



Restoration Effectiveness Blackwood Creek – Reach 1



Research shows that Blackwood Creek has one of the highest sediment loads to Lake Tahoe. A Blackwood Creek TMDL (EPA, 2008) supports actions to restore aquatic habitats in degraded stream segments. The Lake Tahoe TMDL (EPA, 2011) also identifies Blackwood as one of two priority streams for stream channel restoration in the Lake Tahoe Basin.

Historic aerial photos, dating back to 1939, indicate that much of the main stem channel in the valley was a narrow, sinuous stream with vigorous riparian vegetation and a well-connected floodplain. Cumulative impacts of historic grazing, road building, logging, and in-stream gravel mining in the 1960's set the stage for widespread channel and floodplain destabilization during flood events,

As a result of historic gravel mining practices in the 1960s, Blackwood Creek within Reach 1 was deepened and straightened to improve gravel extraction operations, eroding the stream bed 4 to 6 feet below the level needed to allow winter and spring flooding. The condition resulted in the “drying” out of gallery cottonwood areas and promoted conifer invasion into the riparian areas adjacent to the channel.



Construction of boulder grade control weir in Blackwood Creek

In 2010 and 2012, the USFS reconstructed 2,050 of channel and 4.5 acres of floodplain. To restore flow dynamics within Reach 1, restoration actions consisted of; constructed boulder grade control weirs and sills with boulders and importing river alluvium to raise the river bed 3 feet in elevation, re-shaping stream channels and associated floodplain, and installation of wood debris/bank protection structures. Additionally, conifers harvested for use in woody debris structures occurred on 4 acres of adjacent forest, resulting in thinning of the forest structure and improving Northern Goshawk habitat.

Restoration was designed to achieve the following objectives:

- Restore dynamic geomorphic channel stability to achieve and maintain Blackwood TMDL targets for sinuosity (1.6:1) and bank stability (80% stable banks).
- Restore functional channel/floodplain relationship with, floodplain inundation occurring every two to three years.
- Improve downstream water quality by increasing volume of fine sediment retained on floodplains and preventing wide spread cut bank terrace collapse.
- Create aquatic habitat features important to support various forms and life stages throughout the year, sufficient to restore Lahontan Cutthroat Trout to Blackwood Creek.

As a result of restoration actions channel stability and fish habitat was enhanced on 2,050 feet of channel, but over time we expect that in total 4,000 feet of channel will be enhanced (manifested as a raising of stream bed elevation), as a result of channel response upstream of the restoration features. Channel /floodplain hydrologic connectivity was restored on 35 acres of adjacent floodplain.



On December 3, 2012, two months after completion of the project, a rain on snow event resulted in flows within the project reach ranging between 700 to 900 CFS, estimated to be an 8 to 10 year frequency precipitation event. This event produced expected patterns of channel scour and deposition, including raising the base level of the stream channel above the restored reach, as desired. There were no observed failures within the restored areas.

December 3, 2012 Flood in Blackwood Creek Reach 1

Stream channel condition inventories conducted in 2013 indicate that 98% of project area banks rate as stable one year after project completion, well within the Blackwood TMDL Target. However, stream shade, one indicator of habitat quality, was only measured at 26 , well below the desired condition of 50 to 75% . It is expected that this indicator, as well as other aquatic habitat metrics will improve over time, as restoration actions result in continued deposition of sediments transported from the upper watershed, forming channel bars, and create floodplain surfaces conducive for riparian vegetation colonization.

It is expected to take approximately 5 to 10 years post project before a substantial degree of riparian vegetation change occurs.

A report documenting the short term response of restoration activities is posted on the LTBMU website: <http://www.fs.usda.gov/main/ltbmu/maps-pubs> (Blackwood Creek Stream Channel Restoration Reach 1-First Year Post Project Performance Monitoring, 2013)