



The Midden

Monarch butterfly by Diane Humes

Galveston Bay Area Chapter - Texas Master Naturalists

June 2020

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President's Corner by Susette Mahaffey

The arrival of the COVID - 19 virus to our shores has changed the way we all behave and interact. I never imagined that I would live through a pandemic, but it has become part of the history of each of our lives. In an effort to maintain as much normalcy as possible in our own lives and as members of the chapter, we have employed the Zoom communication tool to continue to meet and conduct the business of the chapter. I hope those of you who have participated in Zoom meetings and AT have found it helpful in staying in contact with friends and chapter members and maintaining our mission as Texas Master Naturalists.

Zoom has made it possible for the new class members to continue with the instructional portions of the curriculum and to maintain their contact with each other. Committees have continued to meet and make plans for when the more normal times return. Once the stay at home orders are lifted, I do think that it will take us all a bit of time before we are completely comfortable returning to the way that we used to interact. Whatever the future brings to us, we will remain committed to each other as chapter members and citizen scientists.

One new committee, the Emeritus Committee, began its work during this time of sheltering at home. The group has had meetings to plan the structure of the program and how to make it work to include members who do not get out at night or who feel that they can no longer participate in physical volunteer activities. Our plan is to meet several times a year and have lunch together, a short program about one aspect of the chapter and a volunteer activity. We will have our first meeting with this group on May 12 via Zoom!

At the time of my writing this to you, we do not know the status of the June chapter meeting. When we make decisions, we will err on the side of caution for the safety and well-being of chapter members. I do encourage you to remain in contact with your friends through messages and phone calls. It is important for each of us to feel that someone is thinking about us and cares about us. I encourage you to attend Zoom opportunities. They do add some normalcy to our lives as master naturalists. Even though we have not been working in nature or monitoring the animals in our environment, we are still able to have an impact on those around us.

In closing I want to share this quote by John James Audubon. I think that it is very pertinent to who we are and what we do. Take care and remain safe!

"A true conservationist is a man who knows that the world is not given by his fathers, but borrowed from his children." **John James Audubon**

Next Chapter Meeting

June 4

Talking Trash

By

Diane Humes
GBAC Master Naturalist

(Hopefully)
At Extension Office*

Otherwise via Zoom

Wetland Wanderings: That Cottonmouth Is Not Smiling by Lana Berkowitz

Here's a refresher on the Western cottonmouth snake, which most of us have encountered while working in the wetlands. And a reminder to give any snake a wide berth even though we all want to stop and take a look when someone yells: Snake!



Photo courtesy of Texas Parks and Wildlife

The semiaquatic venomous snake, also known as water moccasin, is prevalent in marshes, swamps and lakes. Its scientific name *Agkistrodon piscivorous leucostoma* loosely translates to hook-toothed fish-eater, but it also eats frogs, lizards, smaller snakes, small birds, small turtles, baby alligators, small mammals and carrion. Juvenile snakes may be snatched by opossums, birds and alligators. The only things that routinely prey on adult cottonmouths are other snakes and humans, according to Texas Parks & Wildlife Department (TPWD).

The thick-bodied cottonmouth gets its name from the color of the skin inside its mouth. When frightened, the snake throws back its head and pops open its mouth to reveal a bright white warning. It may also vibrate its tail and emit an unpleasant smell.

In general, the snake is dark colored with cross-banding. Its broad head is distinctly wider than its neck. They become darker with age. Adults average 30 to 42 inches. Mating occurs in the spring. Females bear three to 12 live offspring August through October. Their lifespan is less than 10 years, according to TPWD.

The swimming style of a cottonmouth distinguishes it from other water snakes. Its body appears buoyant riding high in the water with its head held fairly high above the surface.

Texas has four venomous snakes. In addition to cottonmouths, watch out for coral snakes, copperheads and rattlesnakes. Like rattlesnakes, cottonmouths are pit vipers, which means their venom is hemotoxic, affecting a victim's blood and tissue. Their poison can prevent blood from clotting and can lead to hemorrhages.

The cottonmouth bite can cause bleeding, feebleness, breathing trouble, swelling, exhaustion, numbness, nausea, reduced blood pressure, skin discoloration and increased thirst, according to Texas Department of State Health Services (TDSHS). Seek urgent medical care if any snake bites you.

About 7,000 people are bitten by venomous snakes annually in the United States. In Texas approximately 7 percent of snakebite cases involve cottonmouths. Texas averages only one to two snakebite deaths a year, according to the TDSHS. The type of snakes causing the deaths isn't listed. The department says about half of all venomous snakebites are "dry," meaning the snake does not inject venom into the victim.

And that story most of us have heard about the water skier who fell into a nest of attacking cottonmouths is just a myth, says TPWD. Cottonmouths don't swarm. They are mostly solitary. However, a cottonmouth can bite underwater.



