Audubon

Wind Energy and Bird Conservation: We Can Do Both

WHEN WE ORGANIZE, WE TAKE FLIGHT

UNIVERSITY OF DELAWARE

Virtual Knowledge Exchange
June 30, 2020

Agenda

- Moderator – Marisa Vertrees, Audubon
- Background and Motivations – Bonnie Ram, University of Delaware
- Audubon's Climate Report – Dave Curson, Audubon
- The MD Electricity System & Proposed Offshore Wind Projects – Bonnie Ram
- The State of the Science – Garry George, Audubon
- Q&A - All

Background

- **Research grant ---** First State Marine Wind, University of Delaware
  - Climate change and low carbon energy transitions
  - Strong cluster of subject matter experts (Center for Research in Wind)
  - Focus on social and environmental risks and uncertainties

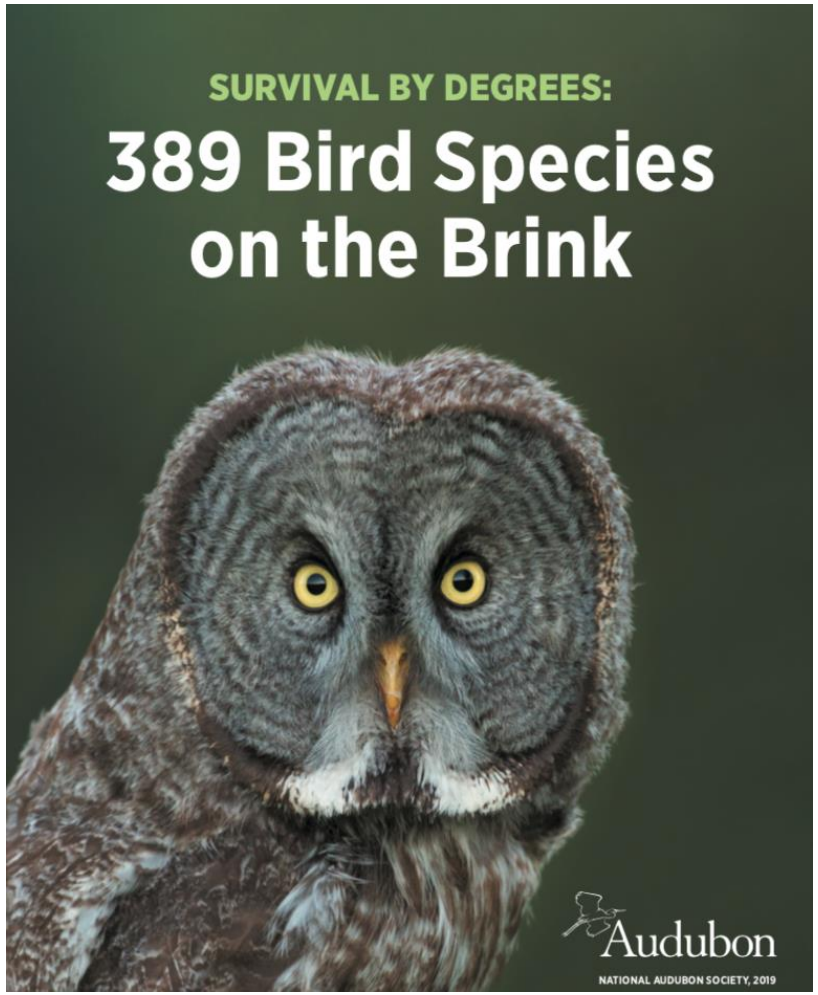
- **Co-Hosts:**
  - Kathy Phillips, Executive Director, Assateague Coastal Trust
  - David Curson, Director of Bird Conservation and Interim Executive Director, Audubon Chapter (DC-MD)

Motivations for Our Meeting today

- Climate change urgencies to reduce CO_2 and other GHGs while transitioning to a low carbon electricity system
- Focus on offshore wind as one of the only utility scale low-carbon electricity sources available now
- Address selected environmental siting challenges and uncertainties, particularly bird conservation
- Highlight how our members and others in the local communities can engage during the decision process.

