Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

"Monitoring Water Quality With Data Collection Platforms

Bonneville project number, if an ongoing project 9029

Business name of agency, institution or organization requesting funding
Clouston Energy Research & Pacific Agricultural Laboratory in collaboration with the Los Alamos National Laboratory, and the US Agricultural Department's Natural Resources Conservation Service.

Business acronym (if appropriate) N/A

Proposal contact person or principal investigator:

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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Los Alamos National Lab.	74 Barcelona	Los Alamos, NM 87544	Larry Sanders
Pacific Agricultural Lab.	12505 NW Cornell Rd	Portland, OR 97229	Stephen Thun
Applied Power Corp	1210 Homann Dr. SE	Lacy, WA 98503	David Love

NPPC Program Measure Number(s) which this project addresses.
Section 2, "SYSTEMWIDE GOAL AND FRAMEWORK" 2.2H The Need to Learn from Implementation; Section3, "COORDINATED IMPLEMENTATION, RESEARCH, MONITORING AND EVALUATION"; 3.1 Monitoring and Evaluation; 3.2A Program Monitoring; 3.2B, 3.2Fand 3.3Ai

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

Other planning document references.
I. "Snake River Salmon Recovery Team: Final Recommendations to the National Marine Fisheries Service" Page III-1 thru 12, INSTITUTIONAL CHANGES AND MONITORING; J. Monitoring for Adaptive Management. Page V-1thru 28, MEASURES TO PROTECT AND RESTORE SPAWNING AND REARING HABITAT 2 Goals, Criteria and Performance Measures. e. Water Temperature Goal; f. General Water Quality Goal.

Subbasin.
Cathrine Creek/Grande Rhonde River. (coordinated monitoring).

Short description.
Monitoring hydrologic conditions from baseline data collection or the continuous measurements of water temperature, turbidity, phosphorus (animal P) and pesticides. The Data Collection Platform is a stand alone system that uplinks the data to satellites.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
X	Resident fish		O & M		Biodiversity/genetics
X	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.
Baseline measurement, continuous measurement, reliable data collection

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
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Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Assemble Data Platforms	a	Size power array to sensor loads
		b	Select and aquire sensors
		c	Assemble and test
2	Install data platform at locations	a	Sites selected
		b	Move and place platforms
		c	Verify on site performance
3	Data collection and transmittal	a	Compile data for analysis
		b	Analyse data trends
		c	Complete communication loop
4	Calibration verification, O&M	a	Field collection and analysis
		b	O&M
5	Administration	a	Coordinate and monitor contract
6	Information and education	a	Aquire Environmental Teller machines (Section 10 objectives)
		b	Install in public locations

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	1/1999	3/1999	40.00%
2	1/1999	3/1999	10.00%
3	3/1999	12/1999	15.00%
4	4/1999	12/1999	5.00%
5	1/1999	12/1999	05%
6	6/1999	12/1999	25%
			TOTAL 100.00%

Schedule constraints.
Weather in some locations may indicate early retrieval of the equipment (snow pack).

Completion date.
Contingent to the monitored project's life and desired placement duration beyond the baseline data collection and sufficient monitoring period. This will be determined during contract and project review.

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		$100,000
Fringe benefits		$50,000
Supplies, materials, non-expendable property		$3,000
Operations & maintenance		$24,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		$156,000
PIT tags	# of tags:	$0
Travel		$4,000
Indirect costs		$4,000
Subcontracts		$25,000
Other		$0
TOTAL		$366,000

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$300,000	$350,000	$400,000	$450,000
O&M as % of total	20.00%	30.00%	40.00%	50.00%

Section 6. Abstract

"The Neighborhood Environmental Watch Network (NEWNET) is a regional network of environmental monitoring stations and a data archival center that support collaboration between communities, industry and government agencies to solve environmental problems. The stations provide local displays of measurements for the public and transmit measurements via satellite to a central site for archiving and analysis. Station managers are selected from the local communities and trained to support the stations. Archived data and analysis tools are available, through a communications network, to researchers, educational institutions, industrial collaborators and the public across the nation. Los Alamos National Laboratory and the Environmental Protection Agency have developed a NEWNET pilot program for the Department of Energy. The pilot program supports monitoring stations in Nevada, Arizona, Utah, Wyoming and California. Additional stations are being placed in Colorado and New Mexico. Pilot stations take radiological and meteorological measurements. Other measurements are possible by changing sensors." (1)

The sensors will provide **Monitoring** in remote or other areas of interest. In some cases the baseline data acquired will be compared to the periodic or continuous data collected to provide greater assurance that funded projects are improving the spawning habitat by measurable lowering of water temperature improved water quality.

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1. "Neighborhood Environmental Watch Network" Author: Larry Sanders Program Mgr. Los Alamos National Laboratory. For, Emerging Technologies in Hazardous Waste Management V Industrial & Engineering Chemistry Special Symposium. American Chemical Society, Atlanta, Georgia. September 27, 1993.

Section 7. Project description

a. Technical and/or scientific background.

One of the many causes of a species demise is the loss or degrading of the habitat that has supported that population in the past. Often it is a complex causal relationship of the many factors. In a symposium paper co-authored by David Chamberlain (2) and I, that is titled, "Rangeland Restoration Utilizing Mobile Solar Powered Livestock Watering Systems", discussed the following desirable methods. The riparian zone was improved by the placement of watering tanks (troughs) away from the stream and temporary fence sequestered an area that healed itself with the greatly reduced traffic by the cows. In addition, as distance to the surface water was increased, runoff waste introduced into the stream is decreased. Futhermore, the sedimentation loading is less due to the restoration of the riparian zone again because of lower traffic to the stream area. The Photovoltaic (PV) mobile watering system with the temporary fence is a tool that ought to become greatly promoted and employed more.

