
PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Lower Klickitat River Riparian & In-Channel Habitat Enhancement Project

BPA project number: 9705600

Contract renewal date (mm/yyyy): 01/2000 **Multiple actions?**

Business name of agency, institution or organization requesting funding

Yakama Indian Nation - Fisheries

Business acronym (if appropriate) YIN

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses

7.6A, 7.6A2, 7.6B.3, 7.6B.6, 7.6D, 7.7, 7.8E.2

FWS/NMFS Biological Opinion Number(s) which this project addresses

Other planning document references

Wy Kan Ush Me Wa Kush Wit, Klickitat Subbasin Plan, CRFMP, Standard Methodology for Conducting Watershed Analysis, Washington State Salmon and Steelhead Stock Inventory (SASSI, 1992).

Short description

Watershed assessment, improve riparian conditions for steelhead and coho with cattle enclosure fencing, land acquisitions, LWD addition, enhance pool formation, capture spawning gravels, revegetation of riparian areas, augment summer flows, reduce sediment.

Target species

Winter and summer steelhead (steelhead), coho and resident salmonids

Section 2. Sorting and evaluation

Subbasin

Klickitat River: Focusing on the following lower basin tributaries: Little Klickitat River, Swale, Dillacort, Snyder, Wheeler Canyon, Summit, White, Trout Creeks

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input type="checkbox"/> Multi-year (milestone-based evaluation) <input checked="" type="checkbox"/> Watershed project evaluation	<input checked="" type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input checked="" type="checkbox"/> New construction <input checked="" type="checkbox"/> Research & monitoring <input checked="" type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
9506325	YKFP M&E/Klickitat - TFW habitat inventory, salmonid population assesment	Data collection through project #9506325 is being used to more effectively direct watershed project in the lower Klickitat basin.
9603501	Satus Watershed Restoration	Information sharing of project success and short-comings.
9803300	Restore Upper Toppenish Creek Watershed	Information sharing of project success and short-comings.
9705300	Toppenish-Simcoe Instream Flow Restoration and Assessment	Information sharing of project success and short-comings.
9206200	Yakama Nation Riparian/Wetlands Restoration	Information sharing of project success and short-comings.
9705100	Yakima Basin Side Channel	Information sharing of project

		success and short-comings. Land appraisal and aquisition information will relate directly to Project objectives.
9901300	Ahtanum Creek Watershed Assessment	Information sharing of project success and short-comings.

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1997	August 97 - Project Initiation, gathered community support through local meetings,	
1997	Construct two Sediment Retention Ponds	
1997	Installed eight miles of riparian fence. TFW Habitat survey of Swale Creek.	
1997	Conducted six miles of Timber Fish and Wildlife (TFW) Habitat survey of Swale Creek.	
1998	Compeletion of Biological Opion for five additional ponds and in-channel construction. Obtained permits for all construction work.	
1998	Construction of five sediment ponds, on intermittent tirbutaries of Swale Creek, which deliver sediment laden waters directly to Swale Creek.	
1998	Installed off-channel watering system, which will allow for the elimination of high density sheep wintering operation within intermittent tributary of Swale Creek.	
1998	Installed seven miles of riparian fence.	
1998	Revegetation of all Sediment rention Ponds and within portions of riparian excloures.	

