
Other planning document references.

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 (see 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 ;

Subbasin.

N/A: Basin-wide program

Short description.

Basic data collection and monitoring program for a wide variety of studies releasing CWT marked fish in the Columbia River Basin. Basic estimates of abundance of hatchery and wild anadromous stocks are used to model and set regional harvest strategies.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction	+	Watershed
	Resident fish		O & M	+	Biodiversity/genetics
	Wildlife	+	Production	X	Population dynamics
+	Oceans/estuaries	+	Research	+	Ecosystems
	Climate	X	Monitoring/eval.		Flow/survival
	Other	+	Resource mgmt	+	Fish disease
		+	Planning/admin.	+	Supplementation
			Enforcement		Wildlife habitat enhancement/restoration
			Acquisitions		

Other keywords.

Stock identification; Life history; Sampling; Tagging; CWT; Harvest; Modeling

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
8906500	Annual Fish Marking Program - Missing Production Groups OR/WA/ID (USFWS)	Recovery of CWTs from marked fish released by BPA funded program

8906600	Annual Coded Wire Tag Program - Missing Production WA HTCH (WDFW)	Recovery of CWTs from marked fish released by BPA funded program
8906900	Annual Coded Wire Tag Program - Missing Production OR HTCH (ODFW)	Recovery of CWTs from marked fish released by BPA funded program
9306000	Columbia River Terminal Fisheries Research Project	Recovery of CWTs from marked fish released by BPA funded program
9000500	Umatilla Hatchery - Monitoring/Eval Projects	Recovery of CWTs from marked fish released by BPA funded program
8816000	Willamette Hatchery Oxygen Supplementation	Recovery of CWTs from marked fish released by BPA funded program
8902900	Hood River Production Program - Pelton Ladder - Hatchery	Recovery of CWTs from marked fish released by BPA funded program
8805303	Hood River Production Program - CWTS - M&E	Recovery of CWTs from marked fish released by BPA funded program
9600800	PATH - Participation by State and Tribal Agencies	CWT data from fisheries and escapement used for stock modeling purposes
833500	Big Canyon Creek Portable Acclimation/Release Facility	CWTs used along with PIT tags and radio tags for evaluation studies
9603301	Yakima River Fall Chinook Supplementation	CWTs used for monitoring and evaluation
9603302	Yakima River Coho Restoration	CWTs used for monitoring and evaluation
9506401	Refinement of Marking Methods for YKFP	CWTs included in marking methods
9506300	Yakima/Klickitat Monitoring and Evaluation Program	CWTs used for monitoring and evaluation
	Incomplete Listing	

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
	Columbia Basin CWT Sampling: Joint ODFW/WDFW Program (Objectives 1-5)		
1	Snout Recovery: Recover snouts from CWT marked salmon and steelhead landed in	a	Randomly sample mainstem Columbia River non-Indian and Treaty Indian commercial fisheries

	Columbia River sport and commercial fisheries and returning to escapement areas.		at a minimum 20% sampling rate.
		b	Randomly sample mainstem Columbia River recreational fisheries below Bonneville Dam (Buoy 10 - ODFW only) for CWTs at minimum 20% rate.
		c	Randomly sample Willamette and Clackamas River spring chinook sport fisheries for CWTs (ODFW).
		d	Randomly sample fall chinook and coho returning to Oregon escapement areas below Bonneville Dam for CWTs (ODFW).
		e	Randomly sample all major Washington tributary recreational fisheries for CWTs (WDFW).
		f	Randomly sample fall chinook recreational fisheries on the Hanford Reach of the Columbia River for CWTs (WDFW).
		g	Randomly sample spring chinook, fall chinook, and coho returning to Washington escapement areas below McNary Dam (WDFW).
		h	Randomly sample fall chinook returning to the Hanford Reach of the Columbia River (WDFW).
2	Creel Census and Escapement Area Programs: Estimate total harvest in commercial fisheries and total effort and catch in recreational fisheries, document hatchery returns and estimate spawning populations.	a	Estimate total harvest in mainstem Columbia River commercial fisheries.
		b	Estimate total effort and catch in the lower Columbia River recreational fisheries (excluding Buoy 10).
		c	Estimate total effort and catch in Buoy 10 sport fishery (ODFW). (Note: WDFW's joint sampling done under other funding).

		d	Estimate total effort and catch in the lower Willamette and Clackamas River spring chinook sport fisheries (ODFW).
		e	Estimate effort and catch in the mainstem Columbia River sport fisheries between Bonneville and McNary dams (ODFW).
		f	Estimate spawning populations for Oregon's lower Columbia River tributaries (ODFW).
		g	Estimate returns to ODFW's lower Columbia River fall chinook hatcheries (ODFW).
		h	Estimate bright/tule stock composition and mark rates of fall chinook at Bonneville Dam.
		i	Estimate stock composition of summer steelhead at Bonneville Dam (ODFW task).
		j	Estimate catch in all major Washington tributary recreational fisheries (WDFW).
		k	Estimate catch and effort in the fall chinook recreational fishery on the Hanford Reach of the Columbia River (WDFW).
		l	Estimate spawning populations of spring and fall chinook for all major Washington tributaries (WDFW).
		m	Estimate spawning population of fall chinook returning to the Hanford Reach of the Columbia River (WDFW).
3	Data Delivery : CWT recovery data will be combined with fishery/recovery and biological data, error checked, and transferred to PSMFC	a	Transfer error checked CWT catch/sample data to ODFW's mainframe computer. (Includes WDFW's Columbia River mainstem recoveries).
		b	Transfer merged and verified recovery CWT data to PSMFC for incorporation into the regional database (Regional Mark Information Sytem (RMIS)).

