



# President's Address

Youth Range Workshop was a success!!!! Last week we hosted a full workshop in Junction, Texas with 36 participating youth from all over our state representing nearly every ecoregion! A big applause and tremendous gratitude go to YRW Coordinators: Austin Kelly, Dan Caudle, Rode Mills, and Jenny Pluhar. Ya'll are the heart of TSSRM and we appreciate your willingness to usher the next generation of range managers into stewardship. They are in good hands, learning not only the science, but the art of rangeland management. Thank you!

Our rangelands have roughly made 50% of their total production for the year. I

am not using that as a scare tactic, just being realistic. Much of the state has been receiving timely rainfall and count that as a blessing. However, our colleagues in Far West Texas and friends in the Southwest continue to battle severe drought conditions. We know all too well the mental and physical hardships drought places on ranchers and range managers. Please keep them in your prayers as we (hopefully) creep into monsoon season.

The last couple of years have been tough, but you are not alone in the journey. Attending events like our TSSRM Summer Ranch Tour July 9 in San Angelo not only allow for information transfer, but also the camaraderie in socializing with range managers experiencing the same range challenges and opportunities as you. With that in mind, we have a full schedule of field days and range tours ahead!

- July 9, 2021 Dry Creek Ranch Summer Range Tour: Please register at: <a href="https://agriliferegister.tamu.edu/productListingDetails/3414">https://agriliferegister.tamu.edu/productListingDetails/3414</a>. We will be touring the 2020 TSSRM TSCRA TXGLC Outstanding Rangeland Stewardship award-winning ranch owned by Carl and Pat Schlinke of San Angelo. The tour is FREE, starting at 8AM and concluding around 1PM with a catered lunch provided. Raffle drawings and plant identification contests will be featured as well as networking opportunities with our Mentorship Committee. Don't miss this incredible opportunity to see one of the most beautiful ranches in West Texas!
- Hopefully some of you have been able to tune into our TAMU RWFM
   Stewardship Webinar Series hosted the first Thursday of every month.
   On July 1<sup>st</sup>, we are featuring Dr. John Tomecek discussing "Integrated Approaches to Managing Wildlife Damage." Please register at:
   <a href="https://agriliferegister.tamu.edu/productListingDetails/3348">https://agriliferegister.tamu.edu/productListingDetails/3348</a>.
- Don't forget Texas Sheep and Goat Raisers annual summer meeting July 15-17, 2021 in Kerrville! We will be awarding the 2021 TSSRM TSGRA Outstanding Rangeland Stewardship award to a ranching family. For more information, please <a href="http://www.tsgra.com/events.php">http://www.tsgra.com/events.php</a>.

- Our friends at Texas and Southwestern Cattle Raisers Association are hosting their annual Cattle Raiser Convention and Expo July 23-25 in Fort Worth. TSSRM will have a booth set up at the trade show, so don't be a stranger! We will also be cheering on the Dry Creek Ranch as they accept their 2020 TSSRM TSCRA TXGLC Outstanding Rangeland Stewardship award. For more information, please visit: <a href="https://cattleraisersconvention.com/">https://cattleraisersconvention.com/</a>.
- TSSRM Annual Meeting is going to be better than ever! Get out of the house and let your hair down in Victoria October 20-22! More details are on the way!

As always, our amazing committees are hard at work, and I have heard good reports from our committee chairs. As you hear of events and useful range information, please be sure to send it to a TSSRM officer for inclusion in the newsletter or Range Flashes.

TSSRM is a tight-knit family, and our hearts are as big as the rangeland pastures we steward. We are holding many members and their families in our thoughts and prayers as they maneuver through uncharted waters and challenging times. Stay strong. Your range family is with you every step. If we can help in anyway, please do not hesitant to reach out to any current or past BOD member.

-Morgan Treadwell



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# Plant of the Season by Dr. Jake Landers

#### **Shinoaks**

There are four main species of Oak in Texas that we usually call Shinoak, or Shinnery, which is more closely associated with the original naming of it. The French in Louisiana called the low shrubby growth "Cheniere" which easily became "Shinnery", then Shinoak, as the word moved westward. In my younger days I thought it meant an oak that was about "Shin-high" which was ridiculous, but many Texas names are a little strange in their meaning: cattle guard, come along, thank you mams, etc.

