NOAA Passive Acoustic Telemetry Efforts
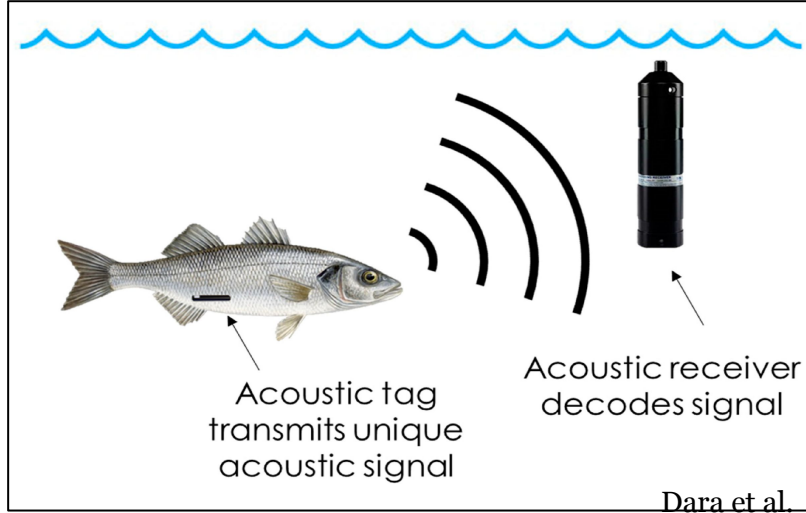
Wilmelie Cruz Marrero[1], Matt Kendall[2], Bethany Williams[2], David Bruce[1], Bruce Vogt[1] Nathan Furey[3]

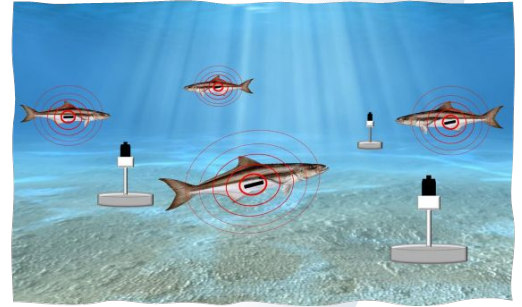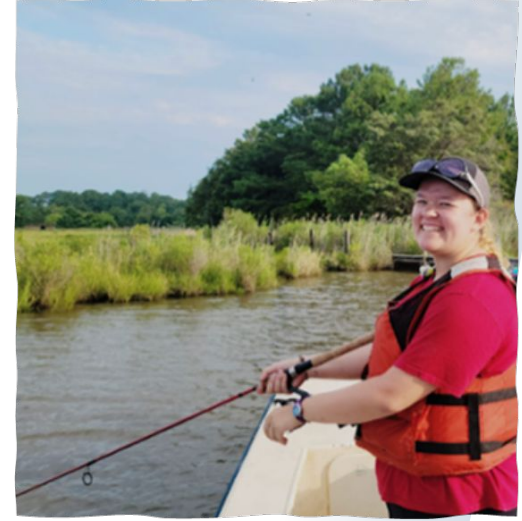1. NOAA Chesapeake Bay Office; 2. NOAA National Centers for Coastal Ocean Science; 3. University of New Hampshire

