PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Implement Tucannon River Watershed Plan To Restore Salmonid Habitat

BPA project number: 9401806
Contract renewal date (mm/yyyy): 10/1999 ☒ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Columbia Conservation District

Business acronym (if appropriate) CCD

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses
7.6, 7.6A-D, 7.7, 7.7A, 7.8B.1,

FWS/NMFS Biological Opinion Number(s) which this project addresses
ESA listed species, Snake River Spring Chinook, Snake River Fall Chinook, & Snake River Steelhead. USFWS T&E listed Bull Trout.

Other planning document references
Tucannon River Model Watershed Plan, Snake River Salmon Recovery Plan, Wy Kan Ush Me Wa Kish Wit, WA Department of Fish and Wildlife Wild Salmonid Policy, Bonneville Power Administration Tucannon Sub-Basin Plan, Columbia Basin Fish & Wildlife Authority FY 1999 Annual Implementation Work Plan

Short description
Restore, protect, & enhance fish habitat, riparian, & upland areas to address FWP measure 7.6, habitat goal, policies, & objectives.

Target species
Snake River Spring Chinook Salmon, Snake River Fall Chinook Salmon, Snake River Summer Steelhead, & Bull Trout.

Section 2. Sorting and evaluation

Subbasin
Lower Snake/Tucannon

Evaluation Process Sort

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

Section 3. Relationships to other Bonneville projects

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

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9401807	Continue with Implementation of Pataha Watershed Plan	Pataha is the major tributary to the lower Tucannon. It negatively effects habitat and water quality in the lower Tucannon where fall chinook spawn, steelhead rear, and bull trout over winter.
9008	Evaluate Fall Chinook Natural Production and Spawning Habitat Conditions	Supportive research in fall chinook spawning area of the lower Tucannon
	Lower Snake River Compensation Plan	Supplementation to increase natural production in the Tucannon

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1996	Completed Final Draft of Tucannon River Model Watershed Plan	A working document to guide Tucannon River Model Watershed Council decisions.
	Installed 20 habitat projects: Utilizing 5 funding sources working with 12 landowners	Created; 11 lg. plunge pools, 125 sm.-med. pools, 1 irrigation modification, 1 off-channel rearing area, 4460 ft. habitat complexity & LWD, 1 lg. riparian desilting basin, 1 upland desilting basin, 3100 ft. riparian fencing, 3000 trees & shrubs
1997	Dormant Stock Plantings on 1996 Project sites	7000 trees & shrubs planted for long term

		reduction in water temperature, bank stability to reduce sediments in gravels, future recruitment of large woody debris (LWD) for habitat complexity and quality
	Installed 12 habitat projects utilizing 5 funding sources and 12 landowners	Created; 8 lg. plunge pools, 98 sm.-med. pools, 1 irrigation modification 3 off-channel rearing areas, 5658 ft. habitat complexity & LWD, 5762 ft. riparian fencing
	Performed O&M on 5 1996 projects - projects cost-shared due to mother nature New Year Day flooding	Insure habitat restoration integrity: 1170 ft. geomorphic stability
1998	Dormant Stock Plantings on 1997 Projects	10,000 trees & shrubs planted for long term reduction in water temperature, bank stability to reduce sediments in gravels, future recruitment of large woody debris for habitat complexity and quality
	Installed 12 habitat projects utilizing 6 funding sources and 8 landowners including the WDFW	Created; 15 lg. pluge pools, 146 sm.-med. pools, 1 irrigation modification 1 off-channel rearing area, 3815 ft. habitat complexity, 1505 ft.LWD, 11,891 ft. riparian fencing
	Performed O&M on 2 1997 projects- enhanced project to insure integrity	Created: 9 pools, 220 ft. habitat complexity

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Improve adult pre-spawning survival	a	Increase natural stream stability and instream pool quality and quantity
		b	Reduce instream water temperature
		c	Reduce erosion and sedimentation rates to maintain pool size and quality
		d	Improve and re-establish riparian vegetation
2	Improve juvenile survival	a	Increase natural stream stability and instream pool quality and quantity
		b	Reduce instream water temperature
		c	Reduce erosion and sedimentation rates and lower the percent of fines in spawning gravel, and maintain pool size and quality
		d	Improve and re-establish riparian vegetation
3	Monitoring & Evaluation of habitat projects for effectiveness	a	Establish site specific pre & post construction data
		b	Validate effectiveness of projects to meet habitat objectives
		c	Apply adaptive management
4	Coordinate Tucannon River Model Watershed Plan	a	Promote cooperation and agreement between landowners and resource agencies for decision-making
		b	Coordinate implementation of fish and wildlife habitat restoration projects

		c	Secure supplemental funding for continued council operations and Plan implementation
		d	Continue watershed information/education program

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	9/2000	1 high-quality pool per 5-7 bankfull widths; reduce width/depth ratio to 25 ft.or less; reduce ave. temp. to 70 degrees; reduce fines in gravel to 15% of the substrate; reduce sediment delivery rates to 10%; increase canopy cover to 75%		32.00%
2	10/1999	9/2000	1 high-quality pool per 5-7 bankfull widths; reduce width/depth ratio to 25 ft. or less; reduce ave. temp. to 70 degrees; reduce fines in gravel to 15% of the substrate; reduce sediment delivery rates to 10%; increase canopy cover to 75%		32.00%
3	10/1999	9/2000	Pre & post construction data collection; 1998 2nd year evaluation; validate methods for adaptive management		16.00%
4	10/1999	9/2000	Increase effectiveness of fish habitat by coordinating watershed decision-making, project implementation, supplemental funding, and information/education program		20.00%
				Total	100.00%

Schedule constraints
Low agriculture commodity prices negatively impact landowner ability to cost share project implementation.

