UF School of Natural Resources and Environment

2025 SNRE Research Symposium

J. Wayne Reitz Union Grand Ballroom
October 14, 2025

UF|IFAS
UNIVERSITY of FLORIDA

Table of Contents

Welcome

Welcome to the 3rd Annual Research Symposium sponsored by the School of Natural Resources and Environment (SNRE) and the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS). This symposium aims to provide graduate and undergraduate students with a framework to showcase their interdisciplinary research in ecology, environment, and sustainability, and enhance the interaction among students, faculty, and other participants from various groups.

SNRE operates horizontally across UF's elaborate structure of academic disciplines and is built on existing strengths in the University by partnering with academic departments and interdisciplinary research centers and institutes. Approximately 330+ members of the UF faculty in 45 departments of 12 colleges are formally affiliated with SNRE. In addition, SNRE graduate students conduct their research with faculty affiliated with or physically located at 35 interdisciplinary research centers and institutes. SNRE offers degree programs, such as undergraduate environmental science B.A./B.S. degrees and graduate-level interdisciplinary ecology M.S. and Ph.D. degrees. At present, SNRE is home to 148 graduate students (110 Ph.D. and 38 M.S.) and 201 undergraduate students (83 B.A. and 118 B.S.).

The keynote speaker for this year's research symposium is **Dr. Nicholas Aumen**, Aquatic Ecologist, and his biographical information is posted in the program brochure. His presentation is entitled "**Integrative interdisciplinary Science in Support of Ecological Restoration: the Everglades Case Study**".

Research conducted by graduate and undergraduate students is the core of SNRE. It is supported by affiliate faculty in multiple academic departments, research centers, and institutes across the UF campus. For this symposium, we offer select examples of research conducted by four early-career affiliate faculty members on ecology and environmental sciences topics. Student presentations include five oral and 66 poster presentations.

We are grateful for the generous financial support from the Robin E. Nadeau Fund, the UF/IFAS College of Agricultural and Life Sciences, the UF Graduate School, and our eighteen academic partners (see the sponsor list on page 25 in the program brochure). These funds will support student oral and poster presentation awards and other related symposium expenses.

Thanks to the SNRE team (see page 24 in the program brochure) for their excellent work organizing the symposium. Finally, we want to thank all our students, staff, and faculty for actively participating in the symposium. The assistance of judges in selecting the best oral/poster presentations is greatly appreciated. We thank all our collaborators and partners for supporting SNRE programs.

For further information, please contact Dr. K. Ramesh Reddy, Director and Graduate Research Professor, School of Natural Resources and Environment, UF/IFAS at krr@ufl.edu.

Symposium Agenda

J. Wayne Reitz Union Grand Ballroom
Tuesday, October 14, 2025

8:00 - 9:00 a.m. ..... ***Registration***

9:00 - 9:10 a.m. ..... ***Introduction***

Dr. K. Ramesh Reddy, Director, School of Natural Resources and Environment

9:10 - 9:20 a.m. ..... ***Opening Remarks***

Dr. Kati Migliaccio, Dean, College of Agricultural and Life Sciences, UF/IFAS

9:20 - 9:30 a.m. ..... ***Opening Remarks***

Dr. Robert Gilbert, Dean for Research and Executive Director for Academic Affairs, UF/IFAS

9:30 - 9:35 a.m. ..... ***Introduction of Keynote Speaker***

Dr. Bette Loiselle, SNRE Affiliate Faculty Advisory Council Chair; Professor, Wildlife Ecology and Conservation; and Director, Tropical Conservation and Development Program (2011-2025)

9:35 - 10:30 a.m..... ***Keynote Address: "Integrative Interdisciplinary Science in Support of Ecological Restoration: the Everglades Case Study"***

Dr. Nicholas Aumen, Aquatic Ecologist

10:30 - 10:45 a.m..... ***Break***

SESSION I - Affiliate Faculty Presentations

Session Chair ..... **Dr. Pablo Lamino,** Assistant Professor, Department of Agricultural Education and Communication

10:45 - 11:00 a.m..... **Dr. Nicolas Gauthier,** Assistant Curator, Florida Museum of Natural History

11:00 - 11:15 a.m..... **Dr. Nikolaos Tziolas,** Assistant Professor, Southwest Florida Research and Education Center

11:15 - 11:30 a.m..... **Dr. Corey Callaghan,** Assistant Professor, Fort Lauderdale Research and Education Center

11:30 - 11:45 a.m..... **Dr. Yue Li,** Assistant Professor, School of Forest, Fisheries, and Geomatics Sciences

11:45 - 12:00 p.m. ..... ***Discussion***

12:00 - 1:00 p.m. ..... ***Lunch Break***

1:00 - 1:15 p.m. ..... ***Introductions and Recognitions***

SESSION II - Student Oral Presentations

Session Chair ..... **Natalia Teryda** (Major Advisor: Dr. Raymond Carthy)

1:15 - 1:30 p.m. ..... **Orlando Acevedo-Charry** (Major Advisors: Dr. Miguel Acevedo & Dr. Scott Robinson)

1:30 - 1:45 p.m. ..... **Taryn Chaya** (Major Advisor: Dr. Todd Osborne)

1:45 - 2:00 p.m. ..... **Isaac Coleman** (Major Advisor: Dr. Vanessa Hull)

2:00 - 2:15 p.m. ..... **Medelin Kant** (Major Advisor: Dr. William Hammond)

2:15 - 2:30 p.m. ..... **Rachel Walsh** (Major Advisors: Dr. Akito Kawahara & Dr. Jaret Daniels)

2:30 - 3:00 p.m. ..... ***Break***

SESSION III - Student Poster Presentations

3:00 - 5:00 p.m. ..... ***Student Poster Presentations***

Keynote Speaker

Dr. Nicholas G. Aumen

Dr. Nicholas Aumen served as Acting Deputy Regional Director for the Southeast Region of the US Geological Survey (USGS). Before this position, he was the US Southeast Regional Science Advisor and Coordinator of the Greater Everglades Priority Ecosystem Sciences Program (2013-2025); Aquatic Ecologist, Everglades Program Team, Everglades National Park, West Palm Beach, FL (1999-2013); and Research Program Director, Ecosystem Restoration Department (1997-1999) and Division Director, and other supervisory positions (1991-1997) with the South Florida Water Management District, West Palm Beach. For the past 12 years, he served as Chair of the committee involved in organizing the biennial Greater Everglades Ecosystem Restoration (GEER) science conference. He started his professional career as a faculty member (Assistant and Associate Professor) at the University of Mississippi, Oxford, MS (1984-1991). Dr. Aumen has extensive experience (40+ years) in the restoration and conservation of natural systems across the southeastern US, with major efforts in Florida.

Integrative Interdisciplinary Science in Support of Ecological Restoration: the Everglades Case Study

Everglades restoration is a multi-faceted, decades-long effort that involves federal, state, and local government agencies, tribes, academia, non-governmental organizations, and the private sector working together on a complex goal – restoring America's River of Grass. This effort exemplifies the necessity of combining multiple scientific disciplines – such as hydrology, ecology, environmental engineering, and others – to address complex environmental challenges. High-quality science in direct support of Everglades restoration must leverage diverse scientific expertise that is led by researchers and restoration practitioners to develop holistic strategies that foster ecosystem recovery and resilience that will provide critical ecosystem services for south Florida's rapidly growing population.

Photo by Dr. Todd Osborne, SNRE Affiliate Faculty.

Invited Speakers

Dr. Kati Migliaccio

Dean, College of Agriculture and Life Sciences, UF/IFAS

Dr. Migliaccio is Dean of the University of Florida College of Agricultural and Life Sciences (CALS), where she leads strategic direction for one of the largest colleges of its kind in the U.S., serving more than 7,000 students across 16 departments and schools within UF's Institute of Food and Agricultural Sciences. She became Dean of CALS in January 2025. Dr. Migliaccio has been a driving force in advancing UF's Artificial Intelligence Initiative, helping embed AI across academic disciplines and shaping the university's long-term vision for its use in research, instruction, and outreach. Her leadership emphasizes cross-disciplinary innovation and preparing students for an increasingly data-driven world. She joined UF as faculty in 2005 and has held several leadership roles, including Department Chair and Interim Associate Dean for UF/IFAS Research. In 2019, she was elected as a lifetime Fellow of the American Society of Agricultural and Biological Engineers (ASABE). In 2022, she received the prestigious James R. and Karen A. Gilley Academic Leadership Award from the ASABE, honoring her exemplary leadership as Department Chair. Dr. Migliaccio holds degrees from Texas A&M University, the University of Kentucky, and the University of Arkansas.

Dr. Robert Gilbert

Dean for Research and Executive Director for Academic Affairs, UF/IFAS

Dr. Gilbert is Dean for Research and Executive Director for Academic Affairs at UF/IFAS. In this role, he is responsible for overseeing the research mission and administration, with oversight of 15 Departments and 12 Research and Education Centers. His office manages more than $9 million in resources that are used to strengthen the capacity and innovation of UF/IFAS research. Gilbert joined the agronomy faculty at the UF/IFAS Everglades Research and Education Center in Belle Glade, FL, in 2000. He then became the Center Director until 2014, when he was appointed as the Agronomy Department Chair on UF's main campus. He also served for 14 months as UF/IFAS Interim Senior Vice President for Agriculture and Natural Resources. Under his leadership as Research Dean, UF has ranked #1 nationally since 2018 in agriculture and natural resource expenditures in the National Science Foundation Higher Education Research Database.

Photo by Cat Wofford, UF/IFAS.

Affiliate Faculty Presentations

Dr. Corey Callaghan, Assistant Professor, Fort Lauderdale Research and Education Center

How Participatory Science is Transforming Biodiversity Research

Participatory science platforms such as iNaturalist and eBird are transforming biodiversity research by generating vast volumes of species observations across ecosystems and taxa. These community-contributed data are increasingly helping to address fundamental and applied ecological questions. In this talk, I will share examples of how these data are being used to advance biodiversity and conservation research. These case studies illustrate how participatory science not only complements traditional biodiversity monitoring but also expands the scope of ecological inquiry, enabling new discoveries about species distributions, interactions, and responses to global change.

Dr. Nicolas Gauthier, Assistant Curator, Florida Museum of Natural History

Modeling Historical Human-Biodiversity Feedbacks Across Scales

This talk explores how artificial intelligence and computational methods are revolutionizing our understanding of long-term human-environment interactions. Through case studies spanning ancient ecosystem engineering and the dynamics of global plague pandemics, I show how these AI-driven methods bridge multiple scales—from individual pottery sherds to continental climate patterns—to illuminate the deep history of human-biodiversity feedbacks. This work not only enhances our understanding of how human societies have shaped and been shaped by ecosystems over thousands of years but also provides crucial insights for predicting future human-environment dynamics in an era of rapid global change.

Dr. Yue Li, Assistant Professor, Forest, Fisheries, and Geomatics Sciences

AI in Environmental Education: Insights from Current and Future Educators

Emerging artificial intelligence (AI) technologies may help environmental educators design and implement educational practices that address growing environmental issues, although their specific roles remain unclear. This presentation shares two research studies exploring AI in environmental education. The first study used a nationwide survey to examine non-formal environmental educators' experiences with AI in their practices. The second, ongoing study investigates how AI integration can support environmental education program development and foster critical thinking among future educators in an undergraduate course. The presentation will conclude with a discussion of implications for research and practice in environmental education.

