



Nightwing News



The Newsletter of the Southeastern Bat Diversity Network



Volume 111, Number 2

Fall/Winter 2021





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In This Issue

	Page
In This Issue	2
President's Address	3
Executive Committee Contact Information	4
Executive Committee Meeting	5
Committees Contact Information	8
WNS Update	9
2019 SBDN Bat Blitz	10
Give Bats a Break	11
State Updates	12
Awards and Recognition	65
Meeting History of the Colloquium & SBDN	66
Upcoming Events	67
Closing Comments	70

Cover Photo: by Price Sewell, Copperhead Consulting

Virginia Big-eared bat portrait was taken at a cave in Estill County, Kentucky.
Part of KY Department of Fish and Wildlife Resources bat monitoring program

President's Address:

President's Address – November 2021:

The Spring 2020 President's Address ended with a note of nostalgia about our traditional gatherings, and optimism about the anticipated opportunity to gather in person at the 2022 Annual Meeting of the SBDN / Annual Colloquium on the Conservation of Mammals scheduled for Jonesboro, Arkansas. Well, after much consternation, and a far greater number of meetings of the Executive Committee than has probably ever occurred within a 6-month period, we've decided that the format of the 2022 meeting should again be virtual.

Each of us are familiar with the concept of ecological resilience - the capacity of an ecological system to weather environmental perturbations, adapting so as to maintain function and capacity despite the stresses associated with changed conditions. Twenty months into the pandemic, as the Executive Committee pivots to convert a second annual meeting from its tried-and-true in-person format to virtual, it feels as though the organization is demonstrating resilience. We remain optimistic that a second year in this format isn't indicative that we've moved to an altered state where virtual meetings are the reality forevermore. We're hopeful that in 2023 we'll finally make it to Jonesboro, giving Tom Risch the opportunity to host (as he had planned in 2021, and again in 2022). And, that we'll gather face-to-face in Hilton Head, SC in 2024.

In the meantime, thanks to all who have provided input via the survey about how best to structure the upcoming meeting to make it useful for you. We anticipate incorporating opportunities to learn from innovative experts (through the plenary); opportunities for members to share results from recent research, monitoring, and education efforts (through posters and presentations); opportunities to get up to date on SBDN and member affairs (through the business meeting); and opportunities to network (as we run into one another in the halls of Gathertown).

Nelson Mandela once said, "Education is the most powerful weapon which you can use to change the world." We realize a virtual event has some drawbacks, but a huge benefit is the chance to learn from one another. Just as important is the opportunity to catch up with one another while huddled around virtual posters, share updates during the business meeting, and take part in unplanned chats while moving through virtual rooms. After all, our predecessors chose to include NETWORK in our name for a reason! So, we hope to see you online, yet again, in March. More details on the event will be coming soon.

Executive Committee Contact Information

President:

Holly Ober
Associate Professor
Collage of Forestry
Oregon State University
311H Peavy Forest Science Center
Corvallis, OR 97331-8614
Office: 541-737-8089
Cell: 850-879-7113
holly.ober@oregonstate.edu

President Elect:

Scott Bergeson
Assistant Professor
Purdue University - Fort Wayne
Department of Biology
Science Building SB330
2101 E. Coliseum Blvd.
Fort Wayne, IN 46805-1499
Office: (260) 481-6317
bergesos@pfw.edu

Past President:

Steve Samoray
Biologist/Project Manager
Copperhead Environmental Consulting
Paint Lick, KY 40461
(615) 542-1000
Ssamoray@copperheadconsulting.com

Treasurer:

Luke Dodd
Assistant Professor
Department of Biological Sciences
Eastern Kentucky University
Memorial #183
Richmond, KY 40475
859-622-2523
luke.dodd@eku.edu

Secretary:

Sue Cameron
U.S. Fish and Wildlife Service
Ashville Field Office
160 Zillicoa Street
Ashville, NC 28801
(828) 258-3939 ext. 42224
susan_cameron@fws.gov

Board Member at Large:

Jennifer Kindel
Wildlife Biologist
SC Dept. of Natural Resources
124 Wildlife Drive
Union, SC 29379
(864) 419.0739
KindelJ@dnr.sc.gov

Executive Committee Meeting

Southeastern Bat Diversity Network Executive Committee Minutes of the Mid-Year Board Meeting November 5, 2021

Attendees

Holly Ober, President

Sue Cameron, Secretary

Steve Samoray, Past President

Jennifer Kindel, Member at Large

Luke Dodd, Treasurer

Scott Bergeson, Incoming President, was unable to attend.

Action Items

AI1: Morris send Bat Blitz host package to Robinson to post to website.

AI2: EC will send "Save the Date" for the annual meeting (to occur on March 10th, with March 9th open for early viewing) by Nov. 24th.

AI3: Ober will reach out to Bats and Mines planners to gauge their interest in tagging onto the SBDN meeting.

AI4: EC will send individual photos to Robinson for EC picture on website.

AI5: Ober will discuss three meeting options developed by EC for the annual meeting with Bergeson to get his feedback.

AI6: Samoray will talk to Nikki Castleberry about the annual meeting awards.

AI7: Ober and Cameron will send President's report and meeting minutes to Wilhide for inclusion in Nightwing News by Nov. 24th.

Call to order: 2:02PM EDT, President Ober

February 2021 Executive Committee Meeting Action Items

AI1: *Not complete.* Morris send Bat Blitz host package to Robinson to post to website.

AI2: *Complete.* Bergeson and Morris meet about NABCA representation.

AI3: *Complete.* Ober send SBDN Meeting Plenary Session link to Cameron to send to meeting registrants and members. Share with Robinson to post to website after one month.

New Business

2022 SBDN Meeting

The EC is planning a one day virtual meeting on Gathertown to be held on March 10th. Gathertown will also be available March 9th for early viewing of materials and for working group meetings.

Meeting details will be worked out over the next couple of months, but components of the meeting could include the plenary, poster session, lightning talks, business meeting and breakout rooms. Ober will organize the plenary session. Bergeson will handle the Gathertown platform again this year. Dodd offered to cover poster submissions and can help Bergeson with Gathertown. Samoray can work on the presentation component. Kindel offered to help design a program, including the logo. Dodd and Cameron can do registration. Samoray will coordinate with Robinson to make registration links live on the website when the time comes. The pay structure will be similar to last year, with a \$21 charge for the meeting and membership.

2023 SBDN Meeting

The 2023 SBDN Meeting and Mammal Colloquium will be held in Jonesboro, Arkansas at the new Embassy Suites Red Wolf Convention Center, dates to be determined. Dr. Tom Risch of Arkansas State University will be the meeting host.

2024 SBDN Meeting

The 2024 SBDN Meeting and Mammal Colloquium will be held in Hilton Head, South Carolina. Lydia Moore from the Palmetto Bluff Conservancy and Jen Kindel from SC Department of Natural Resources will be hosting the meeting.

Bats and Mines Meeting

The Bats and Mines meeting was scheduled for October 4-6, 2021 in Louisville, KY, but was canceled because of Covid-19. Ober will ask meeting planners if they are interested in tagging their meeting onto the SBDN meeting.

Awards

No award were given at last year's meeting, but the decision was made to provide awards this year for posters and student presentations. The EC discussed how these would be judged in a virtual setting and when the awards ceremony would happen. No decisions were made and the EC will meet again to iron out details.

Treasurer's Report (Dodd)

As of 5 Nov 2021, a total of \$82,195.18 was distributed across SBDN accounts. Of that, \$5,502.99 was allocated to our general account. Membership dues remain our primary source of operating income. *This is greater than in previous years, due to linkage of membership with the offering of the 2021 Virtual Meeting.* The largest operating expenses to be incurred this past year are related to 2020 tax preparation and website maintenance. There have been 48 transactions from 2021 to date (versus 123 reported for Fall 2018 EC meeting, 136 reported for Fall 2019 EC meeting, and 67 reported for Fall 2020 EC meetings). *The inflow of funds for 2021 to date total \$18,262.62 and outflows total \$17,488.20.* This contrasts with Fall 2020 reporting of an inflows totaling \$50,791.42, and outflows totaling \$50,103.78. Obviously COVID-19 has continued to impact the overall financial activity of our organization; indeed movement of funds this year is ca. ½ that even reported in 2020. Even so, it is worth noting the vast majority of financial activity in 2020 occurred prior to the epidemic. We serve as a bank for 6 different state bat working groups (AL, FL, GA, KY, NC, TN), *and the SBDN fostered financial activity of all these groups over the past year.* As is readily apparent from the amount of money moving through our bank account, and the funds held on behalf of various functions and groups, we still perform a valuable service to the bat community. Respectfully submitted: 5 Nov 2021 – By Luke Dodd – SBDN Treasurer.

Committee Updates

Website Committee (Robinson): Robinson has made recent updates to the website. He still needs to add a group shot of the EC. EC members will send him individual pictures to include on the website.

Blitz Committee (Pattavina/Burns): The Bat Blitz at Bankhead National Forest will be held August 1 – 5, 2022. Pattavina spoke briefly to Allison Cochran. She's going to follow back up with the venue for headquarters, but thinks we are all set for the moment, with no issues.

Membership Committee (Petric): No update.

Awards Committee (Burnett): Due to the NASBR being cancelled, no student travel awards were given this year. The committee is also still holding off on lifetime achievement awards until they can be presented in person, hopefully in 2023.

Southeastern State Agencies Committee & NABCA (Morris): NABCA is still working on the state of the bats. Morris hasn't gotten any new volunteers for the SE State Agencies committee. She's hoping to set up a call this winter and solicit someone to replace Sunni Carr, who moved on from her position in KY.

Nightwing News (Wilhide): Wilhide needs the President's address and EC meeting minutes by Nov. 24th.

The EC will meet again in early Dec. to work out details for the annual meeting.

Meeting adjourned at 03:25PM EDT.

