

S&T Highlights

Director's Office (Denver, Colorado)

The Research and Development Office has a new Acting Director.—Dr. Curt Brown joined our office in March and brings a wealth of expertise, including work in dam safety risk analysis, design of early warning systems, public involvement and social analysis, environmental impact studies, and policy development in many areas. For the past 9 years, Curt served as Study Manager for the Platte River Environmental Impact Statement. (Siegie Potthoff, 303-445-2136)

Reclamation engineers awarded a patent.—Leslie J. Hanna and Brent W. Mefford, hydraulic engineers in the Water Resources Research Laboratory of the **Technical Service Center (TSC)**, were recently awarded a patent for their invention, a stilling basin flow deflector. The stilling basin flow deflector is a device used to change the follow pattern over the basin end sill to prevent damage to the concrete floor of a waterway's stilling basin. When water is released into a stilling basin, a back flow occurs where rocks can be drawn upstream into the basin, which can damage the concrete floor of the stilling basin. This device can save Reclamation the expense of having to repair abrasion damage to stilling basins. (Samantha Zhang, 303-445-2126)

Managing for Excellence [Team 35 findings](#) are in.—Team 35's charge was to either redefine or validate the Science and Technology (S&T) Program Steering Committee's role in seeing that the agency's mission-related research and development needs are met. The findings call for a restructured S&T Program steering team and a new charter. The Research and Development Office will be assembling the new steering team and begin addressing the tasks in the new charter over the next several months. (Siegie Potthoff, 303-445-2136)

Just a heads up.—The annual call for research proposals for fiscal year 2008 will go out about mid-April. This year, submittals will be due June 29, 2007. (Siegie Potthoff, 303-445-2136)



Improving Infrastructure Reliability

New method for determining generator leakage reactance.—Generator leakage reactance is used in predicting generator loading conditions as well as in machine modeling for power system reliability studies. It typically is determined through the “zero power factor test” performed during generator acceptance testing. However, this test is difficult to perform, and many times, approximations must be made in the calculations. Therefore, a new method to directly calculate the leakage reactance parameter of the generator by alternate means is desirable. The new method, developed by TSC engineers, utilizes data collected during other, less demanding tests (which are already performed as part of the standard generator acceptance testing) and data collected while simply running the generator online at varying real and reactive loads (varying megawatts [MW] and megavolt amperes reactive [MVars]).

Data for this research project have been collected from **Crystal, Glen Canyon, Shasta, and Parker Powerplants**. Thus far, the method appears to acquire a value for leakage reactance that is both reliable and more accurate than the traditional zero power factor test method. It also is substantially less complex and less costly, which is very appealing to both powerplant personnel and test engineers. (J. Agee, 303-445-2309; Jill Smith, 303-445-2307)



174-MVA generator at Glen Canyon Powerplant, on which generator acceptance tests were performed and used to test the new method for calculating generator leakage reactance. A TSC test instrumentation table to collect data for the tests is shown as well.

Improving Decision Support

*Evaluation of alternative legal, institutional, economic, and hydrologic approaches for groundwater banking to facilitate water transfers among uses and users in the **Snake River Basin**.*—In January 2007, the University of Idaho moderated a panel discussion at the Idaho Water Users Association conference on the theory of groundwater banking. Groundwater banking provides a way for water to be transferred from one user to another by way of the Eastern Snake Plain Aquifer. Since Idaho delivers water based on water rights that were given on a first-come/first-served basis, the idea of groundwater banking is somewhat controversial. The panel facilitated conversation among people on varying sides of the issue. The panel consisted of personnel from the Idaho Department of Water Resources, Reclamation's **Snake River Area Office**, Idaho Ground Water Appropriators, Twin Falls Canal Company, Clear Springs Foods, the Deschutes River Conservancy, and Trout Unlimited. (Jennifer M. Johnson, 208-378-5225)

Development of a coupled hydrologic and economic trading model to facilitate development of water markets in the Boise Valley.—A groundwater hydrologist with Reclamation's **Pacific Northwest Region** and an economist with the University of Idaho presented recent results in March from this S&T project to the Idaho Water Board. Water board members and the director of the Idaho Department of Water Resources expressed considerable interest in using the modeling tool to assess options for conjunctive management of groundwater and surface water resources in the Boise Valley and elsewhere in Idaho. (Robert Schmidt, 208-378-5081)

WARMF-SJR training session.—The **Mid-Pacific Region** was awarded a small grant in fiscal year 2007 to perform a proof-of-concept analysis and develop a more comprehensive proposal for the use of the WARMF (Watershed Analysis Risk Management Framework) model in **San Joaquin River** restoration and water quality programs. WARMF is a decision support system for watershed management and TMDL (total maximum daily loads) analysis. WARMF has been applied to numerous watersheds in the United States, Taiwan, and Korea.

The initial approach taken was to become more involved in development of the WARMF-SJR model application by establishing closer communication with the model development team. The Mid-Pacific Regional Office partly facilitated this by cohosting a hands-on class at its **Sacramento, California** offices. Reclamation personnel obtained an in-depth knowledge of the current model and developed confidence in applying the model to Reclamation issues by developing a dialog with current and potential users of the model. Twenty-six people attended the WARMF-SJR model training session, with four from Reclamation in attendance and others from the California Department of Water Resources, State and regional water boards, county agencies, universities, and local consulting firms. (William Rohwer, 916-978-5082; Nigel W.T. Quinn, 916-978-5079)



WARMF-SJR hands-on training session.

