

RESEARCH AND NATURAL RESOURCES HIGHLIGHTS

January 2002

Director's Office (Washington DC and Denver CO)

Welcome to Siegie Potthoff our new Research and Natural Resources Assistant. Siegie will be coordinating development of technology transfer workshops, outreach materials for hard copy distribution and posting on the web, providing logistical support on research formulation and steering committee meetings, coordinating outreach to stakeholders, and keeping us organized.

The Science and Technology (S&T) Program received funding from the Office of Policy to establish a weather modification research program in accordance with the appropriations language under the Drought Act. Open conference calls occur weekly as we work through issues to expeditiously fund research activities that comport with Congress' direction and appropriate scientific protocol. A meeting to identify stakeholder expectations, capabilities and interests in conducting research, and other issues related to program establishment and implementation will be hosted by the Interstate Weather Modification Council on February 13. (Shannon Cunniff (202-513-0682), Dave Matthews, Don Moomaw, Gerry Kelso).

Planning for two workshops is underway; they are intended to put new knowledge and tools for enhancing water delivery reliability into the hands of water managers. These workshops, one on fisheries and one on invasive species, will provide water managers and resources managers an opportunity to learn the state-of-the-art practices and Reclamation S&T Program activities. There will also be an opportunity to provide input on research needs and priorities. More information will be forthcoming. (Shannon Cunniff (202-513-0682), Siegie Potthoff, Ray Bark-Fisheries; Fred Nibling-Invasive Species)

The National Academy of Science's Water Science Technology Board (WSTB) held its biannual meeting. Reclamation was asked to provide financial support to two studies:

A Congressionally directed USGS follow-up study on coordination of water resources research. USGS is looking for other Federal agencies' financial support as well as their participation.

The scientific and administrative issues posed by Sustainable Underground Storage (SUS) of water (which include aquifer storage and retrieval and active and passive recharge associated with conjunctive use activities).

The WSTB is also considering a study proposed by the state of **Washington** to review the science associated with Columbia River salmon. We will explore opportunities for a Reclamation contribution toward the water resources research and SUS studies. (Shannon Cunniff, 202-513-0682)

Upcoming Events:

February:

5-6 Science and Technology Program Formulation Meeting, Denver (Hennig, 303-445-2134)

13 or 14 Interstate Weather Modification Council meeting on weather modification research program, Oklahoma City (Cunniff, 202-513-0682).

25-26 Multi-agency evaluation of water supply research needs and collaborative initiatives, Dallas (Hennig(303-445-2134), Dyballa)

March

4-6 Federal Agency Water Resources Research Directors' Coordination Meeting, Washington DC (Cunniff, 202-513-0682)

Stretching Water Supplies and Developing Water Supply Technologies

The Water Treatment Engineering and Research Group was the recipient of the Consulting Engineers and Land Surveyors of California 2002 Engineering Excellence Merit Award for the Membrane Bioreactor Technology Project, which was co-funded by the City of San Diego and Reclamation's S&T Program. The work performed was lauded as "an outstanding contribution to the community and the industry." The findings make significant contributions toward providing viable water supply alternatives through water purification technology. (Kevin Price, 303-445-2260)

Michelle Chapman and Thomas Poulson of the Phoenix Area Office met with Buz Walker of the **Town of Payson, Arizona**, Water Department to discuss the agreement for the planned ultrafiltration pilot study. If the project is successful, Payson will be able to recharge tertiary treated waste water into their water supply aquifer. The additional water supply will benefit the local Native Americans who receive water from this aquifer. (Michelle Chapman, 303-445-2264)

Requests for R&D proposal (RFP) announcements under the Water Desalination Act of 1996 were issued on 2/1/02. The RFPs announced that solicitation packages to academia, municipalities, and the private sector were available for research pilot-scale systems and demonstration projects. Pre-proposals are due by 3/31/02. Full proposals are expected to be available about 4/30/02. For information contact Tom Jennings, 303 445-2130, or Randy Jackson 303-445-2432.

In FY02, under the Water Desalination Research and Development Act of 1996 (Act), Reclamation requested \$300,000, but Congress provided \$4 million with instructions to expend \$500,000 on additional brine disposal research for landlocked areas such as Phoenix and Las

Vegas, and to expend \$1 million to develop a desalination research and development facility in the Tularosa Basin in New Mexico in consultation with Sandia National Laboratories. In addition, Congress also instructed Reclamation to establish a national clearinghouse for desalination technologies in FY02. Desalination technology provides a strong alternative to expand western water supplies. Planning and implementation is underway. Significant involvement and coordination with **Sandia National Laboratories**, the **Albuquerque Area Office**, and local stakeholders are included. (Tom Jennings, 303-445-2130).