4	Data Analysis: Summarize and analyze data for use in determining status of wild and natural salmon and steelhead populations in the Columbia River Basin. Analyze CWT recoveries for survival, distribution, harvest rates and contribution to fisheries.	a	Determine age composition for all Columbia River basin recreational and commercial fisheries (including Washington tributary fisheries) for spring and fall chinook.
		b	Determine age composition of fall chinook in Oregon tributary escapement areas and summer steelhead at Bonneville Dam (ODFW)
		c	Determine age composition of Washington tributary escapement areas for spring and fall chinook (WDFW).
		d	Coordinate and gather escapement and catch data from other Columbia River resource agencies, plus ODFW and WDFW regional offices.
		e	Determine Washington and Oregon terminal area tag rates for spring and fall chinook by stock.
		f	Determine stock composition of Columbia River mainstem and Washington terminal area fisheries and hatchery/wild ratios of summer steelhead at Bonneville Dam.
		g	Produce run reconstruction for all major salmonid stocks.
		h	Provide preseason run size forecasts for all major salmonid stocks and ESA substocks.
		i	Document information and produce annual reports.
		j	Work with the U.S. v. Oregon Technical Advisory Committee regarding work associated with ESA stock accounting.
		k	Update and maintain databases.
5	Data Management and Benefits:	a	Provide stock identification CWT

	Provide high quality data for use by the scientific community with specific emphasis on supplying data to regional databases.		data that is essential to evaluating and monitoring a wide range of projects under NPPC's Fish and Wildlife Program.
		b	Provide data to major projects funded by BPA, including StreamNet, Process for Analyzing and Testing Hypothesis (PATH), and Columbia River Salmon Passage Model (CRiSP1).
		c	Provide survival data necessary to evaluate hatchery practices.
		d	Provide stock status data for use by state, federal, and international fishery management agencies to set and make adjustments to the ocean and Columbia River fisheries.
	Ocean CWT Sampling: ODFW Program (Objectives 6-10)		
6	Recovery of CWTs from chinook and coho salmon landed in Oregon's ocean commercial troll and recreational fisheries.	a	Sample Oregon's ocean commercial troll salmon fishery at a minimum of 20% of the weekly landed catch within major ocean sampling catch areas.
		b	Sample Oregon's ocean recreational salmon fishery at a minimum of 20% of the weekly landed catch within major ocean sampling catch areas.
7	Determine total commercial troll and recreational landings and effort by time and catch area from expansions of sampled data.	a	Estimate total commercial troll salmon harvest by species in Oregon's ocean fisheries.
		b	Estimate total recreational salmon harvest (private vessels and charter boat) in Oregon's ocean fisheries.
8	Data Delivery. Report Oregon total ocean salmon catch and CWT data by fishery, species, time and area to PSMFC's Regional Mark Processing Center.	a	Uploaded ocean port salmon sampling data onto ODFW mainframe computer.

		b	Complete second level error check and process CWT and sampling data for delivery to PSMFC.
9	Data Analysis. Summarize and analyze CWT data to determine the stock composition of stocks represented in Oregon ocean salmon fisheries. Determine contribution, distribution, and survival rates of wild and hatchery stocks of Columbia River basin chinook	a	Provide stratified time/area data analysis on CWT ocean fishery recoveries, fishery effort and landings to ODFW fishery managers, PFMC, PST, CBFWA, NMFS, ESA stock status reviews, and others as requested.
		b	Produce "Oregon Ocean Salmon Fisheries Annual Report". Contribute to the PFMC annual report on ocean fisheries.
10	Data Management and Benefits. Provide high quality error-free raw and analyzed data for use by scientists, fishery managers, fishing industry, and the public.	a	Deliver timely and error-free data to regional data bases.
		b	Provide stock status data for use by state, federal, and international fishery management agencies.
	Clackamas CWT Tag Recovery Lab: ODFW (Objectives 11-12)		
11	Process Fish Heads Containing Coded Wire Tags.	a	Retrieve fish heads from various collection locations several times a year to provide timely processing and decoding of the CWTs.
		b	Extract and decode Coded Wire Tags from fish heads.
12	Data Delivery. Verify and report decoded CWTs to ODFW's data management operations and to PSMFC's RMIS system.	a	Enter and verify CWT decoding data on the ODFW mainframe database. (Includes WDFW's Columbia River mainstem tag recoveries).
		b	Transfer CWT decoding data to the PSMFC Regional Mark Processing Center.
		c	Return recovered tags of non-Oregon origin to the appropriate agencies.
		d	Maintain an archival tag recovery collection for all tags released by

			Oregon hatcheries and other wild stock tagging programs.
	Regional Mark Processing Center: PSMFC (Objectives 13-14)		
13	Provide regional CWT data management	a	Maintain and upgrade the regional database for all CWT releases and recoveries.
		b	Produce and distribute annual report on regional CWT releases (Pacific Salmonid Coded-Wire Tag Releases: 199- to 199-).
		c	Maintain and upgrade PSMFC's on-line "Regional Mark Information System" (RMIS), to facilitate on-line user retrieval of regional CWT release, recovery, and catch/sample data.
		d	Serve as the official U.S. site for CWT data exchange with Canada, using the standardized Pacific Salmon Commission format.
14	Provide regional coordination of marking programs.	a	Provide coastwide coordination for fin marking and CWT release and recovery programs. This includes chairing the annual Mark Meeting.
		b	Serve on regional committees that involve fin marking and coded wire tags. This includes PSC's Data Sharing, Data Standards, and Catch/Effort committees.
		c	Assist in the resolution of political issues in marking salmonids, including mass marking of hatchery stocks and the impact on the integrity of the coastwide CWT program.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	1/1999	12/1999	37.80%
2	1/1999	12/1999	11.50%
3	1/1999	12/1999	3.90%
4	1/1999	12/1999	12.90%
5	1/1999	12/1999	3.50%
6	4/1999	11/1999	8.40%
7	4/1999	11/1999	1.20%
8	4/1999	12/1999	2.10%
9	1/1999	12/1999	2.40%
10	1/1999	12/1999	0.90%
11	1/1999	12/1999	4.70%
12	1/1999	12/1999	4.70%
13	1/1999	12/1999	5.50%
14	1/1999	12/1999	0.50%
			TOTAL 100.00%

Schedule constraints.

Sampling programs are dependent upon the timing of the various fisheries. As such, any management adjustments in the fisheries (i.e. early closures or extended seasons) may necessitate changes to sampling schedules.

Completion date.

N/A. Ongoing basic data collection and monitoring program for stock identification studies.

