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Nicholas S. Marzolf, Ph.D.

Assistant Research Scientist
The Jones Center at Ichauway
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My Links

Education

- **Ph.D.,** Dept. of Forestry and Environmental Resources, North Carolina State University, 2021.
  - Dissertation: *Drivers and consequences of CO_2 inputs to lowland Neotropical streams, Costa Rica.* Advisor: Dr. Marcelo Ardón
- **M.S.,** Odum School of Ecology, University of Georgia, 2015.
  - Thesis: *Environmental Limits on the Dispersal of* Pomacea maculata *in Lake Seminole.* Co-advisors: Dr. Alan Covich and Dr. Stephen Golladay
- **B.S.,** Biology, College of Liberal Arts and Sciences, University of Florida, 2013.
  - Study abroad: Universidad Autónoma de Yucatán, 2010

Research Experience and Employment

2024 – present: Assistant Scientist, Aquatic Sciences Lab, Jones Center at Ichauway

- Monitor water quality across the Lower Apalachicola-Chattahoochee-Flint watershed
- Describe biogeochemical cycling of Coastal Plain creeks, rivers, and isolated wetlands
- Determine the influence of land management on isolated wetland water quality, habitat, and biogeochemistry

2022 – 2023: Postdoctoral Research Associate, Department of Biology, Duke University

- PI: Dr. Emily Bernhardt
- Develop project to explore longitudinal variation in aquatic gases (CO_2, CH_4, N_2O, O_2) to quantify gas emissions at fine spatiotemporal scales
- Model and create reproducible workflows to estimate productivity in rivers across the continental US using publicly available datasets
- Mentor and assist graduate student research projects
- Associated Projects: StreamPULSE, Macrosheds, MacroGas

2021: Postdoctoral Research Associate, Dept. of Forestry and Environmental Resources, North Carolina St. University

- PI: Dr. Marcelo Ardón
- Compared spatial and temporal variability of water chemistry in Neotropical streams

2017 - 2021: Graduate Student Fellow & Graduate Research Assistant, Dept. of Forestry and Environmental Resources, North Carolina St. University and Organization for Tropical Studies

- Created data visualization tool for long-term water chemistry from Neotropical streams
- Measured carbon fluxes in headwater streams and evaluated fluxes as ecological disturbances
- Conducted *in situ* manipulative experiment to evaluate effects of disturbance in stream ecosystems

2016 - 2017: Research Technician III, Joseph W. Jones Ecological Research Center

- PI: Dr. Stephen Golladay
- Conducted surveys of invasive and threatened fauna across aquatic ecosystems of SW Georgia
- Collected, processed, and analyzed water samples for analytical determination
- Perform manipulative experiments to determine interactions of aquatic fauna and flora.

2013 - 2015: Graduate Research Assistant, University of Georgia

- PIs: Dr. Stephen Golladay and Dr. Alan Covich
- Conducted field surveys for native and invasive fauna and flora in Lake Seminole, Georgia
- Performed lab experiments to determine growth rates and temperature preferences of invasive *Pomacea macualta*

Publications (* denotes undergraduate co-author)

