

# **RESEARCH AND NATURAL RESOURCES HIGHLIGHTS**

**April 2002**

## **Director's Office (Washington DC and Denver CO)**

Met with representatives of Portland Cement Association's (PCA) research, water resources, and training community as well as the Concrete Research Institute to determine opportunities for cooperative partnership. We exchanged lists of current research projects and interests. PCA agreed to provide an opportunity to highlight Reclamation research and concrete issues in its publications. Additional joint research projects will be further explored as will the possibility of Reclamation hosting concrete research fellows funded by PCA. (Shannon Cunniff, 202-513-0682; Dave Harris)

Participated in desalination research roadmapping exercise. This effort, directed by Congress in our FY02 appropriations, is being assisted by Sandia National Laboratory (SNL) and the Kellogg School of Management. This first executive steering meeting involved representatives of Reclamation, SNL, Kellogg, private sector, a municipal water district, academia, and nonprofits representing a variety of interests ranging from chemical engineering, public health, economics, political science, and the environment. A second executive meeting is scheduled for May 20 in Denver, and a larger, technical meeting with stakeholders is scheduled for June. A report to Congress on this effort is due by October 2002. (Shannon Cunniff, 202-513-0682)

Released 2000/2001 Science and Technology (S&T) Program Highlights. This document includes information on research challenges and issues, summaries of research projects, research accomplishments, and contact information. It includes a list of all projects and a map of field project locations. Research funded by the regions and the dam safety program are also highlighted. The report, easily understandable and creatively laid out, has been well received. Interest has exceeded expectations, and a second printing is underway. If you haven't gotten a copy and would like one, please contact Siegie Potthoff, 303-445-2136.

Met with Technical Service Center (TSC) Director and Division Chiefs to discuss research program strategic goals and ongoing activities including technology transfer. (Shannon Cunniff 202-513-0682; Chuck Hennig; Michael Messaros; Siegie Potthoff)

Met and interviewed seven AAAS Fellows for possible sponsorship. Identified one fellow with especially good match to S&T program needs and secured USGS agreement to share cost of sponsoring this fellow. However, fellow chose a position with EPA. Will work with the Department's Science Advisor regarding up-front DOI participation in the program in FY03. (Shannon Cunniff, 202-513-0682)

Selected summer intern through Minority Access program. Intern will begin in June for 10 weeks and work on developing web-based technology transfer and other outreach material. (Shannon Cunniff, 202-518-0682)

## Upcoming Events

May

- 3-5** National Water Research Institute Research Advisory Board meeting. (Shannon Cunniff, 202-513-0682)
  - 7** Briefings for Senators Domenici and Reed's staff on desalination research.(Shannon Cunniff, 202-513-0682)
  - 7** Meeting with Jack Barnett on Colorado River Salinity Control issues. (Shannon Cunniff)
  - 7 - 8** BR strategic planning stakeholder meetings (Shannon Cunniff, Washington Mtg, )
  - 9 -10** DOI Executives meeting (Shannon Cunniff)
  - 13-17** BRC, Reclamation Leadership Team Meeting, Reclamation Managers' Conference (the latter is featuring a display on S&T program as well as a joint display on Advanced Water Treatment Options co-presented by S&T program, TSC'S WATER group, Office of Policy and Yuma Area Office's Water Quality Improvement Center!) (Shannon Cunniff)
  - 20** Research roadmap executive meeting in Denver.(Chuck Hennig, 303-445-2134)
  - 29-30** S&T Program Steering Committee Meeting, Denver, Colorado (Siegie Potthoff, 303-445-2136)
- June
- 5-8** PMTS management retreat in Phoenix (Shannon Cunniff, 202-513-0682)

## Improving Water Supply Technologies

The field testing portion of the Slowsand Pretreatment for Reverse Osmosis for **Central Arizona Project** water in **Marana, Arizona**, is complete, and the Mobile Water Treatment Trailer was returned. It is being repaired and readied for its next project in **Mesquite, Nevada**. For more information on the Marana, Arizona, project contact Chuck Moody, 303-445-2258. For information on the Mesquite, Nevada, project, contact Michelle Chapman, 303-445-2264, or Dennis Watt, 702-293-8180.

