

Duck Valley Habitat Enhancement and Protection

Progress Report 2001 - 2002

March 2003

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Duck Valley Habitat Enhancement & Protection

Progress Report 2001-2002

April 2001 – August 2002

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Abstract/Executive Summary

The Duck Valley Indian Reservation's Habitat Enhancement project is an ongoing project designed to enhance and protect critical riparian areas, natural springs, the Owhyee River and its tributaries, and native fish spawning areas on the Reservation. The project commenced in 1997 and addresses the Northwest Power Planning Council's measures 10.8C.2, 10.8C.3, and 10.8C.5 of the 1994 Columbia River Basin Fish and Wildlife Program. The performance period covers dates from April 2001 through August 2002.

Introduction

The Snake River Basin is estimated to have contained 79% of the stream miles suitable for Chinook salmon in the Columbia River Basin (Idaho Department of Fish and Game (IDFG) 1985). Using the stream mile estimate, IDFG estimated that 650,000 - 1,030,000 adult Chinook, 117,000 - 229,800 steelhead, and 14,400 - 57,400 sockeye were produced annually in the Snake River and its tributaries above what is now Hells Canyon Dam.

With the completion of the Hells Canyon Complex, anadromous salmonids were extirpated from the upper portion of the Snake River and its tributaries. In the Northwest Power Planning Council's (NWPPC) 1994 Columbia River Basin Fish and Wildlife Program (Program), the NWPPC acknowledged that "Salmon and steelhead probably will never be able to return to some areas of the basin because of blockages by dams. These areas include the areas above Chief Joseph and Grand Coulee Dams, the Hells Canyon Complex and other smaller blocked areas." Subsequently, the NWPPC suggested that: 1) mitigation in blocked areas is appropriate where salmon and steelhead were affected by the development and operation of the hydroelectric projects and 2) in order to treat the Columbia River and its tributaries as a system, resident fish substitutions are reasonable for lost salmon and steelhead in areas where in-kind mitigation cannot occur.

The Habitat Enhancement and Protection Program (HEPP) was developed and implemented in 1997 in response to concerns about the impacts of land use practices and policies, and the project is designed to mitigate by enhancing and protecting critical riparian areas, natural springs, the Owhyee River and its tributaries, and native fish spawning areas on the Duck Valley Indian Reservation (DVIR). Critical areas are determined in coordination with the Tribes' Assess Resident Fish project (BPA project number 2000-079-00) where streams are sampled for populations of native fish, including population estimates, visual counts of redds and spawning fish, and snorkel surveys to determine egg - parr survival and young-of-the-year trout estimates. This information facilitates the determination of management objectives for the Owyhee River and its tributaries. A further goal of this program is the development of a unified, comprehensive monitoring program for water quality and a subsequent development of a database that can be used by other fisheries professionals which includes water quality data and information on fish composition, health, abundance, and genetic makeup.

The majority of springs on the DVIR are located on grazing lands. Subsequently, livestock searching for water tend to find the springs and trample the wet, sensitive riparian areas around the spring. This trampling can cause a shift in ground topography or composition and alter the spring flow, water quality, and water temperatures. The cold, clean water from these springs entering creeks provides a refuge for cold-water fish species, such as native redband trout (*Oncorhynchus mykiss gairdneri*), especially in the late summer months. The goals of protecting the springs are enhancing productivity and water quality of springs, preventing damage to unblemished springs, preventing further damage to already blemished springs, and allowing damaged springs to heal. These goals will be met by using exclosure fencing and off-site stock watering through the use of gravity-fed water troughs as well as installing culverts and native vegetation planting where necessary.

Another portion of the project involves protecting headwater areas of streams with native fish populations. This is accomplished with exclosure fencing and native vegetation planting to reduce erosion, to provide shade and cooler water temperatures, and to provide habitat, cover, and forage. Suspended solids and fine particles can be abrasive to fish gills, and fines can also interrupt spawning habitat by entombing fertilized eggs or by blocking off oxygenated water, which results in extremely high mortality rates for eggs and sac-fry. Reduction in these fines will increase fish survival rates within these streams.

