Dear burrowers,

I am humbled and excited for the opportunity to host the 2020 annual meeting in St. Petersburg, Florida. I am a professor at Eckerd College, where my lab is primarily focused on gopher tortoise mark-recapture studies. Prior to Eckerd College, I earned my PhD at Auburn University where I was also a post doctoral fellow. At next year’s meeting, you can expect an opportunity to explore a local conservation site with a robust population of gopher tortoises, gopher tortoise commensals, and a rich native understory at peak fall wildflower season. Stay tuned for the save the date and more details on next year’s meeting as the executive committee and I finalize plans.

The 41st Annual GTC meeting recently took place in Gulf Shores, Alabama. This past meeting, hosted by Ericha Nix with the Alabama Department of Conservation of Natural Resources, was a whopping success. The meeting was held at the idyllic Gulf State Park, which is located on the beach at the intersection of the longleaf pine ecosystem and the coastal sand dunes. Highlights from this meeting included a total count of 147 participants interacting over 26 talks and 19 poster presentations. Among all of our presenters, we were extra excited for 11 student presenters (which included 4 former J. Larry Landers Student Research Awards recipients). At this meeting, we announced a total of $6,022 in grants and awards that included two Donna J. Heinrich Educational Outreach Awards, two J. Larry Landers Student Research Awards, four Joan Berish Student Presentation Awards, and three Bob Herrington Student Travel Awards. What brings me the most satisfaction about working with this organization is its sustained focus on research and education. This is embodied by the above awards that are only made possible by our generous members. New to this past meeting, we had a very exhilarating live auction, hosted by Jimmy Stiles. This was a Can’t Miss Event, and I look forward to continuing this new tradition at next year’s meeting. The meeting ended on a clear brisk Sunday morning with a guided bicycle tour of the state park.

A huge Thank You goes out to Ericha and her staff and volunteers for an amazing meeting. We are also grateful to Betsie Rothermel whose term as the senior co-chair just ended. Lastly, I’d like to personally thank our numerous sponsors who generously made this meeting possible and continuously support our organization. I am excited for the upcoming events in 2020 for this amazing organization. Best wishes for a peaceful holiday season.

Sincerely,

Jeff Goessling
2019 Annual Meeting Highlights

Thank you to all who attended the 41st Annual Gopher Tortoise Council Meeting at The Lodge at Gulf State Park, held November 15-17 in Gulf Shores, Alabama! The meeting kicked off with a beautiful sunrise over the Gulf of Mexico, a warm welcome from Co-Chair Ericha Nix, and a Keynote presentation by Dr. Matthew Aresco. Attendees learned much about the great research and management activities for tortoises and upland species throughout the tortoise’s range. Thank you to all the presenters who shared their work at this year’s meeting!

Presentations

There were many great talks at this year’s annual meeting, including a large proportion of student talks!

Keynote speaker Dr. Matthew Aresco presented on his long-term translocation work on Nokuse Plantation in the Florida panhandle. Photo courtesy of Brad O’Hanlon.

Garrett Lawson presented on movements of gopher frogs outside their breeding season. Photo by Michelina Dziadzio.

The poster session was well-attended this year, with lots of informative posters. Photo courtesy of Brad O’Hanlon.

Paula Quezada presenting her research on endoparasite loads of gopher tortoises. Photo by Michelina Dziadzio.

Retired gopher tortoise biologist Joan Berish held a book signing for her new release *Fire and Fauna, Tales of a Life Untamed*. Joan also held a special excerpt reading during the Awards dinner on Saturday night. To learn more about Joan and her new book, check out this issue’s Interview with a Herpetologist. Photo courtesy of Deb Burr.
2019 Annual Meeting Highlights continued...

The Volunteer Training special session was a huge success! Over twenty interested volunteers attended the training to serve as GTC Representatives at various events throughout the gopher tortoise’s range. Outreach “totes” were provided to designated state education leaders.

Couldn’t make the meeting, but still want to volunteer? Contact GTC’s Education Committee Co-Chairs Jess McGuire (jmcguire@quailforever.org) or Rachael Sulkers (rsulkers@hhnt.com) to participate in this opportunity!

Photos courtesy of Kim Buchheit.

Another first during this year’s annual meeting was a live art demonstration by Laurelin Sitterly, an artist known for her work depicting gopher tortoises and their “burrow buddies”. Laurelin’s work created during the meeting was auctioned off during the live auction.

Photos courtesy of Deb Burr.

In addition to GTC’s annual silent auction, attendees participated in a spirited live auction (left) which generated $2,820 in donations to GTC. The live auction was hosted by Jimmy Stiles and included a large alligator skull which auctioned at $725 (center) and original artwork including a painting, won by Dr. Craig Guyer (right).
2019 Annual Meeting Highlights continued...

Joan Berish Student Presentation Awards were given to:

1st place: Rebecca Cozad, University of Georgia
2nd place: Garrett Lawson, Archbold Biological Station
3rd place (tied): Thomas Prebyl, University of Georgia, and Philip Schulte, Auburn University

From left to right: Co-Chair Ericha Nix, Brad O’Hanlon, Philip Schulte, Thomas Prebyl, Garrett Lawson, Rebecca Cozad, and Co-Chair Betsie Rothermel.

The J. Larry Landers Student Research Award is a competitive grant program for undergraduate and graduate students conducting research on gopher tortoise biology or other relevant aspects of upland habitat conservation and management in the Southeast.

This year’s winners were:

William Hawthorne, Eckerd College. Immunocompetence effects of eastern indigo snakes (*Drymarchon couperi*).

Robin Lloyd, University of South Alabama. Effects of herbivore disturbance on understory plant communities in a longleaf pine forest.

Bob Herrington Student Travel Grants provide financial assistance to students who present their research at GTC’s annual meeting. Recipients are selected randomly among students attending who submit grant applications. This year’s recipients were Emma Cutkomp (Florida Atlantic University), Allison Kelley (Marshall University) and Andrew Marx (University of Florida).

From left to right: Steve Godley, William Hawthorne, Robin Lloyd, and Co-Chairs Ericha Nix and Betsie Rothermel.

Emma Cutkomp with her travel grant check. Photo courtesy of Kim Buchheit.

Congratulations to all of this year’s GTC student award winners!

“Student Spotlight”: GTC wishes to highlight students who are actively involved in upland conservation projects within the gopher tortoise’s range in the GTC newsletter. The purpose of this feature is to encourage greater student participation in the organization and bring recognition to students and their projects. Projects pertaining to research, management, or policy will be considered. Please submit a brief description of the project and any findings to date. Submissions should be 500 words or less and may be accompanied by photographs. Please send to: Michelina.Dziadzio@MyFWC.com
2019 Annual Meeting Highlights continued...

The Auffenberg & Franz Conservation Award is one of GTC’s most prestigious awards. It is presented to individuals and organizations with long-term commitments to furthering conservation of gopher tortoises and their upland ecosystems. We are pleased to announce that this year’s award went to John Jensen. John’s career has supported the research and conservation of Southeastern reptiles and amphibians, including the gopher tortoise, eastern indigo snake, gopher frog, striped newt, flatwoods salamander, and other species associated with upland habitats and their embedded wetlands. John played a lead role over the past 15 years in developing the strategy for conserving gopher tortoises and their upland habitats. John’s efforts also resulted in conversion of rattlesnake roundups to beneficial wildlife festivals, including most recently the Claxton Rattlesnake & Wildlife Festival. John has served as Co-Editor of the GTC newsletter, GTC’s Georgia State Representative, and is a former Council Co-Chair.

The Conservation Education Award was awarded to Becky Bolt. Becky received this award for her volunteer work with the "Ask the Expert" website, which she has done since 1998. Visit the website at: https://nbbd.com/gophertortoise/index.html. Becky is also a long-time member of GTC and has previously served as a Co-Chair (2004-2006).

The Distinguished Service Award was presented to Jen Howze. In addition to being the current Website Manager for the Council, Jen has also served as a Co-Chair and the chair of the Upland Snake Conservation Committee.

From left to right: Lora Smith, Jen Howze, Ericha Nix, and Betsie Rothermel.

The Lifetime Service Award was presented to Cyndi Gates. Cyndi has worn many hats in service to the Council including Treasurer (2003-2006), Newsletter Editor (2012-2018), the Donna J. Heinrich Award coordinator (2015-2019), and GTC’s representative on FWC’s gopher tortoise stakeholder group (2014-present).

