

Conservation Matters

THE TEXAS LAND, WATER AND WILDLIFE CONNECTION

A publication of the Texas Water Resources Institute and the Texas A&M Institute of Renewable Natural Resources

[Finch named director of Water Conservation and Technology Center](#)



Dr. Calvin Finch was recently named the director of the [Water Conservation and Technology Center](#) (WCTC) in San Antonio. Administered by the Texas Water Resources Institute (TWRI) in partnership with the Texas Center for Applied Technology (TCAT), the WCTC is developing projects focused on high priority water issues in Texas.

"I look forward to being involved in directing and developing this center," Finch said. "As the 2011 drought has shown, the urgency and importance of water conservation and technology advancement cannot be underestimated or ignored.

"Applied research and education are an essential part of Texas making the state water plan a reality," Finch said. "With the creation of the Water Conservation and Technology Center, the Texas A&M system is stepping forward to play a leadership role in addressing the challenges of having adequate future water supplies for Texas. I am pleased to be a part of that effort."

Neal Wilkins, TWRI director, said Finch has extensive experience in water conservation issues, not only in San Antonio but throughout Texas. "And with the relationships he has developed in his work through the years, Calvin is the ideal person to lead the center in developing and testing innovative water conservation technologies," he said.

"His knowledge and understanding of priority Texas water issues along with his leadership in obtaining numerous grants and projects are assets he will bring to the center," said **Cindy Wall**, TCAT executive director.

Finch has been involved in Texas water conservation efforts for 22 years, most recently as director of regional initiatives and special programs, director of water resources and director of conservation for the [San Antonio Water System](#) (SAWS). He was responsible for obtaining the water resources necessary for meeting the water needs of San Antonio, a community of 1.2 million people growing at the rate of 3 percent per year.

He also directed the system's water conservation education and rebate programs, including the Community Challenge Program that enlisted nonprofits to convert 25,000 high water use toilets to high efficiency toilets a year. He served as SAWS's representative on the [Edwards Aquifer Recovery Implementation Program](#) that recently completed a habitat conservation plan to manage water use from the Edwards Aquifer and protect the endangered species at the Comal and San Marcos Springs.

Finch was formerly county extension director for Travis County and county extension agent for horticulture for Texas Agricultural Extension Service (now the Texas AgriLife Extension Service) for Bexar County.

Finch writes a horticultural and environmental column for the San Antonio Express-News and other suburban papers in the San Antonio area and appears frequently in local television and radio broadcasts.

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Finch received his doctorate in horticulture from Texas A&M in College Station and his masters in agriculture from Stephen F. Austin University in Nacogdoches.

Texas AgriLife Research, the Texas AgriLife Extension Service, Texas Engineering Experiment Station and Texas A&M University-San Antonio are collaborating on the development of the WCTC.

The center will target its work on four high priority efforts: water conservation, water reuse, groundwater desalination and energy development and water use. Its staff will conduct applied research and development; testing and validation; technology transfer; and training and extension education, Finch said. Currently located at the Texas Engineering Extension Service's South Presa campus in San Antonio, the center will move to the Texas A&M-San Antonio campus in the future.

[Dunes sagebrush lizard not listed as an endangered species](#)



The U.S. Fish and Wildlife Service (USFWS) has [announced](#) that the dunes sagebrush lizard will not be listed under the Endangered Species Act. USFWS credited the decision to voluntary conservation agreements now in place in New Mexico and Texas that provided for long-term conservation of the lizard.

Earlier this year, USFWS [approved](#) the Texas Conservation Plan for the Dunes Sagebrush Lizard, a voluntary species conservation plan spearheaded by Texas Comptroller [Susan Combs](#) with the help of stakeholders representing landowners, the oil and gas industry, agriculture and state and federal agencies. You can view [more information about the plan](#) and how it will affect landowners, on the Texas Comptroller's website.

"This is a great example of how states and landowners can take early, landscape-level action to protect wildlife habitat before a species is listed under the Endangered Species Act," said Secretary of the Interior **Ken Salazar**, in a [press release](#). "The voluntary conservation efforts of Texas and New Mexico, oil and gas operators, private landowners and other stakeholders show that we don't have to choose between energy development and the protection of our land and wildlife—we can do both."