Dr. Nikolaos Tziolas, Assistant Professor, Southwest Florida Research and Education Center

AI-Driven Dialogue from Earth Observation Data for Agro-Environmental Monitoring

Recent advances in artificial intelligence open new pathways for bridging complex environmental data with actionable insights. Here, GaiaBot is introduced as a conversational AI platform that integrates Earth observation, field-trial data, and large language models into an interactive "chat map" system. Instead of running complex analyses, users can simply ask natural-language questions, such as "What is the soil organic carbon in my field?" or "What percentage of crops were damaged after the hurricane?" and receive results within seconds. Case studies from Florida farmlands and hurricane recovery show how conversational AI simplifies access to geospatial intelligence, empowers stakeholders, and strengthens resilience.

Student Oral Presentations

Orlando Acevedo-Charry, Ph.D. Candidate

Advisors: Dr. Miguel Acevedo, Wildlife Ecology and Conservation; Dr. Scott Robinson, Florida Museum of Natural History

Monitoring Population Extinction Risk with Community Science Data

Estimating local extinction risk is essential for conservation, but standardized monitoring data are often unavailable. Community science data offer a promising alternative due to their broad spatial and temporal coverage. We developed a modeling approach using continuous state-space models to estimate local persistence probability over time from eBird observations. To evaluate accuracy, we compared results with long-term monitoring data of the endangered Everglades snail kite. We also conducted sensitivity analyses to test robustness under reduced data availability. Our findings show that persistence trends from eBird closely match those from standardized monitoring. Even with only 5% of the original data, trend estimates remained consistent. This suggests our method is reliable and resilient to data thinning. The framework is computationally efficient and easy to apply, making it a valuable tool for assessing population viability in areas lacking formal monitoring but rich in community science contributions.

Taryn Chaya, Ph.D. Candidate

Advisor: Dr. Todd Osborne, Whitney Laboratory for Marine Bioscience

Seasonal Biogeochemical Dynamics in a Managed Mosquito Impoundment in the Indian River Lagoon

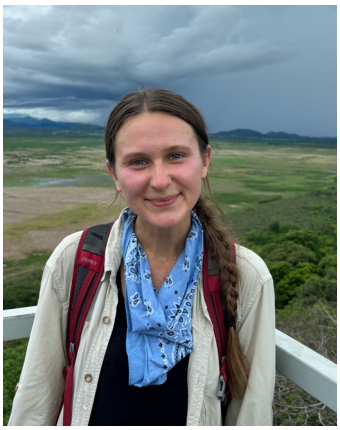
Wetlands throughout the Indian River Lagoon have been extensively modified for mosquito control. Managed mosquito impoundments are diked wetlands equipped with pumping systems that add lagoon water into the wetland and use outflow structures to control water depth. During the summer, this infrastructure maintains elevated water levels to submerge exposed sediments where mosquitoes typically lay their eggs. This seasonal management protocol, known as Rotational Impoundment Management, may influence the system's biogeochemistry; for example, winter water drawdowns can expose organic matter and promote nutrient efflux. To investigate these potential impacts, long-term monitoring was conducted in an actively managed mosquito impoundment to identify seasonal nutrient concentrations, physicochemical parameters, and soil characteristics. Results show increased inorganic nitrogen and dissolved oxygen both inside and outside of the impoundment in the cooler season compared to the summer, suggesting physicochemical conditions—often closely linked to hydrological changes—play a central role in driving nutrient dynamics.

Isaac Coleman, M.S. Student

Advisor: Dr. Vanessa Hull, Wildlife Ecology and Conservation

Testing Pathways for Ecological Monitoring: Integrating Remote Sensing and Open-Source Data in a Coastal Transition Zone

Avian migration has been found to support widespread ecosystem health as migratory species serve as vectors linking distant ecosystems. Using the Next-Generation Radar network along regional migratory flyways and stopover zones, we compare migration traffic rates with encounter rates derived from eBird, a global community science program. Together, these data sources validate wave-like migration dynamics. This integration provides a model for assessing avian flight behavior and ecosystem signals. Our findings show how open-source information systems can help stakeholders recognize emergent biological patterns, foster community engagement, and enhance offshore ecosystem management in an already active coastal environment.



Medelin Kant, Ph.D. Candidate
Advisor: Dr. William Hammond, Agronomy

Pines in the Anthropocene

Pines are among the most widespread and globally important trees, spanning deserts to taiga and persisting as some of the longest-lived and tallest organisms on Earth. Emerging ~150 mya, Pinus is renowned today for resilience and adaptation to extreme environments. Yet, in recent decades at least 28 species have experienced elevated pulses of climate-driven mortality—more than any other tree genus—driven largely by hotter-drought events. Acclimation through plasticity in biochemistry, physiology, and structure may reduce climate vulnerability, but its potential is limited and varies across species, ontogeny, and functional traits. Bioclimate models of the last decade predicted pine mortality at range edges—now confirmed by recent die-off— and project substantial declines in pine habitat suitability and distribution by century's end. Ultimately, extant pine forests in the Anthropocene hinge on their ability to acclimate, migrate, or die—and which outcome predominates has significant potential to influence global carbon cycles, shift ecotones, and transform entire ecosystems.

Rachel Walsh, Ph.D. Candidate
Advisors: Dr. Akito Kawahara and Dr. Jaret Daniels, Florida Museum of Natural History

Endangered Species Act Listing Predicts Research Effort for U.S. Butterflies

Developing effective conservation strategies for at-risk species requires research on ecology, habitats, and threats, yet research effort is uneven and often misaligned with need. We investigated whether U.S. Endangered Species Act (ESA) listing predicts research effort for butterflies, and whether effort is higher before versus after ESA listing. We found that ESA-listed species had significantly more publications than non-listed species after accounting for geographic range and taxonomic family, although NatureServe conservation ranks showed no relationship with research effort. Further, we showed that more papers were published after ESA listing than before, suggesting that ESA listing may catalyze research attention. These findings highlight that ESA protected status may direct more resources toward species in need of data-informed conservation efforts. Meanwhile, the relative scarcity of studies prior to ESA listing, as well as for unlisted, at-risk taxa, underscores the urgent need for proactive research to inform timely conservation action.

Photo by Rachel Walsh, SNRE Ph.D. Candidate.

Photo by Katie Schoenberger, SNRE M.S. Graduate.

Student Poster Presentations

Hernan G. Alvarez, Ph.D. Candidate (Advisor: Dr. Jessica Kahler) **Poster #1**

Understanding Non-compliance with Illegal Wildmeat Trade Regulations in the Western Amazon of Ecuador

Many conservation efforts and resources have been invested to mitigate the conservation impact of wildmeat trade. Despite these efforts, wildmeat trade is a widespread behavior in urban and rural areas in the Ecuadorian Amazon. This study examines factors influencing non-compliance with illegal wildmeat trade regulations across urban and rural areas in two Amazonian provinces of Ecuador. By analyzing data collected from face-to-face surveys at the household level, the study evaluates how deterrence factors, perceptions for crime seriousness, and legitimacy-based factors interact with regulatory and enforcement frameworks influencing non-compliance with wildmeat trade regulations. Results will be used in participatory workshops with local actors to generate an action plan aiming to improve compliance with regulations. Overall, this first study will be useful to provide recommendations to improve public policy and conservation strategies in Ecuador while offering insights into the complexities of the diverse set of factors influencing wildmeat trade.

Jennifer Bishop, M.S. Student (Advisor: Dr. Lyn Gettys) **Poster #2**

Common Nursery Study on Large Eelgrass (Vallisneria neotropicalis)

Eelgrass (*Vallisneria neotropicalis*) is a native submersed plant that plays an important role in the aquatic ecosystem by stabilizing sediments, preserving water quality, and providing habitat for wildlife. These experiments were conducted at the Fort Lauderdale Research and Education Center sawtooth greenhouse in mesocosms. Six ecotypes were collected throughout Florida, and their growth was evaluated in common nursery experiments to see whether one or more ecotypes were better suited for restoration projects. We evaluated five artificial substrates and four nutrient rates, and four replicates were prepared for each substrate/nutrient/ecotype combination. Plants were grown out for 16 weeks, then we measured the length of the longest leaf in each container and conducted a destructive harvest. We recorded separated below-ground roots and above-ground shoot dry weight and analyzed this and leaf length data using the General Linear Model procedure and LSD separation of means in SAS v9.1 (SAS Institute, Cary, NC).

Edison Bonilla Liberato, Ph.D. Student (Advisors: Dr. Sergio Balaguera-Reina & Dr. Frank Mazzotti) **Poster #3**

Understanding Ecological Interactions of Threatened Fauna in a National Estuarine Reserve

The threatened American crocodile has shown steady population recovery in Florida, also increasing the number of ecological interactions with other fauna within its nesting habitats. To understand these dynamics, we deployed camera traps from 2017 through 2024 at two sites in the Rookery Bay National Estuarine Research Reserve. A total of 43 species interact with crocodile nests, exhibiting behaviors such as foraging, nesting, resting, transiting, and nest predation. We documented the first cases of crocodile nest predation by Virginia opossum and coyote, crocodile nesting overlap with the Florida softshell turtle, and crocodile nest disturbance by green iguanas. Species richness peaked in June, aligning with the start of the hatching season. While most interactions were neutral or negative, the presence of both native and invasive species suggests crocodile nesting sites serve as biodiversity hotspots. This underscores the need for continued monitoring and conservation efforts of American crocodile nesting habitats.

Jazmyn Broxton, M.S. Student (Advisor: Dr. Raymond Carthy) **Poster #4**

Long-Term Patterns of Sea Turtle Nest Success in Relation to Beach Nourishment

In order to evaluate whether beach nourishment influences sea turtle reproductive outcomes, this study examined hatching and emergence success along the St. Joseph Peninsula, Florida, from 2008 to 2024. Seventeen years of standardized nest inventory data were compiled and categorized by nourishment history (not nourished, immediately nourished, recently nourished, previously nourished). Generalized linear mixed models with an observation-level random effect quantified differences in success while accounting for year, beach zone, and extra-binomial variance. Results indicated no statistically significant differences among nourishment categories, although immediately nourished sites showed a non-significant trend toward higher emergence success. I found that there still is a need for long-term, standardized monitoring to clarify how nourishment and beach morphology interact to shape nesting outcomes and better inform coastal management.

Photo by Jazmyn Broxton, SNRE M.S. Student.

Photo by Jan Lenc, SNRE Ph.D. Student.

Photo by Kay Schlachter, SNRE Ph.D. Student.

Photo by Ankita Datta, SNRE Ph.D. Student.

Haojie Cao, Ph.D. Student (Advisor: Jiangxiao Qiu) **Poster #5**

Deciphering Human-Nature Interactions in Coastal Areas Using Multimodal Artificial Intelligence

Coastal areas are critical ecosystems defined by intense human-nature interactions. Understanding these dynamics globally is vital for sustainable management, but traditional methods are limited. This study pioneers a multimodal AI framework to analyze these interactions using large-scale social media data. We sourced a global dataset of geotagged Flickr images from coastal regions, filtering over 2.7 million relevant images with the CLIP model. Subsequently, the BLIP model generated a descriptive sentence for each image. These captions were then clustered using BERTopic to identify key categories of human-nature engagement. This automated pipeline provides a data-driven taxonomy of how people interact with coastal environments, presenting a scalable and cost-effective methodology for monitoring public use patterns and informing policy.

