

**William K. Annis, PhD**

Postdoctoral Scholar

*Florida State University, Coastal and Marine Laboratory*

[wannis@fsu.edu](mailto:wannis@fsu.edu)

EDUCATION

---

**Doctor of Philosophy of Wildlife and Fisheries Biology**

**May 2025**

Clemson University, Dr. Brandon Peoples

*Investigating patterns and drivers of nonnative diversity in stream fish communities of the conterminous United States*

**Certificate in Engineering and Science Education**

**May 2025**

Clemson University

**Master of Science in Biology**

**May 2021**

Georgia Southern University, Dr. John Carroll

*What factors influence the distribution of *Geukensia demissa* in Georgia salt marshes?*

**Bachelor of Science in Zoology**

**May 2017**

University of Florida

Minor: Fisheries

---

GRANTS AND FELLOWSHIPS

---

2019. **Annis, W.K.** and Carroll, J. What factors affect the distribution of the ribbed mussel (*Geukensia demissa*) in Georgia Salt Marshes? *Georgia Sea Grant Research Traineeship*. \$25,000

2019. **Annis, W.K.** Travel Grant for Coastal Estuarine Research Federation Conference. *Georgia Southern University Graduate Student Organization*. \$650

2019. **Annis, W.K.** What factors influence the distribution of *Geukensia demissa* in Georgia salt marshes? *Georgia Southern University Graduate Student Organization*. \$850

---

PUBLICATIONS

---

*Published*

Thompson, L. M., **Annis, W. K.**, Midway, S. R., Olden, J. D., & Peoples, B. K. Cross-scale interactions mediate local drivers of nonnative species richness. *Ecography*, 2026: e08379. <https://doi.org/10.1002/ecog.08379>

**Annis, W. K.**, Thompson, L. M., Midway, S. R., Olden, J. D., & Peoples, B. K. (2025). Indirect Effects and Context Dependency in Stream Fish Invasions. *Diversity and Distributions*, 31(1): e13968. <https://doi.org/10.1111/ddi.13968>

Thompson, L. M., **Annis, W. K.**, Midway, S. R., Olden, J. D., & Peoples, B. K. (2025a). Nonnative Species Richness and Dominance Reveal Differing Support for Invasion Theory at a Continental Extent. *Global Ecology and Biogeography*, 34:e70044. <https://doi.org/10.1111/geb.70044>

Thompson, L. M., **Annis, W. K.**, Midway, S. R., Olden, J. D., & Peoples, B. K. (2025b). Spatial Scale and the Underestimation of Community Invadedness. *Global Ecology and Biogeography*, 34(1): e13951. <https://doi.org/10.1111/geb.13951>

Zink, M. L. W., Peoples, B. K., Olden, J. D., Thompson, L. M., **Annis, W. K.**, & Midway, S. R. (2025). A test of the abundant-center hypothesis for stream fishes. *Ecography*, e07711. <https://doi.org/10.1002/ecog.07711>

Carroll, J. M., **Annis, W. K.**, & Cohen, R. A. (2024) The Utility of Ribbed Mussels *Geukensia demissa* for Marsh Grass Restoration on Living Shorelines Projects in the Southeast US: Potential and Pitfalls. *Estuaries and Coasts*, 47, 1333-1344 <https://doi.org/10.1007/s12237-024-01394-z>

*(Selected for Editor's Choice paper for September 2024 issue of Estuaries and Coasts)*

**Annis, W. K.**, Hunter, E. A., & Carroll, J. M. (2022). Within-marsh and Landscape Features Structure Ribbed Mussel Distribution in Georgia, USA, Marshes. *Estuaries and Coasts*, 45(8), 2660–2674. <https://doi.org/10.1007/s12237-022-01090-w>

*In review*

**Annis, W. K.**, Thompson, L. M., Bower, L. M., Midway, S. R., Olden, J. D., & Peoples, B. K. Syndromes of multifaceted beta diversity change in invaded metacommunities. *In review*<sup>a</sup>

