Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

John Day Watershed Restoration

Bonneville project number, if an ongoing project 9137

Business name of agency, institution or organization requesting funding
Confederated Tribes of the Warm Springs Reservation of Oregon

Business acronym (if appropriate) CTWSRO

Proposal contact person or principal investigator:

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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Grant Soil and Water Conservation District	721 S. Canyon Blvd.	John Day, OR 97845	John Day, OR 97845

NPPC Program Measure Number(s) which this project addresses.
5.4D.8, 7.8H.2, 7.8G.2, 7.10, 10.2.C, 7.8.2

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

Other planning document references.
John Day Basin Water Optimization Projects, Phase III. BOR 1996, John Day River Water Conservation Demonstration Project, Phase III, Planning Aid Memorandum. USFWS 1996, Stream Restoration Program for the Upper Mainstem of the John Day

River. BOR 1992, Upper John Day River Basin Master Water Plan Working Paper. BOR 1990,Wy-Kan-Ush-Me Wa-Kush-Wit, CRITFC-1995. .

Subbasin.
Upper mainstem John Day River, Middle Fork John Day River.

Short description.
Protection and restoration actions to improve water quality and fish habitat, eliminate passage barriers for anadromous (spring chinook salmon, summer steelhead trout, and Pacific lamprey) and resident fish, and reduce summer water temperatures.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish	X	Construction	*	Watershed
*	Resident fish		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 en-
			Acquisitions		hancement/restoration

Other keywords.
fish passage, water optimization

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Return Flow Cooling #1 North :	a	Install approximately 1760’ of

	Improve water quality and quantity for anadromous and resident fish in the John Day River.		perforated pipe over a 22 acre project area to replace failing wooden drains installed over 70 years ago.
		b	Install a valve station at the drain confluence with the river to allow adjustment of the local water table as necessary.
		c	Install a safety screen over the outlet pipe.
		d	Place approximately 20 cubic yards of 36” minus riprap around the outlet pipe to prevent streambank and bed erosion.
		e	Shape all construction spoils and plant grasses and hardwoods as appropriate to reduce erosion and to promote rapid riparian vegetative recovery.
		f	Repair the existing riparian exclusion fence.
2	Indian Creek Diversion: Improve water quality and fish habitat and eliminate passage barriers for anadromous and resident fish in Indian Creek, a tributary to the John Day River.	a	Install a permanent concrete and rock diversion structure with positive fish passage facilities at existing ditch head (legal point of diversion).
		b	Construct a concrete turnout box and spillway; install trash screen to protect turnout box; and install headgate in turnout box and water measurement weir as appropriate.
		c	Incorporate layflat stanchions in spillway for insertion of flash boards to regulate water level at headgate.
		e	Place approximately 80 cubic yards of 36” minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions
		f	Incorporate the existing

			hydraulically powered fish wheel to screen fish from the ditch.
		g	Stabilize the east and west banks of the stream as necessary with riprap rock to protect the installation.
		h	Shape existing spoils on the banks and plant grasses and hardwoods to promote rapid riparian vegetative recovery in the disturbed areas.
3	Southside Ditch Diversion (Chouinard): Improve water quality and fish habitat and eliminate passage barriers for anadromous and resident fish in the John Day River (approximately 5 miles east of Dayville, OR).	a	Install a permanent diversion structure with fish passage facilities at the site of the existing annually installed structure.
		b	Construct a concrete turnout box and spillway; incorporate a trash screen and headgate.
		c	Incorporate layflat stanchions in spillway for insertion of flash boards to regulate water level at headgate.
		d	Place approximately 180 cubic yards of 36" minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions.
		e	Install 100 feet of 24 inch PVC pipe immediately downstream of headgate to replace existing high loss open conveyance.
		f	Incorporate the existing hydraulically powered fish wheel to screen fish from the ditch.
		g	Stabilize the east and west banks of the stream as necessary with riprap rock to protect the installation.

		h	Shape existing spoils on the banks and plant grasses and hardwoods to promote rapid riparian vegetative recovery in the disturbed areas.
4	Courchesne Diversion: Improve water quality and fish habitat and eliminate passage barriers for anadromous and resident fish in Long Creek, a tributary to the Middle Fork John Day River (approximately 5 miles east of Long Creek, OR).	a	Install an infiltration gallery at the site of the existing annually installed structure.
		b	Install a shutoff valve and riser to allow backflushing the system if necessary.
		c	Install 400 feet of PVC conveyance pipe.
		d	Place approximately 36 cubic yards of 24" minus riprap in conjunction with sheet steel piling in the bed of the creek on grade to assure erosion or headcutting will not damage the gallery or bypass the collection system.
		e	Stabilize the east and west banks of the stream as necessary with riprap rock to protect the installation.
		f	Shape existing spoils on the banks and plant grasses and hardwoods to promote rapid riparian vegetative recovery in the disturbed areas.
5	Keerins Diversion: Improve water quality and fish habitat and eliminate passage barriers for resident fish in the Upper South Fork John Day River.	a	Install a permanent diversion structure with fish passage facilities at the site of the existing annually installed structure.
		b	Construct a concrete turnout box and spillway; install trash screen and headgate.
		c	Incorporate layflat stanchions for installation of flash boards to regulate water level in spillway.

