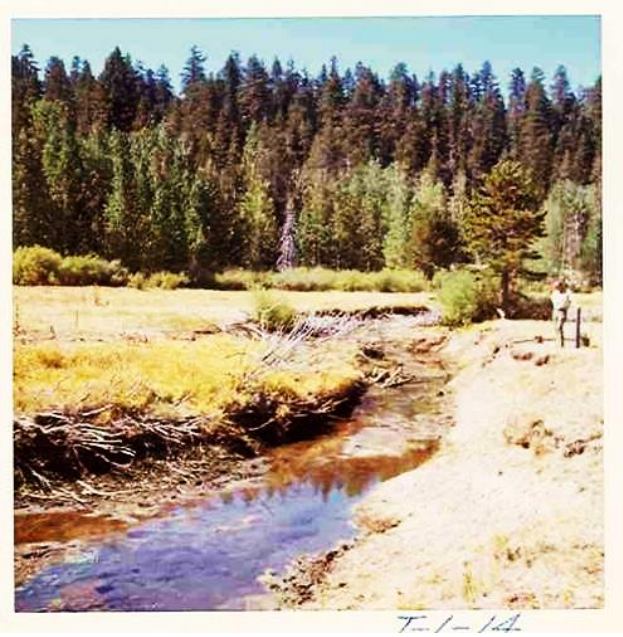
Restoration Effectiveness In Cookhouse Meadow

In 2005 and 2006, the USFS implemented a stream channel/floodplain restoration project in Cookhouse Meadow on Big Meadow Creek, located adjacent to Highway 89 just below Luther Pass. Restoration activities were the construction of 2,400 feet of new channel and obliterate 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 Highway 89 culvert and over grazing, as illustrated in the photos to the right. The USFS stabilized the site however the stream remained disconnected from its floodplain.



Big Meadow Creek in Cookhouse Meadow -1968

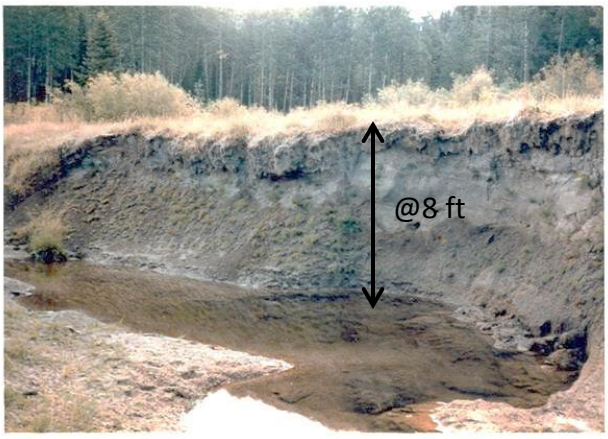
Restoration was designed to achieve the following two objectives:

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 moist to wet meadow vegetation during late summer, reversing the trend of dry meadow grasses and conifer invasion.



Big Meadow Creek in Cookhouse Meadow - 1981

Replacement of the old channel with a new channel successfully converted the channel type from an incised channel (Rosgen F4), experiencing accelerated bank erosion and effectively dewatering the meadow; to a stable channel (Rosgen C4) form that is now connected to the adjacent floodplain.

Survey measurements as well as visual observations indicate that the new channel is maintaining both horizontal and vertical stability. Point bar accretion is occurring with minimal outer bend erosion indicating a slow transition to a Rosgen E-4 stream type.

Prior to restoration, flows on the old meadow surface had not occurred in this meadow for approximately 30

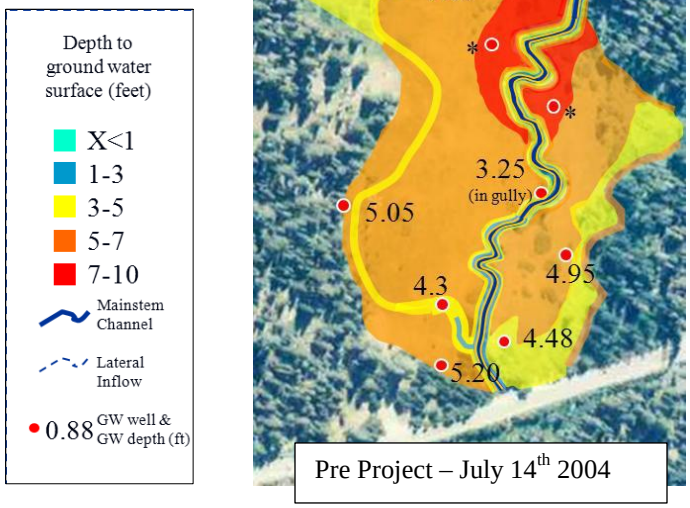
years. Some degree of over bank flooding has occurred nearly every spring post construction, and during the record water year of 2011, up to 3.8 acres of the meadow was flooded for approximately 70 days during spring runoff. Based on analysis of data collected after spring runoff, approximately 24 tons 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 substantially. Monitoring results indicate enhancement of both wet meadow flora and fauna as result.

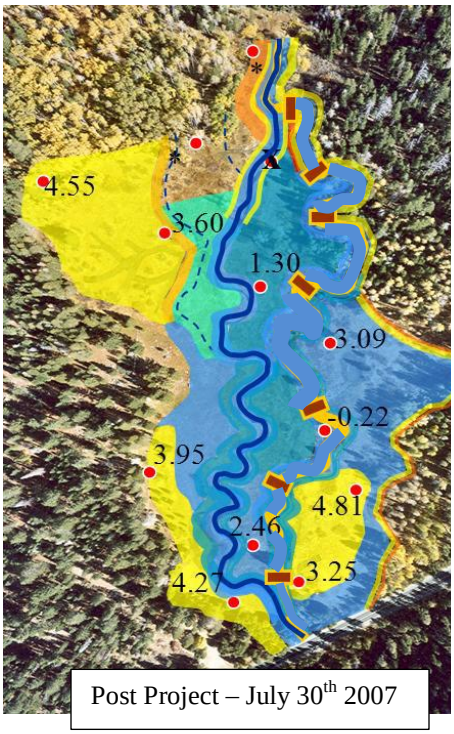
between surface topography and groundwater pattern, coupled with groundwater depth measurements during the mid-summer period, for similar water year types (both below average with 2007 well below average). Photos and transect data indicate that riparian vegetation has responded favorably to these increased groundwater levels. Data on vegetation planted or salvaged as part of the project (sod harvesting, willow staking, willow mats) indicated a high success rate (approximately 90% survival). This is partially due to initial irrigation efforts during the dry season, as well as changes in groundwater and surface water hydrology.

The images below illustrate mapped pre and post project groundwater levels, based on typical relationships

* - ground water depth exceeds six feet



Pre Project – July 14th 2004



Post Project – July 30th 2007

Flooded Meadow during June - 2011

Meadow and Channel Riparian Vegetation – July 2011

More information on this project can be found in the full restoration monitoring report, posted on the LTBMU website: http://www.fs.usda.gov/main/ltbmu/maps-pubs (Cookhouse Meadow Restoration Project Monitoring Report, 2009 & Cookhouse Meadow Restoration Five-Year Effectiveness Assessment , 2013).