Water

Water Resources

Client
Central Utah Water Conservancy District

Location
Roosevelt, UT, USA

"I would like to take this opportunity to bring to your attention the outstanding performance of the CH2M HILL employees who are working on the CUWCD's UBRPs (Uinta Basin Replacement Projects). I have many years of experience in this NEPA compliance business both in and out of the Federal government and your staff in Boise and those that support our EIS program are without a doubt the most cooperative, dedicated, and competent folks I have ever worked with."

Harold Sersland, CUWCD

Land Classification and Salinity Management Uintah Basin Replacement

Project Highlights

- The projection of soil and water salinity and trace element concentrations formed a sound basis for evaluating the feasibility and environmental impacts of the Basin Replacement irrigation project and for planning and designing the irrigation facilities
- Our responsiveness and attention to concerns, requests, and schedules are reflected in our continuing relationship with this client and various project interest groups
- CH2M HILL developed an interactive public involvement plan to gain consensus among stakeholders (irrigators, environmental and recreation groups, Ute Indian Tribe, agencies, and Ashley National Forest)
- The client commended the work performed by the CH2M HILL team over a 10-year period, stating that our team was "...without a doubt the most cooperative, dedicated, and competent folks I have ever worked with".

Project Description

The Uinta Basin Replacement Projects collectively comprise one element of the Central Utah Project (CUP), a major irrigation development effort undertaken by the U.S. Bureau of Reclamation in the 1950s but never completed. The Central Utah Water Conservancy District received federal funding to replace decrepit irrigation facilities in the Uintah Basin. The District contracted with CH2M HILL and Horrocks Engineering to provide the full range of services to implement the irrigation project, including environmental documentation, scientific studies of salt and trace element management, land classification, water demand, and irrigation system design.

The Uintah Basin, in the upper reaches of the Green River watershed (a tributary to the Colorado River), is an area with saline groundwater. Sources of the salinity are principally geologic and below the root zone. As part of a large-scale salinity management program, the U.S. Geological Survey (USGS) and the Natural Resources Conservation Service (NRCS) established that the salt load impact of any irrigation in the region could be approximated as the product of the deep percolation volume and local groundwater quality. Groundwater quality zones were established and mapped for this purpose, along with algorithms for estimating deep percolation from irrigation, depending on a number of factors.

The land classification effort included a focused update of the 30-year-old land classification by U.S. Bureau of Reclamation. In particular, CH2M HILL reviewed the impact of salinity source control technology, such as sprinkler irrigation, on the arable and irrigable status of farmland. We evaluated trace element fate (especially selenium) within the basin and modeled the impact

of projected changes in irrigation methods on basin salinity yield. Salt load modeling was based on an accepted algorithm developed by the NRCS to evaluate individual fields in the Salinity Control Program.

CH2M HILL linked the land classification GIS with the existing mapped groundwater salinity zones to assess the incremental impact of the irrigation project. Because the GIS polygons in the land class are numerous (depending on the themes displayed, in the tens of thousands), linking irrigation to groundwater zones was easiest in GIS. NRCS's algorithms for calculating deep percolation from irrigation were incorporated into an MS Access database model, which readily accepted data files from ArcInfo (and now can be directly linked in other packages such as MapInfo and ArcView). The model also estimated current and projected irrigation amounts and methods, as well as recharge volume, from each polygon of farmland. According to the established methodology, the model then summarized the recharge volumes by groundwater zones, multiplied the volumes by groundwater salt concentrations, and estimated salt loading under current and projected irrigation scenarios.

By taking maximum advantage of existing tools, CH2M HILL agricultural expert, Dr. John Dickey, developed a relatively simple and defensible estimating model, providing salt loading impact estimates that were suitable for the environmental documentation.