



# *Protect and Restore Habitat; Tucannon Watershed*

Annual Progress Report  
(2009-2012)

Northwest Power Planning Council Project #2008-202-00

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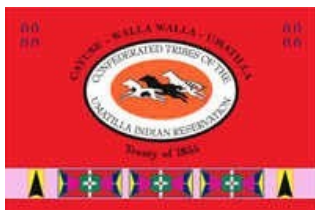
**Prepared By:**

Eric D. Hoverson

Project Leader – Tucannon Fisheries Habitat Project

Confederated Tribes Umatilla Indian Reservation  
Department Natural Resources Fish and Wildlife Program

**CONFEDERATED TRIBES  
UMATILLA INDIAN RESERVATION**



**BONNEVILLE POWER  
ADMINISTRATION**



# Confederated Tribes of the Umatilla Indian Reservation

## Administrative Summary

### Project Headquarters:

Department of Natural Resources  
Fish and Wildlife Program  
Confederated Tribes of the Umatilla Indian Reservation  
46411 Ti'Mine Way  
Pendleton, OR 97801

### Administrative Contact:

Julie Burke  
Confederated Tribes of the Umatilla Indian Reservation Department of Natural Resources  
Fish and Wildlife Program Administrative Manager  
Phone: 541-429-7242  
E-mail: [julieburke@ctuir.org](mailto:julieburke@ctuir.org)

### Technical Contacts:

Eric D. Hoverson  
Confederated Tribes of the Umatilla Indian Reservation Department of Natural Resources  
Project Leader – Tucannon Anadromous Fisheries Habitat Project  
Walla Walla Community College Environmental Center, Building R, Office 2095  
500 Tausick Way, Walla Walla, WA 99362  
Phone: 541-429-7555  
E-mail: [erichoverson@ctuir.org](mailto:erichoverson@ctuir.org)

### BPA CONTRACTING OFFICER TECHNICAL REPRESENTATIVE:

Andre L'Heureux  
503-230-4482  
Email: [alheureux@bpa.gov](mailto:alheureux@bpa.gov)

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## ABSTRACT

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Tucannon Fisheries Habitat Project (TFHP) is an ongoing effort to protect, enhance, and restore riparian and in stream habitat for the natural production of anadromous salmonids in the Tucannon River Basin, Southeast Washington. Fish passage, channel characteristics, habitat diversity, floodplain confinement, temperature, turbidity, flow quantity, and lack riparian vegetation have been identified as the key limiting factors to Endangered Species Act (ESA) Listed salmonids as described in the CTUIR River Vision (RV) document (Jones, 2007). During the reporting period from Projects inception (August 4, 2009) to the conclusion of the 2012 reporting period (December 31), general project activities focused on improving in stream and riparian habitat complexity, fish passage conditions, and restoring natural channel morphology and floodplain function. Fisheries habitat enhancement projects were implemented on Cummings Creek, Russell Springs Creek, Hartsock Springs Creek, Pataha Creek, and the Tucannon River by CTUIR. Specific restoration strategies included: (1) rectifying fish passage at four locations; (2) adding 250 pieces of woody debris and 750 boulders to the channel to improve habitat complexity; (3) planting 10,000 trees and seeding 2,500 pounds of native grasses; (4) planning activities for a large woody debris project scheduled for implementation planned for the upper Tucannon River in 2014; (5) and establishment of baseline and ongoing monitoring and maintenance activities to retain and improve function and appearance of project sites. Project activities and objectives were based on a variety of fisheries monitoring techniques and habitat assessments used to determine existing conditions and identify factors limiting anadromous salmonid abundance in accordance with common language shared between regional Subbasin Plans and CTUIR's RV document and First Foods (FF) policy to adhere to mission statement guidance. Project evaluation strategies included aquatic habitat and fish inventories, in addition to establishment of photo points to gauge effectiveness and inspire timely adaptive management actions toward increasing probability of project success over time. Proper selection of the most effective site-specific habitat restoration plan, taking into consideration the unique characteristics of each project site, including the consideration of restrictive parameters was of paramount importance. CTUIR also participated in the planning and implementation process of several additional project opportunities with cooperating resource management entities. Much emphasis was dedicated to public relations and reporting obligations accomplished through oral presentations in a variety of professional forums across several states. Content was focused on highlighting project success.

## **ACKNOWLEDGEMENTS**

The author would like to sincerely thank the following dedicated employees of CTUIR: Julie Burke, Catherine Dickson, Teara Farrow-Ferman, Mike Lambert, Eric Quaempts, Paul Raab, Alexa Maine, Gary James, Gerald Middel, Celeste Reeves, Collette Coiner, Theresa Ulrich, for

their support, professionalism and team atmosphere. Additional thanks to all good stewards of the land who treat all aspects with respect, particularly Dave & DJ Frame.

"From time immemorial, water has been the giver of all life. We must honor and protect it from the tributaries to the ocean". Enrolled CTUIR member Emma Farrow, words of wisdom.

CTUIR's fisheries habitat restoration work is dependent on the contributions and cooperation of many government and tribal organizations and individuals, private landowners, and small businesses without whom we would be unable to achieve a desired level of success. We are grateful to the following cooperating partners: Lindley Construction, Bonneville Power Administration, Columbia Helicopters, National Marine Fisheries Service, Oregon State Parks and Historical Society, Department of Environmental, Quality, United States Forest Service, United States Army Corps of Engineers, Salmon Recovery Board, and Tetra Tech.

## **ACRONYMS**

BPA	Bonneville Power Administration
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CFS	Cubic Feet per Second
DNR	Department of Natural Resources
ESA	Endangered Species Act
FF	First Foods
LWD	Large Woody Debris
M	Meters
RM	River Mile
RV	River Vision
TCC	Tucannon Coordination Committee
TFHP	Tucannon Fisheries Habitat Project
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department Fish & Wildlife
WWCC	Walla Walla Community College

## **INTRODUCTION**

The Bonneville Power Administration (BPA) funds the CTUIR and other Pacific Northwest Tribes to restore salmonid habitat as part of its mitigation activities due to the harmful effects and loss of habitat caused by the massive Columbia River hydroelectric dams. The CTUIR TFHP, #2008-202-00, funded by BPA through the Northwest Power and Conservation Council in 2003 Fish and Wildlife Program. The TFHP is part of the broader effort by Columbia River

Tribes to protect and restore salmonid populations and to preserve community traditions that honor and celebrate the CTUIR's ties to this vital food source. The CTUIR is guided in its habitat restoration activities by objectives based on a variety of fisheries monitoring techniques and habitat assessments used to determine existing conditions and identify factors limiting anadromous salmonid abundance.

1805 Lewis and Clark journals noted the mouth of the Tucannon River entering the Snake River between a series of tumultuous rapids. Currently the confluence is highly inundated and undefined due to being located between and in close proximity to Little Goose and Lower Monumental Dam. Having the confluence inundated by slack water between two major dams is theorized to cause migrational homing issues for fishes returning from the Pacific Ocean seeking suitable spawning grounds in their natal Tucannon River. Various research studies have indicated extremely high straying rates of adult salmonids (up to 55%) bypass the mouth and are detected at Little Goose Dam or further upstream. This detrimental phenomenon definitively affects potential success of habitat restoration projects and subsequent biological response of salmonid populations.

Historical accounts documented 1860 as the era in which livestock grazing was brought to the Tucannon region, targetting the once bountiful native bunchgrasses. A grist mill was located at the town of Marengo (RM 25) and diverted substantial quantities of water from the Tucannon River to power the mill. Dry land farming atop the adjacent hilltops was discovered to be highly productive as development activity increased accordingly. 1880 brought railroad construction actions to the lowlands of the Tucannon and in close proximity to the river. In 1915, survey crews noted gold and silver mineral mining in the headwaters. The Tucannon River was noted as averaging 11 yards wide by 3.5 feet deep, running along adjacent steep bluffs and having galleries of trees along the river (Beckham 1995, Figure 1).

**Figure 1. Historical account of Tucannon River Conditions, healthy riparian, early 1900's**



Scene on the Tucannon, near Pomeroy, Wash.