Photo by Keaton Adams, USFWS

For more about the habitat of the cottonmouth, and to see some familiar faces, watch a new video highlighting wetlands at Sheldon Lake State Park, Exploration Green and Ghirardi Family WaterSmart Park. *Green Infrastructure: A Nature-Based Solution for Stormwater* was produced by Texas A&M Agrilife Extension Service. Check it out at: <https://www.youtube.com/watch?v=huVJUHWygVc&feature=youtu.be>

Prairie Ponderings: Bison Babies by Diane Humes

Springtime on the prairie! For prairies all over the US and Canada with herds of bison, thundering or not, the numbers will be increasing from the end of April to mid-May when the babies are born.

Bison babies are super cute little fur balls, with curly reddish hair, big black eyes, and long legs. Newborns weigh between 33 and 66 pounds, so they are not really tiny. (If these weights seem slightly peculiar, I suspect they are artifacts of conversion and rounding up from 15 and 30 kilograms.) About the size of dogs, the calves are in fact called “red dogs.”

The bison gestation period is 285 days – only five days longer than a human’s. However, bison babies are precocious compared to human babies. Newborn bison calves can stand and nurse within a half hour of birth. After the first week of life, they can drink water and eat plants, watching their mothers to learn which plants to choose. Mothers will continue to nurse until they have new calves.

Bison babies play throughout the spring, running, jumping, and kicking their little hooves. They learn the rules of the herd, chiefly that they must not stray far from the group. Mama bison and the herd can protect the calves best if they stay close. By mid-summer the “red dogs” begin to grow brown fur like adults.

Male and female bison spend most of the year in separate herds, so the babies are born into maternal

herds with females, youngsters, and a few old males. In midsummer, males in bachelor herds join the females for mating season, which is usually in August and September. After age 3, a female can produce a calf every year for about 15 years. Males spend no time in raising offspring. And so the cycle continues.



Photo by Rich Keen.

Although it is hard to imagine, cute little bison babies will grow to 2,000 pounds, if males, or 1,100 pounds, if females. They will become super bison – able to sprint at 35 miles per hour, stop on a dime, and leap a 5-foot fence in a single bound.

Zooming Along Together by Verva Densmore

I don't know about you, but a month ago I hadn't even heard of the video conferencing program called Zoom; now, because of COVID-19 and our stay home directives, I use it several times a week with different groups of friends and with our master naturalist chapter. As Chuck Snyder says, "Welcome to the 21st year of the 21st century".

Our newest chapter class members now participate in training presentations while they sit at home and the instructors broadcast from their own homes. I sat in on one class while Charriss York presented information about watersheds and non-point source pollution and I was impressed. She shared photos, PowerPoint charts, videos, and included a live question and answer discussion.

At the end, Charriss demonstrated how class members could make their own model watershed, a demonstration just like the one that she did in previous years in her 'live'

class at Armand Bayou Nature Center. From my perspective, her presentation showcased how on-line classes can be an excellent solution to the problem of self-distancing while still completing the training required to become a Texas Master Naturalist.

Thanks to Maureen Nolan-Wilde and Chuck Snyder, with indispensable behind-the-scenes support from Carolyn Miles, these get-togethers are becoming common. The chapter board of directors, the Midden team, the advanced training instructors and more are using Zoom to bring us together when we can't leave home. I wonder if we will continue to do at least some of this on-line meeting even after our quarantine time is behind us?

Zoom is not the only web conferencing program. Our chapter members received an invitation to join the iNaturalist training presented by Texas Parks and Wildlife instructor Dr. Tania Homayoun using another group chat program called Webex. Some organizations use other

programs, such as BigMarker and Lifesize. All of these web conferencing programs allow participants to host or attend meetings via the internet. It is also referred to as online meeting software.



You may have read about security issues with these programs, especially since the use of on-line services has expanded so rapidly during the pandemic. Chuck has been working behind the scenes to address security by using a waiting room (he lets folks into the meeting one by one), limiting who can share their screens, and keeping the power to control the session with the host

and co-hosts. He also keeps abreast of recent process developments aimed at enhancing the user experience, with special emphasis on privacy and security.

There are, unfortunately, some downside issues to this new way of doing business. For example, computers must be capable of loading the Zoom software, and should have a camera (“webcam”) and a microphone to participate in the full interactive experience. Smartphones and tablets are good alternatives to computer upgrades. Access to good WiFi service is critical; meetings conducted in periods of high Internet use may be interrupted by periods of weak video or audio reception.

Still, not everyone is comfortable with this technology, although some would be willing to try if they had help. For those who just need support, the communications team is here for you. Contact Chuck Snyder at crsnyder@gmail.com with questions or requests for help.

Without a crystal ball, we don’t know how long we’ll be depending on technology to keep us connected. For now, our communications team is offering a way to stay together while being apart. Thank you to each of those team members.

Books to Read by Diane Humes

To understand the world or escape it – here is a handful of books chosen especially for you.

