

# The Steward

Summer 2021    Highland Lakes Master Naturalists    Volume 12 Issue 2



**Cathy Hill, Monica Stewart Quintanella, Terry Stracke, Meghan James and George Brugnoli in the Background.**

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Photo creds: Sue Kersey

**Please submit pictures, articles, reports, stories, announcements, etc. to [becky\\_breazeale@yahoo.com](mailto:becky_breazeale@yahoo.com)**

**Photos should have captions and appropriate credits. We will announce the deadline for submissions two weeks prior to the deadline. Or contact Becky and Martelle.**

**Thank y'all for ALL!!**

## Message from our President

By Stephen Harrell

I'm writing to interest you in HLMN leadership roles. There is a large group of people working to organize, manage, and administer many programs in HLMN. Most of us are dependent on them to provide direction, volunteer opportunities, and leadership in our Master Naturalist roles.

The executive board members are nominated and elected each year; most spend longer than 1 year in executive board positions. Many serve in executive board positions multiple times.

But those are not the only leaders in HLMN. There is a core group that are board members and spend a lot of time managing and administering various aspects of volunteer activities. They and others lead the various "Friends" groups and work with HLMN partners to identify activities and organize volunteers. A great many are simply enthusiastic HLMN advocates and seem to work themselves into leadership roles.

Most of you are aware of the coordination and management that occurs to some extent. I was unaware of how much time and how many people were working beyond the actual volunteer activities. Before getting on the board, I just showed up with tools to clear trails, build a shelter, or weed gardens. Once I discovered the extent of management and organizing, I was amazed. And I've begun doing some of that work myself.

But there is always room for more help. Our leadership shifts over time as some move, have different priorities, or are no longer able to commit time to it. If you haven't had an opportunity to serve in this way, I invite you to participate by letting those leading the chapter know your interest. There are various ways to help in this regard and you can get lots of advice and direction from past leaders – no one expects you to know everyone and what's expected in a given role - guidance is given gladly. So, tap on someone's shoulder and ask how you can help them organize or manage an activity or tell someone on the board or on the friends group.

The most gratifying part is I've come to know more people in HLMN and our partners and sponsors. I've become a little more effective as a TMN as well.



## Update on Nesting Season at Inks Lake State Park

By Jerry Stacy

We had a rather successful nesting season this year at Inks Lake State Park, with three active nests containing 14, 13, and 11 eggs. By 05/16, the nest with 14 eggs had 11 eggs hatched. All hatched in the nest with 13 eggs.

Every year seems to bring a new experience. On 06/07, while checking on the last nest with eggs, my timing was such that all eggs had hatched shortly before I got there. See image 194. The new hatchlings leave the nest in about 24 hours of hatching, called out by mama. So, not knowing exactly when the hatching occurred, I was afraid of the possibility that the hen had abandoned the nest. But good news! I returned on 06/09 and took image 196. All ducklings had left the nest! Our total new duckling count for the year is 35.

I had game cameras on all the nests, and wanted desperately to get video of the "jump". But none of them would trigger on the little fuzz balls leaving the nest. Gotta try a new camera, angle, or whatever next year.



Image 194

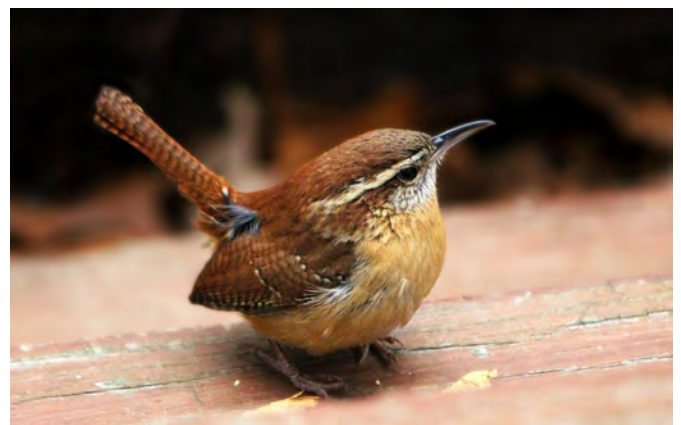


Image 196

Photos by Jerry Stacy

**As a side note**, we also had two Carolina wrens that used the wood duck nest boxes, with one having 6 eggs and one having four. So, ten new Carolina wrens were added to the area.

Right:  
Carolina Wren, Photo courtesy of Pinterest





# Texas Master Naturalist 2021 Annual Meeting

October 21st-24th

## Texas Master Naturalist — 2021 Annual Meeting —



### Agenda & Registration Prices

	In-Person - \$325	Virtual - \$100
<b>Thursday 10/21</b>	11:00am-2:00pm - Chapter Leadership Luncheon Afternoon Field Sessions Social Dinner	
<b>Friday 10/22</b>	Morning Field Sessions 8:00am - 5:30pm - Technical Sessions 12:30-1:30pm - Welcome & Keynote Address 7:00pm - 8:30pm - Wonders of North Texas Nature Keynote Address	
<b>Saturday 10/23</b>	All Day Field Sessions 8:30am - 5:00pm - Technical Sessions 12:00-1:00pm - TMN Science Fair Winners Presentation 6:30pm - 8:00pm - Awards Reception	
<b>Sunday 10/24</b>	8:00am - 9:00am - Contest Awards & 2022 Certification Pin Announcement *Lodging not included	

Get ready for our 22nd Texas Master Naturalist Program Annual Meeting, an event to gather, learn and celebrate another year of the Texas Master Naturalist Program. We're preparing this year's meeting as a HYBRID Event – both online and in-person at our Marriott contract hotel in Irving, Texas.

