

**Bonneville Power Administration  
Fish and Wildlife Program FY99 Proposal Form**

**Section 1. General administrative information**

**Trap and Haul in the Umatilla and Walla Walla Basins**

**Bonneville project number, if an ongoing project** 8802200

**Business name of agency, institution or organization requesting funding**

Confederated Tribes of the Umatilla Indian Reservation

**Business acronym (if appropriate)** CTUIR

**Proposal contact person or principal investigator:**

Name	<u>Gary James</u>
Mailing Address	<u>PO Box 638</u>
City, ST Zip	<u>Pendleton, Oregon 97801</u>
Phone	<u>(541) 276-4109</u>
Fax	<u>(541) 276-4348</u>
Email address	<u>jaburke@ucinet.com</u>

**Subcontractors.**

<b>Organization</b>	<b>Mailing Address</b>	<b>City, ST Zip</b>	<b>Contact Name</b>
ODFW	PO Box 59	Portland, Oregon 97207	Sharon Conyers

**NPPC Program Measure Number(s) which this project addresses.**

**NMFS Biological Opinion Number(s) which this project addresses.**

NMFS Hatchery Operations Biological Opinion - Section IV.C.3.b. While not specifically identified, the project is responsible for coordinating the flow enhancement effort in the Umatilla River which is identified by NMFS as a required measure to reduce straying of Umatilla fall chinook.

**Other planning document references.**

Wy Kan Ush Me Wa Kush Wit Volume II. 1995. CRITFC - Umatilla River, Instream Flow and Passage (II.B.) and Walla Walla River, Instream Flow and Passage (II.B.)

Umatilla Subbasin Plan. 1990. CTUIR - Part II, Habitat Protection Needs, Habitat Protection Objectives and Strategies and Part IV, Anadromous Fish Production Plans, Spring Chinook Actions (IA1,2), Summer Steelhead Actions (IA1,2), Fall Chinook Actions (IA1,2), Coho Specific Considerations

Umatilla Hatchery Master Plan. 1989. CTUIR/ODFW - Facilities Needed to Implement Program, Outplanting Schedule & Coordination

Draft Umatilla Supplemental Hatchery Master Plan. 1993. CTUIR - Present Rehabilitation Efforts, Fish Passage Improvement and Flow Enhancement (III.C.)

Umatilla Basin and Hatchery Annual Operating Plan. 1997. CTUIR/ODFW - Sections II.- V.

Umatilla Fisheries Restoration Plan. 1986. ODFW - Present and Proposed Flow Enhancement and Fishery Rehabilitation Projects and Costs and Rehabilitation Objectives and Potential Fishery Benefits

Walla Walla Subbasin Plan. 1990. CTUIR - Part II, Habitat Protection Needs, Habitat Protection Objectives and Strategies and Part IV, Anadromous Fish Production Plans, Spring Chinook and Summer Steelhead Actions (IA1,2)

Draft Walla Walla Annual Operating Plan. 1997. CTUIR - Sections I.- V.

Draft Walla Walla Hatchery Master Plan. 1993. CTUIR - Present Rehabilitation Efforts (III.C.), Spring Chinook Broodstock Management (V.B.5.), Summer Steelhead Broodstock Management (V.D.5.), Existing Facilities (VI.B.4.), and Juvenile and Adult Collection and Transportation Facilities (VI.C.1)

Reconnaissance Report Walla Walla Basin. 1997. COE - Section 4.01(8) Environmental Restoration, Trap and Haul Program

## **Subbasin.**

Umatilla, Walla Walla

## **Short description.**

Operate passage facilities, flow enhancement measures, trap facilities and hauling equipment to maximize juvenile and adult migrant survival in Umatilla and Walla Walla basins.

## Section 2. Key words

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

### Other keywords.

coordination, data collection, broodstock collection, transportation, adult disposition, passage, ladders, screens, bypasses, outmigration

## Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
8403300	Umatilla Hatchery O&M	Provide adequate passage for juveniles released and collect broodstock for hatchery production
8343500	Umatilla Hatchery Satellite Facilities O&M	Provide adequate passage for juveniles released and collect broodstock for hatchery production
8902700	Power Repay/O&M for Umatilla Basin Project	Coordinate operation of Umatilla Basin Project flow enhancement measures
8343600	Umatilla Passage Facilities O&M	Coordinate O&M and operate Umatilla passage facilities
9601200	Walla Walla Adult Fish Passage Improvements	Operate and maintain adult passage and trapping facilities after construction
8805302	NE Oregon Walla Walla Hatchery Facility	After production begins, provide adequate passage for juveniles released and collect broodstock
9601100	Walla Walla Juvenile Screens and Traps	Operate and maintain juvenile facilities after construction
9000501	Umatilla Basin Natural Production	Provide passage for adults and

