

# tx : H<sub>2</sub>O

*A Publication of the Texas Water Resources Institute*

*Summer 2011*

## TURFGRASS

Getting to the root of it

**Also in this issue . . .  
Tolerant turf, The art of smart irrigation,  
and much more!**

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





*Working to make  
every drop count*

Change has become a popular byword that is often used in all parts of our lives including the political atmosphere, the climate, our families and jobs, and yes, even our physical beings. We must accept change for what it is—another step along the way. With change in mind, I will retire from The Texas A&M University System and Texas Water Resources Institute effective August 31, 2011. Dr. Neal Wilkins has been named director of the Texas Water Resources Institute effective June 1, 2011. I am sure you will enjoy working with him. I have agreed to stay around for a while to ease the transition.

It has been a great pleasure working with you, our many friends and collaborators, in the important water areas, issues, and concerns. I have particularly enjoyed establishing working relationships with numerous federal, state, and local agencies, organizations, groups, and individuals. It has also been enjoyable working with key elected officials and their staffs in support of stakeholder water needs and concerns.

I have been very lucky to work with a highly talented group at TWRI and with faculty from throughout the state. Together we have brought in somewhat more than \$77 million in 232 funded grant proposals since 2001 to support priority water-related research, education, and AgriLife Extension programs for Texas. During that time, we also have awarded almost \$500,000 in scholarships to 239 students working in water projects at universities across the state.

Obviously, Texas faces some major challenges currently and in the future with both short-term and long-term water shortages and water quality issues. TWRI is properly positioned to provide assistance with these issues. With continuing broad-based support, the institute with faculty involvement can help develop new technologies and find research-based solutions to those water issues.

Thank you for your friendship and interest in helping “make every drop count.”

*B.L. Harris*

B.L. Harris

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*make every drop count*

# Volume 6 number 3, Summer 2011



## Turfgrass

*Getting to the root of it*

Editor's Note: Turfgrass covers nearly 50 million acres in the United States and the turfgrass industry has an estimated value of \$57.9 billion annually, according to the USDA Agricultural Research Service, National Turfgrass Research Initiative. Texas AgriLife Research and the Texas AgriLife Extension Service scientists are working to solve challenges related to turfgrass and landscape plants. The following stories spotlight turfgrass and irrigation research, home consumer tips on selecting and managing turfgrass, and El Paso's perspective on home landscaping.

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## With drought and increasing water needs, are green lawns in the past?

*Not so fast, experts say*



With most of Texas currently in a drought, should homeowners just “go blonde”—quit watering and let their yards turn an ugly brownish-yellow? Or maybe dig up the grass and replace it with rocks? While both are options, turfgrass experts with the Texas AgriLife Extension Service said homeowners don’t have to take such drastic measures.

Dr. Richard White, professor of turfgrass physiology and management in Texas A&M University’s Department of Soil and Crop Sciences, said homeowners should “absolutely not” give up on growing grass. But, he added, “We should not continuously strive to produce lawns that are jalapeño green.”

“Turfgrasses are a resource for healthy urban and suburban ecosystems, and people should become more informed about the proper care needed to sustain healthy lawns,” White said.

Dr. Doug Welsh, professor and associate department head for Texas A&M’s Department of Horticultural Sciences, agreed. “Lawns don’t waste water, people do.

“By incorporating landscaping principles outlined in AgriLife Extension’s Earth-Kind® publications, the same green Texas-style landscape that we are accustomed to can be achieved and still conserve water,” he said. Earth-Kind® is a federally registered trademark of the Texas AgriLife Extension Service, Texas A&M University System.

The recipe for growing healthy grass while conserving water, the experts said, involves choosing the right grass for the location, having good soil, and knowing good management practices, including understanding when and how much to water. With many Texas cities implementing drought-related water conservation restrictions, knowing this information is even more important.

### The right grass

According to White, more than half of the lawns in Texas are planted with St. Augustinegrass. Bermudagrass, buffalograss, centipedegrass, and zoysiagrass, a native grass becoming more popular with homeowners, are the other most commonly used warm-season lawn grasses in Texas. Kentucky

bluegrass and tall fescue are cool-season grasses that are sometimes grown in the northern parts of the Texas Panhandle. (See Common Turfgrasses in Texas, pages 6 and 7.)

In addition to knowing the right species of grass for their specific climate, Texans should know which grass varieties are the most water-efficient and drought-tolerant for their region.

“All grasses use about the same amount of water at the same rate when it is available in the soil,” said Dr. David Chalmers, professor in Texas A&M’s Department of Soil and Crop Sciences and state Extension turfgrass specialist, adding that with the right timing, most grasses can persist with 30 inches of water a year.

“Much of their persistence and survival, if water is restricted, depends on their drought tolerance or being able to survive without rainfall or irrigation,” Chalmers said. “Drought tolerance and water use are not the same thing.”

White said the drought tolerance of many of the turfgrasses grown in Texas has improved. “Using a turfgrass variety that is well adapted to a specific location in the state is an important water-saving strategy,” he said. “The advantage of many improved turfgrass varieties is that they can survive longer periods of drought than other varieties.”

Texas A&M has developed drought-tolerant species, and many can be found on the Texas AgriLife Research and Extension Center at Dallas’ website at [urbansolutionscenter.tamu.edu/hot-topics/grasses](http://urbansolutionscenter.tamu.edu/hot-topics/grasses).

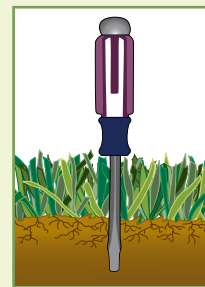
Chalmers and Dr. James McAfee authored AgriLife Extension publications, *Turfgrass Selection for Texas* (L-5519), which outlines the turfgrass species and varieties that are best adapted to the different climates in Texas; and *Turfgrass Establishment for Texas* (B-6239), which lists the things necessary to have a healthy lawn. The publications are available through the AgriLife Extension Bookstore at [agrilifebookstore.org](http://agrilifebookstore.org).

To buy the grass, White said homeowners can check the Turfgrass Producers of Texas website at [txsod.com](http://txsod.com), which lists producers and the grasses they grow. ➡



## How deep is your soil?

According to a 2006-2007 study done by Texas AgriLife Extension Service specialists looking at how turfgrasses survive a prolonged drought, the key was soil depth. Twenty-five varieties were planted in an agricultural native soil that was 16- to 18-inches deep; all survived the 60 days without water. The same 25 varieties were planted in soil with 4 inches of topsoil, the requirement by the city of San Antonio; none of those survived. (The study was sponsored by the Turfgrasses Producers of Texas and San Antonio Water System.)



## Managing the grass

While using a well-adapted variety is a vital water-saving strategy, White said the management of grasses is more important.

“If the grasses are not managed correctly, then home consumers will not see the benefits of using the improved grasses,” he said. “Managing existing lawns properly is probably one of the best ways to achieve substantial water savings.”

## The right soil

The soil is a fundamental component of a successful formula for growing a healthy lawn. According to Chalmers, homeowners need to change their perspective on growing grass: They need to think about turfgrass as three-dimensional, inclusive of the soil beneath the turf.

“It’s not just about the specific turfgrass they put into place, but what type of soil they have, how deep it is, and how appropriate it is to growing plants,” he said.

Turfgrasses are healthier, need less water, and tolerate environmental stress better if they are grown in a deep, noncompacted soil, Chalmers said. A soil depth of at least 10 to 12 inches is preferred.

“Often there is little regard for protecting the soil as an important resource during lawn establishment, especially during home construction,” Chalmers said. “Lawns need good soil infrastructure—the quality of the soil and the depth of the soil—that will support any plant.”

When new homes are built, the soil is compacted by heavy construction vehicles and is not put back the way it was. “Whenever we disturb the land, we have to wonder if it is put back in the right manner,” Chalmers said. “Plants can’t do all the heavy lifting. They have to have good, noncompacted soil to grow.”

Chalmers said the best scenario for growing grass is deep soil with good aeration through the root zone and a turfgrass with a deep root system. “When homeowners have that, their grass can go longer

between irrigations, gradually go dormant if not watered, and persist more readily through drought because of the root system that gradually draws water,” he said.

Residential consumers can use aerification—inserting a tine through the turf and into the soil—to help the lawn capture more water when it rains or when the lawn is watered, White said.

Mowing at the proper height will help maintain a dense canopy, slow the rate of water movement from plant leaves into the atmosphere, and provide for optimum root growth and development, he said.

Another management tip to help conserve water, White said, is limiting the application of fertilizer. “Rapid leaf growth caused by large amounts of applied fertilizer increases water loss from the turf and will increase the need for irrigation,” he said. Too much fertilizer often reduces the grass’ drought tolerance and decreases the chances for the lawn’s recovery if watering restrictions are imposed.

## When to water?

Knowing when to water is another crucial element in managing a healthy lawn.

“Home consumers have heavy reliance on the presence of the grass being green to determine whether it is healthy or not,” Chalmers said. “This can lead to overwatering.”

“Some people typically irrigate at the first sign of stress—when the grass starts to wilt; it may mean the grass needs water or it may be just the time of day that it wilts,” he said.

Earth-Kind® proponent Welsh recommends homeowners take advice from the lawn itself. “Pay attention to what your lawn is telling you.”

He said homeowners should water when their lawn needs it, “not according to a time clock, calendar, or habit. The best switch on an irrigation system time clock is ‘O-F-F’! Keep the system off until the lawn tells you it is time to water.”



“Lawns readily show you when water is needed,” Welsh said. “They wilt, show footprints from people who tread on them, or turn dull, grey-green. St. Augustinegrass will even roll its leaves lengthwise in an effort to reduce water loss from the leaf surface.

“If you are having trouble reading the water-stress symptoms of your lawn, then trust the best moisture meter ever invented—your index finger,” he said. “Stick your finger into the soil 2 to 3 inches deep. During the growing season, if the soil is cool, then there is enough moisture present for plant use. If the soil is warm or dry to the touch, then it is time to water.”

