

#### **(4) Camp Creek Log Weir Removal And Large Wood Placement Project (2011-2014)**

Malheur National Forest, Blue Mountain Ranger District, Bob Hassmiller, Zone Hydrologist.  
Case study prepared by Dan Armichardy, United States Forest Service

##### ***Location and Description***

Camp Creek is a 6th order creek that drains into the John Day River Basin. The John Day River Basin is considered the “most biologically diverse river system and a globally important stronghold of wild salmon” because the John Day River is the longest free-flowing river in the Columbia basin, and is mostly devoid of hatchery influences. The Camp Creek watershed has been rated as high priority for habitat protection and restoration within the subbasin by the Mid-Columbia River Steelhead Conservation and Recovery Plan. This Plan identified limiting factors that impact steelhead production and ecohydrological processes and functions in the Camp Creek watershed: degraded riparian communities, floodplain connectivity and function, channel structure and complexity, water quality (stream temperature), and altered hydrology and sediment routing, all of which are integrally related and play critical roles in the creation and maintenance of quality fish habitat. Past practices of beaver trapping, heavy livestock grazing, riparian logging and associated railroad grade construction in the valley bottoms are the dominant actions that disrupted process and functions and led to the listed limiting factors. Camp Creek is considered the highest priority watershed by The John Day Subbasin Revised Draft Plan. In response to these designations a 2008 Watershed Restoration Action Plan (WRAP) was developed as a road map to complete high priority restoration projects. These projects have been planned with the intent to meet the desired conditions stated in the WRAP. Threatened Mid-Columbia River summer steelhead and spring Chinook salmon, take up residence in Camp Creek and its tributaries during various life stages. Summer steelhead adults use Camp Creek and its tributaries as crucial spawning grounds from April through June. The fry emerge by mid-July, and the juveniles reside in Camp Creek and tributaries for 1 to 3 years, migrate to the ocean, and return as adults to spawn. Spring Chinook adults spawn in the lower reaches of Camp and Lick Creeks. Juveniles use the habitat for 1 to 2 years, and then make their way to the Pacific Ocean. Chinook juveniles hatched in the Middle Fork John Day River use Camp Creek as thermal refuge during the hot summer months when the Middle Fork John Day River temperatures rise.

One of the primary goals identified within the Camp Creek WRAP included the removal of approximately 238 log weirs within Camp Creek watershed. Large wood structures and trees with rootwads were placed in Camp Creek within the same vicinity of log weir removal in 2011 (see Figure 47). 123 log weirs were removed or modified during this work in the lower sections of Camp Creek.

##### ***Restoration Objectives:***

- Reduce the width of the active channel
- Increase floodplain connectivity
- Increase roughness to induce gravel deposition

- Increase area of quality pool habitat

Stream channels within the reaches where log weirs were located have narrowed and vegetation has colonized exposed stream banks. The majority of pools created through excavation have been maintained by instream wood. Gravel sorting is evident throughout the reaches that were predominantly plane bed with an armor layer of cobble that functioned as a transport reach (slope 0.017). Based on this evidence the project continues to improve Mid-Columbia River Steelhead habitat deficiencies identified within the Camp Creek WRAP.

### ***Unforeseen Benefits***

In 2014, beaver moved into a portion of Camp Creek where log weirs were removed, pools were excavated, and wood was added (see Figures 51 and 52). While historical beaver evidence was present within Camp Creek, transient beaver activity and dams have been noted but no prior large dams, such as those observed in 2014, were documented within lower Camp Creek. Many of the dams that appeared in 2014 were keyed into placed wood or boulders for added stability and persistence (Figures 48-50). Additionally the beaver dams backwatered the placed wood structures and the excavated pools increased the depth upstream of the dam to over 5 feet in places. Observations indicate beaver are using the wood structure locations as dens and the deep excavated pools as food caches for over wintering. During the spring of 2015, several smaller dams were breached leaving large gravel patches (built by beaver for dam construction). Several steelhead were observed constructing redds in these breached areas. This provides an example of combined salmon/beaver because the same limiting factors affecting salmonids may also be limiting beaver – the two are not exclusive, but share a common beneficiary relationship. Dams anchored to large wood tended to be taller, had more internal stability and had a larger hydrologic zone of influence (see Figures 48 and 50).



**Figure 47:** Log Weir Removal from Reach 4 of Camp Creek before (top left), immediately after (top right), and 3 years later (bottom)



**Figure 48:** Medium size (< 12 inch) diameter ponderosa pine placed in mid-channel in 2011 following log weir removal. Beaver dam has incorporated rootwad into center of dam (6/15/2014).



**Figure 49:** Existing rock placed mid-channel during log weir removal 2011 has been incorporated into beaver dam (6/15/2014)



**Figure 50:** Beaver dam with rootwad incorporated (12/15/14)



**Figure 51:** Smaller beaver dam built at pool tail out without wood (12/15/14).



**Figure 52.** Valley bottom being inundated with moderate flood because of beaver dam influence (12/22/14). Same dam as Figure 52.