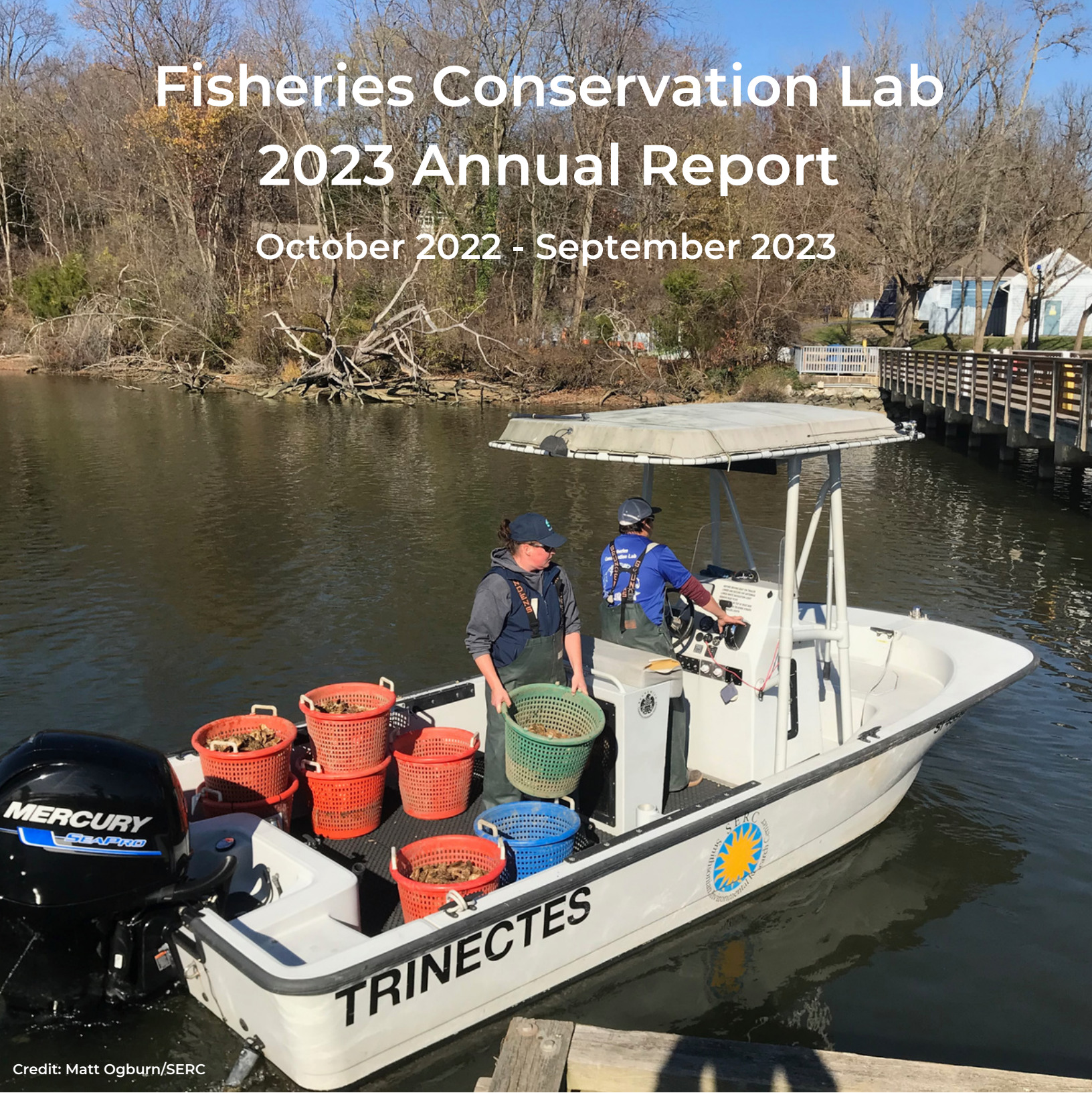
Fisheries Conservation Lab 2023 Annual Report

