
PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Coded Wire Tag Program

BPA project number: 20543
Contract renewal date (mm/yyyy): 1/2000 **Multiple actions?**

Business name of agency, institution or organization requesting funding
Washington Dept. Fish and Wildlife, Oregon Dept. Fish and Wildlife, U.S. Fish and Wildlife Service,
Pacific States Marine Fisheries Council

Business acronym (if appropriate) WDFW, ODFW, USFWS, PSMFC

Proposal contact person or principal investigator:

Name Coded Wire Tag Oversight Committee
Mailing Address Chairperson to be named later
City, ST Zip _____
Phone _____
Fax _____
Email address _____

NPPC Program Measure Number(s) which this project addresses
Sections 7.1C, 7.2A.2, 7.2B, 7.2D, 7.2D.1, 7.2D.3, 8.4C, 8.4C.2, 8.4C.3, 8.4C.4, 8.4D

FWS/NMFS Biological Opinion Number(s) which this project addresses
ESA Section 7 BO (No.383); ESA Section 7 BO:1995 Fisheries in the Snake River Basin Conducted
Under the Columbia River Fish Management Plan , (Consultation Number 428); Biological Opinion -
Impacts on listed Snake Riv

Other planning document references

Snake River Recovery Plan 2.1.d.5; Snake River Salmon Recovery Team: Final Recommendations:
Chapter III.K: Importance of Stock Identification in Managing Salmon; Chapter IV.7 Evaluation and
Monitoring of Population Status and Trends (also subsections 7.c and 7.d). Wy Kan Ush Me Wa Kush
Wit: Review Draft, Volume 1: Section 5A - Recommendations: Research, Monitoring and Evaluation and a
Coordinated Information System; Section 5B - Technical Recommendations: #9) Selective Fisheries
Habitat: Ocean and Mainstem; #10) Chinook Harvest Ceilings Habitat: Ocean (CWTs essential for
estimating survival rates); #13) Stock-specific Concerns Habitat: Mainstem, Tributaries

Short description

Apply coded-wire tags to production groups of chinook and coho salmon at WDFW, ODFW, and USFWS
Columbia River Hatcheries and sample fisheries and spawning grounds, to conduct basin-wide stock
assessment.

Target species

Fall and spring chinook, and coho salmon

Section 2. Sorting and evaluation

Subbasin

System wide (Washington and Oregon tributaries and Columbia Mainstem)

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Multi-year (milestone-based evaluation) <input type="checkbox"/> Watershed project evaluation	<input type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input checked="" type="checkbox"/> Research & monitoring <input type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description
20543	Coded Wire Tag Program
8906600	Annual Stock Assessment -Coded Wire Tag Program (WDFW)
8900690	Annual Stock Assessment_Coded Wire Tag Program (ODFW)
8906500	Annual Stock Assessment- Coded Wire Tag Program (USFWS)
8201300	Coded Wire Tag Recovery Program (PSMFC)

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9600800	PATH-Participation by State & Tribal Agencies	Data from 8906600,8900690, and 8906500 used in analysis
9000500	Umatilla Hatchery Monitoring and Evaluation	Tag coho for release in Umatilla Basin. Identification of hatchery fish from all projects in Umatilla Basin
9306000	Select Area Fisheries Evaluation	Identification of project hatchery fish in Youngs Bay fishery
9506300	Yakima/Klickitat Monitoring & Eval.	Tag coho for release in Yakima Basin and identify hatchery fish in Yakima Basin
9603301	Yakima River Fall chinook supple.	Identification of hatchery fish in Yakima Basin
9603302	Evaluate the feasibility and potential risks of restoring Yakima River	Tag coho for release in Yakima Basin and identify hatchery fish in Yakima Basin
9604000	Evaluate the feasibility and risks of coho reintroduction in Mid-Colum	Identification of hatchery fish in Wenatchee and Methow Basins
8805304	Monitor actions implemented under the Hood River Production Program	Identification of project hatchery fish in Hood River Basin
9144	Monitor natural escapement and productivity of John Day Basin spring	Identification of project hatchery fish in John Day Basin

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1990	Combined project tagging of 2.9 million fish	See individual projects
1991	Combined project tagging of 3.3 million fish	See individual projects
1992	Combined project tagging of 3.03 million fish	See individual projects
1993	Combined project tagging of 4.4 million fish	See individual projects
1994	Combined project tagging of 4.58 million fish	See individual projects
1995	Combined project tagging of 3.75 million fish	See individual projects
1996	Combined project tagging of 3.2 million fish	See individual projects
1997	Combined project tagging of 3.69 million fish	See individual projects
1998	Combined project tagging of 3.6 million fish	See individual projects

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Tag representative groups of chinook and coho at WDFW, ODFW, and USFWS Columbia Basin Hatcheries.		See individual projects, 8906600, 8906900, and 8906500 for tasks.
2	Perform quality control checks on tagged fish prior to release, enter all data generated from tagging and submit to PSMFC		See individual projects, 8906600, 8906900, and 8906500 for tasks.
3	Sample Columbia River fisheries in Oregon and Washington, and coastal fisheries in Oregon, at a minimum rate of 20%. Sample returning adults to Columbia Basin hatcheries, and representative spawning grounds. Collect biological data and remove snouts.		See project 8201300 and other projects for tasks.
4	Extract tags from snouts, decode tags and report data to PSMFC.		See individual projects, See individual projects, 8906600, 8906900, and 8906500 for tasks.
5	Collate data, assign expansion factors based on sampling rate, and enter into PSMFC data base		See tasks for project 8201300
6	Analyze survival and distribution data and report results in Annual Reports or refereed journals.		See tasks for projects 8906600, 8906900, and 8906500.
7	Evaluate technical, logistical and biological feasibility of using alternative marking techniques and report results.		See tasks for project 8906900.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	7/2000	See individual projects as they differ somewhat	All tagging complete	12.00%
2	10/1999	7/2000	See individual projects as they differ somewhat	All quality control checks complete	1.00%
3	10/1999	9/2000	See project 8201300	Sampling of hatcheries, spawning grounds, ocean and river fisheries complete	45.00%
4	10/1999	9/2000	See project 8201300	Snouts removed from all identified fish and tags decoded	10.00%
5	10/1999	9/2000	See project 8201300	Data collated, analyzed and reported	15.00%
6	5/2000	12/2000	See individual projects as there are some individual differences	Analyze and report survival and distribution	15.00%
7	10/1999	9/2000	See project 8906900	Evaluate technical and feasibility of using alternative marks	2.00%
				Total	100.00%

Schedule constraints

Production and release of hatchery salmonids in the Columbia Basin is regulated by NMFS under ESA. Specific groups depend on funding for the production and tagging of hatchery salmon in Washington and Oregon and for the sampling for tagged fish.

