Bonneville Power Administration
Fish and Wildlife Program FY98 Proposal Form

Section 1. General administrative information

Title Reestablish Safe Access into Tributaries of the Yakima Subbasin.

Bonneville project number, if an ongoing project 8066

Business name of agency, institution or organization requesting funding
Yakama Indian Nation

Business acronym (if appropriate) YIN

Proposal contact person or principal investigator:

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Subcontractors.

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NPPC Program Measure Number(s) which this project addresses.
Habitat goal 7.6A.2: "At a minimum, maintain the present quantity and productivity of salmon and steelhead habitat. Then, improve the productivity of salmon and steelhead habitat critical to recovery of weak stocks. Next, enhance the productivity of habitat for other stocks of salmon and steelhead. Last, provide access to inaccessible habitat that has been blocked by human development activities.
Policy 7.6B.3: "Give highest priority to habitat protection and improvement in areas of the Columbia Basin where low or medium habitat productivity or low pre-spawning survival for identified weak populations are limiting factors. Give priority to habitat projects that have been integrated into broader watershed improvement effort and that promote cooperative agreements with private landowners.

Policy 7.8E.1: "Implement land exchanges, purchases or easements of a sufficient width to improve and maintain salmon and steelhead production in privately owned riparian areas and adjacent lands, with full compensation of landowners. Consider factors such as need for fish passage facilities and potential improvements to instream flow conditions when purchasing or exchanging private property. In implementing this measure, acquisition of easement should be the preferred approach for protecting riparian areas and adjacent lands. Exchange or purchase that results in net gains of land in public ownership should be considered the lowest priority method for this purpose. States and federal agencies provide an updated list and report progress to the Council by December 31, 1993. In addition, federal agencies should provide to the council by December of each year, a list of high quality riparian lands that potentially could be acquired through exchange."

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

Not applicable to this project.

Other planning document references.

Wy Kan Ush Me Wa Kish Wit, review draft 6/15/95*:* (PAGE 14:)

"In addition, passage is impeded by poorly designed, maintained, and operated structures and facilities and by reductions in the amount of water available for passage. Although both Oregon and Washington require screens at diversions on fish-bearing streams, surveys of the pumping stations in the Columbia River Basin indicate that 70-80% of Oregon sites and 50% of those in Washington are poorly maintained, damaged, oversized, or entirely absent (ODFW 1994; CBFWA 1994). Tens of thousands of salmon smolt can be lost at these sites...

"Where access to tributaries has been blocked or constrained, anadromous fish populations often become fragmented. Fragmentation of these historically interconnected salmon stocks resulted in the development of numerous smaller subpopulations which have an increased risk of becoming extinct.

(PAGE 22):

"Supplementation actions may be viewed as short-term actions which may not be necessary over the long-term if actions in other areas such as habitat and passage significantly improve the survival of the population. Unless the high mortality levels throughout the life cycle of salmon are reduced, additional losses of salmon populations and the associated genetic diversity will continue and the survival advantage provided by supplementation efforts will simply delay the demise of salmon populations in the Columbia basin."

(also, Table 3-5 lists passage needs in the Yakima subbasin)

Subbasin.

Yakima subbasin.

Short description.

Reestablish safe fish passage over human-made migration barriers into tributaries that do not have chronic instream flow problems, and that have high rearing/spawning production potential. Under current conditions, Yakima Subbasin tributaries found in the agricultural zone produce very few fish, because of instream flow problems and/or passage problems. A tributary assessment conducted by the YIN concluded that, of 17 tributaries found in the agricultural zone of the Yakima subbasin, seven have chronic instream flow problems that effectively prevent access during significant portions of the year. The ten that do not have instream flow problems are severely compromised by seasonal barriers or full barriers near their downstream terminus. These tributaries have a cumulative total of eleven miles of habitat that is accessible by anadromous fish.

The project will also fund the construction of fish screens above existing barriers, to prevent entrainment into diversion ditches. Habitat protection will occur in critical habitats that are at risk of development property and conservation easement purchase. Other habitats will be protected from excessive grazing through fencing. Anadromous fish habitat in the treated tributaries will increase from eleven miles to more than 100 miles.

Section 2. Key words

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

Other keywords.

Permanent barrier, seasonal barrier, unscreened irrigation diversion, entrainment, conservation easement, barrier report.