	M&E	juveniles to and from natural production areas and collect data on returning adults
8902401	Umatilla River/WEID Screens M&E	Operate Umatilla passage facilities and provide migration information
9000500	Umatilla Hatchery M&E	Operate adult trapping facilities and collect data on returning adults

## Section 4. Objectives, tasks and schedules

### *Objectives and tasks*

<b>Obj 1,2,3</b>	<b>Objective</b>	<b>Task a,b,c</b>	<b>Task</b>
1	Monitor river conditions and passage facilities operation in both Umatilla and Walla Walla basins to ensure adequate passage	a	Monitor river conditions
		b	Inspect passage facilities
		c	Coordinate operation of passage facilities and Umatilla Basin flow enhancement projects
2	Operate adult trapping facilities	a	Trap and enumerate all adults at Threemile Dam
		b	Trap steelhead kelts at Westland Canal
		c	Trap and enumerate adults at Nursery Bridge and Burlingame
		d	Trap steelhead kelts at Little Walla Walla
3	Operate juvenile trapping facilities	a	Operate Westland trap and bypass
		b	Operate Threemile Dam trap and bypass
		c	Operate Little Walla Walla trap and bypass
4	Operate hauling equipment	a	Haul adults from Threemile Dam
		b	Haul steelhead kelts from Westland Canal
		c	Haul juveniles from Westland Canal and Threemile Dam
		d	Haul adults from Nursery Bridge and Burlingame

		e	Haul juveniles and steelhead kelts from Little Walla Walla
		f	Haul adults and juveniles as needed from hatcheries

*Objective schedules and costs*

2	10/1998	09/1999	50%
3	10/1998	09/1999	10%
4	10/1998	09/1999	20%

**Schedule constraints.**

Incompletion of key passage or production components for the Walla Walla basin would reduce the effort required in that basin. Similarly, major milestones would be completion of these same key components. There are no major constraints or milestones which affect the Umatilla portion of the project.

**Completion date.**

The project is seen as ongoing with no completion date identified. However, in the future, as instream flow conditions improve and M&E needs decrease, projects efforts and related costs should correspondingly decrease.

**Section 5. Budget**

*FY99 budget by line item*

Item	Note	FY99
Personnel		145,000
Fringe benefits		42,000
Supplies, materials, non-expendable property		10,000
Operations & maintenance		20,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		0
PIT tags	# of tags:	0
Travel		25,000
Indirect costs		82,000
Subcontracts		185,000
Other		0
<b>TOTAL</b>	All project costs are directly related to O&M of passage facilities	509,000

*Outyear costs*

Outyear costs	FY2000	FY01	FY02	FY03
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Total budget	535,000	560,000	575,000	590,000
O&M as % of total	100	100	100	100

## Section 6. Abstract

In the 1980's, CTUIR and ODFW began implementing the Umatilla Fisheries Restoration Plan. An integral part of that effort was to address the inadequate flow and migration conditions (which led to salmon extirpation) by constructing fish passage facilities, initiating a trap and haul program, and implementing the Umatilla Basin flow enhancement project.

The Trap and Haul Project goal is to maximize adult and juvenile migrant survival in the Umatilla and Walla Walla basins. The project provides survival benefits for both hatchery and natural production by operating and maintaining ladders, bypasses, trap facilities, and hauling equipment and coordinating these operations with flow enhancement measures. The project also provides valuable support to other projects by refining fish passage criteria, collecting return and migration data, and collecting and transporting broodstock. Similar passage improvement measures are now being initiated in the Walla Walla Basin and the project will provide the same benefits there.

The project began in 1989. Since then, up to 3,800 adults and 100,000 pounds of juveniles have been trapped and hauled annually. These increases in juvenile and adult survival contribute directly to the NPPC rebuilding goal. In addition, recommendations based on project observations of adult returns and migration are incorporated into subbasin management documents. The project is viewed as a long term O&M project required for maintaining the survival advantages achieved by implementation of the fish passage and flow enhancement projects in the two basins.