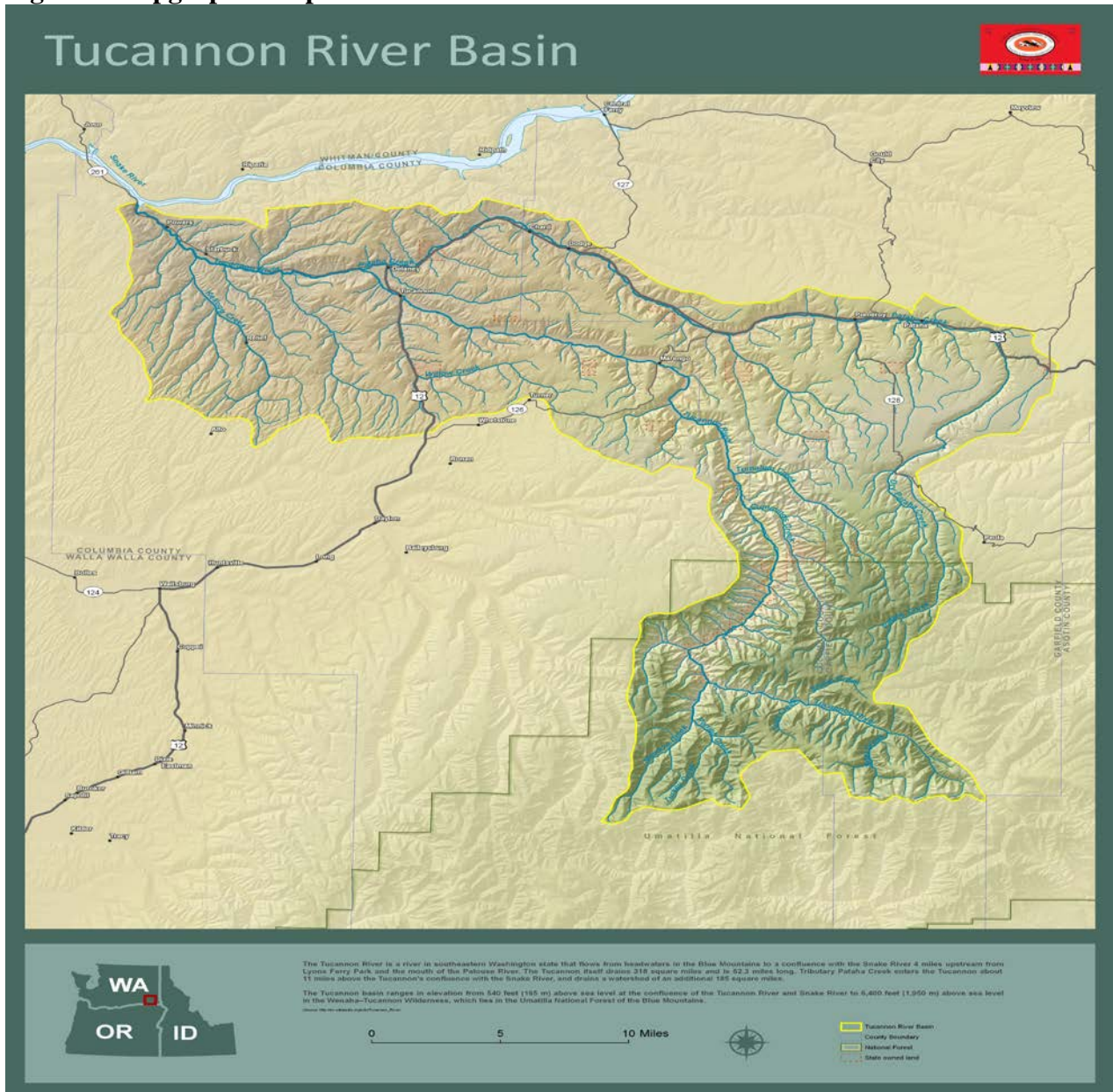
Native Americans have hunted and gathered food and fished numerous rivers and streams of the Pacific Northwest for thousands of years and depended upon anadromous fish for subsistence and trade. The indigenous people of the CTUIR still rely on natural resources from several watersheds located within areas of traditional use to provide them with a multitude of life essentials. CTUIR's right to fish in its historical fishing places was acknowledged in the Treaty of 1855 that stated: "the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations..." (Treaty of 1855, Articles 1, p.3).

Decreased salmonid abundance has significantly impacted the livelihood of the tribal community and altered their way of life. It is the challenging duty of the TFHP to restore and sustain healthy conditions of local watersheds to both assist in salmon recovery and ensure they provide adequate quantities of sustainable natural resources to satisfy the CTUIR's needs and preserve opportunities for traditional ways of life. The CTUIR TFHP was initiated in August of 2009 with the hiring of one staff member.

Since the inception of the TFHP, CTUIR has developed effective interagency partnerships and is effectively working at the policy and project levels with various federal, state, and county agencies and private landowners to improve physical habitat and population status for salmonids.

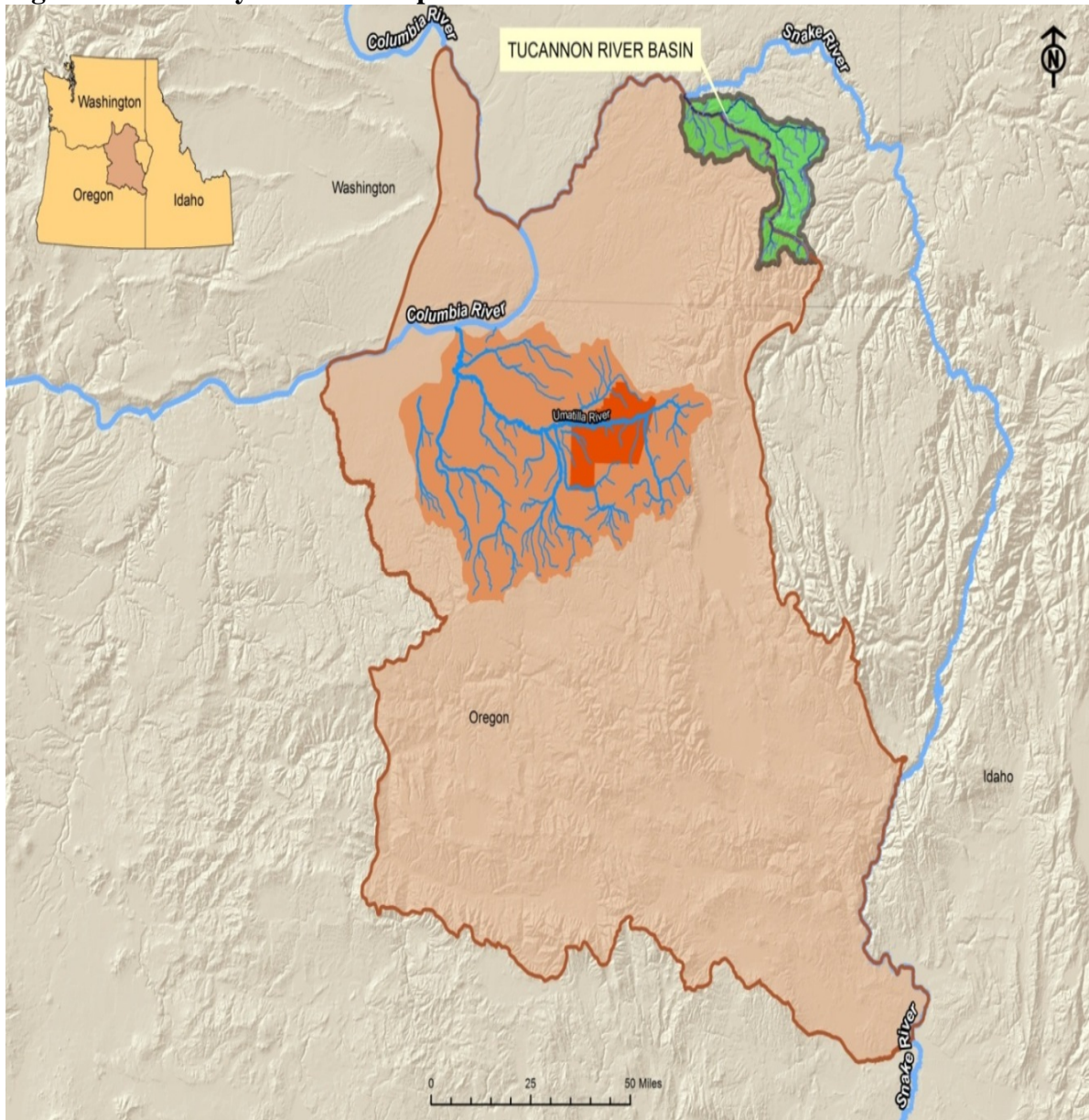
The Tucannon River originates in the Blue Mountains, located in the Umatilla National Forest, and flows generally northwest to its confluence with the Snake River near Starbuck, Washington (Figure 2).

Figure 2. Topographic map of the Tucannon Basin



The Tucannon River is approximately 62.3 miles long and drains watershed area that encompasses 502 square miles in Columbia and Garfield Counties. Elevation varies from 6,400 feet above sea level in the headwaters near the town of Pomeroy, to 540 feet at the confluence with the Snake River near Starbuck, Washington. The Tucannon Watershed is considerably smaller than the neighboring Umatilla Basin (Figure 3).

**Figure 3. Proximity and size comparison of Tucannon Basin in relation to the Umatilla**



Despite its relatively small size, the Tucannon Basin is a superior system with highly productive potential in regard to salmonids. High elevation headwaters and spring water provide consistent cold water flows and very good potential suitability for chinook salmon the mainstem Tucannon River (Figure 4).

**Figure 4. View of Tucannon Watershed headwaters, 2013**



Snake River Spring & Fall Chinook Salmon, Columbia River Bull Trout, Snake River Steelhead Trout are listed as Threatened in the Tucannon Watershed. Restoration funding is aimed at protecting and/or improving the status of ESA-Listed fishes by way of habitat restoration under Accord and Programmatic agreements between BPA and CTUIR as mitigation for detrimental effects from Snake and Columbia River hydropower dams on protected fisheries resources. The Tucannon Watershed is unique in that there are no tributaries suited for holding adult chinook salmon. All chinook production and potential is in the main stem, of which has an extended range of suitability when compared to more restrictive distribution observed in neighboring basins such as the Walla Walla and Umatilla. Roughly half of the mainstem Tucannon's 60 miles harbors adult chinook salmon, while 45 miles is classified as suitable juvenile habitat. Geographically, the Tucannon Basin rates favorably in relation to other neighboring basins in regard to bull trout habitat and population status. Despite unfavorable trends in global warming, restoration activities in the Tucannon Basin are expected to yield notable improvements of bull trout populations as an indirect beneficiary of enhancement activities targeted primarily for chinook salmon and steelhead trout.

