



**NC Chapter of The Wildlife Society
Annual Meeting**

**“Partnerships in Habitat Conservation for
At-Risk Species”**

**YMCA Blue Ridge Assembly
Black Mountain, NC 28711
April 2-4, 2024**

2023-2024 Executive Board

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CWB® = TWS Certified Wildlife Biologist

AWB® = TWS Associate Wildlife Biologist

Annual Meeting Agenda

Tuesday, April 2nd

1:00 – 4:00 pm Concurrent Field Trips

Field Trip 1 – Tour of Cooperative Prescribed Fire Management Site on State- and Federally-owned Public Land – Jamie Tyson, USFS and Brandon Bridges, WRC

Field Trip 2 – Tour of Forest Disturbance Research Sites at Bent Creek Experimental Forest – Dr. Katie Greenberg, USFS and Dr. Susan Loeb, USFS

4:00 pm **Registration Opens (until 6pm)**

6:00 pm **Dinner**

7:00 pm Social/Poster Session/ Jam Session – Bring your own instruments

Wednesday, April 3rd

7:00 am **Registration Opens (until 8:45)**

8:00 am **Breakfast**

8:45 am Door Prizes

8:50 am Welcome

9:00 am PLENARY: Landscape-scale Conservation: Moving at the Speed of Trust - Dr. James Martin, UGA

9:45 am Application of Fire and Partnerships - Adam Warwick, TNC

10:15 am **Break (registration open)**

10:25 am Door Prizes

10:30 am From Conflict to Collaboration: Lessons Learned from the Sandhills Conservation Partnership - Jeff Marcus, TNC and Pete Campbell

11:10 am Recognizing the Significance of Private Landowners in the Restoration of Longleaf Pine - John Ann Shearer, USFWS

11:30 am When Are You Native? Exploring Shifts in Perceptions of Nativeness for Rapidly Expanding Species – Alex Jensen, NC Museum of Natural Sciences

12:00 pm Update on TWS Happenings - Dr. Lisa Muller, TWS, SE Section

12:30 pm Lunch

1:25 pm Door Prizes

1:30 pm ForestHer NC: Engaging Women in Woodland Stewardship - Kelly Douglass, USDA and Deanna Noble, NCWRC

1:50 pm **Break/Relocate (registration open)**

- 2:00 pm Concurrent Session 1 (Choose one session to attend)
Session A – Mammals
Partnership for Red Wolf Conservation and Species Recovery on the Albemarle Peninsula - Dr. Liz Rutledge, NC Wildlife Federation and Luke Lories, USFWS
Using Video Camera Footage to Understand Black Bear (*Ursus americanus*) Interactions with Hair Snare Sites – Caitlin Brett, NCSU
Session B – Herps
Headstart: Program Paves a Path to Secure the Future of Imperiled Amphibians in North Carolina - Mike Martin, NCWRC
Rattlesnakes and Community Science - Jeff Hall, NCWRC
- 2:45 pm **Break/Relocate**
2:55 pm Concurrent Session 2 (Choose one session to attend)
Session A – Forestry/Cover
Shelterwood Harvests Promote High Breeding Bird Diversity and Shrubland Species for Less Than 10 Years in Hardwood Forests - Katie Greenberg, USFS
A Preliminary Assessment of Wildlife Use of Mid- to High-Elevation Rhododendron Thickets in Western North Carolina - Aimee Rockhill, WCU
Session B – Pollinators
NC Pollinator Conservation Alliance: Promoting Conservation and Education from the Mountains to the Sea - Gabriela Garrison, NCWRC
SE Bumblebee Atlas - Laurie Hamon, Xerxes Society
- 3:40 pm **Break/Walk to Drone Demo Site**
4:00 pm Drone Demos (30 minutes at each)
Agricultural Drones for Habitat Management - Moriah Boggess, Hollow Tooth Aerial
Using Drones for Wildlife Monitoring and Habitat Change – Jonas Hattman, Connor Philips, and Elise Trexler, Carolina Drone Lab
- 5:00 pm Free Time
5:00 pm **The Corvid Club Social (more information on page 34)**
6:00 pm **Dinner**
7:00 pm Social/Auction/Raffles/Jam Session

Thursday, April 4th

- 7:00 am **Registration Opens (until 8:45)**
8:00 am **Breakfast**
8:50 am Door Prizes

8:55 am Announcements
9:00 am **NCTWS Business Meeting (detailed agenda on page 32)**
10:30 am **Break**
10:45 am Funding Partnerships:
Regional Conservation Partnership Program - Jessica Schmelz, NRCS
Uwharries to Sandhills Landscape Collaborative: Restoring Fire to Public and Private Lands Across North Carolina's Ancient Mountain Range. - Susan Miller, USFS
11:45 am Award presentations
12:15 pm Closing Remarks/ Adjourn
12:30 pm **Lunch**

Pisgah Game Land – Lake James Burn Unit

Join USFS Grandfather Ranger District Fire Management Officer Jamie Tyson and NC Wildlife Resources Commission Wildlife Forest Manager Brandon Bridges for a tour of Pisgah Game Land – Lake James Burn Unit. We will visit a Dry-Oak/ Pine-Oak Heath restoration site which has had a 40-acre timber harvest to remove offsite white pine, utilized mastication treatments, and had three prescribed burns to release oak and yellow pine. This site is heavily utilized by the public and is part of a larger fire adapted landscape along the Blue Ridge Escarpment. Tour will highlight restoration of fire adapted forest communities and reinforce the benefits of collaborative burning between agencies.

Please dress appropriately for the field (long pants, boots, etc.)

Plan to meet at the Pisgah Game Land Parking area in front of the orange gate on Lake James Road at 1PM on April 2nd.

Additional questions can be directed to Brandon Bridges at brandon.bridges@ncwildlife.org

Tuesday, April 2nd
1:00 – 4:00 pm

Bent Creek Experimental Forest Field Tour

Join US Forest Service research scientists Dr. Katie Greenberg (USFS Research Ecologist) and Dr. Susan Loeb (USFS Research Ecologist) for a tour of research at the Bent Creek Experimental Forest. We will visit various natural disturbances and forestry treatments, such as timber harvests and prescribed burns, and discuss bat, bird, reptile, and amphibian responses. We will also discuss forest food resources for wildlife, such as fleshy fruit and acorn production. Some of Greenberg's work will be highlighted in her presentation on Wednesday during the meeting.

Please dress appropriately for the field (long pants, boots, etc.) and bring a hard hat if you have one (hard hats can also be loaned if needed).

Plan to meet at the Ledford Branch parking lot at 1pm on April 2nd.

Additional questions can be directed to Katie Greenberg at cathryn.greenberg@usda.gov

Tuesday, April 2nd
1:00 – 4:00 pm

Invited Speakers

PLENARY: Landscape-scale Conservation: Moving at the Speed of Trust

JAMES A. MARTIN; PROFESSOR; Warnell School of Forestry and Natural Resources; University of Georgia; martinj@warnell.uga.edu

We are amid a conservation crisis where habitat loss is outpacing habitat protection and restoration. Ironically, there likely has never been more monies available for conservation in the history of humankind. The future of many species, communities, and biomes depends on how conservation decisions allocate those monies—decisions that are made by people, specifically groups of people. However, little thought is given to which people need or should be stakeholders which can have profound impacts on the ultimate decision. Moreover, the spatial scale of decisions is important but is often not clearly defined. In my talk I will outline how successful partnerships operate while specifically focusing on engaging stakeholders and identifying the appropriate spatial scales from conservation programs. I will use a mix of hypothetical and real-world examples for at-risk species.

Bio: James Martin is a Professor of Wildlife Ecology at The University of Georgia. He received a Bachelor of Science in Environmental Studies from the University of North Carolina at Asheville in 2003. His degree had two concentrations: Natural Resources Management and Ecology. He also minored in Economics. He went on to get a PhD from UGA in Forest Resources in 2010. At UGA he conducts research on northern bobwhites, ruffed grouse, and other species in the context of managed ecosystems mostly on private lands. He teaches courses in wildlife habitat management and conservation decision making. He currently advises 13 graduate students and four post-docs. He and his lab have published > 100 peer-reviewed publications, > 50 popular and outreach articles, and helped place over 30 graduate students and post-docs in natural resource management or science positions. Most importantly, he and his wife together raise three kids, 6 dogs, 7 pigeons, a cat, and two bee hives.

Application of Fire and Partnerships

ADAM WARWICK; SOUTHERN BLUE RIDGE – FIRE & STEWARDSHIP MANAGER -
The Nature Conservancy; awarwick@tnc.org

The diversity of the Appalachian Mountains is, in part, a result of people harnessing fire over thousands of years to promote plants and animals that provided them with food, medicine, shelter, and tools. Maintaining fire's role in the contemporary Appalachians is constrained by countless barriers. The Southern Blue Ridge Fire Learning Network was created to accelerate the pace and scale of the restoration of fire to the mountains by tackling such barriers. Collaborative partnerships that capitalize on organizations' respective strengths has made this network a model for how partnerships systematically overcoming barriers to maintain the use of fire to conserve diverse natural communities. Wildland fire management is a group effort that relies on the complementary strengths of government and non-governmental organizations to ensure risk is minimized and public supports fire management so that the process can sustain the ecological integrity of these ancient mountains.

Bio: Adam Warwick has been overseeing The Nature Conservancy's land stewardship in western North Carolina since 2012. The majority of his time and efforts has been devoted to scaling up prescribed burning on public lands to restore open woodlands to the southern Blue Ridge's pine and oak ecosystems. Adam is a NWCG Type 2 Burn Boss, and the NC Prescribed Fire Council recognized Adam as the Prescribed Burner of the Year in 2022. Adam has led multiple landscape teams on behalf of the Southern Blue Ridge Fire Learning Network.