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	ODFW, WDFW, PSMFC (primarily field sampling personnel)	\$880,257
Fringe benefits	ODFW (36%), WDFW (14%-37%), PSMFC (37%)	\$298,408
Supplies, materials, non-expendable property	Computer (\$3,500), software, printer, data logger/parts, cell phones, rain gear,	\$24,530

	sampling gear	
Operations & maintenance	Includes PSMFC computer operations (\$67,132)	\$110,242
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		\$ 0
PIT tags	# of tags: 0	\$ 0
Travel	Vehicles, mileage, per diem, & lodging: ODFW (\$42,219); WDFW (\$73,060)	\$115,279
Indirect costs	ODFW (22.9%), WDFW (19%); PSMFC (15%)	\$268,811
Subcontracts	CEDC (\$15,000)	\$15,000
Other	PSMFC administrative fee on pass-through funds (2%)	\$18,913
TOTAL		\$1,731,440

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	\$1,818,012	\$1,908,913	\$2,004,359	\$2,104,577
O&M as % of total	6.00%	6.00%	6.00%	6.00%

Section 6. Abstract

The **Coded-Wire Tag (CWT) Recovery Project** is an on-going data collection and data management program by ODFW, WDFW, and PSMFC that contributes to a west coast U.S./Canada CWT information system for salmonid fish. The coded wire tag is the most important salmonid stock identification tool used on the west coast and has been the primary methodology used by all management entities since the mid 1970's for assessing both stocks and fisheries. In the Columbia Basin, CWT recovery data are used for evaluating the status of hatchery and wild anadromous salmonid stocks, including those stocks that are threatened, endangered or ESA listed. In addition, the CWT data are used to assess a wide variety of studies designed to improve survival of hatchery produced salmonids.

CWT recovery information provides critical data for evaluating stock rebuilding programs sponsored by NPPC's Fish and Wildlife Program. Section 8.4D, for example, urges fishery managers to **"Develop expanded marking and catch sampling programs for ocean and inriver fisheries where Columbia River weak stocks are caught"**, while Bonneville and appropriate federal agencies are asked to **"Share the cost on a 50/50 or other mutually agreed basis for expanding marking and sampling programs to improve precision of additional coverage"**.

Treaty would be diminished without this sampling program as would the ability to identify harvest of Columbia River salmonid stocks in Canadian and Alaskan fisheries. PFMC requires this data to evaluate the effect of proposed ocean seasons on Columbia River salmonid stocks.

The federal ESA depends on CWT marked hatchery fish to function as surrogates for wild listed populations. Marked hatchery fish function as indicator stocks that provide estimates of survival and exploitation rates for wild fish and aid in monitoring the status of listed salmonid populations. Indicator stocks are also used to limit harvest of Columbia River salmonids in ocean and Columbia River fisheries. The *U.S. v. Oregon* Columbia River Compact, U.S./Canada Salmon Treaty, and PFMC (management of domestic ocean fisheries) all depend on the CWT recovery program to manage fisheries in a manner to limit the harvest and harvest of listed salmonids while targeting on harvestable hatchery reared fish. CWT recovery data are also essential for the BPA funded PATH program whose purpose is to identify factors limiting salmonid survival in the Columbia River Basin.

b. Proposal objectives.

Project Component 1: Columbia River CWT Recovery Program (ODFW/WDFW)

Objective 1 - Snout Recovery : Recover snouts from CWT marked salmon and steelhead landed in Columbia River sport and commercial fisheries and returning to escapement areas.

The goal is to examine a minimum of 20% of the salmon and steelhead landed in Columbia River fisheries for the presence of CWTs. The 20% sampling rate is designed to ensure that CWT recoveries will be adequate for developing stock composition estimates of the fishery and also to ensure that stocks of low abundance will be adequately recovered in the fishery. This is a difficult task for Columbia River sport fisheries because fisheries occur over the lower 146 miles of the Columbia River. Attainment in commercial fisheries is less difficult because fish are sampled at the processing plants. In some cases, limited number of buyers and the need to randomly sample results in sampling rates that are significantly higher than 20%.

Ancillary sampling occurs in mainstem sport fisheries above Bonneville Dam, in significant tributary fisheries, and as fall chinook and coho return to hatcheries. These ancillary sampling programs seldom achieve the 20% goal.

Tributary fishery sampling is conducted with the objective of sampling every major tributary on the Washington side of the river. Escapement area sampling also occurs in all major Washington and Oregon tributaries to recover CWTs on spawning grounds.

Products: - Recovery of snouts for salmon and steelhead containing a CWT.

Objective 2 - Creel Census and Escapement Area Programs: Estimate total harvest in commercial fisheries and total effort and catch in recreational fisheries where CWT's are recovered. Provide expansion factors for all CWTs recovered. Document total fall chinook returns to hatchery facilities, produce spring and fall chinook spawning population estimates for Columbia River tributaries, and perform stock separation for fall chinook and summer steelhead at Bonneville Dam.

- Products:
- Sampling rates necessary for determining CWT expansion factors.
 - Total landings by day and species for Columbia River commercial and tribal fisheries.
 - Estimates of total catch and effort by species for lower Columbia River recreational fisheries, (including Willamette, and Clackamas rivers).
 - Estimates of effort and catch by species for mainstem Columbia River sport fisheries between Bonneville and McNary Dams.
 - Population estimates for fall chinook and coho spawning in lower Columbia River tributaries.
 - Estimated fall chinook returns to lower Columbia River fall chinook hatcheries.
 - Bright/Tule daily stock composition for fall chinook passing Bonneville Dam.
 - Hatchery/wild composition for Group A and Group B summer steelhead passing Bonneville Dam.
 - Population estimates by tributary of spring and fall chinook salmon in Washington tributaries.
 - Catch by month of salmon in Washington tributary recreational fisheries.
 - Catch and effort of fall chinook in the Hanford Reach recreational fishery.
 - Population estimates and biological information on the spawning population of fall chinook in the Hanford Reach.
 - Bright/Tule daily stock composition for fall chinook passing Bonneville Dam.

Objective 3 - Data Delivery : Report catch/sample data to PSMFC's Regional Mark Processing Center for incorporation into the RMIS system. Provide data to PSC Technical Committee and other agencies before it is incorporated into the Regional Database. Verify CWT recovery data for accuracy before transfer.

- Products:
- CWT recovery data will be combined with fishery/recovery and biological data and transferred to PSMFC.
 - Summaries of expanded CWT information available for preliminary use.

Objective 4 - Data Analysis: Summarize and analyze data for use in determining status of wild and natural salmon and steelhead populations in the Columbia River Basin. Analyze CWT recoveries for survival, distribution, harvest rates and contribution to fisheries.

CWT recovery data will be used in conjunction with total harvest data to produce stock compositions for each fishery. Run reconstruction for all major salmonid stocks and ESA substocks is also performed using data collected by this project. Run reconstruction and fishery stock and age composition data are essential for monitoring the status of wild or naturally produced and hatchery produced salmonid stocks in the Columbia River basin.

