HERPETON

South Florida Herpetological Conference

Florida SouthWestern State College

September 27-29, 2024

Florida SouthWestern State College

Fort Myers, Florida

Sponsored By:

Herpeton:South Florida Herpetology Conference Rules & Code of Conduct

While Herpeton is a new burgeoning conference, we are committed to building a safe and welcoming environment for attendees. All speakers, vendors, sponsors, and other attendees are expected to adhere to the code of conduct below. This code of conduct is a slightly modified adaptation used by the meeting of the Southeast Partners in Amphibian and Reptile Conservation (SEPARC) in 2023 combined with the host's (Florida SouthWestern State College) own standards of conduct.

Expected Behaviors

- Treat all attendees and participants with respect and consideration, valuing a diversity of views and opinions
- Communicate openly with respect, critique ideas and not invidiuals
- Avoid personal attacks directed at others
- Be mindful and respectful of surroundings
- Respect the rules, policy, and property of the meeting venue
- Adhere to all State and Federal laws, including wildlife regulations

Unacceptable Behavior

- Harassment, intimidation, or discrimination of any form (verbal, physical, or visual) whether it is sexual, racial, ethnic, or of some other type will not be tolerated
- Disruption of talks and/or poster presentations

Consequences & Reporting

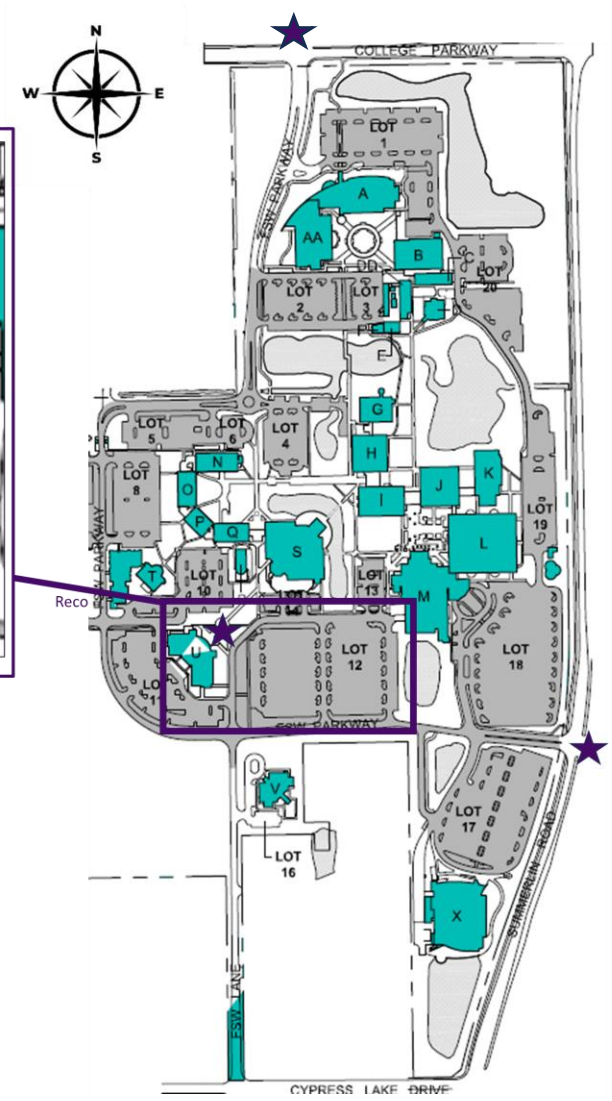
- Anyone requested to stop unacceptable behavior is expected to comply immediately
- Herpeton facilitators or security may take any action deemed necessary and appropriate, including immediate removal from the meeting without warning or refund
- If you are the subject of any inappropriate of unacceptable behavior, or have witnessed such behavior please notify conference chair Jordan Donini (Jtdonini@fsw.edu) as soon as possible

General Conference Rules

- Please collect your name badge from registration tables at the conference entrance
- Please keep name badges on at all times while on the conference campus, this will allow you access to all food events sponsored by the conference
- Please don't invite non-registered attendees to conference activities, as there are strict fire marshall requirements that need to be followed in terms of room capacity
- Make connections and have fun! We look forward to this experience with you all! Thank you for attending!

Herpeton 2024

Florida SouthWestern State College
Edison Campus (U-Building)
Recommended Parking in Lot #12 West Side



★ **Stars indicate entrance locations to campus and/or conference building**

Schedule

Friday 9/27

7:30-9:30am FIELD TRIP: FGCU WETLAND AQUATIC HERP TRAPPING

Description:

Come see Florida Gulf Coast University's campus conservation areas first-hand! We'll check some minnow traps set in wetlands that host greater sirens, two-toed amphiumas, peninsula newts, and a variety of aquatic snakes including mudsnakes and striped crayfish snakes. No guarantees but normally we see at least a few herps! (~20 people, registration required). Field Trip Registration Link

When: 7:30-9:30 AM Friday September 27th

Where: FGCU main campus Welcome Center (Google Maps). Dr. Andrew Durso will distribute parking passes upon arrival. Try to carpool if possible to avoid parking delays.

Bring: Footwear suitable for wading in knee-deep water, field clothes with long sleeves (sharp sawgrasses abound), wide-brimmed hat, camera, water

4:00pm Registration Begins

6:00pm Welcome Banquet (Drinks Courtesy of Point Ybel Brewery) in U-101

9:00pm Banquet Ends

Saturday 9/28 (*Indicates Student Presentation for Award Consideration)

7:00AM **CONTINENTAL BREAKFAST/REGISTRATION**

8:00AM **WELCOME STATEMENT AND ANNOUNCEMENTS U-101**

8:15AM **KEYNOTE SPEAKER: DR. BRUCE MEANS-*HERPS FROM THE GARDEN OF EDEN TO SHANGRI-LA: HOW I WENT FROM PANHANDLE FLORIDA TO SOUTH AMERICAN TEPUIS.***

9:00AM **BREAK/UPLOAD TALKS**

SESSION 1: REPRODUCTIVE ECOLOGY

9:15AM NATURAL AND ANTHROPOGENIC FACTORS INFLUENCING NESTING ECOLOGY OF THE AMERICAN CROCODILE IN FLORIDA, UNITED STATES**. VENETIA BRIGGS-GONZALES**

9:30AM CAN TURTLE MOTHERS USE NEST SITE CHOICE TO RESPOND TO CLIMATE CHANGE EFFECTS ON EMBRYOS? **SEAN DOODY**

9:45AM NOTES ON THE REPRODUCTIVE TRAITS OF FLORIDA MUD TURTLES (*KINOSTERNON STEINDACHNERI*), CHICKEN TURTLES (*DEIROCHELYS RETICULARIA*), AND DIAMOND-BACKED TERRAPINS (*MALACLEMYS TERRAPIN*) IN SOUTHWESTERN FLORIDA. **NADINE COBB**

10:00 AM Q AND A PANEL

SESSION 2: BIOLOGY OF THE CHELYDRIDAE

10:15 AM NATURAL HISTORY OF *CHELYDRA* IN FLORIDA: WHAT WE KNOW AND WHAT WE DON'T. **JEREMEY GEIGER***

10:30 AM TURTLES AS PREDATOR AND PREY OF BIRDS. **SEAN DOODY**

10:45AM THE SUWANNEE ALLIGATOR SNAPPING TURTLE IN FLORIDA: AN OVERVIEW OF RESEARCH AND CONSERVATION CHALLENGES. **TRAVIS THOMAS**

11:00 AM AN ASSESSMENT OF HEAVY METALS IN THE SUWANNEE ALLIGATOR SNAPPING TURTLE (*MACROCHELYS SUWANNIENSIS*). **KIM TITTERINGTON**

11:15AM SOLVING THE ENIGMA OF ALLIGATOR SNAPPING TURTLES IN THE HOMOSASSA. **KEVIN ENGE**

11:30AM Q AND A PANEL

11:45AM LUNCH BREAK (PROVIDED)

SESSION 3: WOMEN IN HERPETOLOGY

1:15 PM BIG LIZARD IN MY BACKYARD: THE BROAD-RANGING IMPACTS OF GREEN IGUANAS (*IGUANA IGUANA*) IN FLORIDA. **NATALIE CLAUNCH**

1:30 PM DETERMINING THE ORIGIN OF MIGRATING BIRDS CONSUMED BY BURMESE PYTHONS WHILE OVERWINTERING IN FLORIDA. **KATE DAVIS***

1:45 PM ALTERED SEASONS INTENSIFY POPULATION INFECTIONS OF AN ENDEMIC PATHOGEN: CONSEQUENCES ON HOST ABUNDANCE AND BEHAVIOR. **ZUANIA COLON-PINEREIRO***

2:00 PM WELCOME TO MIAMI: REPRODUCTIVE TRAITS AND PATHOGEN POTENTIAL OF INTRODUCED CAECILIANS (*TYPHLONECTES NATANS*) IN FLORIDA. **BELLA GONZALES***

2:15 PM UNDER PRESSURE: LONG-TERM DATA REVEAL CHANGES IN THE DIVERSITY OF VULNERABLE HERPETOFAUNA AFTER RAPID URBANIZATION AND REPEATED INTRODUCTION OF NOVEL SPECIES. **JESSICA YATES***

2:30 PM PANEL DISCUSSION + Q AND A

3:00 PM COFFEE BREAK/UPLOAD TALKS

SESSION 4: INVASIVE SPECIES BIOLOGY AND MANAGEMENT I:

3:10 PM LINKING BURMESE PYTHON ECOLOGY WITH REMOVAL EFFORTS IN THE EVERGLADES. **BRANDON WELTY***

3:25 PM Project updates and upcoming objective goals of radio-tracking Burmese pythons in the Big Cypress National Preserve. **Matt Metcalf**

3:40 PM Spectacled Caimans (*Caiman crocodilus*) in South Florida: An Overview. **Sergio Balaguera-Reina**

3:55 PM Emerging Infections Diseases of Invasive Herpetofauna. **Melissa Miller**

4:10 PM Environmental influences on Burmese Python (*Python bivittatus*) and native snake activity in the Florida Everglades. **Kyle Findley***

4:25 PM Friend or Foe? Examining public perceptions of invasive species in Florida. **Lameace Hussain***

4:40 PM Q and A Panel

4:55 PM Poster and Vendor Session w/ hors d'oeuvres and drinks (Courtesy of Point Ybel Brewery) in U-102, U-106 & U-107

8:00 PM Day 1 of Conference Concludes

Sunday 9/29 (*Indicates Student Presentation for Award Consideration)

7:00AM Continental Breakfast/Talk Uploads

8:00AM Announcements (U-102)

Session 5: Ecology of Sea Turtles

8:10 AM Vocal Comparison of two marine turtles nesting on the Gulf of Mexico. **Jake Lasala**

8:25 AM Evaluating the impacts of sand characteristics on groundwater flow and hatchling productivity in loggerhead sea turtle nests. **Kelly Sloan**

8:40 AM Sea Turtle Nesting and hatching success is influenced by predators, renourishment and predator removal on the beaches of Southwest Florida. **Nora Demers**

8:55 AM Sea Turtle Nest Depredation by Coyotes (*Canis latrans*) on Sanibel Island: A Summary of Management and Research. **Jack Brzoza**

9:10 AM Impacts of Change in Storm Events Over Time on Reproductive Success of Loggerhead (Caretta caretta) Sea Turtles on Sanibel and Captiva, FL. **Amanda Manrique**

9:25 AM Q and A Panel

9:40 AM Coffee Break/Upload Talks

Session 6: Invasives Species Management and Biology II:

9:50AM Immunomodulation in Invasive Cane Toads *(Rhinella horribilis)* From Two Field Sites in Southwest Florida. **Emma Ulseth***

10:05 AM Occupancy Modeling and Population Density of Veiled Chameleons (*Chamaeleo calyptratus*) and Knight Anoles (*Anolis equestris*) in Southwest Florida. **Anna Velten***

10:20 AM Development of Multiplex Digital PCR Assays for Use in eDNA Monitoring of Invasive Species in Florida. **Bian Bahder**

10:35 AM Introducing and Updates on Government Python Management Programs: FWC's PATRIC and SFWMD PEP Contractor Programs. **Mike Kirkland**

10:50 AM Under Our Noses and Above Our Heads: Noteworthy Observations of Nile Monitor Lizards (*Varanus niloticus)* in Southwest Florida. **Ali Mulla***

11:05 AM Q and A Panel

11:20 AM Lunch Break (Provided)

Session 7: Captive Husbandry, Disease, and Management

1:00PM Mass Occurrence of Floating Syndrome in Peninsula Cooters (*Pseudemys peninsularis*) found in Cape Coral Canal. **Kasey Mitchell**

1:15PM The Impact of Housing Conditions on the Behavior and Welfare of Captive Leopard Geckos (*Eublepharis macularius)*. **Erin Rickman**

1:30PM Multivariate Analysis of *Ophidiomyces ophiodiicola* Infection in Louisiana, Florida, and Mississippi. **Shivam Shukla***

1:45PM Documented spread of the invasive snake lungworm, *Raillietiella orientalis*, in southeastern snakes. **Jasmine Kesserling***

2:00 PM Q and A Panel

2:15 PM **Coffee Break and Upload Talks**

Session 8: Biodiversity and Communities

2:40 PM Hurricane Effects on a Long-Term Monitored Southwest Florida Barrier Island Gopher Tortoise (*Gopherus polyphemus*) Population. **Mike Mills**

2:55 PM Herpetofauna of the Peruvian Amazon Basin: Conservation Implications. **Matt Metcalf**

3:10 PM Marco Island Gopher Tortoise (*Gopherus polyphemus*) Population Land Study & Conservation Plan. **Brittany Piersma***

3:25 PM Gopher Tortoise (Gopherus polyphemus) Colonies Along Florida's Roads: Monitoring Mortality, and Management. **Elijah Mceuen***

3:40 PM Conserving a Remnant Population of Gopher Tortoises (*Gopherus polyphemus*) at an Urban Nature Preserve in Central Florida: Is the Return Worth the Investment? **George L. Heinrich**

3:55 PM Q and A Panel

4:10 PM Coffee Break and Poster Removal.

