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President's Pen: Move Over, iNat, NABat Swoops In! Sharon Hamilton



New Jersey Volunteer Jerry Jackson with new detector and car mount ready to conduct mobile acoustic survey.

climate factors threaten bat populations.

Threats to North American bats include white-nose syndrome, habitat loss, and human disturbance, especially in winter. Bats burn through fat reserves very quickly if they are disturbed during deep hibernation. Wind energy production especially affects migratory bat species, as they may be attracted to and killed by turbines. Drought, extreme heat, extreme freezing, and other weather and

The **North American Bat Monitoring Program** is a network of people in the US and Canada who use standardized protocols to gather data, allowing investigators to assess population status and trends, inform responses to stressors, and help sustain viable bat populations.

Recognizing a need for consistent methods of monitoring bats, scientists from USGS reviewed the literature and now promote and use improved methods for counting the animals, whether using acoustic equipment, colony counts, or captures.

According to **Dane Smith of USGS**, **"you can't put GPS technology on a bat—it's too heavy."** Radio monitors do work, but the receiver is limited, as it must be within one

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mile of the animal in order to record data. When bats hibernate, investigators can use computer software analysis of photographs to count individuals. "The computer puts a dot on each nose. Count the dots," remarked Smith.

The NABat monitoring program uses grid-based sampling frames of 10 X 10 km

(6.2 x 6.2 miles) cells for individuals to monitor. To participate, you **put an acoustic monitor such as an AudioMoth on your vehicle or have a passenger hold a pole-fastened microphone through your sunroof and drive around within your assigned cell.** The monitor senses bat calls at frequencies between 8—200 kHz. For reference, human hearing senses at less than 20 kHz. Frequencies are species



specific and bats signal for both hunting and communication.

Acoustic monitoring passively records echolocation calls, so no harm comes to the bats. Other advantages of this technology for counting bats is that costs are relatively low, using acoustic monitoring is more reliable than capture and release, and it requires little expertise by the individual, as computer software identifies the species making recorded calls. Repeated visits to the same site provides for measuring population trends.

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According to Smith, the biggest barrier to monitoring is getting permission from landowners. Stationary surveys can also be performed, using pole microphones set over 3 meters (just under 10 feet) above ground. Where are the best places to listen and look for bats? At waters' edge, forest openings, rock features, and "wide-open places." Clutter impacts data as echoes result in inaccurate readings.

Mobile acoustic surveys can estimate bat abundance. **Driving speed, about 20 mph, should be faster than the bats can fly, so that each data point is a different bat.** Within a single 10 x 10 km grid cell, a 15–30-mile route is followed, with no loops over the same spot. Individuals can make their own homemade mounts for vehicles. Readings should be taken about 45 minutes after sunset.

Individuals can help in different ways—collecting data, making data discoverable online, or analyzing data.

To learn about training provided, go to <u>https://www.nabatmonitoring.org/events</u> or contact <u>danesmith@usgs.gov</u>. Virtual training is also provided.

Check out this cool website! https://www.nabatmonitoring.org/

To look at results already collected, go to <u>https://sciencebase.usgs.gov/nabat/#/</u> results.

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Photo credit: https://www.usda.gov/media/blog/2017/10/24/celebrating-bat-benefitsduring-bat-week



Nabatmonitoring.com for more info

CROSS TIMBERS MASTER NATURALIST NEWSLETTER

February 2023 Monthly Announcements

February Meeting:

Our upcoming meeting on February 20, 2023 will be held in person and on Zoom, from 7:00 pm to 8:30 pm. Social time will start at 6:30 pm. Our guest speaker will be Akshaya Mohan, who will be leading a discussion on microplastics in our local fish communities. Hope to see you all there.

To all Members:

Your hours matter. Please record them within 45 days of service.

Hours may qualify as \$74 worth of matching funds so the State of Texas can receive money from the Federal Government. Let's get our tax dollars back in Texas!

Looking for the monthly Calendar of Events?

Please go to https://txmn.org/crosstimbers/events-calendar for a readable, upgraded calendar

Help us include as many Master Naturalist activities as possible to our online calendar.

