**SPENCER T. GARDNER**

Curriculum Vitae

601 S. College Rd., Dept. of Biology and Marine Biology, UNCW, Wilmington, NC 28403

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**EDUCATION**

2024 **Ph.D. Fisheries & Aquatic Science**, Purdue University

2020 **M.S. Biology & Marine Biology**, University of North Carolina Wilmington

Awards: Got-Em-On Live Bait Fellow (2018-2020), Phi Kappa Phi National Honors

Thesis: Ecological mechanisms generating variable first year growth and recruitment in juvenile Southern Flounder (*Paralichthys lethostigma*)

2016 **B.S. Fisheries, Wildlife & Conservation Biology**, North Carolina State University

Minors: Applied Ecology and Forest Management

Awards: Xi Sigma Pi National Honors, Thomas L. Quay Research Award

Thesis: Implications of overfishing marine ecosystems on nutrient capacity

**SCHOLARSHIP**

*Manuscripts in preparation*

TBD **Gardner**, **S**.**T**., and F. S. Scharf. Ecological mechanisms generating variable first year growth and recruitment in juvenile southern flounder (*Paralichthys lethostigma*). In prep.

TBD **Gardner**, **S**.**T**., J. R. Fischer, T.J. Kwak, and R.W. Laney. Towards standardization of American eel age and growth: a review of historical and contemporary methods and terminology. In prep.

*Technical reports*

2015 Boggs, A., and **S**.**T**. **Gardner**. Impact of white-tailed deer on North Carolina soybean production. *North Carolina Soybean Producers Association.*

*Featured Articles*

2020 **Gardner**, **S**.**T**. What Affects the Size of Juvenile Southern Flounder? North Carolina Sea Grant. *Hook, Line & Science* (March 23rd, 2020). <https://ncseagrant.ncsu.edu/hooklinescience/>

*Oral Presentations*

2020 **Gardner**, **S**.**T**., and F.S. Scharf. Ecological mechanisms generating variable first year growth and recruitment in juvenile southern flounder (*Paralichthys lethostigma*). Southern Division American Fisheries Society, Tidewater Chapter Virtual Conference.

2019 **Gardner**, **S**.**T**., A. Valenza, and F.S. Scharf. Mechanisms generating variable first year growth in southern flounder (*Paralichthys lethostigma*). *149th Annual Meeting of the American Fisheries Society, Joint Meeting with The Wildlife Society. Reno, Nevada.*

2018 **Gardner**, **S**.**T**., and F.S. Scharf. Mechanisms generating variation in first year growth of juvenile southern flounder (*Paralichthys lethostigma*): the contribution of post- settlement habitat use and the timing of dietary shifts. *Tidewater Chapter of the American Fisheries Society. Beaufort, North Carolina.*

2017 **Gardner**, **S**.**T**., and F.S. Scharf. Ecological processes driving variable growth in juvenile southern flounder (*Paralichthys lethostigma*). *University of North Carolina Wilmington, Dept of Bio and Marine Bio, Graduate Symposium. Wilmington, NC*

2016 **Gardner**, **S**.**T**., C.A. Layman, and J.A. Allgeier. Implications of overfishing marine ecosystems on nutrient capacity. *North Carolina State University Applied Ecology Undergraduate Symposium. Raleigh, North Carolina.*

2016 Xiong, W.N., T.J. Ivasauskas, J.R. Fischer, T.J. Kwak, J.D. Wehbie, **S**.**T**. **Gardner**,and K.R. Rundle. Recreational angler catch, effort, and satisfaction in an urban setting. *Joint Meeting between North Carolina and Virginia Chapters of the American Fisheries Society. Danville, Virginia*

*Poster Presentations*

2019 **Gardner**, **S**.**T**., and F.S. Scharf. Mechanisms generating variable first-year growth in juvenile southern flounder (*Paralichthys lethostigma*). *North Carolina Sea Grant Coastal Conference. Wilmington, NC*

2019 **Gardner**, **S**.**T**., and F.S. Scharf. The contribution of ontogenetic diet and habitat shifts to variable first-year growth in southern flounder (*Paralichthys lethostigma*). *Tidewater Chapter of the American Fisheries Society. Salisbury, Maryland.* \*Best Student Poster Presentation Finalist.

2019 Valenza, A., **S**.**T**. **Gardner**, and F.S. Scharf. The ecophysiological response of juvenile southern flounder (*Paralichthys lethostigma*) growth to settlement habitat. *Tidewater Chapter of the American Fisheries Society. Salisbury, Maryland.* **\***Best Student Poster Presentation Finalist.

