Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Monitor Natural Escapement & Productivity Of John Day Basin Spring Chinook

Bonneville project number, if an ongoing project 9144

Business name of agency, institution or organization requesting funding
Oregon Dept of Fish and Wildlife

Business acronym (if appropriate) ODFW

Proposal contact person or principal investigator:

Name	Richard W. Carmichael
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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name

NPPC Program Measure Number(s) which this project addresses.
4.3C "Population Monitoring" and 7.1C "Collection of population status, life history and other data on wild and natural spawning populations."

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

Other planning document references.
The PATH Project has identified John Day River sub-basin spring chinook population as a key index population for assessing the effects of alternative future management actions on salmon stocks in the Columbia Basin. This project is proposed in direct response to

recommendations and needs of the PATH Project and the Columbia Basin Fish and Wildlife Authority's Multi-Year Implementation Plan.

Subbasin.
John Day River

Short description.
Monitor and assess natural escapement and productivity of John Day River Basin spring chinook salmon. This project is in direct response to recommendations and needs of the PATH Project.

Section 2. Key words

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

Other keywords.
Anadromous, wild spring chinook, PIT tagging, life history, spawning surveys, PATH analysis, age structure, smolt-to-adult survival rates.

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
9600800	PATH	Evaluation of the Fish and Wildlife Program depends on monitoring of index stocks throughout the Columbia Basin. The PATH Project has identified the John Day Basin spring chinook salmon population as an index population for assessing the
		effects of alternative future mgmt. actions on salmon stocks in the Columbia Basin. To meet the data needs as in index stock, sufficient annual estimates of spawner

		escapement, age-structure, and smolt-to-adult survival rates are
		essential. Without this spawner and age information, the utility of the John Day Basin spring chinook population as an index stock for assessing the effectiveness of Fish and Wildlife program measures will be diminished. In addition, smolt-to-
		adult survival rate information on this population is extremely important to be able to contrast to responses of upper Columbia Basin populations over time.
3810804	Streamnet	This project will provide data for Streamnet.

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Estimate total number of spring chinook spawners returning to the John Day River sub-basin.	a	Conduct extensive spawning ground counts in addition to annual index surveys.
		b	Conduct surveys throughout the range of available habitat to determine spawner distribution.
		c	Conduct multiple surveys which temporally bracket the historic index count timing.
2	Determine sex ratio and age structure of returning spring chinook spawners.	a	Sex and collect scales from carcasses recovered during surveys.
		b	Analyze scales to determine age.
		c	Develop length-age relationships to classify fish that have unreadable scales.
		d	Calculate age structure and sex ratios.
3	Determine adequacy of historic spring chinook index areas/counts for estimating	a	Determine percentage of spawning that occurs outside index areas in each major spawning stream.

	spawner abundance.		
		b	Determine percent of spawning that occurs after index surveys are conducted.
		c	Analyze spatial and temporal variability to assess adequacy of index counts to estimated escapement.
4	Estimate smolt-to-adult survival rates of spring chinook.	a	Collect emigrating smolt spring chinook via seining and irrigation bypass traps.
		b	Insert PIT tags into approximately 2000 to 3000 smolts.
		c	recover PIT tags from returning spawners, record returns to Columbia River dam passage facilities.
		d	Estimate smolt-to-adult survival rates based on PIT tag returns.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	9/1999	45.00%
2	10/1998	9/1999	15.00%
3	11/1998	5/1999	15.00%
4	2/1999	9/1999	20.00%
5	10/1998	9/1999	5.00%
			TOTAL 100.00%

Schedule constraints.
High water during smolt outmigration may limit our ability to capture adequate number of smolts for objective 4.

Completion date.
2003 to account for recovery of 1999-tagged smolts, returning as adults. Four years (one life cycle) beyond last year that PIT tags are implanted.

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		$49,400
Fringe benefits		$18,700
Supplies, materials, non-expendable property		$10,000
Operations & maintenance		$6,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		$5,000
PIT tags	# of tags: 3,000	$9,000
Travel		$4,800
Indirect costs		$22,500
Subcontracts		
Other		
TOTAL		$125,400

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$131,900	$138,500	$145,400	$152,700
O&M as % of total	4.80%	4.80%	4.80%	4.80%

Section 6. Abstract

The John Day sub-basin supports one of the healthiest populations of spring chinook in the Mid-Columbia River Basin. The study of life history and natural escapement conducted from 1978 to 1984 (Lindsay, et. al. 1986) provided valuable information on production and productivity of John Day spring chinook. With the exception of two years since completion of the study in 1984 (1989 and 1995) spring chinook spawning surveys were conducted in index areas only and have not provided adequate information to assess age-structure, progeny-to-parent production values, and estimate natural spawning escapement. The PATH Project has identified the John Day basin spring chinook population as an index population for assessing the effects of alternative future management actions on salmon stocks in the Columbia Basin. We believe the John Day spring chinook are the most important lower river index stock and the PATH Project will rely heavily on data from this population in the future. To meet the data needs as an index stock, sufficient annual estimates of spawner escapement, age-structure, and smolt-to-adult survival are essential. There is a need to determine the annual spawner escapement and age structure for the John Day Basin spring chinook to provide us the ability to estimate progeny-to-parent production for each broodyear. This need can be

met by expanding the annual chinook spawning surveys, estimating annual escapement, determining age composition by scale analyses, and PIT tagging naturally produced smolts in the John Day Basin.

