

RECLAMATION

Managing Water in the West

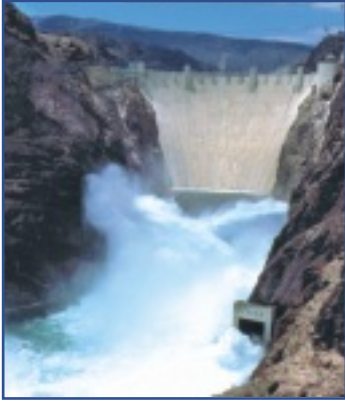
Bureau of Reclamation Science and Technology Program



U.S. Department of the Interior
Bureau of Reclamation

August 2005

Pursuing Innovative Solutions for Water in the West Through Collaborative R&D



Hoover Dam

The Science and Technology (S&T) Program is the primary Research and Development (R&D) arm of Reclamation.

The S&T Program is a Reclamation-wide competitive, merit-based applied R&D program that is focused on innovative solutions for Reclamation water and facility managers, and our western water stakeholders. The program has contributed many of the tools and capabilities in use today by Reclamation and western water managers.

About Reclamation - Established in 1902, the Bureau of Reclamation is best known for the dams, powerplants, and canals it constructed in the 17 western states. These water projects led to homesteading and promoted the economic development of the West. Reclamation has constructed more than 600 dams and reservoirs including Hoover Dam on the Colorado River and Grand Coulee on the Columbia River.

Today, we are the largest wholesaler of water in the country. We bring water to more than 31 million people, and provide one out of five Western farmers (140,000) with irrigation water for 10 million acres of farmland that produce 60% of the nation's vegetables and 25% of its fruits and nuts.

Reclamation is also the second largest producer of hydroelectric power in the western United States. Our 58 powerplants annually provide more than 40 billion kilowatt hours generating nearly a billion dollars in power revenues and produce enough electricity to serve 6 million homes.

Bureau of Reclamation Regions

Today, Reclamation is a contemporary water management agency that helps the Western States, Native American Tribes, and others meet new water needs and balance the multitude of competing uses of water in the West. Our mission is to assist in meeting the increasing water demands of the West while protecting the environment and the public's investment in these structures. We place great emphasis on fulfilling our water delivery obligations, water conservation, improving water supply flexibility, and developing partnerships with our customers, states, and Indian Tribes, and in finding ways to bring together the variety of interests to address the competing needs for our limited water resources. Learn more about Reclamation at <http://www.usbr.gov/main/about/>



R&D Partnership Opportunities

“Great discoveries and achievements invariably involve the cooperation of many minds”-Anonymous

Reclamation employees are the principle investigators eligible to submit R&D proposals and receive proposal awards. Effective partnerships are a primary R&D proposal award consideration. We emphasize efficiency and effectiveness through collaborative R&D with stakeholders, universities, non-profit organizations, the private sector, and other local, state, and federal agencies with water and water-related roles and capabilities. Collaboratively developed solutions meet the greatest number of needs at the least cost to all partnership members, and in the least amount of time than any partner can do on their own. Collaborative R&D projects achieve cost-share from R&D project partners through in-kind services and/or direct funding contributions.

Unparalleled R&D Opportunity - Looking for opportunities to work directly with the end-user of your R&D? Want to make sure that your R&D is valued and put to work making a difference for water in the West? Want access to Reclamation's unique, extensive *“living laboratories?”*

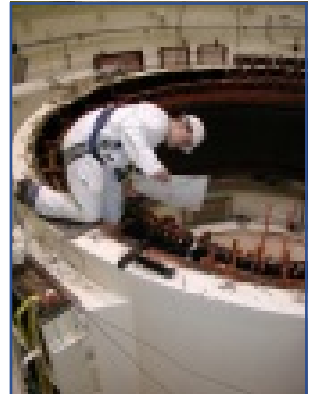
Reclamation's extensive water storage, water delivery, and hydropower facilities offer unsurpassed living laboratories for field tests, evaluations, and demonstrations. R&D partnerships also have access to Reclamation's hydraulic, material testing, and other laboratories.

