

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

Section 1. General administrative information

**Classify riparian and wetland vegetation in the
Columbia Basin of Washington**

Bonneville project number, if an ongoing project 9089 _____

Business name of agency, institution or organization requesting funding
Washington Department of Natural Resources, Natural Heritage Program

Business acronym (if appropriate) _____

Proposal contact person or principal investigator:

Name	Rex C. Crawford
Mailing Address	Dept Natural Resources Forest Resources PO Box 47016
City, ST Zip	Olympia, WA 98504-7016
Phone	360-902-1749
Fax	360-902-1660
Email address	rex.crawford@wadnr.gov

Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name

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

7.6D Habitat Objectives, Riparian vegetation

This project will provide a systematic classification of riparian vegetation that will provide descriptions of riparian vegetation units including the range of vegetation attributes that contribute to shading, slope stability, and production of woody debris for fish habitat. Correlation of vegetation units with hydrologic settings will indicate a potential range of occurrence and functional characteristics that contribute to fish habitat quality. Each riparian unit description will include management information on how it contributes to fish habitat and its reaction to site disturbance.

11.2D.1 Mitigation Plans and Agreements.principles, 11.3E.1 Mitigation Priorities. principles

This project will sample the existing range of riparian and wetland vegetation and associated environment. Definition of the natural range of variation of each vegetation unit within a classification provides a framework for developing cost-effective objectives for mitigation, quantitative standards for riparian habitat mitigation targets, definitions of vegetation types that provide high quality wildlife habitat, templates for watershed, ecosystem and species diversity plans, cross-references with other agency riparian classifications, and a communication tool for interagency projects.

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

Other planning document references.

Bureau of Land Management, Adams County Conservation District, Washington, Department of Fish and Wildlife, U.S. Environmental Protection Agency

Subbasin.

Coordinate with existing US Forest Service riparian and wetland vegetation classifications in the Klickitat, Walla Walla, Tucannan, Grande Ronde, Yakama, Methow, Wenatchee, Entiat, Okanogan subbasins. Coordinate and develop new riparian and wetland classifications in the Lower Snake Mainstem and lower Mid Columbia Mainstem subbasins.

Short description.

Standardize and classify riparian and wetland vegetation that provides an ecological framework for fish and wildlife habitat management, restoration, and mitigation in the Columbia Basin of Washington.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
	Anadromous fish		Construction	x	Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production		Population dynamics
	Oceans/estuaries		Research	x	Ecosystems
	Climate		Monitoring/eval.		Flow/survival
x	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation

_____ Enforcement x Wildlife habitat en-
 _____ Acquisitions hancement/restoration

Other keywords.

Habitat, riparian

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Inventory riparian and wetland environments across the Columbia Basin to sample variation in existing vegetation, hydrologic settings, and landuse.	a b c d e	Prepare a preliminary riparian and wetland dominance type (cover type) classification for Columbia Basin of Washington. Coordinate with state and federal land management agencies in the Columbia Basin to standardize sampling methods, data sharing, and reporting format for project. Determine sampling approach to efficiently capture vegetation variation across range of hydrologic patterns and landuses. Data collection (3 yrs) Data entry and analysis
2	Develop riparian and wetland classification following Federal Geographic Data Committee National Vegetation Classification Standards (http://www.nbs.gov/fgdc.veg).	a b c	Summarize classification into a working draft for field application by selected cooperators to test the classification. Cross-reference Columbia Basin riparian and wetland vegetation classification with current and ongoing riparian and wetland classifications. Coordinate with FDGC and TNC to meet National Vegetation

			Classification Standards
3	Finalize, publish and distribute final classification	a b c	Incorporate comments from field testing to finalize classification Throughout project coordinate with adjacent classification projects; cross-references to other classification, Prepare final descriptions and supporting material for riparian and wetland classification
4	Develop training in identification, use, and application of standard riparian and wetland classification.	a b	Coordinate with WSU extension in developing training needs Prepare training materials and participate in training of uses and applications of classification.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	Oct/1998	Dec/2001	65
2	Oct/1999	May/2002	20
3	Sept/2002	Jan/2003	15
4	Jan/2003	March/2003	10

Schedule constraints.