Spillover: Animal Infections and the Next Human Pandemic by David Quammen (2012)

David Quammen is a superlative writer whom I met when he signed my copy of *Spillover*. This is a must-read book about zoonotic diseases – animal infections transmitted to humans, such as Ebola, rabies, influenza, HIV, West Nile, SARS, and, undoubtedly, COVID-19. This subject matter can be complex, but his book is a detective story, from mysterious deaths of horses in Australia to AIDS.

Quammen, whose passion is evolutionary ecology, researched the intersections between animal and human illnesses for six years and circled the globe to learn first-hand from the experts – brilliant and brave people who track newly-discovered (usually viral) diseases, with all the science and clues they can gather. Read his book and be astounded at the complexity of life!

Viruses depend on a living host organism and most have co-evolved with specific species, probably residing with them more or less benignly for eons. Common hosts are ducks, mosquitoes, pigs, bats and monkeys. In fact, bats are implicated in more than a few zoonoses and may turn

out to the source of COVID-19. Before going crazy worrying about bats, remember that the world’s 1,240 bat species comprise fully one quarter of all mammals on Earth. First, find out if the source is a bat; then, which one.

Disease spread from animals to humans never happens casually; it requires some kind of close contact. By encroaching into the last wild forests with roads for mining, logging, or farming we have brought ourselves into closer contact with wild animals. Our domestic animals live in huge and unnatural concentrations on factory farms – usually in rural areas, often close to wildlife. We transport all manner of wild animals and forest products around the world to feed the demand in global markets – maybe literally “eating” it in wild flavor markets or as bushmeat.

Our human population has doubled since 1970, now reaching over 7.8 billion individuals. Creatures who live closely together in large populations – people AND bats – are more susceptible to disease outbreaks should an infectious agent enter a population.

A virus leaping from its animal host to a human will reach a dead end unless it is also transmissible between humans. In that case, it can quickly turn into a pandemic,

especially if it is highly infectious and can hop on an airplane. Quammen predicts epidemics and the NBO – Next Big One. Maybe a coronavirus? Is this it? Late-breaking news: read Quammen's April 2020 interview in Yale Environment 360. <https://e360.yale.edu/features/spillover-warning-how-we-can-prevent-the-next-pandemic-david-quammen>

Monkeys Are Made of Chocolate by Jack Ewing (2011)

Author and naturalist Jack Ewing has lived in Costa Rica for over 30 years restoring the rainforest on his property. *Monkeys are Made of Chocolate* is a collection of expressive essays about the plants, animals, and human interactions he has observed. Since the cacao trees grow in the rainforest and monkeys eat the cacao, then, monkeys are made of chocolate! As are some humans.

If you love the tropics, if you have been to the Amazon or plan to go soon, you will enjoy these little snippets. Amazon dreaming, indeed!

Where the Crawdads Sing by Delia Owens (2018)

Crawdads has been on the best-seller list for over two years! A friend told me it was a great book about wetlands and I should read it. So right; I could not put this book down.

Set in the salt marshes of North Carolina, this is a multi-layered tale of a young girl abandoned by her family growing up alone with nature. This is a coming of age story, a mystery, and lyrical nature writing. Although critics find it implausible that a young girl alone could survive and thrive, that is what our heroine does. You will be transported into the wetlands and love what you see. And you won't want the story to end.

The Prairie Keepers: Secrets of the Zumwalt by Marcy Houle (2007)

Prairies and hawks – it doesn't get better than that! The Zumwalt Prairie, in a remote northeast Oregon valley, is a wild expanse of 200 square miles of untilled prairie containing the largest concentrations of nesting hawks in North America. Biologist and student Marcy Houle first went to the Zumwalt in 1979 to discover what might attract and sustain such large buteo populations.

Houle describes her adventures as a young field biologist as she explored this glorious valley, banding the birds and mapping their nests, meeting the ranchers who live on the prairie, and learning its history. After all the data is compiled, assessed, and reported, she concluded that ranchers and wildlife are vital to each other and they can and must coexist if the native prairies and wildlife are to be saved.

Returning to the Zumwalt after 25 years, Houle discovers that the wild, beautiful valley she studied and loved is mostly the same – spared the sprawling development spreading across the West. She foresees a hopeful future for the birds, people, and land, especially with a new partnership formed between ranchers and The Nature Conservancy.



The Story of More: How We Got to Climate Change and Where to Go from Here by Hope Jahren (2020)

I first read Hope Jahren's book, *Lab Girl* (2016), and was captivated by the brilliance of her account of her early scientific career. In *The Story of More*, Jahren tackles the topic of climate change. After reasoning as a scientist and analyzing comprehensive data, she writes a delightful narrative, woven with personal stories that cut through to the heart of the matter every time.

Starting her story in 1969, a historically momentous year and the year of her birth, she tracks ways in which our lives (and hers) have changed – perhaps without our even remembering! For example, in 1969 we did not drink out of plastic bottles. Farms were not factories, nor were animals and fish grown on industrial scales. Winter in her home state of Minnesota was longer and colder.

