

## Restoration of Little Prickly Pear Creek at Sieben Ranch, Montana

Status Report for PPL-Montana FERC Project 2188

MoTAC Project 760-13

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January 2015

The project is located on Little Prickly Pear Creek approximately 20 miles north of Helena (Figure 1).In 2011 high mountain snow pack and spring rain caused flooding in central Montana. On June 9, 2011 peak stream flow in Little Prickly Pear Creek reached 2460 cfs which was the highest flow since 1975. Little Prickly Pear Creek overfilled its banks and caused considerable erosion at the BNSF Sieben siding located approximately 13 miles upstream of its mouth (Figure 2, Figure 3). The stream eroded the railroad grade and began to flow underneath the railroad tracks. Considerable erosion is occurring at the sites where the stream crosses under the railroad tracks. The purpose of this project was to restore the stream to a single properly functioning channel that is valuable habitat for rainbow trout, brown trout, mountain whitefish and white suckers.

Little Prickly Pear Creek is an important spawning tributary for the Missouri River trout fishery. It enters the Missouri River approximately 2 miles downstream from Holter Dam. Past studies of trout spawning show that 44-54% of the rainbow trout that spawn in the Missouri River use Little Prickly Pear Creek (Grisak 1999, Grisak et al, 2012) and 51% of the brown trout from the Missouri River use Little Prickly Pear Creek for spawning (Grisak 2011). Leathe and Hill (1988) reported that 15,000 rainbow trout use Little Prickly Pear Creek for spawning.

This spawning tributary is of vital importance to the Missouri River trout fishery. Angler use statistics from 1991-2009 show the Missouri River –section 9 (Holter Dam to Cascade) has a mean 91,100 (range 62,000-123,000) angler days per year. During the same time period, this fishery ranked in the top five fisheries in the state and was the number one fishery in Montana in 2001. Economic statistics for this fishery during the same time period show the mean annual revenue generated by this 30 mile reach of river was \$8.6 million (range 4.9-12.1).

There are 3 sites that require channel alterations (Figure 4). Site # 1 (Figure 5) involves armoring an 126 foot section of LPP Creek where it is eroding into the rail road grade and in jeopardy of destroying a fence (Figure 5). Site #2 (Figure 6) involves constructing 490 feet of new channel, installing a natural log/rock plug to prevent the stream form capturing an historic channel, install a gradient control structure to prevent the stream from headcutting upstream of this site, and remove a portion of a point bar at the lower reach of this meander. Site #3 (Figure 7) involves constructing 2,992 feet of new channel, abandoning the old channel, repurposing overburden into the old channel, installing two grade control structures in the lower reach of the new channel, installing log/rock armor in the outside bends of the newly constructed meanders.

We proposed to install 3400 feet of three strand high tensile steel wire fence along the east border of the stream corridor (Figure 4). This fence will connect with two existing fences and safeguard the riparian zone from livestock encroachment.

We proposed to install 1375 feet of three strand high tensile steel wire fence along the west border of the stream corridor (Figure 4). This fence will connect with existing fences and serve to keep cattle out of a spring, out of a large mud flat created by the 2011 flood, and out of the current stream channels. This fence reach will have a livestock water

gap near the historic railroad siding to provide water for livestock. The water gap would consist of a narrowing fenced area that reaches to the water's edge and is fortified with rock to support the weight of livestock.

In December 2012 MoTAC approved \$88,143 for the realignment and restoratuion of Little Prickly Pear Creek at the Sieben Ranch. In 2013, PPL hired Hydromentrics to conduct a topographical survey of the project area and develop plan view drawings with stationing as a requirement of the ACOE permit (Appendix A). In 2013 FWP and PPL secured Railroad Protective Liability Insurance from the BNSF insurance underwriter Jones Lang and LaSalle.

After securing the regulatory permits from MFWP (124), ACOE (Nationwide 27) and Montana DEQ (318, 401), the project began in February 2014 (Figure 8, Figure 9, Figure 10, Figure 11). Frozen ground provided an ideal base to operate heavy equipment but also required additional equipment time to deal with frozen ground.

