



25<sup>th</sup>

ANNIVERSARY

1996 - 2021

TWENTY

M A N A G I N G

FIVE

E N H A N C I N G

YEARS

P R O T E C T I N G



# NEWS DROP

M A G A Z I N E

A QUARTERLY PUBLICATION

**SUMMER 2021**

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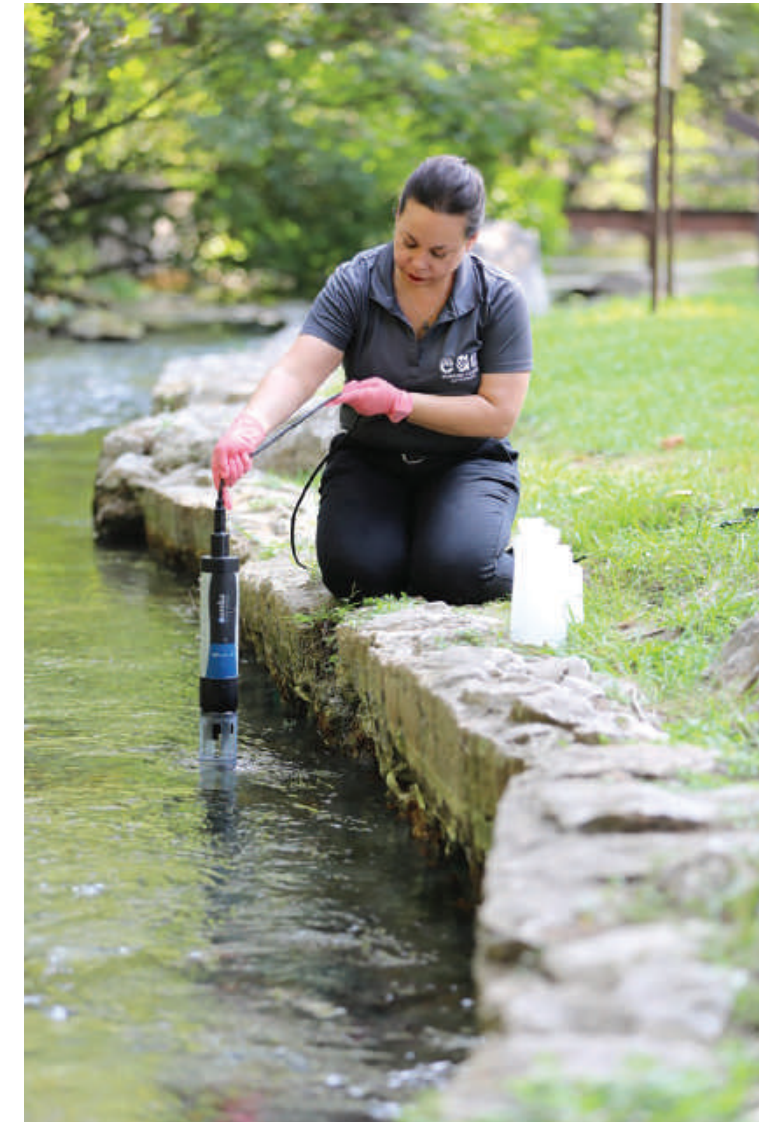
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# FROM THE GENERAL MANAGER

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**ROLAND RUIZ**

EAA GENERAL MANAGER

**“THE PROGRESS MADE OVER THE PAST QUARTER CENTURY IN ACHIEVING GREATER CERTAINTY AROUND THE USE OF THE EDWARDS AQUIFER IS REMARKABLE, ESPECIALLY CONSIDERING FROM WHERE IT WAS THAT WE STARTED. WE’VE IDENTIFIED AND IMPLEMENTED SOLUTIONS TO LONGSTANDING PROBLEMS AND, TO A LARGE DEGREE, FOUND COMMON GROUND AMONG DIVERSE AND COMPETING INTERESTS AS TO HOW TO BEST MANAGE A NATURAL SYSTEM FOR THE GREATER GOOD.”**

## **MANAGE • ENHANCE • PROTECT**

But it’s not the EAA alone that can take credit for this; it’s the people of our region that deserve recognition

The citizens of a vast and increasingly growing and diverse area of South Central Texas - farmers, urbanites, business owners, government officials, naturalists, scientists, policy makers, and Texans of every walk of life - all share the concern and responsibility to protect and preserve the precious resource of water that sustains us.

Through trial and error, from conflict to consensus, and from ambiguity to clarity, the EAA mission endures, and today arouses optimism that ensuring a sustainable, resilient aquifer for generations to come is indeed possible.

So, on the occasion of the 25th anniversary of the EAA, we say thank you. Your engagement with and support of the **mission to manage, enhance and protect the Edwards Aquifer system** has brought much accomplishment and with it the promise of a better future.

**Thank you.**



# FROM TIME to TIME

**Where did the time go? Time flies. There's no time like the present. Don't waste your time.** People are familiar with the notion that time marches on at its own pace and we express how we deal with that in many ways. And while today's culture seems to be preoccupied with what's coming next due to the meteoric evolution of technology, there are very good reasons to maintain a solid connection to humanity's past. In South Central Texas, that past goes back more than 15,000 years.

"Not that long ago, the archaeologist community used to look skeptically at any information that claimed humans lived in this part of the state any more than 10 to 12 thousand years ago," said Mason Miller, an archaeologist and cultural resource specialist for AmaTerra Environmental, Inc. "But as more artifacts are uncovered and our science progresses, that whole notion is changing to accept the fact that people lived here at least 15 millennia ago."



