July 2014 Conservation Matters

Meet a water scientist: Ralph Wurbs
By Sara Carney

When you hear the word "scientist," most likely the image that comes to mind is of someone in a lab coat with test tubes and beakers. While this is true of some scientists, there are many others who do not fit that image. This is especially true of natural resource scientists. To showcase the diversity within this community of researchers, *Conservation Matters* is beginning a series called "Meet a Scientist." In each issue we will introduce a scientist working with water, wildlife or other natural resources. We hope that this series provides insight into the contributions that these people make to their respective fields.

Dr. Ralph Wurbs, Arthur McFarland professor in the Zachry Department of Civil Engineering, has been a water resource engineer since he graduated from Texas A&M University in 1971. Wurbs' interest in water resource engineering is one that evolved and grew as he became more involved in the field. After graduating, Wurbs joined the U.S. Army Corps of Engineers as a civil engineer, planning and designing various water resource projects. Since 1980, Wurbs has worked as a professor at Texas A&M, teaching and conducting research in water resource engineering. He also served as associate director for engineering at Texas Water Resources Institute from 2007 to 2012.

Through his experience as a water resource engineer, Wurbs became interested in water allocation and water rights. "Water allocation became important in Texas," he said, "And we needed a modeling system for analyzing water allocation decisions." Wurbs developed and continues to expand the Water Rights Analysis Package (WRAP), a computer modeling system that simulates river/reservoir systems and assesses water availability. WRAP models water management strategies and allows managers to predict how to allocate water resources under various conditions. WRAP is used throughout Texas for regional and statewide planning, water rights administration and other water management endeavors. Wurbs and his graduate research assistants are currently focusing on expanding WRAP capabilities for modeling environmental flow requirements and impacts on other water users.

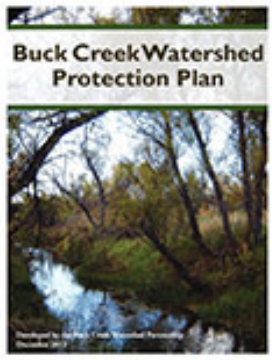
Wurbs was recently designated as an Honorary Diplomate, Water Resources Engineer by the American Academy of Water Resources Engineers (AAWRE). This honor is given to AAWRE members who have extensive experience and education in the field and have also contributed significantly to advancements in the field. "An honorary member is the academy's way of recognizing or distinguishing someone who has been a diplomate for quite some time and has made certain contributions," he said.

Although Wurbs has much experience in the field, there are still a number of challenges that he faces. "The different aspects of water resources engineering can be both technically and institutionally challenging — the complexity — and solving water problems is a long process. It takes a while for management strategies and solutions to be implemented," he said.

Wurbs enjoys his work as both a professor and a researcher. The most rewarding aspects of being a professor, he said, are interacting with students and teaching. As an engineer and researcher, Wurbs finds fulfillment in impacting people's lives. Effective water management is important to society, he said, "so, it's not simply an academic-type field; it's a field that has practical significance to people."

For more information on WRAP, see this article from *txH₂O*. To learn more about Dr. Wurbs, visit his website.

Buck Creek Watershed Protection Plan accepted by EPA



The U.S. Environmental Protection Agency has accepted the Buck Creek Watershed Protection Plan as meeting the agency's guidelines for watershed-based plans and effectively outlining a strategy to reduce nonpoint source pollution in the watershed, according to a Texas Water Resources Institute official.

"This acceptance comes after years of collaboration between local watershed landowners and stakeholders, local soil and water conservation districts, and regional and state agency personnel," said **Lucas Gregory**, a Texas Water Resources Institute (TWRI) project specialist in College Station.

TWRI, Texas A&M AgriLife Research and the Texas A&M AgriLife Extension Service led efforts to develop the plan.

In 2000, Gregory said, Buck Creek was added to the state's Clean Water Act section 303(d) list of impaired water because of the creek's high levels of bacteria. Through improved understanding of watershed function, water quality and landowners' efforts to implement effective measures, Buck Creek is no longer impaired, he said.

