Bonneville Power Administration
Fish and Wildlife Program FY98 Watershed Proposal Form

Section 1. General administrative information

Title # Wind River Watershed Project

Bonneville project number, if an ongoing project 8054

Business name of agency, institution or organization requesting funding
Underwood Conservation District

Business acronym (if appropriate) UCD

Proposal contact person or principal investigator:

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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
USDA Forest Service	1262 Hemlock Road	Carson, WA 98610	Ken Wieman
Yakama Indian Nation-(In-kind funds contribution only)	P.O. Box 151	Toppenish, WA 98948	Lee Carlson
USGS, Columbia River Research Laboratory	5501-A Cook-Underwood Road	Cook, WA 98605	Patrick J. Connolly
USDI Fish and Wildlife Service, Fishery Program Office	9317 N.E. Highway 99, Suite I	Vancouver, WA 98665	Tim Cummings
Washington Dept. of Natural Resources	211 Hemlock Road	Carson, WA 98610	Susan Shaw
Washington Dept. of Fish and Wildlife	6 Cedar Lane	White Salmon, WA	Dan Rawding

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

2.2A, 5.9A, 7.1, 7.1C, 7.6C, 7.7, 7.8B

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

NA

Other planning document references.

Our watershed proposal is designed to preserve and restore the remaining run of steelhead to the Wind River subbasin while increasing our knowledge of the problems and needs of the watershed. Actions include establishing a public education process and rehabilitating watershed health, water quality, channel morphology, and stream habitat. These actions address the factors for decline of wild stocks as listed in NMFS's Coastal Salmon Conservation: Working Guidelines for Comprehensive Salmon Restoration Initiative of the Pacific Coast, WDFW's Wild Salmonid Policy, State of Washington's Lower Columbia Steelhead Conservation Initiative, and the ISG's Return to the River. The actions proposed are consistent with the restoration actions identified in Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon), Endangered Species Act, Wild Salmonid Policy, Lower Columbia Steelhead Conservation Initiative, and the Record of Decision for the Northwest Forest Plan.

Subbasin.

Wind River subbasin

Short description.

Develop a watershed council and restore the Wind River subbassin with an immediate focus on recovery of steelhead production.

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

Other keywords.

Population dynamics, age and growth, education, steelhead, restoration, watershed council, life history, sampling, modeling, ecologocal interactions

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	(Coordination) Expand existing membership of the Wind River Action Committee (AC) to form a watershed council with broad representation from stakeholder groups.	a	Facilitate regular, monthly meetings of the AC in order to develop group by-laws and draft a watershed management plan to outline the group's long term objectives. (FY 98-02)
2	(Coordination) Develop and support a technical working group to guide watershed council efforts by uniting existing membership of the Wind River Restoration Team (WRRT) and the Wind River Technical Advisory Committee (TAC).	a	Facilitate regular meetings of the technical working group to advise on technical aspects of the proposed project and to establish a liaison to the watershed council. (FY 98-02)
3	(Monitoring and Evaluation) Determine productivity and life history of summer steelhead in the Wind River subbasin.	a	Conduct census of the fish assemblage in 10-15 index stream reaches (>500 m per reach) to determine species and age composition, density, and trends over time. (FY 98-02)
		b	Derive annual estimates of the population of naturally produced steelhead parr and other salmonids in the subbasin. (FY98-02)l
		c	Derive annual estimates of production of steelhead smolts in the subbasin. (FY 98-02)

		d	Derive annual estimates of adult returns of steelhead to the subbasin. (FY 98-02)
4	(Monitoring and Evaluation) Evaluate physical habitat conditions in the entire Wind River subbasin through surveying streams on private lands to augment on-going and already-funded surveys on USFS lands.	a	Conduct stream habitat and riparian surveys on 30 miles of stream within private lands in a manner that is compatible with existing USFS surveys. (FY 98-02)
		b	Evaluate spawning composition annually on four index spawning reaches. (FY 98-02)
		c	Monitor water quality (including temperature and nutrients) at 10 new and established sites to evaluate current conditions and change through time. (FY 98-02)
5	(Assessment) Assess the health of the Wind River watershed using an ecosystem-based diagnostic model that will provide the technical basis to prioritize restoration projects in the Wind River.	a	Identify goals and objectives for watershed assessment. (FY 98)
		b	Perform analysis and diagnosis to formulate restoration strategies with action alternatives. (FY 98-99)
6	(Restoration) Reduce sediment sources from hillslopes by reducing road densities to <2mi/mi^2 and revegetating 70% of landslide areas.	a	Decommission and restore 23 miles of road within sub-watersheds indentified in the WRWA: Dry Creek (Dry Creek 4.4miles in FY 98), Panther Creek (7 miles in FY99), and upper Wind River (11 miles in FY 00-02) sub-watersheds
		b	Revegetate 37 acres of landslide area (Eightmile, Ninemile, Compass, Paradise and Proverbial slides) with native shrubs and