From left to right: Ericha Nix, Lora Smith, Cyndi Gates, and Betsie Rothermel.

The Gopher Tortoise Council’s Donna J. Heinrich Environmental Education Grant honors Donna J. Heinrich, an environmental educator whose life was dedicated to conserving wildlife and their habitats. This year’s winners were:

- **The University of Florida, Institute of Food & Agricultural Sciences (UF/IFAS) Nassau County Extension** — Establishment of a community-built Gopher Tortoise Garden habitat which will be used to host educational events in concert with sustainable gardening to feed exhibit animals — $1,800.

- **Friends of Okeeheelee Nature Center** — For educational materials including a gopher tortoise activity book, a gopher tortoise mural, and other materials for use during quarterly “Gopher Tortoise Celebration” days — $1,500.
FEATURE ARTICLE

An Interview with a Herpetologist Featuring Joan Berish

Gopher Tortoise Council (GTC): You joined the Gopher Tortoise Council in its earlier years. In your eyes, how has the Council grown during your time as a member?

Joan Berish (JB): Although it’s always rewarding to see some of the ‘ole guard,’ I was encouraged and heartened to see the number of new, fresh faces at the 2019 GTC meeting. Over the years, folks have entered and exited GTC as fit their schedules and work with gopher tortoises and upland habitats. I can honestly say that the people I have met through this organization, especially during my tenure as FL state rep (1980-2013), are outstanding and dedicated conservationists; moreover, many remain close friends even though I have emigrated to the Land of Enchantment!

The technology and venues have certainly improved. I recall what I always called “indoor habitat modification,” where we had to struggle to find podiums or working slide projectors (yes, we used slides back in the Pleistocene era!).

GTC: Do you have a favorite memory from a previous GTC meeting?

JB: Obviously, there are many fond memories of GTC meetings over my 3+ decades. Choosing just one is difficult—but I was sincerely surprised and touched when I walked into the conference hall in 2013 to see my face (and other parts!) up on the screen. I owe Deb Burr et al. a debt of gratitude for setting up such a fun ‘roast.’ And Plum Creek forester Rob Hicks’ poem about my infamous subadult gopher tortoise, Dufus, was a hit for me and the audience. I still have the written version of that poem about how beleaguered my poor wee, wandering, Dufus felt to have such a tenacious biologist following him!

Of course, Tom Mann reminded me of the time where we sang together to a Jefferson Airplane song (either White Rabbit or Somebody to Love: perhaps someone else remembers which tune!). And I do recall doing some wild dancing at a South Carolina meeting.

GTC: When did you realize that you wanted a career in conservation? Did you find that it was a challenging field to break into?

JB: As I recount in my memoir, I gravitated toward critters (wild and domestic) from my earliest years. “My desires were basically threefold: to be immersed in the world of animals and nature; to seek out adventures of many types, especially those in the great outdoors; and to satiate my innate curiosity and thirst for knowledge. The love of animals and nature guided me to a career working with wildlife; the need for adventure pushed me toward field biology; and my curious mind was a perfect fit for the job of researcher.”

At one point, I naively thought I might follow in the footsteps of such luminaries as Jane Goodall. But I was also interested in veterinary science. A stint with a colorful vet (noted in my book) made me realize that wildlife conservation was my ultimate goal. And yes, it was difficult to get in to a wildlife graduate program—but once I worked on indigo snakes, my career studying gopher tortoises fell into place.

GTC: Aside from gopher tortoises and indigo snakes, you spent time as a wildland firefighter. Is this what you imagined your career developing into?

JB: I was totally surprised when, as I struggled to get biological work in Albuquerque, I received an offer to qualify as a helitack firefighter. As other wildland firefighters know, you must pass a physical challenge, known as a step test. I was in excellent shape, but I was nervous and had trouble with my heart rate at first. The examiner gently urged me to “calm down”—and I did. I passed the test with flying colors. The firefighting stint gave me ‘field cred,’ but I realized that I needed to go back to school to become a wildlife biologist. I truly would have never guessed that I’d work on indigo snakes and that looking down all those tortoise burrows in Georgia would qualify me to become Florida’s gopher gal.

Continued on next page
An Interview with a Herpetologist continued...

GTC: Did you have a favorite job? What experiences made it memorable?

JB: Of course, there were many aspects of my 33+ year career with gopher tortoises that I found both enjoyable and rewarding. But my indigo snake distribution study in southern Georgia was a true labor of love: the travel; the colorful human characters and their stories; and the cool snakes (eastern diamondback rattlesnakes, pine snakes, and, of course, indigos). Zoogeography and ethnozoology have always been interests of mine; this study was an exploration in both those fields.

GTC: You recently published a book, Fire and Fauna, Tales of a Life Untamed. What inspired you to take on that task?

JB: I have always been both a bibliophile and a storyteller. Whenever I would give professional talks (to GTC or other groups), I would season my scientific presentations with colorful anecdotes. I continually heard: “You need to write a book!” But when one is afield 7 days a week during various studies and then generating scientific manuscripts, taking on the monumental task of writing a memoir isn’t possible. So… I gave myself a year to settle into New Mexico after retirement in 2014, and then I spent 4 years writing, editing, and publishing my book.

GTC: Without giving away too much from the book, can you give GTC members a tease of some tales included in the book?

JB: The book is divided into 3 sections: my evolution as a wildlife biologist; my metamorphosis from indigo snake lady to gopher tortoise queen; and both temporary (trips) and permanent modifications to my home range; obviously, I wanted to keep a biological theme. The early years post-baccalaureate involved nuclear medicine research, veterinary work, and the all-important wildland firefighting (which proved that I could do the field work required for a wildlife career). In addition to my research on indigos and gopher tortoises, I also conducted studies on the harvest of rattlesnakes and softshell turtles. Telling folks that you worked at The Skin Shop conjures up all kinds of crazy images! And even though I was a ‘gopher gal,’ I have stories to tell about alligators, bears, and those always entertaining canines.

GTC: What advice do you have for younger members of the Council who are just beginning their careers in conservation?

JB: As I quote in the book: “Persistence and determination...are omnipotent.” I would tell young aspiring wildlife students and newly hired biologists to have the patience and tenacity of a gopher tortoise. Get as much volunteer or paid experience as you can to help you decide what direction you want to go. Field work isn’t for everyone, and some individuals will want to pursue statistics, population modelling, administration, education, law enforcement, and other aspects of conserving wildlife. Of course, there are many field-oriented avenues in both land management and research. Find what you excel at and what rewards you; don’t settle for a job that doesn’t make you feel fulfilled. I was a researcher because of my insatiable curiosity, and I was especially fascinated by the behavioral plasticity of gopher tortoises.

GTC: Can you end with a story that did not make the cut to be included in your book, but that you wanted to share?

JB: Sometimes, the best defense is a good offense and don’t judge a cracker by his clothing! I was working on my Lochloosa WMA study site that had been transformed into a vast clearcut by the timber company that owned it. I had finished my tortoise burrow surveys for the day and was walking back toward my truck. To my surprise, a very rough looking dude (I’m talking the old movie “Deliverance” rough!) was leaning on my truck. I froze for a moment in shock and uneasiness—but then I got irked. “Can I HELP YOU?” I demanded in a loud and assertive voice. His rough demeanor softened immediately, and he apologized profusely for his somewhat scary appearance (dirty leather vest and work pants, no shirt, weirdly brimmed hat) and explained that he and his sons had been out on one of the lakes near Cross Creek and their airboat had broken down. He needed help—and once I heard his story, assessed its veracity and his character, I of course (as a good state employee) gave him a ride to call for assistance because cell phones did not exist then. I always tried to help people in need whenever possible and hoped I could do so safely. In this case, my instincts were right.

NOW: Joan at White Sands, New Mexico, in October 2018. Even after 3+ decades, she is still drawn to SAND. Photo courtesy of Joan Berish.
Outdoor Enclosure at the Flint RiverQuarium

The Tortoise Burrow

The Flint RiverQuarium was established in 2004 as a result of community action to bring attractions and life back into the downtown Albany, Georgia area after two devastating, massive flooding events in 1994 and 1998. Realizing that informed citizens can become advocates, the founders had a vision to educate future generations about the critical need for conservation and stewardship of all natural resources. Best known for our 175,000-gallon Blue Hole Spring exhibit, the RiverQuarium is now home to more than 160 species of animals, the majority of which are native to Georgia and the Flint River watershed.