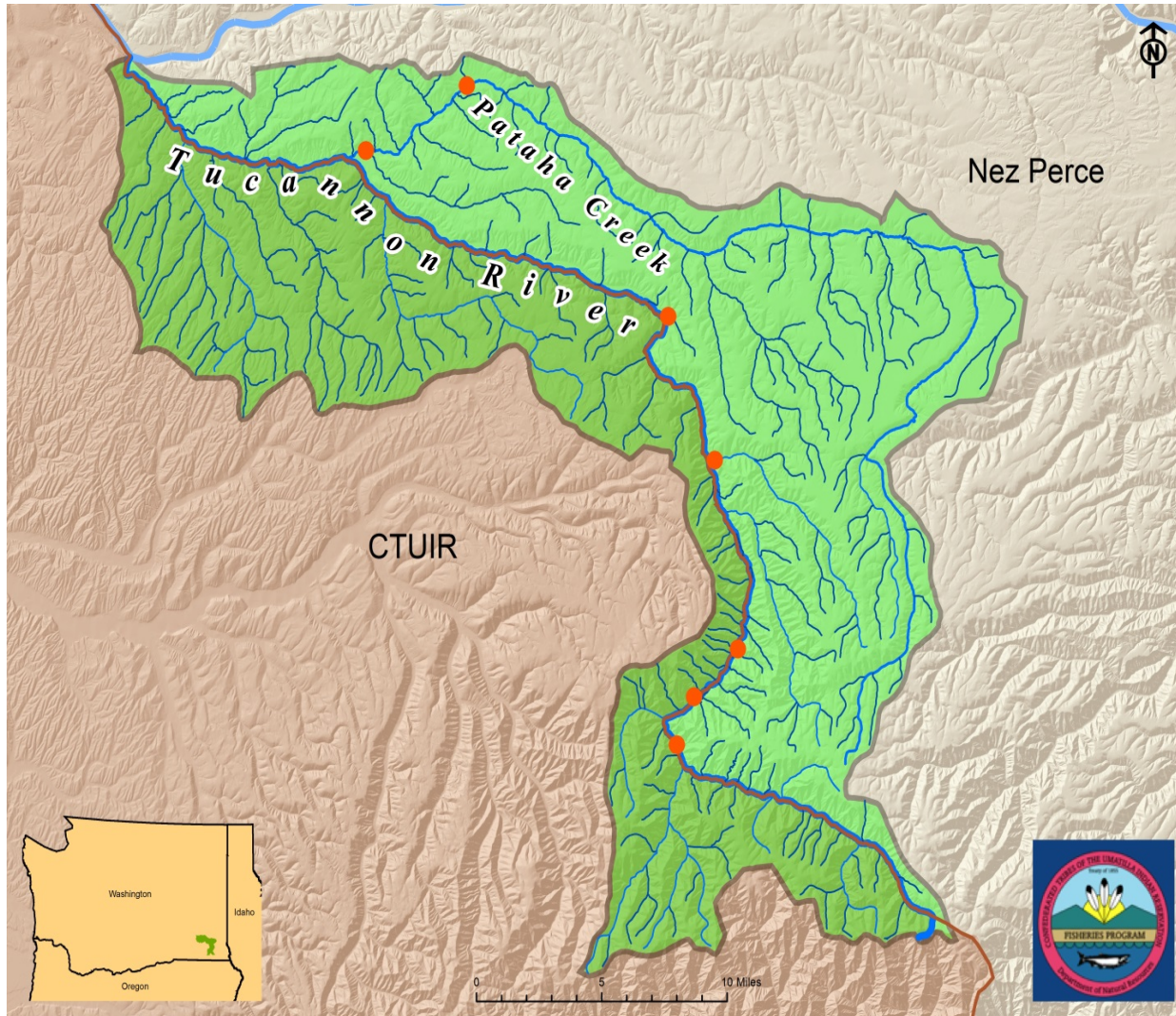
Peak flow rates estimated for the 2-, 10-, 25-, and 100-year flood frequency for the upper Tucannon River near river mile (RM 47) using a unit-discharge gage-transfer method were; 950 CFS, 2,200 CFS, 3,200 CFS, and 5,800 CFS respectively. Flows recorded at RM 8 show a minimum of 15 CFS, a mean of 170 CFS, and maximum of 7,980 CFS.

Riparian vegetation is highly intact, albeit as a reduced ribbon of growth adjacent to the river when compared to historical belt width. There are very few irrigation withdrawals directly from the river. This combined with the stable nature of the hydrograph provide suitable conditions as salmonids are found from mouth to headwaters. This salmonid distribution pattern is somewhat rare in semi-arid climates of the inland Pacific Northwest.

Since 2009, CTUIR has conducted salmonid habitat restoration projects at six sites, stratified throughout the Tucannon Basin. A seventh location is planned for implementation in 2014 and is depicted by the most southerly point shown on the map in figure 5. Project sites are stratified

throughout the basin with recent emphasis on upper reaches of the mainstem Tucannon River, in spring chinook salmon habitat. Suitable salmonid habitat will be increasing significantly over the next several years as a result of several large habitat restoration projects set for implementation.

**Figure 5. Map of CTUIR salmonid habitat restoration projects, Tucannon River Watershed**



- |  |   |   |
|--|---|---|
| 1. <b>Cummings Creek:</b><br><i>Habitat Complexity.</i>            | 2. <b>(Russel) Spring Creek:</b><br><i>Habitat Complexity.</i>      | 3. <b>Hartsock Springs Creek:</b><br><i>Habitat Complexity.</i> |
| 4. <b>Pataha Creek RM 1:</b><br><i>Fish passage rectification.</i> | 5. <b>Pataha Creek RM 10:</b><br><i>Fish passage Rectification.</i> | 6 & 7. <b>Tucannon River:</b><br><i>Habitat Complexity.</i>     |

**Noteworthy habitat restoration accomplishments for the CTUIR TFHP include:**

- Improved fish passage at four sites

- Improved habitat complexity with 500 pieces of woody debris and 500 boulder additions
- Planted 10,000 saplings/cuttings
- Seeded 1000 pounds of native grass seed
- Conducted project monitoring, maintenance and improvement actions at restoration sites
- Conducted pre and post project aquatic habitat inventory and biological inventories

Although many project areas are in an early stage of recovery restoration activities have resulted in improving trends including:

- Improved stream channel stability with early succession dimension, pattern and profile
- Increased accessibility to suitable habitat in headwater streams via passage rectification
- Decreased channel width:depth ratios, gradient, and entrenchment. Increased sinuosity, length, floodplain connection, enhanced pool habitat, increased shade and undercut banks
- Increased availability of instream habitat, including off-channel rearing areas
- Improved watershed condition and function of riparian and wetland plant communities for fisheries benefit and wildlife species
- Increased instream habitat complexity and diversity resulting in improved pool-riffle sequences associated with dynamically stable channel morphology

The primary goal of the TFHP is to protect, enhance, and restore functional floodplain, channel and watershed processes to provide sustainable and healthy habitat and water quality for aquatic species in the Tucannon River Subbasin. This project will achieve shared biological objectives and strategies established in the Tucannon Subbasin Plan and address limiting factors while supporting physical and ecological conditions for the CTUIR FF framework and the RV guidance document. Habitat enhancement activities are designed to improve aquatic and riparian habitat resulting in an increase in viable populations of focal species and secondary species of fish and wildlife in the Tucannon River watershed.

Based on a series of habitat assessments, the TFHP project has six objectives, to: 1) improve fish passage and migration conditions for salmonids, 2) restore river channel functions, 3) increase instream habitat complexity, 4) reconnect floodplains to the main river channel, 5) improve water quality, and 6) establish multi-tiered levels of vegetation in riparian areas.

The mainstem Tucannon River and tributaries provide spawning, rearing, and migrational habitat for four Endangered Species Act- (ESA) listed (Threatened) salmonids: Snake River summer steelhead- (*Oncorhynchus mykiss*), spring and fall chinook salmon (*O. tshawytscha*), and Columbia River bull trout (*Salvelinus confluentus*). The Tucannon River represents the most downstream, tributary-population in the Snake River watershed and is also the lowest elevation drainage where Snake River spring chinook salmon reside. The population was in decline throughout the 1980's, and reached a critical low in the mid 90's, when the number of wild adults plummeted to three naturally-produced individuals. Secondary objectives address other preferred species of traditional importance to CTUIR such as; resident redband rainbow trout, pacific lamprey, mountain whitefish, fall chinook, coho salmon, and freshwater mussels.

In 2007, the CTUIR Department of Natural Resources (DNR) adopted the following mission: *To protect, restore, and enhance the First Foods - water, salmon, deer, cous, and huckleberry - for the perpetual cultural, economic, and sovereign benefit of the CTUIR. We will accomplish this utilizing traditional ecological and cultural knowledge and science to inform: 1) population and habitat management goals and actions; and 2) natural resource policies and regulatory mechanisms* (Figure 6).

The mission was developed in response to long-standing and continuing community expressions of FF traditions, and community member requests that all FF be protected and restored for their respectful use now and in the future. The FF are considered by the CTUIR DNR to constitute the minimum ecological products necessary to sustain CTUIR culture.