		d	Place approximately 48 cubic yards of 36" minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions.
		e	Incorporate water measuring device.
		f	Stabilize the banks of the stream adjacent to the structure as necessary with riprap to protect the installation.
		g	Shape existing spoils on the bank and plant grasses and hardwoods to promote rapid riparian vegetative recovery.
6	Panama Canal Diversion: Improve water quality and fish habitat and eliminate passage barriers for anadromous and resident fish in the John Day River.	a	Install a permanent diversion structure with fish passage facilities at the site of the existing annually installed structure.
		b	Construct a concrete turnout box and spillway; install trash screen and headgate.
		c	Incorporate layflat stanchions for installation of flash boards to regulate water level in spillway.
		d	Place approximately 200 cubic yards of 36" minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions.
		e	Incorporate the existing water measuring device and hydraulically powered fish wheel to screen fish from the ditch.
		f	Stabilize the banks of the stream adjacent to the structure as necessary with riprap to protect the

			installation.
		g	Shape existing spoils on the bank and plant grasses and hardwoods to promote rapid riparian vegetative recovery.
		h	Rebuild existing riparian corridor fence.
7	Lemons Ditch Diversion: Improve water quality and fish habitat and eliminate passage barriers for anadromous and resident fish in the John Day River near Mt. Vernon, OR.	a	Install a permanent diversion structure with fish passage facilities at the site of the existing annually installed structure.
		b	Construct a concrete turnout box and spillway; construct trash screen to protect turnout box; and install headgate in turnout box.
		c	Incorporate layflat stanchions for installation of flash boards to regulate water level in spillway.
		d	Place approximately 260 cubic yards of 36" minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions.
		d	Place approximately 260 cubic yards of 36" minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring water conditions.
		e	Incorporate the existing water measuring device and hydraulically powered fish wheel to screen fish from the ditch.
		f	Stabilize the banks of the stream adjacent to the structure as necessary with riprap to protect the installation.
		g	Shape existing spoils on the bank

			and plant grasses and hardwoods to promote rapid riparian vegetative recovery.
		h	Rebuild existing riparian corridor fence.
8	Upper Basin Cottonwood Reserves Demonstration Project: Demonstrate actions to improve riparian diversity, productivity, provide for long-term instream habitat components, preserve local genetic materials, and enhance water quality in the John Day basin.i	a	Identify locations of key cottonwood reserve areas on private and federal lands, in addition to those already identified.
		b	Secure final cooperative agreements with landowners and agencies, on their respective lands, where reserves will be established
		c	Outline perimeters of proposed reserves.
		d	Secure sufficient materials and construct protective barriers around identified reserves.
		e	Collect young plant materials to be "banked" in the Monument Plant Nursery and BLM Clarno Cottonwood Nursery.
9	Seasonal Corridor Fencing Demonstration Project: Demonstrate actions to improve riparian diversity and productivity, provide for long-term instream habitat components, and enhance water quality in the John Day basin.	a	Select final list of landowners willing to participate in a demonstration project.
		b	Negotiate and secure final cooperative agreements with landowners.
		c	Locate final position for seasonal corridor fences.
		d	Secure solar panels, electric fence, posts, and other materials sufficient to construct seasonal enclosure.

		e	Construct enclosure prior to grazing turnout.
		f	Monitor vegetative response.
		g	Remove electric wire and solar panel following plant dormancy
10	Beaver Management Program: Continue implementation of program reintroducing beaver where suitable habitat is identified, manage beaver that are in conflict with human activities, and inform the public regarding the benefits of beaver management	a	Continue implementation of the intergovernmental agreement. Identify additional participants, if any. Incorporate modification and amendments, if any.
		b	Continue transplant program. Select next five priority watersheds Complete habitat review and suitability analysis, complete communication plan, and incorporate monitoring of additional transplants into monitoring plan. Complete additional relocations.
		c	Continue public education efforts. Continue presentations to local schools, agencies, and organizations. Broaden current local educational effort to encompass regional distribution.
11	Stream Gauge Operations: Collect river flow data downstream of the upper Mainstem restoration projects for use in benefit analysis and evaluation and to assist with planning future actions.	a	Amend current contract and memorandum of agreement with Oregon Water Resources Department for water year 1998 to extend through 1999.
		b	Transfer funds to OWRD.
		c	.Receive collected data.

		d	.Analyze data in combination with other monitoring efforts.
12	Watershed Trust Fund: Complete planning for creation of a watershed trust fund for the John Day basin; provide for the long-term implementation of watershed restoration program; provide flexibility in implementation; and assurance of long-term results.	a	Update 1996 watershed trust fund proposal developed by a consortium of John Day basin cooperators.
		b	Organize local and regional support for proposal.
		c	Prepare presentations, discussion papers, fact sheets, and other informational/supporting materials.
		d	Develop elements of proposal package including, but not limited to:authorizing legislation, restoration principles and objectives, consolidated projects schedules from water optimization study and implementation plans, funding sources, and fund operation.
		e	Develop and negotiate funding agreements with participating agencies and foundations.
13	Monument Native Plant Nursery: Create a local source for native/local plant materials used in restoration activities; provide educational opportunities for the Monument School; reduce costs of conservation plants offered to local landowners; and improve	a	Develop plant materials collection and sale contract templates.
		b	Purchase supplies and equipment for the collection and care of native plants in the nursery.
		c	Collect cottonwood and other native materials for "banking" in the nursery.
		d	Provide funds to "buy down" the

			landowner costs for conservation trees.
14	Implement 1999 Monitoring Effort: Improve assessments of completed projects and evaluate to a sufficient level in order to assist with future planning efforts.	a	Amend or revise the 1998 annual monitoring plan to incorporate 1999 projects as necessary.
		b	Implement specific monitoring efforts including, but not limited to: Collection of water and ambient air temperature data; Monitoring channel.bank configuration changes; and Assess vegetative response.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	7/1998	9/1999	7.80%
2	7/1999	9/1999	6.60%
3	7/1998	9/1999	15.80%
4	7/1998	9/1999	7.80%
5	7/1998	9/1999	10.20%
6	7/1999	9/1999	19.40%
7	7/1998	9/1999	14.80%
8	10/1998	9/1999	2.30%
9	10/1998	9/1999	1.50%
10	10/1998	9/1999	6.90%
11	10/1998	9/1999	2.10%
12	10/1998	9/1999	2.40%
13	10/1998	9/1999	1.20%
14	10/1998	9/1999	1.20%
			TOTAL 100.00%

Schedule constraints.