The event will be held the weekend of Thursday October 21st through Sunday the 24th, 2021 with plenty of activities for all to enjoy! Join us for a long weekend of greenspace adventures in the natural hideaways of our largest urban area in Texas

This year's agenda may look a little different, but we still have over 100+ concurrent technical sessions lined up with a huge variety of topics – from laws & ethics to paleontology, from dendrology to bird conservation issues and from youth programming to water quality community science. There are some really excellent speakers too! Note that our agenda has shifted up by half a day from our historic conference schedule. Join us early for some in-person pre-conference field sessions Thursday October 21st and a welcome social that evening. Officially, we'll kick off the 2021 Annual Meeting Friday October 22nd in the morning, have technical sessions and keynotes through the whole day Friday and Saturday October 23rd, and run through Sunday October 24th morning closing with our contest awards and 2022 recertification pin announcement.

For more information go to: <https://txmn.tamu.edu/2021-annual-meeting/>

#### TO REGISTER

Follow the above link. Click on the icon



Click Here  
to Register

## My Happy Place

by Cathy Hill

When I first became a Master Naturalist I volunteered at many different locations. However overtime I have concentrated most of my efforts at a place close to home, Inks Lake State Park, or as one of my fellow volunteers calls it “My Happy Place.” Not surprisingly I am also a member of the friends group there, FOIL, and for the past year and a half have served as its President. If you have been to ILSP you know it is a beautiful park with many activities for visi-



tors and there are also many opportunities for volunteering. I would like to encourage other HLMN members to join us as FOIL members especially if you live close as I do. Also I would encourage you to invite any nature loving friends who might like to volunteer but don't have the time or inclination to become Master Naturalists. There is no training required to become a FOIL member.

My favorite place to volunteer at ILSP is the Wildlife Viewing Station. As I hope you are aware the WVS was designed and built by members of our HLMN chapter about eight years ago. It now belongs to the park but it and the native gardens are primarily maintained by a combination of volunteers including members of FOIL and HLMN and Park Hosts. Because of a team of dedicated volunteers we were able to keep the WVS open during most of last year due to a daily regimen of disinfecting. Likewise as before and now we are keeping the native gardens healthy with watering and weeding efforts. The Wildlife Viewing Station is much more than just a Bird Blind! It hosts many forms of wildlife including raccoon, rabbits, snakes, butterflies and of course birds which are drawn to the native plants, water feature, and feeders.

When I am there doing watering duty, I enjoy the beauty and peacefulness of the site. I also enjoy visiting with and educating visitors who come by while I am there. It's fun to discuss birding and to find out where people are from and it's great to hear their compliments and thanks. I was told recently by a couple from the Dallas ar-



Above photo by Colette Nicholl

Below: photo by Cathy Hill





ea, who are also Master Naturalists and visit a lot of parks, that “it was one of the nicest birding facilities they had ever visited!” Wow! That was sure nice to hear.



**Wildlife Viewing Station at Inks Lake State Park.**  
**Photos by Cathy Hill.**





I have also joined Monica Q., our park nature interpreter, for the bird program that she does on Saturday mornings. She tells me there isn't always much attendance but whether it's a whole Girl Scout troop or just a couple of drop ins she like me enjoys visiting with them and sharing her birding knowledge.

Monica also does a Saturday afternoon "Snakes Alive" which I recently attended and assisted with. She did a great job of educating and engaging her mixed audience of adults and children with facts and quizzes and of course getting to touch her live bull snake Mr. Pickles. I was happy to get to handle him too. Now I know that would not appeal to some of you but I loved it. Perhaps you would prefer to come and help our own Phil W. on Saturday mornings. For YEARS he and other volunteers have been instructing our younger visitors with the "Fishing with a Ranger" and "Underwater Discovery" programs which alternate weekends. Check with him or the park for details. I know he always welcomes volunteers.



P.W. Hosting Fishing with the Ranger.  
Photo by Cathy Hill



Mr. Pickles with Cathy Hill  
Photo by Cathy Hill



Volunteers also helped with the annual 4th of July Children's Bike Parade. It was a blast helping them decorate their bikes and then watching the parade led by the Hoover Valley Fire Department Trucks in a big loop around the central park picnic playground area. It was a blast and no fireworks needed. Next year we hope to also again have the annual Easter egg hunt event as well.

Speaking of next year, it is our fervent hope that we will once again be able to put on the Great Outdoor Program, which due to Covid restrictions was canceled in 2020 and 2021. Although a version of GOP was originally begun by the park, for the last MANY years it has been a HLMN organized and run volunteer effort with support from the park and FOIL. It is a fun and educational nature program held over six days in April for all the area first graders. It's a lot of work but loads of fun for all involved. If you've never participated I encourage you to do so in 2022. More details will be provided come the beginning of next year.

I've not mentioned all the programs that one can volunteer with at the park but I, of course, want to include that we also do periodic work projects like trail maintenance and trash pickup. Some of our folks even do shoreline trash pickup via kayaks. After the winter storm we helped with the clearing of downed trees and branches at Long-



George Brugnoli, Meghan James, and Eva Hobbs helping with Decorations



Lining up for THE PARADE Photo by Cathy Hill

horn Caverns SP which is part of the ILSP territory. Earlier this summer a dedicated group helped with new signage along one of our trails. It was hot hard work and I confess I didn't help with this project. I'm so thankful we had volunteers who were willing to take it on! But I just want to stress that there is something for everyone. I also want to mention that we have just recently gotten a new Superintendent, Barrett Durst who is very enthusiastic and supportive of volunteers. Inks Lake State Park is a beautiful active park which is a joy to visit and a great place at which to volunteer. I hope some of you will come and join us and find your own "Happy Place!"