The final portion of HEPP to be developed is the monitoring and evaluation of protected areas. This involves establishing photo points to compare temporal differences in the protected areas, profiles of water flow and quality including water chemistry and biological indicators in both streams and springs, and Proper Functioning Condition assessments of streams on the Reservation (PFC training will be set up through the Idaho Interagency Riparian Team). In completing PFC on the waterways of the DVIR in coordination with Project 2000-079-00, habitat data, and salmonid abundance and density information, we can develop a more comprehensive assessment of what protection and enhancement is necessary. To evaluate the success of these projects we will also utilize plant species diversity studies inside the exclosure vs. outside the exclosure. In order to be consistent with other Federal land management agencies operating in the areas surrounding the DVIR, we will be using "Interpreting Indicators of Rangeland Health" (version 3, Technical Reference 1734-6 2000) published by the U.S. Department of the Interior and U.S. Department of Agriculture (BLM, USGS, USDA, NRCS, ARS) as a guide and evaluation of our range exclosures. This monitoring will enable us to track trends in riparian and range health, water quality and quantity over time as well as make comparisons between protected and non-protected springs, as assessments will also include unprotected areas.

Standards for success will include, but are not limited to: 1) lower water temperature in streams adjacent to springs and exclosures, 2) increased abundance of native fish in these streams, 3) increase/no decrease in plant species diversity of the exclosure area, 4) increase in riparian vegetation in protected area of streams.

Through HEPP, our department has fostered a nascent relationship with the Tribal Environmental Protection Program (TEPP) because of our common goals. Programmatic liaisons like these garner more support for project goals from the surrounding community, and the collaborative efforts ensure a considerable cost savings while delivering a much larger impact with more data and more technical expertise. Our projects uncover information useful for the TEPP department in prioritization of the TEPP non-point source water pollution project locations, such as determination priority stream crossings and priority sites for water contamination/quality testing.

As the DVIR is directly downriver of a stream (a tributary to the East Fork of the Owyhee River) that runs through a copper mine tailings pile, inorganic contamination is a serious concern. Our department plans on partnering with the TEPP department for an intensive sampling event of the water, sediments, and fish in the East Fork of the Owyhee River for inorganic contamination. We also will be collaborating on a rigorous restoration of Skull Creek and the North Fork of Skull Creek, where our department has discovered native fish through this Habitat Enhancement project, focusing on replanting native vegetation, moving road crossings, and reducing sediment loads. Further, we are planning a more unified approach in our relationships with cattle owners, wetland delineation and protection, and water quality sampling plans. Finally, a Unified Watershed Assessment (UWA) and a Non-point Source (NPS) Assessment and Management Plan of the DVIR (1999) has been completed by TEPP. However, these two documents are still in the “Draft” stages and have not been accepted by the Tribal Council to date, but are all on file at the TEPP office and can be distributed when finalized.

Because the Duck Valley Indian Reservation is still so relatively unexplored scientifically and remains so isolated, an inventory, assessment, and monitoring program of the Reservation’s resources is imperative, and protecting these resources is crucial. Native redband trout, a species of special concern, were observed in one of our enhanced areas on Little Sheep Creek during late August of 2001. The stream was dry in over 90% of its length except for the areas where the springheads were protected and flowing into the stream. We have also observed Mule deer and various bird species utilizing the drinking troughs added to supply water for stock and to keep them away from vital riparian areas. Finally, critical fisheries and habitat information has also been collected under this project, aiding us in collecting samples for project 2000-079-00, locating possible fish barriers, prioritizing areas for protection, and providing employment and training for Tribal members in an isolated area with high rates of unemployment.

Project Location and Background

The projects associated with the Duck Valley Habitat Enhancement and Protection program fall within the Reservation boundaries. The Duck Valley Indian Reservation encompasses approximately 289,820 tribally-owned acres equally straddling the Idaho and Nevada border, and there are approximately 1,800 enrolled Tribal members. The Reservation is in the Middle Snake Province and both the Bruneau and Owyhee subbasins. As indicated in Figure 1, the Reservation is both remote and isolated; the

closest town centers are Elko, Nevada and Mountain Home, Idaho, both approximately 100 miles from the Reservation's small town of Owyhee. Not only must residents travel this far for groceries, but these are also the closest areas to buy supplies for projects.

The predominant habitat types on the Reservation are sagebrush steppe, riparian, and wetland. Current uses of these habitats are ranching, flood-irrigated agriculture (major crop is hay), and recreation. Water resources on the Reservation include three reservoirs stocked with rainbow trout, approximately 5,440 acres of wetlands in the central valley (see Figure 2 for topography), over 640 acres of wetlands in the eastern highlands, over 200 natural springs, and numerous small reservoirs/stock ponds of 5 to 20 acres each. The wetlands are part of an important wetland complex designated as a "Priority Conservation Site" by The Nature Conservancy (see Figure 3). Over 350 miles of waterways exist on the Reservation; these waterways are major tributaries to the Bruneau and Jarbidge Rivers and the South and East Forks of the Owyhee River. The East Fork of the Owyhee River is the major drainage of the Reservation; this river is also the major source of water for ranching and recharge of the wetlands and aquifer.



