tx H$_2$O

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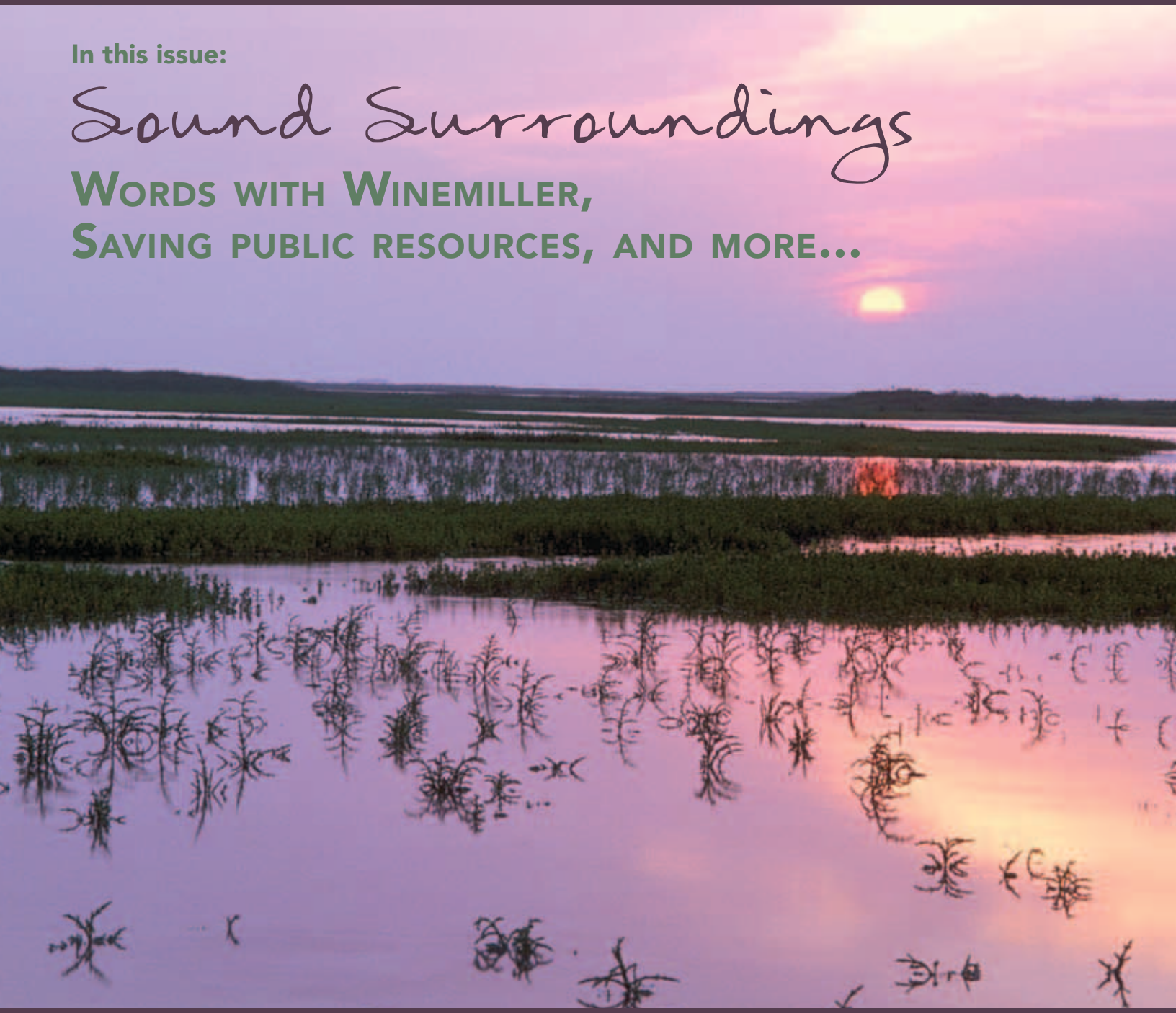
Fall 2009

In this issue:

Sound Surroundings

Words with Winemiller, Saving public resources, and more...



Texas AgriLife Research
Texas AgriLife Extension Service
Texas A&M University College of Agriculture and Life Sciences

Working to make every drop count

As I write this letter, I'm looking out over Canyon Lake, a true gem of the Texas Hill Country. Today, however, because of the drought that began more than 22 months ago, the lake is 14 feet low and inflow from the upper Guadalupe River has dwindled to little more than a trickle. Despite this, the lake continues to release about 60 cubic feet of water per second (almost 40 million gallons daily) to maintain flows in the Guadalupe below the lake.

Similar circumstances can be seen all over Texas.

In times like these, when rivers, streams, and lakes are drying up, the importance of "environmental flows" becomes so painfully clear. To quote officials at the Upper Colorado River Authority, "There's nothing more devastating to the aquatic community and aquatic health than a dry streambed."

In this issue, we focus on the state's efforts to ensure that stream flows, as well as flows into bays and estuaries, are maintained, and precious water resources are protected for future generations. The Texas Legislature has progressively established two programs, the Texas Instream Flow Program and the Environmental Flows Program, to achieve this. Texas A&M researchers, such as Dr. Kirk Winemiller, are playing an active role in these programs.

However, we all need to do our part to "Make Every Drop Count." So be sure to check out the stories about the Texas Watershed Steward program, water conservation in the Rio Grande, calculating your water footprint, and the other stories in this issue.

Let's hope it rains, too!

Until next time,

Kevin Wagner

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On the cover:
The Nueces River and Nueces Bay (pictured) is one of six priority river basins for which a environmental flows regime will be established.
Photo by Earl Nottingham, © Texas Parks and Wildlife Department

Texas Water Resources Institute
make every drop count

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Story by Kathy Wythe

Sound surroundings

Programs seek healthy environment for state's rivers, bays

As a landowner living on the Lower San Antonio River near where it joins the Guadalupe River, Walter Womack has a special interest in preserving the river. In 2008 when he heard about a meeting to discuss the river, he knew he needed to attend.

What he found was a group of individuals—scientists, river authority staff, state water agency staff, and other stakeholders, including landowners like himself—passionate about the river and trying to keep it and its surroundings healthy.

This meeting and others like it are part of the Texas Instream Flow Program, mandated in 2001 by the Texas Legislature through Senate Bill 2 to study the state's rivers and streams.

The bill directs three of the state's water-related agencies—the Texas Commission on Environmental Quality (TCEQ), Texas Water Development Board (TWDB), and Texas Parks and Wildlife Department (TPWD)—to perform scientific and engineering studies to determine what makes a healthy environment for each river or stream and how much water should flow in each river or stream to ensure that healthy environment.

Paired with that program is the Environmental Flows Program outlined in Senate Bill 3 and passed by the Legislature in 2007, which created a process for the state to establish environmental flow standards for its river basin and bay systems.

Both programs have a common goal: to support a sound ecological environment. According to a Texas Instream Flow Program document, a sound ecological environment is "a resilient, functioning ecosystem characterized by intact, natural processes and a balanced, integrated, and adaptive community of organisms comparable to that of the natural habitat of a region."

To find out what is needed to have this kind of environment, the Senate Bill 2 program is looking at instream flows or the amounts of water in a river system, measured by the volume of water in a given river channel in a specified amount of time. The Environmental Flows Program is considering both instream flows and freshwater flows into the bays and estuaries.