\*I would like to thank Park Store Assistant Manager Colette Nicholl for the use of two of her scenic ILSP photographs. Check out the ILSP Facebook page for more of her beautiful photography. The rest of the photos accompanying this article are mine.



## Summer Shots By Phil Wyde

Today is July 15<sup>th</sup> and we are well into summer. Everyday I go out and "shoot" what I can. No, although I have now lived in Texas since 1973, I am not shooting with a gun. I gave that up years ago. Instead I am shooting using one of the 2 cameras that I own. But just as I did when I hunted for real, I use stealth, awareness, a good eye and steady hands. What follows are a few of some of the shots that I got this past 7 weeks. Note that all of the images were shot at home or nearby. I hope that you have as much enjoyment looking at them as I did taking them.



*Illustration 1: Racing Caterpillar*

I realize that the caterpillar in Illustration 1 isn't the prettiest caterpillar in the world. But there he was in my garden racing along towards me! I quickly focused on him, panned to keep him in the frame and took the shot. Then I got out of the way. It was close and I spent a lot of adrenaline taking that shot.



Not too many days later just a few feet from where I saw the caterpillar in Illustration 1, I saw the butterfly shown in Illustration 2. It is an American Lady Butterfly. I did not hesitate, but focused and pressed the shutter button. Luckily she stayed on the Greg Mist plant long enough for me to get the shot.



*Illustration 2: American Lady Butterfly on Greg Mist Flower*

The image of the Golden Lead Ball Tree blossom shown in Illustration 3 was taken on June 12<sup>th</sup>. I did not have to worry about the blossom flying away, nor having it move suddenly, as it was a calm day. Also, the tree was in my yard so I was not worn out from hours of tracking. However, I did have to use some photographic skills. The blossom was high up the tree and I am a little vertically challenged. Regardless, I persevered and got the image. Look at the flower. What a wonderful design for a flower!

In contrast, the shot of the Widow Skimmer Dragonfly shown in Figure 4 did take skill, patience, back and forth tracking and luck since dragonflies like to fly, zig and zag, and not stay still for too terribly long. Their fantastic eyesight makes it difficult to sneak up on them.

Speaking of dragonfly eyes, look at them! They are huge and take up a large proportion of the insect's head. Also note that they can see in almost every direction.



*Illustration 3: Golden Lead Ball Tree Flower*

Another interesting thing about dragonflies is how articulated they are. I almost think that they are put together on an assembly line.

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*Illustration 4: Widow Skimmer Dragonfly*



*Illustration 5: Anole on "Buggy Bush"*

The image of the Anole in Illustration 5 is a good example of where a photographer needs a good eye. The anole was very well camouflaged and hard to see. However, my trained eye spotted him! What is also "cool" about this image is that he is on what I call my "Buggy Bush." We bought and planted the bush years ago and I have long since forgotten the bush's name. However, it has a zillion little flowers in late spring that attract zillions of



little insects. This Anole was laying in the bush just picking off bug after bug!

One last comment on this image. Note that this guy looks very much like the Gecko in the ads for the Geico Insurance Company. That Gecko is really an Anole and it is clear that Geico did not have a Texas Master Naturalist as an advisor when putting together their ads!

In Illustration 6 you can see a White Egret stalking prey at Inks Lake State Park. She was so used to seeing people, and so busy stalking, that she let me get pretty near to her. (There is so much plant growth this year around the shore of Inks Lake I am surprised that she could walk around.) Regardless of her familiarity with people and her being busy hunting, I doubt if a less experienced photographer could have gotten this shot



*Illustration 6: White Egret Stalking*



*Illustration 7: Moon Over Oak Bend*

I want you to note that I take my cameras with me day and night. The image of the moon shown in Illustration 7 was taken June 21 over Oak Bend. (Oak Bend is the name of our house in Kingsland. Doesn't everyone name their house?) Look at the craters and think about the meteor/moon collisions that probably caused them. I know much about the moon, but I am still in awe. It really makes me wonder what ancient, medieval, and primitive people could have thought about what they were seeing.

One side commentary. I took pictures of the solar eclipse that occurred several weeks ago. However, I did not like them. The next day the images that they showed of the eclipse on TV looked just like mine – and were just as ugly. I could not bring myself to show my images to you.

The images shown in Illustrations 8, 9 and 10 were great fun to take. I was on the back edge of our property that borders on the Llano River and saw a Killdeer sitting on the sand. Then she saw me and got ruffled. As you can see in Illustration 8 she is rising up and if you look closely you can see eggs and chicks beneath her. What she did next was heroic beyond words. She went away from me calling and acting hurt. She did everything that she

could to lead me away from her nest. She even did the broken wing bit (Illustration 9). Note, she could easily have flown away, but did not! No matter her effort, I ignored her and walked to where I first saw her. I couldn't find anything. Then I looked down and not 12 inches from my lead foot was 2 mottled eggs and 2 baby chicks (Illustration 10). I had almost stepped on them even though they were totally in the open, sitting on top of the sand. I really did not notice the eggs or chicks until the last second. What effective camouflage!



*Illustration 8: Killdeer Sees Me And Gets Ruffled*

The next image (Illustration 11) is of a Gray Fox that has been around our house for about 2 weeks. Actually there are 2 of them. They are beautiful. To my surprise they seem to like bird seed. This image was taken 2 feet off our front porch. It did not take too much photographic skill except to keep my hands steady in spite of my excitement.