Completion date

On- going

Section 5. Budget

FY99 project budget (BPA obligated): \$2,685,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	See individual projects for detail	%36	1,014,638
Fringe benefits	See individual projects for detail	%12	344,433
Supplies, materials, non-expendable property	See individual projects for detail	%14	392,965
Operations & maintenance	See individual projects for detail	%3	100,826
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	See individual projects for detail	%0	3,500
NEPA costs	See individual projects for detail		0

Construction-related support	See individual projects for detail		0
PIT tags	# of tags:		0
Travel	See individual projects for detail	%2	68,178
Indirect costs	See individual projects for detail	%17	485,973
Subcontractor	See individual projects for detail	%6	169,783
Other	PSMFC Administration fee	%6	169,783
TOTAL BPA FY2000 BUDGET REQUEST			\$2,750,079

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
Total project cost (including BPA portion)			\$2,750,079

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	\$2,887,583	\$3,031,962	\$3,183,560	\$3,342,738

Section 6. References

Watershed?	Reference
<input type="checkbox"/>	Byrne, J., H.J. Fuss and C. Ashbrook. 1998. Annual Coded-Wire Tag Program, Washington Missing Production Groups. Annual Report 1997. DOE/BP01873, Bonneville Pwer Adminsitration, Portland, Oregon
<input type="checkbox"/>	Byrne, J., H.J. Fuss and C. Ashbrook. 1997. Annual Coded-Wire Tag Program, Washington Missing Production Groups. Annual Report 1996. DOE/BP01873, Bonneville Pwer Adminsitration, Portland, Oregon
<input type="checkbox"/>	Fuss, H.J. 1996. Annual Coded-Wire Tag Program, Washington Missing Production Groups. Annual Report 1995. DOE/BP01873, Bonneville Pwer Adminsitration, Portland, Oregon
<input type="checkbox"/>	Fuss, H.J. 1995. Annual Coded-Wire Tag Program, Washington Missing Production Groups. Annual Report 1994. DOE/BP01873, Bonneville Pwer Adminsitration, Portland, Oregon
<input type="checkbox"/>	Fuss, H.J., R. Fuller 1994. Annual Coded-Wire Tag Program, Washington Missing Production Groups. Annual Report 1993. DOE/BP01873, Bonneville Pwer Adminsitration, Portland, Oregon
<input type="checkbox"/>	Blankenship, L. 1981. Coded-wire tag loss study. Washington Department of Fisheries, Technical Report No. 65, Olympia, Washington
<input type="checkbox"/>	Hankin, D.G. and S. M. Mohr. 1990. Determination of levels of coded-wire tagging needed to support time/area harvest management. Final contract report to Klamath River Technical Advisory Team.
<input type="checkbox"/>	Jefferts, K.B.,P.K. Bergman, and H.F. Fiscuss. 1963. A code-wire identification system for macro organisms. Nature 198: 460-462.
<input type="checkbox"/>	Jenkinson, D.W. and H.T. Bilton. 1981. Additional guidelines to marking and coded-wire tagging of juvenile salmon. Canadian Technical Report of Fisheries and Aquatic Sciences No. 1051. 24 pp.

<input type="checkbox"/>	Lewis, M.A. 1996. Stock assessment of anadromous salmonids. Oregon Department of Fish and Wildlife, annual Progress Report, Portland, Oregon.
<input type="checkbox"/>	Lewis, M.A. 1996a. Review of capacity utilization at ODFW salmon hatcheries. Oregon Department of Fish and Wildlife, Information Report 96-8, Portland, Oregon.
<input type="checkbox"/>	Lewis, M.A. C. Mallette, and W.M. Murray. 1997. Annual coded-wire tag program, Oregon missing production groups. Annual Report 1996, Bonneville Power Administration, Portland, Oregon.
<input type="checkbox"/>	Pacific Salmon Commission (PSC) 1995. Hatchery methodology workshop. Held January 10 th through 12 th 1995. Seattle, Washington.
<input type="checkbox"/>	Reisenbichler, R. R. and N.A. Hartman. 1978. Effect of number of marked fish and years of repetition on precision in studies of contribution to a fishery. Oregon Department of Fish and Wildlife, Information Report 78-2, Portland, Oregon.
<input type="checkbox"/>	Johnson, J.K. and R.N. Thompson. 1989. Status of chinook and coho salmon stock identification efforts for Pacific coastal production areas of the U.S. and Canada. Pacific States Marine Fisheries Commission. 328 pp. Submitted to USFWS, Project AFS-125-

PART II - NARRATIVE

Section 7. Abstract

The goal of the coded-wire tag program is to tag a statistically valid number of coho and chinook salmon from each hatchery such that accurate estimates of survival and distribution in the ocean and spawning grounds can be made. These data will allow for more accurate assessments of the proportion of wild and hatchery stocks in the Basin and further allow for valid statistical comparisons to be made among project groups. For among group comparisons, release numbers of coded-wire tagged fish have been calculated to have sufficient power such that the probability of detecting a 50% difference in survival among groups is $p = 1 - 0.95/2$. Survivals of fish released in this project can be used for comparison with coded-wire tag groups originating from other projects throughout the region. Another goal of this project is to evaluate the technical and biological feasibility of alternative marking technologies. Each coded wire tag group (30,000-200,000 fish) represents a portion of the total hatchery production for the species. Thus, the roughly 2.5 million tagged chinook and 0.5 million tagged coho represent approximately 35 million untagged hatchery fish. Multiple tag groups at each hatchery represent different production scenarios, such as one portion of the production released at a different time or size than another portion. Also, several coho tag groups represent production that is transported off-station and released into other river systems, such as the Klickitat, Yakima, Wenatchee, or Methow rivers. This production is keyed to meeting obligation under U.S. v. Oregon.

The expected outcome of this project is to provide a long and consistent time series of survival and distribution data that can be used to measure trends in abundance of hatchery fish and be used as surrogate data for critical wild stocks. These outcomes are possible by tagging adequate numbers of fish (30,000 to 50,000 coho and 50,000-200,000 chinook) and by providing adequate sampling regimes in coastal and Columbia River fisheries (20% or greater sampling rates) as well as adequate sampling rates on spawning grounds, at dams, and at hatcheries.

The project is consistent with the Fish and Wildlife Program goals for monitoring and evaluation (Section 3), restoration of wild stocks (Sections 4 & 7), increased hatchery effectiveness (Section 7), improved passage around dams (Sections 5 & 6) and improved stock assessment and harvest management (Section 8). This project is expected to contribute to these goals by providing annual monitoring, as well as a long-term, consistent data base that contributes to modeling efforts such as used in the PATH project. These data will ultimately be used to address critical uncertainties identified in the Fish and Wildlife Program as well as for managing the Columbia River.

Section 8. Project description

a. Technical and/or scientific background

The coded-wire tag is a stock assessment tool that allows fishery managers to identify the origin of salmon and steelhead when these fish are captured or recovered in fisheries, on spawning grounds, at hatcheries, or in juvenile and adult migrant traps. The coded-wire tag is a relatively inexpensive tool that allows the fishery manager to gain more information about groups of fish over a broader geographic area than the more expensive PIT tag. For example, coded wire tag recoveries have identified the greater distance of ocean migration of mid and upper Columbia River chinook stocks relative to lower river chinook stocks. The coded-wire tag provides accurate estimates of survival, and when applied in sufficient numbers, coded-wire tags have been used to statistically measure differences in performance between experimental groups. Such uses include measuring performance of fish subjected to different hydroelectric passage regimes (barging v. direct release), differences in response to rearing and growth regimes in hatcheries, and basic survival differences between hatchery and wild produced smolts. Key to the development of this information is a consistent tag recovery program that maintains at least a 20% rate of sampling for both coastal and in-river commercial and recreational fisheries, as well as an adequate sampling program to recover tagged fish from spawning grounds and hatcheries.

This project addresses many of the critical uncertainties associated with releases of hatchery reared fish. By providing a stable, representative and consistent data base, rates of production of upriver and lower river hatchery and wild fish can be determined and accounted for. Further, it meets objectives in the Fish and Wildlife Program and in the Biological Opinion for Recovery of Snake River (and soon for Columbia River) for basic monitoring and evaluation .