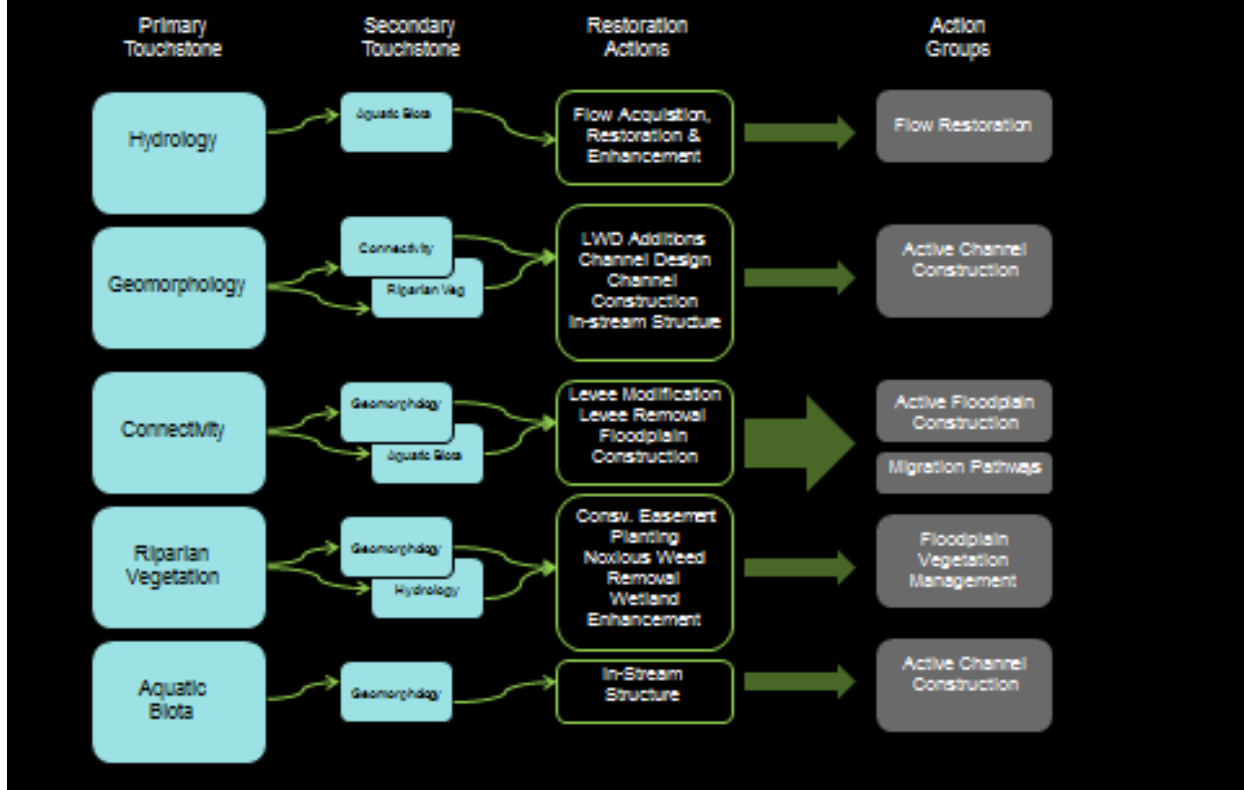
**Figure 6. First Foods Framework principals guiding CTUIR TFHP restoration actions**



In addition to FF principals, CTUIR adheres to RV guidance. Utilization of this document in conjunction with FF, steers managerial decisions and means of conduct in regard to managing natural resources. The RV document identifies processes and conditions needed to sustain aquatic FF, information needed to inform their management, and potential management implications. Applying the FF approach and the RV, managers can focus on appropriate ecological processes that provide and sustain FF, and plan management actions accordingly. The RV seeks to promote a dynamic river and floodplain system with natural variability, address ecological processes rather than localized manipulations that may not take into account the causes of the degradation, and plan projects in relation to larger-scale watershed impacts. The “touchstones” (connectivity, riparian vegetation, aquatic biota, geomorphology, hydrology) described in the RV have applications for managers to help ensure that planned management activities account for an appropriate breadth of ecological considerations and are aligned with one another in pursuit of the goals and needs of the Tribal community that depend upon rivers (Figure 7).

**Figure 7. Utilization of River Vision Touchstone sequencing to guide restoration actions**

## Vision Application: Fisheries Habitat



Sound river management and restoration are predicated upon the need to develop a systemic and holistic vision of a functional river (Stanford et al. 1996; Ward et al. 2001; Jungwirth et al. 2002; Nilsson et al. 2007). Such a vision provides a framework for planning management or restoration efforts and an initial benchmark for assessing management success or failure. Similarly, a RV provides the context necessary for understanding the role of any specific management decision or action in the context of other decisions or actions. The RV philosophy outlines a means for achieving desired ecological characteristics of water quality and water resource management, and facilitates the sustained production of FF. The FF management framework adopts a broad definition of “water quality,” incorporating the physical, chemical, biological, and ecological targets to assess the quality of water. Essentially, according to this framework, the ecological function and health of a watershed becomes a holistic measure of water quality, and provides a pathway toward the restoration and maintenance of FF production.

The CTUIR TFHP aims to effectively re-establish tribal presence into territories of traditional use to uphold cultural FF values, while preserving traditional tribal values in regard to natural resources management. The TFHP operates in a manner with conviction and guidance towards the internal RV document, while embracing common language within external salmon recovery plans and utilizing various data sets from a multitude of natural resource disciplines and sources. The TFHP utilizes a strategy that combines modern science with traditional, cultural procedures to uphold the responsibility of managing natural resources while upholding values. An important

aspect of the process is the identification of limiting actors and devising objectives to guide project actions. Strategic restoration actions improve watershed function and cause changes in physical habitat, which trigger biological response with the intent to improve population status of ESA-Listed salmonids. Monitoring and maintenance of project sites improves overall appearance and efficiency of restoration actions and formulates effective adaptive management strategies to further enhance project success. Table 1 provides linkage from limiting factors to restoration objectives and RV Touchstones, and the associated metrics that can be evaluated for project designs and post-implementation effectiveness monitoring.

**Table 1. Limiting Factors, Objectives, Touchstones, Evaluation and Monitoring Metrics**

Limiting Factors (NOAA equivalent)	Restoration Objective	River Vision Touchstone	Metrics
<p><b>In-Channel Characteristics</b> (6.2: Channel Structure and Form: Instream Structural Complexity)</p>	<ul style="list-style-type: none"> <li>Restore geomorphic processes</li> <li>Increase habitat diversity in the channel</li> <li>Improve habitat quantity and quality</li> <li>Increase instream habitat structures</li> <li>Arrest channel downcutting through structure installation</li> </ul>	<p>Primary: Aquatic Biota Secondary: Geomorphology</p>	Channel geometry (bankfull width, bankfull depth, width/depth ratio), longitudinal profile
			Sinuosity (Lc/Lv)
			LWD Counts
			Pool frequency or spacing
			Percent pools
			Residual pool depth (dmax/dtail)
<p><b>Floodplain Connectivity</b> (5.2: Peripheral and Transitional Habitats: Floodplain Condition)  <b>Riparian</b> (4.1: Riparian condition: Riparian Vegetation)</p>	<ul style="list-style-type: none"> <li>Increase floodplain and secondary channels</li> <li>Increase channel sinuosity</li> <li>Add large wood to channels and floodplains to promote roughness, deposition, and vegetation establishment</li> <li>Increase floodplain cross-sectional area</li> <li>Restore riparian vegetation</li> </ul>	<p>Primary: Connectivity, Geomorphology Secondary: Riparian Vegetation</p>	Percent of floodplain disconnected
			Entrenchment ratio or confinement ratio (Wfp/Wbf)
			Floodplain relative elevation
			Channel Complexity Index

**Table 1. Limiting Factors, Objectives, Touchstones, Evaluation and Monitoring Metrics**

Limiting Factors (NOAA equivalent)	Restoration Objective	River Vision Touchstone	Metrics
			Size, density, and cover of native or site appropriate species
<p><b>Sediment</b></p> <p>(7.2: Sediment Conditions: Increased Sediment Quantity)</p>	<ul style="list-style-type: none"> <li>• Restore geomorphic processes</li> <li>• Establish equilibrium conditions</li> <li>• Reduce fine sediment supply</li> <li>• Increase substrate quality</li> </ul>	<p>Primary: Geomorphology</p> <p>Secondary: Aquatic Biota</p>	Threshold grain size and transport rate
			Meander belt width
			Aggradation rate

In order to meet the Project goal and objectives, restoration designs are developed that address limiting factors while improving riverine habitat for ESA-listed salmonids. Several previous studies have identified the preferred types of restoration activities for addressing the limiting factors in project areas. Table 2 illustrates recent status and projection of restoration potential of limiting factors in the Tucannon Basin.

