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Conservation Matters

THE TEXAS LAND, WATER AND WILDLIFE CONNECTION

IRNR joins partnership to establish the Center for Private Land Stewardship

The Texas A&M Institute of Renewable Natural Resources (IRNR) recently joined with the Samuel Roberts Noble Foundation and the East Foundation to form the Center for Private Land Stewardship (CPLS).

The three entities signed a memorandum of understanding on **Feb. 3**.

Dr. Roel Lopez, IRNR director, said the center is designed to fill critical research, extension/teaching, and policy needs to further a vision of private land stewardship.

The center will be the hub of education for private landowners and the public, according to a Noble Foundation news release. Through activities such as land use forecasting, experiential learning, professional training and policy innovations, the center will communicate and demonstrate the value of proper stewardship of private lands.

"Nothing is more critical to the future of agriculture and society than the stewardship of our land resources," Lopez said. "Our agricultural producers and land managers do an excellent job safeguarding this resource. However, CPLS will offer them more resources, practical tools to help handle the problems they encounter, while also bringing vital education to the public so they too are energized toward the cause of stewardship."

The CPLS will also conduct research on land use changes and other drivers affecting private lands, Lopez said.

"Big movements begin with small moments," said **Bill Buckner**, president and chief executive officer of the Noble Foundation, in the foundation's news release. "By signing this memo, our three organizations are committed to advancing private land stewardship and integrating the interest of landowners with community well-being."

Dr. Neal Wilkins, East Foundation president, said CPLS will continue to grow, forming collaborative relationships with other like-minded organizations to further address regional and national stewardship issues.

"The work of private landowners in conserving natural resources is increasingly important," Wilkins said. "We expect that the three organizations starting this effort will soon be joined by others who also understand private land stewardship."

How drought-tolerant are Central Texas' favorite landscape plants?

Does a tough modern rose really need 4 inches of water a month to survive a drought? Can a plant bounce back after an entire growing season without rain?

A group of Central Texas entities is hoping to find these and other answers by analyzing popular local landscape plants in a drought-survivability study.

The Texas A&M Institute of Renewable Resources (IRNR), Texas A&M AgriLife Research, San Antonio Water System (SAWS), San Antonio River Authority (SARA) and the cities of Austin and Georgetown recently launched a one-year study. The study will examine 100 of the most popular Central Texas landscape plants to determine the minimum amount of water required by the plants to survive and recover after a drought.

Dr. Calvin Finch, urban water program director for IRNR, and **Dr. Raul Cabrera**, AgriLife Research associate professor in Uvalde, are the lead researchers for the study. The study is being conducted at the existing SAWS drought simulator and a new drought simulator in Georgetown, when it is completed.

“The study consists of 1,600 plants that will be subjected to four different drought treatments: no water, and 20 percent, 40 percent and 60 percent of potential evapotranspiration (PET) to determine the actual amount of water they require to survive,” Finch said. “One hundred percent of PET is the estimated amount of water moving through the plant and from the soil based on the weather conditions.”

“Studied plants that decline will then be restored to full irrigation to see if and how long it takes them to recover,” he said.

Cabrera said an analysis of data from metered-water use by single-family residences in Texas indicates that about 31 percent of their annual water consumption is for outdoor uses, mostly landscape irrigation.

“If these plants can survive on less water than commonly thought, the water savings could be significant,” Cabrera said.

Karen Guz, SAWS’ conservation director, said they are looking forward to having objective results to reference when working with customers.

“This study will allow us to quantify how our most beautiful landscape plants can retain quality appearance with very little water,” Guz said. “Our similar study from 2006 confirmed that grass can survive on very little water. This study will show that not only can some of the most attractive shrubs and blooming plants survive drought, they can look great.”

SARA’s Director of Technical Services **Steven J. Raabe** said the authority is “particularly interested in plants that are suitable for low impact development applications like rain gardens and bioswales, which alternate between wet and dry conditions.”

