NC Chapter of The Wildlife Society
&
NC Partners in Amphibian and Reptile Conservation
Annual Meeting

"Human-Wildlife Interactions:
Why Can't We All Just Get Along?"

Hawthorne Inn & Conference Center
Winston–Salem, NC
February 25-27, 2025

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CWB® = TWS Certified Wildlife Biologist
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NCTWS Corvid Club Fundraiser

Background: In 2021, COVID-19 resulted in 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. The Corvid Club was created as an alternative way to fundraise, and it was so well received by NCTWS members that it is now a permanent part of NCTWS fundraising efforts.

Goal: The Corvid Club's goal is to generate an ongoing, additional revenue stream for NCTWS to support the Grants program, which is comprised of seven grants currently totaling $3,700, including the TWS Annual Conference Grant, the Professional Development grant, the SETWS Field Course grant, the NCTWS Annual Meeting Grants, and possibly new grants in the future.

To gain "membership" in The Corvid Club, simply donate a minimum of $30, either prior to or during the NCTWS Annual Meeting. This is an increase of $5, as we had not changed the minimum donation amount since 2021. 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 alcoholic beverage at The Corvid Club Social (Wed., Feb. 26th, 5-6pm. room 109);
- 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.

NCTWS Corvid Club Fundraiser

To date, 72 NCTWS members have donated to Corvid Club, generating approximately $4,970! Members of The Corvid Club are listed on the next page based on total Corvid Club contributions to date.

To donate scan the QR code below

*Indicates Corvid Club Charter Member

$2500+: • Cliff Bampton*	**$150+**: • Pete Campbell* • John Ann Shearer*
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All are welcome to The Corvid Club Social from 5pm to 6pm on Wed., Feb 26th, 2025 in room 109. Current CC members get a free drink; all others can join The CC or purchase a drink during the social.

$50+: • Bob Brown • Brad Gunn* • Albert Henry* • Roland Kays* • Luke Lolies	• Katie Proctor* • Aimee Rockhill • Sara Schweitzer* • Andrea Shipley • Steve Smith* • Lindsey Zarecky
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Annual Meeting Agenda

TUESDAY, FEBRUARY 25th

9:00 am	Optional Workshops/Field Trips (information at the bottom of the agenda)
11:30 am	Registration Opens (until 6 pm), and silent auction drop-off
1:00 pm	Welcome & NCPARC – NCTWS Overview
1:30 pm	**Keynote Address: Promoting Community Well-being with Wildlife Rx** Nils Peterson, North Carolina State University
2:15 pm	Break
2:25 pm	Door Prizes

SESSION 1 – Invertebrates and Aquatic Landscapes moderated by Jenna Jordan

2:30 pm	**North Carolina Spider Diversity, Ecology, and Myths** Matt Bertone, North Carolina State Plant Disease and Insect Clinic
2:55 pm	**Bugs on Film: Communicating Insect Natural History through Media** Adrian Smith, North Carolina Museum of Natural Sciences

3:20 pm **Unveiling A Hidden World: Why Aquatic Wildlife Matters To You**
Brena Jones, North Carolina Wildlife Resources Commission (virtual)

3:45 pm Break

3:55 pm Door Prizes

SESSION 2 – Wildlife and People moderated by Angelina Guerrero

4:00 pm **Urban Wildlife Viewers: Who Are They and How Can We Engage with Them?**
Kelley Langhans, Virginia Tech (virtual)

4:25 pm **Exploring Our Emotional Connections with Wildlife: The Good, the Bad, and the Totally Irrational**
Lincoln Larson, North Carolina State University

4:50 pm **'Possums and Box Turtles and Lampreys, Oh My!**
Jerry Reynolds, North Carolina Museum of Natural Sciences

5:15 pm Wrap-up questions and announcements

6:00 pm Dinner (Poplar Ballroom)

7:00 pm Poster Session and Social (Sycamore Ballroom)

WEDNESDAY, FEBRUARY 26th

7:00 am Registration Open (until 8:45)

8:45 am Welcome, announcements, and door prizes

SESSION 3 – Bats and Birds moderated by Olivia Munzer

9:00 am **Luxury Effect Revisited: What are Bats Responding to Behind the Affluence Variation**
Han Li, University of Nebraska (virtual)

9:25 am **Important Artificial Roosts for Bat Species of Greatest Conservation Need in North Carolina**
Katherine Etchison, North Carolina Wildlife Resources Commission

9:50 am **Factors Influencing Bird-Glass Collisions at the North Carolina Zoo and Success of Mitigation**
Betsy Roznik, North Carolina Zoo

10:15 am Break (Registration Open)

10:25 am Door Prizes

SESSION 4 – Herps and People moderated by Sarah Stevens

10:30 am **Herp Surveys in Urban Settings: Confronting City-Specific Challenges**
Rachael Urbanek, University of North Carolina Wilmington

10:55 am **International Wildlife Trafficking Syndicates**
Jason Keith, US Fish and Wildlife Service

11:20 am **NC Snake Envenomations**
Michael Beuhler, North Carolina Poison Control, Wake Forest University School of Medicine

11:45 am Wrap-up questions and announcements

12:00 pm Lunch (Poplar Ballroom)

12:55 pm Door Prizes

SESSION 5 – Wildlife Challenges moderated by Dustin Smith

1:00 pm **Close Encounters: North Carolina's Biggest Wildlife Issues, According to Voluntary Reporting**
Falyn Owens, North Carolina Wildlife Resources Commission

1:25 pm **Herpetofauna Diversity in a Changing Landscape**
Thomas Reed, Wake County Parks, Recreation and Open Space

1:50 pm **Issues with Mitigation Translocation of Stray Timber Rattlesnakes**
John Sealy, Timber Rattlesnake Conservation Alliance

2:15 pm Break

2:25 pm Door Prizes

SESSION 6 – Landscape Scale Conservation moderated by Marie Young

2:30 pm **Connectivity Conservation for Local Wildlife, Local Habitats, and Local Decision-Making**
Julie Tuttle, University of North Carolina Chapel Hill

2:55 pm **Land Conservation in the Piedmont: Opportunities and Obstacles**
Ken Bridle, Piedmont Land Conservancy

3:20 pm **A Race Against Time: Documenting Biodiversity in a Rapidly Growing Region**

	Lenny Lampel, Mecklenburg County Park and Recreation
3:45 pm	Break
3:55 pm	Door Prizes

SESSION 7 – Wildlife and Roads moderated by Erin Flanagan

4:00 pm	**22 Years of Death: Long-term Monitoring of Vertebrate Road Mortality on a 0.7-mile Section of Secondary Paved Road in the North Carolina Sandhills** Jeff Beane, North Carolina Museum of Natural Sciences
4:25 pm	**Road Ecology for Herps: How and Where to Help Reptiles and Amphibians Cross Highways** Ron Sutherland, Wildlands Network
4:50 pm	**Hellbender Relocations at NCDOT Bridge Projects** David McHenry, North Carolina Wildlife Resources Commission
5:00 pm	Wrap-up questions and announcements
5:15 pm	Corvid Club Social (Room 109)
6:00 pm	**Dinner (Poplar Ballroom)**
7:00 pm	Live and Silent Auction, Potentially Puzzling and Perplexing Pieces and Parts Practical, and Social (Sycamore Ballroom)

THURSDAY, FEBRUARY 27th

8:45 am Welcome, announcements, and door prizes

SESSION 8 – Bears and Gators moderated by Hannah Damewood

9:00 am **Establishing North Carolina as a BearWise® State**
Ashley Hobbs, North Carolina Wildlife Resources Commission

9:25 am **Backyard Swamp Puppies: Luxury Living with Dinosaurs**
John Henry Harrelson, North Carolina Wildlife Resources Commission

9:50 am **Panel Discussion**
Resource Professionals

10:15 am Break

10:20 am Door Prizes

10:25 am **NCTWS Business Session, and NCPARC Working Group reports**

11:30 am Award Presentations

12:00 pm Wrap-up questions and announcements

12:15 pm Lunch (Sycamore Ballroom or Grab & Go)

Workshops/Field Trips:

Non-Lethal Wildlife Conflict Mitigation Techniques Workshop – Yadkin River Game Land

Join Clint Barden (NCWRC), Justin McVey (NCWRC), and Marcus Mustin (USDA-APHIS) at the Yadkin River Game Land to view demonstrations of non-lethal wildlife conflict mitigation techniques. Demonstrations will include electric fencing, unwelcome mats, trapping, pyrotechnics, and others. Attendees will be allowed to participate "hands-on" to the extent possible. Attendees must provide their own eye protection, ear protection, and closed-toe footwear. Long pants and leather gloves are recommended. Limit of 30 people.

