2007 UPPER JOSEPH CREEK RESTORATION PROJECT
BPA Contract #33368
BPA Project #1992-026-01

Completion Report
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Abstract
The 2007 Upper Joseph Creek Restoration Project was successfully completed from August - November, 2007. One hundred forty-two instream structures were modified using an excavator along 8.0-miles of Chesnimnus and Elk Creeks to allow for complete juvenile fish passage and appropriate channel form and function to develop. Road decommissioning activities took place along the entire length of the Peavine Trail, from the north-end trail bridge, 4.6 miles downstream to the 4670 road junction. All culverts were removed and replaced with fords or drain dips, the road was narrowed along its entire length, and all previous riparian exclosure fences rebuilt on the east side of the creek.

Introduction
The project was designed to improve instream habitat and riparian areas for threatened steelhead and a variety of other wildlife species within the Upper Joseph Creek Watershed (now called Chesnimnus Creek). Modification of in-stream structures and road decommissioning activities in combination with monitoring were proposed to enhance the existing condition. Project need and design were developed through site-specific observations by fish biologists, wildlife biologists, hydrologists, as well as recommendations developed through the Upper Joseph Creek watershed assessment.

Instream Structure Modification From 1976 to 1989, the USFS installed 43 gabion and 60 log instream structures along 6.5 miles of Elk Creek. Gabion instream structures consisted of a row of gabion baskets that spanned the entire stream and were keyed into the floodplain. The log instream structures consisted of a single 20-40 ft long log, 1-2 ft in diameter, or a series of smaller diameter logs stacked and pinned on top of each other to reach the height of bankfull or higher. The logs were placed perpendicular to streamflow, and secured in place with each end buried in the bank and topped by a gabion basket. Wire mesh and geo-textile material were placed in the streambed extending 3 ft upstream from each gabion or log ISS to keep water flowing over the structure. The instream structures were trapping sediment and bedload upstream, creating large scour holes in the channel and eroding banks downstream of the structures. These structures that were previously thought necessary for channel stability were really causing permanent channel **instability**. In other words, an inappropriate channel form – a step-pool channel more suited to a higher gradient stream – had been forced on a lower gradient pool-riffle stream and the hardened nature of the structures (burial in the streambanks with gabion baskets on top) was preventing the channel from developing appropriate dimensions.

Similar to Elk Creek, instream structures in Upper Chesnimnus Creek were installed in the mid-1980s to provide scour holes for fish rearing habitat, slow stream incision and increase the amount of large woody debris in the system. These, too, were inappropriate structures for the existing C-type pool-riffle morphology, causing excessive bed and bank scour on the downstream side of the

structures and often proving barriers to juvenile fish passage. The logs in Chesnimnus Creek were larger than in Elk Creek: 40-50 ft long and 1.5-2.5 ft in diameter. They were placed in the same configuration as Elk Creek: straight across the creek with gabion baskets on either side and wire mesh and geo-textile material in the streambed.

This is the third phase of a 3-Phase, 3-year, effort to modify these instream structures and improve juvenile fish passage and hydrologic processes in the UJC watershed. Phase I, completed in 2005, involved modifying 39 structures in Segments A and B of Chesnimnus Creek and 41 structures in Swamp Creek. Phase II, completed in 2006, involved modifying 25 structures in Segment C of Chesnimnus Creek, 25 structures in Peavine Creek and 41 structures in Devils Run Creek. Phase III, completed with this project, involved modifying 52 structures in Segment F of Chesnimnus Creek and 90 structures in Elk Creek.

Peavine Trail Forest Service road 4660 was converted to Peavine Trail #1657 in 1992. It is 4.6 miles in length. At the north end of the trail, an OHV bridge was installed that connects the trail to the 4665 road; at the south end, a locked gate was installed and a few boulders were placed with the intent to prevent full-size vehicle use. The road-to-trail conversion was incomplete: all 22 culverts were left in place and the roadbed left at the standard FS level II road-width of 12 feet. In addition, the boulders were moved at the south entrance, allowing access to full-size vehicles. Thirteen of the 22 culverts were 50-100% plugged, 6 of which connected tributary flow to Peavine Creek. A moderate rainfall or snowmelt event in the watershed could have caused culvert failure, delivering a large amount of sediment to a stream that provides important habitat for threatened steelhead trout and destroying part of the OHV trail.

Methods and Materials

Methods and materials for each project component are described below (Table 1).

