

The Midden



Alligators by Allan Treiman

Galveston Bay Area Chapter - Texas Master Naturalists

October 2019

Table of Contents

| | |
|--|----|
| Wetland Wanderings | 2 |
| Prairie Ponderings | 2 |
| Coastal Corner | 3 |
| <i>Green Fire</i> AT | 4 |
| Worms: The Good, the Bad and the Slimy | 5 |
| Heritage Book Study - Review | 7 |
| Frogfruit: Love it or Pull it? | 7 |
| Nurdle Patrol 101 | 8 |
| Big Picture: Bennu to Biodiversity | 9 |
| Nominations for Treasures of the Bay | 11 |
| Oct/Nov Activities | 12 |

President's Corner by George Kyame

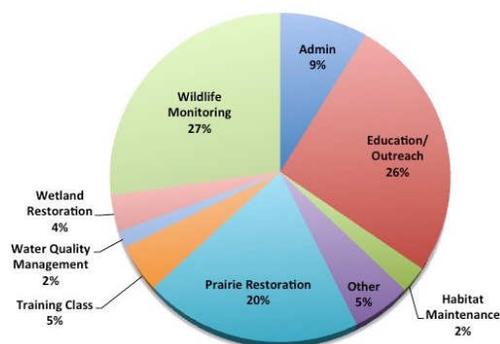
Greetings fellow naturalists.

I hope you all have had a fine summer, with lots of sweltering stewardship and naturalist camaraderie! I might also hope that you have had nice vacations and excursions, possibly escaping our oppressive heat! I might be jealous!

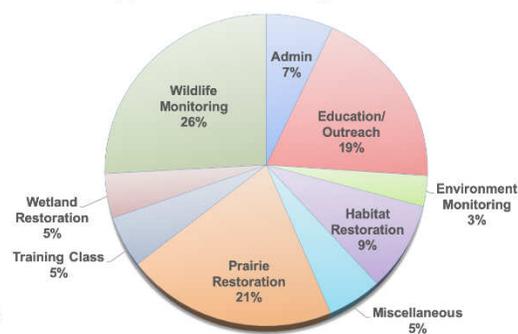
As I look back on past Midden articles, excellently archived on our website, I am always taken aback at the wealth of Master Naturalist knowledge contained therein. On my latest venture in time travel, I found a message from my predecessor, past president Maureen Nolan-Wilde. She spoke of the trials of implementing the latest TMN hours recording software, commonly known as VMS. Love it or hate it, or somewhere in between, it is Our system. Lots of hard work by many in our chapter helped this transition. Thank you to them. [Applause].

I thought there was one particular aspect of that article that might make an informative redo, especially for those with inquiring administrative minds: Behold the Pie Chart! Enjoy this comparison from Oct. 2016 - Oct. 2019. In both of these results, I do believe we are right on target.

Chapter Opportunities Distribution (%) - YTD



Opportunities 2019 August YTD



The State TMN Conference is right around the corner. (Oct. 18-20, Rockwall, TX.) Prepare for a dang near sold out show, with well more than 500 statewide TMNs, guests and presenters in attendance.

Next Chapter Meeting, 3 October. Take care, see you there, GJK

Next Chapter Meeting

October 3

Updated Galveston Bay Report Card

By

T'Noya Thompson
Galveston Bay Foundation

At
Extension Office*

Wetland Wanderings: Boo! It's a Cuban Treefrog by Lana Berkowitz

Here is a frightful story to consider for Halloween.

Imagine you are a small unassuming squirrel treefrog doing treefrog things in the wetlands. You aren't as bright as your green treefrog neighbors, but passing humans sometimes spot you and admire your dexterity and camouflage.

Then one night you notice a treefrog on a nearby branch that looks like you but is triple your size. Alarmed, you look around for your longtime treefrog friends to discuss the interloper, but your buddies are gone. Then you notice another giant treefrog and another and another.

Suddenly you - the smallest treefrog in Texas - are surrounded by amphibian giants intent on world domination. Cue: "Jaws" music.



Photo by Denise Gregoire

The newcomer is the Cuban treefrog (*Osteopilus septentrionalis*). While it's not up to horror-movie invasion levels, the frog has been found in Texas, a long way from its homeland -- the Bahamas, Cayman Islands and Cuba.

The invader has established populations in Florida and Louisiana. The Cuban treefrogs in Florida most likely arrived on shipping crates from the Caribbean, according to Texas Invasive Species Institute (TISI). They also are popular in the pet trade. The frogs were found in at New Orleans' Audubon Zoo after the zoo received a shipment of palm trees from Florida in 2016.

In Texas there have been isolated sightings in The Woodlands near a YMCA (2017) and at a garden center in Port Isabel (2018), according to the U.S. Geological Survey.

The spread of Cuban treefrogs is a worry because, as the largest treefrog in the United States, they outcompete natives. The insectivorous/carnivorous newbies also eat native frog species in addition to small lizards and snakes. Studies have shown they replace green and squirrel treefrogs in residential areas, according to TISI.