Dave Curson

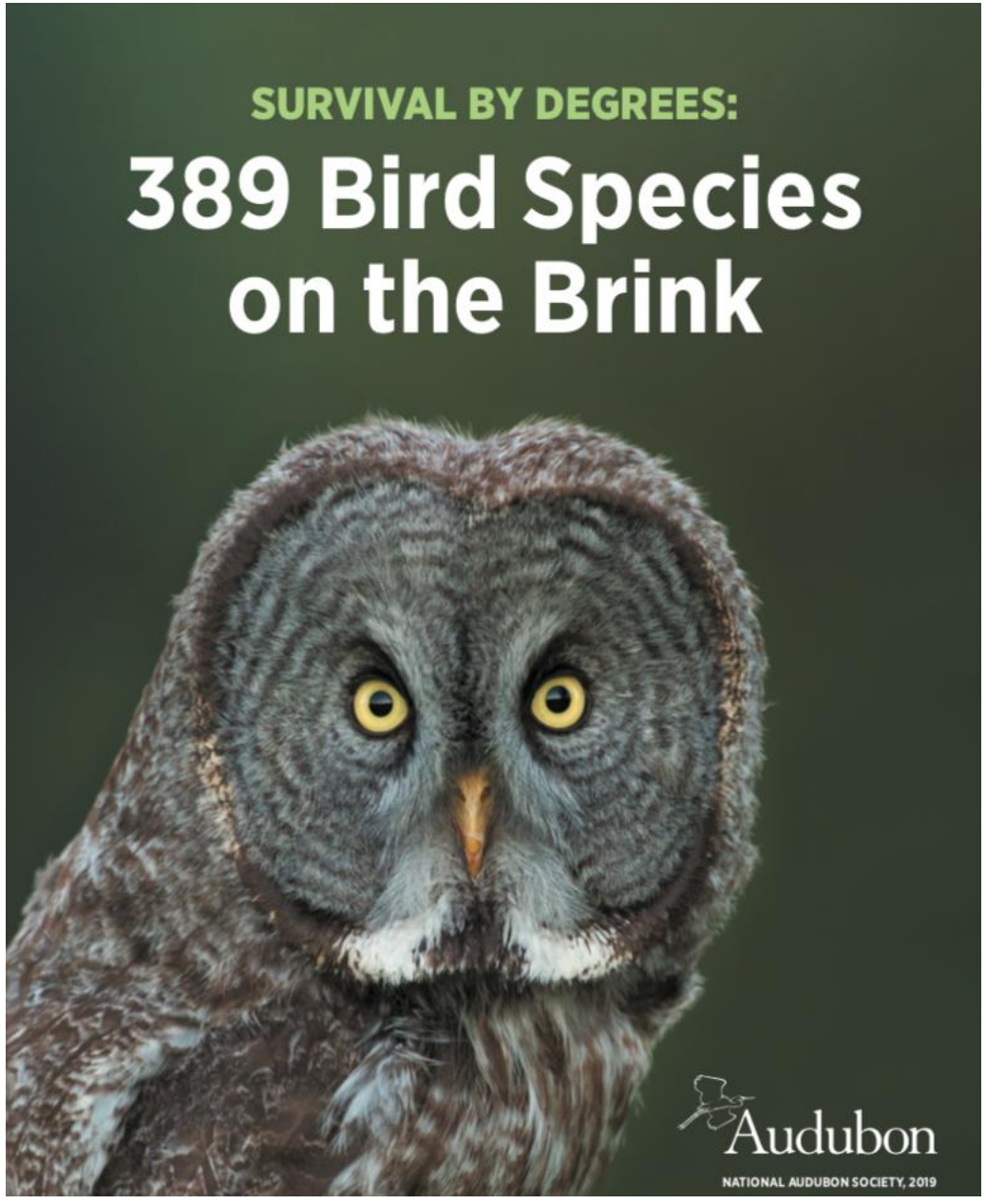
Director of Bird Conservation (MD-DC Chapter)



Audubon's Climate Report 2019
Survival By Degrees

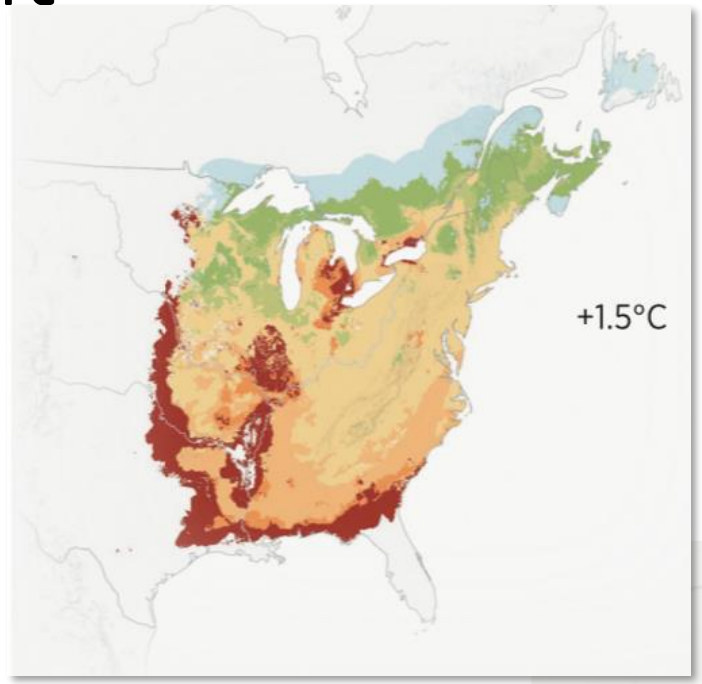
- Big data. 140 million bird observations. Climate models, vegetation, land use.
- 604 species analyzed.
- View species results on climate visualizer.

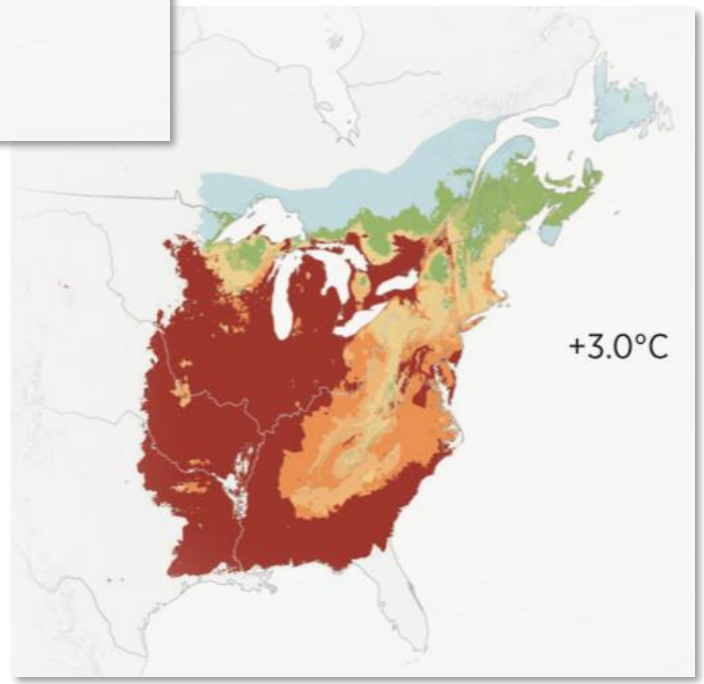
- https://www.audubon.org/climate/survivalbydegrees



Vulnerability Assessment

projection





- Wood Thrush

BOTTOM LINE

BAD NEWS: Two-thirds of North American bird species are at risk of extinction from climate change at 3.0ºC.