State-led voluntary conservation efforts to protect existing shinnery oak dune habitat and greatly reduce the impact of oil and gas development across the species' range now cover over 650,000 acres in New Mexico and Texas, totaling 88 percent of the lizard's habitat, according to the Department of the Interior.

"The states of New Mexico and Texas have worked tirelessly with the Fish and Wildlife Service, the Bureau of Land Management (BLM) and scores of landowners and operators in the Permian Basin to conserve and protect habitat that supports the dunes sagebrush lizard and many other species," said USFWS Director **Dan Ashe**.

The Endangered Species Act requires that listing decisions be based solely on the best available science. A species is listed as endangered when it is threatened with extinction through all or a significant portion of its range.

Since proposing the rule to list the lizard in December 2010, USFWS has received new information provided by the BLM and Texas A&M University that has enabled refined mapping of suitable and occupied shinnery oak dune habitat in New Mexico and Texas and identified more known occupied sites for the lizard, especially in Texas, according to USFWS.

USFWS biologists' analysis of the scientific data and the protections provided by the voluntary conservation efforts determined that the lizard is no longer in danger of extinction nor likely to become endangered in the foreseeable future.

"This is a major victory for Texas jobs and our energy economy," Combs said in a [press release](#). "Working with energy producers and other stakeholders, we were able to enroll nearly 250,000 acres in West Texas as part of the Texas Conservation Plan. This decision proves we don't have to choose between the environment and our economy, but can be good stewards of both. Energy exploration is the economic lifeblood of West Texas, and I am delighted we were able to come up with a creative solution that protects paychecks, property rights and jobs."

According to USFWS, they will closely monitor the conservation measures to ensure they are being implemented and effectively address identified threats. USFWS can reevaluate whether the lizard requires Endangered Species Act protection.

For more information on the dunes sagebrush lizard, see the [USFWS web page](#) for the species.

[Wilkins receives Patriotic Employer Award](#)



Dr. Neal Wilkins, [Texas A&M Institute of Renewable Natural Resources](#) director, recently received the Patriotic Employer Award from [The National Committee for Employer Support of the Guard and Reserve](#). Wilkins was nominated by **Clay Thompson**, an institute employee and a member of the Air National Guard.

The Employer Support for the Guard and Reserve is a volunteer organization of the U.S. Department of Defense. The annual award is given to recognize employers and supervisors who provide outstanding support for their employees who are members of the Guard and Reserve, according to **George Dresser**, Area 14 chairman of the Texas committee of the organization.

[Texas Watershed Planning Short Course to be held Sept. 24-28 in Bandera](#)



The Texas Water Resources Institute (TWRI) will present a five-day [Texas Watershed Planning Short Course](#) **Sept. 24-28** in Bandera. The course will be held at the Mayan Dude Ranch, 350 Mayan Ranch Rd., about 47 miles northwest of San Antonio.

"Voluntary, locally led watershed protection plans are one of the primary methods being used to restore Texas surface waters," said **Kevin Wagner**, an associate director at TWRI and course leader.

Wagner said this is one of the few courses in the country that builds upon the nine essential elements for watershed planning as identified by the U.S. Environmental Protection Agency (EPA).

"People attending this course will come out better prepared to develop watershed protection plans according to EPA guidelines," he noted.

In addition to EPA's nine elements, the course provides watershed coordinators and water resource professionals with guidance on stakeholder coordination, education and outreach; data collection and analysis; and the tools available for plan development. This information is presented through lectures and case studies, Wagner said.

Wagner added that the Texas State Soil and Water Conservation Board and the Texas Commission on Environmental Quality (TCEQ), the two state agencies responsible for Texas' water quality, are financing the creation of more than a dozen watershed protection plans statewide.

Upon completion, participants will receive continuing education units from the National Registry of Environmental Professionals.

Course registration is \$350 if postmarked by **Aug. 10** and \$375 until **Sept. 18**.

A block of rooms at the Mayan Dude Ranch has been reserved at a special rate of \$121 per night, which includes all meals and lodging, but reservations must be made by **Sept. 18** to receive this special rate. Participants are asked to identify themselves as short course attendees when making reservations.

The upcoming short course is the sixth such program to be held in Bandera. The course is funded by TCEQ and EPA.

