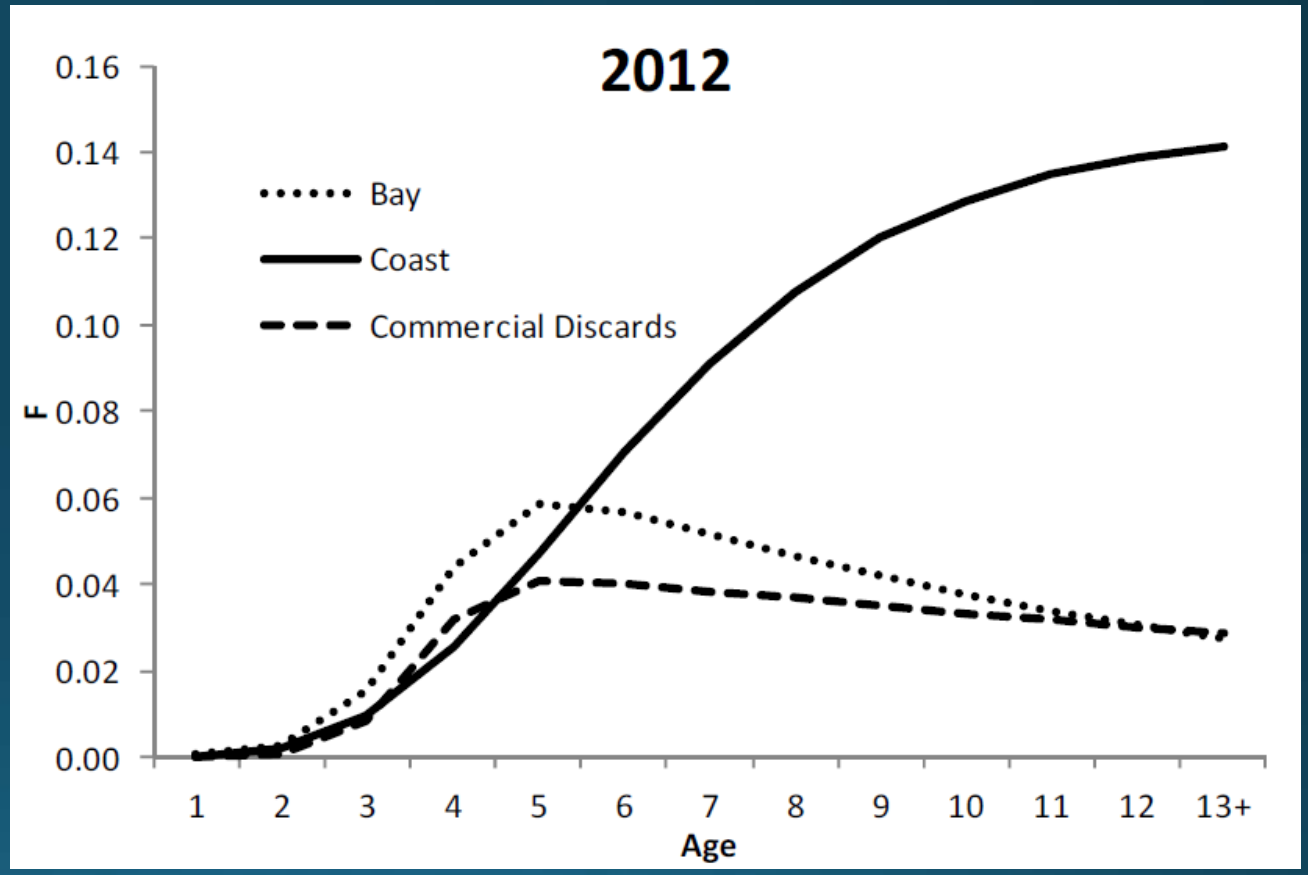
ASMFC: Spatially explicit stock striped bass assessments (differing "fleets")



Nelson, G. 2014. Atlantic States Marine Fisheries Commission Update of the Striped Bass Stock Assessment.

Size-specific and Seasonal Patterns of Emigration, and Chesapeake Bay and Coastal Habitat-use by Potomac River Striped Bass

Dr. David H Secor

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CENTER FOR ENVIRONMENTAL SCIENCE
CHESAPEAKE BIOLOGICAL LABORATORY

Migration and Habitat Ecology
Fisheries Research Lab

PAST: Potomac and Atlantic Striped Bass Telemetry Study

Research supported by funds and cooperation by Atlantic States Marine Fisheries Commission, NOAA Chesapeake Bay Office, MD Department of Natural Resources, and the Potomac River Fisheries Commission.

Project Synopsis:

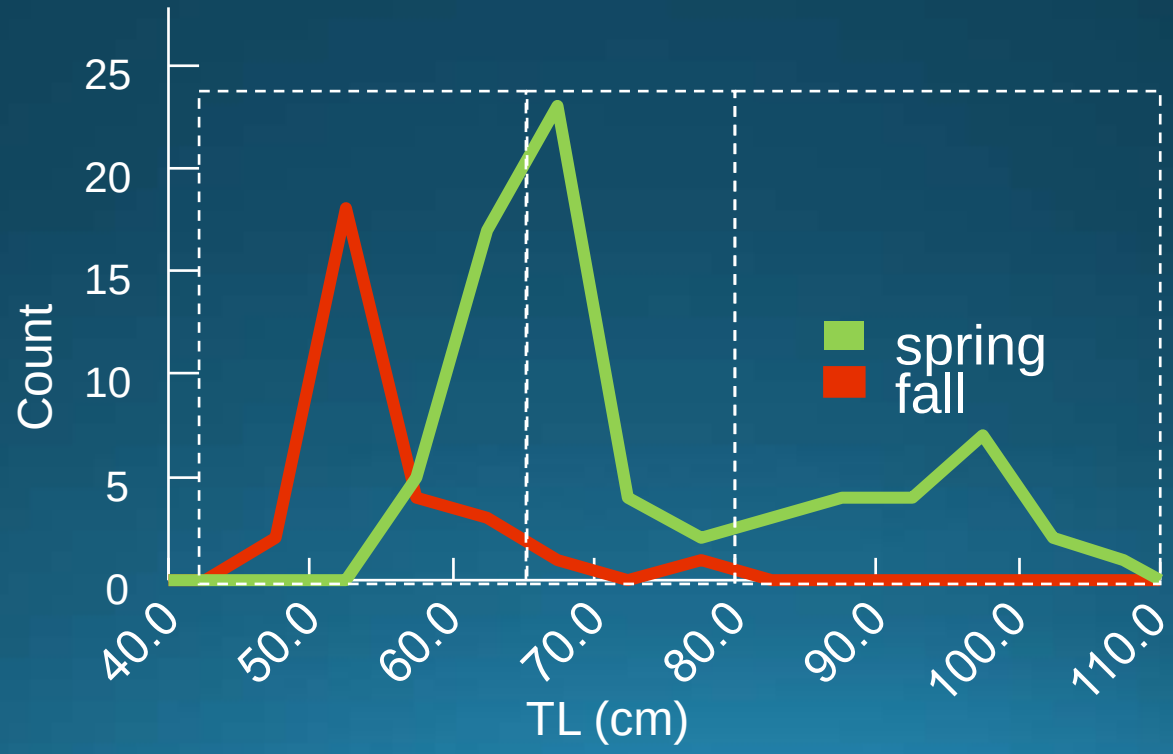
A long-term priority in the assessment and management of coastal striped bass is determination of emigration and residency rates for striped bass produced in the Chesapeake Bay. Past tagging and otolith tracer analyses demonstrate that these rates vary strongly with size, sex, and season, but the data are too coarse to employ in current efforts by the Atlantic States Marine Fisheries Commission to consider how the Chesapeake Bay contributes to Maryland, Potomac River, and Virginia fisheries, as well as those arrayed in mid-Atlantic and New England coastal waters. A unique and timely opportunity exists to leverage telemetry assets deployed by the US Navy, a cooperative Chesapeake Bay Sturgeon research project, and Atlantic state scientists cooperatively sharing data through the Atlantic Cooperative Telemetry Network and the Mid-Atlantic Acoustic Telemetry Observation System. Fishes and other animals outfitted with acoustic transmitters can now be tracked as they traverse into and out of the Chesapeake Bay and seasonally migrate in nearshore coastal waters (6-10 miles from shore).

http://fishconnectivity.cbl.umces.edu/PAST

Objective 1a. Release 75 spawning aggregation striped bass in size-stratified design: 45-66 (25), 67-79 (26), >80 cm TL (21)
Males=24; Females=18; UI=29; tagged March 30- April 11, 2014

Objective 1b. Release 25 fall aggregation striped bass 45-66 cm TL (27), 67-79 (2) Males=19; Females=3; UI=7; tagged October 30, 2014

Why 100? Balance of cost, logistics, fishing mortality, and statistical power.
Comparable size to what DNR tags with conventional tags (200-300)
Cost ~ $35,000 in transmitters alone



VEMCO ©; model V16P-4H-S256; 65 mm, 10 g, 3.0-year expected battery life

Have you seen this tag?