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.	Reestablish safe juvenile chinook and steelhead passage into eight additional miles of habitat in the lower Wilson/Naneum drainage.	a.	Seek additional cost-share funding for construction.
		b.	Subcontract engineering design work with currently approved cost-share funding from the eastern Washington Regional Fisheries Enhancement Group.
		c.	Construct a total of 5 fishways and 5 irrigation diversion screens.
2.	Conduct field surveys to map and describe passage barriers and unscreened diversion in ten tributaries to the Yakima River	a.	Collect maps, ownership information, formulate data sheets.
		b.	Obtain permission to access private properties.
		c.	Conduct field surveys. Develop tributary barrier reports on findings.
		d.	Conduct field surveys.
3.	Complete reports on the conclusions from the barrier and diversion surveys.	a.	Develop draft barrier reports, circulate for peer review.
		b.	Modify draft based upon input form others.
		c.	Circulate final reports to other fish managers and irrigation districts.
4.	Secure cost-share funding for construction projects.	a.	Solicit cost-share funding for engineering and construction from the BOR, the eastern Washington Regional Fisheries Enhancement Group and the USFWS.
5.	Formulate an action plan to remedy passage problems.	a.	Run calculations on cost per unit habitat gained from barrier construction at alternate sites.
		b.	Collect input from other fish managers on findings of report.
		c.	Finalize fishway and screen

			construction plan.
6.	Construct fishways at migration barriers and reliable screens at gravity-fed diversions.	a.	Secure all applicable permits.
		b.	Draft statements of work, circulate to contractors.
		c.	Receive bids, award contracts.
7.	Permanently protect the most productive habitats in treated stream reaches.	a.	Develop list of candidate sites for purchase and fencing.
		b.	Contact landowners to solicit involvement.
		c.	Develop voluntary MOA's with landowners to initiate easement language, land appraisals, and fencing.
		d.	Compare purchase options, prioritize based upon cost/benefit analysis.
		e.	If necessary, conduct Habitat Evaluation Procedures to develop priority list for purchase.
		f.	Finalize purchases, construct fences.
8.	Monitor results of construction.	a.	Conduct snorkle and/or electrofishing surveys in treated streams.
		b.	Conduct redd surveys in treated streams.
		c.	Include findings of surveys in annual and final reports.
		d.	If necessary, conduct statistical analysis' on smolt outmigration numbers at the Chandler juvenile facility.

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1.	5/98	4/99	5
2.	6/98	12/98	1
3.	5/99	9/2002	86
4.	5/98	9/2002	8

Schedule constraints.

Time constraints related to other funding sources may delay construction. Landowners may similarly delay project implementation.

Major milestones include:

1. Implement recommendations from existing lower Wilson/Naneum Creek passage report.
2. Survey, and finalize reports for other tributaries, and the upper portion of the Wilson/Naneum watershed.
3. Implement recommendations from reports filed under milestone #2.

Completion date.

FY2002

Section 5. Budget

Item	Note	FY98
Personnel	Biologist II	38,940
	Technician III	23,964
Fringe benefits	Current rate: 25.3%	25,767
Supplies, materials, non-expendable property	Computer (one), office materials, vehicle rental (two), fencing materials ($10,000)	32,600
Operations & maintenance		0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Conservation easements, land purchase	90,000
Travel	One three-day trip to Colorado @ $131/day + $900/each for training, Three two-day trips to Portland @ $125/day	3,336
Indirect costs	Current rate 26.6%	57,086
Subcontracts	For construction of fishways and irrigation diversion screens.	125,108
Other		0
TOTAL		$396,801

Outyear costs

Outyear costs	FY99	FY2000	FY01	FY02
Total budget	$1,583,000	$1,583,000	$1,583,000	$426,757
O&M as % of total	0	0	0	100

Note: The O&M budget, including fishway repair and replacement, is based upon the following calculations:

Screen and Barrier O&M and Replacement

Funds will be placed in a trust fund for O&M and repair. Assume construction costs will grow by a 3% inflation rate per year and the trust fund will accrue interest at 7%. Figures are summarized in Table A.

Fish Screens

Replacement: assume the screens will begin needing replacement in 25 years, with a 10-year replacement period. Assume one quarter of the screens will not be replaced, and half of the screens will be replaced with smaller screens, due to conversions to pressurized delivery systems and conversions to suburban land use. In '97 dollars calculate screen replacement cost average at $10.75k each. Total screen replacement cost in '97 dollars will become: (135 screens x 75% x$10.75k = $1,088,438. Adjust for inflation for 29 years (assumed to be the median year for screen replacement). Thus, will need $2,564,975 at the end of 29 years. To reach that figure the project will need to put $360,540 in the trust fund in FY02.