“If the study shows that many of the plants can prosper on less water than is currently recommended, water purveyors, such as the partners in this study, and landscapers will have more accurate information on water needs to use in landscape planning, plant marketing, water demand estimates and drought restrictions,” Finch said.

SAWS, SARA and the cities of Georgetown and Austin are funding the study. The Texas Water Foundation is serving as the funding coordinator.

For more information, contact Finch at 210.277.0292, ext. 207, or calvin.finch@tamu.edu.

Meet IRNR associate director Brian Hays

From Texas A&M AgriLife Extension Service extension assistant to associate director of the Texas A&M Institute of Renewable Natural Resources (IRNR), **Brian Hays** has made a career of promoting natural resource stewardship.

Today, Hays works to ensure that IRNR is fulfilling its mission to reach out to and educate landowners about natural resources. To accomplish this, he helps with project management, collaborates with the

institute's partners and seeks funding opportunities for IRNR's programs, he said.

After receiving his bachelor's and master's in rangeland ecology and management from Texas A&M University, Hays' enthusiasm for land stewardship led him to AgriLife Extension.

In 1998, Hays joined the Department of Rangeland Ecology and Management Extension Program Unit, now the Department of Ecosystem Science and Management, focusing on rangeland and watershed management. Three years later he began working on grassland restoration and upland game bird management in the Department of Wildlife and Fisheries Sciences Extension Program Unit. And in 2006, Hays joined IRNR as an Extension program specialist.

Hays has helped guide and implement many of IRNR's programs, including the Texas Conservation Plan for the Dunes Sagebrush Lizard, Recovery Credit System and the Prescribed Burn Alliance of Texas.

Through his Extension experience, Hays grew to appreciate the role that landowners play in conservation. "If you look at a state like Texas, which is 94 percent privately owned, you've got to be able to work with landowners to solve natural resource concerns," he said.

Much of Hays' work focuses on market-based conservation programs, which provide landowners with monetary or technical incentives to implement conservation practices. Market-based conservation answers the question, "How can you turn what a landowner may perceive as a liability into an asset?" he said.

While it may be a challenge to meet both the needs of the environment and landowners, Hays said that keeping landowners involved in the planning process of conservation efforts helps create a successful plan. The goal is to develop voluntary programs that benefit both landowners and natural resources, such as wildlife, he said.

"I get to attend a lot of meetings and conferences with our external stakeholders," Hays said. "So, I can see where they're having issues or where there are opportunities for us to develop Extension programs to help answer their questions."

The newest IRNR project that Hays is looking forward to is the development of the Center for Private Land Stewardship, which will support research and provide technical and educational resources to private landowners. After months of collaborating with the East Foundation and the Samuel Roberts Noble Foundation, a memorandum of understanding was signed between the three organizations to establish the center earlier this month. (See "IRNR joins partnership," also in this issue of *Conservation Matters*.)

The center will support private land conservation and its benefits to water, air and wildlife, Hays said. "I think the center has a tremendous opportunity to become the go-to place for natural resource information."

What Hays finds most rewarding about being associate director is how close it has kept him to his Extension roots, working with landowners and stakeholders to facilitate conservation. "I really enjoy educating landowners and providing them that information that will help them better manage their rangeland and wildlife resources," he said.

TWRI grant recipient quantifies horizontal well cost-benefit, creates new models

Constructing a water well begins with making several design decisions, including whether to drill the well horizontally or vertically. **Ben Blumenthal**, former Texas Water Resources Institute (TWRI) research assistant, investigated the use of horizontal drilling technology for groundwater production and developed mathematical models that simplify that decision-making process.

“Horizontal wells are very advantageous for petroleum production, as evidenced by their widespread use; the question going into this study was what benefits, if any, exist for groundwater production,” said Blumenthal, who graduated in December 2014 with a Master of Science degree in Geology from Texas A&M University. His research was supported by TWRI, with Mills Scholarship and U.S. Geological Survey grant funds.

