Desalination Facility Study Underway in Tularosa Basin, NM

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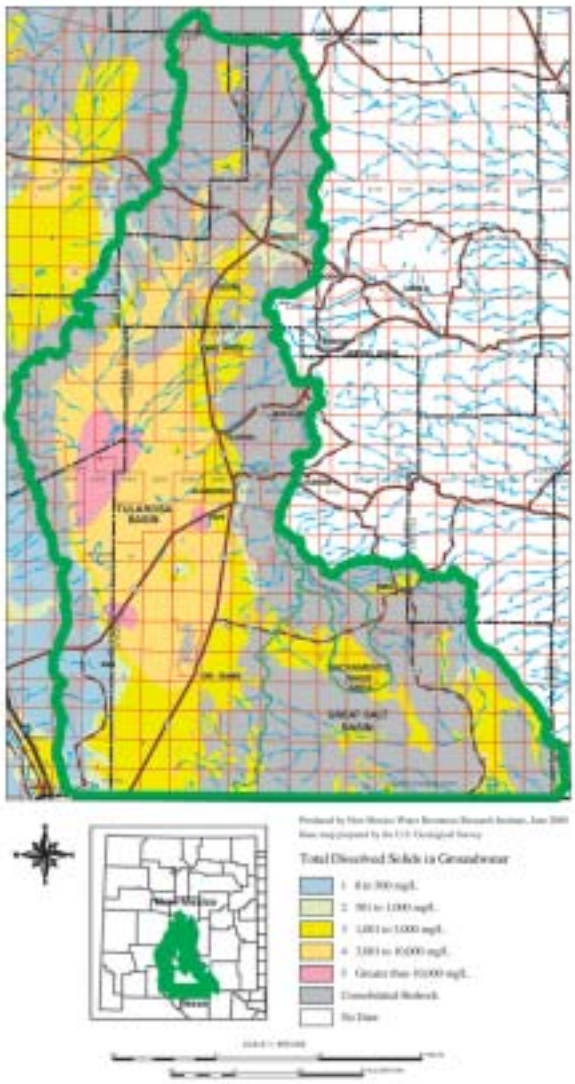
Saline and brackish waters constitute more than 97 percent of the water in the world and the vast majority of New Mexico's water, but the latest cost-effective revolutionary desalination technologies offer a means by which to supplement New Mexico's fresh water supplies.

To address the development of the next generation of desalination technologies, a partnership has been formed between Sandia National Laboratories and the Bureau of Reclamation. The New Mexico Water Resources Research Institute (NMWRRI) will support the partnership with organizational and technical assistance.

Sandia scientists, known for their expertise in energy efficiency and renewable energy resources, will cooperate with the Bureau's staff, bringing a history of well-established desalination research and testing capabilities to the effort. These organizations will provide expertise in salt and brine chemistry, geology, engineering, desalination testing and evaluation, renewable energy, environmental technology, and materials science.

A study is now underway to evaluate the need for a facility to support pilot testing of desalination technologies. For example, testing could be conducted to evaluate the application of renewable energy techniques to reduce desalination costs. In addition, the cost effectiveness of small-scale or portable desalination systems could be explored, as well as the application of desalination technology to large-scale surface flows. Other studies could establish whether the treatment and beneficial use of produced water (from oil and gas wells) is feasible with desalination systems. Similar studies could evaluate the environmental impact (i.e., the disposal problem) of inland brine and salt produced by desalination.