Listening to Stakeholders

For the Texas Instream Flow Program, the agencies first identified six priority river subbasins to study, based on impending water rights permits or water development projects, said Dr. Mark Wentzel, hydrologist with TWDB's surface water resources division. Of those, the program is currently studying four subbasins—the Lower San Antonio, the Middle and Lower Brazos, and the Lower Sabine River, with the Middle Trinity and the Lower Guadalupe studies coming later.

Because local stakeholders' participation and input is vital to the success of the instream flow program, agency officials said the next step was to conduct public meetings in the different subbasins, such as the one landowner Womack attended.

Chris Loft, TCEQ's resource protection team leader, said at these initial public meetings the agencies' staff asked questions such as: How do people look at the river? What do they enjoy about it? What do they like to see?

The values voiced at the public stakeholder meetings, said Dakus Geeslin, aquatic scientist and TCEQ's lead for the instream flow program, are being used to help formulate the goals, objectives, and indicators for the planned technical studies.

The goals and objectives can be as simple as having high water quality or plenty of water for fishing to more complicated values, Geeslin said. "For example, an objective might be to maintain high water quality, so the indicator could be monitoring water temperature or dissolved oxygen, which are both key components to water quality," he said.

Loft said having stakeholder participation "really increases public confidence in both the science and, ultimately, the recommendations" from the studies.

Studying Instream Flows

The Texas Instream Flow Program is conducting multiyear, multidisciplinary studies that include the five riverine components: hydrology, biology, geomorphology, water quality, and connectivity. The studies will assess how water flow affects river characteristics, such as aquatic life and habitat, water quality, movement of nutrients and organisms, stream channel formation, and relationships between rivers and surrounding habitats, according to program documents.

These studies are being conducted not only by the three agencies but also by outside consultants and university researchers. The program is also using past studies to help in establishing the inflow needs. (See related story, page 5.)

After the studies are completed for each subbasin, the agencies will prepare a final study report that will include instream flow recommendations for subsistence flows, base flows, high flow pulses, and overbank flows. The report also will describe the significance of each flow component for the specific river subbasin and fully document study methods and analysis techniques, Geeslin said.

All studies and reports of the priority basins must be complete by 2016, as set forth by the Legislature.

Establishing Environmental Flows

The Texas Instream Program, however, stops short of providing a process to implement any flow recommendations into water permitting.

Enter Senate Bill 3 that established a process for developing environmental flow regimes and standards for all the river basins and bays in Texas, not just the subbasins of the instream flow program.

The bill established a nine-member Environmental Flows Advisory Group, composed of state representatives, senators, and representatives from TPWD, TWDB, and TCEQ. Assisting this group is a nine-member Science Advisory Committee.

As outlined in the bill, the program is currently tackling two river basins: the Trinity and San Jacinto Rivers and their associated bays, and the Sabine and Neches Rivers and their bays. The next group of basins is the Colorado/Lavaca and the Guadalupe/San Antonio, then the Nueces, Rio Grande, and Brazos.

As each of these basins is studied, the advisory group appoints 17 stakeholders to serve on individual Basin and Bay Area Stakeholder ⇨

Photo by Earl Nottingham, © Texas Parks and Wildlife Department

Committees. The bill outlined the specific categories of stakeholders that must serve on the committees. The stakeholder groups, in turn, establish the Bay and Basin Expert Science Teams (BBESTs), which are composed of scientists, engineers, river authority staff, and other water experts.

Each science team is examining the best science available to come up with recommendations for a specific environmental flow regime for its river basin, said Cory Horan, TCEQ's environmental flows program coordinator. These regimes will describe the quantity, frequency, timing, and duration of water flows required to maintain a sound ecological environment.

Each BBEST's flow regime recommendations, which are based only on science without regard to other water use needs, are passed on to the stakeholder committee, which considers other relevant factors such as water demands, economics, human needs, and other competing needs to determine the environmental flow recommendations for the specific river basin-bay system, Horan said.

The Environmental Flows Advisory Group, with input from the Science Advisory Committee, will review the environmental flow analysis and environmental flow regime recommendations submitted by each basin and bay expert science team, and provide comments, if appropriate, to the commission, he said.

Recommending "Set Asides"

TCEQ will use these recommendations to adopt environmental flow standards or "set asides" to be used in its rule-making process for new and amended water right applications. Each new permit will have to set aside unappropriated water, if available, to meet the environmental flow regime.

Senate Bill 3 prohibits TCEQ from issuing a new permit specifically for instream flows. Based on 2003 legislation, however, the commission may approve an application to amend an existing permit for environmental flows, said Kellye Rila, TCEQ's water rights permitting and availability section manager.

With a short timeline, environmental flow regimes and standards for the first tier of river basins should be complete by June 2011.

Although environmental flows recommendations developed from Senate Bill 3 will be implemented before the Texas Instream Flow Program studies are finished, legislators put an adaptive management component into the Environmental Flows Program to allow results from those studies to be incorporated into the environmental flows process, Horan said. Flow regime recommendations must be revisited at least every 10 years.

Protecting Water for Texas' Future

The results of the two programs are still yet to be seen, but for now, those involved seem positive about Texas' holistic, statewide approach to protecting its waters.

"A lot of people are under the impression in Texas when they look at the landscape and see healthy rivers and streams that there is not cause for concern," said Cindy Loeffler, TPWD's water resources branch manager. "But in 2002 when the Rio Grande stopped flowing, I think it opened up people's eyes that … it was time to take the issue up and deal with it.

"I feel like we have evolved in the process now where many more stakeholders, entities, and others interested are involved," she said. "I think what we will come up with in the end is a better, more lasting solution to the problem."

For landowner Womack, he plans to stay involved and hopes to serve on Senate Bill 3's San Antonio River stakeholder group when it is formed.

"I have a responsibility for this piece of land that has been in my family for a number of generations," he said. "I operate on the premise that, as a landowner fulfilling that responsibility, one of the greatest factors is water. That is what keeps me involved."

Story by Kathy Wythe

The Sabine and Neches Rivers and Sabine Lake (pictured) are currently being considered by the Environmental Flows Program. Photo by Earl Nottingham, © Texas Parks and Wildlife Department.

A balancing act

Rivers need varying flows to remain healthy

The Texas Instream Flow and Environmental Flows Programs in place today are products that evolved from diverse perspectives and ever-advancing scientific approaches for examining flows of the state's surface water.

Cindy Loeffler, Texas Parks and Wildlife Department's (TPWD) water resources branch manager, said a long-held common belief was any river water flowing into the Gulf of Mexico was wasted. That water needed to be withdrawn for human and industrial use.

For the most part, that belief has been replaced with the realization that Texas needs a balance between human demands and environmental needs. The state cannot appropriate all the water; its river systems need enough water for wildlife and fish to thrive, and still have enough for recreational and commercial fishing and other uses to continue.

"What we had in the past was the tap was turned on or off," Loeffler said. "There was no in-between. Even if a river was protected, diverters could pump the river flow down to some minimum flow.

"Now what we know is when looking at the health of a river or bay, you have a flow regime that, over a year or several years, will have high flows, low flows, pulses, maybe floods, and all that is important to maintain healthy river ecosystem over time," she said.

This variation in flows provides numerous benefits.

Environmental flows help maintain native and rare animal, fish, and plant species and also help maintain the capacity of streambeds and river channels to carry runoff, scientists and agency staff said. ⇨

For example, high flows provide flushing of sediment and nutrient runoff, which helps protect water quality.

Reduced flows can keep rivers from assimilating wastewater discharges, which can lead to higher treatment costs, Loeffler said.