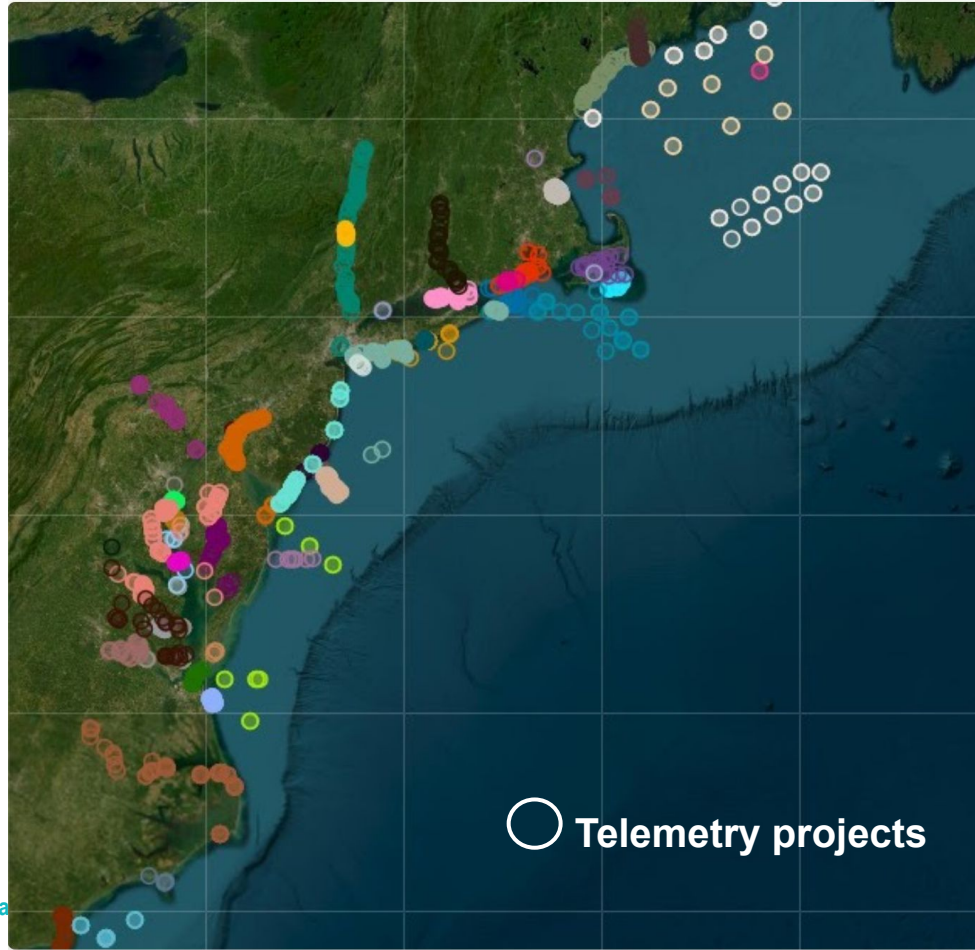March 2025

What is passive acoustic telemetry?

Acoustic tag transmits unique acoustic signal

Acoustic receiver decodes signal

Dara et al. 2023

We use acoustic telemetry to collect information about fish movements (e.g., migration patterns, habitat use, survival).