Table 1. Methods and Materials for 2007 Upper Joseph Creek Restoration Project.

Project Component	Materials Description	Accomplished by:
Instream Structure Modification	Map, GPS, wire, fence pliers, fence stretcher, and thumbed excavator	Contractor and USFS employee
Peavine Trail Conversion	Excavator, grader, dump truck, ATV, fencing tools	Contractor

Project Description

A comparison of the 2007 original BPA contract tasks and the final accomplishments are listed in Table 2 and displayed in Figures 1 and 2.

Table 2. Summary of work performed in Upper Joseph Creek, 2007.

Tasks	Location	Date	Final Accomplishments	Original Contract	Difference
Instream Structure Modification	T02N, R45E, Sec.'s 4, 9, 16, 21, 28 & 33; T03N, R47E, Sec's 16, 17 & 21	08/07	142 structures; 8.0 miles	142 structures; 8.0 miles	none
Peavine Trail Conversion	T03N, R46E, Sections 17, 8, 5; and T04N, R46E Sections 29 & 32	09-11/07	4.6 miles trail narrowed; 25 culverts removed; seeding/mulching; fence moved/repaired	4.6 miles trail narrowed; 22 culverts removed; seeding/mulching; fence moved/repaired	+3 culverts

Figure 1a. Map 1 of modified instream structures in Elk Creek, 2007.