RESEARCH 410-326-7421 RELEASE

If so, please release. These fish have been fitted with an electronic tag to allow University of Maryland scientists to track striped bass migrations.

For more information, visit fishconnectivity.cbl.umces.edu/PAST or call 410-326-7421. This research is sponsored by the Atlantic States Marine Fisheries Commission to improve the management of striped bass.

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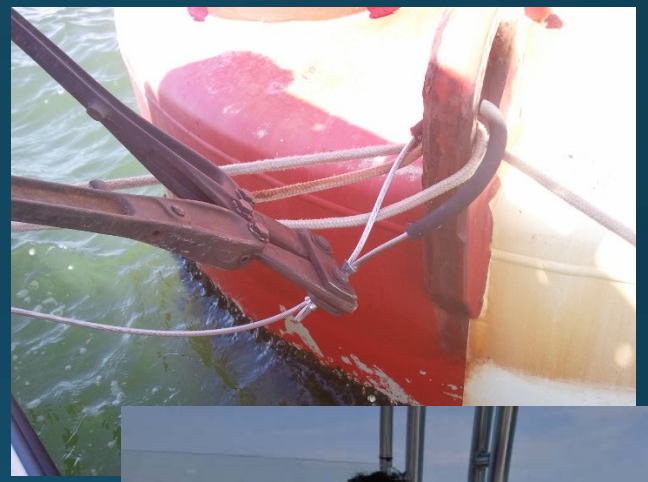
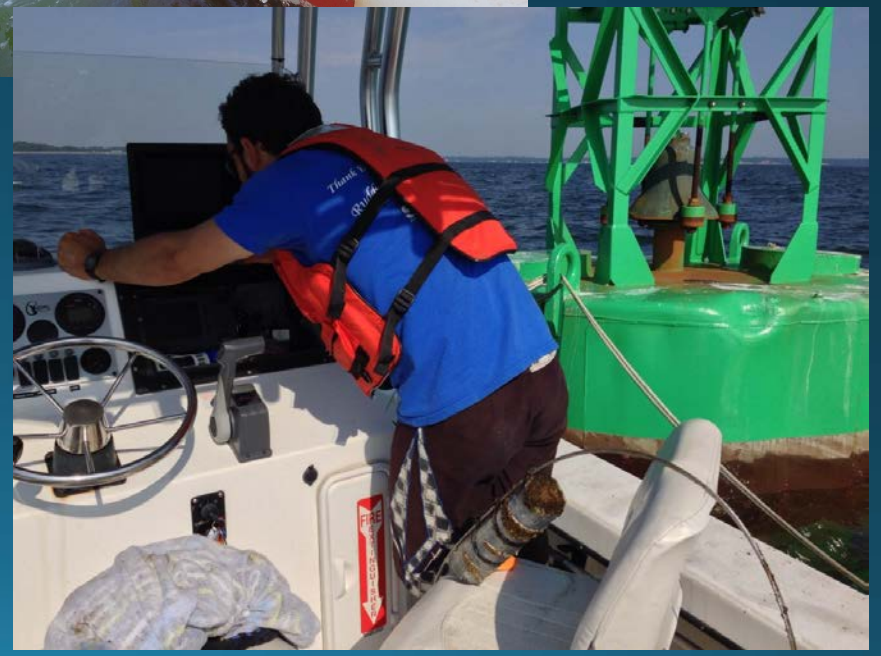
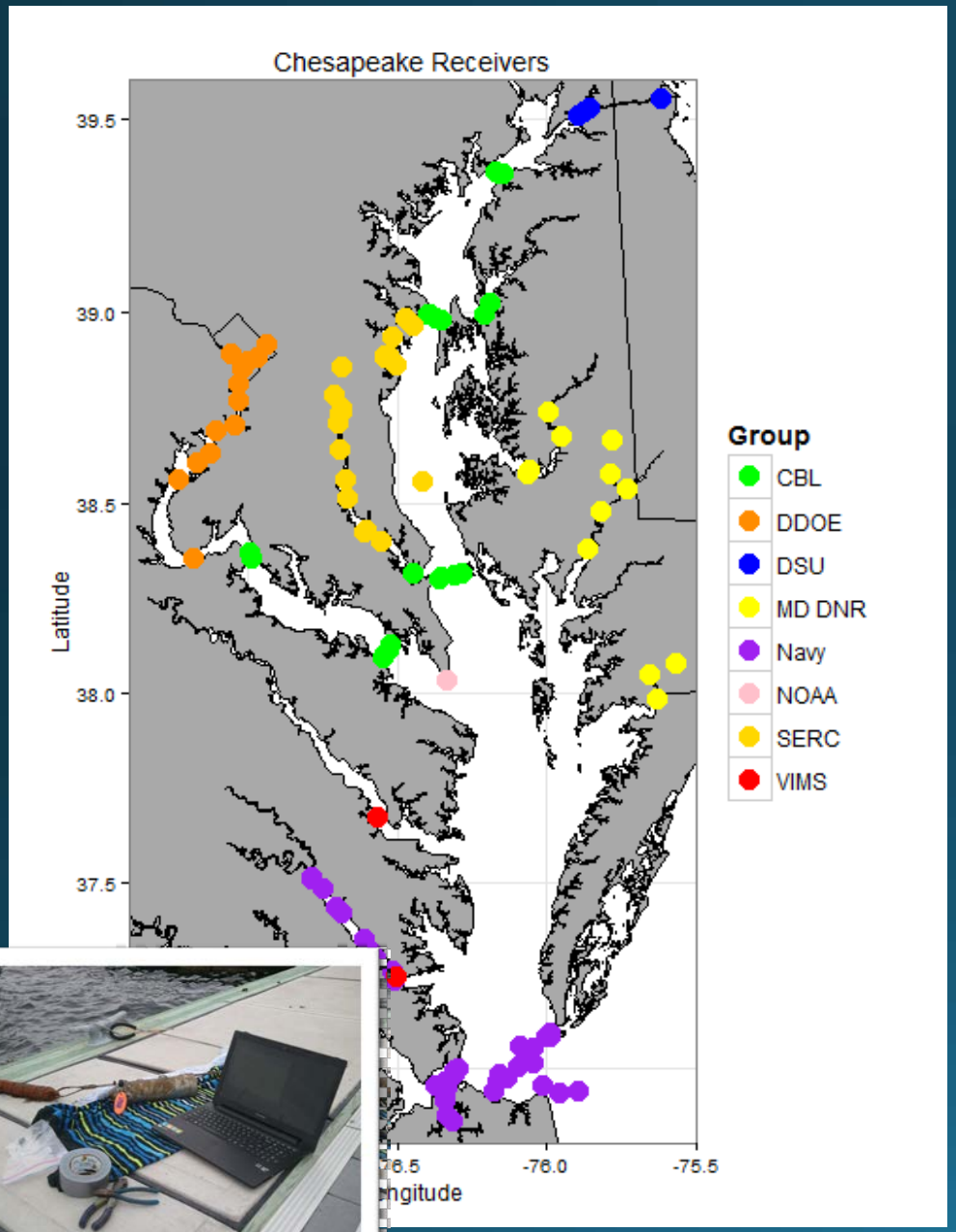
Objective 2. Deploy and maintain receiver gates in the Potomac River and Middle Bay, augmenting other arrays. Cooperate with ACT and MATOS to exchange receiver and transmitter data with others.