The 2001 Interagency Consortium for Desalination and Membrane Separation Research meeting was held. The purpose of the Consortium is to provide a communications network for the exchange of information between Federal government agencies involved in desalination and membrane separation research. Consortium members work together to: 1) prevent federal duplication of efforts, 2) pool limited federal research funding and other resources to obtain common goals, 3) identify future research needs, and 4) allow for discussion of new technologies with other experts in the field. The focus for FY02 is for Reclamation and the U.S. Army to join forces to document methods for measuring membrane productivity in aid of the ASTM effort to update the standard for membrane performance. (Tom Jennings, 303-445-2130, Kevin Price, 303-445-2260)

Improving Infrastructure Reliability

As part of the high-voltage generation (Powerformer™) project, the research report was completed and will be published in early February. Recent developments in the area of high-voltage generation show promise for improving operation and maintenance, reducing life-cycle costs, increasing reliability, and reducing safety and environmental risks at Reclamation hydroelectric powerplants. Mid-Pacific's Central Valley Operations staff are exploring funding methods to implement the first Powerformer™ demonstration in North America at **Folsom Dam** starting later this year with preparation of specifications and potential contract award by the beginning of FY03. (Gary Osburn, 303-445-2297)

As part of our Life Extension effort, Hydro Quebec and the Corps of Engineers continued review and comment on the survey of current condition assessment testing methods developed by Reclamation. Conference calls with these other agencies will take place in February to advance the cooperative effort to agree on standard condition assessment methodologies. The generator/transformer/turbine runner screening tool was completed and is being integrated into the Life Extension Guidebook. (Gary Osburn, 303-445-2297)

Completed a draft Report of Invention for our microwave tunnel communication radios. A patent will be applied for as the first step of technology transfer to commercialize the radios. To this end, an initial meeting was held with Michael Messaros of Applied Design Corporation (recently hired consultant to assist the S&T Program technology transfer efforts) to set the groundwork for obtaining a suitable commercial vendor. These radio communication sets provide a means for work crews, who are often 5 miles or more from the nearest tunnel exit, to

communicate with persons on the outside. Providing this communication link greatly increases the safety of performing work in a tunnel by allowing Reclamation to meet confined space communication requirements. The resulting cost savings to Reclamation are estimated to be about \$100,000/year in labor saving and \$2,000,000/year in increased generation revenues (made possible by more frequent cleaning of tunnels that feed powerplants). (Phil Atwater, 303-445-2304)

Met with Dr. Sen and Dr. Simoes at the Colorado School of Mines to discuss their participation in completing the prototype development of our winding fault detector. The School of Mines accepted our proposal, which will be formalized in February with a written statement of work. The winding fault detector has demonstrated the capability of pinpointing the location of electrical faults in the stator windings of large rotating machines. Reclamation experiences approximately five insulation failures a year. This device can save upwards of \$50,000 per failure. Technology transfer of the prototype will be sought as part of this study. (Phil Atwater, 303-445-2304)

Completed construction of an over-topping test facility to define energy characteristics associated with over-topping hydraulics for assessment of dam foundation erosion potential. The results will improve existing tools for predicting erosion potential in hard rock and other earth materials. We are also working to transfer technology to Geotechnical and Concrete Dams design groups via the Dam Safety Program. (Rod Wittler (303-445-2156), Joe Kubitschek)

Upcoming Events

February We will attend a meeting with the contractor, power customers, and project office staff where Parker Powerplant life extension assessment results will be presented. The contractor's data will be used in our economic risk assessment computer model in February. Life Extension seeks to enhance reliability and dependability by providing decision-making tools to facility management for maintenance and/or system replacement. (Gary Osburn, 303-445-2297)

A research report will be prepared on the findings and results of laboratory work on a pulsed, high-current test method for assessing the electrical integrity of personal protective safety grounding cables. This effort emphasizes maintaining and enhancing the safety of Reclamation personnel and facilities. (Phil Atwater, 303-445-2304)

Improving Decision Support Modeling

Reclamation's watershed modeling representatives met to evaluate the top technical priorities for RiverWare development. Discussion covered rule-based simulation capabilities, channel routing capabilities, water accounting capabilities, engineering methods, interaction between surface and ground water and a variety of analytical capabilities. Priorities will be finalized by the group in the next several weeks. (Don Frevert, 303-445-2473)