Completion date
Implementation of Plan will continue until habitat restoration needs, landowner cooperation, and funding availablitiy are maximized.

Section 5. Budget

FY99 project budget (BPA obligated): $253,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	.75 FTE Watershed Technical Lead .50 FTE Admin. Assistant	%12	40,368
Fringe benefits		%2	9,688
Supplies, materials, non-expendable property	Office supplies, Software upgrades, Newsletters, Presentations, Photos, Ed./Infor., Equip. Maint.	%2	7,000
Operations & maintenance	Habitat Projects (2%)	%2	6,600
Capital acquisitions or improvements (e.g. land, buildings, major equip.)			
NEPA costs			
Construction-related support	Habitat Project & Domant Stock Planting	%58	192,344
PIT tags	# of tags:		
Travel	Meals, mileage, lodging, registration	%2	7,500
Indirect costs	Discretionary	%5	16,500
Subcontractor	Monitoring/evaluation	%15	50,000
Other			
	TOTAL BPA FY2000 BUDGET REQUEST		$330,000

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
Bonneville FY2000	Cash Match - Cost-Share	%53	330,000
USDA NRCS	In-kind Technical Assistance	%8	50,000
USDA NRCS PL-566	Maintenance of Contractual Obligations		
HB 2496 (proposal pending)	Cash Match - Lead Entity & Habitat Restoration Projects	%4	25,000
WA State Salmon Stratagy Recovery (proposal pending)	Cash Match - Watershed Projects	%4	25,000
WCC	Cash Match - Upland/Cropland BMP's	%6	40,000
Landowners	Cash Match - Cost-Share %	%10	62,000
WDFW - State	In-kind Technical Assistance	%3	20,000
WDFW - LSRCP/Fed.	Supplementation Efforts	%3	20,000
USFS (proposal pending)	Cash Match - Habitat Restoration Projects	%3	20,000
USDA FSA/WA State - Conservation Reserve Enhancement Program (CREP)	Cash Lease & Implementation Cost-Share - Riparian Restoration	%4	25,000
	Total project cost (including BPA portion)		$947,000

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$330,000	$330,000	$330,000	$330,000

Section 6. References

Watershed?	Reference
☒	Barrett, D. 1994. Fish Biologist with the cooperative Fisheries and Wildlife Unit of the University of Idaho. Personal communication.
☐	Beschta, R.L., R.E. Bilby, G.W. Brown, L.B. Holtby and T.D. Hofstra. 1987. Stream Temperature and Aquatic Habitat: Fisheries and Forestry Interactions. P. 191-232.
☒	Columbia Basin Fish and Wildlife Authority FY 1999 Draft Annual Implementation Work Plan, Volume I. 1998. 145-146 p.
☒	Columbia River Basin Fish and Wildlife Program. 1994. NWPPC, Portland, Oregon.
☐	Hankin, D.G. and G.H. Reeves. 1988. Estimating Total Fish Abundance and Total Habitat Area in Small Streams Based on Visual Estimation Methods. Canadian Journal of Fisheries and Aquatic Sciences 45: 834-844.
☐	Hecht, Barry, Robert Enkeboll, Charles F. Ivor, and Patricia Baldwin. 1982. Sediment Transport, Water Quality, and Changing Bed Conditions, Tucannon River, Southeastern Washington. 185 p.
☒	McIntosh, Bruce A. 1992. Stream Survey Summary for Asotin Creek and the Tucannon River. - raw data for publication of McIntosh et al. (1993). USFS PNW Research Station, Corvallis, OR.
☐	Mendel, Glen, 1994. Personal Communication. Local Salmon Research Biologist with WDFW Snake River Lab.
☐	Reckendorf, Frank, and Michael VanLiew. 1988. Chapter 10-Streambed Sampling and Analysis-Tucannon Watershed, Washington. USDA/SCS West National Technical Center, Portland, Oregon.
☐	Rosgen, D.L., and B.L. Fittante. 1986. Fish Habitat Structures-.
☒	Tucannon River Model Watershed Plan Final Draft. 1997. Columbia Conservation District
☐	Strategy for Salmon. Vol. II. 1992. NWPPC, Portland, Oregon.
☐	Washington Water Research Center, 1996.
☐	WDF&W. Snake River Recovery Plan.
☒	Wild Salmonid Policy. 1997. WDFW, Olympia, Washington.
☒	Wy Kan Ush Mi Wa Kish Wit (Spirit of the Salmon). 1995. CRITFC.

PART II - NARRATIVE

Section 7. Abstract

The Tucannon River Model Watershed Council will utilize FY2000 Bonneville funding to continue Tucannon River Model Watershed Plan (*Plan)* implementation, which includes, habitat restoration project coordination, installation, and monitoring, as well as public information and education activities.

The *Plan's* goals and objectives for improving the watershed's ability to support viable salmonid populations will address the biological goals of improved adult pre-spawning and juvenile survival. These habitat restoration, protection, and enhancement goals are consistent with identified elements relevant to the "Strategy For Salmon," Wild Salmonid Policy," "Wy Kan Ush

Mi Wa Kish Wit," ISRP's habitat restoration recommendations, and FWP's model watershed and habitat objectives.

