
PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Implement Fisheries Enhancement Opportunities: Coeur D'alene
Reservation

BPA project number: 9004400
Contract renewal date (mm/yyyy): 10/1999 **Multiple actions?**

Business name of agency, institution or organization requesting funding
Coeur d'Alene Tribe

Business acronym (if appropriate) CDA Tribe

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NPPC Program Measure Number(s) which this project addresses
10.1, 10.1A, 10.1B, 10.8B.20, 10.8B.21

FWS/NMFS Biological Opinion Number(s) which this project addresses
N/A

Other planning document references

Upper Columbia River Basin Draft Environmental Impact Statement (USDA 1997)
Status of the Interior Columbia Basin, Summary of Scientific Findings (USDA 1996)
Coeur d'Alene Lake Management Plan (IDEQ 1997)
IDFG Fisheries Management Plan, 1996-2000 (IDFG 1996)
Determination Status for the Columbia River Bull Trout (USFWS 1998)
Feasibility Report on Restoration of Coeur d'Alene Tribal Fisheries (UCUT 1985)
Coeur d'Alene Tribe Project Management Plan (BPA 1998)
Supplementation Feasibility Report (BPA 1998)
State of Idaho Bull Trout Conservation Plan (1996)
Report on Coeur d'Alene Lake (EPA 1977)
Agricultural Pollution Abatement Plan, Lake Creek Watershed (Kootenai-Shoshone Soil
Conservation District 1991)

Short description

Enhance critical watershed habitat to mitigate limiting factors for westslope cutthroat and bull trout in the Coeur d’Alene subbasin. Maintain compensatory harvest opportunities and develop environmental educational programs in local schools.

Target species

Westslope cutthroat and bull trout

Section 2. Sorting and evaluation

Subbasin

Coeur d’Alene subbasin, Upper Columbia subregion

Evaluation Process Sort

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

Section 3. Relationships to other Bonneville projects

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

Project #	Project title/description
9004400	Implement Fisheries Enhancement Opportunities: Coeur D’alene Reservation
9004401	Lake Creek Land Acquisition
9004402	Coeur d’Alene Tribe Trout Production Facility

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1987	NPPC ammended the F&W Program to include baseline stream surveys of tributaries located on the Coeur d'Alene Indian Reservation.	
1990	Conducted field surveys of Reservation streams.	Documented location, accessibility, stream gradient, and habitat potential of 21 streams within the Reservation boundaries.
1990	Completed annual report which assessed the enhancement potential of Reservation streams for westslope cutthroat and bull trout.	Ten tributaries were identified as having potential for habitat enhancement projects.
1991	Physical and biological surveys were completed on the ten tributaries identified for further study.	Surveys incorporated measures of bank and bed stability, riparian condition, land use, urbanization, migration barriers, water quality, stream flow, substrate suitability, channel modifications, relative fish abundance, and macroinvertebrate densities.
1991	Used a modified Missouri method of evaluating streams in combination with information on biological indicators to select target tributaries for restoration and enhancement.	Of the ten tributaries determined to have potential for habitat enhancement four target tributaries (Alder, Benewah, Evans, Lake Creeks) were selected.
1992	Began using watershed assessment techniques to describe watershed processes and resource conditions in target tributaries on the Coeur d'Alene Indian Reservation.	Compiled information related to improving spawning and rearing habitat for each target tributary.
1993	Conducted baseline population evaluations for westslope cutthroat trout and macroinvertebrates in each target tributary.	Compiled population and biomass estimates for westslope cutthroat trout and calculated community metrics for macroinvertebrate populations.
1993	Identified limiting factors for westlope cutthroat and bull trout in target	Determined that stream temperature, base flow, and sediment were

	tributaries.	limiting cutthroat trout and bull trout abundance and distribution.
1994	Developed recommendations to improve and protect habitat while increasing numbers of westslope cutthroat and bull trout in target tributaries.	Recommendations included: Conduct habitat restoration in target tributaries, develop alternative harvest opportunities, purchase critical watershed areas, construct and operate trout production facility, implement monitoring and evaluation program.
1994	Recommendations of the Coeur d'Alene Tribe were adopted by NPPC.	NPPC ammended FWP objectives (10.8B.20).
1995	Priority areas for restoration were identified in the four target watersheds.	Used GIS technology to assist this task by overlaying information on riparian condition, fish population abundance and distribution, and land ownership.
1995	Initiated the first demonstration projects. Erected 2.8 km of exclusion fencing, installed bank protection structures, constructed pool habitat, and reestablished connections with historic floodplain channels at two locations.	Increased natural regeneration of riparian trees, shrubs and forbs by an estimated 300% compared with adjacent grazed areas.
1995	Implemented the first compensatory harvest project by planting 1000 rainbow trout into Worley Pond.	Provided additional harvest opportunities to the Reservation community.
1996	Implemented additional demonstration projects. Erected 1.9 km of exclusion fencing, placed LWD in a 300 meter test reach, installed two current deflectors, and planted more than 9,000 trees and shrubs.	Achieved greater than 50% survival in upland revegetation treatments and increased native plant diversity by an average of 150% in riparian revegetation treatments.
1996	Maintained and stocked Worley Trout Pond with over 3000 rainbow trout.	Provided additional harvest opportunities to Reservation community. Reduced fishing pressure on target tributaries by an estimated 2016 angler hours.
1997	Completed 5-year management plan for enhancement of Tribal fisheries.	Identified appropriate restoration techniques and projected anticipated program expenses for FY1997-2001.
1997	Continued project implementation. Constructed and enhanced 4 acres of wetland habitat, constructed a side-channel rearing pond, built a bio-revetment to protect 100 meters of streambank, and planted more than 9,000	Substantially reduced non-point source sediment pollution from over 100 acres of farmland. Achieved greater than 50% survival in upland treatments and increasing native plant diversity by an average of

	trees and shrubs.	100% in riparian treatments.
1997	Stocked Worley Pond with 2200 rainbow trout.	Provided additional harvest opportunities to Reservation community.
1998	Constructed and enhanced 2 acres of wetland habitat and planted more than 9,000 trees and shrubs.	Substantially reduced non-point source sediment pollution from over 150 acres of farmland.
1998	Stocked of Worley Pond with 1400 rainbow trout.	Provided additional harvest opportunities to Reservation community.
1998	Compiled comprehensive lists of landowner contacts in each of the target watersheds.	Signed 8 long-term easements to protect critical habitat in two target watersheds during the past three years.
1998	Initiated a gravel study in known spawning tributaries of each target watershed to quantify the quality and quantity of available spawning gravel.	Results of the study will be published in annual reports.
1998	Collected over 400 individual tissue samples from 13 location to determine stock purity and relatedness of westslope cutthroat trout stocks.	Initial results from 4 locations indicate that tested stocks are 95% percent pure.
1998	Completed supplementation feasibility report for westslope cutthroat trout on Coeur d'Alene Indian Reservation.	Determined the need for supplementation of natural fish stocks in order to meet goals of NPPC and Tribe for harvestable numbers of westslope cutthroat trout in near future.