### The big question: How much water?

“Landscape water use can account for 25 percent of the annual water use in many Texas cities,” Welsh said. “The percentage increases dramatically to 60 percent for the summer months. For example, the average water use for a residence in Bryan, Texas, is 6,000 gallons in January; in July it is 16,000 gallons. The difference is primarily landscape irrigation.”

Although homeowners often hear that lawns need 1 inch of water every week, this is not always true, White said. “The majority of home consumers could reduce the amount of irrigation water that they apply by 25 percent and still have an attractive and healthy lawn.”

Chalmers said there are many variables to consider when knowing how much to water. Rain gauges measure rainfall in inches; irrigation recommendations in the absence of rainfall are usually in inches; but municipalities charge consumers for water use by gallons used. And irrigation controllers and sprinklers are typically set to water for a certain number of minutes.

“Time watered, in minutes, rarely links back to gallons watered and inches applied,” Chalmers said. “Therein lies the challenge: to understand how to apply water in measured amounts (inches), while accounting for the contribution of measurable rainfall (inches) and relating both minutes and inches of applied irrigations to gallons consumed.”

White agreed that home consumers need to know their irrigation system to water efficiently and recommended that they understand the relationship between the minutes the system operates and the depth of water applied to that area of the lawn.

“Understanding this relationship will help home consumers set their irrigation systems to operate for an amount of time that will apply the correct amount of water,” White said. “Water moves into most clay soils at a rate of about 0.09 inches per hour. This rate is not very fast. Irrigation systems, on the other hand, may apply water at a rate of 0.25 to 1.5 inches per hour or more. So, for efficiency, the irrigation controller should be set to only apply about 0.10 inch of water at a time. Applying water faster than a soil can absorb in one setting results in water moving across the soil surface, running into the gutter, and down the storm drain.”

A useful tool for calculating the amount of irrigation water needed for lawns each week can be found at the Texas ET Network website ([texaset.tamu.edu](http://texaset.tamu.edu)). This site gives daily potential evapotranspiration (ET) data and weather summaries from 28 Texas weather stations. Home consumers can select a weather station in their area and use the information provided to calculate water application rates, White said. (See related story on pages 10-12.)

The bottom line, he said, is people need to know more.

In a survey of 800 home consumers, 25 percent of those surveyed used 50 percent of the total drinkable water, White said. About 90 percent did not know how much water they consumed each month, but 85 percent considered themselves to be efficient irrigators.

“Water consumption by the group increased by as much as 400 percent during the summer from lawn and landscape watering,” he said. “More efficient irrigation practices by this group could have resulted in water savings of 24 to 34 million gallons of water a year.”

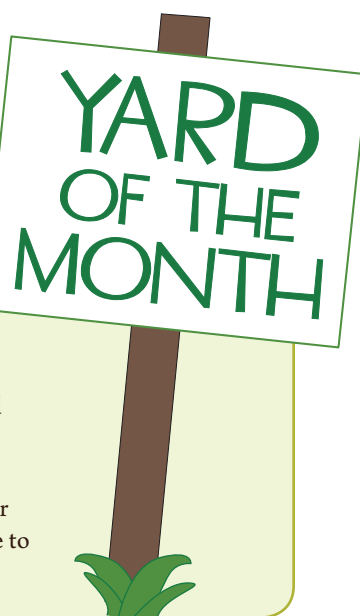
For more information on turfgrass, visit [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O). ➡

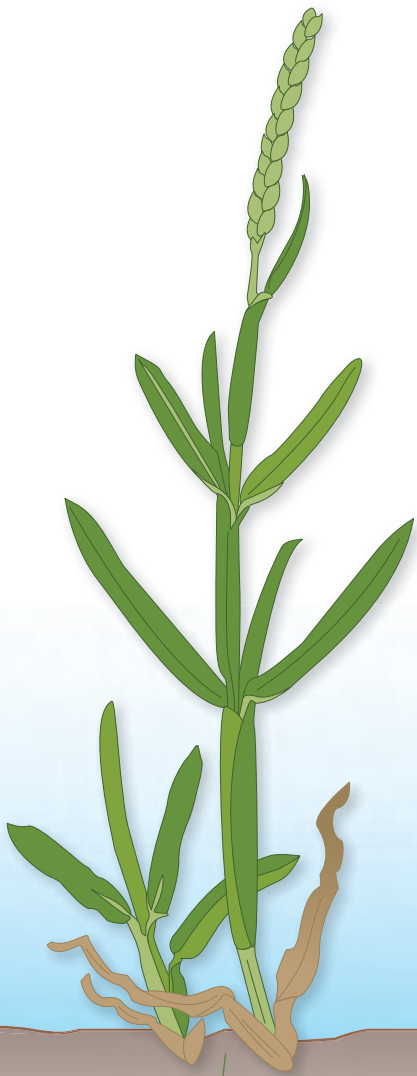
Illustrations drawn by Mary-Margaret Shread, AgriLife Communications.

### Not just for looks

Having a healthy, green lawn serves more purposes than just winning “Yard of the Month” awards. Well-cared-for turfgrasses have many functional benefits, including stabilizing the soil, keeping weeds in check, and keeping dust and dirt from entering people’s homes.

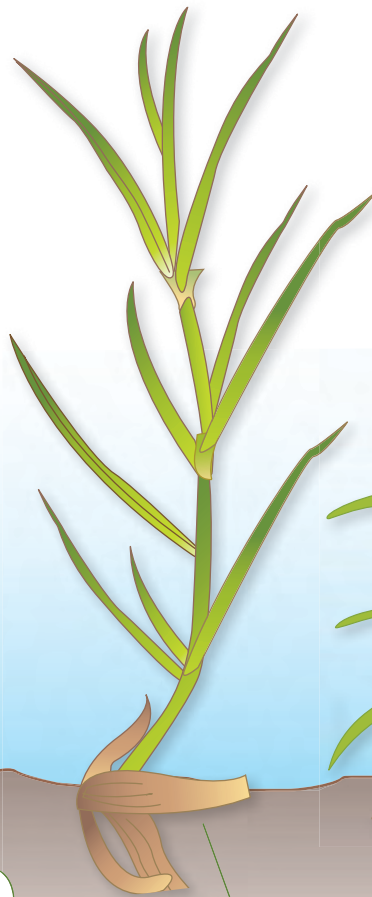
Dr. Richard White said turfgrasses also help with global warming. “All turfgrasses, and particularly warm-season grasses grown in the southern United States, are very efficient at trapping carbon dioxide, a major greenhouse gas,” he said. “Turfgrasses can trap the carbon dioxide for many years so that it does not contribute to global warming.”





### ST. AUGUSTINEGRASS

can be grown in most of Texas, although it may be killed by severe winters in the northern one-third of the state. St. Augustinegrass is less drought-tolerant than bermudagrass or zoysiagrass. It is moderately drought resistant when there is an extensive, deep root system, but shallow soil depths may interfere with drought resistance.



### BERMUDAGRASS

is grown throughout Texas and is very tolerant of drought and traffic. It requires full sunlight. It has a very good recovery potential from drought-induced dormancy. Shallow soil depths may interfere with drought resistance.



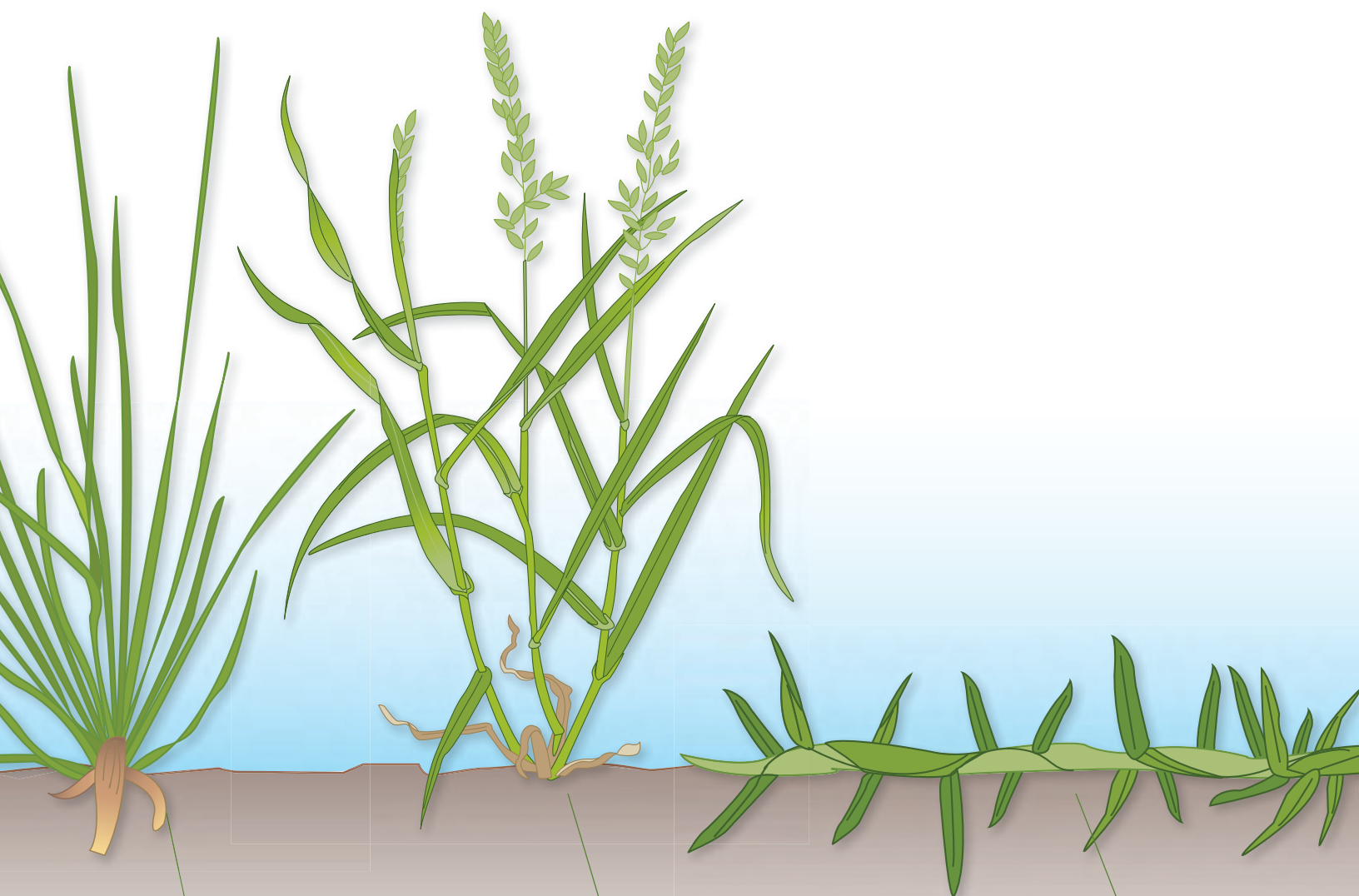
### ZOYSIAGRASS

grows in areas similar to that of bermudagrass. It is drought-tolerant, but tends to turn brown sooner than bermudagrass during an extended drought. It has a moderate to slow drought recovery capability.