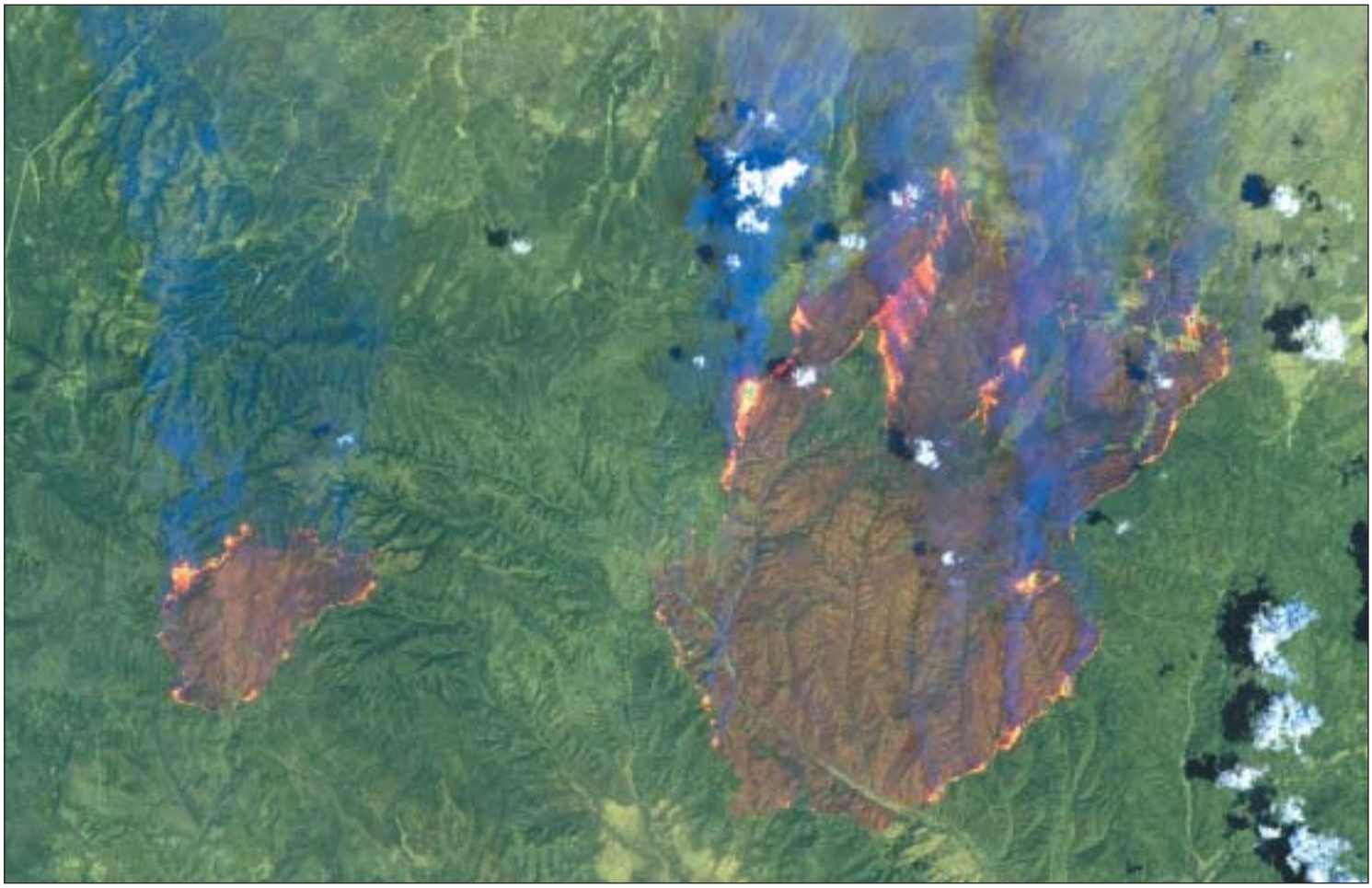
The Tularosa Basin in New Mexico is the proposed site for the desalination facility. This basin has been extensively studied and has substantial amounts of brackish and saline water. Within a 5-mile radius, waters with salinities from 2000 parts per million (ppm) Total Dissolved Solids (TDS) to 100,000 ppm TDS are available. Also, a wide range of water chemistries including sodium-chloride, carbonate, and sulfate-based brine waters are available. Further, the Tularosa Basin is one of the world's leading areas of wind, solar, and geothermal renewable energy.

The design, construction, and operation of the Tularosa Basin Desalination Research Center facility will be managed jointly by the Bureauand Sandia.

During 2002, the feasibility study will review siting issues, identify construction and operational costs, and suggest operational and management plans.

The NMWRRI is providing technical support for the executive committee overseeing the feasibility study. The executive committee is composed of regional and national desalination and water resources experts. The institute is hosting meetings, providing technical expertise, and disseminating information on the feasibility study including the creation of a web site created for the center.

Visit wrri.nmsu.edu/ or contact Bobby Creel at WRRI at (505) 646-4337 for more information.



On June 21, 2002, the Rodeo and Chediski Fires in east-central Arizona were still two separate fires. This false-color scene from the Enhanced Thematic Mapper Plus (ETM+) aboard the Landsat 7 satellite shows the active perimeter of the fires in yellow and vegetation in green. Burned areas appear pinkish-green, and smoke is blue. The smaller Chediski Fire is on the left, and the Rodeo Fire is on the right. Image by Jesse Allen, based on data courtesy Landsat 7 Science Team, NASA GSFC; obtained from NASA's Earth Observatory at earthobservatory.nasa.gov.

Wildfires, Part I: Before the Flames are Out, Hydrologists Start Work

Both Colorado and Arizona experienced the largest wildfires in their states' histories this summer, and hundreds of other wildfires have been fought across the Southwest in this year of extreme drought. Before large fires have even stopped growing, hydrologists, together with soil scientists, engineers, wildlife biologists, range conservationists, and other experts come together to form a Burned Area Emergency Rehabilitation (BAER) team.