Trapping Techniques Workshop – Reynolda Gardens

Join Jeff Hall (NCWRC) and Fred Boyce (NC Aquarium at Pine Knoll Shores) to visit the Reynolda Gardens property on the edge of Wake Forest University campus. We will explore live trapping techniques including minnow traps and turtle traps. The property has forested trails as well as some wetland features and streams. In addition to documenting what we find as a mini bioblitz, we will also cover the history of the property which was once the original location of the Nature Science Center. Limit of 15 people.

Guided Hike with a Ranger – Pilot Mountain State Park

Learn about the history of the mountain from the early stages to where it is today with a hike led by Carla Williams, Park Ranger at Pilot Mountain State Park. Participants will hike the Pilot Knob Trail which is about 1 mile long and is marked easy/moderate level. The visit will include information about both human and animal changes through the years, as well as the overall significance of the park. Participants will also learn about protections for several species, especially those less commonly seen in the region. Limit of 20 people.

Invited Speakers

(in order of presentation)

KEYNOTE SPEAKER

PROMOTING COMMUNITY WELL-BEING WITH WILDLIFE RX

Nils Peterson*, Lincoln Larson, Aaron Hipp, North Carolina State University, nils_peterson@ncsu.edu.

In this talk we highlight the need to focus more on how wildlife can promote community well-being and focus less on the myth of human-wildlife conflict. We describe contexts where exposure to wildlife improves mental health, physical health, and economic health. Our review addresses how different wildlife species and different forms of wildlife related recreation impact human well-being. Notable trends include birds and birdwatching consistently benefiting human health and happiness. We explain why meta-analyses may incorrectly suggest mammals, reptiles, and amphibians have negative impacts on human well-being. Finally, we describe how some landscapes are simultaneously valuable to wildlife and human well-being (e.g., closed canopy forest). We conclude with recommendations for both future research and ways to leverage these findings into conservation action.

Nils Peterson is a Professor of Fisheries, Wildlife, and Conservation Biology at North Carolina State University. His research focuses on unravelling the drivers of environmental behavior. Nils received his B.S. and M.S. degrees from Texas A&M University, and his Ph.D. from Michigan State University. Additional information about his research, teaching, and service activities is on his Google Scholar profile.

NORTH CAROLINA SPIDER DIVERSITY, ECOLOGY, AND MYTHS

Matthew A. Bertone, Plant Disease and Insect Clinic, Department of Entomology and Plant Pathology, North Carolina State University, matt_bertone@ncsu.edu

Spiders (Araneae) are one of the most commonly encountered groups of animals but are also extremely maligned despite their importance to humans. This presentation will focus on the major types of spiders in North Carolina, their biologies and ecologies, and debunking myths surrounding them, with the aim to bring appreciation to, and calm fears about, these fascinating creatures.

Matt Bertone received his B.S. in biology from Salisbury University (MD) before receiving an M.S. and PhD in entomology from NC State University. Matt is the Director and Entomologist with the NC State Plant Disease and Insect Clinic (PDIC), where he focuses on identifying insects and other arthropods for clients. In addition to these services, Matt provides identification training for state extension personnel, publishes new records and biological information on arthropods, and prepares specimens for the NCSU Insect Museum. Matt is also passionate about macro photography.

BUGS ON FILM: COMMUNICATING INSECT NATURAL HISTORY THROUGH MEDIA

Adrian Smith, Entomologist and Head of the Evolutionary Biology and Behavior Research Lab, North Carolina Museum of Natural Sciences, adrianalansmith@gmail.com.

Abstract and Bio not available at printing.

UNVEILING A HIDDEN WORLD: WHY AQUATIC WILDLIFE MATTERS TO YOU

Brena Jones, North Carolina Wildlife Resources Commission, Brena.Jones@ncwildlife.org.

Abstract and Bio not available at printing.

URBAN WILDLIFE VIEWERS: WHO ARE THEY AND HOW CAN WE ENGAGE WITH THEM?

Kelley Langhans*, Ashley Dayer, Willandia Chaves, Virginia Tech, langhans@vt.edu.

Wildlife viewing is one of the fastest growing outdoor recreation activities in the United States, and the majority of wildlife viewers live in urban areas. This presents a challenge for fish and wildlife agencies and other wildlife managers, which have traditionally served hunting and fishing constituents and focused on rural areas. Here, we use the results of a 2021 National and Regional Survey of Wildlife Viewers to explore how wildlife viewing behavior changes across an urban-rural gradient. Specifically, we examine: the ethnoracial identity and income of wildlife viewers, where they view wildlife, what types of wildlife viewing they participate in, their wildlife viewing skill level, barriers to their participation in wildlife viewing, relationships with their state agencies, and their communication preferences. Based on our findings, we share 10 key recommendations for increasing engagement with urban wildlife viewers that were co-developed with wildlife viewing staff from state fish and wildlife agencies.

Kelley Langhans is a conservation social science postdoctoral researcher in the Dayer Human Dimensions lab in the Department of Fish and Wildlife Conservation at Virginia Tech. She received her Ph.D. in Biology from Stanford University in 2023. Kelley studies people's interactions with wildlife, focusing on wildlife viewing and bird feeding, with the aim to promote interactions that benefit both humans and animals.

EXPLORING OUR EMOTIONAL CONNECTIONS WITH WILDLIFE: THE GOOD, THE BAD, AND THE TOTALLY IRRATIONAL.

Lincoln Larson, NC State University, LRLarson@ncsu.edu.

Humans are emotional creatures whose behavior is driven, first and foremost, by affective responses to stimuli. Yet, when dealing with diverse stakeholders, many wildlife managers attempt to address conflict by focusing on rational arguments and scientific facts. This educational approach, inspired by the deficit model, can have perverse and unintended consequences. Rather than ignoring or avoiding emotions in wildlife-related interactions, what if we embraced them? In this presentation, we'll explore our emotional connections with wildlife, how they are measured, and how they can impact wildlife management goals. First, we will investigate what affects college students' tolerance of snakes. The best predictor of killing snakes – and venomous snakes in particular - is people's negative emotional response to the animals, not their knowledge or experience. Second, we will explore what drives bluebird nest monitors (i.e., self-proclaimed bird lovers) to aggressively and lethally remove another bird species: invasive house sparrows. Their actions are more strongly motivated by hatred of sparrows than any other factor, including their love of bluebirds or their broader beliefs about bird conservation. Third, we'll consider how social media taps into our emotions, examining how positively framed YouTube videos can have a bigger impact on attitudes and behavior towards controversial species like wolves and sharks than negative videos – even if negative videos are far more ubiquitous online. Finally, we'll discuss how, if leveraged properly, humans' emotional connections to wildlife can bring us together and activate a latent conservation ethic or "biophilia" that exists in all of us.

Lincoln Larson is an Associate Professor in the College of Natural Resource at NC State University. He received a Ph.D. from the University of Georgia in 2012, where he shifted from wildlife ecologist to conservation social scientist with the goal of studying human-environment interactions to foster healthy relationships between people and wildlife.

'POSSUMS AND BOX TURTLES AND LAMPREYS, OH MY!

Jerry Reynolds, North Carolina Museum of Natural Sciences, jerry.reynolds@naturalsciences.org.

Jerry Reynolds describes the wildlife interactions he has experienced over 20 years in a rural subdivision in northwestern Johnston County. Through direct observation or through trail cameras, Reynolds has documented common and uncommon species that live in or near the local neighborhood. His observations have revealed insights into the ecology, behavior and status of wildlife species that share their homes with human neighbors. He has helped residents develop a better appreciation of our native wildlife and how to get along with our wild neighbors.

Jerry Reynolds is Head of Outreach for the NC Museum of Natural Sciences. Reynolds grew up in Duplin County in eastern North Carolina, spending much time in the swamps and forests pursuing an early interest in reptiles and amphibians. He earned BS and MS degrees in Zoology from NCSU, with a special focus on herpetology. His professional career includes 20 years at Discovery Place Science Museum in Charlotte, three years as Executive Director of Imagination Station Science Museum in Wilson, and now 21 years at the NC Museum of Natural Sciences. He is currently President of the NC Herpetological Society and past Chair of the NCPARC Steering Committee.

LUXURY EFFECT REVISITED: WHAT ARE BATS RESPONDING TO BEHIND THE AFFLUENCE VARIATION

Han Li, University of Nebraska Omaha, hanli@unomaha.edu.

The luxury effect originally described the correlation between affluence and organism diversity or activity in urban environments. This phenomenon has been observed across various taxa, including bats. My research was the first to document the luxury effect in two bat species in North America: the eastern red bat (*Lasiurus borealis*) and the evening bat (*Nycticeius humeralis*). These species exhibited greater activity in more affluent neighborhoods in Waco, Texas. Expanding on this, I utilized data from the North American Bat Monitoring Program (NABat) in North Carolina to demonstrate that the luxury effect extended beyond urban ecosystems to broader spatial scales. Currently, my lab seeks to identify specific environmental stressors indicated by affluence that drive urban bat variation. This presentation will highlight two ongoing projects. The first investigates the vertical complexity hypothesis. As bats need to roost at certain heights above the ground, features that meet this requirement may vary across a city. The second project examines environmental toxins and health biomarkers in bats through fecal sample analysis. Together, these studies aim to elucidate the underlying ecological mechanisms of the luxury effect and inform urban habitat management strategies to enhance bat conservation efforts.