2018 **Gardner**, **S**.**T**., and F.S. Scharf. Uncoupling the ecological processes that generate size variation in southern flounder (*Paralichthys lethostigma*) during the first year of life. *Annual Meeting of the American Fisheries Society. Atlantic City, New Jersey.*

2018 **Gardner**, **S**.**T**., and F.S. Scharf. Mechanisms generating variable first-year growth in juvenile southern flounder (*Paralichthys lethostigma*). *Cape Fear River Assembly Meeting, Wilmington, NC.*

2018 Thurlow, H., J. Brittain, A. Johnson, J. Wu, J. Tresca, E. Arb, **S**. **Gardner**, T. Alphin, F. Scharf, M. Posey. 2018. Importance of estuarine habitats for juvenile finfish. *Cape Fear River Assembly Meeting, Wilmington, NC.*

2017 **Gardner**, **S**.**T**., J.R. Fischer, T.J. Kwak, R.W. Laney. Towards standardization of methodology and terminology for American eel age and growth: a review and comparison of historical and contemporary approaches. *147th Annual Meeting of the American Fisheries Society. Tampa, FL.*

**FUNDING & AWARDS**

2021 Purdue University Climate Center Video Comp – Honorable Mention $250

2020 The National Honor Society of Phi Kappa Phi, UNC Wilmington N/A

2020 Got-Em-On Live Bait Fellow, UNC Wilmington $527

2019 Got-Em-On Live Bait Fellow, UNC Wilmington$1,575

2019 Best Student Poster Finalist. Tidewater AFS $50

2019 Best Student Poster Finalist. Tidewater AFS $100

2019 North Carolina, AFS Student Travel Award $400

2019 UNCW Graduate School Travel Award $852

2018 Got-Em-On Live Bait Fellow, UNC Wilmington $1,046

2018 UNCW Graduate School Travel Award $1,275

2016 Thomas L. Quay Research Award, NC State University $1000

2015 The National Honor Society of Xi Sigma Pi, NC State University N/A

2014 Lincoln Co. Sportsman Scholarship, NC State University $1000

**PROFESSIONAL ACTIVITIES/SOCIETIES**

2021-Present Illinois-Indiana SeaGrant Graduate Student Scholars

2021-Present Purdue University AFS Student Subunit Graduate Representative

2021-Present Purdue University FNR Scholarship of Engagement

2018-2020 Cape Fear River Partnership

2015-PresentAmerican Fisheries Society (AFS) - National, Southern Division, North Carolina Chapter, Indiana Chapter, Early Career Professionals, and Tidewater Chapter

2014-2017 NC State University Student AFS Subunit

\*AFS Southern Division, Best Student Subunit Award (2014, 2015, 2017)

2013-2015 North Carolina Chapter of the Wildlife Society

2013-2015 NC State University Leopold Wildlife Club

**RELEVANT WORK EXPERIENCE**

**Graduate Research Assistant**, Purdue University Jan 2021 - Present

Advisor: Dr. Tomas O. Höök 20 hours/week

Department of Forestry and Natural Resources $24,005 – $57,318.50 comp/year

Email: [thook@purdue.edu](mailto:thook@purdue.edu) [*You may contact*]

Phone: TBD

**Graduate Research Assistant**, University of North Carolina Wilmington Aug 2017 – Jun 2020

Advisor: Dr. Frederick S. Scharf 20 hours/week

Department of Biology and Marine Biology $8,250/Year

Email: [scharff@uncw.edu](mailto:scharff@uncw.edu) [*You may contact*]

Phone: (910) 962-7796

* Investigated the ecological processes responsible for generating recruitment variation in juvenile southern flounder (*Paralichthys lethostigma*).
* Planned and conducted robust field and experimental study into the early life history of southern flounder, coordinating daily assignments of 4-6 undergraduate and research associates.
* Statistical analysis and projection modeling in RStudio produced an advanced understanding of growth dynamics, nursery settlement, ontogenetic niche shifts, and ecological trade-offs that influence the timing and magnitude of annual recruitment.
* Publication quality visuals and research completed in ArcGIS, R coding, and Microsoft offices.
* Developed cooperative sampling protocol between academic laboratories to survey juvenile estuarine habitat in the Cape Fear River estuary.
* Mentored undergraduate honors student through rigorous research project on estuarine ecology.

