Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Pacific Lamprey Research And Restoration

Bonneville project number, if an ongoing project 9402600

Business name of agency, institution or organization requesting funding
Confederated Tribes of the Umatilla Indian Reservation

Business acronym (if appropriate) CTUIR

Proposal contact person or principal investigator:

Name	Gary James
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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Columbia River Inter-Tribal Fish Commission	729 NE Oregon Street, Suite #200	Portland, OR 97232	Technical: D. Hatch Admin: J. Matthews

NPPC Program Measure Number(s) which this project addresses.
7.5F.1

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

Other planning document references.
Wy-Kan-Ush-Mi Wa-Kish-Wit, 1995, Volume II. Recommended actions under John Day, Umatilla, Walla Walla, Grande Ronde, Tucannon subbasin restoration plans.
Status Report of the Pacific Lamprey in the Columbia River Basin, 1995. Recommendations for Immediate Management and Enhancement Actions.

Subbasin.
John Day, Umatilla, Walla Walla, Tucannon, Grande Ronde, mainstem Columbia and Snake rivers.

Short description.
Assess status and survival limitations of Pacific lamprey, develop restoration plans, implement and monitor plans in Northeast Oregon and Southeast Washington subbasins.

Section 2. Key words

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

Other keywords.
Lamprey restoration, limiting factors, abundance, rebuilding, transplantation, monitoring.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
	No other lamprey restoration projects ongoing.	

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determine the current abundance and passage trends of adult lamprey crossing mainstem Columbia and Snake River dams.	a	Perform on-site counts at dams or coordinate with organizations involved with fish counting at dams.

		b	Review fish ladder counts to determine population abundance above each dam.
		c	Estimate diel, seasonal and annual variations in adult and juvenile lamprey migration.
2	Document current presence and distribution of lamprey in the John Day, Umatilla, Walla Walla, Tucannon, and Grande Ronde subbasins.	a	Conduct sampling program (electroshock, seine, etc.) to document presence/absence and relative abundance where information is unknown.
3	Collect habitat information relevant to lamprey production in the John Day, Umatilla, Walla Walla, Tucannon, and Grande Ronde subbasins.	a	Identify habitat factors which have and/or likely still impacting lamprey populations.
		b	Identify tributaries which currently have adequate habitat for lamprey reestablishment.
		c	Identify tributaries which currently do not have adequate habitat conditions to support lamprey populations, and identify habitat enhancement needs.
4	Begin implementation of Pacific lamprey restoration plan in a pilot subbasin and continue plan development for other subbasins in NE Oregon/SE Washington.	a	Continue literature review regarding lamprey capture, handling, holding, transport, release, trasnplantation or supplementation efforts and artificial propagation.
		b	Summarize all lamprey information regarding past and current lamprey abundance, habitat limiting factors, donor stock availability, genetic database, disease database, and homing information in development of restoration plans.
		c	Begin implementation of pilot subbasin restoration plan as developed in 1998.
		d	Begin monitoring and evaluation of pilot restoration plan.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	1/1999	12/1999	15.00%
2	1/1999	12/1999	25.00%
3	1/1999	12/1999	15.00%
4	1/1999	12/1999	45.00%
			TOTAL 100.00%

Schedule constraints.
The most likely constraint to implementing subbasin restoration plans is anticipated to be funding availability, and lamprey donor stock availability.

Completion date.
N/A-ongoing project. Lamprey restoration projects will require continued O&M and M&E following initial implementation.

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		$130,000
Fringe benefits		$39,000
Supplies, materials, non-expendable property		$47,000
Operations & maintenance		$10,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		$6,000
PIT tags	# of tags:	
Travel		$20,000
Indirect costs		$86,000
Subcontracts		$50,000
Other		
TOTAL		$388,000

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$408,000	$430,000	$450,000	$475,000
O&M as % of total	5.00%	10.00%	10.00%	15.00%

