Quantifying the Waters of the Mid Atlantic

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MARACOOS
Ocean Information for a Changing World

IOOS
Integrated Ocean Observing System

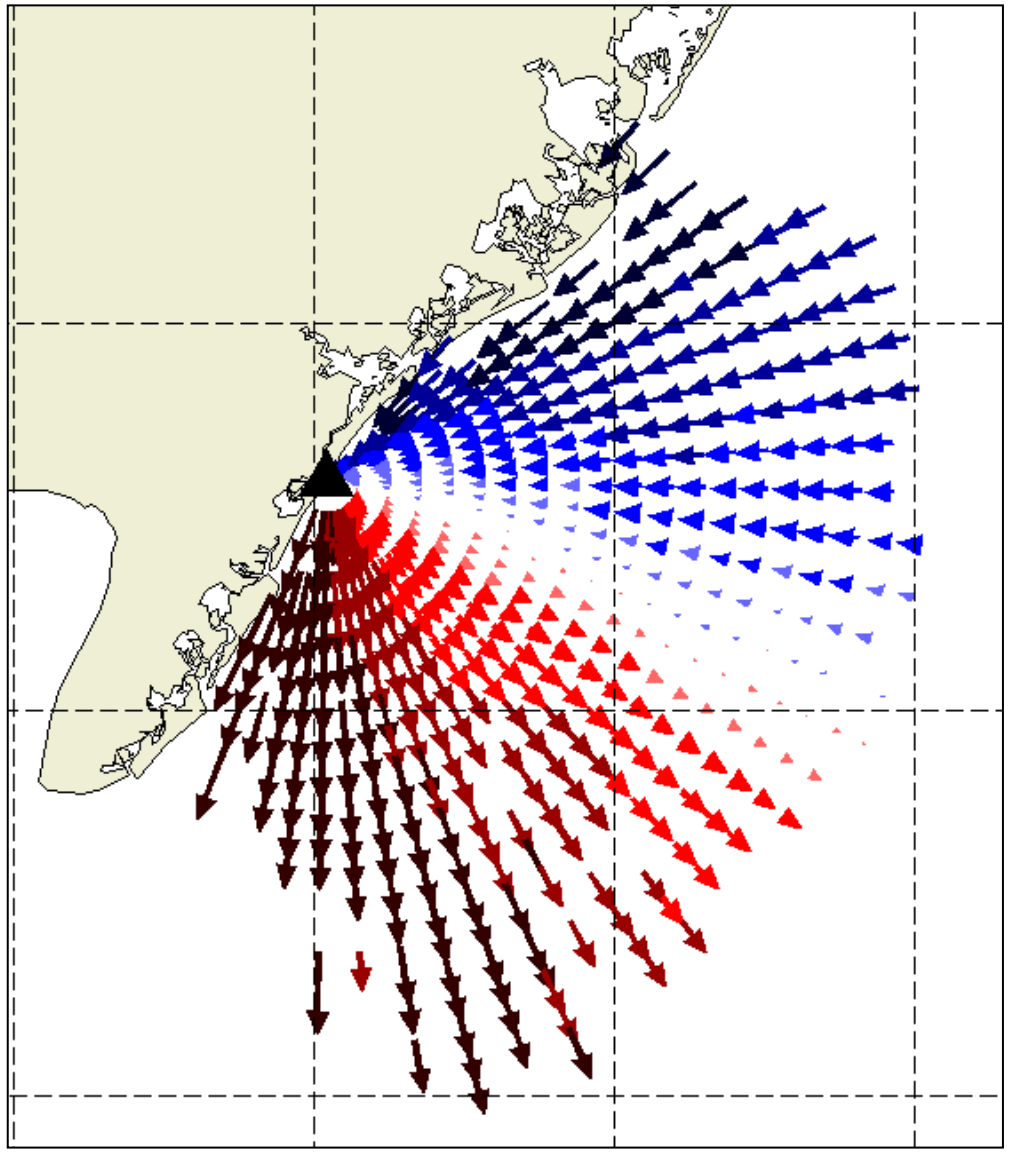
NOAA

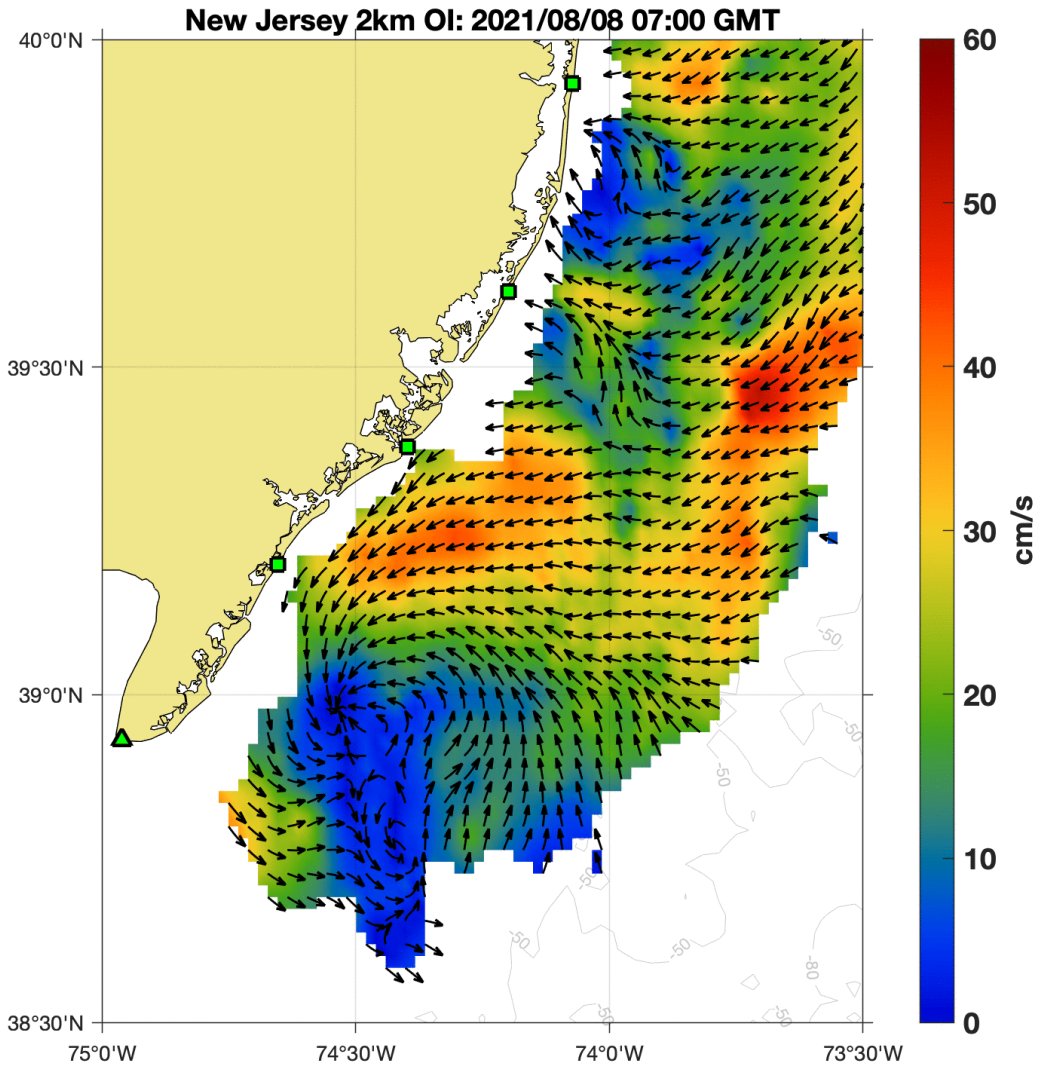
Outline

- Introduction to HF radar
- Surface area calculations of Mid Atlantic water bodies and recent HF radar coverage
- Angular Coverage of the radars in the Mid Atlantic