Completion date.
1999

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		$ 0
Fringe benefits		$ 0
Supplies, materials, non-expendable property		$134,424
Operations & maintenance		$ 0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	$ 0
Travel		$2,500
Indirect costs		$ 0
Subcontracts		$52,737
Other		$26,095
TOTAL		$215,756

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$ 0	$ 0	$ 0	$ 0
O&M as % of total				

Section 6. Abstract

The project objectives are intended to increase in-season river flows through a combination of irrigation efficiency measures, reduce bank instability, sedimentation, and bedload movement thereby improving water quality, reducing or eliminating migratory delays from passage impediments, improve riparian condition and implement an annual monitoring program. Forty-seven percent of costs will come from sources other than BPA.

This project responds to and is consistent with tribal, state and federal goals and objectives within the regions plans and programs. Previous projects of this type have demonstrated success in addressing limiting factors identified for aquatic resource production in the basin. They follow a comprehensive assessment of the watershed and a detailed stream restoration plan. The benefits are to an entirely wild stock and habitat.

The projects utilize standard design criteria, and were selected using an interagency evaluation and prioritization process. The effects of project implementation scenarios on river flows and stream temperatures were analyzed through studies of the basin hydrology. Hydrologic and temperature models were prepared for the mainstem to assist in the evaluation. The effects of individual projects were also assessed for impacts on stream flow, temperature, sediment, and other resources.

These projects will be incorporated into the annual monitoring plan and follow standard methods for the examination of water and water quality. Channel and riparian surveys will follow standard methods of assessment.

In addition to the on-the-ground objectives, the long term restoration needs of the basin will be addressed. Planning will include developing a trust fund based on the restoration needs of the basin.

Section 7. Project description

a. Technical and/or scientific background.

The problems and needs of the John Day basin have been extensively studied over a long period and are detailed in numerous reports, management plans, and other documents. The Tribes, Oregon Department of Fish and Wildlife (ODFW), Oregon Water Resources Department (OWRD), Northwest Power Planning Council (NPPC), Bonneville Power Administration (BPA), Bureau of Reclamation (BOR), universities, and many others have conducted assessments and research, prepared management plans, and/or implemented restoration activities in response to identified problems. The Tribes, in Volume II of the *Spirit of the Salmon* plan, summarize the following problems in the basin:

> *Riparian habitat degradation is the most serious habitat problem in the John Day River Basin with approximately 660 degraded stream miles identified. Degraded fish habitat in the [basin] is a result of low winter water temperature, high spring flows, depressed beaver populations, accelerated streambank erosion, excessive stream sedimentation and reduced instream cover. The basin's ability to naturally repair itself from riparian habitat degradation and other impacts is slow in the John Day's semiarid environment and some areas are adversely affected by activities which ceased long ago. In other cases, poor management practices continue and problems are escalating. As soil erosion increase, flooding occurs and streambanks erode away, degrading habitat quality. In many tributary streams, excessive water volumes are deepening channels, thus lowering water tables in the immediate proximity [citation omitted]. Such loss of habitat quantity and quality, managers believe improved irrigation systems along with restoration of the uplands and riparian systems would provide the greatest long-term natural benefits for fish and improve late season stream flow as well.*

Other research and assessments, such as the ODFW spring chinook study and Oregon State University multi-year research project, identify similar problems. The Integrated System Plan summarizes spring chinook salmon production issues as follows (Anonymous 1991):

> *Limiting factors on the John Day include a number of habitat oriented problems. Passage and spawning is limited during low water years due to natural flow condition, but further aggravated by water withdrawals. This invokes high temperatures in certain areas that*

further restrict spawning. In addition, logging, road building, mining, and channelization has resulted in habitat degradation. A habitat improvement program is under way.

In response to identified issues and needs, various agencies have developed and implemented both active and passive restoration programs. These efforts have focused on instream and riparian habitat, water quality and quantity, and fish production. Many management and project plans rely and draw from other plans, with integration occurring in comprehensive, programmatic management documents. Project efforts rely and build adaptively upon previous and ongoing activities.

In 1988 the John Day Basin Council enlisted assistance from the Bureau of Reclamation (BOR) to provide technical assistance in preparing a watershed improvement plan. The goal was to create a list, using scientifically credible assessment methods, of "do-able" projects, with positive effects on water quality and quantity and aquatic habitat. In 1990, the planning efforts of Tribes, agencies, and publics culminated in the Upper John Day River Basin Master Water Plan Working Paper. The Working Paper identified critical gaps in ongoing agency programs and outlined projects that addressed these gaps. In subsequent years, individual stream restoration plans were prepared for the major watersheds in the upper and middle subbasin. These documents detail a comprehensive restoration program involving multiple agencies which targets all components of the watershed. The implementation strategy involves numerous measures, which used in combination, will result in beneficial impacts to the watershed.

Project implementation activities, under the master watershed plan, began in 1995 with the Luce-Long, Cathedral Rock, Holliday Return Flow Cooling, and Crown Ranch Return Flow projects. These were projects implemented to demonstrate positive achievements in riparian, instream habitat, and water conservation. All projects had multiple parties involved in a cost-sharing arrangement. Preliminary results on the demonstration projects were extremely positive. The Luce-Long project eliminated a "push-up" diversion, previously identified as a migration impediment, replacing it with a permanent, concrete and sheet steel device. The project benefits instream habitat through elimination of potential fish passage barriers (passage is assured at all river levels), ensures appropriation of water to rate and duty, and reduces sedimentation and bank erosion. The Cathedral Rock project actually abandoned a fish passage impediment and increased irrigation efficiency through conversion of an open ditch to a closed-pipe conveyance. The Holliday and Crown Ranch Return Flow projects converted surface irrigation drains to below-ground return systems. Monitoring on the Holliday project has shown a remarkable decrease in return flow temperatures to the river. Prior to implementing the project, only 27.5% of return flows were less than 64 degrees (the State water quality standard), while over 83% of post-project return flows were below the standard (Robertson and Delano 1997).

