Biotelemetry as a Management Tool for Chesapeake Bay Fisheries: *A Brief Overview*

What is biotelemetry?

Using sound or radio signals to monitor the movements or migrations of animals *remotely*, *continuously*, and (we hope) *non-invasively*

Especially useful for 'blackbox' habitats where organisms cannot be tracked visually (i.e., fish in aquatic or marine habitats)

A telemetry system or array consists or one or more transmitters (tags) in or on the organism and one or more *compatible* receivers that may be stationary or mobile

Two basic technologies: Radio *versus* Acoustic

Radio signals travel across the air-water interface, allowing tracking from shore or air, but radio telemetry works only in shallow and fresh aquatic habitats

Recent application: Migration of American shad in the James River fall-zone (Aunins et al. 2012)

Acoustic (sound) signals travel at most salinities and depths and may have much broader application to the assessment and management of Chesapeake Bay fisheries.

Telemetry may be 'active' or 'passive' (trade-offs with either…)

Passive Acoustic Telemetry

Advantages

- long-term and 24/7 deployments possible (…set 'em, forget 'em)
- relatively low labor costs
- collect georeferenced data on wide-ranging, migratory species
- data can be accessed in real-time and with synoptic habitat information
- existing assets are in-place already

Disadvantages

- surgery necessary to implant tags
- relatively coarse spatial resolution (+/- 1 km or so…)
- relatively high capital costs
- *very* large datasets are generated, involving multiple species, investigators, and jurisdictions

Bottom line…. Lots of potential to benefit ecosystem-based fisheries management, but effective *data* management resources (e.g. ACT Network, MATOS) and data sharing agreements are necessary

The Atlantic Cooperative Telemetry Network

Recent Advances in Acoustic Telemetry Technology

Smaller ‘pingers’ (6 x 16 mm; 1 g)

Longer-lived pingers (up to 10 y)

Coded pingers and integrated sensors for depth, water temperature

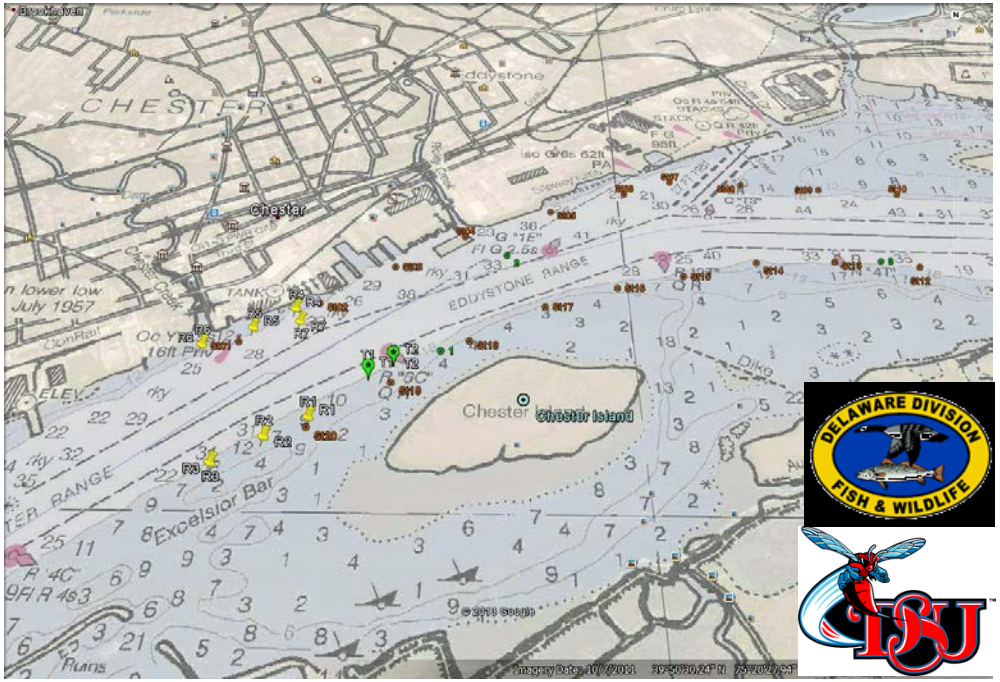
Cost range: about $300 - $700 each

Real-time receivers (VEMCO VR2C) and autonomous gliders with acoustic receivers

Cost range: about $1,500 – quite a lot…

Other Relevant Technologies

Oceanographic buoys that can be paired with acoustic receivers and generate synoptic and realtime data on habitat *and* fish location, e.g. **NOAA CBIBS Program**



VEMCO Positioning System (**VPS**) array that combines passive deployment with better spatial precision

Spring, 2013 use in the Delaware (Matt Fisher and Dewayne Fox; funded by NOAA's Office of Protected Resources)