- Products:
- Age and stock composition for all Columbia River mainstem and tributary fisheries.
 - Run reconstruction for all major salmonid stock and ESA listed substocks returning to the Columbia River.
 - Survival and harvest rates for specific salmon stocks.
 - Preseason forecasts for all major salmonid stocks and ESA substocks.
 - Historical databases for Columbia River salmon stocks.
 - Annual status reports summarizing fish runs, population status, fisheries, and escapements.

Objective 5 - Data Management and Benefits : Provide high quality data for use by the scientific community with specific emphasis on supplying data to regional databases.

Data produced, summarized, and analyzed by this project are widely used by the scientific community to determine status of ESA listed and other wild salmonid populations, evaluate hatchery production and release strategies, evaluate effectiveness of habitat improvement projects, determine survival rates and total production of hatchery produced salmonids, and manage fisheries to protect ESA listed and other wild stocks. Several important BPA funded projects like PATH, StreamNet, and CRiSP1 also depend directly on the data gathered and summarized by this project. The CWT program also provides data that is vital to the Fish and Wildlife Program administered by NPPC. Without the data collected and summarized with these BPA funds, these experimental and monitoring studies would likely not be possible.

- Products:
- Stock compositions for Columbia River fisheries.
 - Run reconstructions for Columbia River salmonid stocks.
 - Survival rates for Columbia River salmonid stocks.
 - Predicted run sizes for Columbia River salmonid stocks.

Project Component 2: Oregon Ocean Fisheries CWT Sampling (ODFW)

Objective 6 - CWT Recovery in Ocean Fisheries: Recover CWTs from chinook and coho salmon landed in Oregon's ocean commercial troll and recreational fisheries.

The goal for sampling CWTs in Oregon's ocean salmon fisheries is to implement a stratified representative sampling plan that samples a minimum of 20% of landed catch for all time and catch area cells in the various fisheries covering ports along the 310 miles of the Oregon Coast. The CWT sampling plan is designed to sample within the normal distribution of each port's weekly commercial and recreational landings. Although

minimum sampling rates are achieved for most sampling weeks in both troll and recreational fisheries, it is difficult to sample all times and areas coastwide to meet this objective.

Products: - Recovery of chinook and coho salmon snouts containing CWTs.

Objective 7 - Determine total Oregon ocean commercial troll and recreational landings and effort.

Oregon's total ocean commercial troll and recreational salmon effort and harvest (numbers of fish), by time and catch area, will be estimated from expansions of sampled data in both respective fisheries.

Products: - Total commercial troll landings in numbers of fish, by species, time, area.
- Estimated total recreational vessel effort by time, port, and area.
- Estimated average anglers/vessel and catch (by species)/trip, time and area.
- Total recreational landings in numbers of fish, by species, time, and area.

Objective 8 - Data Delivery. Report Oregon total ocean salmon catch and CWT data by fishery, species, time and area to PSMFC's Regional Mark Processing Center for incorporation into RMIS.

Products: - CWT recovery data are summarized with sampling and catch/effort estimates for PSMFC regional mark recovery database.
- In-season summaries of observed CWT recoveries by hatchery origin and port of landing are distributed throughout the Northwest.
- CWT information distributed to fishers with sampled CWT fish in their catch.

Objective 9 - Data Analysis. Summarize and analyze CWT data to determine the stock composition of stocks represented in Oregon ocean salmon fisheries. Determine contribution, distribution, and survival rates of wild and hatchery stocks of Columbia River basin chinook and coho caught in these fisheries.

Products: - Widely distributed reports summarizing CWT data collected by the project.
- Data provided for run reconstruction for all major salmonid stocks and ESA listed stocks originating in the Columbia River.
- Data provided for stock composition of ocean fisheries.

Objective 10 - Data Management and Benefits. Provide high quality error-free raw and analyzed data for use by scientists, fishery managers, fishing industry, and the public. A specific objective is to ensure that appropriate, timely, and error-free data are delivered to regional data bases.

Products: - Run reconstruction for Columbia River salmon stocks.

- Survival rates for Columbia River salmon stocks.
- Predict run sizes for Columbia River salmon stocks.
- Representations of Columbia River stocks in PFMC ocean salmon fisheries.

Project Component 3: Clackamas CWT Processing Center (ODFW)

Objective 11 - Tag Recovery. Process Fish Heads Containing Coded Wire Tags.

- Products: - Retrieval of fish heads to the Clackamas Tag Recovery Lab.
 - Recovery and decoding of sampled CWTs.

Objective 12 - Data Delivery. Verify and report CWT decodings to ODFW's data management operations and to PSMFC's Regional Mark Processing Center. Data includes WDFW's tag recoveries from the Columbia River mainstem.

- Products: - Electronic data entry, verification and transfer to PSMFC.
 - On-site archival collection of recovered tags released in Oregon.

Project Component 4: Regional Mark Processing Center (PSMFC)

Objective 13 - Regional CWT Data Management. Verify and then merge all Columbia River and Oregon ocean CWT recovery and catch sample data into the regional CWT database.

- Products: - User access to regional CWT release, recovery, and catch/sample data via PSMFC's on-line "Regional Mark Information System" (RMIS).

Objective 14 - Regional Mark Coordination. Provide coastwide coordination for fin marking and CWT release and recovery programs.

- Products: - Chair the annual Mark Meeting to address current issues and establish new or revised regional agreements.
 - Serve on various regional committees involved with CWTs and fin marking, including the Pacific Salmon Commission's committees on Data Sharing, Data Standards, and Catch/Effort.

c. Rationale and significance to Regional Programs.