Committee Contact Information

BAT BLITZ COMMITTEE

Member	Affiliation	E-Mail
Pete Pattavina (Co-Chair)	USFWS	Pete_pattavina@fws.gov
Leanne Burns (Co-Chair)	Bat Biologist-Independent Biological Consultant	leanneklb@gmail.com
Tim Carter	Ball State University	tcarter@bsu.edu
Nikki Castleberry	University of Georgia	neotoma@uga.edu
Michael Whitby	University of Nebraska-Lincoln	Michael.whitby@gmail.com
Bree McMurray	MO DOT	mobatgirl1@yahoo.com
Katrina Morris	Georgia DNR	Katrina.morris@dnr.state.ga.us
Joy O'Keefe	University of Illinois at Urbana-Champaign	jmokeefe@illinois.edu
Gary Libby	Skybax Ecological Services, LLC	garylibby@windstream.net
Jason Robinson	Biological Systems Consultants, Inc.	jason@biologicalsystemsconsultants.com
Katie Teets	Florida FWC	Katie.Teets@MyFWC.com

AWARDS COMMITTEE

Steven Burnett (Chair)	Clayton College & State University	StephenBurnett@mail.clayton.edu
Nikki Castleberry	Georgia Museum of Natural History	neotoma@uga.edu
Pallavi Sirajuddin	Clemson University	psiraju@g.clemson.edu
Kristina Hammond-Rendon	WEST, Inc.	khammond68@yahoo.com
Lisa Gatens	NC Museum of Natural Sciences	lisa.gatens@naturalsciences.org

MEMBERSHIP COMMITTEE

Rada Petric (Chair)		r_petric@uncg.edu
Steve Thomas	Mammoth Cave National Park	steve_thomas@nps.gov
Blake Sasse	Arkansas Game and Fish Commission	dbasse@agfc.state.ar.us

BYLAWS COMMITTEE

Nikki Castleberry (Chair)	Georgia Museum of Natural History	neotoma@uga.edu
Tim Carter	Ball State University	tcarter@bsu.edu
Brian Carver	Tennessee Technological University	bcarver@tntech.edu

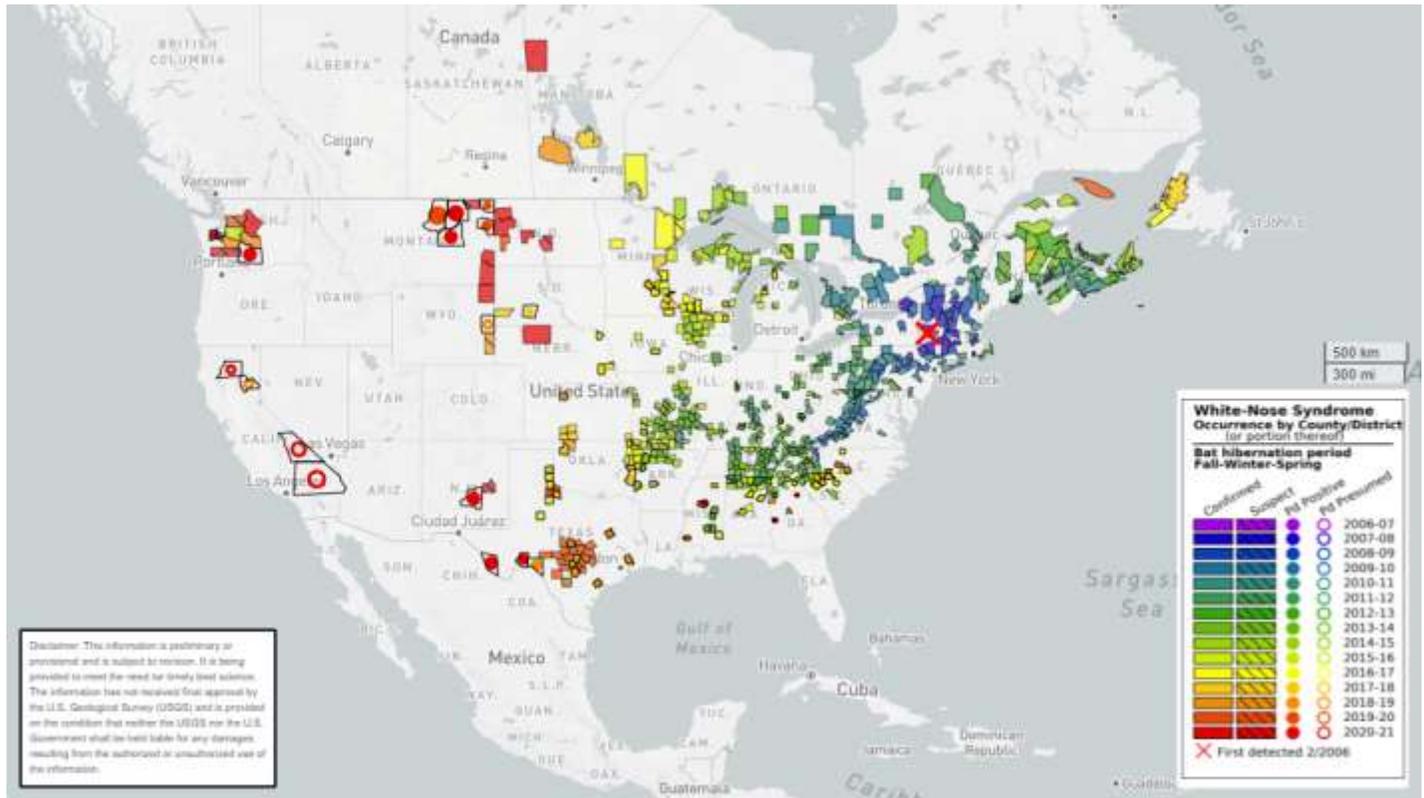
WEBSITE COMMITTEE

Jason Robinson Chair	Biological Systems Consultants, Inc.	jason@biologicalsystemsconsultants.com
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SBDN State Agency Representative Committee & NABCA

Trina Morris (Chair)	Georgia Dept. of Natural Resources	Katrina_Morris@dnr.ga.gov
Nick Sharp	Alabama Wildlife and Freshwater Fisheries	Nicholas.Sharp@dcnr.alabama.gov
Blake D. Sasse	Arkansas Game and Fish Commission	blake.sasse@agfc.ar.gov
Terry Doonan, Ph.D	Florida Fish and Wildlife Conservation Commission	terry.doonan@myfwc.com
Zach Couch	Kentucky Dept. of Fish and Wildlife Resources	zach.couch@ky.gov
Nikki Anderson	Louisiana Dept. of Wildlife & Fisheries--Wildlife Disease Program	nanderson@wlf.la.gov
Dan Feller	Maryland Department of Natural Resources	danj.feller@maryland.gov
Katelin Cross	Dept of Wildlife, Fisheries and Parks	Katelin.Cross@mmns.ms.gov
Jeanette Bailey	Missouri Dept. of Conservation	Jeanette.Bailey@mdc.mo.gov
Katherine Etchison	North Carolina Wildlife Resources Commission	katherine.etchison@ncwildlife.org
Melynda Hickman	Oklahoma Department of Wildlife Conservation	melynda.hickman@odwc.ok.gov
Jennifer Kindel	South Carolina Department of Natural Resources	KindelJ@dnr.sc.gov
Josh Campbell	Tennessee Wildlife Resources Agency	Josh.Campbell@tn.gov
Jonah Evans	Texas Parks and Wildlife Department	jonah.evans@tpwd.texas.gov
Rick Reynolds	Virginia Dept. of Game and Inland Fisheries	rick.reynolds@dwr.virginia.gov
Alex Silvas	VA Dept. of Wildlife Resources	Alexander.Silvis@wv.gov

White Nose Syndrome Update



White-nose syndrome (WNS) has continued to spread rapidly. Bats with white-nose syndrome have been confirmed in 37 states and seven Canadian provinces:

U.S. States:

Alabama Iowa Minnesota North Carolina South Dakota Wisconsin Arkansas Kansas Missouri North Dakota Tennessee Wyoming Connecticut Kentucky Montana Ohio Texas Delaware Maine Nebraska Oklahoma Vermont Georgia Maryland New Hampshire Pennsylvania Virginia Illinois Massachusetts New Jersey Rhode Island Washington Indiana Michigan New York South Carolina West Virginia

In Canada:

Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Prince Edward Island, Quebec

There is evidence that the fungus that causes white-nose syndrome, *Pseudogymnoascus destructans*, is present in three additional states:

California - Mississippi - New Mexico (WNS-suspect)

2022 SBDN BAT BLITZ

After being postponed in 2020 and again in 2021, we will try again for the

2022 Annual Bat Blitz

will be hosted by the

Alabama Bat Working Group

at the

Bankhead National Forest in northern Alabama,

from August 1-5, 2022.



Check the SBDN Bat Blitz page for updates and details for this years Bat Blitz.

Give Bats a Break!!

My name is Nathaniel Marshall (most everyone calls me "Nate" but either one works). I run an account on Twitter called "Give Bats A Break" which is dedicated to bats and their defenders - the humans that research, protect, and advocate for them - and have also started what I believe is the first bat-specific podcast this side of the Atlantic called Give Bats A Podcast. Two others exist, an English-language podcast called BatChat with Steve Roe from the UK and a Portuguese-language podcast called Moregandocast with Érica Munhoz from Brazil, so I'm excited to provide another stream of bat content for bat people everywhere.

I've come to find that most bat people have become so by accident and not many grew up dreaming about one day becoming a chiropterologist. I guess that makes me one of the weird ones. When I was in elementary school, all I wanted was to be a bat scientist and both my parents and my teachers knew it. Fast forward roughly two decades and I am NOT, in fact, a bat scientist but a plumber-turned-manager with a Twitter account dedicated to bats because I still love them. I sent a short series of innocent, thoughtful tweets to the Pope (yes, that Pope) offering a reflection in which bats were examples of how to be better humans and my world was flipped to a decidedly chiropteran orientation. I suddenly found myself at the heart of Bat Twitter, following and being followed by the very scientists whose ranks I had one day hoped to join as a child. What's a fella to do with all these new friends? Start a podcast, obviously! If there's anything less visible to the public than a bat, it's a bat scientist and I want to change that. My Twitter account is called Give Bats A Break, named after Dr. Merlin Tuttle's 2017 essay in *Issues in Science and Technology*, so I decided to call the podcast Give Bats A Podcast: a podcast for bats and their defenders! It launched on October 1st of this year and in it, I have conversations with folks like you who are busy in the lab, the museum, the field, the rehabilitation center, the office, and the classroom actually DOING the work and discuss all things batty. At the time of writing this there are only two other bat-dedicated podcasts out there: Bat Conservation Trust's BatChat, hosted in English by Steve Roe, and Morcegandocast, hosted in Portuguese by Érica Munhoz. I am happy to add mine to that list and even happier to amplify the voices of bat scientists from all over the world. I'd be pleased for you to listen! You can find it at my website, www.givebatsabreak.com, or most anywhere you prefer to listen to podcasts. I would love to connect with you on social media so find me on Instagram or Twitter and let's keep sharing our favorite animal with the masses! Give Bats A Break is for bats and their defenders, and if you're reading this: that means you. So thank you, SBDN members, for all you do.

State Updates

Submit Your State Updates

Thank you for your submissions! We love reading about all of the research and outreach you are conducting in your regions. From those regions that didn't contribute this year, we look forward to hearing from you for next year's state updates.

Send in your reports and photos anytime from the following states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Send summaries and photos to nightwingnews@gmail.com

Alabama

By DAVID RAINER, Alabama Department

Of Conservation and Natural Resources

October 21, 2021

Gates at Weaver Cave Protect Habitat of At-Risk Bats



About 10,000 gray bats, an endangered species, use Weaver Cave in Anniston in the summer.