Blumenthal researched the utility of horizontal groundwater wells, developed new models for groundwater flow to horizontal wells and completed a cost-benefit analysis.

“The main advantage of a horizontal well is greater wellbore contact with the aquifer when compared to a vertical well,” Blumenthal said. “Aquifers are usually much more laterally extensive than vertically thick.”

“For example, an aquifer might extend 10 feet vertically but 100 miles laterally. For this hypothetical aquifer, with a vertical well you are limited to 10 feet of wellbore-aquifer contact. However, with a horizontal well you are limited only by the horizontal drilling capabilities, perhaps 5,000 feet of wellbore-aquifer contact.”

To investigate horizontal wells’ possible production advantages, Blumenthal developed a new type of groundwater flow model. His computer model rigorously models the wellbore, taking into account friction and acceleration pressure loss within the well, he said.

“My model is an analytical model, or a ‘plug and play’ model; you can enter your information, press play and you’re done,” he said. “If you just want to sit down at your desktop and figure this out in an hour or so, my model can run many different simulations in that amount of time.”

This model is a good starting place for professionals considering drilling a horizontal well, he said, but it can also be used to simulate any kind of well – vertical, slant or horizontal. The model has a graphical user interface that is easy to use, but is also thorough, Blumenthal said.

“I designed it so that it could run on anyone’s computer,” he said. “And, it’s going to be free and accessible.”

Potential users include engineering firms, oil and gas companies, state agencies and water utilities and suppliers.

“It’s mainly a tool for front-end, theoretical groundwater planning,” he said. “This model is good for looking at one well and knowing everything there is to know about that one well. The way my model treats the well is more rigorous, and it is simpler to use than many other groundwater models.”

Blumenthal also modeled the cost of drilling both horizontal and vertical wells, using industry data to calculate total well costs.

“Our research shows that a horizontal well may cost anywhere from two to 32 times as much as a vertical well,” he said.

“While well cost estimation is inherently a site-specific task, I think our work is at least a good first look at horizontal well cost and how it varies. Our study was focused on high production rates and large diameter wells. Our cost analysis is especially geared toward large groundwater projects, such as those at the municipality level.”

Blumenthal found that compared to vertical wells, horizontal wells are most cost-competitive at greater depths.

“After combining the cost and benefit analyses, it became clear that horizontal groundwater wells have a cost-benefit advantage over vertical wells in certain hydrogeologic scenarios and not others,” Blumenthal said. “From our research, a horizontal well can produce anywhere from one to 100 times more water than a vertical well, depending on a number of factors.”

Blumenthal found several parameters that increase the benefits of a horizontal well. These parameters include nearby recharge boundaries such as a river, vertical aquifer fractures, lower aquifer permeability, and thinner aquifers, he said.

For example, he found that if the aquifer is thin, with a low permeability, has vertical fractures and a nearby recharge boundary, and the well is deep, then a horizontal well is more economical. Conversely, if the aquifer is thick with a high permeability, has no vertical fractures or nearby river, and the well is shallow, then a vertical well is more cost-effective.

“But, all of these parameters are interconnected, so it’s difficult to just go through a checklist and determine if a horizontal well should be used in a given situation,” Blumenthal said. “This is why I built the model and am providing it free of charge. Anyone could use my work and models to determine the most cost-beneficial well given their specific aquifer conditions.”

Blumenthal’s complete work may be found in his thesis, titled: “Kinetic and Friction Head Loss Impacts on Horizontal Water Supply and Aquifer Storage and Recovery Wells.”

Dr. Hongbin Zhan, Endowed Ray C. Fish Professor in Geology in the Department of Geology and Geophysics, served as Blumenthal’s advisor and described his master’s thesis work as “superior” and its quality “equivalent to some of the best doctoral dissertations we have seen.” Zhan and Blumenthal will co-author forthcoming articles based on his thesis in international journals, Zhan said.

