

RESEARCH AND NATURAL RESOURCES HIGHLIGHTS

June 2002

Director's Office (Washington DC and Denver, Colorado)

Providing support to the 25-year water need strategy effort by gathering existing data and compiling into meaningful data sets and maps to assist identification of water-stressed basins and contributing factors. (Primary contacts: Shannon Cunniff (202-513-0682), Chuck Hennig, Rod Wittler, Doug Clark)

The Steering Team (<http://www.usbr.gov/research/contacts/steering.htm>) for the Science and Technology (S&T) Program met at the end of May to review and prioritize Reclamation research needs. The steering team's highest priorities are:

- \$ Find innovative means to address ecosystem needs without impacting water deliveries
- \$ Improve methods and materials to repair, maintain, and assess condition of facilities
- \$ Improve powerplant operations & maintenance and increase power generation efficiencies
- \$ Improve passage and reduce entrainment of species that could impact operations
- \$ Improve solutions to aquatic and riparian invasive species that impact water deliveries
- \$ Improve solutions that address sediment, water quality, and river/reservoir restoration
- \$ Improve desalination and other water supply and conservation technologies
- \$ Improve methods to forecast water supplies and evaluate operational trade-offs

Although these are the highest priorities, all of the 20 S&T Program research development, demonstration, and deployment (R&D³) Output Areas received favorable consideration by the steering team. (Chuck Hennig, 303-445-2134)

Implemented new business practices for the S&T Program to help build a better scientific and technical foundation to support Reclamation's mission objectives. Our objectives are to strengthen and sharpen our focus on:

- \$ Broad participation and involvement across Reclamation,
- \$ Customer communication and engagement,
- \$ Reclamation priorities,
- \$ Partnerships and collaborative efforts,
- \$ Effectively moving research outputs into standard practice, and
- \$ Reclamation's mission outcomes of water and power deliveries.

Participated in Cooperative Ecosystem Study Unit (CESU) review and approval of the 5th round applicants which included the California CESU. The University applicant for the California CESU was approved by the reviewers and will be notified regarding next steps. Those steps will include minor improvements and clarifications in their proposal and development of a cooperative agreement and dedication of funding support (\$10k per

participating agency). After execution of the California CESU, the entire 17 western states will be covered by a CESU. **MP Region** has expressed interest in participation in the California CESU to provide ready access to university researchers at affordable costs, as well as the opportunity to work cooperatively with other agencies in California with resource management responsibilities. (Shannon Cunniff, 202-513-0682; Michael Tansey)

Re-initiating weather modification research directed by Congress in Reclamation's FY02 appropriations. Efforts to issue a request for proposals were curtailed when funding was targeted for Congressional reprogramming. Firm word on the denial for reprogramming was received by the S&T Program on June 27. (Shannon Cunniff, 202-513-0682)

Attended meeting of the National Academy of Science's Committee on the Status and Future Directions in Weather Modification. This group is charged with identifying research needs and opportunities for weather modification to water resources management. Presented information on the Bureau's water management interests, regional needs, and current situation and position regarding our conduct of weather modification research. (Shannon Cunniff, 202-513-0682)

The Water Resources Research Coordinating Committee elected Shannon Cunniff co-chair of the group. Other co-chair is Dr. Rick Lawford with Department of Commerce's National Oceanic and Atmospheric Administration. The Committee began developing a substantive agenda for articulating Federal agency water resources research roles and responsibilities. (Shannon Cunniff, 202-513-0682)

Briefed the Assistant Secretary and his staff on the state-of-the-art of desalination, Reclamation's role, current research, and future research needs. Briefing was in preparation of a briefing for the Secretary to address her interest in desalination. (Shannon Cunniff, Kevin Price 303 445-2260)

Developed a prototype proposal for DOI participation in the American Academy for the Advancement of Science (AAAS) fellows program. This proposal will be further refined and vetted with other DOI bureaus prior to initial discussions with AAAS. (Shannon Cunniff, 202-513-0682).

