National Park Service
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Rocky Mountain National Park
Continental Divide Research Learning Center

Effects of Beaver Dams on Riparian Areas

The Question: What is the role of beaver dams on hydrological processes in montane riparian areas?

Understanding the hydrological processes such as inundation and recharge of alluvial aquifers in riparian areas is key to proper management of rivers and watersheds. For example these processes can influence biodiversity by providing wildlife habitat for a disproportionally large number of wildlife species (i.e. birds, butterflies, small mammals, insects, and amphibians). Biologists have long assumed that beaver (*Castor canadensis*) may influence hydrologic processes in riparian areas of rivers through the building of dams. Researchers conducted this study in order to test the assumption that beaver dams play an integral role in creating and maintaining healthy montane riparian areas.

The loss of beaver populations would be detrimental to the park's riparian areas.

The Project: Measure ground water flow patterns and levels before and after the breach/ construction of two beaver dams.

During the summers of 2002-2004, Cherie Westbrook and David Cooper (Colorado State University) and Bruce Baker (USGS) used 95 pipe wells to measure subsurface water flow patterns and water table fluctuations along a one-mile reach of the Colorado River containing two beaver dams. One of the dams was constructed in October 2003, and the other dam breached in May 2004 allowing researchers to take surface and subsurface hydrologic data in the study area in the presence and absence of beaver dams.

Beaver dams, like this one, create wetlands habitat for a wide range of species.
(Photos courtesy of Cherie Westbrook)

The Results: Beaver can influence hydrological processes in streams and valleys and thus create flow patterns suitable for the formation and persistence of wetlands.

This study found that beaver dams strongly affect the hydrologic processes of the Colorado River and its floodplain and terraces near its headwaters. The beaver dams and ponds greatly enhance the depth, extent, and duration of inundation associated with floods. Additionally the investigators found that beaver dams elevate the water table during both high and low river flows and slow the decline of the water table during dry months. Unlike previous studies the researchers found that the main effects of beaver dams occur below the dam and not just at the pond created by the dam. Overall this study confirms that beavers and their associated dams play an important role in the formation, function, and persistence of riparian wetlands.

Willows (*Salix sp.*) are the primary food and dam construction material for beavers. The number of willows is markedly declining due to overbrowsing by elk (*Cervus elaphus*) and moose (*Alces alces*). The investigators of the study suggest that without management to reduce the herbivory of willows, beavers could be extirpated from the park. The Kawuneeche Valley has already seen a dramatic drop in the number of beavers from an estimate of several hundred in 1940 to a current population of around 30. The loss of beaver would be detrimental to the park because they are integral to the creation of wetland areas.

This summary is based on published, peer-reviewed and/or unpublished reports available at the time of writing. It is not intended as a statement of park policy or as a definitive account of research results.
For more information on the park's research program, see www.nps.gov/romo
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