October 2022 - September 2023



Credit: Matt Ogburn/SERC

Investigating the Ecology, Management, and Conservation of Marine and Estuarine Fisheries

Smithsonian
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NOTES FROM THE FIELD

Credit: Matt Ogburn/SERC

The Fisheries Conservation Lab engaged more with international researchers in 2023 than ever before! We started with visits from Yushinta Fujaya, a Fulbright fellow from Hasanuddin University in Indonesia, and Roberta Bardelli, a doctoral fellow from University of Palermo, Italy. Yushinta studied reproductive biology of blue crabs and Roberta collected samples to compare blue crab diets in their native range in Chesapeake Bay with areas they have invaded in Italy. Then in spring 2023, Queensland-Smithsonian fellow Nathan Waltham returned to SERC to complete his fellowship on fish migrations that was interrupted by COVID-19 in March 2020.

Our year of international work didn't end with visitors. Postdoc Henry Legett and biologist Rob Aguilar traveled to Indonesia to launch a new project testing the feasibility of responsible stock enhancement of blue swimming crabs. They were excited to visit Yushinta, who is collaborating on the project, and explore a new ecosystem and culture. We also continued our Movement of Life collaboration with Smithsonian colleagues Ximena Velez and Martin Benavides in Peru, who tagged more sharks and rays to learn more about their coastal migrations.

Back in Maryland, we accomplished a major goal of our oyster restoration research when oysters were planted on three replicate oyster reefs in the South River in April and June (see photo above). Designed with several partners, this restoration experiment and a second one in the design phase in the Rappahannock River will provide critical information on the outcomes of oyster restoration. They also provide opportunities for interns such as Grace Loonam, Julia de los Reyes, and Emi McGeady to engage in research and monitoring using cutting-edge tools such as high-resolution imaging sonar and environmental DNA.

In the Rhode River, we're learning new things about our backyard. Intern Julia McElhinny and MarineGEO technician Emily Anderson documented the seasonal growth and decline of horned pondweed, our most abundant bay grass. Postdoc Michele Repetto is compiling the long-term trawl and seine data, now more than 40 years of data, exploring patterns in fish abundance and trait diversity. In addition, technician Sam McNeely, intern Morgan Wolk, and others continued the tradition of benthic sample sorting.

Kim Richie took on a new role as the lab's head technician this year and continues as data manager for the Atlantic Cooperative Telemetry Network. Speaking of telemetry, the alewife tagged in the Choptank River in 2022 returned in 2023 after spending the summer in the Gulf of Maine! Intern MJ Pieras also used bioacoustics to study river herring spawning activity.

Throughout the year, the lab shared our research and passion for fisheries conservation with communities ranging from Maryland watermen to Indonesian fishermen. Technicians Keira Heggie and Emily Anderson led outreach activities at events in Anacostia and at the Captain Avery Museum in Shady Side. Artist intern Anna Pedersen created a painting of oyster reefs to help communicate oyster research and line drawings from the work were incorporated into a new oyster activity book. Finally, we continued to engage members of the public in research, with 35 volunteers contributing to our work this year. I feel blessed to work with such a talented, dedicated team and look forward to another exciting year in 2024.

Sincerely,

Matthew B. Ogburn
Senior Scientist

Table of Contents

Chain Pipefish; Credit: Rob Aguilar/SERC

FISHERIES CONSERVATION LAB MEMBERS

Principal Investigator: Matt Ogburn (OgburnM@SI.EDU)

Staff: Rob Aguilar, Emily Anderson, Keira Heggie, Sam McNeely, Kim Richie

International Fellows: Roberta Bardelli (Italy), Yushinta Fujaya (Indonesia), Nathan Waltham (Australia)

Postdoctoral Fellows: Henry Legett, Michele Repetto

Interns: Emily Johnson, Grace Loonam, Julia McElhinny, Emi McGeady, Anna Pedersen, MJ Pieras, Julia de los Reyes, Morgan Wolk

Participatory Scientists: 35

384 volunteer hours

ABOUT US

The Fisheries Conservation Laboratory engages in science and conservation supporting fisheries and healthy ecosystems. Working primarily in coastal areas, we address critical challenges including:

- *ecosystem impacts of fishing*
- *climate change*
- *habitat loss*
- *invasive species*
- *infrastructure development*

With our research, we hope to directly inform management practices that maintain sustainable harvests in today's fisheries and rebuild populations of species impacted by fisheries in the past.