**Table 2. Recent status and restoration potential projections of limiting factors**

<b>Lower Snake River Steelhead Trout Status, 2009</b>						
Population	2009 Expert Panel Limiting Factors	Ecological Conser - Sub Category	Starting Low Booken	High Bookends		LF Weight
				2018	2033	
Tucannon River	Habitat diversity (LWD)	Instream Complexity	41	55	70	12.50
Tucannon River	High water temperature	Temperature	65	79	93	12.50
Tucannon River	High water turbidity	Turbidity	60	75	90	12.50
Tucannon River	Low stream flow	Decreased Water Quantity	95	97	99	12.50
Tucannon River	Riparian degradation	Riparian Condition	46	68	92	12.50
Tucannon River	Screens	Mechanical Injury	96	97	100	12.50
Tucannon River	Barriers	Anthropogenic Barriers	65	80	80	12.50

<b>Lower Snake River Spring Chinook Salmon, 2009</b>						
Population	2009 Expert Panel Limiting Factors	Ecological Conser - Sub Category	Starting Low Booken	High Bookends		LF Weight
				2018	2033	
Tucannon River	Floodplain confinement	Floodplain Condition	68	75	83	12.50
Tucannon River	Habitat diversity (LWD)	Instream Complexity	51	62	75	12.50
Tucannon River	High water temperature	Temperature	34	60	87	12.50
Tucannon River	High water turbidity	Turbidity	50	62	75	12.50
Tucannon River	Low stream flow	Decreased Water Quantity	85	90	96	12.50
Tucannon River	Riparian degradation	Riparian Condition	46	68	92	12.50
Tucannon River	Screens	Mechanical Injury	96	97	100	12.50
Tucannon River	Barriers	Anthropogenic Barriers	65	80	80	12.50

Several studies have concluded that increased pools and LWD were needed to address the primary limiting factor of habitat quantity in the Tucannon Basin. Recommendations for restoration activities are based on the following framework;

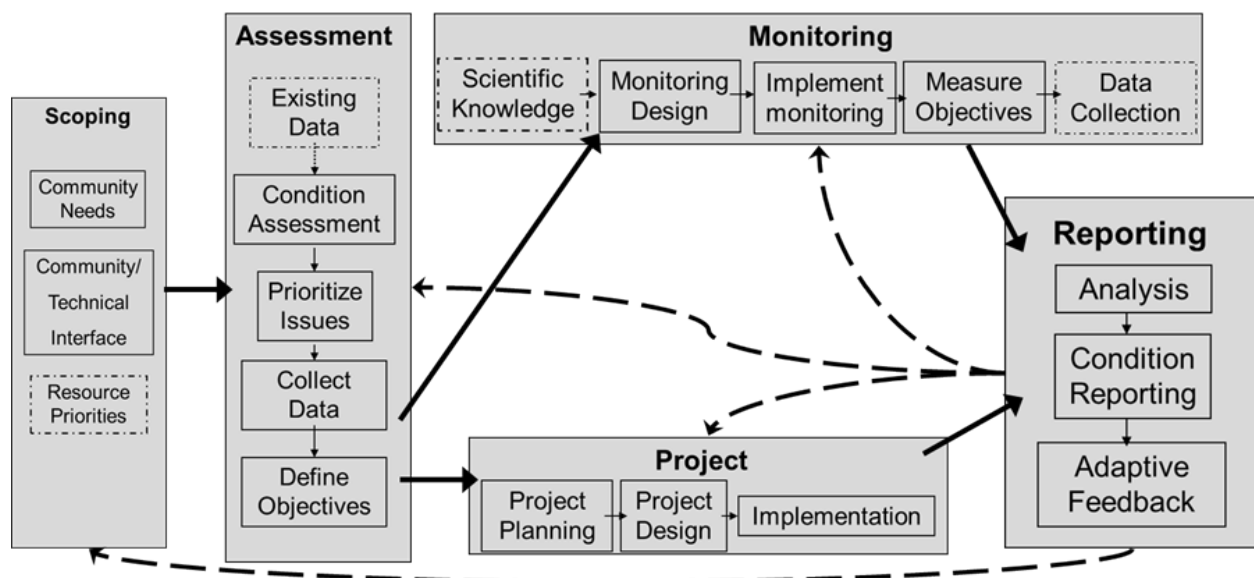
- Protect and maintain natural processes.
- Connect disconnected habitat.
- Address anthropogenic, confining infrastructure impairing natural processes/connectivity.
- Restore riparian processes and canopy. Utilize best forest management practices.
- Improve in-stream habitat. Add LWD to force pools and maintain channel complexity.

The CTUIR TFHP continues to gain and improve knowledge in floodplain and riverine processes and has applied that knowledge to this project resulting in improved administration, planning, design, implementation, and monitoring. Restoration actions implemented by CTUIR and supported by the RV promote a dynamic river and floodplain with natural variability to address ecological processes and approach project planning at a watershed scale. We recognize

that stability in a riverine floodplain must be considered at geomorphic temporal and spatial scales in order for natural ecological processes to occur and restoration actions to be considered successful. Actions that only address symptoms of non-functioning systems have results that are ineffective at meeting restoration goals (Kondolf et.al. 2003). And, the interconnection between physical, chemical and biological processes within a watershed must be considered at multiple scales of time and space.

The CTUIR TFHP develops restoration projects through what we define as the Riverine Planning Approach that includes an adaptive management mechanism at several stages. The approach includes the 5 basic stages of scoping, assessment, monitoring, implementation, and reporting (Figure 8).

**Figure 8. Riverine Planning Approach sequence**



The results of reporting are then available to provide input to additional assessment, evaluation of project objectives, input to monitoring plans, and input to project development and adaptive management. Results from one project also provide information to the planning process of future projects and project in other subbasins. To improve future project development the following solutions have been applied:

1. Develop clear project goals and measurable objectives that address Primary Limiting Factors (Ecological Concerns) and drive the development of project actions and effectiveness monitoring plans through the Riverine Planning Process.
2. Develop integrated and organized planning teams to utilize the Riverine Planning Process. The basic team would be led by a CTUIR project leader with a formation of interdisciplinary members. Disciplines not represented by CTUIR staff or partners would be made available as necessary to the team through subcontract. Roles and responsibilities would be outlined and clearly understood. Develop a timeline and schedule for the planning process up front so that contract amendments and changes are minimized.

3. Adequate data and final design information is collected and provided. The level and detail of site data and information collected needs to meet or exceed the intended use.
4. Detail final plans to an accurate level based on updated site information. A final design plan should be agreed upon and understood by all team members before moving into the implementation phase.
5. Coordinate and communicate early and often with regulatory agencies. Make sure permitting agencies are aware of decision changes in a timely, official, and detailed manner.

Utilization of the RV application procedure to address limiting factors has been partaken by CTUIR with promising results. Examples of related conduct and project results are shown in Figure 9.

**Figure 9. Project actions and results by time period since inception in 2009, through 2012**



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: January - June 2009



**Project Statement/Goal:** To protect, enhance and restore functional, healthy and sustainable floodplain, channel and watershed process for the purpose of protecting and restoring fisheries and aquatic species in the Tucannon Basin.

**Project Objectives:** Design, implement, and maintain fish habitat restoration and watershed projects: 1) Develop 2009 Project SOW and budget, 2) develop project partnerships, 3) Plan, design and prepare projects for 2009 implementation.

**Outputs:**

- Statement of work and budget for a new CTUIR contract to improve habitat conditions for aquatic species in the Tucannon Subbasin.
- Planning/design barrier removal and wetland enhancement on Spring Creek.
- Planning/design riparian function improvement for Tucannon River in partnership with WDFW.

**Outcomes:**

- Design for improved access for spring chinook and steelhead to Spring Creek.
- Coordinated/planning to improve riparian and habitat conditions in Tucannon River.
- Developed agreements and contracts for completion of culvert replacements.
- Filled Project leader position resulting in improved project administration.

**Impacts:**

- Contribute to achievement of healthy watersheds (DNR River Vision) and increase traditional first food abundance and use opportunities.
- Contribute to achievement of Subbasin Plan and ESA Recovery Plan goals.
- Assist in recovery of Endangered Species Act subject species (spring/summer)

Prj	Inputs	09 Budget	Total Staff	Notes



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: July - December 2009



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.

**Objectives:** 1) Identify, design, implement, maintain fish habitat projects, FY09. 2) Develop partnerships, statement of work & budget for 2010.

**Outputs:**

- Produce work plan & budget, improve fisheries habitat, Tucannon Basin.
- Fish passage barrier removal and habitat enhancement of Spring Creek.
- Large woody debris (LWD) incorporation into Cummings Creek.
- Riparian enhancement, Tucannon River, RM 37.

**Outcomes:**

- Improved access and fish and mussel use of quality habitat in Spring Creek.
- Increased aquatic habitat complexity and fish potential in Cummings Creek.
- Enhanced riparian condition, Tucannon River, vegetative supplementation.

**Impacts:**

- Contributed to achievement of healthy watersheds via DNR River Vision.
- Improved traditional first food abundance and use opportunities.
- Achievement toward ESA Recovery & Subbasin Plan goals.
- Facilitation of recovery of Endangered Species Act fish species.
- Addressed limiting factors to water quality, Clean Water Act & 303d list.

Project Inputs:	Funding	09 Budget	Total Staff	Notes
	BPA	\$200,000	1 bio	



Spring Cr. restored, RM 0-0.3

Spring Cr /Tucannon R confluence



Cummings Cr., 20 LWD additions

Tucannon R. RM 37 rip



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: January–June, 2010



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.

**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 10 & 11 project objectives. 5) Initialize development of 2011 statement of work & budget.

**Outputs:**

- Adhere to work plan & budget, secure applicable permission for 2010 work.
- Monitor & maintain fish habitat enhancement projects implemented in 09.
- Incorporation of 37 trees into Cummings Creek for steelhead habitat.
- Planted 3,000 trees into riparian areas to improve overall salmonid habitat.
- Planted 15 sedge mats into wetted channel margins at project sites.
- Preliminary approval of application for securing \$327,000 SRSRB grant.

**Outcomes:**

- Improved access for migratory fishes, increased mussel use in Spring Creek.
- Increased aquatic habitat complexity and fish potential in Cummings Creek.
- Enhanced riparian status & associated benefits; Tucannon River, Spring Cr.
- Increased number of steelhead redds in Spring Creek from 0 to 10.
- Trending increase of steelhead redds documented in Cummings Creek.

**Impacts:**

- Contributed to achievement of healthy watersheds via DNR River Vision.
- Improved traditional first food abundance and use opportunities.
- Achievement toward ESA Recovery & Subbasin Plan goals.
- Facilitation of recovery of Endangered Species Act fish species.
- Addressed limiting factors to water quality, Clean Water Act & 303d list.