Section 7. Project description

a. Technical and/or scientific background.

The John Day population of spring chinook has been identified in the PATH process as an index stock for assessing the effects of alternative future management actions on salmon stocks in the Columbia and Snake river basins. We believe the John Day spring chinook are the most important lower river index stock because the sub-basin supports one of the healthiest populations of spring chinook in the mid-Columbia (perhaps the entire basin). A study of life history characteristics of spring chinook in the John Day sub-basin was completed by Lindsay, et. al. (1986). However, extensive surveys of all available spawning habitat and age structure information has not been collected consistently since then. Extensive surveys have been completed only in 1989 and 1995, subsequently, up to date information is lacking.

b. Proposal objectives.

This project will assess the natural escapement and productivity of spring chinook salmon in the John Day sub-basin. Specific objectives are to 1) estimate total number of spring chinook spawners returning to the John Day River sub-basin; 2) Determine age structure of returning spring chinook spawners; 3) determine adequacy of historic spring chinook index areas/counts for estimating spawner abundance; 4) determine smolt-to-adult survival of spring chinook.

c. Rationale and significance to Regional Programs.

The PATH project will rely heavily on data from this population in the future. To meet the data needs as an index stock, sufficient annual estimates of spawner escapement and age structure and smolt-to-adult survival are essential. There is a need to determine the annual spawner escapement and age structure for the John Day spring chinook salmon to provide us the ability to estimate parent-to-progeny production for each broodyear. This need can be met by expanding the annual chinook salmon spawning ground surveys, estimating annual escapement, determining age composition by scale analyses, and PIT tagging naturally produced smolts from the John Day sub-basin. Results of this project may be used to evaluate the effectiveness of hydroelectric operations and fish recovery efforts in the Columbia Basin.

d. Project history

This is a new project.

e. Methods.

The project will follow a similar approach as ongoing spring chinook adult life history work in the Grande Ronde sub-basin, however, the John Day River has only wild fish and only three dams to pass instead of eight. Procedures and methods of data collection in this project have been widely used throughout the Northwest by all fish management agencies. Spawning surveys will be conducted from late August to mid-October to insure early and late spawning fish are accounted for. Examination of carcasses on spawning grounds will allow for marked fish (if any). Passage of PIT tagged adult and juvenile chinook will be monitored at detection sites located at John Day dam and Bonneville dam. Scales will be collected from all carcasses found during spawning surveys and analyzed to determine age and origin. We anticipate this project to last at least one complete life cycle (5 years), contingent upon continued funding. Results will be reported in annual progress reports.

Critical assumptions are: That PIT tag detection facilities will be installed at John Day and Bonneville dams and detection of PIT tagged juvenile and adult chinook at dams will occur; that access to private lands to conduct surveys will continue to occur; and that high streamflows will not prevent capture of adequate numbers of juvenile chinook for PIT tagging or prevent accurate counting of spring chinook redds during spawning surveys. This project will be coordinated with existing spawning surveys conducted by ODFW District personnel.

Risks associated with the project: Scales will be collected from dead salmon only. Salmon encountered during the course of spawning surveys may be temporarily disturbed, but resume normal spawning activity within minutes following the disturbance. In order to minimize the disturbance to spawning salmon, surveyors walk along the stream bank when possible. The survey is conducted as quickly as possible to minimize the chances of harassing spawning salmon. PIT tagging chinook smolts has risks associated with anesthetizing and tag implantation, however these effects can be minimized by following proper procedures. ODFW has been utilizing this technology in other sub-basins for at least 5 years with good success.

f. Facilities and equipment.

Major equipment purchases will be minimal. A drift boat and seine for capture of chinook smolts for PIT tagging, and the purchase of tagging equipment will be necessary. Office space for employees is available for rent in John Day and La Grande.

g. References.

Beamesderfer, R.C.P., H.A. Schaller, M.P. Zimmerman, C.E. Petrosky, O.P. Langness, and L. La Voy. 1997. Spawner-recruit data for spring and summer chinook salmon populations in Idaho, Oregon, and Washington. Report from Oregon Department of Fish

& Wildlife, Idaho Department of Fish & Game, and Washington Department of Fish & Wildlife to Bonneville Power Administration for the PATH project, Portland, Oregon.