SERC's first all-female trawl crew! Credit: Keira Heggie/SERC

Credit: Matt Ogburn/SERC

Photo credit: Stephen Voss/Smithsonian Institution.

LAB ACTIVITIES

TRAWL SURVEYS

Since 1981, SERC has been sampling species from the deeper waters of the Rhode River, MD, and upper Chesapeake Bay. We record water conditions, fish lengths, and species counts to study changes in population and community dynamics. In 2023, we reported:

100
Trawl hauls

47,307
Organisms

Northern Puffer

Credit: Rob Aguilar/SERC

Postdoc Michele Repetto is leading an analysis of the trawl and seine surveys. She is characterizing how fish communities in the Rhode River have changed through time and how environmental drivers and human activities such as fishing regulations influence those changes.

Credit: Kim Richie/SERC

SEINE SURVEY

26
Seine hauls

7,805
Organisms

We caught 32 fish species (up from 29 last year) including the first Rough Silverside observed in the Rhode River!

OYSTER REEF RESTORATION

Restored oyster reef in Harris Creek, MD

The Chesapeake Bay program is on track to restore oyster reefs in 10 tributaries of Chesapeake Bay by 2025. Former SERC postdoc Allison Tracy led a study showing that protecting oysters in no-harvest sanctuaries and conducting active restoration results in the healthiest oyster reefs in Chesapeake Bay. Interns Julia de los Reyes and Emi McGeady studied a new restoration experiment in the South River. They found an increase in oysters, mussels, and mud crabs on restored reef patches and that reef height should double or triple as the oysters grow.

Emily Anderson and Sam McNeely diving for oysters.

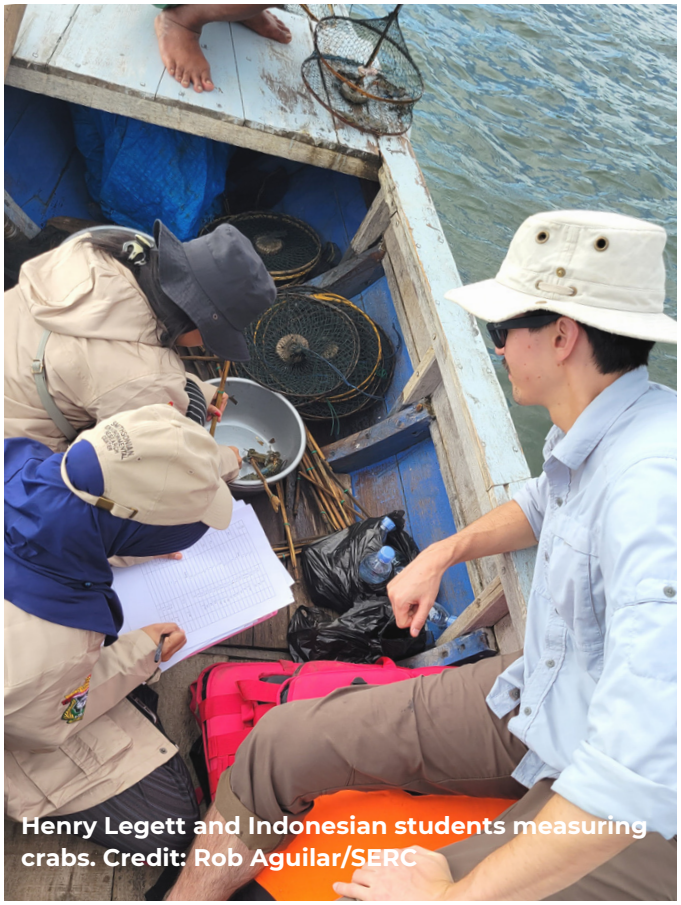
[Learn more with our Chesapeake Reefs storymap]

