Research Proposal and Performance Contract Management (PropC) System

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Proposal ID: 9517

Title

Modeling and Field Experimentation to Determine the Effects of Terracing and Small Reservoirs on Water Supplies in the Republican River Basin above Hardy, Nebraska

State the Problem. How Do Your Research Outputs Contribute to Achieving Reclamation's Mission, and The S&T Program Mission and Performance Measures?

In the Republican River Basin, there are about 1.7 million acres of terraced fields and several thousand water bodies. Estimates indicate that these projects may be depleting the natural water supply of the basin by as much as 175,000 acre-feet per year or nearly 50 percent of the historic flow measured at the Republican River near Hardy, NE where the river flows from Nebraska into Kansas. This R&D proposal will lead to a better understanding of the water balance process of water flowing into and through land terraces and small reservoirs. From this a determination will be made of the impacts of land terraces and small reservoirs on surface water and groundwater supplies. The developed methodology, including any derived values for water balance modeling parameters, should be transferable to other river basins in the west. Information gained from this study will assist with improving overall water management of the limited water supply in the basin and ensure a more appropriate allocation of water among the states of Colorado, Nebraska and Kansas. As land terraces and small dams continue to age, better management decisions can be made on whether they should be repaired, modified or removed. Knowledge of the depletion effect of these water conservation practices will also lead to better overall water management including the management of existing and future conservation practices for an increased basin-wide benefit. Additionally, decisions about placement of future land terraces and small reservoirs could be made based on the expected basin-wide benefit rather than the much narrower landowner benefit. Political subdivisions could begin addressing the benefit of changing how structures are designed and placed in the watershed using the developed methodology. In the absence of the proposed study, land terraces and small reservoirs will continue to be constructed based only on local benefit to individual landowners and not considering the benefit from a basin-wide perspective. Information gained from this study will assist Reclamation and the states in developing reliable river and reservoir management plans that adequately address and account for all of

the existing and future water uses from the available water supply. Accurate water management models are essential tools for making good operational and management decisions. This R&D proposal is intended to enhance an ongoing cooperative study among the states of Nebraska, Colorado and Kansas, and the United States to determine the impacts of land terracing and small reservoirs on the Republican River basin water supply. Existing funds for this study are very limited. This study fulfills a requirement of a recent settlement stipulation resolving a United States Supreme Court case concerning the enforcement of the Republican River Compact. Completion of an adequately funded study is a key component in reducing conflict and potential future litigation. Reclamation benefits by improved management, development and protection of the very limited water resources in the Republican River basin for its projects. The R&D study aligns closely with Reclamation's mission of water management and priorities of honoring state water rights, interstate compacts and contracts with water users. Reclamation also benefits from improved working relations with the states of Nebraska, Colorado and Kansas to address water allocation issues.