SESSION 4 | ARTIFICIAL STRUCTURES AND LARGE WOOD

Timescales of Response on Streams Treated with Artificial Beaver Dams, Silvies River, OR

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ABSTRACT: There is increasing evidence to suggest that the pervasive incision seen in the American West is due, in part, to the removal of beaver (Castor canadensis) in the first half of the 19th century. New restoration strategies for these systems are focusing on the reintroduction of beaver and construction of beaver dam analogs (Pollock et al 2007, Beechie et al 2008). Such dams locally raise streams beds and water tables, thereby reconnecting incised channels to their former floodplains, trapping sediment, increasing hydraulic diversity, and promoting the development of riparian vegetation. A new method of artificial beaver dam (ABD) design and construction has been used on the tributaries to the Silvies River, an internally drained basin in Eastern Oregon with extremely high historic beaver populations and a presently recovering population. ABDs have been installed along the entirety of four different creeks in the last twelve years, providing a unique insight into the timescales of response and evolving impacts of these restoration treatments. Empirical evidence suggests large-scale conversion of upland vegetation to herbaceous wet meadows and augmented low flows.

In an effort to better understand these evolving impacts on catchment and basin-scale hydrology, geomorphology, and ecology, we are instrumenting a long-term experimental and monitoring catchment on Cottonwood Creek, a second order tributary to the Silvies River. The site is being implemented with a high density of fine-resolution hydrologic instrumentation to directly measure surface, ground, and soil water prior to and following restoration. Unique to this site is an intact beaver meadow, which will serve as a reference reach, and a deeply incised reach located on Forest Service land, which will remain untreated to serve as a "control".

As a first step, we are measuring changes in the aerial extents of surface water and vegetative communities, as well as changes to channel sinuosity, channel length, longitudinal profile, and cross-sectional profiles over the time period in which these channels have been restored. These initial data will constrain the expected timescales on which we can expect to see a response from the restorations, and better inform the design and construction of future projects.