Fisheries Conservation Lab 2022 Annual Report

October 2021 - September 2022

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

Credit: Kim Richie/SERC



NOTES FROM THE FIELD



Whew! What a year! For the Fisheries Conservation Lab, 2022 was a year of wrapping up major projects delayed by COVID, wishing lab members well as they moved on to the next stages of their careers, welcoming new members to the team, and launching new collaborations. It was a whirlwind that I'm still not sure I've come to terms with. Luckily, there was much to celebrate.

Postdoctoral fellow Allison Tracy led a project comparing rapid underwater video assessments of oyster reefs to traditional quantitative oyster restoration metrics. She found that the qualitative video assessment effectively identifies reefs that meet restoration targets. Through a series of stakeholder meetings, she led development of implementation protocols to combine rapid assessments with scaledback quantitative sampling to increase efficiency and reduce the cost of oyster restoration monitoring. Allison completed her fellowship in summer and was hired as an Assistant Professor at the University of Maryland Baltimore County and Institute of Marine and Environmental Technology in Baltimore, MD.

Technicians Carmen Ritter and Jack Olson helped the lab make great strides in advancing long-term studies and moving key datasets towards publication. Carmen and a group of citizen scientists processed hundreds of benthic infauna samples, catching up on a yearslong backlog. Jack and Carmen each tackled a set of high resolution sonar data collected at MarineGEO sites. Each project focused on relationships between fish abundance and size and how fish communities are distributed across different habitat types (e.g. oyster reefs, coral reefs, mangroves, seagrasses). During the year, Jack moved on to a new job studying fisheries in Florida and Carmen moved to Australia to start graduate school. Postdoctoral fellow Henry Legett, technicians Keira Heggie and Kim Richie, and biologist Rob Aguilar led another successful year of river herring spawning migration research. Henry explored links between land use and stream temperatures. Keira and Rob tagged 50 Alewife with acoustic telemetry tags, hoping to track them to their summertime habitats in the ocean.

Kim and Matt continued to lead the Atlantic Cooperative Telemetry Network, whose shared receiver array will provide the Alewife tracking data. And the lab partnered with University of New Hampshire Professor Nathan Furey to translate our telemetry results to inform fisheries management.

We welcomed technician Emily Anderson to the lab. Emily will be leading our MarineGEO activities and launched a new project studying coastal soundscapes.

Finally, we took important steps to expand the international scope of our work. We started a collaboration with Smithsonian colleagues in Peru in which we are using acoustic tags to track habitat use and migrations of several shark and ray species. We also welcomed Fulbright Scholar Yushinta Fujaya, Professor of Marine Science and Fisheries at Hasanuddin University in Indonesia, to the lab to study blue crab reproductive biology.

The Fisheries Conservation Lab continues to work towards rebuilding and sustaining fisheries and ecosystems, contributing to Smithsonian's new strategic initiative Life on a Sustainable Planet.

Sincerely,



Matthew B. Ogburn Senior Scientist

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

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Inshore Lizardfish; Credit: SERC/Rob Aguilar

FISHERIES CONSERVATION LAB MEMBERS

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

Staff: Rob Aguilar, Emily Anderson, Keira Heggie, Jack Olson, Kim Richie, Carmen Ritter

Fulbright Fellow: Yushinta Fujaya

Postdoctoral Fellows: Amy Hruska, Henry Legett, Allison Tracy

Teacher Extern: Judith Lukacs

Interns: Lili Bowman, Caitlyn Dittmeier, Grace Loonam, Ryan McIntyre, Isaac Robertson-Brown, Malvika Shrimali, Amber Staples

Citizen Scientists: 10

344 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.



Credits: SERC/Rob Aguilar



Photo credit: Stephen Voss. Fish graphics: Tracey Saxby, University of Maryland

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 2022, we reported:





Organisms, such as Brief Squid, Horseshoe Crabs, Blue Crabs, and 30 fish species, including rare catches of Black Drum and American Shad



Bay Anchovy and Spot comprised 91.7% of the 2022 total catch, same as in 2021!

First record of the non-native Blue Catfish in the Rhode River



Credit: SERC/Rob Aguilar

SUMMER SEINE SURVEY

We continued to sample nearshore, shallow water habitats from the Rhode River headwaters in Muddy Creek to the marshy sub-tributaries and beaches at the river mouth. In 2022, we reported:

26 Seine hauls 5,208

Organisms, such as Blue Crabs and 29 fish species (e.g. Silversides, Mummichog, Killifish, Menhaden, Pumpkinseed, Spotted Sea Trout and Inland Lizardfish)



We recorded our first Pinfish in the Rhode River, a warm water species moving north with climate change.

Credits: Rob Aguilar/SERC

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OYSTER REEF RESEARCH

The Chesapeake Bay program is on track to restore oyster reefs in 10 tributaries of Chesapeake Bay by 2025. This effort has dramatically increased the need for oyster reef monitoring. Allison Tracy led a study which found that rapid underwater video assessments combined with limited SCUBA diver-based sampling can meet this need by increasing efficiency and reducing costs of monitoring.



Learn more with our Chesapeake Reefs storymap



Allison Tracy with an oyster sample

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Interns Lili Bowman and Grace Loonam used high resolution ARIS imaging sonar to study oyster reef habitat complexity and the abundance and size distribution of fish. Three example images from different reefs are shown below. They found that oyster reefs restored with a stone base had the most structural complexity and greater numbers of large fish, suggesting that restored reefs are attractive feeding grounds for predators.