The image of the raccoon in Illustration 12 was taken at the Bird Blind at Inks Lake State Park. I was taking pictures of birds when the raccoon appeared. Note that she knows that she is doing something wrong. Just look at her furtive, guilty look. If she was not doing something wrong, why is she wearing a mask! No doubt in my mind.



*Illustration 9: Killdeer Faking Broken Wing*



*Illustration 10: Killdeer Eggs and Chicks  
12 Inches from My Foot*





*Illustration 11: Gray Fox Under Our Feeder*



*Illustration 12: Raccoon Eating Peanut Butter at Inks Lake State Park*

My last image is that of a Cicada emerging from her case. There is so much in this image. How did she fit in the case? What must it feel like to burst out with a fresh new body? Would it be neat if we (humans) could do this? Look at the cicada with a less scientific eye. Is the cicada an insect -- or Darth Vader's consort?

I will stop here. I could show you many more images, but my intuition tells me that you probably want to quit looking at images on paper and get out and see live images of the myriad of things that are around and near where we live. I have to admit that it took luck to get some of the shots of the things that I have shown and talked about in this narrative. But that statement brings to mind the old saw, "The harder that I try, the luckier that I get." In this case, "The more that I go out and shoot, the luckier I get." I also have to tell you that you do not have to have a camera to go out and see wondrous things.



*Illustration: Cicada Emerging from Case*



## A Complicated Problem By Martelle Luedecke

### Problem:

This is my Big backyard tree that has desperately been trying to make a comeback from the freezes. About a month ago it started to get leaves again. And then they do this (photos below) Could you work your iNaturalist magic. I'm at a complete loss and can't find an accurate answer online (even AgriLife). I need to find out how to treat it and make sure it won't spread to my Oaks or other trees. Submitted to iNaturalist with no positive ID.



Ash Tree - Photo by Martelle Luedecke

### Answer:

Yes, the Ash trees were hit hard by the freeze, which made them more susceptible to insect and disease issues. This appears to be an infestation of the Ash Leaf Curl Aphid. I could zoom-in a little bit, and believe I saw some winged females. Fortunately, these are specific to Ash trees and you should not have to worry about them moving to other species. <http://ipm.ucanr.edu/PMG/GARDEN/PLANTS/INVERT/ashlfaph.html> In a "normal" year, we would not worry too much about them. When a tree is already weakened, however, this could be another issue that they would do better not to have to deal with, as the new growth is needed to produce carbohydrates for recovery. If this is an important tree in your landscape, I would call a Certified Arborist to come out and take a look. Ash trees are really not considered desirable landscape trees, as they are weak wooded and generally short-lived trees. Mary Kay, Backbone Valley Nursery

### Solution:

P.S. The solution before I was able to contact an arborist came accidentally and naturally for a Master Naturalist. I placed my 8 hummingbird feeders out. Mixed 10# of sugar weekly. Hummingbirds when they are not at the feeders are waiting in queue in the trees... **EATING APHIDS!** I'm pleased to report that my backyard soft wood Ash tree is thriving. Thank you Hummers!! ~ Martelle



## Did You Know? By Becky Breazeale

If you were a participant in the June TMN Tuesdays Meeting, you probably learned a lot about Dragonflies and Damselflies from Sam “Biology”. However, did you know that Dragonflies are one of the world’s deadliest predators according to Texas Parks and Wildlife Magazine. “They have a 96% kill rate. They’ll eat anything they catch, including their own species. “The dragonhunter is the most impressive dragonfly. They like to hunt other dragonflies.” says Eric Isley an avid dragonfly watcher from Austin. The blue-eyed darner (*Rhionaeschna multicolor*) is one of the prettiest dragonhunters.

Roe Russell, “An Eye for the Dragonfly”, *Texas Parks and Wildlife Magazine*, April 2021, pp. 31-35.



Blue-eyed darner, courtesy of sites.google.com



Left: In sync! I took the photo from inside my home through the window.

Photo by Shirley Winslow



Fatherly Love. Photo by Shirley Winslow



Had some activity in  
the Screech Owl home  
- Cameron McCabe

Martelle emailed me today saying she found an animal's skeleton on her property while she was working. She could not identify the animal and asked me if I could "hook her up" with my iNaturalist account. I told her to send me a photo and I would post it on iNaturalist.

Here are her photos...

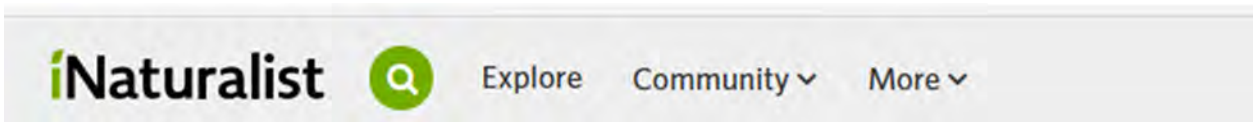
**spoiler alert...graphic images may be disturbing...**





I use iNaturalist as an APP on my phone or go to their website iNaturalist.org. You must sign up for an account, but you don't receive any extraneous emails from them. In addition, they keep all your old observations in case you forget that you already requested an ID on that particular subject.

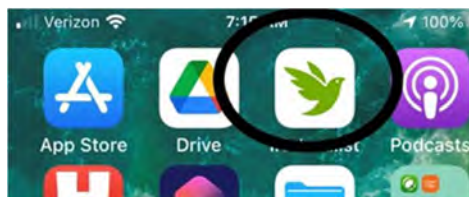
For me, using iNaturalist on my phone is easier. The APP keeps you logged in and the photos you are going to upload are right there on your phone. So, I am going to start with using iNaturalist using your phone app. I am using an iPhone so Androids may be a little different. There is a "Getting Started" section and videos on their site under the MORE drop-down menu. Just locate HELP.