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Implement habitat restoration projects that will ultimately increase production of resident westslope cutthroat and bull trout in four target watersheds.	a	Identify projects using existing information from watershed assessments and biological surveys.
		b	Work with private landowners to procure long term lease agreements or riparian easements.
		c	Conduct project planning activities including: complete project descriptions, submit information for BPA supplemental analysis, coordinate with partnership

			agencies, and obtain permits.
		d	Implement riparian and upland enhancement projects in target watersheds.
		e	Develop sites that will provide high quality rearing habitat for juvenile fish.
		f	Implement wetland enhancement projects in target watersheds.
2	Monitor changing biological and chemical conditions in target watersheds and evaluate the success of restoration projects.	a	Conduct trend monitoring activities. Measure water quality parameters at 10 sites. Measure fish abundance and diversity at 95 sites. Monitor fish migration in target watersheds.
		b	Conduct effectiveness monitoring at each project site. Measure specific habitat variables according to project needs. Use photo documentation where appropriate.
3	Provide compensatory harvest opportunities for the Reservation community at dispersed sites to reduce fishing pressure on target stocks.	a	Maintain and stock existing trout ponds consistent with management direction.
		b	Evaluate trout pond project effectiveness by conducting creel surveys, angler interviews and year-end population estimates.
4	Encourage long-term support of restoration activities by enlisting participation of local school districts, landowners and other agencies in the planning and implementation of projects.	a	Enlist participation in the restoration program through classroom presentations, hands-on activities, and a summer internship program.
		b	Facilitate watershed work group meetings to disseminate program information and develop cooperative opportunities for restoration. Coordinate community and agency activities to integrate restoration projects.
		c	Publish a quarterly newsletter detailing restoration activities and other program highlights.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/2000	9/2002	Achieve 25% habitat improvement target.		46.00%
2	3/2001	9/2001	Track 8 water quality parameters at 10 sites.		17.00%
3	5/2001	9/2001	Reduce fishing pressure on target stocks by 9,000 angler hours.		24.00%
4	10/2000	9/2001			13.00%
				Total	200.00%

Schedule constraints

Critical constraints include: funding stability over time, timeliness of procuring funds, adequate landowner participation, and catastrophic natural events (floods, wind storms, etc.).

Completion date

2013

Section 5. Budget

FY99 project budget (BPA obligated): \$0

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	4 FTE's, 2 Part-time, 6-8 seasonal	%45	307,000
Fringe benefits	41% of personnel costs	%18	125,870
Supplies, materials, non-expendable property	office supplies, restoration materials, etc.	%7	48,624
Operations & maintenance	equipment repair/maintenance, vehicles and milage	%3	22,165
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		%1	9,130
NEPA costs	To be completed by program staff.	%0	0
Construction-related support		%0	0
PIT tags	# of tags:	%0	0
Travel	Includes training	%1	8,000
Indirect costs	Calculated @ 31.6% minus capital acquisitions and subcontracts	%19	129,887
Subcontractor	Restoration implementation,	%4	30,412

	macroinvertebrate sample analysis		
Other	Communications	% 1	4,166
TOTAL BPA FY2000 BUDGET REQUEST			\$685,254

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
EPA Section 106	Water quality monitoring	% 6	50,000
EPA Section 319	BMP Implementation	% 1	10,000
Soil Conservation District	BMP Implementation	% 2	12,000
USDA	Project monitoring	% 3	25,000
CDA Tribe	Summer Intern Program	% 1	5,000
Total project cost (including BPA portion)			\$787,254

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	\$719,516	\$755,492	\$793,267	\$832,930

Section 6. References

Watershed?	Reference
<input type="checkbox"/>	Armour, C.L., K.P. Burnham, and W.S. Platts. 1983. Field methods and statistical analyses for monitoring small salmonid streams. USDI, Fish and Wildlife Service, FWS/OBS 83/33. Washington, D.C.
<input checked="" type="checkbox"/>	Bauer, S.B. 1998. Lake Creek 1996 interim monitoring report, Kootenai County, Idaho. Kootenai-Shoshone Soil Conservation District. Coeur d'Alene, Idaho. 27p.
<input type="checkbox"/>	Beschta, R.L., W.S. Platts, and B. Kaufman. 1991. Field review of fish habitat improvement projects in the Grande Ronde and John Day River basin of Eastern Oregon.
<input type="checkbox"/>	Bisson, P.A., J.L. Nielsen, R.A. Palmason, and L.E. Grove. 1981. A system of naming habitat types in small streams, with examples of habitat utilization by salmonids during low streamflow. American Fisheries Society Symposium, Portland, OR.
<input type="checkbox"/>	Conlin, K. and B.D. Tutty. 1979. Juvenile salmon field trapping manual. Dept. of Fisheries and Oceans, Fisheries and Marine Service Resource Services Branch, Habitat Protection Division, Vancouver, B.C. 136 pp.
<input type="checkbox"/>	Edelen, W. and D. Allen. 1998. A Chronicle of Latah Creek: Fisheries and Land Use. Spokane County Conservation District. Spokane, WA.
<input type="checkbox"/>	Ellis, M.N. 1932. Pollution of the Coeur d'Alene River and adjacent waters by mine wastes. U.S. Bureau of Fisheries. Mimeo Report. 55p.

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<input checked="" type="checkbox"/>	Graves, S., K.L. Lillengreen, D.C. Johnson, and A.T. Scholz. 1992. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: Annual Report, 1990. Project Number 90-044. Bonneville Power Administration. Portland, OR.
<input type="checkbox"/>	Hickman, T. and R.F. Raleigh. 1982. Habitat suitability index models: cutthroat trout. USDI, Fish and Wildlife Service FWS/OBS-82/10.5.
<input type="checkbox"/>	Hicks, C.E., L.C. Belusz, D.J. Witter, and P.S. Haverland. 1983. Application of angler attitudes and motives to management strategies of Missouri's trout parks. Fisheries 8(5): 2-7.
<input type="checkbox"/>	Hoag, J.C. 1993. How to plant willows and cottonwoods for riparian rehabilitation. In: Proceedings-Streambank Stabilization Workshop: Bioengineering Techniques. Pendleton, OR, February, 1995.
<input type="checkbox"/>	Hoag, J.C., G.L. Young, and J.L. Gibbs. 1991. Planting techniques for vegetating riparian areas from the Aberdeen Plant Materials Center. Paper presented at The 45th Annual Meeting of the Society for Range Management, Spokane, WA. 6pp.
<input type="checkbox"/>	Hodgson, T. 1998. Historical Tour of the Benewah Valley. Benewah Valley Association. Benewah, ID.
<input type="checkbox"/>	Hunt, R.L. 1993. Trout Stream Therapy. University of Wisconsin Press, Madison, Wisconsin. 74 pp.
<input checked="" type="checkbox"/>	Idaho Division of Environmental Quality. 1997. Coeur d'Alene Lake Management Plan. Idaho Department of Health and Welfare, Division of Environmental Quality. Coeur d'Alene, ID.
<input type="checkbox"/>	IDFG. 1996. Fisheries Management Plan, 1996-2000. Idaho Department of Fish and Game, Boise, ID.
<input type="checkbox"/>	Kappesser, G. 1992. Riffle Armor Stability Index. Version 4.1. USDA, Forest Service. 7p.
<input type="checkbox"/>	Kauffmann, J.B., R.L. Beschta, and W.S. Platts. 1993. Fish habitat improvement projects in the Fifteenmile Creek and Trout Creek basins of central Oregon: Field review and management recommendations. Bonneville Power Administration. Portland, OR.
<input checked="" type="checkbox"/>	Kootenai-Shoshone Soil Conservation District. 1991. Agricultural Pollution Abatement Plan, Lake Creek Watershed. Final Planning Report. USDA Soil Conservation Service. Coeur d'Alene, ID.
<input checked="" type="checkbox"/>	Krueger, E. 1998. Lake Creek watershed assessment. Environmental Protection Agency. 27p.
<input type="checkbox"/>	Lambert, S.M., and M. Boswell. 1994. Selecting, preparing, and handling native plant materials. In: Proceedings-Streambank Stabilization Workshop: Bioengineering Techniques. Pendleton, OR, February, 1995.
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<input checked="" type="checkbox"/>	Lillengreen, K.L., D.C. Johnson, and A.T. Scholz. 1993. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: Annual Report, 1991. Project Number 90-044. Bonneville Power Administration. Portland, OR.
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<input type="checkbox"/>	Mallet, J. 1968. Coeur d'Alene Lake fisheries investigations. Idaho Dept. of Fish and Game. 3-6 pp.
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<input type="checkbox"/>	NPPC. 1994. Columbia River Basin Fish and Wildlife Plan.
<input type="checkbox"/>	Oien, W.E. 1957. A pre-logging inventory of four trout streams in northern Idaho. M.S. Thesis. University of Idaho. Moscow, Idaho. 92p.
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<input type="checkbox"/>	Pfancuch, D.J. 1975. Stream reach inventory and channel stability evaluation. USDA, Forest Service. 15p.
<input type="checkbox"/>	Plafkin, J.L., M. Barbour, K. Porter, S. Gross, and R. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: benthic macroinvertebrates and fish. EPA Report 444/4-89-001, Washington, D.C.
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<input type="checkbox"/>	Platts, W.S., and 12 coauthors. 1987. Methods for evaluating riparian habitats with applications to management. USDA Forest Service, General Technical Report, INT-221. 177 pp.
<input type="checkbox"/>	Rosgen, D.L. 1994. Classification of natural rivers. Catena 22:169-199.
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<input type="checkbox"/>	Scholz, A. T., and 9 coauthors. 1985. Compilation of information on salmon and steelhead total run size, catch and hydropower related losses in the upper Columbia River Basin, above Grand Coulee Dam. Fisheries Technical Report No. 2, UCUT. Cheney, WA
<input type="checkbox"/>	State of Idaho. 1996. Governor Philip E. Batt's Bull Trout Conservation

