Using acoustic telemetry to project fish distributions in Chesapeake Bay due to climate change to support NOAA's Climate Ecosystems and Fisheries Initiative

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Using acoustic telemetry to project fish distributions in Chesapeake Bay due to climate change to support NOAA's Climate Ecosystems and Fisheries Initiative

Objectives

- Use acoustic telemetry to develop current species distribution model throughout Chesapeake Bay
- Pair model with climate projections of Chesapeake Bay to project future species distributions

Partners

- NOAA Chesapeake Bay Office
- VIMS
- Atlantic Cooperative Telemetry Network

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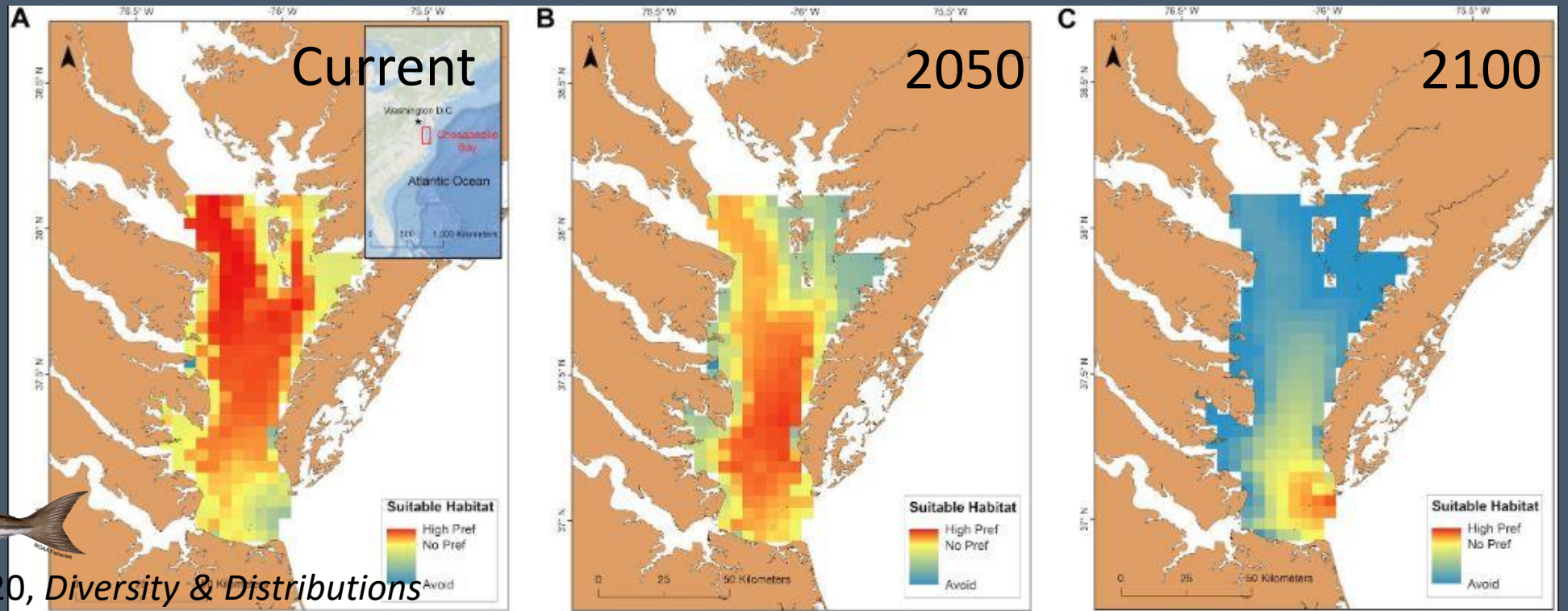
Species of Interest

- Important fisheries in Chesapeake Bay
- Move seasonally in response to environmental cues
- Historically established species and a climate migrant/expanding species
- Limited fisheries independent data on red drum in Chesapeake Bay

