Documenting the spatial and temporal distribution of Atlantic Sturgeon in RI using acoustic arrays

Rhode Island Marine Fisheries Institute (RIMFI) - Fall Meeting

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Eric Schneider[1] & James Miller[2]

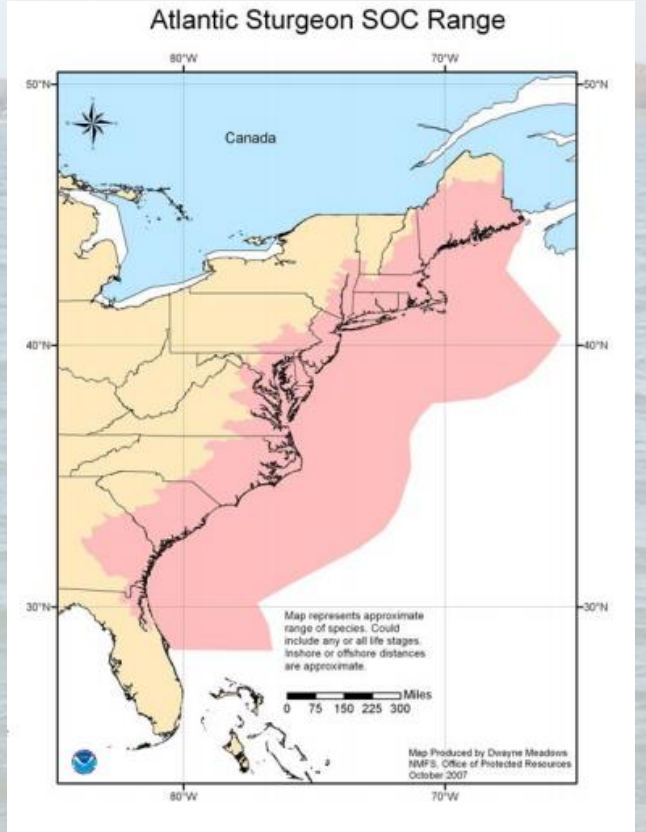
[1]RI DEM, Division of Marine Fisheries
[2]University of Rhode Island, Department of Ocean Engineering

Background

- Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are one of the largest and longest-lived anadromous fish in North America.

- They can live up to 60-years, grow to 14 feet (4.3 m) long, and weigh up to 800 pounds (370 kg).

- A. sturgeon spend most of their life in marine waters, and make seasonal migrations to spawning and foraging grounds throughout their range (Labrador, Canada to St. Johns River, FL).