In 1996, the CTWS and GSWCD signed an agreement to implement additional projects under the "Early Action Watershed Projects" program of the BPA. In 1996, the Holliday Diversion, Kight and Ediger Irrigation, and Lemon's Infiltration Gallery projects were completed. The Holliday Diversion project converted a push-up diversion to a permanent structure, eliminating a fish passage impediment. The Kight and Ediger Irrigation projects involved reorganization of the flood irrigation system to an efficient sprinkler operation. These projects reduce diverted amounts and result in additional flows remaining in the river for a longer period of time (from moving the point of diversion downstream). The Lemon's project consisted of replacing a permanent diversion with an infiltration gallery and converting a portion of the open ditch system with a below-ground conveyance operation. This results in much less water being diverted (from a reduced need to divert more water for head and to make up for conveyance losses) and eliminates entirely a fish passage impediment. All projects consisted of cost-sharing with multiple parties, which effectively reduced BPA's contribution to the projects to less than 50 percent.

In 1997, the CTWS and GSWCD implemented additional projects under the same agreement from 1996. The Field's Irrigation and Infiltration Gallery, and Page and Clausen Irrigation Conversions were implemented in the 1997 field season. Although monitoring of these projects will not begin until next year, early anticipation of project results appears promising. The Fields project eliminated a fish passage barrier, reduced irrigation needs (by reusing warm tailwaters for irrigation), and improved irrigation and conveyance efficiencies. By reusing warm tailwater for

irrigation, forage production is increased and river diversion needs are reduced. The Page and Clausen projects reduce irrigation needs by improving efficiency. The anticipated results of these projects is additional higher quality water is left in the river for a longer period of time, stream temperatures are reduced, and more water overall remains in the river. The overall effect is to increase streamflow, identified as a critical need in the John Day. BPA's total cost-share obligation for these projects was less than 25 percent.

In 1997, the Tribes began working with their cooperators to implement other remaining scheduled projects in the watershed restoration plan. Among the planned projects, the beaver management program, Monument Native Plant Nursery project, water quality monitoring, and stream gauge operations were developed and are anticipated to continue through 1998.

Each project is selected from a range of construction alternatives, including installation of a permanent diversion, pumping station (electrical or internal combustion), or infiltration gallery. The cost of constructing each type of installation, the costs of operation and maintenance, and the site conditions are all compared to the anticipated benefit to the resources (e.g., landowner operations, bank stability, instream flows, etc.) Although infiltration galleries have been constructed in the past (two in 1997), they do not work at all sites (i.e., availability of on-site electrical power, not all can be used without a pump installation), nor do all landowners desire to accept the higher costs of electrical pumping in perpetuity. Numerous pumping stations have also been installed in the past, and for similar reasons, they cannot be used at every site. In addition, the use of combustion engine pumps posses other inherent hazards such as elevated fuel costs and noise/air pollution. As the prior constructed demonstration infiltration galleries receive additional attention and scrutiny, any remaining landowner skepticism should be overcome.

Each permanent diversion structure has two separate openings on opposite sides of the river. The spillway is located on the side closest to the headgate, while the fishway is on the far side of the river. As flash boards are installed in the spillway, the water level raises in the fishway concurrently (flash boards are not installed in the fishway). Consequently, flash boards appear to be the most effective method of ensuring adequate flows through the headgate (then through the fish screen and out to the ditch) without any impairment of fish migration. Evaluation of previous projects has shown that when the sill of the spillway is set equal to the elevation of the headgate, flash boards are not even needed until late July or early August in a normal water year, and in some instances, are not even installed. This effectively replaces diversions that were, oftentimes, a complete barrier to streamflow, season long.

Permanent diversions are installed at a maximum depth of three feet below riverbed grade. Based upon monitoring and evaluation conducted in the upper mainstem, it appears that groundwater interacts with the river in two ways: 1) through lateral releases from water present in adjacent banks/floodplains; and 2) through intergravel flow subsurface to the riverbed. Since the permanent diversion is installed perpendicular to the channel, there is no way for the "hard" parts of the structure to intercept any potential lateral exchange of flow, in either a "gaining" or "losing" reach of stream.

Intergravel interception typically occurs where a break is present in the river bed (e.g., riffle breaks into a pool) and a small plume of cooler water upwells. Since push-up diversions are constructed by excavating a berm using riverbed and bank materials, subsurface flows may be intercepted if the downstream area is excavated. However, the relatively minor benefits of a small pocket of cool water does not appear to outweigh the detriments of delayed or impeded fish migration. The minimal installation depth of the permanent diversion and the nature of intergravel flows precludes any significant interception of subsurface flows.

A primary need in the John Day is to increase late season flows, which are often below 25 cfs in primary spawning and rearing habitat (approximately 13 cfs less than what is needed)[1]. The proposed project area encompasses critical spawning and rearing areas. The USDI Fish and

[1] Bureau of Reclamation. 1994. Water conservation demonstration project, John Day River basin, Oregon. Pacific Northwest Region. Boise, ID. 20 pp.

Wildlife Service evaluated the construction projects from 1993 through 1996, which were permenent diversions, pumping stations, and infiltration galleries such as the proposed projects. They conclude that reducing diversion requirements and reducing warm water return flows, will increase juvenile rearing adult holding survival[2] and provide "significant benefits to spring chinook salmon, summer steelhead, and resident species".[3] These conclusions were essentially the same as those reached during the proposal and design phase of these projects and during the water optimization study which analyzed these projects conceptually.

Part of the John Day Basin Office's efforts is to work cooperatively with landowners, the Oregon Water Trust, and others to identify opportunities to secure instream flows using water "freed up" through the implementation of conservation projects. Under current Oregon water law, there are a number of opportunities to accomplish this objective. However, our *experience* has been that landowners are very reluctant to discuss this issue concurrently with discussing the construction portion of the project. Rather, our greatest successes have been realized by approaching the landowner or irrigation district after the conservation project has been implemented and actual "surplus" water amounts can be presented for consideration of instream lease. However, we do have two ongoing negotiation where landowners are willing to discuss transferring part of their consumptive use to an instream flow as their cost-share contribution of the project. As with construction alternatives, this aspect will always be considered where appropriate.