**BEGIN** by going to the Apple or Google Play store. Download and install the iNaturalist app.

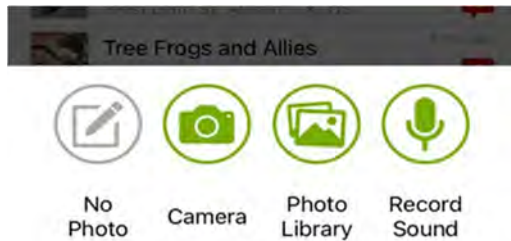
After installing, click the iNaturalist app on your phone's Home Screen, then **LOG IN**.

When the App opens, you will want to click **OBSERVE**

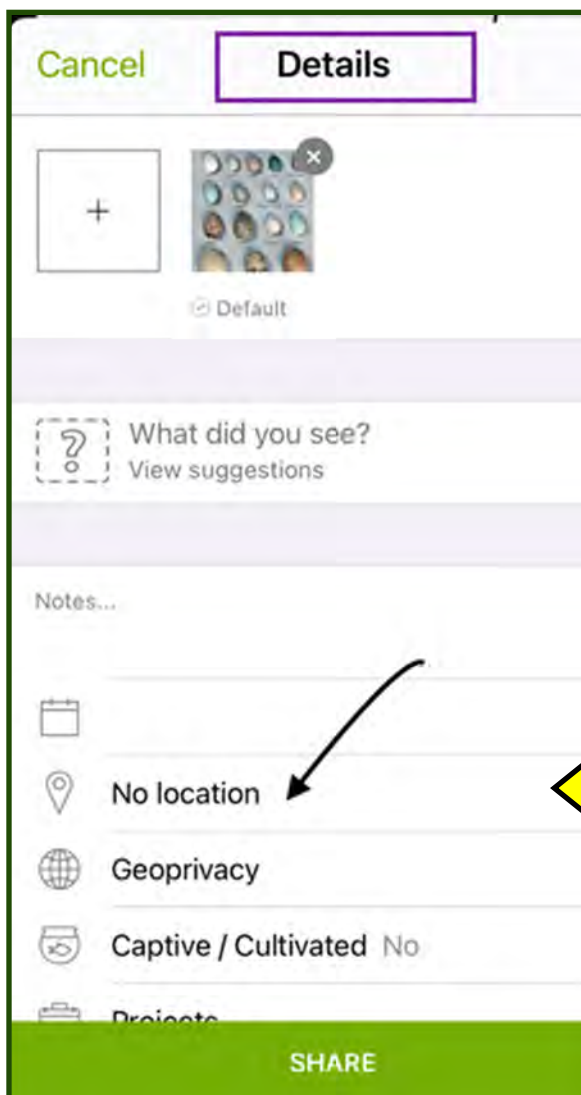
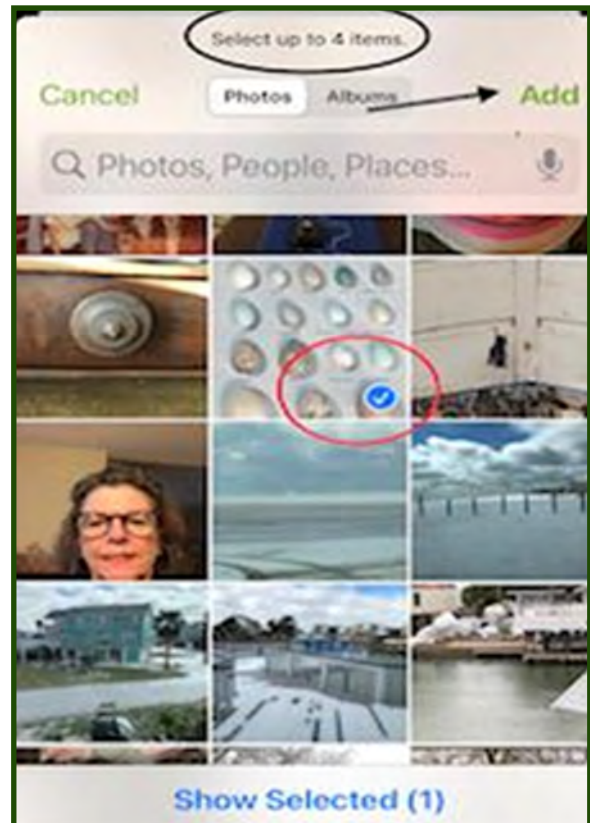


at the bottom of the screen.

On the next screen, click on the appropriate box. I usually have a photo, so I am going to click **PHOTO LIBRARY** or **CAMERA ROLL**, which will go to the photos on your phone. If you want to take a picture at that moment, then click **CAMERA**. If you want to record a bird singing, then click **RECORD SOUND** (I haven't done that yet).



Select the photo or photos you want to use then click **ADD**. You can select up to 4 photos.



