Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Habitat Restoration/Enhancement Fort Hall Reservation

Bonneville project number, if an ongoing project 9201000

Business name of agency, institution or organization requesting funding
Shoshone-Bannock Tribes

Business acronym (if appropriate) SBT

Proposal contact person or principal investigator:

Name David Moser
Mailing Address Shoshone-Bannock Tribes, PO Box 306
City, ST Zip Fort Hall, ID 83203
Phone 208-238-3761
Fax 208-238-3742
Email address salmon@nicoh.com

Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Salmon Corps	P.O. Box 306	Fort Hall, ID, 83203l	John Fred
University of Montana	Division of Biological Sciences	Missoula, MT, 59812	Paul Spruell

NPPC Program Measure Number(s) which this project addresses.
10.3E.10, 10.3E.11, 10.3E.9,

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

Other planning document references.

Subbasin.
Snake mainstem

Short description.
Provide conditions to maintain a self-perpetuating tribal subsistence and trophy trout fishery. Provide conditions and seed stock to re-establish native cutthroat trout runs in bottoms and mountain stream tributaries.

Section 2. Key words

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

Other keywords.
Riparian protection, stream restoration, native species

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
9500600	Shoshone-Bannock/Shoshone-Paiute joint culture facility	Will provide seed stock to re-establish native Yellowstone cutthroat to restored streams

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Baseline data collection in project reaches	a	Measure abiotic stream habitat variables in stream reaches,

			including: channel morphology, substrate composition, water chemistry
1		b	Measure biotic stream habitat variables in stream reaches, including: fish and invertebrate community composition and densities, biomass
2	Install habitat improvement structures to increase existing juvenile and adult salmonid habitat (i.e spawning, rearing, and object cover)	a	Evaluate habitat enhancement projects completed in previous years and modify to increase efficacy
2		b	Construct and install new habitat structures in project areas
2		c	Monitor changes in biotic and abiotic variables; fish populations, riparian vegetation, and channel profiles. Maintain structures as needed
3	Protect and restore riparian habitats of Reservation streams	a	Plant pole cuttings of native willow and cottonwood. Plant native grass and wetland plants
3		b	Erect fences to protect riparian areas and critical spawning habitats
3		c	Maintain fences on an as needed basis
4	Deter and reduce non-game fish migrations into Fort Hall Bottoms streams	a	Maintain permanent weir on Spring Creek
4		b	Remove common carp (Cyprinus carpio) from Clear, Big Jimmy, and Spring Creeks when sampling for trout
5	Promote tribal fisheries management objectives in the Snake River Basin	a	Participate in forums and meetings that affect regional use, storage, and regulation of Snake River flows to promote fisheries restoration
5		b	Solicit design and cost share projects pertaining to Snake and Blackfoot Rivers and American Falls Reservoir habitat enhancement and management

6	Genetic inventory of native Yellowstone cutthroat trout, Fort Hall Reservation	a	Reference samples collected by Shoshone-Bannock Tribes. Allozyme confirmation of reference sample identity
6		b	Screen of introns to identify useful markers
6		c	Sample collection by Shoshone-Bannock Tribes. Sample analysis done by University of Montana

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	3/1992	10/2007	25.00%
2	3/1992	10/2007	20.00%
3	3/1992	10/2007	30.00%
4	3/1992	10/2007	10.00%
5	3/1992	10/2007	15.00%
			TOTAL 100.00%

Schedule constraints.

Completion date.
2007

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	Biologist Program Manager, Biologist (partial), Field Biologist (partial), Technician, Secretary	$54,000
Fringe benefits	34% of Salarys	$18,360
Supplies, materials, non-expendable property	Field Supplies, Office Supplies, Gas & Oil)	$3,200
Operations & maintenance	Equipment Maintenance (i.e electrofishers, generators, vehicles)	$3,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Buck and rail fencing	$20,000
PIT tags	# of tags:	$0

Travel	Professional society meetings, workshops	$4,000
Indirect costs	28% of Salary and Fringe	$20,261
Subcontracts	Field assistance from Salmon Corps ($5,000) and genetic inventory of native Yellowstone cutthroat.	$65,000
Other	Pickup Lease	$4,927
TOTAL		$192,748

Outyear costs

Outyear costs	**FY2000**	**FY01**	**FY02**	**FY03**
Total budget	$130,000	$135,000	$140,000	$140,000
O&M as % of total	2.00%	2.00%	2.00%	2.00%