Glatos.org

NOAA FISHERIES

Atlantic Cooperative Telemetry Network
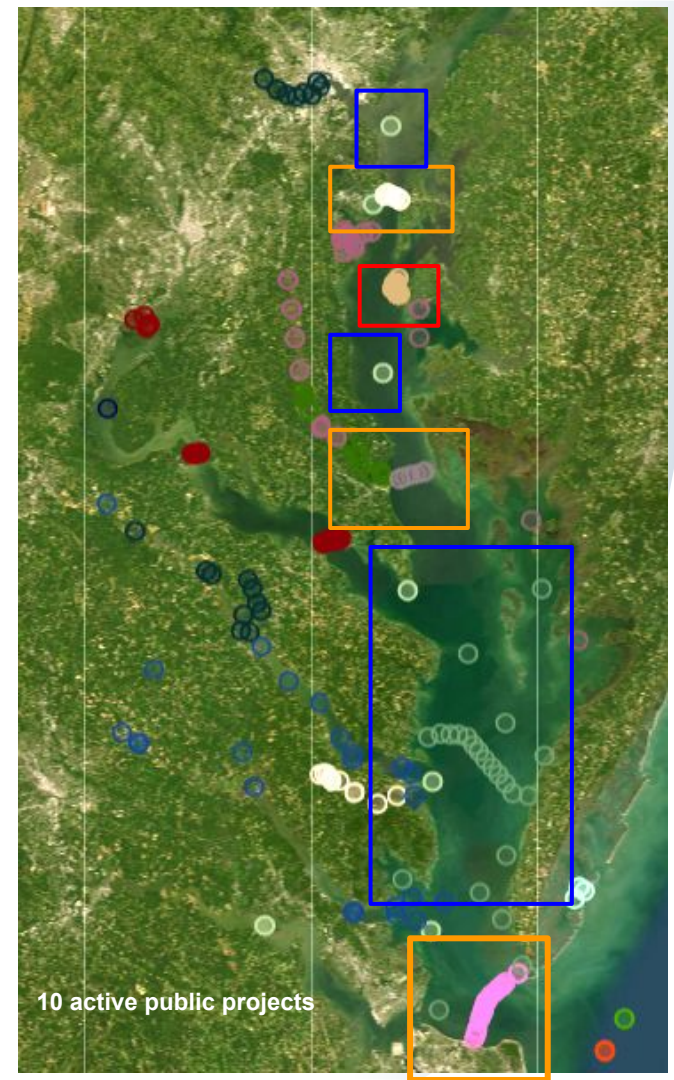

○ Telemetry projects

The ACT network and other networks connects fish taggers with receiver owners across different jurisdictions
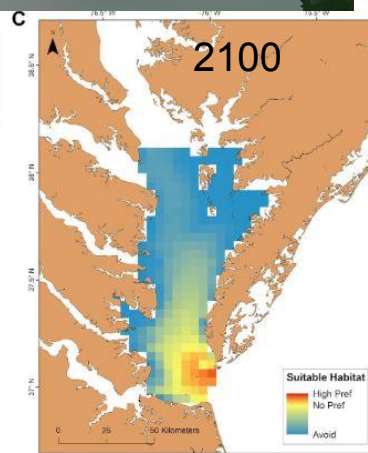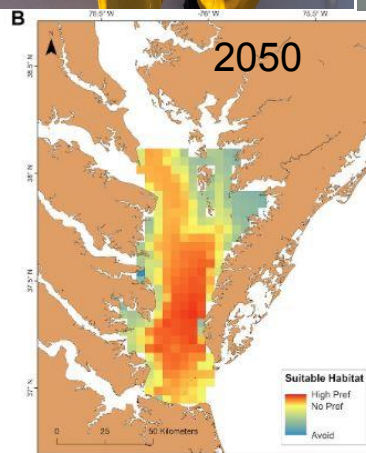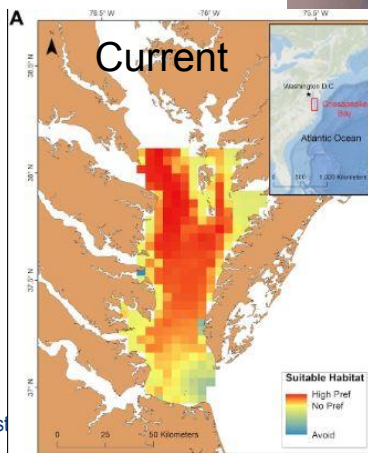
Chesapeake Bay Telemetry Efforts

1. Climate-projected distribution models for Chesapeake Bay—NCCOS

2. Fish movement across natural and restored environments—NCCOS & NCBO

3. Demonstrating the value of Chesapeake Bay arrays in collaboration with fish taggers—NCBO

10 active public projects

Climate-projected distribution models

Project Team: Bethany Williams (NCCOS), Matt Kendall (NCCOS), Bri Cahill (NCCOS), Jason Spires(NCCOS), Jake Shaner (NCCOS), Bruce Vogt (NCBO), Wilmelie Cruz-Marrero (NCBO), Marjy Friedrichs (VIMS), Pierre St. Laurent (VIMS), Matt Ogburn (ACT), Kim Richie (ACT)

- Use acoustic telemetry to develop current striped bass and red drum distribution model throughout Chesapeake Bay

- Pair model with climate projections of Chesapeake Bay to project future species distributions

- PI Bethany Williams (bethany.williams@noaa.gov)

