Datasets: Field sampling and laboratory experiments, datasets for *Penaeus* shrimp and estuarine conditions in southeast NERRs

This document provides detailed information about five datasets that were generated through a collaborative research project titled *Incorporating Environmental Variability into Ecosystem-Based Management for Penaeid Shrimp in the Southeast US.* This webpage provides information about the project. The project was supported by the National Estuarine Research Reserve System (NERRS) Science Collaborative, which is funded by the National Oceanic and Atmospheric Administration. All Science Collaborative supported projects that collect new data adhere to federal data sharing and archiving requirements.

About the Associated Project

Project page: https://nerrssciencecollaborative.org/project/Dunn21
Grant Type: Collaborative Research
Focus Area(s): Application of SWMP Data, Climate Change
Keyword(s): fisheries, shellfish, climate change

Reserve(s): ACE Basin, SC; North Inlet-Winyah Bay, SC; Sapelo Island, GA

Project Duration: October 2021 - March 2025
Grant Amount: $599,959.00
Project Contacts:
Project Lead
- Robert Dunn, North Inlet-Winyah Bay NERR, robert@baruch.sc.edu

Collaborative Lead
- Maeve Snyder, North Inlet-Winyah Bay NERR, msnyder@baruch.sc.edu

Technical Lead
- Joshua Stone, University of South Carolina, stone@sc.edu

Project Partners
Baruch Marine Field Laboratory & Department of Biology, University of South Carolina; Marine Resource Research Institute & Office of Fisheries Management, South Carolina Department of Natural Resources; Georgia Sea Grant; University of Georgia Marine Extension; South Carolina Sea Grant Consortium; South Atlantic Fishery Management Council; Department of Marine Science, Coastal Carolina University; Catbird Stats

Project Description
Shrimping has deep cultural and economic ties to the South Carolina and Georgia coasts, and the southeast US Atlantic coast region as a whole. However, over the past two decades, commercial shrimp landings have been highly variable. Fishery management agencies, extension offices, and several southeastern Reserves have identified the need to better understand how shrimp

populations are responding to changing environmental conditions, including warmer winters and altered salinity regimes.

To do this work, a diverse team with members from universities, fishery management agencies, fisheries extension offices, and Reserves came together to form the Lowcountry Shrimp Collaborative. The Lowcountry Shrimp Collaborative used a comprehensive approach to examine how environmental conditions in estuaries are affecting abundance and timing of shrimp populations throughout the region through examination of each stage of the shrimp life cycle. Together, the Collaborative:

1. Analyzed and synthesized numerous ongoing, long-term (30+ years) datasets on multiple shrimp life history stages (postlarval, juvenile, sub-adult, adult, commercially harvested) and environmental conditions (water quality, including System-Wide Monitoring Program data)
2. Conducted field sampling targeting shrimp and their prey in salt marsh creeks during spring and summer seasons, over two years, at three southeast Reserves
3. Ran controlled seawater laboratory experiments to understand the impacts of competition for limited resources between shrimp species during their overlapping periods of estuarine residency
4. Interviewed commercial shrimpers based in Georgia and South Carolina, to better understand historical changes in, and perceptions of environmental impacts on, the shrimp industry in the southeast US

The project found that estuarine water temperature is rising across the region, mainly driven by increases during winter months. Warming temperatures can alter the life histories of shrimp, including shifting body size, altering the timing of migratory cues, and modifying habitat use. These warmer temperatures are also resulting in longer shrimping seasons with shrimpers often able to continue harvesting well into January. These results were confirmed by observations shared by shrimpers, who joined for a project wrap-up event where the team presented results and engaged in lively discussions about research needs and opportunities for collaboration between researchers, managers, and the industry.

Overview of Datasets

	Dataset	Archival and Access
1	Experimental data on density dependent competition between and among juvenile brown and white shrimp	Available at: https://doi.org/10.5281/zenodo.14270114
2	Phenology metrics for juvenile penaeid shrimp estuarine habitat use	Available at: https://doi.org/10.5281/zenodo.14206338
3	Long-term postlarval penaeid shrimp abundance	Available at: https://doi.org/10.5281/zenodo.15518609
4	Species composition, abundance, and size for estuarine nekton, zooplankton, and benthic infauna collected in 3 southeast US Reserves in 2023 and 2024	These data have been embargoed until 31 March 2026, at which point they will become publicly available at the following link: https://zenodo.org/records/15519488
5	Estuarine finfish diet composition and penaeid shrimp consumption	These data have been embargoed until 31 March 2026, at which point they will become publicly available at the following link: https://zenodo.org/records/15519488

Questions about these datasets can be directed to:
Robert Dunn, North Inlet-Winyah Bay NERR, robert@baruch.sc.edu

Dataset figures

Figure 1: Map showing locations of sampling within three NERR sites in the southeast US: North Inlet-Winyah Bay, ACE Basin, and Sapelo Island. Within each Reserve panel (right column), individual sampling sites are noted.