Photo by Price Sewell

By DAVID RAINER,

Alabama Department of

Conservation and Natural Resources

October 21, 2021

Gates at Weaver Cave Protect Habitat of At-Risk Bats

Important bat habitat in north Alabama has recently been protected in what Nick Sharp of the Alabama Wildlife and Freshwater Fisheries (WFF) Division considers possibly the highlight of his career as the Division's bat expert.

Steel gates have been installed on Weaver Cave in Anniston to protect the extensive underground caverns as important bat habitat.

"Someone brought my attention to a YouTube video of bats coming out of the cave that was shot about six years ago by a local caver," Sharp said. "When I saw it, I thought they must be gray bats. I started doing some investigating – catching bats coming out and counting bats coming out. We did some inside the cave surveys. It became apparent pretty quickly it was an important gray bat cave. Subsequently, we recognized it's important for the tricolored bats as well."

Gray bats are on the Endangered Species List and tricolored bats are under review to determine if listing as endangered or threatened is justified. Another endangered species, the Indiana bat, may also use the cave at times although more research is needed to verify its presence.

Sharp said Weaver Cave has a long history of human use. It was mined by the Confederacy for saltpeter during the Civil War. The mineral used to make gunpowder was loaded on the Selma, Dalton, and Rome Railroad less than a quarter mile from the cave and shipped to the furnaces in Oxford and Rome, Georgia. That railroad line is now the Chief Ladiga Trail.

Before and after the war, the cave was reportedly used for different social activities, like dances and parties. After lighting was installed in the cave in the early 1900s, it became a popular destination for picnicking, school field trips, and Sunday school outings.

Sharp said gray bats, northern long-eared bats, and tricolored bats were documented in the cave as early as 1959. Because gray bats are extremely sensitive to human disturbance in their caves, the bat populations crashed through the early to mid-1900s. The species was listed as Endangered in 1976. The cave is now home to about 10,000 gray bats in summer. About 600 tricolored bats use the cave in winter, making it an important hibernaculum for this at-risk species.

When the Georgia-Alabama Land Trust acquired the cave in 2020, WFF contacted the Trust about protecting the bat habitat with the use of steel gates to prevent people from entering.

With funding provided by the U.S. Fish and Wildlife Service and the Natural Resources Conservation Service, the gates were constructed and installed by Kennedy Above-Underground.

Alabama

By DAVID RAINER,
Alabama Department of
Conservation and Natural Resources
October 21, 2021

Gates at Weaver Cave Protect Habitat of At-Risk Bats

“These are called bat-friendly gates,” Sharp said. “A lot of investigation and thought was put into the design of these gates. They don’t restrict air flow at all. The main entrance to Weaver is the one where almost all of the bats come in and out. The bats always come out near the top so that was left open to give them enough room so they could flow out and the bats do not get backed up behind it.

“We’re grateful to all the partners that made this rare conservation success possible,” Sharp said.



Bat-friendly steel gates were installed on the entrances to Weaver Cave to prevent the bats from being disturbed. Photo by Nicholas W. Sharp/ADCNR

Although the caverns were once thought to be two different caves – Weaver (6,100 feet long) and Lady (6,400 feet long) – exploration by cavers determined the two were connected. They’re now commonly known as Weaver Cave.

By DAVID RAINER,

Alabama Department of

Conservation and Natural Resources

October 21, 2021

Gates at Weaver Cave Protect Habitat of At-Risk Bats

“The cave system is quite extensive,” Sharp said. “It has multiple passages and chambers. I understand that Lady Cave was once used as a bomb shelter because it has a large cathedral size chamber. We found some gray bats roosting in that chamber in the spring. Part of the cave has a creek running through it, and a lot of bats roost in that area.

“Gray bats are real particular what caves they will use. For whatever reason, they like this cave. I think some of it has to do with air circulation. In the summer, they like high domes because it traps heat.”

One area with a high ceiling is called the Chicken Room because the owner at the time attempted to raise chickens in the cave under artificial lighting.

Sharp said 15 species of bats have been documented in Alabama. The animals with a spooky reputation make a very valuable contribution to agriculture in the U.S.

“The point I always make about the bats in Alabama is they are all insectivores,” he said. “They all provide that ecological service of pest control. A recent research paper came out looking at the bats in south Alabama and what crop pests they were eating.

“Another study that is often cited indicates that bats provide a minimum of \$4 billion in pest control for agriculture in the U.S. With all the species we have, bats are eating billions of insects each summer night in Alabama.”

Sharp said the distribution of bats in Alabama varies a great deal. Gray bats are common in north Alabama along the Tennessee River

“The red bat is probably the most common species we have in Alabama,” he said. “They roost in trees and not caves. They look like dead leaves when they roost. In the evening, if you’re looking in the night sky and see a bat flying, it’s likely a red bat or a big brown bat, which is another common species we have.”

Sharp said the populations of the northern long-eared bat and the tricolored bat suffered serious declines because of white-nose syndrome, a disease caused by a fungus introduced from Europe.

“White-nose syndrome is still raging on, unfortunately,” he said. “It continues to spread west. It made it to the West Coast and is slowly covering the western U.S. We have spent a lot of money on ways to prevent it but have not been successful. Some species are near extinction.

“Northern long-eared bats used to be common in Alabama. Now they’re very rare. We never catch them anymore.”

Sharp said the protection of Weaver Cave should be celebrated.

Alabama

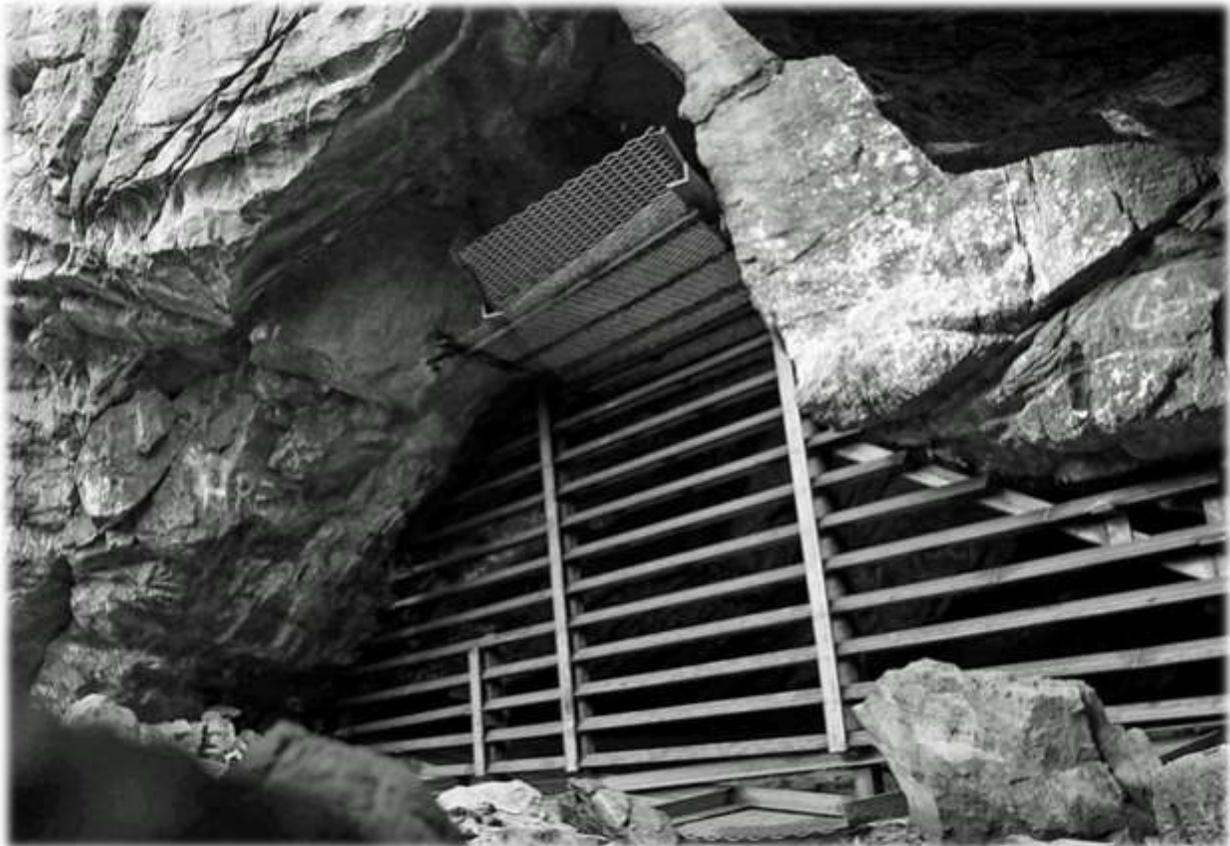


By DAVID RAINER,
Alabama Department of
Conservation and Natural Resources
October 21, 2021

Gates at Weaver Cave Protect Habitat of At-Risk Bats

“This is a big win for conservation,” he said. “It’s rare in conservation in general to see a big win like this. Bats, specifically, because they’re getting hammered so hard by white-nose syndrome and suffer a bad reputation. Putting restrictions on a cave of this importance is a big deal. The cave is right beside a road and has been so heavily vandalized in the past. People had been going in it all the time. Now that the gates are up and it’s protected, it’s going to be interesting to see if the numbers increase. There are roughly 10,000 gray bats in there in the summertime. Just protecting them alone is a big win for conservation.”

Having been in this position for almost 8 years, Sharp said, “This has to be a candidate for most the important thing I’ve been a part of in this job since I’ve been with Wildlife and Freshwater Fisheries.”



An opening at the top of the cave entrance will allow bats easy access to the cave. Photo by Sharon Brewer

Arkansas

In July of 2021, Environmental Solutions Innovations (ESI) biologist Brian Dennis and assistant Jordan Angel netted and radio tagged four Indiana bats while conducting surveys for the U.S. Forest Service on the Ozark National Forest. Over a few nights, they tagged three lactating or post-lactating female and one male Indiana bat. Crews tracked the bats to a shared roost tree, which they used each day until the transmitter batteries expired. Emergence surveys confirmed that bats continued to use the roost tree through the rest of the summer active season. The effort resulted in the first confirmed that Indiana bat maternity colony in upland, forest habitat in the Ozark Mountains of Arkansas. The U.S. Forest Service, Arkansas State University, U.S. Fish and Wildlife Service, Arkansas Game and Fish Commission, and other partners have put substantial effort into bat surveys on the Ozark National Forest in Arkansas over the past decade. This discovery is the result of the sustained effort and commitment to bat conservation by that partnership.