One of the places archaeologists tend to find historical facts like that are near waterways, especially in areas the Edwards Aquifer delivers clean water through the San Marcos Springs and Comal Springs.

Miller explained that he and his colleagues at AmaTerra have been working with the Edwards Aquifer Habitat Conservation Plan (EAHCP) for nearly a decade. He is called in to review the need for cultural resource preservation in EAHCP work plans designed to mainly restore and protect the endangered species habitat. Cultural Resource Management typically deals with preserving those resources associated with physical places or things deemed important to documenting human history.



Old Stone Fountain Well at the Headwaters of the Comal.

**"I'VE FOUND THAT WHILE THE EAHCP IS DOING EXCELLENT ENVIRONMENT PRESERVATION WORK, THEY ARE ALSO WELL ATTUNED TO PRESERVING THE CULTURAL RESOURCES THAT HUMAN HISTORY ASSOCIATED WITH THEIR PRIMARY FOCUS."**



Historic Fire Hydrant.

# FROM TIME to TIME

And, the places they are working are typically parklands, easements and such which are subject to State of Texas antiquities laws and federal statutes as well. So, as an EAHCP project is developed, they contact us as their cultural resources contractor to guide them on whether that project needs a cultural resources protection component or not. "Sometimes we will recommend alterations to projects in order to avoid disturbance of resources in the project area. For example, we might ask if the project could be wider rather than deeper to preclude deeper digging into the soil where cultural resources reside. Additionally, we facilitate communications between the regulatory agencies to ensure we comply in all aspects of the law" said Miller.

One of Miller's primary projects, which is a coordinated effort with the EAHCP, the City of New Braunfels and New Braunfels Utilities, has been the development of the Headwaters at the Comal facility and bioretention basins. He explained that there are thousands of years of human history preserved at that location which is adjacent to the Comal Springs.



**THERE ARE ARCHAEOLOGICAL RESOURCES SUCH AS LIMESTONE ROCK OVENS, VARIOUS TYPES OF TOOLS AND ANIMAL REMAINS WHICH HAVE BEEN UNEARTHED THROUGH CAREFUL EXCAVATIONS THAT SHOW LARGE GROUPS OF PEOPLE INHABITING THE HEADWATERS SITE.**



Preserved Land at the Headwaters at the Comal.



Then there is the City of New Braunfels' first municipal water well and correlating buildings dating back to the 1930s located on the property to be accounted for.

"We did our first walkthrough at the Headwaters facility in 2015," Miller recalled. "This used to be a utility yard of New Braunfels Utilities before they enabled the transformation to an environmentally restored public place. So, before that transformation began, a team of archaeologists completed a site survey by digging in various locations on the property to determine the importance of the artifacts found.

We did find that there were many important resources still there. Additionally, the architectural group took a look at the original water well and connected facilities.

**"OVERALL, WE DOCUMENTED SEVERAL DIFFERENT HISTORICALLY SIGNIFICANT ASPECTS OF THE HEADWATERS SITE, AND BECAUSE OF THAT, WE ALSO STAYED ON THROUGH CONSTRUCTION TO MONITOR THE WORK BEING DONE."**



Examples of stone artifacts.



Many times, there can be misconceptions about the role of the federal and state governments' priorities for requiring archaeological work before a construction project begins.

Miller explained that the agencies responsible for preserving cultural resources aren't interested in stopping projects because someone finds a random arrowhead or old bottle.

They focus their attention and management priorities on those cultural resources that are important.

They then try to find ways to avoid impacting them or mitigate for their loss if avoidance isn't possible.

"There is plenty of historical evidence in the area of the Edwards Aquifer that this has been relatively densely populated in part because of the bountiful supply of water," Miller said.

"Additionally, there was good hunting, a good supply of plants and trees and fishing to provide other essentials for surviving. With that knowledge, I was really expecting to find historical evidence of human habitation going back 10,000 years or so.



Gabion wall protecting the spring openings along the Comal.



**"BUT, OUR EXCAVATIONS ONLY TURNED UP ARTIFACTS DATING TO 5,000 YEARS. I STILL THINK THERE ARE PROBABLY RESOURCES AT THE HEADWATERS SITE THAT WOULD POINT TO EARLIER INHABITANTS, BUT WE JUST DIDN'T FIND THOSE TYPES OF DEPOSITS IN THE AREAS WE ANALYZED."**



“Often, people think that archaeologists are just itching to dig up anything and everything we can. But in reality, the best archaeological site is one that is left alone and the artifacts not disturbed.

I say that because there could be people and technology in the future that could learn more about previous societies than we can now.

And one thing you can't get around in my line of work is that by studying a site, we are destroying it, in a way, because as we dig we can never put it back.

So, our job is to learn as much as we can about the cultural resources located in the areas we dig up to mitigate for the act of digging up those areas in the first place.”

Miller concluded by emphasizing that today's society studies these resources because they give our history and culture tangible substance.

People's lives become physically real rather than just pages in a book. They are objects and places that tell the good and the bad of who we are and where we came from. It's that physical presence that connects us with these long-gone lives and voices.

Each generation can learn from the ruins and the objects of the past. These are the souvenirs of societies linked together by time. ■



Lauren Strack, Headwaters at the Comal assistant manager, and Mason Miller, AmaTerra Archaeologist.





SAWS Aqua Vista - the beginning of Vista Ridge.