Sufficient flows also contribute to the state's economy.

"We enjoy immense economic benefits from recreation and sport and commercial fishing," Loeffler said, adding that billions of dollars are generated from these activities. "So this is not just an environmental issue."

Along with the environmental interests, however, are the multiplied water demands from increasing population and drought. Texas' population is expected to jump from 21 million in 2000 to 46 million in 2060, according to Texas Water Development Board's (TWDB) State Water Plan. And drought is predicted to become more frequent with climate change.

Recognizing these demands, the need for balance became increasingly apparent to the Texas Legislature, prompting it to pass the instream flow and environmental flows legislation.

"I think the Legislature recognized the need to promote a sound ecological environment in the state … while balancing the competing needs of the state," said Kellye Rila, Texas Commission on Environmental Quality's (TCEQ) water rights permitting and availability section manager. "We've grown very fast, and the legislature recognized the need to do the best thing we can do to balance all those needs."

The challenge with both programs is to select and/or synthesize the science to determine instream flows or environmental flow regimes.

An example of an instream flow study is geomorphic classification, which describes the landscape and underlying geology of the river, said Dr. Mark Wentzel, hydrologist with TWDB's surface water resources division. These studies describe the variability along the length of the river. For instance, the lower San Antonio River is a different type of stream just below the city of San Antonio than it is on the coastal plain, he said.

Another type of study is determining baseline characterizations of species present in the basins. The program has current studies on the Sabine and Brazos rivers on the habitat requirements for freshwater mussels.

"When we can identify the habitat that the mussels require, then in the future that will allow us to model how the habitat changes with different flow rates, and that will allow us to pick appropriate flows," Wentzel said.

Dr. Kirk Winemiller, Regents Professor of wildlife and fisheries sciences at Texas A&M University, has researched environmental flows relating to lateral connectivity, which is overbank connections to oxbow lakes and other backwater habitats. Oxbow lakes are U-shaped lakes formed when a curve or meander of a river separates from the rest of the river. His research focuses on determining the relative importance of the off-channel habitats in oxbow lakes and how fish respond to flow variation. This research is being used in the instream flow program.

"What we learned," Winemiller said, "is that quite a number of fish species use these lakes as important habitats. Some fish complete their entire life cycle in oxbow lakes. For some, oxbow lakes are a more important habitat than the river channel.

"We have shown convincingly, at least for the Brazos River, that these (oxbow lakes) are an integral part of the river ecosystem, so it is

essential that the river gets periodic high flow pulses that produce connections," he said. "Without it, we would have a much poorer fish fauna in the river and the abundance of certain species would be significantly lower."

For the environmental flows recommendations, the Bay and Basin Expert Science Teams (BBESTs) are using the best available, previously conducted, science. The Texas Environmental Flows Science Advisory Committee is compiling available information for efficient use by the basin teams.

Winemiller, who is on the Sabine and Neches Rivers and Sabine Lake Bay Basin and Bay Expert Science Team, said work led by The Nature Conservancy to determine a flow regime for Caddo Lake and Big Cypress Creek is providing groundwork for estimating environmental flow requirements for other basins. That effort proposed "building blocks" of instream flow regimes, including frequency, amount, and length of floods, high flow pulses, and low flows needed for variations in annual and seasonal flows that will best protect fish and wildlife populations. An adaptive management approach tests and adjusts the building blocks for a better understanding of how the flows and their values are developed, according to the Caddo Lake Institute's Web site.

"That Caddo Lake effort was a critical proving ground for our current efforts," he said.

For more information on the Texas Instream Flows Program studies, visit *http://www.twdb.state.tx.us/instreamflows/studies.html*.

For more information on the Environmental Flows Program science resources, visit *http://www.tceq.state.tx.us/permitting/water_supply/water_rights/eflows/resources.html*.

Texas Parks and Wildlife Department and Brazos River Authortiy staff sample fish on the Brazos River. Photo by Earl Nottingham © Texas Parks and Wildlife Department.

Story by Kathy Wythe

Dr. Kirk Winemiller, Regents Professor in Texas A&M's Department of Wildlife and Fisheries Sciences, throws a castnet to sample fishes in a floodplain lagoon of the Rio Cinaruco in the Venezuelan Llanos.

WORDS WITH WINEMILLER

Researcher's passion for rivers, fish began early

Growing up in a rural area of north central Ohio, Dr. Kirk Winemiller, now a Regents Professor of wildlife and fisheries sciences at Texas A&M University and internationally known ecologist, often frequented a creek directly across the highway from his home.

"I spent a lot of time in that creek, a lot of time, catching fish and crawdads," he said.

In his home, he took care of his aquarium, filled with tropical fish. "I was obviously drawn to fish; I don't know how to explain it."

This inherent passion for rivers and fish continued as he attended Miami University in Ohio, studying the ecology of local fish, and at the University of Texas at Austin, where he earned his doctorate in ecology with a focus on fish and food webs.

"The goal I always had as a boy raising tropical fish in aquariums was to go to the tropics and study tropical fish," he said. While at the University of Texas, he realized that goal, studying tropical fish in Venezuela and Costa Rica.

After graduation and with a Fulbright Scholarship in hand, Winemiller and his new wife, Dr. Leslie Kelso-Winemiller, arrived in Zambia, Africa, in 1989, to begin a year-long study of fish ecology on the Zambezi River and its huge floodplain.

"That was probably the greatest year in my life," he said, recalling traveling up and down the river and its floodplain, catching and identifying fish. The couple discovered two previously undescribed species, *Serranochromis altus* and *Neolebias lozii*.

While in Zambia, the Winemillers became friends with American Catholic missionaries Bill and Jeannie Ritter, who operated a food distribution and nutrition center in Mongu. The Ritters (Bill is the current governor of Colorado) provided the couple with housing and allowed Winemiller to examine fish in the mission's fish market, where he found rare species. They also linked the Winemillers with other missionaries in outlying, remote areas, who sometimes provided housing and other logistical help.

After a stint at the Oak Ridge National Laboratory's Environmental Science Division in Tennessee, Winemiller came to Texas A&M in 1992 to teach population dynamics and introductory ecology and continue his research.

Through the years, Winemiller's research has focused on two areas of fish ecology: fish population ecology and aquatic food web ecology. With his fish ecology research, he is trying to understand the dynamics of fish populations in rivers and streams and how the fish interact with their environment to influence their behavior, abundance, and ⇨

distribution, Winemiller said. Much of this research relates to environmental flows, another issue he is very involved with (see related stories on pages 3 and 5).

In his food web ecology research, Winemiller is investigating the basis for production dynamics, such as where nutrients in the rivers are coming from, how the nutrients yield different food resources, and how the food resources are passed through the network of predator/prey interactions.

Although based in College Station for the past 17 years, Winemiller has not abandoned his goal of studying and identifying tropical fish. He and his students still go to the tropics to document fish diversity, frequently finding previously unknown species.

Almost half of his research has been international, with projects in at least 10 Latin American and African countries. For 15 years, his lab maintained a long-term study site on the Cinaruco River in Venezuela. The field station was abandoned earlier this year because of political tensions in the region.

It was for his international research and work with international students that Winemiller was recently recognized with three awards.

Last year former Texas A&M President Dr. Elsa Murano presented Winemiller with the 2008 Texas A&M University Presidential Award of Excellence for Faculty Service to International Students.

