

Hydrological Assessment of the Upper Arkansas River Basin in Chaffee County, Colorado

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Abstract. Colorado's Arkansas River, with the largest drainage basin in the state, is one of four major rivers that begin in Colorado and is a vital source of water for the state. At peak flows, the Arkansas River swells by 70% through Chaffee County, in the heart of the Rockies, and only increases 20% thereafter before exiting the mountains onto the high plains near Pueblo. The production of this discharge depends on a complex natural system of snowmelt and groundwater-stream interactions, as well as numerous human interventions. The Arkansas valley in Chaffee County, from Granite to Salida, is characterized as an intermountain, high altitude, agricultural, ranching, and recreational region. Increasing demands on this stream-aquifer system have necessitated more up-to-date, integrated, and technology-driven data for water users, managers, and decision makers to optimize overall water use. To that end, this two-year study aims to better understand the regional water supply, the role of the alluvial aquifer, and any potential water quality issues. Identification of 15 new surface water monitoring sites on major tributaries and construction of 17 ground water monitoring wells coupled with 7 existing surface water sites and 6 existing wells provide locations for monthly synoptic measurements of water quantity and quality. In addition to the monthly measurements of discharge, dissolved oxygen, pH, specific conductance, oxidation reduction potential, and temperature, data collection includes quarterly sampling for dissolved ions, uranium, and selenium. Slug tests for hydraulic conductivity of the alluvial aquifers and seepage tests on selected irrigation ditches also have been conducted. Preliminary results of the seepage tests and water balance analyses suggest that ground water plays a significant role in the net surface water flows. Analysis of ground and surface water samples has confirmed generally good water quality, but with surprisingly high levels of uranium at some locations.

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