In Florida, the Cuban treefrogs have clogged plumbing, caused power outages and taken over birdhouses.

A Cuban treefrog is easy to identify if it is next to a squirrel treefrog (*Hyla squirella*). While the squirrel treefrog grows up to 1.5 inches long, the Cuban treefrog males can get 4 inches long and females 6 inches long. The Cuban treefrogs have large toe pads. Their backs can be warty similar to a toad's, but the Cuban treefrogs have large eyes.

While usually creamy white to light brown, the Cuban treefrogs also can be green, gray, beige, yellow, dark brown or a combination of those colors. They live five to 10 years in the wild.

Here's another warning. Cuban treefrogs secrete a sticky substance that can cause burning and itching on human skin. Happy Halloween.

Prairie Ponderings: Deep Prairie Roots by Diane Humes

Prairie roots go deep -- everyone says so. But how do we know?

Nearly a century ago, John E. Weaver, botanist, prairie ecologist and professor of plant ecology at the University of Nebraska, began his career studying the characteristics of native prairie plants. In 1926, he published his observations of grasses and forbs growing in various soil types based on excavations of hundreds of root systems compiled over the course of 12 years.

Weaver and his students developed two main techniques for studying roots. The trench method consisted of digging -- in a line 6 to 12 feet in length, 5 to 7 feet deep, and 3 feet wide -- a trench placed 8 to 12 inches away from the selected plants in order to uncover the underground plant structures. Using the monolith method, they constructed a wooden frame to dig out a block of soil -- 3 feet thick and 3 to 5 feet long -- containing the roots, which were removed intact and carefully washed to remove all the surrounding soil.

These painstaking excavations are the basis of our understanding the structure of prairies. "There is no easy method of uncovering the roots, and it can be done successfully only at the expense of considerable time and energy and by exercising a great deal of patience ... once started, the work is not only interesting but even fascinating. A small hand pick with cutting edge, an ice pick, a tape measure and a meter stick, pencil, note book, and drawing paper are the only equipment needed," Weaver said.



FIG. 3.—One end of the first trench used for the study of root systems. Pullman, Washington, 1914.

Image taken from *North American Prairie*.

Weaver found that each plant species had its own individual appearance and that "the general characters of the root system of a species are often as marked and distinctive as those of the plant parts above ground." Of the Big 4 prairie grasses, roots of switchgrass (*Panicum virgatum*) were very coarse (3 to 4mm in diameter) and penetrated "nearly vertically downward to a depth of 8 to 11 feet, spreading but little in the surface soil."

Roots of big bluestem (*Andropogon gerardi*) grew very abundantly "both vertically and obliquely downward, a few almost horizontally, and at once thoroughly occupy the soil and form a dense sod," reaching depths of 5 to 7 feet or more, also quite coarse. Indian grass (*Sorghastrum nutans*) roots are finer and usually reach depths of 5.5 feet or less.

A more upland species, little bluestem (*Schizachyrium scoparium*) has much finer roots (0.1 to 1 mm in diameter) with a pronounced lateral spread of 12 to 18 inches from the crown. Most of the roots run nearly vertically downward to depths of 4.5 to 5.5 feet. Its "roots are so abundant as to form a dense sod, almost completely occupying good soil at least to 2.5 feet in depth," Weaver said.

Weaver conducted his studies during the drought years of 1934-1940 and found that variable root lengths had consequences. He reported that, "where little bluestem was intermixed with a smaller amount of big bluestem on the upland, the available water initially became exhausted in the first and second foot of soil. But by midsummer repeated sampling showed that no water was available to a depth of 4 to 4.5 feet. Nearly all of the little bluestem died, but much of the big bluestem was able to absorb enough water below 4.5 feet to maintain life until rains finally came."

Weaver was a contemporary of Aldo Leopold; perhaps they never met, but they certainly must have known about each other's work. Most of Weaver's 100-plus writings may be found in the digital library archives of the University of Nebraska. I was fortunate to read of his experiments in my copy of his book *North American Prairie* (1954). The New Mexico State University Library was removing it and now it is mine -- their loss is definitely my gain!

In addition to species variations, prairie plants show root differences due to soil type. Most likely our heavy clay soils would allow shallower root systems than the more loamy Nebraska soils. Perhaps we should follow Weaver's example and get out our shovels!

Coastal Corner: The Prairie Adventure by Larry Brasfield

As most of you know, the beach side of Galveston Island State Park (GISP) will close for at least two years starting on September 3, 2019. This means that the popular Saturday morning beach walks sponsored by the Friends of Galveston Island State Park and Texas Master Naturalists will no longer be available to the public. In

order to continue our Saturday nature walk program and to stimulate interest in the bayside of Galveston Island State Park, Rick Becker and I have developed a new prairie walk module we are calling "The Prairie Adventure" that will replace the Saturday morning beach walks.