According to a Texas A&M news release, many international students and scientists are drawn to the university because of Winemiller's international reputation. "According to one of his nominators, Winemiller has made his international students feel welcome and integrated them into his teaching, training, mentoring, and research activities in Wildlife and Fisheries," the release said.

In January 2009 the Texas A&M University Board of Regents presented the 2008 Regents Professor Award to Winemiller as a highly productive and internationally known ecologist recognized for his scientific expertise in biodiversity conservation and management of water resources.

In March 2009 he received the Bush Excellence Award for Faculty in International Teaching. According to the news release announcing the Bush award, Winemiller is "internationally recognized for his research and brings that experience into the classroom on a daily basis. The mix of U.S. and international students in his lab creates a cross-cultural environment that is very enriching for all his students enabling them to learn and thrive in international settings."

Winemiller's attraction to and innate curiosity about fish that developed as a young boy is still very much alive.

"I am still fascinated by rivers, streams, and fishes. That lies at the core of what motivates me," he said. "That we can do research that is highly relevant to some of our most pressing problems, not just for conservation of biodiversity and fishery management but also water resource management, is just a huge bonus."

Dr. Kirk Winemiller and his wife, Dr. Leslie Kelso-Winemiller with former President George H. W. Bush, after receiving the Bush Excellence Award for Faculty in International Teaching. The award was established through the support of the former President and Mrs. Bush with financial assistance from the George Bush Presidential Library Foundation.

Story by Leslie Jordan

Texas Watershed Steward Program Educates Stakeholders Across the State

One day a month, in communities all across Texas, groups composed of teachers, doctors, engineers, lawyers, students, and other interested citizens gather to learn about the local watershed and their role in protecting it. The Texas Watershed Steward program, implemented through a partnership between the Texas AgriLife Extension Service and the Texas State Soil and Water Conservation Board (TSSWCB), educates and empowers a wide range of stakeholders in communities with impaired or endangered watersheds.

"A lot of people don't know why their creek or river or lake is impaired," said Jennifer Peterson, AgriLife Extension program specialist in College Station. "They don't know what a watershed is, what is affecting the water quality, or why a watershed protection plan is needed. So the idea came about—how can we get the stakeholders knowledgeable and motivated to participate in locally driven efforts?"

This gap in stakeholder education led a team of AgriLife Extension water specialists to develop the Texas Watershed Steward (TWS) program, which held its first workshop in December 2007. In addition to Peterson, the group includes Dr. Mark McFarland, professor, state soil fertility specialist and state water quality coordinator; Nikki Dictson, AgriLife Extension program specialist; Matt Berg, AgriLife Extension program specialist; and Dr. Diane Boellstorff, assistant professor and AgriLife Extension water resources specialist. ⇨

The TWS team created the program in response to federal and state strategies regarding watersheds. According to the U.S. Environmental Protection Agency (EPA), the most effective way to address current water resources challenges is through a watershed approach, implemented via either a Total Maximum Daily Load (TMDL) or a watershed protection plan (WPP). TWS focuses on educating watershed stakeholders so they can help their communities develop and implement effective plans to improve and protect their water resources.

"We want to empower them to become the driving force in the planning process because really, that's the whole goal—it's not for agencies to write a plan and deliver it to the stakeholders; it's for the stakeholders to get invested, develop the plan, and get assistance from the agencies," McFarland said. "If that doesn't work, if we can't make it voluntary, then the only other option is regulation, which can lead to more strict limitations for certain activities and land uses in the watershed."

Although some workshops are in watersheds already implementing a WPP or TMDL, TWS works to present the one-day event in advance of planning efforts, so that a base of educated and equipped community stakeholders is established.

"Ideally, we hit a watershed where funding has been received and a plan is just getting started, and we try to target all stakeholders—farmers, ranchers, business owners, city personnel, teachers, youth," Peterson said. "So we try to teach them, give them a day of hands-on, applicable watershed education, and provide them with the basic knowledge they need to participate effectively."

The workshop includes interactive presentations and activities led by the TWS team tailored to each watershed. The team uses Google Earth™ to display the home watershed, discuss its aspects and impairments, and then zoom out to show how the watershed—like all in Texas—feeds into the Gulf of Mexico.

"That is often an eye-opening moment, and we get a lot of positive feedback about that segment where they see how their watershed affects other downstream watersheds and eventually drains into the Gulf of Mexico," McFarland said.

TWS has conducted workshops in 15 watersheds so far. Each has included videos, visual stations, and a demonstration of a simulator showing rainfall and runoff in different land-use types. The day's instruction covers topics from basic watershed knowledge to specific issues regarding that watershed. Participants from other areas still learn pertinent information and actions that they can take home with them, Peterson said.

"We've found that people have traveled from hundreds of miles away to come to these workshops," Peterson said. "So we do tailor it in such a way that people not living in that watershed find the information applicable."

Local county AgriLife Extension agents and other representatives from regional, state, and federal agencies, including the EPA, Texas Commission on Environmental Quality, and TSSWCB, participate in the workshops. At the end of the day, participants can share thoughts and ideas about their watershed and the upcoming planning process with each other and agency personnel.

"It's very helpful for people to see and interact with representatives from these agencies," McFarland said. "The agency becomes more real and accessible, and a partner in the process."

Funding from TSSWCB, as well as support from the Texas Water Resources Institute (TWRI), has enabled the TWS program to grow. TWRI and TWS have collaborated in several watersheds, including hosting TWS workshops in the Arroyo Colorado and Buck Creek Watersheds, where TWRI is working to develop and implement WPPs. TWS works

in collaboration with and in support of water resource management agencies in Texas, which Peterson and McFarland agreed has been key to making TWS so successful.

To continually evaluate their efforts, the TWS team distributes pre- and post-assessments at its workshops and follow-up questionnaires six months later. Their results have shown a 31 percent increase in knowledge related to topics such as watershed function, nonpoint source pollution, and water quality protection. The team has found that participants are implementing their new knowledge as Texas Watershed Stewards back home in their communities.

"We are increasing knowledge, and people are doing what they say they are going to do, whether that be maintaining best management practices on their property, getting involved in local planning and zoning decisions, writing a newsletter or article, teaching a local school class about water quality, or participating in clean-ups," Peterson said.

"We bring this program into watersheds to educate and engage the local stakeholders, so they better understand that it is in fact their watershed, their surface water and groundwater, and they have both the opportunity and the responsibility for managing and protecting it," McFarland said. "They realize how very important it is to them and their children, and future generations, to get involved."

In January 2008, the Texas Watershed Steward program held a workshop in Wellington, located in the Buck Creek watershed in the Texas Panhandle (pictured).

Story by Leslie Jordan

Dr. Mark McFarland, professor in Texas A&M's Department of Soil and Crop Sciences and Texas AgriLife Extension Service soil fertility specialist, hopes to make an impact on the quality of Texans' water while also helping growers throughout the state. For his work, he received the 2008 Regents Fellow Service Award.
Photo by Tami Hons, Department of Soil and Crop Sciences.
Some information from AgriLife News, AgriLife Communications

McFarland's Mission

Professor's research helps save Texans money and water

Dr. Mark McFarland centers his research at the intersection of economics and environment. With the goal of using agricultural best management practices to benefit both natural and financial resources, McFarland hopes to impact the quality of Texans' water while helping growers throughout the state.

To accomplish this, he serves dual roles for the Texas AgriLife Extension Service in the Department of Soil and Crop Sciences: state water quality coordinator and state soil fertility specialist.