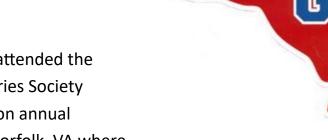
If you have CTMN items to add or corrections, contact Mary Beth Lampe at mblampe@gmail.com

Thank you!

<u>February Speaker - "Microplastics in Local Fish Communities "</u> <u>Akshaya Mohan</u>

Akshaya Mohan is a senior (Class of 2023) at Grapevine High School in Grapevine, TX. She is an honor student and leading member of her high school debate team. In 2022, she received the American Fisheries Society (AFS) Hutton Junior Fisheries Biology Program paid internship (there are typically 40-80 Hutton Internships awarded nationwide each year). Her research project was a continuation and expansion on her

sister's 2018 microplastics study examining the gastrointestinal tracts of fish collected from DFW reservoirs.



Last week, she attended the American Fisheries Society Southern Division annual conference in Norfolk, VA where

she presented the results of her research project. She competed against 14 undergraduate and graduate students for Best Student Presentation and was a runner-up. That makes her one of few high school students to attend the conference, one of fewer to present their projects, and even fewer (possibly the first) to ever win/ place in a best student presentation competition at that level of AFS.

Akshaya was awarded Early Acceptance to Duke University where she will enroll this coming fall to major in Environmental Ecology and Communications. She plans to work to reform law and policy to reduce the negative impacts of humanity on our environment.

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2023 Dues are Due!

You can pay on the ctmn.org website, bring a check to the meeting, or mail a check to our treasurer at:

Dee Ann McGinnis 2843 Co Rd 3838 Bridgeport, TX 76426

Please note, that the membership cost is now \$25.

Thank you for your continued support of our program.

Volunteer Opportunity: Savage Cabbage Bash JoAnn Collins

We are looking for help to eradicate Bastard Cabbage along the Trinity River near downtown. I started the Savage Cabbage Bash 8 years ago at FWISD's Young Women's Leadership Academy. We have done it every year except for the two Covid ones. I am trying to get students from the school to come along with anyone who wants community service, Master Naturalist hours, or just wants some exercise eradicating bastards!

On Feb 25th from 9-12 we will be meeting at Harmon Field Park at the small south parking lot and walking down to the river where the offender is spreading. This is just across the river from Opal's Farm. If you google Harmon field you can get directions. It's not easy to get to. There are two parking lots. Don't go to the large lot by the soccer fields. It's a small lot on the south side. Tarrant Regional Water District sponsors us and requests that we do this because of the past success of this effort.

This is a great opportunity for students to get community service, so bring your kids and the neighbors kids too! A screwdriver is usually a good enough tool to get them out of the ground. This rain will help loosen the soil so it should be easy to pull them. Dress for the weather and wear closed toed shoes. TRWD supplies gloves and trash bags. If anyone else wants to do their own bash, I have signs you can borrow, except for this day, of course! Wish we could somehow get the bastards along the highways!

Email JoAnn @joacollins@gmail.com or call 817-689-0098. If you know of scout troops or other groups that might want to participate, please ask them! It is edible! Take it home if you want some for dinner! Thanks so much!

CTMN Volunteer Achievements 2022

Please take a moment to help us congratulate those members that have recertified in 2022! They have completed, logged, and had 40 approved volunteer hours and 8 advanced training hours. They will all receive the Lightning Whelk Pin.

	DECEMBER	
Anabelle Corboy	Linda Little	Kristina Vera

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ILLUMINATIONS

Past, Present, and Future of Fern Research DORNITH DOHERTY

FEBRUARY 17 - JUNE 30, 2023

RECEPTION AND PANEL DISCUSSION 7 PM / FEBRUARY 17

The <u>Fort Worth Botanic Garden</u> is pleased to present "**Dornith Doherty: Illuminations: Past, Present, and Future of Fern Research**," an art exhibition free and open to the public from Feb. 17 through Jun. 30 at the Madeline R. Samples Exhibit Hall in the BRIT building at 1700 University Dr. Fort Worth, Texas 76107.

Gallery hours are 10 a.m. to 4 p.m. Monday-Friday.

For more information, please call (817) 332-4441.