Han Li is an Assistant Professor of Ecology in the Department of Biology at the University of Nebraska Omaha. Before his appointment in Nebraska, he served as the North Carolina coordinator for the North American Bat Monitoring Program (NABat) from 2015 to 2022, based at the University of North Carolina at Greensboro. Li's research program focuses on urbanization and bats, with a particular emphasis on exploring how urban socioeconomic heterogeneities influence wildlife.

IMPORTANT ARTIFICIAL ROOSTS FOR BAT SPECIES OF GREATEST CONSERVATION NEED IN NORTH CAROLINA

Katherine Etchison*, Joey Weber, Olivia Munzer, Brooke Massa, North Carolina Wildlife Resources Commission, katherine.etchison@ncwildlife.org.

North Carolina is home to 17 bat species, many of which use humanmade structures for day or night roosting habitat. Structures like buildings, bridges, and culverts are the most common artificial roosts for bats in the state and can provide roosting habitat in areas where natural roosts are scarce. The gray bat (*Myotis grisescens*) relies on caves year-round as roosting habitat, but in N.C. where suitable caves for the species are lacking, this species is found roosting in bridges and culverts. Similarly, few caves are found in the Piedmont region and bottomland swamp habitats are uncommon, so the southeastern bat (*Myotis austroriparius*), which typically uses these habitats has been found roosting in culverts and around manhole covers in large colonies. Finally, bridges within the Coastal Plain play an important habitat role to tricolored bats (*Perimyotis subflavus*) who are found roosting under bridges in winter and the active season, including serving as maternity roosts. Since humanmade structures can serve as key roosts for bat Species of Greatest Conservation Need across the state, the North Carolina Wildlife Resources uses multiple methods to locate and monitor these roosts. Highlights on roost survey findings across the state will be presented.

Katherine is a Wildlife Diversity Biologist for the North Carolina Wildlife Resources Commission, a position she's held since 2015. She conducts surveys for rare and threatened bats and monitors bat populations across the state. She received a B.S. in Ecology and Environmental Biology from the University of North Carolina at Asheville in 2010 and a M.S. in Biology from Ball State University in 2015. She is a TWS Certified Wildlife Biologist and serves as co-chair to the North Carolina Bat Working Group.

INTERNATIONAL WILDLIFE TRAFFICKING SYNDICATES

Jason Keith, United States Fish and Wildlife Service,
jason_keith@fws.gov.

A case study examining the successful identification, targeting, dismantling and federal prosecution of transnational criminal syndicates actively engaged in the high level domestic and international trafficking of wildlife. This will include a brief examination of syndicate structures, wildlife values, sentencings etc.

Senior Special Agent (SA) Jason Keith began his resource law enforcement career in 2004 with the Virginia Division of Fish and Wildlife (VDFW) as a Conservation Officer pursuing wildlife violators engaged in a range of activities including fishing violations, poaching activities, commercial market suppliers, as well as fraud and firearms violations. In 2007, he was hired by the Dept. of Homeland Security as a Federal Air Marshal, ultimately becoming a Service Special Agent in 2010. Special Agent Keith subsequently worked as an agent in Little Rock, AR, and his current duty station is in Raleigh, North Carolina. Senior Special Agent Keith's largest successes and greatest impact to further conservation efforts of wildlife species, arise from his ability to identify, target, dismantle and prosecute criminal syndicates engaged in the high level domestic and international trafficking of wildlife. Managing these complex interstate and international investigations is far from an easy task, yet SA Keith consistently achieves higher than average results, achieving felony convictions and seizing ill-gotten assets. His investigations strike at the heart of the illegal global wildlife trade giving our wildlife resources a greater chance to survive and thrive.

BIRD-GLASS COLLISIONS AT THE NORTH CAROLINA ZOO: RISK FACTORS AND MITIGATION SUCCESS

Betsy Roznik, North Carolina Zoo, betsy.roznik@nczoo.org.

As the world's largest natural habitat zoo, the North Carolina Zoo provides excellent habitat for the animals under its care, as well as native wildlife. Native birds are among the most common wildlife at the Zoo, with over 100 native bird species that have been observed on Zoo grounds and adjacent natural areas. Some of these birds make their homes at the Zoo year-round, while others are there during part of the year or visit only briefly during spring or fall migration. Glass panels found in windows and other viewing areas at the Zoo are a threat to native birds. We have recorded 824 bird-glass collisions involving 73 species since 2007. This study examines effects of seasonality, species traits, and local abundance on collisions, outcomes of injured birds admitted for rehabilitation, and the effectiveness of window markers that have been installed to prevent collisions.

Dr. Betsy Roznik is the Associate Curator of Regional Conservation at the North Carolina Zoo, where she oversees the regional conservation program. This includes managing over 2,300 acres of natural areas, conducting a diversity of conservation and research projects, developing sustainable hiking trails, and providing community outreach. Her research has addressed questions of conservation importance around the world related to ecology, behavior, and life history.

HERP SURVEYS IN URBAN SETTINGS: CONFRONTING CITY-SPECIFIC CHALLENGES

Rachael E. Urbanek, University of North Carolina Wilmington, urbanekr@uncw.edu.

Wildlife surveys in urban areas present unique challenges that extend beyond the usual logistics of planning a study. While theft of sampling equipment can be a nuisance in any ecosystem, the higher density of people in urban preserves and parks exacerbates this issue, particularly with sampling materials like coverboards that are difficult to secure. The increased number of people and accessibility of urban study sites also introduce additional safety concerns, the presence of environmental vigilantes, and a significantly greater need for active public relations during urban fieldwork. In this presentation, I will share multiple examples and scenarios from a two-year herpetological study in New Hanover County, North Carolina, highlighting the creative solutions my colleagues and I developed to maintain research integrity while fostering community engagement. Additionally, I will discuss the specific methods we employed and some of the key findings that emerged from our study.

Rachael Urbanek is a professor and the chair of the Department of Environmental Sciences at the University of North Carolina Wilmington. She earned her Ph.D. from Southern Illinois University Carbondale in 2012 and has worked at UNCW since 2015. Rachael and her students research effective wildlife population monitoring techniques, predator behavior around endangered species, and human-wildlife interactions to inform wildlife management by state, federal, and non-governmental agencies throughout NC.

ANTECEDENT ACTIVITIES, EXPOSURE SITE, AND DEMOGRAPHICS OF CROTALID ENVENOMATIONS REPORTED TO ONE SOUTHEASTERN UNITED STATES POISON CENTER, 2014-2018

Michael C Beuhler*, Patricia Lee, Patricia M Beuhler, North Carolina Poison Control, Wake Forest University School of Medicine, michael.beuhler@ncpoisoncontrol.org.

Crotalid envenomations are common, potentially dangerous exposures that occur in a significant part of the United States (US). Studies linking rattlesnake envenomations with human behaviors have been published, but the applicability of these associations in areas with predominantly copperheads is less clear as copperhead behavior is significantly different than that of rattlesnakes. Methods: Retrospective review of human pit viper bites cases reported to one large US Poison Center 2014-2018. Case demographics, body part bitten, exposure site, time, and the presence of pre-determined activity and location categories were abstracted. Results: Of 3384 cases reviewed, 606 were excluded, leaving 2778 cases. Copperheads were responsible for most cases (81.2%), with unknown crotalid being the second most common (15.3%); rattlesnake bites were rare (1.9%). Adults averaged 46.4 years old with 58.3% males, and pediatric cases (age <18 years) averaged 9.6 years old. The anatomic location most often bitten in pediatric cases was the lower extremity (81.1%), whereas the upper extremity was most often bitten in adult males (50.6%). For cases where an activity was documented (n=2382), the most frequent activities associated with envenomation were walking (36.7%), gardening (24.9%), and reaching where they couldn't see (19.8%). Most bites occurred during the day, but a significant number occurred at night (32.9%). For cases with known exposure site (n=2656), the most frequent location was own residence (77.5%) with public area (14.2%), other residence (4.0%) and workplace (3.6%) being less common. Urban counties reported a greater number of envenomations (81.5%) than rural counties. There were 382 (16.0%) bites that occurred in close proximity to a living space, with 25 cases occurring indoors.

Dr. Michael Beuhler is an Adjunct Professor of Emergency Medicine at Wake Forest University School of Medicine and a Medical toxicologist at Atrium Health in Charlotte, North Carolina.