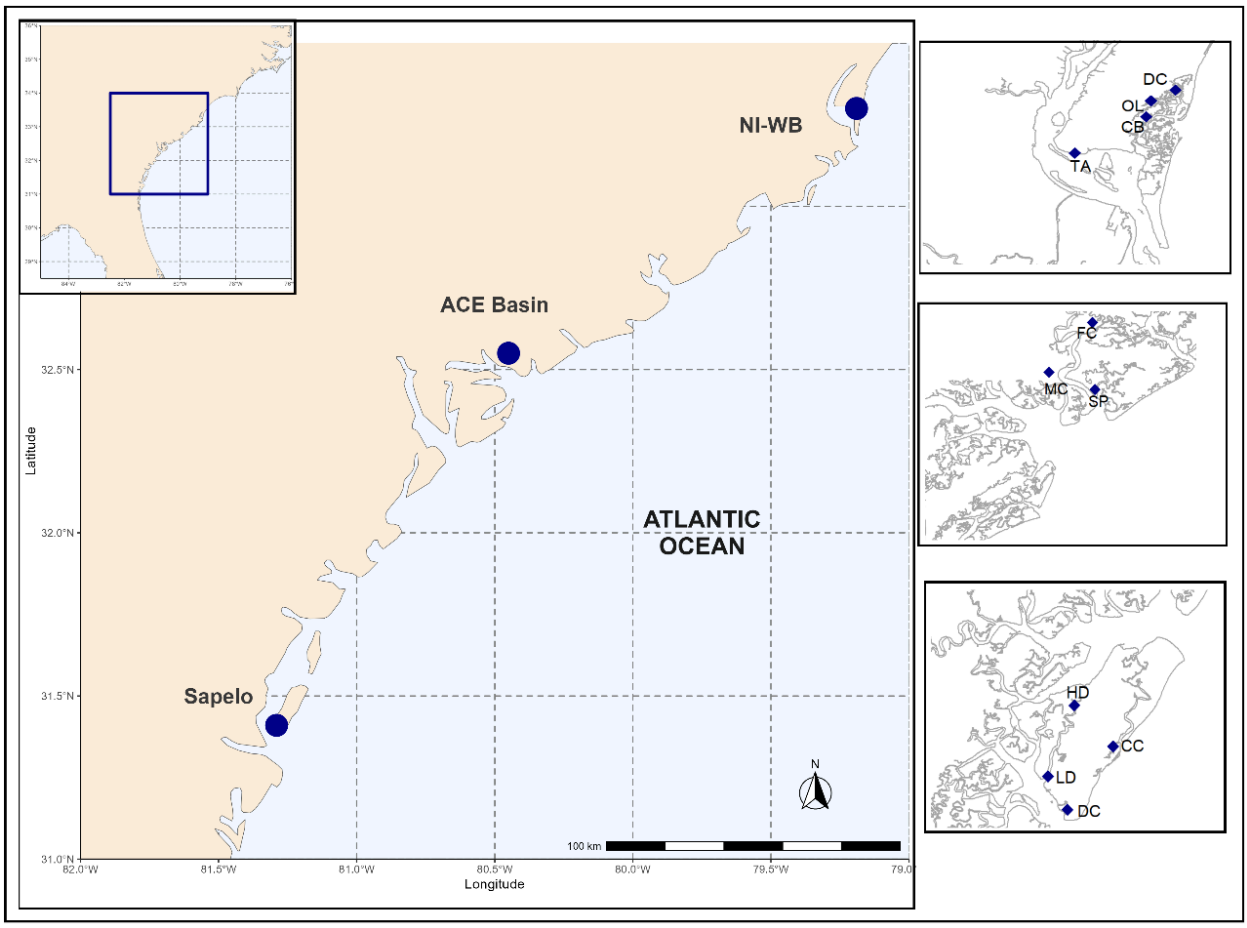