"This was a long process, and it is great to see the plan accepted," said **Phyllis Dyer**, research associate and watershed coordinator with AgriLife Research in Vernon. "The stakeholders and landowners really deserve the credit here. Their diligence and determination to improve Buck Creek really shows in this plan, and their efforts should be commended."

Thanks to work done through the partnership of AgriLife Research, TWRI, Texas State Soil and Water Conservation Board and local stakeholders, *E. coli* levels decreased by 90 percent, well below the state's water quality standards, she said.

"The EPA's acceptance of the plan sets a precedent for future funding to implement water quality management plans, wildlife habitat management, feral hog management, and septic system education and outreach," Gregory said.

The watershed plan is currently available for download or by contacting Dyer at 940-552-9941, pmdyer@ag.tamu.edu.

Development of the plan was funded through a Clean Water Act nonpoint source pollution grant from the Texas State Soil and Water Conservation Board and EPA.

Read the AgriLife TODAY news release.

Texas A&M researcher measures water security in the Rio Grande Valley

A Texas A&M researcher has found that segments of the population, especially along the Texas-Mexican border, exist in a "no-win waterscape," with no easy access to clean water, no ability to pay for it and no immediate solution.

Dr. Wendy Jepson, an associate professor in the College of Geosciences, said the issue is a matter of water security, defined as the ability for individuals to access acceptable, affordable and adequate drinking water for a healthy life.

More than 400,000 people live in 2,300 colonias along the border in a region that is one of poorest in the United States, with more than a third of the families living below the U.S. federal poverty level.

With funding from the National Science Foundation and help of staff from the Colonias Program in Texas A&M's College of Architecture, Jepson systematically interviewed and surveyed the people who actually spend a large part of their incomes trying to obtain clean water for their families.

Out of the households interviewed, Jepson and her team determined that fewer than half, 45 percent, were water secure or marginally water secure. Fifty-percent were identified as marginally insecure or insecure.

Jepson said a combination of factors affect household water insecurity. In some cases it is a matter of impure water — it smells or is dirty, off-color or tastes bad. In other households, it can be a matter of infrastructure, such as no hook-up or a broken one. Economically it can simply be the inability to pay the bill.

The recommended percentage for water bills in the United States is no more than 2 percent of monthly income, but in some cases families are paying 8 percent or more.

"When your household income is less than $1,000 a month, paying the water bill can take a big bite out of your paycheck," she said.

Jepson said many households have turned to water vendors, which may not provide water of higher quality. Furthermore, access to these vendors costs, too, in terms of gas or ability to transport the water back home.

This article was condensed from *No-Win Waterscapes, A Texas A&M researcher measures water security in the Rio Grande Valley* by Karen Riedel of the Texas A&M University Geoscience News.

New partnership effort spurs voluntary conservation for lesser prairie-chicken and agriculture

Producers partnering with USDA-Natural Resources Conservation Service (NRCS), working through the local Soil and Water Conservation Districts, have found a workable and economically viable solution that will continue to enhance and help protect the lesser prairie-chicken habitat.

The new voluntary cooperative conservation effort is making history in Texas. Rancher **Clay Cooper** in Lipscomb County has signed the first conservation plan in the state through NRCS' Working Lands for Wildlife (WLFW) partnership, an agreement with the Department of Interior United States Fish and Wildlife Service (USFWS).

Cooper and other producers like him will receive assurances for up to 30 years; a stamp of approval exempting them from any incidental take of the lesser prairie-chicken to implement and maintain conservation practices in a conservation plan. This means WLFW participants can proceed with planned activities, knowing they are assured coverage of potential incidental take of the lesser prairie-chicken.

Essentially, the landowner or producer with land in the lesser prairie-chicken range works with the local NRCS office to determine if habitat on the property is suitable or can be improved to benefit the lesser prairie-chicken.

