Creating a *Virginia* Ocean Plan
June 8, 2021 Presentation to VOWDA

Virginia Coastal Zone
MANAGEMENT PROGRAM

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

11 Years Ago (2009) Created MARCO: 5 State Governors' Agreement

MARCO

MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

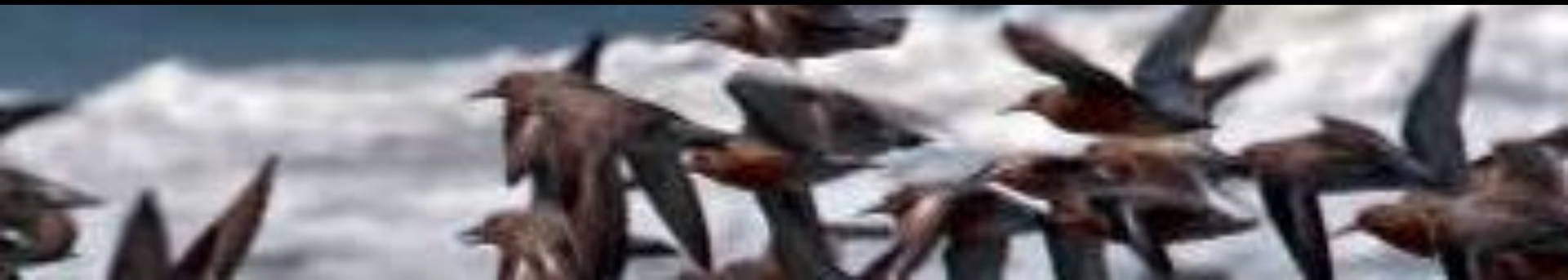
DAVID A. PATERSON *New York* | JON S. CORZINE *New Jersey* | JACK MARKELL *Delaware* | MARTIN J. O'MALLEY *Maryland* | TIMOTHY M. KAINE *Virginia*

Mid-Atlantic Governors' Agreement on Ocean Conservation

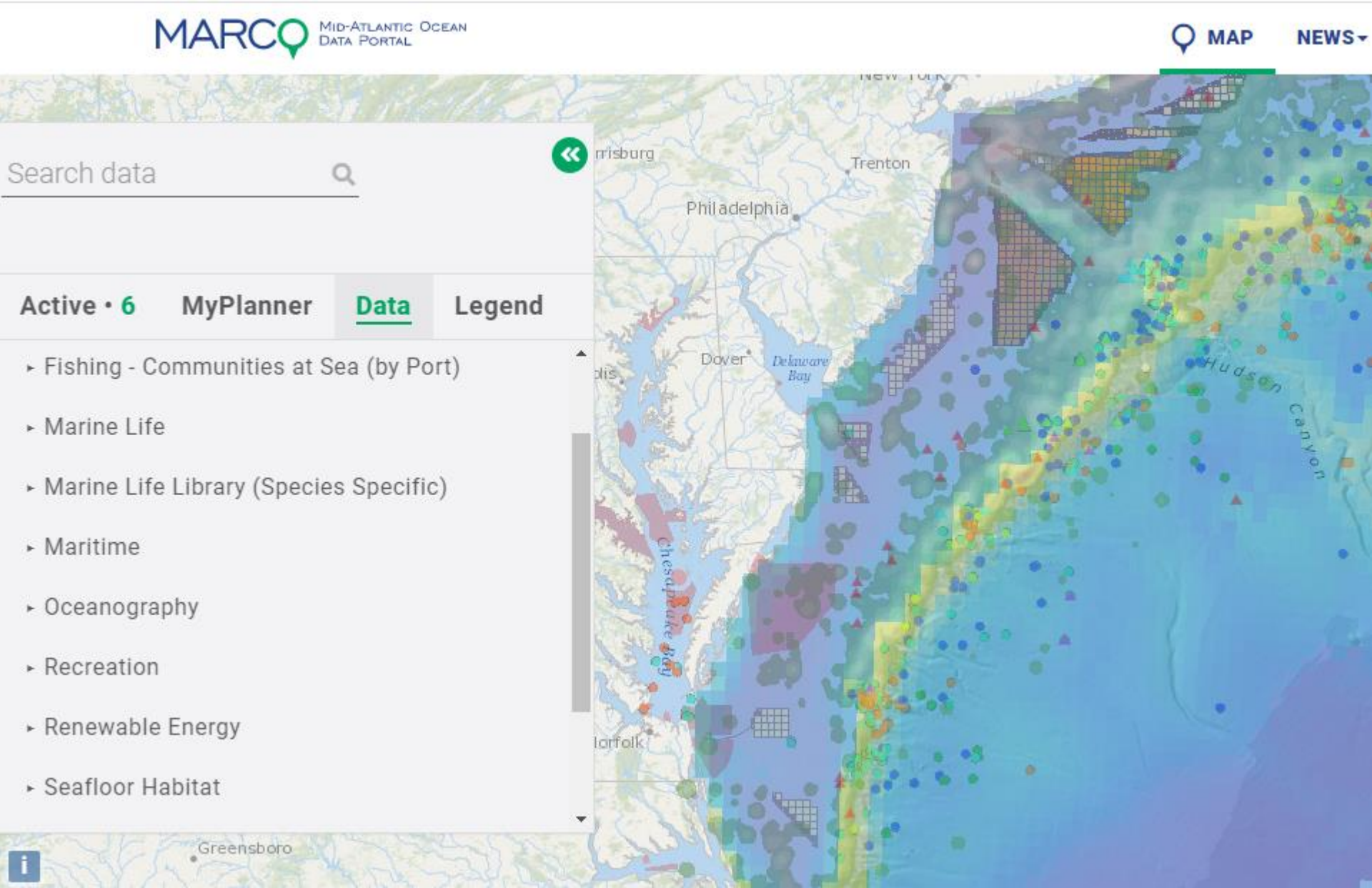
A Rising Tide of New Challenges

The ocean waters of the Mid-Atlantic, stretching from New York to Virginia, provide a wealth of economic and

1. Promotion of Offshore Renewable Energy
2. Ocean Habitat Protection
3. Ocean Water Quality
4. Regional Climate Adaptation



2010 Created MARCO Ocean Data Portal



MARCO Mid-Atlantic Ocean Data Portal

Welcome to the Mid-Atlantic Ocean Data Portal, an ocean planning resource center, and the Marine Planner, an Interactive mapping tool.

Sign up for our email list →

Data Catalog

The Data Catalog offers background information, download options, metadata and important links pertaining to map layers found on the Portal. You can explore the data available under each of the Portal's themes below.

To learn more about how data is selected for inclusion in the Portal, read our Spatial data evaluation and criteria (pdf) fact sheet.

20 **Administrative**

Numerous federal, regional, and state political and management boundaries of the Mid-Atlantic are compiled here to provide a regulatory context to help facilitate well-informed ocean planning decisions.

142 **Fishing**

Explore dozens of maps depicting the extent and locations of commercial and recreational fishing activities throughout the upper East Coast.

7 **Fishing - Communities at Sea (by Port)**

Search nearly 1,000 maps showing commercial fishing activity by several gear types for 200 individual ports along the East Coast.