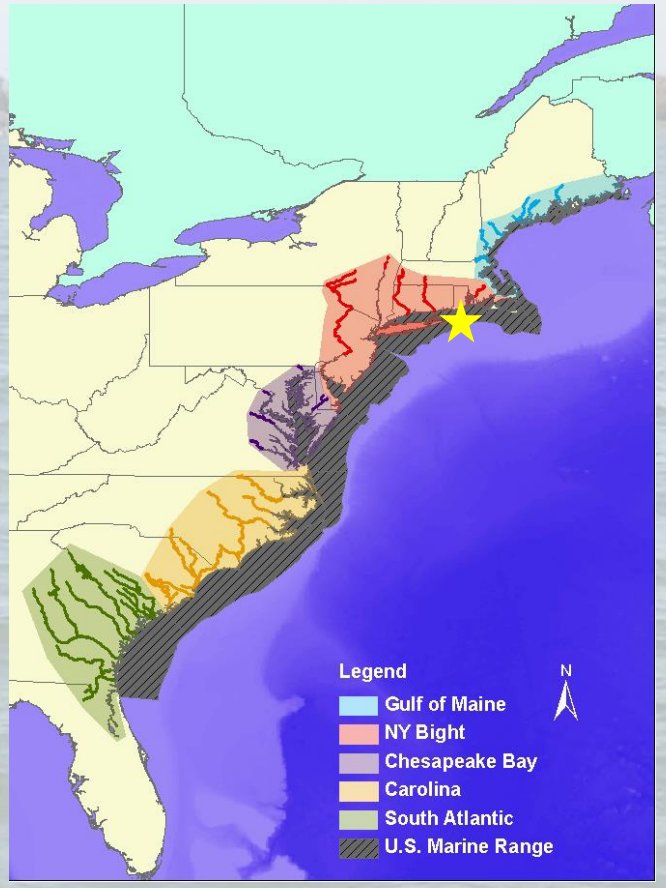


Background

- In 2012 NOAA Fisheries determined that 4 of 5 Distinct Population Segment (DPS) were endangered
  - New York Bight ,
  - Chesapeake Bay,
  - Carolina, and
  - South Atlantic DPS.
  - listed Gulf of Maine DPS as threatened