"Working Lands for Wildlife provides landowners with regulatory assurances that they can continue to make a living on their lands while implementing conservation actions to benefit a declining or listed species and will not be asked to take on additional conservation actions, " said **Darren Richardson**, NRCS assistant state conservationist for field operations in Lubbock.

Cooper worked directly with NRCS District Conservationist **Mary Foster** and Range Management Specialist **Clint Rollins** to develop a comprehensive conservation plan that combines approved conservation practices such as prescribed grazing and upland wildlife habitat management.

Cooper says he's been dealing with drought for many years now and a recent wildfire on **April 1** of this year burned approximately 7,500 acres of his 11,000 acre ranch. He's had to make drastic changes in his livestock numbers since the severe drought conditions in 2011 and 2012. His livestock numbers have been reduced by approximately 175 head of mother cows over the past three years.

Participating in the WLFW Lesser Prairie-Chicken Initiative through NRCS is another example of Cooper's stewardship efforts. He's improving wildlife habitat while increasing the health of his rangeland and the long-term sustainability of his ranching operation.

NRCS in Texas is urging landowners on the High Plains to work with their local NRCS field offices and use their free technical assistance to help implement voluntary conservation measures that not only protect wildlife habitat but also enable them to continue making a living from farming and ranching.

For more information, contact your local USDA Service Center office today or visit the Texas NRCS web site.

To read the full story, see the USDA's news release.

New League City park demonstrates ways to be 'WaterSmart'

With help from the Texas Sea Grant Program at Texas A&M University, the city of League City has transformed a public park into a showcase for the principles of WaterSmart landscapes: water conservation, water quality and habitat for wildlife.

Texas Sea Grant's Texas Coastal Watershed Program (TCWP), a partnership between Texas Sea Grant and the Texas A&M AgriLife Extension Program, designed the new amenities at Ghirardi WaterSmart Park. Funded by the city's Park Dedication Fund and a grant from the Texas Commission on Environmental Quality (TCEQ), the park was completed in February and formally opened in March. The Galveston Bay Estuary Program was also a partner for the project.

"The TCEQ grant for Ghirardi WaterSmart Park gives the city and other area entities the opportunity to study, showcase and improve water management," said League City Mayor **Tim Paulissen**. "Water is one of our most valuable resources, and we are very excited about the opportunity to learn new and better ways to utilize and conserve that resource."

In addition to the pavilion, walking trails and playground found in a typical public park, Ghirardi WaterSmart Park has several special features that highlight water issues, including a cistern that collects rainwater and feeds into a drip irrigation system.

"Recent drought years have served to remind all of us that water is precious," said **Charriss York**, Texas Sea Grant's Stormwater Extension program specialist. "Collecting and using rainwater for irrigation instead of turning on the hose, using native plants that are adapted to our unique climate and having more native areas and less lawn are all water conservation strategies that are used in the park."

Most of the bayous and creeks in the Houston area have degraded water quality as a result of everyday urban activity; the park uses low areas of land called swales and rain gardens, which resemble regular flowerbeds to collect and filter water, breaking down pollutants using the natural microbes in the soil. The pavilion has a "green roof," a roof with living plants that reduces the amount of impervious surface — rooftops and materials used for most streets and parking lots that block rainwater from reaching the soil and increase rainwater runoff and runoff pollution.

The Texas Coastal Watershed Program is also using the park as a living laboratory and will continue to monitor the effectiveness of the stormwater management features installed at the park.

Read the full TAMUTimes article here.

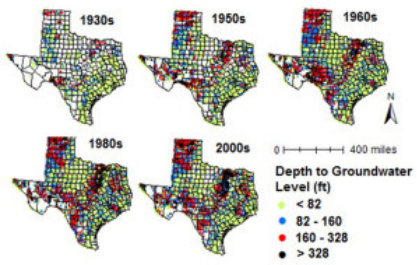
Texas A&M Researchers Devise Unprecedented Test to Detect Water Contamination

Imagine being able to test water for the tiniest levels of waste contamination, even at home. A team of researchers at Texas A&M University, led by **Vladislav Yakovlev**, professor in the Department of Biomedical Engineering, has developed a method to detect a previously undetectable level of contamination in water associated with human and animal fecal matter. The technology detects "urobilin," a byproduct excreted in the urine and feces of many mammals at levels that are thousandths and even millionths of times smaller than those found by conventional methods. Urobilin can be made to glow when mixed with zinc ions, forming a phosphorescent compound. A water sample is placed inside a cylinder and a laser light is beamed inside through a small hole causing any urobilin present in the sample to glow.