Photo Credit: Steve Griffin

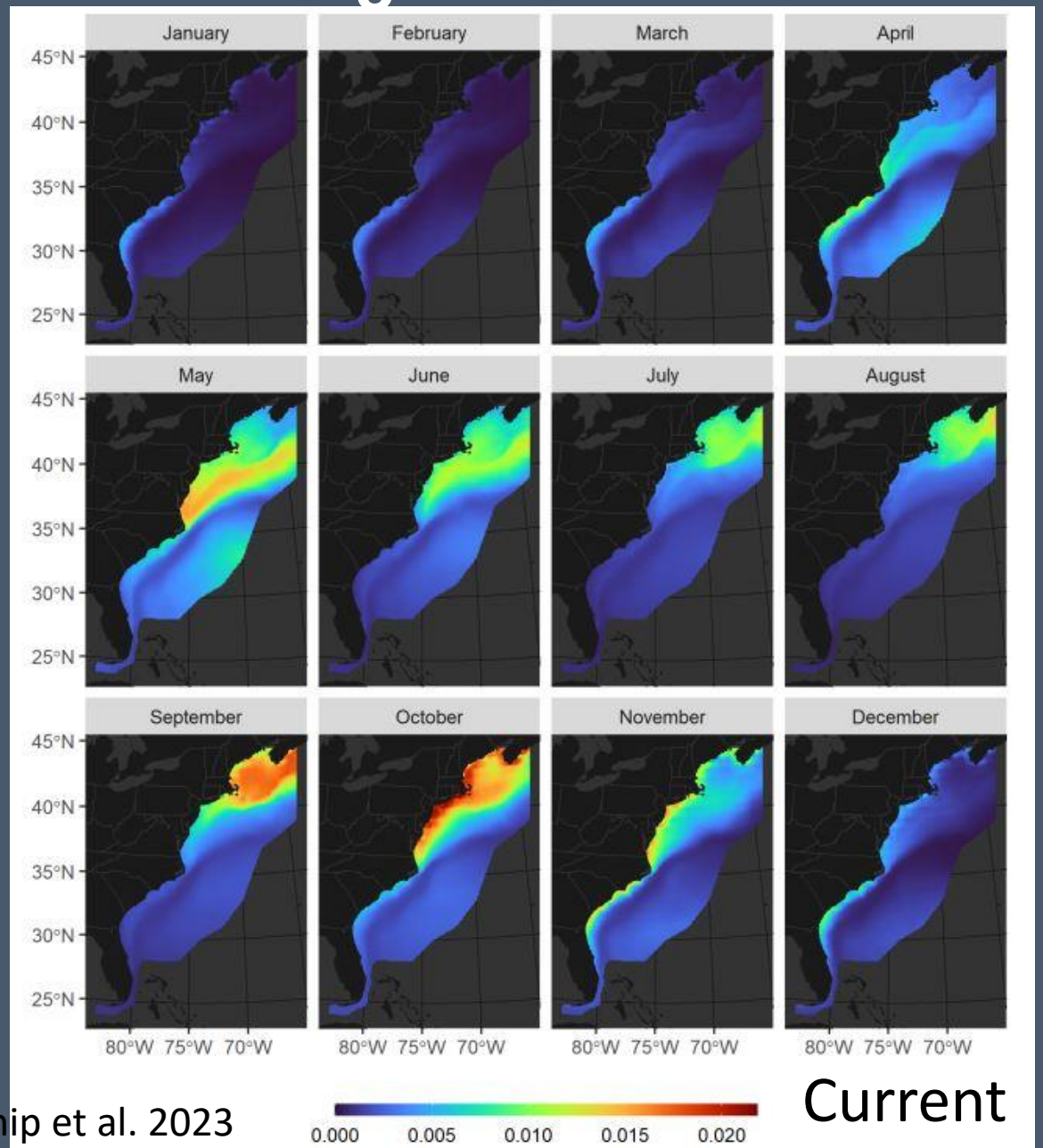
Projecting species distributions in Chesapeake Bay due to climate change