Arkansas

In March of 2021, two female Indiana bats were radio tracked from their hibernaculum in northern Arkansas during the Indiana Bat Spring Migration Project. Bat 120 migrated south to Columbia County, Arkansas and Bat 300 migrated to the Ouachita National Forest, Oklahoma Ranger District (Fig. 1). Copperhead Environmental Consulting, Inc. mist netted these two sites during the summer to locate maternity colonies, but unfortunately, only non-Indiana bat species were captured during that time. Following the discovery of a maternity colony in an earlier year of this project, three artificial roosts were installed at Shirley Bay Rainey Brake WMA in September 2019 and two artificial roosts were confirmed to be used by the Indiana bat maternity colony the following spring and summer seasons. Monitoring during summer 2021, confirmed use at all three artificial roosts after guano collected from each roost were genetically analyzed and confirmed as Indiana bat species



Arkansas



Anneka Lamb, MS student in Dr. Rolland's lab at Arkansas State University, has surveyed 67 culverts in nine counties of Southern Arkansas between 22 November 2020 and 28 February 2021. Of the 67 culverts surveyed, 10 housed bats, although only one tricolored bat (target species) was detected. Other species included big brown bat, Rafinesque's big-eared bat (no more than two in a given culvert), south-eastern bat (a colony of a few hundred individuals), and an evening bat.



Arkansas



Florida

White-nose Syndrome Monitoring and Surveillance – Lisa Smith & Mike Gillikin, Florida Fish and Wildlife Conservation Commission

Last winter, FWC biologists surveyed 64 caves and 49 culverts to monitor Florida's cave roosting bats and conduct surveillance efforts for *Pd*. No physical sign of WNS was observed on any of the roosting bats and all sites swabbed for the fungus came back negative for *Pd*. Florida appears to remain negative for WNS for another year. Despite this, overall numbers of tri-colored bats have decline drastically since regular monitoring began in 2014. The reason for this is unknown, however FWC biologists believe there could be several causes, including changes in microclimate, disturbance, or possible indirect effects of WNS. Monitoring efforts will continue this upcoming winter to continue to monitor trends in Florida's cave bat population.



Photo by: Lisa Smith

A dew-covered tricolored bat.



Photo by: Scout Hogan

A FWC biologist rappels alongside a waterfall at a local cave



Florida

Florida Bat Festival— Lisa Smith & Scout Hogan, Florida Fish and Wildlife Conservation Commission

Florida Fish and Wildlife Conservation Commission and the Florida Bat Working Group joined Lubee Bat Conservancy to celebrate their 15th Annual Florida Bat Festival. Members of both groups presented information on native Florida bats, bat houses, echolocation, and white-nose syndrome. In addition, members of the public were able to learn more about bats through bat trivia and bat coloring sheets and puzzles.



Photo by: Darcy Doran-Myers



Photo by: Darcy Doran-Myers

Florida

Florida's Long-term Bat Monitoring Program – Scout Hogan, *Florida Fish and Wildlife Conservation Commission*

Florida's Long-term Bat Monitoring Program has been collecting data statewide for three years. Data has been collected from 360 stationary point surveys across 64 cells and all data have been uploaded to NABat. There has been over 4Tb of raw data collected in 2020 and 2021 alone. FWC is working to expand surveys into underrepresented areas and to continue quarterly and annual surveying of established stationary points by working with partners.



Acoustic detector and microphone set up at CREW WEA, Collier County.

Florida

Unique caving hazards during winter surveys

Florida wants to know what the weirdest critter other states have encountered during their winter bat surveys? Anyone else finding themselves stuck in tight passageways with alligators?



Photo by: Daniel Batie

Florida

By Dilly Hoyt and Liz Braun de Torrez

How will Everglades restoration affect the Florida Bonneted Bat?



Figure 1 One of the main canals Picayune Strand State Forest at sunset.

The Picayune Strand Restoration Project (PSRP) is the first project of the Comprehensive Everglades Restoration Plan (CERP), which is deemed to be the largest ecosystem restoration program in the world. The ambitious project is designed to restore the flow of water to its natural state by plugging 48 miles of canals, removing 260 miles of roads, and constructing three pump stations in an area previously slated for a housing development. This restoration effort will directly restore more than 55,000 acres of natural wetland habitat and indirectly affect over 2.5 million acres of surrounding public lands and estuaries. Drastic changes in both hydrology and vegetational composition are expected to follow this restoration effort. Monitoring the response of the Florida Bonneted bat (*Eumops floridanus*, "FBB"), a federally endangered species, is critical in determining the implications of land restoration for a species endemic to the region. Together with the University of Florida, FWRI implemented a large-scale study to investigate how FBBs and other bat species may respond to future changes in vegetation and water availability following hydrological restoration efforts.

Florida

First, we assessed bat foraging habitat.

Acoustic surveys that measure relative levels of foraging activity by bats were conducted at over 200 sampling sites across Picayune Strand State Forest and its surrounding public lands, which include: Collier-Seminole State Park, Fakahatchee Strand Preserve State Park (FSPSP), Florida Panther National Wildlife Refuge, Ten Thousand Islands National Wildlife Refuge, and Big Cypress National Preserve. These public lands represent a diversity of habitat types, including: strand swamp, mixed cypress forests, wet flatwoods, mesic flatwoods, wet prairies, saltwater marshes, and mangrove swamps. Each acoustic bat detector was set to record for four nights, with each site being sampled twice during the wet season and twice during the dry season.



Figure 2 From top left to bottom right: Xenabeth Lazaro, FWC biological technician setting up an acoustic detector in a mangrove site; an acoustic detector in the cypress swamp; UF master's student, Laura Nicholson, using snowshoes to traverse mudflats to reach a mangrove site; the UTV carrying a kayak to reach a site across the canal.



Florida

Second, we assessed bat roosting habitat. Using our acoustic data, we identified areas of high FBB activity where we then captured FBBs with mist nets and secured radio-transmitters on break-away collars. These individuals were tracked back to roosts with aerial and ground telemetry. In 2021, we located 9 FBB roost trees, which greatly increased our understanding of roost usage and location relative to capture/foraging locations!



Figure 3 From top left to bottom right: mist nets deployed at Picayune at sunset; a FBB captured with radio transmitter attached; the bat crew radio tracking the bat through the swamp; one of the FBB roost trees identified this year.

Many of our research sites were very remote, but with the help of a fleet of transportation options, from ORVs, to kayaks and even snowshoes, the 2021 field season was a huge success! This research is key to understanding both the local and landscape-scale factors affecting roosting and foraging habitat selection of the FBB as well as other species in the local bat community, which will assist land managers in developing effective strategies to protect and promote Florida's rich bat community and beyond.

Florida

Lorraine Ketzler

USFWS Fish and Wildlife Biologist

Hurlburt Field and Eglin AFB have continued conducting quarterly NABat stationary acoustic surveys, though we saw some extremely high water levels this summer from tropical storms. Our winter tricolored bat structure surveys resulted in 4 new identified bat roosts (and at least one roost hosted a tricolored bat). We are presenting our winter tricolored bat structure survey results at TWS in November 2021.

Lorraine Ketzler, USFWS Liaison to Hurlburt Field, is also co-chair for the National Military Fish and Wildlife Association's Bat Working Group, and is planning for the March 2022 NMFWA meeting with a field trip/training session to provide hands-on training for DoD attendees and partners to learn about conducting NABat stationary acoustic surveys.

Photo of a Petterson d500x deployed near a small pond usually the device can be set along the sandy shoreline, but this summer's survey required setting farther up in the forested edge. Photo by Lorraine Ketzler.





Georgia Department of Natural Resources

GA DNR Mobile Acoustic Routes & NA Bat

GA DNR volunteers have been collecting bat call data through our GA DNR Mobile Acoustic Project since 2014 (<http://georgiawildlife.com/AnabatProject>). The original national acoustic survey protocol provided guidelines for states to follow when starting monitoring programs. In 2021, project volunteers drove 19 DNR Mobile Acoustic Route and 12 NABat route transects across the state collecting bat calls. DNR and U.S. Forest Service partners drove another 17 routes for these surveys. Results from 2014-2017 are available on the website listed above and GA DNR data is also available through the NA Bat Website (sciencebase.usgs.gov/nabat/#/home).



GA DNR NA Bat technician Lexie Dingerson sets up a stationary acoustic monitoring device. Photo by Rachel Pack, GA DNR.

Georgia



Georgia Department of Natural Resources

White-nose Syndrome Winter Monitoring & Surveillance in Culverts



Southeastern bats in a culvert. Photo by Emily Ferrall, GA DNR

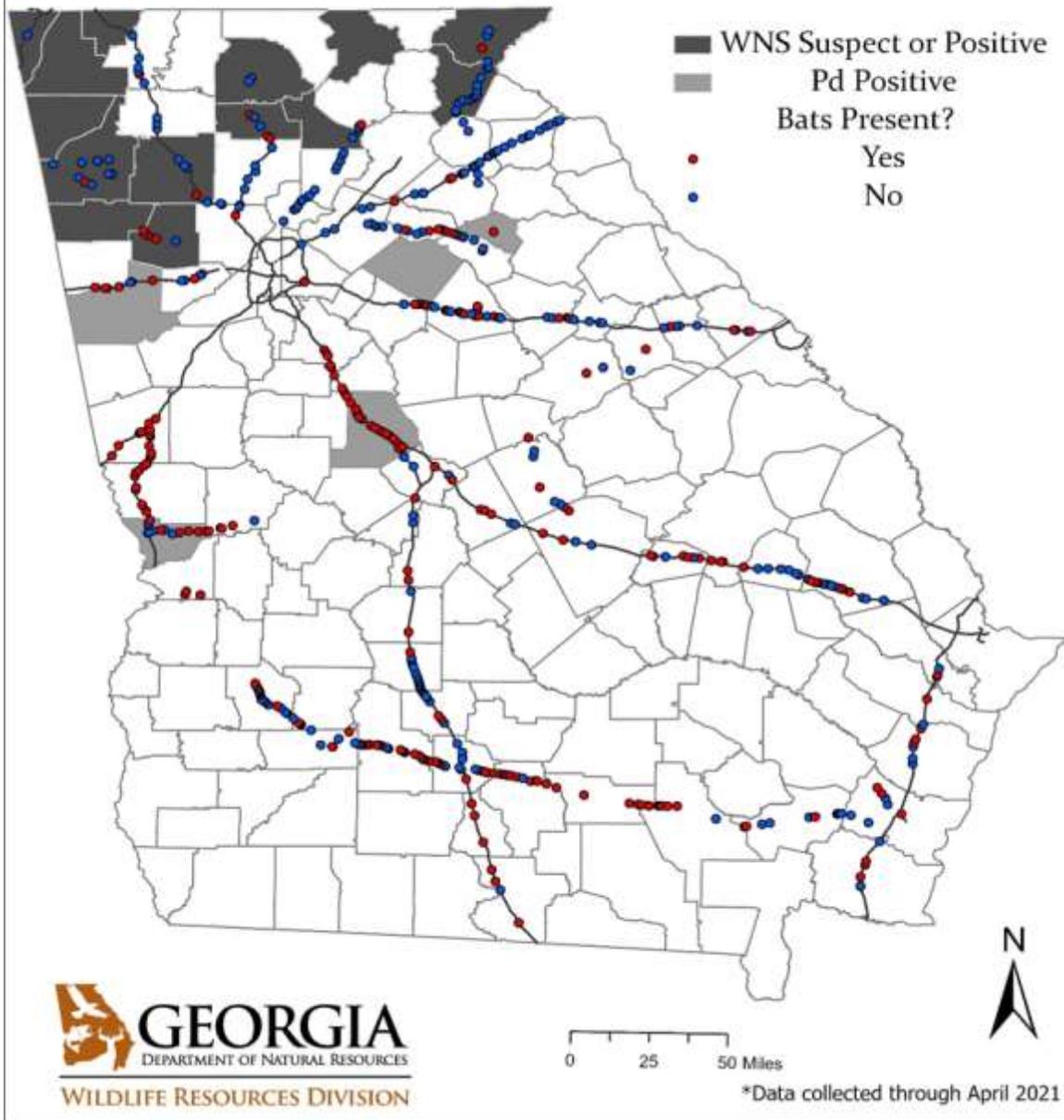
In winter 2021, 205 culverts were surveyed, 52 percent of which had bats. The most significant site found was in Chattahoochee County near Columbus, GA. This culvert had 324 southeastern myotis bats, 41 tri-colored bats, and one big brown bat. Details on the WNS status of some sites are pending, but as of October 2021 two new sites tested positive for Pd. These results represent the second year in a row that Pd has been detected in culverts and marks a more southward progression of the spread of Pd in Georgia.

