

Divining Rod

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NM WRRI Develops Website for U.S.-Mexico Groundwater

by Will Keener

Staffers at the New Mexico Water Resources Research Institute and partner organizations have cast a wide net around a diverse set of water-related data along the New Mexico-Chihuahua border, making it accessible to many in a user-friendly format. The interactive format “expedites research for technical studies and also for anyone else interested in natural resource data for the area,” says Susanna Glaze, who took a leading role in the project’s development for NM WRRI.

The work was funded by a grant from the Environmental Protection Agency through the Southwest Consortium for Environmental Research and Policy (SCERP). The research consortium is a collaboration of five U.S. and five Mexican universities along the border. First funded in 1989, the consortium has been funded by Congress since 1990 to address environmental issues in the border region. “There is a lot of data out there and not a lot of time to gather it,” explains Glaze. “Why not create a central collection point for the data?”



Susanna Glaze, NM WRRI's GIS Analyst, discusses the interactive water maps developed for the New Mexico-Chihuahua border area. The project was originally conceived by former NM WRRI assistant director, Bobby Creel. (photo by Will Keener)

The principals on the database project were originally Bobby Creel, NM WRRI assistant director, and Alfredo Granados-Olivas, professor at Universidad Autónoma de Ciudad Juárez. Dr. Granados-Olivas is credited with providing much of the data from the Mexican side of the border for the project. When Dr. Creel died in 2010,



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Kudos

Nirmala Khandan, professor of civil engineering at NMSU, has been named as the first holder of the Ed and Harold Foreman Endowed Chair in Civil Engineering at NMSU. Professor Khandan and his students have received numerous grants through the NM WRRI over the years. One recent project produced a 2010 NM WRRI report entitled *Sustainable Recovery of Potable Water from Saline Waters*, and was written by Dr. Khandan and doctoral student Veera Gnaneswar Gude.

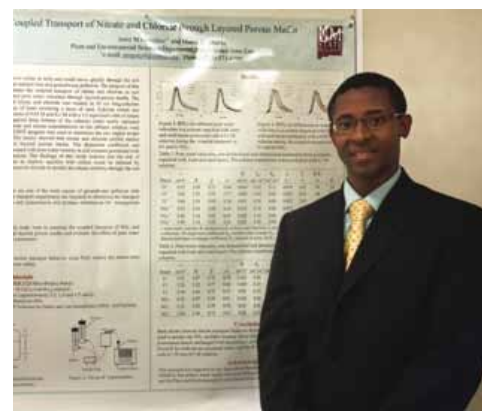


"For more than 20 years Nirmala Khandan has been a leader in scholarly activities in the civil engineering department. He has been widely recognized for his research and teaching and he is most deserving of this honor," said Ricardo B. Jacquez, College of Engineering Dean.

Khandan's current research with funding from a variety of sources focuses on desalination technologies, biohydrogen production, and algal biodiesel production. He also has funding from the National Science Foundation to conduct research in educational materials development.

Khandan, a member of the NMSU faculty since 1989, has taught a variety of undergraduate and graduate courses. He has published a textbook called "Modeling Tools for Environmental Engineers and Scientists," and more than 80 journal papers. Three of Khandan's papers are among the top one percent of all papers published in engineering worldwide in terms of peer citation.

NMSU Plant and Environmental Sciences graduate student **Amir Gonzalez** won second prize in the Soil Science Society of America poster competition at the annual meeting in October, for his poster "Coupled Transport of Nitrate and Chloride through Layered Porous Media." According to the selection committee, Gonzalez received the award for presenting excellent research, clarity, and knowledge about the transport processes through the layered porous media. Gonzalez recently graduated with a Ph.D. from the department of plant and environmental sciences.



Amir's major advisor was associate professor Manoj Shukla, a recent recipient of a NM WRRI grant, that resulted in a final report entitled, "Land Application of Industrial Effluent on a Chihuahuan Desert Ecosystem: Impact on Soil Physical and Hydraulic Properties." Amir Gonzalez used the sand from the project's experimental site to predict the movement of anions, which also aided in the wastewater seed project.

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Glaze had to adjust her role on the project. “Bobby wrote the proposal and had the idea,” she said. “When we got the project, he had a clear concept of how we would build on the Hewlett project. He was the mastermind.”

The project grew from work funded by the William and Flora Hewlett Foundation, done earlier by several undergraduate students. Their maps provided a rough framework, which was refined and updated and put into a consistent format tailored to the project by Glaze and others. The project area covers six groundwater basins, reaching from the eastern edge of Sonora all along the Chihuahuan-New Mexican border and into a small area of west Texas.