Crear et al. 2020
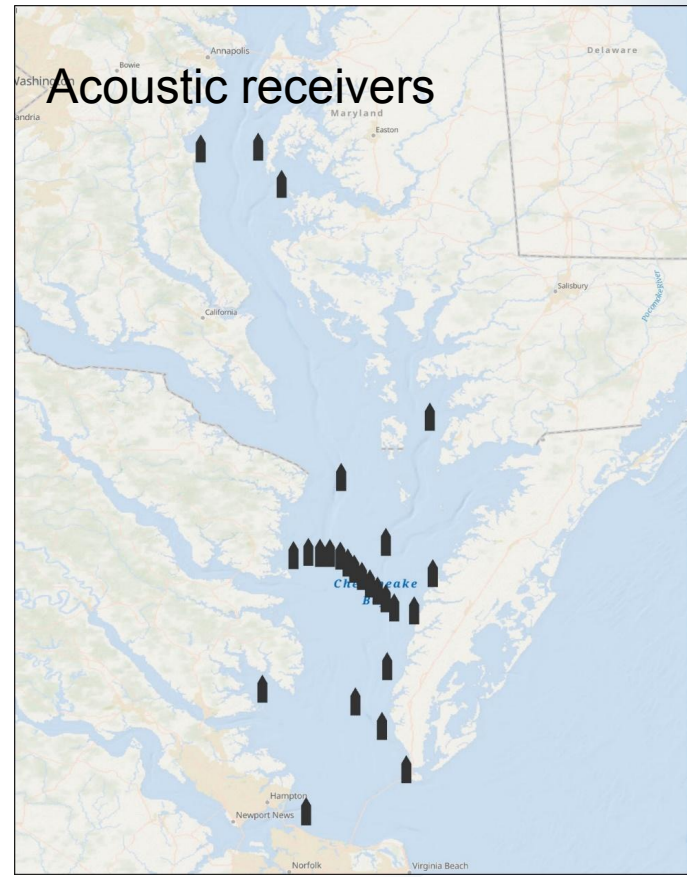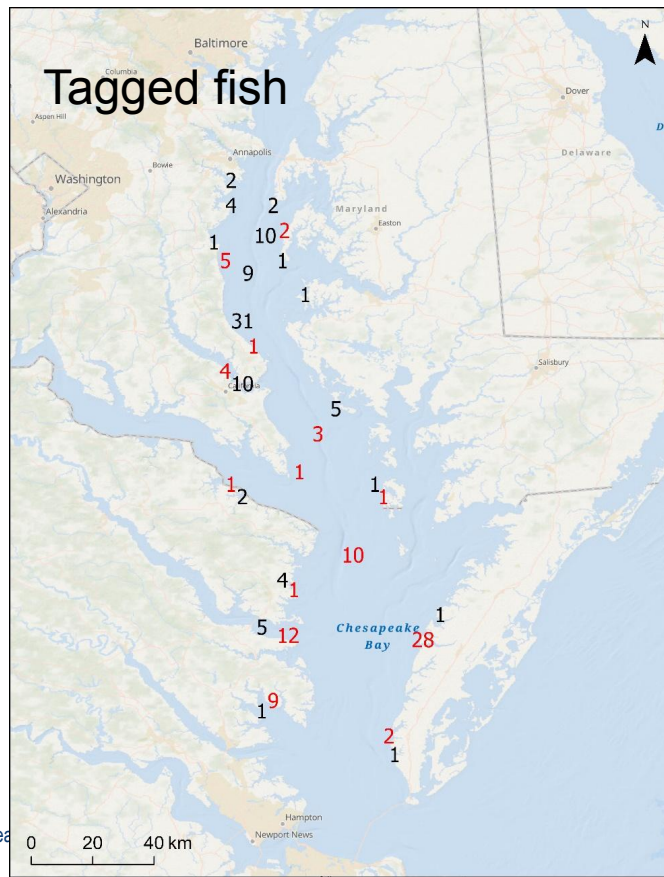
Climate-projected distribution models for Chesapeake Bay
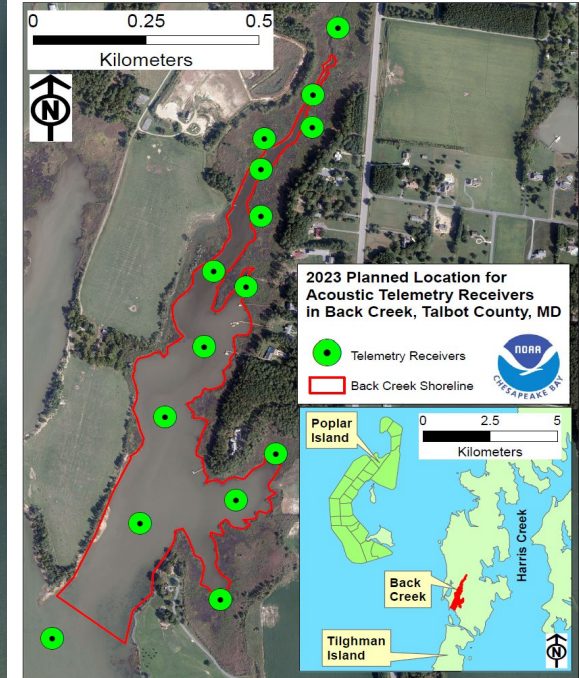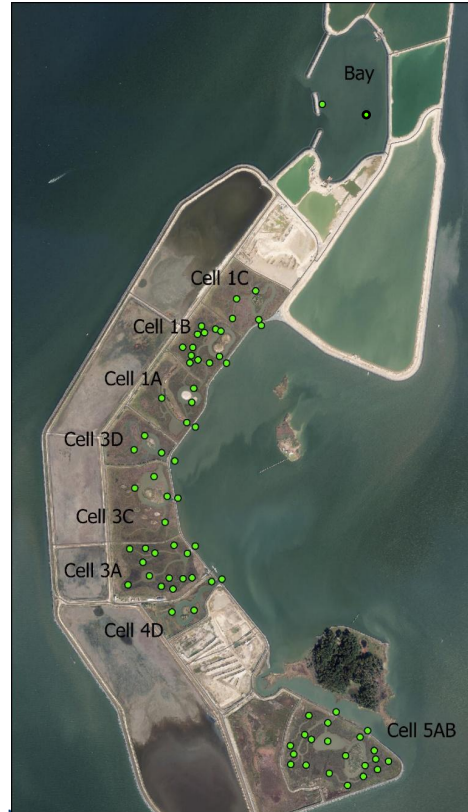