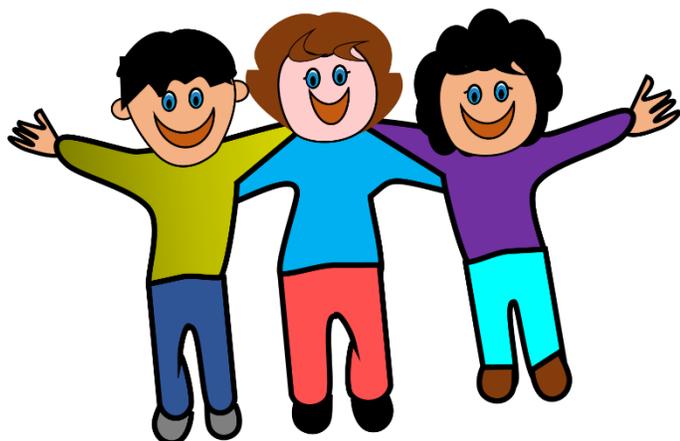
Jahren spreads no blame – just facts and personal experiences – and urges each of us to decide what kind of future we would like to project into the next millennium. She points out that people in the wealthy nations of the world – who have more and use more – could still live well if we changed our story to the Story of Less and Share More.

I suggest that this book as a succinct, readable and human account of issues important to a master naturalist.

The Emeritus Program by Robin Kendrick-Yates

When we step back and reflect on our chapter membership, we cannot help but be amazed. Each person in our chapter is unique. We each have our own experiences, education, training, and world view that enable us to provide what no one else can duplicate--making a difference. Whether at the beach, prairie, bayou, marsh, or classroom, every one of us is a treasure with a valuable contribution.

Each spring, new master naturalists join our chapter. We focus our resources on their training and introduction to our family of knowledgeable, passionate, and busy folks. And yet, despite these annual additions, our total membership remains constant. Long-time, experienced members trickle away, often unremarked. With them goes their experience, wisdom, knowledge, and unique gifts.



Why are these established members lost to the chapter? People have relocated. Sadly, a few have died. These losses are beyond our control. But other causes are not so definitive. People may become ill or disabled. Work schedules may change. Access to transportation or other resources may become limited. For these members, their participation doesn't need to end. It simply needs to be redefined.

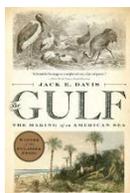
How can we reach these fading members? This is the mission of the Emeritus Program. We have made many calls and written numerous emails to reengage formerly active Galveston Bay Area Chapter master naturalists to explore possibilities. It appears we have reached a tipping point. Dozens of folks are interested in our plans and we are so excited! Please join us and bring your own unique voice.

We have planned for the first two meetings via Zoom: Tuesday, May 12 and Tuesday, June 15, from 10am - 11:30am. An invite will go out through Constant Contact prior to each event. Everyone is welcome to join and participate. Once we can begin gathering again, we plan to meet at Carbide Park for what we do best--enjoy food, fun and friendship!

This program will take a village to make it successful. There are a variety of opportunities for you to explore; we will review these at the Zoom meeting. Other needs will become clear as we grow. Please consider how you may contribute your own gifts to reach out to our extended family.

Heritage Book Study Plans by Madeleine K. Barnes

I would like to applaud each of you for your commitment to staying safe while being flexible and adapting to changes that you have all made in your lives and in your volunteerism. In keeping with that, there will not be a book review article this month as we are still reading our current selection, *The Gulf, The Making of an American Sea* by Jack E. Davis.

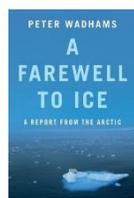


AT session. The reading assignment for this AT session will be pages 1-103.

If you can read the assigned sections prior to the discussion, you are welcome to participate and earn AT credit at the Zoom AT sessions.

Please contact me at mad2btmn@aol.com to be added to the mailing list for updates and Zoom meeting info if you are not already on the email list.

Please note that we welcome everyone to participate whether you are TMN certified, recertified, or just want to remain a chapter member. Looking forward to seeing and/or hearing from you there and let us know if you have read any good naturalist books lately. Happy trails!



We have planned a Zoom AT online session on June 8 for 1-1.25 hours beginning at 10am to complete the reading and discussion of *The Gulf*, pages 354-530. Then on July 6, we plan to discuss the first half of *A Farewell to Ice: A Report from the Arctic* by Peter Wadhams in another Zoom

Hawk Watch 2020: Hawks at Home by Diane Humes

Our chapter's fearless leader and founding father, Dick Benoit, loves hawk migration, the journeys back and forth between North and South America of the larger and fiercer members of the bird world. So after moving here from Michigan, where he had counted migrating raptors for 30 years, Dick founded his own hawk watch site in 1996 in La Porte, close to where he lives. Every spring between March 1 and April 30, he watched for the flights, especially of Broad-winged hawks and Mississippi kites, and encouraged many of us to help.