538 **Marine Life**

The Mid-Atlantic region is well known for nutrient-rich and

13 **Marine Life Library (Species Specific)**

The Marine Life Library is home

129 **Maritime**

The Mid-Atlantic ports are some of the busiest in the nation's

188 **Oceanography**

From the depths of the Mid-Atlantic's submarine canyons to its sandy beaches, explore the physical and chemical properties of the ocean through our Oceanography theme, now under development.

21 **Recreation**

The Mid-Atlantic boasts countless opportunities for entertainment and leisure activities and has flourishing travel, tourism, and outdoor recreation industries, many of which are focused on the region

33 **Renewable Energy**

Offshore wind in the Mid-Atlant holds more than 60,000 Megawatts of potential energy that's 10% of total U.S. offshor potential. This huge resource could help meet the growing electricity demand in the regior

54 **Seafloor Habitat**

From its vast, gently sloping continental shelf to its steep, rocky canyons, the region's seafloor terrains support diverse and vibrant ecosystems.

10 **Security**

The Mid-Atlantic is home to important naval installations and training areas, and it's a busy corridor for commercial shipping and naval and other defense and security operations.

6 **Socioeconomic**

Learn about the ocean's value t your local economy with the Portal's Socioeconomic data. The map data are derived from the Economics: National Ocean Watch (ENOW) Explorer database, available through...

12 **Water Quality**

A healthy ocean ecosystem is

2011-15 Implemented 1st Section 309 5-Year Virginia CZM Ocean Strategy

Thought we'd create a Virginia Ocean Plan

2012 Recreational Use Data

Virginia Coastal Zone MANAGEMENT PROGRAM VCU

Map | Results

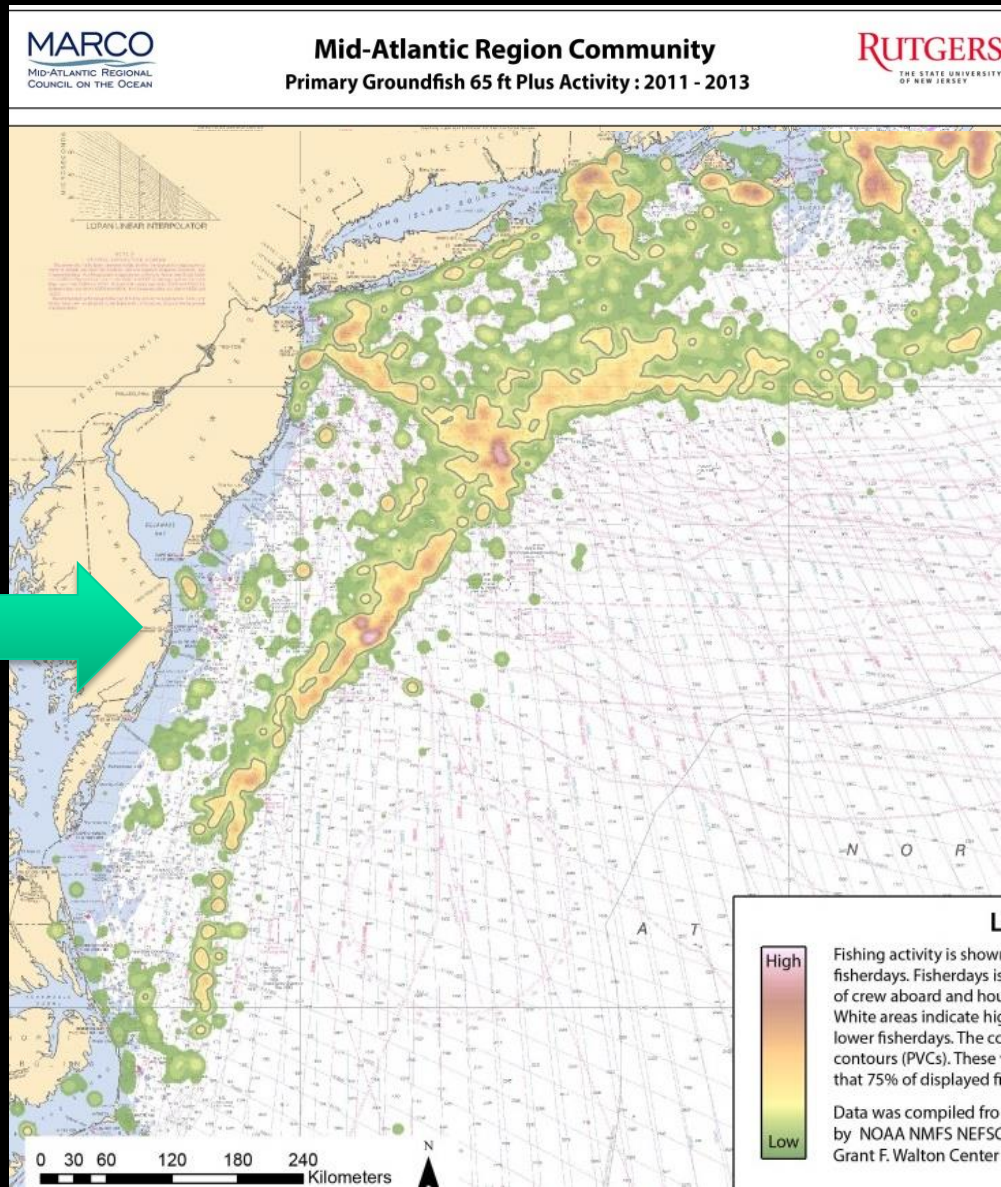
Tools | Print | Bookmarks

Atlantic Coast Recreational Use

40% Transparent

- Scenic/Natural Views
- Historic/Cultural
- Swimming
- Surface Water Sports
- Shore Use
- Sailing
- Paddling
- Motorized Boating
- Recreational Waterfowl Hunting
- Recreational Shellfish Harvesting
- Recreational Shore Fishing
- Recreational Kayak/Non-Motorized Vessel Fishing
- Charter Transport
- Charter Scenic Viewing
- Charter Wildlife Viewing
- Charter Party Cruises
- Charter Diving/Snorkeling
- Charter Fishing (Large Vessel)
- Charter Fishing (Small Vessel)
  - dominant
  - footprint
- Recreational Dive Fishing
- SCUBA/Snorkeling/Diving