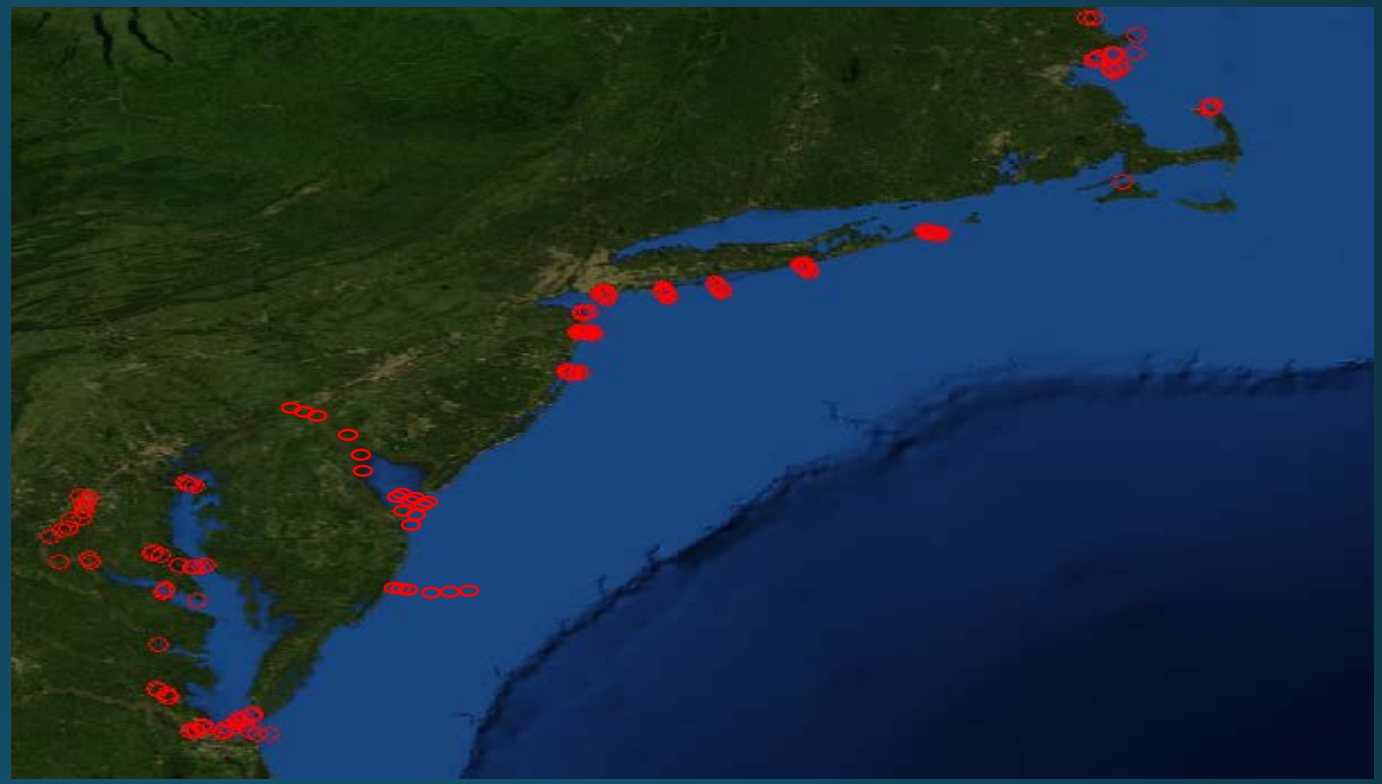




~100 receivers in Chesapeake Bay



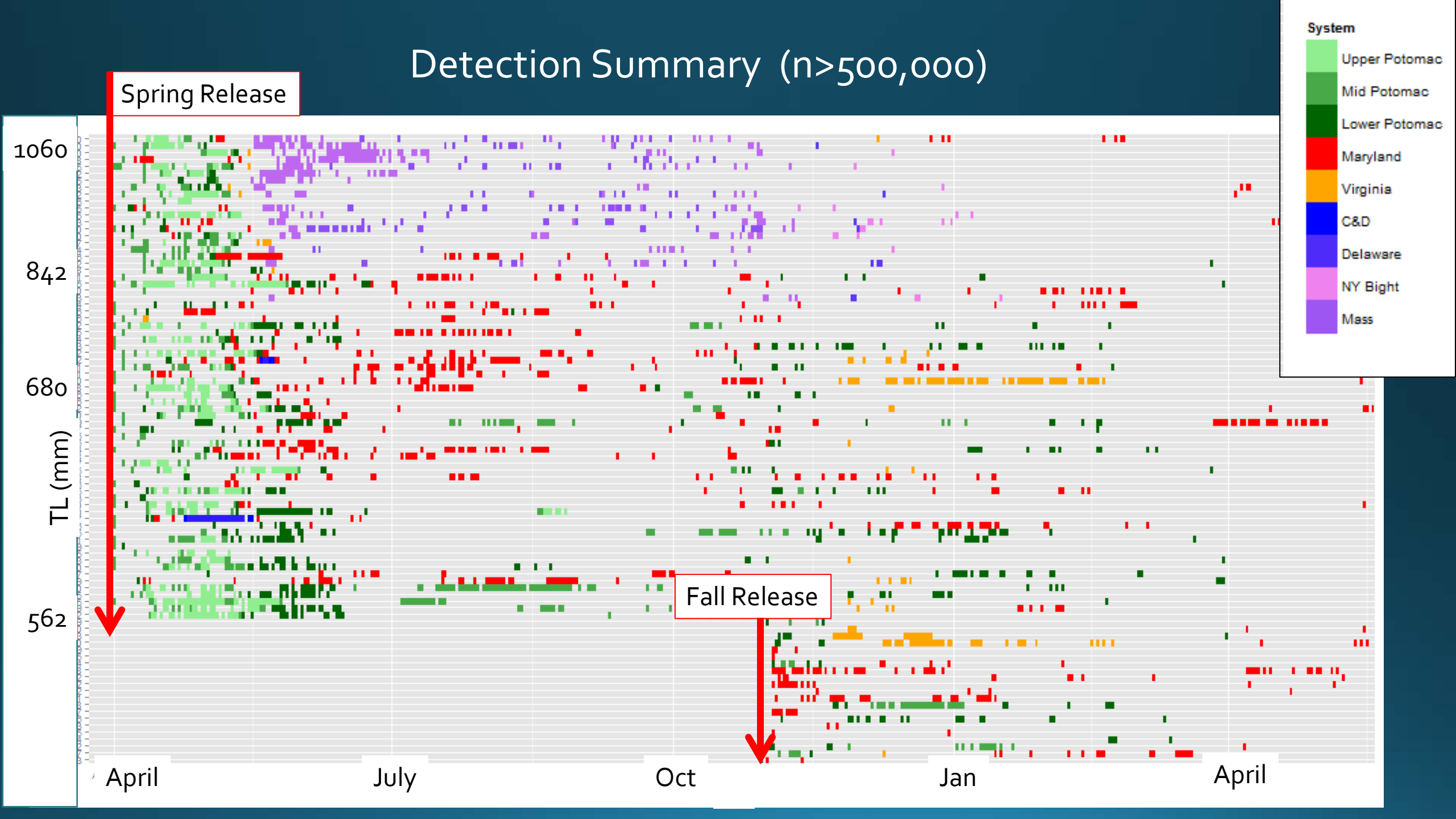
More still over the entire NE Atlantic

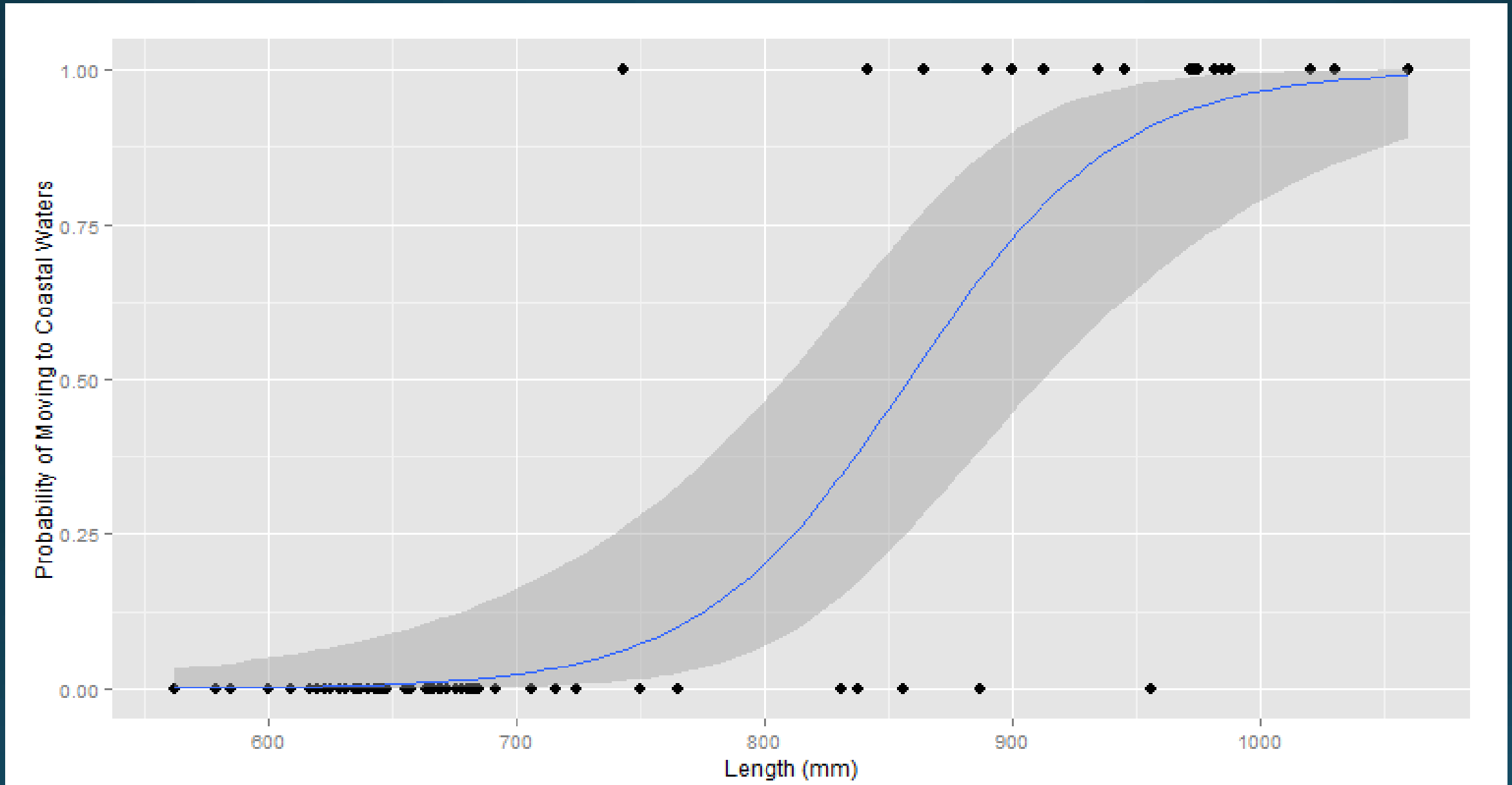


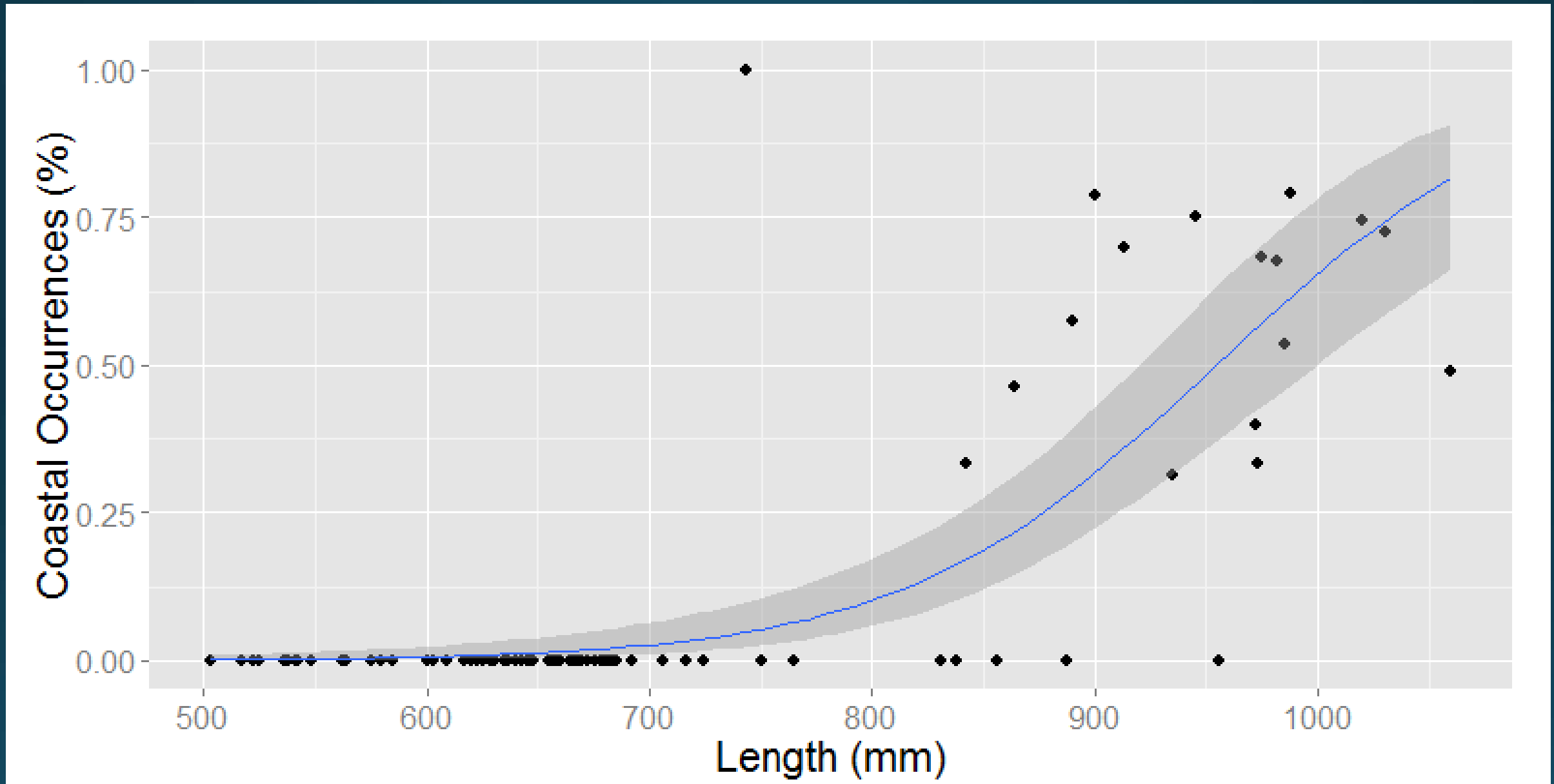
Objective 3. Test,

- Size and sex-specific patterns of emigration
- Timing of emigration/immigration (temperature, flow)
- Timing and incidence of spawning runs
- Partitioning of resident striped bass throughout the Chesapeake (habitat suitability)
- Degree of visitation to other estuaries, straying

Detection Summary (n>500,000)




1.00
0.75
0.50
0.25
0.00
Probability of Mowing to Coastal Waters
600
700
800
900
1000
Length (mm)


Coastal Occurrences (%)