Credits: SERC

CRAB STOCK ENHANCEMENT IN INDONESIA

Fishing boats, Pare Bay. Credit: Henry Legett/SERC

Blue Swimming Crab, Credit: Henry Legett/SERC

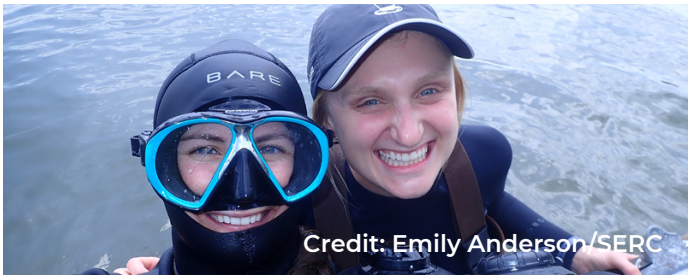


Henry Legett and Indonesian students measuring crabs. Credit: Rob Aguilar/SERC

SERC postdoc Henry Legett and biologist Rob Aguilar traveled to South Sulawesi, Indonesia to kick off a project on responsible stock enhancement of the Blue Swimmer Crab, *Portunus pelagicus*. Along with collaborators Yushinta Fujaya at Hasanuddin University in Indonesia and several researchers at the University of Maryland Institute of Marine and Environmental Technology in Baltimore, MD and Horn Point Lab in Cambridge, MD, we are studying the feasibility of rebuilding and sustaining the crab fishery in Indonesia, which is a major importer of crab meat to the US.

MARINEGEO UPDATE

MarineGEO field work started early in the season this year at the Upper Chesapeake Bay site with MarineGEO technician Emily Anderson and intern Julia McElhinny collecting monthly data through the spring and summer to look at seasonal growth patterns in underwater grass beds. The lab collected annual monitoring data for oyster reefs and fouling communities as well. Emily and Julia even found time to lead a full Rhode River survey to find new areas of underwater grasses and work with Maryland DNR on a pilot SAV restoration project. Emily worked her way through a multi-year backlog of seagrass epifaunal invertebrates and is hoping to make a dent identifying mobile fauna from many years of deployed fouling panels this upcoming year!



Credit: Emily Anderson/SERC


Emily Anderson planting SAV
Credit: Sam McNeely/SERC

RIVER HERRING MIGRATIONS

Alewife, a type of river herring, are anadromous fish that live in the ocean but return to freshwater streams to reproduce. In 2022-23, we recorded the first full annual migration track for the species from Chesapeake Bay to summer habitats in the Gulf of Maine and as far north as Canada. This, year we expanded our tagging study to Virginia, where we worked with the Rappahannock Tribe to capture and tag Alewife in support of Rappahannock River restoration.


Rob Aguilar and Kim Richie tagging an Alewife.
Credit: Emily Anderson/SERC


Henry Legett dip-netting for river herring.
Credit: Emily Anderson/SERC

OUTREACH AND EDUCATION

Credit: Anna Davis/SERC

Intern Anna Pedersen split time between the lab and SERC's Public Engagement program, where she painted Chesapeake Bay oyster reefs and helped produce an oyster-themed activity book. The original painting is on display in the Fisheries Conservation Lab. Come visit us and check it out!

HOW TO SUPPORT OUR WORK

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1. Scan this QR code or click here and select "Fisheries Conservation Lab" in the designation box.
2. Or make out a check to SERC and mail it us. Please add “Fisheries Conservation Lab” on the memo line.