			conifers. (FY 98-02)
7	(Restoration) Rehabilitate plant sturcture and diversity of riparian corridors on 6.4 stream miles to reduce maximum water temperatures (<61 degrees F), to increase bank stability (>90%) and to reduce bankfull width to depth ratios (<30)	a	Install log complexes to reduce bankfull width-to-depth rations to <30. (0.75 river miles (rm) in FY98, 4.1 rm in FY99, 0.75 rm in FY00 and 0.75 rm in FY01).
		b	Plant and thin stands to to achieve stream shade to >75% while establishing riparian conifers to >15 trees over 31" in diameter per acre within the next 100 years. (14 acres in FY 98, 35 acres in FY99. 26 acres in FY00, and 25 acres in FY01).
8	(Restoration) Improve passage for adult and juvenile steelhead at artificial barriers	a	Maintain and evaluate opportunities to improve adult and juvenile passage of steelhead over Hemlock Dam. (FY 99-01)
		b	Evaluate the removal or modification of Hemlock Dam. (FY 99-01)
		c	Evaluate culverts on the lower Wind River for potential fish migration barriers. (FY 98-02)
9	(Restoration) Rehabilitate channel morphology and flood plains by increasing LWD (>75 pieces/mile).	a	Reconnect flood plains by increasing entrenchment ratios (>2.2) of degraded or down-cut channels by constructing grade control log complexes. (Two log complexes in FY98, four log complexes in FY99, and one in FY00).
		b	Place key pieces of LWD to promote recuitment of natural inputs of LWD and achieve the range of natural variability for the Wind River watershed (75-120 pieces/mile). 0.75 rm will be treated in FY98, 4.1 rm in FY99, 0.75 rm in FY00 and 0.75 rm in

			FY01.
10	(Education) Promote watershed stewardship among youth by involving at least 80 students per year in environmental education programs in local schools.	a	Develop an EPA-based StreamWalk program in conjunction with Stevenson High School. (FY 98-99)
		b	Supply StreamWalk and Wind River Middle School's Junior Environmental Trouble Shooters (JETS) students with water quality monitoring tools and equipment, technical assistance, transportation to field sites, and review of curriculum results. (FY 98-02)
11	(Education) Raise community awareness of watershed issues by appending and implementation of the Wind River Watershed Interpretive Plan.	a	Design and install at least 10 signs to inform residents about watershed boundaries, protection of resources, opportunities for involvement, and current restoration efforts. (FY 98-02)
		b	Design brochures to be included with Skamania County PUD mailings describing the watershed restoration effort and opportunities for involvement. (FY 98-02)
		c	Organize two community volunteer events per year (e.g., tree planting, fish viewing, fish education days, river clean-ups) to inform the public about watershed impacts and restoration strategies. (FY 98-02)
12	(Education) Provide technical assistance to promote watershed stewardship to at least 75 landowners in the watershed.	a	Host stewardship technical workshops for landowners in cooperation with the Cooperative Extension of Washington State University. (FY 98-02)
		b	Develop stewardship plans with landowners using DNR and NRCS format. (FY 98-02)

		c	Conduct a water quality screening program by testing water sources on private lands to help landowners determine the quality of their water sources and learn how they can protect the watershed. (FY 98-02)

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1997	9/2002	2.00%
2	10/1997	9/2002	1.00%
3	10/1997	9/2002	45.00%
4	10/1997	9/2002	5.00%
5	10/1997	9/1999	2.00%
6	10/1997	9/2002	8.00%
7	10/1997	9/2002	11.00%
8	10/1997	9/2002	8.00%
9	10/1997	9/2002	12.00%
10	10/1997	9/2002	2.00%
11	10/1997	9/2002	2.00%
12	10/1997	9/2002	2.00%
			TOTAL 0.00%

Schedule constraints.
None known.

Completion date.
FY 2002

Section 5. Budget

FY99 budget by line item

Item	Note	FY98
Personnel	FY 98 in-kind contributions =$63,284	$286,623
Fringe benefits	FY 98 in-kind contributions =$13,885	$95,541
Supplies, materials, non-expendable property	FY 98 in-kind contributions =$17,840	$43,032
Operations & maintenance		$10,400

Capital acquisitions or improvements (e.g. land, buildings, major equip.)	FY 98 in-kind contributions =$34,000	$17,000
PIT tags	# of tags: 0	$ 0
Travel	FY 98 in-kind contributions=$17,843	$8,570
Indirect costs		$140,700
Subcontracts	FY 98 in-kind contributions =$216,000	$220,500
Other	Total FY 98 in-kind contributions =$373,092	$ 0
TOTAL		$ 0

Outyear costs

Outyear costs	**FY99**	**FY00**	**FY01**	**FY02**
Total budget	$10,920	$11,466	$12,039	$12,641
O&M as % of total	1.00%	1.00%	1.00%	1.00%

Section 6. Abstract

Type here (provide answers in paragraph form)

The quality and quantity of salmonid habitat in the Wind River subbasin has been reduced by Bonneville Dam's inundation of the lower two miles of river along with timber harvest, road building, and other land use activities within the watershed. In 1992, the American Fisheries Society listed the Wind River sea-run cutthroat as extinct, and rated summer and winter steelhead as a high and moderate risk of extinction. In 1997 Washington Department of Fish and Wildlife rated the Wind River summer run steelhead as critical. Due to the status of this stock, the Wind River summer steelhead have the highest priority for restoration in the State of Washington's Lower Columbia Steelhead Conservation Initiative.