## AQUIFER MANAGEMENT

**“UNIQUE” ALWAYS SEEMS TO BE A WORD ASSOCIATED WITH DESCRIPTIONS OF THE EDWARDS AQUIFER.**

It is one of the most prolific artesian aquifers in the world. Even today, it continues to be the major source of water for the Edwards Aquifer Region that includes a major agricultural center, the seventh largest city in the U.S. and free-flowing springs that are home to numerous endangered species. The story behind the current management system of the Edwards Aquifer could also be included in a “one-of-a-kind” portrayal.

## AQUIFER MANAGEMENT



SAWS ASR H2Oaks Center.

**A**fter all, the road to today's status quo is lined with water wars, major court battles, claims that the Edwards Aquifer could supply the entire State of Texas with water, and enough colorful characters to create a best-seller.

While the Edwards Aquifer story has evolved into a more collaborative construct, today's managers think it is critically important for future users of this fresh water to understand its history, is quite the success story.

"There are really two parts to the Edwards Aquifer water use story," said Edwards Aquifer Authority (EAA)

Director of Regulatory Affairs Earl Parker. "From the 1940s to about 1997, we saw the amount of water being withdrawn from the Edwards on an upward path.

Once we hit the peak withdrawals in late 1980s of about 550,000 acre-feet, those water use numbers flatten out and then begin to reduce for the following two decades. Actually, we have a chart that demonstrates this incredible journey in a glance. The logical follow up question is why this impressive turnaround occurred.

The answer is people from around the region were brought to the table



**"THE LOGICAL FOLLOW-UP QUESTION IS WHY THIS IMPRESSIVE TURNAROUND OCCURRED. THE ANSWER IS PEOPLE FROM AROUND THE REGION WERE BROUGHT TO THE TABLE AFTER THE FEDERAL GOVERNMENT FOUND THE EDWARDS REGION WAS VIOLATING THE ENDANGERED SPECIES ACT IN THE EARLY 1990S."**





## AQUIFER MANAGEMENT

after the federal government found the Edwards Region was violating the Endangered Species Act in the early 1990s.

Rather than giving up control of the Aquifer to the federal government, local officials went to the state legislature to have a water management system put in place.

That was the beginning of the Edwards Aquifer Authority and the start of people focusing on collaborative solutions to our water issues.

Since the EAA began regulating pumping from the Edwards Aquifer, we have never seen more than 450,000 acre-feet withdrawn in a single year."

**"SINCE THE EAA BEGAN REGULATING PUMPING FROM THE EDWARDS AQUIFER, WE HAVE NEVER SEEN MORE THAN 450,000 ACRE-FEET WITHDRAWN IN A SINGLE YEAR."**



One of the first tasks the EAA accomplished was establishing the water rights permitting system. The State of Texas is a "rule of capture" state meaning that landowners have the right to pump the water beneath their property. However, settling the Endangered Species Act lawsuit required a water management system for the Edwards Aquifer.

Establishing that permit system was the single-most important part of a larger plan to protect the endangered species supported by the Edwards Aquifer.





## AQUIFER MANAGEMENT

The second task included the creation of the Edwards Aquifer Habitat Conservation Plan (EAHCP), which took nearly half a decade to establish. By 2013, the EAHCP was submitted to the U.S. Fish and Wildlife Service (USFWS) and the Edwards Region received a 15-year permit known as an “Incidental Take Permit.” “The establishment of the Edwards Aquifer water permits and the issuance of the Incidental Take Permit were two high water marks for the region,” Parker noted.

**“THE ESTABLISHMENT OF THE EDWARDS AQUIFER WATER PERMITS AND THE ISSUANCE OF THE INCIDENTAL TAKE PERMIT WERE TWO HIGH WATER MARKS FOR THE REGION”**

“But the major accomplishments were just beginning. San Antonio Water System (SAWS), which is responsible for the City of San Antonio’s water supply and management, took some major steps forward after their water rights permits were issued. And we’re definitely seeing the fruits of that work today.” Darren Thompson, SAWS Water Resources Director, explained that their Edwards permits gave them some sense of certainty in knowing what they could expect to use from the Edwards Aquifer from then on.



Earl Parker (left), EAA Director of Regulatory Affairs, Patrick Shriver (center), SAWS, and Darren Thompson (right), SAWS.

However, those limits also created an immediate need to find additional supplies of water to meet the demands of a growing major American city.

“My first task with SAWS was in helping solidify our historical pumping rights,” Thompson commented. “When we were done, it became quite obvious we didn’t have enough water to meet the City of San Antonio’s growing requirements over the next 20 years.

We had to get creative in short order to make sure our water resources were where they needed to be. Water conservation was the cheapest and quickest way to make more water available.

Then, SAWS built one of the largest water recycling programs in the country. After that, we built the Aquifer Storage and Recovery Project (ASR), which is now not only a key water storage asset for SAWS but for the EAHCP as well.

**“WE HAD TO GET CREATIVE IN SHORT ORDER TO MAKE SURE OUR WATER RESOURCES WERE WHERE THEY NEEDED TO BE. WATER CONSERVATION WAS THE CHEAPEST AND QUICKEST WAY TO MAKE MORE WATER AVAILABLE.”**



## AQUIFER MANAGEMENT

About a decade ago, we began building the 50,000 acre-foot Vista Ridge Project, which is a gigantic step forward for ensuring San Antonio has plentiful water for the next 25 years or so.

When you bring on that much water for customers, our need to pump water from the Edwards Aquifer diminished dramatically. That obviously keeps more water in the Edwards [Aquifer] and has a direct benefit to springflows in [the Comal River] in New Braunfels and San Marcos [River] where the endangered species live.