A Simulated Distribution System test was run on the **Mni Wiconi Water Treatment Plant** effluent to determine disinfection byproduct formation using chlorine or chloramine at two dose rates. The Mni Wiconi Water Treatment Plant is in Pierre, South Dakota. (Michelle Chapman, 303-445-2254, Dave Koneche )

Ultrafiltration system is being demonstrated in Green Valley Park at **Payson, Arizona**. Tertiary treated wastewater from a pond in the park will be treated to see if ultrafiltration will produce water of high enough quality to be reinjected into the towns well field. The project is a collaboration between **PXAO**, S&T, and the town of Payson and will benefit the Native American water supply. (Michelle Chapman, 303-445-2254)

Dr. Douglas Clark chaired a paper session at the national meeting of the Association of American Geographers In Los Angeles. The paper session was entitled "Flooding: When Water Runs Amok". He also delivered a paper with Dr. David Longbrake, Chair, Dept. of Geography, University of Denver: *"Determining Low Income and Minority Populations Adversely and Disproportionately at Risk in Modeled Dam Breach Flood Inundation Zones using U.S. Census Data* (Doug Clark, 303-445-2271)

### **Improving Decision Support**

Reclamation and USGS held their semi-annual technical steering committee meeting with USGS in Reno, Nevada, to review progress and plan technical activities for the coming year. The meetings were hosted by the University of Nevada's Desert Research Institute and were very positive with detailed discussions of the ongoing work in the **Truckee, Rio Grande, and Yakima** basins. A detailed summary of the meeting has been distributed to participants and will be posted on the River Systems and Meteorology Group's website: [www.usbr.gov/rsmg](http://www.usbr.gov/rsmg). (Don Frevert, 303-445-2473)

Reclamation received a comprehensive technical review of the Stochastic Analysis, Modeling, and Simulation program from Dr. William Lane. Overall, the review was quite favorable - but it also included number of suggestions for specific improvements which need to be addressed. Don Frevert and Dr. Lane will meet with experts from **Colorado State University** to discuss the additional improvements which need to be made. (Don Frevert, 303-445-2473)

Reclamation team members held a conference call meeting to review progress on the **Yakima Fisheries** modeling effort. Significant work has been done on the Range of Variability Analysis (RVA) and preliminary results show that the RVA analysis will allow us to characterize flow regimes statistically, allow us to address specific impacts statistically and make a quantitative assessment of pre and post impact hydrologic regimes. (Don Frevert, Mark Bowen)

Don Frevert of the TSC and Roger Larson of PN Region with Dr. William Lane to discuss implementation of the stochastic hydrology package developed under the S&T Program on the **Snake River** basin. The meeting was very productive, and the technology is expected to be very

beneficial for future modeling studies on the Snake River system. (Don Frevert, 303-445-2473)

Work continued with NASA's North American Land Data Assimilation System (NLDAS) to enhance the Agricultural Water Resources Decision Support (AWARDS) System in southwestern Oklahoma. Demonstration is planned with the **Lugert-Altus Irrigation District** and Reclamation's **Oklahoma-Texas Area Office**. This water demand analysis and forecasting effort is sponsored by a partnership among the Science and Technology Program, NOAA's Office of Global Programs, the **Oklahoma-Texas Area Office**, and NASA. **The Red-Arkansas River Basin** is of particular interest because NOAA has also proposed this basin as a study site for the Hydrology for the Environment, Life, and Policy (HELP) UNESCO / World Meteorological Organization Program. Sociologists from the University of Arizona have met with Don Moomaw's team to discuss HELP. Real-time results are available at the following URL: <http://yampa.earthsci.do.usbr.gov:8080/awards/Ok/SW/swok.html> (Dave Matthews, 303 445-2470)

Research applications for snowpack analysis and prediction began in the Upper Missouri Basin as part of the research to "Improve Streamflow Forecasts" in the **Great Plains Region**. (Curt Hartzell, 303 445-2482)