Illustrations drawn by Mary-Margaret Shread, AgriLife Communications.



# Common Turfgrasses in Texas



## **BUFFALOGRASS**

is adapted for areas with annual rainfall of 25 inches or less. It does well as a low-maintenance lawn grass from Central to West Texas and has an excellent potential to recover from drought.

## **TALL FESCUE GRASS**

is a cool-season grass for North Texas. It is drought resistant on deep soils due to deep root systems but there is significant loss during long drought periods.

## **CENTIPEDEGRASS**

is best adapted in East Texas. It is moderately drought resistant if there is an extensive, deep root system but shallow soil depths may interfere with drought resistance.



# Tolerant Turf

*Collaborators work to improve turfgrasses' response to drought and salinity*

**A**lthough turfgrass is not food, fiber, or animal feed, it still impacts the lives of millions of people—mentally, socially, and physically—according to Dr. Ambika Chandra. Climate change, recurrent droughts, and increasing public demands on water resources mean that less potable water will be available for irrigation of turf landscapes and golf courses in the future. Chandra, assistant professor of turfgrass breeding and molecular genetics at the Texas AgriLife Research and Extension Center at Dallas, and researchers from five other universities have partnered with three objectives in mind—to develop, improve, and commercialize drought- and salinity-tolerant turfgrass.

These collaborators will do so with a \$3.8 million grant from a Specialty Crops Research Initiative program of the U.S. Department of Agriculture's National Institute of Food and Agriculture. This Coordinated Agricultural Project (CAP) includes researchers from Texas AgriLife Research along with the University of Florida, the University of Georgia, North Carolina State University, and Oklahoma State University. Turfgrass breeders, agricultural extension specialists, physiologists, economists, and social scientists from these major universities will work together over the next five years to develop and commercialize cultivars of five common turfgrass species.

"With this coordinated effort, it's not just Texas involved," said Chandra, who is the project's director. "This project is really going to impact the overall productivity and economic gain of the turfgrass industry in the South. Turfgrasses with improved drought and salinity tolerance will help conserve potable water resources, enhancing the sustainability and profitability of the entire southern turfgrass industry."

Chandra said the team will take a traditional breeding approach targeting warm-season turfgrasses—bermudagrass, St. Augustinegrass, zoysiagrass, and seashore paspalum—as well as ryegrass, a cool-season turfgrass. Researchers will develop and test hundreds of experimental lines

of these species. "The idea is that from that large number, we will select for drought and salinity tolerance and narrow the genetic pool down to about 10 percent of elite material that would then be studied in further detail in greenhouses and out in the field," she said.

Dr. Grady Miller, North Carolina State University professor and Extension turf specialist, said, "It is critical that we find turfgrasses that can be used that require fewer inputs (water and pesticides). To meet the demand of our clientele, we'll have to develop grass cultivars that can handle our change in water use."

Another approach the team will use is marker-assisted selection. Markers for these two traits—drought and salinity—will be identified with hopes of transferring them to other related species. The breeding process will continue in each year of the project. Chandra said researchers will develop new experimental lines annually so the new material can be evaluated in the field the next year.

"We expect the outcomes of this process to be commercialization of scientific intellectual property—in terms of new cultivars of these different grass species, as well as genes and/or molecular markers for drought and salinity," she said.

In the past, each university led the breeding and evaluating of certain turfgrass species, resulting in efforts that were somewhat isolated. However, this grant allows these five universities to exchange genetic materials for these five turfgrass species to evaluate for adaptation to various regions in the South. This encourages a large flow of information, ideas, expertise, and genetic material across the Southern Region Turf Development Program, Chandra said, and possibly avoids duplication of effort.

Extension specialists will serve an important role in the project's evaluation phase. As universities exchange the genetic material, the specialists will help evaluate these developed lines of turfgrass





Dr. Ambika Chandra of the Texas AgriLife Research and Extension Center at Dallas and others work on a turfgrass field at the Dallas center. Photo courtesy of the Texas AgriLife Research and Extension Center at Dallas.

species. The evaluation of the experimental lines will occur at multiple locations to get a better understanding of the breeding lines' environmental interaction and genetic makeup. "There might be some lines that will do very well across the southern region; they'll have a broader adaptation and therefore a broader impact," Chandra said.

National and regional turfgrass industry stakeholders will participate in an advisory panel. Representatives from major turf organizations from each collaborating state will also serve on the advisory panel to provide regular feedback to the researchers. Stakeholder involvement will continue throughout the course of the study, not only through their participation on the advisory panel, but also through involvement in the evaluation of breeding materials.

In addition, the Dallas center recently submitted release documents for two developed varieties

of turfgrass in hopes of commercialization and production next year. The zoysiagrass variety (DALZ 0102; 'Chisholm') is a joint release between AgriLife Research and Kansas State University. This variety was bred for improved cold tolerance, and test results showed an increased cold-hardiness in Kansas.

"Zoysiagrass is a warm-season grass; it likes warmer weather, so the idea was to increase its adaptation up north by improving the cold-hardiness," Chandra said.

The St. Augustine variety (DALSA 0406) has great visual traits, and its performance is comparable to other industry turfgrasses for drought tolerance, water-use efficiency, and resistance to diseases and insects, she said.

For more information, visit [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O). 💧





# The rt of Smart Irrigation

*Researchers work to find the smartest smart irrigation controllers while educating auditors and homeowners to be smart too*

**I**rrigating in Texas is not easy.

Climate and rainfall are highly variable throughout the state and from day to day; therefore, no one way of scheduling irrigation will work.

Dr. Guy Fipps and Charles Swanson are working to improve landscape irrigation practices in Texas by researching the water efficiency of smart irrigation controllers and educating irrigation auditors.

## **What does it take to be “smart”?**

Fipps, professor of biological and agricultural engineering at Texas A&M University and specialist for the Texas AgriLife Extension Service, and Swanson, AgriLife Extension program specialist, have been testing and evaluating smart irrigation controllers since 2007.

“In 2010 we completed the third year of testing, and this is now the longest time period and most intensive test ever done of smart irrigation controllers,” Fipps said. “We’re testing smart controllers that are currently actively marketed in Texas.”

Smart controllers are irrigation systems that use weather data to calculate the amount of water needed by a lawn or landscape. Ordinary irrigation controllers rely on timers and human help. However, researchers have discovered that some smart controllers still have a lot to learn.

“We’re finding that many of these controllers don’t offer any advantages in terms of promoting water conservation,” Fipps said.

The controllers’ irrigation run-times were compared to the recommendations of the Texas ET (evapotranspiration) Network, which is an Irrigation Technology Center (ITC) program that provides online weather information, current and average ET data, and customizable irrigation recommendations. ITC is partially supported through the Rio Grande Basin Initiative, which is administered by the Texas Water Resources Institute.





The testing, said Swanson, required all of the controllers to be programmed as similarly as possible for a single virtual landscape and then monitored to determine how many inches of water they would have applied according to their run-times. They then compared those amounts to Texas ET Network irrigation recommendations for the same time period.

“The methodology we’re using is much different than the smart controller testing that’s being sponsored by the manufacturers,” Fipps said. “Our testing is trying to get a handle on how these perform in real-world situations.”

They tested two types of controllers. The first uses on-site sensors to collect weather data and then calculates the amount of water needed. The other type receives data and run-times remotely, sent from the manufacturer.

“We found in the first two years of studies that the controllers using on-site sensors produced run-times much closer to the Texas ET Network recommendations,” Swanson said.

“However, most of the controllers are performing fairly poorly,” Fipps said. “So we are reporting that the state of this art is not very advanced and several of the controllers have problems when it comes to a water conservation perspective.”

The researchers are providing specific feedback to the manufacturers about the performance of smart controllers. With that feedback, they are seeing improvements in the products and expect to soon be able to fully recommend the technology to consumers, Fipps said.

### What irrigators and homeowners can do

Fipps and Swanson predict that the selection of controllers designed for residential use, though currently fairly limited, will continue to grow, and the devices will eventually be beneficial for homeowners.

“I would recommend that users hold off on purchasing smart controllers at this time, but instead implement seasonal irrigation schedules and check the settings of their controllers on a monthly basis,” Fipps said. “Our test results are showing that if you do that, you’ll do better than most of the smart controllers.”

“Smart controllers are a growing industry; when we first started these studies there were only five smart controllers, and now we’re up to 11 actively marketed in Texas,” Swanson said.

For now, homeowners can use the ET Network website ([texaset.tamu.edu](http://texaset.tamu.edu)) to help them irrigate efficiently.

“What people can do is go online to the ET Network and sign up for weekly irrigation recommendations,” Swanson said. “They can create a profile and log on weekly or however often they can, and it will say that their recommended irrigation is so many inches.”

“And they don’t need any technical information,” Fipps said. “If a homeowner is interested in having nice landscaping while conserving water, the ET Network is a great, easy tool.”

Fipps noted that if homeowners checked their irrigation run-times against the website’s recommendations just once this summer, their water conservation could be greatly improved.

Homeowners also need to watch out for irrigation system installers who offer low bids but poorly designed plans, Fipps said.