	Plan.
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PART II - NARRATIVE

Section 7. Abstract

The Coeur d'Alene Tribe is implementing stream enhancement projects that will help protect wild fish stocks by restoring native habitats and improving water quality (NWPPC Program Measures 10.8B.20). The overall objectives are to increase production of resident westslope cutthroat and bull trout in four target watersheds by removing and mitigating the causes of habitat degradation. Off site harvest opportunities have been developed to reduce fishing pressure on target stocks and restoration activities are integrated with area schools and private landowners to encourage future protection and enhancement.

Watershed assessment techniques were used to identify priority areas for restoration by examining channel stability, sediment routing, riparian function, as well as the abundance and distribution of target species. Demonstration projects were developed in 1995 and 1996 to test the restoration techniques used to reclaim degraded habitat. Passive

regeneration of habitat, using riparian exclosure fencing as a primary method, and active remediation using plantings, off-site water developments, and instream structures are improving habitat conditions for trout. A Tribal Fisheries Management Plan (1998) provides guidance for uniform evaluation, implementation and monitoring of projects. Projects planned for each target watershed are submitted to BPA for supplemental analysis under the watershed management program EIS.

Enhancement progress is monitored by measuring standardized habitat variables at individual project sites and by tracking trends in water quality and population abundance and distribution. Participating landowners sign contracts to ensure long-term commitment to cost sharing, project maintenance and monitoring.

Section 8. Project description

a. Technical and/or scientific background

The Coeur d'Alene Indian Reservation encompasses 139,005 hectares (343,478 acres) in the panhandle section of north Idaho. Lake and stream resources form the heart of the Reservation and have always been an integral part of Tribal culture. Tribal peoples utilized abundant anadromous and resident fisheries within their aboriginal territory until the advent of large-scale land use changes by settlers and the construction of dams in the Columbia River system. Since the extirpation of anadromous fisheries in the Spokane River basin, the Coeur d'Alene Tribe has relied solely on the resident fish resources of Coeur d'Alene Lake and its tributaries. Historic harvest by Tribal fishermen has been estimated at 42,000 trout annually (Scholz et. al. 1985). This number had decreased to 3,300 fish in 1967, a reduction of 92 percent (Mallet 1968).

Recent declines in native salmonid fish populations, particularly westslope cutthroat trout (*Oncorhynchus clarki lewisii*) and bull trout (*Salvelinus confluentus*), in the Coeur d'Alene subbasin have been the focus of study by the Coeur d'Alene Tribe Fish, Water and Wildlife program since 1990. It appears that there are a number of factors that contributed to the decline of resident fish stocks within Coeur d'Alene Lake and its tributaries (Ellis 1932; Oien 1957; Mallet 1969; Scholz et. al. 1985, Lillengreen et. al. 1994, 1996; Peters and Vitale 1998). These factors include construction of Post Falls Dam in 1906, clearcutting and forest road construction, conversion of forested areas to agricultural and pasture lands, loss of wetlands, urban development, mining, and introduction of exotic fish species.

The target watersheds in this proposal have a combined basin area of 34,853 hectares (86,123 acres) and include 529 kilometers (328 miles) of perennial and intermittent stream channel. Fragmented ownership presents a particular challenge to restoration efforts. Tribal ownership represents less than 10 percent of the combined watershed area and private lots are generally less than 80 acres. Private lands are heavily managed and land use consists primarily of managed forest (53%), agriculture (25%), and grazed pasture (22%). For the most part, these agricultural and pasturelands represent lands that were converted from forested and wetland cover types. In one target watershed, for

example, nearly 40 percent of formerly forested areas have been converted to other uses. Road density frequently exceeds 2-miles/square mile in all headwater areas.

On private lands, agricultural and forest practices that failed to consider water resources have contributed to the degradation of water quality and habitat suitability for resident salmonids (Kootenai-Shoshone SCD 1991; Peters and Vitale 1998; Kreuger 1998). Demand for agricultural production in the late 1930s to mid 1950s led the USDA to provide incentives for clearing nearly 8,000 acres in the Lake Creek watershed alone. In the Benewah valley, three splash dams and a flume were built in 1915 to float logs out of the watershed. An estimated 50 MMBF of logs were harvested, principally from riparian areas, between 1915 and 1929 (Hodgson 1998). Increased sediment loads from agricultural runoff and recent and recovering clearcuts, and increases in water temperature due to riparian canopy removal may be two of the most critical problems currently affecting tributary populations of westslope cutthroat trout (Peters and Vitale 1998). To address these problems, restoration efforts target the most degraded lands under private ownership.

Lake and Benewah Creeks are listed on the current 303-(d) list revised in 1996 for temperature and sediment violations. To illustrate this, measured water temperatures in Alder, Benewah, and Lake Creeks regularly exceed 20°C in mainstem reaches during late summer months (Peters and Vitale 1998; Bauer 1998; Lillengreen et. al. 1996). Also, turbidity in the Lake Creek watershed exceeds water quality criteria of 50 NTU during most significant runoff events (Bauer 1998). These increases in water temperature over time have reduced the range of resident salmonids to a fraction of its historic extent. Within this new range, sediment has reduced the quality of both spawning and rearing habitats. Recent population estimates for westslope cutthroat trout indicate that more than 80 percent of available habitat supports less than 2.8 fish/100m², while the remaining headwater areas support populations that range from 2 to 15 times greater (Peters and Vitale 1998). These headwater “strongholds” illustrate the resiliency of native fish populations and represent the potential for habitat and species recovery in the target watersheds.