The AWARDS - ET Toolbox is being demonstrated on the Upper Columbia Basin's Yakima River to improve the water conservation in that area which was heavily effected by drought last summer. The decision support system is sponsored under S&T and UCAO funding. It is available on the web providing real-time information for UCAO water operations managers and planners, and stakeholders. Consumptive use by crops and riparian vegetation is computed for irrigated lands and streams each day, and results are fed as input to the RiverWare river system model to improve water operations decision-making and planning. Real-time research products are available at the following URL: <http://yampa.earthsci.do.usbr.gov:8080/awards/Or/Pend/Pendindex.html>

## Upcoming Activities

### May

- 1** Conference call to review progress on the **Columbia Basin Project** effort to develop the capabilities to jointly utilize AWARDS - ET Toolbox technology in conjunction with RiverWare. (Don Frevert, 303-445-2473)
- 6** Standing Operating Advisory Committee in Yakima on to discuss preliminary results of the Range of Variability analysis to evaluate pre- and post-impact hydrologic regimes (Don Frevert, 303-445-2473)
- 6-10** Work session in Boulder, Colorado, to finalize RiverWare rules for the Truckee River Operational Forecast effort and develop Data Management Interfaces for use with the USGS hydrologic-related models. (Don Frevert, 303-445,2473)
- 13-17** American Meteorological Society conference.

National Weather Service is holding a workshop to discuss the Advanced Hydrologic Prediction Services in Lakewood, Colorado. S&T hydrometeorologists will learn more about plans and opportunities to partner and collaborate with NWS forecasters and researchers in the River Forecast Centers, and the Office of Hydrologic Development. (Curt Hartzell (303 445-2482).

### June

- Reclamation scientists and water operations managers will meet with NOAA hydrometeorologists and forecasters at the California - Nevada River Forecast Center in Sacramento, CA, to discuss research application developments and demonstrations of NOAA's Advanced Hydrologic Prediction Services and WaRSMP's - Modular Modeling System stream flow forecasts in the Truckee River Basin. Future collaborations and opportunities for joint research proposals to meet Reclamation's need for improved water supply and streamflow forecasts will be explored. (Dave Matthews, 303 445-2470)
- 27-28** The University of Colorado will host the Annual RiverWare User's Group meeting in Boulder. This meeting allows for Reclamation, TVA, the Corps of Engineers, and other private sector users to meet and review recent improvements to RiverWare and prioritize future needs (Don Frevert)

## Improving Water Delivery Reliability

The National Hydropower Association presented the Bureau of Reclamation with a 2002 Hydro Achievement Award in the category of Technical Solutions for its state-of-the-art Shasta Temperature Control Device (TCD). The award was announced at the association's annual conference, April 23, in Washington D.C. Completed in 1997, the TCD is a shutter-type structure designed to draw water from the deepest levels of Shasta Lake through the powerhouse turbines, maximizing power generation while at the same time providing life-producing cold water for threatened chinook salmon that spawn downstream in the Sacramento River. The device also improves dissolved oxygen and turbidity levels in the river water and allows Reclamation to fulfill contractual obligations for both water delivery and power generation. The S&T Program helped develop the capability and knowledge necessary to design the TCD. Dick LaFond of the TSC was Principal Designer for the project.

A report entitled "Assessment of Behavior and Swimming Ability of Yellowstone River Sturgeon for Design of Fish Passage Devices" was published. This research was conducted under joint funding from the S&T Research Program and the Corps of Engineers, Omaha Office. The research findings are being used to guide the design of several fish passage structures on the Yellowstone River where endangered Pallid sturgeon and shovelnose sturgeon are present. (Brent Mefford, 303-445-2149)

Following a series of workshops in the Fall of 2001 and Spring of 2002 on urbanization issues facing irrigation districts, information from the workshops has now been posted on our website, including PowerPoint presentations and documents of interest in .pdf format to those attending the workshops, enabling these documents to be more accessible to stakeholders facing the urban encroachment issue. Discussion is underway with **area offices** regarding additional workshops on issues surrounding urban encroachment. Videotapes of the three workshops are available upon request. Our website is located at <http://waterlab.colostate.edu>. (John Wilkins-Wells, 970-491-5635)