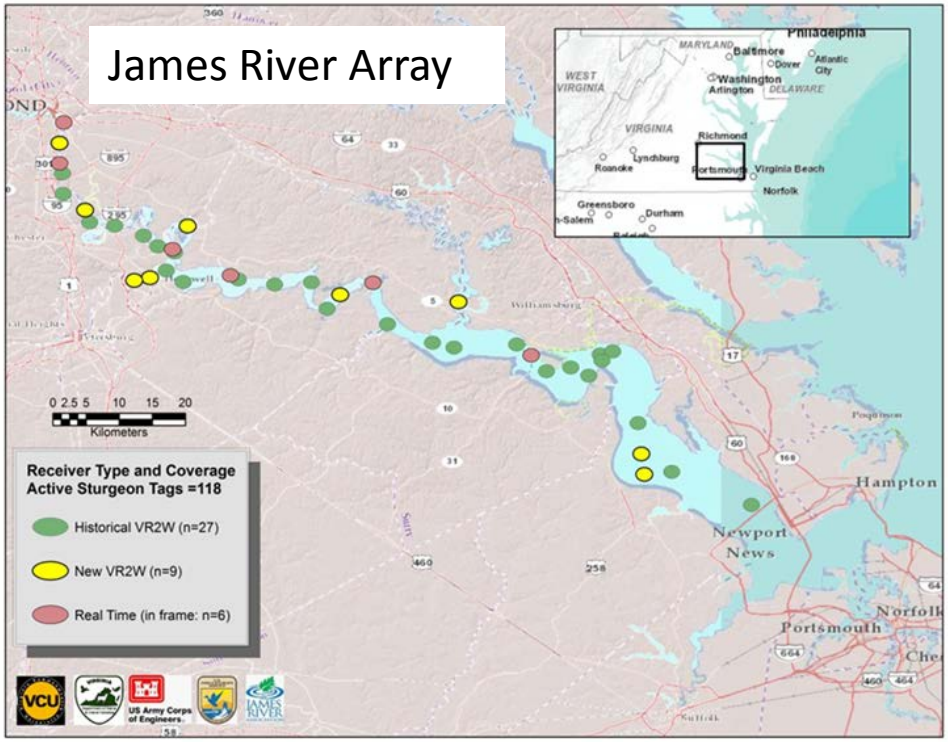
Fall, 2013 deployment by VCU in the James

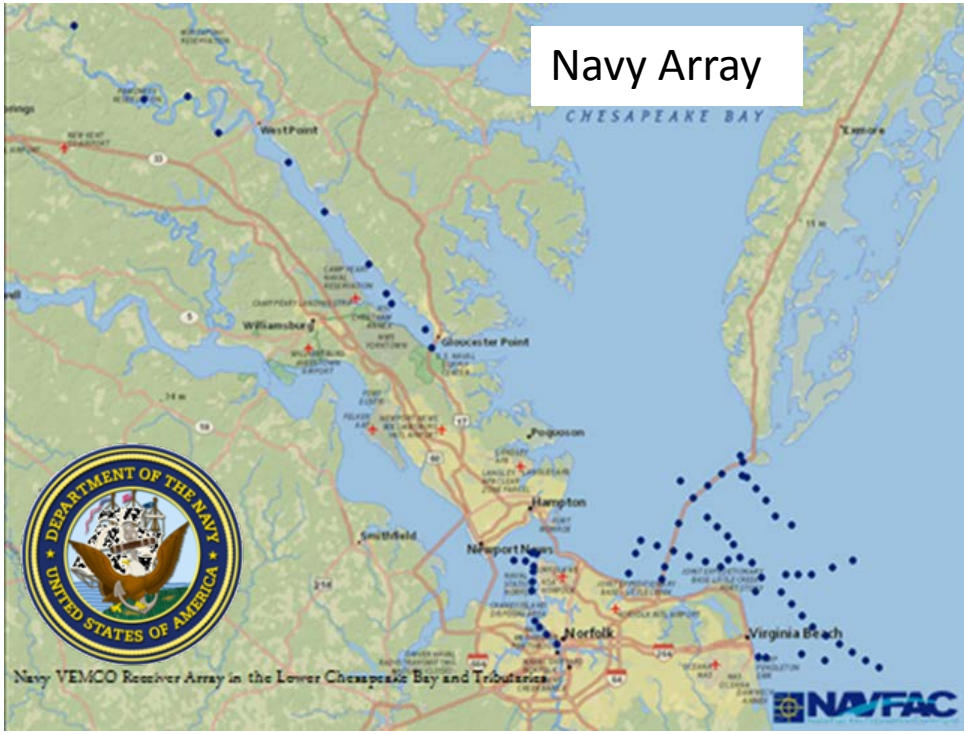
Acoustic Telemetry Assets in the lower Chesapeake

Total of approximately 120 VEMCO receivers (VR2Ws & VR2Cs) deployed

Approximately 100 VEMCO tags in James River Atlantic Sturgeon (but all compatible tags are detected)

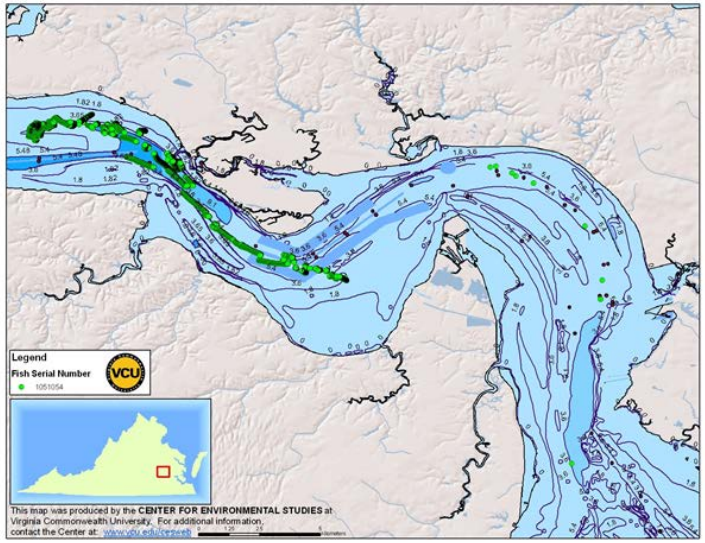
Approximate value of existing assets: $250K





Applications of fisheries acoustic telemetry in the *lower* Chesapeake

Until recently, limited primarily to **Atlantic sturgeon** recovery efforts with a focus on the James. Telemetry data used to understand migration patterns, habitat associations, and response to threats (e.g. ship strikes, dredging)



Proposed research in 2013-2014 would leverage existing arrays for telemetry studies on other species (striped bass and blue catfish) and would expand coverage in the middle and upper Bay