Adam grew up in Knoxville, Tennessee and received his Bachelor of Science degree in Zoology from the University of Tennessee and then obtained a Master's of Science degree in Fisheries and Wildlife from the University of Missouri. He then spent 10 years with the Florida Fish and Wildlife Conservation Commission in overseeing wildlife management and supporting burning for Tate's Hell State Forest. Adam led the agency's response to regional human-bear conflicts and a highlight of his career was coauthoring FWC's Black Bear Management Plan. Today, he lives in Mills River, NC with his wife, Joyce, and 13 year old daughter Cameron; two Australian shepherds and two cats. In his spare time, Adam enjoys fishing, hunting, whitewater kayaking, and mountain biking.

From Conflict to Collaboration: Lessons Learned from the Sandhills Conservation Partnership

JEFF MARCUS; NC LONGLEAF APPLIED SCIENTIST; The Nature Conservancy
jmarcus@TNC.ORG and PETE CAMPBELL; 2021pvc@gmail.com

The longleaf pine ecosystem is one of the most biologically diverse in North America, and the endangered red-cockaded woodpecker (RCW) is one of its most iconic species. In the 1990s, populations of the RCW in the NC Sandhills were critically low. The largest population was on Fort Liberty (formerly Fort Bragg), but the Army did not want to alter training or land management. Private landowners mistrusted government agencies and were cutting their longleaf rather than see an endangered bird move in. It had the makings of a classic environmental conflict, until some forward-thinking people decided they had more to gain from solving the underlying problem than fighting each other. What resulted was the invention of several key programs that are now used nation-wide, the recovery of the Sandhills RCW population, and a partnership that became a model for how to do collaborative conservation. This talk will discuss how the partners overcame mistrust, how the partnership came together, and how the lessons learned can be applied to other environmental conflicts.

Bio: Jeff Marcus is a Certified Wildlife Biologist who has been working for longleaf conservation and management for the past 21 years. Jeff currently works as the NC Longleaf Applied Scientist for The Nature Conservancy in the Sandhills and previously spent 12 years working for the NC Wildlife Resources Commission. Jeff is a 2-time past President of NCTWS. He and his wife, Ellen, and two daughters serve as caretakers and preserve stewards for the Eastwood Preserve in Moore Co.

Pete Campbell retired as a Project Leader with the US Fish and Wildlife Service's (Service) National Wildlife Refuge System in 2019. For the last seven years of his federal career, he oversaw the management of three Refuges in eastern NC: Mattamuskeet, Swanquarter and Cedar Island. During his tenure with Refuges, Pete concentrated on working with local, conservation NGO, federal and state partners to develop strategies to restore the ecological integrity of Lake Mattamuskeet, the centerpiece of Mattamuskeet NWR which is a premier wintering waterfowl refuge in the Atlantic Flyway. Prior to transferring to the Division of Refuges, Pete was stationed for twelve years in the North Carolina Sandhills where he served as the Service's Sandhills Red-cockaded Woodpecker Recovery Biologist and the coordinator for the North Carolina Sandhills Conservation Partnership. Pete graduated in 1979 from North Carolina State University (NCSU) with a BS in Fisheries and Wildlife Science. He held various wildlife and fisheries research positions at both NCSU and Penn State University prior to entering federal service in 1991. Over his 28-year career as a manager and wildlife biologist with the Department of Interior Pete has worked for the Service's Refuge and Ecological Services Divisions as well as the U.S. Geological Survey's Biological Resources Division. He also served as Executive Director of the Fort Bragg Regional Land Use Advisory Commission from 2019 to 2021. Since 2000, his work has focused on collaborating with partners to develop and implement landscape conservation initiatives at national, regional, state, and local scales.

Recognizing the Significance of Private Landowners in the Restoration of Longleaf Pine

JOHN ANN SHEARER; PARTNERS FOR FISH AND WILDLIFE CONSERVATION FOR NORTH CAROLINA; USFWS; johnann_shearer@fws.gov

Ninety percent of North Carolina's land is in private ownership. The role of private landowners in longleaf pine restoration is extremely important, not only for the ecosystem itself, but for the landowners and their families. In this talk, John Ann Shearer will demonstrate how private landowners have played a significant role in longleaf pine restoration in North Carolina over the last 25 years in conjunction with the US Fish & Wildlife Service's Partners for Fish and Wildlife Program. Many of these landowners are now models for their neighbors.

Bio: John Ann Shearer has served as the State Coordinator for the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program in North Carolina since 1999. Earlier in her career, she spent 9 years in refuge management at Wheeler Refuge in Alabama, Upper Souris Refuge in North Dakota, and Mattamuskeet Refuge in North Carolina. She has a bachelor's degree in biology from the University of North Carolina at Chapel Hill and a Master's in Wildlife Management from West Virginia University. John Ann spends most of her restoration and management work focused on longleaf pine and prescribed fire.

When Are You Native? Exploring Shifts in Perceptions of Nativeness for Rapidly Expanding Species

ALEX JENSEN; POST-DOC; NC Museum of Natural Sciences; ajjensen@ncsu.edu

How humans perceive species influences their management and conservation. This is particularly true for perceptions of nativeness – species viewed as non-native are often subject to campaigns to control their spread. Yet as time passes, many of these non-native species become established and shifts in attitudes towards these species likely occur. However, very little is known about what shapes these shifts in attitudes or how quickly they occur. To better understand this, we surveyed 1000 people across the southeast and asked them 1) how long until they would consider a non-native species to be native, and 2) whether or not they viewed coyotes (*Canis latrans*) and armadillos (*Dasypus novemcinctus*) as native. We found that just under half of respondents (47%) would ever consider a non-native species to be native, and those respondents said they would consider species native after 106 years (the median). We tested several hypotheses and found that age best explained these attitudes, with younger respondents saying it would take less time to view species as native. For coyotes and armadillos, we classified respondents according to how long since each of these species arrived and found that attitudes showed clear spatial structuring in line with colonization. Specifically, the percentage of respondents who viewed coyotes and armadillos as native increased by 3-7% for every 10 additional years they had been present. Thus, although these mammals have expanded rapidly across the southeast, our findings suggest that perceptions can also rapidly shift. Given the importance of public perception to wildlife management and conservation, these findings could be useful for anyone interested in better understanding the human dimensions of non-native species, both in North Carolina and beyond.

Bio: Alex is currently a postdoctoral associate at the North Carolina Museum of Natural Sciences working Roland Kays and Liz Kierepka (among others). His primary research interests are in community ecology, human-wildlife interactions, and equity within the environmental sciences. For his postdoctoral work, Alex is focused on large-scale ecology and evolution of mammals in North America. However, the work he is presenting on at NC TWS this year is from a collaboration with other researchers at Clemson University, where he completed his PhD.

Update on TWS Happenings

LISA MULLER; SOUTHEASTERN SECTION TWS REPRESENTATIVE;
lmuller@utk.edu

There was a great plenary session on communicating science and dealing with mistrust at the recent meeting in Louisville. We need to build trust and relationships in our communities and share the great work we do for wildlife conservation. Bob Lanka took over as our new President of TWS. Executive leadership is passionate about shared governance and has been working hard to move TWS forward with the work on the Strategic Plan. I appreciate all of you who took the survey, were members of focus groups, and served on the Strategic Planning Committee. Most of TWS work the next couple of months will be to finalize the plan and start work on implementation.

I am always impressed with the amount of work the Government Affairs staff do behind the scenes. They are very active with congressional offices and engagement with governmental and nonprofit agencies to prioritize wildlife issues. For example, TWS is working hard to make sure our Wildlife Coop Units are adequately funded to complete their mission.

Paul Krausman will be stepping down from his editorial position from the Journal of Wildlife Management. At the March Council meeting, a new Editor in Chief will be discussed and voted on for the upcoming year.

We are looking to see how TWS Certification could be more effective for applicants and more useful for employers. Are current requirements keeping up with all the needs of the profession? How can we make requirements more inclusive but at the same time make sure we keep certification special.

Bio: Lisa works at the University of Tennessee as a professor of wildlife biology. She works on mammalian ecology and management with particular emphasis on deer and elk. She received a BS and MS from Auburn University and a PhD from University of Georgia. Lisa is currently serving as the Southeastern Section of TWS representative to TWS Council. Lisa is a Fellow with TWS and enjoys working with all the amazing professionals.

ForestHer NC: Engaging Women in Woodland Stewardship

KELLY DOUGLAS; WILDLIFE DISEASE BIOLOGIST; USDA Kelly.Douglass@usda.gov
and DEANA NOBLE; WILDLIFE CONSERVATION BIOLOGIST; NCWRC
Deanna.Noble@ncwildlife.org

According to the Women Owning Woodlands network and data published in the National Woodland Owners Survey, “the percentage of family forest ownerships where a woman is the primary decision maker doubled from 2006 to 2013. These women make decisions for 44 million acres of America’s family forest land.” In North Carolina, 65 percent of private forestland is jointly owned by women, yet statistics shows that women are significantly less likely to attend conventional landowner programs and participate in management activities. Research shows women are starting to have a greater influence on private lands management; to address this trend, a group of natural resource professionals and woodland owners, most of whom were women, met in January 2019 to develop a strategy for engaging North Carolina women woodland owners in forest conservation. That meeting resulted in the establishment of a new initiative, ForestHer NC, which seeks to provide scientifically-based forest stewardship information, connect women with each other and with professional resources in their communities, build a community of women landowners and natural resource professionals, and positively impact conservation on private woodlands. The program is specifically designed to appeal to women and engage them in conservation practices, with the ultimate goal of fostering a sense of community among participants, providing them with an opportunity to learn from others in a positive, encouraging environment, and ultimately helping them reach their conservation goals. Program accomplishments have been extraordinary and are being shared to help foster the development of similar programs in other areas. ForestHer NC partnering organizations include Forest Stewards Guild, American Forest Foundation, NC Forest Service, NC State Extension Forestry, NC Tree Farm Program, NC Wildlife Resources Commission, Sustainable Forestry and African American Land Retention Network, Black Family Land Trust, and USDA Wildlife Services North Carolina.