Prior to this project, groups of coded-wire tagged fish were released from Columbia Basin Hatcheries in an inconsistent and random pattern, with some hatcheries included for several years in succession and production from other hatcheries not tagged at all. This pattern of inconsistent tagging resulted in critical uncertainties in the proportion of fish from specific stock groups (wild and hatchery) in escapement and fisheries, where fish of Columbia River origin (both wild and hatchery) mingle with fish from other locations. It further made determination of hatchery effectiveness very difficult because it assumed that both production capabilities from each hatchery and stray rates were the same, which was found to be untrue based on other tagging exercises.

b. Rationale and significance to Regional Programs

The rationale for this project is to provide comprehensive stock assessment and hatchery salmon production monitoring data to regional management entities and all other researchers. The data generated from the long-term coded-wire tag program will be useful, if not essential, in meeting many of the goals and objectives of the 1994 Fish and Wildlife Program. These include:

- 1) Monitoring and evaluation (Section 3)
- 2) restoration of wild stocks (Sections 4 & 7)
- 3) increased hatchery effectiveness (Section 7)
- 4) improved passage around dams (Sections 5 & 6)
- 5) improved stock assessment and harvest management (Section 8).

Furthermore, the data generated by this project provides the ability to prioritize hatchery production programs based on groups that perform well which improves cost effectiveness of the hatchery programs because release groups that perform poorly can be eliminated. One such example, is the Select Area Fisheries Project (9306000) that provides for terminal area fisheries in the Columbia River with minimal by-catch of critical stocks and minimal straying into adjacent rivers. Other examples include elimination of some fall chinook production groups in both Oregon and Washington due to poor performance. The data generated by the Annual Stock Assessment project is also used in the Artificial Production Review for the Columbia Basin, and in the now defunct IHOT project. The tag groups provided under this umbrella project can be used to model wild populations that are too sensitive to capture and tag . It also provides a useful tool to compare wild and hatchery populations that experience similar environments such as those located above Bonneville Dam. The project provides a utilitarian tool to measure and compare performance of hatchery fish from geographic regions such as the review presented by Coronado and Brisbal (1998).

Lastly, monitoring and evaluation is a central theme of the 1994 Fish and Wildlife Program. Expansion of fish marking programs is specifically called for in Section 8.4D.1. The need for a hatchery monitoring and evaluation program is identified in several other Basin plans. For example, the Snake River

Recovery Plan (2.1.d.5) and the Hydrosystem Operations Biological Opinion (VIII.A.13) both call for the establishment of a comprehensive monitoring, evaluation and research program. The July 31, 1996 fall chinook Biological Opinion "Impacts on Listed Snake River Salmon by Fisheries Conducted Pursuant to the 1996-1998 Management Agreement for Upper Columbia River Fall Chinook" relies on coded-wire tagged fish being present from both this project as well as other projects (both funded by BPA and other entities) to allow for successful monitoring of catch. The critical uncertainties that these Plans want addressed is an accounting of the proportion of wild and hatchery fish in both fishery catches and escapement (spawning grounds and hatchery racks). Without the ability to identify the origin of these fish and recover a significant portion of the tags, the ability to effectively manage recovery efforts and account for actions is non-existent.

In summary, the coded-wire tag program meets the goals of the 1994 Fish and Wildlife Program by providing a tool that: (1) better accounts for proportions of weak or critical stocks in the mixed stock fisheries from California to Alaska, and especially in the fisheries and spawning grounds of the Columbia River system; (2) better accounts for the number of fish of each stock, wild or hatchery, that is recovered in various escapement areas (dams, hatcheries, spawning grounds); (3) allows monitoring and evaluation of hatchery practices such that poorly performing production groups can be identified and changed or eliminated, as well as allows for identification of strays and determination of total hatchery adult production.

c. Relationships to other projects

The umbrella project, "The Coded-Wire Tag Program", consists of four sub-projects. Three of these projects are the Annual Stock Assessment-Coded-Wire Tag Program that include projects associated with three state agencies, WDFW (8906600), USFWS (8906500) and ODFW (8906900). The fourth project, "Coded-Wire Tag Recovery Program" (8201300) is critical to the success of the three tagging projects, because this project is responsible for sampling fish from fisheries and spawning grounds, and processing, collating, and managing the resultant data base. The purpose of this new umbrella grouping is to ensure that a comprehensive monitoring and evaluation program exists on the Columbia Basin that is consistent with meeting goals of the 1994 Fish and Wildlife Program. To accomplish this objective, two committees have been established: (1) "CWT Oversight Committee" which will set and review overall program goals and objectives with a strong emphasis towards meeting significance of the CWT Program to regional programs and (2) the "CWT Work Group" which has the responsibility for reviewing daily operations, methods, and determining proper tagging levels.

The Fish and Wildlife Program has a wide range of projects associated with its numerous measures, all of which address critical uncertainties associated with the particular area of concern (e.g., effects of transportation). Some projects seek to improve habitat, others to improve existing artificial production, while others seek to assess the impacts on naturally produced salmon and steelhead of large releases of artificially produced salmon and steelhead, and still others seek to regulate catch in mixed-stock fisheries, and develop analytical methods to better predict and manage the basin's activities for the benefit of naturally and artificially produced salmon and steelhead.

The activities associated with the four projects are closely related to other basin projects. For example, several projects funded by the Fish and Wildlife Program deal with restoration of natural populations of chinook and coho above Bonneville Dam. These projects include John Day Basin spring chinook (9144), Umatilla Basin coho restoration (9000500), Hood River Production Program (8805304), restoration of coho and spring chinook in the Klickitat, Yakima, Wenatchee, and Methow rivers. The umbrella coded-wire tag project is related to these other projects in several key ways: (1) they provide tagged fish for introduction into some of these systems, for example, project 8906600 provides tagged coho for introduction into the Klickitat, Wenatchee, and Methow Rivers, (2) they provide coded-wire tagged releases of hatchery fish that can be identified when recovered in their natal systems and when they stray outside their natal system, thus, providing the ability to more accurately account for total system production, (3) they allow for identification and determination of the proportion of strays in natural or restored populations, and in critical hatchery populations where they can be removed from the spawning population (this ability is particularly essential for listed populations such as with the listed fall chinook at the Lyons Ferry Hatchery, WDFW), (4) they provide a robust and dependable source of data for other projects to perform analyses on a multitude of potential variables that affect survival. For example, data generated by these projects can be used to evaluate effects of flow on survival, comparisons of survival

among upriver and downriver populations and can be used as surrogates for survival and ocean distribution of critical stocks. These data can also be used by non-project researchers such as in the recent analysis of spatial and temporal factors affecting survival in coho salmon (Coronado and Hillborn 1998)

d. Project history (for ongoing projects)

For more than 25 years, the collection and analysis of CWT recovery data from Columbia Basin and coastal hatchery stocks has provided a reliable and vital basis for forming present and future regional ocean and Columbia River fishery management strategies. The CWT information is used to calculate survival rate, ocean catch, freshwater catch, escapement, recovery distribution, and age composition data for Columbia Basin salmon stocks. The data also are used to reconstruct salmonid runs which are critical to building data sets used to predict their abundance. These estimates of abundance (e.g., fall chinook) are used by coastal as well as inside fish managers to model various catch and escapement scenarios necessary to meet ESA impact restraints.

The extensive coastwide CWT recovery effort is primarily funded by Oregon, Washington, California, Alaska and British Columbia. However, beginning in 1982, BPA has funded a portion (project number 8201300) of the CWT recovery costs for the Columbia Basin sport and commercial fisheries and Oregon's ocean fisheries because of the impact of BPA funded tagging studies. Approximately 40% of the 17-21 million CWT marked salmon released annually in the Columbia River Basin are funded by BPA. Oregon and Washington's freshwater and ocean recovery programs are impacted the most, with approximately 15% of the recoveries coming from BPA funded releases.