Peer Reviewed Journal Articles

1. **Marzolf, N.,** Vlah, M., H. Lowman, Slaughter, W., Bernhardt, E. Phenology of gross primary productivity in rivers displays high variability within years but stability across years. 2024. *Limnology and Oceanography Letters* special issue on Phenology in Freshwater Ecosystems. DOI: 10.1002/lol2.10407.
2. Meyer, M., [**Marzolf, N.S.**] and 21 co-authors. Hacking Limnology Workshops and DSOS23: Growing a workforce for the nexus of data science, open science, and the aquatic sciences. 2023. *Limnology and Oceanography: Bulletin.* DOI: 10.1002/lob.10607
3. Shivers, S. D., Golladay, S. W., Waters, M. N., Wilde, S. B., **Marzolf, N.S**., Covich, A. P. Invasive species interactions affect nutrient cycling in a shallow reservoir: A mesocosm experiment. 2023. *Lake and Reservoir Management*. DOI: 10.1080/10402381.2023.2248605
4. Ardón, M., Clark, D., **Marzolf, N. S.,** Ramírez, A, Pringle, C. Can we see nitrate from the trees? Examining the nitrogen paradox in a Neotropical watershed. 2023. *Biogeochemistry*. DOI: 10.1007/s10533-023-01030-1.
5. **Marzolf, N. S.,** D. M. Baca*, T. K. Bruce*, M. Vega-Gómez*, C. D. Watson*, C. N. Ganong, A. Ramírez, C. M. Pringle, and M. Ardón. 2022. Do experimental pH increases alter the structure and function of a lowland tropical stream? *Ecosphere*. DOI: 10.1002/ecs2.4097
6. **Marzolf, N.,** Small, G., Oviedo-Vargas, D., Ganong, C., Pringle, C., Ramirez. A., Duff, J., Genereux, D. P., Ardón, M. 2022. Partitioning ecological and groundwater inorganic carbon sources in a lowland tropical stream, Costa Rica. *Biogeochemistry.* DOI: 10.1007/s10533-022-00954-4.
7. Gómez-Gener, L., G. Rocher-Ros, T. Battin, M. J. Cohen, H. Dalamgro, K. J. Dinsmore, T. Drake, C. Duvert, A. E. Prast, Å. Horgby, M. Johnson, L. Kirk, F. Machado-Silva, **N. S. Marzolf**, M. J. McDowell, W. H. McDowell, H. Miettinen, A. K. Ojala, H. Peter, J. Pumpanen, D. Riveros-Iregui, I. Santos, J. Six, E. H. Stanley, M. B. Wallin, S. White, and R. A. Sponseller. 2021. Global carbon dioxide efflux from rivers enhanced by high nocturnal emissions. *Nature Geoscience*:1–6. DOI: 10.1038/s41561-021-00722-3
    a. In the news: https://phys.org/news/2021-04-streams-rivers-emit-carbon-dioxide.html
8. **Marzolf, N. S**., and M. Ardón. 2021. Ecosystem metabolism in tropical streams and rivers: a review and synthesis. Limnology and Oceanography 66:1627–1638. DOI: 10.1002/lno.11707
9. Rüegg, J., C. C. Conn, E. P. Anderson, T. J. Battin, E. S. Bernhardt, M. B. Canadell, S. M. Bonjour, J. D. Hosen, **N. S. Marzolf**, and C. B. Yackulic. 2020. Thinking like a consumer: linking aquatic basal metabolism and consumer dynamics. *Limnology and Oceanography Letters* 6:1–17. DOI: 10.1002/lol2.10172
10. **Marzolf, N. S.**, C. Smith, and S. Golladay. 2019. Limpkin (*Aramus guarauna*) establishment following recent increase in nonnative prey availability in Lake Seminole, Georgia. *The Wilson Journal of Ornithology* 131:179. DOI: 10.1676/17-26
11. **Marzolf, N. S.,** S. Golladay, P. McCormick, A. Covich, and S. Wilde. 2018. Inter- and intra-annual apple snail egg mass dynamics in a large southeastern US reservoir. *Hydrobiologia* 811:155–171. DOI: 10.1007/s10750-017-3475-x

12. **Marzolf, N. S.**, S. W. Golladay, and A. P. Covich. 2015. Is environmental calcium availability limiting dispersal of an invasive snail in Lake Seminole and associated smaller lakes? Pages 1–5 *in* R. J. McDowell, C. Pruitt, and R. A. Bahn, editors. *Proceedings of the 2015 Georgia Water Resources Conference*. Athens, GA.