Bio: Kelly Douglass currently serves as the Wildlife Disease Biologist with USDA APHIS Wildlife Services in North Carolina and is responsible for planning, coordinating, and implementing wildlife disease surveillance and monitoring programs statewide, including emergency preparedness and response. She is a TWS Fellow, Certified Wildlife Biologist, Certified Environmental Educator, and an alumna of the TWS Leadership Institute. She holds a BS degree in Fisheries and Wildlife Sciences from NC State University in 2002, and a MS degree in Fisheries, Wildlife, and Conservation Biology from NCSU in 2011.

Deanna Noble is the Wildlife Conservation Biologist for District 2 with the North Carolina Wildlife Resources Commission. She provides technical assistance to develop, implement, and monitor wildlife and habitat conservation efforts on private lands in the central part of the coastal region. She holds a BS degree in Fisheries and Wildlife Sciences from NC State University in 2000. Deanna has been working for the North Carolina Wildlife Resources Commission since 2002, holding positions of wildlife technician, forest stewardship biologist, technical assistance biologist, and currently wildlife conservation biologist.

Partnership for Red Wolf Conservation and Species Recovery on the Albemarle Peninsula

LIZ RUTLEDGE; VP OF WILDLIFE RESOURCES; NC WILDLIFE FEDERATION
liz@ncwf.org and LUKE LOLIES; WILDLIFE BIOLOGIST; USFWS
luke_lolies@fws.gov

Red Wolves were once found throughout the eastern seaboard from Pennsylvania to Florida and as far west as Texas. Today, North Carolina's Albemarle Peninsula is home to the only known population of wild Red Wolves in existence. While Red Wolves play a vital and unique biological role within their ecosystem, the species has declined precipitously in recent years to an estimated 20-22 individuals. Habitat loss, wolf-vehicle collisions, gunshot mortality, and hybridization with coyotes continues to threaten the future of Red Wolves in North Carolina. As a result, the US Fish and Wildlife Service partnered with the North Carolina Wildlife Federation to promote red wolf recovery. The partnership between the federal agency and NGO has made significant advances in Red Wolf recovery efforts through implementation of the Prey for the Pack habitat improvement program for private landowners, outreach and education efforts at the Red Wolf Education and Health Care Facility in Columbia, installation of cameras streaming 24/7 video of captive Red Wolves at the facility, and the construction of acclimation pens for Red Wolf releases into the wild. The partnership improved the services at Pocosin Lakes National Wildlife Refuge Visitor's Center to grow interest in wildlife and habitat of the area, with a special focus on Red Wolves. In addition, the partnership supports ongoing efforts to reduce Red Wolf-vehicle collisions using electronic wildlife crossing message boards and within the confines of the national wildlife refuges, the partnership supports Red Wolves through implementation of a Firebreak project and restoration of Atlantic White Cedar, which also creates habitat for other Species of Greatest Conservation Need.

Bio: Dr. Liz Rutledge is the VP of Wildlife Resources at the NC Wildlife Federation. Her work focuses on wildlife conservation, management, advocacy, and policy. Liz has worked with numerous species including white-tailed deer, Canada geese, and red wolves, and enjoys helping introduce people to outdoor recreation. She's a Certified Wildlife Biologist and serves on the NC Wildlife Resources Commission's Nongame Wildlife Advisory Committee, on the NC Chapter of the Wildlife Society's Executive Committee and Conservation Affairs Committee and is the current President of NC Hunters for the Hungry. She has a BS in Biology, MS in Natural Resources, and a PhD in Fisheries, Wildlife, and Conservation Biology.

Luke Lolie is a Wildlife Biologist with the US Fish and Wildlife Service. Since 2020, his role he has been in a shared position with the Partners for Fish and Wildlife and Red Wolf Recovery Programs. Prior to 2020, Luke spent 3 years working for the NC Wildlife Resources Commission as a Wildlife Conservation Technician and then as a Technical Assistance Biologist. Luke's experience has primarily been focused in the coastal plain of NC on restoration and enhancement of early successional plant communities, longleaf pine, and wetlands. He serves as a Co-chair for the NCTWS Program Committee and as a committee member of the Professional Development Committee. He has an Associate's Degree from College of the Albemarle and a Bachelor's Degree in Fisheries, Wildlife, and Conservation Biology from North Carolina State University (Go Pack!).

Using Video Camera Footage to Understand Black Bear (*Ursus americanus*) Interactions with Hair Snare Sites

CAITLIN BRETT; RESEARCH ASSISTANT; NCSU ckbrett@ncsu.edu

Non-invasive sampling via baited barbed wire hair snares is a well-established and effective method for collecting genetic data from wildlife populations, particularly black bears (*Ursus americanus*). Hair samples provide information on population demographics and genetic structure but are blind to fine-scale temporal patterns (e.g., when bait is accessed or hair deposition occurs between weekly checks) and behavioral mechanisms (e.g., snare or wire avoidance) that may affect hair deposition rates.

Camera trapping is a resource-effective and non-invasive approach to provide temporal and behavioral information. Camera footage alone is often insufficient to distinguish between individuals over multiple visits, but it can identify family units and quantify distinct bear-snare encounter events. These interactions can then be analyzed to contextualize weekly hair sample data.

The objectives of this study are to pilot methods of processing and classifying video camera data that may improve our understanding of mechanisms affecting hair snare sampling data. This is part of a larger project using hair snares to study the coastal NC black bear population.

Bio: Caitlin is currently managing the Coastal Black Bear Project as a research assistant at North Carolina State University. She completed her undergraduate degree at the Ohio State University before working for several years on various engineering, landscape planning, wildlife biology, and ecological research projects across the U.S. She went on to earn her M.S. from the University of Texas Rio Grande Valley, researching the effects of wildlife road-crossing structures on habitat connectivity for the endangered South Texas ocelot and associated wildlife community.

Headstart: Program Paves a Path to Secure the Future of Imperiled Amphibians in North Carolina

MIKE MARTIN; WILDLIFE CONSERVATION TECHNICIAN; NCWRC

michael.martin@ncwildlife.org

Abstract: The southeastern US is home to a number of imperiled amphibians, such as the Gopher Frog (*Rana capito*). While habitat management continues improving to better support wildlife needs, maintaining stable populations continues to be a challenge. Headstart programs for wildlife aim to improve recruitment of younger, more vulnerable life stages by providing predator-free environments in captivity for later release with the goal of improved survivorship. In 2016, NC Wildlife Resources Commission staff established a partnership with the NC Zoo to headstart Gopher Frogs in the sandhills region. Together, these partners help add more tools, better address problems, and accommodate needs from different perspectives tackling a common concern, paving a path forward to similar work on other properties and different species.

Bio: Mike Martin has had a lifelong fascination with reptiles and amphibians. He received a Bachelor's Degree in Zoology from NC State University in 2005 and has been working with monitoring and managing reptiles and amphibians in the Carolinas since 2007. He began working for NC Wildlife Resources Commission in 2017 with a major focus on Gopher Frogs. Mike has served as NC Herpetological Society's President since early 2021 and continues working for NCWRC to conserve the state's wildlife through monitoring and applied management.

Rattlesnakes and Community Science

JEFF HALL; HERPETOLOGIST; NCWRC Hall, jeff.hall@ncwildlife.org

In 2009, the NC chapter of Partners in Amphibian and Reptile Conservation (NCPARC) developed a brochure called “Rattlesnake Sightings Wanted” and began handing them out at public events. While a few submissions trickled in over the years, during spring and summer of 2020, staff received over one hundred sightings from the public. These reports led to over seventy new rattlesnake locations for both Timber and Pigmy Rattlesnakes. This community science effort bloomed even further in 2021 with nearly 300 sightings reported, and similar numbers reported in 2022 and 2023! I’ll share details of this project including interesting behaviors witnessed, habitat evaluations and conservation, and trail camera work.

Bio: Jeff Hall has been employed with the North Carolina Wildlife Resources Commission (NCWRC) for 17 years and holds a BS in Biology from Wake Forest University and an MS in Biology from East Carolina University. As state herpetologist for the NCWRC, Jeff’s duties include serving as the Partners in Amphibian and Reptile Conservation (PARC) Biologist and working statewide with landowners to promote habitat management that benefits reptiles and amphibians as well as other wildlife species. With over 25 years of rattlesnake experience, Jeff works on monitoring, research, and conservation efforts for each of North Carolina’s three rattlesnake species.