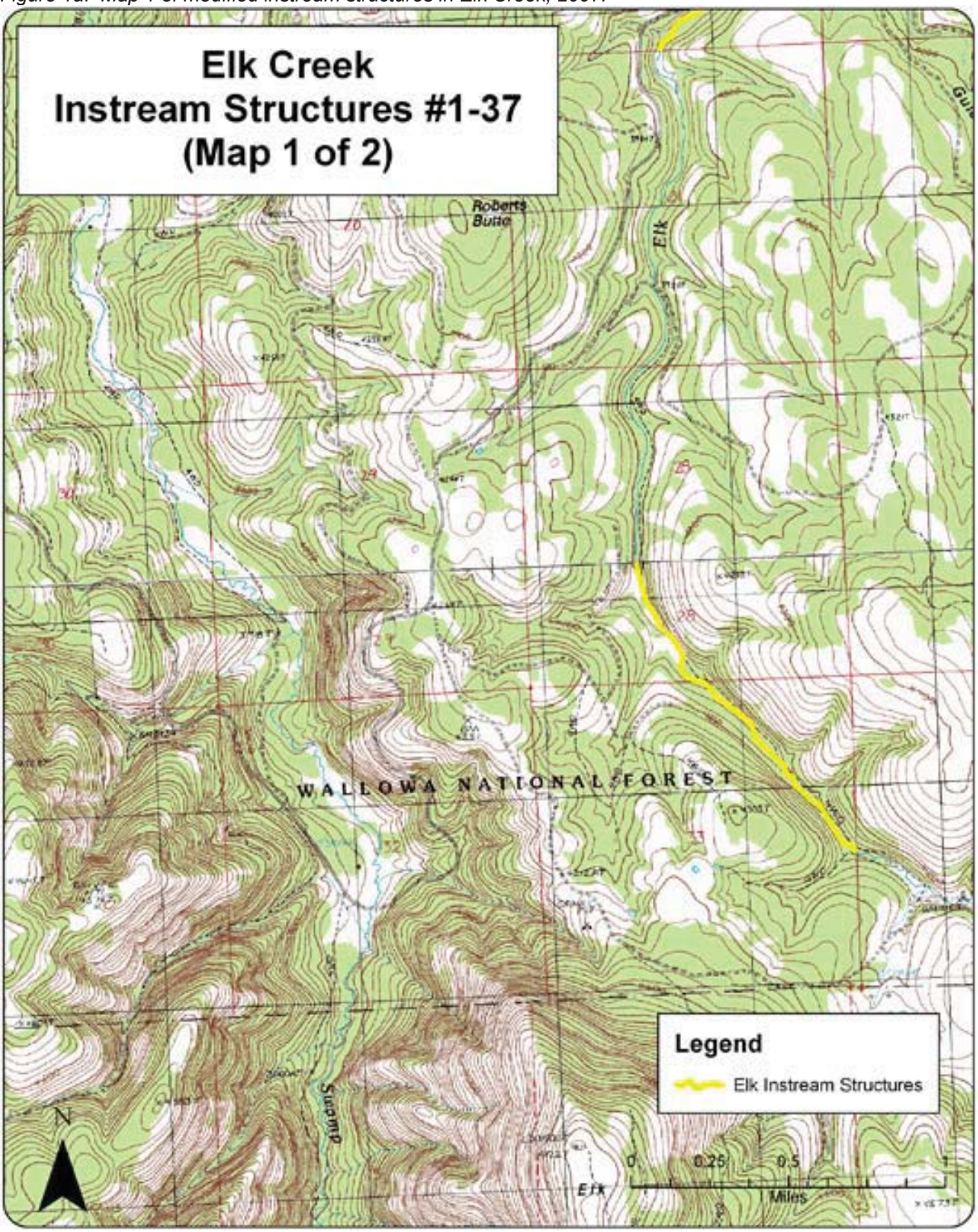

Figure 1b. Map 2 of modified instream structures in Elk Creek, 2007.

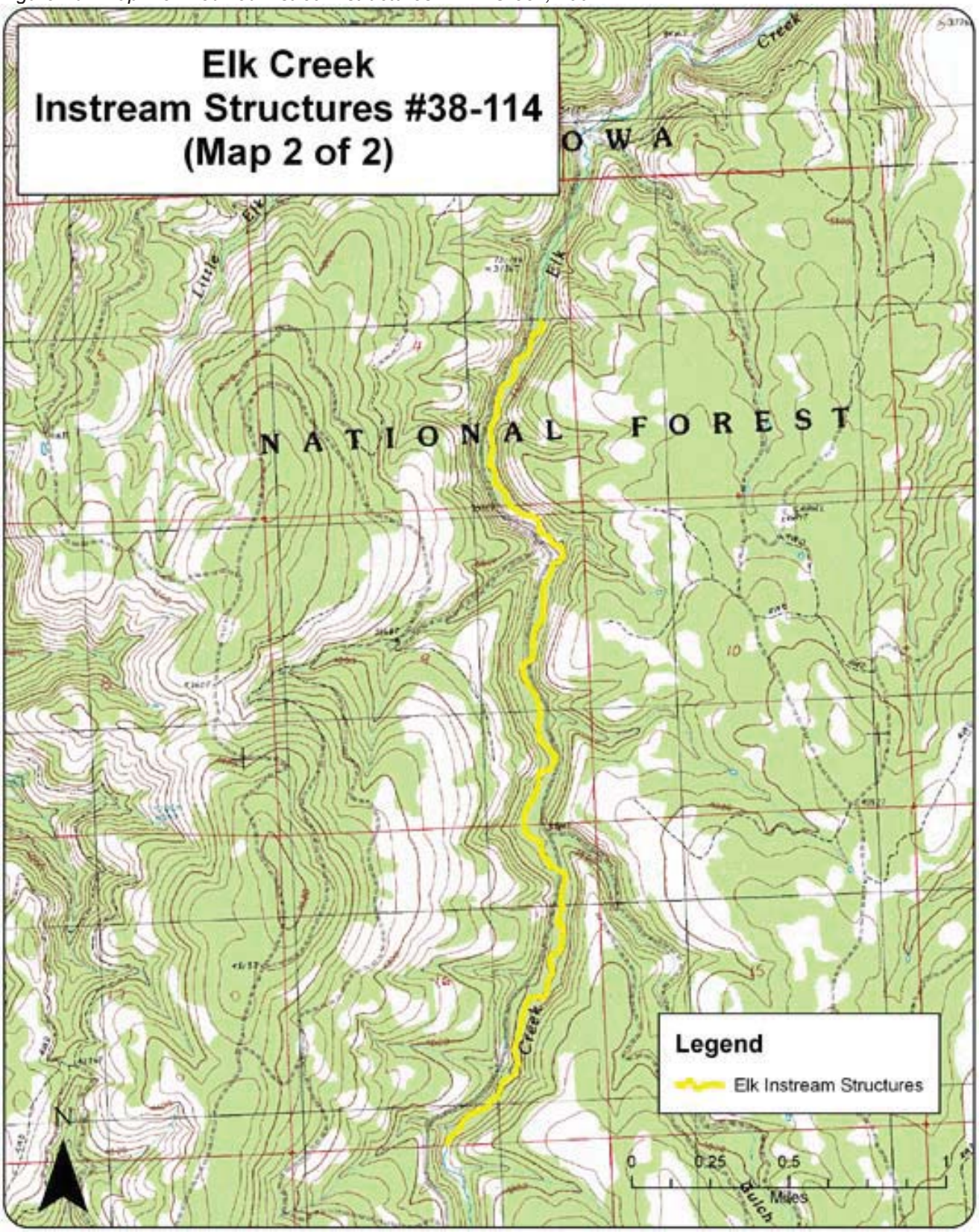

Figure 1c. Map of modified instream structures in Chesnimnus Creek, 2007.