In review

1. Duvert, C., A. V. Borges, E. Calamita, G. Rocher-Ros, A. Linkhorst, J. A. Rosentreter, S. Liu, K. Attermeyer, T. DelSontro, L. Deirmendjian, A. Dixon, C. Grasset, A. M. Herreid, L. C. Jeffrey, L. Marcon, R. M. Mwanake, J. R. Paranaíba, L. Ran, A. T. Rexroade, V. Solano, P. Taillardat, F. Ulloa-Cedamanos, J. Wang, K. M. Whitmore, L. Zhang, C. López-Lloreda, M. N. Macedo, D. Oviedo-Vargas, D. A. Riveros-Iregui, **N. S. Marzolf**. Climate and landscape diversity drive highly variable greenhouse gas emissions from (sub)tropical inland waters. For *Nature Water*.
2. **Marzolf, N.S.,** Ramírez, A., Pringle, C.M., Ardón, M. Deep groundwater buffers the physicochemical response of tropical streams to climatic drivers For *Limnology and Oceanography.*
3. **Marzolf, N.S.,** Rhea, S., Slaughter, W., Vlah, M.J., DelVecchia, A.G., Bernhardt, E.S. Evaluation of whole-stream metabolism estimates from National Ecological Observatory Network stream and river sites. For *Scientific Data.*
4. **Marzolf, N.S.,** Meza-Salazar, A., Hidalgo, M., Ramírez, A., Ardón, M. On the breakdown of woody debris across a groundwater gradient in Neotropical streams, Costa Rica. For *Freshwater Science*.

In prep

1. **N. Marzolf,** others. Variability in geographically isolated wetland hydroperiod in a karst landscape. For *Wetlands.*

Datasets and R Packages

1. neonMetabolismHelpers: R Package to estimate stream metabolism from National Ecological Observatory Network stream and river sites
2. Long-term estimates of river metabolism from US Geological Survey sites: https://doi.org/10.5061/dryad.bcc2fqzj2
3. Long-term stream chemistry from La Selva Biological Station, Costa Rica.: https://nmarzolf.shinyapps.io/LTREB_Data/

In prep

1. Estimates of stream metabolism from National Ecological Observatory Network stream and river sites
2. GHG in TIW: Compilation of greenhouse gas concentration and flux measures from Tropical Inland Waters

Teaching Experience (* denotes instructor of record)

- ***Wetlands of Coastal North Carolina** (ENV 792), Duke University, Fall 2022
    - Graduate level field course to explore wetlands of North Carolina across a salinity gradient
- ***Wetland Ecology and Management** (ENV 812), Duke University, Fall 2022
    - Instruct principles and management applications of wetlands to graduate students in the Nicholas School of the Environment.
- ***Success in Environmental First Year** (ENV 100), North Carolina St., Spring 2021
    - Provide resources to first-semester students in the College of Natural Resources
- **Exploring the Environment (**ENV 101), North Carolina St. University, Fall 2022

    - Roles**:** Lead Teaching Assistant (2020) and Teaching Assistant (2019)
    - Introduce environmental science principles and current research in the College of Natural Resources.
- **Guest Lectures**
    - University of Alabama Professional Development for Graduate Students
        - Discussion on how to prepare for academic job application packet and interviews
    - Geoscience Teaching Outdoors. October 2022
        - Field tour of ghost forests on the Albemarle-Pamlico Peninsula, North Carolina with 20 K-12 science teachers
    - Universidad de Costa Rica, Stream Ecology. June 2019.
        - Primer of Stream Ecology and Methods for Estimating Stream metabolism at La Selva Biological Station, Costa Rica. Delivered in Spanish.
    - Missouri Western State University. March 2019
        - Long-term trends reveal effects of El Niño Cycles in lowland Neotropical streams, Costa Rica.
- **Instructed Workshops**
    - **Introduction to Stream Metabolism**
        - Reading group organized for Duke River Center (Spring 2022)
        - Investigate theoretical basis and models of stream metabolism
    - **Data Management for Undergraduates**
        - OTS LSAMP REU Program, La Selva Biological Station, Costa Rica (2018 – 2021)
        - Introductory workshop to data collection, management, and analysis
    - **An ethical discussion of water use, conservation, and climate change**.
        - OTS LSAMP REU Program, La Selva Biological Station, Costa Rica. (2018 – 2019)
        - Introduce topics related to global water use and effects of climate change

Mentoring Experience

Members of the Aquatic Sciences Lab at the Jones Center at Ichauway

Name	Role	Time in the lab	Current Role
Laila Dowdy	Albany St REU	August 2024	Albany St Undergraduate
Chelsea Wilson	Albany St REU	August 2024	Albany St Undergraduate
Jewell Johnson	RaMP participant	2024 - pres.	
Chloe Hall	Seasonal technician	2024 - pres.	
Jamie Rogers	Research Associate	2024 - pres.	
Brian Clayton	Hydrologic monitoring technician	2024 - pres.	