“In the design and installation process, I’d say the biggest mistake consumers make is going for the lowest bid, without finding out why that bid is lower,” he said. “Generally it’s because the installers are doing things they shouldn’t be doing—stretching the spacing of the sprinklers, not designing the system properly, having too small a pipe size. The consumer should ask questions and compare the plans of several bidders.”

In addition to poor system design and maintenance, the biggest problems they see are systems that are simply set to run too long, Fipps said.

To avoid this, homeowners can have irrigation audits done on their systems. Auditors can find the problems in home systems and help program them to conserve more water. Fipps said that some cities offer irrigation auditing services.

### Educating auditors

The importance of these irrigation auditors has not gone unnoticed at Texas A&M.

Fipps and Swanson help teach the Landscape Irrigation Auditing Workshop through the School of Irrigation, which is part of ITC. The school is administered through AgriLife Extension and Texas A&M’s Department of Biological and Agricultural Engineering, and has been educating irrigation professionals since it was established in 1994.

“The auditing workshop was actually the first course we ever offered through the School of Irrigation, and it’s grown since then,” Swanson said. “Now we have our own software package that students can use to collect data, and we’ve made our own Aggie Catch Can—we’ve sold over 15,000 of those across the country since they were released about two years ago.” ➡

The Aggie Catch Can, developed by the Texas AgriLife Extension Service, measures irrigation water levels. Photo courtesy of Texas AgriLife Extension Service.





The School of Irrigation provides continuing education for professionals employed by cities, school districts, parks and recreation departments, and more, Swanson said.

“With the drought, the school and our students have definitely been busy,” he said. “Many students have questions about how to schedule irrigation. At our recent San Antonio course, the day our course started was the day San Antonio started two-day-per-week irrigation limits because of the drought. So our students want to know how to create irrigation schedules that meet those requirements while also providing enough irrigation. We can help.”

### Partnering with WaterSense

After years of successful auditing workshops, participants suggested that the program offer WaterSense certification, in addition to the AgriLife Extension certification already offered, to students who fulfilled course requirements. Fipps and Swanson listened.


WaterSense is a U.S. Environmental Protection Agency (EPA)-sponsored partnership program that promotes water efficiency and market enhancement for water-efficient products, programs, and practices.

“In August 2010, we began working with EPA WaterSense,” Swanson said. “In order to meet its requirements for accreditation, we rewrote our exam to cover much more detailed topics. And, long story short, January 1 of this year we were approved as a WaterSense accredited organization.”

AgriLife Extension is one of only nine organizations in the country and the only one based in Texas to offer the EPA WaterSense label to irrigation professionals, Swanson said.

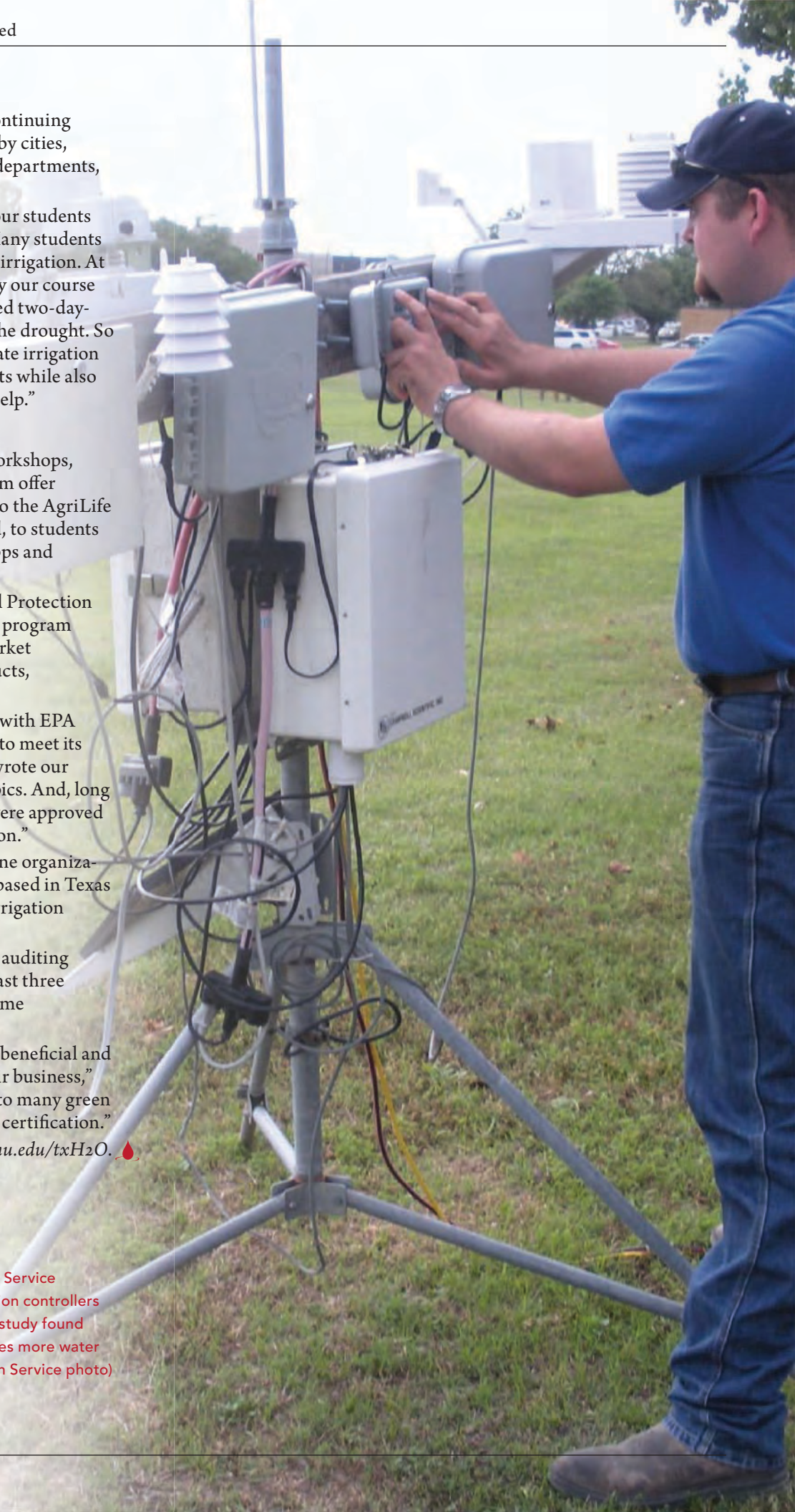
Since its certification, the irrigation auditing course has had 47 participants in the last three classes; 27 of those students have become WaterSense partners, Swanson said.

“Becoming a WaterSense partner is beneficial and helps irrigation professionals with their business,” Swanson said. “It also opens the door to many green industry jobs that require WaterSense certification.”

For more information, visit [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O). 

*Some information in this story is from AgriLife Today news releases.*

Charles Swanson, Texas AgriLife Extension Service program specialist, programs smart irrigation controllers at a College Station test site. An irrigation study found many smart controllers applied several times more water than was needed. (Texas AgriLife Extension Service photo)







# TURFGRASS

*Field to provide lab to research new technologies*

Lawn and garden scientists and specialists with Texas AgriLife Research and the Texas AgriLife Extension Service are getting a new turfgrass facility. The 50-acre turfgrass field laboratory, future home of the Scotts Miracle-Gro Lawn and Garden Research Facility, is being developed at the 600-acre Agricultural and Environmental Life Sciences Center on the Texas A&M University campus in College Station.

Dr. David Baltensperger, head of the Department of Soil and Crop Sciences, said AgriLife Research scientists and AgriLife Extension specialists from his department and from the Departments of Entomology; Horticultural Sciences; Plant Pathology and Microbiology; and Recreation, Park and Tourism Sciences will use the field lab. Much of the soil and crop sciences research will focus on how different turfgrass varieties, soil amendments, and fertilizers impact water use and water quality, he said.

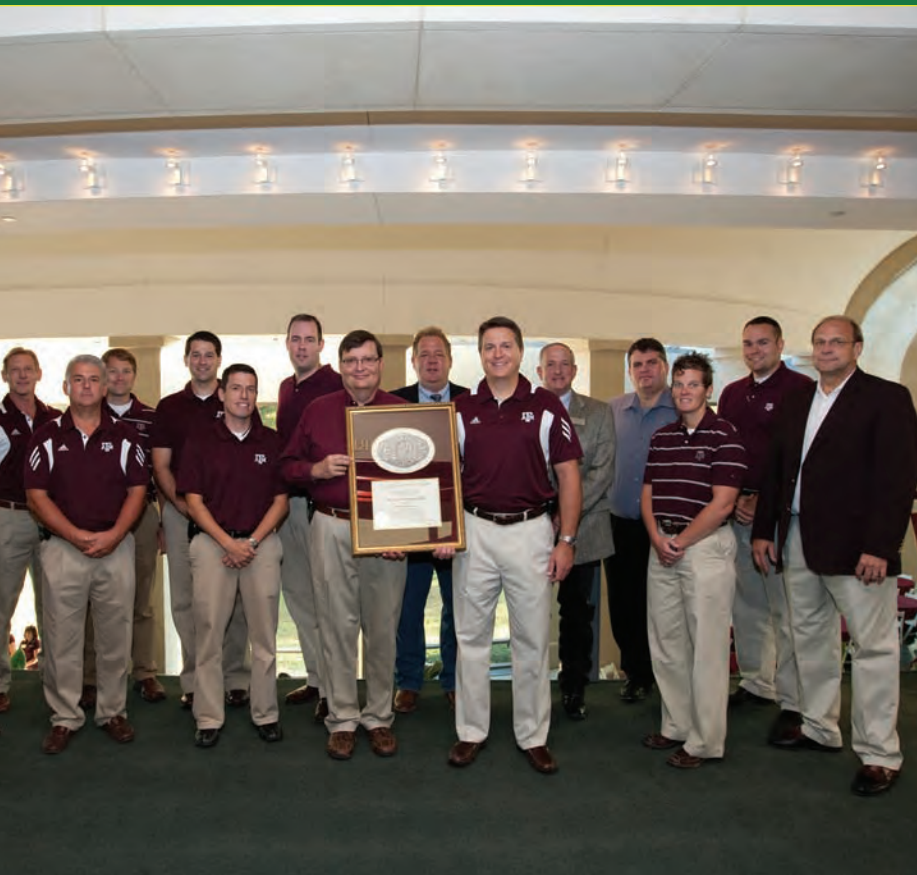
“We will be looking at many water management issues that are important in the state of Texas,” Baltensperger said. “There are no other facilities with this capacity in the world.”