- In RI, state listed as a species of concern and Species of Greatest Conservation Need (SGCN) in the RI State Wildlife Action Plan.

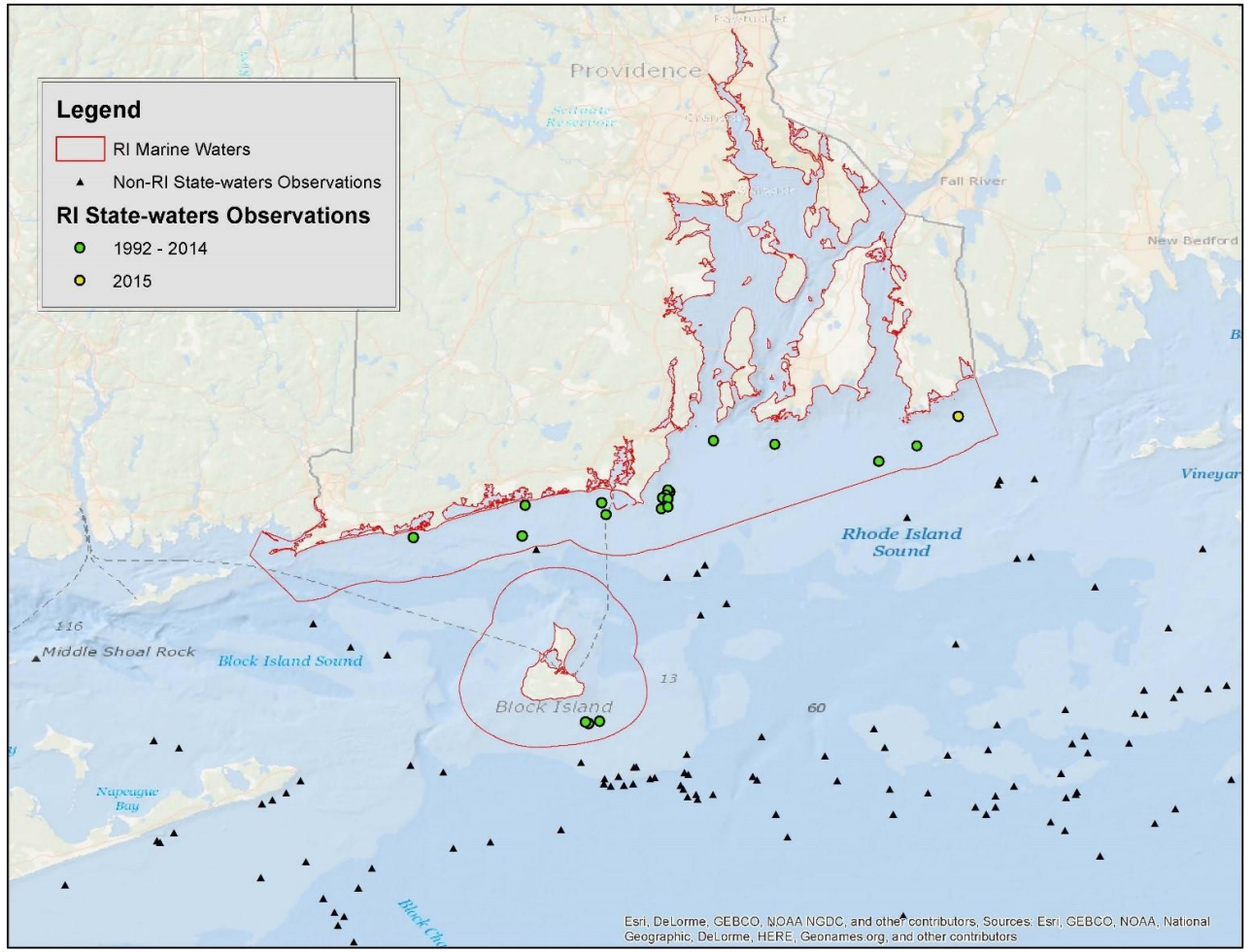
- Primary threats to the recovery include bycatch mortality, ship strikes, and habitat loss and degradation.