Vetted “Communities at Sea” Fishing Maps



Vetted “Communities at Sea” Commercial Fishing Maps

2012-15 Created Whale Data: Grant to VA Aquarium

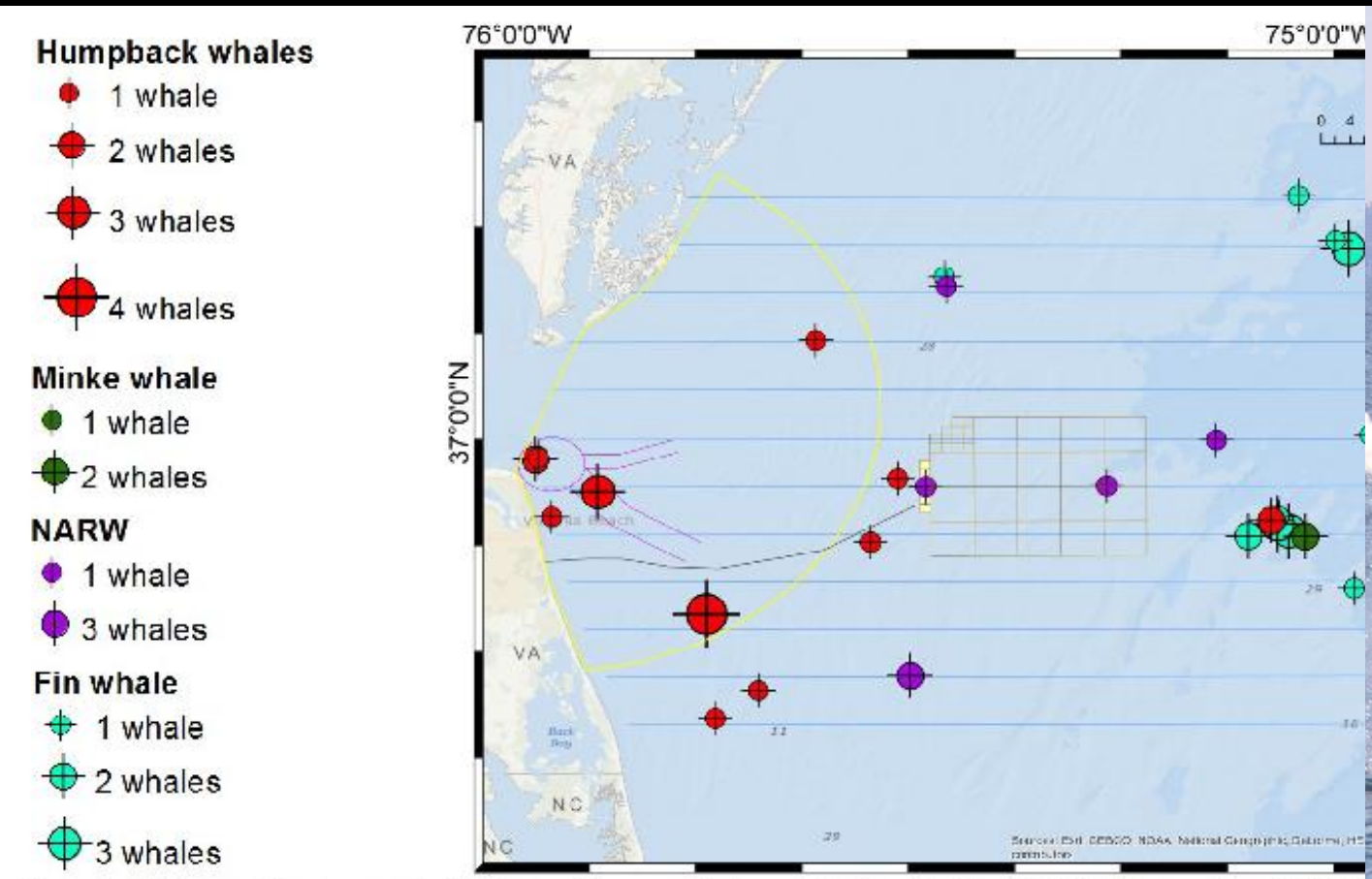
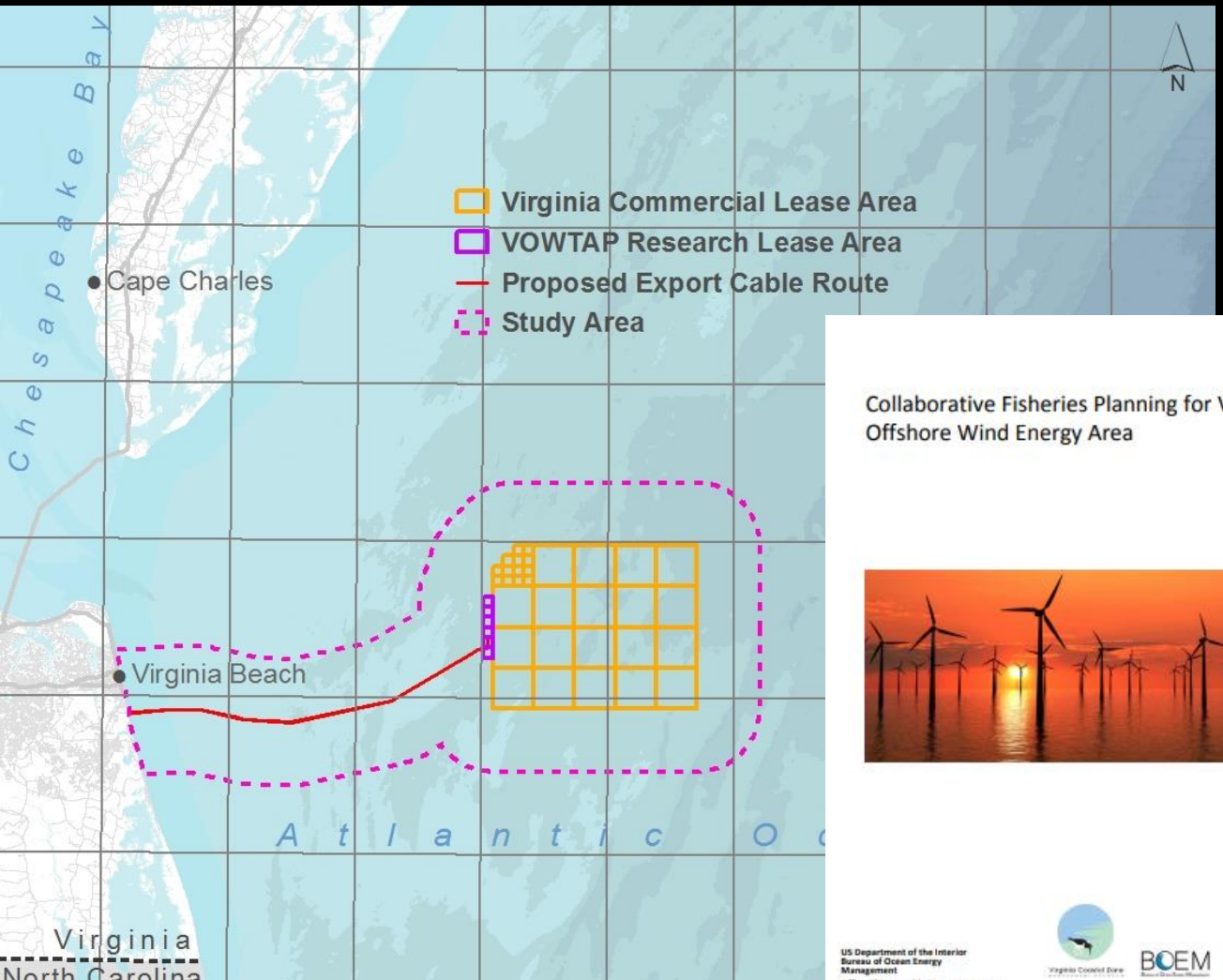


Figure 1. All large whales documented during aerial surveys in the proximity of the Virginia Wind Energy Area (VA WE
2012 through March 2015. Size of each point reflects groups size.