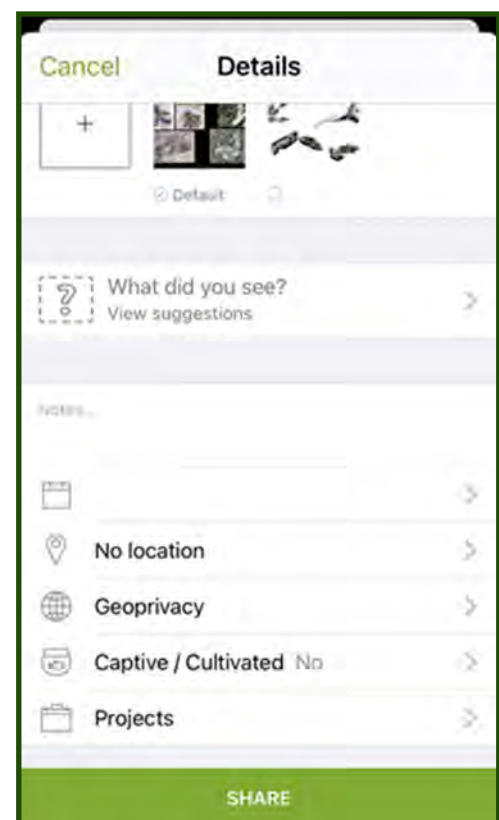
The next screen, called **DETAILS**, is where you put your observation information. Location is important. If you are using a photo from your phone, it may insert the location automatically. If your location is added automatically or you want to edit the location, click in the box marked with the arrow.



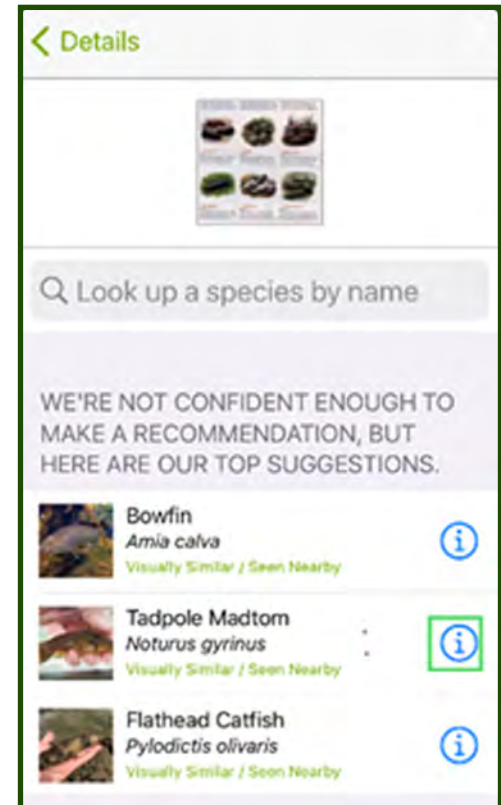
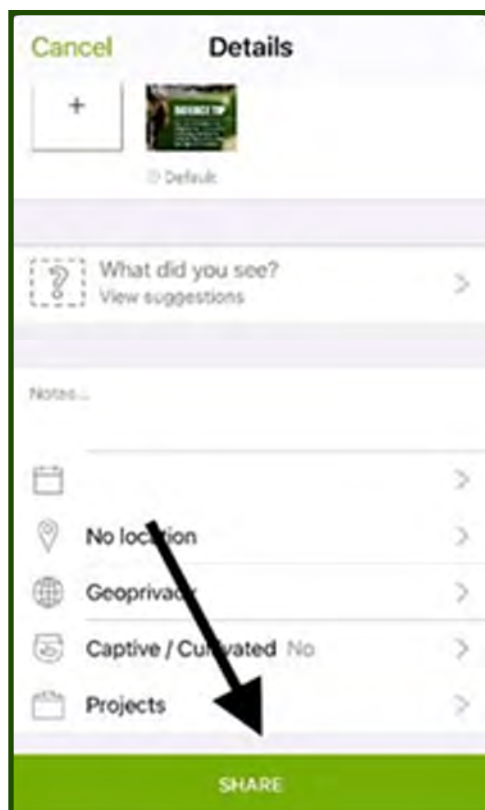
The next screen is **EDIT LOCATION**. The ARROW at the bottom left can be used if you have Location Services enabled on your phone. If not click the **SEARCH** button at the bottom right and type your address or name of the closest town such as, BURNET, TEXAS, in the SEARCH area. If you see your location, click **SAVE**.



Now you will be back at the **DETAILS** screen. If you have any notes, like “soft hair and sharp teeth” put them in the **NOTES** section. You can choose CAPTIVE/ CULTIVATED, and choose any PROJECTS you might be involved in like “Christmas Bird Count” or “City Nature Challenge”. If you are signed up with any projects they will automatically pop up when you click the **PROJECTS** button.



At this point, the iNaturalist artificial intelligence takes over and creates a “What did you see?” based on the information you provided on this screen. Click **WHAT DID YOU SEE?** to see preliminary results. If you see anything that looks like your subject, click on the **“i”** in a circle for more details.



The next page will show you DESCRIPTION, DISTRIBUTION, MORE INFORMATION, AND the opportunity to select their ID result. If you agree with the ID, click on the suggested **ID**. If you do not agree with their suggestion, click **BACK** until you get to the DETAILS screen. At this point, you want to click **SHARE, SYNC, OR DOWNLOAD** on your screen.

Now your information has been uploaded to the iNaturalist community where citizen scientists and experts in the field add identifications. You can check back for any activity on your observation by going to iNaturalist APP or have activity emailed to yourself.