GOOD NEWS: If we take action now, and hold warming to 1.5ºC, we can help improve the chances for 76% of species at risk.

Common Merganser

Maryland summary

39% of birds in Maryland are climate vulnerable

- 70 out of 180 species (39%) are climate vulnerable under a 3.0°C temperature increase in at least one season
- Whip-poor-will, American Woodcock, Red-headed woodpecker, scarlet tanager

Reducing emissions from 3.0 to 1.5 °C makes a big difference

- Only 37 species would be vulnerable in MD in summer
- Only 15 would remain vulnerable in MD in winter

Coastal Impacts – Sea Level Rise

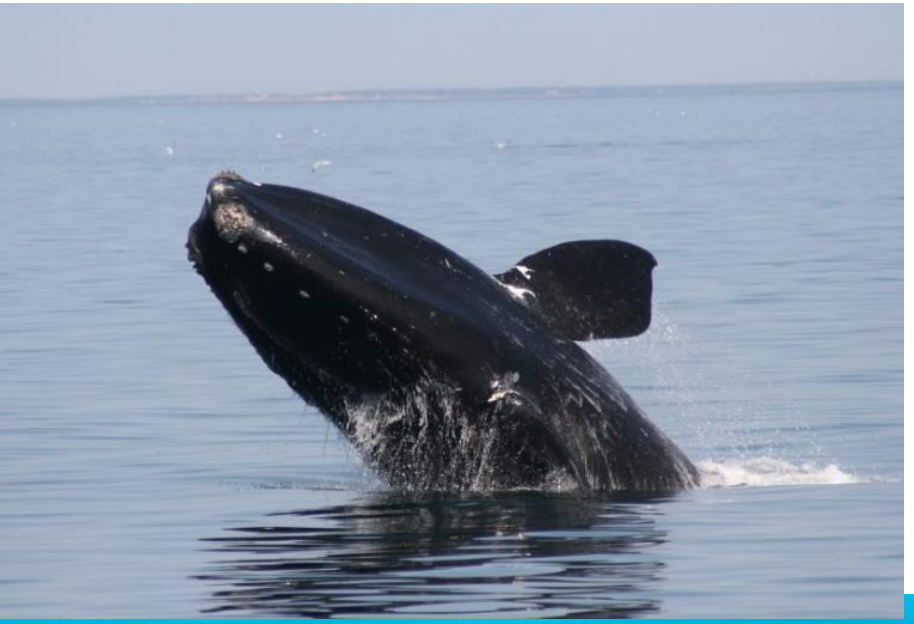
Almost total loss of salt marshes.

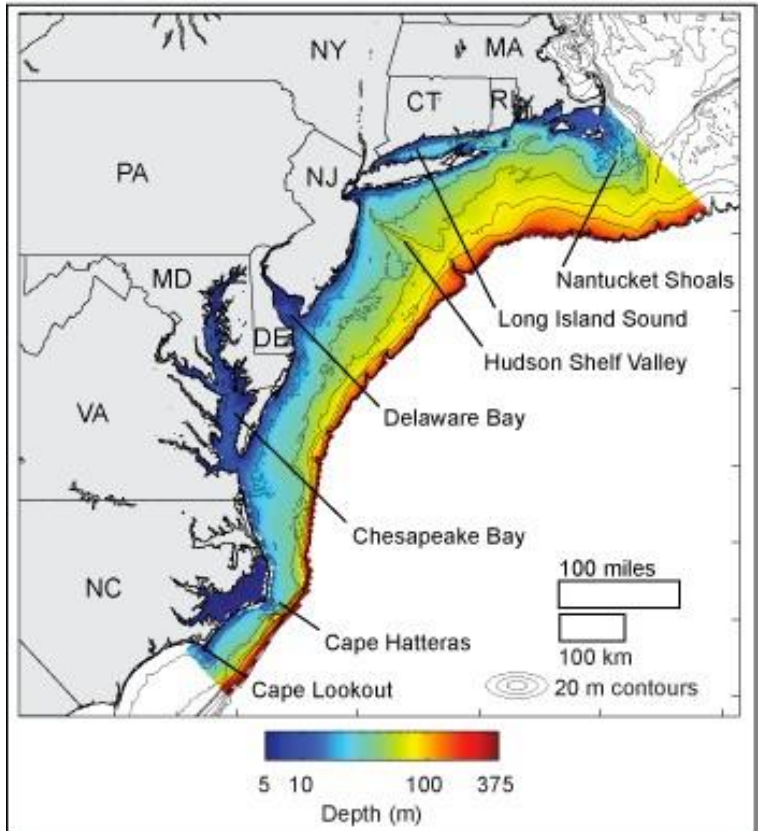
Our Solution

- We can reduce bird species vulnerability by limiting warming to 1.5°C.
- We need to address the underlying causes of the changing climate.

- What needs to change:
- Electricity generation
- Agriculture
- Transportation
- Commercial & Residential buildings
- Industrial Processes

Bonnie Ram, Senior Researcher & Associate Director, Center for Research in Wind, University of Delaware





MD Legislation – C.A.R.E.S.