4:25 PM Closing Announcements and Awards

4:55 PM Conference Concludes

Poster Session (*Indicates Student Presentation for Award Consideration)

- The influence of herpetofaunal community structure and climatic co-variates and on species detection within an urban landscape in central Florida, USA. **Matthew Scott Atkinson**
- Effects of Red Tide on Sea Turtle Nest Success in Sarasota County, FL. **Drew Bailey***
- Using Roadkill to Assess Health and Ecological Dynamics of Florida's Snake Populations. **Ashby Barbee***
- Shade Cover Effects on Temperature, Hatch, and Emergence Success of Loggerhead (*Caretta caretta*) sea turtle nests in Sarasota County, FL. **Alayna Bennett***
- Understanding the dynamics of the importation of reptiles and amphibians between 1999-2018 in Florida and how it relates to propagule pressure of non-native species. **Edison D. Bonilla-Liberato**
- Estimating Survival and Recapture Rates of Loggerhead Sea Turtles (*Caretta caretta*) in Sarasota County from 1983-2023. **Caroline Casserly***
- Plasma proteomics of Red-eared Sliders (*Trachemys scripta*) exposed to brevetoxin of Red Tide (*Karenia brevis*) for Identification of Diagnostic Biomarkers. **Celina Ceballos***
- Influence of Wetland Habitat Restoration on the Seasonal Movement and Habitat Use of Florida Mud Turtle (*Kinosternon steindachneri*) and Florida Chicken Turtle (*Deirochelys reticularia chrysea*) on a Southwest Florida Barrier Island. **Nadine Cobb***
- Preliminary Survey of a Community of Turtles in Caribbean Costa Rica**. Jordan Donini***

- Taxonomy of Sirens. **Matt Felder**

- The hidden consequences of wetland alteration: determining the risk for pathogenic infection in large aquatic salamanders present in central Florida. **Renato Ignacio Guzman***

- Effort of Tagging Loggerhead (*Caretta caretta*) and Green (*Chelonia mydas*) Sea turtles on Casey Key, Sarasota County, FL from 2017 to 2023. **Alexis Isherwood***

- Semi-aquatic Snakes at the Hands of Urbanization and Changing Environmental Pressures in Central Florida. **Avarey Johnson***

- Preliminary summary of endo-parasite communities of native snakes from road surveys on Main Park Road in Everglades National Park. **Eleanor Lane**

- Arboreal Behavior in Burmese Pythons. **Grant McCargar**

- Size-Dependent Differences in Turtle Carapace Sutures: Understanding Biomechanical and Evolutionary Adaptations. **Noor E Jannat Neha***

- Artificial Intelligence Based Smart Traps Outperform Traditional Traps for an Invasive Reptile. **Maria Ojeda-Rojas**

- Nesting behaviors of Burmese pythons in the Big Cypress National Preserve. **Sara Payne**

- The Enemy Within: Unraveling the immunological and physiological response of invasive Cuban Treefrogs (*Osteopilus septentrionalis*) to the pathogen, Amphibian Perkinsea. **Juliette Chanelle Rodrigue***

- Optimizing Survey Conditions for Burmese Python Removals: Insights from Contractor Program Data. **Eric Suarez**

- Short and Long-Term Effects of Urban Development on Native and Invasive Treefrogs at Florida Gulf Coast University. **Bryce M. Sweely***

- Examining Individual Variability Among Nesting Loggerhead (Caretta caretta) Marine Turtles From Sanibel, Florida**. Savannah Weber**

- Exploring a long-term road survey dataset to assess potential population declines of native snakes over time due to an invasive parasite (*Raillietiella orientalis*). **W. James Whelple**

Keynote Speaker

BRUCE MEANS- *HERPS FROM THE GARDEN OF EDEN TO SHANGRI-LA: HOW I WENT FROM PANHANDLE FLORIDA TO SOUTH AMERICAN TEPUIS.*

I know the Garden of Eden where the most frogs are. Where the most snakes are. Where salamander diversity is high. Where turtles flourish. It's the Florida panhandle between the Suwannee and the Perdido rivers (Garden of Eden), one of the top biodiversity hotspots in the U.S. and Canada. And then, I found a remote and unknown tropical biodiversity hotspot with undescribed snakes, lizards, and more. It is a world of new species, genera, and even families of exotic frogs hidden in cloud forests of tepuis (Shangri-La). It is the South American heart of what's left of the ancient continent of Gondwana. May I show you these amphibian and reptile treasures and regale you with their stories?

Dr. Bruce Means is President Emeritus of the Coastal Plains Institute and Land Conservancy and an Adjunct Professor in the Department of Biological Science at Florida State University. His research includes ecosystems of the southeastern U. S., fire ecology, the natural history of South American tepuis, biogeography, conservation, endangered species, and the evolution and natural history of amphibians and reptiles. He has published more than 310 scientific articles, technical reports, and popular articles in *National Wildlife, International Wildlife, Natural History, BBC Wildlife, National Geographic, Fauna, South American Explorer,* and other magazines. His books include several on the ecology of Florida, "***Diamonds in the Rough, Natural History of the Eastern Diamondback Rattlesnake***," ***"Stalking the Plumed Serpent and Other Adventures in Herpetology,"*** as well as **"Basecamp in the Tropics: My Adventures Discovering Biodiversity in South America."** *Basecamp* is the field guide to Bruce's most iconic expeditions, most notably the trip to Guyana's tepuis with climber Alex Honnold that became the 2021 *National Geographic* documentary, *"The Last Tepui."* From 1998 to the present, he and his research have been featured in Explorer documentary films for National Geographic Television (*King Rattler; Quest for the Rainbow Serpent; Into the Lost World; Saving the King of Snakes; Diamondback Survivors,* etc.), BBC Television, and PBS. He lives in Tallahassee and relishes his time in the woodlands, swamps, and bogs of the Florida Panhandle--and making expeditions into the vast tepui wilderness of northeastern South America.

Oral Presentation Abstracts (* indicates student presenter, bold indicates presenter)

DEVELOPMENT OF MULTIPLEX DIGITAL PCR ASSAYS FOR USE IN EDNA MONITORING OF INVASIVE SPECIES IN FLORIDA

MELISSA A. MILLER (1,2), MELODY BLOCH (1,3), SERGIO A. BALAGUERA-REINA (1,2), ERICKA E. HELMICK (1,3), CYNTHIA A FUSSELL PERSAUD (1,2), KEVIN OLEJNICZAK (1,2), FRANK J. MAZZOTTI (1,2), AND **BRIAN W. BAHDER (1,3)***

(1) University of Florida/IFAS, Fort Lauderdale Research and Education Center, (2) University of Florida, Department of Wildlife Ecology and Conservation, (3) University of Florida Department of Entomology and Nematology

[bbahder@ufl.edu]

Florida, U.S.A. is a hotspot of biological invasions with over 500 non-native species reported. Reptiles encompass the majority of non-native wildlife with over 50 species established, many of which are sympatric and are identified as invasive due to their impacts to the environment, economy, and human health and safety. Reports of new non-native reptiles occur, and many established non-native reptiles continue to expand their ranges in Florida, increasing the need for multi-taxa detection and monitoring capabilities. Invasive constrictor snakes, varanids, teiids and crocodilians are of concern due to life history traits that favor successful establishment and dispersal in Florida, their impacts to native wildlife and Everglades restoration efforts as well as documented breeding populations and/or sitings. While traditional survey methods that rely on visual detections fail to reliably detect invasive reptiles, environmental DNA (eDNA) has proven to be a promising method for detection of cryptic and rare species across the landscape. To address emerging needs for multi-species detection and monitoring in Florida we developed various multiplex dPCR assays designed for detection of four species of invasive snakes, three species of tegu, two species of monitor lizards and the spectacled caiman. These assays have been shown the by highly specific for the corresponding target species, with no cross amplification and with high levels of sensitivity. These assays represent a powerful tool for eDNA monitoring due to high levels of sensitivity and stringent optimization to eliminate false positives.

SPECTACLED CAIMANS (*CAIMAN CROCODILUS*) IN SOUTH FLORIDA: AN OVERVIEW

SERGIO A. BALAGUERA-REINA (1)*, BRYNA L. DAYKIN(1), FRANK J. MAZZOTTI(1)

(1) Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, University of Florida

[sergio.balaguera@ufl.edu]

The US state of Florida is home to a large number of invasive species, many of which have proven detrimental to native ecosystems. Biological invasions of reptiles in particular have been a major concern in

recent years. Spectacled caimans (*Caiman crocodilus*) are established invaders in Florida as well as in other parts of the Caribbean (Puerto Rico, Cuba, and San Andres Island, Colombia). The spectacled caiman was first introduced from Latin America to Florida in the 1950's and have been considered established in South Florida since the 1970s. This species have been found primarily within Comprehensive Everglades Restoration Plan (CERP) projects, which conflicts with CERP's goals as they can impact biological resources targeted by restoration efforts. In this paper we analyzed and discussed the history of spectacled caiman introductions and establishment in Florida, the removal and control efforts done until now, and the effect those have had on the caiman population, as well as the work done by our team (CrocDocs) in the last decade. We also summary the knowledge collected about spectacled caimans in South Florida in the past 70 years since first introduced as well as documented the current status of the species and evaluated and discussed the potential for eradication / maximum control within the CERP footprint providing a data-driven prescription for removal efforts. Finally, we provided an overview of ongoing research on spectacled caiman in South Florida as well as describe future research needed to understand the impact of spectacled caimans in South Florida ecosystems.

NATURAL AND ANTHROPOGENIC FACTORS INFLUENCING NESTING ECOLOGY OF THE AMERICAN CROCODILE IN FLORIDA, UNITED STATES.

F.J. MAZZOTTI (1), S. BALAGUERA-REINA (1), L. BRANDT (2), **VENETIA BRIGGS-GONZALEZ** (1), M. CHERKISS (3), S. FARRIS (1) , AND A. GODAHEWA (1)

(1) Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, University of Florida, (2) U.S. Fish and Wildlife Service, (3) U.S. Geological Survey, Wetland and Aquatic Research Center

[vsbriggs@ufl.edu]

Nesting ecology of American crocodiles (*Crocodylus acutus*) in Florida has been both positively and negatively influenced by anthropogenic and natural factors since the species was placed on the federally endangered species list in 1975. This includes a shift in nesting sites and an expansion of nesting to anthropogenic habitat. Using a 50-year record of monitoring data (1970-2020), we assessed factors influencing nesting ecology (number of nests, nest morphology, success rate, and habitat use) from a total of 3,013 nests recorded across South Florida. We detected a change in nesting success rate, increasing from 61% in the 1970's to near 90% since 2010. Our hot spot analysis illustrates that nesting sites in northeastern Florida Bay and Flamingo/Cape Sable (Everglades National Park) were important for American crocodiles. Anthropogenic habitats, such as canals provided vital habitat nesting in areas such as Flamingo/Cape Sable (Everglades National Park), Turkey Point Power Plant, and Crocodile Lake National Wildlife Refuge for the current Florida population. Environmental parameters suspected to affect nesting success have shown an increasing trend over the past 50 years and minimum temperature and rainfall, during the summer season, are correlated with increased nesting success and temporal variation across South Florida. The adaptive capacity that American crocodiles exhibited in Florida gave the species advantages to face changes in climate and landscape over the last 50 years, however, it does not imply that the adaptive capacity of the species to face these changes (evolutionary potential) cannot reach a limit if changes continue. Here, we document *C. acutus* nesting ecology population responses to ecosystem restoration efforts in Florida; and further demonstrate the value of protecting and restoring habitat to support recovery of listed species.

SEA TURTLE NEST DEPREDATION BY COYOTES (*CANIS LATRANS*) ON SANIBEL ISLAND: A SUMMARY OF MANAGEMENT AND RESEARCH

JACK BRZOZA (1), SAVANNAH WEBER (1), KELLY SLOAN (1)

(1) Sanibel-Captive Conservation Foundation

Coyotes (Canis latrans) were first documented on Sanibel Island, FL in 2011. Following their colonization to the beach habitat, a sharp increase in sea turtle nest depredation was documented. The depredation rate has ranged from 1.3 - 43.5% from 2013 to 2024. During this timeframe, several systematic nest protection strategies were undertaken to protect eggs and pre-emergent hatchlings. Starting in 2015, metal self-releasing screens were deployed on all verified sea turtle nests for the duration of their incubation. Camera traps were mounted behind nests from 2015-2021 to characterize the distribution and behavior of coyotes along beach habitat. Over two nesting seasons the five cameras were mounted for a total of 1,231 nights and collected 3,328 coyote photos. Of the depredation events that were captured on camera in 2014 and 2015, three were confirmed as hatchling depredation. The number of hatchlings eaten during these events ranged from approximately 17-25. Additional analyses included an assessment of the vulnerability of nests relative to their distances from the dune, coyote response to screened nests, preferred incubation period for depredation, time of highest coyote activity, and relationship between the number of hatches and number of depredation events. During the 2023 nesting season, in response to an elevated coyote depredation rate, nest protection strategies were adapted to include the use of self-releasing cages. In 2014 the use of the habanero pepper, cages, screens, and rebar anchors were also included to gauge their effectiveness for nest protection.

BIG LIZARD IN MY BACKYARD: THE BROAD-RANGING IMPACTS OF GREEN IGUANAS (*IGUANA IGUANA*) IN FLORIDA

NATALIE CLAUNCH (1), PAULINA JONES (2), EMILY KHAZAN (2), AND BRYAN KLUEVER (1)

(1) USDA, APHIS, Wildlife Services, National Wildlife Research Center, Florida Field Station, (2) U.S. Fish and Wildlife Service, National Wildlife Refuge System, Southeast Inventory & Monitoring Branch

[natalie.claunch@usda.gov]

Green iguanas (*Iguana iguana*), large-bodied lizards native to South and Central America, have been established in Florida since 1966 and are currently of high management concern. Most attempts to formally quantify impacts of invasive green iguanas have been conducted in Puerto Rico or are limited to singular reports. Impact data from Florida are often anecdotal or out of date but are needed to justify research on control methods and to better allow managers to prioritize iguana management. Here we present a contemporary review of known and potential impacts of green iguanas to multiple sectors in Florida over time and space. We leverage data accessed from various stakeholders, including nuisance wildlife report data collected from the Florida Fish and Wildlife Commission's Wildlife Impact Management Section, take reports from the USDA Wildlife Services Management Information System, wildlife strike reports from the Federal Aviation Administration, fault reports from energy companies, and observations from natural resource managers. Green iguanas have been reported from 44 of 67 counties in Florida and reports of conflicts have increased in recent years. Invasive green iguanas have negative impacts on private property, agriculture and horticulture, infrastructure, human safety, and the natural environment. Their foraging behaviors, propensity to dig, and mere presence cause

detrimental effects on native flora and fauna, including at-risk species, and to the proper functioning of services including transportation and electricity. We identify important future research directions to inform future management actions for invasive green iguanas.

NOTES ON REPRODUCTIVE TRAITS OF CHICKEN TURTLES (*DEIROCHELYS RETICULARIA*), FLORIDA MUD TURTLES (*KINOSTERNON STEINDACHNERI*), FLORIDA BOX TURTLES (*TERRAPENE BAURI*), AND DIAMONDBACK TERRAPINS (*MALACLEMYS TERRAPIN*) OF SOUTHWEST FLORIDA

NADINE COBB (1), MIKE MILLS (1), AND CHRIS LECHOWICZ (1)

(1) Sanibel Captiva Conservation Foundation

[ncobb@sccf.org]

The study of Chelonian reproductive biology has garnered greater attention in recent years. Increasing human development encroaching on potential nesting sites, plus climate change threatening sex bias due to temperature-dependent sex determination (TSD) has made this topic vital for the future conservation of turtles. In milder climates that have seasonal fluctuations, turtles typically lay one clutch a year during the warmer spring and summer months. This begins to increase as you approach warmer climates, especially in south Florida where multiple clutches can be laid in a year. Mark-recapture studies of chicken turtles (*Deirochelys reticularia*), Florida mud turtles *(Kinosternon steindachneri*), Florida box turtles (Terrapene bauri), and diamondback terrapins (*Malaclemys terrapin*) have been conducted for several years at our study site in southwest Florida. Captured female turtles were radio graphed to determine egg presence to establish potential nesting seasons and clutch sizes. Radio-tracked individuals were radio graphed once a month and tracked more often when gravid in an attempt to determine when and where they were nesting. Other nesting events were discovered by happen stance or reported by local residents. A potential nesting season has been determined for chicken turtles and it was discovered that Florida mud turtles may have multiple laying events for the same clutch. Florida box turtles tend to lay clutches nearly year-long and unique nesting locations were discovered for diamondback terrapins. The reproductive biology data provided by these studies will support the conservation of turtles in southwest Florida.