Cameron Dasher, Ph.D. Student (Advisor: Dr. Luke Flory) **Poster #6**

Arcytophyllum leymebambensis (Rubiaceae: Spermacoceae): a New Species Defined by Morphological and Molecular Traits from Northern Peru

The newly described species *Arcytophyllum leymebambensis* (Rubiaceae) from the Amazonas region of northern Peru represents a significant addition to the understanding of plant diversity in the Andes. Specimens were collected between 2023 and 2024, leaf tissue preserved in silica gel for later extraction of genomic DNA. This species forms an isolated clade and is phylogenetically distinct, being resolved as sister to other members of the Spermacoceae, with strong support from molecular analyses. Morphologically, A. *leymebambensis* is distinguished by its acuminate leaf and sepal apices, hirsute-lanuginose seeds, and the presence of protective hooks around the ovary. It thrives in humid, high-elevation grassland ecosystems and appears to be endemic to the region. Its restricted range and potential vulnerability to environmental changes, such as overgrazing and fire, qualify it for a Near Threatened (NT) conservation status. Continued research is essential to fully document its distribution and ensure the conservation of this unique species.

Ankita Datta, Ph.D. Student (Advisor: Dr. Patrick Inglett) **Poster #7**

Evaluating the Economic Value of Water Quality and Carbon Sequestration Benefits in Everglades Stormwater Treatment Areas

The STAs in the Florida Everglades are critical for reducing nutrient loads, especially to restore downstream ecosystems. While their ecological benefits are well-documented, the economic value of these improvements remains underexplored. This study presents a cost-benefit analysis (CBA) of water quality treatment in four major STAs, combining nutrient accretion data with ecosystem service. The analysis quantifies the economic benefits of phosphorus removal in terms of improved water quality, enhanced recreational opportunities, and avoided ecosystem degradation costs. In addition, the study incorporates the climate regulation value of carbon sequestration by applying the social cost of Carbon to measured soil carbon accumulation rates. Using benefit transfer methods and region-specific data, this research estimates the monetary value of key ecosystem services, including flood mitigation, carbon sequestration, and recreational use.

Aurora Del Vecchio, B.S. Student (Advisor: Dr. Laura Reynolds) **Poster #8**

How Does Bottom Type (Seagrass vs Hard Bottom) Impact Diel pH Variation?

In coastal systems, photosynthesis and respiration influence water column pH, driving diel fluctuations. Photosynthesis only occurs during daylight, leading to daily pH cycles whose magnitude is dependent on the plant and animal communities present. St. Martin's Marsh Aquatic Preserve consists of seagrass beds intermixed with hard-bottoms that support diverse organisms. In large seagrass and coral reef systems these structures alter animal abundance and types of producers present; however, dynamics between these smaller subtropical hard-bottom habitats are understudied. To complement existing monitoring programs, my goal is to compare diel water pH fluctuations in neighboring hard-bottom and seagrass habitats. I set up 3 paired sites — with a hard bottom and seagrass site separated by at least 100m. Loggers recorded data every 30 minutes over 7 days to fully characterize the changing pH. Data analysis in ongoing, with initial exploratory approaches being used to understand the dynamics and variability between these ecosystems.

Madyson D'Espies, M.S. Student (Advisor: Dr. Iske Larkin) **Poster #9**

Unseen Hours: Nocturnal Foraging of Dolphins Around a Fishing Vessel in Crystal River, Florida.

Bottlenose dolphins (*Tursiops truncatus*) are highly social and intelligent marine mammals, yet gaps remain in our understanding of their nocturnal behavior. Human activities like fishing and boating increasingly threaten dolphin populations, making it crucial to study their responses to these disturbances. This study investigates nighttime foraging and seasonal variation around a fishing vessel in Crystal River, Florida. Using direct observation, video documentation, and photo identification, we record dolphin presence and activity patterns. While initial goals included linking nighttime and daytime behaviors and individuals, limited overlap shifted the focus toward seasonal changes in nocturnal behavior and spatial use. Preliminary observations reveal consistent, prolonged nighttime foraging around a boat—behavior not observed during daylight hours. This pattern may suggest a specialized foraging tactic limited to a subset of the population. As the first study to track dolphin behavior at night using these methods, it offers new insights for science and conservation efforts.

Seyed Abolfazl Ebrahimi, Ph.D. Student (Advisors: Dr. Matthew Cohen & Dr. James Jawitz) **Poster #10**

Water Quality Sampling Patterns and Statistics Diverge Between Regional and National Databases

Effective water quality monitoring depends not only on adequate sampling effort but also on consistent integration across institutional datasets. This study evaluates the spatial, temporal, statistical, and network-distribution consistency of two major water quality sources in Florida, USA: the federal National Water Quality Portal (NWQP) and publicly available data from regional Water Management Districts (WMDs). Using four representative watersheds, we analyzed calcium (Ca), total phosphorus (TP), dissolved oxygen (DO), and total organic carbon (TOC). We assessed data density in records and stations, as well as statistical measures of variability. Results revealed mismatches in both sites and observations, with 53% (30–73%) of WMD measurements and 8–52% of stations absent from NWQP. Despite similarities in station distribution across river networks, statistical outcomes diverged substantially. These findings highlight the need for improved inter-agency coordination and harmonization to ensure that costly water quality monitoring achieves its full scientific and policy potential.

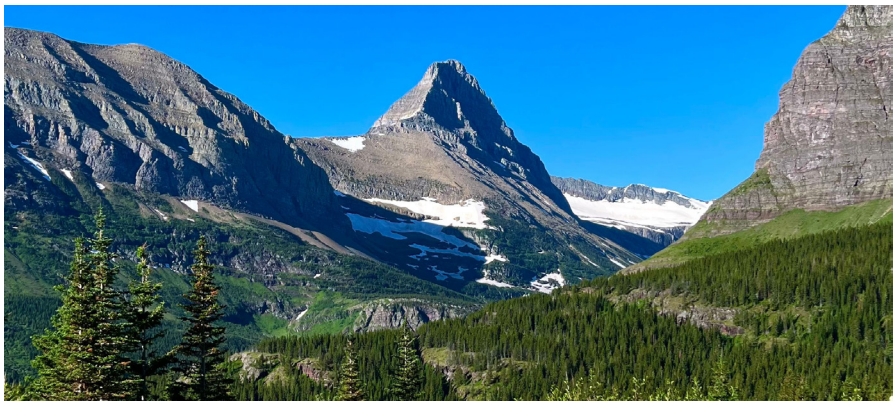


Photo by Cailin Fouraker, SNRE B.A. Student.

Photo by Isaac Coleman, SNRE M.S. Student.

Patricia Escobar Torres, M.S. Student (Advisor: Dr. Jamie Loizzo) **Poster #11**

Preserving the Past Under Uncertainty: Climate Threat Perspectives of Cultural Heritage Managers in Southwest Florida

A need exists to consider cultural heritage (CH) managers' perspectives in preservation efforts for coastal CH sites endangered by climate change and natural hazards. CH includes knowledge, traditions, objects, places, etc. inherited by modern society from previous generations. In this qualitative case study, we recruited CH managers and related professionals from Southwest Florida to participate in virtual semi-structured interviews about their: background, experiences, knowledge, networks, community connections, and recommendations (guided by the Heritage Community Resilience framework). Research questions included: 1) What are CH managers' experiences navigating climate change and natural hazards?, 2) What knowledge, skills, and learning do managers describe as important?, 3) How do managers describe engaging community networks?, 4) In what ways do CH managers feel connected to their communities and their CH sites?, and 5) What recommendations do managers have for CH site resiliency planning? Data collection is underway. Theoretical framework and preliminary analysis will be presented.

Jelvi Fika, M.S. Student (Advisor: Dr. Stefan Gerber) **Poster #12**

Land Use Change Impacts on Soil Organic Carbon Storage in Indonesia

As the largest terrestrial carbon reservoir, soil plays a key role in ecosystem carbon dynamics, and changes in soil can shift carbon storage. In the tropics, land-use change (LUC) has been widely reported to alter soil organic carbon (SOC). Here, we compare natural and managed land uses and their effects on SOC storage in Indonesia. Indonesia is among the top countries emitting CO2 from LUC, yet research on this topic remains underrepresented, as LUC trends show no signs of decrease. We compile data on SOC, soil types, and land use across Indonesia from databases and compare SOC before and after land conversion. Preliminary analysis of 14 land-use types shows natural forests have the highest SOC stocks, while wet rice cultivation has the lowest. We expect to detect declines in SOC storage between natural and managed land uses, and between pre- and post-conversion that are larger than in other biomes.

Photo by Ana Yoko Ykeuti Meigal, SNRE Ph.D. Candidate.

Photo by Varshitha Prasanna, SNRE Ph.D. Candidate.

Cailin Fouraker, B.A. Student (Advisor: Dr. Denjun Wang) **Poster #13**

Effects of Biochar on PFAS Destruction by Advanced Reduction Process

The occurrence of carcinogenic PFAS in water sources poses significant risks to human health and the environment. Advanced reduction processes, like UV/sulfite systems, have demonstrated success in PFAS remediation in water. Incorporating biochar into the UV/sulfite system has shown promise in enhancing PFAS destruction and defluorination. This study aimed to determine what biochars are favorable for defluorination in water by the UV/sulfite system. Corn 500, Douglas Fir 500 and 900, and commercial biochar were chosen. Samples were prepared in anoxic conditions with 1 mg/L of PFAS, 0.1 g/L of biochar, 40 mM of sodium sulfite, and 1 mM of NaCl and placed in a photochemical reactor. At set times, samples were removed and filtered. The fluoride concentration was measured and the defluorination efficiency was calculated. Our findings showed the addition of biochar promoted PFAS defluorination in comparison to the UV and UV/sulfite.

Analise Fussell, M.S. Student (Advisor: Dr. Corey Callaghan) **Poster #14**

Assessing the Potential of eBird to Track Changes in Abundance of Wading Birds in Florida

Participatory science platforms, such as eBird, are increasingly gathering large amounts of data used for many spatial modelling exercises. However, it is less certain how well these data can track trends in abundance through time. We compared 10 years of wading bird nesting colony data from the South Florida Water Management District South Florida Wading Bird Reports to 10 years of eBird observations across South Florida. Our objective was to see whether the relative abundance estimates from eBird, where abundance is per sampling effort, correlates with the absolute peak nesting season data from the wading bird reports. We assessed how the spatial grain of eBird data are aggregated influences the agreement between relative abundance from eBird and absolute abundance estimates from professionally collected data. Overall, our preliminary analysis illustrates that there may be usefulness in thinking about how eBird data can track population trends of wading birds through time.

Oscar Godinez Gomez, Ph.D. Student (Advisors: Dr. Robert Fletcher & Dr. Robert McCleery) **Poster #15**

Assessing Ecological Integrity in Mexican Forests: Trends, Challenges, and Conservation Implications

Mexican forests harbor exceptional biodiversity and provide critical ecosystem services but face intensifying threats from deforestation, and land-use change. These pressures often surpass ecological thresholds, driving forest degradation and declining ecological integrity (EI). Yet, spatial and temporal EI trends and the effectiveness of protected areas (PAs) remain poorly understood. This study evaluates EI across temperate, dry, and rainforest ecosystems from 2001 to 2023. Using the XGBoost algorithm, we developed an annual Integrity Index integrating land cover, disturbance, productivity, and vegetation structure. Pixel-based time series analysis revealed severe declines: dry forests showed the greatest integrity loss (58%), followed by humid (57%) and temperate (45%). Importantly, integrity loss extends beyond deforestation—remaining forests degrade in structure, composition, and function, raising uncertainty about resilience. Iconic PAs such as Selva El Ocote, Calakmul, and Tehuacán-Cuicatlán displayed negative trends, underscoring the urgent need to strengthen conservation strategies, monitoring, and policy alignment with global biodiversity frameworks.