In addition, the restoration effort in the upper basin has been ongoing for over ten years. Each project is viewed as a portion of the overall watershed effort, with the cummualtive benefit of increased flow, reduced sedimentation, lowered temperature, and improved riparian condition. Through experience with these projects, we have shown that reduced diversion amounts remain instream at least down to the next diversion, which in many cases is two to three miles downstream of the project. This provides significant benefits when the project area encompasses critical spawning and rearing areas, as these do. Since the projects are integrated across the watershed, work progresses from upstream to downstream at each point of diversion within the project area, and the overall effect is to save water along a greater reach of stream.

The greatest demonstration of the use of effective scientific principles in designing each project is in the biological response and resource availability following project implementation. The results of monitoring previous projects has displayed a reduction in diversion rates, lowering of stream temperatures, reduced passage impairment, increased bank stability, and increased overall returns of spring chinook. These projects are the result of over six years of intensive study by the Bureau of Reclamation, Tribes, Oregon Department of Fish and Wildlife, Natural Resource Conservation Service, Oregon Department of Fish and Wildlife and others. The cummulative effects of long term implementation and operation have been modeled, analyzed, and evaluated by numerous agencies. Project design and monitoring procedures are evaluated by an interagency team of professionals within the basin and region.

Project design criteria follow the USDA Natural Resource Conservation Service's standard engineering guidelines as described in their National Cooperative Agreement. Calculations of ground water interception and flow rates are based upon "The Design and Construction of Infiltration Galleries" (Bennett 1970), other literature, and current experience with these projects. The technology developed and pioneered in the upper John Day is being adopted by professional scientists and engineers in other parts of the basin and in other basins of the northwest. Instream construction activities follow specific standards established by the Oregon Department of Fish and Wildlife, established through their own research. We are not aware of any alternative scientific

[2] US Fish and Wildlife Service. 1996. John Day River water conservation demonstration project, phase III, planning aid memorandum. Memo to Regional Director, US Bureau of Reclamation, Northwest Region from State Supervisor, US Fish and Wildlife Service, Oregon State Office.
[3] US Fish and Wildlife Service. 1995. John Day River water conservation demonstration project, phase II, planning aid memorandum. Memo to Regional Director, US Bureau of Reclamation, Northwest Region from State Supervisor, US Fish and Wildlife Service, Oregon State Office.

procedure or technique that would be of significant benefit given current constraints of funding and time.

Unfortunately, there are no non-structural approaches to diverting water from a river. After long periods of study and evaluation, the proposed projects are the best alternatives to annual replacement of gravel diversions. As discussed above, less intensive structures (pumping and infilration galleries) are considered where feasible.

Each project is a permanent installation of a project structure. Consequently, the benefits of the project will last as long as the structure is in place. Following the high flows (100 year flood flow estimated) of 1996, each project was evaluated. Although there were minor modifications at some of the projects, each was completely operational and continued meeting objectives.

The annual monitoring and evaluation plan is committed as an ongoing agency program and is not funded through the BPA. Prior to the monitoring season, an annual monitoring plan is developed and reviewed by the interagency team. Each project is evaluated for attainment of project objectives following construction. A representative sample of each project type is selected for monitoring of specific measurable variables. Monitoring measures include, but are not limited to, installation of photo points, evaluation of channel configuration and recovery, temperature data gathering, stream flow gauging, and stream temperature profile analysis using thermal videography. Through the annual monitoring effort, both site specific project benefits and the overall, cummulative watershed effect can be represented.

The primary critical uncertainty in project implementation is the reasonable reassurance of funding availability. Planning and design has already been completed for each project. Landowner approval has been provided, although the final agreement documents cannot be signed until funding has been appropriated. Since ODWR and ODFW are program cooperators, instream permits have been reviewed and approved in a timely manner. Barring some unforeseen natural disaster, such as flood flows lasting through the instream construction window (which has never happened), the only obstacle to project implementation will be the lack of funding.

b. Proposal objectives.

Proposal objectives:

a) Increase in-season river flows through a combination of irrigation efficiency, riparian recovery, and biological measures:

i) Irrigation systems were constructed historically without regard to water efficiency. In many cases, water must travel many miles within the ditch before being applied to the target field. Transport losses due to evaporation, seepage, and spill can be significant. Irrigators may divert more than their legal rate and duty in order to move their entitlement down the ditch.

ii) The 1978—1985 spring chinook study, and other watershed assessments, identified irrigation withdrawals, which reduce flows and increase temperatures, as a possible limiting factor for spring chinook salmon in the mainstem (Lindsay et al 1985).

iii) The interagency watershed assessment and stream restoration plans identify efficiency measures as having the potential for significant, positive effects on flows throughout the irrigation season.

iv) The Return Flow Cooling #1 North project will contribute to this objective by reducing cool-water return flow losses. The Courchesne Diversion project will accomplish this objective by reducing conveyance losses through the upgraded irrigation system.

v) Beaver ponds historically played an important role in capturing spring runoff, allowing slow, steady releases to the streams throughout the year. Establishing beaver in the basin's

tributary streams will contribute to headwater storage and late-season instream flows.

vi) Establishing seasonal grazing exclosures will improve riparian condition and may result in improved water table conditions, improving late-season releases to the river.

b) Reduce bank instability, sedimentation, and bedload movement thereby improving water quality:

i) Annual construction, and reconstruction on an as-needed basis, of push-up diversions require scavenging of river banks and beds to secure materials for the diversion dam. River banks and beds, up- and downstream of the dam are continuously unstable leading to acute and chronic sediment inputs.

ii) Installation of permanent structures on the Indian Creek, Southside Ditch, Keerins, Panama Canal, and Lemons Ditch diversions will eliminate the need for annual construction and in-season reconstruction of push-up diversions. The Courchesne Diversion project will eliminate the instream diversion structure altogether, thereby eliminating the need for any instream maintenance activities.

iii) Beaver dominated systems are typically more stable due to the pond features, improved riparian condition, and bank moisture content. Continuing the beaver transplant program allows for relocations to areas of chronic bank instability and sedimentation. Beavers naturally corrects these problems through their dam building activities.