O&M: will be covered by the landowners.

Fishways

Replacement: Assume a seventy-five year life cycle, with only half needing replacement (due to changing demographics and improved irrigation methods). Total '97 funds for construction: 69 barriers x $25k = $1,725,000. With the above cited inflation and interest rates, the project will need to put $49,519 in the trust fund in FY02.

O&M: will be primarily covered by the landowners, with the exception of weirs. The Wilson Creek fishway adjacent to Interstate 82 was constructed 27 years ago, and although some of the weirs are showing signs of decay, they appear to still have a lot of useful life remaining. An estimate of fishway repair is thus: replace 50% of the weirs (wooden pressure treat 2x8's) in 35 years, with the remainder replaced in 40 years. In 1997 dollars, repair costs/fishway is estimated at $1,000. Sixty-nine barriers x $1,000 = $69,000. Will need 50% ($34,500) in 35 years, with the remainder will be needed in 40 years. From the calculations, the project will need to place $16,608 in the trust fund in FY02 to cover fishway repair.

Cumulatively, the project will need to place $426,757 in a trust fund in FY02, as shown in table A below.

Table A: Budget for Screen and Fishway O&M and Replacement

	FY02 Budget
Screens	

Replacement	$360,540
O&M	0
Fishways	
Replacement	$49,519
O&M	$16,698
Total	**$426,757**

Section 6. Abstract

Items to be funded include:

1. Construction/reestablishment of fishways and screens in the lower ten miles of the Wilson Creek watershed;
2. Field surveys of passage barriers and unscreened diversions in 10 Yakima subbasin tributaries;
3. Construction of fishways and screens in some or all of the surveyed tributaries; and,
4. Tributary habitat protection.

The goal of the project is to rebuild Yakima River spring chinook and steelhead populations. Project objectives include reconnecting mainstem and tributary habitats that are not slated for screening under the Northwest Power Planning Council's Yakima River Phase II screening program. The target tributaries historically had hundreds of miles of anadromous habitat. Today, roughly 10 miles remains. Through property acquisition, easements and fencing, this project will also protect productive habitats that are at-risk of development.

The project is relevant to the 1994 Columbia Basin Fish and Wildlife program in that it will contribute to the protection and restoration of anadromous fish stocks in the Yakima Basin. Further, the project will protect terrestrial wildlife species through riparian habitat fencing, and purchase of conservation easements and property.

The project is based upon the scientific principle that reconnecting more than 100 miles of potentially productive tributary habitat to the mainstem, when only eleven miles exist currently, will contribute to the rebuilding of Yakima River salmon and steelhead stocks. This will be achieved by the end of FY2002.

The results of fishway construction will be monitored through snorkle and redd surveys in the treated streams. Screening will be monitored through direct observation.

Section 7. Project description

a. Technical and/or scientific background.

Tributaries to the Yakima River historically provided hundreds of miles of productive spawning and rearing habitat for five species of salmon and summer steelhead. Irrigation development created migration barriers that have effectively blocked all but the extreme lower end of many tributaries. Some tributaries have profound instream flow problems, while others have adequate flow to support rearing, and some spawning production during much or all of the year. For example, the Wilson/Naneum watershed historically provided well over one hundred miles of spawning and rearing habitat. Today, human-made barriers near the mouth allow anadromous salmonids to access only the lower two miles of each creek. However, during county-wide population surveys, fish managers have found the highest densities of chinook parr in the lower reaches of these two creeks (Easterbrooks, 1997; Pearson et.al,, 1994).

The impact of the loss of spawning/rearing habitat in the tributaries is exacerbated by the reduction in rearing habitat function in the mainstem. Throughout the summer the Yakima mainstem is managed to convey irrigation water. Flows are much higher than normal in the upper 105 River Miles, and mainstem-rearing chinook and steelhead fry are often unable to find suitable habitats. During the winter, reservoir release is kept to a minimum, with flows too low for optimal rearing. Many side channels and alcoves become isolated or dewatered altogether, while others become too shallow to provide functional rearing habitat. Riparian vegetation is often unable to grow close enough to the stream channel to provide over-hanging cover through the winter months. The impact of river regulation also affects salmonid food sources. The result is a reduction in mainstem rearing habitat quantity and quality throughout the year. Thus, the need to reestablish tributary passage is made more important by the altered mainstem flow.