Construction of the 3,000 feet of channel (Site 3) proceeded over the next 45 days. On March 7, 2014, mild air temperatures caused mid level snow to melt and flood the project area (Figure 12). Construction proceeded through the end of March to finish sites 1 and 2. The project was completed in April 2014 (Figure 13-19). A fencing contractor installed 4,700 feet of three starnd high tensile steel electric fence (Figure 20). A water gap was constructed on the west side of the project area (Figure 21). Monitoring for permitting compliance began in October 2014 and will continue for 2 more years.

				total
PPL Montana	Cultural survey	1,835		
	BNSF Insurance	1,000		
	Hydrometrics survey & plans	6,778		
	McNeal – survey, design, oversight	31,991		
	StreamWorks - construction	113,519		
			sub	155,213
Sieben Ranch	Materials – rocks, gravel, willow, logs	3,200		
	Fencing contractor labor	1,500		
			sub	4,700
MFWP	BNSF – occupancy permit	600		
	Fencing materials	700		
	Grass seed	450		
			sub	1,750
Missouri River Flyfishers	Fencing materials	2,000		
			sub	2,000
Pat Barnes Trout Unlimited	Fencing materials	2,000		
			sub	2,000
Montana DOT	Construction - ROW protection	4,400		
			sub	4,400
				169,973

Cost summary by contributor for Little Prickly Pear Creek restoration at Sieben, Mt. 2014.



Figure 1. Location of the proposed project, Little Prickly Pear Creek, Sieben Ranch, Sieben, Mt.



Figure 2. LPP Creek at Sieben showing erosion into BNSF railroad grade and stream flowing through railroad ties. site #3 Sieben, Mt.



Figure 3. LPP Creek erosion into BNSF railroad grade construction site #3, where stream returns to historic channel, Sieben, Mt.



Figure 4. Project overview of Little Prickly Pear Creek. Red dashed lines show alignment of new fence. Sieben Ranch, Sieben, Mt.



Figure 5. Site # 1 showing erosion into the railroad bed, fence that is compromised and location of 2 channels.



Figure 6. Site # 2 showing conceptual locations of grade control structure, debris plug to eliminate old channel, bank stabilization using willow clump/lift.



Figure 7. 2011 aerial photo of the lower reaches of LPP near Sieben showing site where channel was abandoned and is eroding, conceptual new channel alignment (red dash line), plug sites for old channel, and grade control locations. Not to scale.



Figure 8. Excavators shaping new channel for Little Prickly Pear Creek, Sieben Ranch, February 2014.



Figure 9. Excavator installing a gradient control cross vane for Little Prickly Pear Creek, Sieben Ranch, February 2014.



Figure 10. Aerial photo of LPP Creek near Sieben showing the active channel with new channel being constructed. February 2014.



Figure 11. Excavator diverting water into the new channel for Little Prickly Pear Creek, Sieben Ranch, March 2014.



Figure 12. Photo of LPP Creek near Sieben showing the new channel conveying flood flows. March 2014.



Figure 13. Aerial photo of LPP Creek near Sieben showing the new channel with the old channel decommissioned. April 2014.



Figure 14. Little Prickly Pear Creek new channel. Outer bend #1 monitoring point April 2014.



Figure 15. Little Prickly Pear Creek new channel. Outer bend #1 monitoring point August 2014.



Figure 16. Little Prickly Pear Creek new channel. Outer bend #2 monitoring point April 2014.



Figure 17. Little Prickly Pear Creek new channel. Outer bend #2 monitoring point August 2014.



Figure 18. Little Prickly Pear Creek new channel. Outer bend #3 monitoring point April 2014.



Figure 19. Little Prickly Pear Creek new channel. Outer bend #3 monitoring point August 2014.



Figure 20. Riparian fence at Little Prickly Pear Creek restoration section, Sieben Ranch, Montana. August 2014.



Figure 21. Aerial photo of water gap on west side of project area. Little Prickly Pear Creek, Sieben Ranch, Sept 2014.