Around the institutes

The new year has brought some changes to both the Texas A&M Institute of Renewable Natural Resources (IRNR) and the Texas Water Resources Institute (TWRI).

Matt Brown, formerly a TWRI project manager, is now an Extension program specialist in the Department of Soil and Crop Sciences at Texas A&M University.

Debbie Danford, IRNR program manager, will now serve as the administrative coordinator for the Gulf Coast Cooperative Ecosystem Studies Unit (GC-CESU), as former coordinator Carol Gaas recently retired.

Ashley Gregory, formerly a TWRI Extension assistant, will be serving as a horticulture agent for the Texas A&M AgriLife Extension Service.

Todd Snelgrove, formerly an IRNR associate director, is now director of technology advancement for the East Foundation.

New employees around the IRNR and TWRI offices include **Brandon Bowers**, research assistant; Yang “Lydia” Cao, assistant research scientist; **Bethany Friesenhahn**, Extension assistant; Andrew James, Extension assistant; Ashley Long, assistant research scientist; **David Rizzuto**, project specialist; Wade Ryberg, research scientist; **Lisa Thompson**, program manager; and Uyen “Amy” Truong, Extension assistant.

New IRNR and TWRI projects:

- Cost Effective Strategy for State Listed Freshwater Mussels
  Funding Agency: Texas Department of Transportation
  Partners: Texas A&M Institute of Renewable Natural Resources, Texas A&M AgriLife Research
- EWF - GIS Database Development and Support
  Funding Agency: East Foundation
  Partners: Texas A&M Institute of Renewable Natural Resources, Texas A&M AgriLife Extension Service

Don't miss new Texas Water Journal issue

An invited commentary by the chairman of the Texas Water Development Board on the Texas-Mexico water treaty and an article on the Rincon Bayou Pipeline on the Lower Nueces Delta are the first two articles in the 2015 issue of the Texas Water Journal.

The online, peer-reviewed journal is published jointly by the Texas Water Resources Institute and The Texas Water Journal, a nonprofit organization.

In his commentary, *The price Texas pays for Mexico's water debt*, **Carlos Rubinstein** outlines the history of the governance of the Rio Grande and the water treaty of 1944, which provides for allocations of waters in the lower reach of the Rio Grande. He documents the impacts of Mexico's failure to comply with the treaty, beginning in the 1990s.

Authors **Erin Hill** of the Center for Coastal Studies at Texas A&M University – Corpus Christi, **Jace Tunnell** of the Coastal Bend Bays and Estuary Program and **Brien Nicolau** of the Center for Coastal Studies published *Spatial and temporal effects of the Rincon Bayou Pipeline on hypersaline conditions in the Lower Nueces Delta, Texas, USA*. The paper documents the effects of pumped freshwater to the Rincon Bayou Channel. According to the authors, the results of this new and innovative way of delivering freshwater to the Nueces Delta has proved to be a valuable management tool for minimizing the duration of hypersaline conditions within the estuary.

The journal's editorial board accepts papers about Texas water resources management and policy issues from a multidisciplinary perspective that integrates science, engineering, law, planning and other disciplines. To read the journal, visit texaswaterjournal.org.

Cultivating conservation: Howdy Farm promotes stewardship in Aggieland

A quick look around Texas A&M University is all you need to see that the campus and the surrounding community are becoming more urbanized. But, this is not necessarily at odds with Texas A&M's history as an agricultural college. A growing on-campus farming venture is linking Texas A&M's agricultural heritage to today's Aggieland, while adopting a forward-thinking perspective on sustainability, said Howdy Farm president **Jessica Newman**.

Howdy Farm is a student-run community garden at Texas A&M that implements sustainable practices to grow organic produce on campus. The land that the farm uses is part of the Department of Horticultural Sciences, and Howdy Farm is overseen by the Sustainable Agriculture Student Association.

Howdy Farm grows a wider variety of plants than is typically found in grocery stores, some of which are native to Texas, Newman said. Recently, the farm started planting edible weeds, such as purslane and amaranth. Newman said the plants offer a great learning opportunity, exposing people to plants that they are unfamiliar with.