The result of a two-year research-based creative affiliation with Vasco, Niño and Rehman, Doherty presents new large-scale artworks that engage with the past, chronicle the present, and project our possible ecological futures.

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It's time to clear the shelves!

We're hosting our annual Spring Clearance on all Texas Master Naturalist shirts, polos, and jackets in our AgriLife Learn Store. Get 20% off with the coupon code **TMNSPRING20** at checkout. The sale runs from now until <u>March 4, 2023 at mid-night!</u>

Size and colors may be limited.

https://agrilifelearn.tamu.edu/s/

(hint: search "TMN" or "Master Naturalist" to filter for our items!)

Gear up for the busy spring ahead.

Note that the coupon code does not apply towards hats, drinkware, or all TMN gear—only shirts, jackets, and polos.

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Cash or Check Only

Parker County Master Gardener Association's

Bring your own cart or wagon!

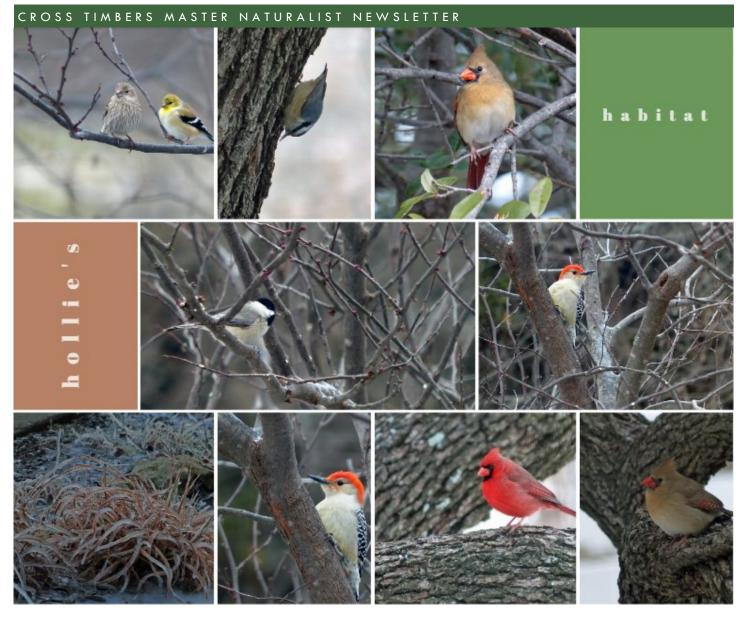
Bring your plant gardening questions to our "Ask a Master Gardener" table! Exciting Raffles again this year!

Proceeds help fund horticultural, educational, & local projects in Parker Co.

Pollinator Plants, Grasses, Annuals, Perennials, Vegetables, Herbs, Roses, Succulents, and MORE! Saturday 8AM-1PM April 8th, 2023

First Monday Trade Days Grounds at Heritage Park-Animal Area 317 Santa Fe Dr. Weatherford, 76086

Visit us at <u>www.pcmg-texas.org</u> Email - <u>pcmgatx@gmail.com</u> Facebook - Search Parker County Master Gardeners



From Top Left to Right:

- Female House finch next to a Goldfinch in winter plumage.
- A Red-breasted nuthatch is feeding on insects he finds in the bark of this Live Oak tree.
- The female Northern cardinal has puffed out her fathers to stay warm.
- A Carolina chickadee hanging out on a Redbud tree.
- Male Red-bellied woodpecker poses, allowing you to see a hint of the rusty red color of his lower belly.
- Little blue stem covered in ice. The seed head is bent to the ground, covered in ice, making it more difficult for the wildlife to feed on the seeds.

Sundays on the Prairie Jo Ann Collins

Lewis and Clark explored uncharted territories of the US from May 14, 1804 until September 23, 1806 to explore the Louisiana Purchase and search for the mouth of the Mississippi. This excerpt is from William Clark's diary dated the 4th of July 1804. I wonder if his impressions of the prairies changed over the course of the expedition. The language is all original.