Habitat goals addressing limiting factors will improve habitat quality and quantity, restore natural stream stability, reduce water temperature, reduce sedimentation, and improve riparian vegetation.

The Co-managers support improving habitat through the use of instream structures as a viable strategy to achieve biological goals. Habitat projects consist of instream bio-engineered structures, dormant stock plantings to re-vegetate riparian areas, and upland BMP's. Habitat restoration actions are identified by an Inter-Disciplinary Team to address site specific limiting factors.

Tucannon River Model Watershed Plan projects will accelerate and complement salmonid habitat and watershed natural ecological processes. Restoration activities will continue until all resources are maximized and *Plan* goals are met.

Monitoring/evaluation, critical for adaptive management, will assess project effectiveness to meet biological goals by validating *Plan* goals and objectives that address limiting factors affecting ESA listed stocks in the Tucannon River. Monitoring will be accomplished cooperatively with resource agencies.

Section 8. Project description

a. Technical and/or scientific background

The Tucannon River is currently home to ESA listed stocks of spring chinook salmon, fall chinook salmon, summer steelhead, and bull trout. These salmonid species are identified by the National Marine Fisheries Service as being within the Snake River Evolutionarily Significant Unit (ESU). Human activities and catastrophic natural events such as floods, droughts, and fires have negatively effected the watershed and these listed stocks.

The headwaters begin in the Tucannon-Wenaha Wilderness, run through public lands managed by U.S. Forest Service and Washington Department of Fish and Wildlife, before entering private land ownership and finally the Snake River. Primary land uses are forest, range, and production agriculture. Starbuck, a small municipality, is located near the river's mouth. Pataha Creek, a major tributary, enters the Tucannon at river mile 11.2 in the upper portion of the fall chinook spawning area in the lower river.

The model watershed process, lead by Columbia Conservation District (CCD), is guided by The Tucannon River Model Watershed Council (Council), composed of The Technical Lead (TL), Landowner Steering Committee (LSC), and Technical Advisory Committee (TAC). CCD and the TL were selected as the lead agency for their history of landowner coordination and the ability to implement on-the-ground solutions for salmonid habitat restoration (Washington Water Research Center, 1996). The TAC is comprised of representatives from USDA Natural Resource Conservation Service (NRCS), USDA U.S. Forest Service (USFS), Washington Department of Fish and Wildlife (WDFW), Washington Department of Ecology (DOE), Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Columbia County Commission, Columbia County Planner, and Columbia County Engineer. The LSC is comprised of local residents with interest in total watershed health. Trust, credibility, commitment and

communication has built these units into a highly effective entity for restoration of the natural ecological process of the Tucannon Watershed.

The Council conducted a watershed-scale resource assessment, reach-by-reach, to provide a basis for the Tucannon River Model Watershed Plan (*Plan*). This *Plan* was written using an "ecosystem approach" where the whole watershed was evaluated for its influence on fisheries resource. During the assessment process the Council made extensive use and comparison of technical reports from state and federal natural resource agencies, personal communications with local residents intimately familiar with the watershed, and detailed on site inventories to establish current and historical resource conditions. Base line data was established for instream fish habitat, listed species life history use patterns, water quality, and upland practices.

Watershed assessment identified high stream temperatures, high turbidity during periods of rain and snow melt, high levels of sediment in spawning gravels, low number of large rearing and resting pools with cover, and stream bank and geomorphic instability as the critical limiting factors effecting salmonid habitat and productivity. These factors are also identified by the Columbia Basin Fish & Wildlife Authority (CBFWA) FY1999 Draft Annual Implementation Work Plan.

Water temperature beyond the zone of critical temperature increases stress and mortality at all chinook life stages. Laboratory studies indicate that juvenile chinook have an upper lethal limit of 77.2^0F but become stressed and susceptible to mortality from diseases and parasites in even lower temperatures in the wild (Beschta et al. 1987). Adult chinook may interrupt their upstream migration when the temperature exceeds 68^0F (Barrett 1995) or 70^0F (Mendel 1994). WDFW temperature data for various locations in the Tucannon (June 1986 to August 1994), show average daily maximum, minimum & median readings above 78^0 in July and August. Reducing water temperature is critical to chinook survival in the Tucannon.

The 1994 geomorphic stream inventory and the 1982 USDA/SCS study, "Sediment Transport, Water Quality and Changing Bed Conditions, Tucannon, Washington (Hecht et al. 1982) show excessive scouring and bedload movement in the river which has contributed to a loss of pools and the development of irregular point bar configurations. These conditions have lead to reduced instream habitat for fish. Bedload deposition and sediment that erodes from upland and upriver areas potentially bury eggs and pre-emergent fry.

The lack of adequate riparian vegetation, and a high width to depth ratio within the river contribute to high stream temperatures and increased sedimentation, which are detrimental to salmonids during various life cycle stages. Flood control measures in the Tucannon River basin, following the 1964-65 flood, reduced the pool-to-riffle ratio and shortened channel length in some reaches by as much as 25 to 30 percent since 1935 (Hecht et al. 1982).

Identified *Plan* restoration goals will improve total watershed health while providing ESA listed stocks with needed habitat to meet the co-managers goals of improved adult pre-spawning and juvenile survival. *Plan* objectives addressing critical limiting factors will; improve instream fish habitat quality and quantity, restore and maintain natural stream stability to benefit fish and wildlife resources as well as private and public resources, reduce water temperature, reduce upland erosion and sedimentation rates to decrease the percentage of fines in spawning gravels, improve and re-establish riparian vegetation, improve and maintain rangeland and forest health, utilize cost-effective ways to treat identified resource problems, and promote cooperation and agreement between landowners and resource agencies in decision making for resource use and fish and wildlife habitat improvement.