## Section 7. Project description

### a. Technical and/or scientific background.

The lower 30 miles of the Umatilla River is heavily diverted for agricultural use. Historically, inadequate flow conditions in this river reach during critical portions of both adult and juvenile migration periods was the primary contributor to the extirpation of salmon and decline of summer steelhead populations in the Umatilla River. The Walla Walla River faces similar problems related to flow diversion and inadequate passage conditions.

Beginning in the early 1980's, CTUIR and ODFW began implementing a comprehensive plan to supplement steelhead and reestablish salmon runs in the Umatilla River Basin. A key component of the Umatilla Fisheries Restoration Plan was a threefold approach to addressing the inadequate migration conditions. The three ingredients included construction of fish passage facilities in the lower river, trapping and transportation of adults and juveniles, and implementation of the Umatilla Basin flow enhancement

project. A similar approach is just now being implemented on the Walla Walla River to address migration concerns in that basin.

The project is currently responsible for coordination and operation of all three of these passage programs in the Umatilla Basin. The project traps and provides physical transportation for adults and juveniles during periods of inadequate flow, operates physical passage facilities to optimize migration conditions during adequate flow periods, and coordinates use of flow enhancement and passage facilities to maximize passage conditions during critical migration periods. It is intended that the project will provide the same functions in the Walla Walla Basin.

The project provides in-place, in-kind mitigation by increasing smolt numbers entering the Columbia River from the Umatilla and Walla Walla rivers. This directly addresses the Council's rebuilding goals by increasing the number of adults returning to the Columbia River and these specific tributary areas. In addition, the flow enhancement efforts coordinated by the project have been identified by NMFS in their Hatchery Biological Opinion as being necessary to reduce straying of Umatilla fall chinook into the Snake River. The project is also responsible for other key components of the planning documents identified in section 1 such as broodstock collection, adult disposition, passage facility O&M, and migration data collection.

The project has been in place since 1989 and has produced an annual report every year. Project observations of migration and adult returns are incorporated into subbasin management documents. In addition, the project is an important source of adult recovery data and contributes that data to other efforts such as the Fish Passage Center's gas bubble disease monitoring, Univ. of Idaho mainstem migration monitoring, and PAC and TAC reports. The project leader and assistant project leader have been on the project since 1991 and 1990, respectively. These key personnel also participate in the following related forums; Fish Screening Oversight Committee, Umatilla Technical Work Group, Umatilla River Operations Group, Umatilla Management Oversight Committee, Integrated Hatchery Operations Team, and U.S. v. Oregon Production Advisory Committee.

**b. Proposal objectives.**

The project has four objectives outlined in its statement of work. However, all four are focused on the project's primary goal of increasing both adult and juvenile survival through the lower Umatilla River and Walla Walla River. The four objectives are: 1) Monitor river conditions and operation of passage facilities to ensure adequate passage conditions exist for both upstream and downstream migrants; 2) Operate adult salmon and steelhead trapping facilities; 3) Operate juvenile trapping facilities; and 4) Operate hauling equipment to safely transport and release adult and juvenile salmon and steelhead.

The project produces an annual report each year which outlines the numbers of fish trapped and hauled. The project also contributes to many other documents as noted in

section 7.a. above. The project benefits to the FWP are an increase of smolts outmigrating from these two tributaries and the subsequent increase in returning adults which directly address the NPPC rebuilding goal. In addition, the project provides an important adaptive management function by making recommendations to subbasin management documents based on observations of migration and adult returns.

**c. Rationale and significance to Regional Programs.**

As stated in Section 7.a., inadequate passage conditions for both upstream and downstream migrants was the primary contributor to the extirpation of salmon and decline of steelhead in the Umatilla and Walla Walla basins. Although many passage improvements have been implemented there are still critical times of the year when inadequate migration conditions still exist. The objectives of the project are all related to the project goal of increasing the tributary survival of migrating adults and juveniles in order to meet the Council rebuilding goal of increasing the number of returning adults.

The Umatilla Fisheries Restoration Plan is a comprehensive effort which involves many different projects. This not only includes all the Umatilla related BPA projects listed in Section 3 but public and private habitat enhancement efforts as well. The success of these many projects and the overall Umatilla Fisheries Restoration Program is directly dependent on the ability of the Trap and Haul Project to ensure that tributary passage conditions are no longer the limiting factor affecting salmon and steelhead survival in the basin.

A similar effort to the Umatilla Fisheries Restoration Plan is just now getting underway in the Walla Walla Basin. This plan includes the Walla Walla related BPA projects listed in Section 3 along with habitat enhancement programs. Just as in the Umatilla Basin, the success of restoring salmon and steelhead in the Walla Walla Basin depends on the ability of Trap and Haul to ensure that tributary passage conditions do not limit the success of the program.