"The main focus of all of the work that I do is trying to look at both economic and environmental issues in Texas agriculture," McFarland said. "The role of AgriLife Extension soil fertility specialist gave me the opportunity to deal with both sides of the nutrient management issue in Texas: optimizing the use of plant nutrients while simultaneously helping minimize potential for their loss and adverse impacts on water quality."

McFarland is a member of the AgriLife Extension team that was presented with a 2009 Texas Environmental Excellence Award from the Texas Commission on Environmental Quality for its Nutrient Management Education program in the Rio Grande Valley. With support from the Rio Grande Basin Initiative and the Texas Water Resources Institute (TWRI), the multicounty team started the program in 2002. Through soil testing training and education, the program has so far saved farmers more than 7 million pounds of fertilizers, with a combined value of more than $2 million.

"Nitrogen and phosphorous play an important role because they are the most costly fertilizer nutrients and the most closely tied to water quality impairment concerns in Texas," McFarland said. "Over the last six years, as the cost of fertilizer has gone up dramatically, we have focused renewed attention particularly on nitrogen, trying to optimize use of the nutrient throughout the state. Our research on deep soil sampling for nitrogen has demonstrated both economic and environmental benefits, and the level of producer interest and adoption is expanding tremendously."

McFarland's diligence also earned him a 2008 Regents Fellow Service Award, which honors exemplary service not only to the Texas A&M System but also to the community, the state, and the nation. An award announcement commended him for obtaining more than $6 million in external funding for nutrient

Dr. Mark McFarland gives a presentation at the 2008 Stiles Farm Field Day. Photo by Tami Hons.

management and water quality programs in Texas since 2003. McFarland credits this success to the increasing importance of water research.

"I think it's not so much that I'm a unique talent in funds acquisition, but that water resources work has become more critical than ever before," he said. "In part because of water woes like extended drought state- and nationwide, there is an enhanced focus on protecting and restoring water resources. By identifying and targeting that need, we've been fortunate to garner primarily federal funds to do work in Texas and the southern region."

McFarland also leads the Southern Regional Water Program, a partnership between the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service (CSREES) and land grant colleges and universities. The regional program coordinates water quantity and quality education and research programs among 21 institutions in 13 states.

Watershed planning is another major area of work for McFarland and his team. With support from the Texas State Soil and Water Conservation Board, and working with TWRI, the Spatial Sciences Laboratory, and Department of Biological and Agricultural Engineering faculty, the team developed a watershed protection plan (WPP) for the Plum Creek Watershed, one of the priority watersheds in Texas. TWRI now uses that plan as a model for training future watershed planners in Texas.

"We're hoping our work will be helpful for those who come after us, making the whole process more efficient and effective," McFarland said. "Once a plan is developed by the local community, they need support to put that plan into action, improve water quality, and protect their watershed into the future."

To facilitate that process, McFarland led development of the Texas Watershed Steward program. (See p. 11.) This program educates community stakeholders about water quality and the development of WPPs, and encourages them to take leadership.

"Local involvement is absolutely key to water resource management, and this program helps build that partnership," McFarland said.

By researching how to reduce water pollution and developing effective watershed education programs, McFarland hopes to help improve and protect vital water resources in Texas.

Story by Danielle Supercinski

Saving public resources

Tips for conserving energy and water in homes and landscapes

Through the Rio Grande Basin Initiative, Texas AgriLife Extension Service county agents and Extension specialists conducted water and energy conservation workshops for homeowners.

Three "Flip the Switch, Stop the Drip—Conserving Energy and Water" workshops were conducted in March, April, and June in Fort Stockton, Uvalde, and McAllen. In-home water conservation kits given to all 150 participants included a water-conserving shower head, a spray nozzle, an energy-saving compact fluorescent light (CFL) bulb, and a faucet aerator, along with fact sheets, booklets, and additional water-saving information.

"Water is inexpensive and is being misused," said Janie Harris, AgriLife Extension specialist in family and consumer sciences, at the Uvalde workshop. "Around Uvalde most water use is for agriculture; 75 miles down the road in San Antonio, they have a growing need for water in homes as the population continues to grow."

Because promoting water-conserving consciousness is of the utmost importance, Extension specialists and county agents are educating homeowners about little ways to reduce water use, such as turning off the water while brushing teeth or shaving. Having a household water management plan also is a good idea, Harris said. This plan is a good way to know how water is used, how much water is used, and how much that water costs. In addition, homeowners should make sure their toilets, faucets, and shower heads fit the current plumbing standards, and replace older faucets and fixtures with water-saving devices.

Prior to 1980, toilets used about 5-7 gallons of water per flush; from 1980 to 1992 that amount was 3.5 gallons per flush.

"New plumbing standards were passed by Congress in 1992; showerheads and faucets were changed to allow only 2.5 gallons per minute and toilets were reduced to 1.6 gallons per flush," Harris said. "By replacing old equipment with new devices, technologies, and appliances, and by fixing leaks, families can reduce water use by 25 percent to 35 percent."

To determine if a toilet fits the 1992 standard of 1.6 gallons per flush, look underneath the tank's lid for the year it was manufactured, she said. Anything made before 1992 should be replaced.

Other in-home energy and water conservation options offered by Harris include:

- Using an Energy Star™ washing machine that uses 18-25 gallons per wash instead of the 32-59 gallons that older washers use.
- Using an Energy Star™ dishwasher that uses an average of 44 percent less water than conventional models. Dishwashers also use less water than hand washing.
- Using energy-efficient water heaters such as the tankless Rennai or Mutland® Hot Water D'MAND® System. An average home wastes about 10,000 gallons of water per year by running it down the drain while waiting for hot water. The tankless water heating systems use less

energy, but not necessarily less water. The shorter the distance between the water heating system and the hot water faucet, the smaller amount of water that runs out while waiting for the hot water to arrive.

"By 2035, Texas will have only about 85 percent of the water required to meet the needs of the population," said Barbara Storz, Hildalgo County AgriLife Extension agent–horticulture, who also spoke at the workshops.

In addition to in-home water conservation, water-wise landscaping is vital because 65 percent of water is used for irrigation, Storz said. "Approximately 782 billion gallons of water are used for lawn and landscape irrigation, and half of that is wasted."

Several options will reduce the amount of water needed in landscapes. Xeriscape is one example. Storz said Xeriscape is not "zeroscape," but a beautiful, water-efficient landscape. Homeowners also can group plants by water use and minimize high water use areas. Runoff can be captured through rainwater harvesting or rain gardens.

"It is important to know turfgrass species that are more drought-tolerant and know when the turf does and does not need to be irrigated," Storz said. "If you walk across your grass and see your footprints, the turf is stressed and needs to be watered. When irrigation is needed, it should be watered longer and less often, more than 15 minutes." This longer period of watering allows the water to saturate more deeply into the soil.

Many homeowners are conserving water by catching rainwater. At the workshops, Billy Kniffen, AgriLife Extension program specialist, said rainwater harvesting can be as small as collecting rain in a small rain barrel or as large as collecting tens of thousands of gallons in multiple tanks. The possibilities and sizes are endless.

"Rainwater harvesting creates 'run in' instead of 'run off,' so rain goes to the plants instead of around them," Kniffen said. "I bought land with no water on it. My whole house is serviced by rainwater—no city water, no well water, all rainwater."

Kniffen uses rainwater in his toilets and laundry, and to wash vehicles. He can store 20,000 gallons in his six catchment tanks. He also has a filtration system for using the rainwater as drinking water in his home.