FY 2000 projects, funded through this proposal, will consider species usage. Projects will be located in prime spawning and rearing reaches of the river and will addressing migration corridor obstructions. WDFW research has identified the upper reaches, river mile 24.8 and up stream, as spring chinook utilization and lower reaches, river mile 13.7 and down stream, as fall chinook utilization. Steelhead utilize areas throughout the basin depending on activity (i.e. spawning, rearing). Bull trout, also, utilizes the entire basin depending on season (i.e. upper reaches in spring and summer, lower reaches during fall and winter). The middle reaches, river mile 13.7 to 24.8 are utilized primarily as passage and limited rearing area.

Individual project sites are evaluated for critical limiting factors and corrective actions are identified by the Inter-Disciplinary Team (IDT). The IDT consists of TL, NRCS and WDFW staff, and landowner. Consistent participation by resource agency staff is emphasized but flexibility is maintained to allow for optimum technical expertise. U.S. Fish & Wildlife Service, National Marine Fisheries Service, U.S. Forest Service, and tribal representatives join the team when their schedules allow. It is the responsibility of this team to design projects that accelerate and complement the natural fluvial action and salmonid habitat enhancement of the watershed.

Alternative corrective actions are suggested within the *Plan* for each limiting factor. The "No Action Alternative" attempts to outline a baseline of resource conditions which do not include measures specifically designed to maintain or improve fish habitat. Due to devastation from 1996 and 1997 floods the Council chose to pursue the more aggressive "Planned Action Alternative" option. This option includes full implementation of PL-566 Plan (upland/cropland BMP's), 514 instream structures to create pools for fish habitat, restore channel stability, and stabilize eroding streambanks, 9 off-channel rearing sites, 5,500 ft of channel geomorphic restoration, and irrigation system efficiency optimization. Accelerating the habitat restoration will complement the natural fluvial action of the watershed and enhance ecological health contributing to biological goals of self-sustaining salmonid populations. The final option, "Optimal Action Alternative", is very aggressive, suggesting increased efforts in all areas. The Council has not chosen to pursue this option at present, however remains open to it provided the economics are justified.

Proposed instream actions, to meet habitat objectives, involve bio-engineering techniques: rock vortex weirs, rock/log barbs, large woody debris (LWD) placement, rootwad revetment, vein/sill, riparian restoration and enhancement, and off-channel rearing as identified by NRCS Watershed Planning Team (WPT) referencing Reckendorf, Frank and Michael Vanliew. 1988., Rosgen, D.L., and B.L. Fittante. 1986. All practices identified are designed and installed to USDA NRCS Standards and Specifications to meet 25 and 100 year flow events. Upland practices include: direct seeding, sediment basins, grass waterways, critical area plantings, irrigation modifications, fencing, and alternative livestock watering.

Projects included in this proposal are designed to augment on past projects. FY 2000 projects will be an additional step toward desired habitat conditions within the Tucannon River Watershed. Restoration in the Tucannon River will balance the present land uses with practices that are geomorphically compatible with the river's natural stable form. The kinds of practices recommended emphasize a long term and practical approach to aquatic habitat restoration. Applying these practices will assist the Tucannon River's natural ability to correct problems such as high width-to-depth ratio, low sinuosity, poor velocity distribution, and impaired bedload movement. Solving these problems will result in positive gains for aquatic habitat and riparian areas.

b. Rationale and significance to Regional Programs

The Tucannon River Model Watershed *Plan* is based on the goals found in the 1994 Fish and Wildlife Program (FWP), Section 7.7B "Model Watershed," WDFW Wild Salmonid Policy, and Wy Kan Ush Me Wa Kish Wit. Specifically they all refer to locally driven, collaborative developed watershed planning and implementation program.

The Tucannon River habitat goals addressing critical limiting factors are referenced in the FWP, Section 7.6D as follows:

large pools	large woody debris	riparian vegetation
sediment	stream morphology	bank stability
water quality	agricultural practices	land management
grazing		

Implementation of proposed priority on-the-ground actions will protect and enhance salmonid habitat productivity. Riparian re-vegetation and enhancement is an integral part of all instream structure projects.

c. Relationships to other projects

Pataha Creek enters the Tucannon at river mile (RM) 11.2. A major tributary, Pataha, delivers excessive amounts of sediment which directly impacts the fall chinook spawning, steelhead and bull trout rearing, and over wintering areas of the lower Tucannon. Pataha Creek, due to its 50 mile length, is a separate Model Watershed, BPA Project Number 9401807. Restoration of the lower Tucannon can not be fully realized without the efforts of the Pataha Creek Model Watershed Program to reduce sediments through land use management strategies and implementation of BMP's as identified in FWP, Section 7.6D, Habitat objectives. The Washington State Department of Fish and Wildlife and the National Marine Fisheries Service both concur that the sediment degradation from the Pataha Creek during high runoff periods is contributing to the reduced quality of fall chinook salmon redds and salmonid rearing in this area.

The Lower Snake River Compensation Plan programs the direction of the Lyons Ferry Hatchery. Hatchery releases into the Tucannon River supplement natural production.