Problem

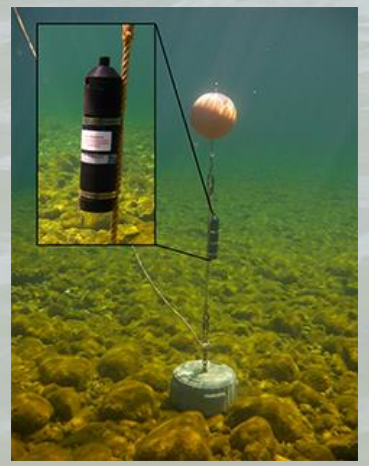
- To effectively manage this listed species, and meet our obligations under the ESA, we need to understand the seasonal timing and corridors used for migration, as well as areas that may provide habitat for foraging.

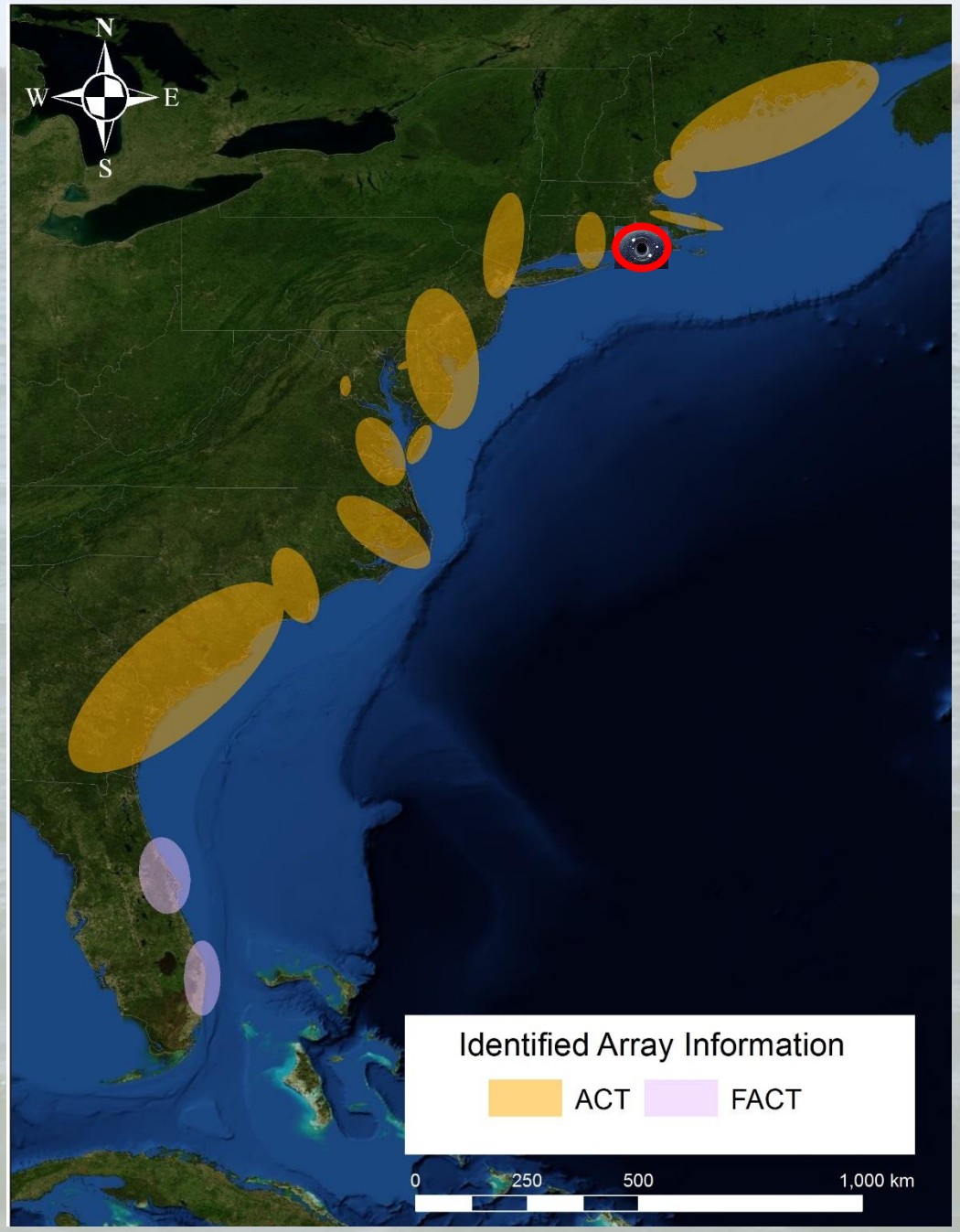
- Problem is - we don't know a lot about how A. sturgeon are using areas and habitats within Rhode Island state waters.