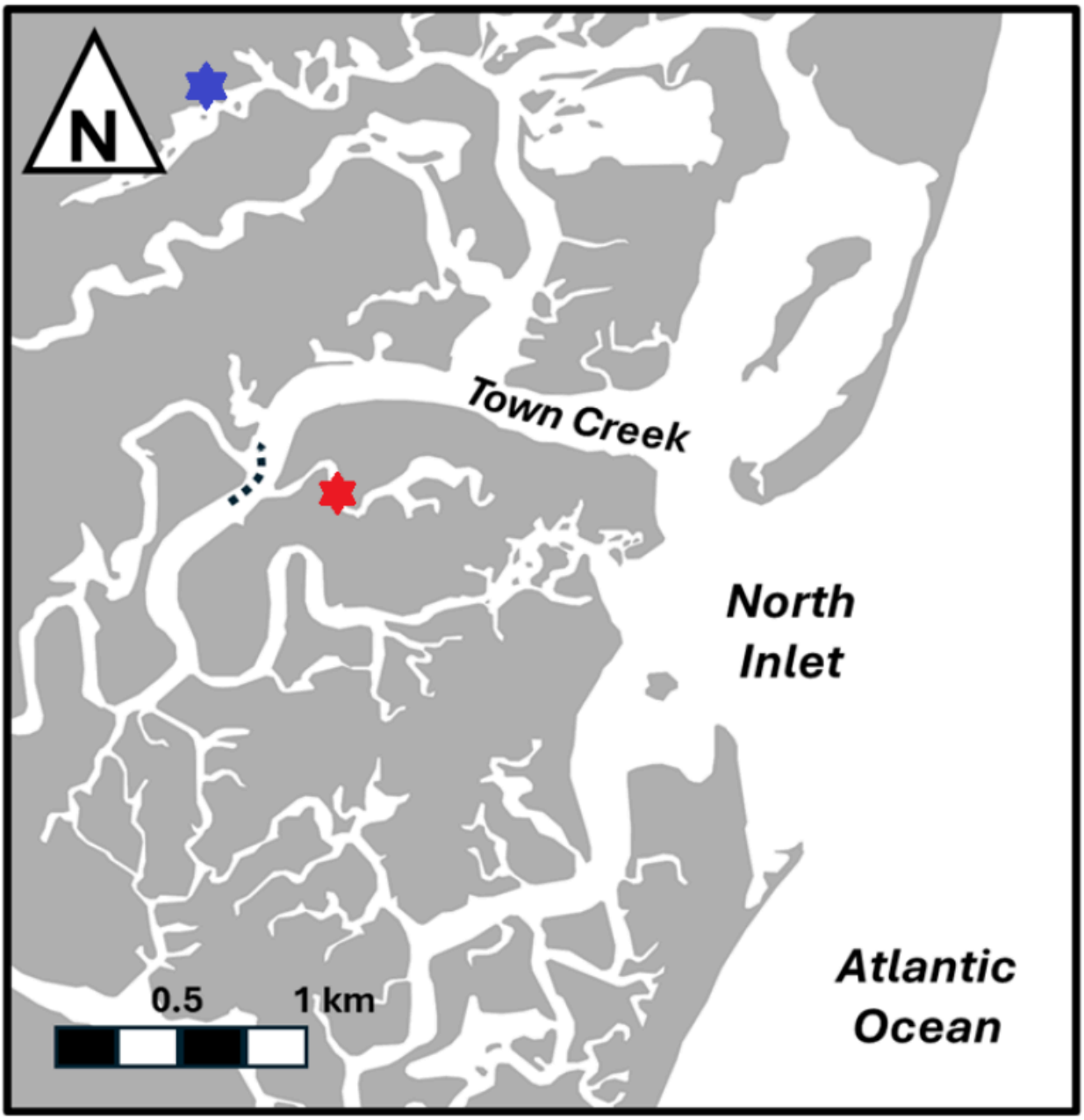