2024 – 82 tags
2025 – 50 tags

2024 – 80 tags
2025 – 50 tags

bethany.williams@noaa.gov
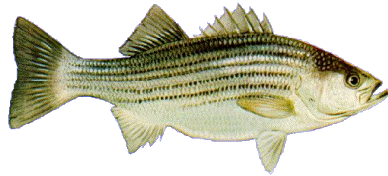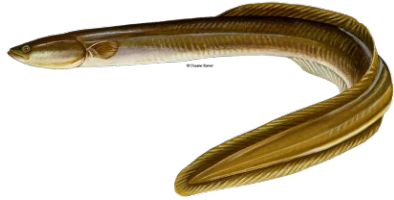
Informing marsh restoration design at Poplar Island and reference site

Project Team: Matt Kendall (NCCOS), Bethany Williams (NCCOS), Bri Cahill (NCCOS), Jason Spires (NCCOS), Jake Shaner (NCCOS), David Bruce (NCBO), Wilmelie Cruz-Marrero (NCBO), Willem Roosenberg (Ohio Univ.), Kelsey Krumm (Ohio Univ.), Matt Ogburn (ACT), Kim Richie (ACT)

- Determine how fish use restored marshes
- Inform restoration design, culvert type, habitat preferences
- Companion study led by NCBO—comparing fish movements in restored and natural marshes
- Collaboration with University of Ohio, SERC, USACE, ACT Network

Target species

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service
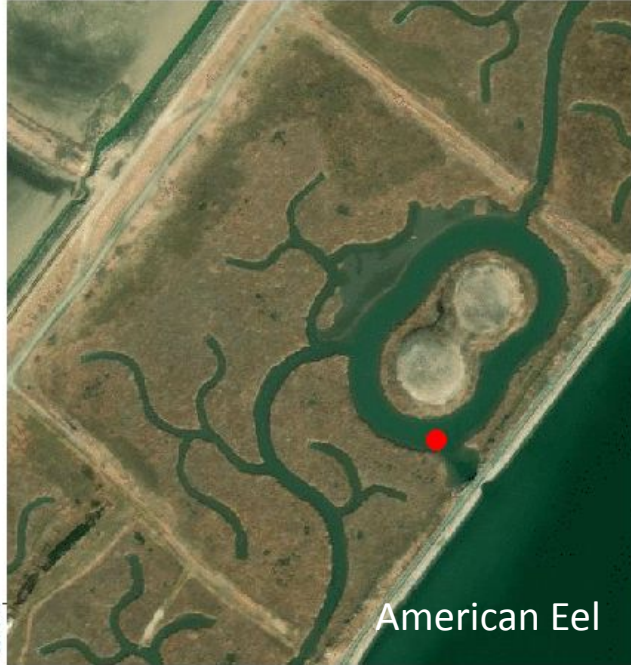
Informing marsh restoration design at Poplar Island