Specific Benefits to NPPC's Fish and Wildlife Program

The CWT recovery program provides stock identification information that is vital to the NPPC's Fish and Wildlife Program. Without CWT recovery data for stock identification, the evaluation and tracking of many of the stock rebuilding programs would not be feasible. A sampling of the various supported projects is provided below:

- a) Population Monitoring (4.3C): Provide data that will allow the Council to monitor indicator populations for wild and naturally spawning populations in the Columbia River basin. A limited number of indicator hatchery populations will be monitored to provide basic life history and survival information applicable to wild and naturally occurring populations. The 'Missing Production' studies of USFWS, WDFW, and ODFW (BPA Project #'s 8906500, 8906600, 8906900) fall under this category.
- b) Pacific States Marine Fisheries Commission (5.0F.15): Provide data used as part of the Coordinated Information System (now known as StreamNet), to provide data management capabilities to ensure open and timely access to all mark recovery data.
- c) Evaluation of Carrying Capacity (7.1A): Implementing the ecosystem approach will require knowledge of the Columbia River ecosystem. Bonneville and federal agencies will evaluate salmon survival in the Columbia River, its estuary, and in the near-shore ocean response to the request.
- d) Collection of Population Status, Life History, and Other Data on Wild and Naturally Spawning Populations (7.1C): Base-line information that will improve management of wild and naturally spawning stocks is needed and long term monitoring strategies must be developed.
- e) Hatchery Evaluation (7.2B, 7.2D.2, 7.2D.3): Provide data to evaluate basinwide trends in fish hatchery fish survival. Trends should be identified over time and geographic areas and fish survival should be correlated with natural factors, hatchery operations, and other fish or river management actions. Also provide data necessary to research, develop, and test hatchery rearing operations and release strategies aimed at improving efficiency of hatcheries by increasing the survival of artificially propagated fish to adulthood.
- f) Snake River Fall Chinook Salmon (7.5B): Provide data that to help identify the range, limiting factors, effects of flow and temperature, spawning, and rearing habitat, and migratory behavior of Snake River fall chinook.
- g) Develop Harvest Goals and Escapement Objectives (8.1, 8.1A.1-3): Provide data that will allow development and/or reevaluation of management goals, spawning ground escapement objectives, and improve statistical quality of run forecasting. The data also will contribute to revision of Columbia River Fish Management Plan and PFMCC's Salmon Plan to project and account for needs of Columbia and Snake River salmon and sockeye populations, including those listed by ESA.
- h) Fall Chinook (8.2C, 8.2C.1, 8.2C2): Data will allow harvest managers to manage fisheries to maintain chinook exploitation rates of no greater than 50% and below 50% using measures outlined in subsection 8.2C.3, 8.2C.4, and 8.2C.5.

- i) Spring Chinook (8.2D, 8.2D.1-2): Data allows fishery managers to reduce catch of upriver spring chinook, limit impacts of non-Treaty inriver fisheries to at about 4% of the upriver run and to intensify monitoring of ocean fisheries to ensure that harvest rates are as low as believed.
- j) Selective Harvest Techniques (8.3B, 8.3B.1): Provide data to evaluate projects that will demonstrate feasibility of various methods to harvest abundant stocks while conserving weak stocks like ESA listed Snake River salmonid stocks.
- k) Improve stock abundance prediction methods (8.4D): Fish managers are to develop expanded marking and catch sampling programs required for ocean and inriver fisheries where Columbia River weak stocks are caught. In turn, Bonneville and appropriate federal agencies are to share the cost on a 50/50 or other mutually agreed basis for expanding marking and sampling programs to improve precision of additional coverage.
- l) Marking Hatchery Salmon (8.4C): Fish managers are to identify an acceptable mark for hatchery fish and determine stray rates that are believed to be a threat to wild and naturally spawning stocks or hatchery stocks. Bonneville should continue to fund a program to mark all salmon from hatcheries having high stray rates and fishery managers will determine effectiveness of such marks. Additionally, data will allow managers to evaluate the feasibility of marking all hatchery salmon and implementing selective fisheries.

The FWP also recommends that all Willamette spring chinook be externally marked to allow differential harvest of underutilized hatchery fish and identification of current population size of wild and naturally spawning spring chinook in the basin (section 8.4C.4). Data collected by these project will be essential in evaluating and implementing these recommendations.

d. Project history

Project 8201300: Coded-Wire Tag Recovery Program:

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 'fair share' portion 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.

In 1992, BPA expanded its funding 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.

Adaptive Management Implications:

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 stratify fishery and escapement salmonid populations by stock, age, distribution, and run timing. 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.

Loss or further reduction in BPA funding for CWT recovery activities in ocean fisheries and the Columbia River fisheries will jeopardize minimum sampling requirements of 20% sampling of landings and result in an inadequate CWT recovery and assessment to support stock management efforts. Lower CWT recovery rates for the Columbia River fisheries and Oregon ocean salmon fisheries, for example, may be inadequate, particularly for rare tag recoveries such as those pertinent of ESA listed stocks. Stock composition data for regional stocks could also become unreliable and thus increase the difficulty in determining the population status and stock composition of ESA listed and PSC indicator stocks. Reduction in BPA funding may also cause CWT recoveries to be inadequate for determining survival data necessary to evaluate BPA supported studies. Additionally, reduction in BPA funding would impact the timeliness of CWT extraction and decoding.

Project Reports and Technical Papers:

Joint ODFW/WDFW reports:

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

ODFW reports:

- a) Willamette River Spring Chinook Salmon Run, Fisheries, and Passage at Willamette Falls.
- b) Status of Willamette Spring Chinook Run and Run Size Prediction.
- c) Preliminary Results of Columbia River Commercial Fisheries.
- d) Status Report: Oregon's Ocean Salmon Fisheries

WDFW Reports:

- a) Hatchery age and stock composition of spring and fall chinook returning to Washington hatcheries.
- b) Age and stock composition of natural spawning populations of spring and fall chinook returning to Washington tributaries.

- c) Summary of CWT recoveries on spawning grounds in Washington.
- d) Summary of CWT recoveries in Washington tributary fisheries.
- e) Bonneville Dam observations.
- f) Accountability of spring and fall chinook returns to the Columbia River basin and preseason forecasts.
- g) Coho database for OPI (Oregon Production Index).

PSMFC Reports:

The Mark Center no longer produces formal hardcopy 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.

Other Reports:

Direct management applications of this information are provided to the Pacific Fishery Management Council (PFMC) for inclusion in their annual Review of Ocean Salmon Fisheries and preseason salmon management reports (stock assessments and evaluation of annual fishery options). The CWT information is also instrumental in the assessment of critical regional salmonid stocks under the US/Canada Salmon Interception Treaty, and their monitoring of stock rebuilding through the Pacific Salmon Commission (PSC). Collected CWT information is reported by the PSC's technical committees in annual technical reports. Recent evaluations of Columbia River salmonid stocks for possible listing under the federal ESA are included in federal Stock Status reviews.

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.

17 years duration (1982-1998)

Funding History:	1998	\$1,542,133
	1997	\$1,400,759
	1996	\$1,251,738
	1995	\$1,241,271
	1994	\$1,329,363
	1993	\$1,285,319
	1982-1992	\$7,737,671

All Years: 1982-1998	\$15,788,254
Average \$/Year	\$928,721

e. Methods.