The Rodeo-Chediski fire that ultimately burned 468,000 acres in the White Mountains of Arizona began on June 18 as two separate fires. On June 22, the fire had burned a combined total area of 145,000 acres and was still growing; the fires had not yet merged. However, on that day, the Bureau of Indian Affairs (BIA) appointed a leader to head up an Interagency BAER team comprised of

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The Salton Sea: Focus on Remediation, Not Restoration

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The long-term fate of the Salton Sea is coming under scrutiny as California's end-of-year deadline to agree on an implementation plan for the Colorado River Quantification Settlement Agreement (QSA) looms. To meet the QSA deadline, California's agricultural water users, including Imperial Irrigation District (IID), must show by Dec. 31 how over time they will reduce their consumption of Colorado River water by roughly 400,000 acre-feet/year (af/y). The Salton Sea currently serves as a sink for irrigation runoff from the IID. Roughly 1.3 million acre-feet of Colorado River water reach the Salton Sea each year. Under the QSA, less water will flow into IID's All American Canal, and that amounts to less water available for the Salton Sea. The proposed IID-San

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LANDSAT Thematic Mapper false-color image of the Salton trough region of California (Scene ID 50203-17462), aquisition date 20 Sept 1984. The Salton Sea is in the center of the image, with the Orocopia Mountains to the northeast of the Salton Sea and the Santa Rosa Mountains to the northwest. The bright green areas are agricultural centers; the area southeast of the Salton Sea is the Imperial Valley area, and the bright green to the northwest is the Coachella Valley. The body of water in the bottom center part of the image is the Laguna Salada in Mexico; the U.S.-Mexico border can be seen diagonally across the bottom of the image, just north of the Laguna Salada. The tan-colored diagonal strip to the southeast of the Salton Sea is the Algodones sand dunes. The image was processed by Lisa A. Heizer, Department of Geological Sciences, San Diego State University (www.geology.sdsu.edu).

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BIA, U.S. Forest Service, and Tribal representatives, to evaluate the damage to the Tribal lands that comprised nearly 60 percent of the burned area. The U.S. Forest Service also organized a similar team to assess the impacts to non-tribal lands.

In the BIA's Interagency BAER team, section leaders were designated to focus on soil and watershed analyses, wildlife, vegetation, forestry, emergency response, and roads. Thus began nearly a month of 16-hour days and seven-day weeks spent assessing the damage and the potential hazards to life, property, water quality, and ecosystems in order to determine how best to alleviate emergency conditions.

Laurel Lacher, White Mountain Apache Tribe Hydrologist, led the soil and watershed analysis section. Her first job was to recruit and import experts to perform the various analyses from other agencies already stretched thin by wild fires all over the West. The immediate tasks of her section were to produce a burned severity map and to try to anticipate flood impacts to two tribal communities downstream of the burned area.

The burned severity map, which shows areas of severe changes in soil and vegetative properties associated with fire, was prepared primarily from satellite imagery. It was used to identify areas of hydrophobic soils where runoff, erosion, and even slope failure may be severe. Post-burn runoff in the watersheds was modeled using HEC-1. The results of the modeling indicated that, for a 10-year, tropical-type storm that would cover the entire watershed, peak runoff may be two to five times the pre-burn, 100-year flood event. Sediment loads, which typically are one ton per acre per year in the area, may be as much as 40 tons per acre per year in severely burned areas.

Having calculated the magnitude of what could come, the soil and watershed team immediately began attempts to mitigate potential damage and to warn the public. With the assistance of the U.S. Geological Survey, three new stream gages were installed high in the watersheds to act as flood warning systems (see related article on page 28), and seven new remote automated weather stations with satellite-telemetered data are on the way. Five million pounds of seed mix containing native grasses and cereal grains was ordered from any place it could be found, and aerially distributed over the entire area. If less than 80 percent ground cover is achieved in test plots, more seed will be distributed this winter.

An estimated 24,000 acres on the reservation are devoid of all vegetation and require mulching. Already, as the summer monsoons have begun, roads are washing out and access is becoming limited. Culverts will be removed so they don't become blocked with debris and force the streams to run down the roads. Sand bags, straw bales, and armored bank are being emplaced to minimize potential damage when the big floods come. Residents of the community are being educated about the potential dangers they could face this summer, perhaps this winter, or maybe not until next year. It will be a long, slow process of soil stabilization and forest regeneration, with high potential for more destruction to occur in the mean time.

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Diego transfer could result in a 200,000 af/y reduction in Salton Sea inflows.

Another smaller threat to Salton Sea inflows arises from two north-flowing rivers that originate in Mexico: the New River and the Alamo River. As human population, agriculture, and industry grow in Mexico's border region, the demand to utilize these waters south of the border will grow, reducing their availability to the Salton Sea.

Salton Sea inflows are balanced by evaporative outflows. Decreasing inflows will result in the sea shrinking in size and becoming even more saline. Currently, the sea is 25 percent more saline than ocean water.

Several issues arise. In the near term, the Salton Sea serves as a major stopover along the Pacific flyway. Approximately 400 species of birds live at or visit the sea annually. With the decline in alternative wetlands in northern Mexico and Southern California, the sea has become a more important stopping point. But the sea's value as a bird sanctuary is in decline. The growing salinity combined with pesticides and other toxic inflows have caused rare diseases in some of the fish populations, with resulting bird die-offs as they eat the diseased fish. As the sea dries, these