ALTERED SEASONS INTENSIFY POPULATION INFECTIONS OF AN ENDEMIC PATHOGEN: CONSEQUENCES ON HOST ABUNDANCE AND BEHAVIOR

ZUANIA COLÓN-PIÑEIRO (1)*, JUNÁNGEL ALEMÁN-RÍOS (2), ORLANDO ACEVEDO-CHARRY (3,4,5), IGNACIO DE LA RIVA (6), ANA V. LONGO (1), AND PATRICIA A. BURROWES (2,6)

(1) Department of Biology, University of Florida, (2) Department of Biology, University of Puerto Rico, (3) School of Natural Resources and Environment, University of Florida, (4) Department of Wildlife Ecology and Conservation, University of Florida, (5) Florida Museum of Natural History, University of Florida, (6) Museo Nacional de Ciencias Naturales-CSIC

[colonpineiro.z@ufl.edu]

Climate change alters temperature and precipitation cycles in unpredictable ways, potentially affecting host pathogen dynamics, especially for ectotherms. However, only a few studies have long-term data to examine how deviations in environmental conditions influence processes that lead to increased or decreased infections.

Here, we test how seasonal variation in temperature, precipitation, and infection with the pathogenic chytrid fungus *Batrachochytrium dendrobatidis* (Bd) modulate the population size and movement of the tropical direct developing frog, *Eleutherodactylus coqui*. In Puerto Rico, coqui populations initially declined after pathogen emergence but gradually recovered with persistent infections. We hypothesize that density-dependent compensation associated with seasonality may promote persistence. To address this question, we conducted monthly capture-mark-recapture surveys to track individuals and their infections over three years. Then, we applied multi-state models to estimate survival, detectability, and host movements. Overall, models showed an increasing trend in population size despite significant changes in the number of hosts between seasons. The models also provided evidence for demographic buffering by increasing recruitment because survival did not depend on infection status. We confirmed strong site fidelity in this species, limited to frogs moving 0-5 m from the initial capture site. However, Bd infection increased the probability of movement, perhaps due to displacement by healthier competitors or behavioral fever, as infected frogs might seek warmer microhabitats to limit the growth of heat-sensitive pathogens. Learning how altered seasonality leads to conditions that may favor pathogens or hosts can help us recognize other processes of climate change that affect the dynamics of emergent pathogens in wildlife.

DETERMINING THE ORIGIN OF MIGRATING BIRDS CONSUMED BY BURMESE PYTHONS WHILE OVERWINTERING IN FLORIDA

KATE DAVIS (2)*, CJ CAMPBELL (1), CHRISTINA ROMAGOSA (1), AND HANNAH B. VANDER ZANDEN (1)

(1) University of Florida**,** (2) Bat Conservation International

[Ka.davis@ufl.edu]

Burmese pythons (*Python bivittatus*) have long been identified as threats to native fauna, though the foraging behavior of this invasive species on native avian species may have further geographical reach than previously understood. During the molting process, birds incorporate local δ2H values into their developing feathers through diet and drinking water, leaving metabolically inert biological tracers that can be used to infer the likely areas where they were grown. Predictable precipitation δ2H isotope gradients can be used to identify the likely areas of feather molting locations. The objective of this study was to better understand invasive Burmese python foraging behavior in Florida by examining the geographic history reflected in the isotope values of feathers. Feathers recovered from python gut contents were identified at the Smithsonian National Museum Feather Identification Lab, and the δ2H values of feathers belonging to 11 species of non-permanent resident birds to Florida were analyzed. Using the R package AssignR, we calculated the likely origins for 16 individual birds. Our results suggest that the extent of python foraging behavior in Florida reaches as far as Canada, as some individuals had potential origins north of the border. This study comprises a novel application of δ2H analysis to determine origins of migratory birds killed by invasive species, and our results reveal that the geographic reach invasive Burmese python foraging extends well beyond Florida.

SEA TURTLE NESTING AND HATCHING SUCCESS IS INFLUENCED BY PREDATORS, RENOURISHMENT AND PREDATOR REMOVAL ON THE BEACHES OF SOUTHWEST FLORIDA.

KIANNA MOSSEY (1), KELSEY RHEINSCHMIDT (1), JOELLE VERNON (1), CHARLES GUNNELLS, AND **NORA DEMERS (1)**

(1) Florida Gulf Coast University

[ndemers@fgcu.edu]

Long-term datasets from Loggerhead Sea Turtle (*Caretta caretta*) monitoring in Collier County and Cayo Costa State Park were analyzed to gain insight into the effects of renourishment, predation and predator removal on nesting and hatching success. Preliminary findings from Collier County show that there was better nesting success on naturally renourished beaches the year after renourishment compared to the year prior and up to five years after the renourishment, however hatchling success was better on mechanically renourished beachers. Additionally, contrary to our expectations, the predation of sea turtle nests was higher along urbanized beaches (Vanderbilt and Park Shore) than the more natural Delnor-Wiggins State Park. On Cayo Costa, predator removal has been used to prevent predatory animals from further deteriorating Loggerhead Turtle populations. Our evaluation of the success of raccoon and coyote predator removal efforts was determined by evaluating annual emergence rates from 2015-2021 in comparison to predator removal. Total depredation was 87% before removal in 2015 and subsequent years and declined to a mere 5% in 2021. We also documented a direct correlation between decreasing depredation and increasing emergence rates. In 2017, hatchlings that emerged from the nest totaled 3,267, compared to 2021 with emergence numbers rising to 13,485 in 2021. The opportunity to understand the factors influencing sea turtle nesting and hatching success are possible only through the collection of these data. There is an abundance of additional scientific questions that can be answered from analyzing these datasets only possible by cooperation with the entities collecting the data.

TURTLES AS PREDATORS AND PREY OF BIRDS

J. SEAN DOODY (1), GEORGE L. HEINRICH (2), AND PRESTON BRADY (1)

(1) University of South Florida, (2) Heinrich Ecological Services and Florida Turtle Conservation Trust

[jseandoody@gmail.com]

The advent and ubiquitousness of cell phone cameras and social media has armed laypersons with a means to record and report field observations at an unprecedented rate, causing an explosion of natural history observations. One example is predator-prey encounters between turtles and birds. Although large birds are well known to prey upon small turtles and a few raptors prey upon larger turtles, the reverse is thought to be unusual or uncommon, prompting the hypothesis that the relationship between turtles and birds is, overall, unimportant and uninteresting. We examined the unlikely predator-prey association between turtles and birds using literature, but especially using internet resources including social media. Herein we present preliminary results of our findings. Birds as predators of turtles followed a predictable relationship based on their relative sizes; some eagles are exceptions, taking large turtles by breaking their carapaces on rocks. Most turtle eggs are unavailable to birds because turtles bury their eggs; exceptions include crows and vultures. Similarly, most bird eggs are unavailable to turtles because most birds nest in trees (but tortoises and other terrestrial species may eat the eggs of ground-nesting birds). We found numerous reports of turtle eating birds, but two species stood out: the African helmeted turtle (AHT*), Pelomedusa subrufa*, and the common snapping turtle (CST), *Chelydra serpentina*. Groups of AHTs hunt drinking birds and CSTs routinely kill birds including the largest waterbirds. Our review suggests that we have underestimated these turtles as predators of birds. We discuss implications for CST hunting strategies.

CAN TURTLE MOTHERS USE NEST SITE CHOICE TO RESPOND TO CLIMATE CHANGE EFFECTS ON DEVELOPING EMBRYOS?

J. SEAN DOODY (1), GEORGE L. HEINRICH (2), AND MANY OTHERS

(1) University of South Florida, (2) Heinrich Ecological Services and Florida Turtle Conservation Trust

[jseandoody@gmail.com]

Conservation biologists hope that populations can respond to imminent climate warming via evolutionary rescue. Although adult and juvenile turtles may use thermoregulation to offset the rapid rate and magnitude of current and future warming, the immobile eggs/embryos cannot. Phenotypic plasticity will likely not be enough to buffer embryos against rising embryonic temperatures associated with climate change, meaning that developing embryos will be reliant on across-generation evolutionary shifts in either behavior (nest site choice) or physiology (the range of embryonic temperatures suitable for offspring fitness). Theory predicts that behavior is more evolutionarily labile, focusing attention on nest site choice. The present study asks if nest site choice is in the repertoire for responding to climate warming effects on embryos by determining if populations have already shifted nest site choice across latitude. Specifically, we will determine if canopy openness at nest sites is inversely related to latitude for 10-15 species of North American turtle species. A second objective is to determine how much scope mother turtles have for offsetting climate change effects on embryos through nest site choice, within populations of selected species. For the clinal study, we have nest site choice data for ~800 nests across 12 species of turtles, mainly from Florida, but also from Louisiana, Arkansas, and South Carolina. Single species studies on Florida softshell turtles and gopher tortoises suggest that mothers can (currently) depress nest temperatures by 2-3°C by nesting in shadier sites and further down their burrows, respectively. Predictions for the clinal study will be discussed.

WHAT ARE THE EFFECTS OF NON-NATIVE FISHES ON SOUTHWEST FLORIDA'S NATIVE AQUATIC HERP COMMUNITIES?

ANDREW M. DURSO (1)

(1) Department of Biological Sciences, Florida Gulf Coast University

[adurso@fgcu.edu]

South Florida freshwater wetlands are home to a unique native community of 7 snakes, 6 turtles, 6 salamanders, 13 anurans, and ~22 fishes including a handful of species that are endemic to the peninsula. There are also no fewer than 14 introduced fish species, mostly from the aquarium trade. In some systems these non-native fishes dominate the small vertebrate biomass, and they have been suggested to be major drivers of declines of native aquatic species. I will review the evidence for herp, and native fish declines caused by non-native fishes, present field data on their relative abundance from SWFL, and discuss how these fishes are different from our native fishes as prey, predators, and competitors of our native herps and fishes.

SOLVING THE ENIGMA OF ALLIGATOR SNAPPING TURTLES IN THE HOMOSASSA

KEVIN M. ENGE (1), TRAVIS M. THOMAS (2), KATHERINE SPRATT (3), GREG BRASHEAR (4), JACK C. THOMPSON (5), ALEX KROHN (6), AND MATTHEW T. FEDLER (1)

(1) Florida Fish and Wildlife Conservation Commission; (2) University of Florida; (3) Florida Department of Environmental Protection; (4) Greg's Turtle Haven; (5) Santa Fe College; (6) Tangled Bank Conservation

[kevin.enge@myfwc.com]

Discovery of a *Macrochelys* population in the Homosassa River in Citrus County led to the question of whether this represented a natural, extralimital population of the Suwannee species (*M. suwanniensis*) or turtles that escaped from the Homosassa Springs wildlife attraction? The Homosassa River is only 14.5 km long and is fed by freshwater and brackish springs. Its mouth is ca. 74 km southwest of the Suwannee River, and it would not appear to be a likely candidate for a disjunct population. We surveyed 1.75 km of Pepper Creek, a dredged and impounded stream used by pontoon tour boats in the Ellie Schiller Homosassa Springs State Wildlife Park. During four surveys in 2023−2024, we trapped or hand captured 14 adult males and four adult females with straight-line carapace lengths (CL) of 369−572 mm and masses of 12−41 kg. A turtle with a CL of 590 mm was shot and killed in Pepper Creek in 2022, and we saw a turtle weighing at least 45 kg. Morphologically, these turtles resembled *M. suwanniensis*, which was later confirmed by genetic analyses. According to a 1984 newspaper article, four turtles were donated to Nature World by an alligator farm in Trenton and housed in a spring-fed pool fenced off from the river. Interviews with former staff members indicate these turtles were gone by 1993. Genetic analyses determined that all the turtles were siblings or parents and their offspring, and they were most similar to turtles from the upper Suwannee River or its Withlacoochee River tributary.

ENVIRONMENTAL INFLUENCES ON BURMESE PYTHON (*PYTHON BIVITTATUS*) AND NATIVE SNAKE ACTIVITY IN THE FLORIDA EVERGLADES

KYLE A. FINDLEY *(1), DR. ANDREW DURSO (1), MEGAN DE ANGELIS (2)

(1) Florida Gulf Coast University. (2) South Florida Water Management District

[kafindley2351@eagle.fgcu.edu]

Burmese Pythons (*Python bivittatus*) are non-native snakes that have proliferated throughout Southern Florida and require population management. The primary removal method used is driving roadways to opportunistically encounter pythons that are moving across or along a road. This study focuses on what drives Burmese Pythons to be more active; the assumption is that when pythons are active, there is a much higher detection rate. General road cruising surveys were conducted on roadways south of Alligator Alley (I-75) for 3 years where all pythons and native snakes were recorded. These surveys were not standardized but provided insight into spatial and temporal use of the roads. Recently, we selected a 5-mile transect of roadway along US-41 through the heart of the Everglades to conduct weekly snake surveys from 8:30 pm-12:00 am. Environmental conditions including temperature, barometric pressure, humidity, wind speed, cloud cover, and traffic volume were recorded every thirty minutes. The driver looked for snakes on the road while the spotter shined for snakes on the southern road shoulder. The expected results will show which environmental conditions have the greatest influence on python movement. Additional results will show which method has higher snake detection rates, searching on-road or on-shoulder. Since all native snakes were also recorded, their population status will be analyzed. Analysis of location data will provide a better insight into which road-adjacent habitats the snakes are moving through more often.

DISTRIBUTION, ABUNDANCE, AND BODY SIZE OF THE COMMON SNAPPING TURTLE (CHELYDRA SERPENTINA) IN FLORIDA. WHAT DO WE REALLY KNOW?