Section 6. Abstract

Streams on the Fort Hall Bottoms have suffered from years of unrestricted grazing and rapid flooding and drafting of American Falls Reservoir. Negative impacts from loss of bank vegetation and resultant lateral scouring and downcutting of streambanks include; siltation of spawning gravels, loss of object cover and pool depth, increasing width depth ratios of stream channels and resulting increases in water temperature. Enhancement and restoration techniques thus far have included use of instream structures to provide cover and direct flow from unstable streambanks (i.e. rock and wood wings dams and barbs), sloping of banks, revegetation with native species, and fencing of project areas and sensitive riparian areas. Monitoring has included measuring pre and post abiotic and biotic parameters, including; channel morphology, aquatic invertebrates, channel substrates, and fish populations. Since 1992 fish population densities have increased five fold from pre-project levels in Clear Creek. Stream depth has increased significantly in project areas, and new areas of clean spawning gravels have been created. Many areas of actively eroding bank have been stabilized and revegetated in Spring Creek. Restoration of riparian areas has provided for increased fish production and has benefitted other wildlife. Continued restoration/enhancement efforts combined with exclosures will address project goals, specifically, returning spring streams on the Fort Hall Bottoms to historical conditions and providing for tribal subsistance and recreational fisheries. Future plans also include supplementation of remaining native Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) populations impacted by hybridization. Fish from the planned SBT/SPT Joint Culture Facility (Project # 9500600) will be used for supplementation. Captive brood stock will be obtained from streams on the Fort Hall Reservation after a genetic inventory of Yellowstone cutthroat trout has been completed.

Section 7. Project description

a. Technical and/or scientific background.

The Fort Hall Indian Reservation, located in southeastern Idaho, is drained by more than twenty streams. Of particular importance, are streams in the Fort Hall Bottoms, which is a wetland lying adjacent to the Snake River near its entrance into American Falls Reservoir. These streams are all spring fed, low gradient, and relatively short in length.

Of the four primary Bottoms spring streams, Spring Creek is the largest (discharge averages 12.75 m^3/s and is approximately 15 km in length) and Clear Creek is the second largest (discharge averages 4.5 m^3/s and is approximately 11 km in length). These Bottoms streams provide critical wintering, spawning, and nursery habitats for adfluvial and resident salmonids (Taki and Arthaud 1993). The streams, lateral springs, and surrounding marshlands are also heavily used by wintering and nesting waterfowl, shorebirds, and raptors. Endangered bald eagles and trumpeter swans winter, nest, and feed on the Bottoms.

Streams on the Fort Hall Bottoms have been affected by a variety of sources including, American Falls Dam construction and operations, upstream Snake River operations, Snake River channelization off reservation, and livestock grazing. Cattle, bison, and horses have been present on the Bottoms since the establishment of the Fort Hall Indian Reservation in the early 1800's. Today many streams support reduced salmonid populations and those streams that do have viable salmonid populations are in serious danger of extirpating remaining native salmonid stocks, through hybridization, competition, and further loss of habitat.

Streambank failures on Bottoms streams are a serious problem affecting aquatic biota through changes in habitat quality. Negative impacts from streambank failures include shallow widened channels, a reduction in riparian vegetation and instream cover, increased summer water temperatures, and deposition of fine sediments.

The primary goal of the Resident Fisheries Program (RFP) is to restore, enhance, and protect these streams so they again may support native salmonid populations at historical levels. Work to be done through the end of the project involves physical and biotic assessments of enhancement areas; developing and implementing fencing projects; placing habitat structures to aggrade sediment; improving water quality and bank stability; providing cover for fish; and an extended phase of monitoring, evaluation, and maintenance.

In other studies instream structures have increased pools, usable spawning gravel, undercut banks, (House and Boehne 1986) and salmonid biomass (Rinne 1981). Numerous examples with beneficial results have been shown using structures in Danish watercourses to restore meanders, banks, riffles and spawning gravels, deep pools, water quality, and fish passage (Madsen 1995). Stream bank revegetation combined with fencing to exclude livestock has had widespread success in improving riparian vegetation, bank stability, water quality, and stream morphology (Madsen 1995; Clary and Webster

1989; Duff 1977); and although more difficult to prove, well designed studies have shown an associated increase in trout biomass (Madsen 1995; Platts 1981; Platts and Rinne 1985).