The walks will begin in the newly renovated Nature Center, introducing visitors to the concept of the Galveston Bay watershed and to the shell table, containing interesting treasures that can be found on the beach and bay. The visitors will then drive to the

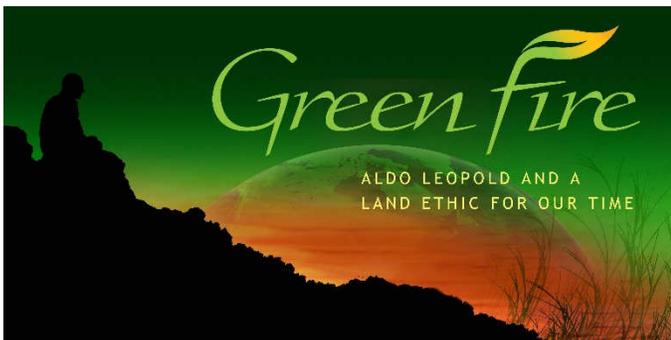
observation tower on Nature Road where they will learn about the Texas coastal prairie, including the purpose of controlled burns and the native prairie grass restoration efforts. There will be a bird identification exercise that will provide visitors a chance to use binoculars and give them a taste of the fun of birding. We will then move down to the boardwalk over the bayou where we will use a cast net to see what aquatic creatures live at the interface between the prairie and the salt marsh. The walk will conclude with visitors learning how to use tracks and scat as clues to discover what animals live in the park but are rarely seen by visitors. This program will acquaint visitors with a different aspect of the park and provide an interesting alternative for people who may have only focused on the park's beach.

The first Prairie Adventure volunteer training class was conducted at GISP on August 24, 2019 to begin this new prairie walk program. If you are interested, please contact Larry Brasfield or Rick Becker.

Aldo Leopold's Legacy from the *Green Fire* AT by Madeleine K. Barnes

A group of 65 master naturalists and master gardeners participated at the *Green Fire* AT movie viewing and discussion about both the film of Aldo Leopold's life and his book, *A Sand County Almanac*. Everyone was encouraged to stay after the training for a brown bag lunch followed by an ice cream social.

The objective of this Aug. 14 AT was to learn about the life and work of Aldo Leopold and his philosophy of a "land ethic." During the discussion participants explored how his legacy informs, challenges, and inspires master naturalists and master gardeners to see the natural world "as a community to which we belong."



Who was Aldo Leopold? Why are his life and writings important to master naturalists and master gardeners?

Aldo Leopold was born Jan. 11, 1887, in Burlington, Iowa. He worked for the U.S. Forest Service (1909-28). In 1924, the country's first national wilderness area was

created at his urging. In 1933, he became the head of the nation's first game management graduate program located at the University of Wisconsin. He also published the first textbook ever written about wildlife management. A fervent campaigner for the preservation of wildlife and wilderness areas, Leopold became director of the Audubon Society in 1935. That same year, he founded the Wilderness Society. Leopold died in Baraboo, Wisconsin, on April 21, 1948.

A Sand County Almanac was published in 1949 shortly after his death. One of its well-known quotes, which clarifies Leopold's philosophy of a land ethic, is: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." In the chapter, "Thinking Like a Mountain," Leopold discusses the concept of trophic cascade and his realization of the serious consequences for the rest of the ecosystem caused by killing a predator wolf – a conclusion that has resonated with later generations. *A Sand County Almanac* became a surprise best seller during the environmental awakening of the 1970's and, more than 60+ years later, it ranks high on the most -beloved list of environmentalists.

Leopold encourages people to expand their vision of the world around them to include the natural world in their community as they would their neighbors. His writings demonstrate the connections to the world around us through the food we eat and the resources we use. Leopold asserts that each piece of land looks the way it does today because of past decisions. He suggests that

any decision reflects our personal and collective values and biases. Many people will formulate their decisions differently, but by thinking about the ultimate effect of your actions, you can choose the evidence you will leave behind for others. Leopold's sobering message asks us to consider how we can protect and cherish something at the same time. He warns that beyond the impacts we make when we degrade land in multiple ways, the act of admiring nature can have impacts of its own. Leopold's own misdeeds led him to be concerned about the impacts of decisions and actions taken with good intentions, but with incomplete information. Leopold understood that ultimately the health of land, and in turn human health, would be determined by people's values.

To give you an example of his insight, Leopold tells a story about a molecule called X as it traveled through nature in the book section titled "Odyssey." He wrote: "The break came when a burr oak root nosed down a crack and began prying and sucking. In the flash of a century, the rock decayed, and X was pulled out and up into the world of living things. He helped build a flower, which became an acorn, which fattened a deer, which fed an Indian, all in a single year." As you read further, X ends up in a beaver, "an animal that always feeds higher than he dies. The beaver starved when his pond dried up in a bitter frost. X rode the carcass down the spring freshet, losing more altitude each hour than heretofore in a century. He ended up in the silt of a blackwater bayou, where he fed a crayfish, a coon, and then an Indian, who laid him down to his last sleep in a mound on the riverbank."