Though the Duck Valley Indian Reservation is a relatively healthy environment, habitat fragmentation, degradation and loss are problematic due to grazing, irrigation, loss of herbaceous understory in sagebrush steppe habitat and encroaching exotics, destruction of biological crusts, and historic mining. The goal of this project is to therefore enhance, create, and/or restore habitats and protect them from grazing impacts.

Project Objectives and Methods

Brief Summary:

In protecting critical areas we provide lower water temperatures, decreased sedimentation, increased juvenile survivability, increased bank stability, increased water quality, as well as an increase in aesthetic value.

Over 45 streams, springs, headwaters, and reservoirs have been protected, enhanced, and restored through this project thus far, with some streams, springs, and headwaters having multiple areas of improvement. The following creeks and springs were either protected with enclosure fences or had water troughs added to them or both troughs and fences. This was done to help keep livestock and domestic animals from trampling these areas. Most streams are intermittent streams and our hope is that by protecting these vital areas we will be able to improve water quantity, quality and temperature in these streams. According to work completed by the Idaho BLM (Zoellick, personal communication) many intermittent streams in the lower East Fork Owyhee watershed are spawning areas for native redband trout.

Springs and Streams Protected 1998:

<u>Name</u>	<u>Location</u>
WM1	Willis Meadows
U3F	Upper 3 Forks (Mary's, Papoose)
OS1	Otter Springs Creek headwaters (2springs)

Springs and Streams Protected 1999 (all headwaters of streams):

<u>Name</u>	<u>Location</u>
CN1 & 2	Cranes Nest (2 sites protected)
HMC1	Watchabob
WB1	Watchabob
BCHW1	Boyle Creek headwaters
TVT1	TV tower

LSC1	Little Sheep Creek headwaters
LSC2	Little Sheep Creek headwaters
HFC1	Headwaters Fawn Creek
WG1	White Gate
WG2	White Gate
SC1	Summit Creek headwaters
ASI1	Antelope Springs

Springs and Streams Protected 2000:

<u>Name</u>	<u>Location</u>
BCHW2	Boyle Creek headwaters
BCHW3	Boyle Creek headwaters
WM2	Willis Meadows exclosure
WM3	Willis Meadows
WM4	Willis Meadows
SS1	Stranger Springs

Springs, Streams, and Reservoirs/Riparian Areas Protected 2001-2002:

<u>Name</u>
Abandoned Gun (fence)
Bell Creek Headwaters (fence and trough)
Billy Shaw Creek (partial fence)
Circle Creek Reservoir (fence and trough)
Coyote Hole
Headwaters of Miller Creek (fence)
Highline Canal
No-Name Reservoir (fence 5 acres and trough)
N. Fork Skull Creek (fence spawning areas)
Parker Spring
Red Cabin
Reed Creek
Rye Grass
Skull Creek Spring (flex culvert)
Spring Creek (flex culvert and trough)
Sugar Loaf Summit Creek (fence riparian area)
Three Stooges

Unfortunately, the Tribes' GIS specialist resigned last year, and our map of enhancements needs to be further updated (see Figure 4); however, in coordination with the TEPP department, our staff is preparing to become further educated in GIS mapping

and creating data layers. The fish and wildlife biologist from the Habitat, Parks, Fish and Game Department and the environmental engineer from the TEPP department attended a GIS training session with a former employee of NASA, and the Water Quality Technician from TEPP is currently taking a college course in GIS mapping. We are working collaboratively to update maps and have created several new maps, as evidenced in this report.

Objective 1: *Identify and protect spawning areas; enhance and protect stream habitat*

Strategy: Increase survival of native juvenile trout; increase stability of stream banks; increase water quality.

- Actions:**
1. Inventory and evaluate lotic areas on the DVIR.
 2. Locate spawning habitat.
 3. Evaluate spawning areas for habitat condition and water quality and temperature.
 3. Determine what enhancement and protection is needed in these areas.
 4. Implement enhancement and protective measures (exclosure fencing, native vegetation restoration, improved road crossings, trough placement, enhancement of existing stock ponds) in order to decrease sedimentation and water temperatures, increase bank stability and water quality.

Deliverables from Objective 1

Accomplishments:

- 37 streams/headwaters springs were inventoried (see Figure 5: Stream Inventory)
 - 19 streams classified according to stream type.
 - 15 streams were evaluated for spawning habitat.
 - 11 streams were found to have native redband trout (*Oncorhynchus mykiss gairdneri*).
 - 30 have been enhanced / protected.
 - 17 were enhanced in 2001-2002.