The recent ESA listing of bull trout in June, 1998 and the petition to list westslope cutthroat trout across its range has led to increased recognition that habitat degradation must be reversed to promote species recovery efforts (IDFG 1996; State of Idaho Bull Trout Conservation Plan 1996; USFWS 1998; USDA 1996). Private ownership comprises more than 90 percent of the area within the target watersheds, yet other state and federal agencies receive very limited funding to support restoration work within the Reservation. The Coeur d’Alene Tribe Fisheries Enhancement Project has become a logical and integral part of any species recovery process in the subbasin by implementing projects that establish long term riparian and instream habitat protection on these private lands.

b. Rationale and significance to Regional Programs

This project shares the FWP objectives of: maintaining biological diversity in the Upper Columbia River basin; maintaining genetic integrity by preserving wild fish stocks; providing needed habitat protection; and increasing run sizes and resident fish populations by implementing effective restoration projects. The priorities and objectives of this proposal are described in the 1995 Fish and Wildlife Program [10.8B.20].

Habitat degradation caused by overgrazing, road construction, timber harvest and agriculture has adversely affected instream habitat and riparian and floodplain function in streams on the Coeur d'Alene Indian Reservation. Low summer stream flows, high water temperatures, poor bank stability, sedimentation and a lack of instream and riparian habitat diversity limits trout production and rearing capacity in all but the upper tributaries within the target watersheds (Lillengreen et. al. 1996; Peters and Vitale 1998). Despite these challenges, wild fish stocks still persist in each of the target watersheds and demonstrate an ability to respond positively to restoration projects.

Restoration projects are prioritized for implementation in the most critical habitat areas using widely accepted passive and active techniques. Riparian and upland plantings are carefully selected from local, native propagates to maintain and increase diversity. Three years of intensive implementation efforts has resulted in cooperative relationships with more than twenty landowners and six partnership agencies. Much work still needs to be accomplished. With continued funding we anticipate: protecting and enhancing an average of two miles of stream channel/year; reducing sediment production and transport from highly erosive upland areas; increasing infiltration of water in off-channel wetlands; and providing continued protection, maintenance and monitoring of existing projects.

Planning for project implementation is coordinated on a watershed basis that includes the participation and involvement of private landowners, state and federal agencies, and other Tribal programs. Furthermore, this project serves as a model for adaptive management by implementing projects based on watershed assessment and limiting factor analysis, sharing data and objectives with partnership agencies and private landowners, and incorporating effectiveness and trend monitoring to evaluate project responses.

c. Relationships to other projects

BPA is providing funding to the Coeur d'Alene Tribe to acquire 2,100 acres of high quality riparian wetlands and adjacent upland habitat in the Lake Creek watershed (9004401). This acquisition will secure critical habitat for protection of fish, water and wildlife, allow for enhancement of degraded areas, and partially mitigate for resident fish and wildlife losses attributed to the Grand Coulee and Albeni Falls hydroelectric facilities. A proposal for a Coeur d'Alene Tribe trout production facility would provide fish needed to stock ponds that provide compensatory harvest opportunities (9004402).

Partnerships with projects that receive funding from other sources represent a substantial benefit to this proposal.

- EPA provides funding to the Coeur d'Alene Tribe to monitor surface water quality of streams on the Reservation under section 106 of the Clean Water Act. Monitoring is conducted at 10 sites within the target watersheds. Data is compiled and used to

supplement the analysis of fish and macroinvertebrate abundance and distribution in the target watersheds. Data on temperature, discharge and turbidity, in particular, are important in evaluating restoration project effectiveness. Annual funding for this grant is expected to be stable through FY2000 and has exceeded \$50,000 for the last several years.

- EPA provides funding to the Coeur d'Alene Tribe for implementing projects for non-point source pollution control under section 319 of the Clean Water Act. Examples of projects that can be funded include most BMP's for agriculture, forestry (particularly roads), riparian restoration, and wetland restoration and creation. Contract awards have ranged from \$100,000 to \$164,000 during the last two funding cycles. This grant will be used to expand current restoration projects and complete watershed assessments on additional Reservation drainages.
- The Kootenai/Shoshone Soil Conservation District received a \$900,000 grant in 1991 under the State Agricultural Water Quality Program (SAQWP) to be used over a 14 year period. The grant is used to implement best management practices in the upper Lake Creek watershed for reduction of non-point source non-irrigated cropland erosion. A considerable amount of momentum has been generated to promote restoration work through integration of this grant with BPA funding. Cost sharing, as well as sharing of technical expertise, has led to implementation of wetlands enhancement projects and planting of trees to restore native upland forest on formerly cropped land.
- The USDA awarded a \$360,000 research grant to scientists at the University of Idaho and Washington State University to study watershed restoration on the Coeur d'Alene Indian Reservation. Scientists on the research team represent the physical sciences, rural sociology, agricultural economy, ecology and conflict resolution. The grant will provide indicators of restoration success through stream sampling, cost-benefit analysis, and evaluation of landowner attitudes toward erosion control and water quality protection. The study will continue through September 2001.
- Washington State University (WSU) received an Environmental Education Grant from the EPA and is conducting an in depth resource and needs assessment of Tribal schools and the Fish, Water, and Wildlife Program through interviews with teachers, school administrators, and program staff. WSU will conduct two workshops: one on integrating environmental education into the curriculum and one on developing an environmental education curriculum based on field trips and stream restoration work that is funded by BPA. The grant period is July 1998 through fall 1999. This grant will help establish a lasting link between restoration projects implemented through this program and classroom resources on the Reservation.
- The Coeur d'Alene Tribe Education Department funds a summer internship program for high school students interested in natural resources management. The Fish, Water and Wildlife Program supervises 3-5 of these interns each year and benefits by using them in tree planting and fence building projects, among other things. Several graduates of the internship program have continued working on restoration projects as seasonal technicians.

d. Project history (for ongoing projects)

This is an ongoing mitigation program: BPA Project 90-044, entitled Implement Fisheries Enhancement Opportunities – Coeur d’Alene Indian Reservation. It has been underway since 1990. Annual funding for this project has averaged \$378,816 and total costs 1990-1998 were \$3,030,533. For the period 1995-2001, this project will supplement regular program funds with more than \$580,000 of outside funds (EPA Clean Water Act Grants, USDA research grant, State Agricultural Water Quality Program, EPA Environmental Education Grant). Beginning in 1997, landowner contracts have provided for cost shares where private landowners provide long term maintenance of projects.

Previous project reports include habitat evaluation annual and biennial reports 1990, 1991, 1992, 1993-94, 1996-97 (Graves, et. al. 1992; Lillengreen et. al. 1993; 1994; 1996; Peters and Vitale 1998), Tribal management plan for enhancement of resident fisheries (Lillengreen et. al. 1998), and a supplementation feasibility report (Peters and Vitale 1998). An evaluation report for restoration projects is in draft form.