Aldo Leopold has left us with a legacy that is both a challenge and an opportunity to address the continuing issue of ensuring "both people and the land will prosper in the long run." If you haven't read the *A Sand County Almanac*, I would encourage you to find the time to do so and see nature through the vision of Aldo Leopold. To learn more about his philosophy and The Aldo Leopold Foundation, visit the website: www.aldoleopold.org.

Worms: The Good, the Bad and the Slimy by Beverly Morrison

Charles Darwin was a big fan of worms. The last book he wrote, *Earthworms*, was devoted to worms. He believed that worms were in a large part responsible for lush topsoil - the product of their ceaseless soil consumption and defecation. He calculated that there were about 54,000 worms per acre. We have figured out that there are a lot more worms than that.

The last Ice Age is thought to have wiped out North America's worms, if there ever were any. So for 10,000 years the trees and birds and insects and all life in the northern forests evolved on the notion that the decay process of leaf litter and such was a slow process. The expectation was that the nutrients from the decay process would be available above ground and not drawn into the soil.

Then, about 1492, along came the Europeans to a wormless continent with deep litter underfoot and gorgeous forests. With them they brought dirt ballast from ships, dirt balls from favorite plants and trees

transported from the Old World with worms. Best guess is common night crawlers and red marsh worms came ashore.

Worms are slow movers. It is said if one is in your yard, it will always be in your yard and they made westward progress in step with Europeans moving west.

Worms are considered an invasive species.

Our worms are detritivores; they eat small organic debris particles. We have about 180 species of the 5000 species supposed to exist. Most live in the tropics. The most familiar species are night crawlers (*Lumbricus terrestris*) - that only like to come out at night - favored by fisherpeople - and the red wigglers (*Eisenia fetida*) - favored by people that are making compost.

Worms can't see, but do sense light; they can't hear, but respond to vibrations. They breathe in air and exhale carbon dioxide, but don't have lungs. Instead, they

breathe through their skin, which traps or dissolves oxygen on a mucus layer; the absorbed oxygen is transported through their bodies by movement, not an arterial system. They must stay moist to live, if they dry out - goodbye.



Photo courtesy of Wikipedia

Worms are good eaters. They don't have teeth, but do have strong mouths. They swallow dirt, decaying leaves, and other litter around plants and trees. Their first segment - the prostomium - is dynamically shaped to squeeze and push into compacted soil. Their mouths are behind the prostomium. Food passes thru the pharynx, the esophagus, and into the stomach where it is ground up and nutrients are absorbed; the leftovers pass into the intestines, which make up two-thirds of the worm's body. Worm poop - castings - pass through the rectum and the anus. It is dark - soil colored - and rich in nutrients valuable to plants.

Worms move using two types of muscles under their skin. The circular outer layer can contract the diameter of the worm and stretch the body out in length. The inner layer is longitudinal which can shorten the body, thus moving forward. Every segment of the worm except the first and the last has four pairs of tiny stiff hair-like projections. It grips the soil and anchors itself with its back projections. Then, it squeezes itself longer in the forward direction. Next the front projections grab on and the back sections catch up. So, circular muscles elongate the body, the longitudinal pull it back. Coordinated effort to be sure.

This brings us to sex. Yep, they have it. But. earthworms are hermaphrodites; each one has the ability to develop

eggs and sperm. So, they find a good-looking worm, flatten themselves against each other, and trade sperm. You have noticed the band of lighter looking flesh on some worms; that is the section that forms a ring producing the eggs. The worm eventually crawls right out of that ring and it seals itself into a cocoon for developing the young worms.

When the worms emerge from the cocoon, they are fully formed but tiny. In a year they will be full size and ready to reproduce themselves. Worms live about six years; some get as long as 14 inches in the Northern Hemisphere. To see 10-foot-long ones, go to the tropics.

Fun Fact: cut a worm in half below the head segments and the worm has the ability to regenerate lost segments of their bodies.

I had a worm bin for years. Easiest pets I ever cared for! It never ceased to amaze the quantity of food they could process. I never planted a bush or plant without castings and used the worm tea on my favorite plants to give them a nutrient pick-me-up. Vermiculture is easy and productive (that is another story). I never knew there was a down side.

Downside: Worms do soften the soil, create aeration below ground, improve water absorption and give off nutrients. HOWEVER, our northern forests slowly evolved using a deep layer of slowly decomposing leaves and other organic matter called duff. When earthworms invade a forest, they quickly eat up the duff, resulting in fewer nutrients for young growing trees and plants. Some species die off. With the long evolved balance of slow above-ground decomposition interrupted, there is evidence of less-desirable trees over-competing our oaks and other slow-growing hardwoods, and out competing plants like trillium, goblin ferns, trout lilies, and other understory plants. That changes the nature of the bugs and caterpillars and insects in the forest. So, fewer insects, fewer birds, fewer frogs, fewer bats..... You know the drill. That such a passive underground resident could do such harm. And improve the soil so much.