Figure 5: Stream Inventory

Stream Name	Type	Presence/Absence	Condition	Enhancement
1. Abandon Gun				Yes (fence) *(2001-2002)
2. Bell Ck.	Perennial	Absent	Good	Yes (fence) *(2001-2002)

3. Billy Shaw Ck.	Intermittent			Yes (fence) *(2001-2002)
4. Blue Ck.				No
5. Boyle Ck.	Perennial	Present	Fair	Yes (3 fences)
6. Circle Ck.	Intermittent		Fair	Yes (fence and trough) *(2001- 2002)
7. Cow Ck.				No
8. Crane's Nest				Yes (fence and trough)
9. Dry Ck.				No
10. Fawn Ck.	Perennial	Present	Excellent	Yes (fence, road crossing)
11. Indian Ck.	Intermittent(pools)		Headwaters Fair	No
12. Jones Ck.	Perennial	Present	Good	No
11. Lamb's Reservoir	Intermittent	Present	Fair	No
13. Little Sheep Creek				Yes
14. Lower Bob				Yes (trough)
15. Mary's Creek	Perennial	Present	Headwater (good), diversion in place	Yes (fence)
16. Miller Ck.	Perennial	Present	Excellent	Yes (fence) *(2001-2002)
17. Mud Ck.	Intermittent		Headwaters fair	No
18. Mud Flats				No
19. N. Fork Skull Ck.	Perennial	Present	Good	Yes (fence spawning areas) *(2002-2002)
20. Old Man Ck.	Perennial	Present		No
21. Otter Springs Creek				Yes (2 fences around headwaters)
22. Papoose Ck.	Intermittent	Absent	Excellent	Yes (fence headwaters)
23. Parker				Yes (fence) *(2001-2002)
24. Red Cabin				Yes (road crossing) *(2002-2002)
25. Reed Ck.	Intermittent	Absent	Excellent	Yes (spring fenced) *(2001-2002)
26. Ryegrass				Yes (fence) *(2001-2002)
27. Scout Creek				Yes (road crossing) *(2001-2002)
28. Sheep Ck.	Perennial			Yes (fence, road crossing, trough)
29. Skull Ck.	Perennial	Present	Excellent	Yes (fence) *(2001-2002)
30. Snow Ck.				No

31. South Cleveland				Yes (fence and trough) <i>*(2001-2002)</i>
32. Spring Ck.	Perennial			Yes (flex culvert, road crossing, fence, and trough) <i>*(2001-2002)</i>
33. Sugar Loaf				Yes (fence) <i>*(2001-2002)</i>
34. Summit Ck.	Intermittent	Present	Excellent	Yes (fence riparian area, trough)
35. Three Stooges				Yes (fence) <i>*(2001-2002)</i>
36. Watchabob				Yes (fence, trough)
37. Willis Meadow (1)				Yes (fence)
38. Willis Meadow (2)				Yes (fence) <i>*(2001-2002)</i>
36. Yatahoney Ck.				No
37. Highline Canal (diverted from the East Fork of the Owhyee; water flows into Lake Billy Shaw and the canal's other diversions eventually re-enter the East Fork of the Owhyee River)		Present		Yes (road crossings, fencing, troughs) <i>*(2001-2002)</i>

- 3 small reservoirs were enhanced: 1. No-Name Reservoir (fenced 5 acres and installed trough), 2. Coyote Hole (fence and bank stabilization, crew dug and back filled a main water line and a drain line), and 3. Circle Creek Reservoir (fenced and installed trough).
- 542 willows were dug, cut, and planted in June, and 16,382 willows were cut and planted in July.
- Enhancements installed (For example, the Miller Creek exclusion fence started in August and was completed during October. In the process of its construction, the crews used 256 steel posts, 16 rolls of barbed wire, 55 cedar posts, and large quantities of scrap wood for the 11 rock jacks built) and existing enhancements were maintained (road crossings rip-rapped and culverts added, fencing and troughs repaired, rock jacks and steel posts added to fences, troughs braced and cleaned, culverts cleaned), solar pumps installed for water troughs—installed black poly pipe, concrete structures, and dug and filled drain lines, pump system removed for winter months. Shovels, dump truck, backhoe, cat, four-wheelers, hydraulic auger, cement mixer, chainsaw, and welder were used for related projects; maintenance by crew required on all equipment.
- Beaver relocation from Highline Canal to higher elevation streams.