1.00
0.75
0.50
0.25
0.00
500
600
700
800
900
1000
Length (mm)


2014-03-30
Length (cm)
<55
55-65
65-80
>80

Some Preliminary Results

How many thus far left the Chesapeake Bay? 19

- 11 visited Massachusetts waters
- 6 went as north as Long Island
- 2 went as far as the Delaware Bay
- 48 left the Potomac but stayed in the Chesapeake
- 19 remained resident to the Potomac

How did they leave?

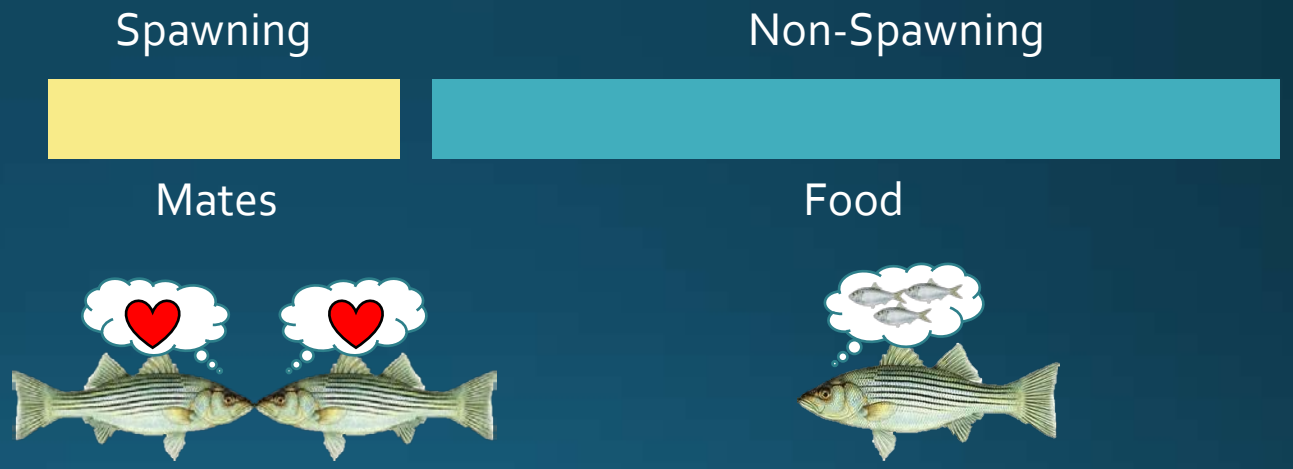
- Most seem to have snuck out undetected (n=13)
- 4 passed through the Chesapeake Mouth
- 2 passed through the C&D Canal

How are they coming back?

- In progress (detections still coming in as of 1 May)
    - 6 in the Chesapeake
    - 1 in the Potomac
    - 7 in coastal MD

