

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal**

Section 1. General administrative information

Demonstrate that a Translucent Pipeline Feels Normal to Fish

Bonneville project number, if an ongoing project 9052

Business name of agency, institution or organization requesting funding

Fish Passage, Inc.

Business acronym (if appropriate) FPI

Proposal contact person or principal investigator:

Name	<u>John Richard "Dick" Woodworth</u>
Mailing Address	<u>P. O. Box 242</u>
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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
Boise State University	1910 University Dr.	Boise, ID 83604	Stephen Affleck
Morrison Knudsen Corporation	P.O. Box 73	Boise, Idaho 83729	Gary West
Idaho Power Company	1221 West Idaho St.	Boise, Idaho 83707	Scott Larrondo
Idaho Department of Fish and Game	600 S. Walnut	Boise, Idaho 83707	Thomas Frew

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

Not Applicable

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

Not Applicable

Other planning document references.

Not Applicable
Subbasin.

Mid Snake River, Boise.
Short description.

Test the biological response of fish to transportation in a translucent pipeline system, and collect design data for pipeline sizing, pump sizing, pipeline positioning below the water surface, and nutrient introduction.

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	+	Ecosystems
	Climate	X	Monitoring/eval.	X	Flow/survival
	Other	+	Resource mgmt	+	Fish disease
		+	Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Fish behavior; pipeline.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
None	None	None

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Bio Assessment Phase	a	Physiological Concerns
		b	Bio Engineering
2	Bio Acoustic Studies	a	Avoidance System Study
		b	Collection System Study
		c	Separation Study
3	Project Design Phase	a	Mechanical Design

		b	Hydraulic Design
		c	Structural Design
		d	Anchoring System Design
		e	Facility Plan Design
		f	Measure Instruments & Controls
		g	Power and lighting Design
		h	Permits, Agency Review
4	Prototype Assembly Phase	a	Station & Support Facilities
		b	Acoustic Collection System
		c	Flume System
		d	Pipeline & Anchor Systems
		e	Mechanical & Electrical System
		f	Collection & Screening System
5	Monitor and Reporting Phase	g	System test & Startup
		a	Data Collection
		b	Report Preparation & Presentation
6	Project Demobilization	a	Disassembly & Salvage

Objective schedules and costs

Objective #	Start Date Mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	02/1999	3
2	11/1998	03/1999	3
3	10/1998	06/1999	14
4	03/1999	09/1999	60
5	06/1999	09/2000	15
6	06/2000	09/2000	5

Schedule constraints.

Funding is primary constraint.

Completion date.

FPI estimates that FY 2000 is the last year requiring funding.

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	12.33 man-years @ \$40 per hour	\$1,025,860
Fringe benefits	35% of Personnel cost	359,050
Supplies, materials, non-expendable property		340,000
Operations & maintenance		250,000
Capital acquisitions or improvements (e.g. land,		4,880,000

buildings, major equip.)		
PIT tags	# of tags:	0
Travel	15% of Personnel cost	153,880
Indirect costs	60% of Personnel cost	615,510
Subcontracts	System Testing	320,000
Other		0
TOTAL		\$7,944,300

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	\$2,000,000			
O&M as % of total	45			

Section 6. Abstract

Fish Passage, Inc. and its subcontractors have assembled a team of interested engineers and fish biologists to design, build, and operate a prototype Boylan Fish Pipeline in the C. J. Strike Reservoir for the express purpose of pushing fish through a reservoir for an extended time period to test stress levels related to water pressure, flow velocity, fish population densities, in daylight, and in darkness. This team of engineers and biologists will also deliver a full scale Boylan Fish Pipeline design package consisting of existing, available technology. Our time schedule shows eight (8) months to twelve (12) months to design and build the prototype system, and twelve (12) to sixteen (16) months to test and report results. We have a number of co-operating agencies who will be advising and monitoring this project: Idaho Power has donated the use of C.J.Strike Reservoir and will determine the risks of this pipeline operating in a power generating reservoir; Idaho Department of Fish and Game will provide fish for the test and will monitor fish stress testing procedures; the Corps of Engineers will evaluate the integration of the Boylan Fish Pipeline into the existing reservoir system of the Lower Snake and Columbia Rivers.

Section 7. Project description

a. Technical and/or scientific background.

The objective of this project is to demonstrate the feasibility of transporting fish over long distances through an underwater pipeline. It is clear in the Northwest United States that present methods of providing fish transport from spawning areas to the ocean are not successful. We believe that the concept of the Boylan Pipeline is logical and practical and has an

excellent chance of being successful, plus it promises a much more efficient and economical way to transport fish than any method presently used or proposed. While the concept is simple, it does need to be tested. The principals of Fish Passage, Inc., have pursued this project for a number of years and have gained considerable support from the public, from industry and from some governmental agencies. A few years ago they had a literature search done by a well known University on transporting fish in pipelines. At that time there was no research reported. They do know of a working pipeline that transports fish a short distance at a hatchery and it works successfully.

b. Proposal objectives.

1. Gather current research information on transporting fish through pipelines. This will be accomplished in the Bio Assessment Phase of the project.
2. Gather research and practical information on collection systems for concentrating and gathering fish. There are a number of methods presently being used successfully and we are particularly interested in the potential of acoustic devices that are reported to work very well with certain fish species and have been tested with fish in the Northwest. (See the reference report authored by Dolat, et al.). This will be accomplished in the Bio Acoustic Studies.
3. Design a prototype section of pipeline in a 10,000 foot loop to be placed under the surface of an operating reservoir. The pipeline will be designed so that research studies on fish being transported through it can be conducted. The fish will be allowed to complete multiple loops through the pipeline so that variables such as stress level of the fish versus time and/or distance traveled in the loop can be measured.
4. Build and install the prototype pipeline.
5. Perform tests that will demonstrate the feasibility of transporting fish long distances through a pipeline and will provide valuable information on the effects on the fish of such things as nutrient level, possible waste product buildup, pH, dissolved oxygen level, residence time and others. Prepare reports on the feasibility study.
6. Demobilize the test loop after feasibility is determined

c. Rationale and significance to Regional Programs.