Shelterwood Harvests Promote High Breeding Bird Diversity and Shrubland Species for Less Than 10 Years in Hardwood Forests

KATIE GREENBERG; RESEARCH ECOLOGIST; USFS cathryn.greenberg@usda.gov

Some bird species are associated with mature closed canopy forest; others require open, young forests created after substantial overstory reduction by natural or silvicultural disturbances. Yet, few are sufficiently long-term to assess changes in breeding bird communities and species abundance over time as young forests mature. We surveyed breeding bird communities most years over a 17-year period (2000-2016) along 200 x 50-m strip transects in 16 mature forest stands (M) and 15 young 2-age stands created by shelterwood-with-reserves regeneration cuts (SW) (1998-1999). Total species richness was greater in SW than M. Total bird abundance was also greater overall in SW than M but did not differ from M by 2011. Abundance of most tested species was greater in SW or did not differ between treatments. Ovenbirds (*Seiurus aurocapilla*) were an exception, with fewer in SW than M; a trend of increasing abundance in SW was evident by 2009. Abundance of indigo buntings (*Passerina cyanea*), chestnut-sided warblers (*Setophaga pensylvanica*), Carolina wrens (*Thyrothrus ludovicianus*), and eastern towhees (*Pipilo erythrophthalmus*) was greater in SW than M overall but decreased in SW over time as young trees grew taller. These species differed in their timing of decreased abundance over the 17-year period, suggesting that subtle differences in forest development and structure affected them differently. Our results indicate that early successional forests promote greater abundance and diversity of birds, and suitable habitat for disturbance-dependent species for <10 years post-harvest. Continual disturbances are needed to maintain a forest landscape with a mosaic of age classes and structural heterogeneity that promotes breeding bird diversity at multiple scales.

Bio: Cathryn (Katie) H. Greenberg is a Research Ecologist with the Upland Hardwood Ecology and Management Research Work Unit, USDA Forest Service Southern Research Station at the Bent Creek Experimental Forest in Asheville NC. She received her MS from the University of Tennessee and her PhD from the University of Florida, where she studied the ecology of sand pine scrub in Ocala National Forest. Her current research focuses on developing information and tools that are useful to forest managers and planners. Research areas include (1) effects of prescribed fire and wildfire, mixed-oak regeneration harvests, and other forest management practices on reptile, amphibian, and breeding bird communities; (2) production of forest food resources, such as native fleshy fruit and hard mast, in relation to forest types and silvicultural disturbances; (3) long-term monitoring of amphibian populations in longleaf pine-wiregrass sandhills in relation to forest health and climate change. She has co-edited books on early successional habitats, natural disturbances, and fire ecology and management in US forests.

A Preliminary Assessment of Wildlife Use of Mid- to High-Elevation Rhododendron Thickets in Western North Carolina

AIMEE ROCKHILL; ASSOCIATE PROFESSOR; WESTERN CAROLINA UNIVERSITY
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The Southern Appalachians have seen range contractions of native evergreen tree species such as red spruce (*Picea rubens*) and hemlock (*Tsuga spp.*), with climate change and insect damage being the main drivers of these losses. Concurrently, native evergreen shrubs such as *Rhododendron maximum* and *Rhododendron catawbiense* (hereafter 'Rhododendron') have expanded their range. Evergreen trees and shrubs are critical for many wildlife species, providing thermal cover and refuge from predators, especially in winter months when deciduous trees and shrubs no longer fill this role. Although Rhododendron are estimated to cover 30 million hectares of the Southern Appalachians, little is known about wildlife diversity or richness of this cover type. The goal of this study was to perform a preliminary assessment of ridge-top Rhododendron thickets to assess mammalian diversity and richness. We selected 5 study sites across Jackson County, North Carolina based on total the homogenous area of ridge top rhododendron thickets. Study site elevation ranged from 2,570 feet to 5,476 feet with 2 sites being below 3,500 feet and 3 sites being above 4,088 feet. We placed 5 camera traps at least 200 meters apart in each study area. Cameras were deployed during winter of 2022 and checked every 3 months for 1 year. We captured 2,348 sequences of 24 identified species; 15 mammals, 8 birds, and 1 reptile. Notable captures include grouse 4 sites around 5,000 feet in elevation, flying squirrel (*Glaucomys spp.*) at 3 sites above 4,500 feet in elevation, and a long-tailed weasel. We will present final results on diversity and richness across all 5 sites with recommendations for future studies. Further, we highlight the importance in identifying areas of rhododendron that may serve as corridors for wildlife movement and allow flexibility in conservation strategies with climate change and range contractions of Southern Appalachian evergreen species.

Bio: Dr. Aimee Rockhill is an Associate Professor and incoming Program Director of the Natural Resource Conservation and Management Program at Western Carolina University. She received her PhD in Fisheries, Wildlife, and Conservation Biology and MS in Forestry from NCSU. Dr. Rockhill teaches Introduction to Wildlife Ecology and Management, Wildlife Research and Survey Techniques, Mammalogy, Applied GIS, and Senior Capstone. Her broad research interest is in better understanding anthropogenic disturbances on vertebrate population dynamics. She is especially interested in understanding how our land-use and management practices impact predator/prey dynamics, resource partitioning of sympatric carnivores, and spatio-temporal land cover use of vertebrates.

NC Pollinator Conservation Alliance: Promoting Conservation and Education from the Mountains to the Sea

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Pollinating insects, birds, and mammals are essential components to a healthy and diverse ecosystem. From an economic perspective, 2/3 of our crops rely on pollinators. From an ecological stance, over 85% of flowering plants are dependent upon their services. North Carolina is home to a myriad of pollinators, including 560 species of native bees, 177 species of butterflies, 2,800+ species of moths, 1 hummingbird, and countless wasps, flies, and beetles. The NC Pollinator Conservation Alliance is a partnership representing more than 25 conservation organizations, including government agencies, non-governmental organizations, academic institutions, and private entities. The primary mission of this group is to support the health and diversity of pollinators in North Carolina through education as well as protection, restoration, and creation of habitat. In 2017, members of this group convened to discuss best management practices for pollinator friendly landscapes on solar farms. Seven years later, we have broadened our reach to include many more initiatives such as outreach, research, native plant resources, and pesticide stewardship.

Bio: Gabriela Garrison is the Eastern Piedmont Habitat Conservation Coordinator for the NC Wildlife Resources Commission. She works with developers, consultants, and government agencies to produce ecologically friendly guidance that minimizes impacts to wildlife and priority habitat in a developing landscape. She also works in support of the Green Growth Toolbox, a non-regulatory guide that provides the appropriate tools for NC towns, cities, and counties to grow while conserving wildlife and natural resources. She earned a B.S. in Zoology, with a minor in Forestry, from NC State University and an M.S. in Wildlife Ecology from Virginia Tech. In 2017, she formed the NC Pollinator Conservation Alliance (NCPA), a partnership that works to promote pollinator and habitat conservation across the State. For more information on the NCPA, please visit www.ncpollinatoralliance.org.

SE Bumblebee Atlas

LAURIE HAMON; ENDANGERED SPECIES CONSERVATION BIOLOGIST; XERCES SOCIETY laurie.hamon@xerces.org

The southeastern US is home to at least fifteen species of bumble bee, including five Species of Greatest Conservation Need (SGCN). Little is known about the distribution, habitat needs, and abundance trends of many bumble bee species, making conservation efforts difficult. To fill this gap in knowledge, the Southeast Bumble Bee Atlas recruits community scientists in North Carolina, South Carolina, Georgia, and Tennessee to conduct non-lethal bumble bee surveys throughout the region. In 2023 - the project's first year - community scientists conducted over 200 surveys and recorded over 2,000 individual bumble bees, including 200 sightings of SGCNs. Efforts in 2024 will focus on historically under-surveyed areas. Findings from this effort help inform State Wildlife Action Plans and provide insight into the conservation needs of rare bumble bee species.

Bio: Laurie Hamon is an Endangered Species Conservation Biologist with the Xerces Society for Invertebrate Conservation, and lead coordinator for the Southeast Bumble Bee Atlas. She earned her PhD at North Carolina State University, where she studied the pollination ecology of Venus flytraps. Her research interests focus on plant-pollinator interactions through a conservation lens.

Agricultural Drones for Habitat Management

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The availability and performance of specialized drones on the market is quickly developing, creating endless opportunities for their use in conservation applications. Large agricultural spray drones are capable of carrying heavy payloads and treating as much as 50 acres in an hour. These unmanned aircraft provide a viable alternative to fixed-wing and helicopter herbicide applications without the expense and space constraints of these larger aircraft. The availability of agricultural spray drones for invasive species control, moist soil management, brush control, and site prep applications could provide a viable alternative to ground equipment. In this session we will conduct a spray demonstration using a 16 liter agricultural drone and discuss the federal and state licenses required to operate these heavyweight drones for herbicide application. We will provide a comprehensive talk on the limitations and applications of these large drones for applying liquid and granular payloads across the landscape, and we will discuss how the American Security Drone Act affects the use of drones by federal agencies and their grantees.

Bio: Moriah is from North Carolina and earned his BS and MS in wildlife science from North Carolina State University and Mississippi State University, respectively. He previously worked for the NCWRC and Indiana DNR and is now a deer biologist for Wildlife Investments, a private wildlife management company based in Mississippi. Moriah also runs his own aerial herbicide application business, Hollow Tooth Aerial, which services several eastern and midwestern states.