Georgia

Georgia Department of Natural Resources



GA DNR Culvert Bat Presence 2018-2021



GA DNR culvert survey data through April 2021



Georgia Department of Natural Resources

GA DNR Bats in Transportation Structures

In 2021, staff made 12 site visits and conducted one emergence survey at transportation structures with DOT to confirm the presence of significant bat roosts. This fieldwork allows staff to provide advice on measures to avoid and minimize disturbance to bats during upcoming projects. Additionally, as a result of the ongoing winter surveys, the agency began early coordination with DOT on a Columbus County culvert that, while in disrepair, is a significant maternity colony site for southeastern myotis, a state-tracked spe-



cies.

GA DNR Biologist Maggie Hunt conducts a survey at a bridge scheduled for maintenance that is occupied by bats. Photo by Trina Morris, GA DNR.



Georgia Department of Natural Resources

GA DNR staff also conducted three sessions of annual Bats in Bridges training with assistance from Laci Pattavina at the USFWS. Two courses were provided for GDOT staff, consultants, and agency staff. An additional class was conducted for USDA APHIS staff who are currently assigned to bird nest removal projects to prevent take during DOT maintenance and demolition projects. These staff have identified known bat roosts and are now better equipped to conduct surveys and hopefully assist with future mitigation efforts at construction sites.



GA DNR staff conducting bridge training for USDA APHIS staff. Photo by Laci Pattavina, USFWS.



Georgia Department of Natural Resources

GA DNR Says Hello to Maggie Hunt



Maggie Hunt preparing for an emergence count at Fricks Cave. Photo by GA DNR.

Please welcome Maggie Hunt to the GA DNR mammal team! Maggie started her job this year with GA DNR as a Wildlife Biologist focused on completing environmental reviews to identify project impacts and assist with mitigation efforts to protect species and habitats across the state. Maggie will also be working on GA DNR's bat and small mammal projects and is currently serving as the chair of the Georgia Bat Working Group. Maggie is a former GA DNR NA Bat technician and completed her master's degree at Kennesaw State University working with bat acoustics.



GA Bat Working Group
[\(http://www.gabats.org/\)](http://www.gabats.org/)

GBWG Bat Blitz 2021 Results



The 2021, the annual Georgia Working Group Bat Blitz occurred on the coast of Georgia from October 14 to October 16. Researchers from across Georgia, as well as from six other states, conducted mist-net surveys at wildlife management areas, state parks, historic sites, national wildlife refuges, and barrier islands throughout the area. Participants hailed from state and federal agencies, multiple southeastern universities, and consulting firms. The turnout was impressive, and much appreciated! The Georgia Department of Natural Resources hosted the event at Crooked River State Park with help from Georgia Bat Working Group partners. This was the first blitz conducted on the Georgia coast and during the fall migration season, with the intention to study bat migratory patterns in the state.

A northern yellow bat captured and banded during the blitz on Cumberland Island, GA. Photo by Emily Ferrall, GA DNR.



GA Bat Working Group

[\(http://www.gabats.org/\)](http://www.gabats.org/)

Over 150 bats of seven different species were captured at the blitz (see a summary of capture results in the table below). Of note were Georgia species of concern, such as the tri-colored bat (*Perimyotis subflavus*), which were banded for capture-recapture studies. Motus Wildlife Tracking System transmitter tags were deployed on northern yellow bats (*Lasiurus intermedius*), Seminole bats (*Lasiurus seminolus*), and eastern red bats (*Lasiurus borealis*). Five Motus tags were deployed on three northern yellow bats and two Seminole bats as part of the Georgia DNR migration study. The Motus Wildlife Tracking System is an automated radio telemetry system that will allow passive tracking of the tagged bats for approximately 60 days. The blitz was very successful and aided the state in data collection that will inform further survey and conservation efforts for years to come.

Species Capture Summary – Georgia Bat Blitz 2021

	Oct.14 (Thurs.)	Oct.15 (Fri)	Oct. 16 (Sat)	Total
Nycticeius humeralis	10	83	4	97
Lasiurus seminolus	6	22	7	35
Lasiurus borealis	1	0	0	1
Lasiurus intermedius	2	8	0	10
Perimyotis subflavus	3	6	2	11
Eptesicus fuscus	1	2	2	5
Corynorhinus rafinesquii	0	2	0	2
Total	23	123	15	161

GBWG board members:

Maggie Hunt GA DNR, maggie.hunt@dnr.ga.gov - Chair

Emily Ferrall, GA DNR, emily.ferrall@dnr.ga.gov – Secretary

Trina Morris GA DNR, katrina.morris@dnr.ga.gov - Treasurer

Laci Pattavina, USFWS, laci_pattavina@fws.gov - Board

Pete Pattavina USFWS, pete_pattavina@fws.gov - Board

Chris Cornelison, Kennesaw State University, ccornel5@kennesaw.edu - Board

Nikki Castleberry, GA Museum of Natural History, neotoma@uga.edu – Board



Kentucky

Bats on the go: 5 migrations, 5 states, 2 species, 3 planes, all hands on deck

By Piper Roby, Copperhead Consulting

When our Fearless Leader, Mark Gumbert, was conducting his Master's research at EKU on Indiana bats, he posited that what he really needed was an airplane to locate and track his radio-tagged bats. Although he was denied this request, the idea stuck with him. Fast forward a decade when he owned his own company and decided it's time to track spring migrating Indiana bats from an airplane. Copperhead was contracted for this work, but we spent years partnering financially to collect the data necessary to not only determine where bats were headed, but also how they got there and their behavior along the way. All the dedication, sleep deprivation, blood, sweat, and tears of the Copperhead Crew over the years has paid off, maybe a little too well...

We usually have 2-3 spring and fall migration projects per year, but 2021 was the year everyone wanted on the migration bus, and we packed every seat. Starting in late March, we radio-tagged 30 Indiana bats from a hibernaculum in northern Arkansas and started tracking. A week later, another crew traveled to eastern Missouri and radio-tagged another 30 Indiana bats to start tracking them. One of those projects was supposed to end before the 3rd project began where we started radio-tagging gray bats. Well that didn't happen, so we had to scramble: add some people, move people off one project and on to the other, and generally stay in the field for 3 weeks or more. However, it was all worth it! We located 3 new maternity colonies in 2 states for Indiana bats and got some timing, behavior, and connections between winter and summer colonies for the grays.

Then summer happened. Not sure about the rest of you, but this was Covid catch up year, so we were all out in the field All. Summer. Long.

Late summer/early fall: it's supposed to be the breathing period for the regulatory bat surveyors. However, no rest for the wicked.

Hello Fall Migration! This year we started 2 fall projects in 2 states, both with Indiana bats: PA and AL. We got lots of great information about how bats behave during this time of year that some people consider "colony break up" time. However, we are starting to see a pattern in late August/early September where bats may leave their primary roost, but they are not migrating; they are just roosting in what are considered secondary roosts or "male" roosts. This behavior has also been seen by other researchers conducting long-term studies at maternity colonies. We didn't connect any maternity colonies to hibernacula this year, but we have learned a tremendous amount of information concerning the behavior of bats in the fall that adds to our growing knowledge of this species during an understudied time of year. We have conducted way fewer fall migration studies than spring, so we're still learning about the bats' behaviors, timing of departures in different regions, and the best way to get the most data. There's always something new to learn!

Kentucky

Bats on the go: 5 migrations, 5 states, 2 species, 3 planes, all hands on deck

By Piper Roby, Copperhead Consulting



From plane during spring migration. Photo by Will Seiter

Kentucky

Bats on the go: 5 migrations, 5 states, 2 species, 3 planes, all hands on deck

By Piper Roby, Copperhead Consulting



Waiting to catch some bats! Copperheaders from left: Kelsie Eshler, Ian Burns, Piper Roby, Crystal Birdsall

Kentucky

Bats on the go: 5 migrations, 5 states, 2 species, 3 planes, all hands on deck

By Piper Roby, Copperhead Consulting



Indiana bat waiting for a transmitter. Photo by Piper Roby

Mississippi



Updates from the Mississippi Bat Working Group

Fifth Annual Culvert Blitz

The fifth annual culvert blitz was held January 8 – 12, 2021. Surveyed culverts were primarily associated with interstate highways and major (4-lane) state highways, with routes (typically consisting of 8 – 12 culverts) spread across the state.

Sixteen volunteers ran 13 routes and checked 165 culverts. Due to concerns regarding coronavirus, all volunteers were masked while in the culverts. Additionally, to insure quality data were collected, training in survey techniques and identification were provided and inexperienced surveyors were paired with experienced surveyors.

Of the inspected culverts, 108 had bats present. A total of 2,705 bats were found representing five species, with the tri-colored bat accounting for approximately 60% of the observations (1,627 individuals). Other species detected include southeastern bats (892), Brazilian free-tailed bat (111), big brown bat (71), and Rafinesque's big-eared bat (2). Only two bats were not identified. Dates for the 2022 blitz are January 7 - 9. If you are interested in participating, or have additional questions, contact the Mississippi Bat Working Group at msbats@hotmail.com.



All volunteers were masked while surveying culverts this year. Photo by B. Rosamond

Annual Meeting

The Mississippi Bat Working Group did not hold its annual meeting in 2021. However, the 2022 annual meeting is scheduled for March 24th at the Mississippi Museum of Natural Science.