**Biological Compliance Technician**, Duke Energy / UNC Wilmington Sept 2017 – May 2020

Supervisor: Kyle Hussey 20 hours/month

Email: [kyle.hussey@duke-energy.com](mailto:kyle.hussey@duke-energy.com) $2,880/Year

Phone: 828.243.2496 [*You may contact*]

* Led night-time biological sampling to document estuarine fish interactions with the Brunswick Power Plant for formal reporting under the US Clean Water Act section 316(b).
* Compiled biological data on estuarine-dependent species through an in-depth understanding of species early life history, morphology, estuarine ecology, and colonization strategies.
* Knowledge in the theory, concepts, principles, and practices of energy generation and biological divergence/passage structures.

**Graduate Teaching Assistant**, University of North Carolina Wilmington Aug 2017 - Dec 2019

Supervisor: Andrew Miller 20 hours/week

Department of Biology and Marine Biology $8,250/Year

Email: [millera@uncw.edu](mailto:millera@uncw.edu) [*You may contact*]

Phone (910) 962-7566

* Lectured and taught laboratory skills to ~140 undergraduate students in *Principles of Biology* (bio201: *Cellular Biology* and bio202: *Biodiversity*)
* Provided students with additional exercises to help them develop concise scientific writing and presentation skills.
* Connected basic principles of biology and ecology to real-world examples, facilitating open discussions into evolution, ecology, and emerging environmental issues.

**Research Technician**, NC Cooperative Fish & Wildlife Research Unit May2014 - June 2017

Supervisor: Dr. Thomas J. Kwak 40 hours/week

NC State University, Dept. of Applied Ecology $13.50/Hour

Email: [tkwak@ncsu.edu](mailto:tkwak@ncsu.edu) [*You may contact*]

Phone: 919.513.2696

* Responsible for maintaining equipment (e.g. electrofishing gear, boats, USGS vehicles, etc.), facilities (e.g. Reedy Creek Field Station and on campus laboratories) and scientific documents.
* Assisted interdisciplinary research in the Co-op unit, but worked closely with fisheries professors on independent research, undergraduate honors projects, and data collection/management.
* Worked with federal, state, and private biologist to document and promote the prevalence of rare, threatened, and endangered aquatic species.
* Trained new technicians on assigned responsibilities and safety procedures.
* Utilized the concept, principles, and practices of fish biology to conduct responsible research and provide critical review when needed.

**Research Technician**, North Carolina Wildlife Federation May2014 - Jan 2015

Supervisor: Judy Gardner [*Contact Unavailable*]

20 hours/week; Salary: Room and board, travel expenses, etc.

* Provided technical and financial assistance to landowners interested in restoring and enhancing fish and wildlife habitat on their land.
* Quantified soybean depredation in southeastern North Carolina caused by unchecked whitetail deer population and initiated a hunting program to responsibly reduce ungulate populations.
* Evaluated and interpreted legislative documents, biological reports, and research papers.
* Developed skills in ArcGIS mapping, experimental designs, hypothesis testing, statistical analysis, report writing and preparation

**TEACHING EXPERIENCE**

*Undergraduate Mentoring*

2018-2019 Apria Valenza – Honors Marine Biology, UNC Wilmington

2016-2017 Carl Hintz – Minor in Applied Ecology, North Carolina State University

*Laboratory Instructor*

Fall 2018-19 Principles of Biology: Biodiversity – UNC Wilmington

Fall 2017 Principles of Biology: Cells – UNC Wilmington

*Teaching Aid*

Fall 2017-19 Fisheries Biology – UNC Wilmington

Spring 2017 Introduction to Fisheries Science – North Carolina State University

*Curriculum Development*

Spring 2018 Introduction to Fisheries Science, North Carolina State University. Coordinated an applied learning opportunity for undergraduate students to assist in lake management exercise.

Fall 2017 Principles of Biology: Cells Laboratory, University of North Carolina Wilmington. Designed and implemented activities to enhance scientific writing and presentation skills.

*Research Development*

Fall 2018 Cape Fear River Estuarine Fish Identification Workshop, UNC Wilmington. Coordinated and led workshop to enhance research, data collection and analysis of UNCW fisheries independent sampling.

**RESEARCH EXPERIENCE**

2019-2020 **Cobia migration contingents**

Surgical implant of VEMCO acoustic telemetry tags in Cobia captured off Cape Hatteras, NC. Maintenance of NCSU offshore telemetry receiver array.

2018-2019 **NC Division of Marine Fisheries – fisheries independent surveys**

Assisted juvenile anadromous fish survey (Program 100) and estuarine trawl survey (Program 120) on the Cape Fear River, NC. Quantitative analysis of North Carolina fisheries independent surveys (Program 100, 120, and 915).