In 1987, the NPPC amended the Columbia River Basin Fish and Wildlife Program to include baseline stream survey of tributaries located on the Coeur d'Alene Indian Reservation [section 903 (g)(1)(B)]. Initial work rated reservation streams according to their potential for habitat development for westslope cutthroat trout and bull trout. Physical and biological surveys incorporated measures of stream bank and bed stability, riparian condition, land use, urbanization, migration barriers, water quality, stream flow, substrate suitability, channel modification, relative abundance estimates, and macroinvertebrate densities (Fejen and Wehnes 1981). Four streams (Alder, Benewah, Evans, and Lake Creeks) were identified as having the best potential for habitat restoration and species recovery and targeted for further study.

Between 1992 and 1994 watershed assessment techniques were used in the target drainages to identify priority areas for restoration by examining sediment routing (Washington Forest Practice Board 1992; Kappesser 1992), channel function and stability (Rosgen 1994; Pfancuch 1975;), instream habitat composition (Bisson et. al. 1981), riparian function (Platts et. al 1983), as well as the abundance and distribution of target species. Parameters looked at included: number of pools, riffles, and secondary channels; large organic debris volume; riparian vegetation diversity and stream canopy closure; land use practices in floodplain areas; and water quality parameters. Measures of substrate composition and percent fines were also used as habitat quality indicators. Biological assessments included trout population and biomass estimates, individual stock assessments, and quantification of macroinvertebrate populations (Plafkin et. al. 1989).

It was determined that in all four target streams base flow, temperature, and sediment are limiting the quality of trout habitat. Average annual base flows of less than 25% of average annual flows were reported in all streams. Temperatures above those values reported as optimal were recorded in each of the four streams. Non-point source sediment runoff is also considered limiting in all four drainages. Average % fines for all streams were above the recommended 10% fines value. It was determined that habitat

degradation (a result of the cumulative effects of many land use practices), as well as, introduction of exotic salmonid fish species has caused the extinction of bull trout and severely depressed native populations of westslope cutthroat trout. Land use practices have altered natural ecosystem processes with which native fishes have evolved. This alteration has created conditions less favorable for native salmonids and more favorable for introduced exotics, as well as, less desirable native fishes.

In 1994, the NPPC adopted the recommendations set forth by the Coeur d'Alene Tribe to improve the reservation fishery. These actions included: 1.) Implement habitat restoration and enhancement measures in Lake, Benewah, Evans, and Alder Creeks; 2.) Purchase critical watershed areas for protection of fisheries habitat; 3.) Conduct an educational/outreach program for the general public within the Coeur d'Alene Indian Reservation to facilitate a "holistic" watershed protection process; 4.) Develop an interim fishery for tribal and non-tribal members of the reservation through construction, operation and maintenance of five trout ponds; 5.) Design, construct, operate and maintain a trout production facility; and 6.) Implement a five-year monitoring program to evaluate the effectiveness of the hatchery and habitat improvement projects. These principles, priorities, and objectives were adopted into the 1995 FWP (10.8B.20).

Demonstration projects were implemented in 1995 and 1996 with the cooperation of private landowners. A primary objective of these first projects was to evaluate the application of a variety of techniques to specific watershed conditions. Passive regeneration techniques, using riparian exclosure fencing as the primary method, were subsequently adopted to restore degraded habitat. This has been proven in other studies to be an effective means of improving riverine/riparian habitats (Beschta et. al. 1991; Platts 1990). Active remediation techniques using plantings, bioengineered stream bank protection, and placement of instream structures made from native materials have also been used when natural processes have been deemed unlikely to result in recovery within a desired time frame.

Adaptive management has been applied on 23 individual projects since 1995. Long-term agreements have been signed with eight landowners in two watersheds, providing protection and enhancement for more than 350 acres of upland habitat and 3 miles of stream channel. More than 17,000 trees and shrubs have been planted over a three year period to enhance water retention and riparian function. Six acres of constructed wetlands have reduced non-point source pollution from 250 acres of farm land. Cost sharing for implementation and monitoring/evaluation activities currently occurs with seven partnership agencies. Watershed work groups comprised of landowners and other interested agencies have been formed in two target watersheds and meet on a quarterly basis. The work groups have proven effective in highlighting restoration work and in generating additional interest among landowners.

Baseline information and on going data collection efforts help to promote an adaptive management strategy in this project. Watershed assessments, population surveys, and water quality data are used to identify high priority areas for treatment and conservation. Ongoing monitoring of demonstration projects, trout migration, habitat use, incubation

success, and genetic analysis are providing data used to refine treatment priorities. Program data and objectives are shared with partnership agencies and private landowners so that a watershed based approach to habitat conservation will be encouraged.

e. Proposal objectives

The overall program goal is to increase production of native westslope cutthroat and bull trout by removing and mitigating the causes of habitat degradation. Expected benefits are reduced sediment loading, improved water quality and quantity, and improved riparian and instream habitat diversity in target watersheds. Maintenance of off-site trout ponds will diversify fishing opportunities over the long term, while education and outreach efforts will foster a conservation ethic in community members. This project will maintain long term program investments by continuing to work with private landowners on new projects in high priority areas.

Objective 1 – Implement Habitat Restoration Projects: Analyze existing information and prioritize potential projects consistent with management guidelines (task a); negotiate and sign landowner contracts (task b); develop site specific plans, obtain permits and submit project descriptions to BPA and participating agencies for supplemental analysis and review (task c); Implement priority projects that can demonstrably improve watershed conditions by reducing sediment delivery and transport, improve water quality and quantity, and increase riparian and instream habitat diversity (tasks d-f). Conduct maintenance activities at existing project sites as necessary. Products include signed landowner contracts and written project descriptions.

Objective 2 – Monitor and Evaluate Restoration Projects: Monitor temperature, dissolved oxygen, stream flow and other water quality parameters at selected sites; determine fish abundance and distribution and monitor migration activities in each target watershed (task a); measure channel profiles and specific habitat parameters at project sites (task b). Prepare an annual report of the results.

Objective 3 – Provide Compensatory Harvest Opportunities: Stock fish (task a) and conduct creel surveys, angler interviews and year-end population estimates at existing trout ponds (task b). Summarize creel results in annual report and reevaluate stocking needs for FY2001.

Objective 4 – Facilitate Education and Outreach Activities: Develop environmental education program in local schools, organize “Water Awareness Week” for local school districts, and supervise summer interns (task a); facilitate watershed workgroup meetings (task b); participate in inter-agency workgroups and publish quarterly program newsletter (task c). Quarterly reports will summarize accomplishments.

f. Methods

Scope: This project addresses habitat degradation and resulting reductions in native trout populations in the Coeur d’Alene subbasin by: 1) planning implementation projects based on limiting factor analysis and coordination with agencies and landowner groups; 2) implementing new restoration projects through lease agreements with private landowners

in four target tributaries and maintaining project investments over the term of lease agreements; 3) monitoring and evaluating projects and applying adaptive management; 4) providing compensatory harvest opportunities to affected community members; and 5) integrating restoration activities into local school curriculum and coordinating activities with agencies, organizations and other Tribal programs.

Underlying Assumptions: Overgrazing of riparian areas, timber harvest, road construction and agricultural practices have led to habitat degradation and reductions in resident trout populations within target tributaries on the Coeur d'Alene Indian Reservation. Encouraging recovery of riparian and upland vegetation, improving streambank stability and instream habitat diversity will result in an overall improvement in water quality and quantity. By addressing limiting factors to juvenile rearing and adult spawning and by encouraging natural successional processes, improvements in habitat will result in an increase in carrying capacity in target tributaries.