JEREMEY S. GEIGER (1)*, AND GERALD R. JOHNSON (2)

(1) Nature Coast Biological Station, University of Florida, (2) Department of Natural Sciences, Santa Fe College,

[jeremy.geiger@ufl.edu]

The Common Snapping Turtle (Chelydra serpentina) is among the largest and most widely distributed freshwater turtles in North America. Its natural history is well-documented in the northern part of its range, but relatively few studies have been conducted on populations in the southeastern United States. In Florida, C. serpentina occurs throughout the state with the exception of the Florida Keys. Although it is often perceived to be a common species, few studies have investigated its distribution and abundance among Florida's diverse aquatic habitats. Studies conducted in lentic systems in northern and central Florida suggest that C. serpentina occurs at lower densities in large lakes than in small ponds. Little is known about populations inhabiting coastal wetlands and the Everglades. Substantial trapping effort in lotic systems across northern Florida for Alligator Snapping Turtles (Macrochelys spp.) have yielded few C. serpentina, suggesting limited habitat overlap between the species. The largest known C. serpentina in Florida occur in spring-fed habitats, but comparative data from non-spring associated lotic systems are lacking. In this presentation, we will review published and unpublished information to identify gaps in the current knowledge about C. serpentina populations in Florida and suggest opportunities for future studies.

WELCOME TO MIAMI: REPRODUCTIVE TRAITS AND PATHOGEN POTENTIAL OF INTRODUCED CAECILIANS (TYPHLONECTES NATANS) IN FLORIDA

BELLA GONZALEZ (1) *, FAITH DUNLAP(2), THIEN NGUYEN (2), ARIK HARTMANN (2), ANA V. LONGO (2)

(1) Department of Wildlife Ecology and Conservation, University of Florida, (2) Department of Biology, University of Florida,

[bellagonzalez@ufl.edu]

In 2019, a single Rio Cauca Caecilian (*Typhlonectes natans*) was captured in a canal in Miami-Dade County, Florida, representing the first record of a wild caecilian in the United States. Many individuals have since been captured in the same canal system, generating potential for new lines of research concerning the reproductive ecology and impacts of the introduced caecilian population. Here, we examined the relationship between body size and reproductive effort in the introduced *T. natans* population. In addition, we evaluated the potential of *T. natans* to carry common amphibian pathogens. We necropsied *T. natans* collected in south Florida across 9 trap sites. To estimate the fecundity of females, we measured the number and size of ovarian follicles. We screened skin swabs and tissue samples to detect the presence and intensity of Ranavirus and Batrachochytrium dendrobatidis using qPCR. We found a positive correlation between female snout-to-vent length and total follicle count as well as a negative correlation between total follicle count and the largest follicle diameter. Our findings provide insight as to the ability of *T. natans* to reproduce in south Florida, as well as their potential role as a vector of emerging pathogens to native amphibians.

CONSERVING A REMNANT POPULATION OF GOPHER TORTOISES (*GOPHERUS POLYPHEMUS*) AT AN URBAN NATURE PRESERVE IN CENTRAL FLORIDA: IS THE RETURN WORTH THE INVESTMENT?

GEORGE L. HEINRICH (1,2)*, JEFFREY M. GOESSLING (3), AND J. SEAN DOODY (4)

(1) Heinrich Ecological Services; (2) Florida Turtle Conservation Trust; (3) Eckerd College; (4) University of South Florida

[george@heinrichecologicalservices.com]

The Gopher Tortoise (Gopherus polyphemus) is an imperiled, keystone species occurring in upland habitats within the Southeastern Coastal Plain of the United States. Listed as Threatened by the Florida Fish and Wildlife Conservation Commission, this species is in steep decline primarily due to habitat loss and modification. Gopher Tortoises are ecosystem engineers that create extensive burrow systems (provide refugia from extreme temperatures, fire, and predators for tortoises, and over 364 other documented species rangewide) and are seed dispersers. This herbivore is dependent on fire to maintain open habitat with abundant rich forage species. We report on tortoise research and management on 150.0 ac (60.7 ha) of upland habitat in a remnant natural area (Boyd Hill Nature Preserve) in urban St. Petersburg, Florida. This population is of regional significance and the preserve is relevant to the species' conservation in Florida. Mark-recapture was conducted from 1991-2013 and 2018-present. Biannual 100% burrow surveys started in 2011 generate data that informs habitat management decisions and allows assessment of strategies long-term. Along with these surveys, we also used mark-recapture and line transect distance sampling to estimate population size. Studies on demographics, diet, movement, physiology, reproduction, and social behavior were added in 2018. Research in 2020 focused on nest site choice and revealed nesting up to 1m inside the burrow. We will review threats, including a recent mass mortality event due to Coyote (Canis latrans) predation. We will also discuss long-term habitat restoration efforts, and the challenges of managing a natural area bordered by urban interface.

FRIEND OR FOE? EXAMINING PUBLIC PERCEPTIONS OF INVASIVE SPECIES IN FLORIDA

LAMEACE HUSSAIN (1)* , TYLER CARNEY (1) , KEARA CLANCY (2) , DANIEL HARO (1), NIA MORALES (1)

(1) University of Florida, (2) Alachua Conservation Trust
[lhussain1@ufl.edu]

Ecosystem impacts and management techniques have been adapted to address the effects of invasive species on Florida ecosystems. However, less attention has been given to understanding how residents perceive these invasive species in their neighborhoods. Understanding residents' perceptions can influence their support for management strategies and provide valuable insights into how invasive species affect daily life in Florida. The current study aimed to assess the knowledge, usage, concerns, and sentiments of Florida residents regarding 22 invasive species of reptiles, amphibians, birds, mammals, and fish. Through a comprehensive online survey distributed statewide, we analyzed variations in usage and attitudes towards these species. These variations were correlated with factors such as proximity to invasion zones, recreational activity frequency, and demographic variables, including age, gender, race/ethnicity, and length of residency in Florida. Furthermore, this study investigated the primary sources from which the public frequently acquired information about invasive species and identified the knowledge residents deemed essential. Preliminary findings of 100 Florida residents who initially took the survey indicated that social media was the predominant source of information on invasive species. Lionfish, Burmese pythons, and feral hogs were perceived as the most dangerous and intimidating species, while also being highly utilized for food, clothing, or taxidermy. Conversely, chameleons, grey-headed swamphens, monk parakeets, and feral cats were regarded as the most aesthetically pleasing and least threatening species, with no reported utilization for food, clothing, or taxidermy.

DOCUMENTED SPREAD OF THE INVASIVE SNAKE LUNGWORM, *RAILLIETIELLA ORIENTALIS*, IN SOUTHEASTERN SNAKES

JASMINE H. KESSELRING (1) *, TARA R. MORGAN* (1), ANNA E. SAVAGE (1), TERENCE M. FARRELL (2), ANDREW M. DURSO (3), AND JENNA N. PALMISANO (1)

(1) University of Central Florida, (2) Stetson University, (3) Florida Gulf Coast University

[jasminekesselring@ucf.edu]

The invasive lung parasite, *Raillietiella orientalis* (Ro), is an emerging pathogen of concern for snakes native to the southeastern United States. The life cycle of Ro begins when invertebrates ingest the parasite's eggs. Secondary intermediate hosts, including anurans (e.g., *Anaxyrus terrestris* and *Lithobates sphenocephalus*) and invasive lizards (e.g*., Anolis sagrei* and *Salvator merianae*), then consume these infected invertebrates. When snakes consume these intermediate hosts, they serve as the definitive host for Ro. Within the definitive host, Ro has been associated with lesions of the lungs, pneumonia, sepsis as well as mortality events and population declines in South and Central Florida. *Raillietiella orientalis* infections have been documented in 18 snake species across 30 counties in Florida, with notable prevalence observed in Coluber constrictor (52.78% prevalence), *Nerodia fasciata* (37.50% prevalence) and *Sistrurus miliarius* (33.33% prevalence). To track the spread of Ro, a multidisciplinary group of over 100 collaborators known as SLAM (Snake Lungworm Alliance and Monitoring), was formed in 2022 to collect data on road-killed snakes. Since SLAM's establishment, we have assessed 384 snakes through dissection and microscopy, documenting Ro in 17 new Florida counties. Given Ro's exploitation of diverse and abundant taxa and our recent discovery of new county record bordering Georgia, it is likely Ro is present outside of Florida. To characterize the threat of Ro's rapid spread, increased sampling efforts are necessary within the panhandle and Southern Georgia particularly for species that are currently facing declines and at risk of infection based on ectotherm heavy diets (i.e., *Heterodon* spp.).

CONTRACTOR PROGRAMS AS A MANAGEMENT TOOL FOR INVASIVE BURMESE PYTHONS.

MICHAEL KIRKLAND (1), JENNA COLE (1)

(1) South Florida Water Management District

[mikirkla@sfwmd.gov]

The invasive Burmese python *(Python molurus bivittatus*) population continues to persist and expand within the Everglades and surrounding areas. Limited control options led agencies to seek innovative methods to increase removal efforts. In 2017, the South Florida Water Management District (SFWMD) and the Florida Fish and Wildlife Conservation Commission (FWC) began a collaboration to develop independent, but parallel, incentivized python removal programs. The objectives of both programs are to deploy experienced python removal experts to specific areas and compensate them for conducting surveys, while collecting search effort data and humanely removing as many pythons as possible from public lands. An additional incentive payment is made for every python removed based on length. Upon the direction of Governor Ron DeSantis, the two programs have since aligned in location access, program regulation, and removal requirements. These expansions and enhanced collaborative efforts have resulted in increased python removals and significant operational efficiencies, such as remote body measurement. Furthermore, the use and standardization of customized data collection systems and digital geospatial applications improves data quality and helps inform program optimization and management decisions. The two contractor programs have resulted in the removal of

over 14,200 Burmese pythons, placing them among the most successful management strategies available in terms of both removals and cost effectiveness. While the contractor programs alone may not be a sufficient control tool for Burmese pythons across the Everglades landscape, they are positioned to be an important component of the broader long-term solution.

VOCAL COMPARISONS OF TWO SPECIES OF MARINE TURTLES NESTING ON THE GULF OF MEXICO

JAKE LASALA (1), BETH BRADY (1)

(1) Mote Marine Laboratory

[jlasala@mote.org]

Vocalizations between individuals within nests of some reptiles and birds provide an avenue for synchronous behavior. Unique vocalizations have been observed in freshwater turtles and sea turtles both in captivity and in the wild. For some sea turtle species, embryos produce sounds within the eggs, hatchlings vocalize leading up to emergence, and post-hatching individuals create distinctive sounds when in the water, suggesting intraspecies communication. However, sea turtle vocal repertoire differs between species and has predominantly been studied in controlled settings - less is known about in situ behavior. The primary goal of this project was to classify and compare the vocalizations of two species of sea turtles within the nest prior to emergence. Loggerhead and green sea turtle nests laid on Gulf of Mexico beaches, were recorded up to a week prior to emergence and sounds were categorized and analyzed. Hatchling emergence was modeled in relation to specific sounds and behavior. Hatch and emergence success were compared to the quantity of individual sounds and provide a non-invasive resource for beach managers in the future to monitor nests.

IMPACTS OF CHANGE IN STORM EVENTS OVER TIME ON REPRODUCTIVE SUCCESS OF LOGGERHEAD (CARETTA CARETTA) SEA TURTLES ON SANIBEL AND CAPTIVA, FL.

AMANDA MANRIQUE (1)*, JACK BRZOZA (1), KELLY SLOAN (1)

(1) Sanibel Captiva Conservation Foundation

[amanrique@sccf.org]

Threats to highly productive beaches used by nesting sea turtles are increasing as global warming heightens their vulnerability to storm surges, sea level rise and flooding. Tides and storms can lead to inundation, accretion, and partial or complete washouts of sea turtle nests, all of which can negatively impact nest success. Understanding how these factors affect the reproductive success of sea turtles is a critical need for managers as the stability of beaches as nesting habitats becomes more uncertain. The objective of this study is to trends impacts of extreme high tide events on loggerhead (Caretta caretta) turtle nests on Sanibel and Captiva Islands, FL. We will use historical data from 1998 to 2024 to evaluate the frequency, timing, and impact of tide and storm events over time. Detailed data on post-washover hatching success will also be evaluated to determine whether impacts have changed since 1998. Hurricane season overlaps with the sea turtle nesting seasons of loggerhead turtles in Florida and females have adapted nesting strategies such as laying multiple nests per season to accommodate. However, if storms are becoming more powerful, increasing in frequency, or becoming earlier in timing, these strategies may become less effective. Evaluating the impacts on nest success from storms and tides will become increasingly important when looking at nesting strategies as anthropogenic climate change escalates the frequency and severity of these events.

Gopher Tortoise (Gopherus polyphemus) Colonies Along Florida's Roads: Monitoring, Mortality, and Management.

Eli McEuen (1)* and J. Sean Doody (1).

(1) University of South Florida

[emceuen@usf.edu]

Turtles are among the most threatened taxa on earth with habitat loss and degradation continuing to present the most significant issues. Further, this threat is exacerbated by urbanization that is accompanied by the building of roads, which adds road mortality as a nominal threat and possible population sink. In this study, the aim is to determine the population density of gopher tortoises (Gopherus polyphemus) living along roadsides across a large expanse (approximately eight counties) in west-central Florida, determine if road mortality is occurring, and examine the differences in canopy cover between roadsides, adjacent roadside habitat, and pristine habitat to determine if tortoises are being forced to reside on roadsides due to unsuitable adjacent habitat. The methods of this study revolve around rapid road and walking surveys focusing on the collection of burrow data, including width, distance from the road, and the number of active/inactive/abandoned burrows within the colony, instances of road mortality, and canopy cover percentage between burrows along roadsides, randomly selected points within adjacent roadside habitat, and burrows within suitable habitat. Thus far, over 200 burrows have been identified and eight deceased individuals have been discovered along one highway corridor. When the field data has been recorded and analyzed, management suggestions will be made to best protect roadside populations. Finally, a population estimate of gopher tortoises residing along roadsides will be published to establish a baseline for future monitoring to indirectly determine if roadways act as population sinks across its range.

Herpetofauna and habitat selection of herpetofauna at two reserves in the Peruvian Amazon Basin

Matthew Metcalf (1)*, Adrian Rodriguez (1), Lane Davis (1), Alex Marsh (2), Ella Guedouar (3), Emerson Torres (4), Devon Graham (4), and Billy Gunnels (1)

(1) Department of Biological Sciences, Florida Gulf Coast University, (2) Virginia-Maryland College of Veterinary Medicine, (3) Department of Integrative Biology, University of South Florida, (4) Project Amazonas

[matt.fox.metcalf@gmail.com]

The Peruvian Amazon Basin is a complex and biodiverse ecosystem that supports a large percentage of the world's remaining tropical rainforests. Much of this region is at risk of encroaching human activity and development, lending to increased concerns of deforestation and loss of wildlife populations. Amphibians and reptiles constitute a significant proportion of wildlife diversity in the Amazon Basin but data on the life history, biogeography, and conservation status is especially lacking. We conducted visual encounter surveys to create a baseline species inventory for two reserves, the Santa Cruz Forest Reserve and the Madre Selva Biological Station, in Loreto, Peru. This study created initial methodological inventories for both reserves and documented the importance of primary forests in the area. It also describes the need and conservation potential of secondary forests to assist in species recovery. Future development is slated near these reserves and this study provides the framework to truly assess impacts on biodiversity as development surrounds nearby areas.

PROJECT UPDATES AND UPCOMING OBJECTIVE GOALS OF RADIO-TRACKING BURMESE PYTHONS IN THE BIG CYPRESS NATIONAL PRESERVE.