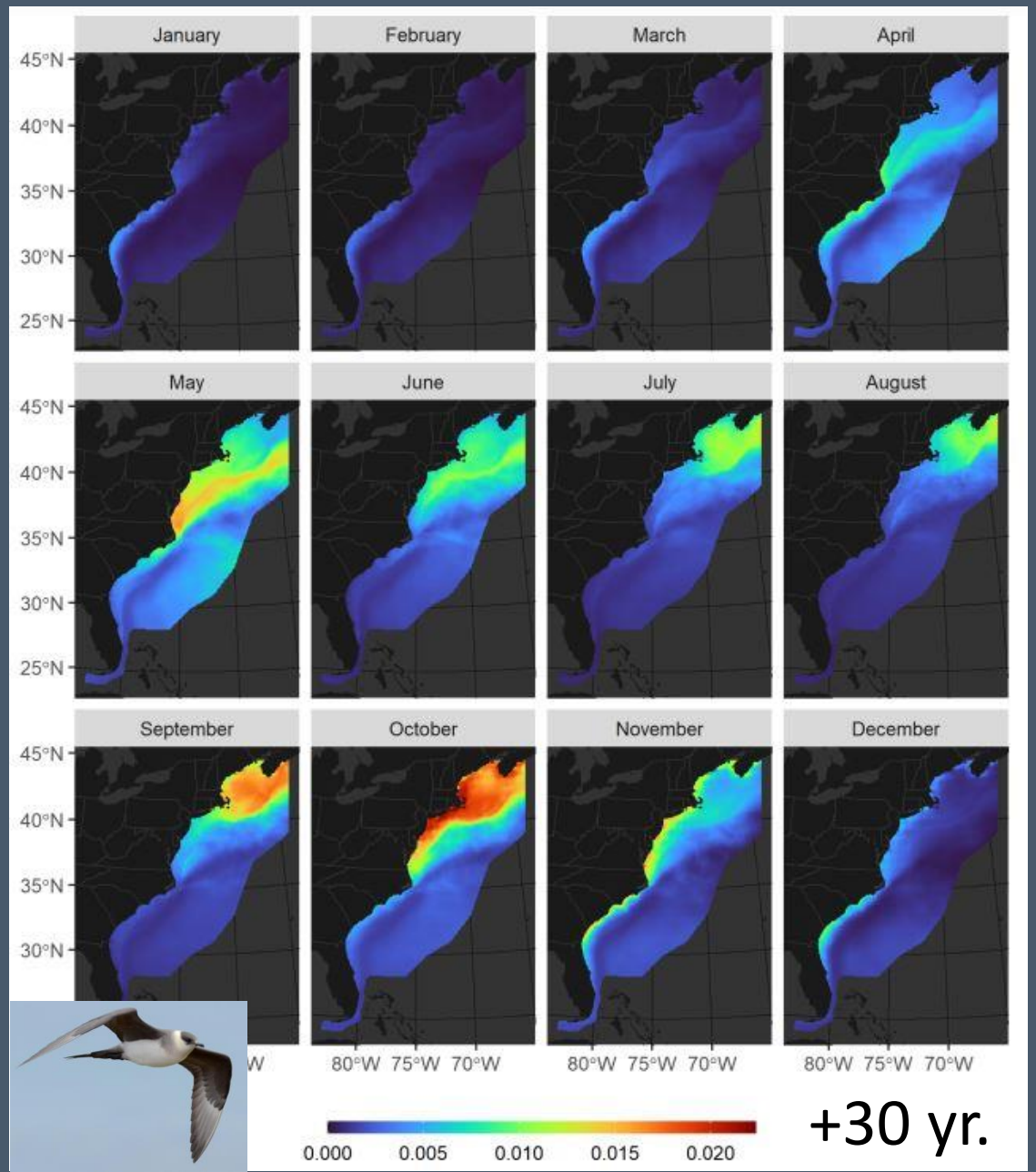
- Build statistical model relating fish occurrence to environmental variables
- Map distributions based on current environmental conditions
- Project distributions into the future using climate modeled conditions