Beginning in 1989 the Coded Wire Tag Program was expanded by the initiation of three new BPA projects designed to insure all hatchery production releases were represented by a CWT group. These new projects (project numbers: 8906500, 8906600 and 8906900) expanded the scope of the project, and provide the data for comprehensive basinwide stock assessment. The tagging projects names were changed for FY2000 from "Annual Coded Wire Tag Program - Missing Production" to "Annual Stock Assessment – CWT". A name change was suggested by the ISRP in their FY1999 project review. The new name better reflects the program goals and the relationships between the four projects in the Coded Wire Tag Program. The tagging projects began as the result of a research proposal from the Northwest Power Planning Council's Hatchery Effectiveness Technical Work Group, because of its direct association with their priority projects 2, 4 and 6. The monitoring and evaluation group, at their January 1989 meeting, went on record as supporting this project as a high basin priority. A committee of agencies and Tribal scientists met to approve the "experimental design", prior to original submission of this project. The tagging projects were originally designed to provide information relevant to the Columbia River Fish and Wildlife Program at that time. Specifically to provide data for evaluation and improvement of hatchery methods at each facility (Measure 200), provide data to contribute to regulation of harvest management (Measure 500), and provide data on the use of artificial propagation (Measure 700).

In 1992, the Coded Wire Tag Program expanded to include partial support of the operational costs of the Regional Mark Processing Center in accomplishing its role as a centralized coordination and data management center for all CWT data. Finally, in 1997 an evaluation of alternative marking techniques was begun. This evaluation is part of project number 8906900, and to date is evaluating Photonic and Visual Implant Elastomer tagging techniques.

There are several critical uncertainties that must be addressed. First, is the adequacy of the 20% sampling rate goal in light of current management goals, i.e. monitoring of ESA compliance, and monitoring and evaluation of wild stock recovery. Second, is the adequacy of proposed tagging levels to achieve the tag recovery goal (30 observed recoveries per group), given current survival rates. Finally, is the adequacy of monitoring hatchery stocks as a surrogate for wild populations. Can and should we be coded wire tagging wild salmon stocks?

Annual Project Reports and Technical Papers:

Joint ODFW/WDFW reports:

Columbia River Fish Runs and Fisheries - Annual Status Report.
The Lower Columbia River and Buoy 10 Recreational Fisheries.

ODFW reports:

Willamette River Spring Chinook Salmon Run, Fisheries, and Passage at Willamette Falls.
Status of Willamette Spring Chinook Run and Run Size Prediction.
Preliminary Results of Columbia River Commercial Fisheries.
Status Report: Oregon's Ocean Salmon Fisheries.
Stock Assessment of Anadromous Salmonids.
Annual Coded Wire Tag Program: Oregon – Missing Production Groups.

WDFW Reports:

Hatchery age and stock composition of spring and fall chinook returning to Washington hatcheries.
Age and stock composition of natural spawning populations of spring and fall chinook returning to Washington tributaries.
Summary of CWT recoveries on spawning grounds in Washington.
Summary of CWT recoveries in Washington tributary fisheries.
Bonneville Dam observations.
Accountability of spring and fall chinook returns to the Columbia River basin and preseason forecasts.
Coho database for OPI (Oregon Production Index).
Annual Coded Wire Tag Program: Washington – Missing Production Groups.

USFWS Reports:

Annual Coded Wire Tag Program: Missing Production Groups.

PSMFC Reports:

The Mark Center no longer produces formal hard copy reports on CWT recoveries because of frequent data submissions and revisions. However, all CWT recovery information is available to users via the online data retrieval system (RMIS). The associated Catch/Sample data are available via requests to the Mark Center.

Major Results Achieved:

For the past two decades, CWT recoveries from sampled ocean and Columbia River fisheries and escapement have provided regional fishery managers with the information to: 1) define distribution, contribution, exploitation rates, and survival rates for Columbia River stocks; 2) set present and future management strategies; 3) establish regional coordination and consistent evaluation standards to assess specific salmon stocks and their contribution to Oregon, West Coast, Canadian, and Southeast Alaska fisheries; and 4) assess potential listing for Columbia River stocks under the federal ESA.

Specific project results are reported in the individual project proposals, but in general terms include the following areas: a) Improved sampling of ocean and freshwater fisheries (project number 8201300), b) Coded wire tag release and recovery information readily available to regional fishery managers (all projects), c) Improved representation of hatchery production in region wide monitoring and stock assessment programs (project numbers: 8906500, 8906600 and 8906900), d) Evaluation of Photonic and Visual Implant Elastomer tagging techniques (project number 8906900).

e. Proposal objectives

Objective 1: Tag at least one production group of chinook and coho at each Columbia Basin Hatchery operated by the Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and U.S. Fish and Wildlife Service. These tag groups represent the untagged portion of the hatchery population. Sub Tasks include tagging coordination between hatcheries and tag applicators, and the actual tagging of over 5 million chinook and coho at respective agency hatcheries. (Tagging of coho occurs from October to January and from May to July for chinook.)

Objective 2: Perform quality control checks on tagged fish prior to release, enter all data generated from tagging operations, and submit these data to PSMFC Regional Mark Processing Center. A small portion of fish from every tag group will either lose tags before release or will have a poor fin clip, making later identification difficult. Quality control checks are made periodically through the tagging process and later after tagging so that these unidentifiable tagged fish can be accounted for when making estimates of survival, distribution and stray rates.

Objective 3: Sample Columbia River sport and commercial (tribal and non-tribal) fisheries throughout the lower 395 miles of the river from the mouth to Priest Rapids Dam and remove snouts for later tag retrieval. Included are sampling of fish returning to hatcheries and spawning grounds. Sample Oregon coastal commercial and sport fisheries for the presence of Columbia River origin chinook and coho. The goal is to sample at a minimum rate of 20% of all landings which is a regionally agreed upon rate. At this rate adequate stock composition (assessment) estimates can be made. However, with the introduction of mass marking of hatchery coho and the start of ocean selective fisheries the achievement of the 20% rate will be in jeopardy without increases in sampling personnel. Another problem is that stocks at low abundance may not be detected if the sampling rate declines.

Objectives 4 and 5: Locate and extract the tag from each snout using dissection and electronic detectors. This is done by WDFW and ODFW Tag Recovery Labs as well as by PSMFC Tag Recovery Labs. Verify and error check these data and enter in the PSMFC Regional Mark Center for inclusion in the regional database. Based on program specific sampling rates, individual tag recoveries are increased by an expansion factor to estimate the total number of that particular tag present in a given fishery, hatchery, or spawning ground area.

Objective 6: Use the data from the recoveries of each tag group to estimate survival and distribution and make estimates of stock contribution of Columbia River hatchery fish relative to other Columbia River stocks and stocks from other regions. Develop survival estimates and catch and escapement distributions for WDFW, ODFW, and USFWS Columbia River hatcheries using data from complete broods of chinook and coho. Compile and analyze these data annually and provide a written report or report results in refereed journals.