Shinoaks are shrubby trees in Central and West Texas forming dense thickets for the most part, only one, Bigelow (*Quercus sinuata* var *breviloba*), reaching tree size as it grows on limestone soils further east. Vasey (Q. *pungens* var *vaseyana*) and Mohrs (*Q. mohriana*) are on limestone soils also, but Havard (*Q. havardii*) is on deep sands to the north. In all cases they possess extensive interconnected root systems and sprout vigorously following top removal. I remember seeing a photo of the massive root system of a thicket of Sand shinnery that Russ Pettit of Texas Tech had washed out with a fire hose, and I challenged him to expose one in limestone, a challenge he didn't take.

Oaks in general, but Shinoaks in particular because of their low height and more nutritious leaves, provide good browse for cattle, goats and deer. However, animals browsing the newly opening buds in a very dry spring can be poisoned. Tannins accumulate in their rumen causing damage to kidneys, and normal digestion is interrupted with diarrhea or compaction. Damage usually can be prevented by having other forage available.

When my Dad was searching for a ranch in 1923 he wanted abundant shrubby oaks as browse. He found what he wanted in Menard County with abundant Liveoak on the deeper soils and Shinoak on the shallow hills just right for Angora goats which were then a hot item on the market. Shinoak leaves are readily consumed by goats and deer and lightly by cattle. Most Shinoaks lose their leaves in winter and Liveoak provides a poor substitute.

Some years acorns are abundant. I remember going to a ranch and seeing scattered Shinoak thickets with a browse line at 4  $\frac{1}{2}$  feet, each with a handful of smart and patient goats waiting for the acorns to fall, and I didn't have my

camera.

One rancher decided to increase his cattle numbers by removing Shinoak by root-plowing and growing more grass. Very expensive. Then he discovered that he could remove it more economically by completely defoliating it with goats for three straight years. When deer hunting became profitable he decided to manage it with prescribed burning and not kill it out.

I was advising a rancher friend in Coke County where a severe wildfire had gone through, and in late summer Shinoak sprouts were eaten to the ground. Across the high fence on his neighbors the sprouts were knee high. Because of the high fence most of his deer were trapped and perished in the fire, and my friend's deer escaped over his standard fences and came back to feast on the new browse. He should have reduced his deer herd after the burn and let the Shinoak recover.

Annual growth rings in Shinoak are easily counted when a cross-section of trunk is sanded and polished. The oldest trunk in 20 sampled from Menard County dates back to 1860 suggesting that most everything has resprouted since that time. Sure would be interesting to know the fire history of our hill country...

**JL M21** 



Photo of Havard Shinoak or Havard shinnery oak, *Quercus havardii*. Photo courtesy of Dr. Cody Scott.

#### Note from the editor

This month's Veteran highlight is near and dear to my own heart. One of the questions I typically ask in this section is "Do you have a teacher/mentor that has played a significant role in your life? If so, who and why?" For me, there is no doubt that Dr. Cody Scott has had the most significant impact on my career.

When I began my tenure as a Master's student at Angelo State University, I knew little about range science. The knowledge I have gained in this subject matter has grown exponentially because of this incredible professor. Of all the things Dr. Scott taught me in and out of the classroom, perhaps the greatest gift he blessed me with is the confidence to believe in my own abilities. His guidance and support inspired me to continue my education to pursue a doctoral degree. I could not have made a better decision for my Master's degree than to study under this renowned range expert.



Veteran Member Highlight Dr. Cody Scott

#### **Education:**

B.S., M.S. in Animal Science (Range Option), Angelo State University. Ph.D. in Range Science, Utah State University

#### Occupation:

Professor, Department of Agriculture, Angelo State University

#### Tell us a little about yourself. (hobbies, family, etc.)

Marred to Bridget Scott since 2002. We have three children; Brian (31), Kaylee (11), and Jase (9).