Restoring Bottoms stream channel morphology and riparian habitats will help improve water quality and maintain/increase populations of native Yellowstone cutthroat trout, rainbow, and hybrid (rainbow x cutthroat) trout, which benefit important Tribal subsistence fisheries. Streams to be benefitted also function as spawning, nursery, and wintering habitat for fisheries in the American Falls Reservoir and the mainstem Snake River.

The assessment of past habitat restoration successes and failures is imperative to the efficacy of any habitat improvement project. Fish population trends have been monitored using electrofishing and snorkeling. Silt And Depth Measurement (SADM) surveys, developed by the Resident Fisheries Program (RFP) for low-gradient spring creeks, continued to be used to assess changes in channel characteristics in treatment and control areas of streams on the Bottoms.

The distribution and abundance of Yellowstone cutthroat trout have declined in the Snake River Plain of Idaho through habitat degradation, genetic introgression, and exploitation (Thurow et al. 1988). This project in concert with the Shoshone-Bannock/Shoshone-Paiute joint culture facility addresses problems with habitat degradation and genetic introgression, respectively. The use of supplementation in conjunction with habitat improvement and other measures has been shown to be successful in re-introducing the greenback cutthroat trout in Colorado (Stuber et al. 1988; Dwyer and Rosenlund 1988) This project addresses the resident fish goals in section 10 in the Columbia River Fish and Wildlife Program (1994), specifically the long-term sustainability of native fish in native habitats. Restoration of bottoms streams is a first step in providing the conditions for sustainable populations of native Yellowstone cutthroat trout. The second step involves supplementation of existing stocks with pure strain Yellowstone cutthroat trout obtained from the proposed Shoshone-Bannock/Shoshone Paiute joint culture facility (# 9500600).

In addition to providing habitat for resident salmonids, Bottoms streams serve as refugia for Snake River populations of salmonids during extreme flow events. This project mitigates for loss of native Yellowstone cutthroat trout resulting from construction and operation of American Falls Reservoir. In addition, this project mitigates for losses caused by changes in duration and magnitude of flows caused by projects upstream of the Fort Hall Bottoms (i.e. Palisades Reservoir).

b. Proposal objectives.

1. Baseline data collection in project reaches

2. Install habitat improvement structures to increase existing juvenile and adult salmonid habitat.

3. Protect and restore riparian habitats of Reservation streams

4. Deter and reduce non-game fish migrations into Fort Hall Bottoms streams

5. Promote fisheries management objectives in the Snake River Basin

6. Genetic inventory of native Yellowstone cutthroat trout, Fort Hall Reservation

Products resulting from this project include: 1) Restoration and protection of instream habitat and riparian habitat in streams on the Fort Hall Reservation. 2) Continued cooperative relationships and cooperative agreements between the tribes and state and federal agencies to further the protection of native fish and wildlife in the basin. 3) Developing a refined method for restoration of unique spring stream ecosystems. 4) Yearly publication of results as BPA annual reports and one or more publications in peer reviewed journals for dissemination of technical restoration techniques. 5) A report describing the genetic status of Yellowstone cutthroat on the Fort Hall Reservation.

c. Rationale and significance to Regional Programs.

This project addresses the principles of the Fish and Wildlife Program (1994) as outlined in section 10.1A. Section 10.1A calls for protection, mitigation and enhancement of resident fish populations affected by construction and operation of dams. Operation of American Falls Reservoir and upstream projects directly negatively affects populations of native Yellowstone cutthroat trout on the Fort Hall Indian Reservation by degrading physical habitat and providing a source pool of non-native hatchery rainbow trout. In addition, this project is directly referenced in the Fish and Wildlife program as measure 10.3E.10; " Implement habitat restoration and enhancement activities in Spring Creek and Clear Creek along the Fort Hall Bottoms located on the Fort Hall Reservation" and 10.3E.11 which provides funding for this project. This project is interconnected with measure 10.3E.9 of the Fish and Wildlife Program, which calls for construction and operation of a fish culture facility for the production of native salmonids. The eventual objective of the project is to provide conditions for self-sustaining populations of native Yellowstone cutthroat trout. Genetic introgression from domesticated non-resident hatchery rainbow trout has all but extirpated pure strains of Yellowstone cutthroat trout on Bottoms streams and will make supplementation a vital part of returning native stocks to historical levels. This project addresses the concerns of section 7 of the CBFWP (1994) through a genetic inventory of Yellowstone cutthroat trout populations on the Fort Hall Reservation. Biodiversity will be maintained through supplementation of Yellowstone cutthroat obtained from captive broodstock collected on the Fort Hall Reservation. Measures will be implemented (i.e. broodstock gametes replaced yearly at a

rate of 20-30%) to insure that supplementation will have no detrimental effects on wild gene pools.