Tori Guarino, Ph.D. Student (Advisor: Dr. Carrie Reinhardt Adams) **Poster #16**

Genetic Diversity of Smooth Cordgrass in Florida's Natural, Donor, and Restored Salt Marshes

Shoreline stability, a function compromised by coastal degradation, can be restored through restoration projects with smooth cordgrass (*Spartina alterniflora*, hereafter Spartina) as plant material, which helps return ecological, social, and economic benefits of coastal systems. Plant material development methods for restoration, such as direct seeding or clonal propagation, contribute to the marshes' genetic composition. As restoration using Spartina expands, understanding the genetic consequences of revegetation may help promote coastal resilience and inform future sourcing and planting practices. In this study, we compared the genetic composition of Spartina populations across three marsh types commonly involved in restoration efforts: restored, donor, and natural. The results show clear differences in genetic structure across marsh types, with AMOVA indicating that about a quarter of the total genetic variation is explained by differentiation among marshes. This highlights the importance of sourcing for restoration projects that consider genetics to maximize ecological performance of restored marshes.

Photo by Natalia Teryda, SNRE Ph.D. Candidate..

Photo by Finella Campanino, SNRE Ph.D. Student.

John Harling, Ph.D. Candidate (Advisor: Dr. Esteban Rios) **Poster #18**

Accuracy of Genomic-based Models for Cowpea Flowering Improves with the Inclusion of Photoperiod Data

Variation in days to flowering (DTF) in cowpea (*Vigna unguiculata L. Walp*) allows breeders to develop cultivars that are adapted to specific environments. Genomic prediction (GP) was implemented in cowpea to increase genetic gain and possibly reduce field trials. However, predicting DTF in unobserved environments might produce serious biases. Therefore, the objective of this research is to predict DTF for cowpea genotypes in selected environments by utilizing photoperiod in GP. Flowering data was collected in eight environments for 208 cowpea genotypes from the University of California, Riverside mini-core collection. An enviromic-GP model was fit using photoperiod to predict DTF in two cross validation scenarios, which included predictions for unknown environments and for unknown genotypes in unknown environments. Incorporating photoperiod reduced the difference between the observed and predicted environmental means, while also providing lower root mean squared error for both scenarios when compared to conventional GP indicating more accurate DTF predictions.

Jaiere Harlow, Ph.D. Candidate (Advisors: Dr. Raymond Carthy & Dr. Vanessa Hull) **Poster #17**

A Coupled Human and Natural Systems (CHANS) Framework Analyzing Manatee Research and Conservation Efforts in Florida.

The Florida manatee (*Trichechus manatus latirostris*) has faced major environmental threats, impacting their population status. Necropsies have revealed signs of starvation, relating to lack of food resources due to algal blooms and cold stress. Management decisions have had major impacts on research efforts. This project will use a Coupled Human and Natural Systems (CHANS) approach to assess prominent factors affecting the population by incorporating environmental and socioeconomic concerns into a Social-Ecological Systems (SES) framework. Surveys will be administered to evaluate the effectiveness of science communication, including the impacts conservation efforts have on public awareness and engagement. Addressing key concerns in Crystal River and the Indian River Lagoon will serve as an initial case study to then be subsequently applied state-wide. Expected project findings aim to identify the level of awareness the public has regarding manatee threats and conservation efforts, and how awareness may influence environmental behaviors and conservation outcomes.

Drew Hiatt, Ph.D. Student (Advisor: Dr. Luke Flory) **Poster #19**

Post-introduction Intraspecific Hybridization Enhances Frost Tolerance of an Invasive Shrub

Introduction of non-native populations from disparate native range locations can lead to intraspecific hybridization and heightened risk of spread. We tested this hypothesis with Brazilian peppertree (*Schinus terebinthifolia*), which is thought to be limited in its invasive range due to its inability to tolerate freezing temperatures. Two different haplotypes have been introduced to Florida. The two haplotypes have hybridized extensively, and we predicted that hybrid individuals are more tolerant of colder temperatures. Across five common gardens that spanned 5.5 degrees of latitude, fitness related traits suggested that hybrid individuals have a wide environmental tolerance. On average, hybrid individuals produced 50% more seeds in the southernmost common garden than haplotypes A and B. In the northernmost garden, haplotype A and the hybrids produced 170% more seed than haplotype B. Overall, post-introduction hybridization has resulted in novel allele combinations that tolerate a wide range of environmental conditions, potentially contributing to range expansion.

Harrison Hobbs, M.S. Student (Advisor: Dr. Todd Osborne) **Poster #20**

Investigating the Drivers of Seagrass Recovery in the Mosquito Lagoon, FL

Seagrass in the Indian River Lagoon (IRL) has been severely degraded since 2011, yet Mosquito Lagoon (ML) experienced an unprecedented recovery beginning winter 2023, unlike other IRL sub-lagoons. We hypothesized the recovery began in late March 2023 and was driven by water quality shifts. Recovery timing was determined through a presence/absence (PA) analysis of satellite imagery, while transect data quantified percent cover changes. Water quality metrics (turbidity, temperature, salinity, chlorophyll-a, and N:P ratio) were analyzed using LOESS, generalized additive models (GAMs), and Welch's t-tests. From February 7 to March 29, 2023, seagrass occurrence rose 40%, with a 35.18% mean cover increase during the growing season. Salinity was the strongest driver, with higher values in ML (31.06 ppt) than NIRL (26.77 ppt). Chlorophyll-a also influenced growth, suggesting light limitation. Results highlight salinity shifts as central to ML's recovery and support further study of IRL water quality.

Levi Hoskins, Ph.D. Student (Advisors: Dr. Corey Callaghan & Dr. Chang Zhao) **Poster #21**

Avian Usage of Urban Greenspaces Throughout the Full-annual Cycle

Urbanization and habitat fragmentation are reshaping biodiversity, with major implications for migratory birds in highly developed regions. South Florida, one of the most urbanized areas along the Atlantic Flyway, provides a critical setting to examine how passerines use fragmented greenspaces across their annual cycle (overwintering, spring migration, breeding, fall migration). Using the species–area relationship (SAR) framework, we analyzed eBird checklists (2010–2024) from 74 greenspaces across Broward, Miami-Dade, and Palm Beach counties to assess how patch size, connectivity, and habitat type influence diversity and abundance. We asked: (1) Do smaller greenspaces experience a higher influx of migrants during migration than overwintering? and (2) How does patch use differ between these phases? Results indicate disproportionate reliance on small greenspaces during migration, particularly in the fall, underscoring the ecological value of even small patches in heavily urbanized landscapes. These findings will inform conservation strategies aimed at sustaining migrants within urban environments.

Liz Hurtado, Ph.D. Candidate (Advisors: Dr. Scott Robinson & Dr. Hannah Vander Zanden) **Poster #22**

Do Flock Mates Partition Their Niche? Insights from Stable Isotope Analysis

Dietary niche partitioning is central to understanding species interactions, such as competition and facilitation, as well as community assembly dynamics. We examined this phenomenon in mixed-species flocks across elevation gradients in the western Bolivian Andes. To test whether co-occurring species partition dietary niches and identify drivers of isotopic variability, we collected 195 feathers and 63 blood samples at elevations ranging from 1,350 to 3,500 masl during the breeding and molting seasons. We analyzed stable isotope ratios (δ13C and δ15N) with mass spectrometry. We estimated isotopic niche breadth and overlap with Bayesian inference (SIBER) and used PERMANOVA to test the influence of species, habitat, elevation, and diet. The mean niche overlap was 20% for feathers and 16% for blood. Species, habitat, altitude, and diet explained 43.2% and 38.3% of the variation in feathers and blood, respectively. Our findings suggest that most species minimize competition by maintaining distinct dietary niches.

Rola Jiang, M.S. Student (Advisor: Dr. Jamie Loizzo) **Poster #23**

Waves of Awareness: Assessing a NOAA B-WET Project's Impact on Youths' Coastal Connection and Knowledge

Our team implemented a three-year project at the UF/IFAS Nature Coast Biological Station (NCBS) in Cedar Key to engage students (grades 7-10) from four underserved counties in hands-on learning about living shorelines, coastal resilience, climate change, and habitat improvement. The project itself became a practice of resilience, as original plans were adapted due to Hurricanes Idalia (2023) and Helene (2024). Despite the challenges, almost 600 students participated in the modified lessons. We assessed program impacts on environmental awareness and understanding via pre-/post-survey with Likert-scale items. Overall index score indicated youths' (pre n = 3.22 to post n = 3.25), and their interest in science and climate attitudes decreased (pre-M = 3.48 to post-M = 3.11). Yet, content knowledge appeared to increase for terms such as living shoreline (pre-knowledge 18.8% 50 post-knowledge 57.0%) and seawall (27.5% to 56.6%).

Sarina Kawall, Ph.D. Student (Advisor: Dr. Matthew Hallett) **Poster #24**

Human-Wildlife Conflict Focusing on Small Carnivores and Small Livestock in the Rupununi, Guyana

Within the Rupununi, conflict events between large felids, such as jaguars and pumas, and large livestock, such as cattle, receive the most attention but may not be the main source of human-wildlife conflict. In fact, conflict events between small carnivores, such as birds of prey, and 'small' livestock, such as chickens, may be more widespread and occur much more frequently than previously assumed. This study examined the prevalence of conflict between humans and small carnivores within rural indigenous communities in Guyana, as well as the current management strategies used with small livestock. Poultry were the most attacked livestock species, with raptors the most often reported depredating carnivores. Respondents experience daily, weekly and monthly attacks from small carnivores, with attacks related to limited use of livestock management methods. Increased use of physical management methods such as pens or coops, or implementation of a herding or shepherding schedule may reduce conflict incidence.

Photo by Mary Schneider, SNRE B.S. Graduate.

Getachew Kefelegn, Ph.D. Student (Advisors: Dr. Niguss Hailegnaw & Dr. Haimanote Bayabil) **Poster #25**

Legacy Phosphorus and Soil Retention Behavior in South Florida Agricultural Soils

Phosphorus (P) fertilizer is widely used in agriculture, yet its efficiency remains low, leading to legacy P buildup in soils. This study examined P adsorption and release properties of Everglades Agricultural Area muck soils using batch experiments. The adsorption study was conducted using seven initial P concentrations (20, 40, 80, 120, 160, 200, 400 mg L^{-1}) and equilibration times from 1, 2, 4, 8, 24 to 48 hours. Adsorption data were fitted to Langmuir and Freundlich isotherms, and release kinetics were assessed using pseudo-first- and pseudo-second-order models. Results showed a maximum P adsorption capacity of 13 mg g^{-1}. The Langmuir model best described adsorption, suggesting monolayer coverage, while P release followed pseudo-second-order kinetics at moderate concentrations (80–200 mg L^{-1}). Overall, muck soils exhibited substantial P adsorption capacity, indicating the need to improve fertilizer use efficiency.

Anna Klevtcova , Ph.D. Student (Advisor: Dr. Jessica Kahler) **Poster #26**

Modeling Human-Induced Mortality Thresholds for the Long-Term Population Persistence in Russia

Population of Amur tigers (*Panthera tigris altaica)* in the Russian Far East has been announced to double in 2022 as a result of extensive conservation efforts. Ironically, the peak of tiger population numbers aligned with a greatest decline in population of wild boars devastated by African Swine Fever (2019-2022) leaving 750 tigers facing acute prey scarcity. While tigers gradually re-oriented their dietary preferences, conflict incidents rose, elevating risk of retaliatory killing and poaching. The study uses a females-only density-independent matrix model to assess a set of scenarios predicting the impact of human-induced mortality rates on a population dynamic of Amur tigers. Results of the simulations show that population growth turned negative once additive human mortality exceeded 15%. Interventions targeting recovery of wild boar population size and conflict mitigation are required to sustain recovered tiger population.