Crear et al. 2020, *Diversity & Distributions*

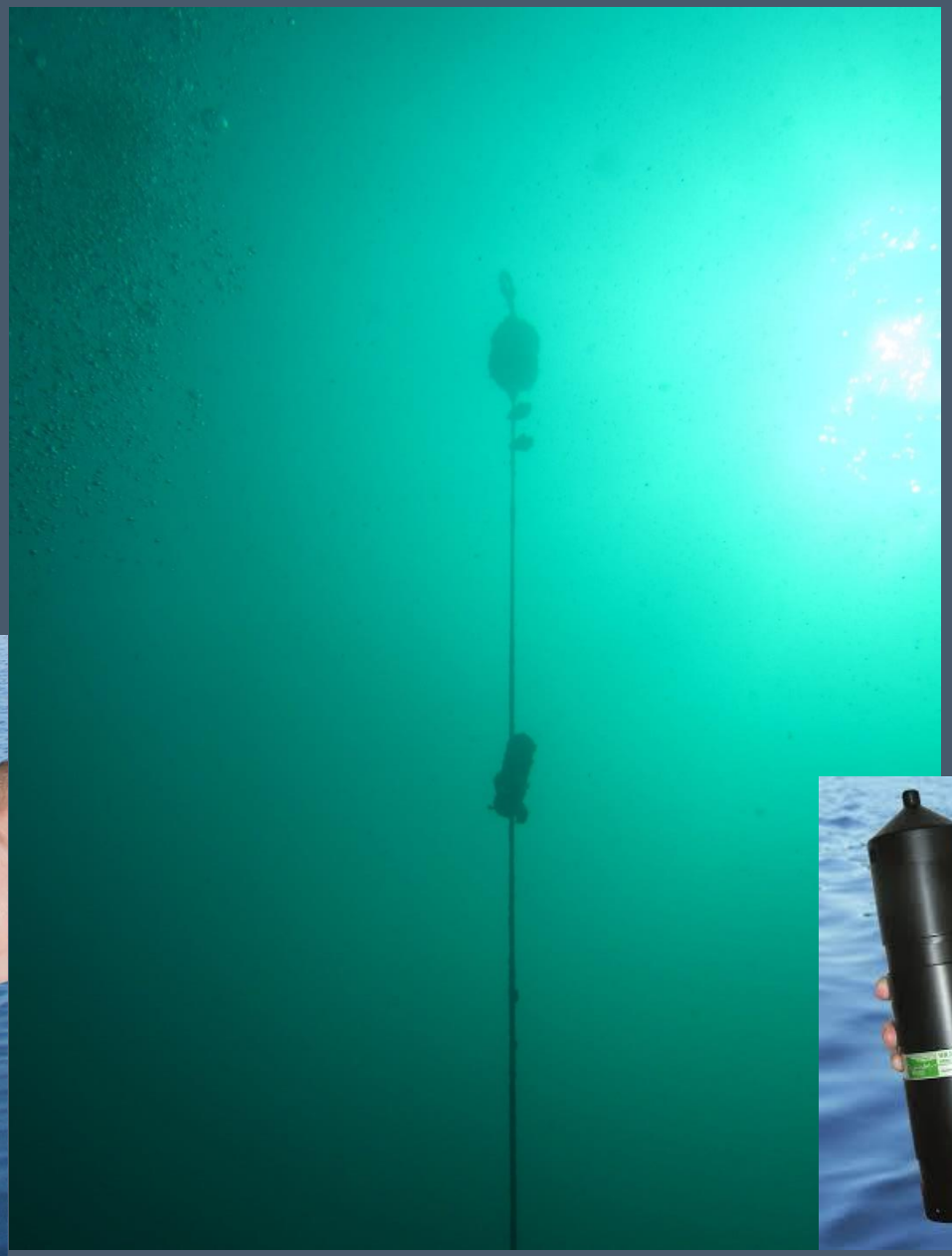
Projecting species distributions in Chesapeake Bay due to climate change