Photo credits: Matt Ogburn/SERC



MARINEGEO UPDATE

Fisheries Conservation lab members stepped up to make sure we collected another year of data on seagrass, oyster reef, soft sediment, and salt marsh communities for the Upper Chesapeake Bay MarineGEO site. We welcomed new MarineGEO technician Emily Anderson, who jumped in right in the middle of the field season and has already made exciting new contributions to the program. Emily initiated a pilot study exploring how low cost hydrophones (underwater microphones) can enhance our understanding of coastal ecosystems by recording soundscapes. In this pilot study, she's deploying the hydrophones at SERC, in Panama, and in Belize.





RIVER HERRING MIGRATIONS

Alewife, a type of river herring, are anadromous fish that live in the ocean but return to freshwater streams to reproduce. For the first time, we are using acoustic telemetry to track Alewife migrations from the Chesapeake Bay to the ocean to learn what ocean habitats they use. Early results from the Atlantic Cooperative Telemetry Network (which SERC coordinates) have revealed a rapid migration north to Long Island, Nantucket, and even the Gulf of Maine. We're excited to continue to track these fish as the return to the bay in early 2023.



Adult Alewife (*Alosa pseudoharengus*) Credit: Kim Richie/SERC



Keira Heggie assists with tagging an Alewife in the Choptank River.

Credits: Matt Ogburn/SERC

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OUTREACH AND EDUCATION

TEACHER EXTERN

The Fisheries Conservation Lab participated in SERC's teacher extern program, hosting Judith Lukacs (at right) for six weeks. Judith will incorporate what she learned into her biology classes at a local high school.

Credit: Kim Richie/SERC

OYSTER EDUCATION CURRICULUM UPDATE

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Intern Ryan McIntyre (left middle) split time between the lab and SERC's education program, where he helped Karen McDonald update the oyster curriculum offered to visiting students.



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HOW TO SUPPORT OUR WORK

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INTERESTED IN DONATING TO FISHERIES CONSERVATION PROJECTS?



- 1. Scan this QR code or click <u>here</u> and select "Fisheries Conservation Lab" in the designation box.
- 2. Or make out a check to SERC and mail it to Smithsonian Environmental Research Center, 647 Contees Wharf Road, Edgewater, MD 21037. Please add "Fisheries Conservation Lab" on the memo line.





NEW PUBLICATIONS AND GRANTS

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PUBLICATIONS

Aguilar R, Prakash S, Ogburn MB, Lohan KMP, MacDonald KS, Driskell AC, Ahyong ST, Leray M, McIlroy SE, Tuckey TD, Baeza JA. 2022. Unresolved taxonomy confounds invasive species identification: the *Lysmata vittata* Stimpson, 1860 (Decapoda: Caridea: Lysmatidae) species complex and recent introduction of *Lysmata vittata sensu stricto* in the western Atlantic. Journal of Crustacean Biology, 42 (1) http://dx.doi.org/10.1093/jcbiol/ruab079

Canty SWJ, Nowakowski AJ, Connette GM, Deichmann JL, Songer M, Chiaravalloti R, Dodge M, Feistner AT, Fergus C, Hall JS, Komatsu K, Linares-Palomino R, McField M, Ogburn MB, Velez-Zuazo X, Akre TS. 2022. Mapping a conservation research network to the Sustainable Development Goals . Conservation Science and Practice, http://dx.doi.org/10.1111/csp2.12731

Edwards ML, McCallister M, Brewster LR, Bangley CW, Curtis TH, Ogburn MB, Ajemian MJ. 2022. Multi-year assessment of immature bull shark *Carcharhinus leucas* residency and activity spaces in an expansive estuarine nursery . Marine Ecology Progress Series, 695, 125-138. http://dx.doi.org/10.3354/meps14113

Guéron R, Almeida AO, Aguilar R, Ogburn MB, Prakash S, Baeza JA. 2022. Delimiting species within the *Lysmata vittata* (Stimpson, 1860) (Decapoda: Lysmatidae) species complex in a world full of invaders . Zootaxa, 5150 (2) , 189-216. http://dx.doi.org/10.11646/zootaxa.5150.2.2

Hruska AM, Cawood A, Lohan KMP, Ogburn MB, Komatsu KJ. 2022. Going remote: Recommendations for normalizing virtual internships . Ecosphere, 13 (3) http://dx.doi.org/10.1002/ecs2.3961

Ogburn MB, Plough LV, Bangley CW, Fitzgerald CL, Hannam MP, Lee B, Marafino G, Richie KD, Williams MR, Weller DE. 2022. Environmental DNA reveals anadromous river herring habitat use and recolonization after restoration of aquatic connectivity. Environmental DNA. https://doi.org/10.1002/edn3.348 Ogburn MB, McDonald K. Oyster science and innovative resources for educators and youth. 2022. Chesapeake Oyster Alliance. \$9,900

GRANTS

Ogburn MB. Eastern Bay oyster enhancement. 2022-2023. Maryland Department of Natural Resources. \$3,500.

Ogburn MB, Legett HD. Anadromous fish restoration in a changing climate. 2022-2023. Smithsonian Office of the Under Secretary for Science, Life on a Sustainable Planet Pathfinder Program. \$60,242.

Ogburn MB. Atlantic Cooperative Telemetry Network data management. 2022-2023. Integrated Ocean Observing System. \$69,153.

Colden A, Ogburn MB. Comprehensive South River and Herring Bay sanctuary scale oyster restoration. 2022-2024. Atlantic Coastal Fish Habitat Partnership. \$50,000.

Ogburn MB. Delaware fish ladder monitoring using eDNA. 2022-2023. Delaware Department of Natural Resources and Environmental Control. \$18,589.

Ogburn MB, Plough LV. River herring response to dam removal in the Patapsco River, MD. 2022-2023. National Fish and Wildlife Foundation. \$124,745.



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