For more information on the course, registration and lodging, go to watershedplanning.tamu.edu or contact Wagner at klwagner@ag.tamu.edu or **Courtney Smith** at courtneysmith@ag.tamu.edu.

[Water Assistantship recipient to work with Center for Invasive Species Eradication](#)

The [Texas Water Resources Institute](#) (TWRI) has selected Texas A&M University graduate student **Elizabeth Edgerton** as the 2012-2013 recipient of the institute's new [Water Assistantship Program](#). She will work closely with the institute's [Center for Invasive Species Eradication](#) and other statewide efforts to evaluate invasive aquatic species threats in Texas.

Edgerton will compile current resources on status and trends of aquatic invasive species in Texas, begin identifying potential aquatic invasive species, begin assessing threats/risk for expansion of invasive aquatic species currently present in Texas, and initiate development of a priority list of species of concern and needed action.

Hailing from San Antonio, Edgerton received her bachelor's degree in environmental studies from Baylor University in 2010. Prior to joining TWRI, she was an intern and subsequently an environmental investigator with the [Texas Commission on Environmental Quality](#). Her primary focus as an investigator was air quality; however, she also has experience with water quality and waste management issues. She is currently a graduate student at Texas A&M, earning her master's degree in the [Department of Wildlife and Fisheries Sciences](#).

The Water Assistantship Program is in partnership with the Department of Wildlife and Fisheries Sciences and is funded by the U.S. Geological Survey and by Mills Scholarship funds.

[New feral hog online resource provides multi-state expertise](#)

The [Texas AgriLife Extension Service](#) has partnered with other land-grant university Extension entities and agencies to launch an important new resource, the [Feral Hog Community of Practice](#), part of eXtension.org.

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"This new resource area on eXtension.org will concentrate on the control, adaptive management, biology, economics, disease risks and human interface relating to feral hogs across the U.S.," said **Dr. Jim Cathey**, AgriLife Extension wildlife specialist who has lead this effort for the past year.

To use the site, go to extension.org/feral_hogs.

"Through this community of practice, experts from across the nation will produce and convey critical information to the public about feral hogs through web-based resources," said Cathey. "We're providing these resources through eXtension.org, an interactive learning environment that delivers objective, well-researched knowledge from some of the best minds within the nation's land-grant university system."

Cathey said a community of practice is typically a multi-institutional, multi-state and multi-disciplinary group of professional educators with expertise in a subject matter area who join together to bring the best and most timely educational resources to the public.

"For the past year, our group has been developing educational resources for feral hog management and now those resources can be viewed by the general public," Cathey said. "And while some of these resources are targeted toward the feral hog situation in Texas, other resources are specific to feral hog management in partnering states."

Cathey said the website includes many creative resources aimed at the public and natural resource professionals.

Read the full [AgriLife TODAY article](#) for more information.

[Researcher says lessons from the Ogallala could help save Mexico's Calera Aquifer](#)

Dr. Francisco Mojarro, a researcher from the Autonomous University of Zacatecas in Mexico, is trying to find a way to save the Calera Aquifer, which is located in central Mexico. The most valuable source of drinking water in the region, the aquifer's continuous exploitation and low recharge rate is causing the groundwater level to decline at an unsustainable rate, Mojarro said.

"It is clear that the solution to arrive at sustainable exploitation of the Calera Aquifer will require more than switching to a better irrigation system and crops with lower water requirements," said Mojarro at a **June 22 seminar** on the Texas A&M University campus.

Mojarro used the [Soil and Water Assessment Tool](#) (SWAT) to assess the vulnerability of the aquifer and simulate different water conservation scenarios.

Mojarro has been working with scientists in the USDA Agricultural Research Service's [Ogallala Aquifer Program](#) since 2007 to design water-conserving scenarios for the Calera Aquifer. "We used the Ogallala platform because there are many similarities between the aquifers," Mojarro said.

The Calera and Ogallala aquifers have similar hydrologic characteristics, and their water is used in similar ways, Mojarro said. Just like in the Ogallala, most of the water pumped from the Calera Aquifer--approximately 80 percent--is used to irrigate crops, and 13 percent is used to provide drinking water to urban centers, including Zacatecas, the capital of the state of Zacatecas.