MATTHEW METCALF (1), LISA MCBRIDE (1), SARAH SHERBURNE (1), GENESIS APONTE-SANTIAGO (2), JUDY BAIRD (2), JOSE TORRES (2), MARK SANDFOSS (1), JACQUELYN GUZY (2), AMANDA KISSEL (3), CHRISTINA ROMAGOSA (4), MATTHEW MCCOLLISTER (5), KRISTEN HART (2), AND AMY YACKEL ADAMS (3)

U.S. Geological Survey, Fort Collins Science Center - South Florida Field Station in Everglades National Park, Homestead, Florida 33034, USA

(1) U.S. Geological Survey, Fort Collins Science Center - South Florida Field Station in Everglades National Park, (2) U.S. Geological Survey, Wetland and Aquatic Research Center, (3) U.S. Geological Survey, Fort Collins Science Center, Fort Collins, (4) Department of Wildlife Ecology and Conservation, University of Florida, (5) National Park Service, Big Cypress National Preserve

[mmetcalf@usgs.gov]

The Burmese python (*Python bivittatus*) is native to southeastern Asia and has established a population across the extent of South Florida. The establishment of this species has adversely affected native populations of meso-mammals and wading birds throughout the region, as well as likely introduced non-native parasites into native snake species. Burmese pythons are fecund and cryptic at all life stages, presenting control challenges for land managers. Here, we provide updates for the 2023-2024 season from our collaborative python radio-telemetry program to obtain Vital Rates in the Big Cypress National Preserve with the explicit goal to inform and improve management. Additional projects and research questions have opportunistically been added and addressed under the umbrella of the program. We will highlight a subset of these projects that focus on successful associate removals, reproductive physiology, and juvenile dispersal.

EMERGING INFECTIOUS DISEASES OF INVASIVE REPTILES: WHAT WE KNOW, WHAT WE NEED TO KNOW, AND WHAT WE CAN DO

MELISSA A. MILLER (1) *, NATHAN D. BURKETT-CADENA (2), MICHAEL V. COVE (3), MADISON HARMAN (4), ROBERT J. OSSIBOFF (5), FRANK RIDGLEY (6)

(1) University of Florida, Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, (2) University of Florida, Florida Medical Entomology Laboratory, (3) North Carolina Museum of Natural Sciences, (4) University of Florida, Department of Wildlife Ecology and Conservation, (5) University of Florida, College of Veterinary Medicine, (6) Zoo Miami, Conservation and Research Department

[melissamiller@ufl.edu]

Florida is a hotspot of biological invasions, particularly nonnative reptiles, with at least 54 species established and breeding in the wild. In addition to impacts through predation and competition, nonnative reptiles can be a source of emerging infectious diseases (EIDs), where parasites and pathogens may rapidly increase in geographic range, host range, or prevalence. As EIDs continue to rise, impacts to people, agriculture, and wildlife are documented and many EIDs pose a substantial threat to conservation of global diversity. Here we summarize and discuss several exemplars of EIDs of invasive reptiles in Florida including introduced pentastomes, Sarcocystis, serpentoviruses, and nonnative lizard-mediated risk of mosquito-borne pathogen transmission. What we know, what we need to know, and what we can do to help mitigate or prevent impacts from EIDs are discussed.

HURRICANE EFFECTS ON A LONG-TERM MONITORED SOUTHWEST FLORIDA BARRIER ISLAND GOPHER TORTOISE (*GOPHERUS POLYPHEMUS*) POPULATION

MIKE MILLS (1), CHRIS LECHOWICZ (1), AND NADINE COBB (1)

(1) Sanibel-Captiva Conservation Foundation,

[mmills@sccf.org]

The gopher tortoise (*Gopherus polyphemus*) is threatened throughout its entire southeastern United States range due to the loss, fragmentation, and reduced quality of habitat. They face additional threats on islands where there is limited space and resources, as well as infrequent gene flow into the population compared to their mainland counterparts. On a southwest Florida barrier island, gopher tortoise burrows were surveyed annually on two different preserves, beginning in the year 2000, and on three additional preserves in the year 2007 to current. Burrows are classified as active, inactive, or abandoned to determine the estimated tortoises per hectare. From the year 2007-2021, all preserves maintained a relatively stable active burrow count. In September 2022, Hurricane Ian caused up to 12 feet of storm surge on the island, flooding burrows and drastically altering gopher tortoise habitat. The 2022 survey, following the hurricane, found most active burrows were lost within four preserves, as well as total loss on one preserve. Although these preserve populations have suffered a significant loss of active burrows, the aftermath of the hurricane has accelerated our upland management efforts due to fire hazard, fire line loss and hurricane debris. This provided the opportunity to clear out hardwood hammocks and replant forage plants to increase open-canopy habitats preferred by gopher tortoises. Many of these tortoises were displaced on the island from the high water and providing optimal habitat should encourage recruitment back to these areas.

MASS OCCURRENCE OF FLOATING SYNDROME IN PENINSULA COOTERS (PSEUDEMYS PENINSULARIS) FOUND IN CAPE CORAL CANAL.

KASEY MITCHELL (1)*, JESSICA COMOLLI (1), SUSAN FOGELSON (2)

(1) Clinic for the Rehabilitation of Wildlife, (2) Fishead Labs

[Kmitchell@crowclinic.org]

Peninsula Cooters (*Pseudemys peninsularis*) are a species of freshwater turtles that are throughout Florida. This species is commonly admitted to the Clinic for the Rehabilitation of Wildlife for care. Beginning November 2023 to date there has been a dramatic increase in *P. peninsularis* admitted for floating syndrome. This is when the turtle is too buoyant and unable to submerge in the water. Common causes for this are secondary to trauma, trapped gastrointestinal gas, pneumonia, and trapped intracoelomic gas. A large majority of the individuals came from one specific canal in Cape Coral. Thus far 14 individuals have been admitted into care for buoyancy issues and few have had resolution of clinical signs. All four that have been submitted for necropsy have had severe coelomitis secondary to bacterial or fungal causes and also tested positive for Turtle Fraiservirus. This case report will go into further details about the clinical presentation of individuals, gross necropsy findings, and treatments that were attempted.

UNDER OUR NOSES AND ABOVE OUR HEADS: NOTEWORTHY OBSERVATIONS OF NILE MONITOR LIZARDS (*VARANUS NILOTICUS*) IN SOUTHWEST FLORIDA

ALI M. MULLA (1)*

(1) University of South Florida

[alimulla@usf.edu]

The Nile Monitor (*Varanus niloticus*) has been established in Florida since the early 1990's. Despite its notorious reputation as a high-risk invasive species, the ecology of this species in Florida is poorly understood. Additionally, standardized techniques for monitoring populations in parts of Florida have been inconsistent since its establishment. Instead, most observation data of *V. niloticus* are generated by reports from citizens, and therefore hold several biases. It is unclear whether populations in Florida are declining, increasing, or shifting. As time elapses, understanding the ecological niche of this species becomes increasingly important for predicting its future. Here, I provide an update on my ongoing spatial ecology research on *V. niloticus* in Cape Coral, Florida. Rather than focusing on quantitative metrics of home range and movements, I discuss noteworthy observations from the past year of conducting radiotelemetry on this species. I focus my attention on instances of foraging, habitat use, interspecific interactions, and intraspecific interactions. I argue that such observations are highly relevant in understanding this species' realized niche. My aim is to encourage others to consider the interface between a species' behavior, the environment in which it occurs, and ecological community in that environment when pursuing research on nonnative and invasive species.

MARCO ISLAND GOPHER TORTOISE (*GOPHERUS POLYPHEMUS*) POPULATION LAND STUDY & CONSERVATION PLAN

BRITTANY PIERSMA (1) *, NANCY RICHIE (2)

(1) Audubon Western Everglades, (2) Island Environmental & Marine Services LLC

[bnpiersma@gmail.com]

The population of Gopher Tortoises on Marco Island exist in an incredibly unique habitat amongst a growing urban environment. Aside from studies on diet and genetics, this specific population has had limited research on their adaptations and survival within a mixture of upland scrub, tropical hardwood hammock, coastal dune, and disturbed sites due to development. Over a four-year period we surveyed transects of all approved properties on the island and collected GPS points of burrows, width of burrows, visible tortoises, habitat descriptions, mortality, marked tortoises, human interactions, and any violations or damage to the sites. Outreach and education increased on the island as car strikes were drastically rising in number. Suggestions were made to both the City of Marco Island and Florida Fish and Wildlife with a comprehensive management plan.

THE IMPACT OF HOUSING CONDITIONS ON THE BEHAVIOR AND WELFARE OF CAPTIVE LEOPARD GECKOS (*EUBLEPHARIS MACULARIUS*)

ERIN L RICKMAN*(1,2), ANNA WILKINSON (1), OLIVER H.P BURMAN (1)

(1) Cold-Blood Care Lab, Animal Behaviour, Cognition & Welfare Research Group, School of Life & Environmental Sciences, University of Lincoln, UK, (2) Anglo-American Reptile Research Laboratory, Animal Studies Research Collaborative, Eckerd College, Florida, USA

[erickman@lincoln.ac.uk]

Reptiles are increasing in popularity as pets but have been the subject of limited research on the long-term effects of captive environments on their behaviour and welfare. Thus, we lack crucial scientific evidence upon

which to base welfare recommendations. This research investigated the impact of different types of environment (Standard, Non-Naturalistic Enriched, Naturalistic Enriched) on the behaviour and welfare of a popular pet species, the Leopard Gecko (*Eublepharis macularius*). Results revealed that the provision of enrichment increased the expression of behaviours associated with positive affective states and increased behavioural diversity—most likely due to the stimulation provided to the animals through choice and control. Further, animals housed in enriched enclosures showed fewer behaviours associated with negative affective states, such as escape behaviour. However, there was no difference between the two types of enriched housing in these measures. A preference test, where the animals could choose which environment to spend time in, revealed that they generally preferred enclosures with naturalistic enrichment over those with non-naturalistic enrichment. Therefore, it is recommended that leopard geckos should be kept in enriched enclosures, with naturalistic resources provided where possible.

MULTIVARIATE ANALYSIS OF *OPHIDIOMYCES OPHIODIICOLA* INFECTION IN LOUISIANA, FLORIDA, AND MISSISSIPPI

SHIVAM SHUKLA (1)*, J. SEAN DOODY (1), ZACHARY GRAY(1), ASHBY BARBEE (1), MICHAEL SHAMBLOTT (2)

(1) University of South Florida, (2) University of Southern Mississippi

[shuklas1@usf.edu]

Snake fungal disease (SFD), caused by the invasive pathogen *Ophidiomyces ophiodiicola*, threatens snake populations across North America. This study investigates ophidiomycosis dynamics in Florida, Mississippi, and Louisiana. We are surveying snake populations across diverse ecosystems, collecting data on SFD prevalence, species composition, and site characteristics. Our objectives include assessing species-specific susceptibility, evaluating the influence of habitat types, comparing urban and non-urban areas, and analyzing the role of environmental factors. Special attention is given to imperiled species in fragmented populations, as these may be particularly vulnerable to disease impacts. We employ field surveys, laboratory diagnostics, and statistical analyses to address these objectives. Snakes are systematically sampled across multiple sites, with data collected on health status and relevant environmental parameters. To confirm the presence of SFD, we utilize molecular diagnostic techniques, including polymerase chain reaction (PCR) assays targeting *O. ophiodiicola*-specific DNA sequences, complemented by clinical assessments of characteristic lesions. This study will provide insights into the complex interplay of factors shaping ophidiomycosis dynamics. Our findings aim to inform conservation strategies and management plans to mitigate SFD's impact on snake populations in the southeastern United States.

EVALUATING THE IMPACTS OF SAND CHARACTERISTICS ON GROUNDWATER FLOW AND HATCHLING PRODUCTIVITY IN LOGGERHEAD SEA TURTLE NESTS

KELLY SLOAN (1), JACK BRZOZA (1), MEGAN REED (1), JACOB WOZNY (1), COURTNEY THOMSON (1), ANDREW GLINSKY (1), MIKE MILLS (1)

(1) Sanibel-Captiva Conservation Foundation

[ksloan@sccf.org]

Beach renourishment is a measure that can help replace lost sand on natural sandy beaches and is generally regarded as less harmful to sea turtles than armoring, but it is well documented that it can affect sea turtle reproductive success in a variety of adverse ways. Beach renourishment has been occurring on Captiva Island since 1961 and another project is slated to occur in 2025. The hatch success on Captiva is an average of 20-40% lower annually (2014-2023) than adjacent, non-nourished stretches of Sanibel when nests with any documented loss events are removed. Since 2021, SCCF has conducted a project evaluating the effects of sand particle size, color, bulk density, and compaction on nest temperature, moisture, and groundwater influence. The relationship of these variables and hatch/emergence rates were analyzed to determine potential impacts on reproductive output. Our preliminary results suggest possible differences in rate of water flow through different sand grain sizes. There is also a strong relationship between nest elevation and groundwater exposure, with higher nests experiencing less water influence. A quadratic model appears to best fit the hatch success vs. elevation data, with nests laid at low and high elevations having lower hatch success than those laid between 1 - 2m. The approach to determining what qualifies as "beach compatible sand" may not be a one-size-fits-all model, and our results will provide data that can drive the methodology for our beaches at a more localized level to maximize reproductive success.

THE SUWANNEE ALLIGATOR SNAPPING TURTLE IN FLORIDA: AN OVERVIEW OF RESEARCH AND CONSERVATION CHALLENGES

TRAVIS THOMAS (1), KEVIN ENGE (2), AND SHEA HUSBAND (1)

(1) University of Florida, (2) Florida Fish and Wildlife Conservation Commission

[Travis.thomas@ufl.edu]

The Suwannee Alligator Snapping Turtle (*Macrochelys suwanniensis*) is confined to a single river drainage: the Suwannee River drainage in Florida and Georgia. Recently, this species was listed as 'threatened' on the Endangered Species act (ESA). Researchers from the University of Florida (UF) and the Florida Fish and Wildlife Conservation Commission (FWC) have been conducting a capture-mark-recapture (CMR) study since 2011, and a recent population assessment found an "uncertain" population status. Here, we present an updated population model for M. suwanniensis that could help clarify this species' status. In addition, we discuss potential threats and conservation needs for the species.

AN ASSESSMENT OF HEAVY METALS IN THE SUWANNEE ALLIGATOR SNAPPING TURTLE (*MACROCHELYS SUWANNIENSIS*)

KIMBERLY TITTERINGTON (1)* AND GERALD R. JOHNSTON (2)

(1) Swamp Girl Adventures, (2) Santa Fe College

[dir@swampgirladventures.org]

Bioaccumulation of heavy metals is well-documented in Common Snapping Turtles (*Chelydra serpentina*) but poorly studied in other species of Chelydridae. The only available published data for Suwannee Alligator Snapping Turtles (*Macrochelys suwanniensis*) are from 14 individuals captured in the upper Santa Fe River (SFR) during June–September in 2001–2003. We collected samples from individuals in the upper and lower SFR to examine whether the previously published data can be considered representative of the *M. suwanniensis*

population throughout the SFR. We did not detect a difference in arsenic levels between turtles from the two sections of the river, but we did observe seasonal variation. Mercury levels also varied seasonally but were higher in turtles from the upper SFR. Our results are preliminary, and this study is on-going. As our sample sizes increase, we will examine possible differences between sexes and life stages.