The PL-566 program provides financial and technical assistance to apply conservation practices to reduce erosion and sediment yield in order to reduce damage to roads, buildings, streams and fish and wildlife habitat. Reduction in erosion and sedimentation will also sustain yields on crop, grazed range and forested lands. Assistance is also available to plant vegetation along stream corridors to stabilize streambanks and reduce water temperatures.

d. Project history (for ongoing projects)

Watershed-wide program interest in the Tucannon River basin began in the 1980's when the District installed the first instream habitat enhancement projects on a cost-share basis. The success of these demonstration projects lead to increased awareness of instream restoration and the impact of upland land use. Landowners continued to adjust upland management systems with positive impact to the rivers riparian and instream environment. Early DOE grant funded demonstration projects included rock and boulder placement, cabled trees, riparian fencing, limited access water facilities, off site watering facilities, and dormant stock plantings (DSP) by volunteer sportsmen and students. USDA NRCS initiated the PL-566 program in the Tucannon Watershed to cost-share resource management conservation systems, reduce erosion, and the

overall deterioration of watershed health. Grant money from the WCC and DOE continued to positively impact conservation through cost-share programs and NRCS technical support in-kind made major strides with landowners.

In 1993 The Tucannon River Watershed was selected as one of the three Washington Model Watersheds. The Columbia Conservation District received funding, through the Washington State Conservation Commission (WCC), from Bonneville Power Administration (BPA), contract #9202602, to develop a watershed based habitat restoration plan. The *Plan* was developed to identify, protect and restore fish habitat by utilizing sound technical information and citizen input. To produce the *Plan*, the Columbia Conservation District coordinated a planning process that combined the concerns and knowledge of local landowners with technical support from an interagency advisory group. The Tucannon River Model Watershed Program (Program) was born.

The Program has been implementing on-the-ground habitat projects guided by the *Plan* since 1996. The contract for 1996 and 1997 projects was #9401800. In 1998 the Washington Model Watersheds separated into individual entities. The BPA contract for the Tucannon River Program is #9401806 (Enhance Habitat For Spring & Fall Chinook, Summer Steelhead, and Bulltrout). In 1999 BPA contract #9202602, coordination through WCC, was enveloped into the individual contracts.

Watershed Habitat Projects

Funding Source	1996	1997	1998
Landowner	$ 55,418	$ 45,810	$ 25,245
Bonneville Power Administration	$ 104,386	$ 215,415	$ 187,510
Washington Conservation Commission	$ 99,705	$ 21,352	$ 11,894
WA Dept. Natural Resources	$ 70,197		
WA. Dept. Ecology	$ 68,180	$ 4,091	$ 4,871
Columbia County		$ 3,387	
WA. State HB 2496			$ 4,937
Individual Donations			$ 17,323
Totals	$ 397,886	$ 290,055	$ 251,780

Watershed Habitat Enhancements

	1996	1997	1998
New Projects	20	12	12
O&M Projects	0	5	2
Funding Sources	5	5	6
Lg. Plunge Pools Created	11	8	15
Ft. of Habitat Complexity & LWD	4460	6828	5540
Off-channel Rearing	1	3	1
sm. & med. Pools Created	125	98	146
Irrigation Modifications	1	1	1
Ft. of Riparian Fencing	3100	5762	11,891
Trees Planted	500	7000	10,000

Habitat objectives are being met using bio-engineering technology, LWD placement, and dormant stock plantings. In addition, a large desilting basin adjacent to the river, damaged in the 1996 flood, was reconstructed to prevent sediments from reaching active spring chinook and Snake River steelhead spawning areas.

A fall 1998 tree planting was conducted so survival rate could be evaluated and compared to spring plantings. Upland treatment and management changes are cost-shared through funding from the WCC, USDA NRCS PL-566, and other applicable USDA farm programs. These figures

are not reflected in the above charts due to the variety of measurements used for various treatments.

Annual project reports are submitted to BPA. A comprehensive report on the Model Watershed Process was submitted to the NWPPC in 1997.

Current project monitoring and evaluation includes pre-construction and one year post-construction cross-section habitat surveys. WDFW, NRCS, and the District jointly evaluate projects for: 1) physical site stability, 2) fish utilization, 3) instream and riparian habitat, and 4) water temperature and quality. WDFW monitors sites for fish usage, spawning density, pool number, pool area, maximum and average site depth, pool quality, quantitative and qualitative counts of woody debris and standard deviation of thalweg depth. NRCS monitors sites for bank erosion, geomorphic channel stability, stream bed aggradation/degradation, substrate fines, bank full width, and gradient. Both teams address water temperature and habitat quality variables. Key photopoints have been established.

BPA funded early action projects following the 1996 flood have resulted in greater landowner awareness of watershed function and willingness to allow agencies to initiate projects for habitat restoration. This cooperation is the result of open-minded resource agency personnel who acknowledge landowner needs in their proposed habitat restoration actions, and the Columbia Conservation District's ability to coordinate funding for proposed restoration.

e. Proposal objectives

This proposal requests the continuation of BPA funding for the implementation of the *Tucannon River Model Watershed Plan*. Funds will be utilized for habitat restoration, protection, and enhancement projects; and for administration and coordination of the Watershed Council planning, assessment, funding, monitoring, and education activities.

The goal established by the LSC and the TAC is to improve habitat conditions in the watershed to support viable salmonid fish populations. The Co-managers goals, identified in the FY 1999 Annual Implementation Work Plan, are to improve adult pre-spawning and juvenile survival. The *Plan's* habitat goal and the Co-managers biological goals will be addressed by implementing the following:

Objective #1: Improve adult pre-spawning survival

Objective #2: Improve juvenile survival

Task a. (*Plan* Objective): Increase natural stream stability and instream pool quality and quantity.