Raptor numbers at our site vary considerably from year to year, but when the birds are here, it gets really exciting! The 2009 season was the record-breaker: 23,427 Mississippi kites and 35,819 Broad-wings passed by Sylvan Beach to be counted in an astonishing seasonal raptor total of 60,458.

Counters always hope for a season like that.

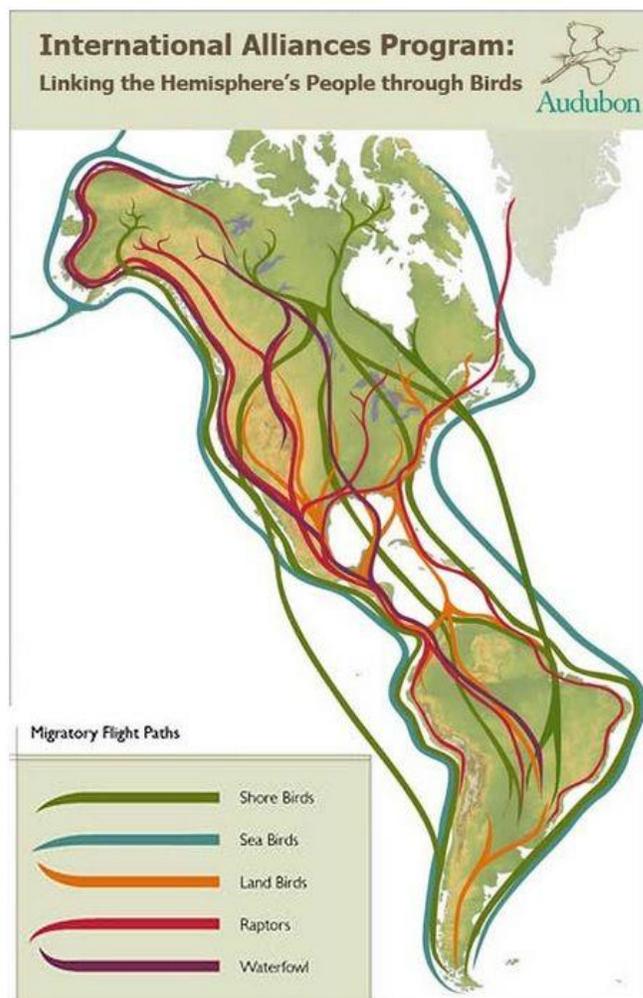
This year, our 25th spring hawk watch, had to be cut short on March 15 because of COVID-19 safety issues. The birds were under no such restrictions: 252,516 Broad-wings (and 139,434 Swainson's hawks) flew over the Tolima hawk watch site in Colombia, mostly in the first two weeks of March. Watchers also recorded 71 Mississippi kites, mostly in April.

The Tolima site is along the western side of the Andes in a river valley known for its hawk migration. This site is part of a strategy to promote conservation education and an effort to stop illegal hunting of migratory raptors.

After passing Tolima, the birds travel through the Isthmus of Panama, then through the narrow slot at Veracruz, Mexico, between the mountains and Gulf of Mexico. This is a great place to watch migrating raptors – tours are available – and I have it on my bucket list!

Except for Peregrine falcons, Osprey, and Swallow-tailed kites, raptors do not like to fly over water, instead preferring the overland journey around the Gulf of Mexico. We know that quite a number of them made it to Texas. In March, counters at Bentsen Rio Grande State Park recorded 19,297 Broad-wings and five Mississippi kites. By the end of April, season totals got to 78,467 Broad-wings and 14,087 kites.

Birds have choices in where they fly, especially in Texas where their main constraint seems to be the Gulf of Mexico and, probably, the weather. At our watch site, we saw a few early migrants the first two weeks of March – 128 Turkey vultures, 138 Black vultures, and one Swallow-tailed kite – but no Broad-winged hawks or Mississippi kites. At Bentsen, counters saw their first Broad-wing on March 6, and the first large numbers



IAP Flyways Map

(>1,000) on March 20. On March 31, they recorded 11,025 and the first Mississippi kite.

Bentsen is about 400 miles from here so I began watching for Broad-wings at my house hoping to get lucky. It was very pleasant to get out of the house, although the neighbors probably thought I was nuts!

What did I discover? First of all, April had bad hawk-watching weather – lots of rain, fog, or drizzle and most days with winds from the south or east. Other counters and I had six days with countable birds, but not in grand numbers. On my best day I counted 613 Mississippi kites. Liz VanOrstrand reported 200 Broad-wings from Exploration Green. Jane Lindsey saw 120 Broad-wings in her backyard and George Kyame saw raptors from his yard, which is not that far from mine.

Each of those good days sported winds from the north or west in various combinations, except the first day in

which the wind was from the east, but, in that case, on the day before the wind had been strongly from the northwest all day. I think we need to look at the Texas map and think like a bird. Sylvan Beach in La Porte is inland of the Gulf of Mexico and on the west side of Galveston Bay. A bird flying from south Texas MAY follow the coastline, but winds from the south probably push it inland and east winds push it west of the Bay. We probably never see those birds.