**Annis, W. K.**, Thompson, L. M., Bower, L. M., Midway, S. R. & Peoples, B. K. Drivers of multifaceted beta diversity change in invaded stream fish communities *In review*<sup>b</sup>

**Annis, W. K.**, Cohen, R. A., Hunter, E. A., & Carroll, J. M., Hierarchical drivers of ribbed mussel (*Geukensia demissa*) population dynamics and spatial distribution across marsh landscapes. *In review*<sup>c</sup>

*In prep*

**Annis, W. K.**, Strickland, B. A., Thompson, L. M., & Trexler, J. C., Temporal cross-scale interactions and the production of freshwater Cyprinodontid fishes in the Florida Everglades. *In prep.*

**Annis, W. K.**, Strickland, B. A., & Trexler, J. C., Multimodal modelling and hydrology-dependent growth of freshwater Cyprinodontid fishes in the Florida Everglades. *In prep.*

Gale, S., **Annis, W. K.**, Carroll, J. M., Drivers of salt marsh invertebrate community structure on ribbed mussel mounds in salt marshes of Georgia, USA. *In prep*

Thompson, L. M., **Annis, W. K.**, Jacobs, G. R., Gerig, B., Pease, A. A., Taxonomic and functional change in fish assemblages across six interior National Park Service properties of the United States. *In prep<sup>a</sup>*

Thompson, L. M., **Annis, W. K.**, Jacobs, G. R., Gerig, B., Pease, A. A., Temporal shifts in stream fish communities of two protected Ozark rivers. *In prep<sup>b</sup>*

## PRESENTATIONS

---

\* *Presenter*

### *Invited talks*

**Annis, W. K.\***. (2026, April 14). *Exploring community change of North American stream fish communities due to species introductions*. Georgia Southern University Biology Seminar Series, Statesboro, GA, United States.

### *Contributed talks*

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2025, February 26-28). *Unraveling the drivers of multifaceted homogenization and differentiation of invaded stream fish communities across the conterminous United States*. South Carolina American Fisheries Society Meeting 2025, McCormick, SC, United States.

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2025, February 18-21). *Unraveling the drivers of multifaceted homogenization and differentiation of invaded stream fish communities across the conterminous United States*.

Southern Division American Fisheries Society Meeting 2025, Ashville, NC, United States.

**Annis, W. K.\***, Bower, L. M., Farmer, T. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2024, June 2-6). *Continental patterns of homogenization and differentiation of stream fish communities within and among the three dimensions of diversity*. Society for Freshwater Science Meeting 2024, Philadelphia, PA, United States.

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2024, February 28-March 4). *Elucidating the hierarchical relationships between drivers of nonnative richness in stream fish communities of the United States*. South Carolina American Fisheries Society Meeting 2024, Table Rock State Park, SC, United States.

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2024, February 1-4). *Elucidating the hierarchical relationships between drivers of nonnative richness in stream fish communities of the United States*. Southern Division American Fisheries Society Meeting 2024, Chattanooga, TN, United States.

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2023, August 20-24). *Elucidating the hierarchical relationships between drivers of nonnative richness in stream fish communities of the United States*. American Fisheries Society Meeting 2023, Grand Rapids, MI, United States.

**Annis, W. K.\***, Bower, L. M., Farmer, T. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2023, August 6-11). *Homogenization and differentiation of stream fish diversity in 3 dimensions of diversity*. Ecological Society of America Meeting 2023, Portland, OR, United States.

**Annis, W. K.\***, Bower, L. M., Farmer, T. M., Midway, S. R., Thompson, L. M., & Peoples, B. K. (2023, March 1-3). *Homogenization and differentiation of stream fish diversity in 3 dimensions of diversity*. South Carolina American Fisheries Society Meeting 2023, McCormick, SC, United States.

**Annis, W. K.\***, Bower, L. M., Farmer, T. M., Midway, S. R., Thompson, L. M., & Peoples, B. K. (2023, February 2-5). *Homogenization and differentiation of stream fish diversity in 3 dimensions of diversity*. Southern Division American Fisheries Society Meeting 2023, Norfolk, VA, United States.