Hobbies – Ranching on the side.

#### How long have you been a member of TSSRM?

First joined SRM and TSSRM in 1989. I have been an active member in SRM since that time. I rejoined TSSRM after spending 3 years (1992 – 95) in Utah.

#### What would you describe as your greatest accomplishment to date?

Student success after graduation. For most of us, the legacy we leave in this world is our children. I have been blessed to teach at ASU for 25+ years. Seeing my students succeed after graduation is my greatest professional accomplishment and furthers my legacy.

#### What do you like most about your job?

Working with students and helping them prepare for their career.

#### How has TSSRM helped you in your academic/career development?

Networking, professional connections, gaining knowledge, collaboration with others on research ideas.

## What advice would you give to students pursuing a career in the range discipline?

Follow your heart and passion. Figure out what you enjoy doing, and make a career of it. Get involved and seek opportunities to serve in leadership roles.

#### What is your favorite part of TSSRM?

Interacting with members, old and new. When the opportunity presents itself, I really enjoy mentoring new members and professionals in the Range field.

# Do you have a teacher/mentor that has played a significant role in your life? If so, who and why?

Really, there are too many to mention. So many have helped me throughout my career. For instance, Butch Taylor, Steve Hartmann, and Bill Pinchak all helped me establish my research program when I arrived as ASU. In addition, I consider all three very close friends. The one individual that has probably had the largest impact on my professional career is Fred Provenza. Undoubtedly, he was the best teacher, researcher, and mentor I have ever been around. However, Fred taught me more about personal growth and the value of life. Despite everything you accomplish with your professional life, there are things much more important like the relationships that you form with those around you.

#### What is your favorite range plant and why?

Probably Netleaf Hackberry. Everything (deer, cattle, sheep, goats, and even horses) love to browse on it. I even tried it, not too bad.

#### Note from the editor

With Youth Range Workshop taking place in the month of June, I set out to highlight a TSSRM member that was participating in YRW for this issue of the newsletter. After receiving a glowing recommendation, I am proud to recognize Camille Carey as this month's Young Gun Member Spotlight!

I had the pleasure of getting to know Camille last week at YRW. Let me tell you-this young woman has one heck of a future ahead of her! In 2019, she was an intern under Dan Caudle at the Botanical Research Institute of Texas (BRIT). After an outstanding performance with BRIT, she was recommended and selected as a Noble Scholar at the Noble Research Institute. She recently completed her Master of Science in Entomology at OSU and will be pursuing her PhD in the fall at Texas A&M University under Dr. Doug Tolleson and the Department of Rangeland, Wildlife, and Fisheries Management. She is kind, passionate, and an absolute joy to be around. I cannot wait to see what she accomplishes!



Young Gun Member Highlight *Camille Carey* 

**Education:** 

A.S General Studies- Weatherford College

BS Horticulture- Tarleton State University

MS Entomology- Oklahoma State University

#### Tell us a little about yourself. (hobbies, family, etc.)

I was born and raised in Texas. I grew up on a farm raising Faverolles chickens for both meat and exposition.

Some of my hobbies are playing the violin and bagpipes. Playing the violin is a very big part of my life and I have been playing since I was 5. I also enjoy raising my chickens, riding, fishing, and collecting insects.

#### How long have you been a member of TSSRM?

I just renewed my membership after letting it lapse while going to Oklahoma State University.

#### What would you describe as your greatest accomplishment to date?

My greatest accomplishment to date professionally would be graduating from Oklahoma State with a Masters in Entomology.

My greatest accomplishment personally is winning Reserve Continental Champion with a Salmon Faverolles pullet at the Fort Worth Stock Show & Rodeo in a show with 1500+ birds.

#### What are your career goals?

After being a Lloyd Noble scholar at the Noble Research Institute I have fallen in love with working with producers and growers. I also feel that my time working at the USDA up in Stillwater has deeply affected my drive to continue working with them. So, I would love to find a job in extension, industry or private working with producers and growers.