Using Drones for Wildlife Monitoring and Habitat Change

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The Carolina Drone Lab (CARDNL) serves as a collaborative space and knowledge hub that facilitates the innovative use of drones and sensors to solve environmental and societal challenges. Applications include establishing high precision GPS baselines for understanding current conditions and change over time, tracking disturbance impacts, providing data to inform restoration projects, and filling data gaps on a project-level scale. Drones allow a unique perspective for prescribed fire research and create better situational awareness on fire progression and crew location via airborne RGB and thermal imaging cameras. In addition, drones also assist in judging burn effectiveness by comparing pre and post burn orthomosaics. Drones also improve wildlife monitoring in a variety of methods. For example, while ground-based acoustic monitoring is effective, coupling recorders on drones with ground sensors creates new perspectives that allows for more accurate and precise monitoring of species and their behaviors such as bat in-flight social calls. We can also create habitat maps and classifications on a centimeter level scale, allowing researchers to gain a better understanding of the supporting ecosystem. RGB sensors provide an abundance of information, but drones are also capable of carrying multispectral cameras which can provide an overview of vegetation health via the Normalized Difference Vegetation Index (NDVI).

Bio: Jonas Hattman is an Environmental Science and GIS major at UNC Chapel Hill. He is currently a researcher with Carolina Drone Lab (CARDNL), UNC's drone lab. He is part of the Currituck Sound project, where he is using drone platforms for monitoring and restoring marsh environments.

Connor Philips is a Geography and Environmental Studies student at UNC Chapel Hill. Growing up in Fletcher, NC the Southern Appalachians have always been his home. Conner's expertise and focus are on the application of remote sensing, especially drones, for environmental research and conservation efforts. Specifically, Connor's research involved utilizing drones to fly migratory bird tracking tags to test signal strength of MOTUS towers. As well as using drones to assist in a study on rehabilitating wetlands by taking photos, videos and maps.

Elise Trexler is a student at UNC Chapel Hill focused on Sustainability, Journalism, and German. Elise grew up in Hendersonville, NC, where she developed a passion for the environment after being surrounded by the mountains. Elise's research was focused in western North Carolina where she utilized drones as tools to test the accuracy of MOTUS towers. Elise is currently an Environmental Education and Agriculture Assistant at the Durham Public Schools Hub Farm. After this semester, she hopes to serve in a position where she can combine her communication skills with environmental science to better the public's understanding of environmental issues.

Regional Conservation Partnership Program

JESSICA SCHMELZ; RCPP COORDINATOR; Natural Resource Conservation Service
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The Regional Conservation Partnership Program (RCPP) is a partner-driven approach to conservation that funds solutions to natural resource challenges on agricultural land. RCPP projects may include a range of on-the-ground conservation activities implemented by farmers, ranchers, and forest landowners. These activities include Land management/land improvement/restoration practices; Land rentals; Entity-held easements; United States-held easements; and/or Public works/watersheds. A single RCPP project application can propose to employ any combination of these eligible activity types as part of an RCPP project. Successful RCPP projects embody the following core principles: (1) Impact—RCPP applications must propose effective and compelling solutions that address one or more natural resource priorities to help solve natural resource challenges. Partners are responsible for evaluating a project's impact and results. (2) Partner Contributions—Partners are responsible for identifying any combination of cash and in-kind value-added contributions to leverage NRCS's RCPP investments. (3) Partnerships and Management—Partners must have experience, expertise, and capacity to manage the partnership and project, provide outreach to producers, and quantify the environmental outcomes of an RCPP project. By leveraging collective resources and collaborating on common goals, RCPP demonstrates the power of public-private partnerships in delivering results for agriculture and conservation. Recently RCPP has been critical to conserving natural resources in the state of North Carolina. As of 2023, North Carolina RCPP projects have funded over 120 applicants more than \$12 million dollars covering over 15,000 acres. This presentation will give an overview of RCPP and the steps from developing a successful proposal to work on the ground.

Bio: Jessica Schmelz currently serves as the RCPP Coordinator for the Natural Resources Conservation Service in Raleigh, North Carolina, and has worked with the agency for 21 years. Ms. Schmelz started with the USDA Natural Resources Conservation Service (NRCS) in 2002 as a Soil Conservationist in Petaluma, California serving the agricultural community of Marin and Sonoma Counties. In 2010, she moved to Kailua Kona, Hawaii to become the District Conservationist for the Kealahou Service Center on the Big Island of Hawaii. In 2020, Jessica joined the Programs team in North Carolina and became the RCPP Coordinator. She has worked with a wide variety of partners developing and managing RCPP agreements across the state including land management agreements, entity-held easement agreements, and alternative funding arrangements. Jessica received a Bachelor of Science in Soil Science and Bachelor of Arts in Native American Studies from the University of California, Berkeley, and a Master of Science in Soil Science from the University of Wisconsin, Madison. A native of Los Angeles, California, Jessica enjoys hiking with her dog Charlie and cooking for friends and family.

Uwharries to Sandhills Landscape Collaborative: Restoring Fire to Public and Private Lands Across North Carolina's Ancient Mountain Range

SUSAN MILLER; DISTRICT RANGER; US Forest Service, susan.l.miller@usda.gov

The Joint Chiefs' Landscape Restoration Partnership is an initiative within the U.S. Department of Agriculture that enables the Natural Resources Conservation Service (NRCS) and the U.S. Forest Service (Forest Service) to collaborate with agricultural producers, forest landowners, tribes and public land managers to invest in conservation and restoration at a big enough scale to make a positive difference. Working in partnership, and at this scale, helps reduce wildfire threats to communities, protect water quality and supply, and improve wildlife habitat for at-risk species.

Bio: Susan Miller is the District Ranger on the Uwharrie National Forest located in central North Carolina. Her primary responsibility includes the oversight and support of staff that manages nearly 52,000 acres. Activities on the Uwharrie National Forest include timber management, prescribed fire, cultural resource inventory and protection, and many recreational activities such as fishing, hiking, mountain biking, camping, equestrian trail riding, and off-road vehicle trail use. Susan came to the U.S. Forest Service in December of 2020 after working for 21 years as a Fish and Wildlife Biologist with the U.S. Fish and Wildlife Service in the NC Sandhills of North Carolina and before that spent more than 6 years as a Biological Science Technician working on Fort Bragg (now Fort Liberty). Susan graduated from the University of Washington with a degree in zoology. She and her husband have two grown daughters and live on a small farm in a 120-year old farmhouse in southwest Moore County. She and her family are actively involved in habitat restoration on their farm where they have planted native warm-season grasses and longleaf pine to promote wildlife habitat. She also enjoys spending time training and competing with her dogs in a variety of dog sports.

Posters

Temporal patterns in cyprinid abundance within tributaries of the upper Little Tennessee River

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Whitetail Shiner (*Cyprinella galactura*) are a species of cyprinid minnow that often co-occur with federally listed Spottfin Chub (*Erimonax monachus*) within the mainstem Little Tennessee River. There have been reports of *C. galactura* movement from the mainstem Little Tennessee into tributary streams during the fall months, but little work has been done to validate these claims or investigate potential drivers of seasonal movement. In an effort to better understand the temporal dynamic of stream fish communities throughout the Little Tennessee watershed, we conducted weekly seine net surveys in three tributary streams throughout the months of August-November. We also collected temperature and discharge measurements at each of our sites to identify any linkages with cyprinid movement. We counted all sampled fishes, and normalized densities as catch per 100 m². We sampled high densities of Warpaint Shiner (*Luxilus coccogenis*) and Tennessee Shiner (*Notropis leuciodus*) across all sampled sites, and noted large numbers of non-native Yellowfin Shiner (*Notropis lutipinnis*) in sampled tributaries upstream of Lake Emory dam. There was no significant linkage between *C. galactura* catch per 100 m², temperature, and discharge, but we noted an uptick in *C. galactura* observations throughout the fall months when comparing our data with summer sampling data collected by Mainspring Conservation trust's aquatic biomonitoring program. Through better understanding cyprinid movement patterns throughout the Little Tennessee basin, we aim to bolster future efforts in stream restoration and watershed connectivity.

Temporal variation in the frequency of alternative reproductive tactics in an Appalachian salamander

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Blue Ridge Two-Lined Salamander (*Eurycea cf. wilderae*) males display one of two alternative reproductive tactics (ARTs). Males display either a “searching” or “guarding” morphology, each possessing distinct physical and behavioral traits and occupying distinct micro-habitats. Searching males have cirri (elongated nostril appendages), pheromone-secreting mental glands, and prominent premaxillary teeth, all of which are better-suited for seeking out females in terrestrial habitats. Guarding males have enlarged jaw musculature to guard aquatic nesting sites from competitors. While recent studies have shed light on the morphological and behavioral traits associated with these ARTs, the evolutionary mechanisms that maintain the polymorphism are not yet fully understood. Here, we initiated a long-term study by using a genetic assay to conduct a comprehensive survey of a population of *Eurycea cf. wilderae* at Highlands Biological Station. We estimated sex ratio and the relative frequency of ARTs, and we evaluated evidence for temporal change in these parameters from 2022 to 2023.

Evaluating wetland health within degraded and reference wetlands along the little Tennessee river, utilizing wildlife species richness and activity level

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Wetlands are key ecosystems in regulating the environment through water purification, flood control, and providing habitats for many endemic species. Despite this, there is a long history of wetland destruction or degradation in the southern Appalachian Mountains, resulting in the need for restoration to re-establish those vital ecosystem services. We performed vegetation surveys, collected bird and frog audio data, and analyzed trail camera footage from four degraded and two reference wetlands in the floodplain of the Little Tennessee River in western North Carolina to understand how restoration might impact species richness. Although our data can provide a robust baseline for future studies, we were unable to detect significant differences in species richness and activity level between reference and degraded wetlands but did see a difference in avian activity level among our sites.