Another factor to consider: When the sun finally came out, the birds were in a hurry to get north to nesting grounds. In a cloudless sky, thermals rise high and the birds are out of sight. On my last day to count, conditions were absolute perfection – warm, sunny, winds from northwest. However by noon, all I could see was one tiny brown speck reflecting sunlight off his wings, so far up in the atmosphere that he was winking in and out of my field of view even with my 10X binoculars. Impossible.

So, all the birds from South America do not come here and neither do all the birds at Bentsen. In the absence of

topography, we need good conditions – north winds to push the birds toward the coast and west winds to push them to the Bay. We need to have good viewing, and the whole team together. Also, the birds ought to play nice and come down just a little lower to the ground.

This was our first season with a pandemic, but not the first with ill winds.

Lynn Wright found Dick's notes from the 2006 season: "This was the eleventh consecutive Spring Hawk Watch at Sylvan Beach, La Porte, Texas. It was the second lowest count of the site mainly due to the lack of favorable winds during the migration period of diurnal hawks. There were only six favorable wind days during March and April. In past springs three to four times as many favorable wind days occurred. Several million raptors pass through the coastal plains of Texas each spring and fall, but only with north or northwest winds associated with cold fronts, are the raptors moved towards the upper Texas coast where the hawk watch is conducted."

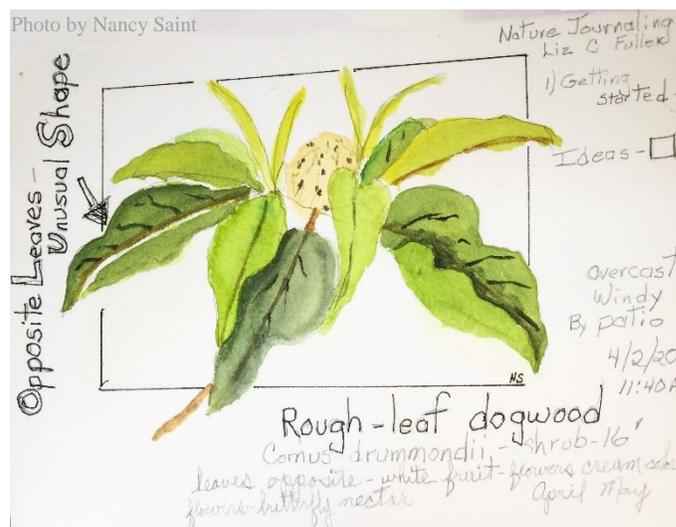
Nature Journaling by Nancy Saint

During the current 'Stay at Home' decree, I have been given a chance to learn more about my own yard. The online Cornell Lab members were encouraged to invite their friends to participate in a class on Nature Journaling. Now would be the ideal time to explore the concept. "I'm in!"

No, it is not necessary to have great skill in drawing, writing or painting, but only skill in the quick accurate power of observation. You will be surprised that your observation powers will become more acute as you practice the skill. Then translate those sightings to some organized notebook. The notebook could be with lined pages, with blank pages or even with paper suitable for sketching or painting. How big? Think of something you would want to carry with you and be able to sketch or write quick notes including the weather, time of day, location and perhaps your mood or feelings.

The STOP and SIT project offered a great beginning. The idea was to find a place in your yard or nearby, where you could quietly observe nature in action for 15 minutes. With the notebook and pencil in hand, just sit very still and watch the action that takes place. After a few minutes, notice what is beginning to happen. Which pollinators have ventured into your space - birds, butterflies? What plants have started to bloom, and do you smell their sweet aroma? Is that a honey bee or a solitary mason bee? What kind of bird makes that sound?

Begin to record the action. Maybe use short phrases to remind you of something. Sketch the resident squirrel that wandered onto the patio about to get a drink from your fountain. What flower is the monarch nectaring on? Is the green anole afraid of the dark brown Cuban anole?



No, you don't have to do it every day. It may be interesting to do it at the same time several different days, to compare the action. What was the same and what was different? Just enjoy your yard that you share with all kinds of natures' creatures

Five Ways to Stay Sane During a Pandemic by Ruth Nasrullah

Many of us are used to being outdoors much of the time and prize the opportunity to maintain and improve the natural spaces around us. Stay-at-home orders and restrictions aimed at reducing coronavirus transmission have some of us sad and frustrated. But there are ways to continue naturalist activities within the limitations imposed by the pandemic. Here are a few suggestions.