As noted in Section 7.a., the project contributes valuable information to many other reports due to the unique, upriver, tributary trapping location. This is one of the few tributary sources for much of this data. Also, due to the uniqueness of the entire Umatilla passage program, the project is able to provide important passage information to other sources involved with similar problems.

**d. Project history**

The Umatilla Trap and Haul Project has been ongoing for 11 years. It has retained the same project number over that period but beginning with FY98 the title and statement of work were expanded to include the Walla Walla Basin. Project costs have averaged \$240,438 over the 11 year period with a maximum annual cost of \$414,003 in FY95.

The project has produced an annual report for each year since 1989 which details numbers of fish trapped and hauled. Between 1990 and 1996, the project trapped and

hauled from 914 to 101,000 pounds of juveniles from the Westland Canal juvenile facility. From 1989 to 1996, the project annually trapped from 3,800 to 6,300 adults at Threemile Dam. Of the adults trapped, 895 to 3,800 have been hauled upstream and 135 to 1,100 have been hauled for broodstock annually. In addition to the number of fish trapped and hauled, the project also coordinates all aspects of the Umatilla passage program including O&M of ladders and bypasses and operation of the Umatilla Basin Project flow enhancement effort.

The project is continually learning how to more effectively operate and integrate physical passage facilities, trapping facilities, hauling equipment, and flow enhancement programs to increase the survival of smolts and adults to and from natural production areas. This information, along with that gained from observations of migration and adults returns, is used in turn to make adaptive management recommendations which are a key component of the Umatilla Hatchery and Basin Annual Operation Plan.

**e. Methods.**

The project uses digital recording and handheld thermometers to monitor river temperatures. Flows are monitored by information received from river gauging stations. Time of year, water quality, flow conditions, and irrigation diversions are all factored into decisions regarding operation of the passage facilities and flow enhancement.

Generally, operation of the passage facilities is guided by criteria developed by NMFS and flow levels are based on recommendations made by BOR in the Umatilla Basin Project EIS and USFWS in their 1981 report, *Instream Flow Study of the Umatilla River*. The project itself has developed most of the guidelines for use of the Umatilla Basin Project flow enhancement program and integration of flow enhancement with the other components of the fish passage effort.

A critical assumption in the passage program is that natural, volitional migration of upstream and downstream migrants is preferable to transportation and that higher overall survival will result if adequate natural passage conditions exist. Based on that assumption, attempts are made to maximize the time periods and optimize conditions for natural migration.

Operation of adult ladders are based on NMFS passage criteria. Operation of trapping facilities are conducted under guidelines developed by the project.

Juvenile facility operations are conducted in the same general manner as adult operations. Operation of the passage portions (screens and bypasses etc.) of the juvenile facilities are based on NMFS criteria. Operation of trapping facilities are based on guidelines developed by the project.

ODFW liberation protocols are used as a general guideline for hauling operations. These protocols have been further refined by the project for use under conditions experienced locally.

A more detailed discussion of project methods can be found in the project annual report, *Trapping and Hauling of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1996-1997* (Zimmerman and Duke 1997).

Environmental conditions are the overriding factor in the success of the project. During drought years, low water flows extend the period when inadequate passage conditions exist and require an extensive hauling effort. Typically, low flows also mean poor water quality conditions under which fish are to be trapped and hauled which results in lower survival rates. Low flow years also result in less water being available for flow enhancement again resulting in more extensive trapping and hauling.

**f. Facilities and equipment.**

The major juvenile and adult trapping facilities operated by the project in the Umatilla Basin are described in detail in the project annual report, *Trapping and Hauling of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1996-1997* (Zimmerman and Duke 1997). Many refinements have been made at these facilities over the years to both the physical portions of the facilities as well as the operating criteria and are generally adequate for meeting management and project needs. However, the juvenile and adult trapping facilities in the Walla Walla Basin are inadequate to perform the anticipated tasks and need to be refurbished. The rehabilitation and construction of the required facilities in the Walla Walla Basin are proposed under project #'s 9601100 and 9601200.

Transportation equipment includes one 3,000 gallon and two 370 gallon fish liberation units. The 3,000 gallon unit is a diesel operated tractor-trailer equipped with a 12 inch discharge opening and two holding chambers capable of isolating two groups in the same load. The unit has both liquid oxygen and electric aeration systems. The two 370 gallon units are mounted on dual axle trailers and are towed by pick-up trucks. Each unit has compressed gas aeration and a recirculation system. Both units have eight inch discharge openings.