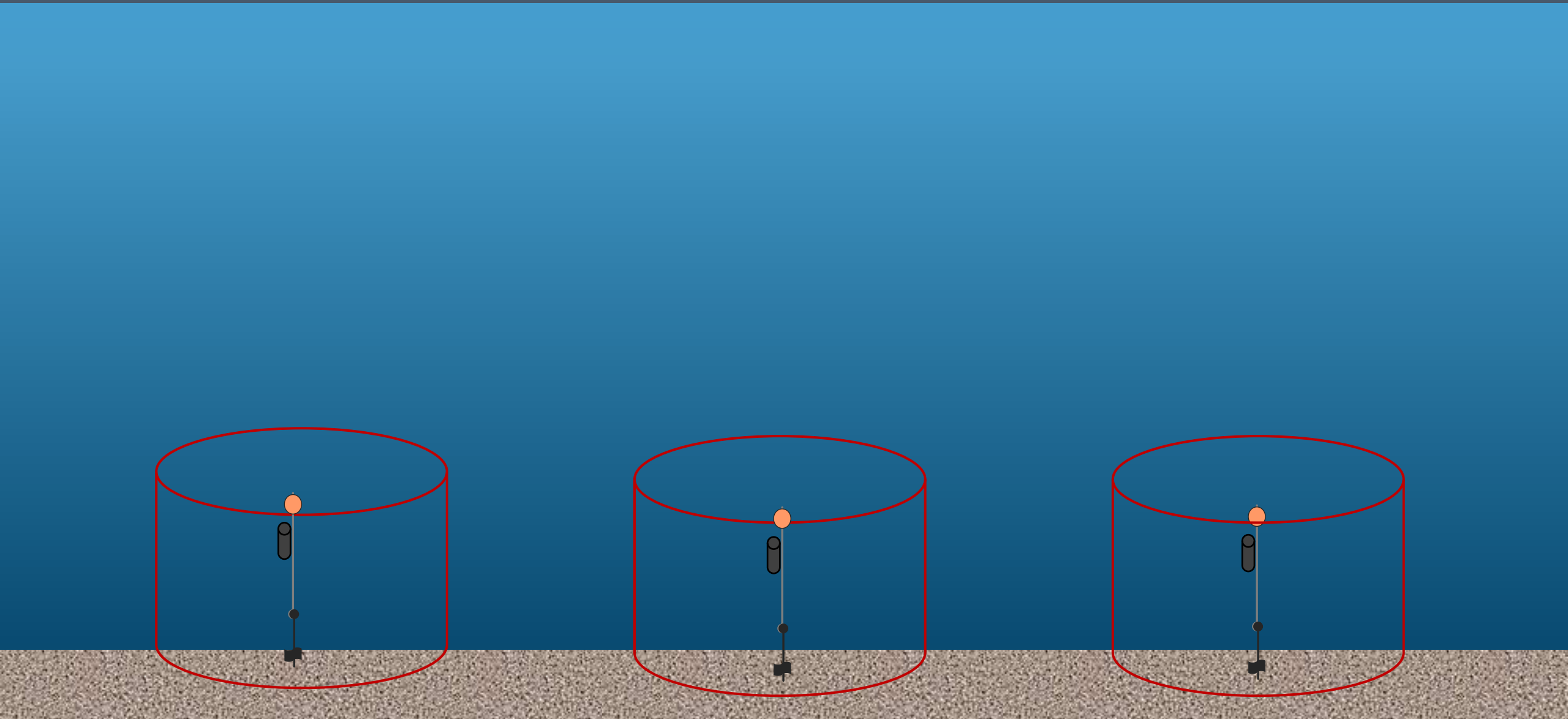


Winship et al. 2023

Acoustic Telemetry

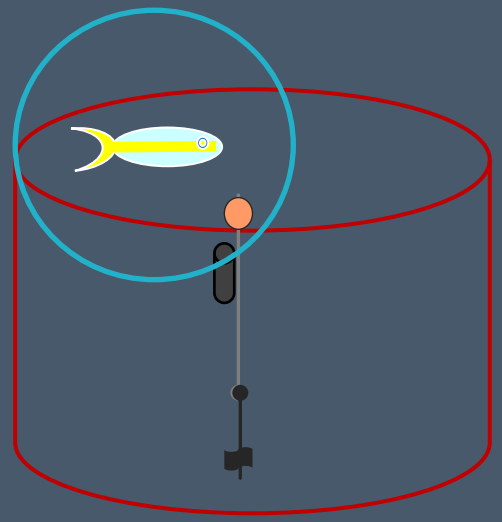


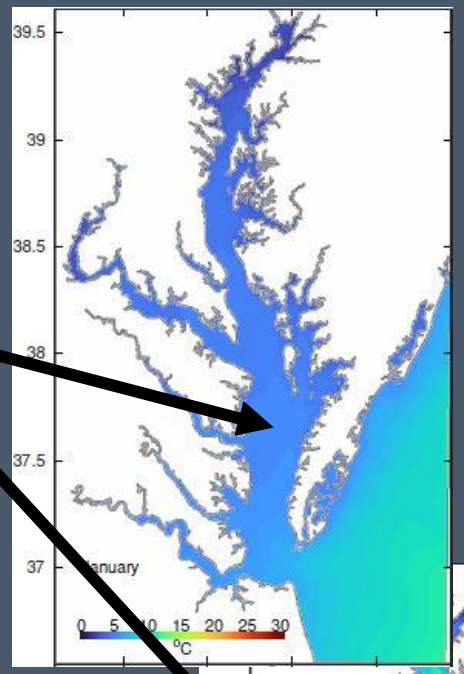
Acoustic Telemetry

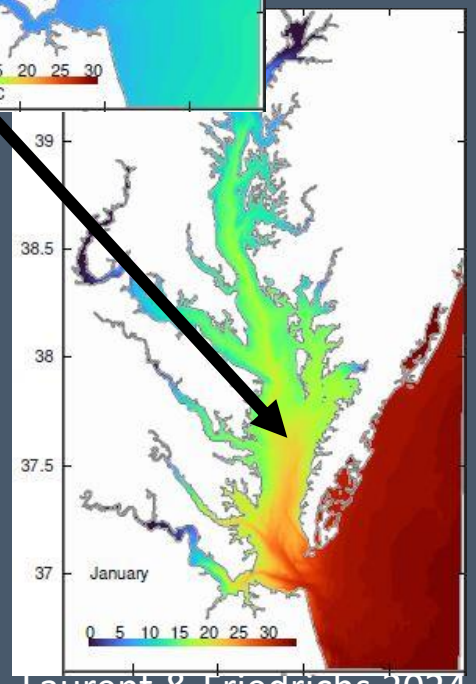