The proposed projects are a joint product of public and private stakeholders. The goal of these projects is to preserve, protect, and restore the Wind River steelhead and its habitat. This goal will be achieved by utilizing a holistic, community-based watershed restoration approach. Proposed restoration efforts will address known degraded streams, riparian, and up-land areas. An adaptive management strategy will build upon past successes in restoring degraded water quality and habitat within the Wind River subbasin. The collection of biological, physical habitat, and water quality data will fill critical gaps on private and public lands necessary to assess the overall condition of the watershed and prioritize future restoration efforts. Coordination and education of land owners, the community, and other stakeholders will be an important part of achieving our goal.

Section 7. Project description

a. Technical and/or scientific background.

Type here (provide answers in paragraph form)

Most populations of salmonids which historically occupied the Wind River watershed are considered depressed (WDF et al. 1993). According to a report by the American Fisheries Society, the Wind River sea-run cutthroat are extinct, and the Wind River winter steelhead are at high risk for extinction and the summer steelhead are at a moderate risk for extinction (Nehlsen et al. 1991). Because Shipherd Falls, 4.3 miles upstream from the historic mouth of the Wind River, was a natural barrier to all anadromous fish except steelhead (Bryant 1949), summer steelhead were dominant and numerous above this barrier. USFWS (1951) estimated summer steelhead run size was 3,250 with an escapement of 2,500 spawners. The current number of wild summer steelhead spawning in the Wind River subbasin has been reduced to approximately 100 adults in recent years (Rawding 1997). In addition, a fall race population of chinook that dominated the lower reach of the Wind River is depressed and composed of a substantial number of stray hatchery fish (WDF et al 1993).

Anadromous fish losses have been attributed to the construction of Bonneville Dam, timber harvest, and rural development of the upper watershed (WDW et al. 1990). These activities in the upper watershed have severely impacted riparian areas and stream channels in several key steelhead subbasins evidenced by maximum water temperatures exceeding 75 degrees F, risk of increased peak flows, and increased sedimentation (USFS 1995). There is also concern of the ecological and genetic risks posed by the anadromous hatchery programs (NMFS 1996). Carson National Fish Hatchery was constructed in 1938 to mitigate for the construction of Bonneville Dam and currently produces 1.8 million spring chinook smolts. A fish ladder at Shipherd Falls was constructed to allow salmon access to the hatchery at river mile 18. Hatchery steelhead smolts have been released in the basin since the 1960's and the current release is between 20,000 and 40,000 fish.

Based on the 1992 Trout Creek watershed assessment small scale adaptive management habitat restoration projects were initiated in 1994. The USFS completed a watershed analysis in 1995 which identified stream reaches that posed a high risk to the long term survival of steelhead (USFS 1995). These efforts have resulted in the development of bio-technical methods to improve steelhead habitat by stabilizing stream banks, improving channel complexity, reconnecting flood plains, and rebuilding riparian areas (Bair 1997). Adult fish passage problems at the Hemlock Dam identified by Orsborn et al. (1987) were partially corrected in 1996 by increasing adult attraction flow at the ladder entrance and eliminating false attraction flow from the Wind River Nursery. Issues concerning juvenile passage at this facility remain unresolved.

The Wind River Restoration Team was formed in 1994 in response to the decline of steelhead within the Wind River subbasin. The team includes technical specialists from the. UCD, USFWS, WSFS, USGS (formerly National Biological Service), Washington Trout (WT) and the Yakama Indian Nation (YIN). Based on work done by Connolly (1995) which summarized know information on Wind River summer steelhead, and the watershed analysis (USFS 1995), the WRRT has funded and completed the restoration projects mentioned above. The recent sharp decline in wild steelhead adults requires that

restoration activities be accelerated but the lack of WRRT funding for FY98 makes it unlikely that high priority projects can be implemented. The WRRT has forwarded this holistic, community based watershed approach to restore steelhead and their habitat. An adaptive management strategy will build upon past successes, and the collection of biological, physical, and water quality data will fill critical gaps to assess overall watershed condition and prioritize future restoration.

This proposal incorporates both public and private lands recognizing that "limiting restoration to public lands would be biologically futile and wasteful of public funds" (NPPC 1994). This holistic watershed approach is also recommended by the ISG (1996). The Columbia Basin Fish and Wildlife Program (NPPC 1994) identified that salmonid restoration is linked to identification of key uncertainties and variables that limit populations. We have proposed to link the steelhead's life history diversity, capacity, and productivity to address this issue. Wind River steelhead are proposed to be listed as threatened under the ESA on February 9, 1998. Protection of wild steelhead and their habitat is the goal of the ESA, WDFW's Wild Salmonid Policy, the tribal restoration plan WY-KAN-USH-MI WA-KISH-WIT, and the Northwest Forest Plan (NMFS 1996, WDFW 1997, Nez Perce et al. 1996, USFS and BLM 1994). In addition Wind River steelhead have received the highest priority for restoration under the State of Washington's steelhead recovery plan – the Lower Columbia Steelhead Conservation Initiative (WDFW et al. 1997).

The information from this proposed study will not only directly and immediately help the planning efforts of the proposed Wind River Watershed Council, but will also fill gaps in implementation of measures of the Fish and Wildlife Program that have received little attention to date. The Wind River represents a unique watershed in the Columbia Basin: above Bonneville Dam but with anadromous fish stocks of coastal lineage. Our results can be incorporated to help rebuild other coastal stocks, such as those in small tributaries and between Bonneville Dam and the Hood River, and to reintroduce anadromous fish into the White Salmon River above Condit Dam.