Dr. Richard White, soil and crop sciences professor of turfgrass physiology and management, said some of the turfgrass research plots will replicate irrigation treatments, fertilizer treatments, or cultivation treatments to determine if any reduce water use. “We want to develop systems that contribute to reduced water consumption while maintaining healthy lawns,” he said.

One of the current projects, in collaboration with the Gulf Coast Irrigation Association and municipal water districts in northeast and northwest Houston, looks at two different grasses and three different water delivery systems. Project members will use information gained from this project to develop educational materials for that area’s home consumers, he said. ➡

Image created by  
Mary-Margaret  
Shread, AgriLife  
Communications.





(Left) Dr. Mark Hussey, vice chancellor and dean for agriculture and life sciences at Texas A&M University, and Jim Tate, Scotts Company southwest region president, are joined by others showing a recognition plaque given to the Scotts Company. Photo courtesy of Texas A&M AgriLife.

In another section of the turfgrass field, the soil and crop sciences department is establishing turfgrass plots with 24 automated water samplers collecting runoff water to measure its quality.

“When these plots are completed, we will have the most substantial capacity to look at runoff water quality for turfgrass in the world,” White said.

Ground-breaking for the Scotts facility was in February 2011. The research facility is part of a long-term agreement among Texas A&M AgriLife, the College of Agriculture and Life Sciences at Texas A&M, and Scotts Miracle-Gro.

“This partnership will not only enhance our turfgrass research efforts, but strengthen our teaching of undergraduate and graduate students,” Baltensperger said. “After graduating from Texas A&M, these students will enter the industry with first-hand experience in learning how to solve complex issues with new and innovative technologies.”

Scotts is providing \$750,000 over five years to create the research facility through the Texas A&M Foundation. A separate agreement will provide funding for developing research programs. 💧

(Right) Dr. David Baltensperger and Dr. Richard White stand in front of the future Scotts Miracle-Gro Lawn and Garden Research Facility. Photo by Leslie Lee, Texas Water Resources Institute.

*Some information in this story is from an AgriLife Today news release.*





# EL PASO LANDSCAPE PERSPECTIVE

*Researchers study water conservation, plant-tolerance, and water reuse*



Dr. Genhua Niu of El Paso is identifying drought, salt, and heat-tolerant landscape plants more suitable for El Paso's environment in her research.

The hot, dry climate and saltier water of El Paso can be a landscaper's nightmare. But scientists at the Texas AgriLife Research and Extension Center at El Paso are researching plant and turf tolerance to better adapt to this climate and saline water situation. In addition, reclaimed wastewater is being used on larger public areas as a way to reuse water resources and conserve potable, or drinkable, freshwater supplies.

Dr. Ari Michelsen, El Paso center director, recognizes the importance of water as well as managing limited water resources in El Paso's desert environment.

"Water is essential and one of the most important resources for human health, economic growth, quality of life, and environment, especially in the desert conditions of El Paso, the fifth-largest city in Texas and the 19th-largest in the United States," Michelsen said. ➡





“Landscape irrigation typically accounts for half of annual residential water use,” he said. “Finding and developing low water use, drought- and salt-tolerant plants are critical to conserving and protecting our limited freshwater supplies to ensure the sustainability of the region.”

### Home landscape water conservation

Dr. Genhua Niu, associate professor at the El Paso center, focuses her research on identifying drought-, salt-, and heat-tolerant plants that are better suited for this environment.

“There is more information available on trees and shrubs, but very limited information on herbaceous plants—annual and perennial landscape plants,” Niu said. “So I started drought-tolerant studies on herbaceous perennials including wildflowers and ground cover. Those are relatively low-maintenance and colorful landscape plants, which can save water, add to landscape appearance, and reduce costs.”

Some of the plants Niu is researching are yellow (*Achillea millefolium*), blanket flowers, lantana, honeysuckle (*Lonicera haliana*), rosemary (*Rosmarinus officinalis*), and verbena.

“I also started to include bedding plants (annuals) in our research,” she said. “We found that some bedding plants performed very well in El Paso landscapes; that is, they can handle the heat and drought. For example, angelonia, petunia, vinca, ornamental peppers, and blue plumbago are moderately tolerant to salt stress. They can be safely irrigated with municipal reclaimed water without any foliar damage, although plants would become a little compact.”

Niu is also starting to investigate garden roses, including EarthKind® and other potentially stress-tolerant rose cultivars. EarthKind® roses have not been tested in El Paso, although these varieties have been tested in most other areas in Texas.

To put the situation more into perspective, El Paso’s average rainfall is only 8 inches per year, and the area has had no significant rain since summer 2010. Therefore, not only is a very dry climate the norm, but El Paso also experienced “the driest winter we have ever had,” she said. Niu’s research is irrigating plants with varying saline

solutions and/or levels of drought to determine how the plants respond. She is also conducting research testing salt tolerance on different types and varieties of chile peppers. This research will help growers select appropriate varieties for their field and water conditions, help breeders develop improved varieties, and will result in increased yields and farm revenue.

“It’s a unique situation here because we do not have much natural rain, and we also have very limited water resources,” Niu said. “The surface water is from the Rio Grande, which is from snow melt from Colorado and is highly variable, and we have two aquifers with limited and, in many areas, poorer quality (saline) water.”

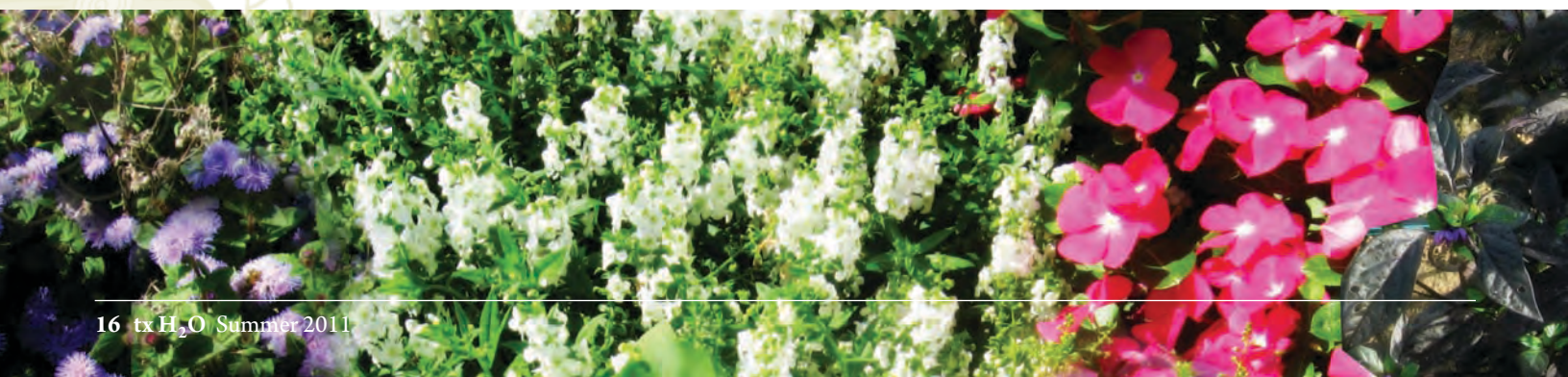
In the end, Niu said, “Everything is related to drought and salt.”

In addition to the ongoing water conservation research, in 1991 El Paso Water Utilities (EPWU) enacted the Water Conservation Ordinance that applies to anyone who uses water from the EPWU supply system. The ordinance provides mandatory year-round restrictions on certain water usages and prohibits water waste, according to the EPWU website, which makes research such as Niu’s even more applicable.

Anai Padilla, EPWU water conservation manager, said, “The ordinance is included on our overall strategic plan that includes among other things: optimization of water resources (surface water and groundwater), water conservation (supply and demand side), reclaimed water, and desalination. It has been one of the key factors in bringing our aquifer back to a sustainable level and making sure there is an ample water supply for the next 50 years before considering the importation of water.”

The ordinance includes tips for El Paso residents, such as watering landscapes based on an even and odd house number schedule and a three-day week, Padilla said.

“Many educational campaigns have been in place throughout the years, not only to introduce the ordinance, but also to provide customers with ‘how to’ tips to conserve water,” Padilla said. “In addition, El Paso Water Utilities has been successful





in establishing rebates and incentive programs to further augment conservation efforts.”

According to Padilla, the per capita water use in the 1990s was close to 200 gallons per person per day. The current per capita water use is 133 gallons per person per day.

To adjust to the climatic conditions and adhere to the city ordinance, Niu encourages homeowners to look for plants that can tolerate El Paso’s harsh environment, and particularly those that can tolerate drought, heat, and salt as well as, in the case of this past winter, cold. Plants that fit into these areas will also work into EPWU’s water conservation ordinance requirements.

### **Irrigating large green areas with reclaimed water**

Another scientist who has been involved in ongoing studies on turfgrass irrigation with reclaimed water is Dr. Seiichi Miyamoto, professor at the El Paso center. Through his and others’ efforts, both advantages and disadvantages of reclaimed water use are brought to the table for comparison.

“Reclaimed water in El Paso and elsewhere in the Southwest provides a comparatively small portion, typically no more than 5 percent to 10 percent, of the total urban water supply,” Miyamoto said. “It is not a cheap water conservation option either.”

Nonetheless, using reclaimed water instead of conventional potable water for irrigation provides direct savings of potable water, and in turn conserves water, he said.

“From the view of water users, especially those who have large areas of turf, it provides a stable water supply at a discounted price,” Miyamoto said. “The stable supply becomes a huge advantage during drought when outdoor water use has to be curtailed.”

In spite of these advantages to both water providers and large water users such as parks, schools, and athletic fields, he said irrigation with reclaimed water caused some initial confusion. “The most widespread problem was plant-leaf damage in broad leaf trees and ground cover caused by overhead sprinkling.