According to CONAGUA, the Mexican Water Commission, the Calera Aquifer is being depleted at a rate of 0.4 to 1.5 meters per year. Additionally, only 3 percent of the water used is recharged to the aquifer. These conditions create a negative balance in the water budget.

One of the conservation scenarios discussed by Mojarro consists of changing from low-efficiency irrigation systems, such as furrows, to high-efficiency irrigation systems, such as sprinklers and drip irrigation. Another scenario consists of changing the types of crops grown in the region, from red beans, chile and garlic to canola and other crops with lower irrigation requirements.

But switching to high-efficiency crops and irrigation systems is not enough, Mojarro said. To conserve the maximum amount of water in the aquifer, he suggested that some crops, such as corn and beans, be replaced with native grasses. According to Mojarro, the benefits of a change in land use from agriculture to rangeland will include a reduction of surface runoff and erosion and an increase in water recharge.

Mojarro said that the next step in the project involves farmers in the Calera Aquifer region using a technology used in the Ogallala region. "Each farmer who has a cell phone will receive a message telling him how much water to apply depending on the type of crop," he said.

The seminar, "A Decision Support System for the Sustainability of the Calera Aquifer in Zacatecas, Mexico," was jointly hosted by the [Texas Water Resources Institute](#) and the Texas A&M [Department of Biological and Agricultural Engineering](#).

Watch the [seminar on YouTube](#).

[Prescribed burn workshop scheduled for August in Sonora](#)

The [Academy for Ranch Management](#) will conduct a prescribed burn workshop at the Texas AgriLife Research Station near Sonora **Aug. 2-4**. The station is located on State Highway 55 between Sonora and Rocksprings.

The Academy for Ranch Management is associated with the [Center for Grazing and Ranch Management](#) at the [Department of Ecosystems Science and Management](#) at Texas A&M University in College Station. The academy's primary goal is training ranchers for effective rangeland management, and the focus is now on prescribed burning for rangelands, said **Ray Hinnant**, a Texas AgriLife Research senior research associate in College Station and a workshop presenter.

Prescribed burning is a tool that can be used to manage rangeland vegetation for livestock and wildlife use and also reduce the risk of catastrophic wildfires by removing hazardous fuel loads.

"2011 was one of the worst wildfire seasons in our recent past," Hinnant said. "Nearly 4 million acres of rangeland and forest burned, and over 3,000 homes were lost. Prescribed burning has the potential to significantly reduce hazardous fuels and catastrophic losses due to wildfires."

The Prescribed Burning School is a basic course providing information on fire, weather, planning a burn, fuels and fuel moisture, and equipment needed for a controlled burn, he said. An Advanced Prescribed Burning School will be held **March 7-9, 2013**. Successful completion of both courses and a passing grade on a comprehensive exam will provide the educational component to begin application to become either a private or commercial certified prescribed burn manager, he said.

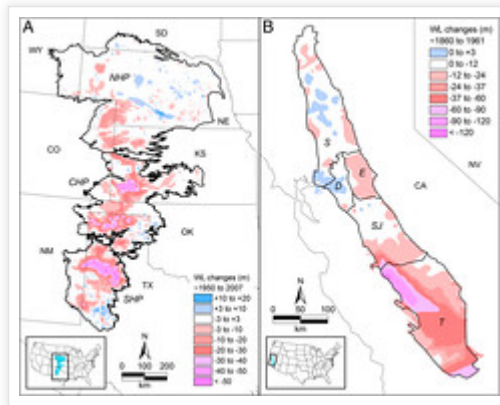
The fee for each workshop is \$395 and includes meals and on-site lodging. The basic course is a prerequisite for the advanced course. For more information call Hinnant at 979.820.1778, and to register, call **Cheryl Yeager** at 979.820.1778.

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or visit ranchmanagement.org to download the registration form.

Read the full [AgriLife TODAY article](#) for more information.

[UT research shows groundwater depletion in Texas, California threatens food security](#)



The nation's food supply may be vulnerable to rapid groundwater depletion from irrigated agriculture, according to a new study by researchers at [The University of Texas at Austin](#) and elsewhere.