In the last three years alone, our reliance on the Edwards Aquifer has gone from 77 percent to 58 percent. That's definitely the lowest it has been in modern times."

Thompson and Parker agreed that over the years, the Edwards Aquifer Authority has transitioned to becoming more of a facilitator of water management and research than strictly a regulator.

"The success of the EAHCP is critical to the region being able to renew its Incidental Take Permit in the next few years.

So, we not only want to be a great partner there, but we want to be the center for excellent scientific research and data to give water managers accurate decision-making tools to use.

"Looking back at where we came from, you quickly realize that everyone in the region has made great water management strides.

The agricultural community is way more efficient at irrigating crops and has embraced the use of technology in doing so. SAWS has become a leader in the nation in water conservation and water recycling, plus it has invested in bringing on a major water supply project and a huge water storage facility.

The leadership in New Braunfels and San Marcos has aggressively taken out non-native plants and animals in the spring areas to help restore the ecosystem to its native environment which benefits the endangered species.

And all of this has been accomplished by people working together. It is quite a success story and an instructive one at that." ■





**WHERE THERE'S A WATERWAY**

**THERE'S A WILL**

WHERE THERE'S A WATERWAY  
THERE'S A WILL



Gaylord Nelson, the former Wisconsin Governor and founder of Earth Day, had a particularly salient quote that interestingly enough didn't reference the environment.

He said, "The ultimate test of a person's conscience may be the willingness to sacrifice something today for future generations whose words of thanks will not be heard." That quote singularly epitomizes the heart and soul of the Texas Stream Team, a diverse group of citizen scientists giving of their time and talents to ensure the state's natural waterways are preserved for decades to come.

"The State of Texas contains more than 191,000 miles of streams and rivers," stated Aspen Navarro, program coordinator for the Texas Stream Team.

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**'THE ULTIMATE TEST OF A PERSON'S CONSCIENCE MAY BE THE WILLINGNESS TO SACRIFICE SOMETHING TODAY FOR FUTURE GENERATIONS WHOSE WORDS OF THANKS WILL NOT BE HEARD.'**

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"And while there are numerous governmental agencies and contractors who monitor the water quality in those waterways, there aren't nearly enough to conduct testing on a monthly basis and that's where our citizen scientists step in.

Throughout the entirety of our program we have trained a little over 11,000 citizen scientists. In total, we have 1,368 monitoring sites in Texas that has water quality data. Of those, 244 are currently being monitored and are active.





WHERE THERE'S A WATERWAY  
THERE'S A WILL



A few members of the Texas Stream Team: Desiree Jackson, Aspen Navarro, Daniel Vasquez.

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**IN TOTAL, WE HAVE 1,368 MONITORING SITES IN TEXAS THAT HAS WATER QUALITY DATA. OF THOSE, 244 ARE CURRENTLY BEING MONITORED AND ARE ACTIVE.**

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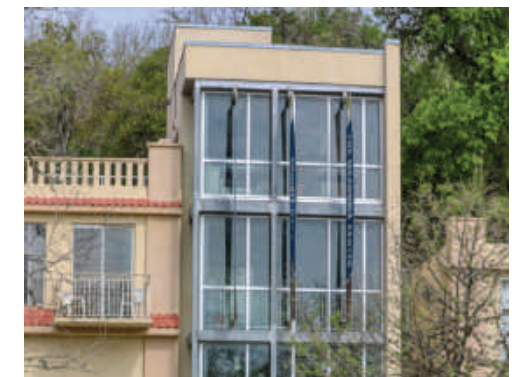
And while we recognize that we have a significant number of members now, we'd love to see that 11,000 number double, and we are constantly working on growing our team."

The citizen volunteer groups began during the mid-1970s when the U.S. Environmental Protection Agency (EPA) started creating a set of environmental regulations for the country.

They knew they wouldn't have enough scientists to conduct the level of testing required in the regulations, so they initiated citizen volunteer groups to assist with that. Texas' statewide citizen scientist programs began operating in 1991.

The Texas Commission on Environmental Quality (TCEQ) worked initially with Texas State University's Geography Department in developing the program. It was ultimately relocated to Texas State University's Meadows Center for Water and the Environment.

The Meadows Center's work begins with Spring Lake, one of the largest artesian springs in the world, and then reaches out across Texas and beyond.



WHERE THERE'S A WATERWAY  
THERE'S A WILL



“A good portion of our group’s funding comes from federal 319 grant funds from the Environmental Protection Agency. But because our group has grown so much over the last several years, we must also utilize other grant awards to sustain our work,” Navarro noted.

“We never want to turn anyone away from joining Texas Stream Team. In fact, our citizen scientists range from school age kids to senior citizens.

And while we have many environmentally knowledgeable people in our group such as Master Naturalists, you do not have to have any experience to become a Texas Stream Team citizen scientist.

We regularly conduct training classes that teach you all you need to know about collecting water samples and then using a test kit to accurately check certain water quality parameters in those samples.”

All of the water quality testing data is funneled into the Meadows Center’s Waterways Dataviewer database.

Every water quality test result goes through quality control review before being uploaded to the database which is then converted into a public Datamap.

Once on the Datamap, anyone can take a look at the water quality samples in their area to obtain an up-to-date snapshot of the quality of the surface water in their location.

Some of the larger Texas Stream Team groups have data coordinators who gather the groups’ test results and submits them directly to the database.

However, an individual citizen scientist can submit their test results via email for inclusion in the database.

Texas Stream Team data is also accessible through EPA’s Water Quality Exchange database, where the data gets uploaded biannually.