Objective 1 – Implement Habitat Restoration Projects

A conceptual approach to the restoration of fish habitat has been adapted from various sources as a guide for management efforts on the Reservation (Lillengreen 1998; National Research Council 1992; Kauffman et. al. 1993). The conceptual model is based on the ecological processes that shape riparian/stream ecosystems and focuses on 1) removing or modifying those land use impacts that are causing habitat degradation, 2) re-establishing riparian/stream linkages, and 3) restoring natural ecosystem processes.

The desired future condition for target watersheds has been defined as being functionally equivalent to the potential natural community. In other words, the goal is to restore those essential ecological conditions and processes necessary to maintain diverse and productive resident trout populations. This concept recognizes that a number of human-caused factors will preclude a complete return to the historical condition. However, under this scenario ecological processes (succession, natural disturbances, competition, evolution, etc.) and hydrological processes (sediment transport and deposition, flood plain storage and subsurface recharge, nutrient cycling, etc.) function in such a manner as to ensure a sustainable intact ecosystem. Such a system has the potential to support a healthy resident trout fishery.

- Task a: Identify stream reaches needing some level of enhancement based on physical and biological conditions and watershed assessments, then prescribe appropriate restoration techniques. Restoration projects will be prioritized using a cost/benefit analysis that considers the potential for long-term ecological recovery and landowner participation.

Priority areas for restoration treatment have been identified in the Coeur d'Alene Tribe Project Management Plan (Lillengreen et. al. 1998). These areas occur where existing habitat conditions (e.g., average residual pool depth, average canopy cover, number of large woody debris/lineal distance, riffle/pool ratio, and average percent fines) fall short of optimal conditions for the target species as defined by habitat suitability indices (Hickman and Raleigh 1982). Seasonal, temporary violations of water quality criteria

and low trout abundance are secondary indications of a need for treatment at these sites. Projects that will restore habitat linkages to highly productive habitats upstream have the greatest potential for increasing the abundance and distribution of trout.

- Task b: Sign landowner agreements for high priority implementation projects. A generalized landowner agreement has been developed that creates a legal foundation to establish the commitments of the landowner and the Coeur d' Alene Tribe Natural Resource Department, while addressing liability issues. Several exhibits that specifically identify the location of the project and define the work to be accomplished accompany the agreement. The terms of the agreement are flexible, but have been long reaching enough (10-25 years) to ensure that monitoring and evaluation procedures can be completed.

An average of three new landowner agreements have been signed each year during 1997 and 1998. In addition, new projects have been implemented as part of existing agreements. Landowner interest in restoration projects has increased as demonstration projects are scrutinized. We estimate that between 3-5 new agreements will be signed in FY2000.

- Task c: All projects will be described and submitted to participating agencies and BPA for a final review prior to implementation. Past data collection efforts for the project site will be described and data gaps will be identified to facilitate implementation and effectiveness monitoring. Project specific goals and objectives that are quantifiable and measurable will be developed. These objectives will be consistent with biological objectives identified in the FWP and should facilitate the implementation of monitoring and evaluation procedures (NPPC 1994). Project implementation will be coordinated with the appropriate regulatory agencies so that all pertinent applications and permits may be obtained.
- Task d: This program will continue to implement riparian enhancement projects as a primary means of restoring ecological function. Control of livestock utilization will be done through construction of exclusion fences and development of off-site water sources. Degraded riparian areas will be restored as needed by planting native shrubs and trees, seeding with grasses and sedges, and controlling noxious weeds. Streambank stability will be improved on a site-specific basis using bioengineering techniques. Information on planting techniques and considerations for riparian rehabilitation has been based on the work of several authors (Lambert and Boswell, 1994; Hoag, 1991; 1993; Van Haveren and Jackson, 1986; USDA, 1981).
- Task e: Rearing habitat for juvenile fish will be enhanced by increasing instream habitat diversity through placement of large wood, boulders or other native materials. Side channels will be reconnected to mainstem reaches where severe degradation of the channel has resulted in isolation from the floodplain. Many of the techniques to be used have been previously compiled by Hunt (1993).

- Task f: This program will continue to implement wetland enhancement projects in areas that historically supported hydric soils and wetland vegetation. Projects will consist of constructing excavated and embankment ponds that capture and store surface water runoff. Target sites have been identified using GIS technology that overlays information on drainage density, soil erosion hazard, land use and vegetative cover type, channel function, and fish abundance and distribution (Montgomery and Buffington 1993; Washington Forest Practices Board 1997). High priority sites are located at the lower end of small (>200 acres) subbasins dominated by agricultural activities that have generally been managed to promote rapid surface water runoff. Soil erosion hazard and transport at these sites is severe.

Implementation of these projects decreases transport of non-point source sediment from source areas to sensitive stream reaches, promotes local infiltration of water, increases the diversity of native plant communities and provides habitat for wildlife. Design and implementation efforts are cost shared with EPA 319 grant monies and the local Soil Conservation District and linked to other projects that reduce non-point source pollution. Planning, design and construction activities are consistent with engineering specifications adopted by the Soil Conservation Service (USDA 1989).

Objective 2 – Restoration Monitoring and Evaluation

The purpose of monitoring streams on the Reservation is to obtain information for use in evaluating the responses of native westslope cutthroat and bull trout populations to riparian and stream management practices. The fundamental objectives of the monitoring and evaluation program are to: 1) Establish a record of mitigation for trout populations and the aquatic/riparian interface, 2) Account for enhancement costs, and 3) Acquire new knowledge about the physical and/or biological effects and interactions of stream enhancement measures.

- Task a: Trend monitoring of abiotic and biotic factors has been an ongoing component of this project. Measurements of abiotic factors (e.g. stage/discharge, temperature, dissolved oxygen, pH, conductivity, turbidity, TSS, nutrients) are tracked at 10 sites within the target watersheds. Temperature is measured continuously, while other parameters are measured weekly from April through October.

Abundance and distribution of trout species are assessed annually at 95 sample sites within the target watersheds using collection methods and analysis techniques described in Armour (1983). Sample sites are stratified by channel type (Rosgen 1996) and by habitat unit to allow for comparisons between streams of similar size and type. Migration of adult and juvenile fish is monitored in each watershed through use of a modified weir and holding pen (Conlin and Tuty 1979). Macroinvertebrates are sampled and analyzed following EPA Rapid Bioassessment Protocol (RBP) II of Plafkin et al. (1989). RBP calculates values for eight community level metrics that help interpret the effects of restoration on ecological processes and allows for comparison to values derived from other sites in the region.

- Task b: Effectiveness monitoring will be used to evaluate individual restoration projects. Techniques include: population assessments that describe habitat utilization; physical habitat assessments that describe changes to channel morphology, hydrology, and riparian function; and water quality assessments that document fluctuation in temperature and dissolved oxygen over time. *Methods for Evaluating Riparian Habitats with Applications to Management* (Platts et. al. 1987) is used as a guidance document for selecting appropriate habitat variables and methods.

Photo documentation has been used at sites where specialized measurements are not needed (e.g. exclusion fencing projects). The purpose of these photographs is to show changes in riparian vegetation, such as increased canopy and shading, improved bank stability, etc. Several photopoints are established at each project site prior to implementation. Pictures are taken at these sites annually or semi-annually.