Aerial surveys were funded under Virginia Coastal Zone Management Grant NA14NOS4190141 Task 95.04

2013 Mid-Atlantic Regional Planning Body is established to create a Mid-Atlantic Plan

2015 CZM Receives $236k grant from BOEM & DMME for Fisheries Planning in and around Virginia's Wind Energy Area



2016 -2020 Implemented 2nd Section 309 5-Year CZM Ocean Strategy – to support Mid-Atlantic Plan

$110k/year for stakeholder coordinator and ocean data

2016 CZM Grant to to VCU for Research on Electromagnetic Effects on Fish

Electromagnetic Field Effects on Marine Fishes in the Mid-Atlantic

Wind Farms and Electromagnetic Fields

Many countries around the world, including the United States, are looking for ways to increase the amount of electricity generated through renewable energy sources. For coastal states, Virginia included, this has led to an exploration into offshore wind energy. As offshore wind farms develop, it is important to investigate potential impacts to the ocean ecosystem. This document summarizes the current state of knowledge regarding interactions between marine fish species and the Electromagnetic Field (EMF) emitted from transmission cables.

Along the east coast, several offshore wind farms are in development and one is already operational. The Block Island Wind Farm off of Rhode Island was the first commercial offshore wind farm in the United States. Similar projects in Maryland, New Jersey, and Virginia are in various stages of development.

Twenty-seven miles off the coast, Virginia is moving forward on the mid-Atlantic's first offshore wind project in a federal lease area. Virginia is working with Dominion Energy and Ørsted Energy of Denmark, a global leader in offshore wind development, to build two 6-megawatt turbines in the Coastal Virginia Offshore Wind (CVOW) research lease area.

Individual turbines in offshore wind farms typically connect to one or more main transmission power cables leading back to the mainland. These high voltage underground cables

What are Electromagnetic Fields?

Electromagnetic fields, otherwise known as EMF, include fields emitted from both electric and magnetic sources. EMFs are generated naturally as well as by human activities. Magnetic fields are used for orientation and migration by some fish and animals. Electric fields allow fish to detect prey and predators which assists with feeding and predator avoidance.

emit a measurable EMF (although the field emitted has been shown to be less than that of typical household appliances[1]). An EMF can be measured in terms of the intensity of both the magnetic and electric fields, as well as its frequency.[2]

Because some fish use the Earth's magnetic fields for navigation and other fish detect electric fields as part of their search for prey, EMF associated with transmission cables has been studied for its impacts on fish behavior. Research to understand how EMF affects fish has focused on the most sensitive species to determine whether significant negative or positive impacts are associated with exposure to these introduced sources of EMF.

What do we know about cables and burial?

Two types of cables may be used in transferring wind generated electricity in coastal waters in the United States: alternating current (AC) and direct current (DC). AC power transmission cables are used extensively in Europe for offshore energy facilities, and many of the offshore wind projects proposed in the US.[3] Smaller interarray cables are used to connect the turbines and a larger export cable takes the electricity to shore.

Cables are covered in sheathing to protect the cable and minimize the electric field from affecting the external environment. This sheathing usually includes steel wires or tape around the cables to enhance the mechanical strength of the cable, and the thicker the sheathing materials the weaker the strength of the EMF outside the cable.[4] The cables are generally buried by ocean currents or trenched at a depth of about 6 feet, so benthic and demersal (bottom and near bottom) fish and shellfish are more exposed to EMF than species living elsewhere in the water column. Burying the cables is a way to mitigate EMF exposure, and the EMF measured above buried cables becomes equal to natural background EMF within a few meters of the cable.[5]

Coastal Virginia Offshore Wind (CVOW) area off the coast of Virginia Beach, VA.

VCU Virginia Coastal Zone Management Program bit.ly/VirginiaWind

What do we know about how marine species are impacted by EMF?

The Bureau of Ocean Energy Management (BOEM) has evaluated published research to summarize the potential effects of EMF on both demersal (bottom species) and pelagic (open water) fish and shellfish species. Reported information on actual sensitivity to EMF exists only for a handful of the most sensitive species, as this research is still developing.[3] Research findings are summarized below and effects are noted by the following legend:

B Behavior M Migration & movement V Vital Signs

Bony Fishes (B M V)

Different species of bony fishes respond differently to EMF exposure.

- Atlantic cod do exhibit some sensitivity toward emitted EMF.[3]
- European flounder exhibited no response to EMF.[4]
- Potential orientation and navigation effects were documented on Atlantic, King, and Spanish mackerel species.[3]
- Salmon and trout species detect magnetic fields to help determine their migratory patterns and EMF could disrupt migration behavior.[3]
- Some behavioral and anatomical responses by Yellowfin tuna have been reported.[3]
- Salmon have elevated heart rates in some EMF ranges.[3]
- Chinook salmon and green sturgeon migration was not impeded by an HVDC cable.[6]
- EMFs can slow embryonic development of brown trout and rainbow trout in freshwater environments.[3]
- EMF can change blood circulation in embryos and larvae of pike, carp, and brown trout.[3]
- There are conflicting reports on whether or not EMF affects predator and prey detection and navigation in sturgeon species.[3,10]

Eels (M V)

- European eels decrease their swimming speed as they pass over cables; the effect is short-lived and determined to be of minor significance.[11]
- Eels have elevated heart-rates when exposed to certain levels of EMF.[3]

Sharks (B M)

- Sharks and rays are 14,000 times more sensitive to EMF than bony fish.[13]
- Scientists have found evidence of EMF effects on multiple species of sharks and rays including prey and predator detection and navigation issues.[3]
- Attraction to cables varies by species and the intensity of the emitted EMF; some species are attracted to the cables while others are repelled.[12,14]
- Some species of sharks can detect buried cables up to 20 meters away.[3]
- Some species have been shown to attack exposed electrodes emitting EMF in some instances.[15]
- Sandy dogfish, *Scyliorhinus ceniola*, were found to non-randomly associate nearer to the cables when energized.[16]

Skates & Rays (B M)

Skate species differ in their responses to EMF exposure including:

- Little Skates (*Leucoraja erinacea*) traveled farther but more slowly which could mean higher energetic costs.[3]
- *L. erinacea* make larger turns, which could be attributed to increased exploratory activity and/or area restricted foraging behavior.[3]
- Thornback skates (*Raja clavata*) exhibited a response to the EMF from an energized cable; the response was variable and not predictable.[16]

Shellfish (B M)