Members met with USGS modeling specialists to discuss the potential for cooperation on fisheries modeling efforts. Use of fisheries models in conjunction with RiverWare is a priority for Reclamation managers in the **Yakima and Umatilla River Basin**, and USGS has some unique capabilities which can help to accelerate the effort. Additional discussions and planning meetings will be held in the coming weeks. (Don Frevert, 303-445-2473)

Upcoming Activities

February

- 26** Members of Reclamation's Watershed and River Systems Management team are scheduled to meet with Reclamation and International Water and Boundary Commission (IBWC) water resources specialists in El Paso to discuss the potential for development of a RiverWare based decision support system for the Lower Rio Grande basin. Meeting expenses will be covered by the El Paso field office. The effort would ultimately involve cooperation with the Republic of Mexico. RiverWare is the primary reservoir management tool for the Upper Rio Grande Water Operations Modeling (URGWOM) effort. (Don Frevert, 303-445-2473)
- 27** Reclamation's team members will hold a conference call to review progress and plan work on the Columbia Basin Project new start. Efforts will focus on enhanced forecasting capabilities, interactions between RiverWare and the AWARDS - ET Toolbox programs, and the USGS Modular Modeling System (MMS). (Don Frevert, 303-445-2473)

Improving Water Delivery Reliability

Dr. Chris Holdren, Manager of the Environmental Research and Investigations Group, received the "Secchi Disk" Award from the North American Lake Management Society (NALMS) at their annual International Symposium held in Madison, Wisconsin. This is the highest honor that NALMS bestows on an individual member. Chris was the lead editor in preparing the Third Edition of the manual titled, "Managing Lakes and Reservoirs." This is an excellent publication written by professionals to provide guidance on issues related to managing lakes and water resource projects. Reclamation also received an award for their sponsorship and support of the symposium. Chris has been very active in Reclamation's Science and Technology Program and

has extensive experience in lake and reservoir water quality and limnology. He is presently serving on an S&T technical team for evaluating the merits of a proposed pilot oxygenation system to enhance sucker habitat on Upper Klamath Lake.

Completed installation of two field-grade piezometers to measure long-term hyporheic (sub-river bed) flow conditions in a critical salmon spawning reach of the Cle Elum River (a tributary of the **Yakima River** in Washington.) These piezometers were developed in the laboratory under the Hyporheic Flow Physical model study to assist biologists with field measurement of hydraulic conditions in salmon spawning redds and provide adaptive management information for improving egg survival. (Mark Bowen (303-445-2222), Joe Kubitschek)

Completed baseline physical model testing and Computational Fluid Dynamics (CFD) model development for a laboratory study designed to improve the primary bypasses at Reclamation's **Tracy Fish Collection Facility** (TFCF) near Tracy, California. Replacement of the existing louver bypasses is scheduled for FY03. The Tracy Project Office in cooperation with the Tracy Fish Facilities Improvement Program and Reclamation's S&T Program have taken this opportunity to develop improved replacement bypasses to achieve

- Improved bypass capture efficiency.
- Improved debris handling characteristics.
- Improved overall salvage efficiency at TFCF.

These improvements will benefit TFCF and other Reclamation facilities (Kubitschek, D-8560)

Upcoming Events

April 30 - May 2

The Federal Interagency Subcommittee on Sedimentation is sponsoring a Turbidity and Other Sediment Surrogates Workshop in Reno, Nevada. The workshop will address issues associated with the definition and measurement of turbidity and the use of turbidity and other measurements as surrogates for suspended-sediment characteristics. Workshop attendance is limited and by invitation only. Anyone interested in attending should contact Christi Young, 303-445-2561

Regional Research
LowerColorado

Cooperative Research and Development Agreement (CRADA) with **Metropolitan Water District**. Met with representatives from the Metropolitan Water District (MWD) on 1/28/02 to finalize logistics associated with conducting a year's worth of membrane water treatment research with the district. The research will help MWD resolve Colorado River water quality issues, helping the state reduce its dependence on river flows. This project is part of the Title I Salinity Control Research Program. (Myriam Fabien (928-343-8292), Chuck Moody)

Met with representatives from Zeta-Rod Company to discuss test results on a high-voltage capacitative device that can be used instead of chemicals to help prevent membrane scaling. Test results appear to be positive. This project is part of the Title I Salinity Control Research Program and co-funded with the Science and Technology Program. (Myriam Fabien (928-343-8292), Chuck Moody)

Met with the **City of Somerton, Arizona**, to discuss a CRADA that could begin in October 2002. The City uses groundwater as its potable water source. Soon, it will use Colorado River water. Somerton wants to avoid "red water" conditions that could occur when it switches from groundwater to river water. This project is part of the Title I Salinity Control Research Program. (Myriam Fabien (928-343-8292), Chuck Moody)