Our project proposal for the 2018 Donna J. Heinrich Environmental Education Grant was to construct a new outdoor gopher tortoise exhibit that would be incorporated into the outdoor education area of the aquarium. Currently, there is a pollinator garden (officially listed on the Rosalynn Carter Butterfly Trail), a seasonal vegetable garden, and a native and migratory bird aviary in the outdoor education area. With the addition of the outdoor gopher tortoise exhibit, the goal was to tie these existing features together more cohesively.

During the planning stages of the new exhibit design, we consulted gopher tortoise experts on what aspects would be best to include in the new enclosure. We were also approached by a group of local middle school teachers who were looking for a project-based learning experience for their students. All of this collaboration and planning was fortuitous as we received the wonderful news of being awarded the grant! The news of this award could not have come at a better time for us at the RiverQuarium as we were recovering from Hurricane Michael and its impacts just days before.

In January 2019, the RiverQuarium entered into a new partnership with Chehaw Park & Zoo, which allowed for us to utilize their invaluable assistance and knowledge in the construction of the new exhibit as well. Also, our established vegetable gardens were boosted with help from Albany State University grant recipients and Farmer “Fredo” Fredando Jackson with Flint River Fresh. Having these gardens in such close proximity to the tortoises has been helpful in explaining why we have a garden here at the RiverQuarium in the first place!

Guests and students alike have been able to enjoy seeing our three tortoises in a more natural looking habitat and we could not be more grateful to the Gopher Tortoise Council for choosing us as recipients of these funds. The idea of changing up our tortoise exhibit has been on our minds for several years but the figuring out of the where, when, and how has been a stumbling block. We have thoroughly enjoyed seeing our tortoises explore their new home and are grateful for everyone’s efforts in the protection and conservation of this keystone species.
Gopher Tortoise Outreach and Education in Manatee County

by Sarah Denison

Manatee County Parks and Natural Resources Staff, winners of the 2018 Donna J. Heinrich Environmental Education Grant, have created a mobile gopher tortoise burrow to bring tortoise education to Southwest Florida. Based on a blueprint created by Florida Fish and Wildlife Conservation Commission, the human-sized mobile burrow is made from PVC pipes and burlap and is filled with puppet commensals for children to interact with. This pop-up exhibit is a fun way for youths (and motivated adults) to get up close and personal with life inside a gopher tortoise burrow.

Manatee County Parks and Natural Resources staff are the caretakers of a non-releasable gopher tortoise, Genbu, who serves as an animal ambassador. A portion of the grant funding has been used to create interpretive signage in both English and Spanish to share Genbu’s story with the public. Since January 2019, County employees have attended 15 events with Genbu and the crawl-through burrow exhibit, reaching over 1,800 children and adults with gopher tortoise conservation messaging.

If you would like a copy of Manatee County’s gopher tortoise lesson plans, burrow design, interpretive signage, or more information, please contact sarah.denison@mymanatee.org. Photos courtesy of Manatee County Staff.

On Sept. 28th the public were invited to visit Genbu, crawl through his burrow, and view the new interpretive signage at his enclosure during the National Public Lands Day Celebration at Robinson Preserve.

New Officers and Co-Chair

Jeff Goessling was chosen as our new GTC Co-Chair! Jeff currently serves as GTC’s Student Research Awards Committee chair. Stay tuned for information from Jeff about GTC 2020!

Martin Costello joins us as GTC’s new Secretary.

Andrew Grosse is the new State Representative for South Carolina.

Nicole Hodges is the new State Representative for Mississippi.

Bradley O’Hanlon joins us as the new chair of the Upland Snake Conservation Committee.

A big thanks to outgoing officers and committee chairs for your outstanding service to GTC!

JOIN US IN CELEBRATING GOPHER TORTOISE DAY!

Gopher Tortoise Day was designated to increase awareness of this fascinating creature and the need to protect its habitat throughout its range in Louisiana, Mississippi, Alabama, Georgia, Florida and South Carolina. Are you interested in participating in Gopher Tortoise Day 2020? Check out OutdoorAlabama.com and GopherTortoiseDayFL.com for resources on how to adopt a resolution in your community, host a Gopher Tortoise Day event, and find printable fact sheets that can be distributed during events year-round!
Alabama Division of Wildlife and Freshwater Fisheries (DWFF) continues work towards determining a more accurate gopher tortoise population estimate and distribution in Alabama. Gopher tortoise surveys on public lands using Line Transect Distance Sampling (LTDS) methodology were completed in October 2017. (AL Gopher Tortoise Surveys on Public Lands SWG Final Report, 2017).

In Alabama, roughly ninety-five percent of the gopher tortoise habitat is in private ownership. The remaining percentage of land holdings are owned by state or federal agencies. Private land surveys are needed to determine accurate gopher tortoise population estimate and distribution in Alabama. Ongoing efforts are taking place to gain access to private lands for these surveys; however, access to private lands has been difficult mostly due to the misperceptions of information needed and data protection concerns. Several targeted landowner meetings took place throughout the fiscal year educating landowners on the status of the tortoise in AL and throughout the range. These workshops have been, so far, well received as landowners are now contacting DWFF and partners to learn more about how they can assist with the conservation of the species and to offer access for LTDS surveys. Results from these workshops are as follows:

- DWFF partnered with Alabama Forestry Commission (AFC), Conservation Southeast, Natural Resources Conservation Service (NRCS), Alabama Wildlife Federation, and American Forest Foundation and held 4 workshops in the candidate range (Baldwin, Dale, Covington, and Monroe counties) and 1 workshop in the listed range (Washington County)
- Roughly 160 landowners participated (total)
- 30 non-industrial landowners signed up for agency staff to visit their property to see if they qualified for a no-cost gopher tortoise survey using the LTDS methodology. These 30 non-industrial landowners allowed us access to ~26,000 acres.
- Site visits were conducted on the 30 non-industrial landowners’ property
- Partners ranked properties where we conducted site visits and are working to have 11 properties surveyed

Alabama gopher tortoise population counts are as follows (includes public and non-industrial private lands):

- 3 viable populations
- 0 primary support populations
- 23 secondary support populations

Typical calls to Wildlife Section district offices often involved single animals encountered by landowners or by motorists. Most calls are related to “nuisance” tortoises that are found close to a landowner’s home or reports alerting Department personnel of the presence of turtles. These concerned citizens are usually instructed to simply leave the tortoise undisturbed. If the animal has been taken into possession, the caller is encouraged to release or return the animal where it was picked up and if retrieved from a roadway, released in the direction it was travelling, out of harm’s way. Usually during these calls, an explanation of the different levels of protection (federal vs. state) is presented. Staff continues to engage private landowners through technical assistance opportunities. Technical assistance consists of a site inspection and burrow scoping to evaluate current habitat conditions and population status for that property. Once a habitat evaluation is completed, best management practices are recommended and discussed.

Calls have increased relating to gopher tortoise impacts from commercial or residential development originating from the unlisted portion of the range, and DWFF has worked with developers and consultants on relocation efforts to permanently protected conservation lands. State regulation only precludes the direct killing or possession of the gopher tortoise and unlike the federal regulation, does not consider the gopher tortoise burrow or the degradation of the habitat surrounding the animal. Landowners and/or developers in the unlisted range likely realize they are less constrained by the presence of gopher tortoises and simply work around the animals. DWFF staff is currently pursuing a regulation that would protect the intentional destruction of gopher tortoise burrows.

There have been no targeted relocation efforts from private lands this year. To date, eight gopher tortoises were placed in a one-acre enclosure built in Spring 2019 at Geneva State Forest. Three tortoises came from a veterinarian and two from public entities in North Alabama (a considerable distance outside the tortoise’s range). Two tortoises were picked up by the public trying to “rescue” the animals; location of origin could not be determined for these individuals so they could not be returned to the wild. Lastly, three tortoises were relocated due to development. All tortoises were soft-released and will remain in the enclosure for 12 months, after which the enclosure will be removed.
Alabama continued...

In February and August 2019, DWFF staff organized and facilitated the 3rd and 4th Alabama Tortoise Alliance (ALTA) meetings. The 3rd ALTA meeting was held in Andalusia, AL. Roughly 70 people participated representing over 35 organizations. The 4th ALTA meeting was held in Ozark, AL and over 60 people attended representing about 30 different groups. ALTA is a partnership that includes private industrial and non-industrial landowners, state, tribal and federal agencies, local governments, organizations and businesses. The purpose of the ALTA is to foster an increased level of communication, collaboration, and conservation among the stakeholders to actively manage and conserve gopher tortoise populations and habitat in Alabama so that the species no longer warrants state or federal protection. Conservation and recovery of the gopher tortoise through the implementation of this alliance will require the cooperation of non-industrial private landowners; local governments; state, tribal, and federal agencies; non-governmental organizations; and business interests.