The end users of our R&D are Reclamation water and facility managers and the stakeholders they serve. We work with our end-users throughout the R&D process to ensure the tools and solutions we develop are needed, practical, and valued. Their on-the-ground understanding of Western water challenges coupled with our technical expertise, our *“living laboratories,”* and Reclamation's solution-oriented approach to confronting Western water challenges provides an unparalleled forum for water and water-related R&D.

Partnership Tools

Department of the Interior Partnership Guidance - The Department of the Interior believes that developing partnerships is a very important way to effectively accomplish its various missions of managing, conserving, and protecting America's natural, cultural, and historic resources. As such, working with partnerships is central to the Secretary's 4 C's....“Conservation through Cooperation, Communication, and Consultation.” The Department of the Interior has issued a Partnership Legal Primer to help guide the development of effective and appropriate partnerships. Learn more about partnerships with the Department of the Interior at <http://www.doi.gov/partnerships/>. Learn more about the Department's *Partnership Legal Primer* at http://www.doi.gov/partnerships/partnership_legal_framework.html

Federal R&D Partnership Legislation - Federal Technology Transfer legislation enables federal agencies to make their R&D facilities and expertise available to the private sector through cooperative research. Technology advancements achieved are transferred to private industry for commercialization. Federal Technology Transfer legislation enables



federal agencies, the private sector, and other non-federal entities to join forces so that:

- U.S. industries have easy access to federal R&D expertise and facilities.
- Federal agencies have access to private sector expertise and resources that complement their agency mission-driven R&D.
- U.S. industries remain more competitive in the global marketplace through technology innovation which helps create jobs, strengthen our national economy, and reduce the nation's foreign trade deficit.
- Industry can license Reclamation intellectual property, or intellectual property that is jointly developed through collaborative R&D. This helps to mature federal innovations for deployment, so that they can be manufactured and broadly available to benefit the public.

Partnership Agreements - Cooperative Research and Development Agreements (CRADAs) are authorized under Federal Technology Transfer legislation. CRADA's define the R&D partnership between the federal government and non-federal entity. Non-federal cooperating entities are authorized to provide an array of resources for developing and commercializing a new product, service, or solution. Non-federal cost-share can include personnel, equipment, materials, or funds to cover any additional cost of Reclamation expertise and facility use. Federal cost share can only include personnel, facilities, equipment, and materials. No federal funds can be transferred to a cooperating entity through a CRADA. Reclamation will enter into a CRADA only when the partnership offers complementary capabilities and interest, but the R&D results need to be relevant and useful to supporting Reclamation's mission of water and power deliveries.

Reclamation's R&D Agenda

Improving Water Delivery Reliability R&D Focus Area

Improve the reliability of Reclamation water deliveries by producing effective solutions, tools, and practices that Reclamation water managers can use to prevent water conflicts with the environmental demands on water supplies. Improvements and technological advances are pursued in the following R&D Output Areas:

- Fish Passage and Entrainment
- Ecosystem Needs
- Aquatic and Riparian Invasive Species
- River and Reservoir Restoration and Sediment Management



Concrete Flume and Baffle Fishway

Expanding critical fish habitat through fishways that allow safe passage around diversion dams