CLOSE ENCOUNTERS: NORTH CAROLINA'S BIGGEST WILDLIFE ISSUES, ACCORDING TO VOLUNTARY REPORTING

Falyn Owens, North Carolina Wildlife Resources Commission, falyn.owens@ncwildlife.org.

As North Carolina's human population increases, unplanned encounters between people and wildlife are on the rise. From foxes raising young under someone's porch to a bear tearing down bird feeders, biologists with the NC Wildlife Resources Commission regularly walk people through best practices for how to respond. These requests for professional guidance reveal the expectations people have about wildlife and what types of encounters occur most frequently. We'll go through some statewide data collected over the past several years and reflect on what it could mean for education efforts as well as the role wildlife professionals play in helping people and wildlife coexist.

Falyn Owens is the Wildlife Extension Biologist at the NC Wildlife Resources Commission, under its Operations Program. Her work focuses on human-wildlife interactions across NC – from addressing conflicts to supporting wildlife in need. As part of her duties, she develops information resources that help people interact with wildlife safely and responsibly. Falyn holds a Master of Science in Wildlife and Renewable Natural Resources from Louisiana State University.

HERPETOFAUNA DIVERSITY IN A CHANGING LANDSCAPE

Thomas Reed, Wake County Parks, Recreation and Open Space, Thomas.Reed@wake.gov .

Wake County is one of the fastest growing counties in the country and faces many challenges. While there are many well-known and discussed impacts caused by rapid urbanization, many people do not often consider the decline of suitable wildlife habitat across the changing landscape. Wake County's Open Space Program works to protect land for the preservation of natural resources, protection of good water quality, and so much more. For the last several years the Open Space Program has been actively monitoring Reptile and Amphibian diversity, managing their habitat, and combating many of the challenges that these animals face as a result of the increased urban development.

Thomas Reed is the Assistant Manager of the Open Space Program with Wake County Parks, Recreation and Open Space. He received his BS in Fisheries, Wildlife and Conservation Biology from North Carolina State University in 2019 and has been working with Wake County since 2016 in a variety of roles. Thomas' main research and survey interests include reptile and amphibian conservation efforts in the piedmont of NC, habitat management, isolated wetlands, biological inventories and citizen science efforts.

ISSUES WITH MITIGATION TRANSLOCATIONS OF STRAY TIMBER RATTLESNAKES

John Sealy, NC Timber Rattlesnake Conservation Alliance, jbsealy@crotalushorridus.org.

The Timber Rattlesnake (*Crotalus horridus*), a vital woodland predator, faces substantial and varied conservation challenges. The Timber Rattlesnake is late to mature, reproduces at three to four-year intervals, and experiences high juvenile mortality. Data indicates there is no harvestable surplus of adults in a viable population. Due to these life history characteristics, coupled with diminished and fragmented habitats, relentless road mortality, and wanton persecution, the Timber Rattlesnake is state listed in North Carolina as a Species of Special Concern. The ecological plague of hominid expansion encroaches upon remaining Timber Rattlesnake habitats causing an increase in human/rattlesnake encounters. Few of these encounters have a positive outcome for the snake. To address negative outcomes, well-meaning professionals and non-professionals alike "assist" Timber Rattlesnakes by moving them (translocate) to more remote populations. These actions, framed as conservation, ignore the tenets of population genetics and conservation ecology and are placing populations in peril. This presentation will examine the issues, motivations, and outcomes of this common and growing practice and suggest alternative actions.

John Sealy has enjoyed a lifelong interest in Timber Rattlesnakes. John initiated North Carolina's first Timber Rattlesnake study utilizing radio telemetry in 1989. He is actively involved in conservation, education, and research involving the species and is currently conducting projects involving NC State Parks, The Blue Ridge Parkway, the North Carolina Wildlife Resources Commission, the Cape Hatteras National Seashore, the US Forest Service/National Forests, and the Wildlands Network. He has published articles concerning Timber Rattlesnake conservation and recently served as an editor and author of the rangewide Timber Rattlesnake: Life History, Distribution, Status, and Conservation Action Plan. John earned undergraduate degrees from Elon College and the University of North Carolina Greensboro, and a Master of Science in Biology from Appalachian State University in Boone, NC. Retired from UNCG as a biology lecturer, John is married with two daughters and three fabulous grandchildren.

CONNECTIVITY CONSERVATION FOR LOCAL WILDLIFE, LOCAL HABITATS, AND LOCAL DECISION-MAKING

Julie Tuttle*, Research Affiliate in Biology, University of North Carolina at Chapel Hill, julieptuttle@gmail.com.

Wildlife communities need diverse, healthy, and connected habitats to survive, thrive, and persist. Successful connectivity conservation requires the collaboration of conservation, land use, and transportation stakeholders, supported by science-based mapping of wildlife habitats and corridors tuned to local landscapes. Working with the Triangle Connectivity Collaborative (TCC, 2019) and Durham County Open Space (2023), Tuttle developed and applied a landscape connectivity modeling approach for the Upper Neuse and New Hope Creek watersheds in the Piedmont of North Carolina. The approach focuses on locally relevant habitats and priority wildlife species to produce a prioritized habitat-corridor network at a scale relevant to local decision-making. The resulting spatial data products are currently in use by local stakeholder groups to prioritize wildlife habitat connectivity in conservation, land use, and transportation planning. Tuttle and colleagues have plans to translate the modeling approach to a shared platform that would enable regular updates, expansion to different geographic areas, and collaboration across jurisdictions.

Julie Tuttle is an Ecologist and Biogeographer whose work focuses on understanding, conserving, and teaching about the natural communities, biodiversity, and landscapes of the southeastern US. She received a Ph.D. from the University of North Carolina at Chapel Hill and an M.S. from the University of Georgia. Julie works on projects ranging from field surveys to project coordination to spatial analysis and modeling, including her recent focus on wildlife habitat connectivity.

LAND CONSERVATION IN THE PIEDMONT: OPPORTUNITIES AND OBSTACLES

Ken Bridle, Piedmont Land Conservancy, kbridle@piedmontland.org.

The Piedmont of North Caolina is the most lived in region and developed region of the state. The Piedmont holds the most private property, multi-generation small farms, urban areas, suburban growth and expanding residential populations. Increasing property values and state and federal tax structures make the purchase of land and conservation easements often a challenge. Variable amounts of funding in the conservation and agricultural funds with increasing competition make some good projects not score good enough. These can be balanced with a larger pool of private, corporate and foundation support, a big pool of volunteers and a general increasing interest in preserving green spaces by anyone who has seen the changes in recent decades. Piedmont Land Conservancy prioritizes land projects for natural heritage, water resources, farmland and nature recreation. Many projects are a multiple of these priorities. Projects grouped into focus areas provide greater resources and protection and wildlife habitat. Old projects find new conservation uses and new projects blend public access and nature preservation. Examples of wildlife related projects will be given.

Ken Bridle is currently Conservation Advisor for the Piedmont Land Conservancy after a period of more than 30 years as Inventory Biologist, Stewardship Director and other roles. He is a founding member of the Dan River Basin Association, the Carolina Butterfly Society and the Triad Mushroom Club. He is President of the North Carolina Native Plant Society and a past Chair of the WRC Nongame Wildlife Advisory Committee. Currently an instructor for the new Northwest Piedmont Master Naturalist training course. He lives in Stokes County where he gardens and paints watercolors.

A RACE AGAINST TIME: DOCUMENTING BIODIVERSITY IN A RAPIDLY GROWING REGION

Lenny Lampel, Mecklenburg County Park and Recreation, lenny.lampel@mecknc.gov.

Areas that we once knew as farm, field, and forest are now being designated as residential, commercial, and industrial. As open space in Mecklenburg County continues to disappear, protected natural areas become some of the last safe havens for native plants and wildlife. Unfortunately, surrounding development isolates these areas and makes them more vulnerable to human disturbances and intrusion by invasive-exotic species. Natural Resources staff in Mecklenburg County work to protect and enhance the natural communities within over 8,000 acres of these protected nature preserve properties. This presentation will provide an overview of this work, with a focus on some of the inventory and monitoring efforts to help document and better understand the biodiversity of these important areas. Also highlighted in this presentation is the Dr. James F. Matthews Center for Biodiversity Studies, a unique facility managed by Mecklenburg County that houses an active herbarium and zoological collection and serves as the repository for plants and animals that are collected within the Charlotte region. With biodiversity loss being an important issue in many parts of the world, it's a race against time to learn as much as we can about our local biodiversity before it disappears from our changing landscape.

Lenny Lampel is a Natural Resources Supervisor with Mecklenburg County Park and Recreation's Division of Nature Preserves and Natural Resources. He is the Curator for the Dr. James F. Matthews Center for Biodiversity Studies and is also responsible for the management of biological assessments and inventories, the monitoring of federal and state listed rare plant species, and the coordination of various fauna and flora studies and projects. Lenny holds an MS in Environmental Studies with a concentration in Conservation Biology from Antioch University New England in Keene, NH.