In NM WRRI’s Geographic Information Center, Glaze opens the home page for the Animas Basin to demonstrate some of the features of the database. The opening page includes a brief description and a photo from the basin. She clicks on a more detailed map of the basin to reveal wells, flow lines, surface water bodies, land ownership, and a variety of possible overlays. A menu along the right side of the screen offers a series of radio buttons for a user to select, leading to other information. Water quality data for some wells are available, tied to well ID numbers.

Glaze zooms in on a map to get to some of the digital imagery available in New Mexico. She is now in the process of upgrading the program to newer technology that will link to several commercial map services, allowing base map data from more sources. A wells layer shows known wells. It adds administrative ownership in colors with a legend to show ownership. An overlay also shows land vegetation and

use information, such as salt flats, mixed areas, crop land, pasture, commercial, wetlands, or forests.

“This will give researchers a lot more options,” says Glaze, who earned her master’s degree in geography from NMSU. She is willing to push the project even further as resources and opportunities arise. “I want to create a reporting tool with up-to-date data flowing into the system. This would allow us to see changes in the data much like watching a video instead of simply looking at a snapshot in time.”

Glaze welcomes suggestions for new data. “If I can add it, I will,” she says. An example of added data is a Mimbres Basin dust control project, conducted near Columbus, New Mexico and Palomas, Mexico. High school students from

Columbus and Palomas were provided GPS tracking devices and surveyed streets in Columbus to map the exact locations of map dirt roads and cleared spaces where dust can originate. The information is now incorporated into the database. Glaze clicks on a close-up map of the area showing the roads and cleared area identified in the study.

Thanks to two design students who helped with the project, Leopoldo Perea and Gustavo Rodriguez, there is a limited Spanish translation for some of the general basin information.

Following completion of the general structure of the database and its formatting, Erin Ward, SCERP director, and Glaze scheduled meetings and presentations on the new system in El Paso and Juárez. Glaze covered the various tools available. Ward indicated, “Universities are remarkably good at conducting research, but we may not be as adept in explaining our results to the general public. For this project, I felt we had an obligation to show our border residents where to find the information and demonstrate how it might be useful to them. It was a good call. Susanna and I have received tremendous feedback, and we’ve noticed increased traffic on our website (river.nmsu.edu)”. 💧



Susanna Glaze (left) demonstrates features of the groundwater data website during a Border 2012 Environmental Education Task Force workshop, held in El Paso at the offices of the Texas Commission on Environmental Quality. (photo by Erin Ward)

New Water New Energy



WRRI

RECLAMATION
Managing Water in the West

December 13-14, 2011

Sgt. Willie Estrada Civic Center, Alamogordo, NM

56th Annual New Mexico Water Conference

New Water New Energy: A Conference Linking Desalination and Renewable Energy

This year's NM WRRI annual water conference aims to identify U.S. research needs concerning inland, small-scale, low-cost rural brackish desalination water projects using renewable energy such as solar, wind, geothermal, and waste heat sources. The conference will bring together a diverse group to gain a better understanding of the topic through a training session on current European projects as well as other efforts in countries such as Australia and the Middle East. Leading international experts on desalination and renewable energy will address participants.

Breakout groups will meet to identify research priorities for projects along with potential collaborations for proposed projects. The final plenary session will include the presentation of proposed projects wherein projects will be discussed and ranked.

The conference will also include a session for posters and presentations on water related research topics. Tours of the Brackish Groundwater National Desalination Research Facility also are offered.

Preliminary Program

Tuesday, December 13

10:00 - Brackish Groundwater National Desalination Research Facility (BGNDRF) optional tours
12:00 (30-minute tours)

1:00 - Plenary session (at civic center)
6:00

1:00 Introductions
Sam Fernald, NM WRRI Director
Ron Griggs, Alamogordo City Mayor
Jim Loya, Associate Research Engineer, WERC/Institute for Energy and the Environment
Mike Hamman, Manager, Albuquerque Area Office, Bureau of Reclamation

- 1:30 Guillermo Zaragoza, Project Researcher
Promotion of Renewable Energy for Water Production through Desalination (ProDes)
Training session and review of the European program
- 3:30 Break
- 3:45 Bekele Debele, Senior Water Resources Specialist
Middle East and North Africa Region, World Bank
- 4:05 David Furukawa, Chief Scientific Officer
National Center of Excellence in Desalination, Australia
- 4:30 Joseph Jacangelo, Vice President and Director of Research
WaterReuse Research Foundation
- 5:00 Break
- 5:15 Kevin Black and Mitch Haws, Phoenix Office
Bureau of Reclamation Projects
- 5:40 Ali Al-Qaraghuli, Principal Research Engineer
National Renewable Energy Laboratory
- 6:30 - 8:30 Working dinner for expert groups