So to sum up and plagiarize several sources:

WORMS: GREAT IN THE GARDEN, BAD IN THE FOREST.



Heritage Book Study - Review of *Comanche Marker Trees of Texas*

by Madeleine K. Barnes

For those of you who are interested in native American cultural history, especially that of the land that became Texas, you may want to read *Comanche Marker Trees of Texas* written by Steve Houser, Linda Pelon, and Jimmy W. Arterberry, who have joined together "to find, record, research, and recognize as many Comanche Marker Trees as possible." An additional goal was to return a small part of Comanche culture by recognizing these trees. Houser is an arborist and master gardener/naturalist, Pelon is a Professor of Anthropology, and Arterberry is a Comanche Nation Tribal officer.

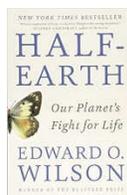


I had not heard of marker trees being used by Native Americans to mark trails, used by only a few Native American tribes, according to the authors. In order to be considered a marker tree, the trees must be between 144 and 315 years in age, which translates to some old specimens, if they are still alive. Trees are taken down each year for a variety of reasons such as development, disease and insects, and other natural causes - lightning, wind, erosion, and floods. So, many may have been removed before they could be identified, recognized, and protected.

Marker trees were used in the Comanche culture to identify trail location and direction, water crossings, burials, ceremonies, medicinal sources, and other uses. Certain tree species have been identified for specific types of use. The trees may have been painted, carved upon, or their growth modified early on to identify their use. There are natural events that may mimic some of these same growth modifications in trees, making scientific research imperative. At the time of book publication, six marker trees located in Texas have been recognized by the Comanche Nation.

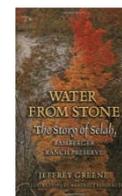
This is a very technical book on how they have identified and researched these trees prior to submittal to the Comanche Nation for their review and recognition. Notably, the same efforts to document marker trees are taking place in other states with other tribes. I learned a lot about tree growth from this book and it did illustrate how much knowledge the Comanche Nation had about each species and habitat.

While it is important to learn about these trees and where and how they were used, the authors do not provide cultural information to understand their significance in the daily lives of the Comanche. For example, they identified certain areas and trees relating to ceremonies, discussing ceremonies that might have taken place, but focusing heavily on scientific methods. They provided an outstanding overview of what has been accomplished so far; their very important documentation and recognition effort for the Comanche Nation is worthy of reading.



We will meet on Monday, October 7, 2019, to discuss the second half, pages 106-212, of *Half-Earth: Our Planet's Fight for Life* by Edward O. Wilson. The next meeting will be on Monday, November 4, 2019, when we will meet to discuss the first

half, pages 1-103 of *Water from Stone: The Story of Selah, Bamberger Ranch Preserve* by Jeffrey Greene. Join us in discussing both of these interesting books.



We welcome your participation each month for two hours on the first Monday of the month starting at 10am at the *Extension office. Please note that we welcome anyone to participate whether you are TMN certified, recertified, or just want to remain a chapter member. We look forward to seeing you and let us know if you have read any good naturalist books lately. Happy trails!

Frogfruit: Love it or Pull it? by Lana Berkowitz

Every time Jim Duron passes our small pollinator garden on his way to work in the Attwater prairie chicken pens at NASA, he shakes his head at the sight of frogfruit growing in the bed.

"You'll be sorry," Jim says. "It doesn't even attract frogs," he adds.

Those of us who water and weed the garden defend the abundance of Texas frogfruit (*Phyla nodiflora*) mostly because Chris Anastas has converted us to her way of

thinking. In the photo, Bev Morrison shows off the flowering mass.

"I LOVE frogfruit," Chris says. She quickly came up with Top 10 reasons to love frog fruit when I mentioned Jim's disapproval.

- Covers the ground and keeps soil cooler for the roots of other garden plants.
- Keeps uninvited guests out! (invasives and their relatives)

- Is an evergreen groundcover so looks nice even in the winter!
- Can replace grass as it may be mowed and keeps a low profile
- Host plant for the Phaon crescent, white peacock and common buckeye butterflies.
- Excellent nectar plant for all pollinators with long bloom times.
- Can grow in partial shade or full sun under wet or dry conditions!
- Is deer resistant!
- Can grow in containers and hanging baskets.
- Trips up turkeys and maybe even Jim (common name turkey tangle).

Jim says the main reason he doesn't like frogfruit is because it tends to overpower everything in its path.

"Of particular importance to me are young seedlings that have been transferred to one gallon containers," Jim said. "The second reason is that it adds a large amount of maintenance time for pulling the weed out of the staging areas when you weed eat the plants."

So are you a fan or critic of frogfruit? It probably depends on your planting goals.