Project Inputs:	Funding	2010 Budget	Staff	N
	BPA	\$205,000 Base \$256,250 Passage	1 Bio	



Spring Cr. planted & maintained, RM 0.1.



Sedges planted in ch



Cummings Cr., 37 additional trees added, RM 4.



Pataha Cr. passage bars



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: July–December, 2010



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.

**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 10, 11, 12 project objectives. 5) Develop and submit 2011 statement of work & budget.

**Outputs:**

- Adhered to work plan budget, secured applicable permission for 2010 work.
- Monitor & maintain fish habitat enhancement projects implemented in 09.
- Incorporation of 25 trees, 10 boulders and new bridge at Hartssock Springs to improve salmonid habitat.
- Added 75 wood pieces, 90 boulders to Spring Creek to improve complexity.
- Planted 1000 trees into wetted channel margins at project sites.
- Received approval to receive a \$327,000 SRSRB competitive grant.
- Designated as sponsor of Tucannon River LWD project valued at \$185,000.

**Outcomes:**

- Improved access for migratory fishes, increased mussel habitat in Springs.
- Increased aquatic habitat complexity & salmonid capacity in project areas.
- Enhanced riparian status & associated benefits to fish & wildlife.
- Increased number of steelhead redds in Spring Creek from 0 to 10.
- Established credibility and presence in ceded areas of the Tucannon Basin.
- Created capability to operate autonomously or within group framework.
- CTUIR has a more direct role in Tucannon resource management decisions.

**Impacts:**

- Contributed to achievement of healthy watersheds via DNR River Vision.
- Improved traditional first food abundance and use opportunities.
- Achievement toward ESA Recovery & Subbasin Plan goals.
- Facilitation of recovery of Endangered Species Act fish species.
- Addressed limiting factors to water quality, Clean Water Act & 303d list.

Project Inputs:	Funding	2010 Budget	Staff	N
	BPA	\$205,000 Base \$256,250 Passage	1 Bio	



Hartssock Springs Channel Restoration

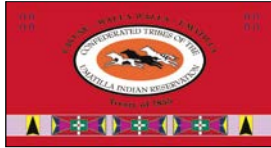


Hartssock Springs Bridge



Sorine Creek Habitat Enhancement





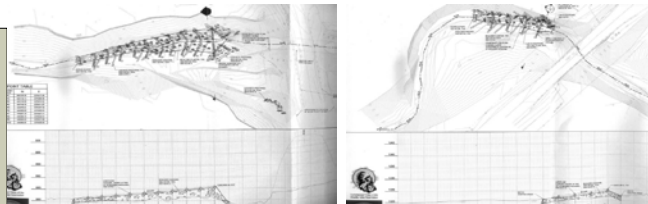
Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: January–June, 2011



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.  
**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 11, 12 project objectives 5) Initiate development of 2012 statement of work & budget.

Project Inputs:	Funding	2011 Budget	Staff	New 2010 Staff
	BPA	\$326,050 Base \$454,000 Grant	2 Bio	1 Bio

**Outputs:**  
 •Adhered to work plan budget, secured applicable permission for 2011 work.  
 •Monitor & maintain fish habitat enhancement projects implemented in 09.  
 •Planted 500 deciduous trees in Hartsock Springs riparian area.  
 •Planted 200 deciduous trees & 300' sedge mats, Russel Springs.  
 •CTUIR responsible for forming the Tucannon Coordination Committee.  
 •Secured \$454,00 SRSRB grant . Spent \$127,000 on design, \$327,000 dedicated to project implementation planned for fall, 2011, Pataha Cr.  
 •Progression involving CTUIR's sponsorship of Tucannon River LWD project  
 •Planned for 2012 as dollars have escalated from \$185,000 to \$700,000.  
 •CTUIR selected as lead entity; restoring habitat, RM 31, Tucannon R., 2012.



Pataha Creek Fish Passage Rectification Project designs, RM 1 & 10, planned for fall, 2011

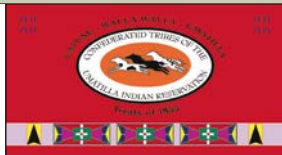
**Outcomes:**  
 •Improved access for migratory fishes, increased mussel habitat in Springs.  
 •Increased aquatic habitat complexity & salmonid capacity in project areas.  
 •Enhanced riparian status & associated benefits to fish & wildlife.  
 •Increased number of steelhead fry observed and steelhead redds counted in restoration project areas of Hartsock and Russel Springs Creeks.  
 •Increased leadership, credibility & partnerships in the Tucannon Basin.  
 •Created capability to operate autonomously or within group framework.



Russel Springs Creek Sedge Mats

Hartsock Springs Riparian Enhancement

**Impacts:**  
 •Contributed to achievement of healthy watersheds via DNR River Vision.  
 •Improved traditional first food abundance and use opportunities.  
 •Achievement toward ESA Recovery & Subbasin Plan goals.  
 •Facilitation of recovery of Endangered Species Act fish species.  
 •Addressed limiting factors to water quality, Clean Water Act & 303d list.



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: July–December, 2011



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.  
**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 11, 12 project objectives 5) Initiate development of 2012 statement of work & budget.

Project Inputs:	Funding	2011 Budget	Staff	New 2011 Staff
	BPA & SRSRB	\$326,050 Base \$454,000 Grant	2 Bio	1 Bio

**Outputs:**  
 •Completed Pataha Creek Fish Passage Rectification Project, RM 1 & 10  
 •Monitor and enhance all fish habitat enhancement projects  
 •Planted 1000 deciduous trees ; Pataha Creek, RM 1 & 10  
 •Planted 400 deciduous trees; Hartsock & Russel Springs riparian zone  
 •Planted 100 trees along Tucannon River, RM 37  
 •CTUIR further developed Tucannon Coordination Committee  
 •Utilized approximately 90% of the \$454,00 SRSRB grant acquired by CTUIR  
 •Identified 2 reaches of the Tucannon River to be evaluated for restoration



Pataha Creek, RM 1, BEFORE

Pataha Creek, RM 1, AFTER

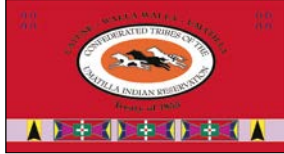
**Outcomes:**  
 •Improved access for migratory fishes, improved mussel habitat in Springs  
 •Increased aquatic habitat complexity & salmonid capacity in project areas  
 •Enhanced riparian status & associated benefits to fish & wildlife  
 •Increased number of steelhead fry observed and steelhead redds counted  
 •Increased leadership, credibility & partnerships in the Tucannon Basin  
 •Developed and expanded autonomous abilities and group framework roles  
 •CTUIR assumed more leadership; Tucannon resource management decisions



Pataha Creek, RM 10, BEFORE

Pataha Creek, RM 10, AFTER

**Impacts:**  
 •Contributed to achievement of healthy watersheds via DNR River Vision  
 •Improved traditional first food abundance and use opportunities  
 •Achievement toward ESA Recovery & Subbasin Plan goals  
 •Facilitation of recovery of Endangered Species Act fish species  
 •Addressed limiting factors to water quality, Clean Water Act & 303d list



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: January 1–June 30, 2012



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.  
**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 12, 13 project objectives 5) Initiate development of 2013 statement of work & budget.

Project Inputs:	Funding	2011 Budget	Staff	New 2012 Staff
	BPA & SRSRB	\$311,816 Base \$54,000 Grant bal	2 Bio	1 Bio

**Outputs:**  
 •Enhanced Pataha Creek Fish Passage Rectification Projects, RM 1 & 10  
 •Monitored and improved all fish habitat enhancement projects  
 •Planted 700 deciduous trees; Pataha Creek, RM 1 & 10  
 •Planted 1400 deciduous trees; Hartssock & Russel Springs riparian zone  
 •Planted 100 trees along Tucannon River, RM 37  
 •CTUIR further developed & promoted Tucannon Coordination Committee  
 •Utilized approximately 95% of the \$454,00 SRSRB grant acquired by CTUIR  
 •Selected project area of Tucannon River to be restored by CTUIR in 2013  
 •Partnered with WDFW to implement LWD complexity RM 37, Tucannon R

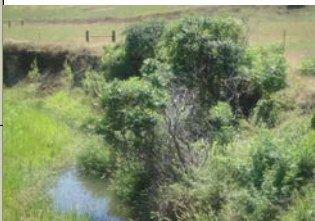


Pataha Creek, RM 1, BEFORE



Pataha Creek, RM 1, AFTER

**Outcomes:**  
 •Improved access for migratory fishes, improved mussel habitat in Springs  
 •Increased aquatic habitat complexity & salmonid capacity in project areas  
 •Enhanced riparian status & associated benefits to fish & wildlife  
 •Increased number of steelhead fry observed and steelhead redds counted  
 •Increased leadership, credibility & partnerships in the Tucannon Basin  
 •Developed and expanded autonomous abilities and group framework roles  
 •CTUIR acquired more leadership; Tucannon resource management decisions  
 •Participated in project prioritization & development to utilize BIOP dollars



Pataha Creek, RM 10, BEFORE



Pataha Creek, RM 10, AFTER

**Impacts:**  
 •Contributed to achievement of healthy watersheds via DNR River Vision  
 •Improved traditional first food abundance and use opportunities  
 •Achievement toward ESA Recovery & Subbasin Plan goals  
 •Facilitation of recovery of Endangered Species Act fish species  
 •Addressed limiting factors to water quality, Clean Water Act & 303d list



Confederated Tribes of the Umatilla Indian Reservation  
 DNR Fisheries Program Project Semiannual Report  
**Project: Tucannon Fish Habitat Restoration**  
 Period: July 1–Dec 31, 2012



**Project Goal:** To protect, enhance & restore functional, healthy & sustainable floodplain, channel & watershed process for purpose of protecting & restoring fisheries & aquatic species, Tucannon Basin.  
**Objectives:** 1) Identify, design, implement, maintain effective fish habitat projects. 2) Seek new partnerships & strengthen existing. 3) Seek additional funding. 4) Identify needs to be successful in reaching FY 12, 13 project objectives 5) Initiate development of 2013 statement of work & budget.