Approach - General

- “Listen careful and you’ll hear them”
- In the last 10 years, >1,331 sturgeon have been acoustically tagged and detected by arrays of acoustic receivers located in coastal waters that are part of the Atlantic Cooperative Telemetry (ACT) Network
- RI waters currently a “black hole” in the telemetry network along the coast





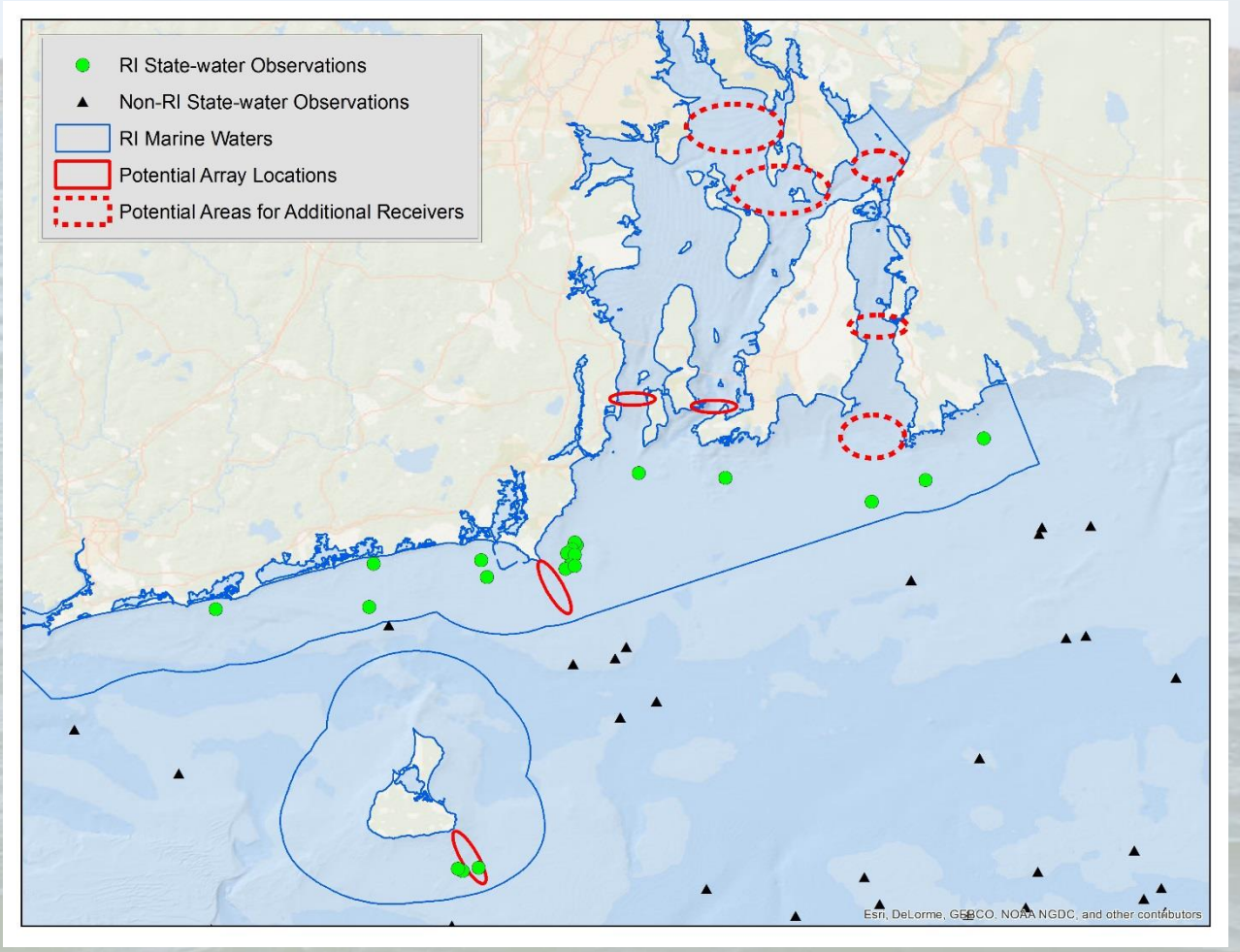
Approach - Goals

Goal: Document the spatial and temporal distribution of A. sturgeon in RI waters.

Obj 1: Design and construct a series of acoustic arrays.

Obj 2: Conduct sensitivity testing to determine the effects of seasonal and environmental aspects on tag detection.

Obj 3: Use tag return data generated from the arrays to determine how A. sturgeon are using areas and habitats within RI state waters.