Intent:

- Create large, high quality pools for adult holding areas and rearing habitat for juveniles.
- Improve gravel sorting and stability for improved spawning, insect production, and survival of overwintering juvenile fish.
- Improve cover (i.e. logs, roots, undercuts, overhanging vegetation, turbulence and boulders).
- Reduce loss of fish habitat and cropland.

Objectives:

- The number of pools will be increased to one, high-quality pool per every 5-7 bankfull widths (Rosgen 1994 and Leopold 1994).
- The pool will be at least one meter deep, with a total surface area of 20 square meters (McIntosh 1994).
- Each pool will have at least one element of cover (Hankin and Reeves 1988).
- Bankfull discharge channel will be reduced to a width-to-depth ratio of 25 feet or less.

Task b. (*Plan* Objective): Reduce instream water temperature.

Intent:

- Reduce the weekly average of the daily maximum water temperature for each month in the summer to 70^0F to make it habitable for salmonids downstream to the confluence with Pataha Creek.

Objectives:

- Reduce the weekly average of the daily maximum water temperature to 70^0F at the confluence with Pataha Creek.
- Prioritize spawning and rearing reaches by species usage.
- Reduce width-to-depth ratio by 20% on public land and at least 5% on private land.
- Improve irrigation efficiency to at least 70%.

Task c. (*Plan* Objective): Reduce erosion and sedimentation rates to Class A water quality standards for turbidity; and lower the percent fines in spawning gravel to less than 15%.

Intent:

- Improve or maintain spawning success and juvenile salmonid overwintering.
- Improve insect production.
- Improve water clarity for feeding.
- Improve respiration.
- Reduce gill abrasion.

Objectives:

- Reduce turbidity to the state standard (not to exceed 5NTU's over background levels).
- Reduce fines in the gravel to less than 15% of the substrate.
- Strive for 8mg/l dissolved oxygen (DO) in the spawning gravel.
- Reduce streambank erosion to 15% of the streambank length.
- Reduce sediment delivery rates to 10%.
- Improve and stabilize water diversions to eliminate the need to rebuild loose-rock diversions or diversion ditches every year.

Task d. (*Plan* Objective): Improve and re-establish riparian vegetation to reduce water temperature, increase stream channel stability and improve fish habitat.

Intent:

- Improve the canopy cover over the stream.
- Reduce streambank erosion and sedimentation.
- Increase filtration of potential pollutants.
- Increase overhanging cover.
- Increase large woody debris recruitment for improved complexity, quantity and quality of instream fish habitat.

Objectives:

* Increase canopy cover to 75%.
* Decrease length of eroding streambank to 15% of the total streambank length.
* Reduce maximum water temperature to 70^0F at the confluence of Pataha Creek.
* Increase species and age class diversity of riparian vegetation.

Objective #3: Monitoring/evaluation

Intent:

- Evaluate effectiveness of implemented projects to address *Plan* habitat objectives.

Objectives:

* Establish baseline, site specific, data on stream stability, fish habitat, riparian vegetation, and water quantity and quality.
* Validate effectiveness of projects to address objectives.
* Use adaptive management based on effects of project implementation for project selection and design.

Objective #4: Coordinate Tucannon River Model Watershed Program

Task a. (*Plan* Objective): Promote cooperation and agreement between landowners and resource agencies for decision-making regarding resource use and fish habitat improvement.

Intent:

- Maintain and improve the good working relationship between landowners and natural resource agencies for a collaborative approach to watershed management.

Objective:

* Clarify, define, and continue the role of the Council in project direction and prioritization.

Task b.: Coordinate implementation of fish and wildlife habitat restoration projects that will increase watershed ecological function.

Task c.: Secure supplemental funding for continued council operations and *Plan* implementation resulting in successful watershed restoration for ESA listed stocks.

Task d.: Continue watershed information/education program resulting in greater public awareness of total watershed ecological function.

Tucannon River Model Watershed *Plan* goals and objectives, while utilizing adaptive management, will effectively address habitat restoration, protection, and enhancement for ESA listed stocks. Watershed biological diversity will be enhanced, with the ultimate outcome being self-sustaining watershed health.

f. Methods

Project selection addressing objectives and tasks, as identified in Section 4, is facilitated by the Model Watershed Technical Lead through the Model Watershed Organizational Structure. This structure includes: Landowner Steering Committee, Technical Advisory Committee, Inter-Disciplinary Team, Landowners, and Public input. These committees and groups identify, assess, design, and prioritize projects drawn from the *Plan*, however, it is the Technical Lead who

facilitates the coordination of project implementation by overseeing development of project designs, submission of biological assessment, landowner agreement and contracts, and coordinates volunteer activities. The TL, also, insures projects reflect the Co-managers biological goals as well as *Plan* goals and objectives for habitat restoration.

Projects are divided into three categories: upland BMP's, riparian restoration, and instream restoration.