The regular gathering of state and federal agency representatives like those of the Gopher Tortoise Candidate Conservation Agreement (GTCCA) continue to be engaged in conference calls administered by the USFWS. These calls included ongoing discussions relating to gopher tortoise conservation issues, strategies, and activities occurring throughout the entire tortoise range. This collaboration contributes to coordinate conservation efforts for future activities aimed at conserving the species throughout the currently unlisted range.

The GTCCA was updated by signatories in October 2018. The Alabama Department of Conservation and Natural Resources (ADCNR) updated sections 6.2 and 10.2, and the 2018 annual report was completed and submitted in February 2019 (Candidate Conservation Agreement for the Gopher Tortoise (Gopherus polyphemus) Eastern Population, 11/2008 (Revised 10/2018); 2018 GTCCA Annual Report).

The DWFF increased education and outreach opportunities to the public promoting gopher tortoise conservation in Alabama. Governor Ivey signed a proclamation declaring April 10th, 2018 as Gopher Tortoise Day in Alabama. Gopher Tortoise Day was celebrated across the state and 5 events took place. Partners included: Birmingham Zoo, Alabama Wildlife Federation, Auburn University Natural History Museum, Auburn University Veterinary School, and Straughn Elementary School. A live tortoise was usually on-site at each event, providing participants the opportunity to see this incredible animal up close and learn about its biology and importance as a keystone species. Alabama citizens and youths participated in several hands-on activities that further demonstrated the importance of the tortoise to the longleaf pine ecosystem. Thousands of participants took advantage of learning about the gopher tortoise and its habitat.

Several presentations and workshops were conducted by nongame staff throughout the year. Presentations included a variety of topics from tortoise biology, protection status, and best management practices that enhances gopher tortoise habitat. Many workshops were given to loggers, foresters, private landowners, and other agencies that provided education on the importance of gopher tortoise surveys and why they are needed to assist the USFWS with the upcoming listing decision.

Georgia

The Gopher Tortoise Initiative

The Gopher Tortoise Initiative is a cooperative effort to permanently protect viable tortoise populations across the Georgia range of the species. It is hoped that these proactive measures will help to make listing of the gopher tortoise in Georgia under the U.S. Endangered Species Act unnecessary. Substantial progress has been made in the past year toward the long-term goal of protecting at least 65 tortoise populations that meet or exceed the current U.S. Fish and Wildlife Service (USFWS) standard for a minimum viable population (MVP). The number of known viable populations on protected lands now stands at 53, up from just 36 when the initiative began. Projects currently being pursued may raise the total to 61 by the year 2021. The success of the Gopher Tortoise Initiative has only been possible due to substantial financial commitments by the organizations participating. It is estimated that about $150 million will ultimately be needed, with federal, state, and private sources accounting for...
roughly equal shares. Supporters of the initiative include the Georgia Department of Natural Resources (DNR), the Georgia Forestry Commission, USFWS, NRCS, the U.S. Department of Defense, The Nature Conservancy, The Conservation Fund, Georgia Conservancy, The Orianne Society, Georgia Chamber of Commerce, Knobloch Family Foundation, Robert W. Woodruff Foundation, Bobolink Foundation, and other private landowners.

Gopher Tortoise Surveys and Other Research

Important research related to gopher tortoises and other species that share their habitat continues in Georgia. For the past 12 years, Line Transect Distance Sampling (LTDS) surveys have been used in Georgia to help determine the location and size of current gopher tortoise populations. A three-person crew is employed by the Wildlife Conservation Section of the Georgia DNR year-round to conduct these surveys on both public and private lands. This year, 13 additional surveys were completed. A total of 107 different sites have now been surveyed. Of the twelve sites where comparable resurveys have been done, all but one indicated an increase or stability in the population. The Orianne Society and DNR continue to monitor the status of indigo snake populations in Georgia by surveying areas where the snakes overwinter in tortoise burrows and conducting a mark-recapture study on select sites. Georgia DNR staff also designed a project that will test the effectiveness of various approaches for restoring amphibian breeding ponds embedded in pine uplands and collected pre-treatment data.

Researchers from the U.S. Geological Survey (USGS) and the University of Georgia are refining methods of accounting for the under-detection of small tortoises on LTDS surveys. This will allow estimates of size distribution derived from LTDS data to be used in assessing the stability of gopher tortoise populations. Recent work will also improve the ability to estimate tortoise densities within smaller areas such as individual timber stands or burn units. In Southeast Georgia, follow-up research is being done on the behavior of translocated and resident tortoises at a state Wildlife Management Area (WMA). Researchers from Georgia Southern University continue long-term research at Fort Stewart into the relationship between habitat conditions, fire management, and tortoise population dynamics. They also investigated methods for determining the sex of gopher tortoise hatchlings. A team from Valdosta State University is comparing use by commensals of tortoise burrows and nearby armadillo burrows. In addition to supporting other research, The Jones Center at Ichauway continues to examine questions like habitat selection by upland snakes and vertebrate use of pine stumps as underground refugia.

Habitat Conservation

Three especially notable properties received permanent protection within the past year as part of the Gopher Tortoise Initiative. The Canoochee Sandhills WMA was created when Georgia DNR was able to purchase five adjoining tracts of private land, totaling 6,366 acres. This site protects an estimated population of about 650 gopher tortoises, as well as indigo snakes and eastern diamondback rattlesnakes. In an area of West Georgia where no viable populations of gopher tortoises were known to remain, the DNR has purchased a 4,360-acre tract now called Lanahassee Creek WMA. This small tortoise population is being augmented by translocation of tortoises displaced by development in hopes of creating a self-sustaining viable population. A 2016 survey revealed that a 7,050-acre tract adjacent to Bullard Creek WMA supported a viable population of gopher tortoises, although the WMA itself had fewer than 70. Now, Georgia DNR is near completion of the purchase of a permanent conservation easement which will protect the tortoise population and incorporate the tract into the WMA. Another project in progress will protect important habitat for gopher tortoises and other imperiled reptiles and amphibians in coastal Georgia.

Habitat Management and Invasive Species

State and federal agencies, conservation non-profits, and private landowners continue to actively manage hundreds of thousands of acres for the benefit of tortoises and other imperiled species in Georgia. Most of the lands that have recently been protected through the Gopher Tortoise Initiative also support important populations of other rare plants and animals. Seasonal fire crews employed by Georgia DNR, The Nature Conservancy, and The Orianne Society considerably supplement the capacity of land managers, both public and private, to conduct prescribed fires. When unable to burn, crew members often assist with other projects beneficial to tortoise conservation, such as marking burrows prior to timber harvests and treating invasive species.

A small population of black and white tegu lizards may have become established in Toombs and Tattnall counties. This adaptable invasive species has been documented sheltering in tortoise burrows and preying on young tortoises in Florida. The USGS, Georgia DNR, and Georgia Southern University are now involved in efforts to trap tegus, educate local residents, and determine the extent of the infestation. It is hoped that aggressive trapping and monitoring efforts will eradicate this problematic species in Georgia before it spreads.
To conserve the gopher tortoises and their habitat, the Florida Fish and Wildlife Conservation Commission (FWC) published its first Gopher Tortoise Management Plan in 2007 (revised in 2012). This plan is intended to guide conservation of the gopher tortoise in Florida through 2022 and places an emphasis on landowner incentives, habitat management, and maintaining the gopher tortoise as a keystone species through commensal species conservation. To help inform the Federal listing decision for the gopher tortoise, the FWC provided data relating to species distribution, stressors, and conservation actions to the USFWS for inclusion in the Species Status Assessment which was initiated this year.

Education and Outreach
FWC frequently distributes fact sheets, brochures, posters, children’s publications, and decals to increase knowledge of gopher tortoises in Florida and promote conservation actions. This year, approximately 13,300 outreach materials were distributed to local governments, schools, nature centers, and Florida residents, including 2,963 “A Guide to Living with Gopher Tortoises” brochures. Over 8,200 “Slow Down for Gopher Tortoise” and “Keep Gopher Tortoises Wild” decals were distributed at various events. Electronic versions of all publications are available for download at MyFWC.com/GopherTortoise.