High Frequency Radar

CODAR Tx/Rx Antenna
Lewes Beach, DE USA



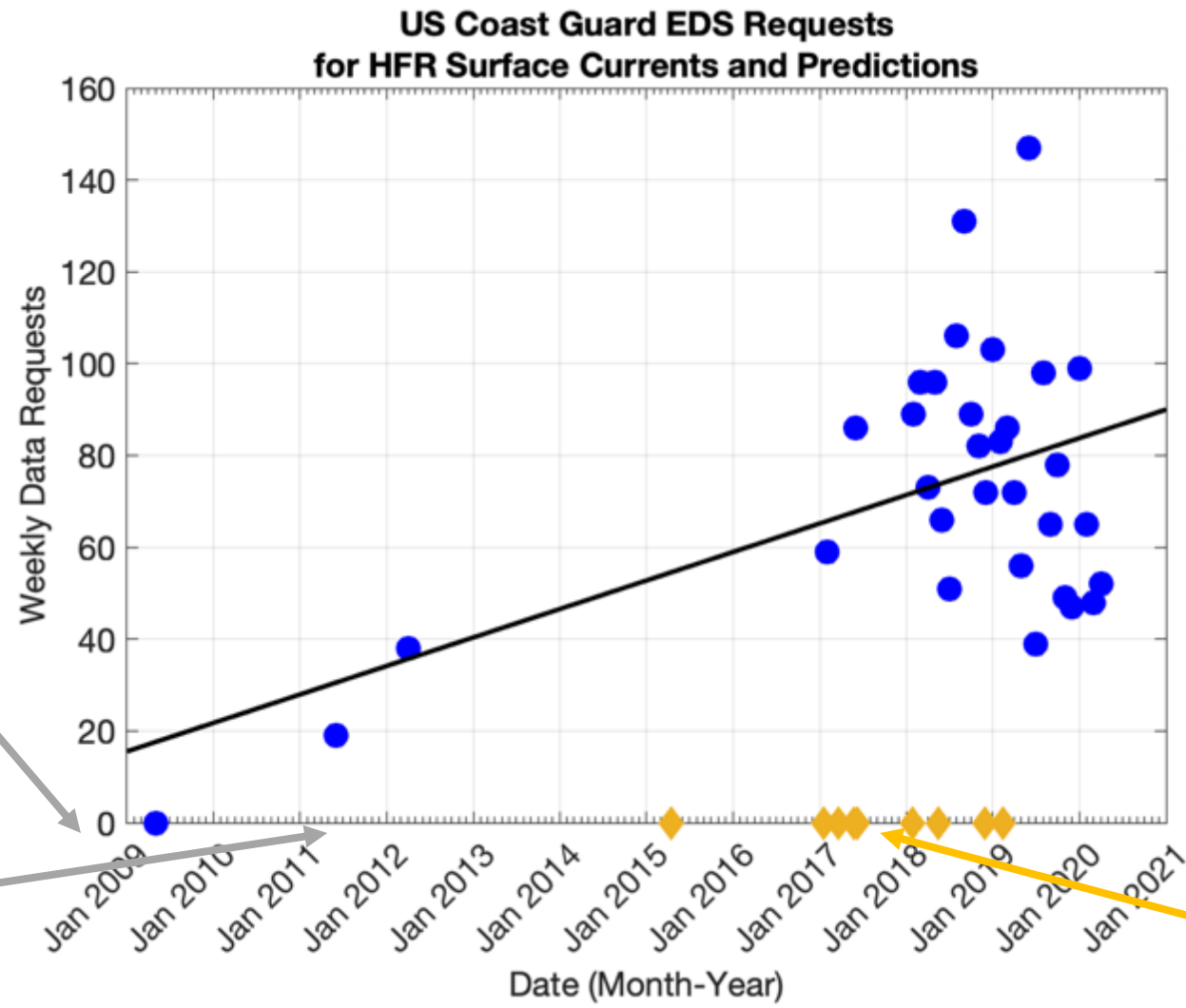


01/12/22 vector_plot_hourly_curly_13MHz_v2.m

Weekly HFR Data Requests by USCG

MARACOOS surface currents operational with USCG May 4, 2009

US IOOS surface currents operational with USCG March 2011



MARACOOS engagement events with USCG

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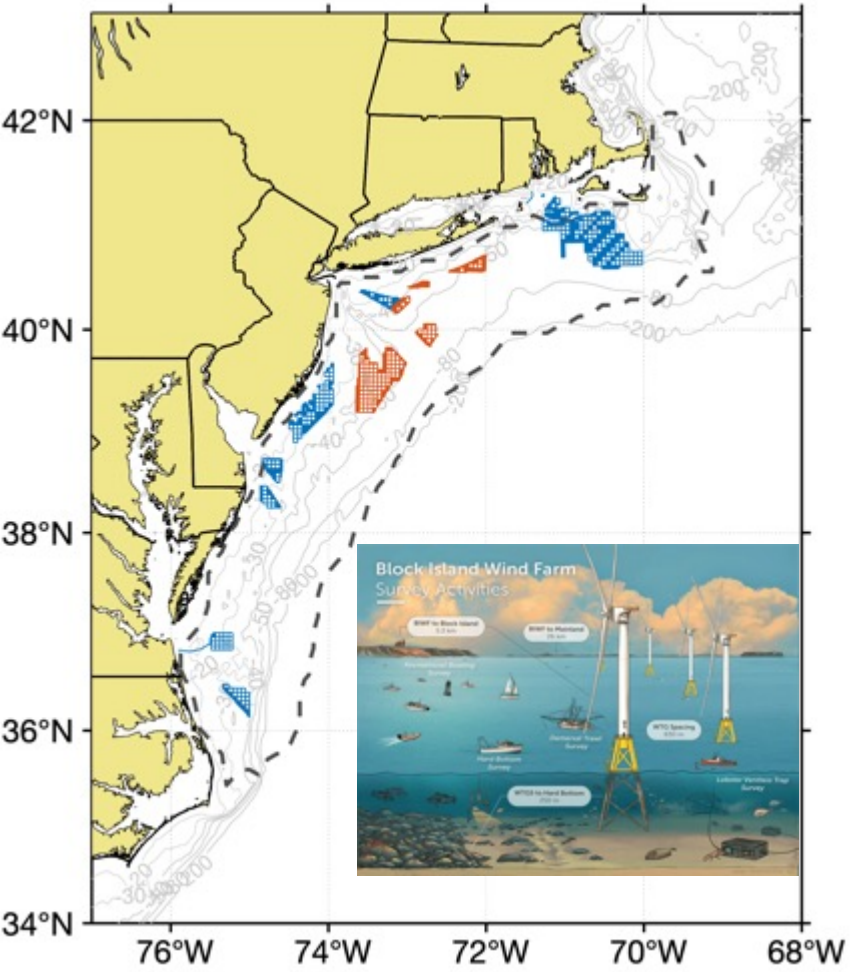
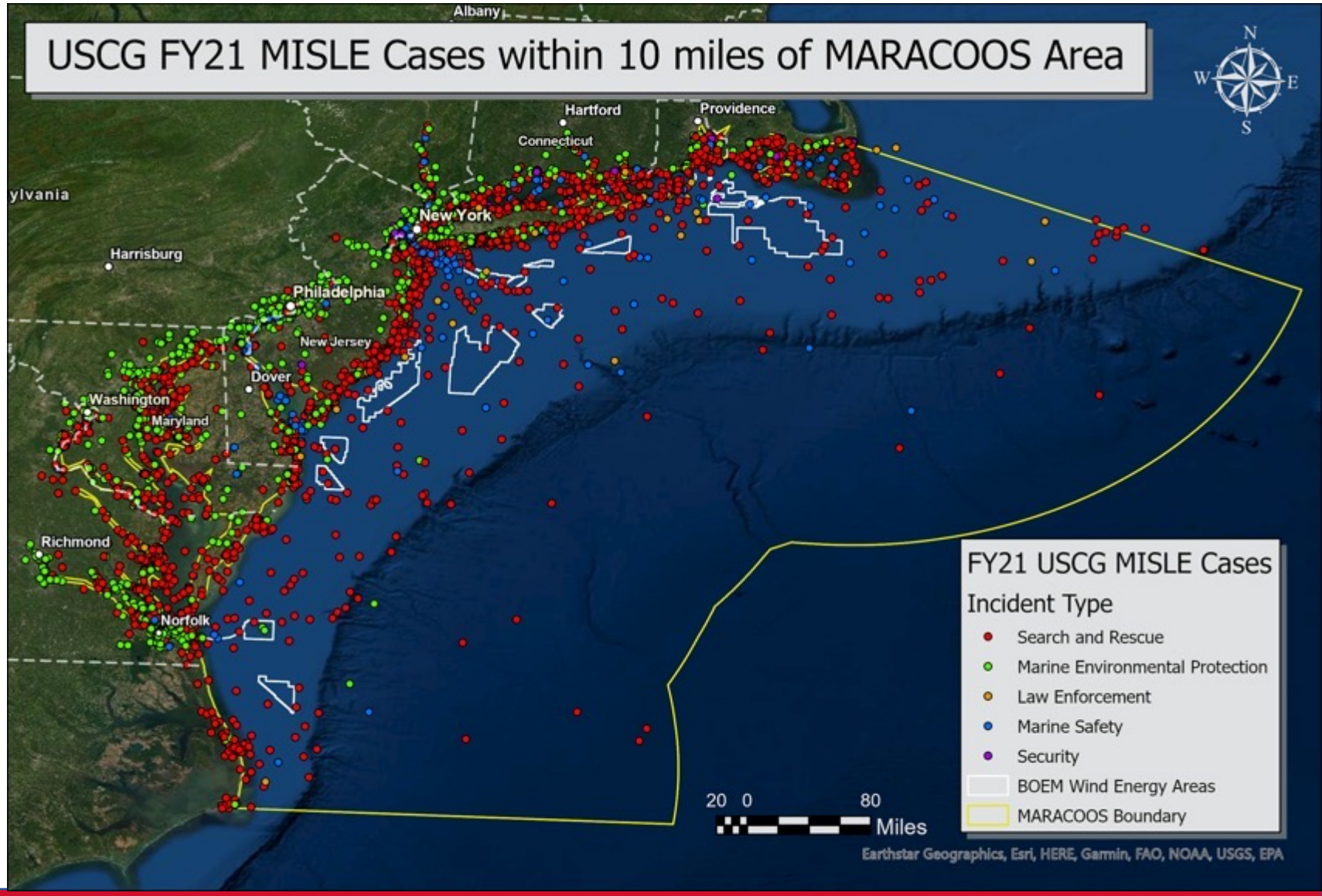
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Offshore Wind
30,000 MW by 2030