By the way: Toward the end of August, a crazy groundskeeper chopped down our garden, which is inside a rope fence marked with a sign proclaiming it a

pollinator garden. While we wait to see what grows back, guess what is surviving? Frogfruit!



Nurdle Patrol 101 by Stennie Meadours

Nurdles are pea-sized pellets produced as the raw material for almost all plastic items we use. Some of these pellets enter the natural environment during manufacturing and transport. Nurdle Patrols were initiated by Jace Tunnell, with The University of Texas Marine Science Institute, Mission - Aransas National Estuarine Research Reserve in November 2018 to provide data to document whether and where nurdles are occurring all around the Gulf of Mexico. So far, Galveston Bay is showing the most nurdles of all locations and more data points are needed.

Nurdles can be collected on any shoreline. Typically, nurdles are found on the incoming high tide line, however some locations seem to be accumulation spots where many weathered nurdles can be found at one location. If you notice nurdles on a shoreline while doing another activity, try to collect nurdles as soon as possible, before either the tides wash them back out or they become ground into sand by tires or foot traffic. When on patrol, do a quick preview of the area prior to picking up any nurdles and starting the 10-minute clock. This will give you a better idea of where to pick up nurdles. If you are

walking along a shoreline for 10 minutes and you don't see any nurdles, zero nurdles should also be reported, because knowing where nurdles do not occur is also of value.



Photo by Stennie Meadours

Jace Tunnell is requesting that all collectors store their nurdles, as chemical analysis of these collections may be possible in the near future.

Nurdles have entered the waterways from every point of transfer from original manufacturing at the factory site to every type of transport. Most nurdles float and have been carried into the major water bodies worldwide by storm water runoff. Nurdles were thought to be inert, insoluble, and harmless. They can easily be overlooked or mistaken for a piece of shell, create no sheen and leave no tracer. However, recent research has found that nurdles are present in large amounts in the aquatic environment and impact marine life thru ingestion.

Citizen scientists in Mexico, Europe, New Zealand and Australia are documenting locations where nurdles wash ashore. So please join the search to better document the presence of nurdles around our treasured Galveston Bay! We are also looking forward to doing Nurdle Patrols on the nesting islands along with any shoreline where we find them! If you do a Nurdle Patrol, please charge your hours to "Water Quality Monitoring." Please contact Stennie Meadours stenmead@aol.com if you have any question.

To complete a Nurdle Patrol, you will need:

- Plastic sandwich bag, or sealable container,
- Permanent marker,
- Camera or cell phone for photo and gps.

Nurdle Patrol Protocol

Search for nurdles along a shoreline of your choice for 10 minutes, pick up all nurdles you find using hands only, no tools or aids.

If no nurdles are found:

1. Report "No nurdles Found" by email to Jace Tunnell at jace.tunnell@austin.utexas.edu with date, coordinates, and "No nurdles found."
2. Post the same info, with or without photos on the "Nurdle Patrol" Facebook page.

If nurdles are found:

1. Photo of you at the location with the collected nurdles, photo of nurdles on the shoreline also recommended but not required
2. Nurdles stored in plastic bag, labeled with lat/long, date, name of location, # of nurdles. 10 min collection, and your name or signature.
3. Report "Nurdles Found" by email to Jace Tunnell at jace.tunnell@austin.utexas.edu with date, coordinates, and number of nurdles found
4. Post the same info in item (c) with photos mentioned in item (a) on the "Nurdle Patrol" Facebook page

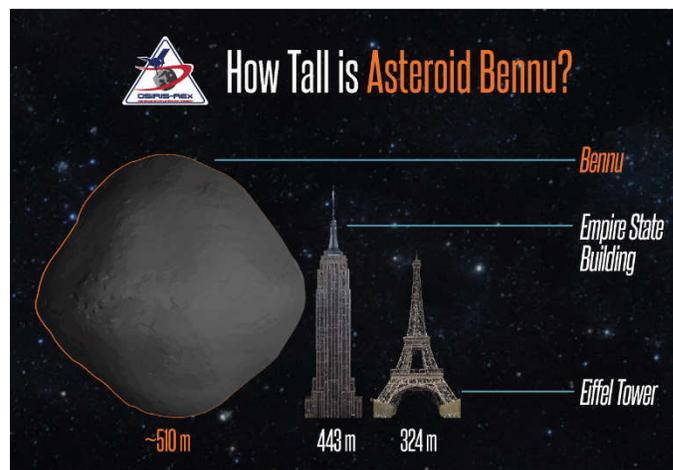
Big Picture: Bennu to Biodiversity by Diane Humes

NASA launched OSIRIS REx from Cape Canaveral on Sept. 8, 2016, beginning its mission to explore the asteroid Bennu. The spacecraft name suggesting Egyptian mythology is an acronym for Origins Spectral Interpretation Resource Identification Security Regolith Explorer. Its target, formerly known as (101955) 1999 RQ36, is now called Bennu. The name denoting an Egyptian heron was the winning entry in a contest to name the asteroid.