"The Plains of this countrey are covered with a Leek Green Grass [big blue-stem], well calculated for the sweetest and the most norushing hay-interspersed with Cops [copses] of trees, Spreding ther lofty branchs over Pools Springs or Brooks of fine water. Groops of Shrubs covered with the most delicious froot is to be seen in every direction, and nature appears to have exerted herself to butify the Senery by the variety of flours Delicately and highly flavered raised above the Grass, which Strikes & profumes the Sensation, and amuses the mind throws it into Conjecterng the cause of So magnificent a Senerey in a Country thus Situated far removed from the Siv-ilised world to be enjoyed by nothing but Buffalo Elk Deer & Bear in which it abound & Savage Indians."

- William Clark, near the Missouri River, northeastern Kansas (now Doniphan County) July 4, 1804

Sundays on the Prairie Jo Ann Collins

I don't consider myself a writer, but if William Clark can make his feelings about prairies known through his writing, I might be able to do likewise! I am constantly inspired by other prairie friends who do the same - Don Young, Cindy Crosby, Amy Martin, Chris Helzer, and Dwayne Estes. Although I don't hold a candle to any of these, perhaps someone might be persuaded to think of prairies in a different light after reading this. I toyed with the idea of naming this conversation in the hopes that I can fulfill my resolution to share at least one a month for a whole year! Sundays on the Prairie came to me because I remember taking Sunday drives with my mother and grandmother in the small town of Bowie. I remember being kind of bored wondering why they were driving around in the country naming this crop or that crop. I was much more interested in what grew in the bar ditches and between crops, I guess I was probably looking at prairie all along.

I also just received a wonderful book from my prairie mentor, Suzanne Tuttle, which is full of prairie literary inspiration which is where I found the above quote. I hope you enjoy reading it. I plan on using this book to find inspiring prairie words to share, it is amazing! The Tallgrass Prairie Reader, edited by John T. Price. In fact, I was so intrigued by the reason he wrote the book, that I bought another prairie book by him as well, Not Just Any Land. Price was invited to speak at a new prairie dedication by the preserve manager, Glenn Pollock. Pollock told the audience that though he believed scientists are good at collecting and organizing data, they are not always good at making it matter to a larger public. That's what artists and writers can do. They can help people care. That's what I want to do, so I will be emulating Price and other authors that I feel can help people care! In the end, we preserve what we love, so I want you to love prairies as much as I do and understand their significance in telling our story.

Sundays on the Prairie Jo Ann Collins

Recently I realized that my foray into all things prairie has been 10 years ago. On September 12, 2012 I attended my first meeting to help save a piece of prairie north of 1187 and east of Benbrook Lake. I spearheaded the effort to find people who might be willing to figure out how to save a piece of 2000 acres owned by the General Land Office of Texas. In partnership with the Great Plains Restoration Council, I planned and hosted monthly hikes to this land until it was sold to a Canadian company. We had high hopes that something could still be saved but that has not panned out quite as we expected. However, land adjacent to this prairie was recently purchased by the city of Fort Worth as open space. The prairie community that was built from the effort perhaps



played a role in not only the formation of the committee that purchases open space for the city, but also the efforts to save prairie in particular! Our prairie effort coalesced with the Tandy Hills Prairie, as well as with our very own Fort Worth Nature Center Prairies.

I hosted Second Sunday hikes on this prairie in the hopes of finding the right people to help us to save it, but I didn't REALLY love prairies until about halfway through the year and a half I spent going to visit it. The prairie has a way of worming its way into your

Sundays on the Prairie Jo Ann Collins

soul. Watching the same plants go through their seasonal changes, along with the pollinators, and other species we discovered that a prairie is a place full of mysterious pieces and that we will never fully understand how they fit together to make such a diverse ecosystem in a place where many people would just say....."Why don't they mow that?"

This involvement led me to meet other prairie enthusiasts across the state and I got involved with the Native Prairies Association of Texas. I am a state and local board member in charge of outreach for the Fort Worth chapter of NPAT. I have broadened my knowledge and met so many prairie peeps along the way by attending conferences and workshops. This year I even did my own teacher workshop to entice some local teachers to include prairie lessons in their curriculum! I also started the Savage Cabbage Bash with the help of the Young Women's Leadership Academy where we pull an invasive species called Bastard Cabbage to help prairies!