Bridge Blitz

The Mississippi Bat Working Group's First Annual Bridge Blitz was held from July 12-18, 2021. Seventeen members participated, covering nine survey routes throughout the state. Four of the 71 bridges surveyed were occupied (5.6% occupancy rate). These bridges were in the Claiborne County area and contained 120 southeastern myotis (*Myotis austroriparius*), 15 big brown bats (*Eptesicus fuscus*), and one Rafinesque's big-eared bat (*Corynorhinus rafinesquii*). The bridge with the largest colony of southeastern myotis was surveyed three weeks later and found to have increased to 220 *Myotis*. For more information, please contact Alison McCartney at alison_mccartney@fws.gov.



A southeastern myotis and tri-colored bat in a crevice. Photo by A. Floyd

The occupancy rate observed during this Blitz was slightly less than bridge occupancy rates found from surveys in neighboring states, which yielded an average of twelve to fourteen percent

Mississippi



Mist Net Event

The Mississippi Bat Working Group held its 18th annual mist net event at J.P. Coleman State Park in Tishomingo County September 14 - 16. The nine participants netted five sites in two nights, but only caught five bats. This included three red bats (*Lasiurus borealis*) and two evening bats (*Nycticeius humeralis*). Although the number of bats captured was disappointing, this was the first time the group has met since February 2020, so it was good to see folks again.

Mississippi Public Broadcasting Special

Mississippi Public Broadcasting recently filmed three members of the Mississippi Bat Working Group for a bat educational program that will air on their “Mississippi Roads” program. Members were filmed mist netting, surveying bridges for bats, and looking at bat specimens and a bat exhibit at the Mississippi Museum of Natural Science. In addition, a colony of over 200 southeastern myotis were filmed roosting and flying under a bridge near the Natchez Trace Parkway in Mississippi. Additional filming will occur in the winter and spring months to finalize the piece.

Updates from the Mississippi Museum of Natural Science

WNS Surveillance

White-nose syndrome surveillance continued for winter of 2020-2021. A total of seven caves and 10 culverts were tested for *Pd*. Swabs were submitted to Northern Arizona University- Foster's Lab. One cave and three culverts tested positive adding Montgomery County as a new *Pd* positive county to Mississippi. Mississippi now has nine *Pd* positive counties. To date, there has not been a documented case of WNS in the state. Overall, tricolored bat numbers seem to be holding steady or increasing in select sites. Surveillance for 2021 - 2022 will continue and expand to test new sites.

Mist Net Surveys

This summer, biologists at Mississippi Museum of Natural Science conducted a mist net survey targeting Indiana and Northern long-eared bats. After 47 net nights encompassing 7 counties, only one *Myotis* species was captured in Tishomingo County. Guano was collected to confirm identification. In addition to mist netting, six bridges, two culverts, four bat towers, and a mine were surveyed as potential maternity roosts. Guano was collected at each site that a *Myotis* species was found for submittal to the Bat Ecology and Genetics Lab at Northern Arizona University.



Tri-colored bats in Waddell Cave. Photo by K. Cross

Mississippi



Outreach and Education

The Mississippi Museum of Natural Science Outreach Education Staff conducted bat education with several formats this past year. We visited 20 schools, participated in two field days, had bat education as part of four teacher workshops, and provided videos for several virtual programs which reached over 2,000 students and teachers. We also had approximately 10 posts and videos on our social media platforms. These posts included: bat adaptations, Mississippi species, current field work, bat habitat, neat facts, and what to do if you find a bat on the ground/in your home.

Updates from U.S. Fish and Wildlife Service

Bats and Bridges/Culverts Survey Effort

A state-wide, year-round bats and bridges/culverts survey effort began in 2021. One-hundred fifty-eight bridges and culverts have been surveyed thus far with 1,604 bats observed. Five species were represented during the project including the southeastern myotis (*Myotis austroriparius*) (6), tricolor bat (*Perimyotis subflavus*) (8), big brown bat (*Eptesicus fuscus*) (14), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) (73), and Brazilian free-tailed bat (*Tadarida brasiliensis*) (1,503). Surveys will continue during the winter months and will include bridges and culverts that have already been surveyed, in addition to new bridges and culverts. Information obtained from this effort should provide essential information regarding relative abundance of bat species and species distribution in Mississippi. Analysis of data collected at each bridge site, including habitat information, bridge/culvert dimensions, water characteristics, and proximity to roads and other development, will provide important information regarding preferred characteristics which will have important implications for bat conservation. Information collected will be shared with the Mississippi Department of Transportation to inform them of areas where care should be taken during bridge



Rafinesque's big-eared bats roosting under a bridge.
Photo by A. McCartney

North Carolina

In April 2021, NV5 biologists had the opportunity to participate in the Neotropical Bat Capture & Acoustics Survey Techniques Workshop, hosted by the Toucan Ridge Ecology and Education Society (T.R.E.E.S.) in Middlesex, Belize. While following COVID-19 protocols, NV5 biologists learned and implemented several bat survey techniques. These including acoustic surveys with both full spectrum and zero crossing equipment, mist-netting over streams and in the jungle, and harp-trapping a cave. A total of fourteen bat species, including insectivorous, frugivorous, and hematophagous species, were physically captured and/or acoustically detected during the five-day workshop. These included the common big-eared bat (*Micronycteris microtis*), dwarf fruit-eating bat (*Artibeus phaeotis*), Underwood's long-tongued bat (*Hylonycteris underwoodi*), common vampire bat (*Desmodus rotundus*), common mustached bat (*Pteronotus mesoamericanus*), and greater spear-nosed bat (*Phyllostomus hastatus*). Although the workshop focused on neotropical bats, the survey and data analysis techniques learned throughout the workshop can be implemented by NV5 biologists regardless of the geographic location their future projects take place. It was an informative workshop with lasting professional connections and wonderful memories. We highly recommend attending if you have the chance! Their website can be found at <https://www.treesociety.org/>



Greater spear-nosed bat (*Phyllostomus hastatus*) with a 91 mm forearm



Underwood's long-tongued bat (*Hylonycteris underwoodi*)



Common vampire bat (*Desmodus rotundus*)



Common mustached bat (*Pteronotus mesoamericanus*)

North Carolina

Cheryl Knepp
Environmental Program Consultant
Biological Surveys Group
Environmental Analysis Unit
North Carolina Department of Transportation

Netting in Eastern NC July 2021

I was working up a bat and a lightning bug landed on my finger...almost taunting my prisoner. Our target species that night was NLEB but I took a pic of this little guy, it just made me laugh because it was like he was pleading with the lightning bug for help...if I don't get outta here...tell my story. I know they're not high quality or rare spp for the cover... but just sharing for a laugh



North Carolina

New Mine Gate at Crowder's Mountain State Park

Katherine Etchison and Ed Corey

An abandoned mine at Crowder's Mountain State Park is sporting a new bat gate thanks to a team of cave gate installers, N.C. State Parks staff, and N.C. Wildlife Resources Commission biologists. A few tricolored bats hibernate in the state park mine but are subjected to human disturbance as evidenced by a well-worn unsanctioned footpath to the mine entrance. Swabs from this mine also tested positive for *Pseudogymnoascus destructans* in 2019, so N.C. State Parks and NCWRC staff recognized the need to restrict entry into the mine. The gate was completed in April and the mine will be monitored by N.C. State Parks and the NCWRC to provide tricolored bat data in an area of the state where hibernacula are limited.



Figure 1. The entrance to a mine on Crowder's Mountain State Park before gate construction (Photo credit: Katherine Etchison, NCWRC).

North Carolina

New Mine Gate at Crowder's Mountain State Park Katherine Etchison and Ed Corey



Figure 2. The entrance to a mine on Crowder's Mountain State Park after gate construction. (Photo credit: Katherine Etchison, NCWRC).

North Carolina

New Mine Gate at Crowder's Mountain State Park

Katherine Etchison and Ed Corey



Figure 3. N.C. State Parks Inventory Biologist, Ed Corey, N.C. State Parks Mountain Region Biologist, Sharon Bischof, and Western Piedmont Habitat Conservation Coordinator, Olivia Munzer, install the top section of the bat gate. (Photo credit: Katherine Etchison, NCWRC).

Oklahoma

Welcome to the Oklahoma Echolocation Grotto; we're glad you're here!!!

The Grotto has been on the road since April of 2019, spreading bat education all around the state of Oklahoma, (and a couple destinations out of state, too). By the end of 2021, the Grotto will have traveled almost 14,000 miles and has help educate and answer bat questions for over 28,000 guests.

The Grotto has made appearances at schools, wildlife-based educational events, civic and organizational gatherings, trade shows and even parades. It is the only mobile educational unit in the Oklahoma State Park system and has supported many state park programs and events since its inception 30-plus months ago.

Information inside the Grotto includes examples of the many different tools and devices used by scientists to study bats; bat related items we find and use in our everyday lives; some bat skulls and skeletons as well as examples of the importance of bats in our lives. The Grotto is designed so that up to four live bat species can be viewed by visitors in a safe and healthy manner. There are four flat screen televisions playing videos inline with our guest's focus and interests as well as a surround sound system to help set the "bat" mood!!!

The Grotto has several additional satellite displays that can be used depending upon the circumstances. Those include a mist net, harp trap, bat house examples and some interactive matching and true/false games. It is completely self-contained, having an on-board generator, tower heaters and an air conditioning unit.

We constantly update information and displays found in the Grotto and look forward to educating those that find an interest in those wonderful furry, flying critters we call bats!!!

Written by Mike Caywood, Park Manager, Alabaster Caverns State Park; mike.caywood@travelok.com



Oklahoma

Come inside the Oklahoma Echolocation Grotto!



Oklahoma

Show and Tell anyone?!



Oklahoma

Photographer-
"Say Cheese?!"

Kids-
"I wonder if these old people know there is a bat in their hair."



Tennessee

Willcox Bat Lab Update

University of Tennessee Knoxville

Research

Roosting and Foraging Ecology of Female Tri-colored Bats

Ash Cable, PhD student in Dr. Emma Willcox's lab, finished Summer Season 2.5 of her research studying the roosting and foraging ecology of female tri-colored bats. Despite high netting efforts, tri-colored bats remain incredibly difficult to capture on the landscape. The team captured 1 female in 2019, 6 females in 2020, and 1 female in 2021 across Tennessee. So far, the team has tracked 6 female bats to 17 roost trees and collected habitat data on used roosts and random trees. Additionally, they have collected foraging data (>30 foraging points) for 5 bats. Female tri-colored bats roosted in multiple tree species: oaks, beeches, maples, tulip poplars, hickories, elm, and one cluster of poison ivy growing on a snag. Female tri-colored bats in TN are roosting too high in the canopy in too dense of vegetation to confirm with binoculars or with emergence counts, therefore they are often confirmed with radio telemetry only. However, one male tri-colored bat was tracked and found roosting much lower than the females, thus was confirmed visually with binoculars. Preliminary selection models determined that bats may select roosts based on high canopy volume of the roost tree and higher tree species richness in the surrounding 0.1 ha forest plot. Overall, foraging areas (95% kernel utilization distributions) had more water, developed area (i.e. in this case, rural paved roads), less open areas, and more forest than available on the landscape. To date, the maximum distance a bat has traveled was a pregnant bat that traveled 9.7 km, while the mean maximum foraging distance for all female tri-colored bats so far is $4.3 \text{ km} \pm 1.7 \text{ SE}$. Attempts to increase sample size will be made in Season 3.5 (Year 2022) in the Great Smoky

Mountains National Park and other sites in TN near TVA Reservoirs. The team thanks the USFWS, TVA, and Great Smoky Mountains NPS for funding this study. Thanks also to Copperhead Consulting for air support and TWRA for assistance with netting efforts and providing tips on where to successfully capture the species.