Yakovlev said the technology has exciting potential uses, including analysis of drinking water supplies, particularly in developing nations and following natural disasters. He even foresees an at-home testing method in which a store-bought LED light can be used to detect contamination.

To learn more, see this video or this news release from the Texas A&M Dwight Look College of Engineering. See the original TAMUTimes article here.

AgriLife Research study identifies contributing factors to groundwater table declines



It's no secret that groundwater levels have declined across the state over the past eight decades and that the primary reason was the onset of irrigation in agriculture and population growth. But a recent Texas A&M AgriLife Research study has identified other factors having an impact.

The groundwater declines have been most severe in the past four decades, but the news isn't all bad, according to **Dr. Srinivasulu Ale**, AgriLife Research geospatial hydrology assistant professor in Vernon.

"Long-term (1930–2010) trends in groundwater levels in Texas: Influences of soils, land cover and water use," authored by **Dr. Sriroop Chaudhuri**, former post-doctoral research associate at Vernon, and Ale, was published in the *Science of the Total Environment* journal recently.

They used the boundaries of the Texas Water Development Board's designated Groundwater Management Areas, or GMAs, for their assessment. The 16 GMAs, with boundaries identified in response to legislation passed in 2001, include all major and minor aquifers in the state. The objective behind GMA identification is to delineate areas considered suitable for management of groundwater resources.

"Our results indicated a progressive decline in statewide decadal median water levels in Texas from about 46 feet to 118 feet between the 1930s and 2000s," Chaudhuri said. "We identified hot spots of deep water levels in GMA 8 (North Central Texas) and the Texas Panhandle regions since the 1960s, mainly due to extensive groundwater withdrawals for urban and irrigation purposes, respectively."

"We know irrigated agriculture is the major cause of depletion in the Texas Panhandle, as compared to increasing urbanization in GMA 8," Chaudhuri said. "We saw a significant drop in median groundwater levels in irrigation wells from 75 to 180 feet between the 1940s and 1950s in the Texas Panhandle, coinciding with the initiation of widespread irrigated agricultural practices."

But he said they knew there was more to the decline than just these uses, because "unused" wells monitored across the state throughout the decades were also showing varying levels of decline. That was when they studied groundwater and surface-water use patterns, soil characteristics, geology and land cover types to better understand the water-level changes in Texas.

The leveling off of the decline has been seen in the past decade after the implementation of the GMAs and the guidelines and regulations that were established with them, he said. Increased use of surface water and assessment of water levels are some measures being used to address groundwater depletion issues in the Houston, GMA 14, and Dallas, GMA 8, areas.

However, these voluntary conservation or regulatory strategies have resulted in a variable pattern of recovery in ambient water-levels, which are still occurring frequently at deeper depths in the hot spots and thus warrant further investigation, he said.

Ale said the need for more spatially intensive and frequent water-level monitoring has been realized over the course of this study. In addition, further investigation of aquifer-specific influences such as groundwater recharge and flow paths, human dimensions on water-level fluctuations and climate are warranted.

For more information, see the full AgriLife Today article.

Water Resources Competitive Grants Program request for proposals

The Institute for Water Resources (IWR), U.S. Army Corps of Engineers in cooperation with the National Institutes for Water Resources (NIWR) has requested proposals for grants to support applied investigations for specific areas related to water resources issues in the United States.

Grant proposals may request up to $200,000 in federal funds, but proposals for lesser amounts are encouraged. Proposals must be submitted to the IWR by a NIWR-designated institute or center, which for Texas researchers, is the Texas Water Resources Institute (TWRI). The government's obligation under this program is contingent upon the availability of funds.