OSIRIS REx is now 70 million miles from Earth and has been orbiting Bennu -- a rounded speck in space smaller than the Empire State Building -- since Jan. 2, 2019. Certainly its arrival was cause for New Year's celebrations!

Why visit asteroids and why this one? More than 500,000 asteroids orbit the sun between Mars and Jupiter. Asteroids differ greatly from each other in size, mass, orbit and composition. Most asteroids are ancient, dating to the beginning of the solar system. Their orbits have changed over time, influenced by the motions of Jupiter, Saturn, Uranus and Neptune. Asteroids preserve a

record of inner solar system impacts, which may help us understand the chronology of orbital dynamics and impacts. Some show resemblances to known meteorites, which, except for the Apollo moon rocks, are the only extraterrestrial samples we have.



The OSIRIS REx mission to Bennu combines elements of practicality and exploration. The plan is to capture a sample of the asteroid and return it to Earth -- a plan greatly facilitated by the closeness of Bennu's orbit to Earth's. Bennu's orbit also crosses Earth's orbit, giving it a higher than average probability of being on a collision course someday! Since we'd all rather be prepared, the idea is to learn as much as possible. Exobiologists search for life's origins in space; some believe primitive life forms or organic molecules arrived on Earth from space. Bennu appears to be rich in carbon -- a precursor to life -- raising its interest quotient even higher.

Mission planners are presently deciding on the perfect landing site, while the spacecraft orbits Bennu. Next summer, OSIRIS REx will make a touch-and-go landing on Bennu, collect a sample, and then head home. Stay tuned for a lot of excitement in the summer of 2023, when the sample lands in the desert of Utah for retrieval and return to the curation facility at Johnson Space Center. (see: asteroidmission.org)

If the solar system can be compared to an ocean, Bennu is an exceedingly small island in a vast archipelago -- the asteroid belt. The planets of our solar system correspond to much larger islands. Earth ecologists study islands to figure out how the great diversity of life on Earth might have evolved.

Biologists Edward O. Wilson (*The Diversity of Life*) and Robert MacArthur developed the theory of island biogeography in 1963 when they noted that the numbers of plant and animal species on islands around the world followed a consistent pattern -- the larger the area, the more species. The numbers followed a mathematical formula; the number of species approximately doubles with each tenfold increase in area, a relationship called the "area effect." The theory takes into account the "distance effect" -- islands more distant from another island or continent will contain fewer species because colonization decreases with distance. As for which species are found on islands; islands isolated over evolutionary time have endemic species -- unique species found nowhere else.

In 1966, Daniel Simberloff, then a graduate student, joined Wilson in conducting the classic experiment to test equilibrium of the distance effect. They chose four small mangrove islands in the Florida Keys of comparable sizes but at varied distances from large islands for their test. After making as complete a survey as possible of all insect and other arthropod residents of each island - Wilson describes crawling through mud to every treetop and back to mud -- they fumigated the islands, killing all the arthropods, leaving vegetation intact.

Constant monitoring for the next two years showed that recolonization began within days; numbers of spider, roach, mite, cricket, moth and ant species were back to

original levels in less than a year. As predicted by the theory, the nearer islands contained more species than the farther islands. The numbers remained constant for a second year, although the exact species composition fluctuated constantly, Wilson said, "like travelers in an air terminal."

The mathematics of island biogeography have been applied in reverse to conservation questions, such as: What happens to population numbers of all species when a particular habitat size decreases? A very early and well-studied experiment in habitat shrinkage occurred on Barro Colorado Island, formerly a hilltop amidst a vast stretch of rainforest. With the construction of the Panama Canal, it became a 6-square-mile island in the middle of Gatun Lake. Designated as a nature preserve and tropical ecology study area, the differences between its flora and fauna and those of intact rainforest are well-documented.

The large carnivores -- puma and jaguar -- left right away. By 1970, 45 bird species had disappeared, including understory and meadow species; the harpy eagle no longer nests there either. Conversely, medium-sized predators -- coatis, peccaries, possums, armadillos, pacas, agoutis -- flourished, while ground-nesting species were in steep decline. Has the lack of top predators to control smaller predators led to decimation of prey species? What will equilibrium look like on this small fragment of rainforest?



Photo by Pam House

According to ecologist and evolutionary biologist, Ilkka Hanski, (*Messages From Islands*) forests are the largest and most complex ecosystems on earth, containing at least half of all land species -- especially tropical rain forests. Before the Neolithic, forests covered half of Earth's land area; in our time the figure is closer to 25 percent.

One rule of thumb -- often called the 20 percent rule -- states when a land-covering habitat such as forest drops

below 20 percent to 30 percent of the landscape area, species will be in danger of extinction. This is especially frightening since we have no firm numbers on how many species presently exist!

Each species, depending on its dispersal ability, specialization and population density, has its own extinction level, but habitat fragments -- islands -- can become too distant for successful recruitment, or too small to sustain many species.