For every 1 inch of rainfall, about 6 gallons of water are collected per square foot of roof area, he said. The main components needed to set up a rainwater harvesting system are: 1) roof and collection surfaces, 2) gutters and downspouts, 3) first flush (wash off roof, which is optional for outside use), screens and filters, 4) gate valve and faucets, 5) overflow pipe, 6) pump and pressure tank (also optional with drip irrigation), and 7) distribution to plants, wildlife, birds, livestock, or in-home uses.

Incentives such as no sales tax on supplies encourage rainwater harvesting. In January 2007, the Texas Commission on Environmental Quality produced new guidelines for using rainwater in the home.

"Rainwater harvesting is certainly one of the tools we can all employ to help us meet future demands for water as the junction between supply and demand grows closer and the need to conserve our water supply while reducing stormwater runoff becomes more critical in Texas," Kniffen said.

"Our desired outcome is that homeowners will adopt water conserving attitudes, change behaviors, install water-conserving equipment and appliances, reduce water use in the landscape, and capture and reuse water," Harris said. "We want families to learn how to use water wisely and efficiently."

For more information about water conservation and rainwater harvesting, visit *http://fcs.tamu.edu/housing/efficient_housing/water_management/index.php* and *http://rainwaterharvesting.tamu.edu/*. ⇨

Tips on reducing energy in the home

Hazel Flores, customer service representative for American Electric Power Texas, presented energy saving tips at the Uvalde workshop. Below are a few tips to help reduce your energy use:

Air conditioning

- During the winter keep the thermostat on 68° at night and 60° during the day. During the summer keep it on 72° at night and 82° during the day.
- Change air filters once a month or rinse if washable. Insert air filter correctly.
- For window units, look at the size of the room and number of people in the household; buy a unit that will accommodate the residents' needs.
- Don't close off air vents.

Windows and thresholds

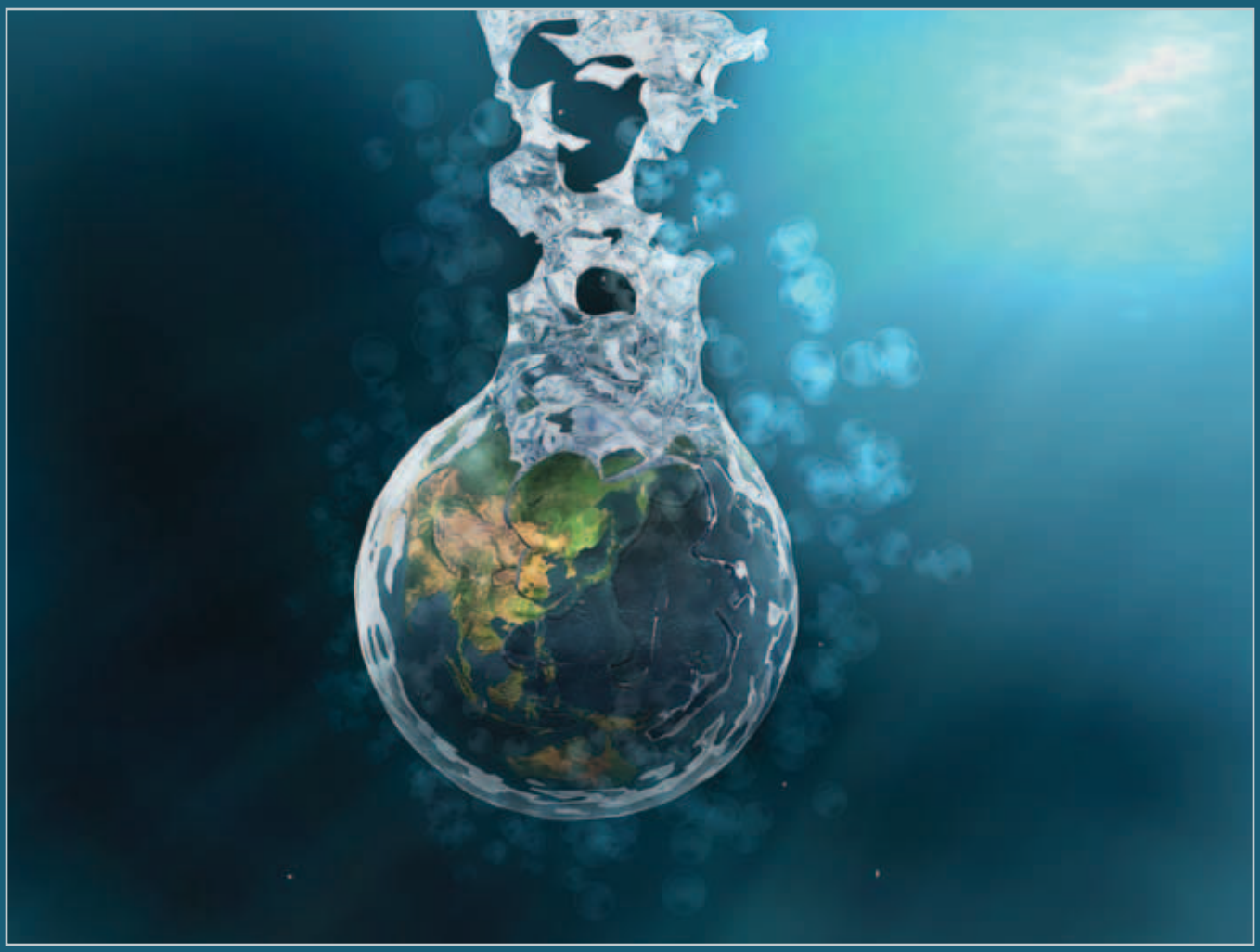
- Use rubber or metal plates along with weather stripping.
- Caulk around windows and doors.

In and around the kitchen

- **Dishwasher** – Run bleach through the dishwasher to clean the drain.
- **Baking** – Use ceramic or glass pans because they bake food quicker than metal pans.
- **During summer** – Cook with the microwave, slow cooker, or toaster oven because they use less energy than the range. Also, turn off the range 10 minutes before the food is done and it will continue to cook.
- **Refrigerator** – If coolness can be felt around the refrigerator, replace the gasket or apply petroleum jelly to it, expanding it and making the suction tighter.
- **Lights** – Use CFL bulbs in all light fixtures; they have a longer lifespan, use less energy, and create less heat.

For more energy-saving tips, visit *http://www.AEPefficiency.com* or the Texas AgriLife Extension Service, Family and Consumer Sciences Web site at *http://fcs.tamu.edu/housing/efficient_housing/energy_management/index.php*.

Story by Leslie Jordan



What's your water footprint?

When it comes to your water use, do you tread lightly or are you an H_2O Sasquatch?

How much water do you think you consume every day? You might initially consider the length of your daily shower, the time of day you run your sprinkler system, and how long the water runs while you brush your teeth.

Conservation in such everyday tasks is important, but water experts have begun to use a more all-encompassing survey of water use by calculating "water footprints" for single individuals, households, and even entire corporations or countries. Because almost every daily activity can be traced back to water, your own actions are only part of your water footprint.