IMMUNOMODULATION IN INVASIVE CANE TOADS (*RHINELLA HORRIBILIS*) FROM TWO FIELD SITES IN SOUTHWEST FLORIDA

EMMA ULSETH (1)*, AND JORDAN DONINI (1)

(1) Department of Pure and Applied Science, Florida SouthWestern State College

[eulseth@bucs.fsw.edu]

Cane Toads (*Rhinella horribilis*) were intentionally introduced to the Southern US in the 1930s to control agricultural pest populations and increase crop viability. However, due to year-round breeding seasons and their high fecundity, Cane Toad populations in Florida have increased markedly since their initial introduction, becoming an invasive species. Because urban environments are known to benefit populations of invasive species, including small vertebrates, it is believed that these animals may have adaptations to survive in anthropogenically influenced habitats. Previous studies have shown in some instances there is a net positive impact of acute external stress on the immune system in vertebrates. However, we hypothesize that long-term external stress in the form of a noisy, highly industrialized location may decrease the immunological response over time, shown by a markedly decreased neutrophil-lymphocyte ratio (NLR) along with impacts on other Leukocyte counts. Adult toads from both sexes adult toads were collected and blood sampled from two sites over a two-month period and blood smears were analyzed for estimated white blood cell counts and differentials. This paper examines the preliminary results collected, with Leukocyte counts serving as a proxy for stress levels and immunomodulation.

OCCUPANCY MODELING AND POPULATION DENSITY OF VEILED CHAMELEONS (*CHAMAELEO CALYPTRATUS*) AND KNIGHT ANOLES (*ANOLIS EQUESTRIS*) IN SOUTHWEST FLORIDA

ANNA R. VELTEN (1)*, ANDREW M. DURSO (1), AND JEANNINE RICHARDS (2)

(1) Department of Biological Sciences, Florida Gulf Coast University, (2) Department of Ecology and Environmental Studies, Florida Gulf Coast University

[arvelten1515@eagle.fgcu.edu]

Southwest Florida (SWFL) has become home to a large number of invasive species, which have been known to cause damage to their non-native ecosystems. Species such as the veiled chameleon, *Chamaeleo calyptratus*, and the knight anole, *Anolis equestris*, have become abundant in SWFL, but their populations have not been studied in depth. This study sought to assess the abundance and distribution of *C. calyptratus* and *A. equestris* in SWFL through the use of visual surveys. Fifteen 350 m transects were surveyed seven times each after dark. Environmental conditions such as wind speed, humidity, and temperature as well as anthropogenic factors like noise and light were measured for each transect. The tree species composition of each transect was also measured and compared with tree characteristics used by individual lizards. Occupancy models suggested that both veiled chameleons and knight anoles were more likely to be found in areas of lower light and when the duration of surveys are longer. Temperature, wind speed, humidity and noise all appeared to have little effect on

the likelihood of finding either species. Finally, we used distance sampling to estimate population density, the first such estimates for these two species in Florida. Larger sample sizes are likely needed in order to make more specific determinations. This information paves the way for further research to be done on the effects of these species on their new ecosystems.

Linking Burmese Python Ecology with Removal Efforts in the Everglades

Brandon Welty (1)*, Samantha Smith (1), Amy Yackel Adams (2), Christina M. Romagosa (3), Daniel Haro (3), Mark Sandfoss (2), Andrea Currylow (2), Nathan J. Hostetter (4), Frank J. Mazzotti (1) and Melissa A. Miller (1)

(1) University of Florida, Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, (2) U.S. Geological Survey, Fort Collins Science Center, (3) University of Florida, Department of Wildlife Ecology and Conservation, (4) U.S. Geological Survey, North Carolina Cooperative Fish and Wildlife Research Unit, Department of Applied Ecology

[bwelty@ufl.edu)

The invasive Burmese python (*Python bivittatus*) is established across southern Florida and is implicated in negative impacts to native wildlife. For over a decade, scientists and natural resource managers have investigated python ecology to develop targeted removal and control tools. However, due to their crypsis, pythons have proven extremely difficult to assess, and no tractable abundance estimates have been made. Several successful python removal programs and tracking efforts have been implemented across South Florida. With few exceptions, these programs are focused in accessible areas or high ground habitats containing a mix of hardwood hammock, pinelands, prairie, cypress swamps, and estuaries that constitute only a portion of South Florida wildlands. In addition, most pythons removed from the region are captured while crossing roads or levees transecting vast wild habitats that may be flooded year-round. As such, there is an informational gap regarding python ecology and removal efficacy in the eastern Everglades region, where landscapes primarily consist of sawgrass marsh interspersed with sloughs and tree islands. To address this need, we initiated a collaborative multi-year study to integrate radio-telemetry field techniques and advanced modelling approaches to estimate population-level metrics to inform python removal efforts within the eastern Everglades. Additionally, we initiated a scout snake program, where adult pythons are tracked during the breeding season to lead researchers to mating aggregations, to increase the ability to detect and remove pythons and provide critical information on movements, behaviors, and demographic rates (i.e., survival and reproduction). We present a preliminary assessment of our telemetry dataset, including a dynamic Brownian bridge movement model analysis to assess python spatial ecology and to identify potential temporal and spatial movement pathways. Knowledge of python spatial ecology in the eastern Everglades can inform targeted removal efforts, allowing for more effective management strategies while reducing resources necessary for python control.

Under pressure: Long-term data reveal changes in the diversity of vulnerable herpetofauna after rapid urbanization and repeated introduction of novel species

Hannah H. DeGraw (1), Nathan J. Swinburne (1), Jenna N. Palmisano (1), and **Jessica R. Yates (1)***

(1) University of Central Florida

[j.rene.yates@tcu.edu]

Biodiversity has severely declined worldwide, in part because of introduced species and habitat alteration. Over the last century, urbanization and establishment of non-native species exponentially increased in Florida, leading to substantial losses of natural areas and displacement of native species, respectively. The University of Central Florida (UCF) was founded in 1963, leading to development of ranchlands and wetlands and provides a unique opportunity to assess potential effects of habitat alteration and introduction of non-native species on herpetofauna. We analyzed a 60-year dataset of herpetofauna found within UCF's campus to understand how reptiles and amphibians might respond to urbanization and introduction of novel species. We also conducted surveys of 16 campus wetlands during 2023 to determine which habitat features predicted probabilities of site occupancy for co-occurring species. We found that the frequency of herpetofaunal observations changed since 1963, but not all species responded in the same manner. Observations of non-native herpetofauna exponentially increased over time, while observations of habitat specialists decreased. Patterns of temporal functional diversity indicate that the reptiles and amphibians at UCF might be connected to other populations to some degree. Remaining herpetofauna disproportionately occupied certain wetland habitats and were more likely to occur in syntopy. Our results indicate that herpetofauna at UCF have significantly shifted since the university was founded. Because eighty acres of campus natural lands continue to be threatened with development, we recommend protection of these natural habitats, particularly wetlands, and management of invasive species to ensure that additional losses of native herpetofauna do not occur.

Poster Presentation Abstracts (* indicates student presenter, bold indicates presenter)

THE INFLUENCE OF HERPETOFAUNAL COMMUNITY STRUCTURE AND CLIMATIC CO-VARIATES AND ON SPECIES DETECTION WITHIN AN URBAN LANDSCAPE IN CENTRAL FLORIDA, USA

MATTHEW SCOT ATKINSON (1)

(1) University of Central Florida, Department of Biology

[Matthew.Atkinson@ucf.edu]

The interaction between urbanization and invasion can profoundly alter the structure and function of ecosystems. Given that central Florida exhibits both high urbanization and high prevalence and/or abundance of invasive reptile and amphibian species, this location serves as an excellent model system to help disentangle these complex interactions between invasion and urban ecology. Here I sought to systematically quantify the herpetofauna community composition within an urban setting in central Florida and determine how environmental conditions and the presence and the number of invasive species observed in a sampling event altered the likelihood of detection of specific species. I systematically conducted visual encounter surveys from February 2022 to February 2023 ($n = 281$) and then used a combination of frequentists and machine-learning-based modeling approaches to compare the impact of specific factors (biotic and abiotic) on the detection of specific herpetofauna species. In total, I recorded 8115 observations (6249 reptiles, 1754 amphibians) constituting 15 distinct species, with 5 invasive species comprising 85% ($n = 6883$) of these observations. Detections for all seven species for which we had at least 50 observations varied significantly by both month ($p < 0.001$) and sub-location ($p < 0.001$). However, our modeling approaches indicated that climatic variables during a specific sampling event best explained the likelihood of detection for these species and not the presence of other species or sub-location. Ultimately, through this work we can start to understand how the

continued urbanization and invasion by these species may manifest in urban herpetofauna communities going forward.

Effects of Red Tide on Sea Turtle Nest Success in Sarasota County, FL

Drew Bailey (1,2)*, and Jake Lasala (1)

(1) Mote Marine Laboratory, (2) Eckerd College

(ambailey1@eckerd.edu)

Exposure to red tide (Karenia brevis) in varying quantities has been known to affect the wellbeing of numerous species in a variety of ways. In sea turtles, prolonged exposure can lead to extreme detrimental impacts on muscular, neurological, and immune function, resulting in death as well as sublethal conditions. While these direct effects are well studied, less is known about how K. brevis uptake by nesting females can affect nest success. In addition, little is known about behavioral responses related to nesting during periods of red tide. Hatching success and emergence success rates of loggerhead (Caretta caretta) & green (Chelonia mydas) sea turtles from 2007 to 2022 across 5 beaches in Sarasota County, FL were compared with the county's historical K. brevis data over the same period to determine the effects of red tide in embryonic development while nesting success of C. caretta & C. mydas in differing periods of red tide were collated to identify changes in nesting behavior. Satellite tag data of nesting females were assessed as a case study to identify if turtles could be confirmed to pass through areas of K. brevis and therefore pass the toxin to their offspring.

Using Roadkill to Assess Health and Ecological Dynamics of Florida's Snake Populations.

Ashby Barbee (1)*, Shivam Shukla (1), and J. Sean Doody (1)

(1) Department of Integrative Biology, University of South Florida

[anabelbarbee@usf.edu]

Snakes play a crucial role in Florida's ecosystems, yet face increasing threats from habitat loss, emergent diseases, and road mortality. This study aims to comprehensively evaluate the health status and ecological dynamics of Florida's snake populations to inform effective conservation strategies. Our research focuses on three key areas: the impact of Ophidiomycosis, an emerging fungal disease caused by Ophidiomyces ophidiicola; the presence and effects of internal parasites, particularly nematodes; and the extent of road mortality. Data is collected through necropsies of road-killed snakes submitted by researchers and community members statewide. The necropsy procedure includes testing for Ophidiomycosis, measuring specimens, documenting external abnormalities, and performing internal examinations. This multifaceted approach provides a broad overview of the health challenges facing Florida's wild snake populations, quantifies the impact of road mortality, and emphasizes the importance of collaborative efforts in wildlife health monitoring. Our findings will contribute valuable data to inform targeted conservation efforts, including disease management strategies and measures to mitigate road mortality, ultimately aiding in the protection of both snakes and their habitats.

Shade cover effects on temperature, hatch, and emergence success of Loggerhead (*Caretta caretta*) sea turtle nests in Sarasota County, FL

ALAYNA BENNETT*(1,2), JACOB LASALA (1)

University of Kentucky (1), Mote Marine Laboratory (2)

[alaynakb02@aol.com]

Incubation temperature can have an impact on hatchling sex ratios, hatch/emergence success of nests, and the viability of sea turtle eggs. Few studies in the Gulf of Mexico have assessed what physical factors influence nest temperatures. The study presented here assesses how shade impacts nests laid on Casey Key, Florida, part of the densest loggerhead rookeries in the Gulf. This project focuses on nests laid between 2021-2024. Temperature data loggers were placed in a subset of nests laid during the study period and then the amount of shade was determined (open beach, partial shade, full shade) for each nest site. The average distance from the dune for each shade value was determined and then applied to all nests laid during that time frame. Generalized additive models were run to determine if date laid, beach width, shade, region on the beach (North to South) impacted nest temperatures and hatch/emergence success. The results were mixed, the date the nest was laid significantly impacted both temperature and success rates, but because shaded regions also experienced higher predation rates, nests laid in partially shaded areas tended to have higher success.

UNDERSTANDING THE DYNAMICS OF THE IMPORTATION OF REPTILES AND AMPHIBIANS BETWEEN 1999-2018 IN FLORIDA AND HOW IT RELATES TO PROPAGULE PRESSURE OF NON-NATIVE SPECIES.

ERIC SUAREZ (1), **EDISON D. BONILLA-LIBERATO (1)*,** ALEXANDER S. ROMER (1), MELISSA MILLER (1), SERGIO A. BALAGUERAREINA (1), AND FRANK MAZZOTTI (1).

(1) Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, University of Florida

[bonillali.edison@ufl.edu]

Controlling propagule pressure is essential to reducing the risk of establishing non-native species. These species are often introduced through various pathways, one of which is via shipment for the pet trade. Introduction pathways like this may generate threats to the conservation of native flora and fauna due to intentional or unintentional releases once in the hands of the seller or consumer. Therefore, understanding the dynamics of the global trade of wildlife is crucial for managing and mitigating the risk of non-native species establishment, especially in regions where a significant number of invasive species have been introduced via this commercial activity (i.e., Florida). In this study, we analyzed the spatiotemporal dynamics of wildlife trade in the state of Florida, based on the United States Fish and Wildlife Service's (USFWS) Law Enforcement Management Information System (LEMIS) data from 1999-2018. We mapped the most relevant countries involved in the global trade of reptiles and amphibians, according to the quantity and diversity of species documented in Florida's major ports of entry. Additionally, we examined the trends in imports throughout the 21st century to determine whether the reported species represent the full scope of those entering the state, and at the same time, identify trends in the global trade of animals for commercial purposes (i.e., pet trade). Finally, by considering both the number of annual documented species imported and the main components of propagule pressure, which includes the number of individuals introduced and the frequency of introduction events, we assessed whether there is a relationship between the frequency of occurrence in import data and the likelihood of introduction and of establishment.