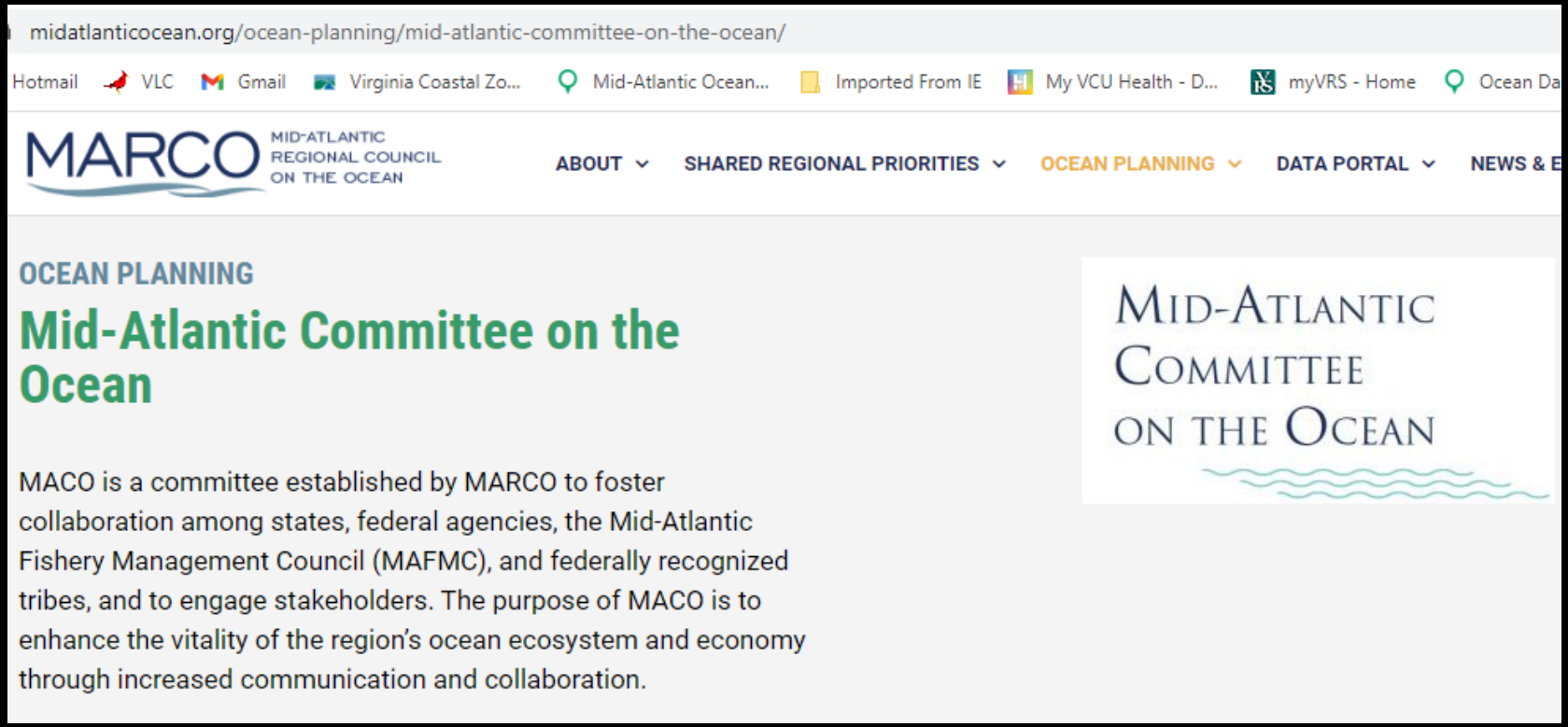
The American lobster had small behavioral responses to EMF exposure including:

- Lobsters were observed making larger turns while foraging.[3]
- Small behavior effects on the lobsters that did not act as a barrier to movement.[3]

VCU Virginia Coastal Zone Management Program bit.ly/VirginiaWind

2016 (Dec) Mid-Atlantic Ocean Action Plan Approved by Obama Administration

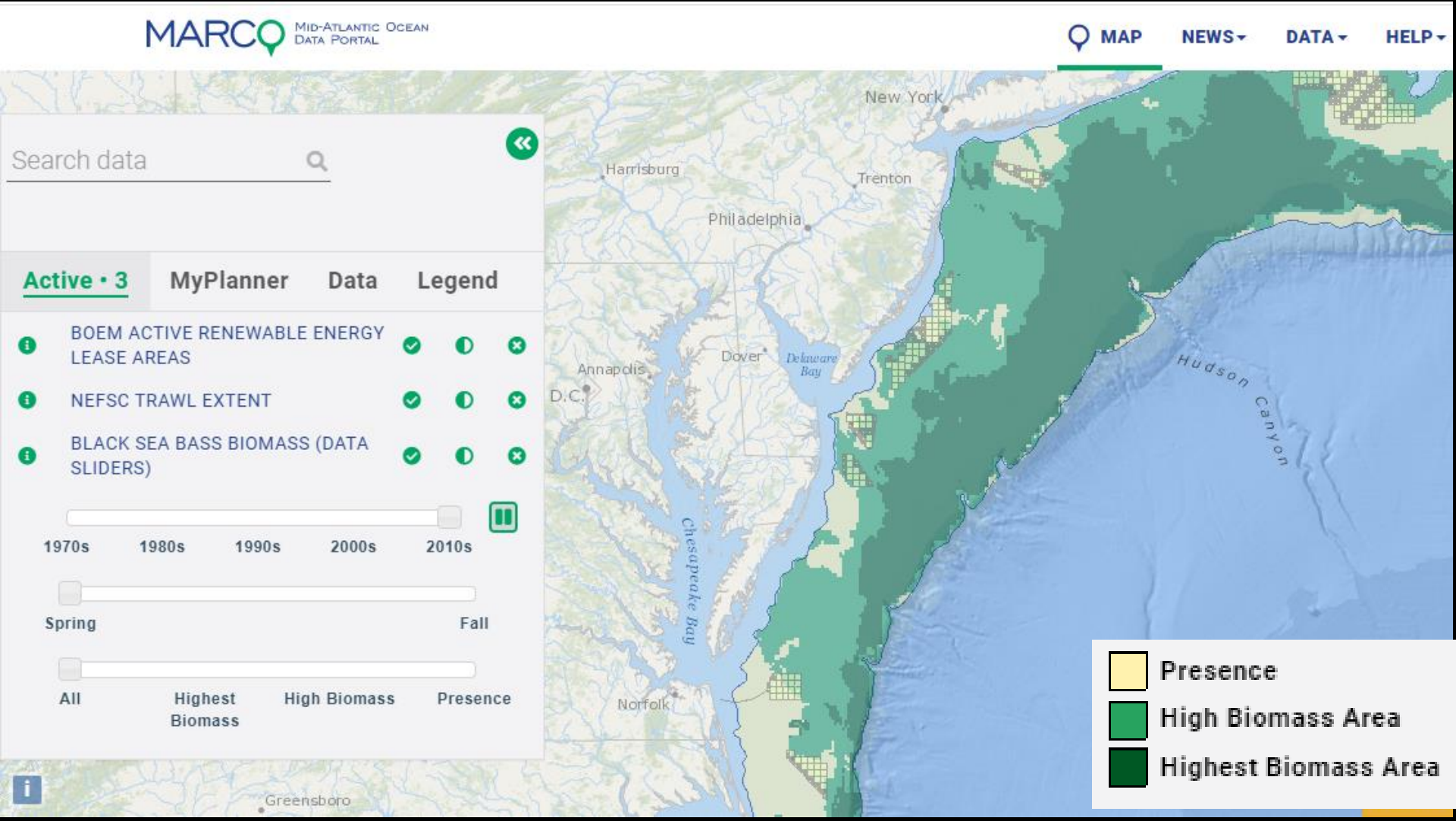
2018 Trump EO 13840 revokes 2010 Obama EO on Regional Ocean Planning