The project currently has sufficient office space, shop availability, and support vehicles. The project also has two computers which are adequate for project recordkeeping and data assimilation requirements. No additional high cost capital items are anticipated to be needed by the project.

**g. References.**

Confederated Tribes of the Umatilla Indian Reservation and Oregon Department of Fish and Wildlife. 1989. Umatilla Hatchery Master Plan. Submitted to Northwest Power Planning Council, Portland, Oregon.

Confederated Tribes of the Umatilla Indian Reservation and Oregon Department of Fish and Wildlife. 1990. Columbia Basin System Planning, Umatilla Subbasin, September, 1990. Submitted to Northwest Power Planning Council and Columbia Basin Fish and Wildlife Authority, Portland, Oregon.

Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, Washington Department of Fisheries, and Washington Department of Wildlife. 1990. Columbia Basin System Planning, Walla Walla Subbasin, September, 1990. Submitted to Northwest Power Planning Council and Columbia Basin Fish and Wildlife Authority, Portland, Oregon.

Confederated Tribes of the Umatilla Indian Reservation and Oregon Department of Fish and Wildlife. 1997. Umatilla Hatchery and Basin Annual Operation Plan, For the Period September 1997 to August 1998. Oregon Department of Fish and Wildlife, Pendleton, Oregon.

National Marine Fisheries Service. 1995. Biological Opinion for 1995 to 1998 Hatchery Operations in the Columbia River Basin. National Marine Fisheries Service, Portland, Oregon.

Olson, D.E., et al. 1990. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1989-1990. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Oregon Department of Fish and Wildlife. 1986. A Comprehensive Plan for Rehabilitation of Anadromous Fish Stocks in the Umatilla River Basin. Project No. 84-10, Contract No. DE-AI79-84BP18008, Bonneville Power Administration, Portland Oregon.

U.S. Army Corps of Engineers. 1997. Walla Walla River Watershed, Oregon and Washington - Reconnaissance Report. U.S. Army Corps of Engineers, Walla Walla District, Walla Walla, Washington.

U.S. Bureau of Reclamation. 1988. Umatilla Basin Project, Oregon. Planning Report - Final Environmental Statement. U.S. Department of the Interior, Northwest Region, U.S. Bureau of Reclamation, Boise, Idaho.

U.S. Fish and Wildlife Service. 1981. Instream Flow Study of the Umatilla River. U.S. Department of the Interior, Fisheries Assistance Office, U.S. Fish and Wildlife Service, Vancouver, Washington.

Zimmerman, B.C., et al. 1991. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1990-1991. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C., et al. 1992. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1991-1992.

Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C. and B.B. Duke. 1993. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1992-1993. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C. and B.B. Duke. 1994. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1993-1994. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C. and B.B. Duke. 1995. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1994-1995. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C. and B.B. Duke. 1996. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1995-1996. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

Zimmerman, B.C. and B.B. Duke. 1997. Trapping and Transportation of Adult and Juvenile Salmon in the Lower Umatilla River in Northeast Oregon, 1996-1997. Project No. 88-022, Contract No. DE-BI79-89BP98636. Bonneville Power Administration, Portland, Oregon.

## **Section 8. Relationships to other projects**

As stated previously, inadequate flow and passage conditions were the primary causative agent leading to the extirpation and/or decline of anadromous fish populations in the Umatilla and Walla Walla basins. The success of each of the individual projects listed in Section 3, as well as the overall success of restoring salmon and steelhead in these two basins, is dependent on the ability of Trap and Haul to ensure that tributary passage conditions do not limit the success of the restoration efforts.

The Trap and Haul Project is a cooperative project between CTUIR and ODFW which provides an important link between many diverse interest groups involved in restoration efforts. The project provides a "contingency plan" for fish during low flow periods to provide adequate passage opportunity while irrigation demands remain intact. The project coordinates operation of the Bureau of Reclamation Umatilla Basin Project and the BPA funded passage facilities with the Oregon Department of Water Resources and local

irrigation districts to provide adequate flow and fish passage conditions. The daily operation and maintenance of the fish passage facilities is conducted by local irrigation districts under the direction of the project. The project works directly with NMFS, the Army Corps of Engineers, and private engineering consultants to review and provide comments on passage facility designs and operating criteria.