The study, which appears in the journal *Proceedings of the National Academy of Sciences*, paints the highest resolution picture yet of how groundwater depletion varies across space and time in California's Central Valley and the High Plains of the central U.S. Researchers hope this information will enable more sustainable use of water in these areas, although they think irrigated agriculture may be unsustainable in some parts.

"We're already seeing changes in both areas," said **Bridget Scanlon**, senior research scientist at The University of Texas at Austin's [Bureau of Economic Geology](#) and lead author of the study. "We're seeing decreases in rural populations in the High Plains. Increasing urbanization is replacing farms in the Central Valley. And during droughts some farmers are forced to fallow their land. These trends will only accelerate as water scarcity issues become more severe."

According to the researchers, three results of the new study are particularly striking: First, during the most recent drought in California's Central Valley, from 2006 to 2009, farmers in the south depleted enough groundwater to fill the nation's largest man-made reservoir, Lake Mead near Las Vegas—a level of groundwater depletion that is unsustainable at current recharge rates. Second, a third of the groundwater depletion in the High Plains occurs in just 4 percent of the land area. And third, the researchers project that if current trends continue some parts of the southern High Plains that currently support irrigated agriculture, mostly in the Texas Panhandle and western Kansas, will be unable to do so within a few decades.

For various reasons, Scanlon and other experts don't think available engineering approaches will solve the problem in the High Plains. When groundwater levels drop too low to support irrigated farming in some areas, farmers there will be forced to switch from irrigated crops such as corn to non-irrigated crops such as sorghum, or to rangeland. The transition could be economically challenging because non-irrigated crops generate about half the yield of irrigated crops and are far more vulnerable to droughts.

"Basically irrigated agriculture in much of the southern High Plains is unsustainable," said Scanlon.

For more information, read the complete [UT news release](#) on the study.

[TWRI grant recipient compares water efficiency of various landscapes](#)

In the first year of a 5-year study, [Sam Houston State University](#) graduate student **Rebecca Hammond** found landscapes containing a greater proportion of woody plants use more water, while mostly turf landscapes used less. She also found turf will leach more water underground and can help recharge aquifers.

A native of Coldspring, Texas, Hammond received a 2011-2012 Texas Water Resources Institute (TWRI) [research grant](#). With the \$5,000 research grant Hammond is working with her advising professor **Dr. Tim Pannkuk** to determine the amount of water used by different combinations of landscape plants.

According to Hammond, approximately 30 percent of the potable water available in Texas is used to irrigate landscapes. What she finds unacceptable is that water used in irrigation is lost as it runs down sidewalks and streets. "One can only hope that the potable water that is now runoff finds soil and is absorbed," she said.

Knowing which landscape combinations need less water or leech more water underground is important given the severe drought the state has experienced.

"Most people take it for granted that you can walk up to a faucet in your house and turn it on, knowing that water will come out," Hammond said. "That will not be the case in the future if water is continuously pumped out from its source without being replenished."

Hammond said the city of Huntsville, Texas, will use the results she has gathered so far to create a water ordinance and general guidelines for irrigation.

"I hope a light is shined on the misuse of our potable water," she said. Hammond said water districts can use the results of her investigation to create and maintain a water conservation program.

She said she hopes that environmentally conscious landowners will use her results to make better decisions about landscaping and water use.

Hammond suggested that people who want to install a landscape should research the plants conditioned for their area and talk with a landscape designer. "What works in North Texas will not work for southern Texas landscapes," she said.

Her research is funded by TWRI through funds obtained from the U.S. Geological Survey (USGS) as part of the [National Institutes for Water Research](#) annual research program. TWRI is the designated institute for water resources research in Texas.

[Climate change will alter wildfire risks around the world, says TTU study](#)

A Texas Tech climate scientist said climate change is widely expected to disrupt future fire patterns around the world, with some regions, such as the western United States, seeing more frequent fires within the next 30 years.

In the study published in *Ecosphere*, an open-access, peer-reviewed journal of the [Ecological Society of America](#), researchers used 16 different climate change models to generate one of the most comprehensive projections to date of how climate change might affect global fire patterns.

[Katharine Hayhoe](#), director of the Climate Science Center at Texas Tech and co-author of the study, was part of a team led by researchers at the University of California, Berkeley, in collaboration with an international team of scientists.