1. Use this downtime to hone your powers of observation and documentation in your own backyard. Measure your plants' growth or record the numbers and species of birds perched on your power cables. Use an app like iNaturalist, eBird or Herps of Texas to document and share your findings.
2. Nurture your inner artist. Compose poetry about what you see, or paint it, or write a song...whatever the downtime moves you to do. Get inspired by the work of writers such as Henry David Thoreau, Mary Oliver, John James Audubon, or Terry Tempest Williams.
3. Finish the Texas Master Naturalist textbook - you can do it! It weighs at least six pounds and has 763 pages. If you read it cover to cover, you may not finish it before the pandemic ends, but give it a try!
4. Take a Zoom class - or two or three. Now that training has gone virtual for the foreseeable future, there are plenty of learning opportunities, many of them free and not all based in the Houston area. As one example, last Saturday the Botanical Research

Institute of Texas (BRIT), based in Fort Worth, offered a Composting 101 webinar -another activity you can do in the backyard. Be sure to contact our advanced training coordinator, Ellen Gerloff, to ask about getting AT credit. egerloff@sbcglobal.net

5. Watch live video from parks, zoos, or nature preserves. The Houston Zoo has one, or if you want to go farther afield, you can watch bald eagles going about their lives at California's Big Bear Lake. Google "nature live stream" or "live nature cam" to find other locations. Hearing the birdsong and wind through the trees is not the same as being there, but it's close.

Don't forget to take care of yourself, mentally, emotionally and physically. If you're well, be grateful that you are rather than dwelling on the things you can't do. Keep abreast of the latest coronavirus updates so you know when it's safe to return to activities you usually take part in. And remember - even if you set off for an activity you expect to be solitary, like a hike on a local trail, traveling there may not be as solitary an endeavor as you expect, and you need to be cautious about avoiding behaviors that risk transmission of the virus.

This won't last forever, and making the sacrifice to limit your activities benefits you, your friends, your family, and your neighbors.

Stay healthy, stay safe, and stay busy!



The Midden Deadline for the next issue

June 29

If you have Advanced Training or Volunteer Opportunities, please submit information to Mike Pettitt, mpettitt_houston1@comcast.net.

The Midden

Published bimonthly by the Galveston Bay Area Chapter - Texas Master Naturalists. The purpose of *The Midden* is to inform, communicate and educate chapter members and the community. If you have an article that contributes to this purpose or want to join the team, please contact Diane Humes, treimanhumes@gmail.com.

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The Midden is posted on the GBAC-TMN chapter website: www.gbamasternaturalist.org two weeks prior to chapter meetings. Archived issues also on chapter website. If you prefer to receive *The Midden* in hard copy and are not currently receiving it, please contact: Julie Massey, julie.massey@ag.tamu.edu.

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Coronavirus, Invasive Species and Exponential Growth by Cindy Howard

It's been a couple of months since "exponential growth", "social distancing" and "flatten the curve" became mainstream phrases in every human language. Of course, we're talking about the novel coronavirus - the cause of the COVID-19 pandemic - but these phrases are based on ecological processes that control populations of invasive species as well - think Chinese tallow or deep-rooted sedge. Most of us had just not ever heard these phrases before!

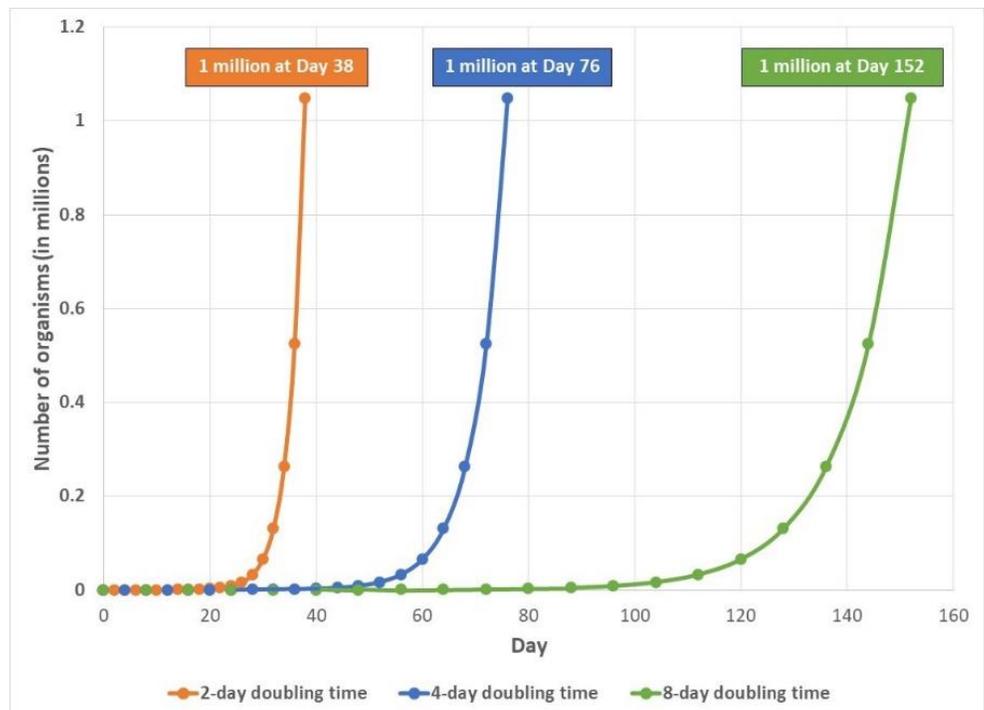
Let's start with our new invasive "species", the novel coronavirus. Like any organism in a new environment with perceived unlimited resources (for the coronavirus, it's human hosts) and no predators (treatments or vaccines), the novel coronavirus has been able to increase exponentially. This means that its population increases by the same multiplication factor every time. If we start with two individuals and the population doubles each time period, exponential growth will be 2, 4, 8, 16, 32, etc. Sounds bad, right? Well, it gets pretty serious when there are a million individuals in the population and the next time the population doubles we have 2 million, then 4 million, then 8 million, in the same amount of time it took to go from 2 to 8 just a little while ago.