Carroll, J. M., Cohen, R. A., & **Annis, W. K.\*** (2021, November 1-4). *Can ribbed mussels be incorporated into living shorelines in Georgia?* Coastal Estuarine Research Federation Meeting 2021, Virtual.

**Annis, W. K.\*** & Carroll, J. M. (2020, November 2) *Spatial Distribution of Geukensia demissa in Georgia Salt Marshes*. Southeastern Estuarine Research Society Meeting 2020. Virtual.

#### *Posters*

**Annis, W. K.\***, Bower, L. M., Midway, S. R., Olden, J. D., Thompson, L. M., & Peoples, B. K. (2024, February 7-8). *Nonnative stream fish richness is structured by differing direct and indirect effects of invasion drivers in two ecoregions in the United States*. NSF Macrosystems Biology Community Virtual Meeting 2024. Virtual

**Annis, W. K.\*** & Carroll, J. M. (2019, November 3-7). *At which gradients do Geukensia demissa densities change?* Coastal Estuarine Research Federation Meeting 2019, Mobile, AL, United States.

## RESEARCH EXPERIENCE

---

### **Postdoctoral Scholar**

**May 2025-Present**

*Florida State University, Dr. Joel Trexler*

- Currently estimating secondary production of small-bodied fish and macroinvertebrates in the Florida Everglades using an extensive 30-year dataset to determine the effects of hydrological alteration on Everglades energy flows and food webs.
- Evaluating the efficacy of the park's fish sampling programs to capture trends key population parameters such as growth, reproduction, and biomass.

### **Graduate Research Assistant**

**August 2021-May 2025**

*Clemson University, Dr. Brandon Peoples*

- Applied concepts from community, metacommunity, and functional ecology to investigate macroscale patterns and drivers of nonnative stream fish beta diversity using data from a continental scale stream fish community database.
- Collaborated with many state and federal agencies to assist in the creation of a continental scale stream fish community database to answer macroscale invasion ecology questions. This required using the R coding language to assess large datasets for errors and coordinating with data managers to resolve those issues. This dataset has been utilized by four peer reviewed manuscripts and many more in various phases of review.

- Created datasets containing environmental variables summarized at multiple spatial scales for the conterminous United States for the use in nonnative species richness analyses. This required using geoprocessing in ArcGIS Pro and the R coding language to summarize data from different sources and data formats.
- Developed a phylogenetic super tree for all fish included in the community dataset for the use in diversity studies. This required extensive literature review and the collection and formatting of phylogenetic trees from multiple sources.

### **Graduate Research Assistant**

**January 2019-May 2021**

*Georgia Southern University, Dr. John Carroll*

- Conducted research on the spatial distribution and population parameters of ribbed mussels in Georgia salt marshes to optimize their use in marsh restoration projects.
- Performed surveys on ribbed mussel densities in various salt marshes. Data from these surveys were used to create a Bayesian model to predict ribbed mussel densities using local and landscape scale spatial variables. This work resulted in a publication in the *Estuaries and Coasts Journal*.
- Created a field experiment testing how population parameters of ribbed mussels changed across their spatial distribution. This project involved monitoring mussel growth, mortality, recruitment, and predation over the period of the year. Environmental characteristics of the experimental sites were quantified by field measurements and laboratory analyses involving flow cytometry and chlorophyll-a extractions. A structural equations model was used to determine how spatial factors indirectly affect population parameters via the measured environmental factors.
- Worked on a collaborative research project with Dr. John Carroll and Dr. Risa Cohen, testing the ability of ribbed mussels to improve the growth of smooth cordgrass in living shoreline restoration projects. This work required monitoring the density, height, and biomass of cordgrass over two years as well as data analysis. This work resulted in a publication in the *Estuaries and Coasts Journal*.

### **Science Diver**

**August 2019**

*Georgia Southern University, Dr. Danny Gleason*

- Assisted with sessile benthic invertebrate surveys at Grey's Reef National Marine Sanctuary as part of a NOAA research cruise on RV Nancy Foster.

