RECLAMATION Managing Water in the West

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Research and Development Office
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The Knowledge Stream
Award Announcements

Desalination and Water Purification Research Program

Facilitates partnerships to develop more effective, environmentally sensitive ways to increase water supplies.

"By investing in alternative water treatment technology research we are working to find ways to stretch the nation's current water supply, use less energy and reduce impacts to the environment. The research we are funding has the potential to unlock efficiencies that ensure future water supplies, strengthen our economy, and create jobs."
Commissioner Connor

Bottom Line

Under the DWPR Program, Reclamation cost shares research and studies with non-Federal entities. A competitive, merit-reviewed process is used to make awards with a recommended cost-share of 25 to 50 percent Federal contribution.

The program has three major goals:

(1) Augment the supply of usable water in the United States

(2) Understand the environmental impacts of desalination and develop approaches to minimize these impacts relative to other water supply alternatives

(3) Develop approaches to lower the financial costs of desalination so that it is an attractive option relative to other alternatives in locations where traditional sources of water are inadequate

Project Awards

In fiscal year 2011, Reclamation awarded $1.5 million under the Desalination and Water Purification Research Program to further research advanced water treatment technologies. This funding will be leveraged to support $2,771,752 in research. Five new projects are:

Design and Testing of a Pressure Regulation Subsystem for a Wave-Driven Desalination System: Resolute Marine Energy, Boston, Massachusetts ($37,000), with with Atlas Water Systems. Olivier Ceberio, oceberio@resolutemarine.com. This project is to design, build, and test a pressure and flow rate regulation system. This system will be used in conjunction with a seawater reverse osmosis system powered by ocean wave energy to create a clean and cost-effective alternative to diesel-driven desalination systems.

Pilot-Scale Evaluation of High Recovery Desalination of Agricultural Drainage Water with Smart Integrated Membrane Systems: University of California at Los Angeles, Western San Joaquin Valley, California ($199,809). Yoram Cohen, yoram@ucla.edu. This is a pilot test of the smart integrated membrane system (SIMS) technology of autonomous/self-adaptive ultrafiltration /reverse osmosis operation for desalination of agricultural drainage water. Operation is scheduled for two field sites in the western San Joaquin Valley where agricultural drainage management is a major challenge. The project aims to demonstrate the ability to continuously desalt brackish water attaining the maximum feasible recovery with a system operation that adapts in real-time to varying water quality scaling or fouling potential.

Combining Electrodialysis Reversal and Slurry Precipitation and Recycle Reverse Osmosis Technologies to Increase Recovery at Inland Desalters: Carollo Engineers, Corona, California ($197,968). Graham Juby, gjgjuby@carollo.com. This new treatment approach aims to decrease the volume of concentrate, thus making disposal easier at utilities where methods like ocean discharge are not feasible. This is a one-year pilot test to be carried out at the Temescal Desalter site in Corona, California.

Optimization of Desalination Diffusers Using Three-Dimensional Laser Induced Fluorescence: Georgia Institute of Technology, Atlanta, Georgia ($101,968). Philip Roberts, proberts@ce.gatech.edu. Designs of multi-port concentrate diffusers require predictions for dilution and environmental impacts. Predictions will be made by measuring and mapping tracer concentration profiles in the jets and the spreading bottom layer using an innovative three-dimensional Laser-Induced Fluorescence system. The results will be detailed data on the three-dimensional concentration distributions.

Studies on Presence, Influence and Control of Biofilms on Desalination Membranes: University of Toledo, Ohio ($115,420.) Isabel Escobar, isabel.escobar@utoledo.edu. This project will investigate making membranes resistant

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to biofoulants by charging the surface with copper. The project will focus on specific metal chelating ligands to bind the metal to the membrane. This work follows successful results on similar treatment of spacers in membrane equipment.