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Level I Watershed Assessment of lower Klickitat subbasin project tributaries	a	Gather knowledgeable professionals and local landowners to form watershed assessment team.
		b	Gather and analyze all existing pertinent information
		c	Investigate all cost-sharing opportunities.
		d	Develop and prioritize prescriptions for each lower basin tributary enhancement opportunity. Formulate monitoring plan for each prescription.
2	Increase survival and production of salmonids in tributary streams of the lower Klickitat through livestock management.	a	Exclusion or management of livestock grazing
		b	Development of off-channel livestock watering systems
		c	Plant riparian vegetation within exclusion fencing to reestablish riparian corridor.
		d	Work with local rancher to develop grazing practices to minimize impacts to riparian corridor.
3	Increase survival and production of salmonids in tributary streams of the lower Klickitat through control of fine sediment delivery and improve water quality.	a	Construct sediment retention ponds in key drainages to reduce impacts from fine sediments from agricultural practices.
		b	Riparian revegetation along stream corridor to increase stream shading and lower stream temperatures.
4	Increase survival and production of salmonids in tributary streams of the lower Klickitat through attenuation of the hydrograph.	a	Construct retention ponds to create wet meadow habitat to retain runoff and reduce the peak of the hydrograph.
5	Increase survival and production of salmonids in tributary streams of the lower Klickitat through acquisition of key habitat.	a	Identify and pursue purchase of key habitat from willing landowners
		b	Development of conservation easements with willing landowners.
6	Increase survival and production	a	Construct in-channel structures to

	of salmonids in tributary streams of the lower Klickitat through construction of in-channel habitat structures.		expedite adult upstream migration into favorable spawning and rearing habitats.
		b	In suitable areas incorporate large woody debris into the stream channel.
7	Monitor habitat improvements	a	Conduct standardized habitat inventory methodology at routine intervals to monitor changes to channel (TFW Ambient Monitoring)
		b	Conduct standardized salmonid population monitoring at routine intervals to monitor changes over time (snorkel transects).
		c	Conduct point-step vegetation inventory within randomly selected riparian exclosures.
		d	Conduct photo point monitor sites to document riparian regrowth within exclosures

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	8/1997	5/1998			0.00%
2	9/1997	12/2010			28.00%
3	10/1997	12/2010			10.00%
4	10/1997	12/2010			10.00%
5	3/1999	12/2010			25.00%
6	6/1999	12/2010			24.00%
7	5/1998	12/2015			3.00%
				Total	100.00%

Schedule constraints

Potential constraints include permitting and weather.

Completion date

2010, with M&E to continue for several more years

Section 5. Budget

FY99 project budget (BPA obligated): \$295,683

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	1/3 Bookkeeper. YIN Biologist, WDFW, and NRCS cost-shared personnel	%2	7,000
Fringe benefits	15.3 %	%0	1,071
Supplies, materials, non-expendable property	Fencing supplies, tools, rooted stock, and in-channel structures.	%10	30,000
Operations & maintenance	Materials for TFW habitat monitoring.	%1	2,500
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Land acquisition, off-channel livestock watering system development.	%27	80,000
NEPA costs	incurred by BPA	%0	0
Construction-related support	none anticipated	%0	0
PIT tags	# of tags: none	%0	0
Travel	none	%0	0
Indirect costs	23.6%	%9	28,456
Subcontractor	Northwest Service Academy (NWSA) - project labor.	%18	55,325
Subcontractor	Local Contractors - In-channel structures.	%22	65,324
Subcontractor	Local Contractors - Sediment Retention Ponds.	%10	30,324
Other		%0	0
TOTAL BPA FY2000 BUDGET REQUEST			\$300,000

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
NRCS	Sediment Retention Pond design. Riparian fencing design. 1/8 time personnel	%2	5,000
WDFW	Fencing crew supervisor, assistant project planner. 1/4 time personnel.	%3	11,000
WDFW	Design and construction supervision of In-channel work (WDFW engineer).	%1	3,000
NRCS, WDFW, Local Landowners	Participation in tributary watershed assessment, to identify project opportunities	%2	5,000

		%0	
Total project cost (including BPA portion)			\$324,000

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	\$300,000	\$260,000	\$230,000	\$200,000