The farm also takes every opportunity it can to reduce, reuse and recycle, which can mean more work than traditional gardening. "We do encounter some people who think that what we do is going way too far out of the way to farm, but we don't mind," said **Corey Wahl**, Howdy Farm's head field manager.

In the midst of the Texas drought, Howdy Farm recognizes the importance of water conservation. The farm is home to three rainwater collection tanks that can hold a total of 2,000 gallons.

Additionally, the farm is working on implementing a wicking bed that waters plants from the bottom up. Rather than planting the soil directly into the bed, a liner is placed into the bed, followed by rocks and then soil. A PVC pipe filters water into the bed, creating a mini-aquifer. Another pipe drains excess water to ensure that plants are not overwatered on especially rainy days.

Not only does the wicking bed allow the roots to grow deeper and steady the plant, it also lets the soil retain more water. “If it works really well, we could use it on other beds,” Wahl said.

Howdy Farm’s stewardship practices go beyond water conservation. The farm also uses solar panels to power its tools and compost in its gardens. Designed and created by the Austin-based construction firm Reclaimed Space and funded through an Aggie Green Fund grant, the farm’s main building was created from reclaimed and repurposed materials, such as a 100-year-old barn wall.

Howdy Farm plans to visit schools and has opened up the garden to tours for elementary school children. During tours, children were allowed to pick produce they could take home with them. “You can tell them about anything, and they’re interested,” Wahl said. “They like to try eating different things.”These sustainable gardening methods are not something Howdy Farm keeps to itself. The farm provides a number of educational opportunities for students and the community and hopes to expand these educational programs in the future by offering monthly classes on subjects such as compost and growing herbs.

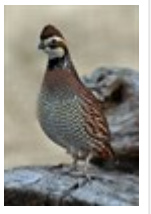
Looking to the future, Howdy Farm is expanding, as construction of the Gardens and Greenway project begins next to it. Wahl said he expects that the project will bring more foot traffic through Howdy Farm. The farm is working on adding fruit trees and creating in-ground beds in addition to their raised beds.

“Every student that comes through here adds a little piece to it and builds into one big thing rather than trying to do it all at once,” Wahl said.

Howdy Farm sells its produce at its location on west campus on Thursdays from noon to 5 p.m. Funds from the sales are used to keep the farm running. Also, student volunteer hours are 1 p.m. to 5 p.m. on Wednesdays and Fridays.

For more information about Howdy Farm, visit its website or find it on Facebook, Twitter and Instagram.

QuailMasters workshops coming to South Texas this spring



The Texas A&M AgriLife Extension Service and the Texas Wildlife Association have set the dates and opened registration for QuailMasters – South Texas.

Dr. Dale Rollins, San Angelo-based retired AgriLife Extension wildlife specialist and lead instructor for the workshops, said QuailMasters is a series of hands-on, intensive training sessions designed to expose participants to the best quail habitat in the state while making them “masters” of the art and science of quail management.

“This is the first time we’ve hosted QuailMasters with a South Texas focus,” Rollins said. “So if you’re from the southern part of the state, hunt quail in that area or own property there, then this is your opportunity to attend sessions that are maybe a little closer to home.

“Those who could benefit from attending QuailMasters include landowners/managers, hunters, quail enthusiasts, consultants, AgriLife Extension agents, wildlife biologists and college students.”

Rollins said participants are expected to attend all four sessions. Session dates and the general locations of each are as follows:

- Session I, **March 22-24**, Victoria/Refugio
- Session 2, **May 3-5**, Cotulla
- Session 3, **June 7-9**, location to be announced
- Session 4, **Aug. 9-11**, Hebbronville

Individual registration for all the sessions is $500, due by **March 6**. The fee includes most meals and classroom materials. Three hours of graduate college credit are available for an additional fee. Space is limited to 35, so coordinators urge those planning to participate to register as soon as possible.