MARCO creates "MACO"

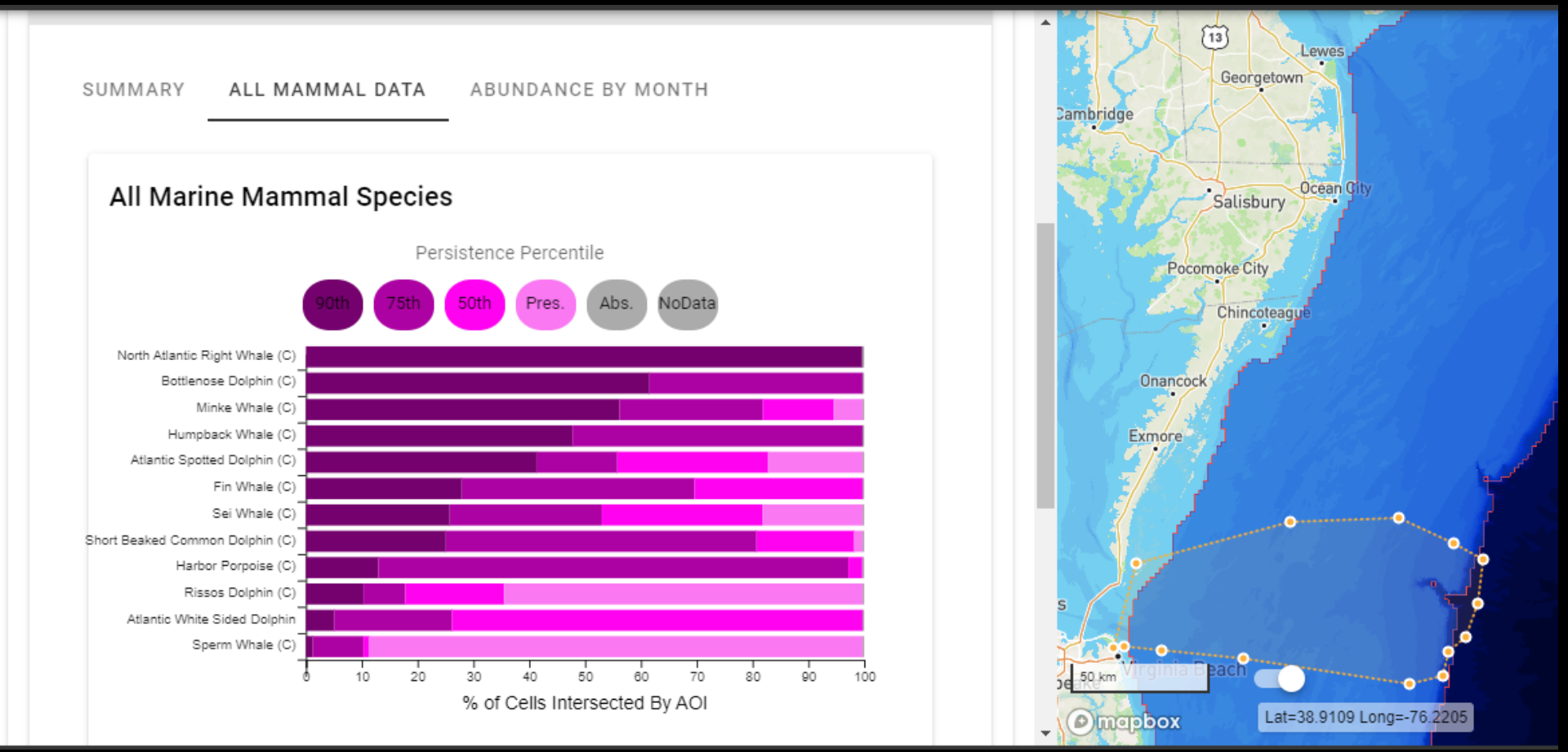
Mid-Atlantic Committee on the Ocean to re-engage federal agencies, tribes and fishery management council

2018-19 CZM Funds “Fish Through Time”



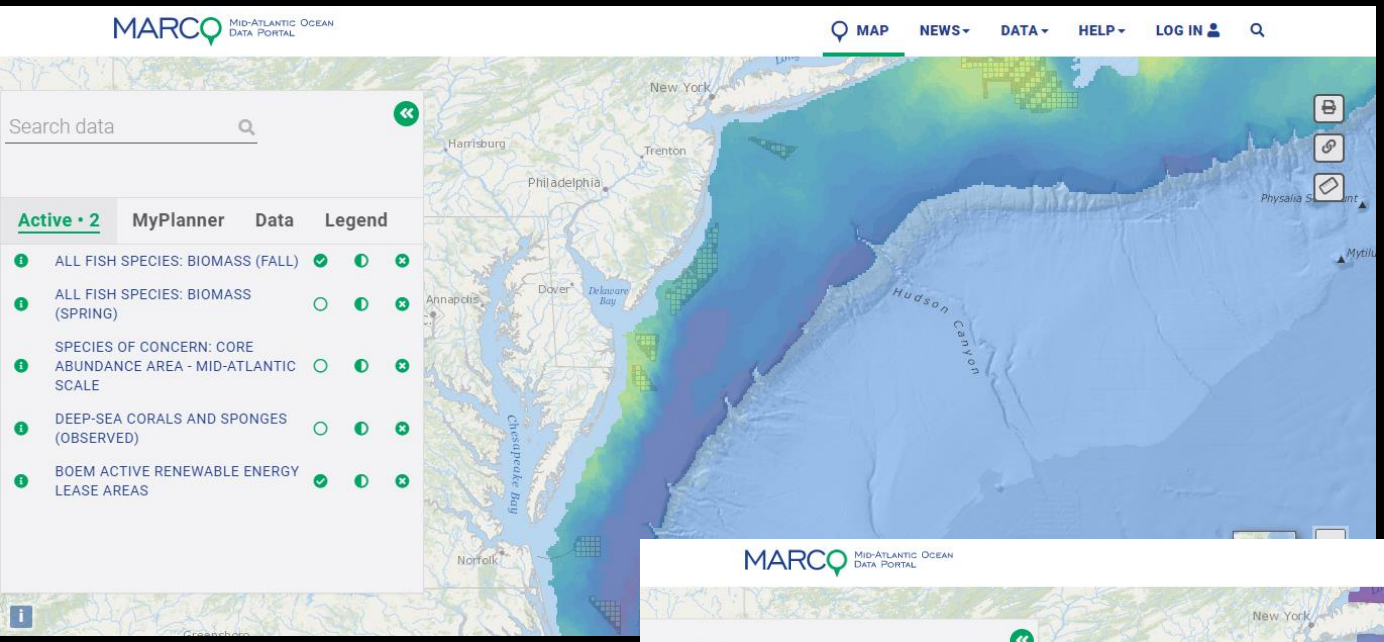
Animated maps of core abundance of 17 fish species over time and future projections.