2017-2019 **Demographics of invasive catfish in coastal drainage.**

Mark-recapture and telemetry tagging of flathead and blue catfish in the Cape Fear River. Maintenance of riverine telemetry receivers.

2017-2019 **CRFL shallow water assessment of juvenile fish habitat in the Cape Fear, NC.**

Developed sampling protocol for long-term, monthly, fisheries independent survey of critical primary and secondary nursery habitat of estuarine-dependent species.

2017 **Stocked striped bass assessment in NC reservoirs**

Evaluated the effectiveness of striped bass stocking efforts in five (5) North Carolina reservoirs.

2016-2017 **Carolina madtom habitat assessment**

Conducted habitat assessments in the Tar and Neuse River, NC to identify critical habitat for the elusive Carolina madtom. Constructed terracotta habitats for NC “At-risk” Carolina madtom.

2016-2017 **American eel demographics**

Led undergraduate student through American eel literature review and collaborated with Dominion Energy to assess impact of manual fish passage on species demographics in the Roanoke River, NC.

2016-2017 **Ontogeny, recruitment, and priority habitat for sicklefin redhorse (*Moxostoma sp*.)**

Examined ontogeny and ontogenetic shifts in a species listed under the NC Endangered Species Act. Evaluated niche overlap with heterospecifics and the potential for competitive exclusion.

2016 **Evaluating mussel mortality with varying degrees of pollution**

Compared in vitro to in vivo rearing methods of native NC mussels and their tolerance for pollution following their release.

2015-2016 **Recreational angler catch, effort, and satisfaction in an urban setting**

Assessed effectiveness of artificial fish attractants on fish abundance and angler CPUE.

2015- 2017 **Robust Roundup, Yadkin River, NC**

Joined creative partnership between NC State University, NC Wildlife Resources Commission, Duke Energy, and the SC Aquarium in their efforts to conserve the robust redhorse in the Yadkin Pee Dee River, NC

2015-2017 **Evaluation of American eel age and growth methodology for its proposed listing under US Endangered Species Act**.

Literature review of age and growth methodologies for preparing, processing, interpreting, and reporting of estimated population dynamic parameters from academic and interjurisdictional agencies. This review and upcoming manuscript document the presence of cryptic error derived from a lack of standardized methodologies.

2015-2017 **Food web contaminant dynamics, Implications for common and imperiled species**

Toxicology assessment of riverine food webs to determine extent and amplitude contamination, in order to provide management recommendations for re-introductions under the NC Endangered Species Act.

2015-2016 **Global impact of intensive fisheries on marine nutrient cycles**

Meta-analysis linking nutrient contents of marine fish and the potential disastrous impacts to critical ecosystems following their removal.

2015-2016 **Caribbean estuarine fishes age and growth; understanding otolith formation**

Use of otolith fluorescence (oxytetracycline) to understand otolith ring formation and periodicity in tropical ecosystems.

1. **Amphidromous fish recruitment and its ecological role in Caribbean ecotones**

Electrofishing rural and urbanized Puerto Rico to better understand amphidromous genetic diversity, distribution, and its relationship with the amount of urbanization.

* 1. **Relation of contaminants to fish intersex in riverine sport fishes**

Survivorship in situ bioassay comparison between non-native and endangered juvenile fish, giving insight into feasibility of future stocking efforts. Assessed biomagnification of toxicants on intersex in game and non-game species.

2014-2015 **Evaluating anadromous fish passage over US Army Corp rock arch in the Cape Fear River, NC**

Actively and passively tracked the passage of striped bass, American shad, and Hickory shad across rock arch structure to evaluate fish passage effectiveness.

2014 **Evaluating ESA listed Atlantic sturgeon’s utilization of the Roanoke River and Albemarle Sound, NC**

Passive tracking of Atlantic sturgeon to understand seasonal movements.

**VOLUNTEER OUTREACH**

*K-12 Involvement*

2019-Present **SciREN Lesson Plan Workshop**, Morehead City, NC. Translated graduate research into a targeted lesson plan for K-12 teachers in North Carolina.

2015- 2017 **Shad in the Classroom**, Raleigh, NC. Introduction to fish anatomy and ecology. Instructed and co-instructed fish dissections for ~10 class and over 150 students in and around the Raleigh area.

2015-2016 **NCWRC National Fishing and Hunting Day**, Lake Raleigh, NC. Introduced children and families to the basics of environmental conservation and proper fishing practices.