While the Texas Stream Team does offer advanced water quality testing training, the standard training covers testing for dissolved oxygen, pH, water temperature and conductivity. Why are these core four parameters important?

Low levels of oxygen in the water can be an indicator of excess organic materials, such as large algal blooms, depleting a stream’s oxygen supply which aquatic animals need.

The pH values can provide signs of too many metals being dissolved by the water. Conductivity measures how much sediment is in the sample. And finally, water temperature values can help indicate the health of a stream over time.

Some plants and animals survive best in warm water while others, like the endangered species in the Comal Springs and San Marcos Springs, thrive in cold water.



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**SINCE TEXAS STATE UNIVERSITY IS A STAKEHOLDER OF THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN, ANY EARLY INDICATION OF WATER QUALITY ISSUES CAN QUICKLY BE COMMUNICATED TO EAHCP STAFF WHO MONITOR THE HABITAT CONSERVATION AND RESTORATION EFFORTS IN THE SPRING SYSTEMS FOR THE FEDERALLY PROTECTED SPECIES.**

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## WHERE THERE'S A WATERWAY THERE'S A WILL

Regularly documenting water temperatures can give environmental managers critical data they need to evaluate evolving changes to their streams and rivers.

Since Texas State University is a stakeholder of the Edwards Aquifer Habitat Conservation Plan, any early indication of water quality issues can quickly be communicated to EAHCP staff who monitor the habitat conservation and restoration efforts in the spring systems for the federally protected species.

"While we do teach other types of advanced water quality testing, we really focus on those four core parameters to let us know the health of the stream at the time of a particular sampling," Navarro explained. "Those consistent numbers over time helps us establish baselines for our waterbodies.

When a high runoff event occurs after a heavy rain, or maybe even some sort of pollutant contamination happens, we can look at the data and know the severity of impact to the stream.

And because we are conducting sampling more often than the state does, we could catch a problem in a timelier fashion which then allows TCEQ and others responsible for managing stream quality to take action. Our thought is that you can never have too much data."

One of the newer focuses for developing the Texas Stream Team into the future is through the development of university student chapters.

Texas State University established the Bobcat Stream Team (BST) in 2016 to advance student interest in watershed awareness and water resource protection. Likewise, the BST provides students with hands-on professional skills such as organization, leadership, teamwork and communication that can help them in their future careers.

This year the Texas Stream Team turns 30 years old making it one of the longest-running citizen scientist programs in the nation.

"We have lots of plans to celebrate this milestone in our group's history," Navarro said. "In October, we'll be putting on a Stream Team Fest conference.

Given COVID, the conference will be held mainly online. And for those who didn't know, April is global citizen scientist month and we'll be giving away a standard core water quality testing kit as well as stepping up our presence on social media. And the anniversary celebration also gives us another opportunity to talk about the Environmental Excellence Award we won a couple of years ago.

Overall, we really are happy about the way the Texas Stream Team is growing. We know that we're expanding our ability to preserve Texas waterways and helping communities understand the importance of that work and involving them in the process as well."

And while this current group of Texas Stream Team members may not hear those words of thanks from people enjoying Texas waterways 50 years from now as Governor Gaylor alluded to, they can most definitely hear our words of thanks now for a job well done. ■

(Opposite page) A few members of the Texas Stream Team: Desiree Jackson, Aspen Navarro, Daniel Vasquez.



# EDUCATION OUTREACH CENTER

## UPDATES



The EAA Education Outreach Center (EOC) at Morgan's Wonderland Camp (MWC).

The drive up to the Education Outreach Center (EOC) looks a little different these days. Wrought iron gates emblazoned with butterflies greet drivers at the entrance to Morgan's Wonderland Camp.

A sign that says "SPEED LIMIT 19" feels less like a warning and more like a countdown to fun on the one lane road leading up to the camp and all its amenities.

Other signs warn of "free range campers" and of "spontaneous dance parties." Horses and donkeys line up to greet you as you make your way down the road to the Edwards Aquifer Authority Education Outreach Center.

The outside of the EOC looks a little different too these days. A hog wire rail has been installed and stained around the patio for added security and to separate the demonstration garden from the breezeway.



**A SIGN THAT SAYS "SPEED LIMIT 19" FEELS LESS LIKE A WARNING AND MORE LIKE A COUNTDOWN TO FUN ON THE ONE LANE ROAD LEADING UP TO THE CAMP AND ALL ITS AMENITIES. OTHER SIGNS WARN OF "FREE RANGE CAMPERS" AND OF "SPONTANEOUS DANCE PARTIES."**



A small rainwater collection tank has been put in place to irrigate the garden which will feature plants native to the area. A drip irrigation system will be snaked throughout the garden supplied by the small rainwater tank.

The small rainwater tank is part of a larger system which collects rainwater from the roof of the EOC.

A partnership has blossomed between the San Antonio River Authority and the EAA as the two agencies work together to install the garden and drip irrigation system.

Drought tolerant plants such as Rock Rose, Purple Coneflower and Turk's Cap have been purchased and volunteers will be putting them into the rocky ground as soon as a six-foot fence is complete.

The fence is intended to keep the plants safe from the area's wildlife which includes white tail deer, armadillos, and a variety of birds.

A red gravel path in the garden will serve as a stage for lessons on water conservation.

Doors to the EOC have been programmed and the building can now be locked when empty although it remains mostly open for contractors as they put the finishing touches on the building.

Furniture and supplies are starting to move in, and staff will soon be able to office on site.