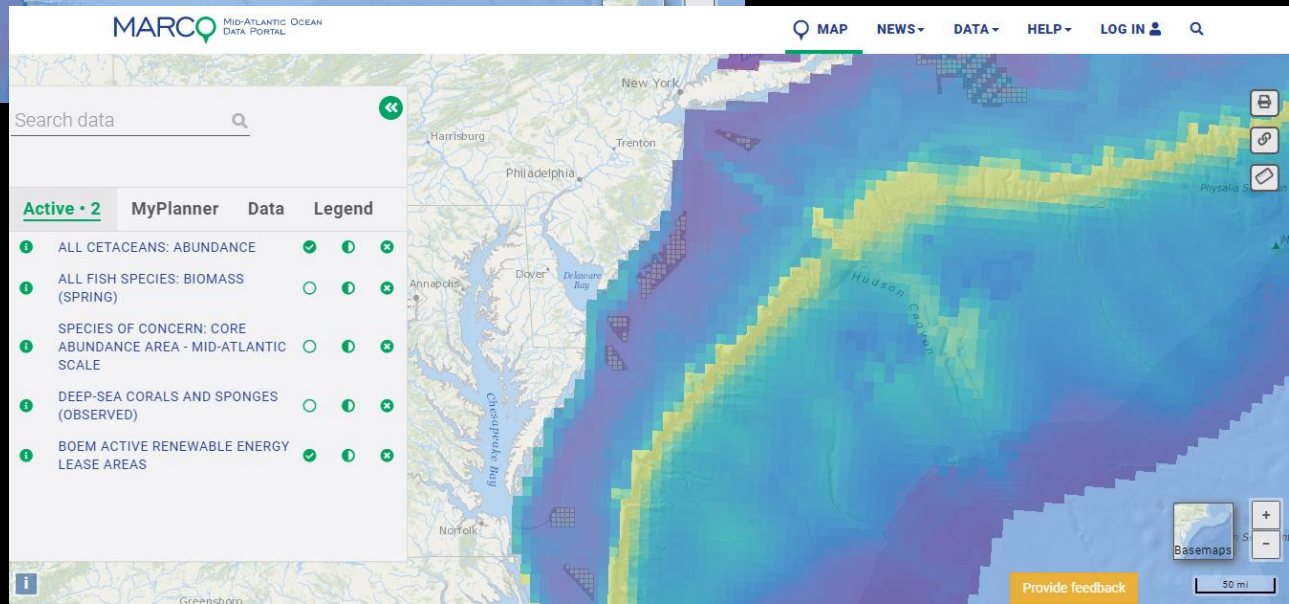
2019-20 CZM helps fund wind siting tool



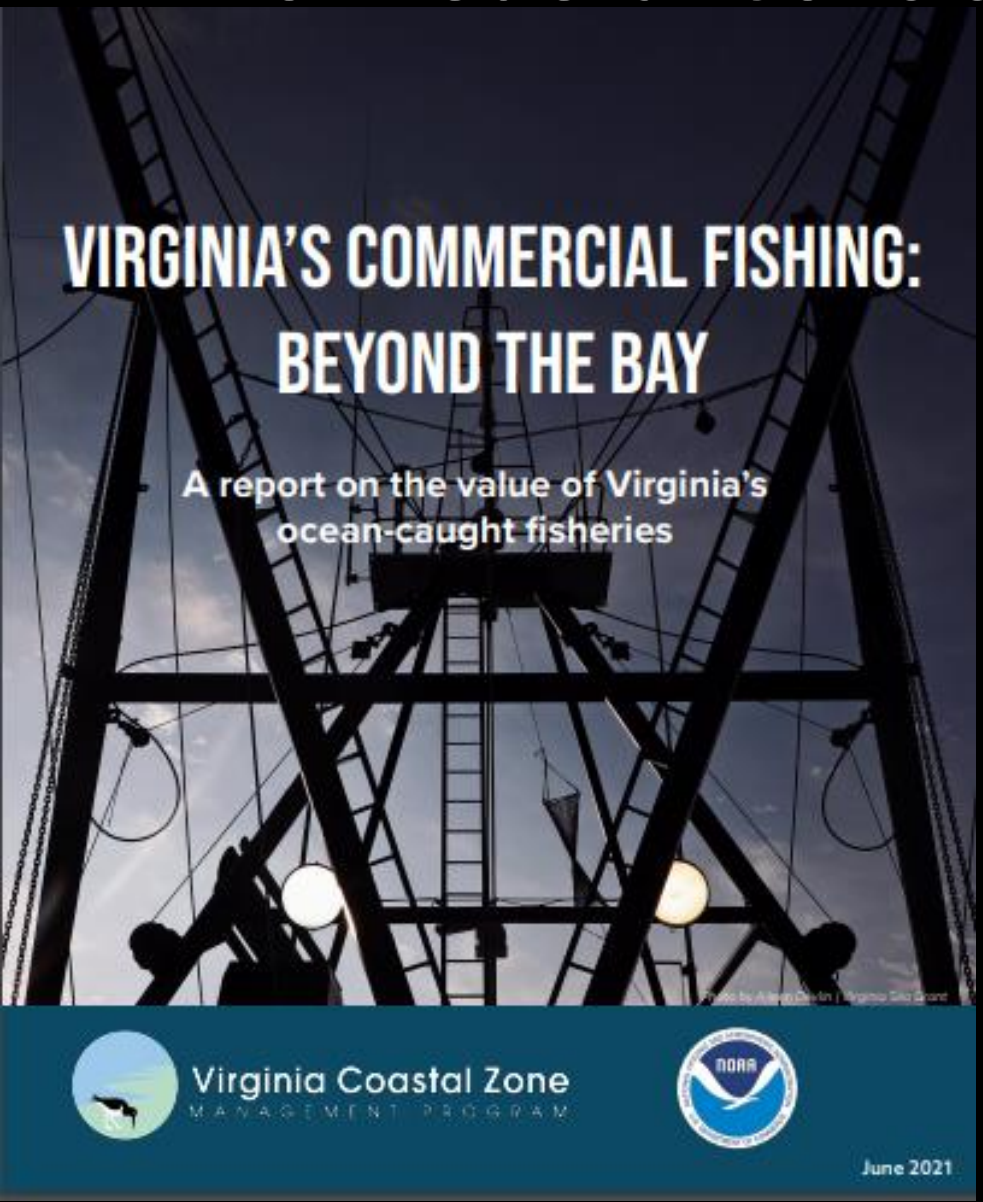
Tool allows you to draw a polygon and receive reports of marine life relative abundance in that area.