“Plant leaves absorb salts when sprinkled. We developed a list of plants that are sensitive to this form of damage. We also found that this form of salt injury is relatively easy to correct through conversion to under-canopy sprinklers, drip, or bubbler irrigation systems.”

The second type of damage, which Miyamoto said is much more limited, is plant growth reduction as a result of salt accumulation in soils. “This problem occurs mainly in sports turfs located on certain soil types. We are currently investigating the soil types that are prone to salinization, and cost-effective ways to reduce this form of salt problems.”

When the public looks at and compares landscapes irrigated with reclaimed water versus potable water, he said usually no one can tell the difference until they are told which is which. However, landscapes developed in poorly permeable soils or landscapes with broadleaf trees and ground cover irrigated with overhead sprinklers are an exception.

“There are greater differences in landscape quality among those irrigated with either potable or reclaimed water,” Miyamoto said. “This usually means that soil and landscape types, plant and irrigation system selection, soil preparation, and management practices play a dominant role in controlling quality of landscapes.”

The bottom line, Miyamoto said, is irrigation with reclaimed water works when water users want to make it work.

Niu, Miyamoto, and other scientists from the El Paso center have published many articles, papers, and fact sheets on their research and results thus far as well as lists of native, tolerant plants, trees, and shrubs. Some of this research is supported by the Rio Grande Basin Initiative, administered through Texas Water Resources Institute and funded by the U.S. Department of Agriculture’s National Institute of Food and Agriculture. Publications, fact sheets, and other information can be found at [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O) or [elpaso.tamu.edu/research/landscape.php](http://elpaso.tamu.edu/research/landscape.php). For information on EPWU ordinances and programs, visit [www.epwu.org/](http://www.epwu.org/). 





# Rainman

*Renowned rainwater harvester Billy Kniffen may be retired, but he's not slowing down anytime soon*



One week after his official retirement from the Texas AgriLife Extension Service on April 30, Billy Kniffen could be found crisscrossing the United States—bringing rainwater harvesting education and systems to organizations in Arizona, North Texas, Kansas, and Georgia.

“I don’t know yet what retirement is,” Kniffen said. “Last week was my first week of retirement, and I spent almost all of it shoveling, digging holes, and setting up irrigation systems.”

Since 2008, Kniffen served as AgriLife Extension’s statewide water resource specialist, focusing on rainwater harvesting. Prior to that, he had been an AgriLife Extension agent in South and Central Texas since 1982. In addition to his service with AgriLife Extension, Kniffen has been a director and education coordinator for the American Rainwater Catchment Systems Association (ARCSA) and helped organize the Texas Rainwater Catchment Association, serving as its first president.

“I worked with ARCSA to develop an accredited professional educational program through which we’ve taught 2,000 people across the nation over the last five years,” Kniffen said.

The recipient of a Texas A&M University System Board of Regents Fellow Service Award in 2006 and a 2010 Vice Chancellor’s Award in Excellence in the technical/Extension support, off-campus category, Kniffen’s name has become synonymous with rainwater harvesting implementation and education. He and his wife, Mary, live in Menard in a home solely dependent upon harvested rainwater for drinking and other household and landscape water needs.



Kniffen said he first started working with rainwater harvesting as an Extension agent in Hays County, where he often worked with water-minded San Marcos residents. Fast forward a couple of decades, and teaching rainwater harvesting has taken Kniffen all over the nation.

"I've been to every corner," Kniffen said, "Hawaii, Maine, the Florida Keys, north of Seattle, all the way down to Los Angeles, and lots of places in between."

"The need is the same everywhere I go—we've got to protect our water supply now and for future generations."

After years of teaching rainwater harvesting, Kniffen recently has been developing more educational tools to teach users how to maintain, repair, and inspect their systems.

"An important part of our inspection and design course is teaching users how to develop an operations manual for that particular system so that they'll know what the parts are, how to maintain the system, and how to fix it if something goes wrong," he said. "That education is something that's not being done effectively enough right now, so that's what I'll be doing."

With drought affecting much of Texas, Kniffen said that interest in rainwater harvesting from industry, various levels of government, and homeowners is increasing.

"The industry is booming, and education has got to keep up," Kniffen said. "I'm very fortunate to be in the position I am to help shape that process. I don't want us to wait until the well runs dry to realize how important our water supply is."

Kniffen remembers water quantity affecting his life, even at a young age.

"In 1957, I was 7 years old, and our neighbor's well went dry," he said. "I went over there, and he had me get in the bucket and lowered me down, and I scooped mud out of it for several hours. And this drought is just as serious."

"I think drought is a time when people are awakened to water issues," he said. "They see how quickly the lake can go dry, how fast that aquifer can drop. Because of drought, interest in rainwater harvesting is very high right now, and decision makers are more receptive to implementing these practices."

Even with the drought, Kniffen's rainwater-sustained home is going to be just fine, he said.

"At my house in Menard, we have enough water stored to last for about eight more months, even if it doesn't rain at all," Kniffen said. "Of course, I hope it does rain, but it's great to be able to teach that the process works, even when rainfall is way below normal."

Water needs in other parts of the world are also of growing interest for Kniffen. He recently gave a rainwater harvesting workshop for Healing Hands International, an organization that provides medical supplies and assistance around the globe, and is working on other international opportunities.

"It's been an honor to serve in Extension," Kniffen said. "My future is looking about like my past—I will continue moving rainwater harvesting forward, professionally here in the United States, as well as helping to provide precious water around the world."

For more information, visit [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O). 



Left: Billy Kniffen travels around the country, teaching people to make rain barrels for rainwater harvesting. Photo by Leslie Lee, Texas Water Resources Institute.

This page: Billy Kniffen demonstrates how a simple wildlife water trough can be made and connected to a rain barrel. Photo by Leslie Lee, Texas Water Resources Institute.





# PLAYING IT SAFE

*Program improves quality of athletic fields and parks*

Who knew that water conservation and athletes' safety were interconnected? Since 1997, the Sports Athletic Field Education program (SAFE) has been evaluating athletic fields and parks across Texas to determine ways to make them safer and more water-efficient.

A program of the Texas AgriLife Extension Service, the SAFE program offers turfgrass management assistance to sports field maintenance personnel who want to maintain the highest quality fields through proper irrigation. Initial funding for the program was provided by the Rio Grande Basin Initiative through the Texas Water Resources Institute.

Ron Leps, former AgriLife Extension agent for Williamson County, created the concept for the program in 1997 with the help of Ron Woolley, now regional program director of Agriculture and Natural Resources for AgriLife Extension, said Dr. James McAfee, associate professor and Extension

turfgrass specialist at the Texas AgriLife Research and Extension Center at Dallas.

"Currently approximately 50 counties are participating in the SAFE program," McAfee said.

The program worked well with the comprehensive water legislation Texas Senate Bill 1, which was passed in June 1997 around the same time the SAFE program began, McAfee said. According to the Texas Water Development Board's website, "This comprehensive water legislation enacted by the 75th Texas Legislature was an outgrowth of increased awareness of the vulnerability of Texas to drought and to the limits of existing water supplies to meet increasing demands as population grows."

Irrigation, fertilization, mowing practices, aerification, and water conservation are examined during the audit process. If necessary, a soil sample is taken to determine soil pH, nutrient availability, and problems such as salinity or sodium, McAfee said.

Participants in the El Paso County SAFE program tour an athletic field.

The city of El Paso has the most active SAFE program in the state. Photo by Ray Bader, Texas AgriLife Extension Service.





"The key aspect is water conservation," he said. "It is important to look at the field and see if there is anything that would prevent water from moving off the field. Athletic fields are seeing a 34 percent savings on water after participating in the program."

Besides improving the quality of the field, McAfee said that the program also improves its safety.

"One of the major causes of player injuries is excess hardness of the playing surface," he said. "Getting the schools or city parks staff to aerate their fields on a regular basis will significantly reduce the hardness of the playing surface. Also, with improved cultural practices, the fields develop a much denser stand of turfgrass, which adds some cushion to the field surface."

"In the past, one of the main methods used to soften the field was applying excess water, which was one of the main causes of over-irrigation of these sports fields," McAfee said.

The program has expanded in recent years to include city parks. "When we audit parks, we look at weed problems, compaction, and irrigation issues," he said.

There is no charge for the service. The program asks participants to implement the recommendations and display a sign that shows the city or school is participating in the educational program.

McAfee said the program has been a success so far and hopes to one day expand it to include home lawns.

The city of El Paso is the most active participant in the program. Dr. Ray Bader, county Extension


director for El Paso County, brought the program to El Paso in 1999.

"In the beginning, we worked with one school district and one school," Bader said. "It grew from there, and now four independent school districts' athletic fields are a part of the program, along with the El Paso City Parks and Recreation Department."

Originally, Bader conducted the audits himself, but a few years into the program the Texas A&M School of Irrigation began training personnel from the school districts, parks, and water utilities service to be certified landscape irrigation auditors.

"By participating in the SAFE program, you are using your resources responsibly and efficiently," he said. "You are using all the information you have, such as soil type, turf type, soil tests, irrigation audit, compaction, and field use to build the management plan specific to the field so there is no guesswork involved."

Participants in the El Paso County SAFE program have found a great deal of community pride in these good quality playing fields, Bader said. "For example, one of the school districts' athletic directors showcased the field crew at the halftime of a football game and presented them with a certificate as the crowd gave them a standing ovation."

"I feel that the SAFE program is vital for our water issues," Bader said. "It is an appropriate program for not just the El Paso area but all others, especially at this time when using resources more efficiently is important, as well as making sure students and residents have the use of good quality playing fields." 







# FAREWELL TO A WATER RESOURCES LEGEND

*B.L. Harris retires after more than 10 years with the Texas Water Resources Institute*





**A**fter 10 years with the Texas Water Resources Institute (TWRI), Dr. B.L. Harris is retiring to spend more time traveling with his wife, seeing their family (mainly the grandkids), working in the yard, and seeking new opportunities to make every drop count.