The proposed projects that have been submitted are consistent with the plans and priorities of stakeholders, along with state, federal, and tribal agencies. We propose to preserve and protect the remaining run of steelhead by rehabilitating watershed health, water quality, channel morphology and habitat; by monitoring populations and production of steelhead; and by increasing our knowledge of the problems and needs of the watershed. Successful restoration projects need public involvement, and we have established a public education and involvement process through the formation of a local watershed council. The decline of steelhead returning to the Wind River, the potential reasons for this decline, and the recovery of these steelhead in this watershed exemplify a spectrum of problems and activities that the Fish and Wildlife Program (FWP) was designed to address.

b. Proposal objectives.

Type here (provide answers in paragraph form)
1. Form a Wind River watershed council by expanding current Action Committee (AC) membership. The group will: 1) produce a comprehensive watershed management plan

and plan-of-work document based on assessment; 2) facilitate communication between land-use interests and enable access for on-the-ground projects; 3) leverage resources for acquiring supplemental funding; and 4) provide a conduit for information to the community as a whole.

2. Develop and support a single technical working group by combining members of the WRRT and TAC to guide restoration efforts of the watershed council. The technical group will work on watershed assessment and oversee the implementation and progress of the project.

3. Determine productivity and life-history diversity of summer steelhead in the Wind River subbasin. Estimates of populations and evaluation of trends of parr, smolt, and adult steelhead populations will be made. The following hypotheses will be tested:
Hypothesis 1 (Parr density and survival) -- Density of parr, parr-to-parr survival, and movements of parr are similar among years and within and among juvenile steelhead populations in Trout Creek, Panther Creek, and the upper Wind River subbasin.
Hypothesis 2 (Smolt production) -- Production of wild steelhead smolts is healthy and constant from year-to-year from tributaries and from the entire Wind River subbasin.
Hypothesis 3 (Adult production) – Factors that determine the number and variability of adults that return to the Wind River subbasin are primarily related to variability in conditions within the subbasin.
Hypothesis 4 (Life history diversity) – More than one life history type and strategy coexist within the steelhead population of the Wind River subbasin.
Hypothesis 5 (Factors limiting growth and survival) -- Growth and survival of fry to the smolt stage are limited by temperature, water quality, disease, species interaction, or habitat within the Wind River subbasin.

4. Evaluate physical habitat conditions in the entire Wind River subbasin by surveying streams on private lands to augment on-going surveys on USFS lands. Tasks call for surveying 30 miles of stream to evaluate stream habitat and riparian conditions; evaluating four index sites for spawning gravel composition; and monitoring water quality conditions at 10 sites.

5. Assess the health of the Wind River watershed on both private and public lands using the Ecosystem Diagnostic Treatment (EDT) model to provide the technical basis to prioritize restoration projects in the Wind River. An analysis and diagnosis will be completed to formulate restoration goals and objectives along with strategies and action alternatives.

6. Reduce sediment sources from hillslopes by reducing road densities to <2mi/mi^2 and revegetating 70% of landslide areas by decommissioning 23 miles of road and revegetating 37 acres of landslide area over a five year period.

7. Rehabilitate riparian corridors on 6.4 stream miles (0.75 river miles in FY98) meet existing state water quality standards and reduce maximum water temperatures (< 61 degress F), to increase bank stability (>90%), and to reduce bankfull width-to-depth ratios (<30). Accomplish by installing bio-engineered structures on degraded streambanks and by restoring riparian vegetation over a five year period.

8. Improve passage of adult and juvenile steelhead over Hemlock Dam and through culverts. We propose to evaluate the removal or modification of Hemlock Dam to provide safe and timely fish passage. Evaluate fish passage of culverts on private lands.

9. Rehabilitate channel morphology and flood plains by increasing large woody debris (LWD) to >75 pieces/mile that will promote an increase in the number of quality pools (0.75 river miles in FY98).
10. Promote watershed stewardship among youth by involving at least 80 local students per year in environmental education programs. The program activities are designed to: 1) provide middle and high school students with the opportunity to explore water quality and related riparian issues using a field approach, 2) incorporate students work to a current watershed restoration effort, 3) coordinate students work to a broadened understanding of the entire Columbia system, and 4) coordinate with other schools and government agencies.
11. Develop a Wind River Watershed Interpretive Plan to guide implementing community outreach projects. Install 10 signs, distribute at least 500 brochures, and organize 2 community volunteer events per year.
12. Provide technical assistance to promote watershed stewardship to at least 75 landowners in the watershed. Assist in conducting at least two workshops and developing five stewardship plans per year. Complete testing of at least 50 water sources on private lands and compile one evaluation report per year.