This project is a complement to project #9006900, the Yakima Hatchery, which strives to rebuild naturally spawning/rearing stocks of anadromous salmonids. The intent to rebuild natural runs obligates fish managers to reconnect migratory access to the tributaries.

This project is a logical progression from BPA project #96FC96064, the Wilson Creek Riparian Zone Restoration Project, which strives to demonstrate that productive salmon habitat can coexist with viable agriculture. To date, mostly on private land, 5,000 plants have been sown on over three miles of shoreline, a survey of the migration barriers and unscreened diversions in the lower 20 miles of the watershed has been completed, and perhaps most importantly, several influential private landowners are now familiar with and support the project's objectives for riparian restoration. The findings of the passage survey will be circulated to 17 landowners, and any others who request the report.

Another complementary YIN riparian restoration project was implemented in 1995-96, in the Cowiche Creek watershed. This project was funded through the Environmental Protection Agency with Clean Water Act Section 319 funds. Again, demonstrating the benefits of maintaining riparian habitat on agricultural land was the goal. Through this project, habitat restoration/protection occurred on 15 private parcels. Meetings were conducted with 40 landowners. A total of twelve presentations were given to the

following groups: local science teachers (through the Education Service District), the Yakima Chapter of the Cattleman's Association, the local Cowiche Creek landowners (public meeting), the Yakima County Weed Board, the Yakima River Basin Watershed Council (YRBWC) Water Quality Committee and the Executive Committee, the Mission Brender Yaxsum Watershed Group, the Cowiche Canyon Conservancy annual meeting, the Cowiche Canyon Conservancy Earth Day Hike (two consecutive years), the Yakima Greenway Foundation Earth Day, and the Ellensburg Rotary Club. In addition, the Cowiche project was highlighted at two riparian restoration workshops, one hosted by the Yakama Nation and another by the Chelan County Conservation District. Informal presentations were given to school field trip groups as well. At the end of the project, an instructional manual was created and given to interested landowners. (Cowiche Creek Riparian Zone Restoration Project, Final Report)

Fish and fish habitat management have received broad press through the riparian and hatchery projects. However, educating private landowners about the benefits of healthy riparian habitat will have little effect on anadromous fish populations if the fish cannot access the habitat. The Wilson Creek watershed includes roughly one hundred miles of habitat, but today only the lower six miles can be accessed by chinook salmon and steelhead. Cowiche Creek historically provided about 25 miles of anadromous habitat, but present irrigation structures have completely eliminated upstream juvenile passage, and have sharply reduced adult passage for spring chinook and coho.

Project #9705200 of the BPA titled "Enhancement Between Selah & Union Gaps" may affect passage in the extreme lower end of Wide Hollow Creek, and Blue Slough, two of the 10 streams targeted for work in this proposal. The primary aim of that project is habitat acquisition within a braided section of the Yakima mainstem, thus it is unlikely that significant passage improvements will be made in these tributaries without funding under the tributary project.

Mitigation for losses will occur in place, by constructing juvenile and adult fishways over human-made barriers; irrigation screens will be constructed at gravity-fed diversion points that would otherwise entrain and kill fish. Habitat protection in the form of property and/or easement purchase and fencing will also occur along treated channels.

During conceptual planning for the project, 10 tributaries were identified that have adequate instream flow during most or all of the year. However, those tributaries fail to support anadromous fish because migration barriers exist near or immediately above their downstream terminus. Candidate tributaries are described below, starting from the headwaters of the Yakima mainstem and working toward its confluence with the Naches River, and from the Naches headwaters to the mouth of the Yakima:

1. **Tucker Creek:** This creek enters the Yakima mainstem at River Mile (RM) 200. It has at least one unscreened diversion, and at least one seasonal barrier near the mouth. Channel gradient, and floodplain confinement in the lower one Creek Mile (CM) is extremely low. Riparian habitat is excellent. The mouth of Tucker

Creek lies in the middle of the "Easton Reach" of the Yakima mainstem, where roughly 60% of the subbasin spring chinook spawn.