Objective 3 may be constrained by gaining access to land needed to adequately sampling the riparian environment. Objective 2 may be constrained by FGDC adoption of new formalized procedures to review classifications.

Completion date.

2003

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel		50420.50
Fringe benefits		
Supplies, materials, non-expendable property		2000
Operations & maintenance		

Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	
Travel		7000
Indirect costs		
Subcontracts		
Other		
TOTAL		59420.5

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	28220.5	48867	45854	41587
O&M as % of total				

Section 6. Abstract

As linkages between the terrestrial environment and aquatic environment, riparian and wetland areas are key to many ecosystem functions such as water quality/quantity, stream stability, nutrient cycles. Consequently, maintenance, restoration and management of riparian and wetland areas become the focus of fish and wildlife habitat projects. Ecological classifications of riparian and wetland systems provide an integrated information system, communication and interpretation of current landuse, definition of desired futures, and comparison and monitoring of management (see Hansen et al 1995). The goal of this project is developing an ecological classification of riparian and wetland vegetation of Washington=s Columbia Basin. The primary objective of this proposal is to complete inventory and classification of riparian and wetland vegetation in the central Columbia Basin of Washington. This project will merge into existing ecological classification systems (Crowe and Clausnitzer 1997; Diaz and Mellen 1996; Kovalchik 1992) and to complete a unified classification of riparian and wetland vegetation in eastern Washington. The final classification will provide a guide to the riparian and wetland vegetation, its relationship to fluvial, geomorphological, and land use processes, and management guidelines for fish and wildlife habitat. The project will characterize riparian vegetation with methods developed by a coalition of governmental and private organizations in Montana (Hansen et al. 1995), on the National Forests of eastern Washington (Kovalchik 1992) and in the rangelands and forests of northern Nevada (Manning and Padgett 1996). The sampling scheme will efficiently survey across the range of variation in stream and riparian ecosystems (Reid and Bourgeron 1993).

Section 7. Project description

a. Technical and/or scientific background.

The importance of riparian and wetland habitats to fish and wildlife greatly exceeds its

areal extent on any landscape. As linkages between the terrestrial environment and aquatic environment, riparian and wetland areas are key to many ecosystem functions such as water quality/quantity, stream stability, nutrient cycles. Maintenance, restoration and management of riparian and wetland areas are consequently a primary focus of fish and wildlife habitat projects. Streamside mitigation and restoration of efforts often rely on personal experience or extrapolation of similar hydrologic settings rather than on systematic, hierarchical guidelines summarizing the variation in streamside vegetation and hydrologic settings.

Classifications provide a means of stratifying these ecosystems into recognizable and repeatable units. Ecological classifications of riparian and wetland systems provide an integrated information system and a communication framework for interpretation of current land use, definition of desired futures, and comparisons and monitoring of management.

Variability within the riparian zone has been recognized and cataloged by classifying its vegetation (Kovalchik 1987, Manning et al. 1996, Hansen et al. 1995). These classifications recognize that each vegetation unit has its own functional characteristics and contributes in its own way to maintaining a healthy riparian and stream ecosystem (Crowe and Clausnitzer 1997). These riparian classifications provide a baseline for monitoring change, productivity, and success in management of and around riparian zones. Classification of riparian vegetation in relation to fluvial surfaces in a particular watershed give targets for restoration or mitigation projects based on quantitative information.

Riparian and wetland vegetation classifications for Columbia Basin in Washington are complete for the Gifford Pinchot National Forest (Diaz and Mellen 1996) and Umatilla National Forest (Crowe and Clausnitzer 1997) and in draft form for the Wenatchee, Okanogan and Colville National Forests (Kovalchik 1992). Existing riparian vegetation classification in the project area is limited and applies at a coarse scale (Cowardin 1979, Evans 1989, Daubenmire 1970). The Washington Natural Heritage Program has merged all existing classifications and other isolated studies into a statewide classification that has been correlated with Oregon and Idaho vegetation classifications. These projects will serve as the baseline information for this project.

b. Proposal objectives.