Estimating Survival and Recapture Rates of Loggerhead Sea Turtles (Caretta caretta) in Sarasota County from 1983-2023

Caroline Casserly* (1), and Jake Lasala (2)

(1) University of Minnesota, (2) Mote Marine Laboratory

[ccasserly7@gmail.com]

Mote Marine Laboratory's Sea Turtle Conservation and Research Program (STCRP) have been tagging nesting sea turtles in Sarasota County, Florida since 1983. Nesting sea turtles are tagged with either flipper tags or Passive Integrated Transponder (PIT) tags, which assigns them to a unique turtle number. The purpose of this study is to use 40 years of STCRP tagging and resight data of loggerhead sea turtles (Caretta caretta) to estimate annual survival and recapture rates. A variation of the Cormack-Jolly-Seber was developed as a best fit model in the program MARK. The effective population size for the rookery in Sarasota was estimated at 11,777. The average annual survival probability was estimated to be 86.23% and the average annual recapture probability was estimated as 5.99%. Survival rates were found to be constant across annual intervals and did not demonstrate a significant change over time, but recapture rates have changed significantly across years. Over the course of this study tagged turtles were resighted at an increasing rate showing that individuals are surviving long enough to be recaptured.

Plasma proteomics of Red-eared Sliders (*Trachemys scripta*) exposed to brevetoxin of Red Tide (*Karenia brevis*) for identification of diagnostic biomarkers

Celina Ceballos (1)*, Catherine Walsh (2), Kathleen Rein (1)

(1) The Water School, Florida Gulf Coast University, (2) Mote Marine Laboratory

[cceballos3193@eagle.fgcu.edu]

The Florida red tide (*Karenia brevis*) is a harmful marine dinoflagellate that produces brevetoxins (Pb-Txs), potent neurotoxins that can cause serious health concerns for many species. Wildlife stranded during red tide can be rescued and receive palliative care at rehabilitation facilities for possible eventual release, but there are no diagnostic criteria for brevetoxicosis other than association with red tide. Brevetoxicosis causes significant alterations in abundances of proteins in plasma of wildlife, and these proteins could be used as diagnostic biomarkers. Sea turtles are especially susceptible to brevetoxicosis as air-breathing reptiles at high trophic levels. However, studying sea turtles offers challenges as they are protected endangered species, with few opportunities to collect samples from sick turtles found during an active red tide bloom. The red-eared slider (*Trachemys scripta*) is an invasive freshwater turtle species, and as a breath-hold diving turtle with physiology like that of sea turtles, it could act as a model organism to study the impacts of brevetoxin on sea turtles. Plasma samples were taken from PbTx-3-exposed and healthy captive red-eared sliders at Mote Marine Laboratory and were analyzed via bottom-up labelled quantitative liquid chromatography tandem mass spectrometry-based proteomics to identify brevetoxicosis biomarkers. We were able to conclude that the abundances of multiple plasma proteins are significantly altered when exposed to the PbTx-3 for red-eared sliders. With predicted increases in severity and duration of red tide blooms due to climate change, this study can result in more accurate diagnoses and insights into mechanism-based treatments for wildlife with brevetoxicosis.

Influence of Wetland Habitat Restoration on the Seasonal Movement and Habitat Use of Florida Mud Turtle (*Kinosternon steindachneri*) and Florida Chicken Turtle (*Deirochelys reticularia chrysea*) on a Southwest Florida Barrier Island

Nadine Cobb (1), Mike Mills(1), Chris Lechowicz (1)

(1) Sanibel-Captive Conservation Foundation

[ncobb@sccf.org]

Until the mid-20th century, the barrier island study site was characterized by sand ridges rising ~1-2m above sea-level with swales alternating between them, allowing for ephemeral wetlands to form from seasonal rainfall. These seasonal wetlands provide critical habitat for the Florida mud turtle (*Kinosternon steindachneri*) and the Florida chicken turtle (*Deirochelys reticularia chrysea*). Through the suppression of wildfires and altered hydrology from mosquito control efforts, woody vegetation such as buttonwood (*Conocarpus erectus*) and cabbage palm (*Sabal palmetto*) encroached into the open wetlands. The storm surge from Hurricane Ian (September 29th, 2022) drastically changed much of this island's landscape, noticeably killing off many hardwood trees through saltwater inundation. In May 2024, a large restoration effort was conducted on a 27-acre preserve to restore its historical wetland status. Dead hardwood and shrubby plants were removed and over 8,000 native sand cordgrass (*Spartina spp/bakeri*) and sawgrass (*Cladium jamaicense*) were planted. Three Florida chicken turtles and one Florida mud turtle on this preserve are fitted with radio-transmitters as a part of an ongoing freshwater turtle mark-recapture and telemetry project. We have collected one to three years of data on these turtles, helping us to monitor movements and habitat use. All four of these turtles stayed in a few small resident ephemeral pools and patches of hardwood hammock prior to the preserve's restoration. With heavy rains in mid-June 2024, three of the four turtles moved into the restored *Spartina* marsh, where they remain currently. This preliminary data shows the potential immediate conservation benefits wetland habitat restoration can have for these cryptic species.

A Preliminary Survey of a Community of Freshwater Turtles in Caribbean Costa Rica

Jordan Donini (1), Angus Cameron (1), Andriws Bello (2) Gustavo Lopez (2), Renato Bruno (2)

(1) Department of Pure and Applied Science, Florida SouthWestern State College, (2) Turtle Love, Costa Rica

[Jtdonini@fsw.edu]

Through a joint collaboration with Florida SouthWestern State College, and Turtle Love Costa Rica we initiated a preliminary survey to investigate the demography and community make up of freshwater turtles within the Caribbean slope. We trapped and surveyed for 12 initial days from late June to early July as part of a study abroad research trip, while Turtle Love continued regular surveys from July-November 2023. In total we captured 161 individual freshwater turtles of five different species via regular aquatic trapping sessions, and opportunistic visual surveys. *Kinosternon leucostomum* were the most common (n=148). *Rhinoclemmys funerea* were the second most common species (n=7), followed by lower abundance in *Rhinoclemmys annulata* (n=3), *Chelydra acutirostris* (n=2), and *Trachemys venusta* (n=1). Counting recaptures, over 220 individual turtles were encountered during surveys. *K.leucostomum* were encountered in traps in jungle pools and ephemeral wetlands, and also while aestivating under fallen palm fronds on jungle trails. *R. funerea* were detected via trapping in riverine edges and in recently formed pools under the jungle canopy, while *R.annulata* were found in open jungle patches and under fruiting shrubs in the beach dunes. *Chelydra* and *Trachemys* were trapped in shallow jungle pools or along riverine edges. Initial demographic data for *K.leucostomum* indicate a

female biased sex ratio with 66 recorded adult females compared to 42 adult males. Sub-adult size classes of unknown sex followed at 29 individuals, with juvenile and hatchling individuals totaling 11. The lack of sample size from other species limits the ability to display demographic data as a whole. Additional data is continuously being collected throughout the initial trapping site, along with several other sites in close proximity and will continue for the next 5-10 years to help establish population estimates, along with other valuable life history and ecological information in a data deficient region.

THE HIDDEN CONSEQUENCES OF WETLAND ALTERATION: DETERMINING THE RISK FOR PATHOGENIC INFECTION IN LARGE AQUATIC SALAMANDERS PRESENT IN CENTRAL FLORIDA.

RENATO IGNACIO GUZMAN (1)*, AND MATTHEW SCOT ATKINSON (1)

(1) University of Central Florida

[Renato.guzman@ucf.edu]

Over the last century, wildlife populations have declined globally, with 40% of amphibian species currently facing extinction. Disease plays a key role in these declines, with one pathogen, Batrachochytrium dendrobatidis (Bd), causing the extinction of ~90 amphibian species alone. However, susceptibility to diseases varies dramatically across different environments and hosts and can be worsened via anthropogenic changes in ecosystems. Large aquatic salamanders often inhabit these altered habitats and exhibit Bd infections, making them suitable models for studying the impact of habitat changes on host-pathogen interactions. Here we sought to determine the influence of anthropogenic habitat alteration on Bd infection dynamics in two large aquatic salamander species: the greater siren (Siren lacertina) and the two-toed amphiuma (Amphiuma means) in central Florida. We are sampling salamanders from eight locations on the University of Central Florida's campus, including four human-altered and four relatively unaltered sites, using baited minnow and crawfish traps. For each salamander, we collected the mass and length, as well as a tail clip and multiple swabs for pathogen surveillance. To date, we sampled seven individuals across three wetlands. We employed an established Bd qPCR protocol to detect Bd presence and intensity in each individual, comparing these metrics to habitat type and morphological data using Chi-square tests and ANOVAs. This study enhances our understanding of urbanization's impact on amphibian pathogen-host dynamics, thereby aiding crucial conservation efforts for declining amphibian populations in urbanized environments.

EFFORT OF TAGGING LOGGERHEAD (CARETTA CARETTA) AND GREEN (CHELONIA MYDAS) SEA TURTLES ON CASEY KEY, SARASOTA COUNTY, FL FROM 2017 TO 2023

ALEXIS ISHERWOOD (1)* JAKE LASALA

(1) University of Florida, (2) Mote Marine Laboratory

[a.isherwood@ufl.edu]

Mote Marine Laboratory's Sea Turtle Conservation and Research Program (STCRP) has tagged nesting sea turtles on Casey Key in Sarasota County Florida since 1983. Tagging surveys were conducted annually from mid-May to August, covering a 7.24-kilometer stretch of beach to tag nesting loggerhead (Caretta caretta) and green sea turtles (Chelonia mydas). In 2020, the COVID-19 pandemic impacted STCRP's ability to take on interns, thus impacting their ability to encounter sea turtles. The objective of this research project was to evaluate the catch per unit effort (CPUE) of taggers. This project compares pre-pandemic years (2017-2019),

the pandemic year (2020), and the post-pandemic recovery phase (2021-2023). Non-parametric tests were used to test for differences in CPUE and mileage covered in relation to these time periods. Data were analyzed using program R, including Shapiro-Wilk, Wilcoxon, and Kruskal-Wallis tests. There was a significant difference in tagger effort in 2020 compared to the average effort in 2017-2019 and 2021-2023. However, no significant difference was observed in the mileage covered each night across these years. These findings suggest that while the pandemic affected the availability or behavior of taggers, it did not significantly impact patrol coverage. This indicates that the program maintained continuous monitoring coverage despite the pandemic.

SEMI-AQUATIC SNAKES AT THE HANDS OF URBANIZATION AND CHANGING ENVIRONMENTAL PRESSURES IN CENTRAL FLORIDA

AVAREY JOHNSON (1)*, JENNA N. PALMISANO (1), AND JESSICA R. YATES (1)

(1) University of Central Florida

[av329404@ucf.edu]

Snakes often are considered poor model organisms for ecological studies because of their secretive nature. However, increasing anthropogenic pressures on snake communities require a greater focus on applied research and long-term monitoring. Threats to snakes include urbanization, emerging infectious diseases, and invasive species. Because there is limited knowledge on Swampsnakes (*Liodytes* spp.) outside of populations in South Caroline and Georgia, we are conducting a study on an urban swampsnake community at the University of Central Florida's (UCF) main campus. Our goal is to investigate the potential impacts of human development on wetlands and the species that inhabit them. This urban snake community provides a unique opportunity to compare the population ecology of Striped Swampsnakes, Glossy Swampsnakes, and Black Swampsnakes to other syntopic species of semi-aquatic snakes for which there has been a greater research focus, such as *Thamnophis* spp. and *Nerodia* spp. UCF offers an ideal system for applied questions concerning snake ecology because the campus contains multiple wetland habitats with varying levels of disturbance. We present preliminary results from our long-term monitoring project assessing the population, disease, and foraging ecology of swampsnakes within disturbed urban habitat. Our findings will provide novel information about swampsnakes in southern portions of their ranges, particularly their habitat and resource utilization within urban environments. We believe our research will not only be useful for land-management decisions at UCF and for management applications for *Liodytes* on campus and throughout their range.

PRELIMINARY SUMMARY OF ENDO-PARASITE COMMUNITIES OF NATIVE SNAKES FROM ROAD SURVEYS ON MAIN PARK ROAD IN EVERGLADES NATIONAL PARK

ELEANOR LANE (1)*, SARAH PAYNE (1), CARTER HALEY (1), GABRIELLA SILVA (1), FAITH DUNLAP (1), MADISON VASQUEZ (1), MATTHEW METCALF (2), SARAH SHERBURNE (2), AMANDA KISSEL (3), AMY YACKEL ADAMS (3), CHRISTINA ROMAGOSA (4), KEVIN DONMOYER (5), AND MARK SANDFOSS (2)

(1) University of Florida and U.S. Geological Survey Intern Program, University of Florida, (2) U.S. Geological Survey, Fort Collins Science Center - South Florida Field Station in Everglades National, (3) U.S. Geological Survey, Fort Collins Science Center, (4) Department of Wildlife Ecology and Conservation, University of Florida, (5) National Park Service, Everglades National Park

[elane@usgs.gov]

In South Florida, an exotic pentastome parasite, *Raillietiella orientalis*, has been found in native snake populations with Burmese pythons thought to be the source of their introduction. Previous research has shown that these parasites can grow larger in native snakes and reproduce within the lungs, causing respiratory issues and potential death in native snakes. While wildlife parasitic communities and their effects are generally understudied, the health concerns created by this invasive pentastome parasite and its potential spread is of conservation concern. To assess the impacts of non-native parasites on the native snake community, we are collecting dead-on-road snakes along Main Park Road in Everglades National Park for necropsies and identification of endo-parasites. Vehicle strikes on roads represent a significant portion of adult snake mortality, even in protected areas such as national parks, but allow us to sample road-killed snakes for endo-parasitic communities that would otherwise be more difficult to assess. Here, we present summary results of endo-parasites from 41 native snake species collected between September 2023 to April 2024.

HYDROLOGY OF BANDED WATER SNAKES *(NERODIA FASCIATA)* IN SOUTHWEST FLORIDA

GIANNA J. MAIDA (1)*, ANDREW M. DURSO (1)*, AND RACHEL ROTZ (2)

(1) Department of Biological Sciences, Florida Gulf Coast University, (2) Department of Marine and Earth Sciences, Florida Gulf Coast University

[gmaida6404@eagle.fgcu.edu]

This study examines the hydrological preferences and seasonal habitat use of the Banded Water Snake (*Nerodia fasciata*) population on the Florida Gulf Coast University (FGCU) campus. By investigating how these snakes utilize different habitats over time and under varying environmental conditions, the research aims to uncover the factors influencing habitat selection and spatial distribution within this species. The FGCU campus, with its diverse aquatic ecosystems, provides a unique setting to explore the interactions of *N. fasciata* with various water bodies in a semi-urban environment. Fieldwork, incorporating minnow traps and hydrological measurements, was conducted to assess water depth and other habitat features, with the data integrated into a long-term dataset. By analyzing the ecological requirements of *N. fasciata* in this environment, the study enhances our understanding of how hydrology impacts habitat selection in semi-urban wildlife. The insights gained may inform future conservation and management strategies on campus and in similar ecosystems.