Mentoring

- **Albany State University REU Program**
    - Chelsea Wilson (August 2024)
    - Laila Dowdy (August 2024)
- **Research and Mentoring for Post-baccalaureates: Woods to Water (RaMP W2W)**
    - Jewell Johnson (June 2024 - pres.)
- **Summer 2023 Field technicians:** Mackie Jackson, Quentin Duval-Smith, Emmy Stewart

    - Conducted morphology surveys, installed sensor stations, conducted conservative and reactive tracer injections in New Hope Creek, NC
- **Data+ and Climate+ Team**: Anna Spitzer, Alejandro Breen, Kaley Sperling, Qinhan Wen, Yiliang Yuan (Summer 2023)
    - Developed applications for the MacroGas project to aid in analyzing conservative tracer injections and cleaning of sensor data
- **Anna Spitzer (2023)**. Duke University.
    - Identifying and quantifying emergent insects from two North Carolina streams
- **Lindsey Weyant (2023).** Duke University
    - Identifying and quantifying emergent insects from two North Carolina streams
- **Ashton Espino (2021).** Organization for Tropical Studies, Research Experience for Undergraduate Program, La Selva Biological Station, Costa Rica
    - Project title*: Determining the frequency, magnitude, and duration of acidification events in tropical streams across a groundwater gradient, Costa Rica*
        - Co-mentored with Ana Meza-Salazar
- **Yessica Jimenez (2019).** Organization for Tropical Studies, Research Experience for Undergraduate Program, La Selva Biological Station, Costa Rica
    - Project title: *The effect of variable stream pH on the activity of stream insects*
        - Co-mentored with Alonso Ramírez
- **Terrius Bruce (2018)**. Organization for Tropical Studies, Research Experience for Undergraduate Program, La Selva Biological Station, Costa Rica
    - Project title: *Stream macroinvertebrates as indicators in response to changes in pH in tropical streams*
    - Co-mentored with Alonso Ramírez
    - Currently: Ph.D. Student, University of Arkansas
- **Dominic Baca (2018)**. Organization for Tropical Studies, Research Experience for Undergraduate Program, La Selva Biological Station, Costa Rica
    - Project title: *Microbial respiration on woody debris across a natural phosphorus gradient & an experimental pH gradient in Neotropical freshwater streams in Costa Rica*
    - Co-mentored with Alonso Ramírez
- **Mariely Vega-Gomez (2018).** National Science Foundation Supplement for Research Experience for Undergraduates. La Selva Biological Station, Costa Rica
    - Project title: *Effect of stream pH on leaf litter decomposition in tropical lowland streams*
    - Co-mentored with Marcelo Ardón
    - Currently: Ph.D. Student, North Carolina State University.

Society for Freshwater Science Instar Program

- 2021 Annual Meeting Mentor

Grants, Awards, and Funding

Title	Funding Agency	Amount	Collaborators (*designates Jones Center)	Status	Funding Period
Geographically isolated wetland management for the protection of at-risk species	SE Climate Adaptation Science Center	$400,000	F. O'Donnell (Auburn), S. Brantley*, L. Smith*	In review	2025 - 2027

Quantifying the ecosystem services provided by agricultural geographically isolated wetlands: a long-term approach	USDA NIFA	$128,000	F. O'Donnell (Auburn), M. Waters (Auburn), S. Brantley*, M. Foltz (Okla St.), P. Cooper (FRSWCD)	In review	2025 - 2027
Fish Dispersal in the lower Flint River basin affected by road-stream crossings	National Fish and Wildlife Foundation	$425,000	G. Hopper, M. Kaller (LSU)	In review	2025 - 2027
River dead zones: identifying and determining hypoxia in rivers across North America	Duke University Data+ and Climate+	$2500	E. Bernhardt (Duke), A. DelVecchia (UNC)	Completed	2023
Graduate Student Association Conference Award	NCSU FER	$30		Completed	2021
Postdoctoral Scholarship, STREAMS Project	NSF	$37500	M. Ardón, A. Ramírez (NCSU)	Completed	2021
Laarman Gift Fund for International Research	NCSU FER	$3,220		Completed	2019
Graduate Student Fellowship	OTS	$5,200		Completed	2017 - 2018
University Graduate Fellowship	NCSU	$24,000		Completed	2017 - 2018
Provost Fellowship	NCSU	$4,000		Completed	2017 - 2018
US Army Corp of Engineers Research Grant. Invasive Apple Snail eDNA in Lake Seminole	US Army Corp of Engineers	$2,500	R. Kaul, A. Covich (UGA)	Completed	2014
Graduate Cooperative Research Assistantship	UGA, Jones Center at Ichauway	$42,000		Completed	2013 - 2015