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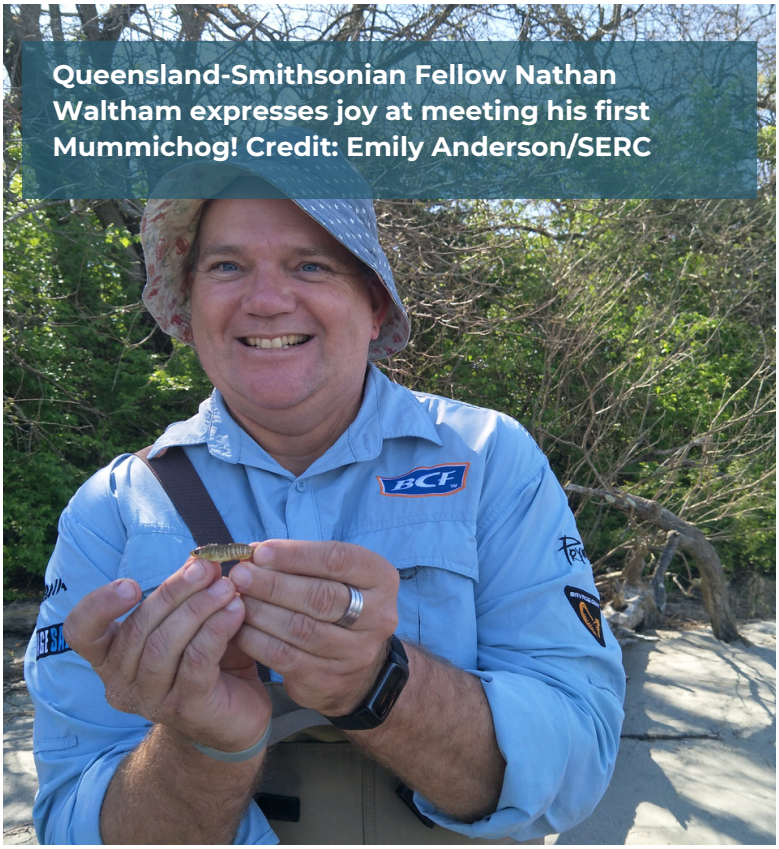
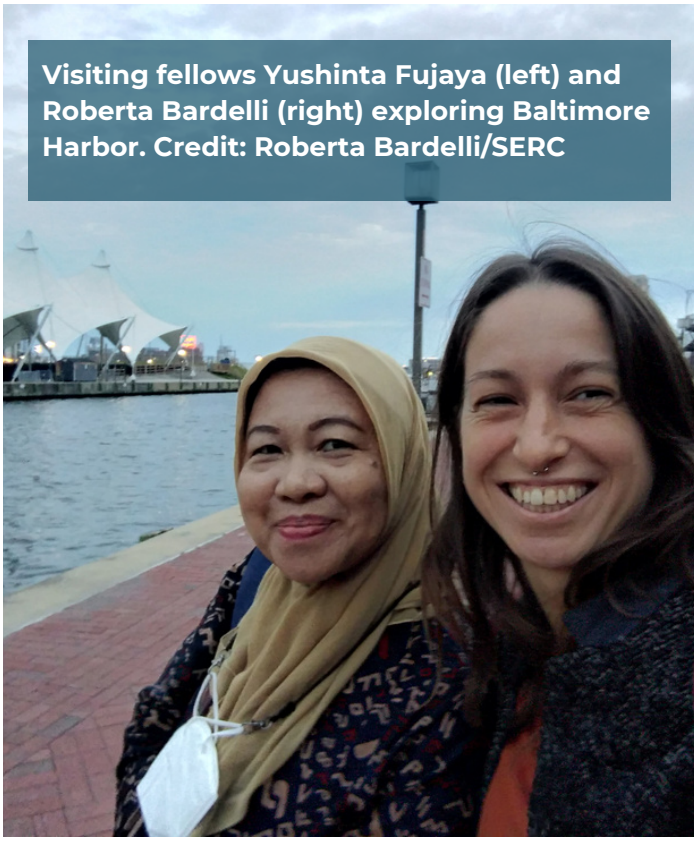
647 Contees Wharf Road
Edgewater, MD 21037