The goal of this project is to complete an ecological classification of riparian and wetland vegetation of the Columbia River system in Washington. The primary objective of this proposal is to complete inventory and classification of riparian and wetland vegetation in the central Columbia Basin of Washington. This project will merge with existing ecological classification systems (Crowe and Clausnitzer 1997; Diaz and Mellen 1996; Kovalchik 1992) that will complete a unified classification of riparian and wetland vegetation in eastern Washington. The final classification will provide a guide to the riparian and wetland vegetation and its relationship to fluvial, geomorphological, and land use processes and guidelines for fish and wildlife habitat management.

Objectives

- 1 Inventory riparian and wetland environments across the Columbia Basin to sample variation in existing vegetation, hydrogeomorphic settings, and landuse
 - a Prepare a preliminary riparian and wetland dominance type (cover type) classification for Columbia Basin of Washington: 1) Review and meta-analysis of existing literature and maps of riparian and wetland vegetation, 2) Summarize information into a document describing type, distribution, associated environment, and landuse, and 3) Distribute preliminary classification to cooperators.
 - b Coordinate with state and federal land management agencies in the Columbia Basin to standardize sampling methods, data sharing, and reporting format for project: 1) Organize a Riparian Program Team to facilitate a meeting of private and public organizations to build support and coordinate expectations of the project, and 2) Report on standardized sampling, data, and reporting formats to cooperators.
 - c Determine sampling approaches to efficiently capture vegetation variation across range of hydrologic patterns and landuses.
 - d Collect field data
 - e Data entry and analysis
- 2 Develop riparian and wetland classification following Federal Geographic Data Committee National Vegetation Classification Standards (<http://www.nbs.gov/fgdc.veg>).
 - a Summarize classification into a working draft of riparian and wetland vegetation Classification for field testing by selected cooperators, particularly fish and wildlife habitat managers.
 - b Cross-reference Columbia Basin riparian and wetland vegetation classification with current and ongoing riparian and wetland classifications.
 - c Coordinate with appropriate organization in meeting National Vegetation Classification Standards
- 3 Finalize, publish and distribute final classification
 - a Incorporate comments from field testing and finalize classification
 - b Throughout project coordinate with adjacent classification projects; cross-references to other classification, prepare final descriptions and supporting material for riparian and wetland classification
 - c Prepare final descriptions and supporting material for riparian and wetland classification
- 4 Develop training in identification, use, and application of standard riparian and wetland classification.
 - a Coordinate with WSU extension in developing training needs
 - b Prepare training materials and participate in training of uses and applications of classification.

c. Rationale and significance to Regional Programs.

Riparian or streamside environments are critical linkage or transition zones between the

upland and the aquatic environment. Riparian zones provide a variety of ecosystem functions, such as wildlife habitat, contributions to fish habitat, unique plant species habitat, improving flood control, and sediment trapping. A standardized classification will provide benefits to:

COMMUNICATION: A consistent language for description, identification, and management of riparian vegetation and ecosystems across multiple ownerships

RESTORATION/MITIGATION: Guidance for restoration or mitigation described as suites of vegetation targets associated with specific hydrogeomorphic environments

MANAGEMENT PLANNING: Units by which management can be planned based on ecological potential and dynamics

MONITORING: Benchmarks against which vegetation change due to landuse can be monitored

RECOVERY OF LISTED OR CANDIDATE SPECIES: A tool to be used in habitat improvement or habitat monitoring for salmonids.

CONSERVATION: A more thorough description of biodiversity and its status in riparian and wetland ecosystems which will help set conservation priorities

NATIONAL-LEVEL COORDINATION: Improve the National Vegetation Classification accepted (October 1997) as the standard for vegetation classification and mapping by the federal government

The Environmental Protection Agency has funded a similar classification project in Cow Creek in the Palouse River subbasin. Through that one-year project the proposer will initiate agency and private landowner contracts, streamline sampling procedures, and sample and preliminarily classify riparian vegetation in a Columbia Basin subbasin not under FWP purview.

d. Project history

e. Methods.