iv) Establishing cottonwood reserves will meet the dual purpose of providing for bank stability in the immediate area of the reserve and allow for the use of cuttings in restoration projects elsewhere. This should have the cumulative effect of improving riparian condition, decreasing bank instability, resulting in enhanced water quality.

c) Reduce or eliminate migratory delays from passage impediments:

i) Anadromous fish entering the upper John Day system have already traveled over 200 miles to access spawning areas. Research that the CTWS -- John Day Basin Office has funded in the upper basin shows that adult holding areas are closely tied to thermal refugia (Torgersen 1996). Most of the refugia areas are in the upper mainstem above Prairie City and the upper Middle Fork, above the Camp Creek confluence.

ii) Passage impediments delay migration to spawning areas and may lower spawning success. The proposed projects address passage impediments in the migratory corridor downstream of the identified refugia and spawning areas

iii) The Indian Creek, Southside Ditch, Keerins, Panama Canal, Lemons Ditch, and Courchesne Diversion projects all eliminate passage impediments.

d) Improve riparian condition and extent:

i) Annual construction of push-up diversions require scavenging of river banks to secure materials for the diversion dam. In addition to removing riparian vegetation, this leads to chronically unstable river banks both up- and downstream of the diversion dam. Increased velocity over the diversion dam scours downstream banks.

ii) The diversion projects will eliminate the need for scavenging materials from adjacent river banks and reduce bank scouring below the structure. This, in combination with revegetation following project construction, will result in stable, well vegetated riparian areas surround the project structure.

iii) Irrigation and agriculture operational efficiencies which improve forage production and quality reduce the pressures to graze riparian areas.

iv) The Middle Fork and primary tributaries (e.g., Camp Creek, Long Creek, Cottonwood Creek) lack cottonwood in the riparian community. Although there are cottonwood present, the extent of the galleries as well as the understory production has been significantly reduced through a combination of land management practices and ungulate grazing. Cottonwoods play an

important role in the long-term habitat structure of these streams. Establishing cottonwood reserves will provide a necessary seed source for future plantings, allow for understory production to replace the current decadent overstory stands, and will demonstrate the productive potential of the stands following application of protective measures.

v) Beaver play an important role in the improved vigor of riparian communities. Pond building, and the subsequent raising of the water table, discourage ungulate grazing allowing for improved riparian vigor. Use of riparian shrubs can directly stimulate riparian growth.

vi) Restoration programs are moving toward the almost exclusive use of native plant materials in revegetation efforts. The John Day lacks an viable source of native/local materials. With the changes to the Monument Nursery in 1997 and those proposed in 1998, this could become a source for the ongoing agency programs. Investing in the nursery would allow for "buying down" the costs of conservation plants, thereby increasing the availability of plant materials to the average landowner. This should increase the rate of plantings an improve riparian condition throughout the basin.

e) Create a flexible, responsive watershed restoration program funding mechanism with a reasonable reassurance for continued operations.

i) A key to successful watershed restoration is a reasonable reassurance of project funding. The inherently capricious nature of landowner involvement in agencies programs reinforces a need to have a reliable source of funding that can be used as opportunities arise.

ii) Many landowner and organization cooperators are currently frustrated with the nature of project funding and desire a more stable and reliable process. Establishing a basin trust fund would meet their objectives while continuing past and ongoing efforts of the Tribes and agencies.

iii) Completing basic planning in order to develop a fund structure, protocol, and other components is a necessary prerequisite to requesting funding for the fund itself.

f) Implement annual monitoring program:

i) The benefits of project implementation are generally outlined from the comprehensive watershed assessment, stream restoration plans, and other agency documents. The specific benefits are being identified under project-level monitoring efforts. However, these efforts have been conducted only when monitoring funds have been secured.

ii) A primary objective of the irrigation related projects is to improve late summer flows. Analyzing each project's contribution to this objective requires an assessment of flow conditions downstream of the project. The stream gauging operations at the John Day gauge is critical for conducting this assessment, since it is downstream of most of the upper mainstem projects. The data collected at this site, used in combination with the specific flow information gathered at each project, is an effective measure of the cumulative flow benefits.

iii) Trapping and relocating beaver provides an needed assessment of beaver population status and habitat requirements.

iv) The CTWS -- John Day Basin Office, is currently preparing a comprehensive monitoring program that will evaluate the specific benefits of the proposed and previous projects. The program will utilize the previous and ongoing efforts, such as the OSU thermal videography project, temperature and flow monitoring, and other activities.

c. Rationale and significance to Regional Programs.

Rationale and significance to Regional Programs:

a) This project responds to many goals and objectives within the region's plans and programs. Although all of these goals cannot be responded to in this form, key passages are listed below. Other objectives met, to varying degrees , with these projects include the Program's doubling goal

(4.1), principles of salmon and steelhead rebuilding (4.1A), wild and naturally spawning population policy (7.1D), habitat goals and policies (7.6), coordinated habitat planning (7.6C), habitat objectives (7.6D), cooperative habitat protection and improvement with private landowners (7.7, 10.2B), implementation of state, federal and tribal habitat improvements (7.8), water conservation (7.8H), passage and protective screens on tributaries (7.10), resident fish goals (10.1), and diversion screening and passage (10.2C).

b) Proposed projects are described in the comprehensive watershed assessment and stream restoration plans referenced above. They were identified and prioritized using an interdisciplinary team of specialists from numerous agencies with familiarity with basin resources and needs.

c) From the Spirit of the Salmon plan, recommended habitat enhancement actions for the John Day subbasin, instream flow and passage: "Implement more efficient irrigation methods and water conservation practices benefiting landowners and instream flows."

d) The CTWS currently have a signed agreement with the GSWCD and ODFW for coordination of previous restoration projects and agreements with OSU and the GSWCD for monitoring. These agreements are anticipated to be updated for the proposed projects. In addition, issues and opportunities in the basin are coordinated through a multi-agency team of professionals. Although this team is not formally coordinated through an interagency agreement, the completed restoration projects demonstrate the success of ongoing project collaboration.