"Most of the previous wildfire projection studies focused on specific regions of the world or relied upon only a handful of climate models," said Hayhoe, also an associate professor. "Our study is unique in that we build a forecast for fire based upon consistent projections across 16 different climate models combined with satellite data, which gives a global perspective on recent fire patterns and their relationship to climate."

By the end of the century, almost all of North America and most of Europe is projected to see a jump in the frequency of wildfires, primarily because of increasing temperature trends. At the same time, fire activity could actually decrease around equatorial regions because of increased rainfall, particularly among the tropical rainforests.

"In the long run, we found what most fear—increasing fire activity across large parts of the planet," said lead author **Max Moritz**, a fire specialist in UC Cooperative Extension. "But the speed and extent to which some of these changes may happen is surprising. These abrupt changes in fire patterns not only affect people's livelihoods, but also they add stress to native plants and animals that are already struggling to adapt to habitat loss."

The projections emphasize how important it is for experts in conservation and urban development to include fire in long-term planning and risk analysis, Moritz said, who is based at UC Berkeley's College of Natural Resources.

Read the complete [TTU news release](#).

[Advanced water rights workshop to be held in August](#)



The [Texas Water Resources Institute](#) will host an advanced [Water Rights Analysis Package workshop](#) **Aug. 30-31** at the Spatial Sciences Laboratory on the Texas A&M University campus. WRAP is a generalized modeling system for simulating the development, management, allocation and use of the water resources of a river basin.

The Texas Commission on Environmental Quality's Water Availability Modeling (WAM) System consists of this modeling system, along with input data sets for all river basins of Texas, said instructor **Dr. Richard Hoffpauir**, a research engineering consultant for the Texas Engineering Experiment

Station in College Station.

Hoffpauir said the workshop will cover advanced aspects of the Water Rights Analysis Package, or WRAP, related specifically to simulations using daily time steps.

"The course will focus on the daily-time step simulations with WRAP and will include computer modeling exercises," Hoffpauir said. "The course will cover WRAP topics of an intermediate to advanced level. Course participants are expected to have proficiency with the monthly time-step features of WRAP."

He said the course is designed for engineers and scientists employed by water agencies and consulting firms. Hoffpauir said participants will gain a thorough understanding of the modeling system features that are pertinent to building daily time step input data, selecting simulation parameters and analyzing simulation output.

Continuing Education Units (CEUs) will be awarded for completion of the course. For more information or to register, visit naturalresourcestraining.tamu.edu.

[National eXtension Conference coming to Oklahoma City this fall](#)

Extension professionals are invited to the [National eXtension Conference](#), to be held **Sept. 30-Oct. 5** in Oklahoma City. The conference's theme is "Spur on the Evolution of Extension," and it will include sessions on social media, eval

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innovative education techniques, and more. Conference registration is \$300 before **Sept. 1** and \$350 thereafter, and travel scholarships are available.

[eXtension](#) is an interactive online collaborative environment where Land Grant University content providers exchange objective, research-based knowledge in real time. Covering topics ranging from family caregiving to oil spills to pest management, information on eXtension's website is designed for the general public and to complement the community-based [Cooperative Extension System](#).

More information, including hotel and transportation options, is available on the conference website: nexc2012.extension.org.

[Extension offering wide variety of summer workshops, training opportunities](#)

[Texas AgriLife Research](#) and the [Texas AgriLife Extension Service](#) are hosting the following upcoming educational programs.

- [Range and Pasture Program](#): **July 2** at the Brown County Fairgrounds in Brownwood.
- [65th Annual Beaumont Field Day - Texas Rice Challenges and Solutions](#): **July 12** at the Texas AgriLife Research and Extension Center at Beaumont.
- [Wildlife, Range Workshop](#): **July 16** at the Dink Wardlaw Ag Complex in Del Rio.
- [Rolling Plains Summer Crops Field Day](#): **July 17** at the Texas AgriLife Research Chillicothe station, south of Chillicothe.
- [Small Poultry Flock and Vegetable Gardening Seminar](#): **July 20** at the Kosse Community Center in Kosse.
- [Small-scale Poultry Production Workshop](#): **July 27** at the Embassy Suites San Marcos Hotel, Spa and Conference Center in San Marcos.
- [Cattle Trails Wheat and Stocker Cattle Conference](#): **July 31** at the MPEC Center in Wichita Falls.

