



Restoration Effectiveness in Cookhouse Meadow



In 2005 and 2006, the USFS implemented a stream channel/floodplain restoration project in Big Meadow Creek through Cookhouse Meadow, located adjacent to Highway 89 just below Luther Pass. Restoration activities included the construction of 2,400 feet of new stream channel to replace 1,400 feet of existing deeply incised and eroding stream channel. The existing channel became incised over a period of 30 years, as a result of installation of a culvert under Highway 89 and over grazing, as illustrated in the photos to the right.

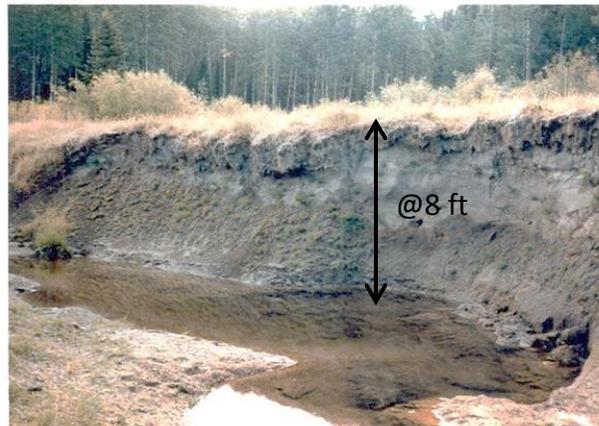
Restoration was designed to achieve the following two objectives:

- 1) Restore stream channel geomorphic function in terms of channel stability, and aquatic habitat features.
- 2) Restore surface and subsurface channel floodplain connectivity so that;
 - stream channel flows frequently flood the meadow surface resulting in the deposition of fine sediments on floodplain surfaces and;
 - seasonal ground water levels and associated capillary rise is increased in the central meadow to support growth of wet meadow vegetation during late summer, reversing the trend of dry meadow grasses and conifer invasion.

Replacement of the old channel with a new channel successfully converted the channel type from an incised channel, experiencing accelerated bank erosion and effectively dewatering the meadow, to a stable channel form that is now connected to the adjacent floodplain. Channel survey measurements as well as visual observations indicate that the new



Big Meadow Creek in Cookhouse Meadow -1968



Big Meadow Creek in Cookhouse Meadow - 1981

channel is maintaining both horizontal and vertical stability.

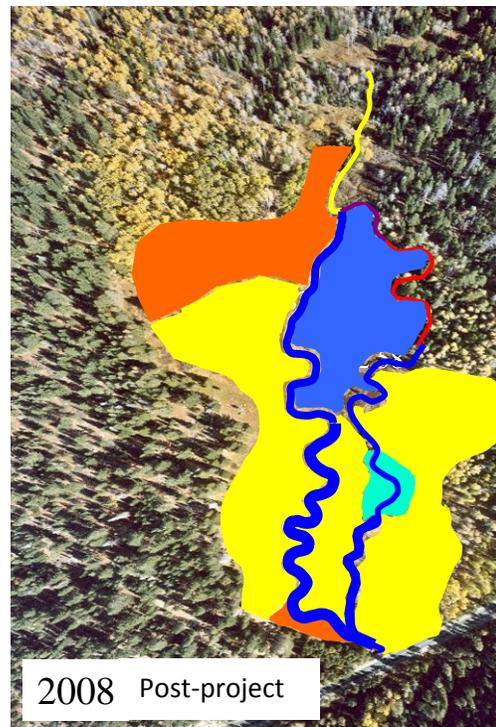
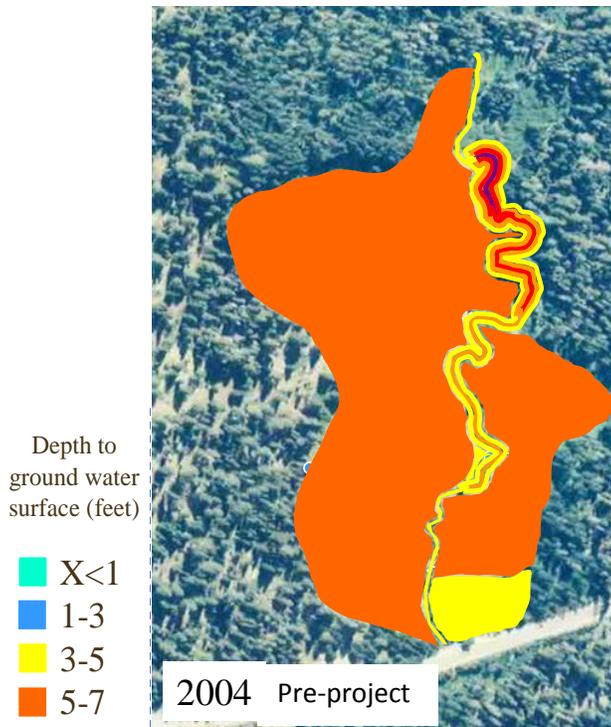
Prior to restoration out-of-bank flows had not occurred in this meadow for approximately 30 years. Some degree of over bank flooding has occurred every spring post construction, and during the record

water year of 2011, up to 3.8 acres of the meadow was flooded for approximately 70 days during spring runoff. Based on analysis of data collected after spring runoff, approximately 24 tons of fine particles (silt/clay) were deposited in the floodplain.

In addition, the restoration project has resulted in a 2 to 4 foot increase in groundwater levels, increasing the duration of available water for meadow vegetation. The images below illustrate mapped pre and post project groundwater levels, utilizing

groundwater depth measurements during the late summer period, for similar water year types (both below average).

The vegetation community responded favorably to increased groundwater. Sod harvesting, willow staking, and willow mat data indicated a high success rate (approximately 90% survival). Also long term monitoring plots to measure vegetation community response indicate an increase in the proportion of obligate and facultative wet wetland species.



Flooded Meadow during Spring of 2011



Meadow and Channel Riparian Vegetation – 2011

More information on this project can be found in the restoration monitoring report, posted on the LTBMU website: <http://www.fs.usda.gov/main/tbmu/maps-pubs> (Cookhouse Meadow Restoration Project Monitoring Report, 2009).