e) The 1978—1985 spring chinook study (Lindsay et al, 1985) identified habitat limitations in the mainstem. The watershed assessment and other plans/evaluations have identified additional issues and opportunities. Areas of suitable habitat, but currently unoccupied due to affects from water withdrawals, were identified. Instream habitat improvements have been completed in the project area and other restoration activities have been completed and are ongoing. For example, some of the proposed projects are within the project areas for prior instream habitat improvements, riparian corridor fences, and other on-farm enhancements.

f) Irrigation screening began in the late 1950s and continues under the BPA fish screening and passage improvement program. The proposed projects reduce the need for fish screens by providing alternative measures (*see* 10.2C of the Program), in some cases, by converting flood diversion to pumping stations. In other situations, the effectiveness of the screening device is enhanced through reconfiguration of the diversion structure.

g) 5.4D.8 "Evaluate the potential for water conservation, water efficiency or other measures in [BOR] programs with the most potential to benefit anadromous fish and with the least impact on third parties. BOR sponsored and assisted in the preparation of the water optimization and stream restoration plans. Prior demonstration projects were implemented and monitoring has identified the positive benefits of these actions. The proposed projects are the logical extension of completing the demonstration projects and broaden the application of developed technology.

h) 7.0A.1 "…In identifying actions, use Table 1, Table 2, and Appendix A of the Columbia Basin Tribal Restoration Plan submitted to the Council on August 15, 1994, the Integrated System plan and other appropriate information…" As described above, these projects are incorporated and described in the Tribal restoration plan. In addition, the Tribes were a cooperator on the water optimization and stream restoration plans.

i) The BPA Integrated System Plan identifies the following goals & policies:

  i) Area above Bonneville Dam is accorded priority: The John Day drainage is in the region above Bonneville Dam.

  ii) Genetic risks must be assessed: The John Day supports one of the largest remaining, completely wild/natural populations of anadromous fish in the Columbia River basin. The projects are intended to increase productivity of wild stocks.

  iii) Harvest management must support rebuilding: No sport fishing for spring chinook salmon has been permitted in the basin since 1978 (Anonymous 1991) and subsistence fishing has been estimated at between approximately 2% and 20% and do not appear to impact John Day River stocks (Lindsay et al 1985) Although sport fishing for summer steelhead is

currently allowed, a “no-kill” regulation is in effect. Catch and release mortality on summer steelhead is assumed to be negligible.

iv) System integration will be necessary to assure consistency: All projects have been integrated in the watershed assessments and stream restoration plans. Additional planning and implementation collaboration occurs in the field during project construction. Monitoring has been coordinated through county committees, formally through agreements among the agencies, and informally through regular agency contact.

v) Adaptive management should guide action and improve knowledge: Proposed actions build upon previous project activities and monitoring information gathered from these projects. These projects are a result of identified gaps in previous agency programs and respond to critiques of past actions (Beschta 1991).

j) The Integrated System Plan also identifies the following recommended actions for the John Day: Enhance streamflows through improvement of irrigation efficiency, water conservation, enforcement of established minimum streamflows, instream water rights, and watershed improvement, riparian storage, and beaver management.

k) 2.2A: Support Native Species in Native Habitat: The Program preference is to support and rebuild native species in native habitats, especially weak stocks. John Day spring chinook are classified as wild stock that is depressed but stable, with enhancement through a natural production strategy. All John Day summer steelhead are wild and classified as healthy and increasing (although current trend is downward), with increased natural production as a restoration strategy is recommended.

l) 2.2C.1: Share Costs: The Council expects that costs will be shared among parties to implement measures in the Program, in particular, for projects that mitigate the effects of non-hydropower caused problems. Six of seven proposed projects have a total cost share by Bonneville of less than 50%. The total cost share proportion of Bonneville’s contribution is approximately 53%.

m) 7.6B Habitat Policies

i) 7.6B.3: “Give highest priority to habitat protection and improvement in areas of the Columbia Basin where low or medium habitat productivity or low pre-spawning survival for identified weak populations are limiting factors. Give priority to habitat projects that have been integrated into broader watershed improvement efforts and that promote cooperative agreements with private landowners.”

ii) 7.6B.6: “Encourage the involvement of volunteers and educational institutions in cooperative habitat enhancement projects. Promote public outreach and encourage education in watershed and resource management and protection throughout the basin.”

n) 4.1A Salmon and Steelhead Rebuilding Principles:

i) (3)“…Special priority should be given to projects that are part of model watersheds or other coordinated watershed programs, especially those with local community involvement.”

ii) (5)”Consistent with the Council’s adaptive management policy, priority should be given to activities that address critical uncertainties and/or test important hypotheses…”

d. Project history

Project history: See above at Technical Background

e. Methods.

Methods:

a) The Grant Soil and Water Conservation District utilizes project design criteria based on the

Natural Resource Conservation Service's standard engineering guidelines as outlined in their National Cooperative Agreement.

b) Projects are selected using an interagency evaluation and prioritization process. Anticipated outcomes are weighed against costs to determine cost—benefit ratios for the proposed projects and alternatives.

c) Conceptual projects were analyzed in the Water Optimization Study. The effects of the project implementation scenarios on riverflows and stream temperatures were analyzed through simulation studies of the basin hydrology. Hydrologic and temperature models were prepared for the main stem to assist in the evaluation. The effects of individual element (project) implementation was also assessed for impacts on streamflow, temperature, sediment, fish, and other resources (e.g., crop production).

d) Tasks associated specifically with objectives are described above at Section 4 and Section 7(b).

e) The methodology for these projects is being designed, dynamically modified, and applied at the local level. However, it draws upon research conducted in the field of hydrology and engineering. Some of these resources are described in the paper "The Design and Construction of Infiltration Galleries" (Bennett 1970) and other geotechnical manuals.