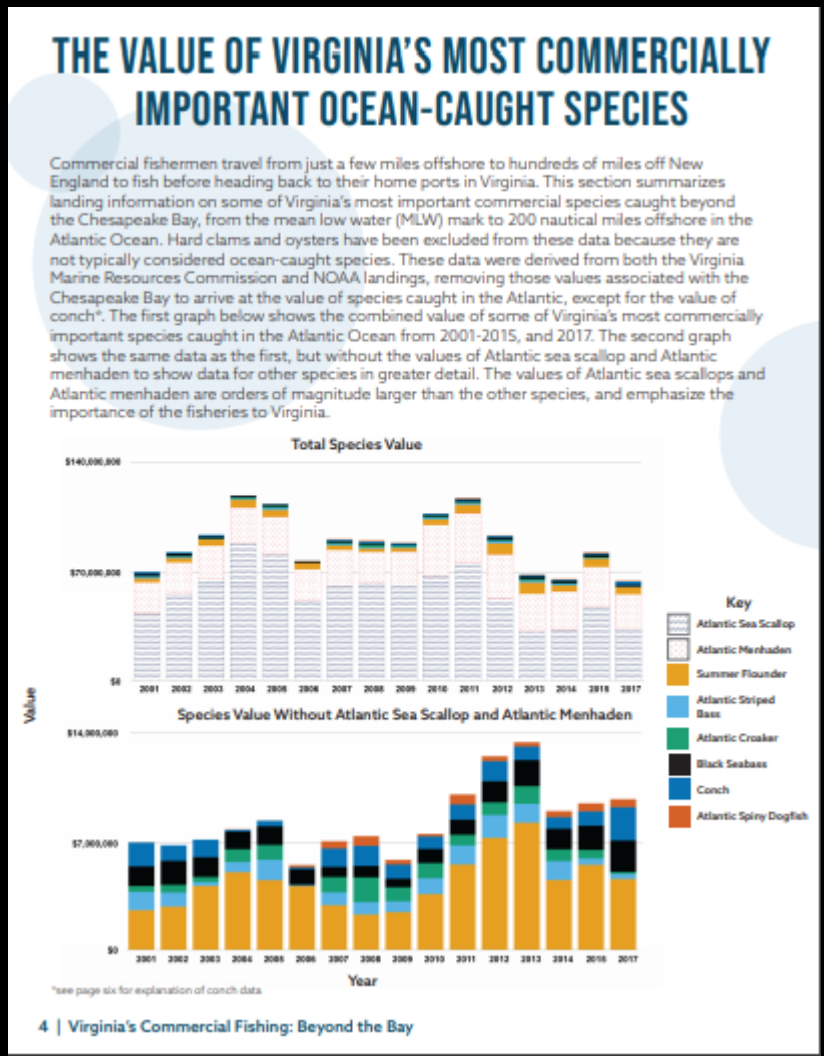
2019 and 2020 NOAA Grants to MARCO to Improve Fisheries and Wildlife Data





2019-20 CZM funds development of GLDs for Federal Consistency Purposes





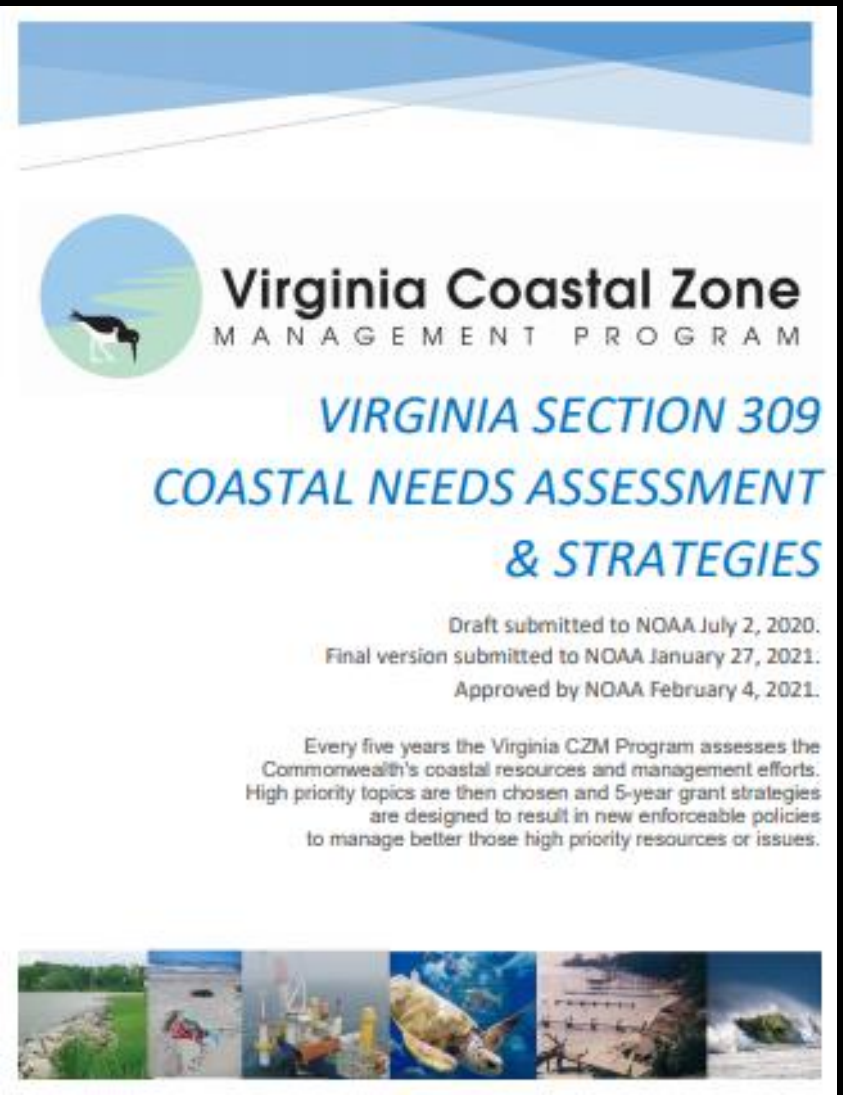
Summer 2020 1st Two Turbines in Federal Waters & Dominion Files COP in Dec 2020

2,600 MW from about 186, 14MW turbines by 2026

2024-2026

Construction and commissioning

2021-25: 3rd CZM Ocean Strategy



- Develop a Virginia Ocean Plan
- $183k/year for 5 years
- NOAA-approved
- Includes stakeholder engagement in :
  - ***Policy*** development
  - ID of additional ***OSW lease area(s),*** offshore ***aquaculture*** areas and potential ***conservation*** areas in support of 30% by 2030 goal
  - Refinement & implementation of VA ***ocean acidification*** plan
  - Incorporation of ***marine mammal/sea turtle conservation*** plans

Year One October 2021 – September 2022

92.01	W&M/CPC	OR: Virginia Ocean Plan Policies (1.49 FTE)	$60,000	$0	$60,000	$183,000
92.02	VCU	OR: Virginia Ocean Plan Stakeholder Engagement (.35 FTE)	$44,000	$0	$44,000	
92.03	DWR	OR: Integration of Marine Mammal/Sea Turtle Conservation into Virginia Ocean Plan (.48 FTE)	$50,000	$0	$50,000	
92.04	CSSF	OR: MARCO Liaison to Virginia Ocean Plan (.31 FTE)	$29,000	$0	$29,000	

https://www.deq.virginia.gov/home/showpublisheddocument/8346/637540014441970000

Questions?