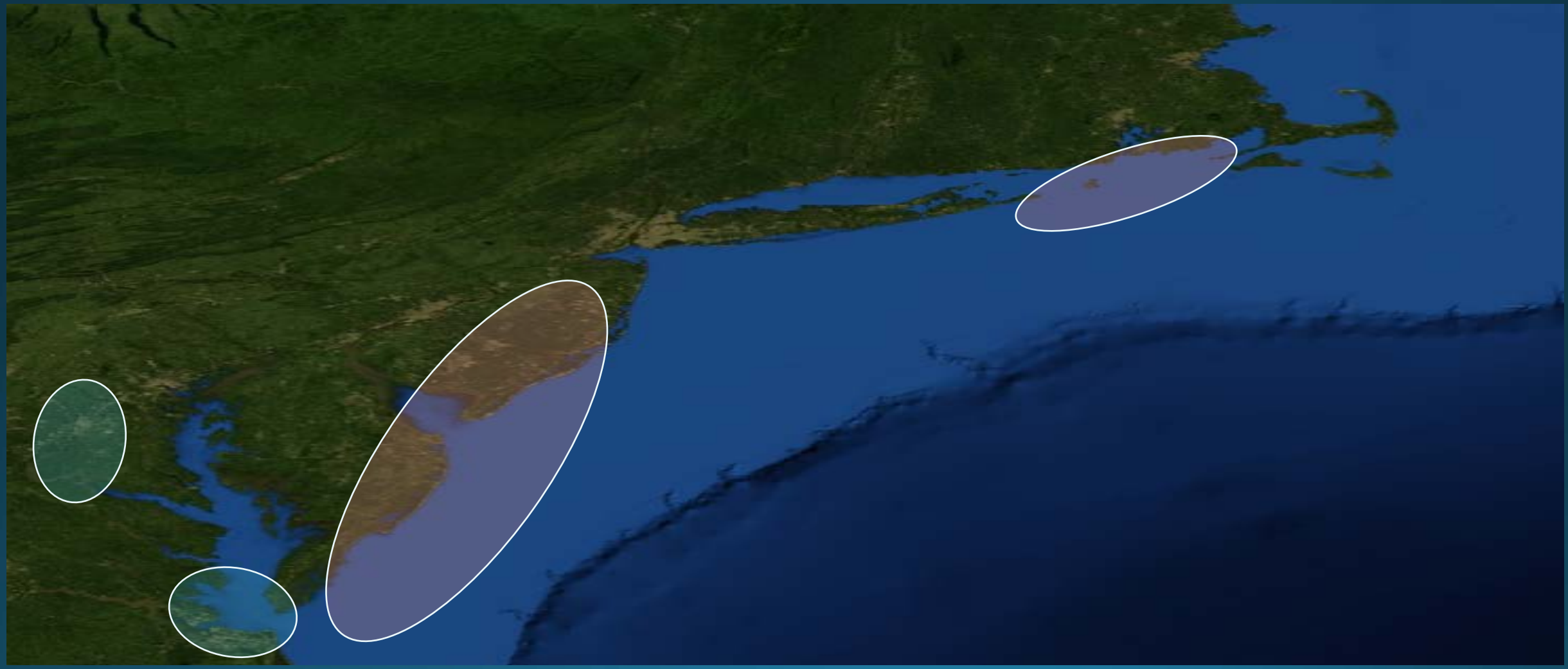
Lévy flight in spawning and non-spawning striped bass

- Michael O'Brien, David Secor

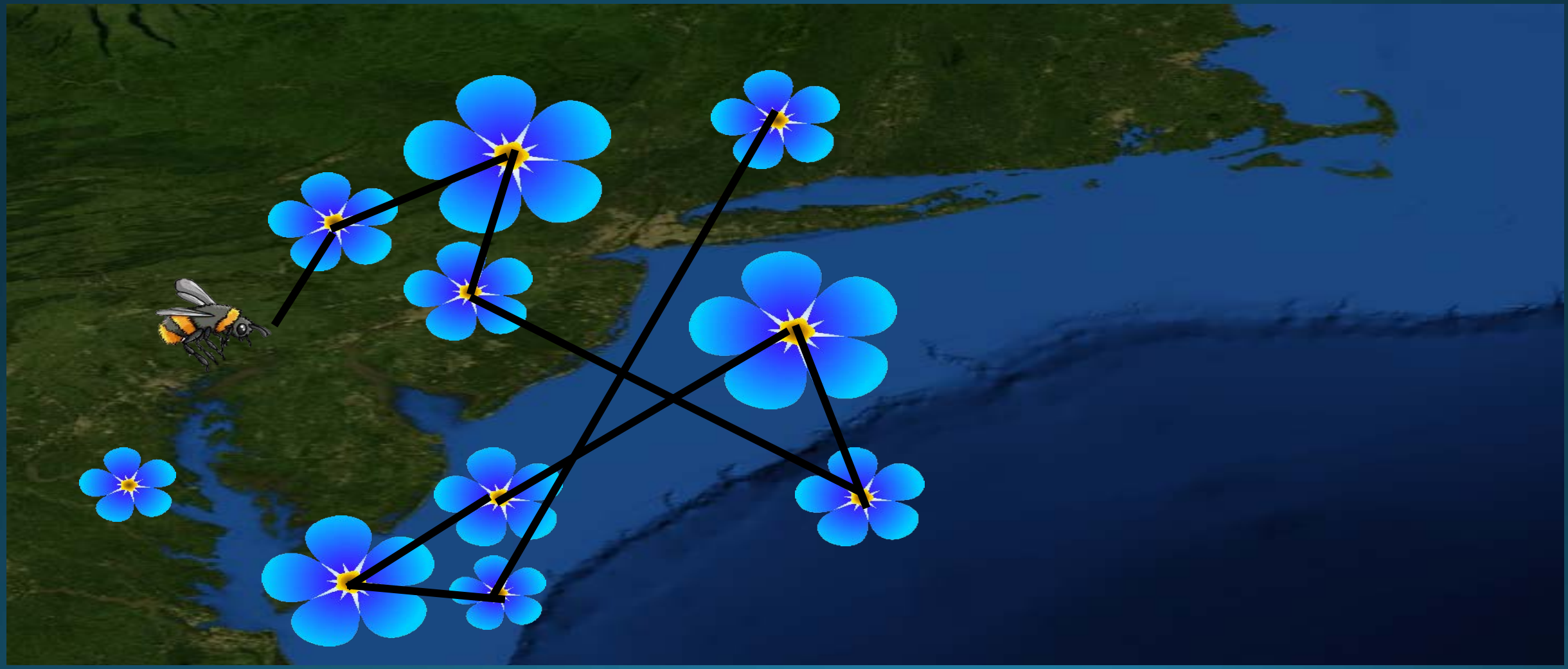


- Do striped bass exhibit different search patterns in different functional phases?