Improving Water Supply Technologies

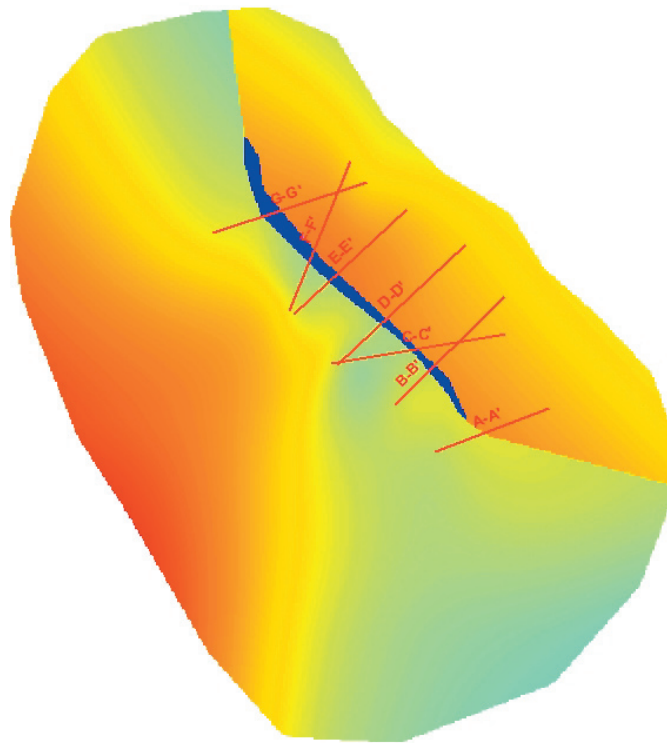
Subsurface geology integrated into HydroGeoSphere.—Integration of geospatial tools to support data preparation, model input, and visualization of model output from the HydroGeoSphere (HGS) model has had a major success. Subsurface geology developed by local geologists was successfully integrated into the ArcGIS geographic information system from developed cross-sectional data. These data were then output into formats compatible with the model structure. This step provides some significant understanding as to how to construct geospatial data to be easily integrated into the overall model to better evaluate and analyze water flow in basins. Reclamation personnel presented this research to the University of Davis in March 2007.

Geospatial tools being researched also include:

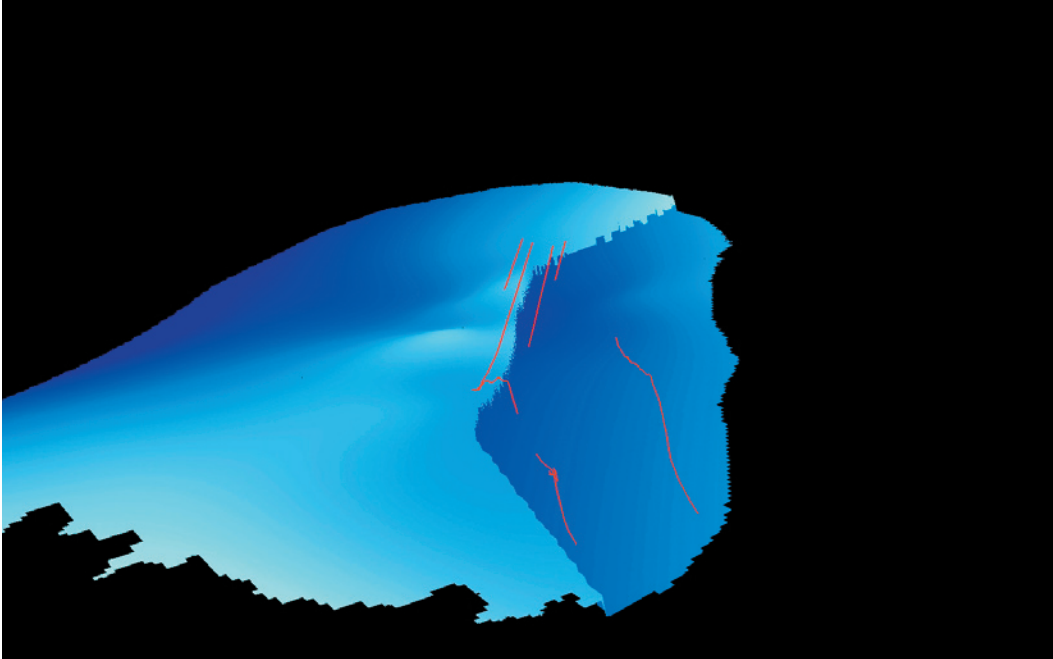
- A groundwater modeling database designed at the University of Texas, Austin, to provide a format through which the various models can communicate more easily.
- EarthVision to develop comprehensive coordinated geologic databases in coordination with the U.S. Geology Survey, Water Discipline.

- Groundwater Modeling System (GMS) construction, visualization, and model design for display and integration into the database design from the University of Texas.

During January through March 2007, additional database purchases were completed for Red Rock Ranch in the San Joaquin Valley in California, and database design and coupled research continue. Despite some technical problems that have been overcome by support from the various software companies, this research is moving ahead, supporting work in the **Klamath Long Lake Valley area** and in the San Joaquin Valley with focus on Red Rock Ranch. Now that modeling is moving ahead with HGS, the geospatial efforts are focusing on familiarization with the software packages and integration with output formats, with focus on visualization of the modeling results. (Lorri Peltz-Lewis, 916-978-5271)



Map view of the composite geologic data for lithology layer 2 in the Klamath Long Lake Valley model area. Geospatial methods developed to create this lithology layer provide unique insights to structurally creating data for the Red Rock Ranch efforts



Three-dimensional view of the composite geologic data for lithology layer 2 in the Klamath Long Lake Valley model area. Visualization helps the researchers understand the geologic data in the third dimension, as well as providing critical lithology information to the HGS model.