Wednesday, December 14

- 8:00 Track 1 - Expert groups continue to work on project recommendations (at BGNDRF)
Track 2 - Posters and Oral Presentations (at civic center; see page 8 for schedule)
- 12:00 Luncheon for plenary group
Welcome by Barbara Couture, New Mexico State University President
Michael Gabaldon, Bureau of Reclamation (invited)
David Townsend, Local Historian, Professor Emeritus, NMSU/Alamogordo
- 2:00 Expert group presentations of proposed projects to plenary group
- 3:15 Proposed projects review
Participants vote on top two proposed projects
Kevin Price, Bureau of Reclamation provides initial summary
- 5:00 Adjourn, followed by optional tours of BGNDRF

BGNDRF to Host Tours at the 56th Annual New Mexico Water Conference

This year's water conference, co-sponsored by the Bureau of Reclamation, will showcase the Brackish Groundwater National Desalination Research Facility. The facility is a focal point for developing technologies for the desalination of brackish and impaired groundwater found in the inland states. This facility brings together researchers from other federal government agencies, universities, the private sector, research organizations, and state and local agencies to work collaboratively and in partnership.

The mission is to pursue research into supply-enhancing technologies using brackish groundwater sources including solutions to brackish concentrate management, renewable energy/desalination hybrid systems, desalination technologies for produced water, and small-scale desalination systems. Water desalination apparatuses being developed by entities such as NMSU, UTEP, General Electric, Veolia, the Bureau of Reclamation, and others will be highlighted. Randy Shaw, facility manager of the Brackish Groundwater National Desalination Research Facility will host the tours.



Upcoming Meetings

Dec. 1-2, 2011 Western Water Law, New Developments in the Western States, Arizona Biltmore Resort and Spa, Phoenix, AZ (www.cle.com/biltmore)

Dec. 13-14, 2011 NM WRRI's 56th Annual New Mexico Water Conference, *New Water New Energy: A Conference Linking Desalination and Renewable Energy*, Alamogordo, NM (<http://wrri.research.nmsu.edu>)

Jan. 12, 2012 Changing Waters: Adaptation and Resilience, The New Mexico Water Dialogue, Indian Pueblo Cultural Center, Albuquerque, NM (www.nmwaterdialogue.org)

August 22, 2012 NM WRRI's 57th Annual New Mexico Water Conference, *Hard Choices: Adapting Policy and Management to Water Scarcity*, Las Cruces, NM

The 2010 Report of the Rio Grande Compact Commission to the Governors of Colorado, New Mexico, and Texas was recently issued. Contact the New Mexico Interstate Stream Commission at 505-383-4041 for copies of the report.

Turfgrass Publication Offers Latest Ideas for Managing Turf While Conserving Water

by Audry Olmsted, NMSU

Note: The NM WRRRI provided Leinauer with a seed grant, "Utilization of Saline and Other Impaired Waters for Turfgrass Irrigation," and the project's final report is in review. Dr. Leinauer was nominated recently by the NM WRRRI for a National Institutes for Water Resources Impact Awards, which recognize the nation's best federal Water Resources Research Act funded research.

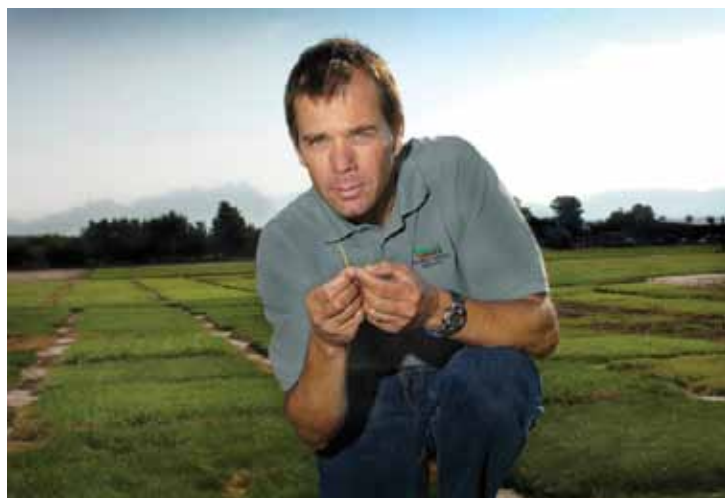
Think turfgrass can beautify recreational areas – such as home lawns, golf courses and public parks – but can't be used as grass seed because the turf will soak up precious water?

An Extension turfgrass specialist at New Mexico State University has co-edited a book that dispels that misconception. "Turfgrass Water Conservation – Second Edition" brings together experts from around the country who offer tips, ideas and information on how to manage turfgrass whether you live in a desert region or by the shoreline.