Section 6. References

Watershed?	Reference
<input checked="" type="checkbox"/>	Washington Forest Practices Board, Standard Methology for Conducting Watershed Analysis, Under Chapter 222-22 WAC, Version 3.0 November 1995
<input type="checkbox"/>	Beschta, R.L. 1991. Stream Habitat Management for Fish in the Northwestern United States: The Role of Riparian Vegetation. American Fisheries Society Symposium 10:53-58.
<input type="checkbox"/>	Binns, A.N. 1994. Long-Term Responses of Trout and Macrohabitats to Habitat Management in a Wyoming Headwater Stream. North American Journal of Fisheries management 14:87-98.
<input type="checkbox"/>	House, R. 1996. An Evaluation of Stream Restoration Structures in a Coastal Oregon Stream, 1981-1993. North American Journal of Fisheries Management 16:272-281
<input type="checkbox"/>	Evans, R.A., and R.M. Love. 1957. The step point method of sampling-a practical tool in range research. J. Range Manage. 10:208-212.
<input type="checkbox"/>	Fast, D.E et al. 1989. Yakima/Klickitat Natural Production and Enhancement Program. Prepared for Bonneville Power Administration. Project No. 88-120 Grant DE-A179-88BP93203.
<input type="checkbox"/>	Timber Fish Wildlife Ambient Monitoring Protocol. 1994. Northwest Indian Fisheries Commission. TFW-AM9-94-0011994.

PART II - NARRATIVE

Section 7. Abstract

Conduct Watershed Assessment to identify and prioritize habitat restoration opportunities in tributaries of the Lower Klickitat Basin. Continue ongoing restoration and monitoring activities with Swale and Little Klickitat subbasins. Through continuation of ongoing and initiation of new restoration efforts, it is expected that critical habitat for salmonid production will be increased and can be demonstrated. Through monitoring, the project can be assessed for its ability to meet target objectives for riparian conditions and in-channel habitat, as well as judge effects on production of salmonids. This knowledge can be applied to future projects for determining expected outcomes and benefits to habitat enhancement. The objective of the project is to improve spawning, rearing and holding habitat, stabilize stream banks and channels, revegetate

riparian corridors with beneficial deciduous and coniferous species, deter grazing impacts, and provide adequate summer flows for fish passage and rearing. The project work is also expected to improve water quality by reducing erosion, filtering and storing fine sediments, augmenting canopy cover for temperature moderation and reducing livestock waste from entering waters. Through restoration efforts on the channel, available habitat is anticipated to increase by at least two-three fold for spawning, juvenile rearing, velocity refugia, and adult holding. The Lower Klickitat River Riparian and In-Channel Habitat Enhancement Project (Project) ties specifically to 1994 Columbia Basin Fish & Wildlife Program (CBFWP) goals of an ecosystem approach to species recovery through protection and improvement to habitat conditions. This coordinated approach brings together land managers and landowners to develop a habitat plan to protect an important natural resource.

These improvements will benefit both anadromous (steelhead, chinook and coho salmon) and resident (rainbow trout) salmonid populations in the Klickitat River. Project duration is from present through September 2010. Timber Fish & Wildlife (TFW) Ambient Habitat Monitoring, photo documentation, step-point vegetation surveys, and fish populations surveys pre and post project work will quantify whether objectives were attained.

Section 8. Project description

a. Technical and/or scientific background

Tributaries within the lower reaches of the Klickitat watershed provide critical spawning habitat for winter and summer steelhead (steelhead) and coho, as well as, critical rearing habitat for all juvenile salmonids. The Klickitat steelhead population has suffered serious decline from historical levels along with all mid-Columbia ESU steelhead. This trend is unlikely to reverse itself soon without increasing smolt production. Through watershed assessment and subsequent habitat enhancement activities, it is expected that in-basin conditions, which currently limit production, can be ameliorated.

The project area lies directly south (downriver) of the “Closed Area” of the Yakama Nation. It is within this lower reach of the Klickitat subbasin that anthropomorphic influences are most evident. From the late 1800’s this portion of the basin has experienced extensive livestock grazing, agricultural impacts, timber harvest, channel constriction from railroad embankments, and moderate levels of human habitation.

This project will focus habitat enhancement activities in all lower basin tributaries described in Section 2. To date the project has focused activities within Swale Creek, and to a lesser degree the Little Klickitat River. These basins were selected as a starting point based on their obvious need for habitat enhancement, local landowner support, and a manageable sized drainage.