- Streams were evaluated further to determine spawning habitat potential based on water quality (Figure 6: Water quality); substrate composition, woody debris, organic debris, and sediment entrainment (embeddedness) (Figure 7: Substrate, debris, and sediment entrainment); bank shape, channel shape, riparian condition (Figure 8: Bank, channel, and riparian area); and presence of fish barriers and plant types (Figure 9: Fish barriers and vegetation). Qualitative data was collected in types of algae present (Figure 10: Algae) and water odor and appearance (Figure 11: Water appearance, odor and wildlife present). Creeks were hypothesized as possible spawning locations through these sampling and habitat characteristics and electroshocking was then conducted to determine and confirm spawning potential (Figure 12: Salmonids). The listed sites in the attachments were determined to be spawning areas or have high probabilities of being spawning areas. These sites were determined by the presences of fish size class of 0-100mm and/or suitable habitat conditions.
- Limited GPS coordinates were taken for evaluated streams (Figure 13: GPS coordinates).
- In enclosure areas, increased forage and grass abundance and diversity were noted by crews.

Figure 6: Water Quality

Creek	Site	Date	Mean Width	Mean Depth	Wdth/Dpth ratio	Temp (C)	Conductivity (microsiemens)	Dissolved O2 (ppm)
Fawn Ck.	Upper	7/18/2001	2.35	0.37	0.157	9.6	131.6	9
	Lower	7/18/2001	2.14	0.34	0.157	17.8	194.0	74
Skull Ck.	Upper	7/3/2001	3.08			16.6	92.5	5.8
N. fork (Skull)		6/26/2001	2.57	0.64	0.249	21.8	139	79.4
Summit Ck.	Upper	5/14/2002	3.15	0.01	0.003	17.7	96.3	7
	Lower	5/15/2002	4.4	0.02	0.004	14.9	98.9	76
Spring Ck.	Uppr/Lwr	5/9/2002	2.81	0.01	0.004	10.9	91.3	7.5
Jones Ck.	Uppr/Lwr	6/20/2001	1.58	0.47	0.297	59.9		102.1
Sheep Ck.	Lower	5/14/2002	4.12	0.02	0.004	13.5	118.5	8.52
Indian Ck.	Upper	6/4/2002				14.4	104	75
Miller Ck.	Lower	6/18/2002	2.27	0.39	0.172	52.7		100
	Upper	6/12/2002				16.2	100.2	75.5
Reed Ck.	Uppr/Lwr	5/8/2002	2.89	0.02	0.008	11	59.7	78
Papoose Ck.								
Willis Mdws(1)		7/30/2002				8.4		7.1
Willis Mdws(2)		7/30/2002				25.7		7.3
Willis Mdws(2)		7/30/2002				17.1		6.6
Abandon Gun		7/30/2002				24.7		7.1
Three Stooges		7/30/2002				52.7		16.5
S. Cleveland		7/30/2002				38.1		8.2
Watchabob		7/31/2002				22.8		7.2
Lower Bob Trgh		7/31/2002				23.7		7.3
Parker Camp		7/31/2002				26.2		8.3

Bell Ck. Sprngs		7/31/2002				7.1		8.5
Crane's Nest		7/31/2002				23.7		7.5
Sheep Ck. Trgh		8/1/2002				27.3		16.6
Sheep Ck. Xing		8/1/2002				17.3		18.1
Scout Ck.		8/1/2002				24.2		21.1
Red Cabin Xing		8/1/2002				30.3		26.8
Fawn Ck. Xing		8/1/2002				22.2		16.1
Sugarloaf Trgh.		8/1/2002				27.4		13.2

Figure 7: Substrate, debris, and sediment entrainment

Creek	Site	Date	Substrate	Woody debris	Organic debris	Embeddedness
Fawn Ck.	Upper	7/18/2001	gravel/cobble	occasional	occasional	25%
	Lower	7/18/2001	bedrock	occasional	occasional	75%
Summit Ck.	Upper	5/14/2002	sand/gravel/boulders/cobble	occasional	occasional	25%
	Lower	5/15/2002				
Spring Ck.	Uppr/Lwr	5/9/2002	cobble/gravel/sand	plentiful	occasional	25%
Jones Ck.	Uppr/Lwr	6/20/2001	silt/bedrock/sand/gravel	none	plentiful	
N. fork (Skull)		6/26/2001	sand/gravel	plentiful	plentiful	25%
Sheep Ck.	Lower	5/14/2002	boulders/cobbles/silt/sand	some	occasional	50%
Miller Ck.	Lower	6/18/2002	cobbles/boulders/bedrock	none	plentiful	75%
	Upper	6/12/2002		plentiful		