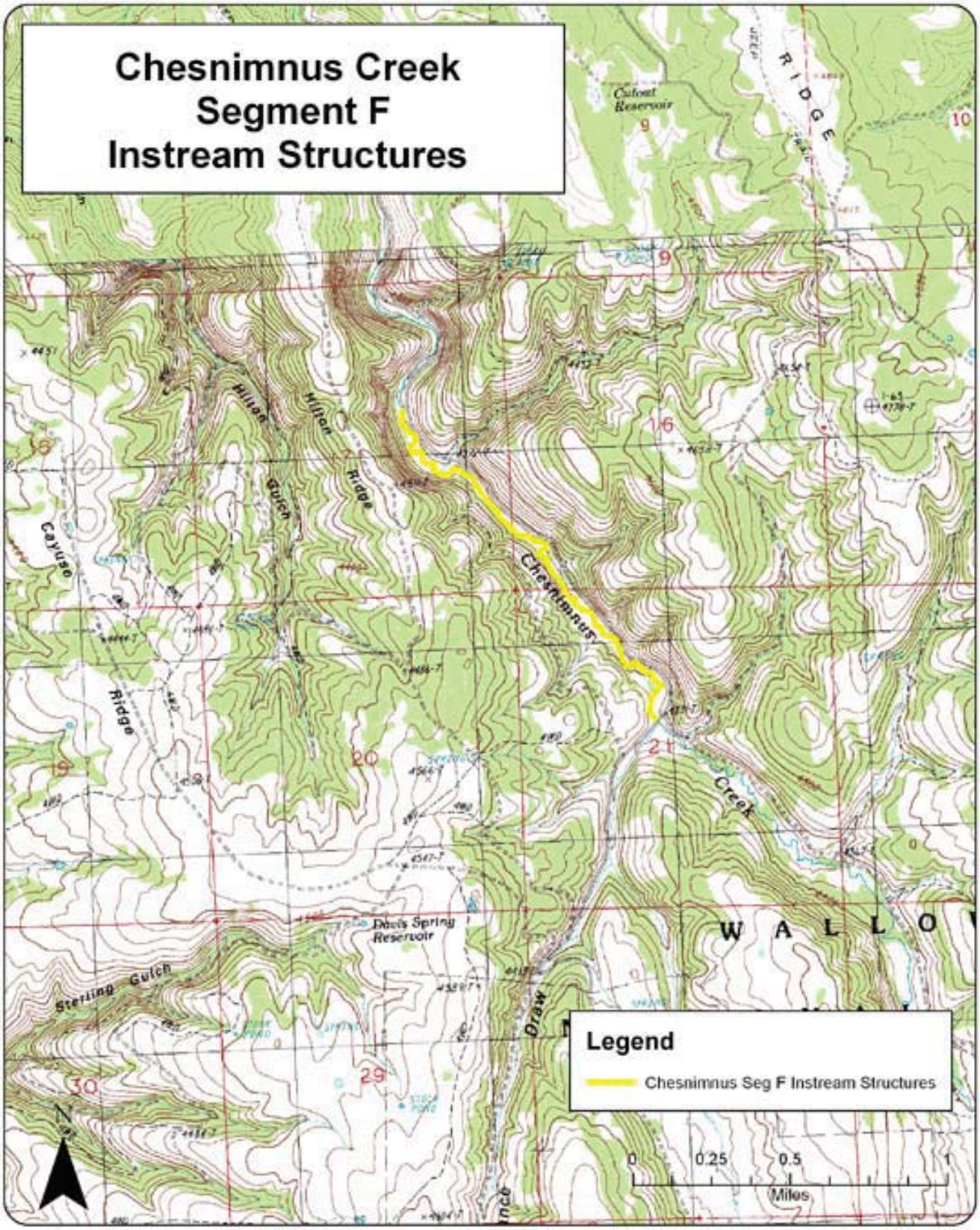

Figure 2. Map of Peavine Trail Conversion, 2007.