Harris, a native Texan and soil scientist, joined TWRI in 2001, bringing with him 27 years of experience in soil science, agriculture, and natural resources with the Texas Agricultural Extension Service (now the Texas AgriLife Extension Service) and Texas Agricultural Experiment Station (now Texas AgriLife Research). Harris earned a bachelor's degree in agronomy and a master's degree in soil science from Texas Tech University, and a doctorate in soil mineralogy from The Oregon State University. He joined the faculty of The Texas A&M University System in 1974 from the faculty at Oregon State.

"I have known Dr. Harris since my original date of employment in January 1979; he was project leader for the soils group in my department at that time, and I was in the crops group," said Dr. Travis Miller, professor, Extension program leader, and associate head for the Department of Soil and Crop Sciences. "I have known Dr. Harris as an Extension project leader, Extension soils specialist, Texas Agricultural Extension Service associate director for Ag and Natural Resources, associate director of TWRI, director of TWRI, friend, and confidant."

Since 2001, Harris has provided management and leadership for the institute, serving as associate director from 2001–2009 with Director Dr. Allan Jones and acting director from 2009–2011. In addition, he has been project director for the Rio Grande Basin Initiative for the 10 years of the project, and an integral part in numerous other water quality and conservation projects.

"Bill developed a massive network of state and federal leaders along with commodity groups and water-related organizations, which positioned TWRI as a go-to place related to addressing water issues," said Dr. Ron Lacewell, assistant vice chancellor for Federal Relations, associate director of Texas AgriLife Research, and professor in the Department of Agricultural Economics.

"With similar interests related to agriculture, we began to work jointly on projects reaching all the way back to the 1970s," Lacewell said. "Bill had the science and relationships across Texas to bring to the economic models and evaluations, making for a strong program."

Through these networks, Harris and Lacewell put together program ideas addressing many of Texas' most critical water issues and presented these to funding agencies and legislative staff to try to bring new funds and projects to TWRI. Once those projects were received, management, reporting, and accomplishments and accountability were equally important to him.

"His tenure at TWRI has resulted in huge accomplishments: Rio Grande Basin, Arroyo Colorado, Seco Creek, Seymour and Ogallala aquifers, Buck Creek, Fort Hood, Dairy Composting in North Central Texas, and many others," Miller said. "Not only have these huge projects made measurable impacts on water and environmental quality in many areas of the state, but he has developed highly competent and competitive teams that will continue to expand on this legacy. Bill has made an exceptional impact on TWRI and the water programs in Texas and the United States."

From developing state and federal initiatives to providing input on strategic planning, Harris has positioned priority water issues within the focus of state and federal agencies. He has also served as the liaison with other units of the Texas A&M System and with other universities and agencies across Texas and the nation.

From 2001 to 2011, under Harris' direction, TWRI developed and submitted 371 individual proposals for water projects, most with TWRI as lead and some that TWRI facilitated. Of those submitted proposals, 232 were funded, amounting to \$77 million. In conjunction with those proposals, TWRI funded about 175 faculty members per year in 15 different Texas A&M System departments and in 16 universities in Texas and four other states. During the same time period, TWRI also provided about \$500,000 in scholarship support to almost 250 students throughout the state who were studying water resources-related fields. At any point in Harris' ➡

Dr. B.L. Harris enjoys nature in the flower garden at his home. Photo by Danielle Kalisek, Texas Water Resources Institute. Photo manipulation by Mary-Margaret Shread, AgriLife Communications.





time, TWRI administered more than 90 active projects focused on timely responses, outcomes, and accomplishments.

Former TWRI director Jones, now associate director and professor at the Texas AgriLife Research and Extension Center at Dallas, said, "Bill has been responsible for much of what went on with TWRI in the past 10 years. To a large degree, he stayed under the radar by not wanting credit, but the numbers speak for themselves in terms of funding. He deserves a lion's share of the credit for any and all of those accomplishments.

"And, in spite of all the efforts of Harris and Lacewell to support their Texas Tech alma mater, we were able to resist giving too much money to Texas Tech," Jones said in jest. "They are both distinguished alumni of Texas Tech and have official red and black ribbons to put around their necks."

He added that Harris' success in bringing in more than \$77 million in grants and contracts can be "blamed" for creating a lot of work for other people within TWRI and the university. Those who have received these "opportunities" from Harris know all too well his expectation to deliver more than promised, yet this is what makes his programs so successful.

Harris was also integral in tying TWRI with the Texas AgriLife Extension Service.

"Prior to Bill, TWRI had fewer connections with Extension," Jones said. "However, his past Extension background and contacts allowed us to greatly improve that relationship, and now we go through AgriLife Extension for outreach, demonstration, and dissemination projects."

Harris was instrumental in broadening the relationship with Texas A&M's Zachry Department of Civil Engineering as well. "Bill's efforts to bring Dr. Ralph Wurbs to TWRI as a part-time associate director created opportunities for AgriLife to work more closely with civil engineering and its excellent hydrologists and environmental engineering faculty," Jones said.

Harris not only worked with faculty within the A&M System, but served on committees for numerous graduate students as well. He has also helped many new, young faculty to get established within the university through project opportunities.

"Dr. Harris has served on student graduate committees from the beginning of our relationship, bringing his unique perspective to the analysis," Lacewell said. "Although we developed strong respect for the contribution of each, and certainly there was an improved product by working together, it was always an unknown what off-the-wall question he might throw at students in orals,

making them think beyond themselves. I view this as a major contribution in the growth of students."

Harris' numerous accomplishments have also led to several awards recognizing his efforts and impacts. He received the Epsilon Sigma Phi Retiree Service Award in 2007, the Texas Tech University Distinguished Alumnus Award in 2003, the Extension Administration ANR Program Leadership Contributions Award, the Associate Department Heads and Extension Program Leaders Leadership Award, the Extension Specialists Association Distinguished Service Award, and the Texas Agricultural Lifetime Leadership Award for Assistance.

"Bill has also played a big part in the Texas Commission on Environmental Quality's Texas Environmental Excellence Awards," Jones said. "He was responsible for helping develop the proposals for several TWRI projects, which then led to these projects being finalists and/or winning the prestigious award. These awards brought further recognition to AgriLife projects and accomplishments as well as to the funding agencies."

TWRI project participants received Texas Environmental Excellence Awards in 2006 as winner for the Fort Hood federal initiative project, in 2007 as finalist and 2008 as winner for the Rio Grande Basin Initiative federal initiative, in 2009 as winner for the Rainwater Harvesting Team Task Force, and in 2011 as finalist for the Arroyo Colorado Watershed Partnership.

Through all of his efforts, Harris is recognized as someone who can get the job done.

"He can cut through the undergrowth to identify the critical problems, he is on a first-name basis with those that can do something about it, and he has an uncanny ability to find funding sources to put money into the hands of teams to get the work done," Miller said. "In short, he has blazed the trail for practical, applied projects with direct impact on our natural resources and upon our stakeholders. Generations of Texans will benefit due to his leadership."

The words of the song "What I Like about Texas" by Gary P. Nunn may describe Harris' dedication and vast coverage of the state best:

You ask me what I like about Texas.  
I tell you it's the wide open spaces!  
It's everything between the Sabine  
and the Rio Grande.  
It's the Llano Estacado,  
It's the Brazos and the Colorado;  
It's the spirit of the people who  
share this land!





During his retirement “free-time,” Dr. B.L. Harris will continue being a good steward of water by using his harvested rain water for irrigating his landscape and garden. Photos by Danielle Kalisek, Texas Water Resources Institute. Illustration by Mary-Margaret Shread, AgriLife Communications.



Besides developing proposal ideas and projects, Jones credits Harris with creating the institute's communications team.

“The whole TWRI Communications Team as it is today—Kathy Wythe, Danielle Kalisek, Courtney Smith, Leslie Lee, and Melanie Orth—was put in place by Bill,” Jones said. “He saw the need to better communicate our project outcomes and accomplishments, and therefore continued to develop this team throughout the years as TWRI grew, to disseminate our results to wider audiences. He also worked with the team to develop the concept of this magazine, *txH<sub>2</sub>O*, and made sure it stayed up and running and the communications kept flowing. I still know nothing about how he and the communications team does all of that!”

Now that Harris is retiring, Jones feels sure that his legacy will continue.

He adds, jokingly, “We’re sure that after retiring twice, if he comes back for a third stint, he will convince the federal government to divert the Mississippi River to refill the Ogallala Aquifer.”

While Harris is dedicated to water resources, he knows how to take some time to relax as well.

“The professional side of Bill Harris is impressive, and his contributions will endure,” Lacewell said. “But there is another side that is equally impressive. With Janie, his better half, they have a wonderful extended family with close ties to the community and the church.”

He said in the 1970s, soccer was first introduced to Bryan. As it turns out, two young Harris boys and one young Lacewell boy were on that team. So for the first year of the formal soccer league, Harris and Lacewell were coaches of a team, which then extended over many years.

“Bill, as a coach, was balanced and treated all the kids with respect, allowing everyone to play,” Lacewell said. “Winning was the goal, but a greater goal was for the kids to have fun, learn about fair play, and how to follow rules.

“I consider Bill as a dear friend that began early in our careers,” Lacewell said. “It is far more than the professional relationship but one of respect and trust—a valuable attribute to cherish forever.”

His staff at TWRI is very thankful for the many “opportunities” Harris has provided for them, making the institute and each person individually successful. His extensive knowledge, kindness, and respect for his employees and others have been greatly appreciated, and TWRI looks forward to continuing to build upon the programs Harris began. 💧





# WILKINS BECOMES DIRECTOR OF WATER INSTITUTE

*Editor's Note: Dr. Bill Harris, acting director of the Texas Water Resources Institute since 2009 and previously the institute's associate director for eight years, announced his retirement, effective Aug. 31, 2011. Dr. Neal Wilkins, director of the Texas A&M Institute of Renewable Natural Resources, assumed leadership over both institutes as of June 1, 2011.*

*Dr. Neal Wilkins, director of the Texas A&M Institute of Renewable Natural Resources, is also now director of the Texas Water Resources Institute. Photo by Danielle Kalisek, Texas Water Resources Institute.*

Changes are under way for the Texas Water Resources Institute (TWRI) and the Texas A&M Institute of Renewable Natural Resources (IRNR), both part of Texas AgriLife Research and the Texas AgriLife Extension Service—changes that will make the achievements of each even better, according to the new director of the two institutes.