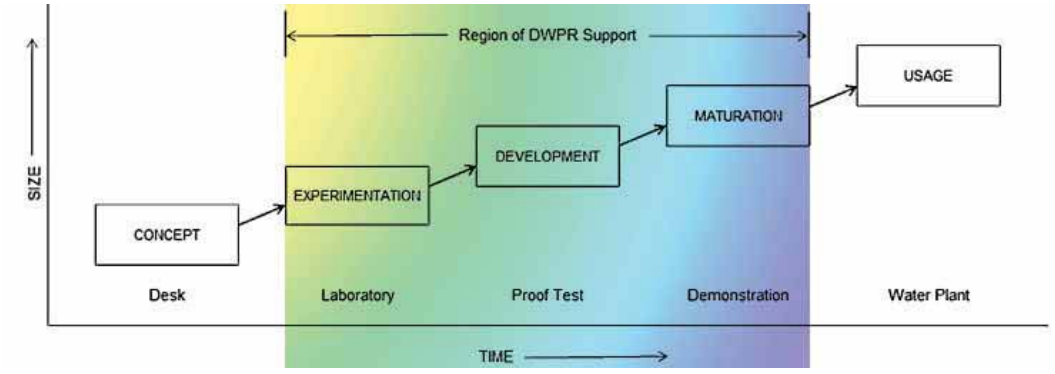
Guidelines for the Use of Stainless Steel in the Water and Desalination Industries: Eastern Municipal Water District, Perris, California ($86,572). Erin Mackey, emackey@carollo.com and Thomas Seacord, tseacord@carollo.com. Stainless steel is widely used in water and desalination systems. There are six major types of stainless steel and over 150 compositions. This project is developing guidelines to properly specify the type of stainless steel and construction standards used and to identify appropriate operating conditions to avoid corrosion.

Installation and Operation of a Full Solar Distillation Desalination Unit at the Brackish Groundwater National Desalination Research Facility: Suns River, Many, Louisiana ($84,703). Hill Kemp, hillk@suns-river.com. $84,703. Previously developed solar stills suffer from low productivity that limits the application of this technology. The unit to be tested has several novel features: a tilted adsorption surface almost normal to the incident sunlight and falling film evaporation, which are expected to materially increase the rate of evaporation and a modified surface to provide improved condensation. Initial efforts will concentrate on small production units.

Two projects are receiving continuing funding for the second phase:

Demonstration of Zero Discharge Desalination at the Brackish Groundwater National Desalination Research Facility at Alamogordo, New Mexico: University of Texas at El Paso with Veolia Water Solutions and the City of Alamogordo. ($499,996). Malynda Cappelle, mcappelle@utep.edu. The Zero Discharge Desalination process offers the potential to maximize the volume of product water from a brackish source while minimizing the amount of waste to be disposed. Recovery is progressively increased to very high values (about 97 percent) by removing gypsum (calcium sulfate) and silica. This work will build on pilot tests at various locations. The primary goal is to move towards commercialization and regulatory acceptance of this process.

Osmotically Assisted Desalination: A Low Energy Reverse Osmosis Hybrid Desalination System: University of Nevada, Reno ($186,492). Amy Childress, amyec@unr.edu. This will be a pilot-scale test of a hybrid system combining reverse osmosis with pressure retarded osmosis. The system will be used as a proof-of concept investigation to verify the bench-scale results and optimize the operating parameters necessary for developing a highly efficient reverse osmosis desalination system. The system will be field tested at the Brackish Groundwater National Desalination Research Facility in Alamogordo, New Mexico.



Desalination timeline. DWPR supports projects from the laboratory to demonstration.

"Through this program, Reclamation is forming partnerships with private industry, universities, water utilities, and others to address a broad range of desalting and water purification needs."

Kevin Price, Advanced Water Treatment Research Coordinator

Better, Faster, Cheaper

DWPR research has led to building desalination systems with innovative ways to save energy, reduce concentrate waste, and reduce costs—extending our water supplies around the world. We have researched and applied ways to build bigger plants more economically, and to facilitate industry-developed standards, thus reducing costs even further.

Web site

www.usbr.gov/research/AWT/DWPR

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