Project Participants

Table 3. Summary of 2007 Upper Joseph Creek Restoration project participants, responsibilities and fiscal contributions.

Participant	Responsibilities	Fiscal Contribution
Wallowa Resources	Developed RFPs & contracts with USFS; managed contracts; wrote reports	
USFS	Developed DSL permits; assisted in developing RFPs & contracts with WR; provided oversight and inspection for contract work; wrote reports	$44,285
Grande Ronde Model Watershed	Assisted in project quality control	
Bonneville Power Administration	Fiscal contributor	$31,605
Oregon Watershed Enhancement Board	Fiscal contributor	$35,200
National Forest Foundation	Fiscal contributor	$4,940
Western Watershed Joint Venture*	Fiscal contributor	$10,000
Wallowa County Title II	Fiscal contributor	$41,581

Description of Project Area

This project is located in Peavine, Chesnimnus and Elk Creeks, T02N, T03N and T04N, R45E, R46E and R47E, in the Upper Joseph Creek Watershed, Wallowa County, Oregon. See Figures 1 and 2 in Project Description section.

Results and Discussion

Instream Structure Modification One hundred forty-two instream structures were modified along 8.0 miles of Chesnimnus and Elk Creeks in August 2007. A small, thumbed excavator was used to remove the geo-textile material and rusty wire from the streambed and reconfigure the structure logs from being buried in the banks to resting in the creek or angling into the stream from the bank. The channel was lightly graded 4-5 ft upstream to create a thalweg and provide a small transition riffle to prevent headcutting upstream of the former structure. Gabion baskets were opened and the rocks inside deposited in the overly-widened section of the creek just downstream of the former structure near one or both banks, depending on the channel morphology at each site. Empty baskets, wire mesh and geotextile material were removed from the site and disposed of by the contractor at the County landfill.

Reconfiguring the instream structures will allow for complete juvenile fish passage and appropriate channel form and function to develop in Chesnimnus and Elk Creeks and eliminate chronic erosion of the banks downstream of each structure.

Peavine Trail This project took place along the entire length of the Peavine Trail, from the north-end trail bridge, 4.6 miles downstream to the 4670 road junction. Road fill along the entire 4.6 miles was pulled back from the creek, narrowing the trail to an average of 10 feet. Six culverts were replaced with rocked fords. Nineteen cross-drains and smaller culverts were replaced with drain dips. The trail was outsloped at approximately 3%, eliminating the inside ditch. Exposed soil along the creek side of the trail was seeded with a native seed mixture and spread with chopped certified weed-free straw to reduce raindrop impact and erosion potential. All trees greater than 9”dbh on both sides of the trail were preserved, with the smaller, removed trees used as windrows along the base of the trail

* Oregon Watershed Enhancement Board and USFS combined funding

fill slope. On the uphill side of trail, smaller diameter trees were left in place at 15 ft. intervals, approximately. Approximately 2.9 miles of existing electric fence was moved upslope to the new roadbed and replaced with barbed wire to maintain current protection from livestock access. Following fence construction, travelable roadbed width was reduced to an average of 8 ft.

Culvert removal, eliminating the inside ditch, and outsloping the trail surface reduces the risk of destroying a part of the OHV trail or delivering a large amount of sediment to a stream that provides important habitat for threatened steelhead trout. In addition, narrowing the roadbed increases the accessible floodplain for Peavine Creek and eliminates full-size vehicle accessibility.

Summary and Conclusions

Instream Structure Modification The instream structures along Chesnimnus and Elk Creeks were modified as planned, creating unimpeded juvenile fish passage along 8.0 miles of stream. Over time, modification of these structures will also allow these creeks to narrow to their appropriate widths. This was the last of three phases to modify the instream structures in Upper Joseph Creek. We are extremely pleased with the results of this project. Once again, we improved our process and this year the cost per structure for these creeks was $176 – much less than the $250/structure originally estimated. This cost savings is due to several things:

- The structures in both creeks were in close proximity to each other.
- The same operator, though with different companies, performed the modifications each year, contributing efficiency.
- No whole trees were added at the structure sites nor logs buried in the streambanks.

Savings from this project component were applied to the road decommissioning portion of the project.

Peavine Trail The Peavine Trail was improved as planned, eliminating a large sediment hazard and improving the OHV experience by eliminating access by full-size vehicles. Over time, we expect excavated areas to heal with both seeded and on-site vegetation covering excavated areas. For Peavine Creek, increased access to the floodplain could potentially increase water storage and prolong base flow in the summer.