The BatPack: A citizen science approach to studying bats along the Appalachian National Scenic Trail

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Bat populations have been sharply declining across the U.S., including the Southern Appalachian region due to climate change, habitat destruction, and the introduction of White-nose syndrome (*Pseudogymnoascus destructans*) to bat roosts and hibernacula. Of the 13 species of bats present in the Southern Appalachians, nearly half are federally endangered, threatened, or at risk. Effective species management requires accurate species information, and we lack information about bat activity and habitat preferences along the Appalachian National Scenic Trail (ANST). The Batpack is a citizen science approach to studying bats along the southern portion of the ANST. Using acoustic monitors, set out overnight at campsites along the trail, we record bat calls, which provide information about behaviors, habitat preferences, and population dynamics. The project functions as an accessible and non-invasive method for engaging volunteers to connect to a long-term monitoring project, as well as learn about the necessity of species conservation. In Summer 2023, we covered over 100 miles of the ANST across 8 weekend trips. Surveying between north Georgia and southwestern Virginia, we collected information from 13 bat species. We hope to continue the Batpack as a long-term monitoring project to collect bat information as well as monitor changes in species composition across different seasons and years.

Harvest susceptibility of white-tailed deer across an urbanization gradient

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Hunting is an important population management tool for many wildlife species, but it can be challenging in urbanized areas due to decreased parcel size, municipal policy, and loss of huntable lands. White-tailed deer (*Odocoileus virginianus*) are a widespread and economically important species common in urbanized landscapes. Areas of high deer abundance can lead to negative interactions with humans through damage to landscape ornamentals or vehicle collisions. Our objectives are to 1) identify predictors of harvest susceptibility of white-tailed deer and 2) determine whether predictors change across an urbanization gradient. To do this, we are monitoring white-tailed deer along an urban-to-rural gradient in Durham County, North Carolina from 2022-2024. We use GPS collars that take fixes on a 2-hour interval and notify in the event of mortality including hunter harvest. We will estimate a seasonal home range for individuals from September-December (harvest season) and evaluate covariates influencing harvest susceptibility, including sex, age, seasonal home range size, and huntable lands within the seasonal home range. Of 63 collared individuals entering the 2022 harvest season, 16 were harvested (16/63; 25%), with harvest rates of males (12/29; 41%) higher than females (4/34; 12%). We had 90 individuals collared entering the 2023 harvest season, which is ongoing. In 2024, we plan to capture and monitor harvests of additional individuals. Our approach will quantify drivers of white-tailed deer harvest susceptibility across an urbanization gradient and predict implications using future landscape projections. Results will inform managers of the effects urbanization has on the harvest of white-tailed deer and provide important insights for future management approaches.

Effects of visitor exposure on zoo-housed red wolf behavior

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Red wolves (*Canis rufus*) are critically endangered, where 95% of the current population resides under human care. The leading causes of mortalities among wild red wolves are human-caused, yet little research exists on how, or if, current ex situ management protocols contribute to this outcome via habituation. The North Carolina Zoo houses the second largest population of red wolves, and while the majority are kept away from guests, some are rotated into a guest view habitat. We investigated how repeated exposure to guests may affect red wolves' activity behavior. Throughout July - August 2023, we conducted 10-minute group focal sampling on two wolves housed on a public-view exhibit and compared activity profiles across crowd size, decibel levels, and time of day. Our objectives were to 1) quantify the behaviors and activities of the wolves on display, 2) compare how their activities and behaviors change when exposed to differing amounts of visitors present, and 3) investigate if wolf behavior changes with differences in noise level (i.e., decibels). In total, we had 969 usable focal sessions, 19,380 data points. Alert, locomotion, and rest comprised an average of 87% of all daily observations. We found that on busy days and higher guest counts, the wolves spent most of their time being locomotive and exhibiting alert behaviors while choosing locations in the habitat that distanced themselves from guests. Guest presence, not their noise, altered wolf behavior. These behaviors indicate that these wolves are still responding to humans with their normal skittish, elusive behaviors. Therefore, wolves on public display at zoos do not appear likely to seek human interactions once released in the wild. Zoos can continue exposing the public to red wolves which could help change public opinion and legislation around the wild population without fear of harming the overall survival of the species.

Bat roosts and hibernacula in the mines of western North Carolina

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As White Nose Syndrome (*Pseudogymnoascus destructans*) continues to pose a serious threat to bat (Order Chiroptera) populations, it is more important than ever to work towards conserving the remaining populations of these species. This includes understanding the roosts and hibernacula used by bats, specifically man-made structures such as mine shafts, so that proper protection of these areas can be implemented. In this project, we surveyed 12 mines and one cave site across western North Carolina using acoustic monitoring techniques to determine the presence of bats in abandoned mines in this area. Over the course of four months from August to November 2023, we gathered over 23,600 calls from all 13 species present in western NC, including three federally endangered species— Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), and Northern Long-Eared Bat (*Myotis septentrionalis*)-- and two species considered “at risk” and under federal review for listing— Little Brown Bat (*Myotis lucifugus*) and Tri-Colored Bat (*Perimyotis subflavus*). We identified calls automatically using Kaleidoscope software and manually using SonoBat software. We found bat activity at every site, with higher levels of activity at the cave site and four of the twelve mine sites. While we lack temperature and humidity data at this time, our current findings suggest certain species of bats use mines more than others, and this may be attributed to differences in hibernacula criteria at each site. Despite limitations, our research is one of the first to take an in-depth look at the use of mines as roosts and hibernacula for bats in western North Carolina and can be used to inform land managers on which mines should be prioritized for protection.

Ecology of coyotes on the Outer Banks

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Coyotes (*Canis latrans*) have become established on the Outer Banks of North Carolina within the last ten years, where they act as novel predators for native wildlife, predated the nests of sea turtles and birds. Efforts to remove coyotes have been ongoing since 2017, however, the effectiveness of this approach is in question since their population persists. This project aims to provide park managers with new information on coyote density and abundance. First, we will fit coyotes with high-resolution GPS tracking collars to gain information on movement, behavior, and habitat use. To date, we've successfully captured and equipped two adult coyotes with GPS collars set to an accelerometer-informed tracking schedule. We're using the MoveApps platform for automated analysis of the movement data. Preliminary tracking data revealed that the coyotes are almost exclusively active at night, are capable of large movements across the island, but focus their foraging in smaller areas. Secondly, we will estimate the densities of coyotes on Cape Lookout and Hatteras during three sampling periods (winter 2024, summer 2024, and winter 2025) via non-invasive genetic sampling and spatially explicit capture-recapture. Lastly, we are exploring cost-effective methods for tracking the relative abundance of coyotes, which can aid park managers in long-term population monitoring following the study's conclusion. This research will contribute to our understanding of coyote ecology on barrier islands and provide vital information enabling effective wildlife management.

A Not So Silent Night: The Impacts of Anthropogenic Noise on Bats and Insects in the Southern Appalachians

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With an increasingly urbanizing world, noise pollution has become an ever-pressing threat to wildlife reliant on vocal communication. As a bioindicator that relies on echolocation for their behavior, bats (*Order Chiroptera*) are especially susceptible to anthropogenic noise. However, little research has been conducted on the effects of such noise pollution on bats outside of the lab, as well as their common prey, insects. In this study, we measured the relationship between bat activity, insect abundance, and anthropogenic noise. At eight lakes and ponds in Western North Carolina, we monitored bat calls and insect presence while playing sonic and ultrasonic sound exemplars. We found a statistically significant correlation between bat activity and the sound exemplars, suggesting that anthropogenic noise, particularly ultrasonic sound, masks bats' communication. Across all our field sites, we collected 3218 insects of seven different orders, representing 4989 mg of biomass. Despite its limitations, our study is important in addressing the issue of anthropogenic noise pollution and its impacts on our environment and can hopefully be used in further research on this matter.

Survey of disjunct red spruce (*Picea rubens*) stands in the Rich Mountain and Alarka Laurel Basins, North Carolina

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In the southern Appalachians, disjunct populations of red spruce (*Picea rubens*) persist at low latitudes. These populations, at the southernmost end of their range, are likely the first stands to experience the impacts of climate change. This study aims to assess the health and recruitment of the Rich Mountain and Alarka Laurel spruce bog basins in Nantahala National Forest, North Carolina. We assessed red spruce and stand dynamics to provide baselines for future studies. Using five 10 m wide belt transects per basin, we conducted surveys of the overstory and spruce saplings and seedlings. We measured overstory and sapling red spruce diameter at breast height (DBH), the height of seedlings, and the health of all spruce. We recorded the DBH of all overstory species ≥ 10 cm. Red spruce was the dominant overstory species, representing an average of 25.6% of all measured overstory trees. Great rhododendron (*Rhododendron maximum*) and mountain laurel (*Kalmia latifolia*) were dominant in the shrub layer, limiting open sky exposure. Seedlings and saplings were present throughout the basins, accounting for 72.8% of red spruce. Overall, red spruce were healthy, with some variability between age categories. These two red spruce populations are currently stable with healthy trees and large seedling banks and appear to be not yet affected by climatic warming, despite the southern latitude and relatively low elevation.