d. Project history

Project Reports and Technical Papers

Taki, D. and D.L. Arthaud. 1993. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1992 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Arthaud, D.L. and D. Taki. 1994. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1993 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Arthaud, D.L., C.G. Colter , and J. Gregory. 1995. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1995 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Arthaud, D.L., C.G. Colter , and D. Moser. 1996. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1996 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Moser D. and C.G. Colter. 1997. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1997 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Results from the first six years of the Fort Hall study show that habitat enhancements in 1.9 km of Clear Creek increased wild trout populations 5-12 times and biomass 3-4 times over pre-treatment conditions. Within two years, a bison exclosure fence around 2.5 km of Clear Creek in the upper pasture has reduced bare banks from a 30% frequency to less than 5%, along with an associated regrowth of upper-bank willows, dogwoods, and birch. Bank stabilization and revegetation work on Spring Creek series 200 and 300, since 1993, has reduced eroding, unvegetated banks from 15% frequency down to 9% (1,000 m of stabilized bank) along 9 km of stream. Peak fry densities in areas where evergreen revetments were intalled averaged 0.69 fry/m^2 of bank over a six year period, whereas in areas of bare bank fry densities ranged from 0-0.04 fry/m^2.

Since project inception an iterative process has been developed whereby effective techniques for monitoring and implementation have been adopted over techniques deemed less effective. The time frame for the project allows for and in future years will provide for continued adaptive management of fish and wildlife on and off the Fort Hall Reservation.

e. Methods.

Objective 1: Data collection at project locations. Variables measured in treatment and control strata in Clear Creek will include stream cross-section profiles, substrate composition, bank stability, instream and riparian vegetation composition, water temperature, invertebrate and fish population estimates. Variables measured in Spring Creek, other Bottoms streams, and select mountain streams will be similar, yet not so exhaustive.

Task a: Measure stream habitat variables in project locations for pre and post treatment evaluation.

Techniques used will be similar to the USDA Forest Service General Aquatic Wildlife System Level III surveys or IFIM depending on stream size and type of habitat modifications implemented. Variables to be evaluated will include, but not be limited to: stream channel profile, discharge, substrate composition, percent cover by cover type, bank composition/stability, pool:riffle ratio, width/depth ratios, *p*H, DO, specific conductance, Total Dissolved Solids, riparian vegetation composition, and canopy density. Substrate composition will be measured with a McNeil-Ahnell core sampler. Water temperature will be monitored with Stowaway recorders.

Task b: Obtain fish and invertebrate compositions, population estimates, and trends for all streams that will be affected by habitat restoration efforts.

We will use a backpack electrofisher to sample fish in small streams, a tote barge to sample moderately sized streams, and an electrofishing boat to sample the Portneuf and Blackfoot rivers, Bannock, Spring and lower Clear creeks. Estimates will be made using the Peterson mark-recapture method from boat samples, and the Zippin multiple pass method—or modified single pass method to reduce injury (Mesa and Schreck 1989)—with the backpack and tote barge electrofishers.

Invertebrates will be sampled throughout each year using Serber and Hess samplers and Ponar substrate dredges.

Objective 2: Install habitat improvement structures to increase existing juvenile and adult salmonid habitat.

Task a: Evaluate habitat enhancement projects implemented in previous years to determine which methods most effectively increased salmonid biomass and usable habitat. Analysis of variance (ANOVA) will be used to compare pre and post treatment stream width, mesohabitat area, maximum water depth, mean water depth, and mean wetted silt depth. ANOVA will also be used to compare changes in substrate pertaining to usable spawning gravel every two years after structure placement. Shannon-Weaver species diversity and other metrics will be used to assist in quantifying aquatic invertebrate community health. Surveys similar to GAWS level III will be used to measure changes in channel morphology. Fish populations will be sampled during spring or fall to determine which type of habitat enhancement had the greatest success increasing numbers and biomass of wild trout.

Task b: Construct and install selected habitat structures in project areas. We will add treatment strata to Clear Creek mostly downstream from current locations. Unstable banks on Spring Creek will be treated over the length of the stream, and to a lesser extent channel improvements for spawning bars, adult and juvenile cover. Big Jimmy, Jeff Cabin, Diggie, Kinney, Jimmy Drinks, Ross Fork, and Bannock creeks may also be treated similarly. No river mile locations are available, but project areas are parallel to Snake River miles 726 through 750.