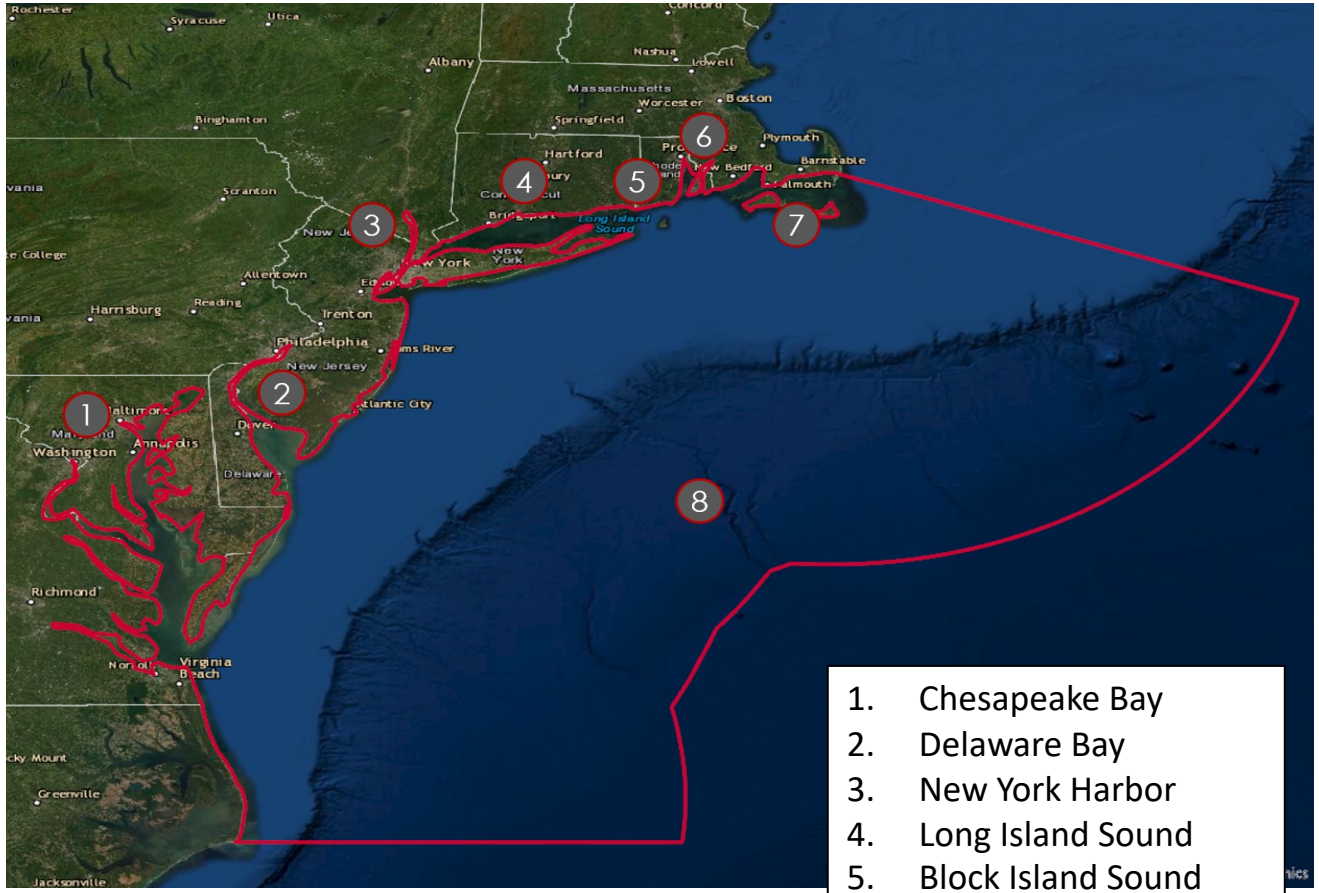




Mid Atlantic Surface Waters

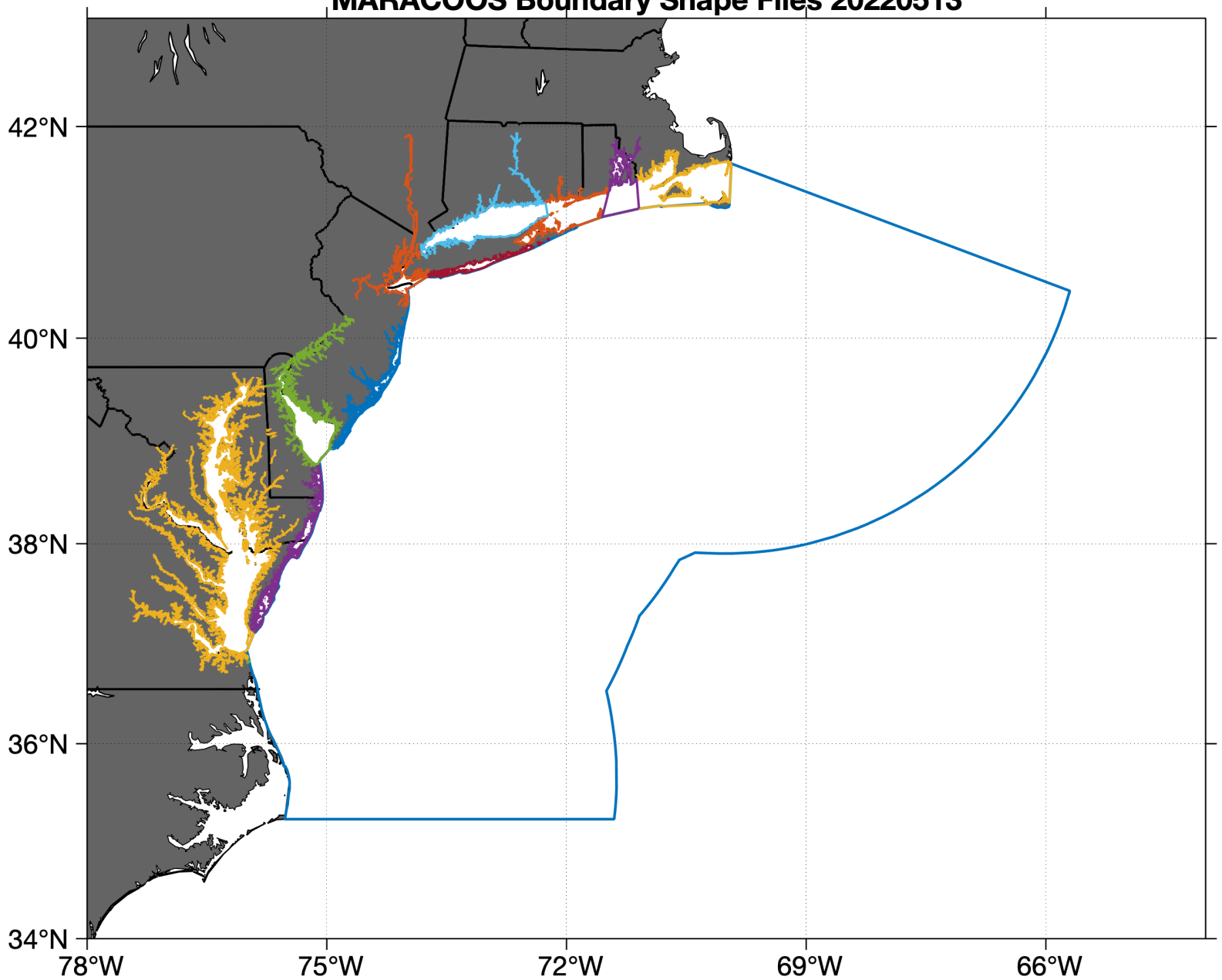

Massachusetts
New York
Connecticut
Rhode Island
Pennsylvania
New Jersey
Maryland
Delaware
Virginia
North Carolina
MARACOOS
"from head of tide to the U.S. exclusive economic zone"
Earthstar Geographics