A water footprint is the amount of water you directly or indirectly consume. This includes "virtual water"—the amount of water needed to produce everyday things such as food, clothing, and energy. ⇨

Everyday water use:

- **1 bath = 70 gallons**
  By comparison, a 5-minute shower uses 10–25 gallons.
- **1 dishwasher cycle = 9–13 gallons**
- **Watering the lawn = 750 gallons**
  About a half gallon of water is needed to irrigate a single square foot of grass; watering the average American lawn requires about 750 gallons.
- **1 dripping faucet = 20 gallons**
- **1 toilet flush = 1.6–5 gallons**
  Traditional, non-efficient toilets use 3.5–5 gallons of water or more per flush, while ultra-low flow toilets use 1.6 gallons per flush.
- **1 swimming pool = 19,000 gallons**
  About 19,000 gallons of water fill up the average swimming pool. If left uncovered, pool water can evaporate at a rate of about 1,000 gallons a month.

Your virtual water use:

- **1 bottled drink = 1.5 gallons**
  The water footprint of a pound of plastic is 24 gallons, so the average bottled water, juice, or soda uses three to five times as much water as it contains.
- **1 day of electricity at home = 4–5 gallons**
- **1 tank (18 gallons) of gasoline = 18–45 gallons**
  Because between 1 and 2.5 gallons of water are needed to refine a single gallon of gasoline, the 384 million gallons of gasoline used each day in the United States translate to more than 1 billion total gallons of water per day.
- **1 beer = 30 gallons**
- **1 cheese sandwich = 34 gallons**
  Growing wheat requires 156 gallons per pound; 600 gallons of water are required to make a pound of cheese.
- **1 cup of coffee = 37 gallons**
  Making a cup of coffee takes about 37 gallons of water, including growing and processing the coffee beans, while tea requires 8 gallons of water.
- **1 egg = 120 gallons**
- **1 pair of jeans = 400 gallons**
  Growing cotton for a pair of jeans takes about 400 gallons.

Ways to reduce your footprint:

- If you choose to wait for your shower water to heat, place a bucket in the shower to catch the water and use it later for watering plants or cleaning.
- Cut water use in half by hand-watering your lawn or garden instead of using sprinklers, or use a drip irrigation system instead of a hose or sprinkler.
- If your family wants to play with the hose or sprinkler, make sure they do it in a dry part of the lawn that can use the water.
- After a meal, scrape off dishes into the trash rather than rinsing. Many new dishwashers don't require pre-rinsed dishes.
- Fix leaky toilets and sinks. A leaky toilet can waste about 200 gallons a day.
- If building a new home or changing the plumbing in your current one, install a graywater system, which allows you to reuse the water from your nonkitchen

sinks, laundry machine, and dishwasher for watering plants and flushing toilets. Follow local and state graywater system regulations.

- Recycling one plastic bottle and one newspaper saves more than 5 gallons of water. According to the U.S. Environmental Protection Agency (EPA), in 2007 only 12 percent of plastic waste was recycled, compared to more than half of all paper materials, even though both of these water-intensive materials can be reused and recycled.

Learn More:

- To calculate your individual water footprint, visit *h2oconserve.org*. H20 Conserve is a program of the Johns Hopkins University Center for a Livable Future, the Interfaith Center on Corporate Responsibility, nonprofit environmental organization GRACE, and Food & Water Watch.
- To learn more about graywater systems, visit Extension's On-site Wastewater Treatment and Reuse Web site at *ossf.tamu.edu*.
- Lean more about water efficiency at the EPA's WaterSense® Web site, *www.epa.gov/watersense/*.

Did you know?

China's population is more than 1.3 billion, and each of those individuals uses about 184,920 gallons of water per year. Japan has a population of more than 126 million, with each person's water footprint at about 303,798 gallons per year. The United States' water footprint is 660,430 gallons per year per person–multiplied by 306 million.

- For information on making your home and appliances more efficient, visit *www.energystar.gov*.
- Conducting a water audit of your household can result in savings of 20 gallons to 30 gallons of water per day. To learn more, see the water conservation checklist provided by Texas AgriLife Extension Service Family and Consumer Services at *fcs.tamu.edu/housing/*.
- To find Community Supported Agriculture programs, visit the U.S. Department of Agriculture at *www.usda.gov* or the National Sustainable Agriculture Information Service at *attra.ncat.org*.

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Story by Kathy Wythe

Researcher explores economics of U.S. urban water demand

Photo by: Danielle Supercinski

With projected demands for future water supplies becoming more critical, understanding urban water needs more thoroughly is essential for accurate planning.

Ron Griffin, professor in Texas A&M University's Department of Agricultural Economics, and his graduate student, David Bell, recently completed a study of the economic factors contributing to urban water demand in the United States. They analyzed how water use is affected by water prices in nearly 200 U.S. cities.

"It's interesting that many people still buy into the myth that water demand is not price-sensitive, even though that would make water unique among all commodities and is well disputed by hundreds of statistical studies emphasizing residential water," Griffin said.

The study, funded by the U.S. Geological Survey, looked at not only residential use but also commercial and industrial use. The researchers assembled water use, water rates, census, business activity, and weather data spanning 11 years—from 1995 to 2005. They collected the information on a monthly scale, which allowed them to examine the seasonality of rate responses, Griffin said.

"Traditional visions of water supply problem-solving have reduced relevance as cities confront the challenges ahead," Griffin said. "As a consequence, continued economic growth and the preservation of economic welfare for American cities likely depend on the cultivation of demand management strategies, such as water use regulations, conservation incentives, and advanced forms of water pricing, to augment supply development, which in turn is aided by a more comprehensive understanding of water demand."

Without this information, Griffin said local planners will be ill-prepared when making important supply choices and crafting appropriate demand-influencing strategies, and policy makers will be deprived of clear projections of water use based on economic growth, rate modifications, population growth, and climatic conditions.

The data collected from the study showed that for all three sectors, water and sewer rates increased more rapidly than the Consumer Price Index—a measure of the average change over time in the prices of consumer goods and services. The data also showed that cities are revising rates more often in recent years.

"Knowing how water consumption responds to rates enables not only better informed rate-making by water utilities," Griffin said, "but it also embeds the information needed to do other analyses, such as computing the user benefits associated with proposed water development projects."

Their statistical analyses provide quantitative findings regarding both short- and long-term elasticities, by sector and by U.S. region, Griffin said. Price elasticity is a measure of how demand for a commodity, in this case water, reacts to a change in price.

The researchers' statistical analyses found lower long-term price elasticities than are typically reported, Griffin said, which means that users are less reactive to price.

"Short-term price elasticities are even lower," he said, "due to the adjustment time as consumers make progress in adopting new behaviors and establishing conservation measures."

Griffin said the short-term results, once they are verified, imply that pricing appears to be less effective as a short-term conservation policy, and that policies that address short-term shortages by acquiring water—for example, leasing water—are more valuable than previously thought.

More information on the research can be found at *http://twri.tamu.edu/reports/2008/tr331.pdf.*

Story by Kathy Wythe

Providing protection

Agencies receive funding to repair, upgrade dams

Scattered across Texas are almost 2,000 nondescript, earthen dams built on private land to protect property, roads, and bridges from flood damages. Some of these dams, called floodwater retarding structures and built mostly in rural areas during the 1950s to 1970s, are aging and need repairing. Others now protect urban areas that have developed downstream and need upgrading to meet more stringent safety standards.

With recent funding from Congress and the Texas Legislature, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), and the Texas State Soil and Water Conservation Board (TSSWCB) can repair or upgrade some of these dams.