Inside the building, the walls of sheet rock have been taped and floated and a fresh coat of paint has gone up.

The ceiling and rafters have been painted a dark navy blue giving the entire space a cave-like feel.

Communications and Development Intern, April Myers, had the opportunity to visit the EOC to observe two of our EAA scientists, Gizelle Luevano and Brent Doty perform well water testing.

April said she was "torn between taking pictures and wanting to just ask questions, because it was so interesting to listen to the reasons for the testing."

The tests that were being used measure in parts per trillion, meaning they are very sensitive and can even be affected by people in the area wearing sunscreen or insect repellent.

The well was also being tested to find out how old the well water is.

This is done using carbon 14 testing, which is also what archaeologists use to date artifacts.

Despite the heavy rains and thunderstorms that persisted in May, two very special groups came out to visit the EOC and the Field Research Park (FRP).

Representatives from HEB and Valero were treated to tours of both facilities as well as a ride through the field in an off-road vehicle.

Mark Hamilton, Executive Director, Aquifer Management Services drove guests through the Field Research Park pointing out all the methods and instruments used to study the Edwards Aquifer. ■

April Myers, EAA Communications and Development Intern, takes notes as Gizelle Luevano, EAA Lead Hydrologic Data Coordinator and Brent Doty, EAA Research Manager, test the water quality of a well on Morgan's Wonderland Camp.



**THERE IS STILL A LOT OF WORK TO BE DONE AS WE PREPARE THE BUILDING FOR EXHIBITS. FLOORS MUST BE PREPPED, AND INTELLIGENT LIGHTING HAS BEEN SELECTED. THE FINISHING TOUCHES ARE IN THE WORKS, AND EXHIBITS ARE GOING INTO PRODUCTION. EXHIBITS AND DISPLAYS ARE DUE TO START LOADING INTO THE BUILDING IN SEPTEMBER. IN THE MEANTIME, OUR INTERNS ARE PRODUCING EDUCATIONAL VIDEOS AND ACTIVITIES TO KEEP THE LEARNING GOING THROUGH THE SUMMER. WATCH OUR SOCIAL MEDIA FEEDS FOR MORE!**



# AUGUST IS NATIONAL WATER QUALITY MONTH



## CLEAN WATER. It might not always be what you think of when you go to reach for a glass of water, but the quality of water is as valuable as the quantity of water available to you.

This August is National Water Quality Month, and every year across the nation it's observed to bring awareness to the significant role water plays in our everyday lives, how much we depend on access to clean water for our health, agricultural needs, environmental needs, and beyond.

The story of water quality began back in 1972 with the Clean Water Act, which established regulations for discharges of pollutants into the waters of the U.S. and regulating quality standards for surface waters (Summary of the Clean Water Act, 2020).

Then, in 1974 the Safe Drinking Water Act was passed by Congress to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires further actions to protect not only drinking water but its sources, such as, rivers, lakes, reservoirs, springs, and groundwater wells (Overview of the Safe Drinking Water Act, 2021).

These acts paved the way for people and organizations across the nation to make efforts to promote better practices to ensure the quality and conservation of natural water resources.



EAA Lead Hydrologic Data Coordinator, Gizelle Luevano, conducts water quality sampling from Comal Springs at Landa Park in New Braunfels, Texas.

Even so, sustaining these measures is an ongoing necessity for not only people, but wildlife too. The threatened and endangered species protected by the Edwards Aquifer Habitat Conservation Plan (EAHCP) that live within the Edwards Aquifer System are considered indicator species, meaning their health can offer insight to the health of their environment (e.g. Comal and San Marcos Springs ecosystems).

To understand the health of the aquifer the EAA operates nine continuous water quality monitors at the Comal Springs and the San Marcos Springs as part of the EAHCP.

The EAA's water quality testing processes measure the following parameters in 15-minute intervals: water temperature, specific conductance, dissolved oxygen, pH, and turbidity.

This data is then sent to the water quality data service "EnviroNet" and "Aquarius Samples" where it is then analyzed and recorded for the use of any interested party. "It is important for us to study the aquifer's water quality now because it will give us insight on how to better protect it for future generations and for the threatened/endangered species," says Gizelle Luevano, the EAA's Lead Hydrologic Data Coordinator.

In addition to these water quality monitoring sites, samples are taken yearly from approximately 8 rivers, 9 springs, and 50 wells to analyze the water for man made contaminants such as herbicides, pesticides, volatile organic compounds, semi volatile organic compounds, and bacteria.

This information is available in the "Water Quality Summary" every year on the EAA website at <https://www.edwardsaquifer.org/science-maps/research-scientific-reports/hydrologic-data-reports/>.

What can you do to help protect the quality of our invaluable water resources?

A great start is to be mindful of how your personal activities can positively or negatively impact the environment.

This can be as simple as choosing to wash your car at a car wash where you end up saving water and preventing toxic chemicals from flushing into the storm system or opting to using a broom to clean your driveway instead of hosing it down.

Also, rainwater harvesting via rain barrels is a great way to collect water for watering your landscape or refrain from using fertilizer with phosphorus, and instead opt for a more organic material.

If you are interested in participating in community events check your city's event calendar for stream/river cleanups, tree-planting, or join a cause related to water conservation/awareness.