2. Manastash Creek: This creek enters the Yakima mainstem at RM 155, and has a drainage area of over 75 square miles. It has been extensively altered through irrigation development. Currently, anadromous fry/parr passage is blocked at CM 1.4. The second barrier is located near CM 3.4. The upper human-made barrier occurs at CM 5.1. Above that point, many miles of rearing/spawning habitat exists, that is functionally much more intact than rearing habitat in the mainstem Yakima.

3. Reecer Creek: This creek enters the Yakima River at RM 154. Although excellent rearing habitat occurs along the lower portions of the drainage, a seasonal migration barrier immediately above the mouth precludes juvenile access. One unscreened diversion lies immediately above the barrier. An undetermined number of migration barriers and unscreened diversions lie above this point.

4. Wilson Creek and associated tributaries: Wilson Creek and its attendant tributaries enter the Yakima River at RM 147, with a collective drainage area of 382 square miles. All the tributaries have been altered through agricultural practices, including channelization, soil runoff, grazing, and irrigation diversion. However, juvenile rearing densities below the barriers are high relative to the rest of the basin (Pearsons., et.al., 1994). Implementation of this project will increase the amount of rearing habitat available by at least twenty miles, and possibly as many as seventy miles.

a. Wilson Creek: This stream has been extensively altered through irrigation development. Currently, chinook fry/parr rearing occurs up to CM 1.8, where the first irrigation barrier lies. Densities of juvenile chinook are high relative to the rest of the basin throughout a large portion of the year. Channel gradient and floodplain confinement are extremely low for the next six miles above the first barrier. Channel sinuosity is relatively high. A barrier survey up to CM 8 found one permanent barrier and two seasonal barriers, with an additional seasonal barrier that has not been used for three years. Five unscreened diversions with high potential for entrainment were found. The west branch of Wilson Creek flows into the main channel at CM 4.9, with only one barrier and no diversions found in the lower mile of the west branch.

b. Naneum Creek: This stream enters Wilson Creek at CM 1.6. The west branch has three seasonal barriers in the lower 1.3 CM's, with four unscreened diversions in this reach. Channelization and consequent entrenchment have limited habitat complexity. Riparian conditions vary from good to poor; the east branch of Naneum Creek has extremely high densities of chinook fry/parr in the lower 1.9 CM's (Easterbrooks, 1997).

c. Coleman Creek: This stream enters Naneum Creek at CM 1.0. The first migration barrier is permanent, and is located at CM 0.7. The second and third barriers are seasonal and lie at CM 1.0 and CM 2.0, respectively. Six unscreened diversions are located between the first and third migration barrier. Riparian conditions within the study reach are considered good.

d. Cherry Creek: This channelized, highly entrenched stream enters Wilson Creek at CM 1.0. The first migration barrier is permanent at CM 1.4. Barrier and unscreened diversion surveys were not conducted above the first barrier, because habitat function above the barrier is of extremely low value due to siltation, channelization and grazing.

e. Badger Creek: Again, this stream is channelized, highly entrenched and has high silt loads. It joins Cherry Creek at CM 0.4, with the first permanent migration barrier at CM 0.6. Barrier and unscreened diversion surveys were not conducted above the first barrier.

5. Cowiche Creek: This tributary enters the lower Naches River at RM 3, it has a drainage area of 120 square miles, and has been impacted by agricultural development. An irrigation structure immediately above the mouth blocks upstream juvenile chinook passage. Adult chinook access is problematic because a irrigation diversion ditch from the Naches River flows through Cowiche Creek, which shunts virtually all Cowiche water down the irrigation ditch. The change in water chemistry at the mouth of Cowiche Creek eliminates olfactory attraction for adult fish seeking their natal stream.

6. Wide Hollow Creek: This tributary has a drainage area of 65 square miles entering the Yakima mainstem at RM 107. A grain mill flume at CM 0.4 formed a permanent barrier until 1989, when a fishway was constructed for the migration of adult salmon. However, the fishway does not provide passage for juvenile salmonids. A seasonal barrier lies at approximately CM 3.2. A similar seasonal barrier exists at CM 4.6. No other barriers exist up to approximately CM 13, where flows become seasonal in drought years (Harvester, 1997). Water temperature in lower Wide Hollow Creek is much more benign than in the Yakima mainstem during winter months, and juvenile salmonids occur below the first migration barrier in very high densities during this period (author, personal observation). Riparian habitat conditions vary tremendously, however pacific willow climax communities are prevalent in many locations.