The results of monitoring efforts have been included in quarterly, annual, and semi annual reports that are published by BPA and shared with other agencies or interested parties.

Objective 3 – Provide Compensatory Harvest Opportunities

Development of compensatory harvest opportunities consists of constructing and maintaining a “put and take” fishery located at several dispersed sites within the Reservation. Hatchery reared fish are stocked into several man-made ponds to serve as an alternative harvest base and to promote the recovery of resident wild fish in selected rivers and streams. To minimize the impact of stocking on existing native fish stocks, constructed ponds are isolated from the rivers and streams on the Reservation. One pond is currently in service, with four additional ponds scheduled for completion by the end of FY 1999.

- Task a: Stock hatchery reared rainbow trout into each of the existing ponds. Stocking rate is determined by the carrying capacity of each pond and by an estimate of angler satisfaction and success. Studies have shown that stocking densities around 1,400 fish/ha will provide angler satisfaction ratings of good to excellent (Weithman and Katti 1979, Hicks et. al. 1983, and Miko et. al. 1995). The Coeur d’Alene Tribe Fisheries Management Plan (1997) calls for providing a catch rate of about 0.5 fish/hour.
- Task b: We will evaluate the effectiveness of the interim harvest program by monitoring pond use through creel census, public surveys, and fish population estimates. Monitoring results will be summarized in annual reports submitted to BPA and further used to refine the pond stocking strategy for FY2001.

Objective 4 – Education and Outreach

- Task a: Environmental education will focus on interaction with and integration of ongoing restoration work and area students, grades K-12. The Fish, Water and Wildlife Program will coordinate Water Awareness Week for local school districts. This event offers hands on learning stations that expose students to the scientific method, restoration techniques, and biological inventory and monitoring. Additional field trips during the school year will provide students with an opportunity to assist with

monitoring at established restoration sites. The Fish, Water and Wildlife Program will also supervise summer interns from the local high school who receive funding through the Tribal Education Department. Interns will assist with restoration activities, such as fencing, tree planting and monitoring, as appropriate. A summary of these activities will be presented in quarterly reports submitted to the BPA.

- Task b: Watershed Working Group (WWG) meetings will be conducted on a quarterly basis, or as needed to allow for project review and planning. WWG are comprised of local landowners, farm operators, special interest groups and interested agencies. They are the primary method in fostering landowner cooperation and on modifying land use practices that impact fisheries habitat. These working groups are greatly responsible for engendering public support and cooperation for ongoing restoration work. In addition the WWG help identify and solicit other sources of revenue for restoration work through interagency interaction. Minutes are kept for each meeting which include an attendance list, agenda, and summary of discussion points.
- Task c: Public relations will focus on educating the general public on the importance of fish habitat and watershed health issues. Special emphasis is placed on increasing public awareness of the Coeur d'Alene Tribe's compensatory harvest program. A quarterly newsletter is published and distributed to all landowners, tribal members, Reservation residents and other interested parties. Additional presentations target civic organizations, local schools, the general public and other interested parties addressing the needs and protection of fisheries habitat. Field trips are used to showcase restoration projects. A summary of these activities is presented in quarterly reports submitted to the BPA.

Expected Results: This project ensures that streams and associated native plant communities are allowed to evolve through natural stages of succession. Planting native plant species and implementing best management practices for controlling soil erosion reclaims degraded riparian and upland habitats. Near term changes (1-5 years) in target streams include: increases in sedges, grasses, forbs and shrubs; narrowing and deepening of stream channels; and increased habitat diversity. Long term changes (>5 years) include: increased shading of stream channels through overstory development; reduced summer water temperatures; increased base flows; reduced sediment recruitment and streambank erosion; and increased instream and riparian habitat diversity. Increased large woody debris recruitment and pool development will occur naturally as late succession plant communities develop.

Improvement of the quality and quantity of spawning and rearing habitat for native westslope cutthroat and bull trout will result from restoration techniques. Increases in natural production should occur. This project will also provide multiple benefits for wildlife as well. Benefits to participating landowners include reduced soil loss, increased soil productivity, better pasture management, etc. Feedback from landowners on existing projects indicate that the majority have recognized improvements in the project sites and are willing to continue maintenance beyond the terms of the effective agreements.

Factors that may limit success of this project include the response of private landowners to restoration practices, catastrophic natural events, changes in upslope management practices, or changes in land use regulations. Regardless of the outcome for target species, project results will be generally beneficial to all other stream and riparian dependent native species.

g. Facilities and equipment

Existing equipment and office space will be used to complete the tasks described in this proposal. Implementing and maintaining restoration projects requires trucks, tractors, excavators, fencing equipment, tree and shrub planters, hand tools, etc. Monitoring projects requires electroshocking equipment, GPS navigation hardware, telemetry equipment, field computers, and water quality monitoring instruments. In FY2000, all of this equipment will come from the existing inventory of the Coeur d'Alene Tribe. Additional equipment may be needed as existing equipment wears out, but costs are expected to be low.

h. Budget

Restoration efforts for FY2000 involve a high level of commitment to planning, implementation, and monitoring/evaluation activities. Staffing requirements include a restoration project coordinator, one full-time habitat biologist, one full-time biologist/teacher, one full-time technician, 6-8 seasonal technicians and one half-time administrative assistant, plus cost shares with other projects for the program manager and fisheries project supervisor. Project personnel review planned projects for NEPA compliance, implement all restoration projects, collect water quality samples, maintain and stock trout ponds, and conduct site specific monitoring and evaluation on an annual basis. Personnel and fringe benefits comprise 63% of the total budget. These line items cover administrative oversight, project supervision, NEPA compliance, and all other personnel costs.

Supplies, materials, and non-expendable property cover items related to day to day operations, including: office supplies, fencing materials, instream structures, plant materials, planting tools, blocknets, waders, fish traps, etc. This comprises 7% of the overall budget.

Operations and maintenance covers costs associated with routine maintenance of motor vehicles, boats and motors, and sampling equipment, including: oil changes; repairs or service to the electroshockers; net repairs; as well as unforeseen repairs necessary to keep our equipment in efficient operating condition. Four vehicles are needed to complete water quality monitoring activities at ten sites, provide transport to and from restoration sites, and conduct creel surveys at five trout ponds. This comprises 3% of the overall budget.

Capital acquisitions include temperature monitors, water quality testing equipment, and a hand-held field computer. This comprises 1% of the overall budget.

The Fish, Water, and Wildlife Program is committed to ensuring that the most recent and accepted scientific procedures are being utilized during the implementation phase of this project. This commitment requires training for technical staff. Travel will also be used to coordinate project with BPA, NPPC, CBFWA and other appropriate entities. Funds will also be used to participate in regional forums, processes related to BPA funding, prioritization of projects, and to interact with other professional peers working within the Columbia Basin ecosystem. Travel costs comprise 1% of the overall budget.

Indirect costs total 31.6% of the total budget minus capital acquisitions and subcontractual costs, or 19% of the total budget.

Other subcontractual costs include construction of off-channel wetlands, falling and transport of trees for instream structures, and analysis of macroinvertebrate samples. This represents 4% of the total budget.