- Performed surveys on SCUBA identifying sponge, coral, and tunicate species while underwater.

**Volunteer**

**June 2018-December 2018**

*Florida International University, Dr. Jeremy Kiszka*

- Assisted with an invasive seagrass project by using facial and flipper scale patterns to identify unique individual sea turtles to determine foraging patterns.

**Science Diver**

**May 2016-January 2018**

*University of Florida Scientific Diving Program, Douglas M. Marcinek*

- Aided various multidisciplinary projects that required work to be completed on SCUBA.
- Participated in dye releases in spring vents to track movement of water.
- Provided support in managing gear for photo surveys of reef fishes.
- Maintained and serviced life support gear such as regulators and buoyancy control devices to ensure safe use for researchers.

**Undergraduate Research Assistant**

**May 2016-September 2017**

*University of Florida, Dr. Donald Behringer*

- Used dichotomous keys to identify larval fish, decapods, and amphipods to assess recruitment ability of rostered sponges.
- Performed tasks on various lab projects such as spiny lobsters capture and care, chlorophyll-a extractions, sediment analyses, seagrass surveys, sponge sample collection, and boat maintenance.

---

**TEACHING EXPERIENCE**

**Graduate Student Instructor, Ichthyology**

**August 2023-December 2024**

*Clemson University*

- Co-instructed lecture and lab components to an Ichthyology course for 20-25 students.
- Developed lectures, exams, discussions, lab activities, and practical for students with interest in pursuing careers in fisheries or other natural resource-based careers.
- Focused on using interactive learning techniques to teach students the ecology of fishes.
- Led and developed field trips to allow students to experience various types of fish habitats and gain experience in fish sampling techniques such as gill netting, seining, and electrofishing.

**Teaching Assistant, Non-major Biology Lab**

**January 2019-May 2019**

*Georgia Southern University*

- Independently taught four sections of up to 25 students a semester.
- Developed lectures and exams based on general biological concepts geared towards non-biology majors.

**Divemaster**

**January 2016-January 2018**

*University of Florida Scientific Diver Program*

- Assisted in the instruction of open water and advanced open water dive classes to train future scientific divers.
- Acted as a dive leader with student divers in various types of dive environments such as night dives, wrecks, and overhead environments.

**PROFESSIONAL AFFILIATIONS AND SERVICE**

---

*Society memberships*

**American Fisheries Society:** member since 2022

**Ecological Society of America:** member since 2023

*Society positions and services*

**President****August 2024-May 2025***Clemson Natural Resources Graduate Student Association*

- Revitalized an inactive graduate association, increasing engagement, participation, and sense of community among ~45 graduate students.
- Organized and chaired meetings, workshops, and events to support professional development and social engagement within the graduate student body.
- Set up and managed departmental accounts for finances and communication.
- Assisted in the coordination of a hurricane relief fundraiser in which close to \$800 of supplies were purchased for affected communities, demonstrating leadership in community outreach.
- Secured funding and strengthened relationships with departmental/university administration to ensure the long-term sustainability of the organization.

**Social Media Chair****August 2021-May 2022***Clemson Chapter American Fisheries Society*

- Managed the society's social media accounts to reach potential members and advertise society events to boost attendance.
- Took photographs at events for use in society's social media profile.

**Writer's Bootcamp Coordinator****January 2021-May 2021***Georgia Southern University Graduate Student Organization*

- Collaborated with graduate students from various departments to participate in weeklong virtual writing seminars with the purpose to boost productivity and a sense of community during the pandemic.
- Created activities that would boost writing productivity and allow the students from different academic backgrounds to meet.
- Reviewed grant proposal for funding approval.

## SKILLS

---

**Software:** R, STAN, JAGS, ArcGIS Pro, Illustrator, Lightroom, Photoshop, Microsoft Office suite.

**Certifications:** AAUS Scientific Diver 90ft, NAUI Divemaster, NAUI EANX Diver, TDI Cavern Diver.

**Lab techniques:** Flow cytometry, chlorophyll-a extraction, organic matter analysis, specimen identification via dichotomous key, and invertebrate animal care.