MARACOOS Shape File



1. Chesapeake Bay
2. Delaware Bay
3. New York Harbor
4. Long Island Sound
5. Block Island Sound
6. Narraganset Bay
7. Nantucket Sound
8. Atlantic Ocean

Refined Boundary


MARACOOS Boundary Shape Files 20220513
42°N
40°N
38°N
36°N
34°N
78°W
75°W
72°W
69°W
66°W

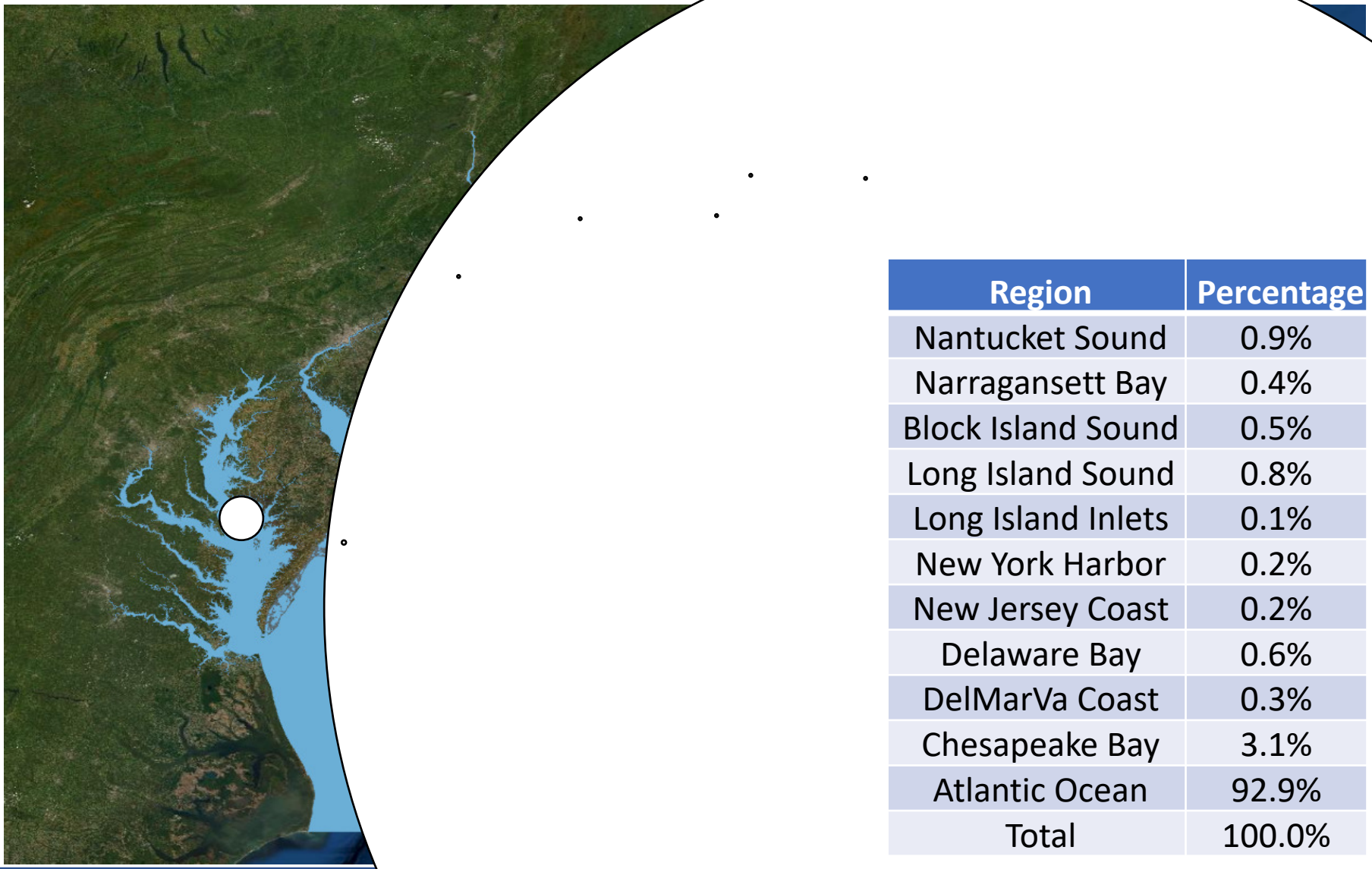
MARACOOS Surface Area

Region	IOOS (km^2)	Rutgers Calculation (km^2)	Percent Change
Nantucket Sound	3,854	3,515	-9 %
Narragansett Bay	1,373	1,365	-1 %
Block Island Sound	2,124	2,036	-4 %
Long Island Sound	2,872	3,050	6 %
Long Island Inlets	0	420	100%
New York Harbor	746	851	14%
New Jersey Coast	0	577	100%
Delaware Bay	2,054	2,225	8 %
DelMarVa Coast	0	997	100%
Chesapeake Bay	11,040	11,816	7 %
Atlantic Ocean	354,058	352,050	-1 %
TOTAL	378,121	378,902	0.2 %