Task c: In close proximity to treatments, monitor fish populations annually or biennially, revegetation mortality seasonally, and stream cross-section profiles annually or biennially for evaluation.

Task d: Maintain bank and channel treatments on an as needed basis, to promote long-term stability and aid natural restoration.

Objective 3: Protect and restore riparian habitats of Reservation streams.

Task a: Plant pole cuttings of native willow and cottonwood and seedlings of native riparian grasses and wetland species in heavily eroded and unstable bank areas. Monitor plant survival seasonally. If soil in upper banks becomes dry, water on an as needed basis.

Task b: Erect fences to protect riparian areas and critical spawning habitats, yet provide adequate livestock access to water. Erect fence to protect bank revegetation where banks have been sloped. Protection enclosures will be erected primarily on Clear, Diggie, Spring, Bannock, and Ross Fork creeks.

Task c: Maintain fences on an as needed basis. Enclosures will remain in place as long as necessary, until changing grazing leases or restored riparian vegetation warrant removal.

Objective 4: Deter and reduce non-game fish migrations into the Fort Hall Bottoms streams.

Task a: Maintain permanent weir in Spring Creek to prevent upstream migration of non-game fish into Fort Hall Bottoms streams .

Task b: Remove common carp *Cyprinus carpio* from Clear, Big Jimmy, and Spring Creeks when sampling for trout.

Objective 5: Promote fisheries management objectives in the Snake River Basin.

Task a: Participate in forums and meetings that affect regional use, storage, and regulation of Snake River flows to promote fisheries restoration on the Fort Hall Reservation. Participate in forums, committees, Watershed Advisory Groups pertaining to the Blackfoot River, Portneuf River, and Bear River.

Task b: Solicit, design, and cost-share projects pertaining to Snake and Blackfoot rivers and American Falls Reservoir habitat enhancement and management.

Objective 6: Genetic inventory of native Yellowstone cutthroat trout, Fort Hall Reservation

Task a: Reference samples collected by Shoshone-Bannock Tribes. Allozyme confirmation of reference sample identity. Non-lethal tissue samples.

Task b: Screen of introns to identify useful markers.

Task c: Sample collection by Shoshone-Bannock Tribes. Sample analysis done by University of Montana. Non-lethal tissue samples, 15- 30 samples per stream (≈ 30 streams)

f. Facilities and equipment.

All office space and field equipment is currently provided for at the Shoshone-Bannock Tribes Fisheries Department. The Fisheries Department has three backpack electrofishers, a tote barge electrofisher, and a Smith Root boat electrofisher for estimation of fish population densities and biomass. Other field equipment includes nets, waders, field notebooks, meter tapes, chemical preservatives, etc. All equipment necessary for implementation and monitoring have been purchased in prior years of this project. Replacement and repair of existing items may be necessary in future years.

g. References.

Arthaud, D.L., and D. Taki. 1994. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1993 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Arthaud, D.L., C.G. Colter , and J. Gregory. 1995. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1995 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Arthaud, D.L., C.G. Colter, and D. Moser. 1996. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1996 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Clary, W.P., and B.F. Webster. 1989. Managing Grazing Areas of Riparian Areas in the Intermountain Region. USDA Forest Service, Intermountain Research Station, GTR INT-263.

Duff, D.A. 1977. Livestock grazing impacts on aquatic habitat in Big Creek, Utah. Paper presented at the symposium on livestock interactions with wildlife, fish, and their environments, May 1977, Sparks, Nevada. University of California, Davis, California, USA.

Dwyer W.P., and B.D. Rosenlund. 1988. Role of fish culture in the reestablishment of greenback cutthroat trout. American Fisheries Society 4: 75-80

House, R. A., and P. L. Boehne. 1986. Effects of instream structures on salmonid habitat and populations in Tobe Creek, Oregon. North American Journal of Fisheries Management. 6: 38-46.

Madsen, B.L. 1995. Danish watercourses-ten years with the New Watercourse Act. Danish Environmental Protection Agency, Ministry of Environment and Energy, Denmark.

Mesa, M.G., and C.B. Schreck. 1989. Electrofishing mark-recapture and depletion methodologies evoke behavioral and physiological changes in cutthroat trout. Transactions of American Fisheries Society 118: 644-658.