Representatives to the Gopher Tortoise Council and FWC hosted and/or participated in approximately 50 outreach events this FY including: 6 local government workshops; 8 law enforcement training events; Gopher Tortoise Day Proclamation signing events; multiple festivals including the Flatwoods Fire and Nature Festival, Rattlesnake Festival; and multiple presentations to school groups.

Florida citizens are encouraged to submit gopher tortoise sighting(s) to the “Florida Gopher Tortoise” smartphone app, the goal of which is to increase public awareness and citizen participation in conservation at the local level. Citizens can use the app to learn more about the life history of the species, report potential wildlife violations, and test their tortoise knowledge with a quiz. Since launching in 2014, nearly 3,700 gopher tortoise locations have been submitted.

The mortality data collection program engages Florida residents in conservation efforts by asking citizens to report deceased or injured gopher tortoises through an online webform or the Florida Gopher Tortoise app. These data provide insight on mortality “hotspots” throughout the state. This year, 158 gopher tortoises were reported to the webform; vehicles were the leading cause of mortality. Citizens that reported an injured or ill tortoise were provided with contact information for a nearby licensed wildlife rehabilitator to provide the tortoise with prompt medical attention.

The Gopher Tortoise program has utilized student interns from Florida State University since 2011, who contributed approximately 757 hours this year to help implement gopher tortoise conservation actions. Examples of projects completed by interns this year include: creation of spatial data files from the digitization of conservation easements granted to FWC; outreach to Scientific Collecting permit holders with dated or expired permits; creation of a gopher tortoise and dog safety fact sheet; outreach to Incidental Take Permit holders for humane relocation of gopher tortoises; and continued outreach for Gopher Tortoise Day and the associated website, GopherTortoiseDayFL.com. Gopher Tortoise Day outreach in 2019 resulted in the adoption of 12 resolutions proclaiming April 10th as Gopher Tortoise Day in counties and municipalities throughout Florida. A resolution was also adopted by the Friends of Split Oak Forest. In total, 32 Gopher Tortoise Day events were held throughout the State at parks, preserves, schools, and nature centers.

Habitat Management
This year, the Habitat Management Assistance Funding (HMAF) program provided $111,005 to assist local governments with gopher tortoise habitat management activities on more than 565 acres of conservation land. The HMAF program continues to offer a reimbursement for the installation of silt fencing, intended for the soft release of gopher tortoises on public lands that have agreed to receive tortoises from previous Incidental Take permitted (ITP) development sites; however, no new ITP recipient sites were funded through HMAF this past year. Habitat management and improvement activities conducted through the HMAF program included fire line installation and maintenance, selective herbicide treatments of invasive exotics, planting of herbaceous groundcover, and mechanical treatments such as roller chopping, mulching, shredding, and timber thinning.

Law Enforcement
On Friday, August 9th, 2019, an investigation conducted by the FWC led to the arrests of three suspects in Levy and Pinellas counties for violating state laws pertaining to illegally harvesting and selling various fish and wildlife. Fifteen additional suspects

Continued on next page
Florida continued...

were served with notice to appear citations in Levy, Orange, Pinellas and Broward counties. As a result of a long-term undercover operation, investigators were able to identify an individual in the Levy County area illegally harvesting and selling wildlife including gopher tortoises. The primary suspect sold investigators 11 gopher tortoises for a total of $220. The perpetrator was ultimately arrested on multiple Misdemeanor and Felony violations. Over 259 misdemeanor and 12 felony violations were observed throughout the course of the investigation.

Population Monitoring
FWC contracted Florida Natural Areas Inventory (FNAI) to conduct a series of surveys at selected state conservation lands following protocol for Line Transect Distance Sampling (LTDS). FNAI surveyed eight conservation lands; FWC staff completed one additional survey. As of September 2019, 79 LTDS surveys have been completed in FL, of which 44 sites met criteria for a viable population (≥250 adult tortoises, ≥0.16 tortoises/acre, and ≥250 acres of continuous gopher tortoise habitat).

Waif Tortoises
Efforts have continued to identify solutions for waif tortoises, or tortoises that have been removed from the wild (either by unauthorized means or due to injury) whose origin cannot be determined. One solution includes identifying willing landowners to care for waifs on their property, designating the land as a “waif tortoise recipient site.” One new private lands waif recipient site, Marie Acres, was established in Brooksville with a permitted capacity for 99 tortoises. Marie Acres received 4 waif gopher tortoises this past year. Fifty-five waif gopher tortoises were released this past year on sites already permitted by FWC. Additional waif sites are always needed, specifically where populations are depleted on lands owned by cities, counties or land trusts. Outreach has continued to wildlife rehabilitators to make sure releasable tortoises are released to permitted recipient sites or released back to their origin, if location information is known. Under a Memorandum of Agreement (MOA) with the South Carolina Department of Natural Resources (SCDNR), there is also an ongoing effort to restock depleted gopher tortoise populations on public lands in South Carolina using waif tortoises. Since 2012, 140 tortoises have been relocated to South Carolina under this partnership, 10 of which were relocated this year. A new MOA was executed on April 10, 2019, that continues this partnership for an additional five years.

Permitting
Since implementation of the recipient site permit program in 2008 (a voluntary program in which landowners may use their lands with suitable habitat to receive gopher tortoises from development sites), approximately 22,085 acres of gopher tortoise habitat have been protected through permanent conservation easements. Currently, 37 long-term recipient sites (14 of which have multiple units) with a capacity of approximately 6,470 tortoises are permitted. An additional 5 long-term recipient site permit applications are currently under review with potential capacity for 7,304 tortoises on 3,656 acres of gopher tortoise habitat. During this year, 8,561 tortoises were relocated under FWC-issued permits.

To humanely relocate tortoises from ITP development sites and restock tortoises on conservation lands where tortoise populations have been depleted, FWC has approved ITP recipient sites on several properties in northern Florida including Nokuse Plantation, Avalon Plantation, and most recently Eglin Air Force Base. Each recipient site contains at least 250 acres of suitable tortoise habitat and can accept at least 250 adult gopher tortoises. During this year, 894 tortoises were relocated to Eglin Air Force Base, and 36 to Avalon Plantation.

FWC also works closely with public agencies, non-profit organizations, and private landowners to identify and provide incentives for gopher tortoise conservation on private lands. To address special situations that provide more flexibility and furthers the objectives of the Gopher Tortoise Management Plan, FWC has entered into two MOAs. The Department of Military Affairs entered into a MOA with FWC to establish a 312.3-acre recipient site within the Upchurch property of the Camp Blanding Joint Training Center in Clay County. The public conservation land recipient site was permitted by FWC to receive gopher tortoises from development projects that occur on Camp Blanding. The Florida Park Service entered into a MOA with FWC to establish a 303-acre recipient site within Deer Lake State Park in Walton County. This public conservation land recipient site was permitted by FWC to accept gopher tortoises from development projects on Florida State Parks in northern Florida and to restock Deer Lake State Park.
Florida continued...

Research
There are many active research projects in Florida this FY, one of which is focused on evaluating the unique aspects of gopher tortoise ecology in extreme South Florida. After a century of habitat loss, there are likely only three populations of gopher tortoises left within Miami, all in urban reserves of unique pine rockland habitat. The tortoises are in relatively small urban parks, and with such proximity to people, the tortoises are often displaced as they are encountered by people - likely causing population depletion and high incidence of waif tortoises. Given development scenarios for Florida which warn of rapid urbanization, lessons from Zoo Miami’s urban tortoises will help produce management recommendations for Florida’s tortoises in a more urbanized future. Other studies currently being conducted in Florida include examining: social clique structures of translocated tortoises, the ecology of tortoises on barrier islands in the FL panhandle, critical habitat breadth (range) for tortoises, and impacts of temporary exclusion on gopher tortoises. See the Gopher Tortoise Council’s annual meeting program for additional research being conducted in Florida, the findings of which were presented during this year’s annual meeting.

Commensals
The FWC, Central Florida Zoo’s Orianne Center for Indigo Conservation (OCIC), and USFWS have continued efforts to reintroduce the federally threatened eastern indigo snake to The Nature Conservancy’s (TNC) Apalachicola Bluffs and Ravines Preserve in Bristol, FL. Fifteen progeny from captive-raised indigo snakes (10 females and 5 males) were released in July 2019. For more information on this reintroduction effort, visit TNC’s website. In conjunction with this project, research is underway to evaluate prevalence of Cryptosporidium serpentis (Crypto) among native snakes at the repatriation site. Understanding the prevalence of Crypto among wild snake populations will allow the Eastern Indigo Snake Reintroduction Committee and designated captive facilities to make informed adaptive management decisions about reintroduction efforts.