Section 6. Abstract

A Pacific lamprey status report, which was completed in 1995, determined that Pacific lamprey populations were generally depressed in mid to upper Columbia and Snake River tributaries, and made recommendations for research and management to restore populations. The Pacific Lamprey Research and Restoration Project, a cooperative effort between CTUIR and CRITFC (and initially OSU), was formed with the goal to increase Pacific lamprey populations above Bonneville Dam. An initial objective is to determine the past and current magnitude and location of lamprey populations in the Columbia River Basin. Limiting factors of Pacific lamprey will be identified and ultimately restoration plans will be developed and implemented for NE Oregon/SE Washington. Adult counts are monitored at several mainstem Columbia and Snake River dams to assess populations status and trends. Through historical information, interviews, compilation of recent fish sampling, screening records, and site sampling, data is showing that most previously abundant areas now have critically low populations. General habitat conditions in tributaries will be compared to presence/absence findings to better understand lamprey habitat preference. In 1996 and 1997, OSU assessed lamprey tagging techniques and resultant stress for application in passage research. In 1998, development of a genetic database for determination of lamprey population structure in the Columbia Basin will be made. All information will be considered in development and implementation of specific subbasin lamprey restoration plans. A multi-agency lamprey technical work group has been formed to discuss various questions and needs regarding lamprey restoration.

Section 7. Project description

a. Technical and/or scientific background.

The once-abundant Pacific lamprey (*Lampetra tridentata*) populations are believed to be severely depressed or absent in mid upper Columbia and Snake River tributaries where hydroelectric projects have created serious migration impacts. The Pacific lamprey is an important part of the food web of north Pacific ecosystems, both as predator and prey. Lamprey (eels) are also a valuable food and cultural resource for American Indians of the Pacific Northwest. Depressed upriver lamprey runs have impacted treaty-secured fishing opportunities by forcing tribal members to gather this traditional food fish in lower Columbia River locations. To date, little attention has been given to assessment of lamprey populations, documentation of impacts, or the potential enhancement efforts for this species. Columbia River lamprey are currently a likely candidate for listing as threatened or endangered under the Endangered Species Act. The NPPC Fish and Wildlife Program supports lamprey restoration following identification of problems and plans to do so.

The goal of this project is to identify Pacific lamprey enhancement opportunities and implement projects which will bring back populations in the mid and upper Columbia and Snake River tributaries. Historic and current populations and distribution will be documented to identify losses. Analysis of limiting factors (including assessment of

mainstem passage problems) will be conducted on representative populations to identify problems. Upon determining limiting factors, and researching restoration techniques, various proposals will be developed to address problems and implement enhancement or restoration projects in NE Oregon and SE Washington.

b. Proposal objectives.

Objective 1. Determine the current abundance and passage trends of adult lamprey crossing mainstem Columbia and Snake River dams.

Products derived from Objective 1:
Continued and expanded abundance monitoring (counts at all mainstem dams) will allow for assessment of Pacific lamprey population status and trends. Sources for donor populations to support restoration efforts will be better understood.

Objective 2. Document current presence and distribution of lamprey in the John Day, Umatilla, Walla Walla, Tucannon, and Grande Ronde subbasins.

Products derived from Objective 2:
Through historical information, interviews, compilation of recent fish sampling and screen records, site sampling, an assessment of past and present lamprey populations will be made. This information will be critical in developing restoration plans in specific subbasins (Objective 4).

Objective 3. Collect habitat information relevant to lamprey production in the John Day, Umatilla, Walla Walla, Tucannon, and Grande Ronde subbasins.

Products derived from Objective 3:
General habitat conditions (flows, temperatures, substrate, etc.) will be compiled from existing sources. Habitat conditions will be compared to lamprey presence/absence findings to better understand habitat requirements of lamprey period. This information will be critical in developing restoration plans in specific subbasins.

Objective 4. Begin implementation of Pacific lamprey restoration plan in a pilot subbasin and continue plan development for other subbasins in NE Oregon/SE Washington.

Products derived from Objective 4:
Past and present lamprey abundance, limiting habitat factors, donor stock availability, genetic database, disease database, homing information and handling/transportation techniques will all be considered in development of one or two subbasin pilot lamprey restoration plans. Monitoring and

evaluation will also be included to provide for hands-on adaptive learning from initial plan implementation.

c. Rationale and significance to Regional Programs.