Changes in the condition of surface bodies of water, resulting from data sample of such practices mentioned above, or other remedial actions like forest buffer zone enhancement projects suggest a change in water quality. The data collected as a baseline prior to the implementation of the remedial project ought to clearly show the change in monitored conditions during the process. Data collected after the start of a project ought to change as the project matures over time and can be the verification of the improvement which is necessary as a tool for analysis.

"The Neighborhood Environmental Watch Network (NEWNET) is a program that addresses the need for environmental understanding. It helps the public become more involved in observing the environment and understanding the impact of agents on the environment. NEWNET also provides researchers with important data needed to better understand the environment" (1)

The Data Collection Platform (DCP) is a tool for analysis that will be an upgrade to the present methods of monitoring the effects of the practices affecting the habitat of several endangered species.

b. Proposal objectives.

1. Monitoring for adaptive management – "An important objective for the Team's Recovery Recommendations is to allow for management flexibility that can adapt the restoration program to use evolving and improved information for future management decisions" (2).

2. Recovery actions must be supported by monitoring objectives. – "These will help the SOC determine which initial actions to continue, which to modify, and which to modify, and which to replace with new actions. The time needed to achieve recovery will provide time for monitoring information to be incorporated into the decision making process." (2)

3. The team believes that all aspects of Snake River salmon recovery must be monitored and evaluated. In most instances, monitoring and evaluation should be the product of well-planned experimental design, utilizing experimental controls wherever appropriate (2)

4. Monitor for the water temperature goal.

5. Monitor for the water quality goal.

6. Monitor for turbidity level.

7. Data collection analysis and archived.

8. Provide trends data to the public via electronic teller machines.

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(2) ibid.

c. Rationale and significance to Regional Programs.

Much of the discussion above involves the collaboration on Hall Ranch and Catherine Creek, which is a part of the Grande Ronde Model Watershed Program. The DCPs can provide the information that qualify the success of the projects that affect that area.

Initial discussion with Dr. James McIver of the blue Mountain Natural Resource Institute (BMNRI) resulted in statements of interest and that the DCP will become a topic of discussion with the U.S. Forest Service (FS). The FS has interest in monitoring local conditions. Not only meteorological as it relates to fires, but to the stream conditions in the large and diverse area of their stewardship as it relates to aquatic habitat. Forest buffer zone near streams are so very important to the life-cycle of salmon from the Redds through rearing to migration to the ocean. Up to 75% of the basis of the food chain

begins in small upland stream that have canopies. Organic material enter the stream and feed Benthic detritivores and on up the chain to fish, etc. Data produced by the DCPs can be most helpful for adaptive management processes.

d. Project history

Although not a Bonneville Power Administration continuing project, there is a track record and history. Please visit the Internet site; http://NEWNET.jdola.lanl.gov

e. Methods.

The methods for collection of data with instruments and uplinking to a GEOS satellite and downlink to dish antenna for analysis and archival process has been explained in the discussions above.

f. Facilities and equipment.

The basic NEWNET facilities and equipment exist and will be employed in the system as described above. Station manager training can be done in Oregon or New Mexico. It is a one and a half day training course. Quality Assurance will be performed by the Los Alamos National Laboratory personnel. There will not be a need to be redundant in equipment, only DCPs for the collection of data and transmitter to a GEOS satellite are required.

g. References.

1. Northwest Power Planning Council, Columbia River Basin Fish and Wildlife Program Section 3 Coordinated Implementation, Research, Monitoring and Evaluation. Doc. 94-55

2. Snake River Salmon Recovery Team: Final Recommendation to the National Marine Fisheries Service, May 1994 Monitoring for Adaptive Management.

3. Sanders, Larry 9-27-93 Neighborhood Environmental Watch Network. Emerging Technologies in Hazardous Waste Management V Industrial & Engineering Chemistry Special Symposium. American Chemical Society, Atlanta, GA

Section 8. Relationships to other projects

Indirectly, the monitoring that is discussed herein, has a relationship to most habitat or forest buffer projects. It has usefulness for Rangeland management improvement with riparian zone activities.

Ongoing discussion with Los Alamos National Laboratory and the Blue Mountain Natural Resoursce Institute exists. Collaboration with OSU Rangeland Resources has been able to select Catherine Creek as the location of one or more DCPs.

Section 9. Key personnel

Project Manager: Larry Sanders, M.S.E.E., Texas Tech University. Employed at Los Alamos National Laboratory since 1974.
Computer Simulation, Computer Control and Data Acquisition Systems.

Program Coordinator(s)
Gary Causley PhD, Oregon State University, Department of Biochemistry and Biophysics.

Sidney N. Clouston, Jr. , A.A. Santa Monica City College, Long Beach City College 1976. Business Administration, Finance University of California Long Beach. Database Custodian, Defense Logistics Agency Joint U.S. and Canadian program 1990-95

Section 10. Information/technology transfer

The data collected provides researchers monitored information for adaptive management processes. This is made available to the Internet, parts or all of the data, via the computer links. There is a Station Manager education component to train local persons in the system operation and maintenance.

Available to the public are Environmental Teller Machines (ETM), these are able to be located in public places for educational purposes.