In addition to smaller area, Earth's forests are massively fragmented, simplified and lacking in large animals. One estimate, using satellite imagery, shows that 20 percent of our remaining forests are located within 100 meters of forest edge, while more than 70 percent lie within one kilometer of the edge. Effectively, this makes forests much more like islands.

Might as well live on the asteroid Bennu.

Nominations for Treasures of the Bay by George Kyame

Each year our chapter recognizes those Chapter members and other individuals and organizations that have gone **above and beyond regular commitment and stewardship** with regards to all of our focused activities. Please consider the following descriptive categories for your suggestions or nominations. Feel free to share these thoughts with Julie Massey, our Chapter Sponsor, or any board member.

- **Dick Benoit Leadership Award:** Awarded for extraordinary service, mentoring, leadership and dedication to our organization.
- **Beth Cooper Memorial Service Award:** Awarded to a new Chapter member (2 years or less) in recognition of their volunteer service and dedication to the chapter.
- **Sara Snell Education Award:** Awarded in recognition of initiatives in education about the Galveston Bay ecosystem.
- **Chapter Service Award:** Awarded to an active Master Naturalist of the Galveston Bay Area Chapter for outstanding work and commitment to the success of our organization.
- **Making a Difference Award:** Awarded in recognition of an individual or individuals whose initiatives in preservation, restoration, education and/or enhancement of our natural world have improved and/or enriched the quality of the environment in the Galveston Bay area.
- **Non-Profit Award:** Awarded to a non-profit for leadership and unselfish investment in protecting and improving the Galveston Bay area environment.
- **Corporate Award:** Awarded to a corporation for leadership and unselfish investment in protecting and improving the Galveston Bay area environment.

The Midden

Published bimonthly by the Galveston Bay Area Chapter - Texas Master Naturalists. The purpose of *The Midden* is to inform 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.

Texas AgriLife Extension Service
4102 B Main (FM 519) Carbide Park
La Marque, TX 77568

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.

Midden Team

| | |
|------------------------------|-------------------|
| Diane Humes, Managing Editor | |
| Madeleine K. Barnes | Lana Berkowitz |
| Verva Densmore | Carolyn Miles |
| Chuck Snyder | Jennifer Trandell |

The Midden Deadline

for the next issue

October 25

If you have Advanced Training or Volunteer Opportunities, please submit information to Cindy Liening, calieni272@msn.com.



October and November Activities

ADVANCED TRAINING OPPORTUNITIES

Chapter Meeting - October 3; Updated Galveston Bay Report Card

Presenter: T'Noya Thompson
6:15 Social, 7:00 Meeting, 7:30 Speaker Extension Office*; 1 AT hour

Introduction to League City Ghirardi Family WaterSmart Park - Monday, October 28. 12:30-3pm; 2.5 hours AT
Location: League City Civic Center Room 3. 300 West Walker; We will carpool to the park.

Presenter: Charriss York
Register with Emmeline Dodd txdodd@aol.com

Why Ecology Matters-Part 4 - Saturday November 16
9am - noon; 3 hours AT
Location: Extension Office*
Presenter: Cindy Howard
Register with Emmeline Dodd txdodd@aol.com

Ongoing

Galveston Island State Park

10am at the Welcome Center
Every Saturday - Prairie Adventures
Every Sunday - Bay Explorations
Tours 1 to 1 ½ hours long. Bring water and family.

Heritage Book Study Group

First Monday of every month. Extension Office*
10am-noon; 2 hours AT
Contact: Elsie Smith (409) 392-7003
See Pg. 7 for meeting dates and books.

STEWARDSHIP OPPORTUNITIES

Ongoing Activities:

Mondays - Galveston Island State Park, Contact: Chatt Smith chattsmith@gmail.com

Tuesdays -

- Sheldon Lake State Park, Contact: Tom Solomon crandtr@sbcglobal.net
- Texas City Prairie Preserve, Contact: Jim Duron wishkad@yahoo.com
- Environmental Institute of Houston at UHCL, Contact: Wendy Reistle reistle@uhcl.edu

Wednesdays - Wetland Restoration Team, Contact: Charriss York cyork@tamu.edu

Thursdays -

- Stormwater Wetland Team, every Thursday, 9am - noon. Contact: Christie Taylor cctaylor@tamu.edu
- San Jacinto State Park, Contact: Jim Duron wishkad@yahoo.com

Fridays - Prairie Friday, ABNC, 8:30 - 11:30am, Contact: Chatt Smith chattsmith@gmail.com

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, check calendar

Committee Meetings

Advanced Training - Third Monday, 10-noon
Education/Outreach - Third Tuesday, 1-2:30pm
Communication - Meets quarterly, check calendar
Midden Team - October 26, Monday, 9-noon



Texas A&M AgriLife Extension provides equal opportunities in its programs and employment to all persons, regardless of race, color, sex, religion, national origin, disability, age, genetic information, veteran status, sexual orientation, or gender identity. The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