Rollins said the course is partially funded by AgriLife Extension’s Reversing the Quail Decline Initiative, as a way to educate landowners in best management practices for bobwhites. Rollins is the initiative’s statewide coordinator.

Jerry Hammon, a quail hunter from Friendswood and a past participant, said, “Nowhere can you find a more comprehensive study regarding quail, quail habitat and management practices while enjoying the comradery of the other participants, instructors and professionals that shape Texas wildlife habitat — a first-class program.”

Registration is available online. For more information, contact Rollins at 325.653.4576 or d-rollins@tamu.edu, or Clint Faas at 979.541.9803 or cfaas@texas-wildlife.org. Read the full AgriLife Today article for more details.

Bennett Land Stewardship Conference set for April 23-24 in Kerrville

The second annual Bennett Land Stewardship Conference is scheduled for **April 23-24** at the Inn of the Hills Resort and Conference Center in Kerrville.

The conference is funded by the Ruth and Eskel Bennett Endowment and hosted by the Texas A&M AgriLife Extension Service, said **Dr. Larry Redmon**, co-chair and Bennett Trust AgriLife Extension specialist.

Redmon said the Bennetts posthumously provided an endowment that will support land stewardship education in the Edwards Plateau for generations to come. The Bennetts retired to a ranch just outside Dripping Springs and established this endowment by generously gifting a portion of their estate to AgriLife Extension, he said.

“Mr. Bennett loved the Edwards Plateau and left a legacy that will afford landowners and resource managers ongoing opportunities to acquire knowledge and sharpen their skills as responsible stewards of this unique and storied part of Texas,” Redmon said. “The proceeds from the invested endowment will provide unparalleled private sector support for AgriLife Extension educational efforts in the region.”

Cost of the two-day conference is $75 and includes all meals, break refreshments and tour transportation costs. Register at agriliferegister.tamu.edu/BennettTrust or by calling 979.845.2604.

Dr. Rick Machen, AgriLife Extension livestock specialist from Uvalde, said the conference will include “the best and wisest, accomplished stewards, visionaries and legacy-leavers together as educators for this conference. Those with a passion for natural resource stewardship and a love for the Texas Hill Country will want to be there.”

Titled “Keys to Hill Country Living,” the conference’s preliminary agenda for the first day includes a presentation on the history of Hill Country plants, animals and early people found in the region, as well as the water cycle of the Hill Country and Edwards Plateau. Specific topics will include aquifer recharge and spring flow, drought, urban sprawl and rainwater harvesting, Redmon said. There will also be a presentation on juniper impacts on rangeland health, herbivore-forage interaction, stocking rates and infiltration versus runoff.

“Texans work hard to purchase and maintain their Hill Country property, so additional presentations will take place regarding estate planning, elder law, 1-D-1 Open Space land tax valuation and leasing implications,” he said.

The first day will close with a discussion on which animal species combinations are appropriate for which properties and an update on forage crop insurance, Redmon said.

Day two of the conference will provide unique behind-the-scenes tours, Machen said.

The first tour, Natural Resource Stewardship, includes a visit to the historic Hillingdon Ranch in Kendall County. With agritourism in mind, the second tour will go to Fredericksburg and Gillespie County and will include visits to sustainable vineyards, orchards and gardens. The third tour will highlight wildlife management and the hunting industry. Both days will conclude with Texas Hill Country hospitality – food, music and the opportunity to visit with conference presenters, the coordinators said.

For more information on the program, contact Redmon at l-redmon@tamu.edu or Machen at r-machen@tamu.edu. Read the full AgriLife Today news release for more details.

Natural Resources Training Courses

Texas Riparian and Stream Ecosystem Workshop - Dickinson Bayou Watershed
Feb. 27

Introduction to ArcGIS 10
March 11-12

Texas Riparian and Stream Ecosystem Workshop - Leon River Watershed
March 12

Introduction to ArcGIS 10
May 12-13