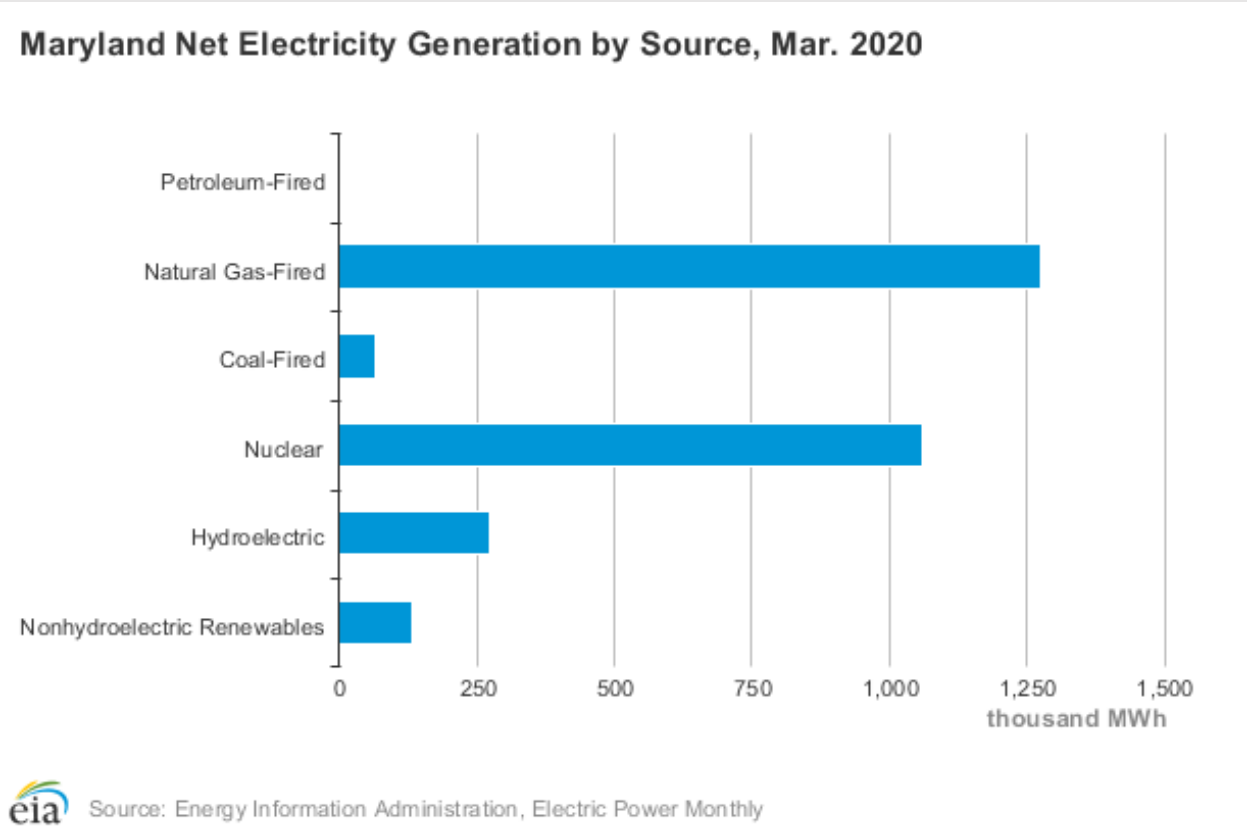
CARES embraces Maryland's clean and renewable energy resources and increases the re**newable portfolio standards (RPS) requirement of 50% by 2030 to 100% clean electricity by 2040.**

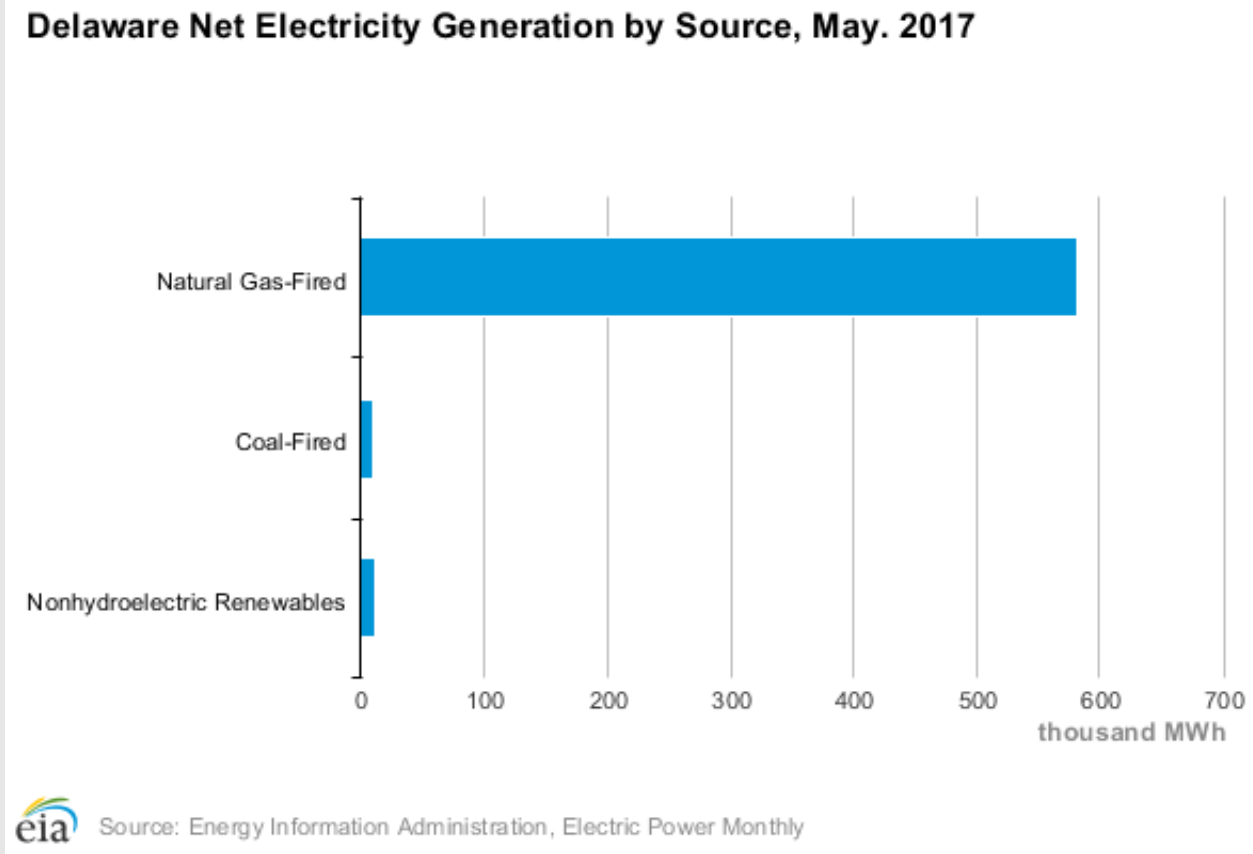
Key elements include:

- Increasing use low-carbon clean and renewable energy sources.
- Counts exiting nuclear – carve outs for emerging technologies (carbon capture, modular reactors)
- Supporting hydropower
- Encouraging energy-efficient combined heat and power systems

- see news here:
- https://news.maryland.gov/mea/2020/02/11/governor-hogans-proposals-embrace-a-bold-vision-for-marylands-energy-future/

MARYLAND and Delaware ELECTRICITY PROFILES

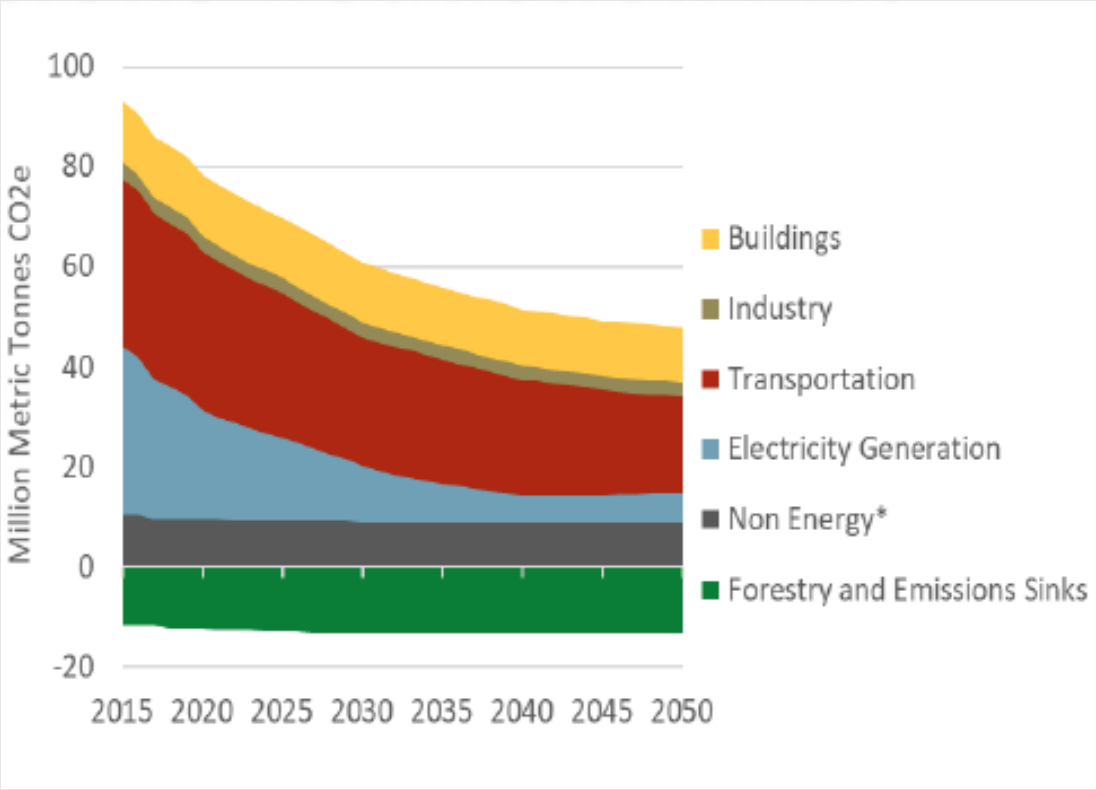




SOURCE: https://www.eia.gov/state/index.php?sid=MD#tabs-4

Point Sources of CO_2 in Maryland

- Total 2018 Reported Emissions: 21,166,462 metric tons of CO2
- **74.8% is emissions from Power Plants:** (15,837,769 metric tons of CO2)
- **CO_2 represents 95% of all GHG emissions in Maryland.**



Sources: https://news.maryland.gov/mea/wp-content/uploads/sites/15/2019/11/POINT-SOURCES-OF-CARBON-DIOXIDE-IN-MARYLAND-Alan-Mikowychok-ERM-Paul-Petzrick-MD-DNR.pdf and https://www.eia.gov/electricity/state/maryland/ and EPA's Facility Level Information of Greenhouse gases Tool (FLIGHT) Database; and 2019 Maryland Report. Maryland Commission on Climate Change. https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Pages/index.aspx