Figure 8: Bank, channel, and riparian area

Creek	Site	Date	Bank	Channel	Riparian
Fawn Ck.	Upper	7/18/2001	gradual/no slope	narrow/shallow	1
	Lower	7/18/2001	steep slope	narrow/shallow and deep	1
Summit Ck.	Upper	5/14/2002	gradual/no slope	narrow/shallow	2
	Lower	5/15/2002			
Spring Ck.	Uppr/Lwr	5/9/2002	vertical/steep slope		2
Jones Ck.	Uppr/Lwr	6/20/2001	vertical/steep slope	narrow/deep	2
N. fork (Skull)		6/26/2001	steep/gradual slope	wide/shallow	2
Sheep Ck.	Lower	5/14/2002	vertical/steep slope	narrow, wide/ shallow, deep	1
Miller Ck.	Lower	6/18/2002	vertical	narrow/deep	2
	Upper	6/12/2002			

Figure 9: Fish barriers and vegetation

Creek	Site	Date	Fish Barriers	Aquatic plants	attached/free floating
Fawn Ck.	Upper	7/18/2001	none	none	
	Lower	7/18/2001	none	occasional	attached
Summit Ck.	Upper	5/14/2002	none	occasional	attached
	Lower	5/15/2002			
Spring Ck.	Uppr/Lwr	5/9/2002			

<i>Jones Ck.</i>	Uppr/Lwr	6/20/2001	none	plentiful	attached
<i>N. fork (Skull)</i>		6/26/2001	beaver dams	occasional	attached
<i>Sheep Ck.</i>	Lower	5/14/2002	road barriers	occasional/none	both
<i>Miller Ck.</i>	Lower	6/18/2002	beaver dams	none	
	Upper	6/12/2002			

Figure 10: Algae

Creek	Site	Date	Algae	Color	Stinglike algae	color	floating algae	color
<i>Fawn Ck.</i>	Upper	7/18/2001	none		none		none	
	Lower	7/18/2001	occasional	light brown	none		none	
<i>Summit Ck.</i>	Upper	5/14/2002	occasional	light	occasional	green	none	
	Lower	5/15/2002						
<i>Spring Ck.</i>	Uppr/Lwr	5/9/2002						
<i>Jones Ck.</i>	Uppr/Lwr	6/20/2001	none		none		occasional	green
<i>N. fork (Skull)</i>		6/26/2001	occasional	light brown	none		none	
<i>Sheep Ck.</i>	Lower	5/14/2002	occasional	light brwn/grn	none		none	
<i>Miller Ck.</i>	Lower	6/18/2002	none		none		none	
	Upper	6/12/2002						

Figure 11: Water appearance, odor and wildlife present

Creek	Site	Date	Other wildlife	Water Appearance	Water Odor
<i>Fawn Ck.</i>	Upper	7/18/2001	mammals	clear	none
	Lower	7/18/2001	amphibians	clear	none
<i>Summit Ck.</i>	Upper	5/14/2002	mammals/waterfowl	clear	none
	Lower	5/15/2002			none
<i>Spring Ck.</i>	Uppr/Lwr	5/9/2002		turbid/green	none
<i>Jones Ck.</i>	Uppr/Lwr	6/20/2001	amphibians/reptiles	clear	none
<i>N. fork (Skull)</i>		6/26/2001	amphibians/reptiles/waterfowl	clear	none
<i>Sheep Ck.</i>	Lower	5/14/2002	mammals/waterfowl	turbid	none
<i>Miller Ck.</i>	Lower	6/18/2002	amphibians/reptiles	clear	none
	Upper	6/12/2002			

Figure 12: Salmonids

Creek	Site	Date	trout/m2	Salmonid Size Distribution			
				0 - 100	101 - 150	151 - 200	201+
<i>Fawn Ck.</i>	Upper	7/18/2001	0.3	60	32	0	0
	Lower	7/18/2001	0.13	52	19	1	0
<i>Skull Ck.</i>	Upper	7/3/2001					
<i>N. fork (Skull)</i>		6/26/2001	0.06	4	29	7	

<i>Summit Ck.</i>	Upper	5/14/2002	0.006	5	16	1	0
	Lower	5/15/2002	0.009	10	6	1	0
<i>Spring Ck.</i>	Uppr/Lwr	5/9/2002	0.06	39	18	3	0
<i>Jones Ck.</i>	Uppr/Lwr	6/20/2001	0.06	3	18	5	0
<i>Sheep Ck.</i>	Lower	5/14/2002	0.002	0	2	0	10
<i>Indian Ck.</i>	Upper	6/4/2002		0	0	0	0
<i>Miller Ck.</i>	Lower	6/18/2002	0.16	18	18	8	0
	Upper	6/12/2002		0	0	0	0
<i>Reed Ck.</i>	Uppr/Lwr	5/8/2002	0.012	7	5	2	0
<i>Papoose Ck.</i>							