Louisiana
During the past year, Louisiana Department of Wildlife and Fisheries (LDWF) Wildlife Diversity Program staff conducted gopher tortoise population status surveys on public lands including Sandy Hollow Wildlife Management Area (SHWMA) and Bogue Chitto National Wildlife Refuge to update the species’ occurrence data. We are currently revisiting our historical records to assess the status of those isolated individuals as well as surveying new private properties as access is granted. We are gathering current data from our eight known support populations1 to contribute to the U.S. Fish and Wildlife Service (USFWS) Species Status Assessment. Recruitment has been documented this year with juveniles observed on both the north and south tracts of SHWMA. In addition, a fifth waif tortoise pen was installed in 2019 on the north tract of SHWMA, which received three male tortoises after each passed a health check by the Louisiana State University (LSU) School of Veterinary Medicine. All three males appear to be acclimating well to their new home; the pen will be removed after a 12-month acclimation period. One additional male waif tortoise will be released pending a favorable health assessment.

Through a federal grant acquired for gopher tortoise habitat restoration, prescribed fire was applied to 1,095 acres of private lands on three properties in Tangipahoa, St. Tammany, and Washington parishes (one property/parish) in early spring 2019. Two of these properties are owned by non-industrial, private landowners. The final property is owned by an industrial timber company and currently contains Louisiana’s largest gopher tortoise support population. The Multi-state Sandhills/Upland Pine Restoration State Wildlife Grant (SWG) Round 4 funds will be used during Spring 2020 to implement prescribed burning on eight separate, privately-owned properties (2,412 acres), most of which surround SHWMA, which contains Louisiana’s second largest known tortoise support population. A longleaf pine tract on industrial timberland that received prescribed fire in 2019 will be burned again in Spring 2020 in an attempt to suppress woody vegetation. In addition, longleaf pine planting will take place on 245 acres of private lands in St. Tammany Parish. LDWF continues to partner with Natural Resource Conservation Service (NRCS) staff to enroll private landowners into the Working Lands for Wildlife Program to provide opportunities for financial and technical assistance. LDWF will also continue to work with private landowners interested in open pine habitat restoration within the gopher tortoise range in Louisiana.

LDWF awarded a SWG in 2018 to develop Priority Amphibian and Reptile Conservation Areas (PARCAs) for Louisiana. PARCA designation criteria was developed by Partners in Amphibian and Reptile Conservation (PARC) in an effort to leverage partnerships and facilitate collaborative conservation on key areas defined as important to long-term population and species survival. Through an intense workshop with key herptile experts and partners statewide, seven PARCAs, two of which contain multiple gopher tortoise support populations, were identified in Louisiana. LDWF has also been working on a SWG project

1Currently, Louisiana has no known minimum viable populations.

Continued on next page
Louisiana continued...

aimed at collecting occurrence data on upland snakes within eastern Louisiana. We have deployed box traps with drift fences at several locations within the gopher tortoise range in Louisiana to document the presence of upland snake species, particularly the eastern diamond-backed rattlesnake and the black pinesnake. Conversations regarding potential dusky gopher frog reintroduction efforts in Louisiana were initiated recently, and the feasibility of such efforts will be discussed and evaluated among key partners. LDWF continues to promote outreach and education on threatened and endangered species through participation in various events throughout the year. These events included several festivals and school groups, field lectures at SHWMA for college students, National Hunting and Fishing Day, and Louisiana Master Naturalist workshops and covered topics ranging from gopher tortoise conservation to habitat management.

Mississippi

Tom Mann

Status Overview

No major new development threats surfaced this year in Mississippi’s tortoise habitat. However, Enviva will be constructing a wood pellet mill near Lucedale next year. Depending on the hardwood/softwood mix of the vegetation harvested for the manufacture of these pellets, this could prove helpful in restoration of open midstory and understory conditions in tortoise habitat on private and public land; however, this could shift markets toward an increase in planting of loblolly, potentially undermining efforts to restore longleaf. Maintenance of open habitat through repeated cycles of removal of materials for pellet manufacture instead of by burning could potentially produce changes in soil calcium and phosphorus content. I am also concerned that sandhill species such as turkey oak, may be removed during a process aimed at an overly simplistic (my opinion) management goal of well-spaced pines with a vigorous herbaceous groundcover. The latter are important components of many tortoise habitats, but there are often other important vegetative components as well, and with their own intrinsic value.

This was a very wet year in Mississippi, and there is concern that this may have enabled fire ants to occupy sandhill habitat generally unfavorable for them. This may have had negative consequences for hatching and emergence success in tortoise nests therein.

Tortoise Research

2019 head-starting project at Camp Shelby — Jim Lee (TNC, Camp Shelby Tortoise Biologist) Camp Shelby Field Office (CSFO), Camp Shelby Joint Forces Training Center

This is a significant elaboration of the project begun at Camp Shelby by Matt Hinderliter to rear juvenile tortoises to a size at which they become less vulnerable to mortality from various predators since Camp Shelby has a long-term recruitment deficit.

In 2019, 51 gopher tortoise nests were found at 24 sites on the Camp Shelby Joint Forces Training Center, Forrest and Perry counties, Mississippi. Nests were excavated, and eggs (N=262) were transported to the lab for incubation (250 eggs incubated; one egg was broken during nest excavation, 6 were cracked/broken, and 5 eggs had been predated upon discovery). Twenty-three clutches (116 eggs) were incubated at 31°C, 20 clutches (90 eggs) were incubated at 28°C, and the remaining 8 clutches (44 eggs) were incubated at 29.3°C; incubation temperatures that are believed to have an increased likelihood of producing females, males, or an equal ratio of F:M (respectively; Demuth 2001). Average (+ SD) number of eggs per clutch (including non-incubated eggs) was 5.1 (+1.54; range: 2-11) and overall hatching success (excluding non-incubated eggs), 56.8% (142 of 250 eggs), was similar to that previously reported for lab incubated eggs in southern Mississippi (e.g., 58.8%, Noel et al. 2012; 59.2, 64.3, 42.1, 51.1, 56.6%, Lyman and Lee 2014, 2015, 2016, 2017, 2018). Unlike in 2015, eggs incubated this year at higher temperatures had a lower hatching success (50% at 31°C, 47.8% at 29.3°C), than eggs incubated at a lower temperature (70% at 28°C). Of the 105 eggs that did not hatch, 86 (81.9%) showed no visual signs of embryonic development, two (1.9%) exhibited partial development (i.e., embryo < the size of a nickel), and 17 (16.2%) eggs contained fully developed embryos that did not hatch. It should be noted that microscopic examination of eggs was not conducted. Three hatchlings died in the process of hatching from the egg (n=2), or while absorbing their yolk sac (n=1; w/in 24 h of hatching). The 142 hatchlings were placed in our indoor head-start facility where they will be raised at a constant temperature over the course of the next two years.

Forty-nine 2.5-year-old head-started tortoises were released on April 10th, 2019. Additionally, 102 2-year-old head-started tortoises were released on September 3rd, 2019. The head-start building currently contains 283 individuals; head-starts range in age from this year’s hatchlings to 5 years old. Average (+1 SD) carapace length of the five tortoises that were randomly selected to be retained from our initial year (2014) for 5 years, is 25.0 ±1.92 cm (range: 22.2-27.0 cm). Average mass of these same individuals is 3,534 ± 539.36 g. Minimum adult size (reported in the literature) can be achieved via 4-5 years of head-starting in the lab. The five-year olds will be released in the spring and outfitted with radio transmitters.

Continued on next page
In coordination with others, Jim also continues an important role in inoculation of ponds with head-started tadpoles and/or metamorphs of dusky gopher frogs. Ponds include the few with historic records of this species, natural ponds without such records, but within potential metapopulation distance of historic ponds, and newly created ponds and modified natural basins. For the first time, males called from two of the latter categories during heavy fall rains this year.

"Yellow spot" research – Dr. Nicole Hodges (Coordinator, MS Natural Heritage Program)

Nicole is investigating possible environmental correlates of this condition (mid-plastral fontanelle in many mature tortoises), comparing blood levels of calcium, phosphorus, and vitamin D between tortoises with and without yellow spot at 9 sites with different soil types and burning regimes in an 8-county area. She is also evaluating forage species composition and nutrient content at each of the study sites. Results from the 2018 season indicate a significant difference in phosphorus and Vitamin D levels between tortoises with and without yellow spot, with greater levels of both nutrients in tortoises without yellow spot. Interestingly, there were no significant differences between tortoises with and without yellow spot with respect to blood calcium levels. Tortoises manifesting plastral fontanelles are found on savannah and sandhill habitats.