Upland BMP implementation will meet the following objectives;
- Reduce sedimentation in spawning gravel (obj. 1&2, task 3)

Riparian restoration will meet the following objectives;
- Reduced stream temperature (obj. 1&2, task 2)
- Increased stream bank and geomorphic stability (obj 1&2, task 1)
- Reduced sedimentation in spawning gravels (obj. 1&2, task 3)
- Increase water quality (obj. 1&2, task 3&4)
- Increase LWD recruitment to stream (obj. 1&2, task 1&4)

Instream restoration will meet the following objectives;
- Reduce stream temperature (obj. 1&2, task 2)
- Decrease the width/depth ration (obj. 1&2, task 1&2)
- Increase resting/rearing pools (obj. 1&2, task 1)
- Enhance habitat complexity (obj. 1&2, task 1&4)
- Increase stream bank and geomorphic stability (obj. 1&2, task 1&4)
- Provide & enhance gravels sorting in spawning area (obj. 1&2, task 1&3)

The strategies, identified by the Co-managers, to achieve these objectives include improving habitat through the use of instream structures and long term restoration of channel and riparian flood plain function. All instream and riparian habitat restoration, protection, and enhancement projects consist of bio-engineered instream structures and dormant stock plantings (DSP) to re-vegetate the riparian area. In addition to instream structures, upland land practices contributing to sediments will be addressed through cooperating programs. Each project will contain a combination of components, identified by the Inter-Disciplinary Team, to address site specific problems.

Watershed *Plan* identified critical limiting factors will be addressed utilizing the following components:

Rock Vortex Weirs	Log Barbs	Barb/Rootwad
Vane/Sill	Rootwad Revetment	LWD Placement
Off Channel Rearing	Meander Reconstruction	DSP
Fencing	Sediment Basins	Direct Seeding
Upland BMPs	Off Channel Livestock Watering	

All habitat and management activities identified within projects are identified in the 1994 Fish and Wildlife Program (FWP) Section 7.6D and are supported by the CBFWA's Annual Implementation Work Plan. Utilizing expertise and resources from WDFW, NRCS, USFS, Washington State University (WSU), and Landowner Steering and Technical Advisory Committees will ensure projects incrementally move toward total watershed restoration, there by ensuring over all success of the program.

Each project will have a proposal developed identifying objectives and benefits and include IDT proposed corrective action, NRCS engineered design, specifications, cost estimate, required permits, and NMFS and USFWS Biological Assessment concurrence. Project proposals will be submitted to BPA for individual project contracting. Individual project files will include project plans, photos, permits, contracts/agreements, monitoring/evaluation reports, and other information assessing project status.

Specific FY2000 projects will be identified in Fall/Winter 99-2000 with on site assessments. FY99 projects not completed due to funding limitations, projects broken into phases, and identified new projects will be considered for FY2000. District staff develops grant requests to fund as many projects as can possibly be installed in the WDFW identified instream work window. The number of projects identified and developed for installation in a given FY always exceeds known funding levels, due to timing requirements for NMFS, USFWS, and permitting. Projects ready for installation also allow for utilization of unexpected funding availability.

Long-term habitat restoration, protection, and enhancement retention is expected as a result of the *Plan* and project implementation. All parties involved are committed to efforts needed to reflect long term habitat benefits and stability. Basic project O&M is a contract obligation of the landowner. O&M needs due to catastrophic events are evaluated on a project by project basis for potential funding support. In-kind services from USDA NRCS, WDFW, landowners, Columbia County, and volunteers maximize funds received from BPA and other state and federal sources.

At the request and direction of the Tucannon River Model Watershed Council, a long term Tucannon Model Watershed Fish Habitat Enhancement Project Monitoring and Evaluation Plan was developed by WDFW in consultation with Del Groat of the USFS, and facilitated by the TL for long term project effectiveness. This plan continues the efforts of the short term plan developed in FY98. Habitat quantity and quality, rather than numbers of returning anadromous fish, were selected as the measures of success for the *Plan* because much of the decline of anadromous fish populations results from causes outside the Tucannon River Watershed.

Monitoring and evaluation will validate project effectiveness for fish habitat complexity and utilization, stream bank and geomorphic restoration and stability, instream and riparian habitat components, and temperature and water quality indicators for applying adaptive management strategies to insure restoration success.

Monitoring & evaluation (obj. 3)

- Pre-construction cross-section habitat surveys
- 2 year project (1998) post-construction cross-section habitat surveys
- Validation of restoration efforts

WDFW and the District will address and provide monitoring and evaluation for categories 2 , 3, and 4. NRCS and the District will develop and provide a monitoring and evaluation plan for the category 1 and 4. WDFW will address: 1) Number of fish using sites, 2) Spawning density at sites, 3) Pool number, 4) Pool area, 5) Maximum and average site depth, 6) Pool quality, 7) Quantitative and qualitative counts of woody debris, and 8) Standard deviation of thalweg depth. The following variables will be addressed by the NRCS monitoring and evaluation plan for physical site stability: 1) Bank erosion, 2) Geomorphic channel stability, 3) Stream bed aggradation/degradation, 4) Substrate fines, 5) Bank full width, and 6) Gradient. Both teams will address water temperature and quality variables. Established photopoints will be utilized to measure visible change.

Data will be used by Watershed Organizational Structure for method evaluation and application of adaptive management. Adaptive management will allow the Council to respond to new technology, changes in societal demands, or new legislation. As project components are applied on the ground, they will be monitored for their degree of success so that adjustments, if necessary, can be made to similar projects in the future.

g. Facilities and equipment

Columbia Conservation District receives assistance from the USDA Natural Resources Conservation Service (NRCS) through a working agreement called the "Memorandum of Understanding." The local NRCS field office provides the District with in-kind services including: technical assistance, office space, office equipment, minor field equipment and phone service. The total match exceeds $50,000.00 per year. The working relationship between the District and NRCS is in great order.