Using acoustic telemetry to project fish distributions in Chesapeake Bay

Lat/Long
Date/Time
Fish ID & presence







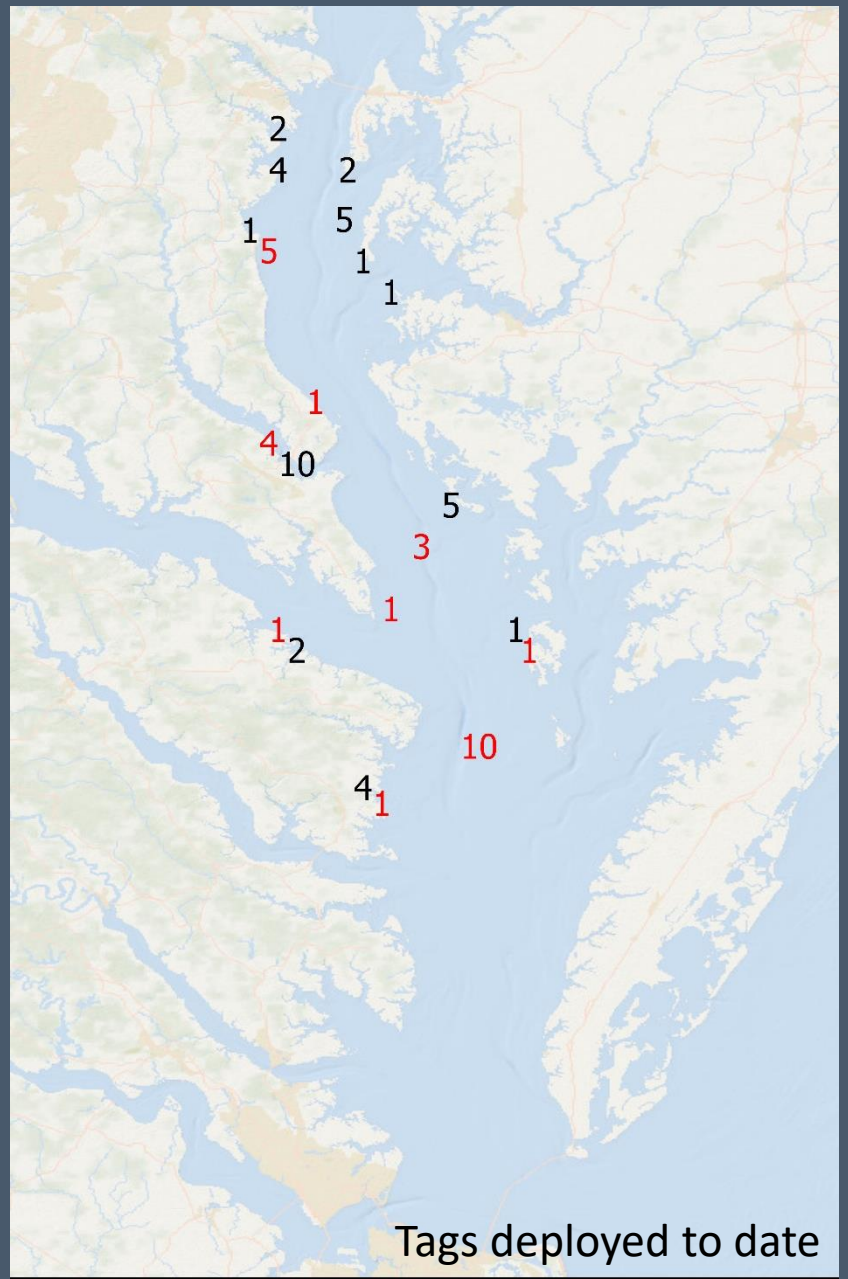
Statistical model of fish occurrence

St. Laurent & Friedrichs 2024

Using acoustic telemetry to project fish distributions in Chesapeake Bay

- Tag small and large striped bass and red drum throughout Chesapeake Bay
- Innovasea V9 tags with temperature and depth sensors, 2 year life
- 81 tags/species in 2024