f) Monitoring and evaluation of each project is committed as part of the agencies' (e.g., CTWS -- John Day Basin Office and Grant SWCD) annual monitoring program. Current monitoring on previously completed projects consists of visual assesssments of post construction site conditions and acquisition of temperature and flow information. In addition, the 1998 monitoring plan proposes to monitor channel configuration, flow, temperature, fish species distribution, and riparian reestablishment. In order to evaluate sediment delivery within the project construction area, cross sectional channel measurments will be compared to the detail pre-project engineering design drawnings. Changes in channel configuration and estimates of sediment input can be calculated. Based on previous photo point monitoring at each constructed project, restoration of stream bank vegetation has been extremely rapid. This indicates that sediment delivery is effectively controlled within one to two years of project implementation.

g) Instream construction follows guidelines established by the Oregon Department of Fish and Wildlife for timing considerations to protect migrating, spawning, and emerging fish. Standard methods of construction for protection of instream resources are followed to ensure minimization of acute affects to aquatic and terrestrial resources in the area of impact. Compliance with the National Environmental Policy Act, through preparation of project level documents, provides additional assurances of and attention to biological protection requirements.

h) Risks to species from short term, acute construction impacts have been weighed against the long term risks of failing to complete restoration actions. In all cases, the risks and chronic impacts of not implementing the projects have been significantly higher to resources than the negligible effects of project activities.

f. Facilities and equipment.

Facilities and equipment:

a) Construction equipment to be used varies depending upon site characteristics, materials to be installed, and site objectives. For example, the diversion projects use a trackhoe and loader to place rip-rap rock and a pump to dry the site for placement of concrete. Sites with additional excavation requirements will utilize a bulldozer as well. Equipment is readily available within the project areas.

b) Project design utilizes various engineering computer-aided design packages. Project monitoring will include application of microchip data loggers and computer analysis programs.

This equipment is already present in the project offices.

g. References.

7) References:

a) Anonymous. 1991. Integrated system plan for salmon and steelhead production in the Columbia River Basin. Prepared by the Agencies and Indian Tribes of the Columbia Basin Fish and Wildlife Authority. Columbia Basin Fish and Wildlife Authority and Northwest Power Planning Council.

b) Anonymous. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit. The Columbia River anadromous fish plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. Vol. I and II.

c) Beschta R.L., W.S. Platts, and B. Kaufmann. 1991. Field review of fish habitat improvement projects in the Grande Ronde and John Day River basins of Eastern Oregon. October 1991. Pp. 52

d) Lindsay R.B., W.J. Knox, M.W. Flesher, B.J. Smith, E.A. Olsen, and L.S. Lutz. 1985. Study of wild spring chinook salmon in the John Day River system. U.S. Dept. of Energy, Bonneville Power Administration, Division of Fish and Wildlife. DOE/BP-39796-1.

e) Robertson S.W. and K. Delano. 1997. Holliday Ranch return flow cooling project, 1995—1996 monitoring report. Confederated Tribes of Warm Springs, John Day Basin Office. *In Prep.*

f) Torgersen, C.E. 1996. Multiscale assessment of thermal patterns and the distribution of chinook salmon in the John Day River basin, Oregon. M.S. Thesis. Oregon State Univ. pp. 99.

Section 8. Relationships to other projects

These projects are incorporated into the overall watershed restoration program of the agencies. Many proposed projects are within the project areas of previously implemented projects (e.g., instream habitat or riparian corridor project).

As explained in Schedule Constraints, above, these projects require permitting by other agencies. Since planning has already been completed, funding will allow submission of permit applications in sufficient time to perform instream construction activities during the 1999 instream construction "window".

Section 9. Key personnel

Patty O'Toole - fisheries biologist
Duties include project administration, planning, design, implementation, coordination and monitoring and evaluation.
B.S. Zoology, Oregon State University, area of emphasis: Organismal Biology, 1989
Employed by the Confederated Tribes of the Warm Springs Reservation of Oregon.
Eight years in fisheries management, project planning and implementation (production, management and habitat). Lead preparer for the Hood River Production Project Master Plan, Master Agreement and Environmental Impact Statement. Contributor to IRMP I and II.

Shaun W. Robertson - Watershed Restoration Coordinator, 250 hours

Duties: Contractual oversight, technical assistance, project review, project monitoring, public education efforts.

Other project personnel will be assigned/hired/contracted when contract is established with BPA.

Section 10. Information/technology transfer

The Tribes anticipate obtaining assistance from a Bureau of Reclamation engineer in 1999. This engineer will be dedicated to planning and designing project in the Middle Fork and North Fork of the John Day using technology developed on the upper mainstem John Day. This engineer will "apprentice" with the GSWCD engineer to learn the techniques developed under this and other previous projects. The anticipation is that following the 1999 field season, the engineer will be able to return to BOR and use the projects completed during the field season to develop similar projects in other states.

In addition, other engineers and biologists from other basins have reviewed the projects completed in previous years. Their interest has been in taking this technology to their basins (e.g., Rogue River). We anticipate continuing this technology transfer in 1999.

Numerous tours of completed projects were conducted in 1997, involving landowners, watershed councils, and agency staff. A project information sheet entitled "Partners in Water Conservation" is prepared following completion of each project. These are then distributed to interested individuals and groups throughout the basin. These educational efforts have resulted in increased awareness of water/riparian conservation efforts and generated additional interest in cooperative projects in other areas. The tour conducted with the North Fork Watershed Council has generated sufficient interest in the subbasin to warrant requesting additional technical assistance to plan projects in their area.

The Beaver Management Program has a well established public information and exchange component that will be continued, if funded, in 1998. The technology and evaluations conducted within the five priority watersheds (established annually) is transferred to other parts of the basin.

Successful evaluation of the two proposed demonstration projects will result in information transferred to the basin's watershed councils and other organizations.

All data gathered under the stream gauge operations project is available, in various formats, from the USGS.

Information collected will be made available via Streamnet and informational reports will be available detailing project specifics. Site visits with government and private groups will be continue and information will be presented at watershed, range and fisheries workshops.