#### How has TSSRM helped you in your academic/career development?

It has helped me in meeting new people and giving me a platform to explore new opportunities. I am SO happy that TSSRM is supportive and is a strong society.

## What advice would you give to the students participating in Youth Range Workshop?

My advice would be to be open to new opportunities and try to take as many of them as you can. You never know what might interest you or what you can learn from each opportunity. And don't be afraid of not knowing things. Everyone starts right where you are.

#### What is your favorite part of TSSRM?

My favorite part is the level of support and information the society has. Very happy I get to be a part of it.

# Do you have a teacher/mentor that has played a significant role in your life? If so, who and why?

I have been blessed with having many mentors but Dan Caudle has been the biggest and most significant in my life. When I first met Dan, I knew a bit about Range but was mostly focused on entomology and palynology. He honestly has changed my life and giving me so many opportunities that he could have easily not have. If there is anyone who has not met Dan, I would HIGHLY recommend that you do. He is a wonderful role model and mentor. Also, I need more people to convince him that Harry Grama is the BEST range plant around.:)

#### If you were a range plant, which one would you be and why?

Harry Grama of course!! How could anyone say anything else?!

# TSSRM at Texas Wildlife Association Annual Meeting in San Antonio, TX

The Texas Section will be participating in this years Texas Wildlife Association (TWA) Annual Meeting at the Hyatt Regency Resort in San Antonio, TX July 15-18, 2021. TSSRM will be partnering with the Texas Grazing Lands Association (TX-GLC) to represent rangeland and grazing land management as a critical component to the conservation and stewardship of natural resources in the State of Texas.

TWA focuses its mission on private landowners and their ethical relationship to the land, and concentrates on issues relating to private property, hunting and hunter rights, and conservation of our natural resources.

TWA has three main program areas: Conservation Legacy (youth and adult education), Hunting Heritage (Texas Youth Hunting Program and Texas Big Game Awards), and Issues and Advocacy. The future well-being of wildlife, game, nongame and rare species depends upon private landowners' commitment to habitat. They are the real stewards of the land in their care.

#### **TWA Mission Statement**

Serving Texas wildlife and its habitat, while protecting property rights, hunting heritage, and the conservation efforts of those who value and steward wildlife resources.

#### **TSSRM Mission Statement**

To provide leadership for the stewardship of rangelands based on sound ecological principles.

#### **About Texas Grazing Lands Coalition**

TXGLC is organized to support sound grazing land stewardship and assist owners and managers of private grazing lands. Expert technical assistance is available to implement, on a voluntary basis, technologies for conservation management of the private grazing lands and other natural renewable resources of Texas.



Photo by Bill Fox - G-C Ranch, Rosston, TX

### 2021 State 4-H Roundup Range Contests

by Barron S. Rector, Extension Range Specialist

The 2021 State 4-H Roundup Range contests were held at College Station on June 7-9. Both the 4-H Range and Pasture Grass Identification Contest and 4-H Range Evaluation Contest included practice contests and training opportunities prior to the actual State competition. The site of both contests was at the Department of Rangeland, Wildlife and Fisheries Management (RWFM) ENRTA or Ecology and Natural Resource Teaching Area. Dr. Barron Rector served as Superintendent and Dr. Bob Knight served as the Assistant Superintendent.

Sponsors for the 2021 awards included the Texas Section Society for Range Management (TSSRM) for Team Awards and Corteva Agriscience for individual awards. At the luncheon awards program, Range and Pasture Specialists Mr.

Patrick Sutton and Mr. Colton Spencer represented Corteva and each addressed the youth participants on their roles as rangeland stewards, the perspective jobs available with Corteva, college education needed and internships available.

TSSRM 1<sup>st</sup> Vice President Dr. William Fox represented TSSRM President Dr. Morgan Treadwell with award presentations and spoke on the interest that this organization has for the future of youth today. Dr. Parr Rosson, Associate Department Head for RWFM Extension and Assistant to the Dean of TAMU AgriLife, spoke on the role of the Land Grant University System at TAMU and the role of youth in a changing agricultural complex. In the grading period, participants, 4-H leaders and County Extension Agents participated in a handson nature walk led by ENRTA Manager Dianne Robinson on the discovery of soils, the range water cycle, native plants and the abundant wildlife on the Post Oak Savannah vegetation area at the ENRTA.