"I hope that through the information provided in this book, people realize how important turf is, or can be," said Bernd Leinauer, with NMSU's Department of Extension and Plant Sciences. "It is not just the perceived water-guzzling groundcover that has to be removed at all cost. I hope anybody who grows turf will get ideas from this book on how to irrigate efficiently, how to irrigate wisely and how to conserve as much water as possible."

The publication is filled with a variety of turf topics, from its history to development of varieties with drought resistance, and heat and salinity stress tolerance.

Leinauer, along with co-editor Stephen T. Cockerham, from the University of California, Riverside, are also contributing writers in the book. Leinauer and Cockerham co-authored the chapter "Practicum: Applying the Science of Turfgrass Water Conservation." Leinauer and Robert Green, also from UCR, co-authored "Water Management Technologies."



"Turfgrass Water Conservation – Second Edition," includes a "who's who" of turfgrass specialists offering tips and ideas on how best to grow and maintain turf while still conserving water. Bernd Leinauer, pictured in a turfgrass research plot, co-edited the book and contributed chapters on water conservation and water management technologies. (NMSU photo)

Rossana Sallenave, an aquatic ecology specialist in NMSU's Department of Extension Animal Sciences and Natural Resources, wrote the chapter titled, "Environmental Issues Surrounding Turf-Dominated Urban Landscape."

The content of the book, published by the University of California Division of Agriculture and Natural Resources, is geared toward turf managers, educators, students in turfgrass management and anybody who enjoys turf. It can also be a valuable resource for landscape architects, designers, contractors, suppliers, consultants, sod growers, administrators and those who make political decisions.

This second edition is an updated version of a 1985 publication, which came on the heels of a landmark symposium in 1983 that brought together the "who's who" of turfgrass experts from across the country. The presentations from that symposium were compiled and included in the book "Turfgrass Water Conservation," edited by Victor A. Gibeault and Cockerham.

"This book has been the bible for experts regarding turfgrass water conservation for years," Leinauer said. "I used the 1985 edition when I was in graduate school in Germany."

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Leinauer said available authors of the original publication were invited to provide content for this edition, but new information is also included that reflects the changing times and advances in science, including special chapters on breeding, how turf is incorporated in the landscape, and its importance to wildlife. Every article is peer reviewed.

Contact information is available for each of the contributing authors within the book, but Leinauer encourages people who have questions or want more information to first contact their local Extension agent.

The cost of the book is \$24. Leinauer said copies are available to purchase

at the Extension Plant Sciences departmental offices or through the University of California at <http://anrcatalog.ucdavis.edu>. For more information, contact Leinauer at 575-646-2546. ♦

NM Water Conference Track 2 Presentations, December 14, 2011

Sgt. Willie Estrada Memorial Civic Center, Alamogordo, NM

(poster and oral presentation abstracts online at <http://wrrri.research.nmsu.edu>)

	Auditorium	Conference Room A
8:30	Use of Low Quality Water for Algal Production: Constraints - Thomson, Howe	Geothermal Resources Suitability for Desalination in New Mexico - Witcher
8:50	Algae Production Using Desalination Effluent - Goldstein	Treating High TDS Brackish Water in Sandoval County, New Mexico - Fowlie, Anderson
9:10	Treatment and Use of Oil and Gas Produced Water as a Media Substrate for Algae Cultivation for Biofuels - Sullivan, Dean, Steichen, Laur, Vizsolay, Brown, Brown	Use of Hybrid Photovoltaic/Thermal (PV/T) System for Water Desalination - Davis, Cappelle
9:30	Brackish Water as a New Medium to Maximize Biomass of Microalgae - Abuhasel, Rastegary, Ghassemi	Wastewater Reuse at Holloman AFB - Griffin
9:50	Selective Salt Recovery from Reverse Osmosis Brine Using Inter-stage Ion Exchange - Goldman	An Urban Water Needs Strategy: Proper Water Pricing, Conservation, Rainwater Harvesting & Greywater - Axness, Ferrando
Poster Session 10:10 - 11:00		
11:00	Marketability and Selective Recovery of Salts from Brackish Water Desalination - Fowlie, Howe, Goldman	Non-Commercial Thinning Effects on Runoff, Infiltration, and Sediment Yield in a Mixed Conifer - Garduno, Fernald, VanLeewen
11:20	Design and Piloting of a Brine Minimization System for Concentrate Disposal - Rynders	Evaluation of Pecos River Salinity Inputs Near Roswell, NM - Reimus, Archer, Jones
11:40	Lunch set-up	Soil Thermal Properties Under Contrasting Soil Textures, Soil Moisture Regimes and Water Quality - Adhikari, Shukla, Mexal