Assessing the detectability rate of Motus towers using UASs

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The Motus Wildlife Tracking System (Motus) is used to track migratory animals, including birds, bats, and insects. It is an international collaborative research network that uses coordinated automated radio telemetry to assist in the research and education on the ecology and conservation of migratory flying animals. This study was conducted to examine the detectability rate of Motus towers using Unoccupied Aircraft Systems (UASs). Unoccupied Aircraft Systems are useful tools for collecting remote sensing data and have the potential to be used to test Motus tower capabilities. Different migratory flight paths were emulated using the UAS, pre-planned flights, and an attached LoTek NanoTag. There were a total of 20 successful flights with differing speeds, altitudes, and distances from the Motus tower. We chose a Motus tower located at the Mountain Retreat and Learning Center in Highlands, North Carolina due to its proximity and accessibility. The results show a significant negative correlation between signal strength and distance from the tower, but no significant differences in signal strength when comparing altitude or speed. Additionally, topography was not found to be a significant impacting factor in signal strength. While there were significant technological limitations, future studies should continue attempting the methodology from this study in the southern Appalachian Mountains and other regions of the world.

Microhabitat selection on native and invasive small mammals at piedmont wetlands and streams

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Small mammals are an important bioindicator of sustainable forest management and can reflect aspects of total ecosystem health due to their significant role in the food web. However, little research has been performed analyzing the relationship between land usage and small mammal populations in southeastern wetland and stream areas. We investigated the influences of microhabitat factors on small mammal populations across 8 sites in Guilford County. Using three years (2020-2023) of nocturnal trapping data combined with vegetation data (summer 2023), we aimed to understand how microhabitat features that are significant to local small mammal species—such as ground cover, vegetation density, canopy cover, and vegetation species—impact small mammal presence. Species studied include the White-footed Mouse (*Peromyscus leucopus*), Marsh Rice Rat (*Oryzomys palustris*), Woodland Vole (*Microtus pinetorum*), Eastern Meadow Vole (*Microtus pennsylvanicus*), House Mouse (*Mus musculus*), and Hispid Cotton Rat (*Sigmodon hispidus*). Further work could include measuring seasonal variation in microhabitat preference across the different species. Understanding significant microhabitat preferences can better inform future land management practices in relation to species conservation and forest health.

Canopy gaps provide structural diversity and promote early successional vegetation

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Closed canopy, even-aged forests provide many ecosystem services including valuable habitat for species like the eastern gray squirrel and wild turkey. Homogeneous mature forest, however, provides limited complexity for species who thrive under disturbance. Canopy disturbance such as harvested gaps create pockets of early successional plant communities, resulting in a mosaic of uneven-aged forest. The vegetative composition of gaps creates potential habitat for early successional specialist species, including ruffed grouse, eastern cottontail, and indigo bunting. We aim to quantify vegetative vertical structure from gaps to interior forest. Using a point contact method, we measured the vegetative structure and life form composition of the gap-forest matrix and unharvested control areas in a mature mixed hardwood forest in Pisgah National Forest, NC. Calculated cover by life form, paired with Habitat Suitability Indices for the target species allowed us to assess the potential to provide habitat for early successional species. By better understanding the vegetative structural diversity created by canopy gaps, and their impact on early successional species, forest managers can be more targeted in achieving habitat-focused management objectives.

Impacts of annual weather on denning chronology of female American black bears in Asheville, North Carolina, USA

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Krishna Pacifici: North Carolina State University

Nicholas P. Gould: United States Forest Service

Jennifer E. Strules: North Carolina State University

Colleen Olfenbittel: North Carolina Wildlife Resource Commission

Christopher S. DePerno: North Carolina State University

Recent studies of mammal ecology have suggested that behavioral patterns may be impacted by a changing climate. Specifically, American black bears (*Ursus americanus*) enter dens to compensate for natural winter food shortages and avoid harsh weather. However, in regions with milder temperatures, bears demonstrate reduced denning duration or even remained active. Rising temperatures may cause bears in regions that historically averaged sub-freezing temperatures in the winter to alter hibernation behavior. If hibernation duration is reduced, human-bear interactions may increase. Our objective was to investigate how annual weather factors over seven years impacted the denning ecology of female urban bears inhabiting western North Carolina. We attached GPS collars to bears ($n = 118$), noted their reproductive status, determined denning duration and den site characteristics, and assessed mast production of the study area. We evaluated the effects of temperature, precipitation, den substrate, reproductive age of the bear, and mast production on den entry, emergence, and duration using linear regression models and used prediction analyses to evaluate potential climatic changes. We determined that bear hibernation chronology is primarily impacted by weather factors and reproductive status. Black bears in Asheville did not have a discrete denning period: entry dates ranged from 10/6 - 2/26 and emergence dates ranged from 12/3 - 4/26, while denning duration times ranged from 16 - 174 days. For den entry, a 1°C increase in temperature influenced bears to enter dens 5.87 days earlier and extended hibernation duration by 6.08 days, and each additional 93.26 mm in precipitation delayed bear entry by 14.85 days and reduced hibernation duration by 16.29 days. Mast and denning substrate did not have a significant effect on hibernation chronology. We noted different results compared to other studies most likely due to the temperate climate of our study area, and if climatic changes occur, we could see further changes in hibernation behavior that influence the timing and level of human-bear interactions. For humans and bears to inhabit the same areas, mitigating potential interactions (e.g., reducing bear attractants) and increasing public outreach should be a priority.

Field evaluation of condensed tannins as a white-tailed deer repellent for soybeans

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Rachel Vann, Assistant Professor and Soybean Extension Specialist, Department of Crop and Soil Sciences, NC State University

Guy Collins, Extension Cotton Specialist and Associate Professor, Department of Crop and Soil Sciences, NC State University.

Christopher S. DePerno, Fisheries, Wildlife, and Conservation Biology, North Carolina State University

In the United States, ungulates are responsible for millions of dollars in annual agricultural damages. Without a promising solution, continued depredation of cash has severe economic implications. While ungulate repellents exist to deter depredation, many are ineffective and lack empirical evidence. Commercially available and commonly used in ruminant feeding trials, condensed tannins are a naturally occurring secondary metabolite used by plants as a defense mechanism against foraging. In a study involving captive white-tailed deer (*Odocoileus virginianus*), researchers at South Dakota State University determined that condensed quebracho tannins had a negative influence on intake rate and probability of consumption. Our objective was to evaluate the efficacy of condensed quebracho tannins sprayed on soybeans as a white-tailed deer repellent in a field setting. Our study site was located near Black Creek, North Carolina, USA. To test the efficacy of our repellent, we used 16 fields ($n = 16$), each approximately 1.6 hectares (4 acres), randomly assigned to receive a treatment ($n = 8$) or control ($n = 8$). During the growing season, treated fields received a single application of a solution containing 10% concentration of condensed quebracho tannins and water. Our carrier volume was applied at 93.5 liters per hectare (10 gallons per acre). We placed camera traps in each field to document white-tailed deer use and foraging behavior, conducted bi-weekly measurements of soybean height and width, and completed a small-scale simplified yield estimate when plants reached the R6 growth stage. We will present results from the 2023 field season at the 2024 annual North Carolina Wildlife Society State Chapter Meeting.

Indirect effects of the COVID-19 pandemic on wildlife activity on an urban campus

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Dr. Rachael E. Urbanek¹, CWB[®]

Dr. Brian S. Arbogast²

¹Department of Environmental Sciences

²Department of Biology & Marine Biology, University of North Carolina
Wilmington

Anecdotal observations and media reports suggested an increase in wildlife activity during the 2020 COVID-19 lockdown. However, existing studies are contradictory as to if wildlife activity changed during the pandemic and few sought to quantify changes in human activity that could serve as an influencing factor. We investigated if human activity on campus changed during the pandemic and how that change may have influenced wildlife activity. From 28 August - 23 October 2020, we deployed individual passive infrared game cameras at 18 sites to capture terrestrial wildlife activity along trails within a ~78ha longleaf pine (*Pinus palustris*) forest. During this time, classes were moved online, in-person events were canceled, students were quarantined, and half the freshman class were moved off-campus. We used regression analyses and ANOVAs to determine what factors influenced human and animal activity on campus and to examine changes in the 24-hr activity periods of both humans and animal species. Weather and the number of positive COVID-19 cases in New Hanover County had no effect on human or wildlife activity. However, our findings suggest a decrease in COVID-19 cases on the UNCW campus led to an increase in human activity, which then led to an increase in wildlife activity. Thus, the number of COVID-19 cases indirectly affected wildlife activity. These results provide insight into species' responses to sudden changes in human activity in an urban setting and indirect effects of societal public health measures on wildlife populations.

Black bear (*Ursus americanus*) abundance and population genetics in the North Carolina Coastal Bear Management Unit

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⁶U.S. Geological Survey, North Carolina Cooperative Fish and Wildlife Research Unit, Department of Applied Ecology, North Carolina State University

Black bear (*Ursus americanus*) populations in the Coastal Bear Management Unit (CBMU) of North Carolina have increased over the past 50 years, and in some areas, occur at high densities. Current, unbiased estimates of abundance and variation in density across the CBMU, however, are lacking.

We sought to quantify abundance, density, and genetic structure of the CBMU black bear population and calibrate population monitoring methods to inform future management decisions. Our study spans 37 counties in the CBMU, with the northern half surveyed in 2023 and the southern half to be surveyed in 2024.

Field methods used baited barbed wire hair snares to collect black bear hair samples for genetic analyses and abundance estimation via spatial capture-recapture methods. Hair snares were arranged in a clustered sampling design. Clusters were spaced ~16-24 km apart and each cluster consisted of 5-9 hair snares spaced ~2-km apart in a grid design. Hair snares are constructed in May - June, then visited weekly over a 6-week sampling period to collect and document hair samples and re-bait each site with a scent lure and bakery product.