For the top 3 teams and individuals in both contests, the Texas 4-H program and the 2021 4-H State Council members did a special awards program on Tuesday night at the Palace Theater in downtown Bryan and Wednesday evening at the College Station Wolf Pen Amphitheater. The top individuals and teams recognized include the following:

### Range and Pasture Grass Identification

#### **Team Awards**

1<sup>st</sup> Place Milam County 4-H (D8)

2<sup>nd</sup> Place Comal County 4-H (D10)

3<sup>rd</sup> Place Roberts County 4-H (D1)

4<sup>th</sup> Place Maverick County 4-H (D12)

5<sup>th</sup> Place Johnson County 4-H (D8)

6<sup>th</sup> Place Mills County 4-H (D7)

#### <u>High Point Individuals</u>

1st Joseph Hollas-Milam Co.

2nd Jenna Lindig-Milam Co.

3rd Keene Kreusler-Comal Co.

4th Haiden Thompson-Roberts Co.

5th Hanna Hardt-Maverick Co.

6th Reagan Ackerman-Comal Co.

7th Charles Purcell-Maverick Co.

8th Kylee Edwards-Comal Co.

9th Elizabeth Gorecki-Innis-Roberts Co.

10th Ryan Luckey-Milam Co.

### 4-H Range Evaluation Contest

1 <sup>st</sup> Place	Comal County 4-H (D10)
2 <sup>nd</sup> Place	Mills County 4-H (D7)
3 <sup>rd</sup> Place	Bee County 4-H (D11)

1 <sup>st</sup>	Keene Kreusler-Comal	Co.
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- 2<sup>nd</sup> Reagan Ackerman-Comal Co.
- 3<sup>rd</sup> Kylee Edwards-Comal Co.
- 4<sup>th</sup> Connor Bartek-Mills Co.
- 5<sup>th</sup> Ray Allen Schaefer-Comal Co.



Figure 1. ENRTA manager Dianne Robinson (front left) leading the 1 ½ hour outdoor training event and nature walk at the ENRTA for 4-H participants, 4-H leaders and County Extension Agents. (Photo by Laura Miller, Tarrant County Extension Agent).



Figure 2. At the State 4-H Roundup Range and Pasture Grass Identification Contest held indoors with 50 live grasses, grass mounts and grasses growing in pots. 4-H contestants write the common name and mark characteristics on a score sheet.



Figure 3. The top 3 placing teams in the State 4-H Grass Identification contest (I to r) included Comal County 4-H, Milam County 4-H and Roberts County 4-H.



# DON'T MISS these upcoming lectures in the RWFM STEWARDSHIP WEBINAR SERIES!

Texas Department of Agriculture (TDA) licensed agricultural pesticide applicators can earn Continuing Education Units (CEUs) through the RWFM Stewardship Webinar Series every month.

#### July 1, 2021

Noon CST

Integrated Approaches to Managing Wildlife Damage

Dr. John Tomeček, Texas A&M AgriLife Extension Service

This presentation will address the methods by which damage is managed on native wildlife species. We present an integrated approach, choosing the appropriate tool for the problem, and how to apply multiple tools to achieve management goals. We will discuss lethal and non-lethal approaches and include a special session on the proper use and application of toxicants.

#### August 5, 2021

Noon CST

The Prairie Project: Coupling Fire and Grazing

Dr. Laura Goodman, Oklahoma State University

Grasslands and savannas worldwide are an imperiled biome—particularly as a result of woody plant encroachment (WPE), increasingly extreme climatic conditions, and more frequent and intense wildfires. This is especially true for the Great Plains of the United States. We contend here that the widespread adoption of pyric herbivory (the synergistic application of fire and grazing) and mixed-species grazing (cattle and goats) would not only make grasslands and savannas more resilient to environmental change but also enhance the profitability of livestock production systems. These management strategies control woody plants, enhance forage

quality, and increase animal production. Although this new management paradigm holds tremendous promise, it has not been widely adopted because of cultural constraints. Saving the remaining grasslands in the Great Plains and elsewhere will require a widespread shift in cultural norms—facilitated by targeted government incentives and a coordinated program of regional research, extension, and education.