2023-05-28 00:01:51 UTC

American Eel
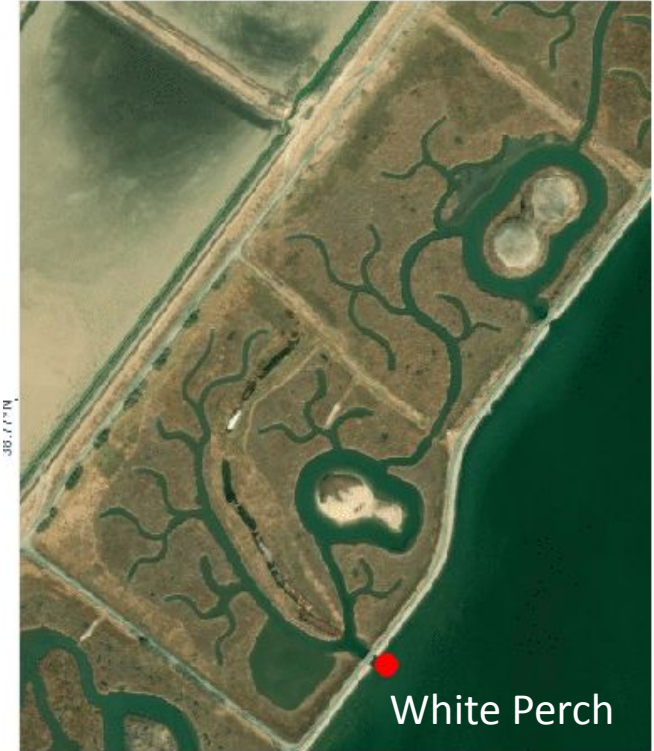
2023-07-27 00:01:19 UTC

Gizzard Shad

2023-05-23 00:11:20 UTC

White Perch

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

NOAA FISHERIES

Chesapeake Bay passive acoustic telemetry arrays

A. Northern Array

- MD DNR—Chuck Stence /Ashlee Horne

B. Mid Bay Array

- CBL—Dave Secor, Mike O'Brien

C. Southern Array

- VMRC—Ethan Simpson

D. Chesapeake Bay Interpretive Buoy System (CBIBS)

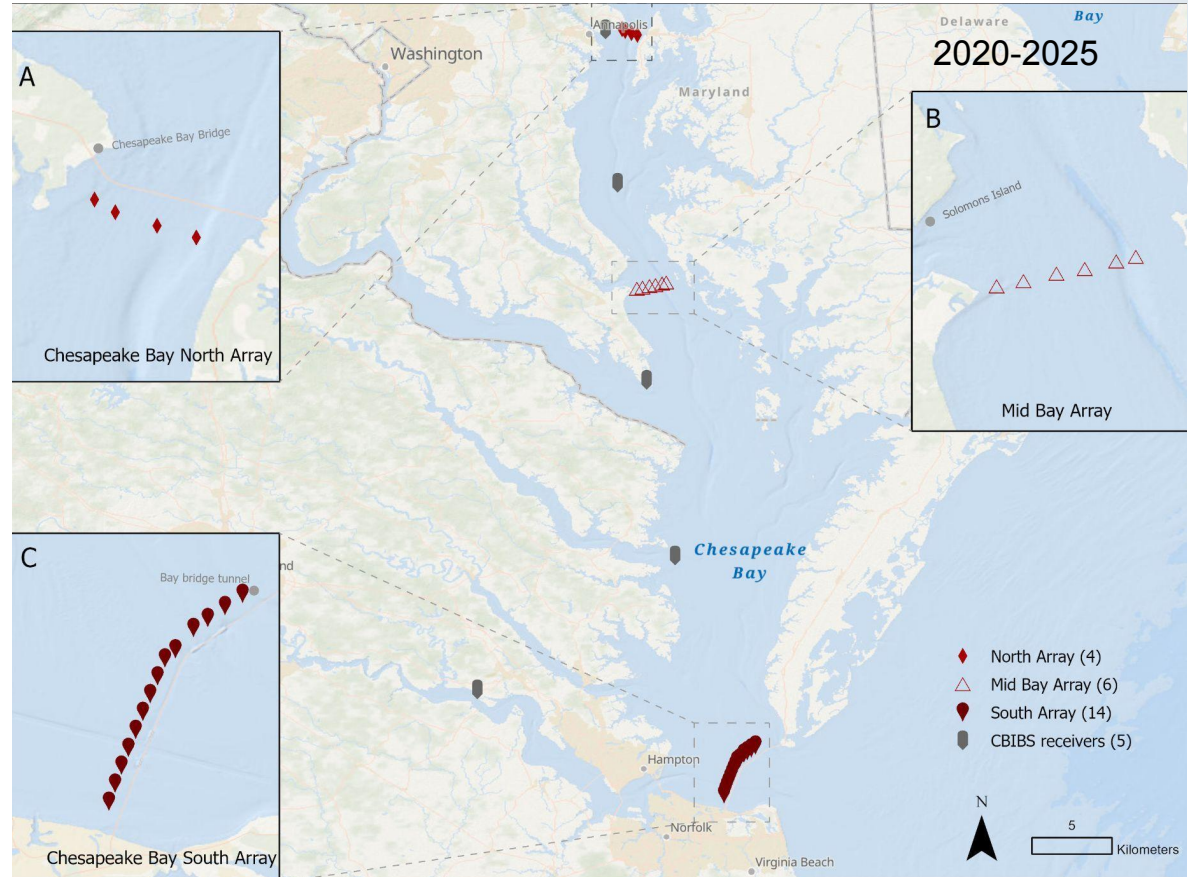U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service
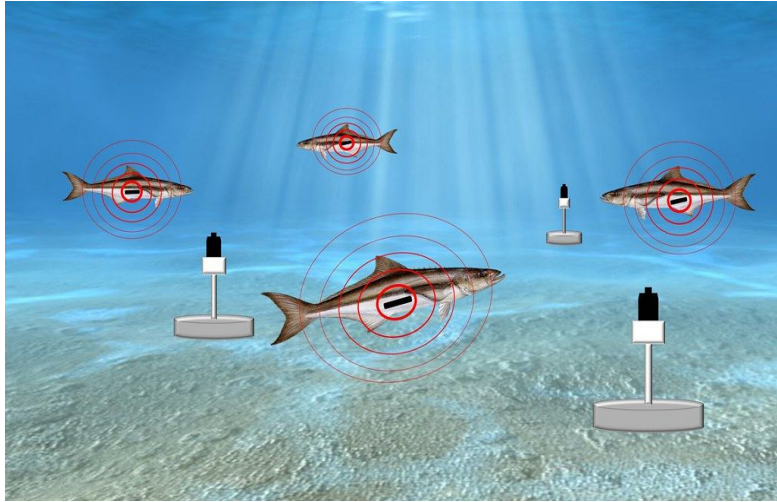
Chesapeake Bay arrays