7. Blue Slough: This is a remnant side channel of the Yakima mainstem. Fish access it from both the upstream and downstream ends. Rearing habitat potential is high, however access from the downstream end is periodically blocked by seasonal diversion structures. Roughly 12 to 15 irrigation diversions occur along the channel, but few are expected to have approved surface water rights under the Acquavella adjudication process (Harvester, 1997). Similar to Wide Hollow Creek, Blue Slough is deemed a high priority for rearing habitat restoration, because that reach of the Yakima mainstem immediately below the lower end of this side channel has lethal temperatures during much or all of the summer. Blue Slough and Wide Hollow are seen as the "last chance" for summer rearing chinook fry.

8, 9. Spring & Snipes Creeks: Both creeks enter the Yakima at RM 42 and have a collective drainage area of 50 square miles. Spring Creek has a migration barrier three miles above the mouth. In general, the primary habitat problem is riparian clearing and grazing. The channels are incised, so few gravity-fed unscreened diversions occur, however several dams exist that form full migration barriers.

10. Corral Creek: This channel enters the Yakima mainstem at RM 34. Habitat conditions are similar to Spring and Snipes Creeks, with few unscreened gravity diversions but profound riparian impacts. Steelhead, and perhaps coho, used Corral Creek for spawning as recently as 20 years ago; juvenile fall chinook continue to rear in the lower end.

The ten creeks listed above reflect hundreds of miles of rearing and spawning habitat that is currently not accessible. Under current conditions, cumulatively only eleven miles of rearing habitat is available in all of these tributaries combined.

A total of seven other tributaries are not proposed at present for passage, because of chronic instream flow problems. These include: Little Creek, Big Creek, Swauk Creek, Dry Creek, Lmumma Creek, Wenas Creek and Ahtanum Creek. In a survey of the agricultural portion of the watershed, YIN biologists concluded that no tributaries exist in the basin that have both adequate passage and adequate instream flow to support healthy runs of anadromous salmonids.

Previous work related to this proposal includes a survey of migration barriers and unscreened diversions in the lower Wilson Creek watershed, conducted by Amy Houtakker and Scott Nicolai of the YIN (Draft). This report concluded that construction of five fishways and five irrigation screens will increase the amount of rearing and spawning habitat by at least eight miles (from 1.9 CM's currently available, to over ten CM'S after construction). A grant application for $10,000 has been awarded from the eastern Washington Regional Fisheries Enhancement Group to complete the conceptual design engineering for the fishways. The YIN intends to cost-share this grant with funds from this proposal, to complete engineering work for fishway construction in all of the tributaries.

The proposed work is a logical component of the *Wy-Kan-Ush-Mi Wa-Kish-Wit*, the Yakima Subbasin Plan, and the 1994 Fish and Wildlife Program, because the project strives to put the fish back into the habitat, and to protect the most productive habitat in the reaccessed tributaries.

b. Proposal objectives.

Objectives of this project include:

1. Reestablish safe migratory access for juvenile and adult anadromous salmonids to over ten miles of habitat in lower Wilson Creek.
2. Conduct field surveys to map, measure, photograph and describe migratory barriers and unscreened diversion in ten tributaries in the Yakima subbasin.
3. Complete a report of the conclusions from the barrier and diversion surveys. Circulate the draft for peer review. Circulate the final to interested parties.
4. Form an action plan to remedy passage problems. Develop recommendations based upon cost/benefit analysis'.

5. Construct fishways at migration barriers, and reliable screens at gravity-fed diversions.
6. Protect into perpetuity the most productive riparian and instream habitats in the reaccessed habitats conservation easement purchase and property purchase. Protect habitat from grazing impacts through fencing. Property appraisals have not been conducted, but the cost is expected to be approximately $2500 per acre.
7. Monitor the results of fishways and irrigation screen construction.

Products of this project include:
1. A report detailing the location, description and number of migration barriers and unscreened diversions in ten Yakima subbasin tributaries.
2. Structures that provide migratory access for juvenile and adult anadromous salmonids, in all tributaries deemed economically feasible for fixing.
3. Irrigation diversion screens to prevent juvenile entrainment in treated tributaries.
4. Conservation easements and property acquisition on habitats with high functional value.
5. Fencing to protect riparian habitat from overgrazing.
6. Annual reports on project efforts and results, including number of miles of tributary rearing habitat that is regained through the fishway/screening and habitat protection efforts.

c. Rationale and significance to Regional Programs.