Aline Kuzma, Ph.D. Student (Advisor: Dr. Andrew Koeser) **Poster #27**

Incentive-Based Policies for Tree Protection: A National Review

This study presents the first national review of local urban forest incentive programs targeting private property owners in the United States. Although private trees comprise a significant share of urban canopy cover, their management varies across jurisdictions. Analyzing codes and government websites from U.S. cities, counties, and communities with populations over 50,000, the study finds that 35.24% offer incentives, while 6.14% plan to implement them in future updates. Incentive mechanisms vary based on the type of tree management they seek to support. They were organized into 18 categories with examples to illustrate the range of possible approaches. Many programs lack formal documentation, target a single stage of the tree's life cycle, and differ in complexity. Consistent with prior research, there is no "one-size-fits-all" solution; effective urban forest incentive programs should consider the full tree life cycle, site-specific factors, and long-term impacts to inform context-appropriate strategies for sustainable urban forest management.

Beatrice Kyasiimire, Ph.D. Candidate (Advisor: Dr. Mark Hostetler) **Poster #28**

Evaluating Enabling Conditions of Alternative Livelihoods in Communities Adjacent to Queen Elizabeth Protected Area in Uganda.

Alternative livelihood interventions link conservation and socio-economic development for frontline communities around protected areas. Their effectiveness depends on local enabling conditions and delivery mechanisms. This study maps initiatives around Uganda's Queen Elizabeth protected area, applying the sustainable livelihoods framework to examine how community-perceived enabling conditions across human, social, financial, natural, and physical capital shape implementation. A mixed-methods design combined surveys, focus groups, and key informant interviews. Analysis used descriptive statistics and cumulative link mixed models (CLMM) to test relationships between livelihood capitals. Beekeeping, tree planting, and coffee cultivation emerged as key interventions, with many participants engaging in multiple projects. Human, financial, social, and natural capital were rated significantly more critical by participants than non-participants, while physical capital showed no difference. Perceptions of implementation procedures showed a polarized relationship. Results underscore the need for participatory design, equitable benefits, accountability, and stronger community engagement for sustainable conservation outcomes.

Photo by Jenna Reimer, SNRE Ph.D. Candidate.

Photo by Anna Klevtcova, SNRE Ph.D. Student.

Photo by Madeline Franco, SNRE B.S. Student.

Photo by Anna Klevtcova, SNRE Ph.D. Student.

Saneer Lamichhane, Ph.D. Candidate (Advisor: Dr. Madan Oli) **Poster #29**

If You Build It, Will They Come? Assessing Tiger Population Response to Conservation in Nepal.

Thirteen tiger-range countries adopted the 2010 St. Petersburg Declaration to double tiger populations by 2022. As a signatory, Nepal intensified conservation efforts, and we evaluated tiger population responses in Banke and Bardia national parks (2013–2022) using capture-mark-recapture analyses. In Bardia NP, tiger numbers rose from 49 to 122, with density increasing from 3.39 to 8.47 tigers/100 km². Female survival was higher than males (87–89% vs. 73–77%), with females growing at 6–7% annually versus ~2% for males. Banke NP saw abundance increase from 3 to 22 and density from 0.34 to 2.42/100 km², driven by survival rates ≥90% and recruitment of 0.27 individual–1 year–1 (2013–2018), yielding 18–20% annual growth. Recolonization and dispersal from Bardia, combined with suitable habitat and recovering prey, underpinned these gains. Our findings indicate Nepal met or exceeded its St. Petersburg commitment, demonstrating rapid population recovery with effective conservation.

Andrew Lebowitz, B.S. Student (Advisor: Dr. Matthew Cohen) **Poster #30**

From Raindrops to Groundwater: Hydroclimatic and Ecological Controls on DOC Export in North Florida Forests

Forests generate abundant dissolved organic carbon (DOC), yet rainfall-driven export remains undercharacterized. We analyzed DOC quantity and chemistry in north Florida forests via two year-long, weekly campaigns sampling rainfall in longleaf pine (sandhill), oak, and slash pine (flatwood) stands. Throughfall, stemflow, and litterflow DOC concentrations varied little with forest type. However, older, larger trees generated far greater concentrations of DOC in stemflow, and phenological-driven events in throughfall, displaying the significant influence of old-growth forests. While production was generally similar, DOC export diverged by setting: in sandhills, despite high topsoil concentrations, groundwater was DOC-dilute, indicating deep, mineral subsoils may provide a major C sink. In flatwoods, groundwater DOC was high, peaking in summer, mirroring nearby stream concentrations. This suggests high seasonal recharge and water tables can activate the transportation of forest derived DOC to surface waters.

Dakota Lewis, Ph.D. Candidate (Advisor: Dr. Andrew Altieri) **Poster #31**

Multidecadal Analysis of Fish Community Change Across the Florida Keys Reef Tract

Ecological communities are changing. Biotic and abiotic factors determine community structure and function. As temperatures continue to warm and habitats are degraded in many regions, it is important to assess how and at what rate communities are changing over time. Both environmental and biotic interactions drive community diversity, structure, and stability. Here we evaluated regional community stability, identified the drivers of species richness patterns, and quantified how environmental factors interact to shape short-term (annual) and long-term (decadal) changes in fish community diversity and structure across the Florida Keys Reef Tract. Rising temperatures that reduce habitat complexity and destabilize communities may be obscured by annual gains in species richness and biodiversity variability. Overall, the results emphasize the central role of diversity, habitat complexity, and environmental change in shaping community dynamics and resilience.

Meng Lin, M.S. Student (Advisor: Dr. Dail Laughinghouse) **Poster #32**

From Identification to Application: Treatment of Freshwater Benthic Cyanobacteria Using Bacteria and Their Cyanocidal Compounds

Benthic cyanobacteria are globally distributed and produce cyanotoxins that threaten aquatic ecosystems and animal health. This study evaluated 38 bacterial isolates for their ability to degrade benthic cyanobacteria and two cyanotoxins, microcystin-LR and saxitoxins, while investigating potential modes of action for cyanocidal activity. Cyanobacterial growth was monitored using relative fluorescence units (RFU), which serve as a proxy for cyanobacterial biomass based on pigment fluorescence, and toxin degradation was quantified by ELISA after 72 hours of treatment. Genomic analyses identified biosynthetic gene clusters and secondary metabolites linked to cyanocidal activity. Among these bacteria, Serratia, Variovorax, Stenotrophomonas, Microbacterium, Brevundimonas, Paenalcaligenes, Pseudomonas, Ectopseudomonas, Acinetobacter, Aeromonas, and Achromobacter inhibited cyanobacterial growth through cell lysis or metabolite release. Additionally, Aminobacter, Achromobacter, Agrobacterium, Pseudomonas, Variovorax, and Ectopseudomonas possessed the mlrC gene, which encodes an enzyme responsible for microcystin-LR degradation. This work highlights bacterial roles as potential biocontrol agents against (toxic) benthic cyanobacteria.

Nicole Luchau, M.S. Student (Advisor: Dr. David Chagaris) **Poster #33**

Applying the U.S. Gulf of Mexico-wide Ecosystem Model to Forecast Climate Impacts on Fisheries

Climate change threatens the Gulf of Mexico by altering fish populations, ecosystems, and ocean–atmosphere dynamics. Current climate vulnerability assessments rely heavily on expert opinion rather than quantitative data. To address this gap, this study applies a spatially explicit ecosystem model using Ecopath with Ecosim (EwE) and Ecospace. EwE integrates productivity, trophic interactions, and habitat structure with spatial–temporal dynamics to evaluate ecosystem responses to environmental and management changes. The Gulf-wide ecosystem model (GWEM) will be run under alternative climate and fishing scenarios, incorporating spatial–temporal drivers from NOAA's Modular Ocean Model 6. This climate-informed framework will generate projections of biomass, mortality, species distributions, and potential winners and losers. By linking climate change with fisheries dynamics, the project will provide decision-makers with a robust tool to forecast ecosystem shifts and design adaptive strategies, helping sustain both ecological resilience and the economic future of Gulf fisheries.

Alynza McBride, B.S. Student **Poster #34**

Tree Rings as a Potential Monitoring Tool for Saltwater Intrusion: Year 2

This project assessed whether pine tree ring growth could be used to track rates of saltwater intrusion by analyzing growth ring response to surface water specific conductance levels. Since pine trees are non-halophytic, growth ring declines are expected with specific conductance spikes, so if that is observed, pine growth rings could be used to monitor saltwater intrusion. Pine tree cores were collected at 13 sites near Suwannee, Chassahowitzka, and Crystal Rivers. The independent variable was surface water specific conductance levels. The dependent variable was tree ring width. The control group consisted of duplicate cores collected from one tree at each site. Tree cores were collected, dried, mounted, and sanded. The rings were measured. Three-year ring width percent growth change was calculated and compared against specific conductance data from nearby gages. The hypothesis was supported because ring growth declined when specific conductance spiked, demonstrating trees are useful for saltwater intrusion monitoring.

Photo by Jan Lenc, SNRE Ph.D. Student.

Photo by Andre Brebion, SNRE M.S. Student.

Cameron McMullen, B.S. Student and **Sydney Barfus,** B.S. Student **Poster #35**

Ecological Niche Models Reveal Climate Threats to Florida's Hardwood Forest Biodiversity

Florida Hardwood Forest ecosystems support diverse temperate plant species at their southernmost distributions within the North American Coastal Plain biodiversity hotspot. Human activities increasingly threaten these forests, including deforestation, land-use changes, and climate change, necessitating the development of ecological niche models to predict the future putative distributions of key Hardwood Forest species and inform conservation strategies. Thousands of native Hardwood Forest records from global biodiversity databases GBIF and iDigBioccurrence occurrence data were compiled, cleaned, and filtered. Environmental variables were used to map current suitable niche distributions and estimate potential future habitat availability under various climate scenarios. These models provide important insights into possible impacts of climate change on species distributions, enabling greater understanding of how the species comprising Hardwood Forest ecosystems may shift in the future. Our findings can inform conservation efforts to protect Florida's hardwood forests, ensuring the preservation of biodiversity and ecosystem function amid ongoing environmental changes.

Stephanie Medo, M.S. Student (Advisor: Dr. Daniel Smith) **Poster #36**

Wildlife Responses to Trail Paving: A Camera Trap Study Along the Cross Florida Greenway

Recreational trails are expanding across Florida, providing community access to natural areas but raising questions about wildlife responses to increased human activity. In 2017, a trail on the Marjorie Harris Carr Cross Florida Greenway was paved through Marion County, including CR 475, CR 475A, SW 49th Avenue, CR 484, and the I-75 Landbridge. Camera traps were deployed at these sites between 2013 and 2016, creating a rare baseline before construction. This project compares that dataset to data from 2025 to evaluate changes in wildlife activity following trail paving. Species detections will be analyzed for temporal shifts (day vs. night use), spatial avoidance of high-use areas, and overall changes in diversity and abundance. Spatial factors such as distance to trailheads, local population density, road proximity, and land cover will also be incorporated. Expected findings will reveal how multi-use trails shape wildlife behavior and inform management strategies for coexistence in shared landscapes.

Photo by Madison Self, SNRE M.S. Student.

Photo by Silvia de Melo Futada, SNRE Ph.D. Candidate.