Athletic Band Scholarship (Trombone), School of Music, University of Florida	UF School of Music	$2,500		Completed	2009 - 2013
Florida Bright Futures Scholarship	State of Florida	$100,000		Completed	2009 – 2013

Invited Talks

1. College of Coastal Georgia, Departmental Seminar Series, Brunswick, GA. October 2024. *Carbon cycling in aquatic ecosystems: views from the reach to the globe*.
2. Duke University University Program in Ecology Seminar, Durham, NC. November 2023 *On the stability and resource availability in aquatic ecosystems.*
3. Hacking Limnology 2023 Virtual Summit and Workshop. July 2023. *MacroSheds: a synthesis of long-term biogeochemical, hydroclimatic, and geospatial data from small watershed ecosystem studies*. Co-delivered virtually with Dr. Audrey Thellman.
4. International Society of Tropical Foresters, NCSU Chapter. January 2020 *Partitioning inorganic carbon fluxes in headwater streams, Costa Rica*.
5. North Carolina State University Department of Forestry and Environmental Resources Seminar Series, Raleigh, NC. December 2018. *Alternative states and regime shifts across a Neotropical stream elevation gradient.*
6. Southern Division of the American Fisheries Society Spring Meeting, Savannah, GA. January 2015. *Development and Use of eDNA Methods to Monitor Dispersal of Invasive Apple Snail,* Pomacea maculata*,in a SE Reservoir*.
7. National Shellfisheries Association Annual Meeting, Knoxville, TN. March 2017. *An Overview of Apple Snail Research in Lake Seminole, GA.* Organized by Shirley Baker.

Contributed Presentations

1. **Marzolf, N**., Rok, A., Bernhardt, E., DelVecchia, A. Rejecting advection, or doing ecosystem science in rivers when they stop flowing. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
2. DelVecchia, A., **Marzolf, N.**, Rok, A., Quach, A., Bernhardt, E. Ponding in the stream: discontinuities in greenhouse gas dynamics across pool - riffle sequences. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
3. Ardón, M., **Marzolf, N.**, Ramírez, A. N-fixing trees as a source of nitrate for tropical streams. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
4. Behrens, J., **Marzolf, N.**, Bernhardt, E. Hot, Stressed, and Contaminated: The Movement of Energy through Stream Ecosystems in Urbanized and Forested Watersheds. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
5. Golladay, S., Sweeney, C., Horn, N., Greenberg, E., Cannon, J., Whelan, A., **Marzolf, N.,** Rowles, K., Masters, M. Estimating Stream Inundation Characteristics For Freshwater Mussel Conservation In The Lower Flint River Basin, Georgia. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
6. Shogren, A., Atkinson, C., **Marzolf, N.,** Plont, S., Smith, C., Golladay, S. Using Multi-Solute Concentration-Discharge (Cq) Responses To Document Interacting Drivers Of Change. *Oral presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.
7. Atkinson, C., Heinrich, K., Shogren, A., Golladay, S., **Marzolf, N.**, Benstead, H., Cannon, J., Fausnaught, G., Fugate, B., Giencke, L., Moss, E., Pine, B., Starr, G., Staudhammer, C. Woods To Water (W2w): Leveraging The Unique Biodiversity Of The Southeastern Usa For Training In

Ecology And Resource Management. *Poster presentation*. Society for Freshwater Science Annual Meeting. June 2024. Philadelphia, PA.