Moser D., and C.G. Colter. 1997. Fort Hall Reservation stream enhancement: Shoshone-Bannock Tribes 1997 Annual Report to Bonneville Power Administration, Project 92-10, Portland, Oregon.

Platts, W.S. 1981. Impairment, protection, and rehabilitation of Pacific salmonid habitats on sheep and cattle ranges. Pages 82-92 *in* Proceedings: propagation, enhancement, and rehabilitation of anadromous salmonid habitat in the Pacific northwest. Humboldt State University, Arcata, California, USA.

Platts, W.S., and J.N. Rinne. 1985. Riparian stream enhancement management and research in the Rocky Mountains. North American Journal of Fisheries Management 5: 115-125.

Rinne, J.N. 1981. Stream habitat improvements and native trouts. USDA, Forest Service research note RM-409.

R.J. Stuber., B.D. Rosenlund, and J.R. Bennett 1988. Greenback cutthroat trout recovery program: management overview. American Fisheries Society Symposium 4: 71-74.

Taki, D., and D. Arthaud. 1993. Fort Hall Reservation Stream Enhancement: Shoshone-Bannock Tribes 1992 Annual Report to the Bonneville Power Administration, Project 92-10, Portland Oregon.

Thurow, R.F., C.E. Corsi, and V.K. Moore. 1988. Status, ecology, and management of Yellowstone cutthroat trout in the upper Snake River drainage, Idaho. American Fisheries Society Symposium 4: 25-36.

Section 8. Relationships to other projects

This project is linked to the Shoshone Bannock/Shoshone Paiute joint culture facility (# 9500600). Habitat restoration/enhancement and protection is aimed at providing conditions for self perpetuating populations of native Yellowstone cutthroat trout. The hatchery is needed to provide supplementation for stocks dwindling due to habitat loss and genetic introgression from hatchery rainbows. Selection of broodstock and source pools for wild gametes will require a comprehensive genetic inventory of existing Yellowstone cutthroat trout populations on the Fort Hall Reservation.

Work done on the Blackfoot and Portneuf rivers are collaberative efforts with state agencies, including; Idaho Fish and Game and the Bureau of Land Management. Much of the labor intensive work done on the project is completed with the help of Salmon Corps, an offshoot of Americorps. Most of the year 15-20 Salmon Corps members are available for implementation of restoration work.

Section 9. Key personnel

David C. Moser
Program Manager

Education

Bachelor of Science, Humboldt State University, 1989.
Major: Freshwater Fisheries
Major Advisor: Terry Roelofs, Ph.D.

Master of Science, Idaho State University, 1993.
Major: Aquatic Ecology
Major Advisor: G. Wayne Minshall, Ph.D.

Experience

Most recent experience:

Interim Resident Fisheries Biologist/Program Manager. Position in Resident Fisheries Program (RFP) responsible for soliciting, implementing, and maintaining Bonneville Power Administration and other contracts; planning biologically sound long-range fisheries restoration programs on and off the Fort Hall Reservation; assist in managing fishery resources, personnel, budgets, and equipment, under the RFP Coordinator. Membership in Columbia Basin Fish and Wildlife Authority Resident Fish Committee enables tribal cultural and biological concerns to be presented and addressed in a regional forum. Wrote and co-wrote annual reports for the BPA and BIA in 1997.

Fisheries Field Biologist for the Shoshone-Bannock Tribes. Responsible for implementation and maintenance of the resident fisheries program on the Fort Hall Indian Reservation. Duties included; supervision of field crews ranging from 5-20 technicians and Salmon Corps personnel.

Projects Participated In

1991-1993
Research assistant at the Idaho State University stream ecology center. Pocatello, ID.
1993-1994

The effect of flow regimes on primary and secondary production in Hawaiian streams. University of Hawaii and Department of Land and Natural Resources,

1996-1998

Resident Fisheries Biologist, Shoshone-Bannock Tribes, Fort Hall, ID.

Publications and Presentations

1995

Moser, D.C. and G.W. Minshall. 1996. Effects of Localized Disturbance on Macroinvertebrate Community Structure in relation to Mode of Colonization and Season. Am. Midl. Nat. 135:92-101.

1997

Moser, D.C. And C.G. Colter. 1997. Fort Hall Reservation Stream Enhancement: Shoshone-Bannock Tribes 1997 Annual Report to Bonneville Power Administration, Project 92-10, Portland, OR.

Section 10. Information/technology transfer

Information/technology transfer will be provided through published annual reports, presentations at professional society meetings, and at least one publication in a peer reviewed journal.