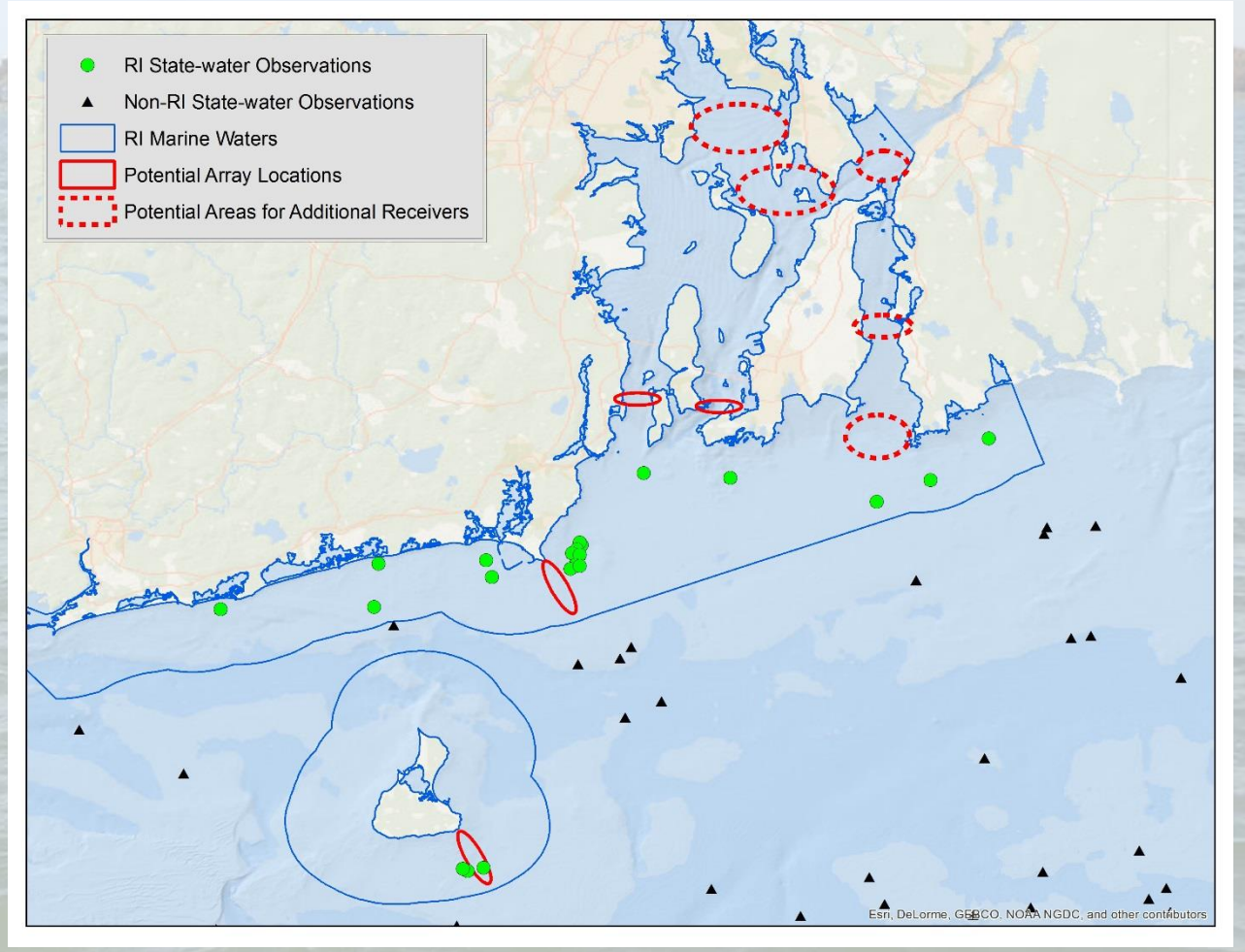
Note: we will only be listening, not tagging as part of this work

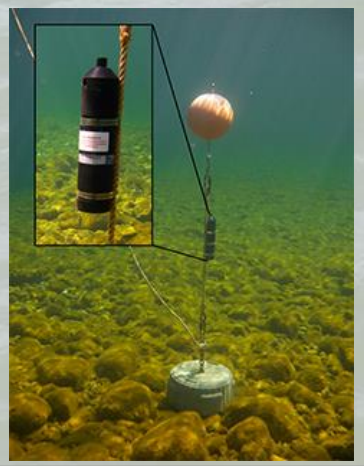
Right now, not us →

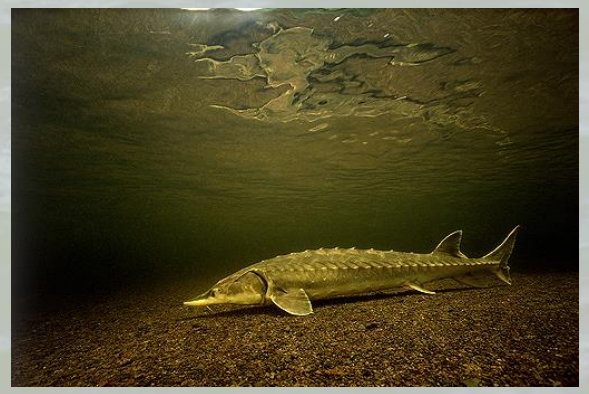
Design Aspects

Design of acoustic arrays

- Location & configuration v. important
- Need to consider both sturgeon related aspects, as well other uses that could result in loss of equipment or lower quality data (fishing, shipping, noise, etc.)