Project tributaries are all located in south-central Washington within Klickitat County. The tributary watersheds range in size from Wheeler Canyon Creek 9.8 square miles to the Little Klickitat River at 282 square miles (Table 1).

Table 1. Drainage Areas

Tributary	Drainage Area (sq.mi.)
Dillacort Creek	11.9

Wheeler Canyon Creek	9.8
Snyder Creek	24.0
Swale Creek	126.0
Little Klickitat River	282.0
Summit Creek	44.8
White Creek	130.0
Trout Creek	102.0

These tributaries are characterized primarily by agricultural and range land, ponderosa pine / white oak transitional forests, and remnant wetlands. All are accessible to anadromous stocks throughout their watersheds, but current habitat conditions limit spawning opportunities to the lower reaches in most cases.

Project Goal

The overall goal of the proposed project is elevated survival and production of salmonids in tributary streams of the lower Klickitat subbasin. The Project proposes to accomplish this goal through improvements to in-channel habitat and riparian conditions, and amelioration of water quality, and hydrology problems.

The objectives of the project include multi-agency watershed assessment of individual tributaries to guide project development. Techniques to be employed include: stabilization of stream banks and channels, introduction of large woody debris and structures to the channel, revegetation of riparian stands with deciduous and coniferous plant species, exclusion or management of livestock grazing in riparian areas, reduction of fine sediment transport, enhancement of summer flows for fish passage and rearing, and project monitoring. These objectives correspond with the habitat section of the Columbia River Basin Fish and Wildlife Program (NWPPC, 1994). Through these restoration efforts, available habitat is anticipated to increase measurably for spawning, juvenile rearing, velocity refugia, and adult holding. In addition, water quality impacts, such as fine sediment delivery, will be moderated, and overall hydrologic conditions are expected to improve. This work will benefit both anadromous and resident salmonid populations, including steelhead, coho, and rainbow trout. Two of these anadromous runs in the Klickitat River (coho and winter steelhead) are considered depressed stocks in the Washington State Salmon and Steelhead Stock Inventory (SASSI, 1992).

Project Elements

The enhancement activities will include design plans with a description of existing conditions; actions needed to restore the channel and riparian areas to target conditions; the logistics necessary to complete the work; and benefits expected from the work. The approach for this project entails use of existing information, coupled with additional monitoring, to further identify and evaluate stream conditions. Critical stream segments for fish production and/or water quality protection will be targeted for restoration work. The strategy developed by the resource agencies involve restoring riparian habitats to lower basin tributaries includes the following project elements:

- In-Channel Riparian Enhancement;
- Riparian and Wetland Revegetation;
- Grazing management;
- Retention pond construction; and,
- Monitoring.

In-Channel Riparian Enhancement

The basic premise of the restoration efforts is that there is a lack of natural sinuosity and instream diversity due to the historic confinement and modification of the tributaries. Where channels are deficient in rearing habitat, restoration efforts may include restoration of historical side channel habitat, placement of large woody debris, boulders, and/or bank deflectors in the channel. This work is also expected to help retain / store spawning gravels. In areas of active bank erosion, bioengineering techniques may be utilized. These techniques will include: establishment of dense woody vegetation for rooting strength and soil stabilization; placement of large rock at the base of eroding areas; and construction of rock bank deflectors to direct flows away from problem areas. In the lower reaches, side channels will be restored by removing rock material to reach subsurface flow. Upon review and acceptance of the plans a designated subcontractor, will complete the work. The work will be evaluated by Project personnel for its consistency in meeting the design plans and project objectives.

Riparian Revegetation

Establishment of native riparian vegetation will be completed to enhance the riparian restoration activities proposed as part of this project. Where riparian areas contain little or no vegetation, plantings of coniferous and/or deciduous species will be completed to provide future material for wood recruitment to the channel, shade for temperature moderation, allochthonous nutrient delivery, and bank stability. The NWSA Watershed Restoration Team will be utilized to complete the revegetation activities proposed for this project.