ARBOREAL BEHAVIOR IN BURMESE PYTHONS

GRANT MCCARGAR (1)*, GENESIS APONTE-SANTIAGO (1), CONOR JOYE (1), DIANA RODAS (1), MATTHEW METCALF (2), LISA MCBRIDE, SARAH SHERBURNE (2), MARK SANDFOSS (2), AMANDA KISSEL (3), CHRISTINA ROMAGOSA (4), MATTHEW MCCOLLISTER (5), AND AMY YACKEL ADAMS (3)

(1) University of Florida and U.S. Geological Survey Intern Program, (2) U.S. Geological Survey, Fort Collis Science Center-South Florida, (3) U.S. Geological Survey, Fort Collin Since Center- Colorado, (4) Department of Wildlife Ecology and Conservation, University of Florida, (5) National Park Service, Big Cypress National Preserve

[gmccargar@ufl.edu]

Burmese pythons are an invasive species that have established in South Florida with negative cascading effects throughout the Greater Everglades Ecosystem. A radio telemetry project was established in Big Cypress National Preserve to investigate several aspects of python ecology such as micro-habitat utilization. Despite being significantly large, heavy-bodied snakes (up to 90 kg); pythons have recently been observed to actively

climb vegetation and make use of trees for basking behaviors. Here, we present several observations of this previously undescribed arboreal behavior in pythons across age classes and sex in Big Cypress National Preserve. These observations of arboreal use of wild Burmese pythons in Florida provide novel insights into habitat use and the potential for predation events on nesting birds and other tree dwelling species.

Size-Dependent Differences in Turtle Carapace Sutures: Understanding Biomechanical and Evolutionary Adaptations

Noor E Jannat Neha (1)*, Ivana J. Serra (1), Jeanette Wyneken, PhD (1)

(1) Florida Atlantic University

Skeletal sutures between flat bones are syndesmoses. These fibrous joints linking the edges of bones like those in the skull and turtle shell provide stability between elements. Traditionally, a major function of syndesmoses sutures is to allow adjacent bones to expand and develop with growth. In turtles, they offer limited flexibility necessary for shock absorbance and force distribution throughout the shell when it is under pressure (such as diving or under assault by predators). In red-eared slider turtles, carapacial sutures have been described as pointed boney teeth arranged in a zig-zag interdigitating pattern. Hard-shelled marine turtle suture morphology remains undescribed. To address this knowledge gap, we examined the structural differences of sutures in various size classes of green turtles (*Chelonia mydas*) using micro-CT imaging. Micro-CT provides high-resolution, non-destructive visualization, enabling extensive investigation of suture morphology. Carapacial suture morphology was described and analyzed through Dragonfly™ software, allowing us to identify the height, width, and tooth angle of suture teeth in pleural bone samples. Initial data indicate that there is considerable variation in suture morphology with turtle size class. In adult turtles, suture tooth angles are larger and tooth number fewer than in younger turtles. Size-related differences in these sutures should have biomechanical implications that change throughout ontogeny but also inform of the potential evolutionary role of this structural design. Researchers can infer how various species have evolved to deal with their habitats and the mechanical demands put on their shells by examining sutures.

Artificial Intelligence Based Smart Traps Outperform Traditional Traps for an Invasive Reptile

Melissa A. Miller (1), Benjamin Stookey (2), **Maria Ojeda-Rojas (1)***, Eric Suarez (1), Jenna Cole (3), Kelly McCaffrey (4), Bryan Kluever (5), Frank J. Mazzotti (1), and Derek Yorks (2)

(1) University of Florida, Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, (2) Wild Vision Systems, (3) South Florida Water Management District, (4) National Park Service, (5) U.S. Department of Agriculture, National Wildlife Research Center

[m.ojedarojas@ufl.edu]

Invasive species management can be limited due to a lack of sustained resources needed to elicit an effective outcome. Live trapping has proven to be an effective means of detection and removal of certain invasive species such as the Argentine black and white tegu (*Salvator merianae*). However, research has shown that trapping efforts for this species may be most effective when traps are operated for sustained periods of time with high trap saturation in suitable habitats. These requirements pose a challenge for natural resource managers as traditional means of trapping are often labor and time intensive. Yet the recent development of an automated

smart trapping system, designed by Wild Vision Systems (WVS), that utilizes artificial intelligence (AI) for capture of tegus holds promise for ameliorating many resource concerns. The WVS smart traps can be operated remotely via a software application and the AI software is designed to selectively trap a target species of interest, while excluding capture of bycatch. During May – October 2023, we collaborated with WVS to field test tegu smart traps in St. Lucie County, FL where an incipient population of tegus has established. Specifically, we conducted a comparison study to evaluate the efficacy of smart traps versus traditional (i.e., non-smart) traps for the capture of invasive tegu lizards. We observed a higher number of tegus captured in smart traps (n = 15) compared to traditional traps (n = 1). We recorded one instance of bycatch in a smart trap versus 28 occurrences of bycatch in traditional traps. These results indicate that smart traps may have significant advantages over traditional traps relative to selective trapping of target species and reduced bycatch rates, resulting in a reduction of required resources and increased efficacy of invasive species management.

NESTING BEHAVIORS OF BURMESE PYTHONS IN THE BIG CYPRESS NATIONAL PRESERVE

SARAH PAYNE (1)*, ELEANOR LANE (1), COHEN EASTRIDGE (1), JOSUE PEREZ (1), ELI SUASTEGUI (1), GEORGE BANCROFT (DERRICK BIGLIN (1), JOHN-KAARLI RENTOF (1), LISA MCBRIDE (2), MATTHEW METCALF (2), SARAH SHERBURNE (2), GENESIS APONTE-SANTIAGO (3), JUDY BAIRD (3), JOSE TORRES (3), JACQUELYN GUZY (3), AMANDA KISSEL (4), AMY YACKEL ADAMS (4), CHRISTINA ROMAGOSA (5), MATTHEW MCCOLLISTER(6), KRISTEN HART (3), AND MARK SANDFOSS (2)

(1) University of Florida and U.S. Geological Survey Intern Program, (2) U.S. Geological Survey, Fort Collins Science Center - South Florida Field Station, (3) U.S. Geological Survey, Wetland and Aquatic Research Center, (4) U.S. Geological Survey, Fort Collins Science Center, Fort Collins, (5) Department of Wildlife Ecology and Conservation, University of Florida, (6) National Park Service, Big Cypress National Preserve

[sspayne@usgs.gov]

The Burmese python (*Python bivittatus*) is a large, constrictor endemic to Southeast Asia and has become well-established in South Florida, USA. This invasive species has severely impacted the Greater Everglades Ecosystem and control of this species is challenging. While the python invasion and its deleterious effects on the landscape are well documented in this region, little is known on general life history for this species. Importantly, reproductive habits and behaviors of this species are often anecdotal and understudied. To address these knowledge gaps, we are conducting long-term radio telemetry projects to assess the movement patterns and impacts of this species across Big Cypress National Preserve. We are providing preliminary data summaries on egg counts, hatching rate, reproductive timing, and general nesting behaviors of radio-tagged female pythons that bred in 2024. This information will provide baseline data and may inform future management practices and research.

THE ENEMY WITHIN: UNRAVELING THE IMMUNOLOGICAL AND PHYSIOLOGICAL RESPONSE OF INVASIVE CUBAN TREEFROGS (*OSTEOPILUS SEPTENTRIONALIS*) TO THE PATHOGEN, AMPHIBIAN PERKINSEA

JULIETTE RODRIGUE (1), AND MATTHEW SCOT ATKINSON (1)

(1) University of Central Florida, Department of Biology,

[Jcrodrigue1307@gmail.com]

Over the last century, wildlife populations have declined as a direct result of pathogenic infections. However, some species, particularly invasive species, appear tolerant to these infections and may serve as a reservoir for diseases within the environment. The Cuban Treefrog, *Osteopilus septentrionalis*, has invaded much of the southeastern United States and may serve as a potential host reservoir for pathogens including amphibian Perkinsea (Pr). Here we sought to determine the impact of Pr on host immune response and body condition in wild O. septentrionalis to determine if this species suffers from negative fitness consequences of infection. We collected O. septentrionalis on the University of Central Florida's campus in Orlando, FL. For each individual, we measured the mass and length, collected a liver tissue sample and created a blood smear slide to compare white blood cell (WBC) ratios. Finally, we ran qPCR from the extracted liver tissue samples to determine the presence and intensity of Pr infection. In total, we caught 100 individuals and have completed WBC counts on 40 individuals to date. Body condition significantly varied by month ($p < 0.001$), with winter months showing a steep decline in body condition. This correlated to an increase in Eosinophils cells occurring during the same time. This study builds on the growing knowledge on host immune response to pathogenic infection in invasive species, which will allow us to better understand the consequences of this interaction on disease ecology of invaded systems

OPTIMIZING SURVEY CONDITIONS FOR BURMESE PYTHON REMOVALS: INSIGHTS FROM CONTRACTOR PROGRAM DATA

KELLY R. MCCAFFREY (1),†, MELISSA A. MILLER (1) , SERGIO A. BALAGUERA-REINA (1) , ALEXANDER S. ROMER (1), MICHAEL KIRKLAND (2) , AMY PETERS (2) , EDWARD F. METZGER III (2) , LEROY RODGERS (2) , **ERIC SUAREZ (1)**, AND FRANK J. MAZZOTTI (1)

(1) University of Florida, Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, (2) South Florida Water Management District Current Affiliation: †- National Park Service, Everglades National Park, South Florida Natural Resources

[Eric.Suarez@ifas.ufl.edu]

Invasive Burmese python populations (*Python bivittatus*) have rapidly spread since their introduction to Florida, USA while demonstrating low detectability and generating significant undesirable ecological impacts. To mitigate these effects, South Florida Water Management District's Python Elimination Program incentivizes contractors to perform python removal, who concurrently gather valuable data on search efforts and captures. This study leverages that data to analyze the impact of various operational and environmental covariates on survey outcomes, specifically focusing on survey success (probability of removing at least one python) and efficiency (pythons removed per survey hour). Warm temperatures (> 25°C) result in improved survey outcomes, especially when surveys occur late at night and during the wet season. The most efficient interval for conducting surveys occurs from 20:00 to 02:00 under temperatures consistent with Florida's climatic regime. Furthermore, spatial analyses indicate that the geographic distribution of python removals is concentrated in four regions and contractor search effort is greatest in these areas. This study underscores the potential of citizen science to inform and optimize invasive species management practices. By identifying effective survey conditions and locations, this research provides actionable insights that can improve the efficacy of removal programs. Moreover, this study demonstrates that data generated by citizen scientists can be used to synthesize recommendations for invasive species removal efforts.

Short and Long-Term Effects of Urban Development on Native and Invasive Treefrogs at Florida Gulf Coast University

Bryce M. Sweely (1)*, Matthew F. Metcalf (2,1), and Andrew M. Durso (1)

(1) Florida Gulf Coast University, (2) U.S. Geological Survey, Fort Collins Science Center - South Florida Field Station in Everglades National

Climate, which is shifting due to global warming, and urbanization are essential factors that determine the distribution and range of native and invasive species. In southwest Florida, behavioral patterns of hylids are not only affected by temperature and rainfall but are dependent on variation in such factors throughout the dry and rainy seasons. Combined with global climate change, human influence, and rapid urban development, short and long-term behavioral effects may be observed in native and invasive hylid species over time. The Cuban tree frog (*Osteopilus septentrionalis*) is an invasive species that actively competes with the native American green tree frog (*Hyla cinerea)* and the squirrel tree frog (*Hyla squirella*). This study compared the likelihood of treefrog presence due to temperature and rainfall throughout the dry and rainy seasons across different habitat types (urbanized areas and natural areas) on the Florida Gulf Coast University campus in 2013 – 2014 and 2022 – 2023. We utilized polyvinyl chloride tubes as artificial refugia to sample frog occupancy throughout the years at five sites around student housing buildings and five sites within conservation areas. Preliminary results from regressions and occupancy modeling show how local temperatures during the rainy and dry seasons have increased within the past decade, and rainfall variation may affect treefrog presence. In natural habitats, Cuban treefrogs may be less likely to be observed as daily precipitation increases, whereas native treefrogs may be more likely to be observed. Probabilities of treefrogs being detected has decreased between the 2013 – 2014 and 2022 – 2023 sampling periods.

Examining Individual Variability Among Nesting Loggerhead (Caretta caretta) Marine Turtles From Sanibel, Florida.

Savannah Weber (1), Andrew Glinsky (2), Jack Brzoza (1), Kelly A Sloan (1)

(1) Sanibel-Captiva Conservation Foundation, (2) Cooperative Institute for Marine and Atmospheric Research

[sweber@sccf.org]

Population monitoring is an important aspect of ensuring the conservation and protection of endangered species, such as marine turtles. Mark and recapture studies (i.e., flipper and PIT tagging) allow us to track and monitor individuals, which can help identify trends within a population. Examining the variability among individuals for different reproductive metrics within a nesting population can provide insights into factors that affect reproductive success, and can help reveal how marine turtles may respond to environmental changes. In this study, we will analyze a tagging dataset (2016 – 2024) from loggerhead (*Caretta caretta*) turtles nesting on Sanibel Island, Florida. We will investigate individual variability in nesting metrics such as clutch count, inter-nesting interval, remigration interval, nest distance from mean high-water, and the temporal distribution of nests laid within the season. We will evaluate the relationships between these variables and reproductive success for individual turtles within and among nesting seasons. This study will enhance our knowledge on the factors that affect reproductive success and nesting behavior, and how they vary among individuals, accounting for the complexities of biological diversity within populations.

EXPLORING A LONG-TERM ROAD SURVEY DATASET TO ASSESS POTENTIAL POPULATION DECLINES OF NATIVE SNAKES OVER TIME DUE TO AN INVASIVE PARASITE (*RAILLIETIELLA ORIENTALIS*)

W. JAMES WHELPLEY (1)*, SERGIO BALAGUERA-REINA (1), ERIC SUAREZ (1), FRANK J. MAZZOTTI (1), AND MELISSA A. MILLER (1)

(1) Department of Wildlife Ecology and Conservation, Fort Lauderdale Research and Education Center, University of Florida

[wjames.whelpley@ufl.edu]

Long-term surveillance of wildlife populations can provide novel opportunities to investigate changes in population dynamics over temporal scales. Sustained multi-year datasets are increasingly of interest to examine population changes due to global change stressors, such as invasive species, as these datasets can provide the pre- and post-invasion data critical for assessment. Since 2014, we have conducted weekly standardized road surveys within Everglades National Park (ENP) as part of our Everglades Invasive Reptile and Amphibian Monitoring Program (EIRAMP); a program initiated to increase detection, monitoring, and removal of nonnative wildlife, while concurrently documenting native wildlife populations. In this study, we assess a decade of EIRAMP data, amassed during 2014-2023, to explore potential heterogeneity of native snake populations over time relative to introduction of a nonnative pentastome parasite, *Raillietiella orientalis*, (Ro), known to infect many native snake species in Florida. As Ro has potential to negatively impact its hosts, we quantified abundance and diversity to access native snake populations in ENP pre- and post-introduction of Ro. Native snakes were examined at different levels, including taxonomic and feeding guild, to explore potential correlates among infection severity of host species, collected during a previous study, and any changes in population dynamics over time. We present preliminary results of our analyses and discuss implications for native snake species in Florida.