8. DelVecchia, A., **N. Marzolf**, Bernhardt, E.Greenhouse gas production in streams: understanding the role of the Piedmont peapod. *Oral presentation*. Society for Freshwater Science Southeast chapter meeting. November 9, 2023. Columbus, GA.
9. **N. Marzolf,** DelVecchia, A., Bernhardt, E. Rejecting advection, or doing ecosystem science in rivers when they stop flowing. *Oral presentation*. Society for Freshwater Science Southeast chapter meeting. November 9, 2023. Columbus, GA
10. **N. Marzolf**, Vlah, M., Slaughter, W., Lowman, H., Bernhardt, E. Temporal variability and the reliability of primary production in rivers. *Oral presentation*. Ecological Society of America Annual Meeting. August 7, 2023. Portland, OR.
11. **N. Marzolf**, A. Meza-Salazar, M. Hidalgo, A. Ramírez, M. Ardón. La descomposición de restos de madera en un gradiente de agua subterranean en arroys Neotropicales, Costa Rica. *Virtual presentation*. VI Congreso Latinoamericano de Macroinvertebrados y Ecosistemas Acuáticos. May 31, 2023. Sololá, Guatemala.
12. **Marzolf, N.**, DelVecchia, A., Vlah, M., Rhea, S., Gubbins, N., Bernhardt, E. Continental-scale estimates of lotic ecosystem metabolism from NEON aquatic sites. *Oral presentation.* Joint Aquatic Science Meeting. May 18, 2022. Grand Rapids, Michigan.
13. Behrens, J., Bernhardt, E., **Marzolf, N.,** Anderson, S., Hassett, B., Ramirez, X., Edwards, T., Hu, L., Gu, H. Smaller bugs and heavier metals in the aquatic to terrestrial subsidies of urban streams? *Oral presentation.* Joint Aquatic Science Meeting. May 18, 2022. Grand Rapids, Michigan.
14. Duvert, C., **Marzolf, N.,** Linkhorst, A., Deirmendjian, L., Herreid, A., Jeffrey, L., Lopez-Lloreda, C., Macedo, M., Oviedo-Vargas, D., Riveros-Iregui, D., Solano-Rivera, V., Whitmore, K., Borges, A. Greenhouse gas emissions from inland waters: A perspective and research agenda for the tropics and subtropics. *Virtual presentation.* Joint Aquatic Science Meeting. May 18, 2022. Grand Rapids, Michigan.
15. Ardón, M., **Marzolf, N.,** Ramírez, A., Pringle, C. Are N-fixing trees responsible for high nitrate in tropical streams? *Virtual presentation.* Joint Aquatic Science Meeting. May 18, 2022. Grand Rapids, Michigan.
16. Ardón, M., **Marzolf, N.,** Ramírez, A., Pringle, C. Can we see the nitrate from the trees? Examining the nitrogen paradox in Neotropical streams. *Oral presentation.* Society for Freshwater Science Annual Meeting. May 23, 2021. Presented virtually due to COVID-19.
17. **Marzolf, N.,** Small, G., Ganong, C., Pringle, C., Ramirez. A., Duff, J., Ardón, M. Partitioning ecological and groundwater inorganic carbon sources in a lowland tropical stream, Costa Rica. *Oral presentation*. Society for Freshwater Science Annual Meeting. May 23, 2021. Presented virtually due to COVID-19.
18. **Marzolf, N.,** Ardón, M., Ramírez, A., Pringle, C. Long-term trends reveal effects of El Niño Cycles in lowland Neotropical streams, Costa Rica. *Oral presentation*. Association for the Sciences of Limnology and Oceanography Annual Meeting. February 2019. San Juan, Puerto Rico.
19. **Marzolf, N.,** Ardón, M., Ramírez, A., Pringle, C. M. Long-term trends in water chemistry in geothermally-modified groundwater influenced lowland tropical streams. *Poster presentation*. Society for Freshwater Science Annual Meeting. May 2018. Detroit, MI.
20. Golladay, S. W., **Marzolf, N. S.,** Smith, C. R., Shivers, S. D., Covich, A. P. Of Limpkins and Apple Snails: Invasive Species, Novel Ecosystems, and an Uncertain Future. *Oral Presentation.* Georgia Chapter of the Wildlife Society Annual Meeting. September 2017. Covington, GA.
21. Smith, C. R., Golladay, S. W., **Marzolf, N. S**. Invertebrate Resistance/Resilience Mechanisms in an Intermittent Stream Among Years with Varying Hydroperiods. *Oral Presentation*. Society for Freshwater Science Annual Meeting. June 2017. Raleigh, NC.
22. Golladay, S. W., **Marzolf, N. S.**, Smith, C. R. Applying the Sustainable Boundary Approach to Develop Flow Guidelines in the Unregulated Flint River, Georgia. *Oral Presentation.* Society for Freshwater Science Annual Meeting. June 2017. Raleigh, NC.
23. **Marzolf, N. S.,** Golladay, S. W.; Smith, C. R. Intra- and inter annual apple snail population dynamics in Lake Seminole. *Poster Presentation*. Presented at Society for Freshwater Science Annual Meeting. June 2017, Raleigh, NC and Georgia Water Resources Conference, April 2017, Athens, GA.