Grazing Management

The grazing management component will supplement on-going work consisting of cross-fencing and water development to restrict livestock access to lower basin tributaries and/or limit the time and intensity of grazing. Exclosure fences are to be installed where grazing activities would continue to thwart establishment of beneficial vegetation, cause ground disturbance and bank erosion. Fencing will consist of standard wood post and barbed wire design with controlled livestock access points to the creek for watering. Off-stream watering tanks will also be included as part of the project to provide livestock watering points away from the riparian corridor. The NWSA Watershed Restoration Team will be utilized to construct the fencing. Portions of the fenced areas of the creek will be revegetated with native plantings.

Retention Pond Construction

These ponds will be designed by Natural Resources Conservation Service (NRCS), and created with earth-fill embankments fitted with a commercially available spillway. Each pond site will be located on actively managed pastureland, within existing intermittent drainages to larger tributaries within the lower Klickitat subbasin. The ponds will retain sediment and store water for groundwater recharge. The ponds will also provide habitat for a variety of wildlife species; in particular the ponds will provide open water habitat for waterfowl. Livestock will be excluded from the pond area by fencing.

Heavy equipment was used to move earth for the embankments, and the NWSA Watershed Restoration Team provided manual labor. Native soils will be utilized for constructing the retention pond embankments. The NWSA will revegetated the ponds with native plantings.

Monitoring

All specific project sites will have a Monitoring Plan completed by project personnel with restoration experience. Monitoring will be conducted both before and after restoration work. The

monitoring (Timber Fish Wildlife Ambient Monitoring Protocol, Northwest Indian Fisheries Commission, 1992) will assess the habitat features (large woody debris, pool area and frequency, residual pool depth, spawning gravel quality and quantity), channel characteristics (wetted and bankfull width and depth), riparian condition (canopy cover, species composition), and fish population estimates (spawner surveys, electroshocking, snorkeling). Project monitoring and evaluation will include use of a photographic record coupled with on-site inspections and maintenance. The monitoring data will be analyzed to compare pre- and post-restoration habitat conditions, and provide a basis for additional action if necessary.

Monitoring will be conducted, at a minimum, for the duration of the twelve-year project period to assess changes to stream and riparian conditions, as well as fish populations. Follow-up surveys will be ongoing to determine the results of the project. Changes to habitat and riparian conditions, and water quality are anticipated to be measurable within the planned twelve-year time frame of this project. However, changes to the riparian vegetation conditions may be less evident within the project period, especially establishment and recruitment of woody vegetation, which may take ten or more years for substantial growth.

b. Rationale and significance to Regional Programs

The rationale behind this project is improvements to riparian and in-channel conditions, as well as water quality, will elevate survival and production rates for salmonids. The objectives of the project (monitoring, planning, riparian enhancement, in-channel habitat development and bank protection, livestock management, wetland and retention pond construction, and land acquisition for permanent protection) are designed to comprehensively enhance habitat conditions and water quality. This approach supports the habitat objectives of the Columbia River Basin Fish and Wildlife Program. Project efforts should reduce fine sediment impacts on redds, improve bank stability, decrease summer stream temperatures, provide large woody debris to the stream, produce additional pool frequency, and enhance riparian vegetation. Past investigations in British Columbia and the states of Washington and Oregon have clearly shown the critical importance of in-channel habitat and adjacent riparian stands for salmonid production (Binns 1994, House 1996, Beschta 1991). Habitat enhancement and riparian revegetation work by the Yakama Nation in recent years has created additional rearing area and demonstrated use by juvenile salmonids. Projects initiated by the USFS in the Wenatchee National Forest have also increased the area available for salmonid rearing and have been shown to have juvenile salmonid use. The USFS also found, in some cases, an increased retention of spawning gravels.

