codes will be retained. If a user chooses to ignore the replicate coding, the scheme becomes transparent, having no effect on the data.

4) For tags upon which two replicate codes can be read, i.e. tags where the replicate codes are adjacent to the ends of tags, a rule for selection of the replicate code to be utilized is needed. The rule

needs to state that with the tag in it "normal" orientation, i.e. least significant digits to the right, (See Sketch) the right-most legible replicate number be recorded. Note that the opposite choice could be established equally well.

The rule needs to be established both to prevent biases resulting from a reader choosing the replicate code which is easier to read, and to assure that an independent reader gets the same answer.



* P = parity bit
R = Replicate