We will follow procedures for characterization of riparian vegetation developed by a coalition of governmental and private organizations in Montana (Hansen et al. 1995), forests of eastern Washington (Kovalchik 1992) and rangeland and forests of northern Nevada (Manning and Padgett 1996). The inventory scheme will efficiently sample across the variation in stream and riparian ecosystems (Reid and Bourgeron 1993). Vegetation units in valley bottoms on fluvial or geomorphic surfaces that may not meet jurisdictional wetland criteria will be sampled to fully characterize riparian ecosystems. Each sample will include location, sketches of fluvial (riparian) or hydrologic (wetland) settings and adjacent uplands, Rosgen stream type characteristics, valley landform

variables, landuse variables, and indicators of wildlife use. At each setting, vegetation composition and structure and basic soil variables (at least to determine jurisdictional wetlands) will be recorded. Data analysis will use the PC-ORD program for ordination and clustering of plot data and environmental data. The final classification will describe the variation in riparian and wetland vegetation units, how each type contributes to environmental functions (water quality, runoff, habitat, etc.), and how each type contributes to conservation of natural resources. The classification to vegetation units will contain a key using vegetation characteristics and a key using landform/stream form characteristics to aid in identification of vegetation units.

f. Facilities and equipment.

Vehicles, facilities, office space, and computers will provided in-kind by the Department of Natural Resources.

g. References.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. La Roe. 1979. Classification of wetland and deepwater habitats of the United States. USDI. FWS/OBS-79/31. 103 p.

Crowe, E.A. and R.R. Clausnitzer. 1997. Mid-Montane Wetland Plant Associations of the Malheur, Umatilla and Wallowa-Whitman National Forests. USDA For. Ser. PNW Tech Paper R6-NR-ECOL-TP-22-97. 299 p.

Daubenmire, R.F. 1970. Steppe Vegetation Washington. Tech. Bull. 62 Wash. State University. 131 p.

Evans, S. 1989. Provisional Riparian and Aquatic Wetland Plant Communities of the Columbia Plateau, Washington. Wash. Dept Ecology. File Report. 52 p.

Federal Geographic Data Committee. 1997. www.nbs.gov/fgdc/veg/standards/vegstd.htm

Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Joy, and D.K. Hinckley. 1995. Classification and Management of Montana's Riparian and Wetland Sites. University of Montana. Misc. Publ. No.54. 646 p.

Kovalchik 1987. Riparian zone associations: Deschutes, Ochoco, Fremont, and Winema National Forests. USDA For. Ser. PNW Tech Paper R6-NR-ECOL-TP-279. 171 p.

Kovalchik 1992. Riparian zone associations on the National Forest of eastern Washington. USDA For. Ser. PNW DRAFT 203 p.

Lowrance, R. R. Leonard, and J. Sheridan. 1985. Managing riparian ecosystems to control nonpoint pollution. Jour. Soil and Water Cons. 40:87-91.

Manning, M.E. and W.G.Paggett. 1996. Riparian Community Type Classification for Humbolt and Toyiyabe National Forests, Nevada and Eastern California. R4-ECOL-95-01. 306 p.

Reid, M. and P. Bourgeron. 1993. Vegetation survey design for conservation: gradsect directed transects of riparian communities in northwestern Colorado. File Report The Nature Conservancy. Boulder, CO. 29 p.

Section 8. Relationships to other projects

Section 9. Key personnel

Rex C. Crawford

EDUCATION

PhD	University of Idaho	Forest and Wildlife Ecology
MS	University of Idaho	Rare Plant Ecology
MS	University of Texas-El Paso	Plant Ecology
BS	University of Texas-El Paso	Biology/Chemistry

EMPLOYMENT

Current - Washington Department of Natural Resources
responsibilities: Lead Natural Heritage ecologist for eastern Washington ecosystem assessments and conservation planning. Inventory and coordination of vegetation surveys, preparation of natural area proposals, review of conservation planning, and consulting with private and public land managers. Coordinator with national vegetation classification project.

1994-1996 The Nature Conservancy
1986-1993 Washington Department of Natural Resources
1985-1986 Washington Department of Transportation

EXPERTISE

10 years coordination of natural heritage vegetation ecology activities at the state-level and 2 years at the western regional-level. Vegetation classification and its application to conservation planning and the state, region, and national levels. Field surveys of plants and associated environment and interpretation of disturbance and land use in the southwest US for 5 years and Pacific Northwest for 20 years.

Ecology Working Group, The Nature Conservancy. In Press. The National Vegetation Classification. of the United States. Vol.2. The Nature Conservancy, Arlington VA.