It is expected that the project will provide immediate and future benefits to fish production, but the exact gains will not be known until monitoring is completed. In addition the length of time for complete stream recovery, or period until desired conditions are achieved, is not completely known. For example, optimal benefits from the revegetation of channel margins and riparian areas will require several years of plant growth.

Landowner agreements are likely to ensure that restoration work planned and implemented on their lands will be properly protected in future years.

c. Relationships to other projects

This habitat enhancement project is directly related to the other YIN restoration projects highlighted in Section 3. Project personnel will routinely share and disseminate information. YIN watershed projects will develop a pool of qualified subcontractor to carry out on-the-ground projects. Monitoring techniques and equipment can be shared between projects.

This project relates directly to WDFW Regional Enhancement Group (EG) efforts to restore stream habitat conditions within the Klickitat Basin. The EG has been instrumental in project development and enlisting community involvement. Additionally, this project relates to the overall goal of the Klickitat portion of the Yakima Klickitat Fisheries Project (YKFP). The YKFP goal is to restore anadromous fish runs to increase natural production and to improve harvest opportunities, while maintaining the long-term genetic fitness of the wild and native salmonid populations.

Project staff will provide scientific support to the Klickitat Watershed Assessment Team (WIRA # 30) recently formed under Washington State Legislative bill HR 2514, and HR 2496. Providing state approval of the Watershed Team, project staff will become active members in guiding basinwide habitat enhancement activities. This platform may provide additional cost-sharing opportunities in the near future.

Collaboration between Natural Resources Conservation Service (NRCS) and YIN continues by incorporating project goals and activities within the NRCS's Conservation Reserve Plan (CRP). Sediment retention pond construction is being located adjacent to lands incorporated into the CRP program to provide greater watershed protection.

d. Project history (for ongoing projects)

Since Project inception, public meetings have been held to describe the Project and to enlist landowner support. Increased public awareness has benefited this project tremendously, and will make Project expansion into adjacent tributaries more effective.

Early in 1997, an intensive one-month baseline stream survey (TFW 1994) of Swale Creek was completed by the NWSA. Results from this survey identified areas to direct restoration efforts along Swale Creek.

In 1997, first priority was given to construction of two miles of livestock enclosure fencing on the Max Fernandez sheep ranch. Construction of two sediment retention ponds to trap sediment-laden run-off before entering Swale Creek, were constructed on the Fernandez Ranch. Completion of final design drawings for the off-channel water system designed to disperse livestock grazing impacts to the riparian zone. Subcontract development with well drilling company for livestock watering system was completed. Developed agreement with Fernandez to move entire sheep wintering operation to new location, away from free-flowing water.

In 1998, one-half mile of cattle enclosure fencing on Patricia Martin property was installed. Completed design of a sediment retention/livestock-watering pond to permanently exclude cattle from this stretch of stream. Completed design of an additional sediment retention pond on the Martin property to restore wet meadow function and attenuate the Swale Creek hydrograph. Development of habitat improvement option with Stan Crocker, the largest single landowner on Swale Creek. Constructed 5 miles riparian exclosures on the Crocker Ranch. Developed strategies with Stan Crocker for additional fencing, riparian revegetation, and placement of instream structures within in his four plus miles of stream ownership.

Between 1997 and 1998 seven retention ponds have been constructed in upland areas of three different private lands adjacent to Swale Creek. The ponds, were designed by Natural Resources Conservation Service (NRCS), and created with earth-fill embankments fitted with a commercially available spillway. Each of the pond sites is located on actively managed pastureland, within existing intermittent drainages to larger Swale Creek. Each site has a small seasonal drainage channel with varying degrees of channel erosion taking place. The seven retention ponds inundate an average of 0.47 acres of land (Table 2). The ponds retain sediment and store water for groundwater recharge.

Table 2: Retention Pond Parameters

Property Owner	Legal Description	Watershed Area (Acre)	Pond Surface Area (Acre)	Pond Capacity (Acre-Feet)
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