24. **Marzolf, N. S.,** Shivers, S. D., Smith, C. S., Golladay, S. W., Covich, A. C. An Overview of Apple Snail Research in Lake Seminole, GA. *Oral Presentation.* National Shellfisheries Association Annual Meeting. March 2017. Knoxville, TN.
25. **Marzolf, N. S.,** Shivers, S. D., Golladay, S. W., and Covich, A. P. Potential Physiochemical Limitation on the Dispersal of the Invasive Apple Snail: Applying the Novel Ecosystem Concept in a Large Reservoir. *Oral Presentation*. Ecological Society of America Annual Meeting. August 2016. Ft Lauderdale, FL.
26. Shivers, S. D., **Marzolf, N. S.,** Covich, A. P., Golladay, S. W. Hydrologic drivers of submerged aquatic vegetation coverage alter nutrient retention: Applying the novel ecosystem concept to a large reservoir. *Oral Presentation*. Ecological Society of America Annual Meeting. August 2016. Ft. Lauderdale, FL.
27. Smith, C. S., **Marzolf, N. S.,** Golladay, S. W. Changing Ecosystems. *Oral Presentation.* ACF Freshwater Mussel Workshop. August 2-4, 2016. Newton, GA
28. **Marzolf, N. S.,** Golladay, S. W., Covich, A. P., Wilde, S. B., McCormick, P. V. Rapid Expansion of an Invasive Snail and Implication for Water Quality in a Novel Ecosystem. *Poster Presentation.* University of Georgia Celebration of Graduate Education in Support of the Land-Grant Mission. March 2016. Tifton, GA.
29. **Marzolf, N. S.,** Shivers, S. D., Golladay, S. W., and Covich, A. P. Abiotic Effects on Spatial Distribution and Abundance of Two Highly Invasive Species in a Novel Lake Ecosystem. *Oral Presentation*. Society of Freshwater Science Annual Meeting. May 2015. Milwaukee, WI.
30. **Marzolf, N. S.,** Shivers, S. D., Golladay, S. W., and Covich, A. P. Is Environmental Calcium Availability Limiting the Dispersal of an Invasive Snail in Lake Seminole and Associated Smaller Lakes? *Poster Presentation.* 2015 Georgia Water Resources Conference. April 2015. Athens, GA.
31. **Marzolf, N. S**., Covich, A. P., Golladay, S. W., McCormick, P.V., and Wilde, S. B. Quantifying Effects of Invasive Apple Snails (*Pomacea maculata)* in a Large Reservoir: an Outline for Research. *Poster Presentation.* Florida Lake Management Society Annual Meeting. June 2014. Stuart, FL.
32. **Marzolf, N. S**. Faster than a Swimming Snail: Understanding Ecological Impacts of Apple Snails in Lake Seminole. *Oral Presentation.* Odum School of Ecology Graduate Student Symposium. January 2014. Athens, GA.

