

EFFECTS OF WATER DIVERSION IN UPPER BEAVER MEADOW
ROCKY MOUNTAIN NATIONAL PARK

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ABSTRACT OF THESIS
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Since 1907 up to 10 L/s has been diverted from Beaver Brook about 400 m upstream of Upper Beaver Meadow in Rocky Mountain National Park. The effects of this diversion on surface-groundwater interactions were investigated by installing and monitoring 32 wells, 13 piezometers, and five stream gaging stations. Peak flows above the diversion in 1994 and 1995 were approximately 60 L/s and 300 L/s, respectively, and the water diversion had little effect on surface water flow during snowmelt. However, during late summer the entire flow of approximately 3 L/s is diverted, and hillslope seepage in the confined reach between the diversion and the meadow adds less than 0.1 L/s. In 1994 the water diversion caused approximately 150 m of Beaver Brook to go dry from 10 August until 3 October when the water diversion ceased. Groundwater levels in the meadow adjacent to the drying reach fell 1.5-2.0 m while the channel was dry, and drawdown was noted up to 100 meters from Beaver Brook

Downstream of the drying reach, Beaver Brook is incised 1.5-2.0 meters into the alluvial substrate. Lateral and vertical groundwater gradients indicate that the channel gains water from the adjacent meadow during both snowmelt and

baseflow periods. Upland vegetation is encroaching onto the terrace, and dead or dying willows indicate that dewatering is changing the meadow from a hydric to a more arid environment.

Farming activities in the late 19th and early 20th centuries and the water diversion have adversely affected the health and vigor of riparian and wetland vegetation. In addition, intensive herbivory is now hindering the recovery and establishment of woody vegetation within the incision

An agreement between the National Park Service and the High Drive Water District to end water diversion from Beaver Brook should stabilize low flows and minimize groundwater drawdown attributable to occasional channel drying. The re-establishment of beaver would facilitate conversion of the meadow back to the probable pre-settlement, willow-dominated environment, but at the present time there is little available forage. Successful restoration will ultimately depend on difficult resource management decisions that will affect the balance between vegetation production and herbivory in Upper Beaver Meadow.

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