Figure 13: GPS coordinates

Creek	Site	Date	Beg. Northing	Beg. Westing	End Northing	End Westing
<i>Fawn Ck.</i>	Upper	7/18/2001				
	Lower	7/18/2001				
<i>Skull Ck.</i>	Upper	7/3/2001	41.9621	116.0353		
<i>N. fork (Skull)</i>		6/26/2001				
<i>Summit Ck.</i>	Upper	5/14/2002	41.5232	116.0437	41.52138	116.045
	Lower	5/15/2002	41.53189	116.03193	41.53106	116.2223
<i>Spring Ck.</i>	Uppr/Lwr	5/9/2002	41.5103	116.2229	41.5106	116.2223
<i>Jones Ck.</i>	Uppr/Lwr	6/20/2001	41.5257	116.0086		
<i>Sheep Ck.</i>	Lower	5/14/2002	41.53183	116.1455	41.5354	116.1433
<i>Indian Ck.</i>	Upper	6/4/2002	42.831	116.35		
<i>Miller Ck.</i>	Lower	6/18/2002				
	Upper	6/12/2002	42.02103	116.4121		
<i>Reed Ck.</i>	Uppr/Lwr	5/8/2002	41.5344	116.0341	41.5348	116.0324
<i>Papoose Ck.</i>						

Expectations for 2003:

- Complete and update data sets and enhance department's GIS education and capabilities for making data layers and maps.
- Conduct Proper Functioning Condition assessments, focusing on streams with redband trout.
- Further protect riparian areas that are not in Proper Functioning Condition
- Monitor evaluated streams in early spring for spawning fish and monitor habitat condition.
- Protect springs flowing into Little Sheep Creek and focus enhancement work on upper 3-5 miles of the creek.
- Enhance Lamb's Reservoir.
- In coordination with the Shoshone Paiute Tribes' TEPP department, particularly technical staff including an environmental engineer and water quality technician, restore riparian areas and improve road crossings on Skull Creek and the North Fork of Skull Creek; implement a bird monitoring program in the Blue Creek

wetlands area, and collaborate with the TEPP department in wetlands delineation and inventory for further protection.

Objective 2: *Protect and repair natural springs*

Strategy: Increase water flow from springs that provide pool habitat/cold water refuges for trout in late summer; improve water quality; provide cold, clean water to Owhyee River and tributaries

- Actions:**
1. In cooperation with Western Shoshone Cattlemen's Association, evaluate habitat to determine priority spring Enhancements.
 2. Erect enclosure fences at these springs and install gravity flow water troughs (fencing is approximately a 50yards x 50yards square—depending on number of spring heads and size of springs. A 1 ½" black PVC pipe is run from the spring head outside the enclosure fence and into a USFS specs 250gallon water trough).
 3. Implement maintenance of spring work (including inspection and repair of fencing; inspection of spring area and reseeding if necessary; inspection of water trough and pipe; photos of spring areas); this is also done in cooperation with the Western Shoshone Cattlemen's Association.

Deliverables from Objective 2:

Accomplishments:

- Redband were observed in one of the cold-pool refuges springs supply on Little Sheep Creek during late August of 2001. The stream was dry in over 90% of its length except for the areas where the springheads were protected and flowing into the stream. We have also observed Mule deer and various bird species utilizing the drinking troughs.
- Springs in 7 areas (Parker Spring, Skull Creek Spring, Three Stooges Spring, Rye Grass Trail springs, Sugar Loaf Spring, South Cleveland spring, and springs at Willis Meadow) were protected with fencing, troughs were installed, and willows were planted.
- Existing enhancements were maintained with the help of the Western Shoshone Cattlemen's Association (fencing and troughs inspected and repaired, rock jacks and steel posts added to fences, troughs braced and cleaned, photos taken, troughs turned off for winter months) (See Figure 14: Maintenance).
- At Stranger Springs, White Gate, Sugar Loaf, Spring Creek, Crane's Nest, Watch-A-Bob, Spring Creek, and Antelope Springs, pipes and railroad ties were added on to troughs as braces.
- At the Three Stooges trough, pipes were installed to initiate better flows.

Figure 14: Maintenance (Rock jack added and trough braced)

Expectations for 2003

- Collaborate with TEPP to develop a comprehensive water quality monitoring plan for enhanced springs.
- Develop a monitoring program for enhanced areas in order to evaluate trends in enhanced areas; plan will include photopoints, vegetation diversity indices, GIS data layers and mapping, and the above-mentioned water quality monitoring plan.
- Collaborate with Western Cattlemen's Association to continue maintenance on existing enhancements as well as prioritize further enhancements.
- Protection of Mary's Creek Headwaters.