Expected Products :
1) One draft watershed management plan developed by a watershed council (FY 98)
2) One annual report including sections on each objective described above (annually)
3) One road decommissioning project (4.4 mi. in FY98, 19 miles in FY 99-02)
4) Thirty-seven acres of landslide revegetated (10 acres in FY 98, twenty seven acres in FY 99-02)
5) Four technical description of bio-technical methods developed for bank and channel rehabilitation
6) Ten interpretive signs designed, constructed, and installed (FY98-99)
7) Two community events (annually)
8) Five hundred brochure mailers to resident landowners (annually)
9) One watershed stewardship curriculum with development of five plans (FY 98) and 50 well water tests (annually)
10) Two peer-reviewed publications (FY 99-02)
11) Two professional meeting presentations (FY 00, FY01)
12) Fourteen community presentations or meetings (annually)

Benefits to FWP:

The proposed projects will mesh restoration, research, and monitoring efforts that are specifically designed to enhance watershed health, water quality and rebuild wild steelhead runs in the Wind River watershed and gather much needed information. A recent decline of wild steelhead returning to the Wind River warrants a strong response to ensure an expedient restoration to this once heralded run to both tribal and sport fisheries. We wish to emphasize that the types of restoration efforts and information we seek are directly synchronous with goals and measures of the Council's Fish and Wildlife Program (NPPC 1994), the concepts presented in "Return to the River" (ISG 1996), and in the "Wy-Kan-Ush-Mi Wa-Kish-Wit" (Nez Perce et al. 1996).

c. Rationale and significance to Regional Programs.

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The NPPC (section 7.6C of the Fish and Wildlife Program, e.g.) and the ISG (1996) have recommended a holistic, watershed approach to be used to identify key physical and biological limitations for the recovery of salmon and steelhead stocks. The studies we have proposed for the Wind River watershed and would meet the FWP goals through interagency cooperation along with public participation. We have proposed an on-the-ground, multi-faceted, and broad-scale restoration project. We propose activities that will provide specific information to the Wind River Restoration Team for their efforts to restore steelhead to the subbasin, and will provide managers with the data needed to make informed decisions about additional efforts that will help to restore the Wind River ecosystem. By involving the community through participation in committees and in on-the-ground restoration activities, we hope to foster a healthy stewardship that will last for generations to come.

Measure 7.6C of the FWP recognizes the value of the collaborative efforts of the Wind River Restoration Team operating within a local watershed. Measure 7.6C also stresses the importance of landowner and community participation in restoration activities. This is being addressed through the development of a watershed council through which all stakeholders, including public and private entities, will be able to work toward restoration activities in concert. Restoration activities proposed address Measure 7.7 of the FWP. Because of the concern for health of steelhead in the lower Columbia, the need for the type of data sought, and the location of the Wind River (above Bonneville Dam but within the lower Columbia River system), we believe that funding of the proposed projects would reap highly valuable results.

Life history diversity may be an important factor in the persistence of steelhead in the Wind River subbasin. These investigations would address measures 2.2A, 5.9A, 7.1, 7.1C, and 7.8B of the Fish and Wildlife Program. It is recognized that "Implementation shall incorporate a high level of public involvement and collaboration with constituents that have a high interest or stake in the outcome of [wild salmonid conservation] actions..." (WDFW 1997). A Wind River watershed group will be the venue for community involvement and overall project guidance. Recent efforts by UCD, Skamania County, and USFWS have established a diverse 27 member stakeholder group (Wind River Action Committee) of watershed interests, including community and agency representatives. This USFWS-funded effort is limited in scope, focused on implementation of two "demonstration" on-the-ground restoration projects on private or state lands, intended to illustrate the benefits of watershed partnerships. Funding under this proposal will allow the Wind River Action Committee to take the next logical step, establishing themselves as a permanent advisory body to be involved in all aspects of the proposed project.

d. Project history

Type here (provide answers in paragraph form)

Not applicable: this is a new project.

e. Methods.

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1. Coordination of the various interest groups will follow coordinated resource management planning methodology. The watershed council will be modeled after similar, local councils, including the White Salmon Watershed Management Committee and the Grande Ronde Model Watershed effort. The group will generally follow guidelines prescribed for in the "Management of Non-Point Source Pollution" handbook (Puget Sound Water Quality Authority, 1989).
2. Technical working group members will devise strategies to meet Wind River watershed management plan objectives. The group will employ Best Management Practices and progressive solutions to identified problems.
3. Under Task a of this objective, we propose to conduct annual estimates of density of juvenile and resident salmonids in established reaches by established methods (following Connolly 1997) to allow comparisons of densities to past estimates: 1984 (Crawford et al. 1985), 1996 (Connolly 1997), and 1997 (Connolly and Hanten in prep.). We will conduct intensive habitat and fish surveys during summer low-flow conditions on at least four tributary reaches in Trout Creek watershed (Crater, Compass, Planting, and Martha creeks), at least one mainstem Trout Creek reach, at least two tributary reaches in Panther Creek watershed (Eightmile and Cedar creeks), and at least three other reaches yet to be assessed. These estimates will be obtained by electrofishing within a systematic sample of habitat units within strata of habitat types (e.g., pools, glides, riffles). A backpack electrofisher will be used to conduct two or more passes under the removal-depletion methodology (Zippin 1956, Bohlin et al. 1982). The field guides of Connolly (1996) will be used to insure a controlled level of precision for the population estimate is achieved within each sampling unit for each salmonid species (expected: steelhead/rainbow trout, brook trout) and age group (expected: two-three groups). These methods have been chosen to specifically insure maximum conservancy in the number of units sampled and in the number of passes conducted, which lessen the chance that individual fish will be exposed to potentially harmful effects of electroshocking. Data obtained will be analyzed for age and growth parameters and other life history aspects.
Under Task b, we will conduct snorkel surveys and largely follow the methodology of Hankin and Reeves (1988) to gain an estimate of annual production of juvenile steelhead within the entire Wind River subbasin. This methodology utilizes stratified systematic surveying techniques to sample and derive an estimate of fish density for vast areas within the constraint of a sampling season (July-September). We will coordinate the time of our snorkel sampling for the subbasin survey with the time, place, and intensity of our electrofish sampling during the reach surveys so that minimal additional electrofishing will be required to calibrate snorkel estimates by the ratio method as detailed in Dolloff et al. (1993).