There are no other lamprey restoration efforts under the NPPC Fish and Wildlife Program. Critical Pacific lamprey population reductions is a wide spread problem throughout the Columbia River Basin. All findings from this program will have significant application to other locations in need of lamprey restoration. The multi-agency lamprey work group will help bridge information exchange for regional application.

d. Project history

The CTUIR Pacific Lamprey Research and Restoration Project # 9402600 was initiated in 1995. The NPPC required initial development of a Columbia Basin lamprey status report prior to funding continuing efforts. The status report documented that the once-abundant Pacific lamprey populations are severely depressed or absent in mid to upper Columbia and Snake River tributaries due mainly to hydroelectric projects and other habitat alterations. The report pointed out the cultural and treaty fishing value of the lamprey to Indian people and that depressed upriver runs have forced the tribes to gather this traditional food fish in the lower Columbia area. The status report also contained a list of recommendations to begin immediate protection of lamprey populations and objectives to begin lamprey research and restoration efforts. These recommendations have been funded in 1996 through 1998 and have included abundance monitoring at mainstem dams, assessment of past and current lamprey distribution and general abundance in NE Oregon and SE Washington tributaries, assessment of limiting factors which have caused population declines, assessment of radiotagging techniques and tools for application in passage research, assessment of general homing behavior in mainstem Columbia and Willamette rivers, development of a genetic database for determination of lamprey population structure in the Columbia Basin, and initial development of a pilot subbasin lamprey restoration plan in the Umatilla Basin. Average annual project cost has been $200,447.

e. Methods.

Objective 1: Determine the current abundance, passage trends, and length frequency of adult lamprey crossing mainstem Columbia and Snake River dams.

Approach: Fish passage estimates of adult lamprey will be used as an index of abundance to help assess the status of Pacific lamprey. Currently, lamprey passage counts are made at most hydoprojects in the Columbia River Basin. However, a significant proportion of the Pacific lamprey run traverses the fish ladders at night when counting is not performed and counting is not performed at Bonneville Dam during times of high shad

passage. This study will coordinate with agencies and organizations that conduct fish ladder counts on the Columbia and Snake rivers to obtain passage estimates. Additionally at key locations or times when lamprey counting is not being conducted, we will implement a program to estimate lamprey passage. This may include on-site counting or the use of videography.

Lamprey length-frequency estimates will be made by measuring images recorded on videotapes at locations that employ videography systems for fish counting. Length frequency estimates will also be compared both temporally, and spatially. These data will help in determining if different stocks of lamprey exist.

Objective 2: Document past and current presence and distribution of lamprey in the John Day, Grande Ronde, Tucannon, Walla Walla and Umatilla River subbasins.

Approach: Past and current presence and distribution of lamprey in northeast Oregon tributaries will continue to be documented through a literature search and interview process. Tribal elders will be interviewed and fisheries management agencies records will be analyzed to establish historical information. Currently lamprey presence will be analyzed by review of all existing efforts that involve sampling/counting fisheries populations. Field sampling will be conducted to further document lamprey presence or absence. Some lamprey will be taken to the Oregon Department of Fish and Wildlife (ODFW) pathology laboratories for baseline disease data analysis. Results of this data will be taken in account in development of subbasin restoration plans under Objective 6.

Objective 3: Collect habitat information relevant to lamprey production in the John Day, Grande Ronde, Tucannon, Walla Walla and Umatilla River subbasins.

Approach: Lamprey abundance, distribution, and passage studies will help define where lamprey currently are and are not present. The passage and habitat studies will help answer the "why question" regarding depressed or extirpated lamprey populations. Habitat condition in tributaries are generally known from temperature, flow, and stream survey records. This information will be gathered, summarized, and compared with lamprey presence/absence findings. To quickly target efforts on what habitat "works" and what is "broken", particular attention on habitat conditions or features will be made where moderate or abundant lamprey populations still exist. Also, from old data, photographs and oral histories, we will define where lamprey were once abundant and examine habitat changes that have occurred since that time. Habitat enhancement recommendations will be made based on these findings.