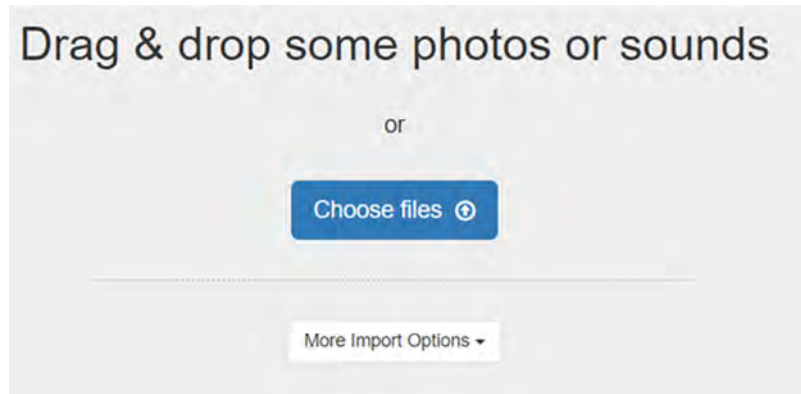
WEBSITE – [www.inaturalist.org](http://www.inaturalist.org)

LOG IN

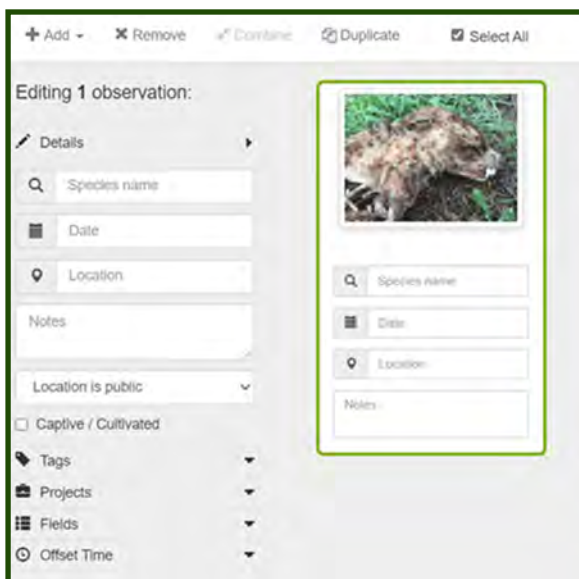
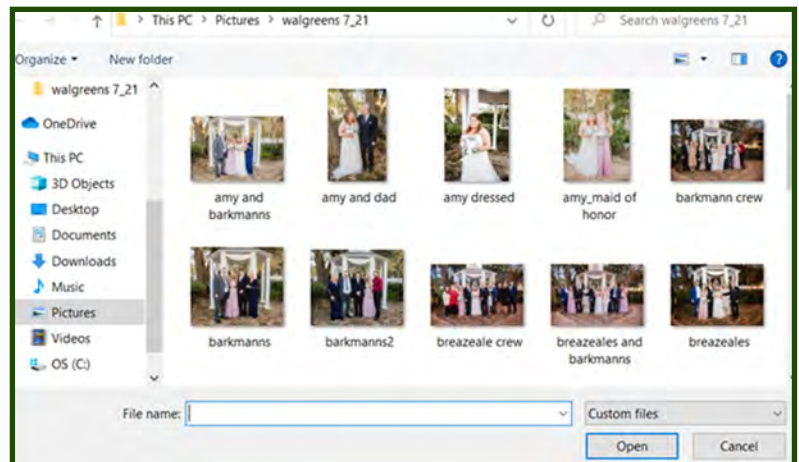
Click **UPLOAD**



On the next screen, drag photos or locate the photos on your computer to add.

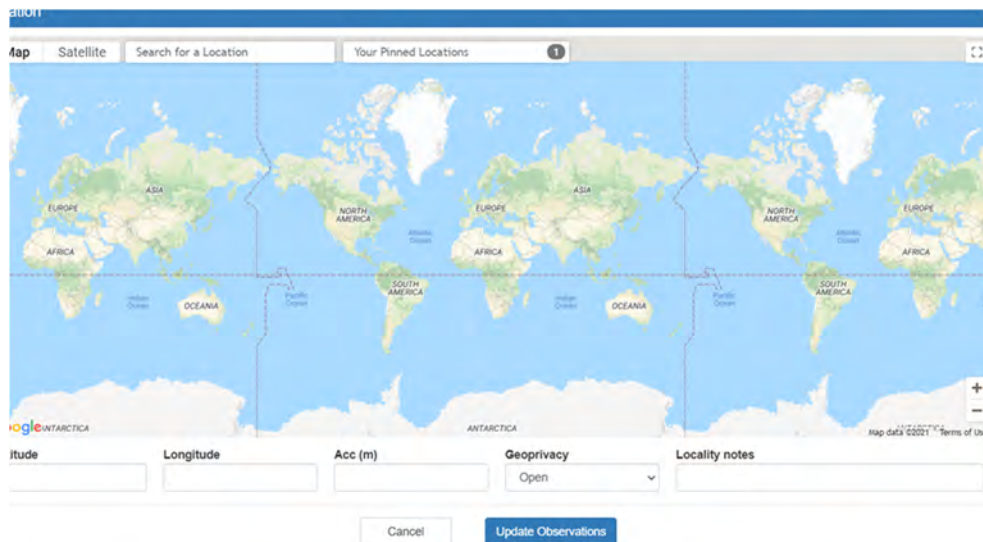


If you select **CHOOSE FILES**, locate the picture(s) you want and click **OPEN**. Most likely the photos are in the Pictures area as shown. If not, you will have to navigate to find them. You can upload up to four photos.