Queensland-Smithsonian Fellow Nathan Waltham expresses joy at meeting his first Mummichog! Credit: Emily Anderson/SERC



Visiting fellows Yushinta Fujaya (left) and Roberta Bardelli (right) exploring Baltimore Harbor. Credit: Roberta Bardelli/SERC

NEW PUBLICATIONS AND GRANTS

PUBLICATIONS

Tracy AM, Heggie K, Ritter CJ, Norman D, Aguilar R, Ogburn MB. 2023. Oyster reef habitat depends on environmental conditions and management across large spatial scales. Marine Ecology Progress Series 721:103-117.

Pagenkopp Lohan KM, Aguilar R, DiMaria R, Heggie K, Tuckey TD, Fabrizio MC, Ogburn MB. 2023. Juvenile Striped Bass consume diverse prey in Chesapeake Bay tributaries. Marine and Coastal Fisheries 15:e10259.

Legett HD, Aguilar R, Heggie K, Richie KD, Ogburn MB. 2023. Timing and environmental drivers of spawning migrations of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) in rivers of Chesapeake Bay. Fishery Bulletin 121:96-111.

Cahill BV, DeGroot BC, Brewster LR, Lombardo SM, Bangley CW, Ogburn MB, Ajemian MJ. 2023. Visitation patterns of two ray mesopredators at shellfish aquaculture leases in the Indian River Lagoon, Florida. PLOS ONE 18:e0285390.

Staples A, Legett HD, Deichmann JL, Heggie K, Ogburn MB. 2023. Automated acoustic detection of river herring (Alewife and Blueback Herring) spawning activity. North American Journal of Fisheries Management. DOI: 10.1002/nafm.10897.

Huang CS, Legett HD, Plough LV, Aguilar R, Fitzgerald C, Gregory B, Heggie K, Lee B, Richie K, Harbold W, Ogburn MB. 2023. Early detection and recovery of river herring spawning habitat use in response to a mainstem dam removal. PLOS ONE 18:e0284561.

Olson JC, Lefcheck JS, Goodison MR, Lienesch A, Ogburn MB. 2023. Fish size-spectra from imaging sonar reveal differential patterns of community structure and habitat use along a spatial gradient. Marine Ecology Progress Series 705:95–108. DOI: 10.3354/meps14247.

Donelan SC, Ogburn MB, Breitburg D. 2022. Legacy of past exposure to hypoxia and warming regulates an ecosystem service provided by oysters. Global Change Biology 29:1328–1339. DOI: 10.1111/gcb.16571.

Ouellet V, Collins MJ, Kocik JF, Saunders R, Sheehan TF, Ogburn MB, Trinko Lake T. 2022. The diadromous watersheds-ocean continuum: Managing diadromous fish as a community for ecosystem resilience. Frontiers in Ecology and Evolution 10:1007599. DOI: 10.3389/fevo.2022.1007599

GRANTS

Davis A, Ogburn MB, Cawood A. Community-based monitoring of restored oyster reefs to increase coastal resilience. 2023-2024. Smithsonian Our Shared Future: Life on a Sustainable Planet. $71,420

Ogburn MB, Hines AH. Testing the feasibility of responsible stock enhancement of blue swimmer crab in Indonesia. 2023-2025. National Fisheries Institute. $330,319

Ogburn MB. Atlantic Cooperative Telemetry Network data management and offshore wind coordination. 2023-2024. Integrated Ocean Observing System. $225,000

Legett HD, Nelson TR, Ryan J, Ogburn MB. Migration ecology of river herring in a changing climate. 2023-2026. NOAA. $445,623.

Davis A, Ogburn MB, Cawood A. Establishing a citizen science program to engage the public in oyster restoration monitoring. 2023-2024. Chesapeake Bay Trust. $27,943.

Hofman B, Ogburn MB, et. al. Increasing oyster restoration capacity in the Rappahannock River. 2023-2024. National Fish and Wildlife Foundation. $846,000.

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