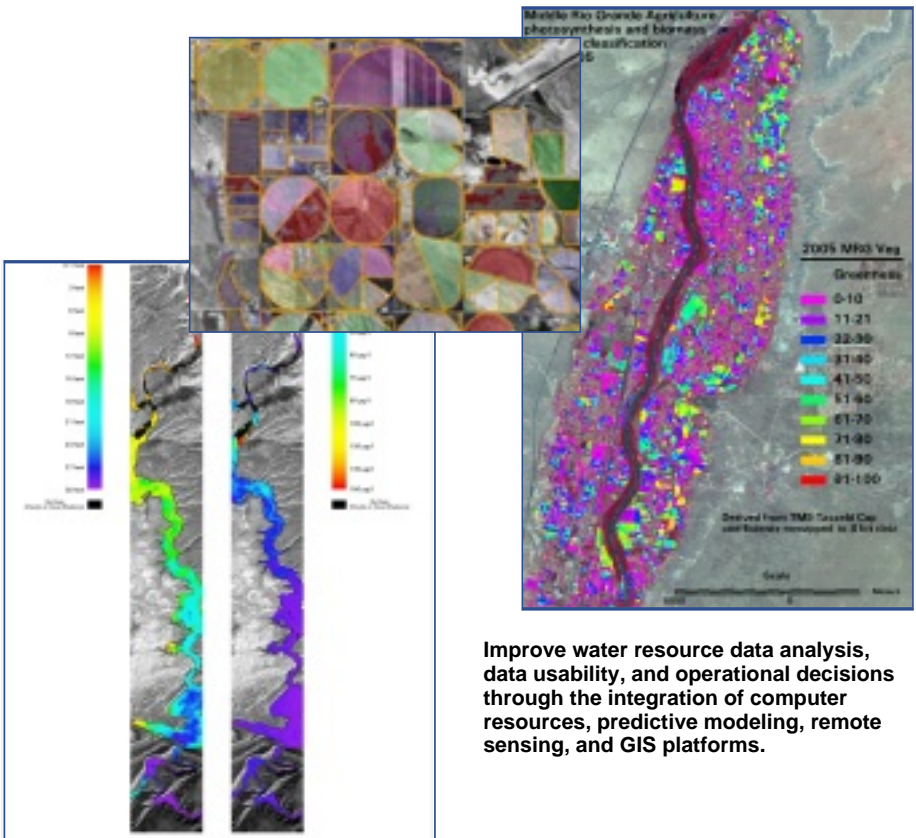
Archimedes Screw Pump designed for safe fish passage

Reclamation's R&D Agenda

Improving Water Operations Decision Support R&D Focus Area

Develop solutions and tools that help Reclamation water managers make effective reservoir and river system operational and planning decisions through better integration, evaluation, understanding, and presentation of critical data and information. Improvements and technological advances are pursued in the following R&D Output Areas:

- Managing Hydrologic Events
- Water Supply Forecasting
- Water Operation Models and Decision Support Systems
- Water Resource Data Analysis



Improve water resource data analysis, data usability, and operational decisions through the integration of computer resources, predictive modeling, remote sensing, and GIS platforms.

Reclamation's R&D Agenda

Improving Water and Power Infrastructure Reliability and Safety R&D Focus Area

Improve the reliability of Reclamation water storage, water delivery, and hydropower facilities by producing or advancing effective solutions, tools, and practices that Reclamation facility managers use to maintain, modernize, and extend the life of Reclamation's aging infrastructure. Improvements and technological advances are pursued in the following R&D Output Areas:

- Structural Condition Assessment and Performance Monitoring
- Repair and Maintenance
- Public and Employee Safety
- HydroPower Generation



The S&T Program partnered with Woodward Governor to fund the development of digital governor algorithms specifically tailored for hydro generators.



Our "Guide to Concrete"
is considered an industry
standard

Reclamation's R&D Agenda

Advancing Water Supply Technologies R&D Focus Area

Enhance water supplies for Reclamation stakeholders with new technologies, solutions, and practices that expand, liberate, or conserve water supplies. Improvements and technological advances are pursued in the following R&D Output Areas:

- Conjunctive Groundwater Storage and Use
- Desalination and Water Treatment
- Agriculture Water Efficiency
- Institutional Approaches to Water Solutions
- Helping Irrigation Districts Cope with Change
- Reducing System Water Losses and Other Conservation Practices



Canal lining innovations help conserve significant amounts of water.



Innovative techniques in canal automation and remote telemetry can conserve water by decreasing diversions by 20% while increasing crop production.

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