I find myself talking about prairies to students, at the grocery store, to my neighbors, heck, I even talked to a guy parked on the side of the road watching the sunset tonight when I went to take some pictures of "My Prairie". I know "My Prairie" is set to become a new neighborhood. I have asked someone who is working for the development to see if we can do a plant rescue before they start moving soil. Interestingly, I met Chris Hamilton when he spoke at our meeting about a project that used native plants to replant a wetland area near Alliance Airport. He also recently spoke at our People for Prairies event. He is going to try to help me get permission for a plant rescue! I used to imagine laying in front of the bulldozers when they start to

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Sundays on the Prairie Jo Ann Collins

scrape the prairie into whatever they do to build. Now I can feel at least some solace in knowing we tried and are making some headway. NPAT has doubled its holdings in Texas in the last 5 years to over 5 thousand acres! We have prairies spread out from Texarkana to Colorado City, down to San Antonio and Houston! We don't have an NPAT property in the Fort Worth area yet, but did help with the acquisition of Mathews Prairie near Greenville.

I hope to see you on the prairie someday soon! Hopefully I will see you here again too!



A Conversation Between Two Cross Timber Master Naturalists Leigh Langford



Leigh Langford and Sam Kieschnick sat down to talk about their fond memories of being Master Naturalists and to unpack an unfortunate coyote incident that occurred last year near White Rock Lake. Leigh launched a podcast called Canid Thoughts in December of 2022. Her podcast is an exploration of the feelings and meanings which humans project onto wolves, coyotes, and foxes.

Canid Thoughts is searchable on Spotify, the iheart app, Apple Podcasts, and Google Podcasts.

Below is a link directly to the discussion with Leigh and Sam:

https://canidthoughtspodcast.podbean.com/e/a-unified-response-to-a-tragic-incident/



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HELP CREATE A CLIMATE-SAFE NEIGHBORHOOD!

JOIN US FOR:

- DOOR PRIZES
- NATURE ACTIVITIES
- MOBILE HEALTH UNITS
- COMMUNITY RESOURCES
- VOTER REGISTRATION
- OPEN FORUM ON PARK
 IMPROVEMENTS

Sponsored by the Fort Worth Climate Safe Neighborhood Coalition Historic Southside Neighborhood Association; TCU; Community Frontline; Tarrant County Public Health; City of Fort Worth Community Engagement, Park & Recreation, & Police; RxPLORE; Cross Timbers Master Naturalist Chapter

SATURDAY, APR. 22 9 A.M. - 12 P.M.

GLENWOOD PARK 900 S RIVERSIDE DRIVE



Harris College of Nursing & Health Sciences

Nursing

25th Anniversary Storytelling Project



The Texas Master Naturalist program needs your help! To celebrate the 25th Anniversary ofTexas Master Naturalists, they are hosting a year-long storytelling project to highlight the wonderful TMN members and their conservation volunteer work across the state.

They want to know! What inspired you to become a TMN member? Do you have a favorite TMN in-the-field memory? What has been your most meaningful project, community outreach, or conservation event? What does nature mean to you? Use these questions as inspiration for your creative brainstorming or feel free to use them as a direct prompt.

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25th Anniversary Storytelling Project

You'll have two options to share your experiences as a Master Naturalist in one of these ways:

(1) **A video** (around 1-3 minutes) that can be a selfie or can be an interview by someone else. The interviewer does not need to be a master naturalist.

(2) In writing (written story and/or poetry).

Please choose one format per story. You're welcome to share more than one story if you'd like to try each format (just submit the form again!). To submit your story, please fill out the form <u>here</u>.

Tips on writing down your experiences:

- Find a nice quiet place to write and let your ideas flow out onto the page for a few minutes without self-interruption.
- When you're ready to put on your editor's hat don't forget to spell check your work.
- Keep stories short and sweet, for example no more than 1 page in Word/google doc.