Check out <a href="https://agriliferegister.tamu.edu">https://agriliferegister.tamu.edu</a> for more information and to register!



# Abstracts are now being accepted for the Don Pendleton Memorial Collegiate Awards

**Click the link below** to read the guidelines for submission.

Deadline for submission of abstracts is September 1<sup>st</sup>, 2021.

**Abstract Submission Guidelines** 

### Youth Range Workshop was a hit!

Last week TSSRM hosted Youth Range Workshop in Junction, TX.

36 teenagers + lots of heat and humidity + plant collections + soil health + inaugural range judging exercise + prescribed fire demo + forage inventory + wildlife management + mechanical and chemical brush control + seeding techniques+ infiltration demos + public speaking =

#### a bunch of tired kids and exhausted adults!

We learned, we sweated, we sang, we collected and then collected some more!















A huge "thank you" to everyone that made YRW possible. Jenny Pluhar, Austin Kelly, Rode Mills, and Dan Caudle poured their heart and soul into this event. The activities and speakers they secured were incredible! It was a treat to be able to see the next generation of land stewards get so excited about Texas rangelands. We had an excellent group of kids this year. If they are any indication of the future of our industry, it's looking bright!

### **STAY TUNED!**

The August newsletter will feature camper spotlights from some of this year's outstanding students.

# There's still time to submit your nominations for the 2021 TSSRM Annual Awards!

Click the links below to access each nomination form. The deadline for nominations is August 15th.

**Honor Awards Nomination Form** 

**Grass Roots Awards Nomination Form** 

**Publication Awards Nomination Form** 







# DRY CREEK RANCH TOUR

Join us for a ranch tour of a classic West Texas family ranching operation and award-winning stewardship! Lunch is included.

JULY 9, 2021 8 AM - NOON 3500 DRY CREEK RD. SAN ANGELO, TX 76941

MUST PRE-REGISTER FOR THE TOUR AND FREE CATERED LUNCH AT: HTTPS://AGRILIFEREGISTER.TAMU.EDU/PRODUCTLISTINGDETAILS/3414



Please come join us as we tour the award winning Schlinke Dry Creek Ranch!

This tour is a once-in-a-lifetime opportunity to watch generational stewardship leave a lasting signature on West Texas rangelands.

The Dry Creek Ranch has been sharing its land and legacy of stewardship for nearly half a century with AgriLife Extension. The last tour of this scope at the ranch was held in 1973.

The Schlinke family has worked hand-in-hand with several state and federal rangeland partners to advance their knowledge of rangeland productivity, function and integrity. They have a fundamental appreciation and respect for the rangeland and relationships with range managers, particularly those associated with AgriLife Extension. Interestingly, Drs. Jake Landers Jr. and Sr., and Dr. Allan McGinty, former AgriLife Extension range specialists, San Angelo, have all conducted applied research and field demonstrations at Dry Creek Ranch.

Both Carl and Pat Schlinke regularly attend Reagan, Irion and Tom Green counties' range programs hosted by local AgriLife Extension county agents, and they are on a first-name basis with the Natural Resource Conservation offices throughout those same counties. The sincerity and authenticity that Carl and Pat approach their community and range partnerships with is unlike anything else. They are two of the kindest, hardest-working and most down-to-earth individuals. To be welcomed on their ranch to tour their pastures is a treat for ranchers and range managers alike.

Map of 1973 tour of Dry Creek Ranch. Photo provided by Dr. Morgan Treadwell and Texas A&M AgriLife Extension.

Click the link below to register.

Register now!