We collected >9,900 hair samples across 601 hair snare sites in 2023. Of the 601 sites, >300 produced at least 1 black bear hair sample. Preliminary results of the distribution of bear hair collections indicate that bear density varies across the CBMU. Hair samples are currently being processed for genetic analyses, and field methods will be replicated in the southern CBMU during May-August 2024. Overall, this study demonstrates the ability of non-invasive field sampling methods to provide comprehensive data for genetic and abundance studies across broad spatial extents.

Social tolerance and perception of management of black bears in an urban environment

Sarah Wyrick swyrick@ncsu.edu, Fisheries, Wildlife, and Conservation Biology, North Carolina State University

Jennifer Strules, Fisheries, Wildlife, and Conservation Biology, North Carolina State University

Nick Gould, United States Forest Service

Nils Peterson, Fisheries, Wildlife, and Conservation Biology, North Carolina State University

Emily Griffith, Department of Statistics, North Carolina State University

Collen Olfenbittel, North Carolina Wildlife Resources Commission

Christopher DePerno, Fisheries, Wildlife, and Conservation Biology, North Carolina State University

American black bear (*Ursus americanus*) populations have increased across their range, which now includes urban and suburban areas. To reduce the likelihood of human-bear interactions, state agencies are increasingly implementing BearWise® (bearwise.org) public outreach focused on securing bear attractants (e.g., garbage; bird seed). To determine attitudes toward attractant-reducing strategies, we mailed a survey to 2,438 residents in four neighborhoods of Asheville, North Carolina to gather information on public perceptions of black bears and attitudes towards reducing bear attractants, receiving a total of 1,194 responses. Despite 52.7% of respondents believing the presence of bears in Asheville was a sign of a healthy environment and wanting to see the population maintained (51.2%), most respondents (51.7%) agreed that bears could pose a problem for residents. However, 82.7% of residents believe that conflict with bears can be mitigated by changing human behavior and 83.2% reported a strong willingness to keep trash and recycling indoors until the day of trash pickup. However, there was slightly less support (57.3%) towards refraining from feeding birds and other wildlife. Evaluating public perceptions and experiences with black bears allows state agencies to determine where public knowledge gaps exist in basic bear ecology and how to create effective BearWise outreach programs to proactively reduce human-bear interactions. Next steps of the project include a post-treatment survey to re-evaluate public perceptions following a 12-month BearWise educational campaign and comparing compliance of attractant-reduction practices through trash and attractant surveys pre-, during and post- educational treatment.

**North Carolina Chapter of The Wildlife Society
Business Meeting Agenda**

April 4th, 2024; 9:00 - 10:30 am
YMCA Blue Ridge Assembly

- I. Welcome and Opening Comments – Gabriela Garrison
- II. Secretary Report * – Liz Hillard
 - Review and approve the minutes of the February 20th Executive Board meeting.
- III. Treasurer’s Report and 2023-2024 Budget Review * – Justin McVey, CWB®
- IV. Southeast Section Update * – Kelsey Pistner
- V. Committee Reports * – Committee Chairs
 - Audit – Todd Menke, CWB®
 - Awards – Chris DePerno, CWB®
 - Communications – Rada Petric, Kelsey Pistner
 - Conservation Affairs – Rachael Urbanek, CWB®
 - COWCH – David Mattocks
 - Fundraising – Katie Proctor
 - Grants and Finance – Pete Campbell
 - Membership – Colleen Olfenbittel, CWB®
 - Mentoring – Aimee Rockhill
 - Nominating & Elections – Rada Petric
 - Procedures – Rada Petric
 - Professional Development – Gabriela Garrison
 - Program – Clint Barden, Luke Lories
- VI. Student Chapter Updates *
 - Haywood Community College
 - North Carolina State University
 - University of North Carolina – Wilmington
 - Western Carolina University
- VII. Hunters of Color Program Introduction – Jeff Marcus
- VIII. Election Results – Gabriela Garrison
 - Present new officers and “Passing of the Goat”
- IX. Words from the new president – Rada Petric
 - * Reports are available at <http://nctws.org/wordpress/members>

Awards

NCTWS CHAPTER AWARD

This award is presented to a chapter member for individual effort and contributions to wildlife conservation through The Wildlife Society. Service to the Society and Chapter is strongly considered, along with professional achievement. The award includes a certificate or plaque and a copy of the commendation read during the awards ceremony. Presentation to the recipient is typically made at the annual meeting of the Chapter.

WILDLIFE CONSERVATION AWARD

This award is presented to individuals or groups within North Carolina who deserve recognition for achievement in wildlife conservation, education, research or related endeavors. There is no requirement for Society or Chapter membership. The recognition is for accomplishments widely recognized and publicized. The award includes a certificate or plaque and a copy of the commendation read at the awards ceremony. The award is presented to the recipient or organization at a time and location that is meaningful to the recipient and to the Chapter in terms of future interaction with others who work for the betterment of wildlife conservation.

KEN WILSON MEMORIAL AWARD

The Ken Wilson Memorial Award is presented annually to a student or students, nominated by the wildlife faculty of the various schools within the State having student chapters (NC State University, Haywood Community College, Western Carolina University, and University of North Carolina Wilmington) and selected by the Awards Committee. Awards are presented for academics, contributions to research, work projects that contribute to State wildlife conservation efforts, involvement with the student chapter of The Wildlife Society, and other accomplishments that the Chapter deems worthy of recognition. Recipients receive a cash award, a plaque, a copy of the Sand County Almanac, and a copy of the commendation signed by the Chapter President.

BEST POSTER AWARD

This award is given to a Chapter member for the most outstanding poster presented at the annual meeting. The poster must be presented during the specified poster session period when the poster evaluation is performed.

NCTWS Corvid Club Fundraiser

In 2021, COVID-19 had shaken up everything, including the cancellation of the in-person 2021 NCTWS Annual Meeting and, by default, annual fundraising events, such as silent auction, live auction, and raffle trips. To replace these fundraising mechanisms, the NCTWS Fundraising Committee introduced an alternative way for NCTWS members to support student chapters, grants, and awards – The Corvid Club! The Corvid Club was so well received by NCTWS members that it is now a permanent part of NCTWS fundraising efforts.

The Corvid Club's goal is to generate an ongoing, additional revenue stream for NCTWS to support students and student chapters. The Corvid Club donations fund the four Ken Wilson Awards, the SETWS Field Course grant, NCTWS Annual Meeting student grants, and various student chapter activities and events (e.g., Lunch and Learns, Resume review, Student Conclave).

To gain “membership” in The Corvid Club, simply donate a minimum of \$25. NCTWS members who donated in the 2021 inaugural year of The Corvid Club are considered charter members.

Annual Corvid Club donors will receive:

- A free corvid-themed alcoholic beverage at The Corvid Club Social that takes place at the NCTWS Annual Meeting (non-alcoholic beverages are also provided free of charge);
- A special name tag ribbon to wear at the Annual NCTWS Meeting;
- First-time donors receive a free decal of the NCTWS Chapter logo;
- Second-time donors receive a free koozie of the NCTWS Chapter;
- Their names published in the NCTWS newsletter and on our Chapter website.

All are welcome to The Corvid Club Social from 5pm to 6pm on Wednesday, but space is limited!

Current CC members get a free drink; all others can join The CC or purchase a drink during the social.

NCTWS Corvid Club Fundraiser

To date, 52 NCTWS members have donated to Corvid Club, generation approximately \$2,715! Thank you to the following NCTWS members who have generously donated to The Corvid Club. Members of The Corvid Club are listed below based on total Corvid Club contributions to date.

*Indicates Corvid Club Charter Member

<p><u>\$500+:</u></p> <ul style="list-style-type: none"> • Cliff Bampton* 	<p><u>\$100+:</u></p> <ul style="list-style-type: none"> • Allen Basala* • Pete Campbell* • Rachael Urbanek* • John Ann Shearer* 		
<p><u>\$50+:</u></p> <table style="width: 100%; border: none;"> <tbody> <tr> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> • Clint Barden* • Chris Deperno • Kelly Douglass* • Gabriela Garrison* • Brad Gunn* • Matthew Harrell* • Albert Henry* • John Isenhour* • Dr. Roland Kays* </td> <td style="width: 50%; border: none;"> <ul style="list-style-type: none"> • Jeff Marcus* • Susan Miller* • Colleen Olfenbuttel* • Rada Petric • Katie Proctor* • Sara Schweitzer* • Steve Smith* • James Tomberlin* • Gordon Warburton* </td> </tr> </tbody> </table>		<ul style="list-style-type: none"> • Clint Barden* • Chris Deperno • Kelly Douglass* • Gabriela Garrison* • Brad Gunn* • Matthew Harrell* • Albert Henry* • John Isenhour* • Dr. Roland Kays* 	<ul style="list-style-type: none"> • Jeff Marcus* • Susan Miller* • Colleen Olfenbuttel* • Rada Petric • Katie Proctor* • Sara Schweitzer* • Steve Smith* • James Tomberlin* • Gordon Warburton*
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All are welcome to The Corvid Club Social from 5pm to 6pm on Wednesday, but space is limited!

Current CC members get a free drink; all others can join The CC or purchase a drink during the social.

NCTWS Corvid Club Fundraiser

\$25+, Continued:

- Liz Hillard
- Isaac Hinson*
- Andrew Isenhower
- Melody Key
- Jeff Kiser
- Luke Lolies
- Kathleen Mahoney*
- Andrea Shipley
- Cindy Simpson
- Dennis Stewart*
- Shem Unger
- Kendrick Weeks*
- Lindsey Zarecky

To donate, you can pay at the registration table, during the evening socials, or scan the QR code below!



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Order your Chapter swag now!

<https://my-store-bdff14-2.creator-spring.com>