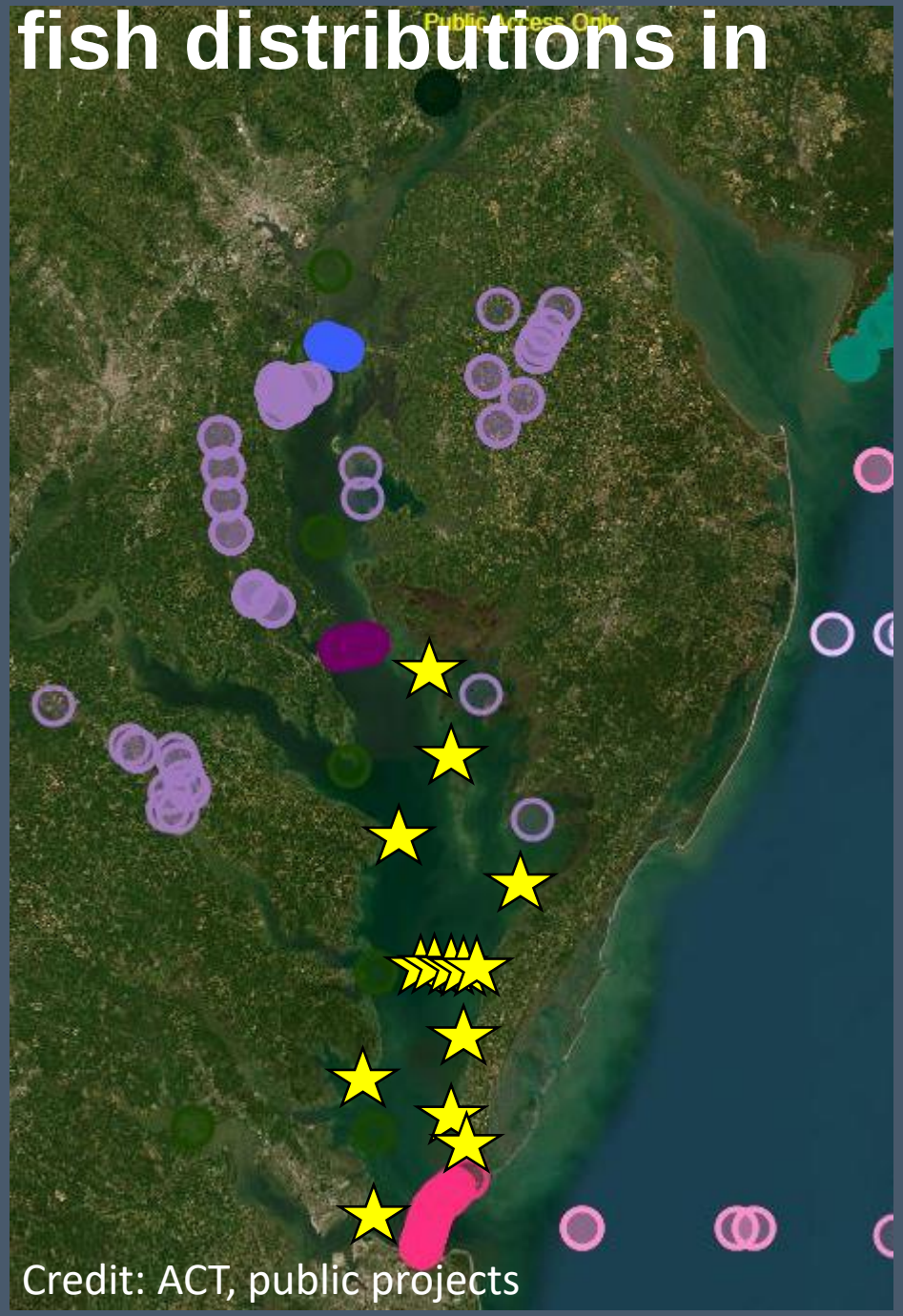
	Small striper	Big striper	**All striper**	Small red	Big red	**All red**	**All**
North Bay	16	15	**31**	16	0	**16**	**47**
Mid Bay	22	15	**37**	7	14	**21**	**58**
South Bay (West)	7	0	**7**	20	0	**20**	**27**
South Bay (East)	6	0	**6**	20	4	**24**	**30**
All	51	30	**81**	63	18	**81**	**162**



Tags deployed to date

Using acoustic telemetry to project fish distributions in Chesapeake Bay

- Existing coverage through Atlantic Cooperative Telemetry Network (ACT)
- Adding 26 receivers throughout the bay
- Cover range of environmental conditions



Credit: ACT, public projects

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Timeline

Time period	Activity
Summer/Fall/ 2024	Tagging ~160 fish Receiver deployments
Spring 2025	Receiver downloads
Summer/Fall 2025	Tagging ~80 fish Receiver downloads
Spring 2026	Receiver downloads
Fall 2026	Receiver downloads
Spring 2027	Receiver downloads Model predictor development
Fall 2027	Final download and receiver retrieval Model development
Spring 2028	Final model development
Fall 2028	Finalize deliverables

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Questions & Discussion

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Photo Credit:
Steve Griffin