This field season (the 2nd of three), 20 tortoises from three sites were trapped. Six of the 20 gopher tortoises captured manifest yellow spot (see photo). Forage samples (N=126) were collected near burrows from which tortoises were sampled; these have been submitted for analysis. Nicole was assisted in the field by Heather Sullivan, Tom Mann, Kathy Shelton, and Katelin Cross of the Mississippi Museum of Natural Science, and Dr. Lisa Yager and Jay McClain of the US Forest Service.

Site-specific differences in calcium content of tortoise eggshells in MS and elsewhere will also be examined. MS samples will come from the Camp Shelby head-start project, and non-MS samples have already been received from Archbold Biological Station courtesy of Dr. Betsie Rothermel, and from Nokuse Plantation courtesy of Kevin Loope.

The importance of fire season and deer competition on gopher tortoises – Dr. Marcus Lashley (Principal Investigator), Brandon Barton (Co-principal Investigator); Mississippi State University

For the past 2.5 years, the interrelationship between different burning regimes, forage quality, and dietary overlap between gopher tortoises and white-tailed deer has been investigated, focusing on the competitive impact of the latter on tortoises, and the degree to which this may be a density-dependent impact. Fire season treatments, plant sampling, camera trapping for tortoise and deer use, and fecal samples for diet analysis have been completed for 2018 & 2019 seasons, samples are being analyzed, and a summary of results will be available in 2020.

Habitat usage and movement patterns on land managed primarily for timber production – Duston Duffie and Dr. Scott Rush (Mississippi State University)

Tortoises were tracked on Weyerhaeuser parcels in MS and in LA in 2018, and Duston presented results at the GTC Annual Meetings in 2018 & 2019. Twenty-four male, 15 female, 6 subadult, and 9 juvenile tortoises were captured on the Richton, MS site. A 95% minimum convex polygon (MCP) home range was determined for seven tortoises (3 males, 4 females). Male home range averaged 1.93 ± 1.70 (0.028 - 3.310) ha; female home range averaged 0.34 ± 0.36 (0.092 - 0.881) ha. Gopher tortoise ticks were observed on 25 individuals. These ticks are found in very few sites in MS, and this is by far the best site in MS for them and for Florida harvester ants.

Interactions between the Florida harvester ant and red imported fire ant – Andrew Roberson (Southeastern Louisiana University)

Andrew plans to conduct this investigation at several sites in MS next year.

Does low allelic heterozygosity negatively affect tortoise hatching success and hatchling survivorship in MS? – Dr. Brian Kreiser and Dr. Carl Qualls (University of Southern Mississippi)

Outcrossing experiment to test if hatching success and hatchling viability are improved by crossing MS tortoises west of the Continued on next page
Mississippi continued...

Chickasawhay River with FL tortoises and/or with MS tortoises in a subpopulation within the listed range east of the Chickasawhay. Enclosures have been constructed near the USM campus at Lake Thoreau, but tortoises to be used in the experiment have not been obtained.

Tortoise Surveys

Dr. Nicole Hodges surveyed 3 colonies in conjunction with her yellow spot research.

See Tortoise Habitat Management Section (below) for surveys on the DeSoto National Forest.

Tortoise Habitat Management

De Soto Ranger District (DRD) — Ed Moody (DRD Wildlife Biologist):

- 13,172 acres prescribed burned
- 1,568 acres thinned
- 390 acres restored to longleaf
- 175 acres treated to eradicate cogon grass
- Collaborated with TNC on the Camp Shelby tortoise and dusky gopher frog head-start and release programs
- 1,958 acres surveyed for tortoises prior to future timber sales
- Contracted 5-year interval tortoise survey and population estimate for USFWS on priority soils (results not yet available)
- Partnered with the Land Trust of MS and the MDWFP for waif tortoise releases near Glen’s Pond

Chickasawhay Ranger District (CRD) — Jonathan Thomas (CRD Wildlife Biologist)

- 15,405 acres growing season prescribed burned
- 3,895 acres dormant season burned
- 3,300 acres surveyed for tortoises prior to future timber sales
- 750 acres thinned
- 170 acres restored to longleaf

Camp Shelby

Melinda Lyman, Coordinator, Nature Conservancy Office at Camp Shelby

- Treated cogon grass on 92 acres of State and Dept. of Defense land

Mississippi National Guard

- 96 acres of tortoise habitat improved within the cantonment area

Natural Resources Conservation Service (NRCS) — Glynda Clardy, State Wildlife Biologist, Jackson, MS

The NRCS administers assistance programs (technical and financial—easement may be involved)) to landowners interested in restoration/proper management of longleaf pine habitat, many acres of which will also include areas occupied by tortoises or potentially inhabitable by tortoises:

For FY 2019:

1) Healthy Forest Reserve Program – non funded for 2019

2) Environmental Quality Incentive Program:
   - Longleaf Pine Initiative (LLPI); 128 contracts, 11,393.5 acres
   - Working Lands for Wildlife Initiative (WLFW); 137 contracts, 21,742.2 acres
   - Under LLPI and/or WLFW, 27,214.7 acres were targeted for burning, and 827 acres were targeted for weed control

Mississippi Dept. of Wildlife, Fisheries, and Parks (MDWFP) — John Gruchy

The Fire on the Forty (FoF) partnership with the Foundation for Mississippi Wildlife, Fisheries and Parks and the USFWS, which provides cost-share for prescribed burning on private lands, is entering its seventh year. Landowners in selected counties are reimbursed for up to 50% of costs for implementing and performing a prescribed burn. Within focal counties which also support...
Mississippi continued...

tortoises for the 2018 funding cycle (2019 burning season), FoF paid for 5,245 acres of burning on 41 different tracts. The cost to the grant was $65,346 and the landowner cost was $66,171. Landowners must apply to be considered for this cost-share program. Applications are competitively ranked based on potential habitat benefits; priority sites will be selected for funding by the MDWFP. To download an application, visit www.mdwfp.com/longleaf. For more information regarding the Longleaf Pine Restoration Program, contact the MDWFP: 601-432-2199.

Kathy’s Bog (formerly Dead Dog Bog; now named after the late Kathy Shelton) Burn —

In July, a team of volunteers from MMNS, MDOT, and the USFWS conducted a growing season burn at this bog site, the uplands of which support a tortoise population.

US Fish and Wildlife Service — Ecological Services

Randy Browning —

- Initiated and completed 6 longleaf pine restoration projects on 511 acres within Wayne, Hancock, Jones, Pike, and Franklin counties
- Initiated 7 new longleaf restoration projects for the 2019-20 planting season on 498 acres within Lamar, Wayne, Simpson, Newton, Stone and Pearl River counties
- Initiated 23 new enhancement agreements this year and completed 28 new or active agreements. This contributed to the enhancement of 3,484 acres of pine grassland habitat consisting of longleaf, loblolly and mixed pine with prescribed fire and understory control on an additional 292 acres of longleaf.
- Also worked with partners on an additional 14 completed FoF accomplishments, enhancing an additional 2,135 acres of longleaf pine/grassland habit

Tamara Campbell —

- The FoF Program continues; funding levels vary from year to year. Roughly 65-68K acres have been burned through the program in focal areas of MS. Phase II of the program includes conducting prescribed fire workshops for private landowners to learn about prescribed fire and engage in a live prescribed fire demonstration. The workshops should improve prescribed fire culture and burn capacity.
- Mississippi ES staff (Tamara Campbell, Randy Browning, David Felder, Matt Hinderliter and Michael Reeves) have been assisting the MS Longleaf Implementation Team (LIT) and Florida Natural Areas Inventory with the Longleaf Ecosystem Occurrence (LEO) Project. Mississippi's LIT comprises several federal, state, and non-government organizations, including timber industry representatives, private consultants, and non-profit conservation organizations. The Mississippi's Longleaf Pine Significant Geographic Area will be the first of several LEO focal areas across the Southeast to be assessed for longleaf pine occurrence and condition. The results will help the Mississippi ES office prioritize conservation actions on both public and private lands in south Mississippi for a host of rare and unique species endemic to the longleaf pine ecosystem.