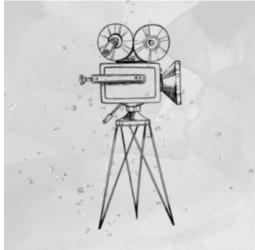


25th Anniversary Storytelling Project

Tips on taking a great selfie video:

- Be sure to wear your favorite TMN regalia (hats/ patches/t-shirts/sweaters etc.) if you have them, when recording.
- Find a nice nature spot outside for a backdrop.
- Notice what sounds and noises surround your spot. Try to avoid, if possible, any sounds that may make it difficult for the microphone to catch your words (for example traffic noise and/or windy days).
- Have a good light source. When outside, mornings and evenings can give you a nice soft light good for videos.
- If it helps you to stay on track, write down your thoughts before recording and have your notes close at hand.

You'll be able to find the stories on the Texas Master Naturalist state website and social media channels throughout 2023. Thank you for all you do this year and every year as a Master Naturalist volunteer!



Back to Back Winners! Carol Marotte and Josephine Keeney

We always love having the opportunity to showcase our members triumphs! The city of Arlington chose two of our members as their Volunteer of the Month for January and February. Carol Marcotte was chosen in January and Josephine Keeney was chosen in February.

If you see either of these two women in the next few months, please join us in celebrating their hard work.



The Nature Fix ; Why Nature Makes Us Happier, Healthier, and More Creative Linda Little

Of course nature is beneficial to our health physically, emotionally and spiritually, but WHY does that happen?

In "The Nature Fix; Why Nature Makes Us Happier, Healthier, and More Creative" Florence Williams explores the actual mechanics of it all by traveling around the world and sharing the latest scientific research in the field. The government of Japan invests millions of dollars a



FLORENCE WILLIAMS

year on nature trails in the interest of public health; they call it Forest Medicine. In South Korea the sense of smell is a topic of research, specifically the powerful

physical effects from inhaling the aroma of the Hinoki Cypress. Cancer research has uncovered surprising results in how a walk in the forest can boost natural killer cells, part of our immune system, by up to forty percent.

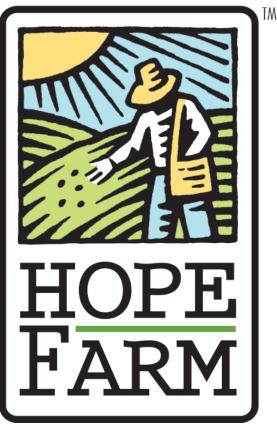
The people of Western Europe have known for centuries the importance of nature in a child's development. The original kindergartens had nothing to do with numbers and letters. The children planted gardens, cut down trees, built fires and shelters. In Scandinavia the profound impact of color, pattern and fractals on our brain waves, hormone levels, and emotions are being researched.

This book is a fascinating exploration into how nature affects us in ways we may not be aware of and after reading it you may find yourself identifying the ways in which nature is influencing you while you are exploring the world around you.

HOPE Farm Gina Alexander

One of our chapter's newest project sites, HOPE Farm, received the Conservation Treasures grant from the Tarrant Regional Water District to revitalize their monarch waystation and courtyard area. Some TCU Nursing students helped with the grant writing, and HOPE Farm submitted it in November – then received approval notice in December, so their courtyard revitalization project will begin this spring. Great timing for our volunteers. Please email g.alexander@tcu.edu if you're interested in volunteering in the monarch waystation once the TRWD has completed the upgrade.

Hope Farm website: https://hopefarmfw.org/



Advanced Training Opportunity Texas Water Specialist Program



Through Texas Parks and Wildlife Department's (TPWD) Texas Waters program, we develop a corps of well-informed volunteer specialists who provide education, outreach, and service dedicated to the beneficial management of aquatic resources and aquatic habitats within their communities for the state of Texas. Certification requirements, advanced training, and service opportunities can be found on TPWD's Texas Water Specialist webpage. Join one or all the

Texas Waters webinars to learn about Texas aquatic ecosystems, partnerships, water laws, and conservation efforts. To register for the webinars, click links below or visit the <u>Texas Waters Specialist</u> page for registration and recorded webinars.