As stated in 7.a., under current conditions in the Yakima Subbasin, rearing habitat function in the mainstem is sharply compromised because of irrigation delivery-related impacts on the hydrograph. At the same time, in the tributaries identified for work under this project, irrigation diversion structures and water withdrawal have reduced rearing and spawning habitat from hundreds of miles to a mere eleven miles. Juvenile fry/parr densities below the lowest barriers are often extremely high relative to other portions of the basin. The objectives of the project are to:

1. provide safe access to productive tributary habitat through construction of fishways and irrigation screens; and,
2. protect the most productive habitats within the project area through conservation easement and property purchase, and through fencing.

Accomplishing these objectives will tremendously increase the amount of available tributary habitat. Rearing habitat in the tributaries is not influenced by the summer-long high flows of the mainstem. Tributary habitat is often more thermally-benign in the winter months (author, personal observation). The hypothesis that will be tested through this project is whether the ratio of adult recruits per spawner will increase if access to tributary habitat is significantly increased.

This project will further the goals of the Fish and Wildlife Program (FWP), through protecting at-risk, highly productive habitat, and through restoring migratory access to productive tributary habitats. At section 7.6, the FWP states: “wild and naturally spawning populations of salmon and steelhead are generally at low levels throughout the

Columbia River Basin as a result of impaired mainstem passage, **blocked habitat**, habitat degradation..."(emphasis mine). Later in the same section, the FWP states: "However, maintenance and recovery of anadromous fish resources will not be possible unless dramatic steps are taken to **protect existing high quality habitat**, improve the quality of degraded habitat, **and increase the quantity of presently blocked habitat that could be made accessible**... "**Habitat has decreased by more than a third...**" (emphasis mine). Under section 7.6A, the FWP states that the goals for rebuilding Columbia River salmon stocks include: "At a minimum, maintain the present quantity and productivity of salmon and steelhead habitat. Then, improve the productivity of salmon and steelhead habitat critical to recovery of weak stocks. next, enhance the productivity of habitat for other stocks of salmon and steelhead. Last, provide access to inaccessible habitat that has been blocked by human development activities."

This project will increase the amount of spawning/rearing habitat from eleven miles to well over 100 miles. These tributary habitats could become excellent rearing habitats again, as they were historically.

This project fits well with other habitat and fish production efforts ongoing in the basin, in that it focuses strictly on tributary habitat. Of 17 tributaries surveyed in the agricultural zone of the Yakima subbasin, all had extreme passage limitations or full barriers near the mouth because of diversion structures and/or instream flow problems. No tributaries exist in the study reach that did not exhibit at least one of these problems. In that ongoing fish rebuilding efforts strive to rebuild the natural-spawning population, and in consideration of the highly-compromised nature of rearing habitat in the mainstem, tributary habitat reconnection is a critical step toward achieving anadromous fish restoration.

d. Project history

This is a new project.

e. Methods.

This watershed restoration project is addressing a problem that is well recognized among the subbasin fish managers. That is, that the vast majority of the tributary spawning and rearing habitat in the ten candidate tributaries has been lost through human activities over the last 140 years. The assumption is that reconnecting as much of that habitat as is possible with BPA funding cost-shared with other entities will result in greater productivity in the entire watershed. The function of fishways and diversion screens will be tested through snorkle and redd surveys, while the larger hypothesis will be tested through statistical analysis' conducted to determine egg to smolt survival with outmigration data gathered at the Chandler juvenile fish handling facility.

Tasks for each objective include:
Objective 1: Reestablish safe juvenile chinook passage in lower Wilson Creek.

Task 1a: Subcontract engineering work, with already-approved cost-share funding from the eastern Washington Regional Fisheries Enhancement Group.

Task 1b: Seek additional cost-share funding for construction from the eastern Washington Regional Fisheries Enhancement Group, the BOR, the USFWS, and the Natural Resources Conservation Service.

Task 1c: Construct a total of five fishways and five irrigation diversion screens, to regain access to at least eight miles of habitat.

Objective 2: Conduct field surveys to map, measure, photograph and describe migratory barriers and unscreened diversion in ten tributaries in the Yakima subbasin.

Task 2a: Collect maps and ownership information, formulate data sheets.

Task 2b: Obtain permission to access private properties.

Task 2c: Conduct field surveys.