Objective 7: Evaluate technical, logistical, and biological feasibility of using alternative marking techniques to mark large numbers of juvenile coho salmon. Initial work with photonic tagging experienced technical problems and the emphasis was switched to visual implant elastomer tagging. Specific hypotheses include:

- a) No difference in mortality, growth, or disease occurrence during hatchery rearing. Assumes results with Sandy hatchery coho are representative of other hatchery coho, random assignment of fish to treatment and control groups, equal feeding rates between groups, accurate determination and recording of test variables.
- b) Tags are retained and visible throughout the fishes life. Assumes results with Sandy hatchery coho are representative of other hatchery coho, random assignment of fish to treatment and control groups, marked adults are recognized and correctly assigned to treatment or control groups, results at the hatchery (maturing fish) are representative of ocean caught (immature fish).
- c) No difference in post-release survival, growth, age composition or sex composition. Assumes results with Sandy hatchery coho are representative of other hatchery coho, random assignment of fish to treatment and control groups, marked adults are recognized and correctly assigned to treatment or control groups.

f. Methods

Survival differences of chinook and coho determine the number of fish needed for tagging such that at least 30 observed recoveries from each group are made in total, or in each fishery or escapement location, and that sufficient power exists such that the probability of detecting a 50% difference in survival among groups is $p = 1 - 0.95/2$. These fish are randomly selected for tagging from the general hatchery population. At some hatcheries, more than one tag group is used for a species because the release timing or size of each group are different enough that survival may be different. Because each tag group may

represent up to several million untagged fish, it is important to have as many tag groups at a particular hatchery as necessary to make an accurate estimate of total adult contribution. The critical assumptions for the project are: 1) tagged fish represent untagged fish, and, 2) the probability of recovering tagged fish is not contingent on hatchery location. Rates at which tags are applied are determined using techniques reported in : “DeLiberio, F.E. 1986. A statistical assessment of the use of the coded-wire tag for chinook and coho studies. Ph.D. dissertation, University of Washington, Seattle, WA” and “Hoffman, A., C. Busack and C. Knudsen. 1994. Experimental designs for testing differences in survival among salmonid populations. U.S. Dept. Energy, BPA Technical Report. DOE/BP-0029-3. Pp. 71.”. Tagging rates also reflect a minimum sampling rate of 20% in each recovery location. However, if this sampling rate is reduced then the size of each tag group must be increased to compensate.

After fish are selected from the general rearing population, coded-wire tags are applied into the snouts of the fish and at least 75% of the adipose fin is removed. These procedures are approved by the Bonneville Power Administration and conform to the most recent edition of the “A Manual of Procedures for Coded-Wire Tagging of Pacific Salmonids” (Pacific States Marine Fisheries Commission). Upon return as adults, tagged fish are identified by the missing adipose fin, and biological data is collected along with the snout of the fish. Beginning in 1998, all returning hatchery origin fish are missing adipose fins, thus identification of coded-wire tagged fish is done using a tag detector. Once the snouts are collected from the various fisheries (California to Alaska), hatcheries (Washington, Oregon, Idaho) and spawning ground locations (Washington, Oregon, Idaho), the coded-wire tags are removed from the snouts, the code identified, checked, and the data for all the individual tags recovered is recorded and sent to the Pacific States Marine Fisheries Commission where the data are subjected to a second battery of error checks when reported to PSMFC’s Regional Mark Processing Center (RMPC), then collated, expanded based on the sampling rate of the recovery site, after which the data are entered into the RMIS central data base. Once in the central data base, data users may then query the on-line ‘Regional Mark Information System’ (RMIS) to obtain tag recovery data (summary reports or raw records) for research and harvest management analysis applications anyone can access the data for any purpose.

RMIS provides on-line access to all coastwide CWT data, including that for the Columbia Basin tagging studies. Data sets include releases, recoveries; catch/sample, and location codes. The Mark Center also serves as the site for exchanging U.S. CWT data with Canada for Pacific Salmon Treaty purposes.

After the data are finalized for the most recent year, each project calculates the total survival (estimated recoveries/total tags released) and contribution rate (total tags recovered by fishery or escapement/total tags recovered). Annual and quarterly reports are generated summarizing the results.

g. Facilities and equipment

Tagging occurs at WDFW, (Grays River, Elochoman, Toutle, Fallert Creek, Kalama Falls, Lewis River/Speelyai, Washougal, Klickitat, and Ringold hatcheries), ODFW(Big Creek, Bonneville, Cascade, McKenzie, Oxbow, Sandy, South Santiam, South Fork Klaskanine, and Willamette), USFWS (**add**). Tagging trailers or vans equipped with Northwest Marine Technology Mark 4 tagging machines and quality control devices are used to facilitate tagging of each species at each hatchery. Snouts and biological data are taken from each adult fish identified by a missing adipose fin. Snouts are held in freezers, first at the recovering hatchery, and later at the WDFW Tag Recovery Lab, Olympia, WA. Snouts are defrosted and a coring tool is used to remove the tag from the snout. Tags in these cores are detected by a electronic tag detector and after further dissection the tag is removed and the binary code deciphered by the technician. Data from individual fish are recorded by computer and sent to the PSMFC Regional Data Base in Gladstone Oregon.

Sampling

ODFW Columbia River Sampling Program

The majority of ODFW staff sampling the Columbia River basin will be based at Clackamas. Office space, support staff, computers, and other equipment necessary to perform the jobs will be provided at this location. Expendable supplies include rain gear, boots, tape measures, forceps, fish weighing scales, knives, measuring boards, plastic bags, ice chests, scale cards, and acetate. Data collected in the field is recorded on hand held data loggers and each sampler will be supplied with a hand held data logger.

Columbia River Management currently owns 17 these devices. Because the majority of field sampling personnel are stationed out of Clackamas, located 20 miles from the Columbia River, and the sampling programs occur over the lower 148 miles of the Columbia River, vehicle mileage charges represent a sizable portion of the Columbia River program's expenditures on services and supplies. To ensure vehicles in adequate operating conditions, all ODFW vehicles used in this project are leased from the Oregon State Motor Pool.

The Columbia River Management Program also rents office space in Astoria for a full time NRS-1, a half time EBA, and several part time EBA's. As with the office in Clackamas the necessary equipment, including computers, are provided for these employees to perform the jobs. The Astoria office reduces the number sampling trips made between Clackamas and Astoria during the spring and summer months when commercial and sport fishing effort greatly increase. Additionally, by stationing staff members in Astoria, ODFW is better able to sample and manage the large fisheries occurring in the lower 20 miles of the Columbia River. Vehicles used by personnel stationed out of Astoria are also leased from the Oregon State Motor Pool.

The introduction of mass marked coho has necessitated that all coho landings now be electronically sampled with either hand wands or the larger tube detectors. ODFW's Columbia River Sampling Program is well equipped with 15 hand wand tag detectors. However, no tube detectors are currently available. Sampling data are captured with electronic data loggers.

WDFW Columbia River Sampling Program

In Washington, PSMFC personnel are stationed in two locations, Vancouver and Kennewick. Four full time biologists and three technicians are based at the Vancouver office. In addition, up to two temporary technicians are located there. The mainstem Columbia River and its tributaries downstream from McNary Dam are sampled from this office.

In Kennewick, one technician is employed for nine months. In addition to sampling spring chinook fisheries and fall chinook data compilation, this person supervises up to seven temporary technicians. These technicians are hired to sample fall chinook from the Hanford Reach sport fishery plus hatchery and natural spawn escapement areas upstream from McNary Dam.

Boats and vehicles are stored at the Vancouver office. Several jet-powered sleds with high powered outboard engines, two rubber rafts, and a drift boat are available to conduct various sampling activities. Railings are attached to the bow of the sled for on-water observations. Life preservers, rings, and first aid kits are readily available.

Vehicles range from sedans, vans, and small trucks to larger 4x4's. Again, first aid equipment is readily available. Some trucks are equipped with canopies and trailer hitches.

Safety in the field is a primary concern. Cellular phones are used for communication between samplers and the office. Unfortunately, only four cellular phones are available for the 17 potential employees.

Freezers are available for storing fish heads at the Vancouver office. A lab with a scale press is also located there. Computers are available for full time biologists but are in limited supply for the technicians.

WDFW also is well equipped for electronic sampling. A total of 12-14 hand wands and three tube detectors will be available for use by their respective sampling crews in Vancouver and Kennewick. Data loggers are used to capture field sampling data.