Service Activities

- **Reviewer**
  - *Atmosphere* (2024 - pres., n = 1)
  - *Ecosphere* (2024 - pres., n = 2)
  - *Environmental Science and Technology* (2024 - pres., n = 1)
  - *Limnology and Oceanography: Letters* (2023 - pres., n = 2)
  - *Water Resources Research* (2023 – pres., n = 1)
  - *Scientific Data* (2023 – pres., n = 2)
  - *Functional Ecology* (2022 – pres., n = 1)
  - *Limnology and Oceanography* (2022 – pres., n = 2)
  - *Freshwater Biology* (2022 – pres., n = 2)
  - *Communications Earth and Environment* (2022 – pres., n = 1)
  - *Biogeosciences* (2021 – pres., n = 2)
  - *Biotropica* (2021 – pres., n = 1)
  - *Aquatic Ecology* (2020 – pres., n = 2)
  - *Journal of Geophysical Research: Biogeosciences* (2020 – pres., n = 1)
  - *Hydrobiologia* (2019 – pres., n = 2)
  - *Freshwater Science* (2019 – pres., n = 2)
- **Volunteer**
  - Ellerbe Creek Watershed Association: Participate in local clean-ups and invasive species removal (2022)
  - Dougherty County Public Schools Science Fair Judge (2016)
  - City of Gainesville Air Potato round-up invasive species removal (1998-2009)

- **Professional Society Activities**
  - Steering Committee, 2025 Georgia Water Resources Conferences
  - Southeast Chapter of Society for Freshwater Science: Abstract reviewer for 2023 meeting
  - Organized Special Sessions
    - Georgia Water Resources Conference 2025 Biannual Meeting: Conserving and restoring ecosystem function and biodiversity in Georgia's wetlands in the face of climate and human change
    - Society for Freshwater Science 2023 Annual Meeting: Responses of inland water greenhouse gas emissions to management and global change
    - Society for Freshwater Science 2021 Annual Meeting: Greenhouse gases in tropical streams, rivers, lakes, and wetlands: current work and future research needs
- **Graduate Student Representative**: Search Committee for College of Natural Resources Dean of Diversity, Equity, and Inclusion, North Carolina State University, 2018

Proficiencies and Training

- **Proficiencies**
  - Software: ArcMap, QGIS, R, Microsoft Office, LoggerNet, Arduino IDE
  - Languages: English, Spanish (conversational)
  - SCUBA Certified: PADI, Nitrox
- **Training**
  - **Diversity: Inclusion in the Modern Workplace**. Raleigh, NC. February 2021
  - **Managing Bias**. Raleigh, NC. February 2021
  - **Data Security Training Workshop**. Raleigh, NC. October 2020.
  - **NSF Workshop Heterotrophic Regimes: A cross-biome perspective.** Ovronnaz, Switzerland. September 2018
  - **Fundamentals of Ecosystem Ecology Graduate Course.** Cary Institute of Ecosystem Studies. Millbrook, NY. January 2018.
  - **Prescribed Fire Course.** Joseph Jones Ecological Research Center. Newton, GA. 2014 – 2015; 2024
  - **Freshwater Mussel Workshop**. Joseph Jones Ecological Research Center. Newton, GA. 2014, 2016.

Professional Membership

- Organization for Tropical Studies (2022 – pres.)
- Association for the Sciences of Limnology and Oceanography (2018 – pres.)
- North American Lake Management Society (2018 – pres.)
- Ecological Society of America (2016 – pres.)
- Florida Lake Management Society (2014 – pres.)
- Society for Freshwater Science (2014 – pres.)

References

Dr. Amanda DelVecchia (adelvecc@unc.edu)

- *Assistant Professor, Department of Geography, University of North Carolina-Chapel Hill*

Dr. Emily Bernhardt (emily.bernhardt@duke.edu)

- *James B. Duke Distinguished Professor and Chair, Department of Biology, Duke University*

Dr. Marcelo Ardón (mlardons@ncsu.edu)

- *Associate Professor, Dept. of Forestry and Environmental Resources, North Carolina State University*

Dr. Stephen Golladay (steve.golladay@jonesctr.org)

- *Affiliate Biologist, Affiliate Mussel Conservation Lab, Georgia Water Policy and Planning Center, Jones Center at Ichauway*