The contractor designed and implemented an erosion control method that utilized the small diameter trees removed in the trail narrowing process. Trees were placed in windrows along the base of the trail fill to trap sediment. By the time they decay and are no long effective, the new fill slope should be vegetated.

While we are very happy with the first road decommission project in Upper Joseph Creek, a few issues are worth mentioning. First, sulfur cinquefoil was present on site prior to the project. It was treated twice prior to earth moving activities, but must be monitored over time for recurrence. The USFS is aware of this and responsible for detection and treatment. Next, this project was heavily scrutinized by a few members of the Wallowa County Natural Resources Advisory Committee based on a site tour looking at only the first ¼ mile of trail. Some of the issues may have arisen due to this project's timing concurrent with the USFS Travel Management Plan. However, there are a couple of points that bear discussion.

- Much more road fill was moved than originally anticipated by the USFS and all of the contractors that attended the pre-site meeting. For future projects, we plan to utilize more accurate estimates of fill volumes based on more cross sections.
- The project was bid and paid on an hourly basis rather than lump sum. In Wallowa Resources and USFS restoration partnership since 2005, most contracts have been paid this way. It was especially crucial for this project as it was the first of its kind and there were a lot of unknowns. While we were criticized for it on this project, we believe it is crucial for project flexibility and fairness to the contractor. In addition, it has been our experience on prior projects that they are less costly paid on an hourly basis than if paid lump sum. With more experience with this type of project, we expect to move to breaking the work components into distinct bid items that can be evaluated objectively as well as reduce the risk to both parties.

Summary of Expenditures

Table 4. Summary of expenditures for the 2007 Upper Joseph Creek Restoration Project.

Item	BPA	USFS	Wallowa Resources[1]	Total
Modification of In-stream Structures				
Improving fish passage (142 old log weirs @ $176 ea)	$15,033		$10,000	$25,033
Peavine Trail Conversion				
Trail Narrowing and Culvert Removal (4.6 miles @ $11,497/mile)	$12,067		$40,821	$52,888
Mulching/Seeding/Erosion Control (9.5 acres @ $1,381/acre)		$3,000	$10,120	$13,120
Remove and Rebuild Exclosure Fence (2.9 miles @ $11,777/mile)		$9,173	$24,980	$34,153
Subtotal	**$27,100**	**$12,173**	**$85,921**	**$125,194**
WR Project Manager	$3,061		$3,800	$6,861
WR Indirect Expenses	$1,444		$2,000	$3,444
USFS Personnel		$27,260		$27,260
USFS Indirect Expenses		$4,852		$4,852
Total	**$31,605**	**$44,285**	**$91,721**	**$167,611**
Original Contract	$31,605	$32,112	$76,000	$139,717
Percent of Expenditure	**19%**	**26%**	**55%**	**100%**

[1] Funding sources: USFS/OWEB Joint Venture Funds, Title II, NFF, OWEB

Photo Monitoring – Elk Creek Instream Structure Modification

Elk structure #61, gabion weir, pre-2003 modification by hand

Elk structure #61, post-2003 modification by hand

Elk structure #61, pre-modification by machine; Aug 2007

Elk structure #61, post-modification by machine; Oct 2007

Photo Monitoring – Elk Creek Instream Structure Modification

Elk structure #85, log weir pre-hand modification; Jul 2003

Elk structure #85, post-hand modification; Jul 2003

Elk structure #85, post-modification by machine; Oct 2007

Photo Monitoring – Chesnimnus Creek Segment F Instream Structure Modification

Chesnimnus segment F, Reference Reach; Jul 2007

Ches seg F str #52, log weir pre-modification; Aug 2006

Ches seg F str #52, log weir post-modification; Aug 2007

Photo Monitoring – Chesnimnus Creek Segment F Instream Structure Modification

Ches seg F str #46, log weir pre-modification; Jun 2007

Ches seg F str #46, close-up view showing downstream scour

Ches seg F str #46, geo-textile removal during modification

Ches seg F str #46, post-modification; Aug 2007

Photo Monitoring – Peavine Trail Conversion

French Gulch culvert before decommissioning; May 2006

French Gulch after removal, but before rocking; Oct 2007

Peavine Trail narrowing in progress; Oct 2007

Peavine Trail narrowed with windrows (L) and filled inside ditch (R)