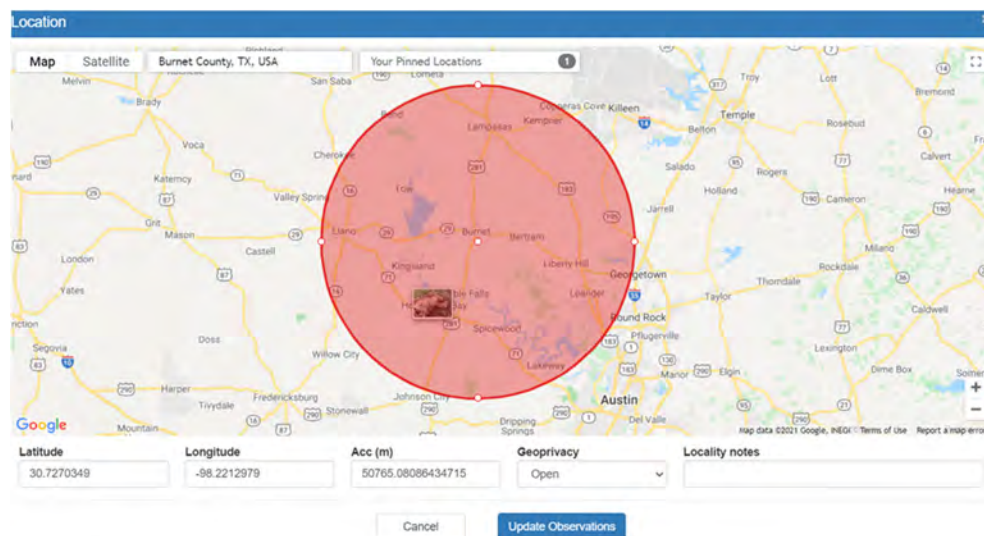


On the next screen, you will supply information for your observation. On the LEFT you enter information and the right is what is known as your **OBSERVATION CARD**. You can **SEARCH** for a Species name (which I usually don't know). Next type in the **DATE** you observed the species.

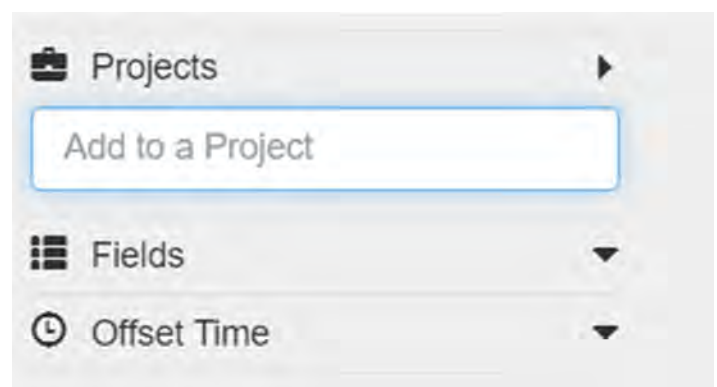
When you click in the Location box, you will get this map. Type the address in the **SEARCH FOR A LOCATION** box. If it brings up the correct location, click **UPDATE OBSERVATIONS**.



If you want to **EDIT** the location, use the “plus” sign at the bottom right. You can also drag the circle around until the center of the circle is over the location. The outer circle determines the range and you can make it larger or smaller by dragging an outer white circle. Once you have the center of the circle on the location, click **UPDATE OBSERVATION**.

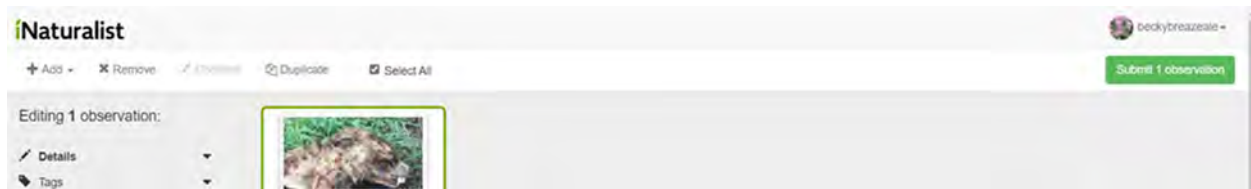


You can add Projects you are registered for like Selah-Bamberger Ranch Herp Day. Any projects that you are signed up for will appear in the drop-down menu.





When you have finished entering all your information, click the **SUBMIT** button.



Now your information has been uploaded to the iNaturalist community where citizen scientists and experts in the field add identifications. You can check back for any activity on your observation by going to iNaturalist.org and signing in or have activity emailed to yourself.

These are the basics of submitting an observation to iNaturalist and I am sure there are other ways to accomplish the process. There are many other tools available such as exploring observations by others, joining Bio-blitzes and even identifying others' observation.

Unfortunately, Martelle never got an ID on her mystery animal. What would your ID be?



Left: This morning at the hatchery, the blooms on the Flameleaf sumac at the pollinator garden were swarming/covered with bees and other bugs. One poor bee landed on the wrong bloom where a Yellow-bellied bee assassin was waiting for a meal!

Jerry Stacy

Below: Visitor by Allan Wolfe





Frog house by Vicki Adcock



## Rainbows

What is a rainbow? We see an arc of color. Notice we said, see? From our ground level perspective, a rainbow appears to be a semi-circle. But if you were in a plane looking down, you would see a full circle with the center point opposite the sun. When we see a rainbow, we are seeing sunlight which is reflected at  $42^\circ$  back into our eyes. The reflection is what causes the shape of the rainbow.

The colors of the rainbow are refractions. A refraction is when white light is bent entering a drop of water in the air after a rainfall or a garden hose being sprayed. From the outside in, we see red, orange, yellow, green, blue, indigo, and violet. Different cultures see rainbows (the  $42^\circ$  refraction reflection) as signs of hope, promise, good luck, and new beginnings.







## MISSION

The Texas Master Naturalist program is a natural resource-based volunteer training and development program sponsored statewide by Texas A&M AgriLife Extension and the Texas Parks and Wildlife Department.



The mission of the program is to develop a corps of well-informed volunteers who provide education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities for the state of Texas

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Photo creds: Colette Nicholl