Under Task c, we propose to develop annual estimates of smolt production from the Wind River subbasin. Proposed trap sites will be located to estimate total basin production (mouth of Wind River) and production from key watersheds (Trout Creek, Panther Creek, and Upper Wind River). Rotary screw traps will be fished from March 15 to June 15, which coincides with Wind River smolt migration (Rawding in prep). Traps will be checked daily and fish will be enumerated. After fish are anesthetized, we will obtain fork lengths and weights from all fish and scale samples will be obtained from up to 10 fish daily. Ages from these fish will be used in conjunction with fork-length frequencies to determined age composition for the smolt outmigration.

Smolt estimates will be determined by the trap efficiency method of releasing marked fish upstream of each trap (Thedinga et al. 1994). All fish will be tattooed and marks will be rotated weekly to determine changes in trap efficiency. Trap efficiency will be determined by Bailey's (1951) modification of the Petersen estimator. Short-term survival and mark retention will be measured and used to adjust trap efficiency (Murphy et al. 1996). Confidence intervals will be determined using a bootstrap method (Efron and Tibshirani 1986).

Under Task d, we propose to assess the annual adult steelhead returns to the Wind River subbasin. Currently, expanded redd surveys are used to develop adult escapement estimates based on assumptions on differences in winter and summer steelhead distribution and differences in hatchery and wild spawning time. Knudsen (1997) rated these methods as fair to poor for determining escapement estimates. Therefore, we propose to reinstall an adult trap in the Shiperd Falls fish ladder to improve the accuracy of adult escapement estimates. We propose to operate the adult trap year round. Adult steelhead will be floy tagged and released upstream. Since summer steelhead can successfully jump the falls, snorkel surveys and the Trout Creek trap will be used to determine the total number of tagged and untagged fish. Adult run size will be estimated using Baily's (1951) modification to the Peterson estimator. Floy tag loss will be estimated through the use of double marking. In addition to receiving a floy tag, a small hole will be placed in the caudal fin with a paper punch. As fish are recaptured upstream at the Trout Creek trap floy tag loss will be estimated. In addition, caudal fin tissue will be taken with a paper punch, and the sample will be archived for future genetic analysis (DNA).

4. Stream habitat and riparian surveys will follow the USFS Region 6 Stream Inventory Handbook guidelines for Level 2 surveys. In general, this survey will quantify key habitat types (i.e. pools, riffles), key habitat features (i.e. LWD, substrate) and classify channel types according to Rosgen (1994). Riparian surveys will distinguish vegetation into major plant association types and seral stage. We propose to estimate spawning gravel composition within four indexed spawning reaches using methods described by the Yakama River Resource Management. Using this standardized process, sample cores from spawning gravel will be collected with a McNeil core sampler and subsequently analyzed in a lab to determine substrate composition including percent fines. Impacts to egg survival will be estimated using methods described by Young et al. (1991).

Water quality monitoring will be conducted at 10 new stations located primarily on private lands. These stations will augment existing stations on National Forest land. Monitoring will consist of an initial assessment in the first year, consisting of four quarterly sampling rounds and two flush flow sampling rounds. One flush flow and one base flow sampling

round will occur each year for the next four years to monitor change over time. Parameters to be sampled include pH, turbidity, dissolved oxygen, conductivity, continuous temperature, nitrate and nitrite nitrogen, phosphorous, and total and fecal coliform bacteria. Water quality monitoring program will be devised according to DOE QA/QC plan criteria.

5. To accomplish this objective, data from fish (Obj. 3) and physical habitat (Obj. 4) assessments will be combined with existing data to help assess the health of the Wind River subbasin. Substantial information on habitat conditions are available in the USFS's (1995) Wind River Watershed Analysis but most of the data and analysis is collected on USFS lands. The Wind River Watershed Analysis could be improved by incorporating a theoretical basis for analyzing how these processes affect populations such as summer steelhead, by examining cumulative effects of environmental factors on steelhead, and by adding additional information from off forest lands. We propose to use the EDT model following Mobrand et al. (1995) and Lestelle et al. (1996) to link environmental factors with population biology by using life-history diversity, capacity, and productivity information to provide more certainty in the analysis and outcomes of proposed restoration activities to help rebuild the Wind River summer steelhead population.

6. Under task a, road obliteration will be accomplished in accordance with the USFS's (1996) Forest Service Technology and Development manual. Twenty-three miles of road will be decommissioned over the next five years. Work will be conducted in accordance with the State of Washington Hydraulic Permit Approval. Erosion control prescriptions will follow best management practices using native grass seed and shrubs along with natural filter netting. Culvert sites will be fitted with erosion control mat, grass seed and shrubs. Roads will be seeded with non-invasive or native grass seed and native trees and shrubs. Photo points and vegetative growth/survival plots will be established to monitor rehabilitation. Road decommissioning projects are expected to reduce risk of mass failure/landslides, reduce road related sediment sources, and restore natural water routing and reduce run-off.