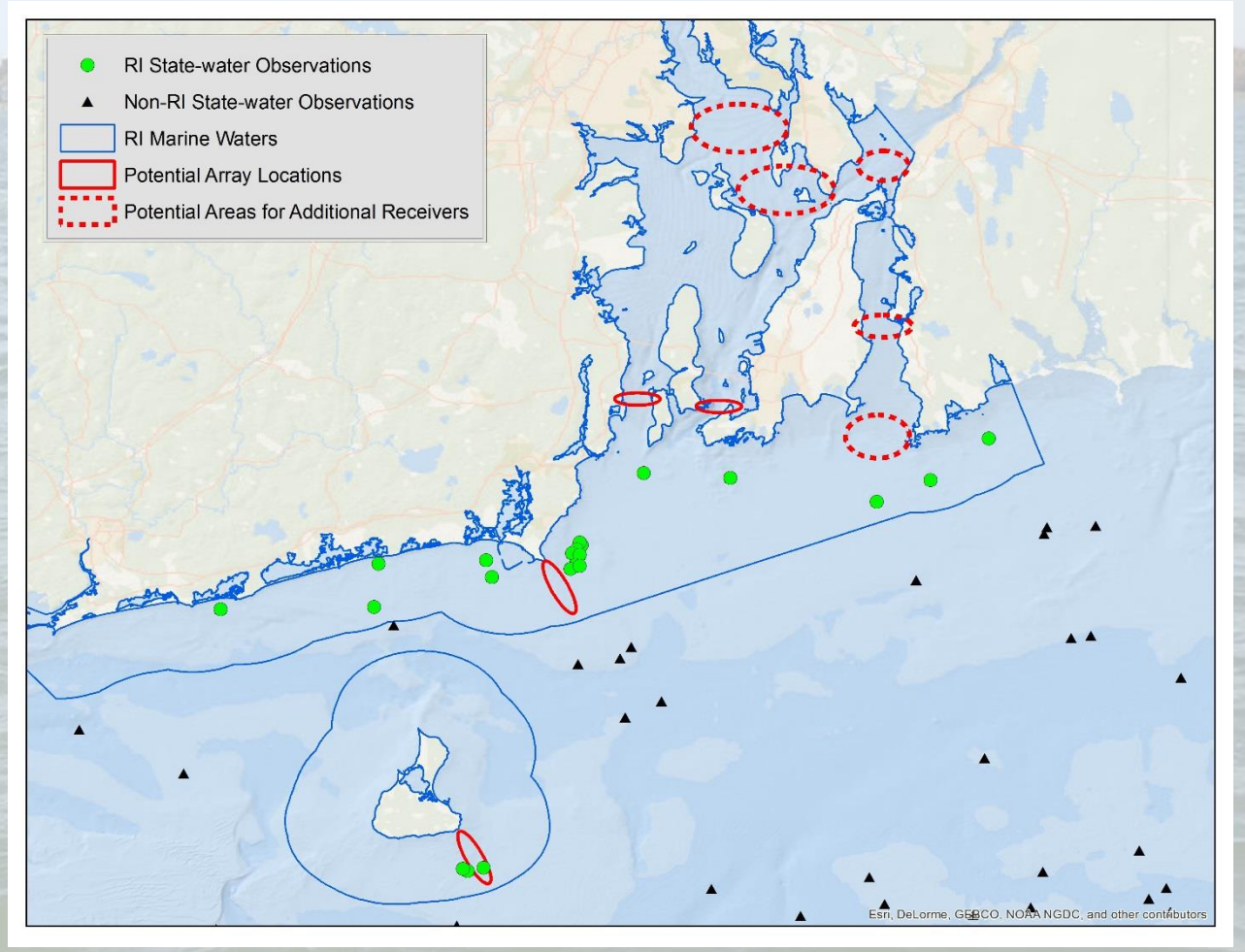


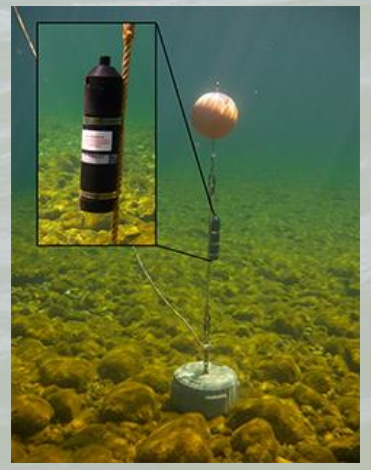


Design Aspects

Sensitivity testing - effects of seasonal and environmental aspects on tag detection

- We plan to generate detectably estimates for each array, to improve the confidence in the estimates of sturgeon in RI waters.
- Most A. sturgeon tags set to ping at a random interval b/w 1 and 180 sec





Expected Results

- Provide valuable & contemporary information regarding when and how A. sturgeon use areas and habitats within RI state waters.