[Water, environment focus of new Soil and Crop Sciences Department curriculum](#)

The curriculum of the Texas A&M University [Department of Soil and Crop Sciences](#) is about to change with the times and place more emphasis on water and environmental issues, said **Dr. Jim Heilman**.

Heilman is a professor of environmental physics who chaired the curriculum committee. The committee's three-year review and assessment process has resulted with changes that will be implemented this fall, as well as others that will go before the Board of Regents and the Texas Higher Education Board for approval.

"The first thing we needed to do was determine what knowledge and skills our graduates should have," Heilman said. "We created external panels outside the Texas A&M University System--from academia, industry and government agencies. That reduced imposing our biases."

With about 100 panelists providing input, he said information was gathered to create learning outcomes that describe what graduates should be able to do when they get out, such as data analysis, communication and working collaboratively.

"And then these learning outcomes were used as a basis for developing new courses and revising existing courses," Heilman said. "We are eliminating courses and replacing them with new ones. The total number of courses didn't change that much, but the structure of the courses has changed."

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"We've designed our courses to first introduce learning outcomes, then be followed by courses that reinforce the learning outcomes, and then the students will go to capstone courses designed to demonstrate mastery of the skill—problem-solving and creative thinking," he said. "They will be studying real-world problems and coming up with creative solutions."

The new curriculum will involve less lecturing and more lab and field instruction, which will create both challenges and excitement among professors and students, Heilman said.

"Our new degree programs will be a bachelor's of science in plant and environmental soil science, which is an existing degree we've modified," he said. "And we are awaiting approval of a new degree, a bachelor's of science in turfgrass science."

For more information, read the full [AgriLife TODAY article](#).

[AgriLife Research: Rolling Plains groundwater nitrate concentrations are increasing](#)



Nitrate is a major contaminant and threat to groundwater quality in Texas and around the U.S., so knowing where this chemical tends to pool will be a help in controlling potential damage, according to a [Texas AgriLife Research](#) study.

Dr. Srinivasulu Ale, AgriLife Research geospatial hydrologist at Vernon, and his post-doctoral research associate, **Dr. Sriroop Chaudhuri**, completed a study of groundwater nitrate concentrations in Texas and recently had their results published in the [Journal of Environmental Quality](#).

The research paper was co-authored by **Dr. Paul DeLaune**, AgriLife Research environmental soil scientist, and **Dr. Nithya Rajan**, AgriLife Research agronomist, both at Vernon.

Results indicated that groundwater nitrate concentrations have significantly increased in several Rolling Plains counties since the 1960s. In 25 counties, more than 30 percent of the groundwater quality observations exceeded the U.S. Environmental Protection Agency maximum contamination level for nitrate in the 2000s as compared to eight counties in the 1960s, they said.

"This suggests that more counties in the state are getting affected by high nitrate levels in the groundwater over time," Ale said.

This groundwater, if used for irrigation without accounting for the high nitrate concentration and domestic purposes, could have serious environmental and health implications, he said. Ingestion of high nitrate groundwater can cause methemoglobinemia, commonly known as "blue baby syndrome," in infants less than six months of age.

Although earlier studies reported high levels of nitrate, exceeding the maximum contaminant level for drinking water, in different parts of Texas, a comprehensive statewide assessment of the groundwater nitrate contamination over a longer time period was lacking, Ale said.

"We assessed 50 years (1960 to 2010) of groundwater nitrate data, as available from the Texas Water Development Board, and employed different statistical and geospatial techniques to study long-term trends in groundwater nitrate contamination across Texas," Ale said. "We also identified the major factors affecting nitrate contamination."

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Read the full [AgriLife TODAY article](#) for more information.

[New Projects](#)

New TWRI/IRNR Projects

Translocation of Mussels from the San Saba River

In Texas, there is presently little guidance on methods for relocation projects or for monitoring the subsequent long-term status of the relocated mussels. To date, the handful of relocation projects conducted within the state offer very little data to evaluate the effectiveness of mussel relocation techniques. The exception may be a small relocation study being performed by Texas A&M Institute of Renewable Natural Resources (IRNR) on the San Marcos River. Results from this study will help confirm whether or not relocation is a viable conservation tool when mussels are relocated to suitable habitat already containing existing mussel aggregations.