Methods

1. Tasks Associated Specifically With Objectives:

1.1 Columbia Basin CWT Sampling Program (Objectives 1-2)

ODFW and WDFW jointly share the task of sampling the Columbia River sport and commercial fisheries for CWT marked salmonids.

Sport and commercial fisheries target salmon and steelhead stocks throughout the lower 395 miles of the Columbia River stretching from the mouth at Buoy 10 to the Priest Rapids Dam. The primary mainstem sport fisheries occur below Bonneville Dam (including Buoy 10) and at Hanford Reach on the upper Columbia. Tributary sport fisheries primarily occur below The Dalles Dam. The treaty Indian commercial fisheries operates between Bonneville and McNary Dams while the non-Indian commercial fishery is limited to below Bonneville Dam. Additional sampling occurs for fish returning to hatcheries and natural escapement areas.

The goal is to sample a minimum of 20% of the salmon and steelhead landed for the presence of CWT's. The 20% sampling rate is a regionally agreed upon sampling rate designed to ensure that CWT recoveries will be adequate for developing stock composition estimates of the fishery and also to ensure that stocks of low abundance will be adequately recovered in the fishery. Fish containing a CWT will have their snout removed and will be sampled for pertinent biological data. Pertinent biological data will vary from project to project and may include length, weight, sex, skin color, other marks, and a scale sample.

1.1.A. Sampling Columbia River Commercial Fisheries

Columbia River non-Indian and Treaty Indian commercial salmon and steelhead fisheries may occur during February through October, but the majority of the landings occur from mid-August through October. Seasons are set during the year based on expected run strength of various salmon and steelhead stocks. In recent years, the ESA has severely restricted mainstem non-Indian commercial fisheries and has greatly increased the need for precise stock accounting in fisheries. The BPA funded Select Area Fishery Enhancement Project has increased the time and area in which Columbia River non-Indian commercial fisheries occur in select areas. These fisheries generally occur during late April through early June and August through October and have effectively harvested net-pen reared salmon while limiting the handle of ESA listed fish.

Catches will be examined for the presence of CWTs at the minimum 20% level by sampling landings received by commercial fish processors at their plants. All snouts recovered from these fisheries are delivered to the ODFW tag recovery lab in Clackamas. In conjunction with CWT sampling, a random portion of the catch is sampled for average weight and pertinent biological data. These data are used to determine species specific average weights that are applied to poundages recorded on fish tickets to estimate the total salmonid catch by species in Columbia River Treaty Indian and non-Indian fisheries.

1.1.B. Sampling Columbia River Sport Fisheries

The sport fishery on the lower Columbia River occurs year round with the majority of the catch occurring during mid-February through March and late-May through September. The salmonid catch is comprised of spring chinook, summer steelhead, coho, and fall chinook. Sport anglers encountered on the water, at bank fishing locations and at boat ramps or moorages will be queried regarding success in catching fish. Boat and bank effort will be estimated by aerial 'fly over' counts conducted over the lower Columbia River twice a week during February through October. These data will be used as part of a statistical creel program that will estimate monthly effort and catch for lower Columbia River salmonid fisheries. This fishery has been sampled as part of a statistical creel program since 1969.

The sport fishery located near the Columbia mouth is known as the Buoy 10 fishery and occurs early August through mid-October. The vast majority of the Buoy 10 catch is fall chinook and coho with a few steelhead being landed. The fishery has been sampled since its resurgence in 1982. Effort and catch is estimated on a weekly basis and is not part of the statistical creel program. Effort is indexed by on ground trailer and rod counts at popular launch sites and bank angling locations. Anglers are queried for success at boat ramps and bank fishing locations, but no on-water sampling occurs.

The lower Columbia sport fishery (including Buoy 10) is sampled at the 20% minimum sampling level for CWT recovery. (Note: WDFW's Montesano office samples the Buoy 10 sport fishery under different funding).

The lower Willamette and lower Clackamas sport fisheries occur late January through late June and are directed at spring chinook. These fisheries have been sampled since 1946. Boat and bank effort is estimated on a weekly basis and effort is indexed by aerial counts conducted twice a week during February through June. Anglers are queried for success at boat ramps, moorages, and bank fishing locations, but no on-water sampling occurs. These data will be used as part of a statistical creel program that will estimate weekly effort and catch for lower Willamette and Clackamas River spring chinook fisheries. This fishery has been sampled as part of a statistical creel program since 1974.

Effort and catch data are used to estimate Washington tributary spring chinook fisheries which typically occur between April and June. The fisheries occur on lower Columbia

and Bonneville Pool tributaries plus Ringold on the upper mainstem Columbia. Anglers are queried for success at boat ramps and bank fishing locations. Effort is estimated based on number of boats and bank angler counts. Bonneville Pool tributaries are managed jointly between WDFW and Yakama Indian Nation (YIN) to meet hatchery escapement goals in addition to harvest sharing.

The Hanford Reach fishery occurs from mid-August through October. Anglers are interviewed at boat ramps or bank fishing locations. Trailer counts are made to estimate total effort. Angler success data is used to estimate total catch. In addition, limited creel sampling of the salmonid sport fisheries in the mainstem Columbia River between Bonneville and McNary Dams began in 1994.

1.1.C. Hatchery Sampling

Spring and fall chinook plus coho are sampled at several Columbia River hatcheries and spawning grounds between the mouth of the Columbia and Priest Rapids Dam from August through January. In conjunction with biological sampling, snouts are recovered from fish containing CWTs.

1.1.D. Spawning Ground Surveys

Spring and fall chinook plus coho are sampled in the Columbia River mainstem and tributaries from the mouth of the Columbia to Priest Rapids Dam from August through January. Peak counts (redd or live and dead fish) are used to estimate the total natural spawning populations. In addition to sampling for CWT's and biological data fish are separated according to stock based on skin color or external marks. In addition, fish counts are divided into adults and jacks.

1.1.E. Future Sampling - Selective Fisheries

Beginning in 1998, the majority of the coho returning to the Columbia River will be adipose marked but not all will contain a CWT. Previously, the adipose clip was used to indicate the presence of a CWT. In addition, some unmarked coho will contain a CWT. Electronic equipment will be required for the detection of CWTs. This situation will greatly reduce the efficiency of the CWT sampling process. Therefore, additional samplers will be needed to attain the current sampling rates in fisheries and at escapement areas.