IRNR's Director Dr. Neal Wilkins became director for TWRI as of June 1. Wilkins said he looks forward to leading the two institutes and believes together the two institutes will continue to increase the successes that they had separately.

"Both institutes have historically been successful in carrying out their respective mandates to enhance water and natural resources in the state," Wilkins said. "I expect that the core functions and missions of both institutes will continue much as they have been and be enhanced following this action."

Wilkins sees the next few months as a transition time as the institutes' personnel develop closer working relationships.


"We look forward to continuing service to our stakeholder clientele in collaboration with university faculties and agencies across the state and beyond," Wilkins said.

Before becoming director of the IRNR in 2006, Wilkins served as associate head of the Department

of Wildlife and Fisheries Sciences at Texas A&M University and was statewide program leader for wildlife and fisheries with AgriLife Extension. He joined Texas A&M in 1998 as an assistant professor, then became an associate professor and professor in the wildlife and fisheries sciences department. He also served as wildlife specialist for AgriLife Extension.

Prior to joining Texas A&M, Wilkins was the wildlife and fisheries program manager for Port Blakely Tree Farms, a forest landowner in the Pacific Northwest. He directed the wildlife and fisheries program across 150,000 acres of private forestlands in Washington and Oregon, and 40,000 acres of forest plantation in New Zealand.

Wilkins currently serves as vice president for the Texas Wildlife Association and is a professional member of the Boone & Crockett Club. He is a Governor appointee to the Texas Farm and Ranchlands Conservation Council and serves on the Board of Trustees for the Foundation for Economics and the Environment, Texas Wildlife Association Foundation, and Houston Wilderness.

Wilkins earned a bachelor's degree in forestry at Stephen F. Austin State University, his master's degree in wildlife and fisheries sciences at Texas A&M, and his doctorate in wildlife ecology at the University of Florida. 



# promoting safety, security, and sustainability

*Institute fosters programs on natural  
resource science and management*

Through its research and extension programs focusing on natural resource science and management, the Texas A&M Institute of Renewable Natural Resources (IRNR) protects and promotes the safety, security, and sustainability of land, water, and wildlife. IRNR, a unit of Texas AgriLife Research and the Texas AgriLife Extension Service, conducts interdisciplinary research and technology transfer, policy and economic analysis, and engagement with land managers and policymakers.

Many of the institute's land projects are science-based programs and demonstration projects that promote sustainable land use through stewardship practices, land-use forecasting and policy, restoration ecology, and ecosystem services. Involved in working on landscape-scale restoration projects, IRNR developed the Trinity River Information Management System (TRIMS). TRIMS provides landowners, stakeholder organizations, and the public with an outreach and planning tool for supporting land conservation and habitat restoration decisions in the Trinity River Basin.

IRNR's water projects encourage secure and sustainable water resources for humans and wildlife through watershed restoration, conservation, and policy innovations. IRNR, AgriLife Extension, the Texas Water Resources Institute, the Texas Wildlife Association, and Trinity Waters have a joint project that engages and educates middle Trinity landowners about improving the river and its ecosystems.

The institute's wildlife programs promote sustainable wildlife, including game, nongame,

and endangered species, through demographic and spatial modeling, impact assessments, and monitoring protocols. In addition, IRNR works to solve problems with policy innovations concerning endangered species, including the Edwards Aquifer Recovery Implementation Program—a collaborative, consensus-based stakeholder process working to protect federally listed endangered species potentially affected by the management of the aquifer. Other efforts include a Recovery Credit System developed for endangered species, such as the golden-cheeked warbler and the black-capped vireos.

IRNR has a strong history of working with military lands and land-use compatibility with military training. Currently, the institute is working with the military on land management and training on Fort Hood and on a regional readiness cooperative program. It also offers a web-based graduate certificate program in military sustainability that provides an understanding of how ecology, economics, policy, and culture influence natural resource conservation and management on military lands.

Along with its main office in College Station, IRNR has satellite offices in Gatesville and San Antonio. The Gatesville office addresses programmatic needs in Central Texas, including support for Fort Hood and work along the Leon River. The San Antonio office supports the ongoing Edwards Aquifer program, endangered species recovery, and expands efforts in military land sustainability.

For more information about IRNR, visit its website at [irnr.tamu.edu](http://irnr.tamu.edu).





## 14th International SWAT Conference in Spain draws large crowd

The 2011 International SWAT Conference drew nearly 200 attendees from 37 countries. More than 130 oral and poster presentations were given on the Soil and Water Assessment Tool (SWAT), a river basin-scale computer model developed to quantify land management practices in large, complex watersheds.

The public domain model, jointly developed by U.S. Department of Agriculture's Agricultural Research Service (USDA-ARS) and The Texas A&M University System, is widely used in hydrology and water quality assessment.

SWAT is used to simulate the quality and quantity of surface water and groundwater and predict the environmental impact of different land management practices. SWAT is used in soil erosion prevention and control, nonpoint source pollution control, and regional management in watersheds.

The conference, held June 15-17 at the University of Castilla La Mancha in Toledo, Spain, was the 14th international SWAT conference. Included were presentations on SWAT developments, climate change applications, environmental applications, and new model develop-

ments. More than 65 attendees participated in three SWAT workshops before the conference.

"The worldwide SWAT users' community has continued to contribute research and help improve the SWAT model through applications and issues resulting from those applications," said Dr. José María Bodoque del Pozo, environmental science faculty member at the University of Castilla La Mancha, in his welcoming address.

Dr. Raghavan Srinivasan, director of Texas AgriLife Research and Texas A&M University's Spatial Sciences Laboratory and member of the SWAT development team, said, "I strongly believe that these conference gatherings will continue to serve as a positive opportunity for our international research community to share the latest innovations developed for SWAT."

SWAT developer, Dr. Jeffrey Arnold, an agricultural engineer at the USDA-ARS Grassland Soil and Water Research Laboratory in Temple, said these conferences also offer networking experiences for fellow scientists and students around the globe. "It's a chance for SWAT users to meet and exchange research and seek advice on model issues," he said.

Conference participant Christine Kuendig, a doctorate student at Eawag, Swiss Federal Institute of Aquatic Science and Technology in Switzerland, is using SWAT to research the impact of the relationship between sub-basin scale and climate stations resolution in the Rhine River Basin in Western Europe.

"Some presentations and subsequent discussions at the conference provided helpful insights, which I can relate to my own research, namely the importance of the representation of climate data on smaller scales in contrast to my large-scale study area," she said.

Natalia Uribe Rivera, a hydrologic modeler at the International Center for Tropical Agriculture in Colombia, said this was her second international SWAT conference and she appreciated the increased number of attendees from South America.

"The conference was excellent, and I met participants from my continent and communicated in regards to current SWAT applications in South America," Rivera said.

Conference presentations, photos, and more information can be found at <http://swatmodel.tamu.edu/conferences/2011>. Video presentations will be available in August.



The Rainwater Harvesting Task Force Team comprised of Justin K. Mechell, Billy A. Kniffen, and Dorothy Woodson, Department of Biological and Agricultural Engineering; Jim C. Cathey, Department of Wildlife and Fisheries Sciences; Monty C. Dozier, regional program director for Agriculture and Natural Resources; and John W. Smith, Department of Soil and Crop Sciences, won the 2010 Vice Chancellor's Award in Excellence in the Extension Education and Service team category. Dr. Mark Hussey, vice chancellor and dean for Agriculture and Life Sciences, presented the award to (left to right) Dozier (also accepting the award on behalf of Kniffen), Mechell (also accepting the award on behalf of Cathey), Woodson and Smith. Photo by Chandler Arden, Chandler Arden Photography.



The Arroyo Colorado Watershed Partnership was a finalist in the 2011 Texas Environmental Excellence Award in the pollution prevention category. Presented annually by the Governor of Texas and the Texas Commission on Environmental Quality (TCEQ) commissioners, the Texas Environmental Excellence Awards spotlight the state's highest achievements in environmental preservation and protection. Allen Berthold, Texas Water Resources Institute project manager, and Jaime Flores, Arroyo Colorado Watershed Partnership watershed coordinator, represented the partnership at the awards banquet in May. Shown left to right are: TCEQ Commissioner Buddy Garcia, Chairman Bryan Shaw, Berthold, Flores, and Commissioner Carlos Rubinstein. Photo courtesy of TCEQ.

## BST conference set for February 2012

The Texas Water Resources Institute, the Texas State Soil and Water Conservation Board, and Texas AgriLife Research are hosting the 2012 Bacterial Source Tracking—State of the Science Conference Feb. 28–29, 2012, at the T Bar M Resort and Conference Center in New Braunfels.

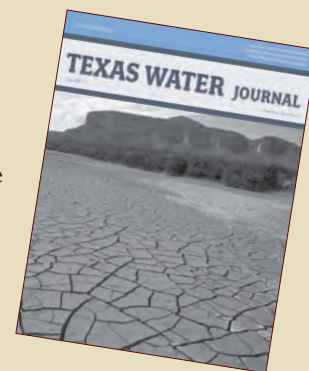
Speakers at this one-and-a-half-day conference will discuss bacterial source tracking (BST) and its application regarding current practices, scientific advances, and improvements in application.

Nonpoint sources (NPS) of pollution greatly affect water quality, with bacteria being a serious concern. Identifying and assessing sources of fecal pollution are vital in effectively implementing a NPS pollution management program. BST helps identify the source of bacterial pollution.

For more information on the conference, visit [texasbst.tamu.edu](http://texasbst.tamu.edu).

## New issue of water journal available online

The newest issue of the *Texas Water Journal* (TWJ) is available online at [texaswaterjournal.org](http://texaswaterjournal.org). More articles will be added to the issue in the coming months. TWJ is an online, peer-reviewed journal devoted to Texas water resources management and policy issues from a multidisciplinary perspective that integrates science, engineering, law, planning, and other disciplines. The new issue will also include summaries of recent key state legislation related to water.





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