Under Task b , slide rehabilitation will be accomplished with soil bio-engineering techniques such as "living silt fences" and planting grasses and shrubs to reduce surface erosion. A total of 37 acres of slides will be treated. Photo points and vegetative growth/survival plots will be established to monitor rehabilitation efforts. Slide rehabilitation will reduce surface erosion into stream channels.

7. Under Task a, bank stability will be increased along a total of 6.4 river miles of stream within public and private portions of the Wind River watershed over the next 3 years: LWD and soil bio-engineering stabilization methods developed during the 1994-1996 Trout Creek Restoration (Bair 1997) project will be used to revet banks. In addition to lower bank treatments, shrubs and conifers will be planted on upper banks to increase bank root densities. Fish and other aquatic vertebrates will be removed with seines and electrofishing prior to in-stream activities. Environmental analysis of cultural resources, sensitive plants and animals will be conducted prior to restoration. In addition, work will be conducted in accordance within the standards of both US Army Corps of Engineers and State of Washington Hydraulic Permits. Photo points, permanent cross sections and thalweg profiles will be established and monitored for at least four sites after treatment. The task associated with this objective are expected to reduce bank related sediment, help

reduce width-to-depth ratios, increase pool quality and quantity, increase nutrient retention, increase fish hiding cover and increase stream shade.
Task b proposes to: 1) thin 25 acres of overstocked, homogeneous stands of hardwoods and Douglas fir to release native conifers such as cedar, hemlock and grand fir, and 2) under-plant 100 acres of stands with native conifers. Environmental analysis will follow EPA and NEPA standards. Plant survival and growth plots will be established and monitored for four years after treatment. A solar path finder will be used to evaluate the percentage of stream shaded during the months of June, July, August and September. Riparian rehabilitation will accelerate growth rates and diversify stream side vegetation which increases potential LWD, bank stability, and stream shade. Restoration of riparian areas will provide a long-term, self-sustaining aquatic ecosystem.
8. Under Task a, we propose to release radio-tagged juvenile steelhead upstream of the Hemlock Reservoir and monitor the timing and route of passage through the reservoir as described by Wieman and Adams (in progress). A system of four aerial antennas will monitor smolt progress through the 16 acre forebay. Five underwater receivers will locate the points of passage over the dam and associated fish ladder. Mobile tracking will be use to monitor downstream passage to the mouth of the Wind River. It is proposed to incorporate ongoing mainstem telemetry efforts to determine passage over Bonneville Dam. Adult steelhead passage conditions at Hemlock Dam will be monitored using three, stage level indicators. Levels located in the fish ladder and spillway will be used to estimate attraction flow and discharge in the fish ladder. Monitoring and maintenance of appropriate water conditions in the fish bypass is expected to improve upstream steelhead migration and ensure compliance with instream water rights. Additionally, we propose to install an automated fish counter or underwater video. This task will be initiated by first completing a technical feasibility study in 1998 followed by the installation and operation of the surveillance device (99-02). This monitoring effort is expected to reveal if the adult bypass effectively attracts fish and passes them over the dam in a safe and efficient manner. Lastly, we will maintain the existing fish trap located at the ladder. This monitoring tool is expected to enumerate and inspect the condition of adult steelhead. This will enable us to collect biological information on and inspect fish for bodily injury.
Under Task b: We propose to contract an engineering firm to develop two or more alternatives and associated cost assessment for modify or removing Hemlock Dam. Specific issues to be addressed in the feasibility study will include: volume of sediment and disposal methods, impacts to downstream users, impacts to fish and wildlife and appropriate restoration strategies.
Under Task c: We proposed to conduct a field assessment of road crossing to determine if conditions exist that may restrict fish passage. In accordance with Washington Trout's (WT) instructional manual, "Culvert College", we will measure relevant data including but not limited to: 1) flow approach conditions 2) culvert internal conditions, 3) downstream conditions and 4) design flow.
9. Under Task a, approximately seven log jams will be constructed on 1.7 river miles of degraded or "down-cut" channel to reconnect flood plains and side channels within the Wind River, Trout and Dry Creek. Methods developed during the 1994-1996 Trout Creek Restoration (Bair 1997) will be used to accomplish objectives. Fish and other aquatic vertebrates will be removed with seines and electrofishing. Photo points,

permanent cross sections and thalweg profiles will be established and monitored for at least four after treatment. The task associated with this objective are expected to reduce tributary head-cutting, bank-related sediment, width-to-depth ratios, solar input into the stream, increase over-winter habitat for juvenile steelhead, and increase nutrient availability.

Under Task b, instream LWD will be increased in 17 river miles to with in the range of natural variability (75 -120 pieces of LWD/mile depending on channel type) documented in the USFS's (1995) Wind River Watershed Analysis. LWD will be placed within the bankfull channel to supplement LWD levels until riparian stands are old enough to contribute wood into the channel. LWD supplementation is expected to store sediment, dissipate water velocity, and restore habitat complexity. LWD reintroduced into channels will not be secured with cable or other means. However, placement of wood will be within reaches of stream that do not pose a significant threat to bridges, roads or structures. LWD will be photographed, tagged and mapped.

All work proposed under this objective will be preceded by an environmental analysis of cultural resources, and sensitive plants and animals will be conducted prior to restoration. All work will be conducted in accordance to the standards of both US Army Corps of Engineers and State of Washington Hydraulic Permits.