2015-2016 **NCWRC Family Fishing Fiesta**, Yates Mill, Raleigh, NC. Introduced Latin American children and families to the basics of environmental conservation and proper fishing practices.

2015-2017 **Student Fisheries Society Rocky Branch Clean Up**, Rocky Branch Greenway, Raleigh, NC. Removed trash from the NC State University portion of Rocky Branch creek.

2014-2016 **Project WET/WILD Workshop**, Co-instructed (Granite Falls Elementary School, NC) activities designed to incorporate ecological processes into K-12 grade levels.

*Community Involvement*

2019-2020 Food Bank of Central & Eastern North Carolina, Wilmington, NC

2016-2018 Hessed House of Hope, Lincolnton Food Pantry, & Daniels Food Drive, Lincolnton, NC

**SPECIALIZED COURSEWORK**

**Foundations of Fisheries Science August 2019**

* Review of foundational topics in fisheries science through an in-depth survey of the primary literature, providing a historical perspective for the current challenges in fisheries management.
* Applied analysis and explanation of new approaches to the field of fisheries science.

**Biostatistics January 2019**

* Provided a conceptual understanding for experimental design, data collection, and analytical techniques necessary to conduct directed biological research.
* Developed an advanced fluency in R coding through rigorous hands-on experience exploring complex data sets, field and laboratory experimental design, and the construction of models,
* Ability to understand and critically review statistical findings across all disciplines of ecology.

**Ecology of Teleost Fishes – Recent Paradigms in Fish Science August 2018**

* Broad coverage of important principles in fish ecology and how they impact population dynamics, conservation, and fishery management.
* Topics included feeding/trophic ecology, bioenergetics, migration/habitat use, growth, reproduction, species interactions, life history strategies, and community assemblages.
* Linked ecological principles to solutions for applied fisheries management problems.

**Renewable Resource Management and Policy January 2016**

* Summarized past and present natural resource, forestry, wildlife, and recreation laws, institutions, and programs.
* Familiarity with Magnuson-Stevens Fishery Conservation and Management Act, Marine Mammal Protection Act, and the Endangered Species Act, with an ability to disseminate complex technical documents.
* Ability to rationally analyze and participate in current resource issues with advanced technical writing and communication skills.

**Fisheries Biology January 2015**

* Developed knowledge in the theory, concepts, principles, and practices of fisheries biology, with experience in data analysis, stock assessment techniques, and management practices in order to understand the factors that affect the population dynamics of fishes.
* Introduction to principles of fish stock assessment, estimation of population metrics, population model construction, and fisheries management strategies.
* Advanced ability to communicate the fundamental principles of fish biology.

**SPECIALIZED SKILLSET**

Scripting language – R, MATLAB, JMP, Python

Agent-based modeling – NetLogo, Interactive Data Language (IDL)

**APPLICABLE SKILLS**

Principles and methodologies of fish ecology and management; Ability to research and analyze pertinent technical data; Advanced quantitative analysis and technical writing skills; Experience modeling and interpreting stock population dynamic parameters, optimal yield, community composition, food web dynamics, and oceanography; Critical habitat designation; Water quality assessment; Field work safety; Laboratory safety procedures; Otolith microstructural interpretation; Diet analyses; Stable isotopic interpretation; Experimental design; Hypothesis testing; Statistical analysis; Database management; R coding;NetLogo; Interactive Data Language; Agent-based modeling; Microsoft office programs (Office, Excel, PowerPoint); GIS mapping; Scientific writing & verbal communication; Public outreach; Literary analysis; Figure and table preparation; Critical review of federal laws, policies, and regulations; Socioeconomics; Parliamentary procedure; Responsible conduct and research; Self-motivated; Team-oriented; Result and goal driven; Leadership

**PREFERRED CONTACTS**

**Dr. Tomas O. Höök**

Director of Illinois-Indiana Sea Grant

Professor of Fisheries and Aquatic Science

Dept. of Forestry and Natural Resources

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Phone: (765) 496-6799

**Dr. Paris D. Collinsworth**

Great Lakes Ecosystem Extension Specialist

Illinois-Indiana Sea Grant College Program

Research Assistant Professor

Dept. of Forestry and Natural Resources

Purdue University

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**Dr. Frederick S. Scharf**

Professor – Fisheries

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Wilmington, NC 28403

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**Dr. Thomas J. Kwak**

Unit Leader - Fisheries

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226 David Clark Labs

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**Dr. Jesse R. Fischer**

Biologist

U.S. Fish & Wildlife Service

Columbia Fish & Wildlife Conservation Office

Columbia, Missouri

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