Epidemiologists have been tracking the doubling time of the coronavirus, or the number of days it takes to double the number of cases. We can see the effect of doubling time in the graphic. If each of these populations starts out with two individuals (or two cases), there will be a million individuals (or cases) in 38 days if the doubling time is two days. Wow! If the doubling time is four days, it takes 76 days to reach a million cases; and if the doubling time is eight days, that million cases won't happen for 152 days. It's really in our best interest to slow down the doubling time.

Before we started practicing social distancing in the U.S., the doubling time for the new coronavirus was three days. It was increasing exponentially - 2, 4, 8, 16 - every three days, but most of us didn't notice it doubling when there weren't many cases here. However, when the number of cases reached 2000, 4000, 8000, 16000 over the same amount of time, we began paying attention.

Similarly, invasive species creep in and start increasing, often before we even realize they are there. Once we notice them, they may be in that fast phase of exponential increase and then are difficult to eradicate.

So what can stop exponential growth? In nature, when a population runs out of the resources it needs to survive, it can no longer grow. Some populations will outgrow their resources and crash or die out. The successful



populations will slow down their growth rates until they are in balance with their resources. To our dismay, many invasive species become quite successful in their new environments and we have to battle them physically (chopping and pulling) and chemically (pesticides).

The world is working hard to stop the exponential growth of the novel coronavirus by flattening that exponential growth curve, which starts with slowing down the doubling time. Social distancing has been an important part of flattening the curve - not allowing the coronavirus to find its next person, the resource that its growth depends on. Social distancing is working - the doubling time in the U.S. has now increased to about five days. We can continue to slow the virus' exponential growth with continued, careful social distancing, until we have treatments or vaccines.

We need to fight this invader as diligently as we fight all of our other invasive species.

June and July Activities

ADVANCED TRAINING OPPORTUNITIES

Chapter Meeting - June 4; Talking Trash
Presenter - Diane Humes
6:15 Social, 7:00 Meeting, 7:30 Speaker
Extension Office*; 1 AT hour

Is Taxonomy Really Taxing? - Tuesday, June 16;
12:30-3:30 pm; 3 hours AT
Location: Extension Office*
Presenters - Emmeline Dodd and Cindy Howard
Register with Emmeline Dodd txdodd@aol.com
(May be postponed due to social distancing restrictions)

Ongoing

Galveston Island SP
10am at the Welcome Center
Every Saturday - Prairie Adventures
Every Sunday - Bay Explorations
Tours 1 to 1 ½ hours long. Bring water and family.
(May be postponed due to social distancing restrictions)

Heritage Book Study Group

First Monday of every month. Extension Office*
10am-noon; 2 hours AT
Contact: Madeleine Barnes 281-474-9406
See Pg. 6 for meeting dates and books.

STEWARDSHIP OPPORTUNITIES

For a complete list of stewardship activities, go to our chapter website at <https://txmn.org/gbmn/what-we-do/>.

EDUCATION - OUTREACH VOLUNTEER OPPORTUNITIES

Bay & Island Adventures - Volunteers teach six in-class hands-on modules on a once a month basis in Dickinson and Galveston Schools. Presenters and helpers are needed for eleven 4th and 5th grade classes. Contact: Sara Snell snellsw@verizon.net.

Education and Outreach Committee - We can use your help in supporting outreach efforts, responding to requests for exhibit booths and presenters, planning Treasures of the Bay; and developing a library of education-outreach materials. Contact Sara Snell snellsw@verizon.net.

Partner and Associate Programs - Many organizations sponsor guided walks and education programs or need volunteers to staff their nature center. Go to <http://txmn.org/gbmn/partners/> for the list, then click on the link to the organization's website.

BOARD AND COMMITTEE MEETINGS

(At Extension Office* monthly unless specified)

Board Meetings - usually First Tuesday, see the chapter calendar at <https://txmn.org/gbmn/events/month/>

Committee Meetings

Advanced Training - Third Monday, 10-noon
Education/Outreach - Third Tuesday, 1-2:30pm
Communication - Meets quarterly, check calendar
Midden Team - Last Monday, Monday, 9-noon



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