10. The Stevenson High School and Wind River Middle School programs are based on the EPA StreamWalk model. Successful USFS programs, including "Fashion A Fish" and "Senior Challenge" activities, will be incorporated into the programs. StreamWalk consists of classroom study, water quality monitoring, and assessment of land-use impacts. An end-of-term report prepared by each student will be reviewed by teacher and UCD for evaluation of curriculum effectiveness.

11. A Wind River Watershed Interpretive Plan will be developed according to USFS format. Planned products include watershed delineation signs, watershed informational signs, brochures, and community volunteer events. Tree planting events will utilize conifers from UCD Tree Sales Program and will target degraded private riparian areas. River clean-ups will follow the WA Water Weeks and White Salmon Trash Rodeo models. Snorkeling events will be conducted to let people see fish in their natural environment. Fish Education Days will utilize agency personnel and build off of established local models. Schools, environmental groups, service organizations, and the general public will be targeted for participation. An interpretive plan will insure that such actions are carried out with community support and in accordance with agency standards.

12. Stewardship workshops that may be conducted include the L.E.A.P. program for local loggers, Master Watershed Steward course, Coached Forest Stewardship Plan Writing Course, and Forest Stand Management workshop. Assistance will be provided to landowners preparing stewardship plans using the Department of Natural Resource (DNR) SIP format and the NRCS Resource Management System format. A Wind River Water Quality Screening Program will involve NWSA, UCD, and SWWHD. The program will primarily utilize existing UCD equipment, including a spectrophotometer. A formal monitoring plan and Quality Assurance/Quality Control Document will be developed using Department of Ecology (DOE) design criteria. Source locations will be plotted using GPS. A final report will describe likely water quality concerns including pollution sources,

potential linkages between surface and ground waters, and recommendations for protection and improvement. Results will be shared with participants.

f. Facilities and equipment.

Type here (provide answers in paragraph form)

The UCD's offices in White Salmon (WA), USFS's Wind River Ranger District at Stabler (WA), USGS's facility at Cook (WA), and WDFW's offices in North Bonneville (WA) are all well equipped with the modern computer and office equipment necessary to conduct complex data analyses and prepare professional documents.
Special or higher-cost equipment to be purchased with project funds include:
one GPS unit (see section 7e-12) - $700; lab equipment for the Water Quality Screening Program - $2,000; two backpack electrofishers with probes and batteries - $9,600; and one smolt trap (screw-type) - $17,000.

g. References.

Type here (provide answers in paragraph form)

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Section 8. Relationships to other projects

Type here (provide answers in paragraph form)

We are unaware of any relationships to other projects funded under the FWP.

This project is a collaborative effort between UCD, WDFW, USFS, USGS, USFWS, YIN. Key personnel within these groups have an established working relationships through the Wind River Restoration Team.

Section 9. Key personnel

Type here (provide answers in paragraph form)

Name	Employer	Title	Hours to be funded
Thomas Brian Bair	USFS	Project Fishery Biologist	862
Duties: Habitat surveys and restoration, watershed health assessment.			
Lee C. Carlson	YIN	USFS/Tribal Liaison Biologist	0 (all in-kind)
Duties: Monitoring of spawning bed sediment			
Patrick J. Connolly	USGS	Research Fishery Biologist	2088
Duties: Monitoring of parr populations, watershed health assessment.			
Tim R. Cummings	USFWS	Fishery Management Biologist	192
Duties: Smolt monitoring			
J. Gardner Johnston	UCD	Watershed Coordinator	1440
Duties: Formation of a Watershed Council, Community involvement.			
James H. Petersen	USGS	Research Fishery Biologist	176
Duties: Watershed health assessment			
Daniel J. Rawding	WDFW	Fish Biologist	664
Duties: Monitoring of smolt and adult populations, watershed health assessment.			
Susan C. Shaw	WDNR	Watershed Analysis Prg. Mngr.	360
Duties: Watershed health assessment.			
Steve Stampfli	UCD	Manager	376
Duties: Project management, formation of Watershed Council, community education activities.			
Ken Wieman	USFS	Fisheries Program Manager	922
Duties: Habitat surveys and restoration, watershed health assessment, monitoring of spawning bed sediment.			

Resumes of these key personnel follow.

Section 10. Information/technology transfer

Type here (provide answers in paragraph form)

Despite recent improvements in information exchange and communication between watershed managers and scientists, there remains a critical missing link in communication on the local level, especially for species-specific restoration strategies.

Our objective will be to present project findings, techniques, successes, and failures to regional watershed managers and scientists. At least one article describing experience gained from our efforts will be submitted to magazines and/or newsletters (e.g., EPA WaterTalk, Land and Water, Fisheries). In addition, project descriptions and findings will be presented at no less than two regional watershed conferences or workshops.

Water quality data will be submitted to WDOE for 303d evaluation. Data will also be made available to regional and national databases such as the USFS's "wqdat" and "hydrostoret" databases.

The WRRT will host a Lower Columbia Steelhead Conservation Workshop at Skamania Lodge, in Stevenson, WA. Lower Columbia Basin watershed efforts will be targeted for participation, with an emphasis on watersheds suffering from declining steelhead runs. Topics will include facilitation of stakeholder groups, watershed assessment, monitoring and evaluation, education, and restoration techniques.