Meetings with stakeholders, including the Colorado River Basin Salinity Control Forum (CRBSCF), the Natural Resources Conservation Service (NRCS) and several soil conservation districts, have confirmed stakeholder support for our study's effort to assist them in a new Framework Plan for Monitoring and Evaluating the Colorado River Salinity Control Programs. In conjunction with this effort, a National Conservation Basebook on 1.2 million cost share contracts administered through the Farm Service Agency and NRCS between 1987 and 1999 is being compiled. A large number of these cost share contracts were for salinity control and water conservation in the seven Colorado River Basin states and other states. The format and proposed contents of the National Conservation Basebook, along with stakeholder involvement in our research project, will be presented to the Annual CRBSCF meeting in June in Silverthorne, Colorado. (John Wilkins-Wells, 970-491-5635)

## **Improving Infrastructure Reliability**

The research project on "Clogging of Perforations in Plastic Drain Pipe" is complete. Reports will be distributed to those who contributed to the project. Copies will also be sent to the Regional Research Coordinators and Denver Office S&T Program Coordinator. The primary objective of the research was to assess the extent of clogging of perforations by the gravel envelope if any. We concluded that there is no wide spread problem. We also checked the residual strength of polyethylene pipe that has been buried for up to 29 years and found no discernable deterioration. (Glen Sanders, 303-445-2514)

Met with president of Adwel International, Ltd, to discuss the status of the ramped voltage test set commercialization project. The ramped voltage test detects damaged or deteriorated insulation before generators, pumps, and other electrical machinery break down. The Agreement with Adwel will provide Reclamation with a dependable manufacturing source for this innovation. To date, Adwel has designed and built a prototype ramped voltage test set based on Reclamation's existing design and future requirements. Over the next 8 to 12 months, Reclamation engineers will be involved in a variety of activities including: evaluating the prototype hardware and software; reviewing and editing technical papers, product data sheets, etc.; training Adwel personnel on the theory and practice of ramped voltage testing; and providing guidance on the safety aspects of high-voltage testing as well as interpreting test results. Adwel anticipates a commercial instrument will be available by September 2002. The test set will be brought to the Reclamation O&M Workshop scheduled for December 2002 so that field personnel can witness a demonstration of the equipment. (Lori Rux, 303-445-2307)

Malin Jacobs and Phil Atwater are finalizing a research report on laboratory test results and findings for a new method of measuring electrical resistance (continuity) of personal protective grounding cables. The method involves the application of high pulses of current through the cable to detect very low values of resistance. Cable resistance is a key parameter in assessing the physical condition of grounding cable and the level of safety afforded in applying the cable to a work site. (Phil Atwater, 303-445-2304)

The draft CRADA (Cooperative Research and Development Agreement) for completing the prototype development of our winding fault detector has been submitted to the Colorado School of Mines for their review. We anticipate that the CRADA will be signed and in place by the first part of May and that Colorado School of Mines students will begin work during their summer "Field Session" beginning in May 2002. The winding fault detector has demonstrated the capability of pinpointing the location of electrical faults in the stator windings of large rotating machines. Reclamation currently 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)

**Central Valley Operations Office** and **Central California Area Office** staff are planning to use Powerformer™ for Unit 1 replacement at **Folsom Powerplant** in the **MP Region**. Design

and project management meetings were held at Folsom on April 11 and 25 among **Central Valley Operations Office, Central California Area Office, and Technical Service Center** staff to resolve design and construction issues. **The Hydroelectric Research and Technical Services Group** is providing information for the specifications that will be important to ongoing research activities. An expanded research plan has been drafted to encompass the various aspects needing investigation. Work will continue under the S&T program as condition assessment methodologies are devised and developed to assess the Powerformer™ once operational. (Gary Osburn, 303-445-2297)