David Felder; Matt Hinderliter —

- The USFWS and the MDWFP/MMNS have worked with the USFS to prioritize tortoise sites for effective growing season burning to reach targets for viable populations on the De Soto. An expanded collaborative “fire team” began this year, with personnel from aforementioned groups assisting with burns on National Forests, National Wildlife Refuges, and WMAs.

Relocations, Injured Tortoises, Waifs

Two tortoises were relocated from a development to the Greene County tortoise mitigation bank by Mark Bailey.

Nine tortoises (4 males, 3 females, 1 juvenile, and 1 hatchling) necessitating human assistance of some sort materialized in 2019. One had been hit by a car, 2 had been mauled by dogs, 1 had been injured by a raccoon, several turned up as waifs (one painted blue, and in a parking lot) in non-tortoise habitat or in habitat no longer supporting other tortoises. One of the tortoises died of sepsis, 2 were transferred to Jim Lee for head-starting or release, and one of the non-releasable adult tortoises was recruited into the MMNS educational outreach program; 5 tortoises remain in rehabilitative care. Several of the latter are positive for URTD exposure, and their disposition is still uncertain. In addition, 5 hatchlings of unknown provenance (somewhere in southern Harrison Co.) were left at a veterinary clinic in Saucier. The hatchlings have been recruited into the head-starting program at Camp Shelby.
Mississippi continued...

Missy Dubisson, Christy and Luke Milbourne (Central Mississippi Turtle Rescue) and the late Kathy Shelton (MDWFP/MMNS) are appreciated for long-term services in rehabilitative care of waif and injured tortoises, and for temporary care for other waifs.

A brief note about Kathy, who died suddenly in July 2019. She was the editor of the MS 2015 State Wildlife Action Plan (MDWFP), organized several herp meetings at the MMNS, and also organized the February 2011 SEPARC meeting near Louisville, MS. Kathy was an esteemed colleague and friend at the MDWFP/MMNS for decades, and will be particularly missed by folks working with tortoises, gopher frogs, and bats here in MS. In 2011 and 2012, she assisted me with Webster’s salamander bucket brigades on the Natchez Trace when she happened to be in the Jackson area on wet winter nights (often with thunderstorms and associated pyrotechnics). Late in June of this year she assisted me in the field again, as I was unable to phlebotomize a very uncooperative tortoise I had trapped on Fred Hight’s property north of Leakesville as part of the research undertaken by Nicole Hodges (see above). I phoned Kathy from Fred’s place, and she drove up to bail me out. My last memory of Kathy is of her sitting on the ground in the shade, calm, with the tortoise positioned plastron-up in her lap, successfully obtaining the needed blood sample via repeated probing with the medical harpoon in the tortoise’s front leg. She will be missed, but lives on in the fond memories of each of us.

New State Rep for MSI

My closet is stuffed with GTC annual meeting t-shirts, and after well over a decade of representing MS’s tortoises at various exotic GTC annual meeting venues, I will be passing the State Rep torch to Dr. Nicole Hodges, Coordinator of the Mississippi Natural Heritage Program, and tortoise researcher. I cannot say enough good things about the many GTC officers and State Reps with whom I have worked, and the others in these positions who, working together for the past 40 years, have made the Gopher Tortoise Council an effective element for conservation of and research on tortoises, the myriad other creatures which share its habitats, and the habitats themselves.

South Carolina

Will Dillman

Over the last year, the conservation community in South Carolina has continued conservation efforts for the gopher tortoise and other upland species as well as initiated some exciting new projects and partnerships. Staff of South Carolina Department of Natural Resources (SCDNR), the University of Georgia’s Savannah River Ecology Lab (SREL), US Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), and NGOs like the Longleaf Alliance and Amphibian Reptile Conservancy (ARC) continue to implement conservation measures and projects throughout the state.

Efforts to conserve existing populations of gopher tortoises continue in South Carolina. SCDNR owns and manages two properties with gopher tortoise populations. The first, Tillman Sand Ridge Heritage Preserve, is a well known site home to a minimum viable population. Since 2015, SCDNR has focused efforts on maintaining and improving existing habitat and beginning restoration of approximately 180 additional acres. Restoration began with removal of timber from areas that had not been managed or burned in many decades and had developed thick stands of trees. Once the timber was removed, we used a combination of herbicide treatment, longleaf seedling planting, planting of wiregrass plugs, and the broadcast of a “sandhills” seed mix to restore native plant communities. Initial results have been encouraging and the restoration area is scheduled for its first burn in 2020. We have also observed at least 20 burrows established in the restoration area. These efforts have been guided by SCDNR Heritage Preserve Biologists, SCDNR Herpetologist, and the SCDNR Forester and will result in approximately 50% more available habitat on this site. During the restoration process, several isolated ephemeral wetlands were identified for targeted restoration as well. SCDNR staff hand-cleared the basins of several ponds and removed woody debris from the basins. Ecotones were mulched to allow fire to propagate through the basins, and we have seen the establishment of herbaceous cover in the basins and ecotones. We plan to continue restoration activities in the coming year to provide additional high-quality habitat for this important area. Approximately 320 acres of Tillman was burned during the growing season in 2019.

The Aiken Gopher Tortoise Heritage Preserve (AGTHP) is the second gopher tortoise property owned and managed by SCDNR and is a location where we are trying to establish a minimum viable population utilizing mainly waif tortoises. In recent years, we have begun releasing head-started tortoises, provided by SREL, to the site and monitoring their survivorship and movements through radio-telemetry. From 2016-2019, 132 hatchling, 1-year head-started, and 2-year head-started tortoises have been released on site. This year, we released 14 adult waif tortoises to the preserve in addition to 77 head-started tortoises. The property continues to be managed for tortoise habitat and approximately 260 acres were burned in 2019.

Continued on next page
South Carolina continued...

SREL and the Longleaf Alliance continue to provide head-started tortoises, from AGTHP and a privately-owned site, for release at their respective natal sites through 2020. Tortoise nests are identified and protected from predators for natural incubation and removed just prior to hatching. Eggs are hatched in the lab and tortoises are head-started for eventual release. The USFWS Partners Program has provided funding to improve habitat at the largest privately-owned tortoise population in South Carolina.

Surveys for pine snakes and southern hognose snakes continue using traditional field survey, road cruising efforts, and camera trap arrays deployed throughout the state. Several new records for each species were recorded in 2019. Additionally, the USFWS has provided funding to examine the genetics of pine snakes in South Carolina to better understand the intergrade zone between Florida and Northern pine snakes.

SCDNR has continued efforts to survey and monitor upland isolated ephemeral wetlands for gopher frogs, tiger salamanders, and flatwoods salamanders. Flatwoods salamanders have not been documented in SC since 2010 though surveys of historic sites have occurred in years where conditions were favorable. Gopher frog surveys have been conducted at historic locations and other areas of suitable habitat using automated recording, dip-net surveys, and egg mass surveys.

Though gopher frogs appear to have been extirpated from several historic locations due to fire suppression, they still occur on two large publicly-owned properties. Representatives from USFWS, USFS, SCDNR, and ARC have begun efforts to head-start gopher frogs at the USFWS Bears Bluff Hatchery for release to their natal ponds. In early 2019, egg masses were collected from Francis Marion National Forest and transferred to the USFWS’s Bears Bluff Hatchery to be reared. This resulted in the release of 243 frogs to their natal pond. Based on the success of this project, there are plans to increase efforts at Bears Bluff and to bring a second hatchery online to head-start gopher frogs from the Savannah River Site population.

Finally, this will be my final South Carolina report to the Gopher Tortoise Council as the South Carolina Representative. I will be handing those duties off to Andrew Grosse’s capable hands. I am grateful to have served as the State Representative for South Carolina as well as the Co-Chair of the Council and would like to thank the GTC Members and Board for allowing me to be part of this exceptional organization. It has been a privilege to work with each of you. I am inspired by the passion and commitment you bring to conservation of the gopher tortoise and its upland habitats. Thank you! – Will

Recent Research Citations

Below are a few recently published articles pertaining to gopher tortoises and upland communities in the southeast! Looking for more interesting reads? Check out GTC's Education & Outreach section of our website for tortoise and snake bibliographies.


Directory of 2019-2020 Gopher Tortoise Council Officers, Committee Chairs, and State Representatives. Please view the GTC website for contact information.

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The Tortoise Burrow is published in Spring, Summer, and Winter. Interested in submitting an article? Contact the Newsletter Editor for information:

Michelina Dziadzio
Michelina.Dziadzio@MyFWC.com

Decisions concerning publication of submitted material rest with the editor and co-chairs.

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