Overestimated

Underestimated

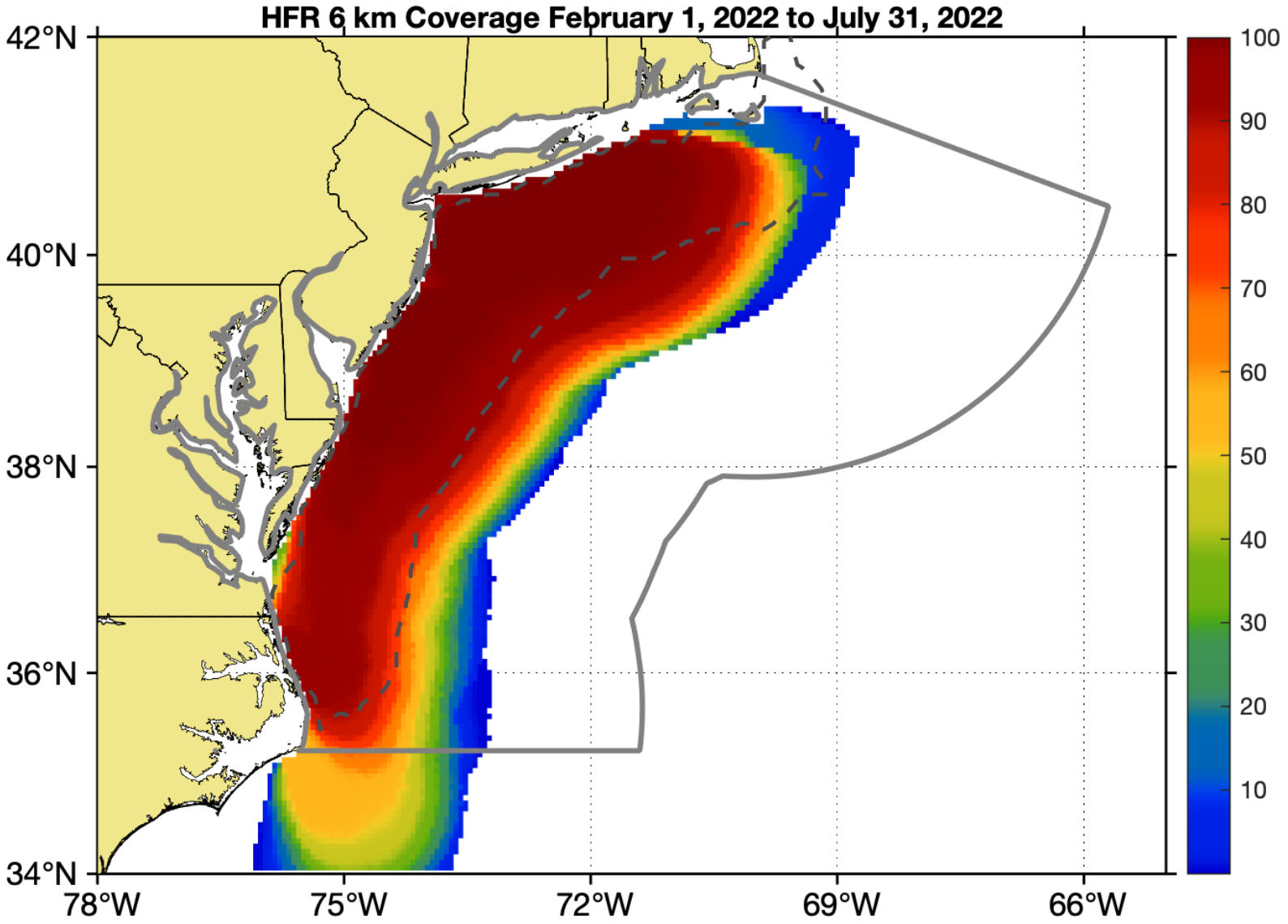
Percentages



Region	Percentage
Nantucket Sound	0.9%
Narragansett Bay	0.4%
Block Island Sound	0.5%
Long Island Sound	0.8%
Long Island Inlets	0.1%
New York Harbor	0.2%
New Jersey Coast	0.2%
Delaware Bay	0.6%
DelMarVa Coast	0.3%
Chesapeake Bay	3.1%
Atlantic Ocean	92.9%
Total	100.0%

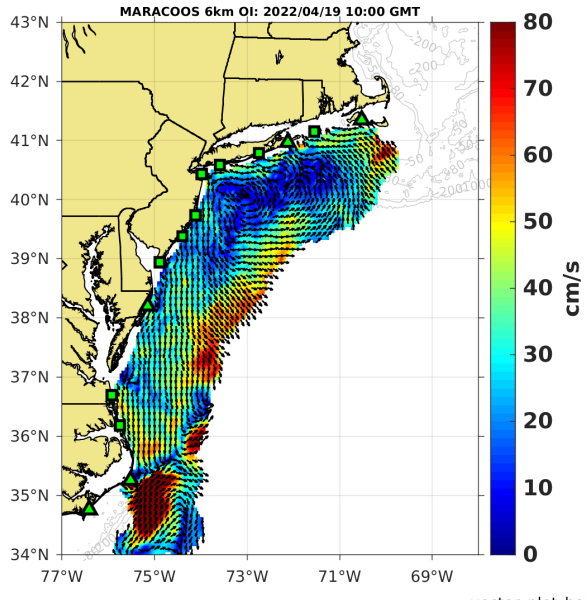
Mid Atlantic HF Radar Coverage

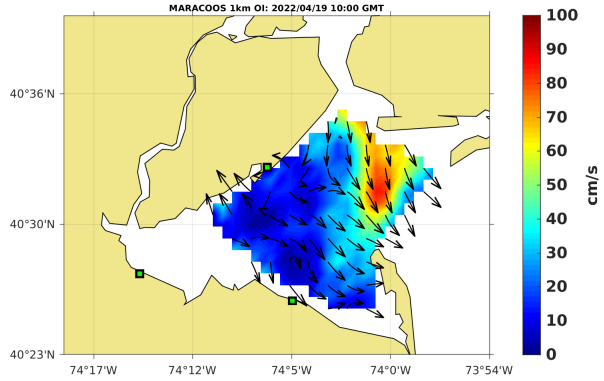
Total Vector Coverage, 6km Feb01-Jul31 2022