The project is also directly involved in the production component of the restoration program. In addition to providing safe passage for both natural and hatchery adults and juveniles to and from natural production areas, the project also is responsible for collecting and transporting broodstock required for artificial production programs. These brood provide eggs for programs at both ODFW and U.S. Fish and Wildlife Service hatcheries. The project is also involved in transportation of juveniles from these hatcheries as well as transporting surplus adults from hatcheries to natural production areas in the Umatilla.

## **Section 9. Key personnel**

Brian C. Zimmerman  
Fish Passage/Artificial Production Biologist

### Employment

1991 - Present

Confederated Tribes of the Umatilla Indian Reservation,  
Pendleton, Oregon

Trap and Haul Project Leader (0.75 FTE)

Oversee all project activities including monitoring of flow and passage conditions; coordination and operation of passage facility and flow enhancement projects; operation of adult and juvenile trapping facilities; fish transportation; fish disposition and broodstock collection; development of annual operating budget; data collection and assimilation; and production of monthly and annual reports. Serves on Fish Screening Oversight Committee, Production Advisory Committee, Integrated Hatchery Operations Team, Umatilla Management Oversight Committee, Umatilla Technical Work Group, and Umatilla River Operations Group.

1989 - 1991

Paradise Bay Seafarms, Port Townsend, Washington  
Production Manager

Supervised all aspects of production programs at three hatcheries, two net pen sites, and two adult capture stations. Responsibilities included design, coordination, and implementation of captive brood and conventional production programs; budget and contract development; scheduling and logistics of fish transportation program; facility design, startup, and modification; data compilation and analysis; research and technical program development; and interagency and community interaction.

1988 - 1989

Anadromous Incorporated, Coos Bay, Oregon

### Saltwater Facilities Manager

Responsible for all aspects of daily facility operation and program implementation at two saltwater release/recapture facilities, one net pen site, and one freshwater hatchery.

1983 - 1988

Anadromous Incorporated, Corvallis/Klamath Falls, Oregon

Assistant Freshwater Facilities Manager

Assisted manager in supervising all aspects of daily facility operation and program implementation at two freshwater hatcheries.

### Publications

Have co-authored last 7 project annual reports (see reference list, Section 7.g.).

### Education

Graduated Cum Laude, 1979, Humboldt State University

Bachelor of Science Degree in Fisheries Science

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William B. Duke

Fish and Wildlife Technician III

### Employment

1990 - Present

Oregon Department of Fish and Wildlife, Pendleton, Oregon

Asst. Trap and Haul Project Leader (1.0 FTE)

Assists project leader in oversight of all project activities including monitoring of flow and passage conditions; coordination and operation of passage facility and flow enhancement projects; operation of adult and juvenile trapping facilities; fish transportation; fish disposition and broodstock collection; data collection; and production of monthly and annual reports. Also responsible for operation and maintenance of project transport equipment and assists in development of basin annual operating plan. Serves on Umatilla Management Oversight Committee, Umatilla Technical Work Group, and Umatilla River Operations Group.

1988 - 1990

Oregon Department of Fish and Wildlife, Enterprise, Oregon

Fish and Wildlife Technician I

Involved in all aspects of daily operations at Wallowa Hatchery including spawning, incubation, and rearing of rainbow trout and summer steelhead; operation of hatchery equipment; maintenance of grounds and equipment; and maintaining fish production records.

1985 - 1988

Oregon Department of Fish and Wildlife,  
Enterprise/LaGrande/Clackamas, Oregon

#### Experimental Biological Aide

Involved in three different projects including summer steelhead creel survey and radio tracking; kokanee creel survey and stomach analysis; and mark/recapture study for walleye, squawfish and smallmouth bass.

1983 - 1984

Battelle Northwest Laboratories, Richland, Washington  
Technician

Participated in all aspects of a juvenile salmonid migration study including juvenile collection and stomach analysis.

#### Publications

Have co-authored all 8 project annual reports (see reference list, Section 7.g.) and last 4 Umatilla Hatchery and Basin Annual Operation Plans.

#### Education

Graduated 1984, Oregon State University  
Bachelor of Science Degree in Fisheries

### **Section 10. Information/technology transfer**

The technical information obtained by the project is disseminated by means of project monthly and annual reports, through basin technical, scientific, and operational group meetings, and by informal interagency and interproject communication (field meetings, memorandums, and personal communication) which is incorporated into other more formal report formats developed by these other sources.