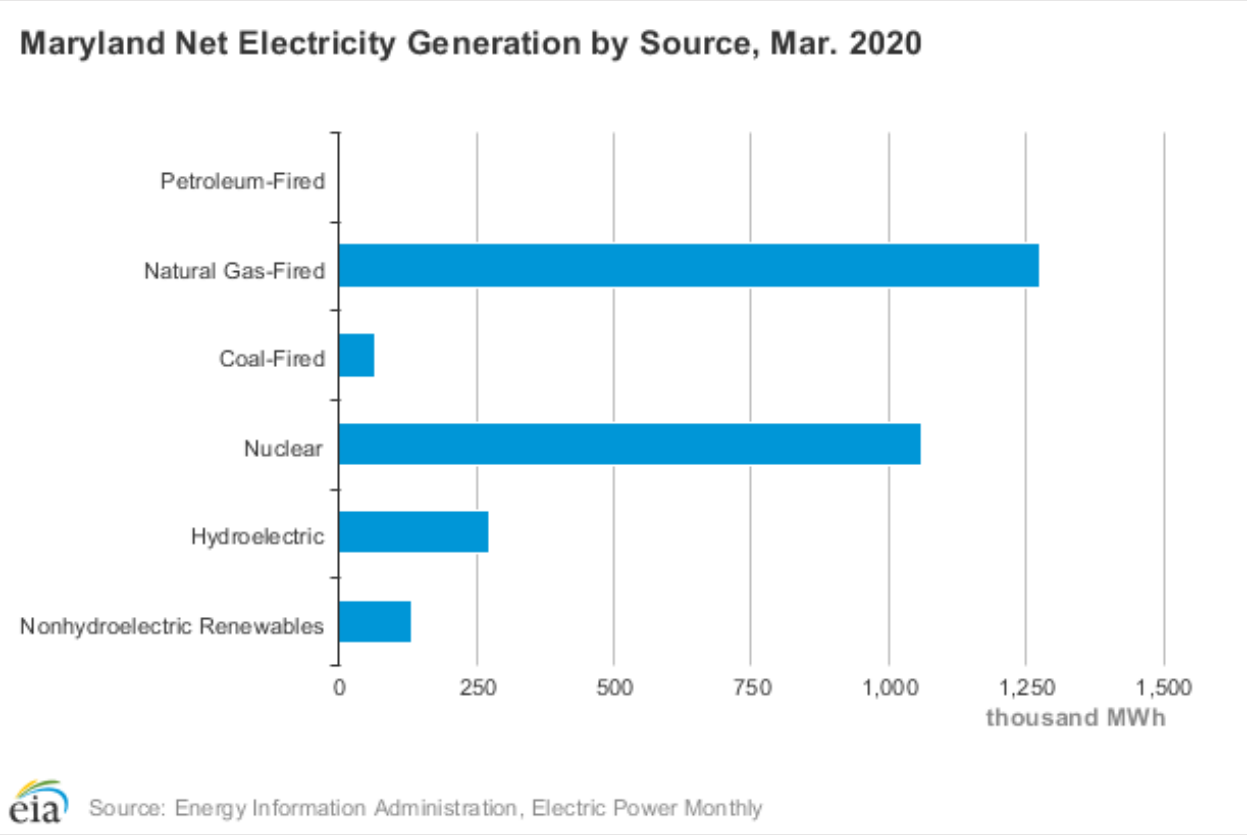
MARYLAND SOURCES OF ELECTRICITY highlights

- Consumes more electricity than it generates
- Imports nearly half of its power from other Mid-Atlantic States through the regional grid

Over the last decade:

  - Coal power has been on the decline
  - The share of electricity generated by nuclear power and natural gas has increased.