Michael Messaros, Technology Transfer Facilitator, has submitted the Tunnel Communication Radio Report of Invention for both a market survey and patentability evaluation. (Phil Atwater, 303-445-2304, Michael Messaros, 303-445-2135)

Improving Decision Support

The University of Colorado hosted the Annual RiverWare Users. The meeting included representatives of Reclamation, Tennessee Valley Authority, the Corps of Engineers, State water resources agencies, and private sector users. Researchers provided summaries of improvements to RiverWare during the past year, and the group discussed a number of future priorities. (Don Frevert, 303-445-2473)

Watershed and River Systems Management Program (WaRSMP) team members met with representatives of the Korea Water Resources Corporation (KOWACO) to discuss water resources issues in the two nations and opportunities for cooperation and sharing of technology. KOWACO plans to obtain a temporary RiverWare license in the coming weeks. (Don Frevert, 303-445-2473; Terry Fulp)

WaRSMP's co-principal investigator met with Drs. Jose D. Salas, Oli Sviensson, and William Lane to review improvements to the SAMS stochastic hydrology package. The package is expected to be used to enhance decision-making capabilities on several major river basins managed by Reclamation. (Don Frevert, 303-445-2473)

Members of Reclamation's WaRSMP team met to enhance accounting capabilities and Data Management Interfaces for the **Truckee River** Operational Forecast demonstration. Significant progress was made in both of these areas. (Don Frevert, 303-445-2473).

Curt Hartzell, Richard Stodt, and Dave Matthews met with the **California Nevada River Forecast Center** Reclamation, **MP Region** Water Operations Managers, and representatives of the **California Department of Water Resources**, USGS, NRCS, PG&E, and Desert Research Institute to discuss forecasting needs and opportunities for collaborative research. The meeting resulted in a list of action items and primary areas of mutual interest that the group will pursue over the next 6 months. (Dave Matthews, 303 445-2470)

Dr. Tanya Smirnova, Forecast Systems Laboratory, NOAA, presented a seminar on research applications of the Rapid Update Cycle - Coupled Data Assimilation System that the Forecast Systems Laboratory is developing for snowpack analysis and prediction. Her research team will collaborate with Reclamation's water supply forecast research team in FY03. (Dave Matthews, 303-445-2470)

Upcoming Events – July 2002

- 19** Brief management in DOI regarding the Administration's Climate Change Research Initiative (CCRI). Exploring areas of mutual interest and collaboration in the arena of climate variability and change research applications for water resources management and policy. (Dave Matthews, 303-445-2470; Shannon Cunniff 202 513-0682)
- 18** WaRSMP Fishery biologists and water resources engineers will hold a conference to review preliminary Range of Variability Analyses for endangered species on the **Yakima River** basin and formulate plans for future conjunctive modeling efforts. (Don Frevert, 303-445, 2473; Mark Bowen)
- 17-19** Dave Matthews will meet with research program managers at the Goddard Space Flight Center, NASA, and National Centers for Environmental Prediction's Environmental Prediction Center, Hydrologic Prediction Center and Climate Prediction Center to discuss research collaborations and applications of emerging forecast technologies for water supply and demand predictions. (Dave Matthews, 303-445-2470)
- 28-8/1** Members of the WaRSMP team will participate extensively in the Second Federal Interagency Hydrologic Modeling Conference in **Las Vegas**. This will include about a dozen oral, demonstration, and poster presentations showing WaRSMP products and a short course on the SAMS stochastic hydrology package. (Don Frevert, 303-445-2473)

Improving Water Delivery Reliability

Presented a poster session at the Western Soil Science Society meetings in **Fort Collins, Colorado** on Soil Moisture effects on Electromagnetic meter (EM38) readings. This research was a joint effort with Colorado State University. The poster session was well received, and several papers were distributed. This research will help develop EM38 deterministic equations to better estimate soil salinity from the raw meter readings. Some of the attendees at the meeting also saw potential for using the meter as an irrigation scheduling tool. (Joseph Brummer, 303-445-2457)

Water quality evaluation of the contracted wetland at **Pinon, Arizona**, on the **Navajo Nation** was done to determine the effectiveness of using a wetland in conjunction with a lagoon system for treating wastewater. This was done at the request of the **LC Region** and in cooperation with the Indian Health Service, the USGS, and Reclamation's S&T Program. By final polishing of this wastewater, it can be reused and irrigation of crops is now being considered for the discharge rather than disposal. (Rick Roline, 303-445-2213)