Principal Collaborators: Institute of Renewable Natural Resources, Texas AgriLife Research, Texas Department of Transportation

Funding Agency: Texas Department of Transportation

Freshwater Mussel Survey (Family: Unionidae) of Allens Creek and the Lower Brazos River

The status and distribution of the mussel fauna in the lower Brazos River basin is largely unknown. Therefore, the purpose of this study is to begin evaluating the current distribution of mussels in this basin by comprehensively surveying Allens Creek and the Brazos River from RM 125 to RM 59. In addition, this study will collect and develop habitat criteria for mussels inhabiting the lower Brazos, which can then be used in combination with hydraulic modeling results to determine whether the Allens Creek project will negatively impact freshwater mussel habitat.

Principal Collaborators: Institute of Renewable Natural Resources, Texas AgriLife Research

Funding Agency: Texas Water Development Board

Freshwater Mussel Survey (Family: Unionidae) of the Lower Sabine River Between River Mile 100 to River Mile 10

Given the limited knowledge of unionid abundance and distribution in this drainage and the potential impacts of impoundment release on downstream mussel communities, the purpose of this study is as follows: 1) to provide a better understanding of the distribution of mussels downstream of impoundments and 2) to identify the impacts, if any, associated with impoundment release on mussel distributions in the lower Sabine. Emphasis will be placed on providing information that will inform instream flow analysis and recommendations.

Principal Collaborators: Institute of Renewable Natural Resources, Texas AgriLife Research

Funding Agency: Texas Parks and Wildlife Department

Freshwater Mussel (Family: Unionidae) and Benthic Macroinvertebrate Data Collection in the Middle and Lower Brazos River

The purpose of this study is to examine the effects of subsistence and high pulse flows on freshwater mussel populations in the lower and middle Brazos River. This information is important because two Texas state threatened species, *Quadrula houstonensis* and *Truncilla macrodon*, inhabit this portion of the Brazos (Randklev et al. 2010), and both of these species are being considered for protection under the Endangered Species Act (USFWS 2009).

Principal Collaborators: Institute of Renewable Natural Resources, Texas AgriLife Research, Te

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and Wildlife Department, Texas Water Development Board

Funding Agency: Texas Parks and Wildlife Department

[New Publications/Papers and Training Courses](#)

New TWRI and IRNR publications

[Arroyo Colorado Agricultural Nonpoint Source Assessment Final Report](#), **A. Berthold**, Texas Water Resources Institute, TR-429.

[Evaluation of Smart Irrigation Controllers: Year 2011 Results](#), **C. Swanson, G. Fipps**, Texas Water Resources Institute, TR-428.

[SWAT Modeling of the Arroyo Colorado Watershed](#), **N. Kannan**, Texas Water Resources Institute, TR-426.

[Evaluation of Electrostatic Particle Ionization and BioCurtain Technologies to Reduce Dust, Odor and other Pollutants from Broiler Houses](#), **S. Jerez, S. Muhktar, W. Faulkner, K. Casey, S. Borhan, A. Hoff, B. VanDelist**, Texas Water Resources Institute, TR-415.

[Approaches to Watershed Planning in Texas](#), **A. Berthold**, Texas Water Resources Institute, EM-112.

[Best Management Practices \(BMPs\) and Water Quality Parameters of Selected Farms located in the Arroyo Colorado Watershed](#), **A. Berthold**, Texas Water Resources Institute, EM-113.

[Bacteria and Surface Water Quality Standards](#), **A. Berthold**, Texas Water Resources Institute, EM-114.

New Extension publications

[Making a Rain Barrel](#), **Brent Clayton, Billy Kniffen, Dotty Woodson**, Texas AgriLife Extension Service L-5518, 2012 (reprint).

[Keys to Managing Poultry Litter](#), **Monty Dozier, Daren Harmel**, Texas AgriLife Extension Service E-318.

Natural Resources Training Courses

2012 International SWAT Conference	July 16–20
Texas Watershed Coordinator Roundtable	July 26
Advanced River/Reservoir Modeling with WRAP Workshop	Aug. 23–24
Advanced River/Reservoir Modeling with WRAP Workshop	Aug. 30–31