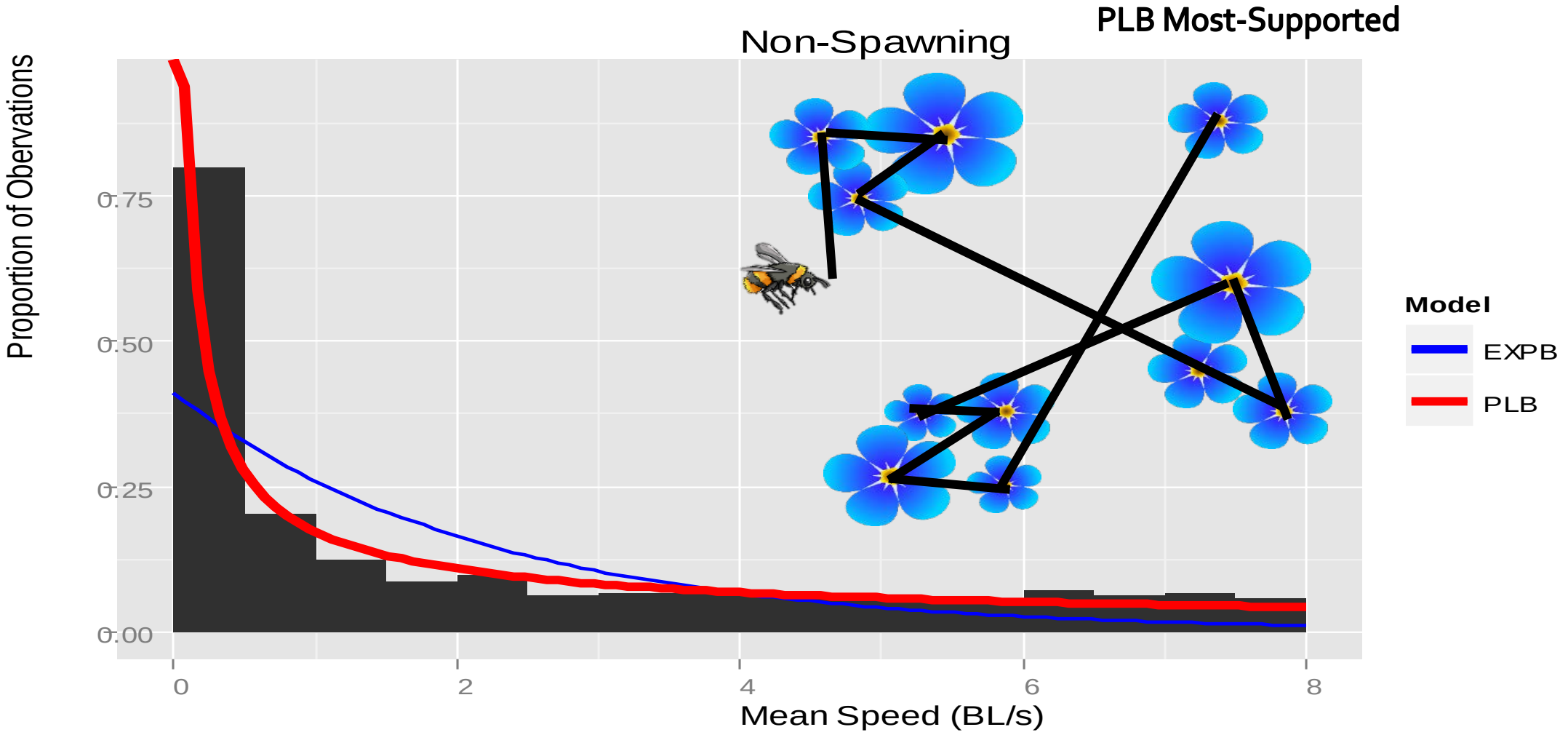
Scale Invariance



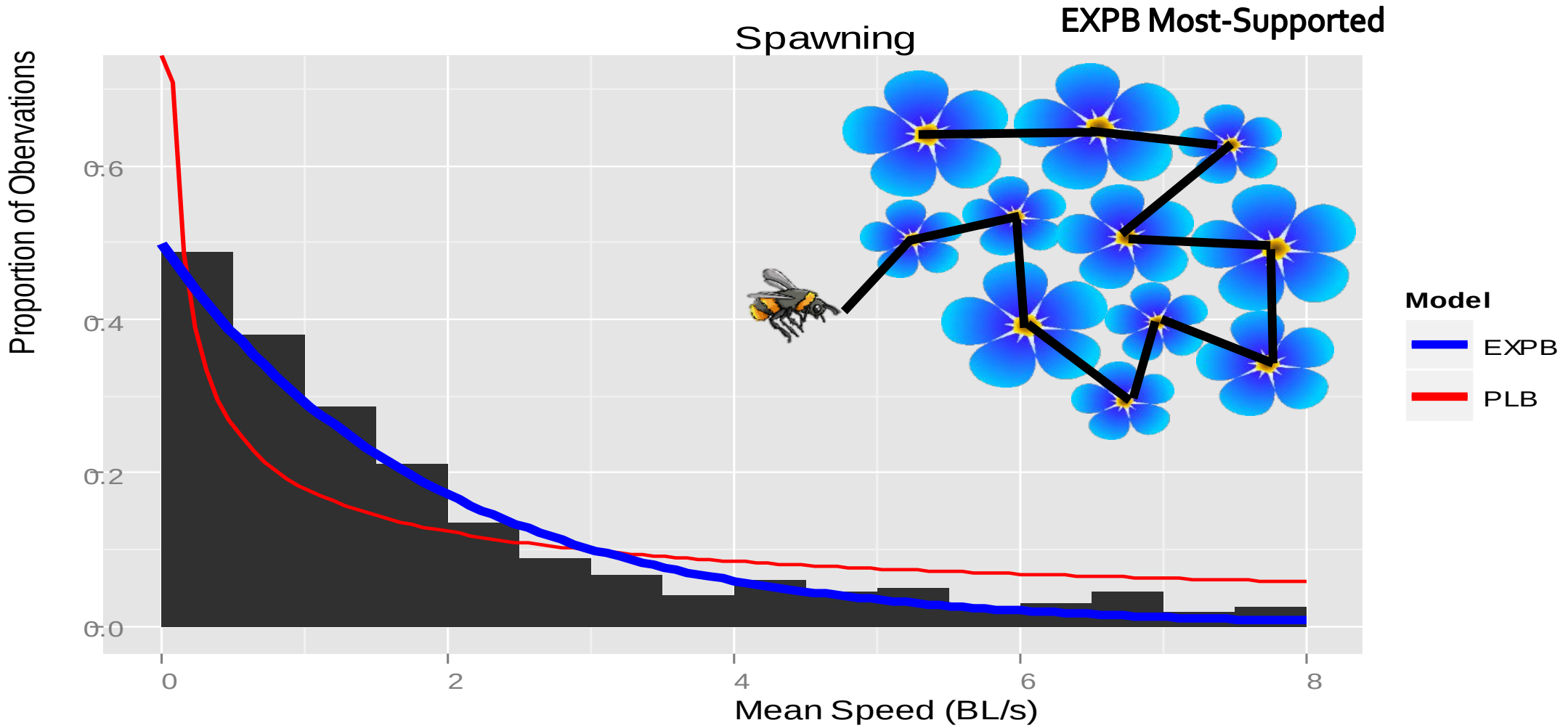
Scale Invariance



Results: Functional Phase

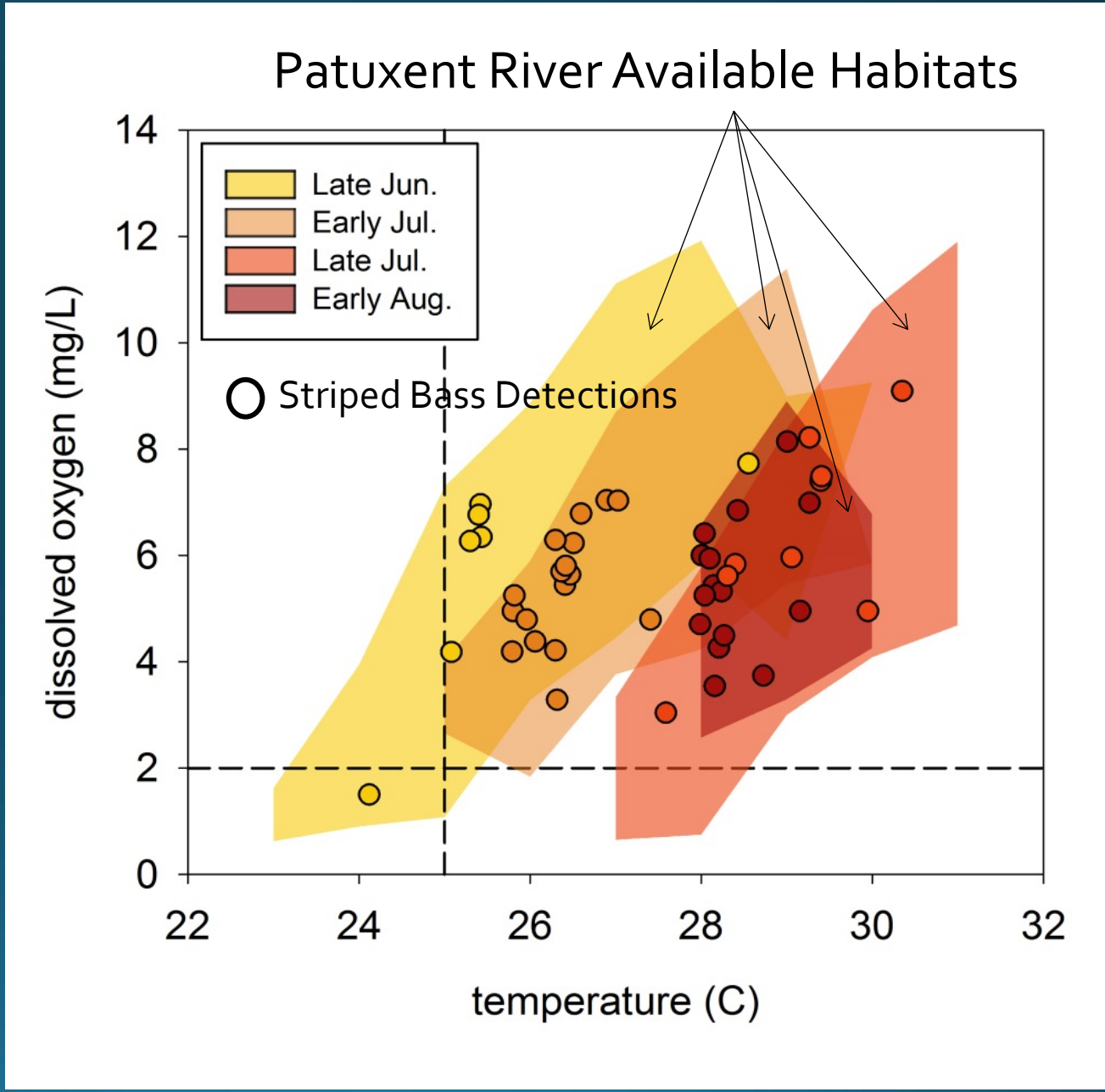


Results: Functional Phase



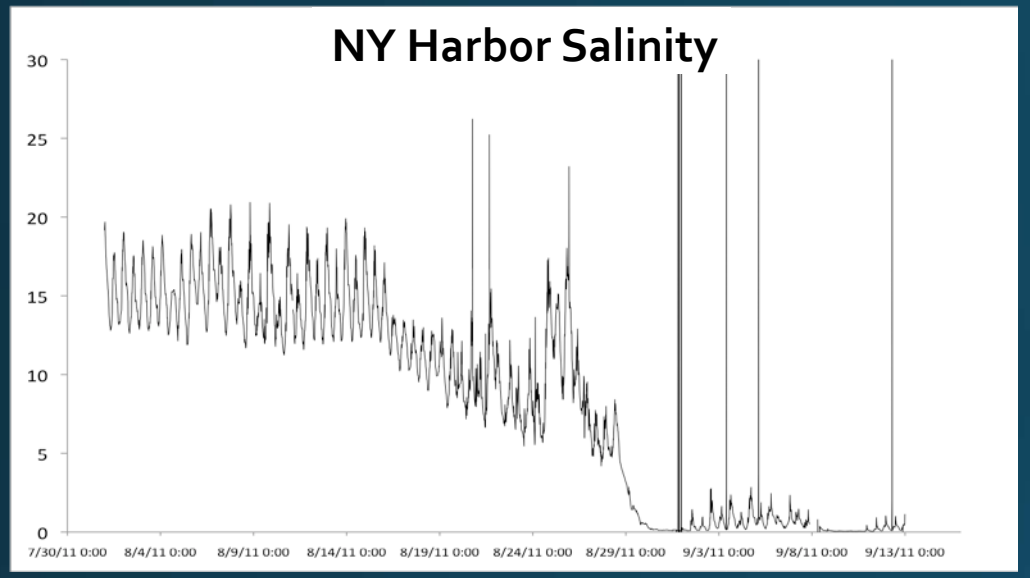
Other Telemetry Applications…

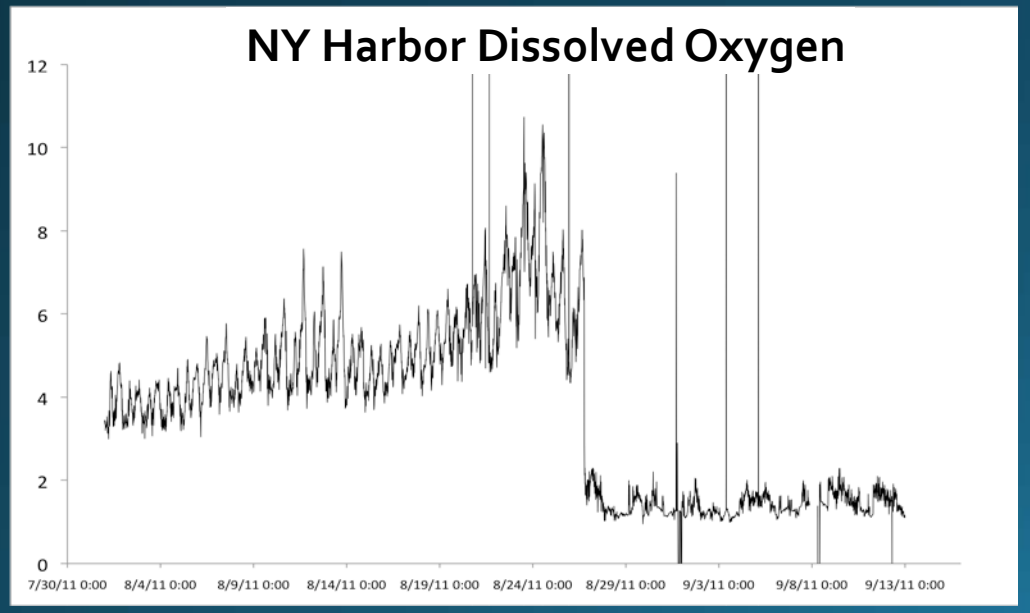