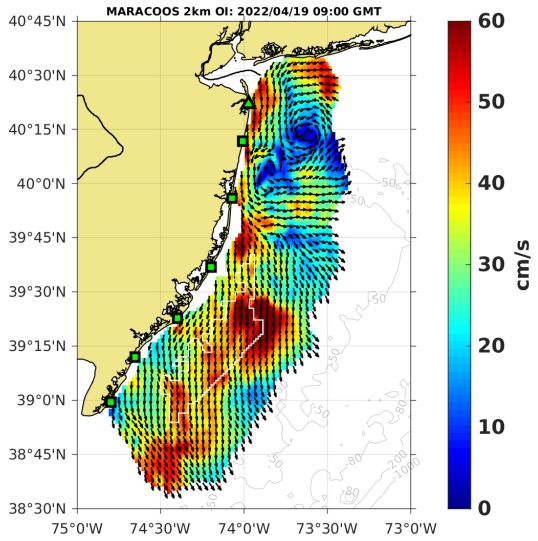


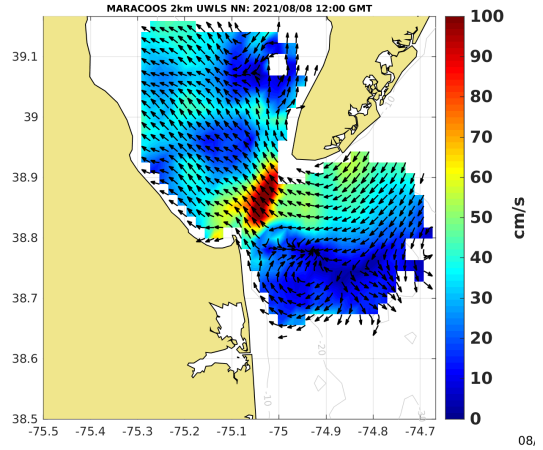
Subregional Coverage

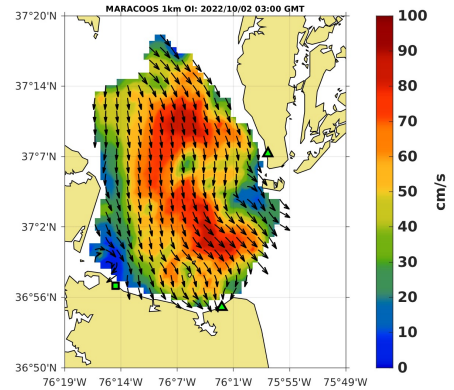
Region	Covered by HF Radar
Mid Atlantic Shelf	40%
Block Island Sound	48%
Long Island Sound	8%
NY Harbor	36%
Delaware Bay	37%
Chesapeake Bay	7%