Currently the District either owns or has access to equipment needed to accomplish the tasks in a proficient manner.

h. Budget

FY 2000 funding request is based on previous out year budget estimates. This request is higher than FY99 allocated funding. Increase is constant with fixed cost and inflation increases, as well as, the commitment to be pro-active and continue on-the-ground efforts to expedite salmonid habitat recovery.

FY2000 BPA Funding

Fish Habitat Restoration Projects	$192,344
Instream:	
• *vein/sill* *rock vortex weirs*	
• *rock barb/rootwads* *log Barbs*	
• *rootwad revetment* *LWD placement*	
• *log jam bends*	
Riparian Restoration	
• *DSP* *riparian fencing*	
• *off site watering* *re-vegetation*	
• *irrigation modifications*	
Dormant Stock Plantings	
• *Contract with Nez Perce Salmon Corp*	
Monitoring & Evaluation	$ 50,000
• *Contract with WDFW, WSU, Salmon Corp*	
• *NRCS and District staff*	
O&M (2%)	$ 6,600
Administrative	$ 64,556
Discretionary (5%)	$ 16,500
TOTAL	$330,000

Cost share incentives are a key factor to continued fish and wildlife habitat restoration. The opportunity and ability to utilize BPA funding as match and/or leveraged with other supportive funding and in-kind services greatly expands restoration efforts for cost-effective implementation with private landowners and state and federal agencies. Program costs will be augmented by in-

kind and cash contributions from landowners, WCC, Washington State Legislature, WDFW, USDA NRCS, USDA USFS, and proposed federal allocations. Cost share funds from these sources will supplement the above budget and fund watershed upland management practices such as direct seeding/no-till, grass waterways, upland sediment basins, strip farming, terraces, and irrigation modifications.

Section 9. Key personnel

Terry Bruegman
Tucannon River Model Watershed Technical Lead

Education: AA - Criminal Justice, Green River Community College 1972

Current Employer: Columbia Conservation District

Current Responsibilities: As District Coordinator, responsible for performing management and administrative duties in relation to District and Model Watershed Programs as directed by the Columbia Conservation District Board of Supervisors.

Recent Previous Employment:

- April 1997-Present: District & Model Watershed Coordinator, Columbia Conservation District, Dayton, WA.
- April 1995-April 1996: Laborer, Equipment Operator 1996 flood recovery efforts and Ag. Production.
- October 1981-April 1996: Wildlife Area Manager, WDF&W - Manage a wildlife area for production and restoration of fish and wildlife habitat and compatible public use including the development & implementation of annual and long range management plans and budgets and acting as liaison with the public, landowners, and agency representatives.
- February 1977-October 1981: Assistant Superintendent, Ellensburg Game Farm - Primary assistant to superintendent, responsible for organizing and supervising seasonal and voluntary work crews, liaison between public, landowner and agency representatives.
- March 1972-February 1977: Superintendent, Walla Walla Game Farm - Develop and implement annual and long term management plans and budgets, hire, supervise and train seasonal employees, supervise voluntary work crews, liaison between public, landowner and agency representatives.

Expertise: Self-motivated individual with extensive experience in working with the general public, landowners and government agencies in relation to natural resource management. Positive personality with flexibility to adjust to changing work environments. Ability to objectively listen to concerns of various parties and develop a pro-active working solution. Very pro-active for on ground implementation and results while addressing various concerns.

Debra Nordheim
Administrative Assistant

Education: BS - Home Economics & Sociology, Oregon State University, 1978

Current Employer: Columbia Conservation District

Current Responsibilities: Assist the District Coordinator and Tucannon Model Watershed Technical Lead in the management and administrative duties of the District's Model Watershed Programs.

Recent Previous Employment:

- November 1989-Present: District Administrative Assistant, Columbia Conservation District, Dayton, WA. Duties include but not limited to maintaining all records for the district and their programs, work with landowners and natural resource agency personnel and programs, responsible for state and federal vouchers, billing, reporting, and auditing, and administering district cost share programs.
- April 1987-November 1989: Bookkeeper, Hillside Machinery Company, Dayton, WA. Responsible for all bookkeeping, inventory controls, contract writing, financial statements, tax reporting, and audits.
- January 1982 - March 1987: Motherhood. Responsible for everything!
- September 1979 - January 1982: Extension Home Economist/Rural Development, Oregon State University, Pendleton, Heppner, and Lakeview, OR. Liaison between the university and the people of rural Oregon, responsible for youth and adult transition programs and to bringing current information and research to improve life and environment of the area.

Expertise: Self-motivated, dedicated individual with extensive experience in working with government regulations and procedures. Positive personality with flexibility to adjust to changing work environments. A deep and personal understanding of the needs and attitudes of rural life.

Section 10. Information/technology transfer

The District works closely with area news media to promote holistic resource management from a watershed prospective. Articles about the Tucannon River Model Watershed projects have appeared in regional newspapers, as well as, BPA's Circuit and the Journal. Presentations at Neighborhood meetings, before commodity groups, at public meetings, and before Legislators has created great interest in the success of a "bottom up" effort for salmonid habitat restoration. Formal and informal tours of the projects have included, students, landowners, agency personnel, and Legislators. The success of the Tucannon Model Watershed is reflected in the level of trust established between landowners and resource agencies and has created interest nationally as evidence by the number of national level agency personnel visiting the project sites. Bio-engineering technology used in the Tucannon River was the basis for a very successful effort by a local group of FFA members who placed 3rd in the National FFA Current Issues Contest and thus reached hundreds of young resource oriented students. The Tucannon River Model Watershed process has been the basis for the Touchet River Watershed Plan effort started in 1998.

Congratulations!