Upcoming Events – July 2002

July

25-26 Aquatic and Riparian Invasive Species Research and Outreach Workshop, Colorado Springs, Colorado (Siegie Potthoff, 303-445-2136)

Improving Infrastructure Reliability

Maxim Morency, from the University of Laval, Quebec, Canada, completed a 6-week assignment with the Materials Engineering and Research Laboratory. He helped the laboratory implement five new test procedures for evaluating thin repair materials for concrete. In addition, we co-presented *A Performance Testing of Repair Materials* at the American Concrete Institute Spring 2002 Convention. We plan to use the new test procedures to begin a screening process to select thin repair materials for concrete (Kurt VonFay, 303-445-2399)

Plans have been made to install (demonstration) a rotor turning gear at **Green Mountain Powerplant**. Nathan Nakamoto will travel to the plant in July to obtain required measurements to complete the design. The rotor turning gear safety device was developed using S&T funding to improve safety when performing the hazardous task of slowly turning large hydroelectric generator and motor rotors. The prototype was successfully installed at Glen Canyon last year. (Roger Cline, 303-445-2293)

Efficiency testing of seven of the **Glen Canyon** turbines was accomplished during June as part of the new research investigating the correlation of efficiency between similarly designed hydro turbines and the best approach to test similar machines within Reclamation. Data will be analyzed and a report prepared in the remaining months of the fiscal year. Determining whether after 30 to 40 years of service, units that are of similar hydraulic design still have very closely correlated efficiency will benefit us in our optimization efforts since our knowledge of performance of similar machines will increase. (Dave Hulse, 303-445-2881)

Began discussions with the Electric Power Research Institute (EPRI) regarding initiation of a tailored collaboration research project to evaluate the technical and economic feasibility of implementing the PowerformerJ technology. Tailored collaboration under the auspices of EPRI would provide an excellent mechanism for non-Reclamation entities to contribute funds and participate in evaluating the application of the PowerformerJ and to assist in identifying and developing the condition assessment tools and methodologies needed for on-going operation and maintenance. (Lori Rux, 303-445-2307)

Presented a technical paper entitled *Assessing the Condition of Rotating Machine Stator Winding Insulation Using the Ramped Direct High-Voltage Method* at the Insucon 2002

Conference in Berlin, Germany. The test instrument, developed under the S&T Program, detects insulation problems in high voltage meters and generators before failures occur. Joined Adwel personnel at their exhibition booth at the Coil Winding, Insulation and Electrical Manufacturing Exhibition where a prototype test instrument was on display. Both the technical session and exhibit were well attended. Interest in the testing technique and equipment was outstanding. The S&T Program and Adwel are working in partnership under a Cooperative Research and Development Agreement to develop a prototype test instrument and then provide a commercial vending source to Reclamation and other power, operations, and maintenance managers for this invaluable diagnostic device. (Lori Rux, 303-445-2307)

Began developing a mathematical model for predicting the voltage profile on the surface of stator winding end turns. This portion of the stator winding is treated with a special semi-conducting grading coating to control the surface stress and eliminate potentially damaging electrical discharges during machine operation. Laboratory measurements on several coil specimens were made to determine an appropriate range of capacitance and resistance parameters for use in the insulation model. (Lori Rux, 303-445-2307, Eric Eastment)

Upcoming Events – July 2002

Hydro Vision 2002 Conference, Portland Oregon. Presenting a technical paper at the Hydro Vision 2002 Conference. The paper is entitled "Early Detection of a Shorted Turn Fault in **Grand Coulee** Generator G-7." The paper discusses infrared images obtained using a rotor-mounted thermal scanning system that was installed on G-7 as a pilot project to determine the possible benefits of this monitoring technology. The scanner was in operation prior to and during an unexpected in-service stator winding insulation failure, providing a rare and informative view of the failure initiation process. (Lori Rux, 303-445-2307)

Evaluation of recently upgraded data acquisition equipment installed at **Yellowtail Powerplant** to characterize the performance of the new digital excitation systems recently installed there. Information obtained will be applied to our ongoing power system stability investigations to determine the impact of new equipment on the stability of the interconnected power system (i.e., avoiding regional blackouts). (J. C. Agee, 303-445-2309)