22 YEARS OF DEATH: A LONG-TERM, ONGOING SURVEY OF VERTEBRATE MORTALITY ON A 0.7-MILE SECTION OF SECONDARY PAVED ROAD IN THE NORTH CAROLINA SANDHILLS

Jeffrey C. Beane, North Carolina Museum of Natural Sciences, jeff.beane@naturalsciences.org.

A 0.7 mi. (1.1 km) section of secondary, state-maintained, paved road in the Sandhills region of southern Moore County, North Carolina has been opportunistically and continually monitored on foot and via vehicle since 27 October 2002, to document vertebrate roadkill. As of 26 November 2024, 2,406 pedestrian surveys and 3,156 vehicular surveys have been undertaken on 2,474 dates ($\bar{x}$ = 2.2 dates/week or 112 dates/yr.). A total of 6,747 vertebrates of 125 species were documented as roadkill during that period. Of the total, 64.4% (4,345 individuals, 22 species) were amphibians; 28.9% (1,953 individuals, 40 species) were reptiles; 3.0% (203 individuals, 45 species) were birds; and 3.2% (215 individuals, 18 species) were mammals. Seven species (*Bufo* [*Anaxyrus*] *terrestris*, *Pseudacris crucifer*, *Hyla* [*Dryophytes*] *cinerea*, *Scincella lateralis*, *Rana* [*Lithobates*] *clamitans*, *Notophthalmus viridescens*, and *Anolis carolinensis*) accounted for over half (50.1%) of the total roadkill. Pedestrian surveys were far more effective at detecting roadkill, accounting for 96.5% of the total, while vehicular searches accounted for only 3.5%. Various interesting facets of this survey will be discussed.

Jeff Beane is Herpetology Collection Manager for the North Carolina State Museum of Natural Sciences in Raleigh, where he has been employed since 1985. He holds a B.S. in Zoology from North Carolina State University (1982) and has authored many popular and scientific natural history publications. His interests include virtually anything pertaining to natural history or conservation, especially Sandhills ecology and the natural history, zoogeography, and conservation of amphibians and reptiles in North Carolina and the Southeast. Sometimes he feels like a roadkill.

ROAD ECOLOGY FOR HERPS: HOW AND WHERE TO HELP REPTILES AND AMPHIBIANS CROSS HIGHWAYS

Ron Sutherland*, Liz Hillard, Wildlands Network, ron@wildlandsnetwork.org.

Roads pose major threats to amphibian and reptile populations worldwide. Fortunately, there are effective solutions for reducing the mortality risk for herps on busy highways. These principally include the combination of appropriate wildlife road crossing structures and guide fencing to steer animals to the crossings. We will introduce the science of wildlife road crossings and then briefly review 3 case studies: 1. Herp mortality rates observed on US 64 in northeastern North Carolina, 2. Herp use of wildlife culverts at Gorges State Park, and 3. Prioritizing wildlife road crossing locations statewide across North Carolina. Implications from these projects for other herp road mortality problem areas in the southeast will be discussed.

Ron Sutherland is the Chief Scientist and Southeast Program Director for the conservation nonprofit group Wildlands Network. He received his PhD in Environmental Science and Policy from Duke University in 2009 and has worked for Wildlands Network since 2010. Ron's work focuses on road ecology and improving habitat connectivity across the southeast. He also has been deeply involved in efforts to study and protect endangered red wolves. Ron is based in Durham, NC, and in a prior life he trained bird dogs to find northern pine snakes.

HELLBENDER RELOCATIONS AT NCDOT BRIDGE PROJECTS

Dave McHenry, North Carolina Wildlife Resources Commission, david.mchenry@ncwildlife.org.

Bridge replacements in Western North Carolina can have unavoidable impacts to habitat for Eastern Hellbender (*Cryptobranchus a. alleganiensis*), a long-lived state listed aquatic salamander. These impacts are typically associated with temporary dewatering structures and permanent bridge pilings or rip rap bank protection. For years, North Carolina Wildlife Resources Commission (NCWRC) staff have been advocating conservation measures for hellbenders during environmental reviews and regulatory permitting of bridge replacement projects. Hellbender surveys and relocations are often recommended and typically conducted by NCWRC aquatic wildlife diversity staff with assistance from partner groups such as the North Carolina Department of Transportation (NCDOT), United States Forest Service, North Carolina State Parks, and North Carolina Zoo. NCDOT staff have provided invaluable assistance with coordination of construction schedules and some schedule adjustments to facilitate the surveys shortly before construction impacts occur. There have been four survey efforts conducted in recent years involving over 13 individual captures and relocations. NCWRC staff are continuing to coordinate with NCDOT on these relocation opportunities to reduce incidental mortality of hellbenders from bridge work.

Dave McHenry is a Conservation Biologist with the NC Wildlife Resources Commission in the Habitat Conservation Division. He began his professional career in 1991 with Weyerhaeuser Paper Company and since 2002 has held various environmental positions with the Commission and NC Department of Transportation. Dave's current position is funded by NCDOT and primarily involves facilitating environmental reviews and permitting of transportation projects in the 41 westernmost counties of the state.

ESTABLISHING NORTH CAROLINA AS A BEARWISE® STATE

Ashley Hobbs, North Carolina Wildlife Resources Commission, ashley.hobbs@ncwildlife.org.

The SEAFWA created BearWise in 2018 as a regional effort to communicate consistent and effective messaging about how to live responsibly with American black bears (Ursus americanus). After garnering nationwide interest, BearWise is now housed under AFWA and adopted by 40 states in the US. North Carolina has quickly become one of the leading states for implementing BearWise at the community level. The NC Wildlife Commission utilizes the consistent, science-based information provided by the program to address human-bear interactions through social media, community outreach and educational programming. NC adopted a formal recognition program for BearWise communities, businesses, recreation areas, and campuses. As human-bear interactions continue to be a significant portion of human-wildlife interaction calls statewide, the Commission is looking to expand its BearWise program through partnerships with outside agencies and community groups and identify new ways to connect NC residents and visitors to BearWise messaging.

Ashley Hobbs is a Special Projects Biologist with the NC Wildlife Resources Commission, in the Wildlife Management Division. She graduated from the University of Georgia in 2015 with a degree in Forestry Resources and has been with the Commission since 2019. Ashley is responsible for the management of human-wildlife interactions in Buncombe County and the implementation of North Carolina's BearWise® Program statewide.

BACKYARD SWAMP PUPPIES: LUXURY LIVING WITH DINOSAURS

John Henry Harrelson, North Carolina Wildlife Resources Commission, john.harrelson@ncwildlife.org.

The American alligator's range in North Carolina is primarily relegated to coastal counties with their highest concentrations being found in the southernmost counties. These same coastal counties continue to grow into retirement destinations, and the human-wildlife conflicts continue to grow as well, particularly involving alligators in close proximity to people's homes and hobbies. The NC Wildlife Resources Commission is tasked with educating the public about coexisting with alligators, as well as addressing potentially life-threatening situations with these large apex predators.

John Henry Harrelson is the District 4 Wildlife Biologist with the NC Wildlife Resources Commission, in the Operations Program. He received an M.S. from Louisiana State University in 2011 and has worked as a biologist with the Commission since 2013. John Henry focuses his spring and summers on resolving human-wildlife interactions, primarily involving alligators, and his fall and winters surveying for Chronic Wasting Disease (CWD) in his nine-county district in southeastern NC.

Poster Abstracts
(in alphabetical order)

Evaluating Boater Safety Violations and Associated Law Enforcement Outcomes

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Lack of compliance with boating safety regulations results in property damage, injuries, and fatalities, emphasizing the need for interventions and effective enforcement strategies. In this study, we evaluated wildlife agency law enforcement officer (LEO) responses to boating interactions throughout North Carolina between 2018 and 2023 (n= 41,513). We used logistic and multinomial regression models to evaluate predictors of boating safety violations and predictors of enforcement outcomes after a violation occurred. More serious violations (e.g., reckless behaviors) were least common in mountain waterways, but more common during boating season and for boats with more passengers. Confirming a violation during a boat stop was positively predicted by year, gender of operator, number of passengers, boating season, and region. Tangible penalties for boat operators were predicted by year, gender of operator, number of passengers, boating season, region, and the reckless behavior violation type. This study suggests there may be safety benefits of policies establishing passenger limits, similar to young driver restrictions on land, for boaters. Results also underscore the need for further research on social dynamics of LEO discretion.