Project Inputs:	Funding	2012 Budget	Staff	New 2012 Staff
	BPA & SRSRB	\$311,816 Base \$47,000 Grant bal.	1 Bio 3	2 E Hire Techs replaced Bio 2
Staff: Eric Hoverson				
Collaborators: USFS, WDFW, SRSB, CTUIR Wildlife (Rainwater)				

**Outputs (specific 6-mo task accomplishments):**  
 •Monitored & enhanced Pataha, Hartssock & Russel Springs Habitat Projects  
 •Calculated numerical value of physical habitat response at project sites  
 •Planted 200 deciduous trees; Pataha, RM 1 & 10, removed noxious weeds  
 •Planted 300 deciduous trees; Hartssock & Russel Springs riparian zone  
 •Developed in-house designs for upcoming Large Woody debris Project  
 •Utilized approximately 90% of the \$454,00 SRSRB grant acquired by CTUIR  
 •Advanced the strategies for proceeding with future Tucannon River projects  
 •Partnered with WDFW to implement LWD complexity RM 37, Tucannon R



Designs for 2013 Tucannon R Project

**Outcomes: (broader results/changes from cumulative accomplishments)**  
 •Improved riverine habitat complexity to benefit Salmonids in project areas  
 •Enhanced riparian status & associated benefits to fish & wildlife  
 •Increased steelhead & chinook fry observed & steelhead redds counted  
 •Increased leadership, input & expanded partnerships in the Tucannon Basin  
 •Developed and expanded autonomous abilities and group framework roles  
 •Attained landowner approval on designs for upcoming restoration project  
 •Participated in project prioritization & development to utilize BIOP dollars



Russel Springs Creek BEFORE



Russel Springs Creek AFTER

**Impacts (work supports long-term progress towards):**  
 •Contribute to achievement of healthy watersheds (DNR River Vision) and increase traditional first food abundance and use opportunities.  
 •Contribute to achievement of Subbasin Plan and ESA Recovery Plan goals.  
 •Assist in recovery of Endangered Species Act subject species (spring/summer chinook, summer steelhead, bull trout).  
 •Address water quality limiting factors as per Clean Water Act 303d list.

The general objective sought by BPA for the time period 2008-2018 is to achieve a 17% improvement in physical habitat in the Tucannon Basin. This objective is to be a pooled effort in that it includes the efforts of all implementing entities involved with managing natural resources in the basin. The CTUIR comprises only a fraction of the handful of restoration entities in the basin. Results of CTUIR actions as they pertain to specific pre and post implementation metrics as physical and biological habitat categories are further analyzed and shown below in Figure 10.

**Figure 10. Pre and post implementation results of physical and biological metrics**

Physical habitat and biological response result summary for CTUIR habitat enhancement projects in the Tucannon River Basin, 2009-2012.

Aquatic Habitat Inventory methodology developed by Moore, Jones, 2006 was used to for habitat surveys.

Electrofishing was conducted to attain biological status of juvenile salmonids. Redd counts were conducted to tally adult spawning nest locations.

Location	RM	Pre # Hab units	Post # Hab units	Positive Improvement # Hab units	Pre Wet Length	Post Wet Length	Positive Improvement Wet Length	Pre Ave. Width	Post Ave. Width	Positive Improvement Ave. Width	Pre Ave. Depth	Post Ave. Depth	Positive Improvement Ave. Depth
Pataha Creek	1	10	12	20%	163	163	0%	3.1	2.5	24%	0.26	0.31	19%
Pataha Creek	10	6	8	33%	105	105	0%	5.1	3.3	35%	0.17	0.31	82%
Russel Springs	0.5	19	50	163%	559	773	38%	1.0	2.0	^100%	0.09	0.27	200%
Hartsock Springs	1	7	16	129%	315	322	2%	2.6	1.1	58%	0.13	0.23	70%
Cummings Creek	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>SUB-TOTAL</b>		<b>42</b>	<b>86</b>	<b>105%</b>	<b>1142</b>	<b>1262</b>	<b>10%</b>	<b>n/a</b>	<b>n/a</b>	<b>54%</b>	<b>0.65</b>	<b>1.12</b>	<b>75%</b>

Location	RM	Pre Undercut	Post Undercut	Positive Improvement Undercut	Pre Erosion	Post Erosion	Positive Improvement Erosion	Pre Shade	Post Shade	Positive Improvement Shade	Pre Wood Class	Post Wood Class	Positive Improvement Wood Class
Pataha Creek	1	24	28	17%	29	0	*2800+%	26	32	23%	1.0	2.4	140%
Pataha Creek	10	17	30	76%	43	6	86%	37	44	19%	1.0	2.6	160%
Russel Springs	0.5	35	41	17%	10	2	80%	39	46	18%	1.3	2.0	54%
Hartsock Springs	1	29	43	48%	7	0	*600+%	19	36	89%	1.1	2.1	91%
Cummings Creek	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.4	3.1	121%
<b>SUB- TOTAL</b>		<b>105</b>	<b>142</b>	<b>38%</b>	<b>89</b>	<b>8</b>	<b>1013%</b>	<b>121</b>	<b>158</b>	<b>33%</b>	<b>1.2</b>	<b>2.4</b>	<b>100%</b>

Location	RM	Pre # Wood Pieces	Post # Wood Pieces	Positive Improvement # Wood Pieces	Pre # Rootwads	Post # Rootwads	Positive Improvement # Rootwads	Pre Ave. Length	Post Ave. Length	Positive Improvement Ave. Length	Pre DBH	Post DBH	Positive Improvement DBH
Pataha Creek	1	0	22	*2100+%	0	20	*1900+%	0	11.2	*1000+%	0	0.48	*4700+%
Pataha Creek	10	0	17	*1600+%	0	15	*1400+%	0	11.4	*1000+%	0	0.41	*4000+%
Russel Springs	0.5	18	156	866%	2	34	1700%	5.1	5.1	0%	0.19	0.27	30%
Hartsock Springs	1	2	22	1000%	0	3	*200+%	3.0	4.0	25%	0.15	0.24	60%
Cummings Creek	3	23	81	352%	0	0	0%	7.9	12.2	65%	0.19	0.52	174%
<b>SUB-TOTAL</b>		<b>43</b>	<b>298</b>	<b>693%</b>	<b>2</b>	<b>72</b>	<b>3500%</b>	<b>3.2</b>	<b>8.8</b>	<b>175%</b>	<b>0.11</b>	<b>0.38</b>	<b>245%</b>

Location	RM	Pre # Redds	Post # Redds	Positive Improvement # Redds	Pre # Steelhead	Post # Steelhead	Positive Improvement # Steelhead	Pre # Chinook	Post # Chinook	Positive Improvement # Chinook	Pre W:D Ratio	Post W:D Ratio	Positive Improvement W:D Ratio
Pataha Creek	1	0	2	200%	4	12	200%	0	0	0%	12	8	33%
Pataha Creek	10	0	4	400%	0	0	0%	0	0	0%	30	11	173%
Russel Springs	0.5	0	34	3400%	16	33**	106%	3	10	233%	11	7	36%
Hartsock Springs	1	0	12	1200%	3	8	167%	4	6	50%	20	5	300%
Cummings Creek	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
<b>SUB-TOTAL</b>		<b>0</b>	<b>52</b>	<b>5200%</b>	<b>23</b>	<b>53</b>	<b>130%</b>	<b>7</b>	<b>16</b>	<b>129%</b>	<b>73</b>	<b>31</b>	<b>135%</b>

\*Calculated using smallest possible value within the same decimal range as post-project recorded value of metric

^Our objective was to increase wetted channel width due to increased flows

Orange highlighted areas indicate where the objective of attaining at least a 17% positive change was achieved at the specified project location

Green highlighted areas indicate where the objective of attaining at least a 17% positive change was achieved when expressed as average value for up to 5 project locations combined

Red Font indicates the specific habitat metric where at least a 17% increase was achieved when expressed as a cumulative total for all sites affixed with a determined value when comparing pre project status versus post implementation status.

n/a indicates when data was not available for comparative analysis.

It is theorized with a high degree of confidence that the goal of 17% would be achieved in all biological categories if repeat fish surveys were to be conducted based on visual observation of substantial increases in juvenile fish inhabitation in subsequent years following project implementation.

\*\*One bull trout, 124mm was captured

Project accomplishments were highlighted by presenting orally or as posters in a variety of forums in three states from 2009-2012. An example of presentation content from poster and oral forums are shown below in Figures 11 and 12.