Lindsay, R.B. , W.J. Knox, M.W. Flesher, B.J. Smith, E.A. Olsen, and L.S. Lutz. 1986. Study of Wild Spring Chinook Salmon in the John Day River System. 1985 Final Report. DE-A179-83BP39796, Bonneville Power Administration, Portland, Oregon.

Schaller, H.A., C.E. Petroskey, and O.P. Langness. 1996. Contrasts in stock-recruitment patterns of Snake and Columbia Rivers spring and summer chinook populations. Chapter 3 in D.R. Marmorek, editor. Plan for Analyzing and Testing Hypotheses (PATH) final report on retrospective analyses. ESSA Technologies, B.C.

Section 8. Relationships to other projects

Meeting the need in FY99 is critical for providing adult escapement estimates and age structure information to allow for productivity assessment of the 1994 and future broodyears. Without this information, the utility of the John Day Basin spring chinook salmon population as an index stock for assessing the effectiveness of Fish and Wildlife program measures will be minimal. It is critical to obtain information for the 1994 and later broodyears to serve as baseline prior to the implementation of major spring chinook salmon recovery actions in the Snake River Basin.

Section 9. Key personnel

Program Manager -- Richard W. Carmichael
FTE = 0.1
Duties -- Program manager serves as principal investigator and oversees all aspects of the project.

Program Manager
Richard W. Carmichael

EDUCATION

7/90 - Present **Program Leader - Executive Manager**, Oregon Department of Fish & Wildlife, 211 Inlow Hall, EOU, La Grande, OR 97850

Program leader for NE Oregon Scientific Investigations Program. Primary responsibilities are to develop and direct implementation of a complex research program to evaluate success of protecting, reestablishing, and restoring ESA listed and non-listed stocks in eastern Oregon, oversee the work of 14 full-time fisheries biologists and up to 8 projects, and represent ODFW on regional and national scientific committees.

12/83 - 7/90 **Fisheries Research Biologist (Project Leader)**, Oregon

	Department of Fish and Wildlife, La Grande, OR
3/83 - 12/83	**Fish Research Biologist (Ass't Project Leader)**, Oregon Department of Fish & Wildlife, La Grande, OR
10/82 - 3/83	**Project Assistant (Experimental Biology Aide)**, Oregon Department of Fish & Wildlife, La Grande, OR
1/80 - 7/83	**Research Assistant**, Oregon State University, Corvallis, OR

EXPERTISE

Nineteen years of experience in fisheries work. Expertise in fisheries research project development and implementation, personnel management, budget development and tracking, technical report writing, natural production and supplementation research, statistical analysis, life history-habitat relationships, hatchery-wild interactions, straying, hatchery effectiveness, ESA recovery efforts, passage evaluation, bass and trout ecology, and creel censusing.

PUBLICATIONS

Carmichael, R.W. 1997. Straying of Umatilla River hatchery origin fall chinook salmon into the Snake River. *In* Genetic Effects of Straying of Non-Native Hatchery Fish into Natural Populations (R.S. Waples, convenor). National Oceanic and Atmospheric Administration, Seattle, WA.

Carmichael, R.W. and R.T. Messmer. 1995. Status of supplementing chinook salmon natural production in Imnaha River basin. *In* Uses and Effects of Cultured Fishes in Aquatic Ecosystems (H.L. Shramm, Jr., and R.G. Piper, eds.).

Whitesel, T.A., P.T. Lofy, R.W. Carmichael, R.T. Messmer, M.W. Flesher, and D.W. Rondorf. 1994. A comparison of the performance of acclimated and direct stream released, hatchery-reared steelhead smolts in northeast Oregon. Pages 87-92 *in* High Performance Fish (D.D. MacKinlay, ed.); Fish Physiology Section, American Fisheries Society, Fish Physiology Association, Vancouver, British Columbia, Canada.

Carmichael, R.W., L.A. Borgerson, and P.T. Lofy. 1992. Straying of hatchery origin spring chinook salmon and hatchery: wild composition of naturally spawning adults in the Grande Ronde River basin. *In* Salmon Management in the 21st Century: Recovering Stocks in Decline. Proceedings of the 1992 Northeast Pacific Chinook and Coho Workshop. American Fisheries Society, Bethesda, MD.

Carmichael, R.W. 1990. Expectations for spring chinook salmon population responses to habitat enhancement projects in northeastern Oregon. *In* Status and Future of Spring Chinook Salmon in the Columbia River Basin -- Conservation and Enhancement. NOAA Tech Memo NMFS F/NWC-187, Seattle, WA.

Section 10. Information/technology transfer

- Reports -- Monthly, Quarterly, Annual.
- Technical Presentations and Manuscripts.
- Public and Civic Group Presentations.
- FWP Reviews.
- ODFW Research Reviews.
- Appropriate Regional Workshops.