Whichever way you decide to make a positive environmental impact helps spread awareness amongst your family, friends, and community by inspiring them to do the same! ■

### Citations:

August is National Water Quality Month. (n.d.). National Water Quality Month. <https://nationalwaterqualitymonth.org/>

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**This summer we are featuring the Limestone Squad series on our Facebook and Instagram accounts where we share firsthand insights into the various roles our staff serve to collectively manage, enhance and protect the Edwards Aquifer. Learn more about the people that work at the EAA, and their careers by following us at our Social Media links listed below:**



**@TheEdwardsAquifer**



**@EdwardsAquiferAuthority**



SEASON 2, EPISODE 5

## **I.Y.C.K. ANIMAL OF THE YEAR CAVE BEETLES**

As you all may know by now this year is International Year of Caves and Karst, and the 'cave beetle' has been designated as animal of the year. Hosts Ann-Margaret and Brent discuss two endangered beetle species with Edwards Aquifer Habitat Conservation Plan (EAHCP) Department's Kristy Kollaus, EAA Environmental Scientist, and Kristina Tolman, EAA Habitat Conservation Coordinator.

To listen to the podcast visit  
[www.edwardsaquifer.org/news-community/the-recharge-zone-podcast/](http://www.edwardsaquifer.org/news-community/the-recharge-zone-podcast/)



Comal Springs riffle beetle.





## **A 25-YEAR EAA PERSPECTIVE: LUANA BUCKNER AND CAROL PATTERSON**

We've officially made it to the anniversary month that launched the EAA into existence back on June 28, 1996, and on this episode hosts Ann-Margaret and Brent have two very special guests that have held longstanding positions on the EAA board since the EAA began operations, EAA chairman Luana Buckner, representative for Medina / Atascosa Counties, known as District 13 and board member Carol Patterson, representative for Bexar County, District 1.

Hear their perspectives from serving on the board to the work the EAA has done and continues to do to manage, enhance, and protect the Edwards Aquifer.

To listen to the podcast visit  
[www.edwardsaquifer.org/news-community/the-recharge-zone-podcast/](http://www.edwardsaquifer.org/news-community/the-recharge-zone-podcast/)

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(Opposite page) Starting from the left, EAA Board Member Carol Patterson and EAA Chairman Luana Buckner.



# PLUGGING AWAY AT THE EAA

**Addressing abandoned and deteriorated wells in its region is one of the many endeavors at the Edwards Aquifer Authority. Abandoned wells with no future planned use require a permanent fix - specifically, plugging - to ensure that contaminants do not harm the Aquifer. Properly plugging a well is a critical task ensuring that the mission elements of managing and protecting the Edwards Aquifer are satisfied. The EAA employs a team whose workload includes responsibility for the proper addressing of these wells in due time.**

**R**oger Andrade, Groundwater Protection Manager for the EAA, oversees a team which is responsible for identifying the subject wells and properly notifying property owners of any abandoned well issues on their properties. But that is not the end of their work. In fact, in the interest of facilitating solutions, the EAA remains engaged with landowners and their contractors. And while the repairs of abandoned wells are the primary responsibility of the landowner, who secure expert contractors that perform all the essential work, the EAA maintains communication, providing contractors with data, research, and guidance to ensure the work is done properly.

EAA staff provide historical well data, which allows for a more accurate estimate for repairs. These calculations are especially vital on the larger flowing artesian wells. The cost of mobilization alone to plug these wells can run into the tens of thousands of dollars, as rig and

equipment time, along with the need for appropriate personnel on-site, adds up. Once a contractor is secured, the planning for the well plugging commences.

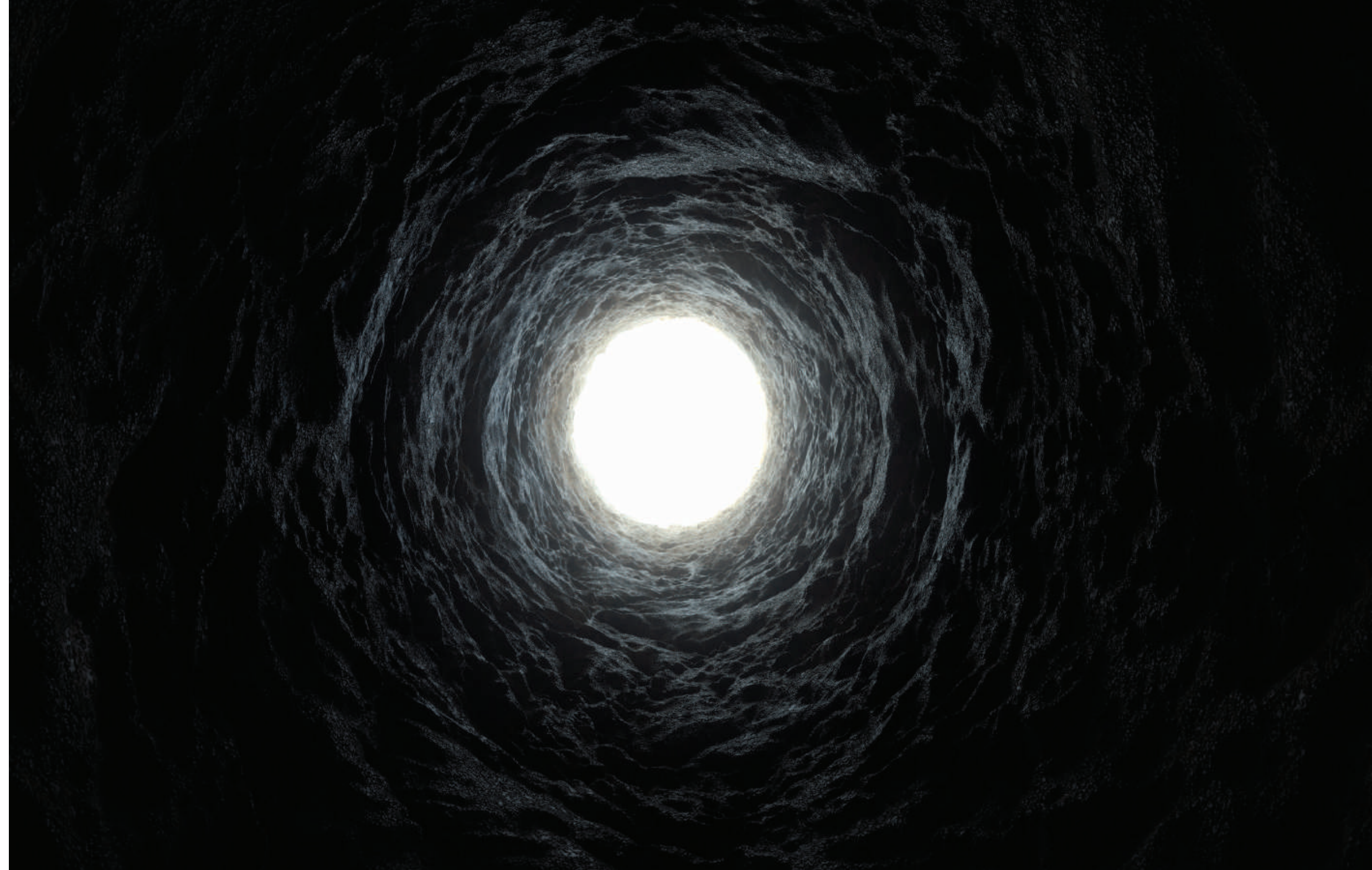
EAA staff and the contractor discuss and review the plugging specifications within the plugging application.