Silvia de Melo Futada, Ph.D. Candidate (Advisors: Dr. Karen Kainer & Dr. Joel Correia) **Poster #37**

Conservation Policies and Protected Areas and Indigenous Territories in the Amazon Basin

Bulding on the Amazon Assessment Report by the Science Panel for the Amazon, we examined historical processes shaping conservation in the Amazon Basin, particularly Protected Areas and Indigenous Territories, exploring the institutionalization of national PA systems, their categories, and the legal status of ITs. We analyze IT recognition across Amazonian countries and its correlation with state policies influencing land occupation, land-use change, and demographics. We highlight management frameworks that incorporate Indigenous and traditional territorialities, recognizing their rights and the role of ecological connectivity in conservation, as well as examples of landscape-scale conservation initiatives. Policy advancements have strengthened PA and IT protections, but deforestation rates surged between 2016 and 2022, even within PAs and ITs, highlighting the urgent need for more effective, innovative conservation strategies and political commitment to honoring conservation goals. This article relies on data from the RAISG, a literature review, and country specific analysis.

Jeffrey Mintz, Ph.D. Student (Advisor: Dr. Mathew Leibold) **Poster #38**

Simplifying the Predator-prey Power Law with Properties of Logarithms

The predator-prey power law describes an empirically observed pattern between the biomass density of predators and prey across a variety of ecosystems. Similar to other power relationships, its functional form $Y = c \cdot X^k$ or $\log Y = c + k \cdot \log X$ relates predator and prey biomass through a scaling constant, k, and coefficient of normalization, c. Most attention has been paid to the consistency in the scaling constant k across ecosystems. We illustrate a practical technique for simplifying power laws with properties of logarithms, through which we derive additional meaning from the coefficient of normalization, c.

Erin Nadel, B.A. Student (Advisor: Dr. Ryan Good) **Poster #39**

Determining Residential Stormwater Management Pond Buffer Zone Width Recommendations for Reducing Soil Erosion

Stormwater systems are present through urban and rural infrastructure, helping to manage polluted runoff and flooding. Rural stormwater ponds have wide buffer zones supported by research. However, residential stormwater buffer zone width recommendations are not heavily backed by science, which our proposed modeling aims to fix. A strip of grass at a stormwater management pond will be divided into vertical sections mowed to selected widths. Over twelve months, erosion rates will be measured using erosion pins and hose clamps. Residential areas necessitate smaller buffer widths due to space requirements, but it is known that larger buffer widths are associated with decreased soil erosion rates. Based on this, our proposal aims to develop quantitative data specific to residential stormwater management ponds. We hope this proposal will lead to the formation of evidence-based buffer zone recommendations, in comparison to the vague suggestions currently found in policy and development codes.

Caleb Nyatuame, Ph.D. Student (Advisor: Dr. Yue Li) **Poster #40**

AI Use in Environmental Education: Does Awareness of its Environmental Costs Really Matter?

Artificial intelligence (AI) tools have become vital resources for environmental educators in designing meaningful learning experiences for students. While AI provides notable advantages, it also has adverse effects on the environment. Specifically, the energy demands of running large AI models can conflict with sustainability goals unless powered by renewable energy. Environmental educators, especially those who work in non-formal settings, often emphasize hands-on, experiential learning over technology use in environmental education (EE). They may also have concerns about the ecological footprint of AI. Considering their historical views on technology and the environmental costs of AI, important questions arise about how environmental educators view AI, its environmental impact, and whether their awareness of these costs shapes their attitudes toward using AI in EE. This study seeks to explore how non-formal educators' awareness of AI's environmental costs influences their perceptions and application of AI in EE.

Photo by Isaac Coleman, SNRE M.S. Student.

Photo by Coral Keegan, SNRE Ph.D. Student.

Oluwasegun Olubisi, Ph.D. Student (Advisors: Dr. Mary Lusk & Dr. Davie Kadyampakeni) **Poster #41**

Integrated Impacts of Soil Amendments and Cover Crops on Sandy Soil Health, Carbon, and Nutrients

Sandy soils, covering nearly 900 million hectares globally, remain among the most challenging agricultural systems due to poor water and nutrient retention and low organic matter content. In Florida, coarse-textured Entisols and Spodosols are highly vulnerable to nutrient leaching, requiring integrated management strategies that balance productivity with environmental sustainability. This proposed research will evaluate the combined effects of soil amendments (biochar, treated wastewater biosolids, and organic manure) and cover crops (sunn hemp, sorghum-sudangrass, and fallow) on soil health, carbon sequestration, and nutrient cycling in subtropical sandy soils. A two-year factorial field experiment with 12 treatments and four replications will be established at the Gulf Coast Research and Education Center in Wimauma, Florida. We hypothesize that amendments and leguminous cover crops will enhance soil organic carbon, nutrient availability, and microbial activity while reducing greenhouse gas emissions. Outcomes will provide evidence-based recommendations to improve soil resilience, support food security, and advance regenerative.

Charles Overdevest, B.S. Student (Advisor: Dr. Jamie Loizzo) **Poster #42**

Exploring the Efficacy of Podcasting for Changing Knowledge and Opinions of Wetlands and their Conservation

Prior research has indicated increasing public awareness of wetlands could increase conservation efforts of the natural areas. Podcasting has become a proven science communication tool to inform adult learners about natural resources issues such as wetland ecosystem services and protection. We have created a three-episode podcast series about wetlands with guests of varying levels of expertise based on their academic background (1st year graduate student, 5th year graduate student, faculty member). The purpose of this study is to examine podcast episode impacts on listeners' wetlands attitudes, knowledge, conservation intentions, and perceived source credibility via a post-retrospective survey with Likert-scale questions. The podcast and survey will be distributed through UF/IFAS Extension channels and other listservs with the goal of reaching the study population of adults (aged 18+) living in Florida. We expect that listeners will have more positive views of wetlands and greater knowledge of the ecosystem services they provide.

Chad Palmer, Ph.D. Candidate (Advisor: Dr. Edward Camp) **Poster #43**

Testing for Positive Density Dependence at Multiple Scales Among Reef-Building Oysters

Oyster reefs provide critical biodiversity, ecosystem functions, and human services, yet they are experiencing global decline. One potential driver is limited understanding of oyster population dynamics. Positive density dependence is typically considered only at very low abundances, but ecosystem engineers such as oysters may exhibit depensatory dynamics even at higher densities due to habitat modification. We conducted a field experiment using concrete oyster mimics to test recruitment and juvenile survival across two cluster sizes and three reef densities. Bayesian analyses revealed near-significant evidence that increased structural density benefits both settlement and survival, though high variance limited statistical certainty. A post-hoc power analysis indicated that sample sizes were insufficient to rule out ecologically meaningful effects, and median estimates suggest effect sizes with management implications. These results highlight the need for greater experimental power and consideration of positive density dependence in oyster reef conservation and restoration strategies.

Sebastian Palmieri, M.S. Student (Advisor: Dr. Lyn Gettys) **Poster #44**

The Effects of Urbanization and Invasive Species on the Aquatic Plant Pollinators of South Florida

Pollinators play a critical role in the reproduction of flowering plants and are essential to ecosystem health. A majority of previous pollinator research is focused on terrestrial systems, while the relationships with aquatic plant flowers remain understudied. This study aims to investigate pollinator diversity and interactions with aquatic plant flowers in South Florida wetlands. The first portion of the research will involve seasonal surveys of pollinators and aquatic plant flowers across wetlands with varying levels of urbanization. The second part of the research will utilize a controlled outdoor experiment to test if invasive plants are competing with native plants for pollinator visits. By comparing the pollinator visitation and biodiversity, this study will assess how the presence of urbanization and invasive plant species impact pollinator behavior and floral resource utilization. The results are expected to show that both urban development and invasive species presence alter natural pollinator visitation patterns.

Taylor Pierson, M.S. Student (Advisor: Dr. Jaret Daniels) **Poster #45**

Applied Conservation Genomics Informs Population Management of the Frosted Elfin Butterfly

Population genomics (POPGEN) studies allow us to estimate the health of at-risk insect populations, making it possible to better predict and respond to their conservation needs. Frosted Elfin (FE), Callophrys irus, is a small, specialist butterfly facing historic habitat loss and is likely extirpated in several states and is critically imperiled or imperiled in 22 other states. Here, we sequenced individuals from 9 states and assembled a genome for the species. We used this genome to align reads for a POPGEN analysis, allowing us to evaluate genetic distributions and inform management priorities and recovery actions for the species, as well as generating information to guide listing decisions. This is the first study for FE using high-throughput technology aimed at producing a proactive conservation model, which could be applied to other at-risk taxa in the future.

Stasia Pietraszun, M.S. Student (Advisors: Dr. Carrie R. Adams & Dr. Laura Reynolds) **Poster #46**

Plant Density Did Not Hinder Germination, but Limited Seedling Survival and Growth in Spartina alterniflora

Spartina alterniflora (smooth cordgrass, hereafter Spartina) is a cosmopolitan species distributed over the northern hemisphere and is often used in restorations and ecosystem engineering projects like living shorelines. Little is known about sexual reproduction in its most southern geographical limit, limiting the use of seeds in these projects. We investigated seed and vegetation density influence on germination, seedling survival, and early performance in a greenhouse common garden experiment where density treatments included six variations of seed density (3,8) and adult stem density (0,3,6) combinations. Seed germination was high regardless of treatment, but survival, seedling size, and vegetive reproduction were higher when adult stem density was reduced. These findings highlight that restoration strategies should consider existing vegetation in shaping seed recruitment outcomes. Our study contributes knowledge on intraspecific interactions that mediate Spartina recruitment and provides guidance for future studies on Spartina seed use in restorations and ecosystem engineering projects.

Liliane Poincon, Ph.D. Candidate (Advisor: Dr. Anita Anantharam) **Poster #47**

The National Women in Agriculture Association: Evaluating the Contributions of US Chapter Leaders in Community Empowerment

The National Women in Agriculture Association (NWIAA) contributes to women farmers' empowerment in the USA through its chapters. Many chapter leaders are also highly involved in Community empowerment efforts. My research question for this presentation is: How do the NWIAA chapter leaders contribute to community empowerment? I collected data from 6 NWIAA chapter leaders. I do two to three interviews per participant, with a total of 14 interviews. The leaders have impacted on their communities by increasing the number of farms in their communities and improving the performance of some of them. They increase people's access to information regarding agriculture and other sectors. The NWIAA chapters provide employment, volunteer, and learning opportunities in the areas where they are located, especially when they get funding. In sum, the chapter leaders contribute to women farmers' empowerment and advancing US agriculture, and address issues in their communities.

Varshitha Prasanna, Ph.D. Candidate (Advisor: Dr. Vivek Sharma) **Poster #48**

Integrated Irrigation and Nitrogen Management in Potato: Field Evaluation, Climate Adaptation, and UAV Machine Learning Approaches

Potato production is highly dependent on efficient irrigation and nitrogen (N) management, particularly on sandy soils where water and nutrient losses are prevalent. A two-year field study (2022–2023) at NFREC, Live Oak, FL, evaluated the effects of different irrigation regimes and N fertilizer sources, including conventional and controlled-release fertilizers, on growth, yield, N-uptake efficiency, and leaching. Findings were further used to calibrate and evaluate the DSSAT model, and this calibrated model further used for assessing potato yield under future climate scenarios (2040–2099) using CMIP6 projections (SSP126, SSP245, SSP585). Results highlighted the importance of adaptive irrigation–fertilizer strategies to sustain yields under climate stress. Additionally, UAV-based vegetation indices, combined with ground-measured leaf area index and machine learning algorithms, were tested for estimating crop coefficients (Kc) to improve evapotranspiration-based irrigation scheduling. All these approaches combined help optimize water and nitrogen management, boost productivity, and minimize environmental impacts in potato systems.

Photo by Marliz Arteaga, SNRE Ph.D. Graduate.

Photo by Katlyn Swestyn, SNRE M.S. Student.