Crawford, R.C. and H. Hall. 1997. Changes in the South Puget Prairie Landscape. IN: Ecology and Conservation of the South Puget Sound Prairie Landscape. Dunn and Ewing eds. The Nature Conservancy Seattle, Wa. 11-16pp.

Chappell, C.B. and R.C. Crawford. 1997 Native vegetation of the South Puget Sound Prairie Landscape. IN: Ecology and Conservation of the South Puget Sound Prairie Landscape. Dunn and Ewing eds. The Nature Conservancy Seattle, Wa. 107-122pp.

Reid et al. 1995. Documentation of the Modeling of Potential Vegetation at three spatial scales using Biophysical settings in the Columbia River Basin Assessment Area. Columbia River Basin Project contract report 53-04H1-6890. 21p. plus 650p. Appendices.

Moseley, R.K. and R.C. Crawford. 1995. Fifteen-year population and habitat changes in a narrow Idaho endemic, *Phlox idahonis* Wherry. Bull. Torrey Bot. Club. 109-114pp.

CHRISTOPHER B. CHAPPELL

M.S. Forest Ecosystems Analysis, 1991. University of Washington, Seattle, WA.
B.S., 1983. The Evergreen State College, Olympia, Washington. Environmental Science.

CURRENT POSITION:

Washington Department of Natural Resources, Natural Heritage Program, since 1992.
Vegetation Ecologist. Responsibilities:

- 1) Statewide ecological and vegetation inventory and analysis focusing on high-priority sites or communities for conservation, including wetlands;
- 2) Evaluate, propose, and justify sites for appropriate conservation designation;
- 3) Maintain and modify statewide plant community classification;
- 4) Provide consultation to variety of clients;
- 5) Develop new plant community classifications as needed for unclassified regions or communities of the state

OTHER RECENT EMPLOYMENT:

Wildlife Biologist/Ornithologist, The Evergreen State College, WA, 1997. Adjunct faculty.

Ornithology Instructor, U.S. Bureau of Land Management, Oregon, 1994-96.

Teacher, Tahoma Audubon Society, Tacoma, WA, 1996.

Teacher, North Cascades Institute, Washington, 1991 & 1994.

Wildlife Biologist, U.S.D.A. Forest Service PNW Research Lab, Olympia, WA, 1991.

Biological Technician (Plants), Mt. Rainier National Park, 1991.

Graduate Research Assistant, Univ. of Washington College of Forest Resources, 1989-1991.

Graduate Teaching Assistant, Univ. of Washington Inst. of Environmental Studies, 1991.

Field Ornithologist, King County Resources Planning Division, WA, 1989-1990.

Biological Technician (Plants), U.S.D.A. Forest Service, Olympic Nat=l Forest, 1989 & 1987.

My primary expertise is in plant community (or vegetation) ecology. Through field work over the last 15 years, I have become very familiar with the vegetation of Washington, more so that west of the Cascade Crest. Particular areas of interest and expertise include the role of exotic species in native communities, fire ecology, impacts of human disturbances on natural systems, riparian plant communities, and the status and distribution of rare plant communities. I also have expertise in ornithology and wildlife biology, particularly avian ecology and habitat use.

RELEVANT PUBLICATIONS OR JOB COMPLETIONS:

Chappell, C. B., and R. C. Crawford. 1997. Native vegetation of the south Puget Sound prairie landscape. Pages 107-122 in Dunn, P. V., and K. Ewing, eds. Ecology and Conservation of the South Puget Sound Prairie Landscape. The Nature Conservancy, Seattle, WA.

Chappell, C. B., and J. K. Agee. 1996. Fire severity and tree seedling establishment in *Abies magnifica* forests, southern Cascades, Oregon. *Ecological Applications* 6: 628-640.

Recently completed classification of Puget Lowland terrestrial plant communities; now in draft format; will be published in the future; involved multivariate analysis of 700+ plots.

Currently developing a unified list of riparian and wetland plant communities for Washington, based on existing knowledge.

Section 10. Information/technology transfer

Final products will be developed for various websites, other electronic formats, and limited hardcopy publication for granting and cooperating agencies and organizations. Training aids and materials will be developed for project managers and land managers.