**Figure 11. Poster content presented at River restoration Northwest Conference**



**Figure 12. Oral presentation content presented at Salmon Recovery Conference**

**Improving Fish Passage and Habitat Complexity in Pataha Creek**

*Techniques used to address fisheries habitat deficiencies in Pataha Creek, Tucannon Basin, southeast Washington.*

Eric D. Hoverson

Confederated Tribes of the Umatilla Indian Reservation

Fisheries Habitat Program

*Presented at the Salmon Recovery Conference, May 14, 2013, Vancouver, WA*

Degraded and disconnected habitat conditions in the Tucannon River Basin in southeast Washington have contributed to a decline in salmonid abundance, particularly in Pataha Creek. A variety of habitat monitoring techniques and habitat assessments were used to determine existing conditions and identify factors limiting salmonid abundance. Fish passage, habitat complexity, water quantity and quality were

identified as key limiting factors. Additional information showed channel migration and floodplain connectivity were reduced from historic levels; primarily due to channel straightening, resulting in simplified aquatic habitat, entrenchment, bank erosion and degraded water quality.

In 2011, the Confederated Tribes of the Umatilla Indian Reservation, Fisheries Habitat Program implemented two projects at Pataha Creek to improve fish passage, habitat complexity, and water quality conditions. A roughened channel strategy was utilized to eliminate 1-2' step-heights at road crossings located at river mile 1 and 10. A total of 32 whole trees and hundreds of large boulders were strategically placed within the roughened channel to add complexity to the channel. Thousands of trees were planted in adjacent riparian areas to stabilize bank conditions achieved through the various benefits associated with vegetative components. Landowner coordination was an important determinant of technique selection. Restrictive parameters set by landowners were considered during the planning stages and addressed during development of the final designs. The site-specific applicability of the chosen restoration technique, along with, proper implementation, and effective maintenance and monitoring ultimately translated into project success at both project locations. The total cost of the two projects was approximately \$400,000. The majority of funding was provided by the Snake River Salmon Recovery Board. Bonneville Power Association also contributed monetarily towards this salmonid habitat improvement effort.

## **REPORTING OF PROJECT ACTIONS BASED UPON BPA PISCES STATEMENT OF WORK DELIVERABLES; DESCRIPTIONS AND RESULTS**

Work elements and identifier codes assigned by the BPA Division of Fish and Wildlife as displayed in PISCES are presented in the following section. The work elements and milestone descriptions provide a comprehensive view of FY2009-2012 TFHP work activities.

### **27: Remove Debris**

Russell Spring Restoration:

Twn10N R41E Sect. 16

GPS Point; N46.34697 W117.68114

In 2009, a total of 22 Car bodies and 1, 20' x 10' waste container filled with assorted metals extracted from the high water and riparian areas.

**Figure 13. Restoration of Russel Springs, debris removal from channel and riparian area**



## **29: Increase In-stream Habitat Complexity**

Human activities in the Tucannon River subbasin have transformed the river from a branching channel with a connected, diverse riparian zone, to a moderately incised and confined single-thread channel with a degraded and disconnected riparian zone. These impacts have resulted in severely reduced in-stream habitat complexity, pool frequency, and floodplain connectivity, which limits adequate spawning and rearing habitat for the ESA-listed species. Additionally, much of the surrounding watershed burned in the School Canyon Fire from August 5-19, 2005 which impacted over 52,000 acres of forest and riparian areas along the Tucannon River. Some of the most severe fire damage occurred in Hixon Canyon, located in prime spring chinook salmon habitat the upper Tucannon River Watershed near RM 45 (Figure 14.)

**Figure 14. Tucannon River, RM 45, School Canyon fire near Hixon Canyon, summer 2005**



The fire's origin is traced to a dead pine tree falling over power lines, causing the lines to arc and send sparks to the ground (similar scenerio shown in Figure 15)The powerline serves one customer, the Camp Wooten Environmental Learning Center (Figure 16).

**Figure 15. A similar scenerio (tree contact powerline) caused the School Canyon in 2005**



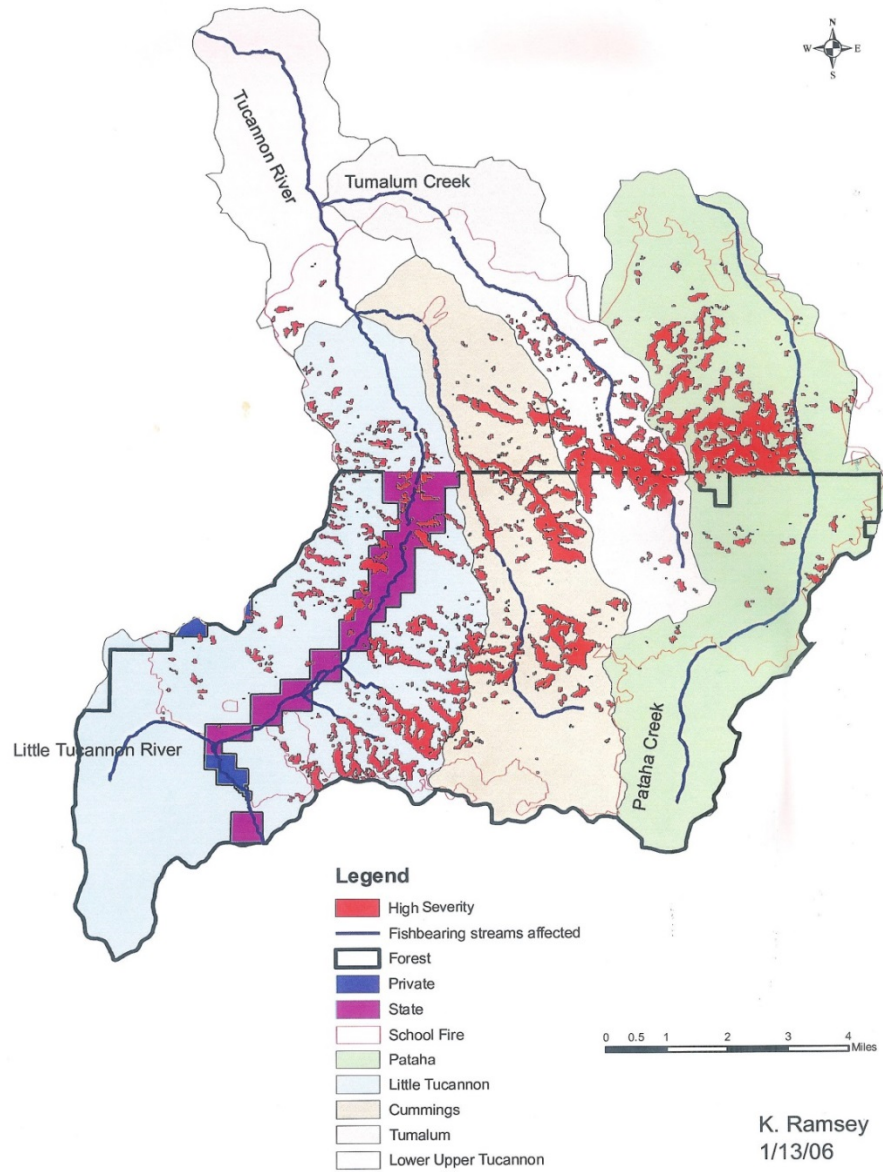
**Figure 16. Powerline serving Camp Wooten caused the School Canyon in 2005**



The School Fire was the largest fire reported in the lower 48 states during the summer of 2005, and burned a substantial quantity of valuable riverine riparian habitat, important to salmonids (Figure 17).

**Figure 17. Map of 2005 School Canyon Fire & burn severity classification (Ramsey, USFS)**

### Map 3. Severely burned acreage, fishbearing streams affected



One hundred and nine cabins and 106 outbuildings were destroyed. The conditions prior to the fire were volatile based on a dry winter with below-average snowpack, followed by an unusually wet spring, resulting in a healthy crop of grass. The wet spring was superseded by a hot, dry

summer, and by August, fire danger had reached extreme levels only seen about once every 20 years. The trees shot burning embers hundreds of feet into the air, which the wind caught and deposited as much as half a mile away. The wind-borne embers created their own spot fires where they landed. Experienced firefighters reported flames as high as 75 feet in the grass and up to 200 feet in trees. Smoke rose to 15,000 feet and was visible as far away as Spokane, 120 miles to the north. 1,600 firefighters were on the scene. Their efforts were impeded by the area's rugged terrain of steep mountain slopes made tactful mobilization difficult. The canyons enhanced phenomena known as plume activity as "when smoke billows high, builds and builds, and then collapses on itself. The (downward) rushing cloud sends fire-fanning winds down canyons and ridges."

Preventative trimming and removal of trees near power lines is now standard practice and impacts to the riverine system are felt as the lines run in close proximity to the Tucannon River and therefore the riparian area is significantly altered and riverine habitat complexity is reduced. Based on the potential repeatability of the wildfire scenerio, it would appear that consideration of alternative power or subsurface burial of the 14,000-volt power line is merited.

Additional fires were the Columbia Complex Fire, which was caused by a lightening strike on August 22 and ignited until September 30, 2006 after burning 110,000 acres. The Hubbard fire burned 11,500 acres until being extinguished on August 29, 2010. Despite the devastating magnitude of the fires, fine sediment budgets from this source yielded only 3% of the total input to the Tucannon River, whereas channel incision was identified as the dominant source, contributing 49% of the total, followed by channel migration (23%) . The Tucannon River offers significant potential for improvement of ESA-Listed salmonid species population recovery if in-stream habitat and floodplain conditions are improved from the current state of detriment caused by wildfires.

Increasing overall habitat complexity and riverine function is the primary focus of CTUIR's TFHP scope of work and involves increasing complexity of in-stream habitat features with natural materials. Maximizing "edge-effect" frequency and quantity through various means of improving the overall diverse, complex physical details within the wetted channel as means of potentially maximizing; overall population levels, density, fitness, and biomass of Listed Salmonid populations, inclusive to all life stages. Efforts to improve habitat complexity was performed at several locations and described in detail below;