Objective 4: *Collect water quality and fisheries data from streams and river; collect range data*

Strategy: Create database with water quality, fisheries, and range information

- Actions:**
1. In cooperation with TEPP, collect water quality data to include: Dissolved Oxygen; Temperature data; BOD; pH; Invertebrate and phytoplankton samples; qualitative data .
 2. Collect fisheries information on Owyhee River and tributaries, including population estimates; egg and parr survival; length/weight frequencies; and species composition in conjunction with the BPA Assess Resident Fish project (number 2000-079-00).

Deliverables:

Accomplishments:

- Streams were walked to observe salmonid spawning, to complete redd counts, and locate fish barriers.
- Streams were electro-fished and snorkel surveys were conducted to estimate egg-parr survival and to obtain population estimates; these estimates helped in determining management decisions as well as aided us prioritizing habitat enhancement/restoration projects; this work was done in coordination with the BPA Assess Resident Fish project.
- See Figures 5-13 under Objective 1.

Expectations for 2003:

- In coordination with the Shoshone Paiute Tribes' TEPP department, particularly technical staff including an environmental engineer and water quality technician, develop a unified approach to water quality sampling on the DVIR including testing for bacteria levels as well as the usual biological and chemical indicators; intensively sample the East Fork of the Owhyee River for inorganic contamination of fish, sediments and water; become more involved with the Rio Tinto Mine Working Group and Technical Group.
- In cooperation with TEPP and the Western Shoshone Cattlemen's Association, develop a map of all range fences on the DVIR.
- Develop a more comprehensive monitoring plan for enhanced areas in order to evaluate trends in enhanced areas; plan will include water quality monitoring, photopoints, vegetation diversity indices, waterbird monitoring, and GIS data layers and mapping.
- Proper Functioning Condition Assessments of streams.

Objective 5: *Outreach and education*

Strategy: Increase community involvement and support for projects through Education.

- Actions:**
1. Get involved in Tribal Summer Youth Program to give students on-the-job experience while teaching ecological concepts, data management and evaluation skills, and skills in computer software and internet use.
 2. Involve students in planting trees in Arbor Day ceremony.
 3. Sustain relationship with local Boy Scout troupe.
 4. Write articles for the Sho-Pai News, a local paper.
 5. Coordinate community meetings to involve public in our projects.
 6. Write monthly reports for Tribal Administrator, Tribal Council, and Tribal Chairman; participate in monthly Full Council public meetings.
 7. Maintain relationship with the Western Shoshone Cattlemen's Association.

Deliverables:**Accomplishments:**

- In this performance period, we have hosted more than 15 youth, each employed for 6 weeks through the Tribal Summer Youth Program; each student accompanied a biologist or technician in the field while also learning office/data management and evaluation /computer software/internet/reporting skills; their wages were paid by the Tribes.
- The local Boy Scout troupe accompanied the fisheries biologist in the field to electro-fish for a redband trout presence/absence survey.

- The local Boy Scout troupe worked with our department to carve and paint signs indicating the names of the major tributaries to the East Fork of the Owhyee River, and the signs were set up along the highway at each confluence.
- Students planted hybrid poplars in an Arbor Day Ceremony and were involved in environmental science-based games and instruction.
- Our department has held several community meetings this year to inform the community about our projects and to gather ideas about.
- Our department meets monthly with the Tribal Council and Tribal Chairman to keep them informed of our projects; we also write monthly reports for the Tribal Administrator and the Tribal Council and Chairman for the monthly Full Council public meetings.
- Seven articles were written for the Sho-Pai News, a local community newspaper, about our Habitat Enhancement projects.
- Western Shoshone Cattlemen's Association maintained their involvement in our projects and we maintained clear communication and a symbiotic relationship.

Expectations for 2003:

- Implement a volunteer bird monitoring program with youth, community, and travelers in the Blue Creek wetlands area.
- Coordinate with TEPP to deliver more educational, rather than simply informational, articles to the local Sho-Pai News paper .
- Coordinate with TEPP to help students design, implement, and craft a report for the science fair involving water quality and fishery health on the DVIR.
- Maintain relationship with local Boy Scout troupe and develop Habitat Enhancement-related project with troupe leader.

Objective 7: *Reports to BPA*

Strategy: Keep BPA, ratepayers, and general public informed of our projects.

- Actions:**
1. Quarterly reports to BPA.
 2. Annual Reports to BPA.