Section 9. Key personnel

Summary of Key Personnel

Name	Title	FTE/Hours	Experience
Kelly Lillengreen	Program Manager	Part time	9.0 years
Ron Peters	Project Supervisor	Part time	9.5 years
Angelo Vitale	Project Coordinator	Full time	9.5 years
Unfilled (2)	Habitat Biologist	Full time	Unknown
David Neighbor	Outreach Specialist	Full time	12 years
	Technicians (6-8)	Seasonal	

Resumes

Kelly Lillengreen

Education:

M.S.; Eastern Washington University, Zoology/Fisheries Management; 1993

B.S.; Eastern Washington University; Zoology; fisheries emphasis; 1989

Current Employer and Responsibilities:

Coeur d'Alene Tribe; Fish and Wildlife Program Manager; 1992 to Present

Responsible for oversight, coordination and implementation of all fisheries and wildlife projects undertaken by the Coeur d'Alene Tribe.

Previous Employment:

Eastern Washington University, Research Associate, 1990 to 1992

Eastern Washington University, Research Assistant, 1988 to 1990

Expertise:

Mrs. Lillengreen has over eight years' professional experience in the evaluation and management of aquatic and terrestrial ecosystems. She currently serves as the Fish, Water and Wildlife Manager for the Coeur d'Alene Tribe. In this position, she is Principle responsibilities include supervision of professional and technical staff, preparation of policy recommendation for Council Action, preparation and approval of implementation and monitoring plans, annual reports, and budgets. In other positions, she has mapped fisheries habitat characteristics, studied fish population characteristics, benthic communities, conducted watershed analysis using Timber-Fish-Wildlife ambient monitoring methodologies, and evaluated the potential impacts of forest management practices on aquatic resources.

Publications and Presentations:

Ashe, Becky L., K.L. Lillengreen, J.J. Vella, L.O. Clark, S. Graves, M.R. Barber, G. J. Nenema, A.T. Scholz. 1991. Assessment of the Fishery Improvement Opportunities on the Pend Oreille River: 1990 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 88-66. March 1991.

Lillengreen, K., T Skillingstad, A.T. Scholz. 1993. Fisheries habitat evaluation in tributaries of the Coeur d'Alene Indian Reservation: 1992 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. October, 1993.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. September, 1996.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan - enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. *In press*: U.S. Department of Energy, Bonneville Power Administration.

Angelo J. Vitale

Education:

B.S.; University of Idaho; Biology/Botany; 1991

Current Employer and Responsibilities:

Coeur d'Alene Tribe; Restoration Project Coordinator; 10/95 to Present
Coordination and implementation of BPA funded habitat restoration projects. Principle responsibilities include supervision of technical staff, preparation of annual implementation and monitoring plans, annual reports, and data reduction and analysis.

Previous Employment:

Integrated Resource Management; Project Scientist; 1995

EA Engineering, Science, and Technology, Inc.; Fisheries Scientist; 1991 to 1995
University of Idaho; Research Assistant; 1990 to 1991
Idaho State University; Research Assistant; 1988 to 1989

Certifications:

Designing and Negotiating Studies Using IFIM; 1993
Watershed Analysis Methodology; 1995
Wildlife Habitat Evaluation Procedures; 1997

Expertise:

Mr. Vitale has over eight years professional experience in the evaluation and management of aquatic and terrestrial ecosystems. In other positions, he has conducted instream flow analysis for site specific studies and basin wide projects, mapped fisheries habitat characteristics, studied fish population characteristics, conducted watershed analysis using Timber-Fish-Wildlife ambient monitoring methodologies, and evaluated the potential impacts of forest management practices on aquatic resources. He also has extensive experience identifying, mapping and interpreting plant community assemblages and conducting site specific surveys for candidate threatened and endangered wildlife species.

Publications and Presentations:

Peterson, C.R. and A.J. Vitale. 1989. Measuring the activity patterns of free-ranging animals with radiotelemetry. *American Zool.* 29(4):43A.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. September, 1996.

Vitale, A.J. 1997. Restoration planning and implementation: Using watershed analysis to identify effective restoration tools. Presented at Landscape Connections: Restoring Ecological Integrity in the Inland Northwest, Washington State University, Pullman, WA.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan – enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Peters, R. and A.J. Vitale. 1998. Supplementation Feasibility Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Ron Peters

Education:

B.S.; Eastern Washington University; Zoology/Fisheries Management; 1987
M.S.: Eastern Washington University; Fish Pathology/Fisheries Management; 1995

Current Employer and Responsibilities:

Coeur d'Alene Tribe; Fisheries Projects Supervisor; 5/1996 to Present

Coordination and implementation of BPA funded harvest enhancement projects.
Responsible for all aspects of water quality monitoring and analysis.

Previous Employment:

Quinault Indian Nation; Fisheries Biologist; 1992 to 1996
Upper Columbia United Tribes; Research Associate; 1991 to 1992
Eastern Washington University; Research Assistant; 1989 to 1991

Expertise:

Mr. Peters has over eight years professional experience in the evaluation and management of aquatic ecosystems. In other positions, he was the lead technical person in charge of management of the Quinault River sockeye salmon run. His duties included collecting, recording, and interpreting information relating to the enhancement and preservation of the Quinault River sockeye salmon run. He was also lead investigator in charge of the Quinault Indian Nation Water Quality Laboratory where primary duties included oversight of all activities, development of experimental design, quality control, and data analysis.

Technical Publications and Presentations:

Peters, R. 1994. Hydroacoustic estimate of escapement of Quinault River sockeye salmon. Presented to North Pacific International Chapter American Fisheries Society. March.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan - enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Peters, R. and A.J. Vitale. 1998. Supplementation Feasibility Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

David Neighbor

Education:

B.S.; Humboldt State University; Wildlife Management/Speech Communication; 1984
A.S.; College of the Siskiyou; Wildlife and Forestry; 1982

Current Employer and Responsibilities:

Coeur d'Alene Tribe; Education/Outreach Specialist; 5/1998 to Present
Coordination and facilitation of BPA funded education and outreach projects.
Primary responsibilities include facilitation of watershed working groups, editing and publishing program newsletter, incorporating restoration projects into local school curriculums, and managing a summer internship program.

Previous Employment:

Idaho Department of Parks and Recreation; Park Ranger; 1998
Self Employed; Taxidermist; 1994 to 1998
California State Parks; Park Ranger; 1986 to 1994
Champion Timberlands; Forester; 1985
Humboldt State University; Research Assistant; 1984 to 1985

Expertise:

Mr. Neighbor has 12 years of professional experience in natural resources related fields. He has extensive expertise teaching students about ecological systems through hands-on field investigations and nature presentations. He has conducted over 600 lectures in an outdoor setting. In past positions he developed a shorebird identification key, birding pamphlet and native plant restoration guide. He formed and served as chairman of the MacKerricher Docent Council that trained volunteers for park interpretation and enhancement projects.

Section 10. Information/technology transfer

Information gathered through program efforts is distributed in a variety of public forums. The Fish and Wildlife Program publishes a quarterly newsletter which provides non-technical information to interested and affected parties. Restoration activities are incorporated into local school curriculum to facilitate implementation and monitoring of projects. The Program coordinates Water Awareness Week in the local school districts to educate children in technological applications and proper watershed function. Program staff present information on habitat and population response to management techniques at meetings of the American Fisheries Society and other regional workshops. Coordination of implementation activities with other management agencies in the Coeur d'Alene subbasin is accomplished through participation in an inter-agency workgroup. Finally, the Bonneville Power Administration publishes technical information in progress reports, management plans and annual monitoring reports printed.

Congratulations!