- Improve estimates for RI's Incidental Take Permit (ITP) under Section 10(a)1(b) of the ESA
  - Evaluate potential impacts and threats to Atlantic sturgeon (ship strikes, bycatch, etc.)
  - May provide another approach for long-term monitoring of A. sturgeon in RI

- Data collected by this project will add to the ACT Network's coast-wide distribution of acoustic arrays and close the current coverage gap around RI
  - Once acoustic arrays are set, pick up anything passing by, therefore broad applicability

Expected Results

- We expect to hear at least a few of these species
- These arrays can be leveraged for future work on other species

Common Name	Number of Researchers Studying the Species
Alewife	2
American Eel	4
American Lobster	1
American Shad	9
Atlantic Bluefin Tuna	1
Atlantic Cod	3
Atlantic Croaker	1
Atlantic Salmon	1
Atlantic Stingray	1
Atlantic Sturgeon	24
Atlantic Torpedo Ray	1
Black Drum	2
Black Sea Bass	1
Blacknose Shark	2
Blacktip Shark	2
Blue Catfish	3
Blue Crab	1
Blue Shark	1
Blueback Herring	2
Bluefish	1
Bluntnose Stingray	2
Bonnethead Shark	2
Brook Trout	1
Bull Shark	2
Bullnose ray	1
Channeled Whelk	1
Clearnose Skate	1
Cobia	1
Common Carp	1

Common Name	Number of Researchers Studying the Species
Common Snook	2
Cownose Ray	2
Diamondback Terrapin	1
Dusky Shark	1
Dusky Smoothhound	1
Finetooth Shark	1
Flathead Catfish	2
Florida Pompano	1
Gag Grouper	1
Grass Carp	1
Great Hammerhead Shark	1
Green Turtle	5
Grey Snapper	2
Gulf Kingcroaker	1
Haddock	1
Hickory Shad	2
Horseshoe Crab	4
Kemp's Ridley Turtle	3
King Mackerel	1
Largemouth Bass	1
Lemon Shark	2
Loggerhead Turtle	5
Manta Ray	1
Northern Diamondback Terrapin	2
Northern Snakehead	2
Not Identified	9
Red Drum	3
Red Snapper	1
Roughtail Stingray	2

Common Name	Number of Researchers Studying the Species
Sand Tiger	5
Sandbar Shark	3
Scalloped Hammerhead	1
Scamp Grouper	2
Sheepshead	2
Shortnose Sturgeon	12
Smooth Butterfly Ray	1
Smooth Dogfish	1
Snowy Grouper	1
Southern Flounder	2
Southern Stingray	1
Spanish Mackerel	1
Speckled Hind	1
Spinner Shark	1
Spiny Butterfly Ray	1
Spiny Dogfish	2
Spot	1
Spotted Seatrout	2
Striped Bass	21
Sturgeon - species not defined	2
Summer Flounder	5
Tarpon	1
Tautog	1
Tiger Shark	2
Tripletail	2
Weakfish	2
White Perch	2
White Shark	1
Winter Flounder	3
Winter Skate	1

Interested in telemetry

- Join the RIMFI Telemetry Working Group
  - goal - allow for feedback on current work, scope future work, or just keep up to speed on collaborative acoustic work in general.

  - Interested – send email to Eric.Schneider@dem.ri.gov

Partners

- RI DEM Div. of Marine Fisheries – Eric Schneider and others (TBD)
- URI Ocean Engineering Program – Dr. Jim Miller, Dr. Gopu Potty, and students
- Atlantic Cooperative Telemetry (ACT) Network

- Funding provided by:

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Questions