Evaluating predictors of white-tailed deer (*Odocoileus virginianus*) birth-site selection along an urban-rural gradient

FAITH BRADSHAW[1] fkbradsh@ncsu.edu, Christopher Moorman[1], Mikiah Carver-McGinn[1], Nathan Hostetter[1], Elizabeth Kierepka[2], John Kilgo[3], Jared Lamb[1], Nils Peterson[1] and April Boggs-Pope[4]

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Birth-site selection by parous white-tailed deer (*Odocoileus virginianus*) may affect neonate survival, but factors influencing selection in more urbanized areas are poorly understood. Our objectives were to describe deer birth sites in Durham and Orange Counties, NC, evaluate landscape features as predictors of selection, and assess if selection for these predictors varied across an urban-rural gradient. We identified birth sites and nearby available sites for 61 GPS collared deer and assessed the influence of tree canopy cover, impervious surface, vegetation productivity (NDVI), distances to roads and buildings, and urbanization index on birth-site selection. We compared 3 models: a null model, a model with all covariates, and a model incorporating covariate-urbanization index interactions. The top model, which included interactions, indicated that landscape covariate influence varied across the gradient. Specifically, deer in urban areas selected birth sites with lower NDVI and greater canopy cover, whereas deer in rural areas had little or opposite selection for these same covariates. These results demonstrate behavioral responses to urbanization and provide context for management strategies in urbanizing landscapes.

Microplastics in a Southern Appalachian forest: assessing connections between atmospheric deposition and terrestrial food chains

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Microplastics (MPs) are ubiquitous pollutants, yet there is a gap in knowledge concerning how microplastics move through terrestrial food chains. To address this gap, we analyzed MPs in atmospheric deposition samples, earthworms, and shrews collected in the southern Appalachian Mountains. Tissues of earthworms and shrews were digested in hydrogen peroxide, filtered, and examined microscopically to count and classify MPs to color and type. We found that the mean MP concentration in shrew tissues was 1.4 times greater than that of earthworm tissues, which may suggest bioaccumulation up the trophic level, given that earthworms are an important food source for shrews. Of the four shrew organ groups analyzed (heart, liver, kidneys and gut), we found the highest MP concentrations in hearts and the lowest concentration in livers. Blue and black were the most common colors, while fibers and fragments were the most common types of MP among all three sources analyzed. Similar distributions of colors and types of MPs were observed in atmospheric deposition, earthworms, and shrews, suggesting that atmospheric deposition may be a significant source of MPs found in food chains of southern Appalachian forests. By quantifying the presence of MPs in wild organisms, we hope this work will increase research regarding the presence and impacts of MPs in terrestrial environments.

How hunters and non-hunters view barriers to hunting in an urban county

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Barriers to white-tailed deer hunting shape recruitment, retention, and reactivation (R3) efficacy and the ability of agencies to use hunting as a management tool. These barriers are more important to understand in urbanizing landscapes where deer may persist in relatively high numbers and there are increased barriers to hunting. We compared perceived barriers to deer hunting among hunter (n=896) and non-hunter (n=265) residents of Durham County, NC. For both groups, small property size was perceived as the largest barrier (Hunter=4.47, SD=1.08; Non-Hunter=4.19, SD=1.24), and safety-related variables (too many roads/houses) were also important barriers ($\bar{x}$=3.47-4.20). Hunters generally viewed all barriers as less important than non-hunters, with the largest difference for not knowing hunters who want to hunt their property (Hunter=2.89, SD=1.58; Non-Hunter=3.99, SD = 1.33). Both groups viewed safety issues as larger barriers for properties in suburban/urban areas than for rural properties. Results indicate that perceived barriers align with variables predicting whether land is huntable (e.g., property size). Helping hunters secure huntable land access from residents who do not know any hunters could promote hunting in urban areas.

A preliminary investigation of temporal variation in the frequency of alternative reproductive tactics in an Appalachian salamander

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Blue Ridge Two-lined Salamanders (*Eurycea* cf. *wilderae*) have developed two distinct male phenotypes with discrete reproductive tactics. “Searching” males leave the stream to court terrestrially, whereas “guarding” males guard mates with their powerful jaws in the stream. The proximate cause of these alternative reproductive tactics is a Y-chromosome polymorphism, but little is known about the mechanisms responsible for maintaining this polymorphism in wild populations. Here, we present preliminary results from the beginning of a long-term study on temporal variation in the frequency of *E.* cf. *wilderae* alternative reproductive tactics at Highlands Biological Station. Using a genotyping assay, we characterized the frequency of searching and guarding males for three consecutive cohorts of larvae, and we evaluated the effect of humidity and precipitation on variation in relative frequency. We also collected data on terrestrial activity to better understand how weather might influence reproductive opportunities in adults. This study system presents a unique opportunity to understand the mechanisms maintaining variation, which will assist in monitoring the relative frequency of the two male phenotypes.

Investigating variations in loggerhead sea turtle availability across environmental conditions

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With increases in anthropogenic activity and the impending risks of climate change on the Atlantic coast of the United States, it is crucial to have an accurate understanding of how this area is used by vulnerable marine wildlife. This is especially apparent for *Caretta caretta*, the loggerhead sea turtle, who mate, nest, and forage between the Caribbean and Canada. Current efforts to map loggerhead sea turtle abundance and distribution often use boat and aerial survey data to account for presence observations in their models. With the diving and surfacing nature of this species, however, it is appropriate to include an availability bias parameter to account for the probability of an individual being below the surface of the water and out of view for surveyors. Diving behavior is often associated with foraging, thermoregulation, migration, and avoidance of predators, which are further driven by environmental conditions. As these conditions vary over space and time, it is likely that surfacing and diving activity, and therefore availability, varies as well. This project will use Argos time-at-surface data with satellite-derived environmental variables in generalized additive models to investigate the changes in the probability of surfacing with environmental covariates. We expect to see lower availability in areas considered suitable for diving activities. These relationships can be applied to surveying locations to correct for availability in detection probabilities and prevent underestimations or overestimations of loggerhead sea turtle abundance for better conservation management.

Four decades of loggerhead sea turtle nesting data on MCB Camp Lejeune

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Loggerhead sea turtles (*Caretta caretta*) have the broadest nesting range of any sea turtle species; however, very few long-term studies have been conducted at the geographic limits of the reproductive habitats. With climate change in coastal zones, it is unclear how nesting itself has changed throughout the range. Long-term loggerhead sea turtle nesting surveys at Marine Corps Base Camp Lejeune (MCBCLJN), located in southeastern North Carolina, USA, have been conducted continuously since the 1980's. Although the beach at MCBCLJN is crucial for military training operations, portions of the beach function effectively as a natural and undeveloped beach. MCBCLJN manages one of the longest running continuous surveys at the northernmost extent of the loggerhead population within the Northwest Atlantic Regional Management Unit. To mitigate potential military training impacts on sea turtles that utilize MCBCLJN, daily mitigation measurements are implemented. This study analyzed MCBCLJN's 40-year dataset to determine change in nesting indicators and population trends over time while considering phenological shifts from longer summertime conditions due to climate change. The results of the study suggest that the nesting population is stable at MCBCLJN, according to nest counts and DNA analysis. The results from this study highlight the importance of monitoring loggerhead nesting throughout the nesting range, especially given concern about future impacts of climate change to this broadly distributed marine reptile.

Bat activity in mines of Western North Carolina

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With the changing urban environment of Western NC, bats have adapted by using man-made structures for hibernation. Due to the decline in bat populations seen in Western NC since the introduction of White Nose Syndrome (WNS) in 2011, it is important to understand how and why bats choose these structures for hibernation. This project aims to analyze bat behavior and activity at 14 potential hibernacula sites; 13 sites are abandoned mine shafts and 1 site is a natural cave. We collected data using ultrasonic acoustic detectors deployed at each site between September 2023 and November 2024. We also collected data on each site's physical characteristics, relative humidity, and temperature. Our analysis of bat acoustic data showed the highest relative abundance of the Little Brown Bat (*Myotis lucifugus*) and the Tri-Colored Bat (*Perimyotis subflavus*). In 2024, peak bat activity at our sites occurred in April and September. Data on bat activity contribute to our understanding of how bats behave in correlation to temperature and seasonal changes. Furthermore, this research assists in our understanding of hibernacula preference and helps us properly allocate conservation efforts for bat habitats at sites where bat activity is high.

Characterization of ultrasonic vocalizations produced wild woodland jumping mice

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Vocalizations in wild animals are important for communication with and between species. Communication is essential for identity determination, establishing dominance, defending territories, mother-offspring interactions, finding mates, and more. Rodents represent almost half of all living mammalian species and yet there are clear knowledge gaps in the production of vocalizations and understanding the extent of their vocal repertoire. The majority of mice communication studies have been conducted in laboratory settings which can have an altered effect on vocalizations due to the inhibition of natural behaviors. Understanding the characterization of ultrasonic vocalizations (USVs) produced by wild mice based on spectral (frequency) and temporal (duration) features allows for the association of unique call types with specific behavioral patterns, which can be used in comparative studies. The goal of this study is to characterize USVs produced by free-living, woodland jumping mice (*Napaeozapus insignis*). Using remote sensing technologies, such as acoustic recording devices to record their vocalizations, imaging (thermal and trail cameras) to record behaviors during the time of vocalizations, and radio telemetry to identify individuals vocalizing. In this novel study, I am able to assign vocalizations to species, individuals, and behaviors.