Kraus, R.T., D.H. Secor, and R. L. Wingate. *In Press*. Testing the Thermal-Niche Oxygen-Squeeze Hypothesis for Estuarine Striped Bass. Environmental Biology of Fishes.



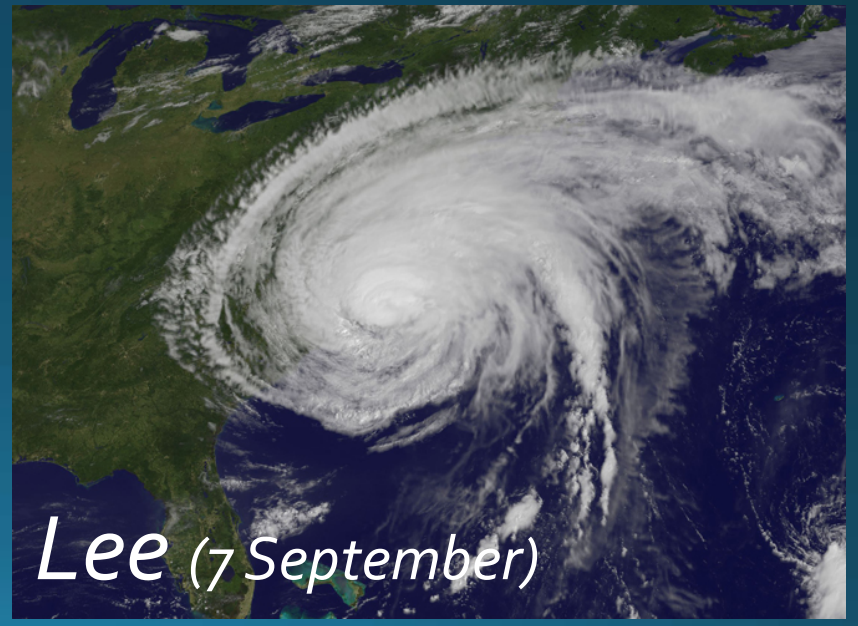
Event Driven Migrations of Hudson River Striped Bass

Helen Bailey and Dave Secor (HRF Study)