- Solar power generation has a target of 25% by 2020



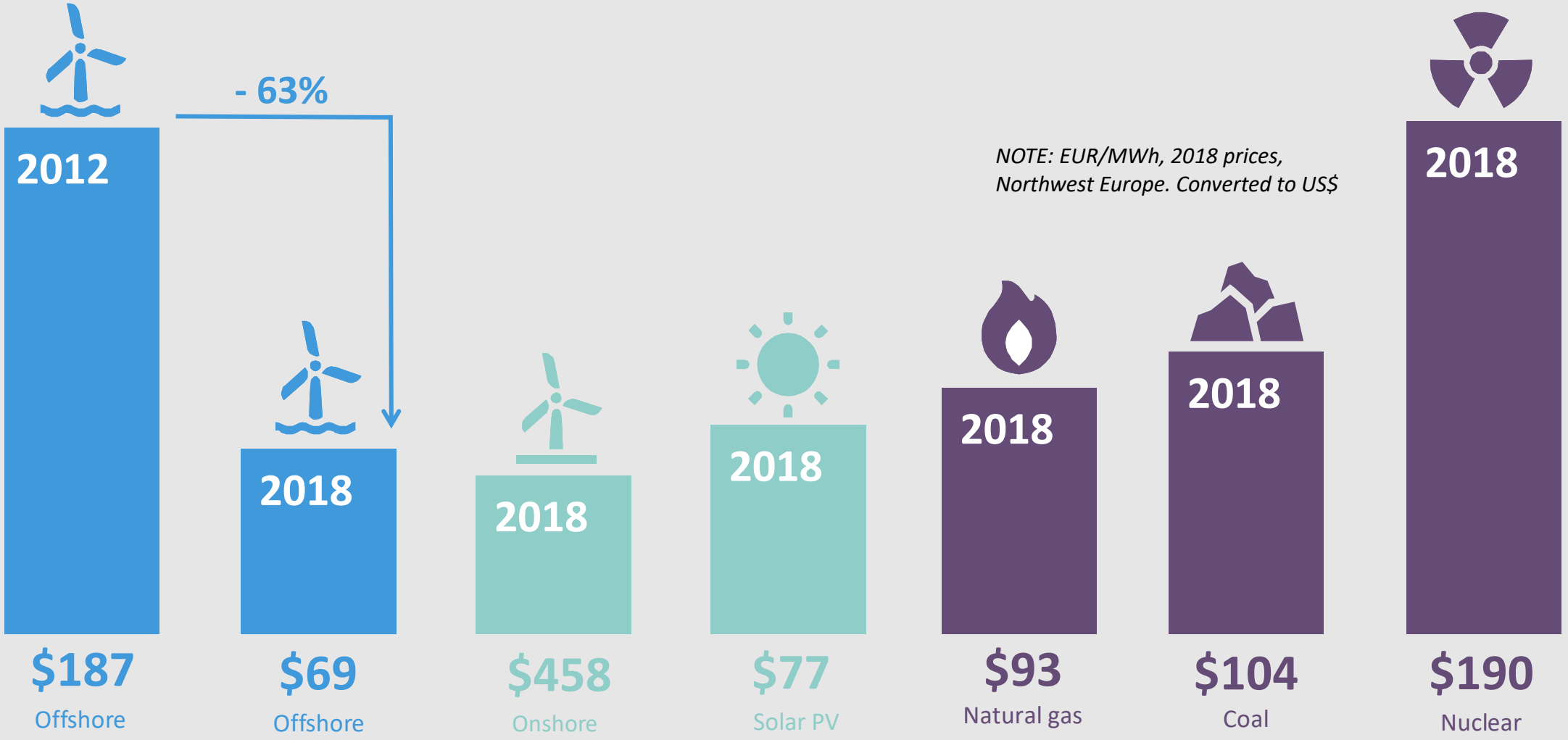
Sources: https://www.eia.gov/state/index.php?sid=MD#tabs-4 and https://www.nytimes.com/interactive/2018/12/24/climate/how-electricity-generation-changed-in-your-state.html

LOW CARBON ENERGY CHOICES?

- **Need to consider ALL viable options**
  - Utility-scale and community solar
  - Small modular nuclear reactors
  - Rooftop solar and geothermal
- **Offshore wind is one of the only utility scale low-carbon electricity sources available now**
  - Near huge coastal electricity loads
  - Large offshore wind resource
  - Buildable (shallow) continental shelf

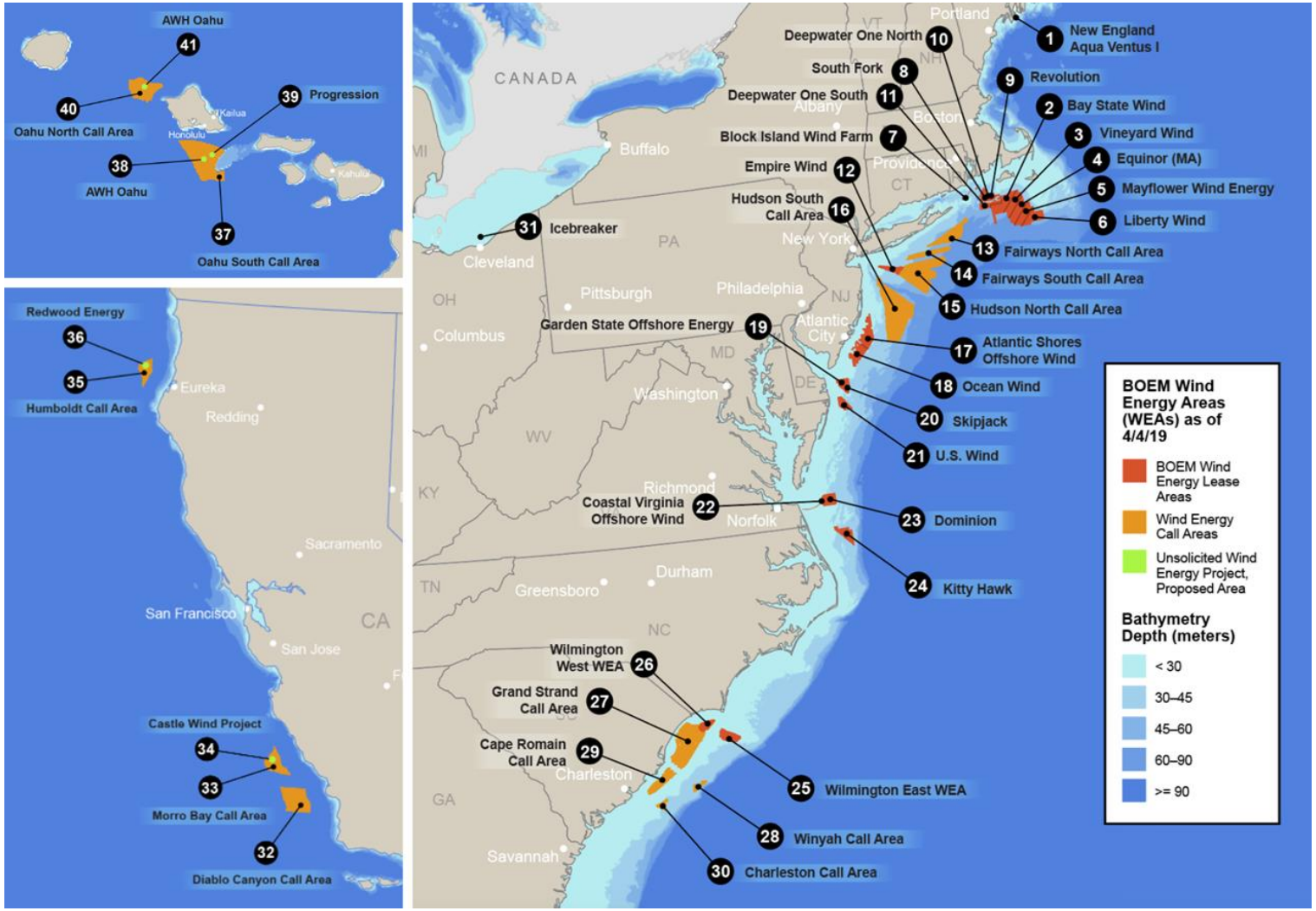
Levelized cost of electricity for different technologies