Demonstrate the value

- Demonstrate the power of cross-network collaboration
- Species preferences, seasonal timing, and connectivity patterns that could be translated into management implications
- Highlighting the arrays' value to institutions and Chesapeake Bay

Observations in the Chesapeake arrays

Florida Fish and Wildlife Conservation Commission, CC/Flickr.

Data from 60 fish taggers 2020–2024
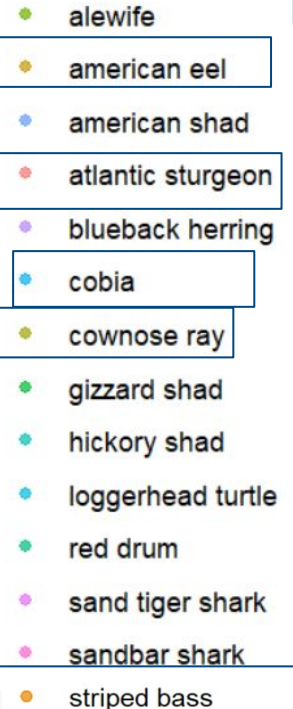
- **Total fish detected 965 in ~300,000 detections**
- ~20 species
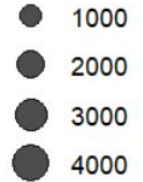- 3 species constituted 75% of the observations

Results: Yearly fish detections
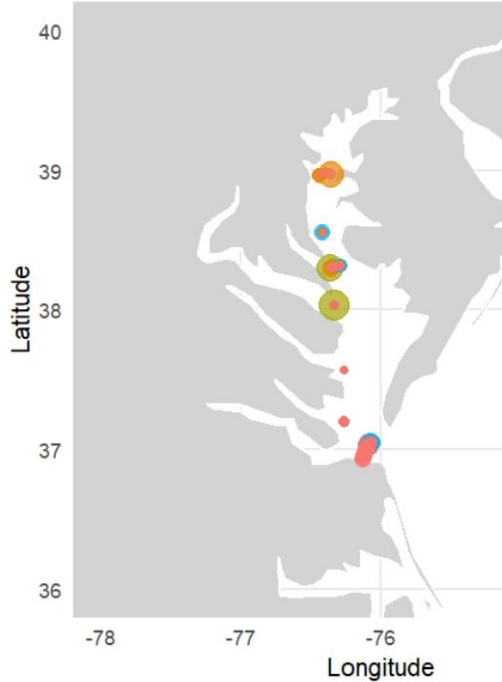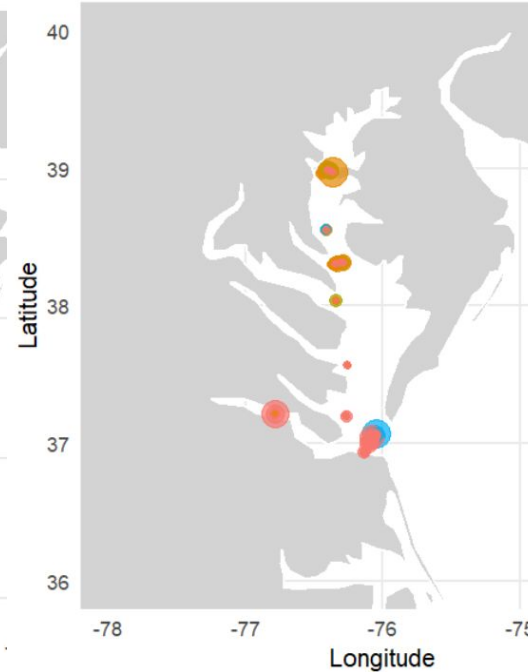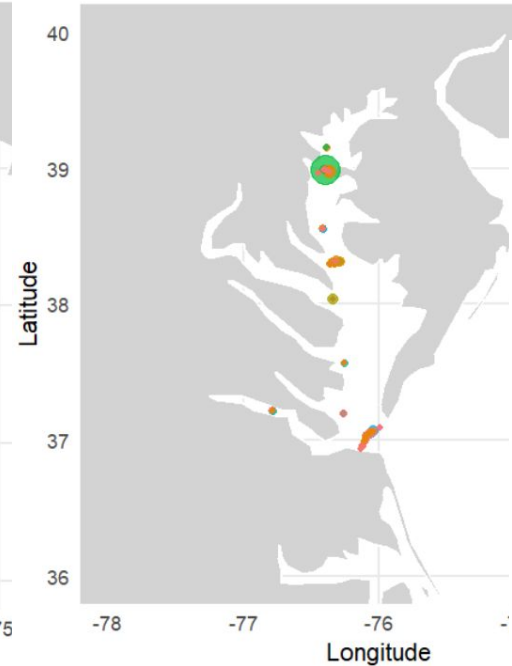