Md Jahir Rayhan, M.S. Student (Advisor: Dr, Akito Kawahara) **Poster #49**

The Evolutionary Diversification of Silk Glands in Bombycoidea: Insights from Morphology and Molecular Biology

The superfamily Bombycoidea (silk moths and relatives) is a diverse lineage of Lepidoptera with global distribution and major economic importance as the primary source of silk. Silk production, enabled by specialized silk glands, represents a key evolutionary innovation with significant ecological and behavioral roles. These glands show striking diversity in morphology and function across Lepidoptera. However, current knowledge of their structure, physiology, and evolutionary history remains limited to a few models, notably *Bombyx mori*. This study addresses these gaps through a comparative analysis of silk glands across Bombycoidea. Using high-resolution CT scanning, we reconstruct three-dimensional gland organization and assess evolutionary modifications via phylogenetic analyses. To explore molecular mechanisms, we examine region-specific gene expression and protein localization using techniques such as Hybridization Chain Reaction (HCR). By integrating morphological, molecular, and evolutionary perspectives, this work aims to clarify silk gland diversification and inform both evolutionary biology and biotechnological applications.

Daniela Rojas-Canizales, Ph.D. Student (Advisors: Dr. Vanessa Hull & Dr. Raymond Carthy) **Poster #50**

Hawksbill Turtle Tortoiseshell Trade in Bocas del Toro, Panama.

In 1950, Bocas del Toro, Panama, was one of the major exporters of hawksbill tortoiseshell to Japan. As turtle populations declined and international bans were introduced in 1977, the trade in tortoiseshell ceased. However, the perceptions of the sea turtle ban within Bocas del Toro remain unclear, as well as the motivations behind sea turtle illegal take. Accordingly, during June of 2024, twenty-five semi-structured interviews were conducted. Participants highlighted how the ban on tortoiseshell commerce affected their economy and livelihood. They also stated they did not understand why trade is no longer allowed, especially since sea turtles are abundant. Finally, participants mentioned that sea turtle take is still occurring to supply illicit markets of tortoiseshell on the island. Bocas del Toro is a major rookery for hawksbill sea turtles, and understanding their history and the drivers behind sea turtle take is crucial for effective management planning.

Bruno Rozzi, Ph.D. Candidate (Advisor: Dr. Zachary Brym) **Poster #51**

Agroecological Carbon Sequestration and Restoration on Reclaimed Mine Land in the Subtropical Central Florida Phosphate District

Central Florida's phosphate district (CFPD) yields a large share of global fertilizer (~65%) yet leaves more than 150,000 acres of reclaimed mine lands (RMLs) that resist stabilization and reuse. Over three consecutive growing seasons we asked whether modest increases in crop functional diversity could catalyze longer term soil recovery on these clay deposits in a minimally managed system. Sorghum-sudangrass (*Sorghum bicolor x S. bicolor var Sudanese)* has been determined as an ideal crop for its efficiency in biomass production using limited inputs, while showcasing increases in productivity when paired with legumes in polycultures. Across the three-year span, the diverse mixtures surpassed monocultures by roughly forty percent in shoot-carbon yield and allocated a larger share of total biomass below ground. The results illustrate how integrating crop diversity with annual row crops delivers a scalable pathway for rehabilitating Florida's extensive phosphate mine footprint while advancing both soil health and climate.

Suyash Sawant, Ph.D. Student (Advisor: Dr. Kathryn Sieving) **Poster #52**

Dynamic Information Landscapes: Social and Vocal Adaptations of Avian Flocks Across Urban-Natural Gradient

Bird communities function as dynamic social networks, reshaped by habitat structure, environmental conditions, and human disturbance. Mixed-species flocks (MSFs) are a model system for exploring these dynamics, where cohesion and vocal communication aid survival in complex environments. We investigated how MSF social and vocal traits vary along an urban-natural gradient in Gainesville, Florida. Systematic behavioral surveys and acoustic recordings across natural forests, urban forests, and suburban habitats allowed us to characterize flock composition and communication, focusing on two leader species, the Tufted Titmouse (*Baeolophus bicolor*) and Carolina Chickadee (*Poecile carolinensis*). We measured the social dynamics through participation, persistence, and spatial associations, while evaluating vocal complexity using call diversity and behavioral context. We proposed the Dynamic Information Landscapes Model, which revealed that urban flocks were less diverse, with low participation and persistence rates, and limited information exchange. These results highlight the constraints and flexibility of avian communication systems across ecological gradients.

Photo by Dr. Todd Osborne, SNRE Affiliate Faculty.

Megan Siemann, Ph.D. Student (Advisors: Dr. David Chagaris & Dr. William Patterson) **Poster #53**

Validating Energy Pathways in Equilibrium Ecopath with Ecosim (EwE) Food Web Models with Stable Isotopes

Ecopath with Ecosim (EwE) food web models consider trophic dynamics under different scenarios. Predator-prey relationships are represented in the diet matrix, typically developed from stomach contents analysis (SCA) data. Stomach contents may differ from average diet due to factors including differential success in identifying prey items (e.g., digestion progression, size), leading to model uncertainty. Stable isotope ratios reflect average diet over time and have been used to validate trophic levels and trophic niche size in EwE models. Here, we demonstrate a method of predicting consumer stable isotope signatures in EwE models, based on primary producer isotopic signatures. Subsequent comparison of predicted signatures to measured δ13C and δ34S allows for validation of relative contributions of carbon sources and benthic and pelagic pathways to modeled diets. This approach indicates observed Red Snapper diets are composed of more pelagic sulfur and planktonic carbon sources than represented in the West Florida Shelf model.

Carolina Simon-Pardo, Ph.D. Student (Advisors: Dr. Yue Li & Dr. Julie Brown) **Poster #54**

Assessing the Needs for Integrating Biocultural Knowledge in Science and Environmental Education in a Multiethnic Indigenous Territory in the Colombian Amazon

Indigenous youth living in indigenous territories in the Colombian Amazon navigate rapid social and environmental changes while sustaining traditional knowledge and territorial stewardship. Re-thinking education in a way that integrates biocultural knowledge is part of the autonomy processes of these communities. Through arts-based activities, individual and group interviews and workshops, this study explores the multiple views and interests of community members about their science and environmental education in relation to their youth and territorial development. Preliminary results showed that the communities wanted to provide youth with global and local perspectives of the Amazon, preparing them to thrive inside and outside their territory. They also emphasized the importance of deep knowledge of their languages and culture, along with leadership skills to actively contribute to their local community development and environmental conservation. Art-based research will be displayed as part of this poster presentation.

Lydia Soifer, Ph.D. Candidate (Advisor: Dr. Brett Scheffers) **Poster #55**

Taller Canopies are Better Generators of Biodiversity in the Tropics

Vertical landscape features, including mountains and trees, shape global biodiversity patterns. Mountains harbor an extraordinary biodiversity, but generate greater richness in the tropics, a pattern known as Humboldt's enigma, due to latitudinal variation in mountain climates. We present a vertical corollary to Humboldt's enigma, finding that taller forests support greater biodiversity globally, but do so more effectively in the tropics. We then examine how interactions between macro- and micro-climatic characteristics may generate this pattern. In the tropics, arboreal species can finely partition vertical habitat, increasing richness with forest height, because wet and warm climates reduce physiological constraints across wide-ranging climate conditions from the ground to the canopy that are organized in distinct vertical bands. As the mountains of forests, tall tropical canopies are therefore essential to preserve.

Jiayi Song, Ph.D. Student (Advisors: Dr. Chang Zhao & Dr. Corey Callaghan) **Poster #56**

FoundationSoil: Enhancing Soil Organic Carbon Mapping Using a Multi-Temporal Geospatial Foundation Model

Soil organic carbon (SOC) is a key indicator of soil health and climate resilience, yet large-scale mapping remains challenging due to sparse field data and complex processes. We present FoundationSoil, a digital soil mapping framework that integrates the geospatial foundation model Prithvi-EO-2.0 with environmental covariates to predict SOC concentration. Prithvi-EO-2.0 encodes multi-temporal satellite image patches via a transformer encoder, producing spatiotemporal representations of land-surface dynamics. These features are combined with 109 environmental covariates (e.g., climate) to train Random Forest and neural network regressors. Using 12,692 georeferenced topsoil samples from the WoSIS database across the continental United States, we applied stratified grid partitions to mitigate spatial autocorrelation. Results show that FoundationSoil consistently outperformed a pixel-based baseline, achieving RÂ² = 0.72 and RMSE = 38.62. Feature attribution shows that Prithvi-derived components capture semantically-rich, non-redundant signals relevant to SOC processes. These results demonstrate the promise of pretrained vision foundation models for soil mapping.

Anna Swigris, Ph.D. Student (Advisor: Dr. Corey Callaghan) **Poster #57**

Freshwater Zooplankton Dynamics in a Subtropical Lake

In pelagic freshwater lake systems, zooplankton are critical mediators of energy transfer, functioning at multiple consumer levels while exerting top-down pressures on phytoplankton populations. However, in eutrophic systems, these trophic relationships become more complex due to changes in prey base and selective predation pressures on different zooplankton size classes. This study uses a three-year dataset to investigate the trophic roles of two zooplankton size classes in Lake Okeechobee, Florida, a eutrophic lake in the Greater Everglades. Spatially, zooplankton communities of both size classes showed greater similarity at deeper sites compared to shallower locations. Temporally, we observed increases in larger-bodied zooplankton during spring months, while smaller-bodied zooplankton exhibited higher monthly variability. Analysis of zooplankton-phytoplankton relationships suggested that phytoplankton dynamics primarily drove their relationships, indicating bottom-up forces dominate over top-down control in this system. These findings provide insight into pelagic trophic web dynamics, facilitating informed adaptive management decisions for Lake Okeechobee.

Yukti Taneja, Ph.D. Student (Advisor: Dr. Luke Flory) **Poster #58**

Relative and Interactive Role of Mutualists and Enemies in Invasion Success

Plant invasion success depends on interactions with both antagonists and mutualists. While arbuscular mycorrhizal (AM) fungi can enhance nutrient uptake and growth, herbivory can suppress biomass and reproduction. How these forces interact across native and non-native ranges remains unclear. We tested the combined effects of AM fungal mutualism and insect herbivory on *Conyza canadensis*, a widespread invader. Seeds from 30 populations (15 native, 15 non-native) spanning latitudinal gradients were grown in a factorial greenhouse experiment manipulating AM fungi and herbivory. We measured herbivore damage, insect performance, and plant biomass following a recovery period. We hypothesize that AM fungi enhance growth and buffer herbivory, particularly in non-native populations. Our findings will shed light on how multiple biotic interactions jointly shape invasion success across ranges.

Kaitlyn Tucker, Ph.D. Student (Advisor: Dr. William Patterson) **Poster #59**

Estimated Age, Growth, and Mortality of Blackbelly Rosefish, Helicolenus dactylopterus, in the U.S. Atlantic Ocean

The blackbelly rosefish (*Helicolenus dactylopterus*, BBRF) is deepwater (300-600 m) reef fish vulnerable to overfishing due to its longevity (>90 y) and slow growth. The Charleston Bump wreckfish fishery in the U.S. Atlantic captures BBRF but little is known about their population dynamics in that region. The goal of this research was to estimate age, growth, and mortality of BBRF via otolith analysis. A sample of 1,269 otoliths was processed for ageing, with an age range of 9-81 y. A von Bertalanffy growth model (VBGM) was applied to the age composition data, with preliminary VBGM parameter estimates of $L\infty$ = 364.2 mm total length, k = 0.052y-1, and t0 = 0.156 y from a model that assumed logistic fishery selectivity. Natural mortality was estimated to be 0.067y-1 based on observed longevity. The preliminary ratio of F:M suggests the Atlantic BBRF stock may be undergoing overfishing.