# Join us in the Coastal Bend for the 2021 Annual TSSRM Meeting!

If you have not experienced the coastal prairie, you cannot miss this! Historic ranches, outstanding land stewards, coastal prairies, the latest industry info and fellowship all wrapped up in the meeting which features TSSRM's partnerships and collaborations.

When: October 20th-22nd, 2021

Where: Victoria, TX

**Theme:** "Celebrating Partnerships"

Location:

Victoria College-Emerging Technology Complex

7403 Lone Tree Rd Victoria, TX 77904

More information to follow.

Click the link below to view the preliminary agenda for the event.

#### Agenda

The TSSRM newsletter wishes to recognize outstanding faculty members for the research they are conducting on rangelands. This issue will feature a recent publication by Dr. Ben Wu of Texas A&M University.



X. Ben Wu is a Professor of Ecology and Conservation Biology, Associate Dean for Faculty Affairs and Presidential Professor for Teaching Excellence at Texas A&M University. The current research of his lab group is focused on the spatial ecology of pyric herbivory in savanna landscapes and associated education program focused on educator development and educational innovations. Other recent projects include landscape biogeochemistry of savanna systems, ecology of terracette landscapes, and authentic scientific inquiries in introductory ecology courses and their effects on student learning. He teaches a large-enrollment introductory ecology course and a graduate course on spatial analysis and engages in faculty development work.

# Web-based authentic inquiry experiences in large introductory classes consistently associated with significant learning gains for all students

by X. Ben Wu, Carolyn Sandoval, Stephanie Knight, Xavier Jaime, Maria Macik, and Jane F. Schielack

#### **Background**

Continuous calls for reform in science education emphasize the need to provide science experiences in lower-division courses to improve the retention of STEM majors and to develop science literacy and STEM skills for all students. Open or authentic inquiry and undergraduate research are effective science experiences leading to multiple gains in student learning and development. Most inquiry-based learning activities, however, are implemented in laboratory classes and the majority of them are guided inquiries. Although course-based undergraduate

research experiences have significantly expanded the reach of the traditional apprentice approach, it is still challenging to provide research experiences to nonmajors and in large introductory courses. We examined student learning through a web-based authentic inquiry project implemented in a high-enrollment introductory ecology course for over a decade.

#### Results

Results from 10 years of student self-assessment of learning showed that the authentic inquiry experiences were consistently associated with significant gains in self-perception of interest and understanding and skills of the scientific process for all students—both majors and nonmajors, both lower- and upperdivision students, both women and men, and both URM and non-URM students. Student performance in evaluating the quality of an inquiry report, before and after the inquiry project, also showed significant learning gains for all students. The authentic inquiry experiences proved highly effective for lower-division students, nonmajors, and women and URM students, whose learning gains were similar to or greater than those of their counterparts. The authentic inquiry experiences were particularly helpful to students who were less prepared with regard to the ability to evaluate a scientific report and narrowed the performance gap.

#### **Conclusions**

These findings suggest that authentic inquiry experiences can serve as an effective approach for engaging students in high-enrollment, introductory science courses. They can facilitate development of science literacy and STEM skills of all students, skills that are critical to students' personal and professional success and to informed engagement in civic life.

#### **READ FULL PUBLICATION**

# 2021 Calendar & Events

- July 1: RWFM Stewardship Webinar: Integrated Approaches to Managing Wildlife Damage
- July 9: Dry Creek Ranch Tour
- July 15-17: Texas Sheep and Goat Raiser's annual summer meeting in Kerrville, Texas
- July 15-18: TWA Wildlife Convention

- July 23-25: Texas and Southwestern Cattle Raiser's
   Association's annual Cattle Raiser Convention
- August 2-4: Texas A&M Beef Cattle Short Course
- August 5: RWFM Stewardship Webinar
- September 17: Burn School Field Day-Location TBD
- October 20-22: Annual Meeting in Victoria, Texas
- October 29: Burn School Field Day-Location TBD

For additional events or more information, check out the Texas A&M

AgriLife Extension calendar

at <a href="https://calendar.tamu.edu/agrilifeextension/">https://calendar.tamu.edu/agrilifeextension/</a>.

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