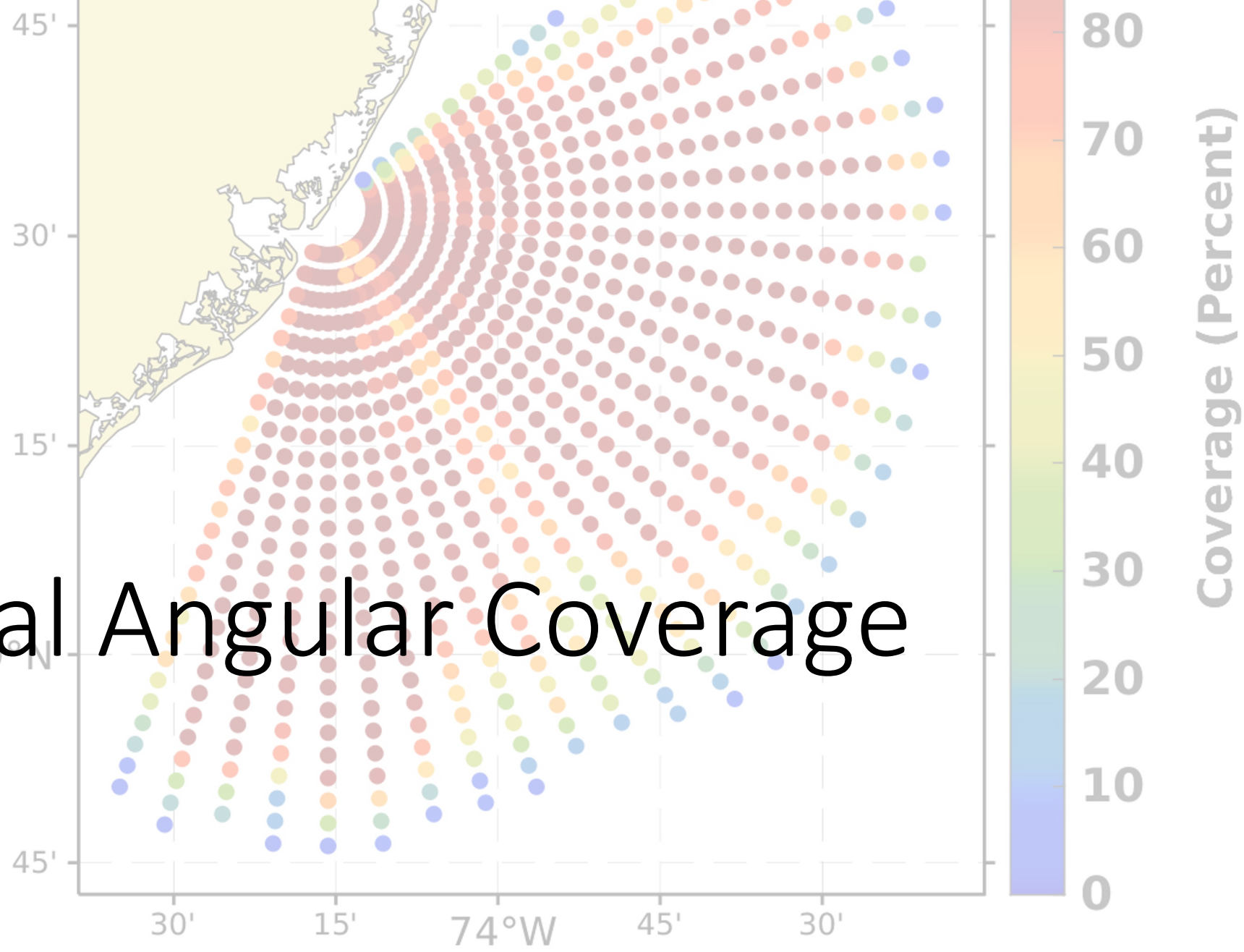




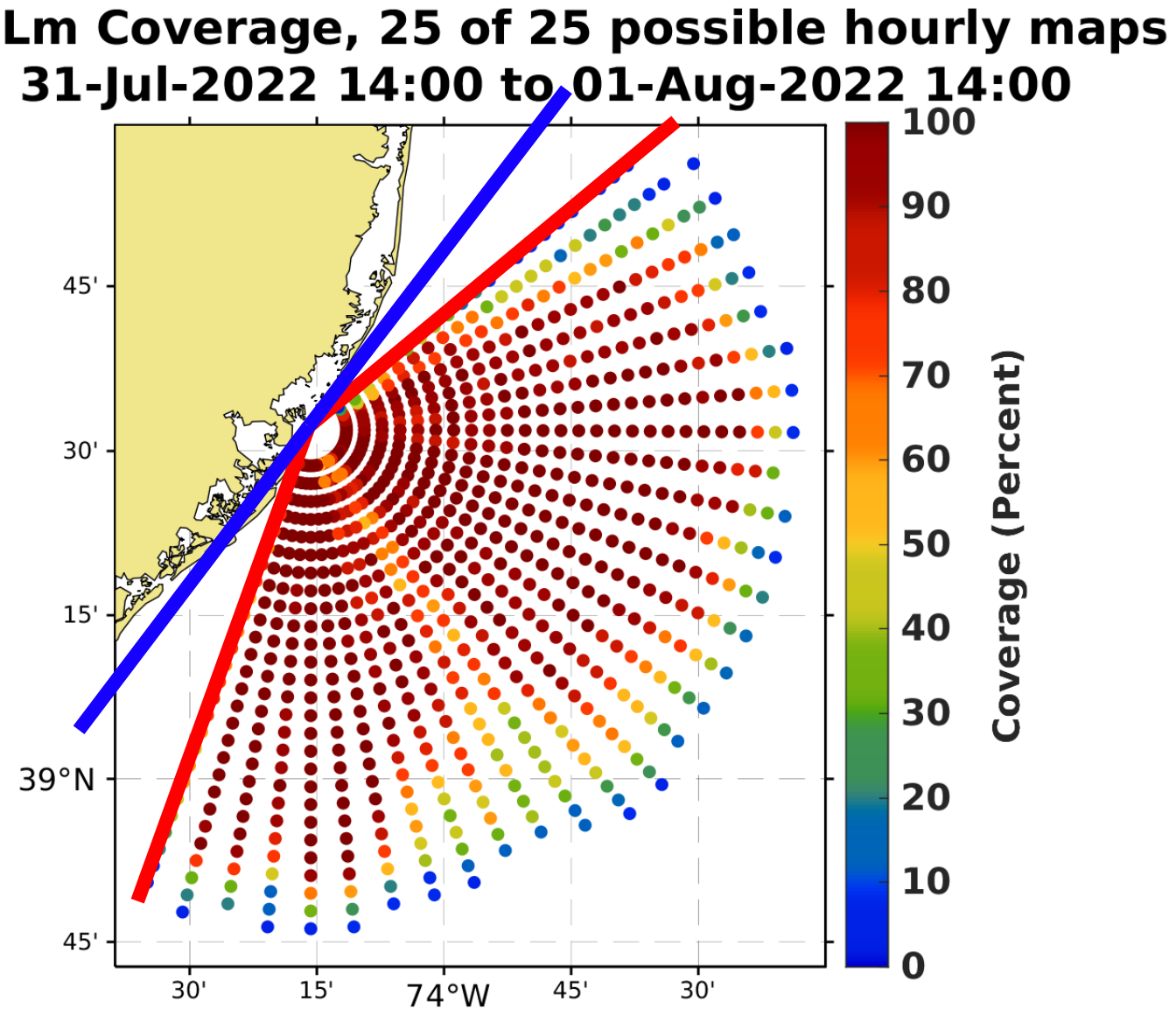




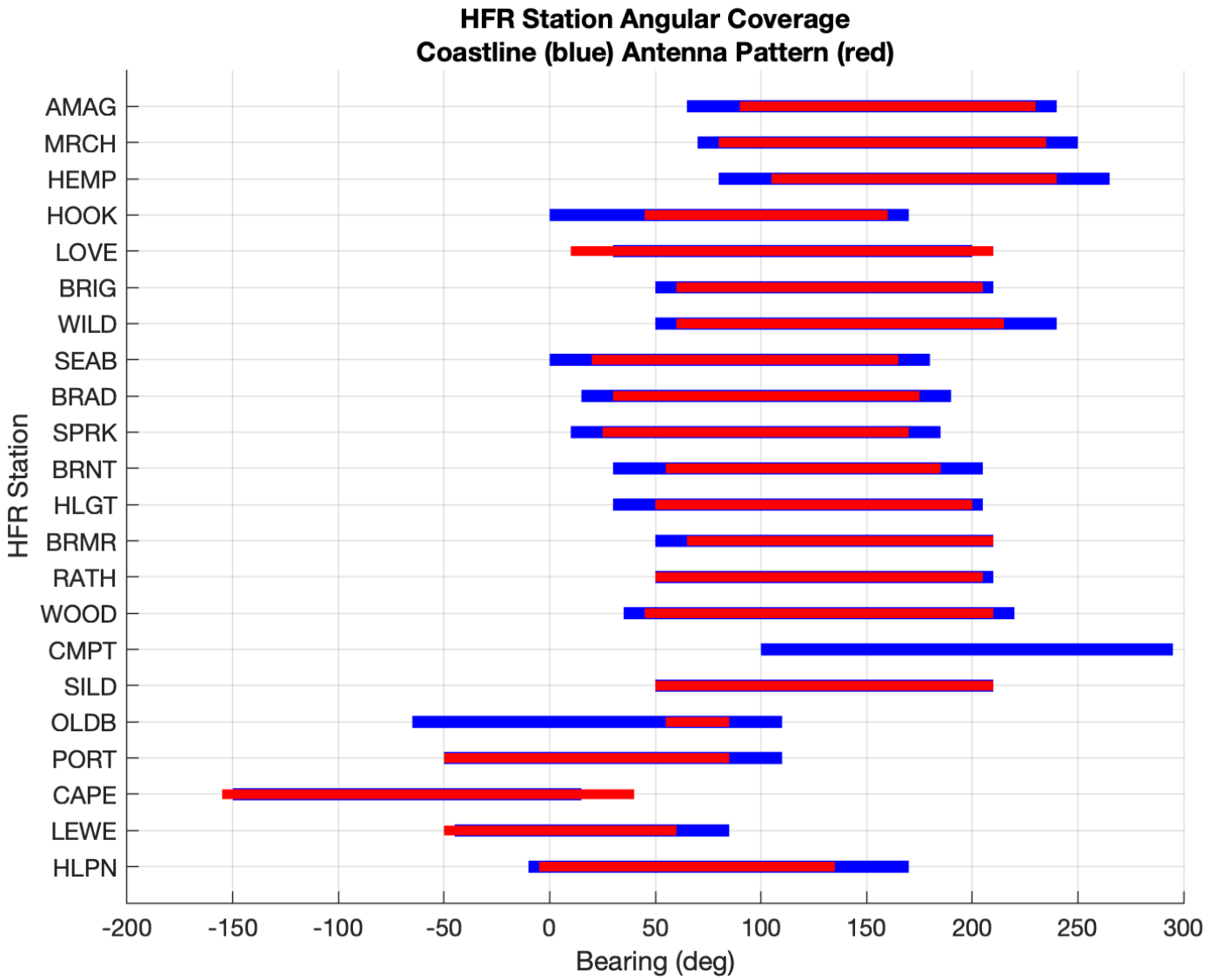
Radial Angular Coverage



Radial Angular Coverage



Radial Angular Coverage



Coastline Bearing Angles

Radar Angular Coverage

On average the stations listed cover 83% of the over water angular swath between the coastlines.

Conclusions

- Knowing the water surface area of the Mid Atlantic helps develop requirements for ocean observing
- Utilizing boundaries provided by IOOS we refined the shape file to better represent the coastline and improve the surface water calculations
- We also quantified the angular coverage we expect the radars to provide on a consistent basis

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Thanks

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