Becca Walters, B.S. Student **Poster #60**

Mulching Soil with Dried Marigolds for Pest Control

Marigolds (*Tagetes* spp.) have been studied for their ability to repel plant pests such as hemipterans and aphids through the emission of chemical compounds. Such compounds have made marigolds prime for use as an intercrop for previously vulnerable tomato plants. A gap in research persists regarding the chemical potency of the flowers once dried, detached from their stems, and mixed into soil. Mulch has demonstrated pest-repellencing properties when mixed with biomass. Thus, mixing dried marigolds in with mulch has potential to improve soil conditions and suppress pests, serving as a practical alternative to chemical pesticide. An outdoor triplicate experiment was conducted to measure the impact of dried marigolds, mulch, and a combination of the two, respectively, on the numbers and types of insects surrounding a tomato plant. Findings suggest that the presence of marigold petals and mulch result in a rise in the density of both pests and beneficial groups.

Alexandria Walus, Ph.D. Student (Advisor: Dr. Marc Hensel) **Poster #61**

Unlocking Predator-prey Dynamics in a Changing Coastal Ecotone

Global change continues to drive widespread ecological impacts, including habitat degradation and climate change, specifically tropicalization. Coastal ecosystems, such as salt marshes, are experiencing shifts in structural complexity, as foundation species composition begins to shift as mangroves continue their march poleward due to fewer freeze events. These shifts in vegetation will change predator-prey interactions and ultimately alter coastal ecosystem structure and function. In this study, I examine how tropicalization affects the strength of top-down control on marsh community structure and ecosystem function. This summer, I established a marine predator exclusion experiment along a gradient of marsh to mangrove dominated coastline in Cedar Key, Florida. Plots are monitored for changes in vegetation structure, invertebrate community, and ecosystem functions. This work will provide unique insight into how predator dynamics influence ecosystem transitions through both top-down and bottom-up processes.

Photo by Kaitlyn Tucker, SNRE Ph.D. Student.

Photo by Ana Yoko Ykeuti Meiga, SNRE Ph.D. Candidate.

A. Ondine Wells, Ph.D. Student (Advisor: Dr. Paul Monaghan) **Poster #62**

Can We Grow Smarter? Tackling Barriers to Water-Efficient Landscapes in Florida

More than half of residential water use in Florida goes to landscape irrigation. Installing water-efficient landscapes in new homes requires a coordinated approach across industry groups, including nursery growers, turf producers, builders, developers, landscape architects, and irrigation professionals. Researchers engaged these stakeholders through surveys, interviews, and focus groups to identify the challenges and opportunities to implementing water-efficient landscaping. Key challenges included high upfront costs, limited availability of water-efficient plant material, poor irrigation system design and installation, misaligned homeowner expectations, and inconsistent regulations. Opportunities included the development of new cultivars, an increased interest in native plants and soil health, the adoption of improved technology to monitor water use, and collaboration across industries. The socio-ecological model (SEM) was used to articulate the systemic relationships among different industry groups, pinpoint where key stress points occur, and identify where water savings can be achieved.

Elise Whitaker, B.S. Student (Advisor: Dr. Luke Flory) **Poster #63**

Variation in Spread Among Lineages of Invasive Cogongrass

To accurately predict the spread of invasive plants, variations among lineages of a species must be well understood. Intraspecific variation in functional traits and phenotypic plasticity has been observed among two lineages of invasive cogongrass (*Imperata cylindrica*, (L.)), which was introduced to the United States through two introductions-from Japan to Alabama and from the Philippines to Florida-and has degraded longleaf pine ecosystems of the Southeastern United States. In this study, I aim to reveal whether lineage and environmental context interact to shape invasion dynamics. Three replicates of 10 populations of the Florida- and Alabama-type lineages exposed to either light or shade tents have been established, are being monitored for spread and growth-related metrics and will be harvested for above- and belowground structure at the end of the experiment. It is expected that populations of the Florida-type lineage will exhibit higher plasticity and greater spread across different light conditions.

Joel Wixson, Ph.D. Student (Advisor: Dr. Joann Mossa) **Poster #64**

Understanding How Upland and Floodplain Factors Influence Darter Presence in Pascagoula and Pearl River Watersheds.

This study investigates how upland and floodplain watershed characteristics influence the distribution and abundance of darter species (subfamily Etheostomatinae) in the Pascagoula and Pearl River basins of Mississippi. Recognizing that riverine ecosystems are tightly linked to their surrounding landscapes, this study adopts a watershed-scale approach to assess the impact of land cover, land use, soil types, impoundments, and geomorphology on darter occurrence. Using a GIS desktop analysis, darter presence data from survey collections are spatially and temporally correlated with environmental variables derived from publicly available datasets. The analysis incorporates zonal statistics, spatial overlays, and proximity metrics within HUC-12 watersheds and stream corridors. Preliminary literature review suggests that darter presence will be positively associated with forest cover (riparian and upland), low impoundment density, and well drained soils. While urban, agriculture, and mining (in-stream and upland) land uses may correspond with a reduced occurrence of darters.

Ruoyu Wu, Ph.D. Student (Advisor: Dr. Jiangxiao Qiu) **Poster #65**

Root Traits in Response to Interactive Climate, Grazing, and Land-Use Stressors in Subtropical Grassland

Plant functional traits play critical roles in regulating ecosystem processes and predicting plant community and ecosystem responses to global changes. While aboveground trait dynamics are well-studied, root traits remain understudied, especially in subtropical biomes, despite their importance as primary drivers of soil carbon and health. This study leverages a factorial experiment established in 2021 at Archbold's Buck Island Ranch (Florida, USA) to investigate grassland root traitsâ€™ responses to multiple climate, management, and disturbance stressors. The experiment manipulates three factors: land management, grazing intensity, and rainfall regimes. Replicated root samples were collected in May 2025 using soil cores. Their morphological and chemical traits were measured. Preliminary data (morphological traits from four of eight pastures) suggest that plant roots in cultivated pastures tend to be wider, with lower specific root length. Similar patterns appear under high-grazing intensity. These patterns indicate potential tradeoffs in root traits shaped by environmental and land management factors.

Ana Yoko Ykeuti Meiga, Ph.D. Candidate (Advisor: Dr. Denis Valle) **Poster #66**

Carrying the Burden: Unraveling the Role of Parental Care on the Behavior of Giant Anteaters

Animal movement patterns provide insights into factors influencing individual behavior, distribution, and interactions with the environment. These movement patterns are related to an animal's internal state, motion, and navigation capacity, which are in turn influenced by environmental characteristics. Understanding these mechanisms is crucial when animals face energetic trade-offs during reproduction, particularly in human-modified landscapes where movement strategies can change. We analyzed GPS telemetry data from female giant anteaters in the Brazilian Savanna, focusing on their responses to parental care and landscape changes. Our goals were to assess changes in activity patterns during parental care, determine the use of forested areas while caring for a pup, investigate if females constrain their home ranges when carrying offspring, and examine site fidelity during parental care. We hypothesized that females would be more active at night, use more forested areas, restrict their home ranges, and show site fidelity during the parental care period.

**Ph.D. candidates are doctoral students who have passed their qualifying exams, a key milestone in their program.*

Acknowledgements

SNRE Faculty Advisory Council
SNRE Graduate Student Council
IEC Connectors

Thanks to Karen Bray, Patricia Escobar Torres, Alexandra Goetz, Rola Jiang, Christy LaPlante (Chair of the Research Symposium Committee), and Natalia Teryda for their excellent work in organizing the 2025 SNRE Research Symposium.

We want to express our gratitude to all students, faculty, and staff for their active participation in the Symposium. Assistance of judges in selecting the best oral/poster presentations is greatly appreciated. We thank all our collaborators and partners for their support of our programs.

Cover photo credits: Tyler Jones, UF/IFAS Communications.

Photo by Cailin Fouraker, SNRE B.A. Student.

Photo by Paula Davo, SNRE B.A. Graduate

Photo by Madison Self, SNRE M.S. Student.

Sponsors

We would like to thank our generous sponsors for helping make this symposium possible. We are grateful for your support.

The Robin E. Nadeau Fund

UF IFAS UNIVERSITY of FLORIDA

UF IFAS CALS UNIVERSITY of FLORIDA

Agricultural and Biological Engineering
Agronomy
Entomology and Nematology
Forest, Fisheries, and Geomatics Sciences
Fort Lauderdale Research and Education Center
Horticultural Sciences Department
Invasion Science Institute
Nature Coast Biological Station
Soil, Water, and Ecosystem Sciences
Tropical Research and Education Center
Wildlife Ecology and Conservation

Artificial Intelligence and Informatics Research Institute
Biodiversity Institute
Center for Latin American Studies
Florida Museum of Natural History
Tropical Conservation and Development Program
Water Institute
Whitney Laboratory for Marine Bioscience

UF THE GRADUATE SCHOOL UNIVERSITY OF FLORIDA

SNRE Partners

Academic Units

Agricultural and Biological Engineering
Agricultural Education and Communication
Agronomy
Anthropology
Architecture
Biochemistry and Molecular Biology
Biostatistics
Chemistry
Construction Management
Design, Construction, and Planning
Economics
Human Development and Organizational Studies
Entomology and Nematology
Engineering School of Sustainable Infrastructure and Environment
Environmental and Global Health
Environmental Horticulture
Electrical and Computer Engineering
Forest, Fisheries, and Geomatics Sciences
Food and Resource Economics
Family, Youth and Community Sciences
Geography
Geological Sciences
History
Horticultural Sciences
Journalism and Communication
Landscape Architecture/DCP
Large Animal Clinical Sciences
Law
Mathematics
Medicinal Chemistry
Natural History
Microbiology and Cell Science
Physiological Sciences
Pathology, Immunology, and Lab Medicine
Plant Pathology
Political Science
Religion
Sociology and Criminology & Law
Statistics
Soil, Water, and Ecosystem Sciences
Tourism, Hospitality, and Event Management
Urban Regional Planning
Veterinary Medicine
Wildlife Ecology and Conservation

UF Centers and Institutes

Artificial Intelligence and Informatics Research Institute
Biodiversity Institute
Center for Landscape Conservation and Ecology
Center for Aquatic and Invasive Plants
Center for Land Use Efficiency
Center for Latin American Studies
Center for Remote Sensing
Citrus Research and Education Center
Emerging Pathogens Institute
Everglades Research and Education Center
Florida Climate Institute
Florida Institute for Built Environment Resilience
Florida Medical Entomology Laboratory
Florida Museum of Natural History
Florida Sea Grant
Fort Lauderdale Research and Education Center
Global Food Systems Institute
Gulf Coast Research and Education Center
Howard T. Odum Center for Wetlands
Indian River Research and Education Center
International Center
Invasion Science Institute
Land Use Environmental Change Institute
Mid-Florida Reseach and Education Center
Nature Coast Biological Station
North Florida Research and Education Center
Plant Diagnostic Center
Range Cattle Research and Education Center
Southwest Florida Research and Education Center
Thompson Earth Systems Institute
Tropical Aquaculture Laboratory
Tropical Research and Education Center
Vet Med-Anatomic/Aquatic Pathology
Water Institute
West Florida Research and Education Center
Whitney Laboratory of Marine Bioscience

Thank you for attending the 2025 SNRE Research Symposium!

Please scan the QR code below to submit anonymous feedback and suggestions.

Follow us on social media!

uf_snre

ufsnre

ufsnre

school/university-of-florida-snre