All proposals must be submitted by **1 p.m., CST** on **Thursday, August 15** to TWRI to allow time for compilation and submission to IWR. The request for proposals (RFP) is available online.

Questions or comments concerning the review process or the RFP may be addressed to **Dr. Joe Manous**, IWR U.S. Army Corps of Engineers, 703.428.7074 or Joe.Manous@usace.army.mil. For more information from TWRI regarding submission, please contact **Danielle Kalisek** at 979.845.2781 or dmkalisek@tamu.edu.

TSSWCB requests proposals for FY2015 Clean Water Act Section 319(h) Nonpoint Source Grant Program

The Texas State Soil and Water Conservation Board (TSSWCB) is requesting proposals for watershed assessment, planning, implementation, demonstration and education projects seeking funding under the FY2015 Clean Water Act §319(h) Nonpoint Source Grant Program. Proposed projects should focus on agricultural and/or silvicultural nonpoint source pollution prevention and abatement activities within the boundaries of impaired or threatened watersheds.

Up to $1 million of TSSWCB's FY2015 Clean Water Act grant will be eligible for this request for proposals. A competitive proposal review process will be used so that the most appropriate and effective projects are selected for funding.

Specific activities that can be funded with §319(h) grants include the following: development of nine-element watershed protection plans including the formation and facilitation of stakeholder groups; surface water quality monitoring; data analysis and modeling; implementation of nine-element watershed protection plans and the nonpoint source portion of total maximum daily load implementation plans; demonstration of innovative best management practices; technical assistance to landowners for conservation planning; public outreach/education; and monitoring activities to determine the effectiveness of specific pollution prevention methods.

To obtain a complete copy of TSSWCB's request for proposals and proposal submission packet, please visit http://www.tsswcb.texas.gov/managementprogram#rfp or contact **TJ Helton** at 254.773.2250 ext. 234. Proposals must be received electronically by **5 p.m. CDT, Friday, August 22** to be considered for funding.

Click here to see the full call for proposals.

New TWRI and IRNR publications

Attoyac Bayou Surface Water Quality Monitoring Report, S. Schwab, M. McBroom, L. Gregory, B. Blumenthal, K. Hein, K. Wagner, B. Sims, TR-457, 2012.

Attoyac Bayou GIS Inventory, Source Survey and Land Use Land Cover Report, N. Boitnott, A. Castilaw, L. Gregory, K. Wagner, TR-455, 2014

Natural Resources Training Courses

Introduction to ArcGIS 10	**July 29–30**
Texas Freshwater Mussel Symposium and Workshop	**August 18–21**
Applied Environmental Statistics	**August 25–29**

New IRNR and TWRI Projects

Support of REPI Program (FY2015) in Sustaining Military Readiness

Military readiness – the preparedness of the U.S. Armed Forces – depends on the quality and frequency of testing and training. Incompatible land uses such as urban development, loss of habitat and competition for frequency spectrum resources, if left unchecked, can further limit already constrained training and testing activities ultimately inhibiting military readiness. The military services have generally tried to manage these threats through programs implemented at an installation-by-installation approach. Solving many of these issues, however, requires a collaborative, regional approach that fully engages local, state and federal interests. These same incompatible land uses and increasing competition for scarce resources, threaten the ability of a region to sustain an economically competitive and healthy environment. Thus, our nation's military readiness, economic competitiveness and environmental quality are all linked to natural resource sustainability at regional scales and across state boundaries. The challenge of sustainability requires the engagement of both science and policy across political boundaries to maintain these critical linkages. Integrated and coordinated planning and action for regional sustainability are essential to achieving mutual and multiple benefits over the long-term. Universities are well-positioned to provide support related to regional planning and sustainability practices by integrating policy and applied science with current and future regional partnering initiatives.

Funded by: DOD – Corps of Engineers through the Gulf Coast CESU

Partners: Texas A&M Institute of Renewable Natural Resources, Texas A&M AgriLife Extension Service