The funding source for additional Oregon staff will be obtained via the Sport Fish Restoration Program (WB/DJ) during 1998 and 1999. Oregon state funds were obtained via the Fish Restoration Act to purchase the electronic detection equipment. Washington has purchased electronic equipment and has now identified additional funding sources for sampling. Oregon has not identified funding sources for sampling after 1999.

1.2. Oregon Ocean Fisheries CWT Sampling (Objective 6)

Oregon's ocean commercial troll and recreational fisheries target a multitude of regional and West Coast chinook and coho salmon stocks along the approximately 310 miles of the Oregon Coast and in both state and federal offshore waters. The evaluation of Columbia River salmonid stocks through BPA-funded CWT sampling is an essential component for determining stock composition, distribution, and survival characteristics of these important stocks. Recent inclusion of several Columbia River system stocks under the federal Endangered Species Act (ESA) and other critical stocks have increased the need for information for evaluating impacts in regional fisheries. It is also needed to provide life history information to evaluate stock rebuilding strategies and management alternatives.

The ODFW's Ocean Salmon Management (OSM) Program implements the ocean salmon sampling and CWT collection program. A statistically-based and unified ocean commercial troll and recreational angler creel program has been in place since 1979. Project objectives are to: (1) implement non-biased representative sampling at a minimum rate of 20% of landings by week, catch area (troll) and port (recreational), and species strata; (2) provide necessary CWT sampling and recovery data to evaluate stock contribution and distribution characteristics in Oregon's ocean fisheries; (3) provide information for evaluating stock survival rates; and (4) deliver collected data into PSMFC's regional RMIS database and make it available for regional and international salmon management forums to implement management strategies that meet harvest impact criteria for Columbia River basin stocks.

Seasonal port samplers are hired to collect CWT and other biological data at 12 coastal ports (from north to south: Astoria, Garibaldi, Pacific City, Depoe Bay, Newport, Florence, Winchester Bay, Charleston, Bandon, Port Orford, Gold Beach, Brookings). Salmon observed by samplers to have an adipose fin clip or "mark" contain a CWT and have their snouts removed for later CWT extraction and decoding.

Funding provided by BPA represents only part of the overall federal/state support necessary to initiate and operate Oregon's yearly ocean salmonid CWT sampling program. The BPA supported approximately one third of the total OSM ocean sampling costs in 1996.

1.2.A. Sampling Commercial Troll Fisheries

Oregon's ocean commercial troll fishery has changed from historically targeting coho to a directed chinook fishery during the 1990's. Critical wild salmonid stock management and rebuilding needs for such stocks as Oregon's coastal wild coho have precipitated this change. Although ocean troll chinook regulations vary by coastal area, with several ocean areas closed for part or all of the season, the 1997 ocean season generally opened for most of the Oregon coast in mid April and extended through October. The month of July has generally been closed to trolling in recent years, due to harvest impacts on Oregon Coastal Natural (OCN) Coho. Additional but limited "late season" state water

ocean troll fisheries take place during October and November to harvest healthy local chinook stocks.

The majority of ocean-caught chinook are harvested in August and September, although significant landings are made in all months the season is open. Columbia River stocks are distributed over a wide time and area during the season. In 1996, troll chinook were landed at about 72 buying locations, mostly at Oregon's 12 major coastal ports. Oregon's ocean salmon fisheries are established by the PFMC and the state of Oregon in April each year. Seasons are established on the basis of several factors including regional species (chinook and coho) stock status. Columbia River basin stocks are important in setting these yearly harvest strategies as they include ESA-listed and other "critically" managed Columbia River chinook and coho populations.

1.2.B. Sampling Ocean Sport Fisheries

The recreational fishery presently spans the period from mid April through October, with the month of July closed along most of the coast due to high impact levels on Oregon's OCN coho. Several added terminal ocean state waters chinook fisheries take place during October and November and are managed to target local coastal stocks. Oregon's ocean recreational fisheries are managed to harvest healthy chinook salmon stocks as recent management strategies have increasingly emphasized protection and rebuilding of wild coho stocks.

Some directed ocean coho fishing does take place off the Columbia River mouth in most years between Cape Falcon, Oregon, and Leadbetter Point, Washington, where Columbia River hatchery stocks are concentrated and wild coho stock impacts are low. Oregon's ocean recreational chinook catch is spread over the entire season with about one third of the catch occurring in August. The Columbia River ocean area coho fishery takes place during the July-early September period with most of the catch occurring in August.

The ocean recreational fishery is sampled at most major coastal ports including multiple charter boat business locations, and private boat fisherman at moorages, marinas, and launch ramp sites. The evaluation of this angler and trip effort, expanded landed catch estimates by time and catch area, and CWT sampling are collectively used to evaluate Columbia River basin stock representation in both Oregon and regional fisheries for establishing appropriate management strategies. These CWT data provide wider information for a variety of users through PSMFC's RMIS system.

1.3. Clackamas CWT Tag Recovery Lab (Objective 11)

Sampled fish heads are either delivered fresh daily or stored in freezers at various collection locations and retrieved several times a year to provide timely processing and decoding of the CWTs. This also includes a number of trips to Newport on the Oregon coast to retrieve heads recovered in the ocean fisheries.

CWTs are extracted from the fish heads using dissecting tools and electronic tag detection equipment. Decoding is done by cleaning the wire and then reading and verifying the code under a dissection scope. All tags released by ODFW's hatcheries and wild stock tagging programs are archived for possible future reference. Tags recovered from other releasing agencies are returned.

1.4. Data Management and Analysis (ODFW/WDFW) (Objectives 3-5 , 7-10, 12)

The codes for the extracted tags are entered and verified on a mainframe computer. Associated fishery/recovery and biological data, collected when snouts are recovered, are uploaded to the mainframe computer and merged with previously entered CWT recovery data. 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 natural escapement area.

CWT recovery data are summarized to estimate the number of CWT's recovered for each tag code for each sampling program. Throughout this process, the data are diligently error checked and errors corrected to ensure quality data. The CWT recovery data are then transferred to PSMFC and distributed to managers for making inseason fishery management decisions.