ODFW Ocean Sampling Program

Oregon's ocean salmon CWT recovery program is administered by ODFW's Ocean Salmon Management Program, part of the department's Marine Resources Program at Newport, Oregon. The core OSM program (administration, data, and technical support) is located at Newport, with additional inseason field sampling coordinators located on the north coast at Tillamook and south coast at Charleston. These field staff are responsible to coordinate multiple of seasonal field samplers at remote port locations and to ensure effective CWT and biological sampling procedures and data collection.

The OSM program maintains necessary freezer capability to store salmon snouts for CWT recovery at multiple locations. The Program has converted from field forms to 25 hand-held "all weather" data entry computers to electronically record all ocean fishery interviews and snout (CWT) collection data.,

effective with the 1995 season. Twenty hand-held electron “wand” CWT detectors have been purchased for use in ocean “selective” coho salmon fisheries beginning as early as 1998.

ODFW Clackamas Tag Recovery Lab

The Clackamas Tag Recovery Lab is well equipped with the necessary freezer units, dissection tools and microscopes, and monitor screens for head storage, tag extraction’s and decoding. An upgraded personal computer and modems are available for data management needs.

PSMFC Regional Mark Processing Center

The Regional Mark Processing Center maintains the regional CWT data on a 1000e Sun minicomputer that has proven more than adequate in speed for timely processing of data requests. In addition, PSMFC’s data center has a T-1 communication line to support high speed Internet access and data transfers.

h. Budget

Section 9. Key personnel

WDFW

Howard J. Fuss
Research Scientist
Washington Department of Fish and Wildlife
600 Capitol Way N
Olympia, Washington 98501-1091
360-902-2664
fusshjf@dfw.wa.gov

Work Hours for Project 8906600: 2 months (352 hours)

Duties: 1) Identify production groups for tagging; 2) Determine tagging level for each group; 3) Supervise staff to coordinate tagging and collect pertinent data on tag groups at time of tagging and time of release; 4) Supervise staff in coordinating collection of snouts at hatcheries and retrieval of data from PSMFC data base; 5) Supervise staff collating, analyzing and reporting of coded-wire tag recovery data; 6) Supervise staff in preparation of quarterly and annual reports; 7) Prepare annual budget and complete annual project review; 8) Represent project in discussions with CBFWA, NPPC staff, and participate in coordinating process with other umbrella project leaders.

Qualifications: 1) Eight years as project leader; 2) Sixteen years experience analyzing survival and distribution trends of hatchery reared salmon including several publications and professional presentations; 3) Master Degree in Fisheries Science from University of Washington, 1982.

Pertinent Work History

Current Employer: Washington Department of Fish and Wildlife
600 Capitol Way N
Olympia, WA 98506

1996-Present: Research Scientist 1, Washington Department of Fish and Wildlife. Principal Duties: (1) Monitor and evaluate long term trends in post-release survival and catch distribution of hatchery reared salmonids; (2) Define type and degree of interactions of post-release hatchery juveniles and wild juveniles; (3) Compare survival and physiological differences of fish reared in semi-natural and standard hatchery environments; (4) Determine survival and migrational characteristics of hatchery-reared fall chinook salmon reared in two types of rearing containers; (5) Develop operation plans for all WDFW fish rearing

facilities; (6) Determine relationship of rearing density and survival of hatchery-reared steelhead and develop profile of successful hatchery steelhead smolts.

1980-1996: Fish Biologist 1,2,3,4, Washington Department of Fisheries. Principal Duties: (1) Research effects of rugose substrate on developing alevins in relation to size at yolk absorption and initial survival; (2) Determine time to initiate feeding of salmon alevins; (3) Develop low cost system to manipulate incubation temperatures; (4) Determine survival and fishery contribution of chinook and coho salmon reared at hatcheries; (5) Determine ($\text{Na}^+ - \text{K}^+$) gill-ATPase levels of hatchery chum salmon with respect to freshwater rearing and exposure to brackish water; (6) Determine alevin development rates for each species of salmon and develop guide for hatchery personnel to initiate feeding; (7) Determine benefits of alternative feeding schedules and methods and how they affect post-release survival of hatchery chinook and coho.

Publications

Fuss, H.J and C. Johnson. 1988. Effects of artificial substrate and covering on growth and survival of hatchery-reared coho salmon. *Progressive Fish Culturist* 50: 232-237.

Pascual, M.A., T.P. Quinn, and H. Fuss. 1995. Factors affecting the homing of Columbia River hatchery-produced fall chinook salmon. *Transactions of the American Fisheries Society*, 124: 308-320.

Fuss, H.J. and C.W Hopley. 1990. Survival, marine distribution, and age at maturity of Hood Canal hatchery chum. *Proceedings of the 1989 N.E. Pacific Pink and Chum Salmon workshop*, 1991.

Fuss, H.J., J. Byrne, and C. Ashbrook. 1998. Stock Characteristics of Hatchery-Reared Salmonids at Washington Department of Fish and Wildlife Columbia River Hatcheries: Annual Report 1997. National Marine Fisheries Service. July 1998.

Other Key Personnel (WDFW)

Nine other WDFW employees split a total of 15 months (2,520 hours) of time on various aspects of the project:

Fish Biologist 2 (Hatcheries division), 3 months doing routine paper work and data entry associated with rearing of project fish and releases of coded-wire tagged fish.

Fish Biologist 2 (Hatcheries division), 2 months doing coordination of tagging related activities at hatcheries and collecting snouts from hatcheries and processing paper work and checking accuracy of data. Scientific Technician 2 (3 total, 3 months each; Resource Assessment Division), 9 months total activities associated with location, removal, decoding and error checking, and entering data from tags recovered in snouts of salmon collected at hatcheries, spawning grounds and in various fisheries.

Administration Division, 1 month total for activities related to WDFW Fish Program administration, internal processing of payments, travel vouchers, word processing, general reception, and computer maintenance including network.

ODFW

Project Manager (ODFW): Mark Lewis

Title: Special Projects (Natural Resource Specialist 2)

FTE/Hours: Full time position, 1.0 FTE. Time on this project 4 months/year, 0.33 FTE.

Duties on this Project: Write project proposals and project work statements, develop and track project budget, determine groups for tagging, coordinate tagging and tag recovery with ODFW Fish Identification Section, perform pre-release tag retention and fin clip quality checks, file CWT release reports, write annual reports, summarize and analyze data collected, prepare and deliver oral and written presentations of project results as needed.

Other ODFW employees involved with this project include: Christine Mallette Fish Identification Section supervisor; Bill Murray tag recovery supervisor; John Adkins, Stan Brzycki, Bill Close, Bill Haugen, Jenniffer Hewlett, Randy Johnson, and Gene Thoming tagging supervisors and/or tag processors.

Resume

Personnel: Mark Lewis Phone: (541) 757-4263 ex 241
28655 Highway 34 Fax: (541) 757-4102
Corvallis, OR 97333 email: lewisma@ccmail.orst.edu
College: Oregon State University, Graduated June 1986
Bachelors Degree in Fisheries Science, and Bachelors Degree in Wildlife Science
Current Employer: Oregon Department of Fish and Wildlife.

Assigned to Hatchery Assessment Project of the Fish Propagation Section of the Fish Division.
Duties include: Project Manager for BPA contract; Project Manager for NMFS CWT contract; other projects, as assigned.

Recent Employment History: Current Position – March 1990 to Present.

North Coast Crew Chief – January 1990 to March 1990. Natural Resource Specialist 1 position with the ODFW Ocean Salmon Management Section. Assistant project manager for two projects; Sampling of Northern Oregon ocean salmon fisheries, and Salmon River fall chinook indicator stock project.

