

S&T Highlights

Director's Office (Denver, Colorado)

Visiting Researcher Program: connecting managers with researchers.—The Research Office recently implemented, on a trial basis, the Visiting Researcher Program. The goal of the program is to increase research collaboration and technology transfer by cosponsoring Reclamation researchers for extended visits with water and resource managers in Reclamation. It often is not possible for researchers to understand the needs of managers, or for managers to understand new solutions and tools without extended interaction in person. This program will result in beneficial partnerships and research products tailored to the need of the end user. The Visiting Researcher Program is an outgrowth of discussions at the Hydrologic Modeling Workshop in April 2004, and is cosponsored by the Science and Technology (S&T) Program and the hosting region. Dr. David Raff of the **Technical Service Center's** (TSC's) Flood Hydrology Group subsequently served a 1-month detail to the **Pacific Northwest Region's** River and Reservoir Operations Group to enhance the region's procedures to forecast runoff and evaluate daily reservoir operations. The success of this initial trial has encouraged the S&T Program to extend the Visiting Researcher Program for additional trials. (Dan Levish, 303-445-3175; David Raff, 208-378-5240; Pat McGrane, 208-378-5215)

Upcoming Events

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| June | 7-10: Lower Klamath Basin Science Conference, Arcata, CA. (Chuck Hennig, 303-445-2134) |
| July | July 26: Proposal submission process will close and review phase will begin. (Siegie Potthoff, 303-445-2136) |
| August | 3-4: Steering Team Meeting, Fort Collins, CO. (Siegie Potthoff, 303-445-236) |
| October | Early October: Funding awards made for FY05. |

Improving Infrastructure Reliability

Operational and environmental constraints and their impact on ancillary services.—The primary goal of this research is to develop methods of optimizing the production of ancillary services from Reclamation powerplants. Past work has shown the value of both regulation and spinning reserves. Spinning reserve is the unused capacity of a unit to run at higher speeds. Both of these services support power system reliability—avoiding blackouts. Work in recent months has focused on the production of spinning reserves as a constraint in addition to energy production. A method is needed of distributing spinning reserves across a group of powerplants within a basin while maximizing total efficiency and maintaining



river release constraints. A scheduling model based on a product called GTMax was obtained for review. This system is being proposed for use in both the **Upper Colorado (UC)** and **Great Plains (GP)** Regions. This product may be enhanced to provide the needed reserve scheduling feature in the future. Therefore, simple manual optimizations were performed for the Great Plains powerplants which would distribute spinning reserves in a way to optimize operating efficiency. The manual optimizations show noticeable efficiency improvements, but do not address water constraints. During June and July, proposed scheduling tools for Upper Colorado will also be reviewed with the goal of developing concepts for the optimization of spinning reserves across a group of powerplants. (Steve Stitt, 303-445-2316)

Improving Decision Support

Valuation of wildlife benefits.—The Economics Group of the TSC recently submitted a paper for publication in the proceedings of the W1133 Benefits and Costs Transfers in Natural Resources Planning, an interagency research group, sponsored by the U.S. Department of Agriculture, relating to the valuation of wildlife benefits, including endangered species. This research valued critical habitat for nine threatened and endangered fish species in the Southwest. Among the results, the research showed that preserving habitat provides significant economic value to households in the U.S. but that the level of value may depend on the methodology of the data collection. These results can help in the operations of Reclamation sites that affect listed fish species. (Earl Ekstrand, 303-445-2731)

The TSC's Jeff Rieker on detail.—Mr. Jeff Rieker began working on a 10-week detail in Carson City, Nevada. Jeff is working with staff in the **Lahontan Basin Area Office** on the development and deployment of Watershed and River Systems Management Program technology for the Truckee basin and related issues. (Don Frevert 303-445-2473)

Upcoming Events

July 8: The Columbia Basin Research Team will hold their next conference call. (Don Frevert 303-445-2473)

Improving Water Supply Technologies

Second-year accomplishments of the Rio Grande silvery minnow nursery habitat study.—The **Albuquerque Area Office** conducted its second year of the **Rio Grande** silvery minnow nursery habitat study. The study evaluated two previously constructed sites and three new natural sites this year. The study increased the diversity of features examined and the time collecting data. The preliminary data demonstrates important differences between feature types, emphasizing secondary flow dynamics for transporting eggs into suitable areas for incubation and rearing. Representatives from the U.S. Fish and Wildlife Service and the New Mexico Interstate Stream Commission participated in field workshops during the study to learn about nursery habitat function. Biologists from the GP Region and the TSC participated in the field study to facilitate technology transfer to other regions. The results of this study will assist Reclamation with improving habitat for native fish species of concern, while managing limited water resources. (Michael Porter, 505-462-3596)



Setting up transect lines at Abo Arroyo for deploying quadrats.

Mapping of chlorophyll-a concentrations.—Reclamation's Remote Sensing and Geographic Information Group has used hyperspectral imagery to map chlorophyll-a concentration in two Reclamation reservoirs. Chlorophyll-a concentration is a common indicator of biological productivity used to characterize water quality in lakes and reservoirs. An Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) image was processed for **Owyhee Reservoir in eastern Oregon**, and a Hyperion satellite image was processed for **Flaming Gorge Reservoir, Wyoming/Utah**. The narrow spectral channels of the hyperspectral images allowed for the discrimination of a subtle spectral feature found near a wavelength of 700 nm that was highly correlated to chlorophyll-a concentration. Unlike broader band satellite images, such as Landsat Thematic Mapper, the spectral feature of interest was unaffected by varying concentrations of mineral sediment mixed with the algae, or by sun glint off of the water surface. This processing technique will allow for faster, cheaper, and more accurate mapping of reservoir water quality. (David Eckhardt, 303-445-2273)

New servers and software installed.—The Western Water Information Network Threatened and Endangered Species (WWIN TES) Locator research reached a milestone, when two new Dell 2650 servers were installed and made operational. Geographic Information System (GIS) water resource data are being loaded and applications are under construction. Software on the servers can deliver dynamic maps and GIS data and services via the worldwide web. It allows for not only the query and display of geographic data, but also the development of custom applications and data sharing. The WWIN TES will act as a central repository for publishing and browsing data and metadata related to water resource management with a special focus on threatened and endangered species. A meeting was held in June in the UC region to demonstrate a specialized GIS application being developed for the **San Juan and Gunnison basins**. (Doug Clark, 303-445-2271)

Selenium remediation using biological processes for the Central Valley Project.—Pilot studies supported by the S&T Program continue in **Central California** to remove selenium from agricultural drainwater. Reclamation's **Mid-Pacific Regional Office in Sacramento**, the **South-Central California Area Office in Fresno**, along with the TSC are evaluating alternatives for complying with a court order. In November 2000, the Ninth Circuit of Appeals ordered the Government to provide drainage to the **San Luis Unit of the San Joaquin Valley**. In 1986, the drains at the Westlands Water District were closed because of adverse environmental impacts thought to have been caused by selenium present in the drainage water. Reclamation is conducting a pilot system to treat about 2 to 3 gallons per minute of reused drainwater within bioreactor tanks that contain media inoculated with bacteria. The media provide surface area to develop a biological film that reduces the dissolved selenium to a solid form that is captured within the biomass. So far, this biotreatment has drastically reduced selenium concentrations, and Reclamation continues to make improvements. (Ken Yokoyama, 303-445-2014)



Biotreatment of selenium at Westlands Water District