Figure 2: Map showing locations of sample sites for long-term datasets collected in the North Inlet estuary, Georgetown, SC, USA. The blue star shows the location of the long-term intertidal creek nekton seine collections, the red star shows the location of the long-term benthic invertebrate (sediment core) collections, and the black dashed line shows tow path for the long-term zooplankton (epibenthic sled) collections.



Dataset 1: Experimental data on density-dependent competition between and among juvenile brown and white shrimp

Data overview:
Data associated with laboratory experiments testing for density-dependent competition between brown and white shrimp at the USC Baruch Marine Field Laboratory's flow-through seawater facility. Data include measurements on shrimp growth and mortality as well as environmental conditions during the experiments. See associated paper at: https://doi.org/10.1371/journal.pone.0316219]

Data collection period:
May 2022 – August 2023

Geographic extent:
See Figure 2.

File format:
Excel, Word, and text files.

File name(s):
NIWOLWQ.csv
Shrimp_Lab_Experiments_3way_Analysis_Data.xlsx
ReadMe.docx

Data access and archival:
https://doi.org/10.5281/zenodo.14270114

Maps and schematics for data collection:
See Figure 2.

Dataset 2: Phenology metrics for juvenile penaeid shrimp estuarine habitat use

Data overview:
Data associated with analyses of long-term habitat utilization phenology by brown and white shrimp in the North Inlet estuary, SC, USA. Data include measurements on shrimp abundance, timing and size as well as environmental conditions during the period 1984-2022. See associated paper at: https://doi.org/10.3354/meps14741

Data collection period:
1984-2022

Geographic extent:
See Figure 2.

File format:
Excel and text files.

File name(s):
ENSO_MultiVar_ENSOIndex_1979_2022.csv
GHCND Brookgreen.csv
North Inlet Oyster Landing Water Quality Data 1981-2022 10AM Daily.xlsx
North Inlet_Shrimp Seine_2022.xlsx
North_Inlet_Shrimp_Phenology_Environmental.xlsx

Data access and archival:
https://zenodo.org/records/14206339

Maps and schematics for data collection:
See Figure 2.

Dataset 3: Long-term postlarval penaeid shrimp abundance

Data overview:
Data associated with analyses of long-term collections of pink, brown and white shrimp postlarvae in the North Inlet estuary, SC, USA. Data include measurements on postlarval shrimp abundance, collection metadata, as well as environmental conditions during the period 1981-2017. Paper is in press at Marine Ecology Progress Series.

Geographic extent:
See Figure 2

Data collection period:
1981-2017

Geographic extent:
See Figure 2.

File format:
PDF and csv files.

File name(s):
EPI_PPL_final_long.csv
EPI_PPL_final_long Metadata.pdf

Data access and archival:
https://zenodo.org/records/15518609

Maps and schematics for data collection:
See Figure 2

Dataset 4: Species composition, abundance, and size for estuarine nekton, zooplankton, and benthic infauna collected in 3 southeast US Reserves in 2023 and 2024

General description of data:
Data associated with field collections of zooplankton, nekton, and benthic infauna from three southeast US NERR sites.

Data collection period:
Collections were made during April – September of 2023 and 2024. Geographic extent: North Inlet estuary, South Carolina, USA; ACE Basin, South Carolina, USA; Sapelo Island, Georgia, USA

File format:
PDF and Excel files

File name(s):
Lowcountry Shrimp Collaborative Data Archival Overview.pdf
LSC SE NERRs Benthic Core Macrofauna Density 2023-2024.xlsx
LSC SE NERRs BenthicSled SiteData.xlsx
LSC SE NERRs Castnet.xlsx
LSC SE NERRs Trawl.xlsx
NInlet Benthic Core Macrofauna Density 1981-2024.xlsx
NInlet Penaeus Lengths 1981-2017.xlsx
NInlet_Macrobenthos_Metadata – BMFL 20240222.pdf

Data access and archival:
These data have been embargoed until 31 March 2026, at which point they will become publicly available at the following link: https://zenodo.org/records/15519488

Maps and schematics for data collection:
See Figure 1.

Dataset 5: Estuarine finfish diet composition and penaeid shrimp consumption

Data overview: Data associated with field collections of Atlantic croaker (Micropogonias undulatus) and silver perch (Bairdiella chrysoura), and associated gut contents from three southeast US NERR sites.

Data collection period:
Collections were made during April – September of 2023 and 2024.

Geographic extent:
North Inlet estuary, South Carolina, USA; ACE Basin, South Carolina, USA; Sapelo Island, Georgia, USA

File format:
Excel file

File name(s):
LSC SE NERRs FishGutContents.xlsx

Data access and archival:
These data have been embargoed until 31 March 2026, at which point they will become publicly available at the following link: https://zenodo.org/records/15519488

Maps and schematics for data collection:
See Figure 2.