Summarized CWT data recoveries, fishery catch estimates, and estimated escapements for most Columbia River salmonid stocks are provided by several state and federal agencies for additional data analysis. Data analysis includes run reconstruction of all major salmonid stocks. Total returns are categorized by age and stock. Included in total returns are fishery catches, escapement estimates for both hatchery and natural spawn fish, and dam counts. Additionally, preseason run size forecasts are developed annually. Data are provided to the *U.S. v. Oregon* TAC on status of ESA listed stocks and is summarized annually in technical reports. Annual stock assessment reports are produced and distributed to fish resource agencies throughout the basin. All resultant databases are updated annually and are used in a variety of management forums

1.5. RMPC Data Management (Objectives 13-14)

ODFW and WDFW tag recoveries and associated catch/sample data are subjected to a second battery of error checks when reported to PSMFC's Regional Mark Processing Center (RMPC). Upon validation, the recoveries are combined with the coastwide recoveries reported by other agencies. 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.

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.

All CWT data can be accessed on PSMFC's computer via the following methods:

Telnet:	telenet.psmfc.org
FTP:	ftp.psmfc.org
WWW:	http://www.psmfc.org
dial-up:	(503) 650-5437 (up to 28,800 bps)

2. Critical Uncertainties

Adequate and stable annual funding is a critical uncertainty for maintaining a quality CWT recovery program that is essential to achieve a wide variety of study results and wide ranging ESA related fisheries management capabilities. Included in a quality CWT recovery program is the need for rapid tag extraction and decoding for use in in-season management decisions. An additional complication is that the tagging and recovery phases of a CWT study are typically separated by two or more years, and thus funded under different fiscal cycles.

A second critical uncertainty is the introduction of mass marking of hatchery coho in Oregon and Washington (including the Columbia River), and the start of ocean selective fisheries in 1998. Without increased funding support, many coastal ports of landing and Columbia River fisheries may not meet the minimum CWT sampling rate of 20% necessary for suitable CWT expansions for use in setting regional harvest strategies and assessing the impacts on critical ESA listed Columbia River stocks.

3. Key Assumptions

A key assumption is that quality CWT sampling programs will be maintained and on-going in the Columbia River fisheries and escapement, as well as the ocean fisheries in order to continue to provide the necessary stock identification information required by researchers and fishery managers.

A second assumption is that the 20% minimum CWT sampling rate is adequate for the recovery of rare tags such as those pertinent to ESA listed stocks and for determining the survival rates of a specific stock. It also required that sampling is stratified and random.

A third assumption is that tag extraction and decoding will occur on a timely basis for use in in-season fishery management decisions and post-season stock status evaluations.

4. Critical Constraints

A critical constraint in the Columbia River sport fisheries is to reach the minimum CWT sampling rate of 20% because the sport fisheries are spread over large areas. It may not be possible to reach this objective in most cases without increasing the number of samplers at a major increase in overall program costs. In 1994, the CWT sampling goal

of 20% was met in most Columbia River sport fisheries because of the increased funding available that year. However, by 1996, funding had decreased and the CWT sampling goal of 20% was not met in most Columbia River sport fisheries.

Critical constraints in the ocean fisheries include the adoption of harvest regulations that target healthy stocks for specific time periods and areas. Such fisheries are usually of short duration and can break up established sampling routines at various ports, resulting in sampling rates of less than the required 20%. **It is important that BPA funding take into account that short duration fisheries require more sampling personnel at higher cost to ensure minimum sampling rates of landings.**

ODFW, WDFW and USFWS are now mass marking public hatchery coho (SW Washington, Columbia River, Oregon Coast) with the adipose only mark. The 1995 brood was the first to be marked, with selective fisheries beginning in 1998. These actions will directly affect the present ocean and Columbia River CWT sampling programs, and will require additional manpower and electronic detection equipment to maintain the 20% sampling rate as the adipose clip is no longer a flag for CWT marked coho.

f. Facilities and equipment.

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 extractions 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.

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Section 8. Relationships to other projects

The extensive relationship of the CWT recovery program to other FWP projects has been reviewed in Section 7.c.

In addition to ODFW and WDFW, the CWT recovery data are also of great value to several other agencies (including ADFG, CDFO, NMFS, USFWS, IDFG, and the Columbia Basin Tribes) whose actions have a large effect on the health of Columbia River salmonid populations. Regional universities (UW, UI, OSU) and private industry also benefit. Monitoring capability of harvest sharing between U.S. and Canadian fisheries, required by the Pacific Salmon Treaty, would be diminished without this sampling program. Similarly, the ability to identify harvest of Columbia River salmonid stocks in Canadian and Alaskan fisheries would be significantly impacted. PFMC requires these data to evaluate the effect of proposed ocean seasons on Columbia River salmonid stocks.

The federal ESA depends on CWT marked hatchery fish to function as surrogates for wild listed populations. Marked hatchery fish function as indicator stocks that provide

estimates of survival and exploitation rates for wild fish and aid in monitoring the status of listed salmonid populations. Indicators stocks are also used to limit harvest of Columbia River salmonids in ocean and Columbia River fisheries. The *U.S. v. Oregon* Columbia River Compact depends on the CWT recovery program to manage fisheries in a manner to limit the handle and harvest of listed salmonids while targeting on harvestable hatchery reared fish. CWT recovery data are also essential for the BPA funded PATH program whose purpose is to identify factors limiting salmonid survival in the Columbia River Basin.

Section 9. Key personnel

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 Mgnt. 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 interjurisdiction 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. Member of ADFG's North Pacific Fishery Management Council's shellfish fishery management planning team.

**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).

Section 10. Information/technology transfer

CWT recovery data are made available through the various project reports and technical paper cited in Section 7.d and through PSMFC's Regional Mark Processing Center. The CWT data will be analyzed by federal, state, and tribal agencies, as well as universities and industry. Key entities include both ODFW and WDFW's Ocean Salmon Management Programs, the Columbia River Fisheries Management Program (ODFW/WDFW), the Columbia Basin Tribes (including those represented by CRITFC), IDFG, PFMC, PSMFC, and the Pacific Salmon Commission to determine stock composition in Columbia River sport and commercial fisheries and harvest of Columbia River salmonids in ocean fisheries. The data are also used by Canada and Alaska to monitor the status of Columbia River stocks that are harvested in their respective fisheries.

These data will also be used to determine stock specific exploitation rates. Harvest data will be combined with escapement data to produce annual population estimates for Columbia River salmonid stocks. Based on fishery stock compositions, managers can determine if stock specific harvest rates exceeded preseason expectations or guidelines set forth by the ESA or Columbia River Fish Management Plan.