Business owners are less concerned about risks posed by white-tailed deer than residents in urban areas

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Understanding public concern about wildlife-related risks is crucial to aligning management and stakeholder interests. Past research has investigated resident perceptions of wildlife risks, although the specific perspectives of business owners are unknown. We measured and compared concerns about risks associated with white-tailed deer (*Odocoileus virginianus*; hereafter deer) among business owners (n = 235) and residents (n = 972) of Durham County, NC. Using a 5-point scale ranging from not at all concerned (1) to very concerned (5), business owners were relatively unconcerned about all risks ($\bar{x}$ < 3), whereas residents were concerned about deer-vehicle collisions and tick-borne illnesses ($\bar{x}$ > 3). Businesses were less concerned than residents about plant damage ($\bar{x}$ difference=1.0, p=<0.001), deer-vehicle collisions ($\bar{x}$ difference=1.1, p=<0.001), tick-borne illness ($\bar{x}$ difference =1.1, p=<0.001), COVID-19 in deer ($\bar{x}$ difference=0.4, p=<0.001) and chronic wasting disease ($\bar{x}$ difference=0.6, p=<0.001). Despite differences, both groups shared support for lethal responses to overabundant deer ($p \geq 0.38$), although business owners may be less concerned than residents about risks as they spend less time on the affected property.

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

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In the United States, ungulates are responsible for millions of dollars in annual agricultural damages. Without a promising solution, the continued depredation of cash crops is an important concern. 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 objectives were 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 20 plots (n = 20), each approximately 0.2 hectares (0.5 acres), randomly assigned as a treatment factor (n = 10) or control (n = 10). 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 37.8 liters (10 gallons) per acre. We placed camera traps in each field to document white-tailed deer use and foraging behavior and conducted weekly measurements of soybean height and browsing damage during the early growth stages. Yield was recorded at the end of the growing season. Condensed quebracho tannins applied at the V2 growth stage positively impacted soybean height, suggesting reduced deer browsing on treated plants. Additionally, condensed quebracho tannins decreased the proportion of soybean stems browsed by white-tailed deer. Preliminary analyses indicate that condensed quebracho tannins can function as a landscape level repellent to reduce white-tailed deer browsing on soybeans in a field setting.

Ultrasonic vocalizations produced by golden mice in the wild

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Despite considerable research on ultrasonic vocalizations (USVs) production and function of calls on mice in the laboratory settings, no research has shown that golden mice (*Ochrotomys nuttalli*) produce USVs. Here, we aim to examine the production of USVs and classify call types of free-living golden mice. Using capture-mark-recapture we determined resident individuals and outfitted resident mice radio collars were put on the mice and radio telemetry was used to record nest locations. Ultrasonic detectors and video (thermal imaging and trail camera) equipment were deployed throughout trapping sites to record mouse calls and behaviors. Each call identified to a golden mouse was analyzed using Raven pro based on five frequency variables duration, bandwidth, modulation, and slope. Preliminary data shows that in the wild, golden mice have three distinct call types. The discovery of ultrasonic vocalizations in golden mice in the wild highlights the need for further research into behavior and social interactions and the possible impacts of anthropogenic disturbances.

Wildlife viewing strategies of bioluminescent insects

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Featuring a collaborative research approach between managers and researchers, this study outlines how a viewing strategy for fireflies (Lampyridae) and glow worms (*Lampyris noctiluca*) was developed and implemented in the summer of 2022. Requiring a pre-online registration, and capped at an on-site attendance of 300, the three separate viewing events held in the summer of 2022, provided participants with opportunities to become familiar with fireflies and glow worms through interpretive strategies provided by staff and/or managers. Educational material was developed to educate viewers in-order to understand the conservation methods established in-order to minimize disturbance to the fireflies and glow worms. The viewing area was established as a closed off section of the paved park road near the viewing area. Staff were located along the viewing area to inform guests of these practices. Consisting of field observations and informal discussions with staff and some participants, and post-viewing surveys administered by the managers, the results provide an overview of the types of bioluminescent insect viewing opportunities in the Grandfather Mountain Stewardship Foundation nature park while also examining the role of interpretive strategies. The conclusion highlights four key strategies that will help guide future viewings' management practices in this protected area:
a. Species and habitat conservation
b. Viewing guidelines
c. Staff involvement
d. Interpretation strategies

Growth of Captive *Trachemys scripta scripta* fed on a natural diet and commercial pellets

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The turtle shell serves multiple functions, including predator defense; pH buffering; and as a storage site for nutrients, water, and waste products. Ontogenetic changes in calcification and ossification of the shell result in an increase in shell strength over time that contributes to higher survivorship in older age classes. Given the importance of shell development in the life history of turtles, I investigated the effect on growth rates and shell morphometrics in juvenile yellow-bellied sliders by changes in Mass, Carapace Length, Plastron Length, Depth, and Carapace Width in captive turtles offered a diet of either Commercial Pellets or Crickets at an equivalent level of calories over a period of four weeks. I found a significant difference in the change in Mass and Plastron Length between the two treatment groups. However, when I factored in the actual calorie intake based on the difference between the amount of food offered and amount of food consumed, there was no significant difference in any of the measured variables between treatment groups. This indicates that higher overall growth rates in turtles fed Commercial Pellets are not necessarily due to higher digestive efficiency, but simply to a higher level of calorie intake per gram of food eaten. I found no significant difference in ratio of shell morphometrics. My study provides support for the use of modified Commercial Pellets to promote safe and efficient growth of captive turtles.

Investigating the Impacts of Disease, Environmental Factors, and Human Disturbance on Endemic Neuse River Waterdog (*Necturus lewisi*) Populations

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Amphibians worldwide have seen significant population declines over the past few decades due to factors including human disturbance, changing environmental conditions, and chytridiomycosis, a disease resulting from infection with the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*). The Neuse River Waterdog (*Necturus lewisi*), endemic to the Neuse and Tar-Pamlico River Basins of North Carolina, was declared a threatened species in 2021, granting them federal protection. Our research has two primary goals: (1) to address the lack of data on *Bd* infection in Neuse River Waterdogs by utilizing dermal swabbing to assess current *Bd* infection rates, and (2) to assess the impacts of environmental factors and human disturbance on the health of *N. lewisi* populations through geospatial and biostatistical analysis. This information may help direct conservation efforts and help us understand the susceptibility of these populations to disease. Each individual captured was swabbed for *Bd* in conjunction with collecting and recording biometric data and capture location. *Bd* swabs were processed by the Student Network for Amphibian Pathogen Surveillance (SNAPS) program to determine if *Bd* was detected.

Diet of three large co-occurring Plethodons in Western North Carolina

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Three species of large Plethodon salamanders co-occur in northwestern NC; *Plethodon yonahlossee*, *Plethodon montanus*, and *Plethodon cylindraceus*. They occupy similar habitats so it has been hypothesized that dietary niches may differ to allow co-occurrence. We performed gastric lavages on >10 individuals of each species at three different sites. All regurgitated prey items were preserved for identification and enumeration. Out of the 170 samples collected thus far, we've processed 100. From those 100 samples, there is a high degree of overlap in diets of the three species. There is also high overlap among the most common prey items: ants, springtails, millipedes, mites, and beetle larvae.

Assessing Niche Overlap of Isotopic and Morphological Space in Plethodontid Salamanders

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Approximately 2.16 million living species have been identified on Earth. Species are expected to differentiate along at least one dimension of niche space to reduce resource overlap or else eventually become extinct. The southern Appalachians are a biodiversity hotspot for salamanders, specifically plethodontids. Small-bodied plethodons play vital roles in the communities where they are found, yet the mechanisms for coexistence remain unknown. Southern Zigzag salamanders, *Plethodon ventralis*, and Southern Redback salamanders, *Plethodon serratus*, are two small-bodied woodland salamanders with areas overlap in the Great Smoky Mountains National Park. A total of 17 populations, 8 sympatric sites, 5 allopatric *P. ventralis* sites, and 4 allopatric *P. serratus* sites, will be studied to determine if niche overlap exists in isotopic niche and morphological space. Tail tissues approximately 5mm in length were collected in the field and processed for stable isotope analysis while photos of live individuals will be digitized and processed in geomorph, an R package. Based on preliminary results, overlap in isotopic niche space exists between all populations of *P. ventralis* and *P. serratus*. Morphological data are undergoing analysis.