Seasonal Sampler – June 1986 to December 1989. Experimental Biological Aide position with various ODFW projects including: Oregon ocean sport and commercial fishery sampler, summer 1986, 1987, 1988. Oregon coastal salmon spawning ground surveyor, fall/winter 1986-87. Salmon river fall chinook indicator stock study, fall/winter 1987-88, 1988-89. Willamette River spring chinook creel, spring 1988. Salmon scale reader, summer 1989. Salmonid habitat research project, fall/winter 1989.

Foreign Fisheries Observer Program – July 1985 to September 1985, March 1987 to May 1987. Position with NMFS, subcontracted through OSU, collect biological and fishery management data from joint venture ground fish fishery in Bering Sea.

Expertise:

This project is essentially a mark-recapture project with hatchery salmon. My degrees in fisheries and wildlife science provide the biological and technical background to perform this kind of project. My work experience includes mark-recapture studies with juvenile wild salmon (salmonid habitat research project) and adult salmon (Salmon River fall chinook indicator stock project). I also have experience with the CWT technology including, tagging and sampling the various areas CWT fish are recovered. Computer use, data compilation and analysis, and report preparation skills have been developed through college courses and projects, as well as through my work experience on various projects.

Recent Publications and Job Completion:

Ewing, R.D., T.R. Walters, M.A. Lewis, and J.E. Sheahan. 1994. Evaluation of Inventory Procedures for Hatchery Fish. I. Estimating Weights of Fish in Raceways and Transport Trucks. *Progressive Fish-Culturist*. 56:153-159.

M.A. Lewis, T.R. Walters, and R.D. Ewing. 1994. Evaluation of Inventory Procedures for Hatchery Fish. II. Variation in Specific Gravities of Pacific Salmonids During Rearing. *Progressive Fish-Culturist*. 56:160-168.

Lewis, M.A. 1996a. Review of capacity utilization at ODFW salmon hatcheries. Oregon Department of Fish and Wildlife, Information Report 96-8, Portland, Oregon.

Lewis, M.A. 1996b. Stock Assessment of anadromous salmonids. Oregon Department of Fish and Wildlife, Annual Progress Report, Portland, Oregon.

Lewis, M.A., C. Mallette, and W.M. Murray. 1997. Annual coded wire tag program, Oregon missing production groups. Annual Report 1996, Bonneville Power Administration, Portland, Oregon.

PSMFC

Cindy LeFleur
Fish and Wildlife Biologist 4
Washington Department of Fish and Wildlife
Vancouver, Washington

FTE/Hours = 0

Education B.S. Wildlife Science Oregon State University, 1980

Experience and Qualifications

1988 - present: Washington Department of Fish and Wildlife. Currently responsible for the CWT recovery program for the Columbia River. Duties also include primary responsibility for harvest management activities in the Columbia River and Washington tributaries. Involved with the U.S. v. Oregon Columbia River Fish Management Plan implementation, review, and all technical aspects.

1980-1988: Pacific States Marine Fisheries Commission. CWT recovery program. Duties included extensive involvement in CWT recovery and analysis for the Columbia River and tributaries. Developed many of the basic methods now used in the analysis today.

1976-1980: Standard training in the Fish and Wildlife Department at Oregon State University

Relevant Publications

Contributed to the following reports as a member of the Technical Advisory Committee:

U.S. v. Oregon Technical Advisory Committee. 1996 All Species Review - Columbia River Fish Management Plan. August 4, 1997.

U.S. v. Oregon Technical Advisory Committee. Biological Assessment of the Impacts of Anticipated 1996-98 Winter, Spring, and Summer Season Columbia River Mainstem and Tributary Fisheries on Listed Snake River Salmon Species Under the Endangered Species Act. January 22, 1996.

U.S. v. Oregon Technical Advisory Committee. Biological Assessment of the Impacts of Anticipated 1996-98 Fall Season Columbia River Mainstem and Tributary Fisheries on Snake River Salmon Species Listed Under the Endangered Species Act

Rodney J. Kaiser
Oregon Department of Fish and Wildlife
Marine Resources Section
Ocean Salmon Management Program, Newport

FTE/Hours = 0

Education M.S. Oceanog./Marine Resource Mgmt. Oregon State University, 1983
 B.S. Technical Journalism Oregon State University, 1970
 B.S. Fishery Science Oregon State University, 1969

Experience

1989-Present: Program Leader, ODFW Marine Resources, Ocean Salmon Management Program., Newport, OR.

Administer, direct, and supervise OSM program, and staff, at Newport, including Oregon's ocean investigative studies, inseason fisheries sampling and harvest management, and PST field chinook indicator stock studies. Position participates as part of ODFW fishery management team.

1982-1989: Assistant Program Leader, ODFW Marine Resources, Ocean Salmon Management Program, Newport, OR.

Act as assistant OSM program leader. Supervise analysis of ocean salmon statistics for interjurisdictional and domestic fisheries application (PSC, PFMC, KFMC. ODFW technical representative to US/Canada Salmon treaty negotiation and member of CTC (1985-1986). ODFW representative to PFMC Salmon Technical Team (1982-1988).

1982: Marine Resources Consultant

Contracts with ODFW and Alaska Department of Fish and Game.

1974-1980: Area Shellfish Management Biologist, ADFG Westward Region, Kodiak Management District, Kodiak, AK.

Administered, directed, and supervised shellfish management programs and staff for Kodiak management district. Supervised multiple interview/catch sampling and/or tag recovery programs. Conducted management-oriented research, population surveys, and gear studies. Presented oral and written presentations to Alaska Board of Fisheries. of ADFG's North Pacific Fishery Management Council's management planning team.

Member
shellfish fishery

Patrick A. Frazier
Oregon Department of Fish and Wildlife
Fish Division
Columbia River Management, Clackamas

0.25 FTE (Hours = 520)

Education B.S. Fishery Science Oregon State University, 1981

Summary of Qualifications

Seventeen years of service for Oregon Department of Fish and Wildlife on fishery management and research programs, including five years on the Rogue River research project and 12 years with the Columbia River Management group. Considerable experience in management and sampling of commercial and sport fisheries.

Experience

1996-Present: Assistant Project Leader (SFWB), Columbia River fisheries management program, Clackamas, OR.

1994-1996: Project Leader (FWB-3), Columbia River commercial sampling program, Clackamas, OR.

1989-1993: Project Leader (FWB-2), Columbia River commercial sampling program, Clackamas, OR.

1986-1989: Staff biologist (FWB-1), Willamette River spring chinook statistical creel programs.

Extensive experience with both commercial and sport fishery sampling programs. Participated at all levels of sampling programs from actual field sampling positions to supervisory program leader positions.

Duties have included:

- 1) Collection of snouts from CWT marked fish and associated biological data.
- 2) Transferring data to PSMFC regional mark recovery database.
- 3) Produce sport and commercial fishery catch estimates and CWT expansion factors.
- 4) Supervising commercial and sport fishery management projects.

Christine Mallette
Supervising Fish and Wildlife Biologist
Oregon Department of Fish and Wildlife
Fish Identification Section
Clackamas, Oregon

0.25 FTE (Hours = 520)

Education

M.S.	Zoology Johann W. von Goethe University, Frankfurt, Germany	1989
B.S.	Biology Johann W. von Goethe University, Frankfurt, Germany	1984

Summary of Qualifications and Experience

Project leader for Fish Identification Section of ODFW's Fish Division since 1995.

Oregon representative on Pacific States Marine Fisheries Commission's (PSMFC) Regional Mark Committee

Manage ODFW fish marking program such as Coded Wire Tag (CWT), fin clipping, and experimental marking operations.

Oversee tag processing activities at the central CWT recovery laboratory in Clackamas, Oregon.