The rationale behind this project is to test a method of providing a protected and sure pathway for naturally spawned fish to proceed from the spawning waters of the Northwest to the ocean. This is the critical step for the fish and current practices are not successfully accomplishing

it. It is critical to the Fish and Wildlife Program that the fish do not disappear and that is definitely the direction current practice is taking. The novel approach that the Boylan Pipeline provides may save the fish. We propose that a 10,000 foot long pipeline (about two miles) is necessary to provide credibility and practicality to the results obtained.

d. Project history

Not Applicable

e. Methods.

- 1 and 2. Gathering research and practical information will be accomplished under the direction of an experienced fish biologist who has conducted fish habitat tests and is familiar with the literature sources in that area.
- 3 and 4. The design and construction of the prototype pipeline will be done by engineering design professionals from Morrison-Knudsen, Inc., who have many years of experience in the design and construction of such facilities.
5. The fish biologist and other professionals on the team will design the experiments and perform the tests to determine environmental effects on the fish. The Idaho Department of Fish and Game will provide the fish for testing. Preparation of reports on the prototype design, construction, and testing will be coordinated by the principal investigator with appropriate input from all team members.
6. Demobilization of the test loop after tests are completed will be done under the direction the construction professionals working on the team. It is likely that the major portion of the test loop and its amenities will be recovered with little loss and minimal effect on the environment of the reservoir.

f. Facilities and equipment.

Major facilities and equipment for the project will include the 10,000 feet of 24 inch plastic pipeline, pumps suitable for pushing water and fish through the pipeline, facilities for introducing fish into the pipeline, facilities for collecting fish for testing, and an anchorage system to hold the pipeline in place in the reservoir. Installation equipment will be provided by the construction and installation contractor and by the pipeline manufacturer. Boats and other water gear necessary will be either provided by contractors or rented.

g. References.

Dolat, Stephen W., Stephen Hays, Richard Nason and John R. Skalski. 1995. Effects of an Acoustic Behavioral Barrier on Juvenile Salmonid Entrainment at an Irrigation Canal Intake on the Wenatchee River at Dryden Dam, Washington. A Study Using Sonalysts, Inc. FishStartle Technology. Available from Sonalysts, Inc. PO Box 280, Waterford, CT 06385 (860) 442-4355 or fax (869) 442-5080.

Section 8. Relationships to other projects

There are no direct relationships to any other projects.

Section 9. Key personnel

Key Personnel:

John Richard "Dick" Woodworth, Principal Investigator, full-time during all phases of the project. Approximate commitment 2000 hours for FY99. Duties include coordinating design criteria of individual components with overall prototype concept. (Resume attached to hard copy)

Gary W. West, Manager, Design and Construction, full-time during the Project Design Phase (Objective 3), and part-time during the other phases. Approximate commitment 2,000 hours for FY99. Duties include directing, planning, scheduling, and coordinating the design engineering activity, including arranging for adequate, qualified design staff and resources, and for meeting all design deliverable requirements and deadlines. (Resume attached to hard copy)

Gary B. Snow, Project Engineer, full-time during the Project Design Phase (Objective 3), estimated half-time during the Prototype Assembly Phase (Objective 4) and part-time during the other phases. Approximate commitment 2,000 hours for FY99. Duties include managing and performing all mechanical and piping engineering and supervising all other discipline engineering (electrical, civil, structural and instrumentation), reviewing, approving and certifying all mechanical and piping drawings and specifications, and assisting with construction installation and startup of mechanical and piping systems. (Resume attached to hard copy)

James E. Winner, Project Biologist, full-time during the Bio Assessment and Bio Acoustic Studies Phases, full-time during the Monitor and Reporting Phase, and part-time during the other phases. Approximate commitment 2,000 hours for Fy99. Duties include assisting with biological assessments and acoustic studies, helping to establish design criteria, reviewing design products for conformance with biological criteria, and assisting with operating the test facility. (Resume attached to hard copy)

Peter S. Bair, Construction Manager, full-time during the Prototype Assembly Phase (Objective 4) and part-time during the Project Design Phase (Objective 3). Approximate commitment 1,600 hours for FY99. Duties include managing and directing the construction activities, including the pre-qualification, bidding, selection and award of contractor(s), the preparation, bidding, award, and expediting of all procurement activities other than those performed by the contractor(s), and the reviewing of design products for constructibility. (Resume attached to hard copy)

Stephen B. Affleck, Design Consultant, part-time during all phases of the project. Approximate commitment 1000 hours for FY99. Duties include overall coordinating and managing of design consultants on the project. (Resume attached to hard copy)

Section 10. Information/technology transfer

This model study will provide research and data that will be applied to the further development of the Boylan Smolt Transport System and facilities as well as other similar fish handling devices. The results will be presented to State and Federal agencies, and other private and public agencies involved in Salmon and Steel head preservation.

Morrison Knudsen Corporation, Idaho Fish and Game, Idaho Power Company and Boise State University have provided leadership and have been well represented at workshops devising and planning this prototype development project. Students and Staff from Boise State university and The University of Idaho continue their involvement with this project in the Engineering, Construction Management and Biology departments. Government and private businesses and the general public will receive results through press releases, publications, incorporation of a visitors site, and continued efforts with students and educators.