Typically, there is back and forth discussion between staff and contractor to make sure all the potential scenarios have been discussed and a plan developed, should a worst-case scenario arise.

For example, with the larger flowing artesian wells, a geophysical log may not be on file, and it may not be possible to issue the complete permit before work commences.

To secure a geophysical log, well flow would need to be controlled with mud, much like it would be when the actual plugging occurs, when larger tankers with water, mud and cement are on-site.

Hence, it makes eminent sense to save effort, time, and most importantly, money for the landowner, by being flexible.



# PLUGGING AWAY AT THE EAA

Once the well is accessed, whether through pump or valve removal, and mud is pumped down and flow under control, the well can then be logged at that time. Based on those results, the plugging permit will then be issued or revised, and the work can typically continue.

An added level of complexity occasionally arises when these types of wells are obstructed. An obstructed well is a complex undertaking, and much more so when it is a flowing artesian well. An added element of complexity arises when there is a petroleum seep from one of the overlying formations.

This was the case with a recently plugged well in Von Ormy, Texas. The well was deteriorated, and the seepage exhibited a petroleum component.

Because the well was obstructed or collapsed the drilling contractor, after significant effort, could only advance to a depth of 480 feet. Initial attempts to perform geophysical logging were unsuccessful. Significant amounts of sand coming into and already in the well made it extremely difficult to continue further.

A point was reached where it became financially unfeasible to continue a clean-out effort -- there was the potential to make matters worse had equipment become lodged in the well.

This would have been costly to the contractor. In a situation like this, EAA groundwater staff ensures that a good faith effort to clean out the well has been exercised.



Well plugging.

Taking into consideration potential liabilities for continuing work on the well, including excessive costs, staff approved a variance for the geophysical log requirement, approved plugging the well from the obstruction depth, which allowed the effort to continue. Ultimately, the well was successfully plugged.

The evolution of the EAA's regulatory approach is on full display in plugging wells. Rather than simply mandating an action, and then leaving landowners and contractors to their own devices, the EAA has adopted a customer

**"WE UNDERTAKE RESEARCH FOR WELL DATA. OUR STAFF GOES TO GREAT LENGTHS TO RESEARCH WELL INFORMATION, OFTEN VISITING AND SCANNING OLD ARCHIVES AT THE UNITED STATES GEOLOGICAL SURVEY OR THE OFFICES OF SAN ANTONIO WATER SYSTEM AND PORE THROUGH HUNDREDS OF DOCUMENTS LOOKING FOR DATA ON SPECIFIC WELL SITES" STATES ANDRADE.**

service philosophy that encourages continued side-by-side support to successfully complete the work.

"Without this research, essential data would not be readily accessible. It's our responsibility, and one we are happy to conduct to get the job done and minimize mistakes, ultimately keeping costs for landowners down."

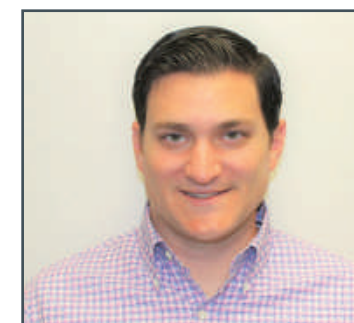
With 127 total plugged wells since 2019, including drill-through Edwards wells, the EAA Groundwater Management team has been busy, and will continue to "plug away" with a positive and cooperative attitude, ensuring that the waters of the Edwards Aquifer are properly managed and protected. ■



**Roger Andrade,**  
EAA Groundwater Protection Manager



**Mariah Bonham,**  
EAA Groundwater Protection Coordinator



**Ben Jacobson,**  
EAA Groundwater Protection Coordinator



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EAA Sr. Well Construction Coordinator



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**25<sup>th</sup>**

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