Ches Bay Detections - 2021

Ches Bay Detections - 2022

Ches Bay Detections - 2023

Total Detections
- 1000
- 2000
- 3000
- 4000

Species
- alewife
- american eel
- american shad
- atlantic sturgeon
- blueback herring
- cobia
- cownose ray
- gizzard shad
- hickory shad
- loggerhead turtle
- red drum
- sand tiger shark
- sandbar shark
- striped bass

Acknowledgement: ACT network and Chesbay fish taggers

Future goals

Creating long-term connections to support Chesapeake Bay fisheries

- Strengthening partnerships and focus on the connectivity of the projects for future developments
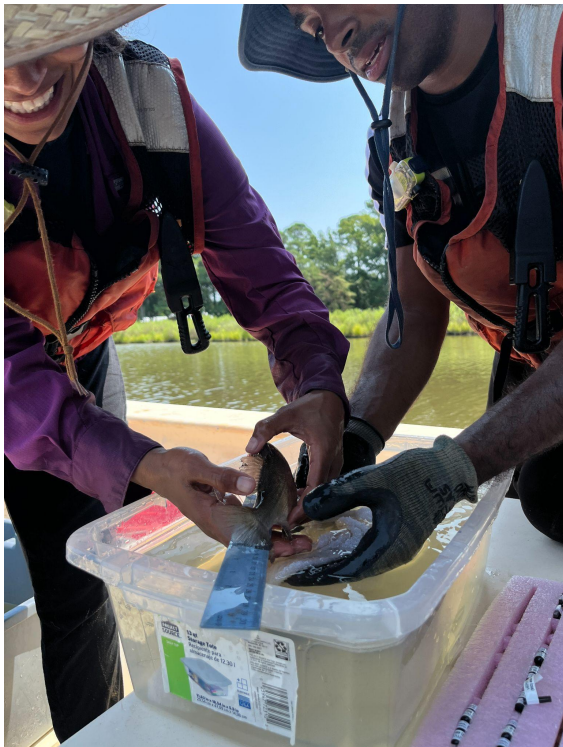
- Analyzing and creating data products for use in Chesapeake Bay seasonal summaries, Mid-Atlantic State of the Ecosystem Report, and to support management strategies

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

NOAA FISHERIES

¡Gracias!

Further questions: wilmelie.cruz@noaa.gov

- NCBO: Anthony Johnson II, Max Ruehrmund

- Interns: Catherine Carrion, Emma Vernade, Oliver Sojka

- ACT: Kim Richie and Matt Ogburn

- UMCES: Dave Secor and Mike O'Brien

- MD DNR: Chuck Stence and Ashlee Horne

- VMRC: Ethan Simpson, Margaret Withmore

- UMES: Stephen Tomasetti & Justine Whitaker

- NCCOS: bethany.williams@noaa.gov,

matt.kendall@noaa.gov USACE

NCCOS