Figure 1 Technicians Cameron Johnson, Tullie White, and Leah Crowley conduct a visual search of the roost tree.

Tennessee

Willcox Bat Lab Update
University of Tennessee Knoxville

Figure 2 The transmitter is spotted emerging from a dead leaf clump used by a male tri-colored bat



Tennessee

Willcox Bat Lab Update

University of Tennessee Knoxville

Microplastics in Bats

By Leah Crowley

Researchers in Dr. Emma Willcox' lab at the University of Tennessee, Knoxville have started a USFWS-funded research project to assess exposure to microplastics in insectivorous bat species across the spectrum of WNS susceptibility. The goal of this study is to investigate the potential exposure route of microplastics via food intake, as well as the relationship between microplastics exposure and bat body condition (i.e. mass). Bat guano samples are being collected from bats captured in mist nets and at roost structures throughout Tennessee and other states by the University of Tennessee and collaborators¹. Additionally, we are performing necropsies of bat carcasses from Knox County and Davidson County, TN rabies monitoring programs. We are extracting organs for microplastics analysis including: the gastrointestinal tract, liver, lungs, and kidneys. Guano and selected organs will be digested and examined under a microscope to determine the extent of bat exposure to microplastics, and eDNA diet analysis will be used to determine bat diet. Once the diets have been determined, the potential relationship of food sources contributing to bat exposure to microplastics will be examined. Finally, using known microplastic concentrations and data on bat body mass and condition, we will investigate if a link between microplastic exposure and body condition exists. Studying the relationship between microplastic concentrations in bats and their body conditions will provide insight into factors that may contribute to the survival of bats infected with WNS. If microplastics significantly worsen the body condition of bats, it is possible that greater implications for surviving WNS or other environmental stressors exist. If you are interested in collaborating to collect bat guano samples or carcasses through public health programs for this project, please contact Ash Cable (acable5@vols.utk.edu). We are accepting samples from all southeastern bat species until October 2022. Thanks to everyone who is helping collect samples!

¹ *Sample collection collaborators: Stantec (James Kiser, Josh Adams, etc.), Arnold Air Force Base (John Lamb), Tennessee Wildlife Resource Agency (Dustin Thames, Mallory Tate, Chris Ogle, Josh Campbell), Tennessee Valley Authority (Liz Hamrick, Jesse Troxler, Rob Stinson, Sara McLaughlin, Megan Wallrichs), Copperhead Consulting (Piper Roby, Theresa Wetzel, Steve Samoray, Kelsie Eshler, Will Seiter, Ian Burns, etc.), and EnviroScience (Mary Gilmore).*



Figure 3 Lab technician Leah Crowley organizes guano samples for microplastic analysis.

Tennessee

Willcox Bat Lab Update

University of Tennessee Knoxville

Outreach

TN Master Naturalist Mammals Course

Willcox Bat Lab members Ash Cable (PhD student), Leah Crowley (undergraduate field/lab technician), Holly Whited (undergraduate lab volunteer/TWRA intern), and Nick Stahlman (undergraduate lab volunteer/Master Naturalist) co-instructed a Mammals course for the Tennessee Master Naturalist Program at Ijams Nature Center in Knoxville in October 2021. Attendees learned mammal trapping techniques, mammal skull identification, radio telemetry, and learned about bats in the eastern USA.



Figure 4. Lab volunteer and TWRA intern Holly Whited captured an eastern mole at the TN Naturalist class co-instructed by members of the Willcox Bat Lab.

Women in Nature Network Radio Telemetry Workshop

Willcox Bat Lab members Ashley Epstein (MS student) and Ash Cable (PhD student) taught a radio telemetry workshop to the Women in Nature Network (WiNN) UTK Student Chapter in October 2021. Eleven women learned methods for tracking wildlife including triangulation and homing

Tennessee

Willcox Bat Lab Update
University of Tennessee Knoxville



Figure 5 Undergraduate students in WiNN learned radio telemetry techniques in a workshop led by Willcox Bat Lab graduate students.

Virginia

Gray Bat (*Myotis grisescens*) Summer Roosts, Emergence Counts and Acoustic Passage Rates: The VA Dept. of Conservation Recreation – Division of Natural Heritage (VDCR) with assistance from Radford University (RU), Virginia Tech – USGS Coop Unit, and VA Dept. of Wildlife Resources (VDWR) continue to monitor gray bat bachelor and maternity sites using Bat Call Data Recorders (BCDR). These data (passage rates) provide an index of activity at sites as well as a phenology of site use. Bat Call Data Recorders have deployed at up to 13 gray bat roost sites over the past three years. A final report summarizing these data is on file with the USFWS in Abingdon, VA.

Orndorff, W.D., Malabad, T.E., and K. Kosič Ficco, 2021, Gray Bat (*Myotis grisescens*) summer habitat use within the upper Tennessee River basin in Virginia: Natural Heritage Technical Report 2021-17. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. 38 pages.





Gray Bat (*Myotis grisescens*) DNA: Virginia Tech Master's student Hila Taylor under the direction of Drs. Ford, Hallerman and Powers complete the fieldwork and most of the analyses testing a combined approach using intensive acoustics to detect species present in areas around 40 bridges in southwestern Virginia's Bristol District in conjunction with DNA-barcoding of guano found at sampled bridges. Gray bat activity at bridges was correlated with proximity to the known summer maternity roost in the Bristol area and mean cave density in the surrounding landscape. Combined with pilot acoustic data from 2018 and a partial continuation in 2020, they observed high year-to-year variation in gray bat activity. A long acoustic sampling duration is necessary to discern monthly presence and relative abundance patterns of an imperiled bat across the year from emergence to the initiation of hibernation. Two hundred eighty-three guano samples were collected from 29 bridges for subsequent DNA analysis. Although 245 of the samples were amplified, only 77 were of good enough quality to find a species match (27% of collected samples). Nine bridges had guano with DNA that matched big brown bats (*Eptesicus fuscus*), 12 bridges had guano matching gray bats, and three bridges had guano matching the federally threatened northern long-eared bat (*Myotis septentrionalis*). All sites with guano-derived DNA also had those bat species recorded acoustically. For guano DNA analysis, additional work refining techniques will be needed; however, as proof of concept, the combined approach to bat sampling developed will aid VDOT managers in assessing bat use of bridges, which is particularly valuable in areas such as the New River drainage into which gray bat presence is newly expanding.

Virginia

Coastal Bat Migration: Virginia Tech Master's student Mike True, under the direction of Dr. Ford, is finishing a nano-tag study on tree bats in conjunction with the Motus Wildlife Tracking System. Tagging predominately red bats in Rhode Island, New York, New Jersey, Delaware, and Virginia, Mike is tracking red bat movements in relation to climatic conditions during fall migration. In addition, Mike is maintaining 7 Motus towers along coastal VA. Mike will be completing and defending his thesis later this year.





Eastern Shore Acoustic Survey: Virginia Tech student Mike True, under the direction of Dr. Ford, with funding from VDWR has completed the analysis of acoustic data collected from five locations off the Eastern Shore of Virginia including: Chincoteague Island, 2015-2019 (791 nights), Cedar Island, 2012-2019 (1586 nights), Hog Island, 2014-2019 (1268 nights), Silver Beach, 2014-2017 (762 nights) and Smith Island, 2014-2018 (1328 nights). Because acoustic calls of tree bats (red, *Lasiurus borealis*; hoary, *Lasiurus cinereus*; and silver-haired, *Lasionycteris noctivagans*) were the predominate calls identified, analysis of bat activity in relation to temporal, climatic, and habitat conditions were conducted on these three species. At Chincoteague Island, the only site with extensive roosting habitat, nightly occurrence had a unimodal shape with respect to season, low occurrence in winter, increase in spring, peak in summer, and decrease through fall. The other sites, with little to no roosting habitat, showed a bimodal shape with low occurrence in winter, a small peak in spring, slight decrease in summer, and an increase and peak in fall. At all sites there was a negative relationship with wind speed, as wind speed increased activity decreased, and a positive relationship with temperature and visibility, as temperature and visibility increased activity increased. Mike has submitted a manuscript, Monitoring and Modeling Tree Bat (Genera: *Lasiurus*, *Lasionycteris*) Occurrence Using Acoustics on Structures Off the Mid-Atlantic Coast – Implications for Offshore Wind Development, to the journal *Animals*, Special Issue: “Bat Biology in Relation to Wind Energy Development.”





North American Bat Monitoring Program (NABat): Virginia Tech (Dr. Ford and Jesse De la Cruz) with funding from the VDWR continued acoustic monitoring in conjunction with NABat. Because of restrictions placed on hiring seasonal positions and the requirements of social distancing in occupied vehicles, the NABat sampling effort was reduced during this past summer. Following the NABat grid-based sampling frame, 24 stationary points in 13 grid cells were sampled using Wildlife Acoustics SM4 zero-crossing acoustic detectors. Detectors were deployed for a minimum of 4 nights each according to NABat protocol. Because stationary transects provide a better representation of species diversity, we ran only stationary detectors during this period. Acoustic data collected over the past three years will be analyzed over the winter of 2021 – 2022 to better inform the type of survey (stationary vs. mobile), number of surveys, and locations for next year's survey efforts.

National Park and DOD Surveys: Various students at Virginia Tech, Nick Kalen, Samuel Freeze, Amber Litterer and Michael St. Germain and the USGS continued long-term acoustic and mist-netting surveys at Prince William Forest Park-Marine Corps Base-Quantico, Fort A.P. Hill, Colonial National Historic Site, Richmond National Battlefield, Petersburg National Battlefield and Shenandoah National Park, as well as Rock Creek Park in the District of Columbia and the Chesapeake and Ohio Canal National Historic Site across the Potomac River in Maryland. Northern long-eared bats (*Myotis septentrionalis*) continue to be caught in Prince William and Quantico. Work examining the efficacy of both auditory and light lures to attract bats to netting sites has been a new focus at Prince William whereas work at the battlefield sites in southeast Virginia has continued examining winter activity with acoustics. Using data from these sites, two papers have been published:

Gorman, K.M., S.M. Deeley, E.L. Barr, S.R. Freeze, N. Kalen, M.S. Muthersbaugh, and W.M. Ford. 2021. Broad-scale geographic and temporal assessment of northern long-eared bat (*Myotis septentrionalis*) maternity colony landscape association. *Endangered Species Research* (in press).