Texas Waters Specialist and Webinar Flyer 2023

- Thursday, March 9 @ 6:30-7:30 PM CT Marty Kelly, Natural Resources Specialist-Coastal Fisheries with Texas Parks and Wildlife Department
 Texas Water Resource Data - Register
- Thursday, April 20 @ 6:30-7:30 PM CT Elizabeth McGreevy, Ecological planner and Roots in Karst CEO

Mountain Cedars: the Limestone Junipers of Texas - Register

Advanced Training Opportunity Texas Water Specialist Program

- Wednesday, May 10 @ 6:30-7:30 PM CT Rachel R. Fern, Statewide Wetland Program Leader with Texas Parks and Wildlife Department Texas Wetlands - <u>Register</u>
- Wednesday, June 21 @ 6:30-7:30 PM CT Wendy Anderson, Spatial Analyst-Wildlife Division with Texas Parks and Wildlife Mapping Texas Landscapes on the Go: Texas Parks and Wildlife Departments' TEAMgo Tool - <u>Register</u>
- Tuesday, July 11 @ 6:30-7:30 PM CT Ally Schlandt, Program and Outreach Specialist with The Meadows Center for Water and the Environment Texas Stream Team - <u>Register</u>
- Wednesday, August 9 @ 6:30-7:30 PM CT Robert Mace, Executive Director & Chief Water Policy Officer with The Meadows Center for Water and the Environment One Water & Water Conservation - <u>Register</u>

Questions? Please direct them to Melissa Felty (Alderson), Conservation Education Manager, ConservationEdu@tpwd.texas.gov

Fort Worth Climate Safe Neighborhood Coalition Gina Alexander

This coalition consists of multiple agencies and community-based organizations (including CTMN). The strategic goal is to increase equitable access to safe, sustainable green space and to advance tree equity and extend environmental knowledge throughout Fort Worth. The initial focus is Glenwood Park, a 37-acre gem that turns 100 in 2027. We're starting with Glenwood Park because of its large size and need for investment – it's ideal for environmental education and could be a hub for health promotion and civic engagement in our city. The coalition meets regularly, and there are three upcoming events that we'd love for others to join:

- Town hall: Tuesday, March 7, 2023 @ 6 pm, Southside Community Center (Food and drinks served) – focused on building capacity for master park planning (flyer in development) @ Southside Community Center: 959 E Rosedale St, Fort Worth, TX 76104
- Bioblitz: Saturday, April 1, 2023 from 9am 12pm, Glenwood Park (flyer in development) @Glenwood Park: 910 S Riverside Dr, Fort Worth, TX 76104
- Earth Day Cleanup: Saturday, April 22, 2023 from 9am 12pm, Glenwood Park (flyer link: https://tcu.box.com/s/6xkft6xrpkgaok82a1p7niuz0oh1jebv)

We would love for our expert bioblitz members to come on 4/1 – please email g.alexander@tcu.edu if you have ideas to share and lessons learned from previous experience! We need your help to lead community members to discover the beauty and wonder of the natural resources in the park!

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- MARY BETH LAMPE VICE PRESIDENT
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- THERESA THOMAS RECORDS
- Evan Vaughn Newsletter
- FRANK KEENEY WEBMASTER
- ERIKA SWYRYN CLASS OF 2022 REPRESENTATIVE

Citations

- "Presidents Pen" photos Photo of Jerry Jackson: http://www.conservewildlifenj.org/protecting/projects/bat/acoustic/; Photo of Bat: https:// www.usda.gov/media/blog/2017/10/24/celebrating-bat-benefits-during-bat-week
- "FEBRUARY SPEAKER" PHOTOS- PHOTO OF GHS LOGO: HTTPS://EN.WIKIPEDIA.ORG/WIKI/GRAPEVINE_HIGH_SCHOOL
- "CTMN VOLUNTEER ACHIEVEMENTS" PHOTOS- PHOTO OF PIN: HTTPS://TXMN.TAMU.EDU/CHAPTER-RESOURCES/PINS-AND-CERTIFICATES/
- "ILLUMINATIONS" PHOTOS—HTTPS://FWBG.ORG/
- "HOLLIE'S HABITAT" PHOTOGRAPHER: HOLLIE CARRON
- "SUNDAYS ON THE PRAIRIE" PHOTOGRAPHER: JOANN COLLINS
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- "ISPY" PHOTOGRAPHS—HTTPS://WWW.INATURALIST.ORG/