Objective 3: Complete reports on the conclusions from the barrier and diversion surveys.

Task 3a: Develop draft tributary barrier reports, circulate for peer review.

Task 3b: Circulate final reports to other fish managers and irrigation district personnel.

Objective 4: Seek additional cost-share funding for construction, from groups listed under objective #1.

Objective 5: Formulate an action plan to remedy passage problems. Develop recommendations based upon cost/benefit analysis' from the survey reports.

Task 5a: Run calculations from findings of report, on cost per unit habitat gained for rectifying problems in each tributary.

Task 5b: Collect input from other fish managers on findings of the report and the calculations.

Task 5c: Finalize fishway and screen construction plan, based on calculations, input from other fish managers, and biological criteria, including proximity in the watershed, habitat conditions in the subject tributary, access concerns from the mainstem and water quality in the tributary.

Objective 6: Construct fishways at migration barriers, and reliable screens at gravity-fed diversions.

Task 6a: Secure all applicable permits.

Task 6b: Draft statements of work, circulate to contractors, request bids from same.

Task 6c: Receive bids; award contract(s).

Task 6d: Begin construction.

Objective 7: Protect, into perpetuity, the most productive riparian and instream habitats in the reaccessed habitats through conservation easement and property purchase. Protect habitat from grazing through fencing.

Task 7a: Develop tentative list of purchases and fencing projects based upon risk of permanent habitat loss, and current/potential habitat function.

Task 7b: Contact landowners to solicit involvement, based upon willing seller-willing buyer approach.

Task 7c: From list of interested sellers, develop MOA's with each to initiate the appraisal and hazardous materials assessment process.

Task 7d: Compare funding limitations to amount of potential habitat to acquire under different scenarios.

Task 7e: If necessary, conduct Habitat Evaluation Procedures to prioritize parcels for purchase.

Task 7f: Finalize purchases and construct fences.

Objective 8: Monitor results of constructing fishways and screens.

Task 8a: Conduct snorkle surveys or electrofishing surveys in treated tributaries, utilizing mark/recapture population survey methodologies, to determine project efficacy.

Task 8b: Conduct redd surveys in treated tributaries to determine project efficacy.

Task 8c: Conduct statistical analysis' on smolt outmigration numbers at the Chandler juvenile facility to attempt to quantify project benefits.

f. Facilities and equipment.

The project will utilize the existing YIN fisheries office building. Vehicles will be leased through GSA. Typical field equipment is available through the YIN fisheries program. One office computer will be required. No special or high-cost equipment will be required.

g. References.

References

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Section 8. Relationships to other projects

Other projects funded under the FWP include project #9006900, the Yakima Hatchery, which strives to rebuild naturally spawning/rearing stocks of anadromous salmonids. This project is critical to the success of the hatchery, because currently only 10 miles of tributary habitat is accessible. The hatchery's intent to rebuild natural runs obligates fish managers to reconnect migratory access to the tributaries.

This project is a logical progression from BPA project #96FC96064, the Wilson Creek Riparian Zone Restoration Project. Although they are not critically linked, the riparian restoration project has educated many landowners on fish resources found in the Yakima subbasin tributaries, and the need to maintain healthy stream habitat. Currently the YIN has a working rapport in Wilson Creek never before experienced. Several third-generation landowners have given YIN biologists perpetual property access permission to their property to conduct habitat restoration work. A full-time cattle rancher brought up the issue of migratory passage, and later expressed his support for the YIN's efforts to restore fish access in the Wilson Creek watershed. When the barrier/diversion survey was conducted, private property access permission, from telephone calls, was granted on 85% of the parcels for which access was requested. Thanks to the work of the riparian project, the iron is hot for reestablishing safe migratory access in the Wilson Creek watershed.

Section 9. Key personnel

Scott Nicolai, Assistant Environmental Manager, YIN Fisheries Resources Program. Duties will include personnel hiring and project oversight. Qualifications include Masters Degree in Natural Resources Management, six years experience working in the field of fisheries habitat management, project oversight on five large habitat restoration projects and numerous small projects. Current employer is the Confederated Tribes and Bands of the Yakama Indian Nation. Job completions include the Cowiche Creek Riparian Zone Restoration Project, the lower Wilson Creek barrier/diversion survey report, the Brunson bioengineering bank stabilization and riparian habitat restoration project, and the Teanaway Junction Side Channel enhancement project.