Objective 4: Begin implementation of Pacific lamprey restoration plan in a pilot subbasin and continue plan development for other subbasins in NE Oregon/SE Washington.

Approach: The overall goal of the lamprey research and restoration project is to restore lamprey populations through implementation of various subbasin restoration plans. To initiate the restoration effort, CTUIR is planning to implement pilot projects in one or two subbasins within CTUIR ceded lands. These projects will provide an opportunity for hands-on learning regarding the numerous uncertainties involved in lamprey restoration. Information such as past and current lamprey abundance, limiting habitat factors, donor stock availability, genetic database, disease database, and homing information will be considered in development of the pilot lamprey restoration subbasin plan. The anticipated lamprey transplantation guidelines being developed by the multi-agency Columbia Basin lamprey technical work group will also be utilized. Literature reviews and interviews will be conducted in order to integrate all existing knowledge on lamprey handling, transport, ect. A monitoring and evaluation section will be included in the plan to allow for adaptive learning and management. Plan implementation would be expected to begin in 1999.

f. Facilities and equipment.

Specialized equipment required to implement project has included 2 desktop computer (one purchased and one more needed), a camera, and an electroshocker. Trapping facilities will likely be necessary in the near future to capture broodstock for transplantation to target subbasins for restoration. Subcontractor, CRITFC will contract a genetics laboratory in 1998 to perform electrophoretic genetic analysis. CTUIR will utilize ODFW pathology lab in La Grande, Oregon in 1998 to conduct tissue analysis.

g. References.

CRITFC – 1995. Wy-Kan-Ush-Mi Wa-Kish-Wit Spirit of the Salmon. Columbia River Anadromous Fish Plan of the Nez Perce, Umatilla, Warm Springs, and Yakama Tribes.

Close, D.A., M. Fitzpatrick, H. Li., B.L. Parker, D.R. Hatch, and G. James. 1995. Status Report of the Pacific Lamprey (*Lampetra tridentata*) in the Columbia River Basin. Bonneville Power Administration Report, Project Number 94-026, Portland, Oregon.

Section 8. Relationships to other projects

No other lamprey projects are being funded under the NPPC Fish and Wildlife Program. However, the numerous ongoing salmon and steelhead habitat enhancement projects will likely also be beneficial for lamprey natural production and restoration. In the Umatilla Basin, projects such as diversion dam laddering, canal screening, enhanced upstream flow, and stream habitat enhancement have allowed for salmon restoration. The relationship of these projects to Pacific lamprey may be similar to that of salmon. The CTUIR and CRITFC will continue to coordinate with the US Army COE to conduct adult lamprey counts and record video tapes at mainstem facilities. A multi-agency lamprey work group has been formed to discuss various questions and needs regarding lamprey restoration. This will continue to ensure that lamprey restoration plans are well thought out and don't conflict with other agency concerns or ongoing projects.

Section 9. Key personnel

Name: Gary A. James
Title: Fisheries Program Manager
Months funded this project: 1
Education: BS Fisheries 1979 Oregon State University
Experience: 20 years fisheries experience; last 15 years CTUIR Program Manager; expertise in multi-project fisheries program development, coordination, and oversight.

Name: David A. Close
Title: Fisheries Lamprey Biologist
Months funded this project: 12
Education: BS Fisheries 1994 University of Idaho, MS Fisheries 1998 Oregon State University.
Experience: 3 years graduate work on lamprey restoration for CTUIR. 2 years fisheries technician for CTUIR and US Forest Service.

Name: Aaron D. Jackson
Title: Lamprey Project Technician
Months funded this project: 12
Education: High School Diploma
Experience: 4 years – 2 years with CTUIR Umatilla Basin Natural Production Monitoring and Evaluation project, 2 years with CTUIR Pacific Lamprey Research and Restoration project.

Section 10. Information/technology transfer

Project reports of accomplishments are produced quarterly and annually. Project personnel also participate in a Columbia Basin Pacific lamprey work group to share findings and discuss information needs. Project personnel also participate in local public forums to communicate lamprey project status.