Quantifying behavioral responses of alligators to humans following mark-recapture at Lake Waccamaw, North Carolina

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Due to concerns about potential impacts to small, slow-growing alligator (*Alligator mississippiensis*) populations, relocation occurs more often than euthanasia in response to human-alligator conflicts in North Carolina and has become more frequent alongside the continuous increase in human development of coastal areas. Since relocated alligators often attempt to return to established territories and may not survive encounters with highways or larger alligators en route, alternative management options are needed that reduce risks to alligators. Aversive conditioning is one such suggested strategy, whereby behavioral modification is induced by capture and handling before release on-site. As such, the mark-recapture (MR) that occurs twice-yearly for an ongoing study of the Lake Waccamaw alligator population may also serve to simulate the effects of aversive conditioning. Our objectives are to (1) survey alligator behavioral response to humans following mark-recapture and (2) quantify differences in behaviors observed. Walking surveys of the canal were conducted between April and October in 2023 and 2024 along a 3-km route. The canal was divided into three zones (i.e., near, middle, and far) parallel to the survey transect. For each alligator observed, surveyor(s) recorded its estimated size, initial zone use and behavior, and response(s) to surveyor approach. Surveyors described 1,308 total alligator observations (range of 3-68 within a single survey) from 19 and 15 surveys in 2023 and 2024, respectively. Preliminary results will be presented in the poster.

Timber rattlesnake (*Crotalus horridus*) trailhead signs, a successful approach providing relevant information and promoting conservation action

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[2]NC Wildlife Resources Commission

The presumed danger associated with encountering a Timber Rattlesnake in state and national forests is a primary concern of the hiking public, far exceeding fears of falls and drowning, the leading causes of death. Due to these irrational fears, the outcome of human/rattlesnake encounters are rarely positive and not infrequently lead to the death of the snake. Signs heretofore are typically little more than vague warnings representative of the ingrained fears and subconscious bias of land managers. Warning signs exaggerate an essentially nonexistent danger while providing no relevant information or conservation benefit. Our rationale in developing new signage is that the hiking public and snake populations will benefit from accurate safety and educational information which improves hikers' natural experiences and promotes the species' conservation. In addition, addressing prevalent fears on trails where these concerns are most applicable and pertinent is a teaching opportunity impossible to duplicate in other settings. To this end, we have developed trailhead signs with messaging indicating the possibility that rattlesnakes may be encountered and how safely to respond. The signs inform hikers of the snake's protected status in North Carolina including access to species information and an invitation to take part in the NC Wildlife Resources Commission's community science conservation efforts. To date, trailhead signs have been placed in two national forests and 4 state parks in North Carolina. Preliminary surveys and community science reporting indicate the signs are an effective component of comprehensive conservation and education programs on behalf of the species.

Diversity of terrestrial salamander assemblages along elevational gradients in the Southern Appalachians

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[1] Appalachian State University

The Southern Appalachian Mountains are a biodiversity hotspot, especially for plethodontid salamanders. While the ranges of some salamander species are well understood, much less is known about how environmental parameters affect their diversity and abundance. To investigate these patterns, we conducted repeated nighttime visual encounter surveys along 25 x 4m transects throughout western North Carolina and East Tennessee across a range of elevations (500-2,000 m) during the summer of 2024. Each of the 128 transects were searched at least 3 times, and 93 were searched a fourth time. Throughout the active season, we counted 2,673 individuals representing 17 species. Using the R package spAbundnce, we estimated the abundances of the five most common species encountered (*Desmognathus orestes*, *Eurycea wilderae*, *Plethodon cylindraceus*, *P. montanus*, and *P. yonahlossee*). Preliminary results indicate that the abundances of these species are predicted by similar covariates, such as elevation. Our findings will enhance the understanding of what environmental parameters shape terrestrial salamander communities and provide valuable data to inform their conservation and management.

Spatial connectivity analysis of *Plethodon nettingi* occurrences in West Virginia's Monongahela national forest

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The Cheat Mountain Salamander (*Plethodon nettingi*) is a federally threatened species found in the Monongahela National Forest that has suffered habitat fragmentation and loss. Forest managers must balance the needs of *P. nettingi* with the needs of other species, timber production, and recreation mandates. Although both current and future habitat suitability models for *P. nettingi* have been created, connectivity among occurrences has not been assessed. Our main objectives are to 1) model optimal paths and habitat corridors for *P. nettingi*, and 2) model the potential impact of climate change on connectivity. We modeled least cost pathways using ArcPro's "Optimal Path" and "Least Cost Corridor" tools. We created cost surfaces for these models by combining existing habitat suitability layers, both current and future, with additional movement barriers, including roads, streams, and utility lines. Preliminary results highlight key pathways between occurrences and corridor degradation due to climate change. Understanding the location and quality of pathways connecting disjunct occurrences of *P. nettingi*, both current and projected, will aid managers in prioritizing surveys and habitat management, enhancing conservation efforts overall.

Bridging the gap: evaluating BearWise's role in fostering coexistence with urban black bears

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[1]North Carolina State University, [2]NC Wildlife Resources Commission

State agencies are increasingly implementing BearWise® (bearwise.org) to reduce negative human-bear interactions. While technical guidance is vital for addressing human-wildlife conflicts, research on its effectiveness remains limited. We conducted a before-after control impact (BACI) study to evaluate the effects of a 12-month BearWise campaign on residents' knowledge, attitudes, and behaviors related to black bears (Ursus americanus) in Asheville, North Carolina, using mailed surveys to collect data on residents' perspectives and experiences. Our response rate was 46% and 38% before and after the campaign, respectively. Results indicate BearWise may have encouraged residents to modify their trash bins to exclude bears (Mean Difference: 0.064; p=0.053) and refrain from feeding birds and wildlife year-round (Mean Difference = 0.145, t(df)=310, p=0.030, one-tailed). However, increased support for limiting bird feeding year-round did not result in a detectable reduction in bird feeding behavior during the same period (p=0.159). We found no effect of BearWise on residents placing bins curbside on the morning of service (Mean Difference = 0.015, t=0.66, p = 0.509) likely because 84% of residents already followed this practice. After the campaign, perceptions of risk increased, particularly on the potential risk to residents' property (Mean Difference 0.271, p < 0.007). These results suggest BearWise may influence attitudes and encourage behaviors like waste management modification, but its impact on ingrained behaviors (e.g. bird feeding) remains limited. Continued, targeted interventions are needed to foster long-term behavioral shifts and mitigate human-bear interactions effectively.

Influence of urbanization on white-tailed deer fawn survival and cause-specific mortality

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[2]USDA Forest Service Southern Research Station

White-tailed deer (*Odocoileus virginianus*) fawn survival and cause-specific mortality is well documented for rural landscapes, but relatively unknown in urban and suburban landscapes. We captured 112 white-tailed deer neonates across an urbanization gradient in Durham and Orange counties, North Carolina, and monitored survival for 16 weeks. Across the gradient, 37.5% (42 of 112) of fawns survived to 16 weeks, and predation was the leading cause of mortality. We plan to use a Bayesian hierarchical known-fate model to investigate predictors of survival, and explore the effects of percent impervious surface (a proxy for urbanization), sex, age, birth year, and birthdate deviation from average birthdate for each year on survival and mortality. Quantifying fawn survival across an urbanization gradient provides important information related to deer recruitment and population growth that can inform wildlife management decisions.

North Carolina Chapter of The Wildlife Society
Business Meeting Agenda

February 27, 2025; 10:25 - 11:00 am
Hawthorne Inn & Conference Center

I. Welcome and Opening Comments – Rada Petric

II. Secretary Report * – Candice Moreau
- Review and approve the minutes of the February 21th Executive Board meeting.

III. Treasurer's Report and 2023-2024 Budget Review * – Justin McVey

IV. Southeast Section Update * – Kelli Applegate

V. Committee Reports * – Committee Chairs
- Audit – Todd Menke, CWB®
- Awards – Chris DePerno, CWB®
- Communications – Rada Petric
- Conservation Affairs – Sau Silwal
- COWCH – David Mattocks
- Fundraising – Katie Proctor
- Grants and Finance – Pete Campbell
- Membership – Colleen Olfenbuttel, CWB®
- Heritage – Kelly Douglass
- Mentoring – Aimee Rockhill
- Nominating & Elections – David Mattocks
- Procedures – David Mattocks
- Professional Development – Gabriela Garrison
- Program – Olivia Munzer CWB®(NCTWS), Jeff Hall (NCPARC)

VI. Student Chapter Updates *
- Haywood Community College
- North Carolina State University
- University of North Carolina – Wilmington
- Western Carolina University

VII. Hunters of Color Program Update – Jeff Marcus

VIII. Election Results – Rada Petric
- Present new officers and "Passing of the Goat"

IX. Words from the new president – David Mattocks
- Reports are available at http://nctws.org

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.

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