

Human-water interactions in Colorado: Evaluating the impacts of population growth, energy development and dynamic industries on water resource management

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The gap between water supply and demand is growing in the western U.S. due to climate change, rapid population growth, intensive agricultural production, wide-spread energy development and changing industrial use. Water conservation efforts among residential and industrial water users, recycling and reuse techniques, and innovative regulatory frameworks strive to mitigate this gap, however, the extent of these management strategies are often difficult to quantify and are typically not included in prediction of future water allocations. Water use on the eastern slope in Colorado (Denver-Metro region) is impacted by high-intensity activities, including unconventional energy development, large withdrawals for agriculture, and increasing demand for recreational industries. These demands are in addition to a projected population increase of 100% by 2050 in the South Platte River basin, which encompasses the Denver-Metro region. The current presentation focuses on the quantification of regional sector water use utilizing a range of observations and technologies (including remote sensing) and integration into a regional decision support system. We explore scenarios of future water use in the energy, agriculture, and municipal/industrial sectors, and discuss the potential water allocation tradeoffs to various stakeholders. We also employ climate projections to quantify the potential range of water availability under various scenarios and observe the extent to which future climate may influence regional management decisions.