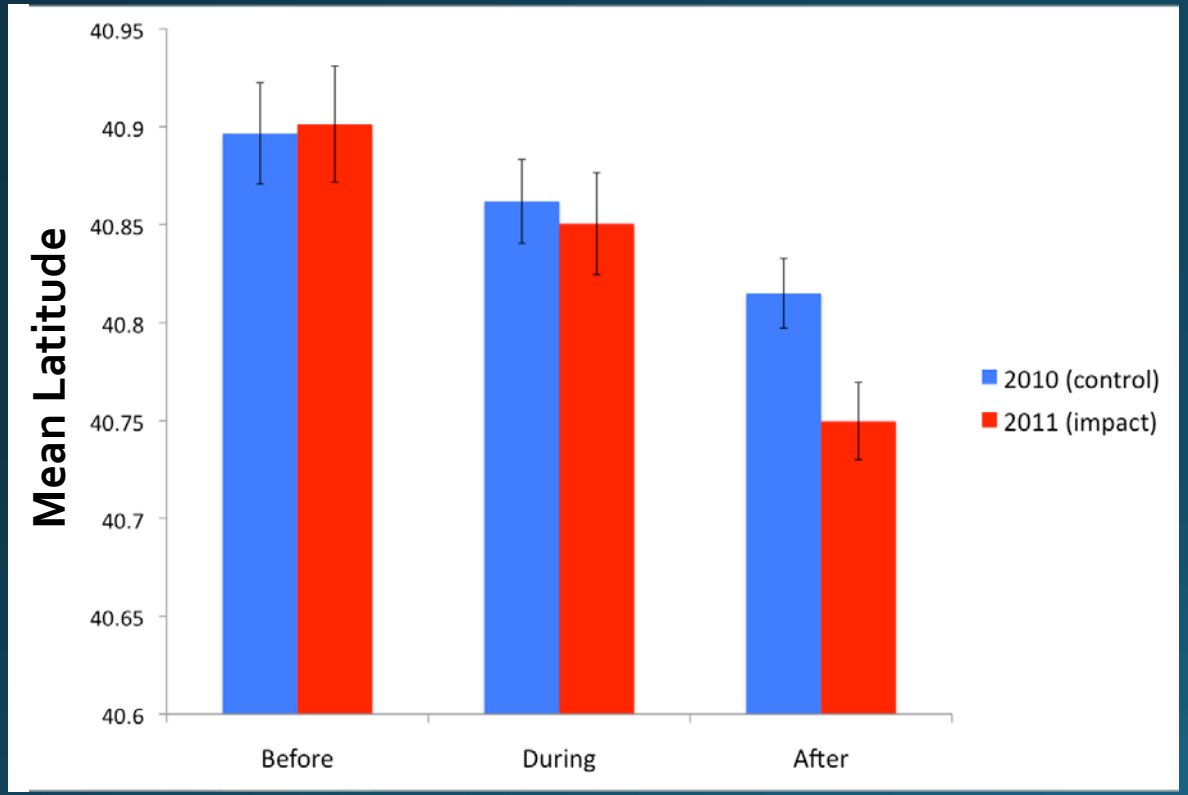


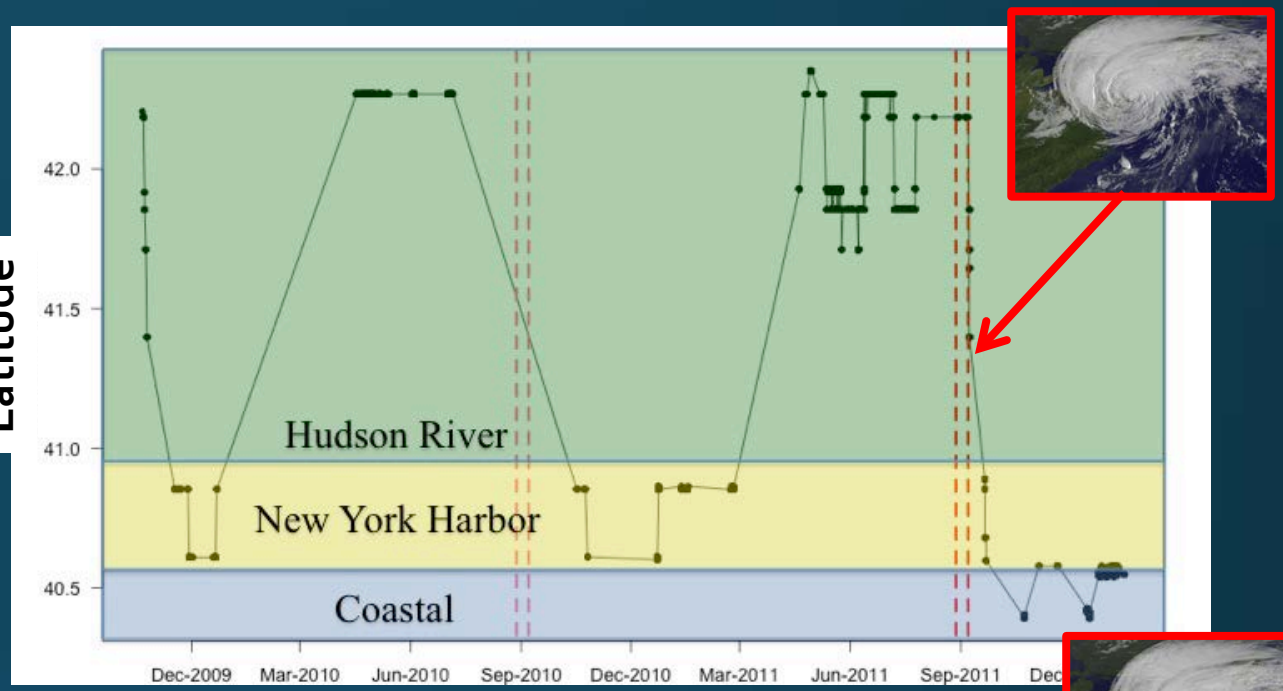
Double Whammy (summer '11)

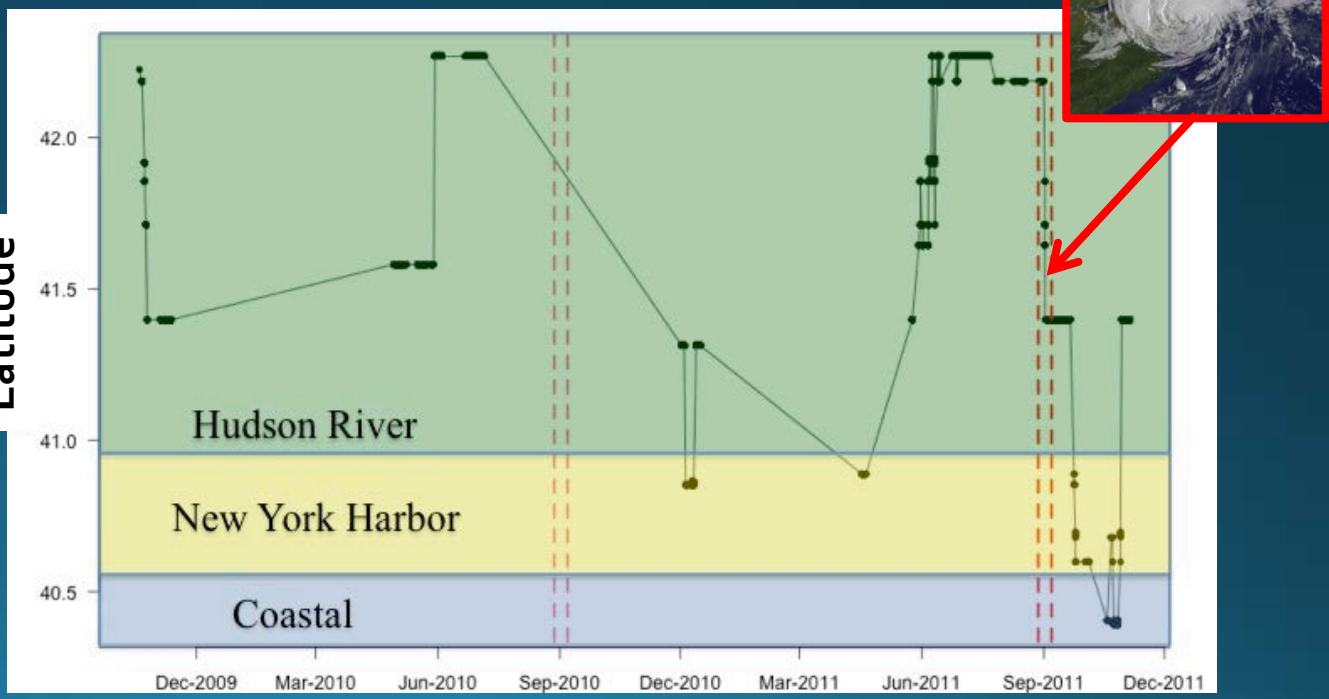


Event Driven Migrations of HR Striped bass

H. Bailey and D. Secor (HRF study)





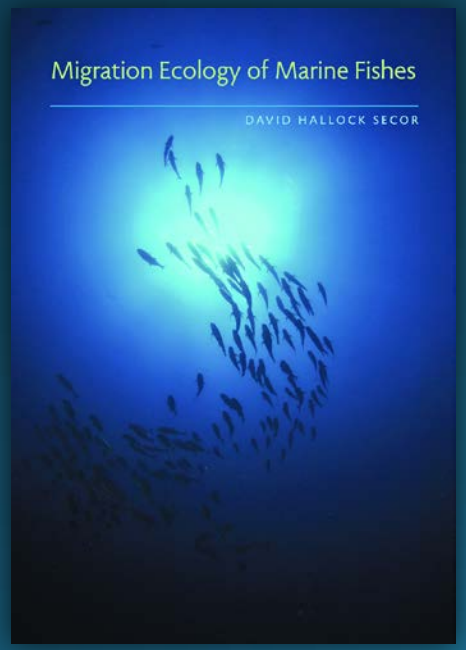


Next steps:

- Age-specific migrations
- Continued accumulation of telemetry records, track 65 cm (26”) mode for future years
- Evaluate hypotheses: emigration rates, straying, skipping, estuarine habitat use
- Investigate Hudson River migration rates (awarded HRF proposal with K. Hattala)

Future studies?

- Long-term telemetry of tagged age 1, age 2 juveniles
- US Atlantic coast flyway telemetry
- In-season migration forecasts



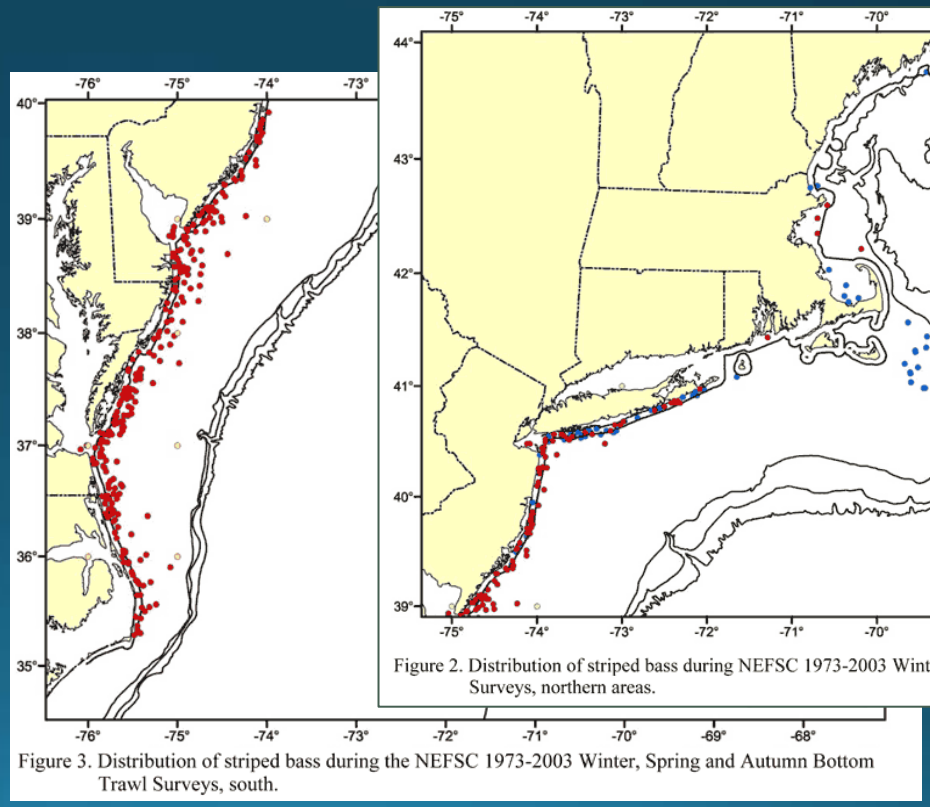


Figure 2. Distribution of striped bass during NEFSC 1973-2003 Winter, Spring and Autumn Bottom Trawl Surveys, northern areas.

Figure 3. Distribution of striped bass during the NEFSC 1973-2003 Winter, Spring and Autumn Bottom Trawl Surveys, south.