Kalen, N.J., M.S. Muthersbaugh, J.B. Johnson, A. Silvis, and W.M. Ford. 2021. Northern Long-eared Bats in the Central Appalachians Following White-nose Syndrome: Failed Maternity Colonies? *Journal of the Southeastern Association of Fish and Wildlife Agencies*. (in press)



Small-footed Myotis (M. leibii) Survey: Because of restrictions placed on the handling of bats due to SARS-CoV-2, Dr. Moosman (Virginia Military Institute) suspended most of his small-footed myotis surveys this year. Instead, Dr. Moosman and VDWR staff conducted a pilot acoustic and camera (video and still pictures) project to assess the ability of these techniques to document small-footed myotis activity during fall and winter. The objective is to determine if small-footed myotis roost and hibernate in rocky talus slopes during fall and winter months. Wildlife Acoustic SM4 bat detectors were paired with two Bushnell HD Trophy cameras, one shooting still photographs and one shooting video, at two sites where small-footed myotis occur during summer months. All sampling units were run between September and December 2020. While both acoustic detectors and cameras captured bat activity, the acoustic detectors documented a greater number of nights of bat activity versus the cameras. The results of this effort will be utilized by a graduate student at Marshall University as part of their Masters study looking at small-footed myotis activity during fall and winter. Surveys for small-footed bats were resumed during the summer of 2021.

Dr. Moosman published a manuscript (below) assessing performance of the visual survey technique and summarizing 7 years of survey data in rocky-talus slopes.

Moosman PR, Marsh DM, Pody EK, Dannon MP, Reynolds RJ. 2020. Efficacy of visual surveys for monitoring populations of talus-roosting bats. *Journal of Fish and Wildlife Management* 11(2):xx-xx; e1944-687X.

<https://doi.org/10.3996/122019-JFWM-103>



In addition to conducting small-footed myotis population monitoring efforts, Dr. Moosman worked with Nick Kalen and Dr. Mark Ford of Virginia Tech. to radio-tag a large maternity colony of small-footed myotis at Shenandoah National Park. They used temperature sensitive tags and a network of

data-logging telemetry receivers surrounding the roosting area to continuously monitor activity of pregnant and lactating bats within the colony, over a period of 2 to 3 weeks.



Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) Summer Surveys: Similar to our summer surveys for gray bats, *C.t. virginianus* population changes associated with summer roosts were assessed by conducting emergence counts using night-vision goggles for one night at each site. In addition, a Bat Call Data Recorder (BCDR) was deployed at each of the 2 known summer roosts, 1 in Highland County, and 1 in Tazewell County. Emergence counts were conducted at the two maternity sites, one each in Highland and Tazewell counties. The emergence count at the Highland County site was 703, similar to the 2020 count of 763. The count at the Tazewell site was called off due to inclement weather. While the Tazewell count was interrupted by inclement weather, the initial emergence appeared to be down, similar to 2020.

Little Brown Bat (*M. lucifugus*) Maternity Surveys: Restrictions on the handling of bats were modified for 2021 allowing research efforts to resume following strict handling guidance and adherence to Personal Protective Equipment (PPE). VDWR and partners (RU, VDCR, VT-USGS) conducted mist-net surveys at 3 little brown maternity colonies in Wythe, Rockingham, and Fauquier counties. This is a continuation of mist-netting efforts first conducted between 2012 and 2016 with the objective of assessing productivity and survivorship in little brown bats. A total of 256 *M. lucifugus* was captured including 169 adult females, 10 adult males, 36 juvenile females, 35 juvenile males, and 6 of unknown age or sex. Of the 169 adult females captured, 152 (89.9%) were either pregnant, lactating, or post-lactating. Of the 43 recaptures, 1 was a minimum of 9 years of age, 4 of 7 years of age, 5 of 6 years of age, and the remaining, 5 years of age or younger. Recaptures accounted for 24.0% of the total adult captures. These data show that of the females surviving WNS, the majority are still reproducing with proof of longevity in recaptures. Sierra Felty (RU undergrad) presented a poster at the SEAFWA conference titled “Examining Reproductive Trends in Little Brown Bats (*Myotis lucifugus*) Before and After the Onset of White-nose Syndrome.”



Hibernacula Phenology: Virginia Tech – USGS Coop Unit and partners (VDWR, VDCR, RU) are studying activity patterns, using acoustic detectors, at 12 major hibernacula supporting threatened and endangered bats. The main objective of the study is to understand the temporal use of hibernacula during autumn and spring. The secondary objective is to assess habitat use during the fall swarm period at a subset of the sites. These data will help in developing conservation buffers around hibernacula, refining the time periods, distances, and hab-

Awards and Recognition

SBDN SERVICE AWARD

Purpose: To recognize outstanding service and contributions to the Southeastern Bat Diversity Network.

Nomination Procedure: The SBDN awards committee will call for nominations in September or October of each year through the SBDN mailing list. Nominations will be submitted to the committee by December 1. Nominations can be submitted by any SBDN member, including members of the Executive Committee and the Awards Committee. Nominations will consist of a letter that describes the nominee's service to SBDN. The committee will review the nominations and evaluate them based on significance of the contributions to SBDN. One name will be forwarded to the SBDN Executive Committee for final approval by January 1. If no worthy nominees have been submitted for consideration, no name will be forwarded to the Executive Committee.

Award Process: The awardee will be announced at the SBDN annual meeting, usually held in February. A plaque will be presented to the awardee by the previous recipient or the SBDN president. The Awards committee will be responsible for obtaining the plaque and funds will be provided by SBDN. A copy of the nomination letter and pictures of the award presentation will be deposited in the SBDN archive.

SBDN LIFETIME ACHIEVEMENT AWARD

Purpose: To recognize individuals who have made significant contributions to the conservation of southeastern bats through research, education, or management efforts. The intent of this award is to recognize more senior individuals who have amassed a variety of accomplishments throughout their careers. The award is SBDN's highest honor. The award may not be given every year.

Nomination Procedure: The SBDN awards committee will call for nominations in September or October of each year through the SBDN mailing list. Nominations can be submitted by any SBDN member, including members of the Executive Committee and the Awards Committee. Nominations will be submitted to the committee by December 1. Nominations will consist of: 1) a letter that describes the nominee's accomplishments and how they have impacted bat conservation in the southeast, and 2) the nominee's Curriculum Vitae. The committee will review the nominations and evaluate them based on the totality of the accomplishments and their impact on bat conservation and/or our understanding of bat ecology. The committee will forward one name to the SBDN Executive Committee for final approval by January 1. If no worthy nominees have been submitted for consideration, no name will be forwarded to the Executive Committee.

Award Process: The awardee will be announced at the SBDN annual meeting, usually held in February. A plaque will be presented to the awardee by the previous recipient or the SBDN president. The Awards committee will be responsible for obtaining the plaque and funds will be provided by SBDN. A copy of the nomination letter, the awardees' CV, and pictures of the award presentation will be deposited in the SBDN archive.

History of the Mammal Colloquium and SBDN Meetings

COLLOQUIUM	SBDN	YEAR	LOCATION	HOST
31 st	26 th	2021	Virtual Meeting	SBDN Executive Committee
30 th	25 th	2020	Athens, GA	Georgia Department of Natural Resources
29 th	24 th	2019	Jacksonville, FL	Florida Fish & Wildlife Commission
28 th	23 rd	2018	Roanoke, VA	Joint Bat Working Group Meeting
27 th	22 nd	2017	Asheville, NC	Tim Carter, Mary Kay Clark, Katherine Caldwell
26 th	21 st	2016	Guntersville, AL	Tennessee Valley Authority
25 th	20 th	2015	St. Louis, MO	Joint Bat Working Group Meeting
24 th	19 th	2014	Nacogdoches, TX	Chris Comer
23 rd	18 th	2013	Fall Creek Falls, TN	Brian Carver
22 nd	17 th	2012	Louisville, MS	Darren Miller
21 st	16 th	2011	Louisville, KY	Tim Carter & Brooke Hines
20 th	15 th	2010	Asheville, NC	Mary Kay Clark
19 th	14 th	2009	Jonesboro, AR	Tom Risch & Blake Sasse
18 th	13 th	2008	Blacksburg, VA	Michael St. Germain
17 th	12 th	2007	Destin, FL	Jeff Gore
16 th	11 th	2006	Chattanooga, TN	Tim Carter & Troy Best
15 th	10 th	2005	Paris Landing, TN	John Nelson
14 th	9 th	2004	Helen, GA	Steven Castleberry
13 th	8 th	2003	Mississippi State, MS	Darren Miller
12 th	7 th	2002	Clemson, SC	Susan Loeb
11 th	6 th	2001	Memphis, TN	Michael Kennedy
10 th	5 th	2000	Guntersville, AL	Troy Best
9 th	4 th	1999	Wytheville, VA	Rick Reynolds
8 th	3 rd	1998	Hot Springs, AR	David Saugey
7 th	2 nd	1997	Black Mountain, NC	Mary Kay Clark
6 th	1 st	1996	Somerset, KY	Mike Lacki
5 th		1995	Cookeville, TN	Michael Harvey
4 th		1994	Athens, GA	Joshua Laerm
3 rd		1993	Mountain View, AR	Gary Heidt & Rick McDaniel
2 nd		1992	Guntersville, AL	Troy Best
1 st		1991	Memphis, TN	Mike Kennedy

Upcoming Events

Save the Date



Southeastern Bat Diversity Network
2022 Virtual Meeting
March 9 - 10

Mark your calendar for the 27th Annual Meeting of the Southeastern Bat Diversity Network and 32nd Annual Colloquium on the Conservation of Mammals in the Southeastern U.S.

We are planning a full day of activities on Thursday, March 10, and will offer the opportunity for working group leaders to hold meetings on Wednesday, March 9.

More details on the event and instructions on how to register will be forwarded soon.



2022 ANNUAL MEETING OF THE NORTHEAST BAT WORKING GROUP (NEBWG)

The Hilton Doubletree Downtown, Manchester, New Hampshire

January 12-14, 2022.



101ST ANNUAL MEETING OF THE AMERICAN SOCIETY OF MAMMALOGISTS.

June 17th – 21st, 2022

In Person and a Virtual Option

Westin La Paloma

TUCSON, ARIZONA



North American Society for Bat Research

50th Annual Meeting of the North American Symposium on Bat Research

And

19th International Bat Research Conference (IBRC)

August 7 - 12th, 2022

Downtown Hilton Austin, Austin Texas

Editors Closing Comments



ANOTHER GREAT NEWSLETTER!!!

Despite all the challenges we have all had over the past couple of years, you have all once again come through with some really interesting items from your projects.



Thank You! Thank You! Thank You!



It is my wish that each of you has a truly Merry Christmas, and that we all will have a most prosperous and productive New Year.