J. Kenneth Johnson
Regional Mark Coordinator/Manager
Pacific States Marine Fisheries Commission
Gladstone, OR

0.25 FTE (Hours = 520)

Education	Ph.D.	Biological Oceanography	Oregon State University, 1980
	M.S.	Biological Oceanography	Oregon State University, 1974
	B.S.	Zoology	Brigham Young University, 1970

Summary of Qualifications

Advanced training in aquatic sciences. Publications in refereed scientific journals. Management of the regional CWT database at PSMFC since 1979. Experience in system analysis and design, development of data standards and exchange protocols, database implementation and reporting.

Experience

1979-Present Regional Mark Coordinator and Manager. Pacific States Marine Fisheries Commission, Gladstone, OR

Manage the Regional Mark Processing Center (RMPC) which provides essential services to States, Federal, and Tribal fisheries agencies involved in marking anadromous salmonids. These services include regional coordination of tagging and fin marking programs, maintenance of a regional database for Coded-Wire Tag (CWT) releases and recoveries, production of data reports and distribution of CWT data sets. The regional CWT database is accessed through the RMPC's Regional Mark Information System (RMIS).

Duties also include chairing the Regional Mark Committee and serving on various Pacific Salmon Commission committees, including Data Sharing Committee (member), Data Standards Working Group (U.S. Co-Chair), and Catch and Effort Working Group (member).

Relevant Publications

Johnson, J.K. 1990. Regional overview of coded wire tagging of anadromous salmon and steelhead in northwest America. *American Fisheries Society Symposium* 7:782-816.

Johnson, J.K. and J. Longwill. Annual report: Pacific Salmonid Coded Wire Tag Releases. (Report covers most recent past seven years of release data).

USFWS

Project Coordinator: Walter J. Ambrogetti
Title: Deputy Project Leader, Supervisory Fishery Management Biologist, Lower Columbia River Fisheries Program Office

FTE/Hours on Project: 0.06 FTEs

Duties on Project: Contracting officer, budget development, and administration.

Education: B.S. Fish and Wildlife Management, Oregon State University, 1968

Experience: Mr. Ambrogetti joined the USFWS in 1970 and has worked in the field of fisheries and fish marking for over 25 years. Mr. Ambrogetti was responsible for the design and construction of fish marking trailers. Mr. Ambrogetti wrote the USFWS Special Report "Northwest Fisheries Program, Micro-Tagging Trailer", July 1976. This report was reprinted in 1978 (with permission from USFWS) by Northwest Marine Technology, the manufacturer of the coded-wire tags and tagging machines, for distribution to their customers. Literature on using coded-wire tagging machines in mobile trailer units was not available anywhere else at that time. Mr. Ambrogetti served as the assistant USFWS Coded-Wire Tag Coordinator to the Pacific Marine Fisheries Commission for several years.

Project Supervisor/Analyst: Tim Roth

Title: Fishery Management Biologist, Lower Columbia River Fisheries Program Office

FTE/Hours on Project: 0.04 FTEs

Duties on Project: Project supervisor and program analyst.

Education: B.A. Biological Sciences, Northwest Nazarene College, 1974

Experience: Mr. Roth joined the USFWS in 1975 and has worked in the field of Columbia River and west coast ocean and harvest production management for the last 23 years and currently oversees the USFWS marking program for the Columbia River Basin. Mr. Roth has served as the USFWS representative on the Pacific Fishery Management Council's Salmon Technical Team, the Pacific Salmon Commission's Chinook Technical Committee, and continues to serve as the USFWS representative on the Technical Advisory Committee and Production Advisory Committee for the U.S. v. Oregon Columbia River Fish Management Plan. Mr. Roth has co-authored numerous reports pertaining to the harvest and production management, and impacts on listed stocks as a member of these technical committees. Mr. Roth has recently taken on the role of USFWS policy representative for the Pacific Fishery Management Council.

Database Specialist/Annual Report Preparation: Stephen Pastor

Title: Fishery Management Biologist, Lower Columbia River Fisheries Program Office

FTE/Hours: 0.14 FTEs

Duties on Project: Maintain data set, analyze data, produce annual analysis report.

Education: B.S. Biology, Pennsylvania State University, 1972

Experience: Mr. Pastor joined the USFWS in 1974 and has worked in the field of hatcheries, hatchery database management and use, and fish marking for the past 12 years. Mr. Pastor manages the USFWS regional fisheries database (CRiS). This includes maintenance of the database for coded-wire tag releases and recovery information at all federal hatcheries in the basin, production of data reports, and distribution of tagging and coded-wire tag data to PSMFC. Mr. Pastor is USFWS representative to the 'StreamNet' steering committee.

Papers and Presentations:

- "Missing Production Groups' at National Fish Hatcheries in the Columbia basin", Columbia River Basin Fish and Wildlife Program Review of Projects, Portland, Oregon, March 1997
- "Columbia River (information) System (CRiS) - Status, and Following the Paperless Trail", Northwest Fish Culture Conference - Fife, Washington, December 1995.
- "A Database Pond Inventory System - Leaving a Paperless Trail", Northwest Fish Culture Conference - Boise, Idaho, December 1990.
- "Overview of Harvest and Hatchery Survival. What's Going On? How are your fish doing?", 1st Annual Fish Culturist Workshop in Pendleton, Oregon June 1995.
- "Better Information for Hatchery Managers - a Database Method for Transferring Information to the Hatchery, and from the Hatchery", Northwest Fish Culture Conference - Gleneden Beach, Oregon December 1989.

Annual Report Preparation: Steven K. Olhausen

Title: Fishery Management Biologist, Lower Columbia River Fisheries Program Office

FTE/Hours on Project: 0.08 FTEs

Duties on Project: Annual report preparation.

Education: B.S. Fish and Wildlife Management, Oregon State University, 1973

Experience: Mr. Olhausen joined the USFWS in 1975 and has worked in the field of fisheries and fish marking for over 20 years.

Field Programs Supervisor: Ken Walch

Title: Fishery Management Biologist, Lower Columbia River Fisheries Program Office

FTE/Hours: 0.09

Duties on Project: Supervises all field tagging and recovery operations, reading of scales for age structure analysis, and initial computer data entry.

Education: B.S. Wildlife Management, University of Montana, 1964

Experience: Mr. Walch joined the USFWS in 1983 and has worked in the field of fish marking for 15 years.

Other USFWS personnel involved with this project include:

Carolyn Minor and Deborah Burkett – administrative support (0.04 FTEs)

Dan Magnuson, Chuck Fuller, and Pat Kemper – tagging supervisors and tag recovery (0.19 FTEs)

Section 10. Information/technology transfer

All recoveries of tags from this and companion projects is stored on a regionwide database maintained by the Pacific States Marine Fisheries Commission, Gladstone, Oregon. These data are accessible by virtually anyone and are used for a variety of purposes. Data generated from this project can be used by other projects funded by Bonneville to meet Fish and Wildlife Program goals. Comparison of performance of salmon tagged under this project can be compared with performance of salmon tagged in other projects to compare such things as above and below dam survival and distribution. For example, coho tagged as part of the restoration programs in the Umatilla, Wenatchee, Methow, or Yakima rivers can be compared to survivals of coho tagged in lower river hatcheries to assess if mortality due to freshwater or ocean productivity is equal. Other uses include determining hatchery effectiveness, stray rates into watersheds with critical or listed stocks, and comparison of survival trends of Columbia River salmon with salmon from other geographic areas. These kinds of relational comparisons provide insight to relative productivity's of the Columbia River system. We also summarize the data annually and report these summaries in Annual Reports that are published by Bonneville and available upon request. Lastly, results are often presented at professional meetings such as those sponsored by the American Fisheries Society, or the Bonneville Power Administration.

Congratulations!