Through the American Recovery and Reinvestment Act of 2009, the Texas office of NRCS received about $20 million to repair 20 dams, said Steven Bednarz, the agency's assistant state conservationist for water resources for Texas. The office also received $4.8 million to "rehabilitate" or redesign and upgrade two existing dams—Calaveras Creek Dam No. 6 in Bexar County and Plum Creek Dam No. 5 in Hays County.

In addition to these federal funds, the Texas Legislature recently appropriated $15 million to TSSWCB for the operation, maintenance, and structural repairs of these dams. The funds will be used as grants to local soil and water conservation districts, said John Foster, TSSWCB statewide programs manager. The state board is setting up two grant programs—one for operation and maintenance, the other for repairs—through which the districts, along with local partners, can apply for grant funds, he said.

Construction of the dams began through four federal authorizations passed between 1944 and 1981. Land rights were acquired from landowners, and local agencies constructed the dams with federal money from NRCS (formerly the Soil Conservation Service). Local sponsors—including cities, counties, local soil and water conservation districts, water control and improvement districts, and other organizations—were responsible for needed operation and maintenance as well as repairs and enhancements, Foster said.

When built, the dams were given low, significant, or high hazard ratings, depending on the potential damage or loss of life should failure occur, said Richard Egg, TSSWCB statewide programs engineer. Most were built as low hazard dams in rural areas.

"Many dams originally constructed as low hazard are now being reclassified as high hazard because of population growth and urban development downstream," Egg said.

With the change in classification, the dams need rehabilitation to meet more stringent design criteria to prevent potential failure during major storms, he said.

During 2008, NRCS surveyed the conditions of the nearly 2,000 watershed structures. Bednarz said the survey found that about 120 dams need repair at an estimated cost of $53 million, with maintenance needs for all dams totaling about $11 million. Of the 343 dams currently classified as high hazard,

about 240 need to be rehabilitated to meet the high hazard design criteria at an estimated cost of $350 million.

Although the dams were built to protect agricultural lands and property, rural roads, and small towns from flood damage, said agency officials, through the years they have provided other benefits.

The dams protect urban homes and businesses, preserve the storage capacity of downstream water supply reservoirs by reducing sediment flow, and improve water quality by keeping nutrients from entering streams, Bednarz said.

In addition, 5,800 bridges are protected, as are numerous county, state, and federal highways throughout the state.

"(The dams) provide $4.1 billion in capitalized benefits and more than $118 million in average annual benefits," Bednarz said.

Egg said the Texas Department of Transportation considers these structures and their protective benefits when it designs roads and bridges, and therefore can construct a less costly design.

Without these dams, stormwater infrastructures of cities downstream would also have to be built to a higher standard to handle increased flood waters, Foster said.

"A lot is riding on these structures being maintained and doing their job," he said.

For additional information, visit the Texas NRCS Watershed Web site at: *http://www.tx.nrcs.usda.gov/programs/watersheds/index.html.*

State Water Legislation

For more information about water bills passed by the 81st Texas Legislature, visit the Texas Water Conservation Association's Legislative News Web page at *http://www.twca.org/1n.html* or read in "The Cross Section," a monthly publication of the High Plains Underground Water Conservation District No. 1 at *http://www.hpwd.com/CrossSection/06-2009%20Cross%20Section.pdf.*

The earthern dam or floodwater retarding structure is one of 20 that is being repaired using American Recovery and Reinvestment Act (ARRA) funds.

RGBI Conference

More than 120 attendees participated in the 2009 Rio Grande Basin Initiative Conference Aug. 10-13 in McAllen, including Texas and New Mexico administrators and representatives, federal project representatives, and project participants. Project participants gave brief overviews of their accomplishments throughout the past year. The conference ended with three field tour stops: McAllen Northwest Water Treatment Plant, Old Hidalgo Pumphouse, and San Juan Park turf and rainwater harvesting demonstrations.

Consortium for Irrigation Research and Education

The third annual Consortium for Irrigation Research and Education (CIRE) meeting was held May 27-29 in Amarillo, with 22 participants.

The CIRE group hopes to find funding for statewide irrigation research and education teams. The newly elected CIRE committee includes: Dr. Shad Nelson, associate professor at Texas A&M University–Kingsville, chair; and Dr. Jeff Johnson, joint assistant professor for Texas Tech University and Texas AgriLife Research, vice-chair. Danielle Supercinski, project manager at Texas Water Resources Institute, continues serving as the CIRE secretary.

Additional information about the CIRE group and the Amarillo meeting notes can be found at *http://cire.tamu.edu*.

SWAT Conference

New Faculty

Dr. Diane Boellstorff

Dr. Diane Boellstorff has been named an assistant professor of soil and crop sciences and a Texas AgriLife Extension Service water resources specialist. Boellstorff has been part of the AgriLife Extension water team since 2001, working as a program specialist under the direction of Dr. Mark McFarland. She has a strong background in developing effective state and regional AgriLife Extension water programs. She is the project manager of the Southern Regional Water Program, a partnership of the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service, and land grant colleges and universities that includes 13 states and 21 institutions.

Boellstorff's new role will involve providing AgriLife Extension agents with educational support in water resources, including long-term community water resource planning through Watershed Protection Planning or Total Maximum Daily Load analysis, and a Master Well Owner Network to serve residents using drinking water wells.

She earned her master's and doctorate degrees from the University of California–Davis, and her bachelor's degree from Iowa State University.

New Faculty

Dr. Diane Rowland

Dr. Diane Rowland joined Texas A&M University in February 2009 as an associate professor in the Department of Soil and Crop Sciences and plant stress physiologist at the Texas AgriLife Research and Extension Center at Uvalde. Her research focuses on drought stress and efficient water use in row crop production.

Rowland earned her doctorate in plant physiology from the University of New Mexico and joined the U.S. Department of Agriculture's Agricultural Research Service in 2001 as a research plant physiologist at the National Peanut Research Laboratory in Dawson, Ga. She established the laboratory's physiology program, which focused on understanding and quantifying physiological responses to water scarcity in peanut, cotton, corn, and other rotational crops.

Her current research projects include quantifying water use in drought resistant corn; developing conservation tillage systems for corn, cotton, and sunflower for the region, and quantifying water use differences between conventionally tilled and strip-tilled crops; developing alternative irrigation methods for cotton production that increase water-use efficiency in the Wintergarden area; and testing oilseed crops and rotations for on-farm biodiesel production.

SWAT Conference

More than 160 attendees from 16 countries participated in the 2009 International SWAT Conference Aug. 5-7 at the University of Colorado at Boulder. SWAT, the Soil and Water Assessment Tool, is a public domain model jointly developed by USDA Agricultural Research Service and The Texas A&M University System.

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AgriLife Extension soil testing program wins environmental award

The Texas AgriLife Extension Service won the 2009 Texas Environmental Excellence Award in agriculture for the "Nutrient Management Education in the Rio Grande Valley" program. The Texas Commission on Environmental Quality (TCEQ) award was presented by Gov. Rick Perry at a ceremony in Austin.

Pictured (left to right) are Sen. Kip Averitt, Rep. Byron Cook, Dr. Enrique Perez, Gov. Rick Perry, TCEQ Chairman Buddy Garcia, Brad Cowan, former TCEQ Commissioner Larry Soward, and TCEQ Commissioner Bryan Shaw. Perez and Cowan are Extension agents in Cameron and Hidalgo counties, respectively. Other program organizers not pictured are Omar Montemayor, Extension agent from Starr County, and Extension specialists Dr. Mark McFarland and Dr. Tony Provin of College Station.

(Photo courtesy of TCEQ)