The rapid cost reductions in the industry, have made offshore wind power competitive relative to conventional power generation based on fossil fuels



Slide courtesy of Ørsted

U.S. Offshore Wind Industry Regulatory Activity

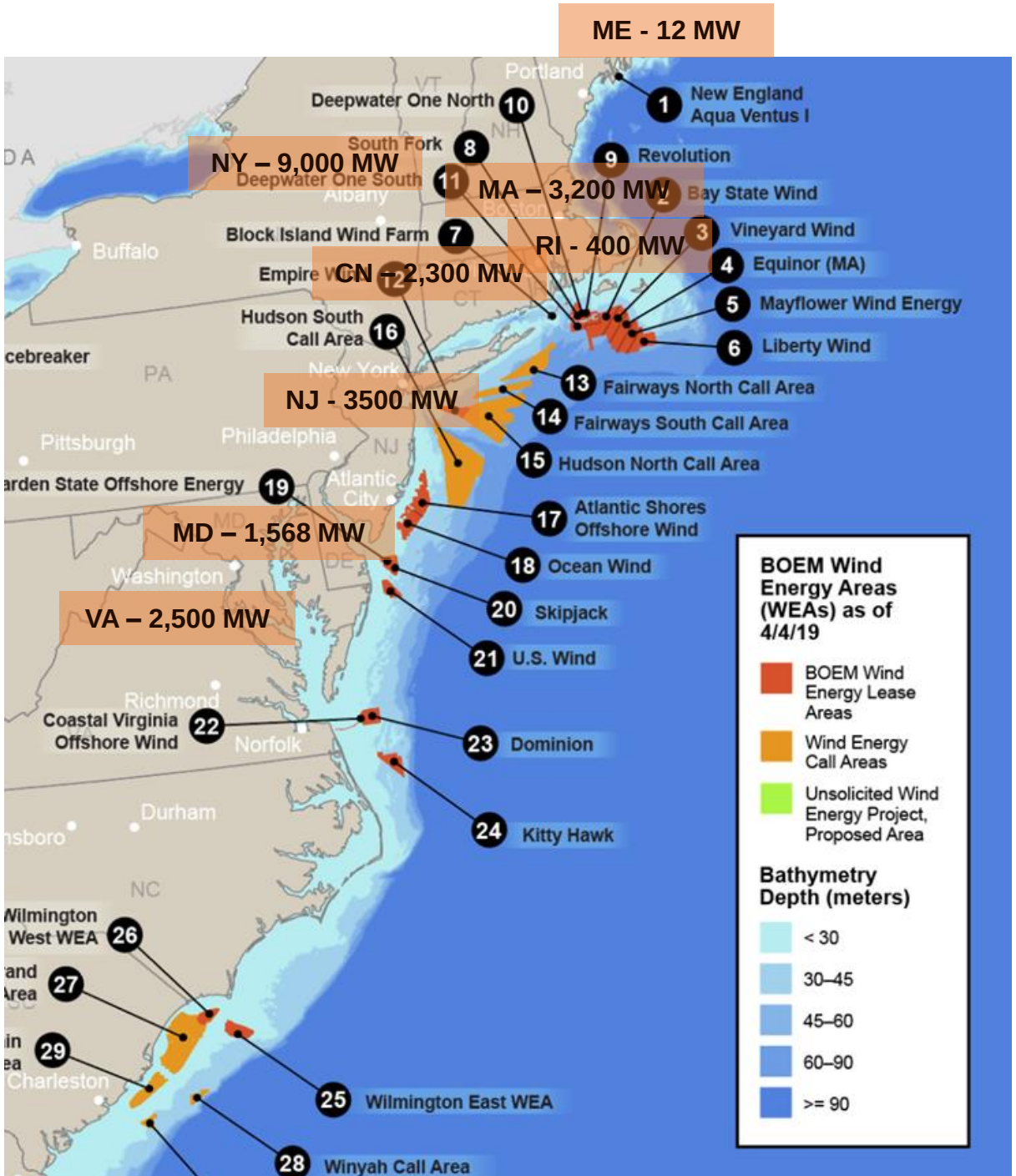


- Bureau of Ocean Energy Management (BOEM) given authority under EPAct 2005
- 30 CFR 585 released in 2009 provides regulatory framework for federal waters
- Offshore Wind lease sales began in 2011
- BOEM works with state task forces prior to lease area designation
- 16 lease areas have been sold in public auctions (about 21 GW)
- ***Call areas (13)*** are nascent ocean tracts under consideration for possible leasing

U.S. State Offshore Wind Policy Commitments

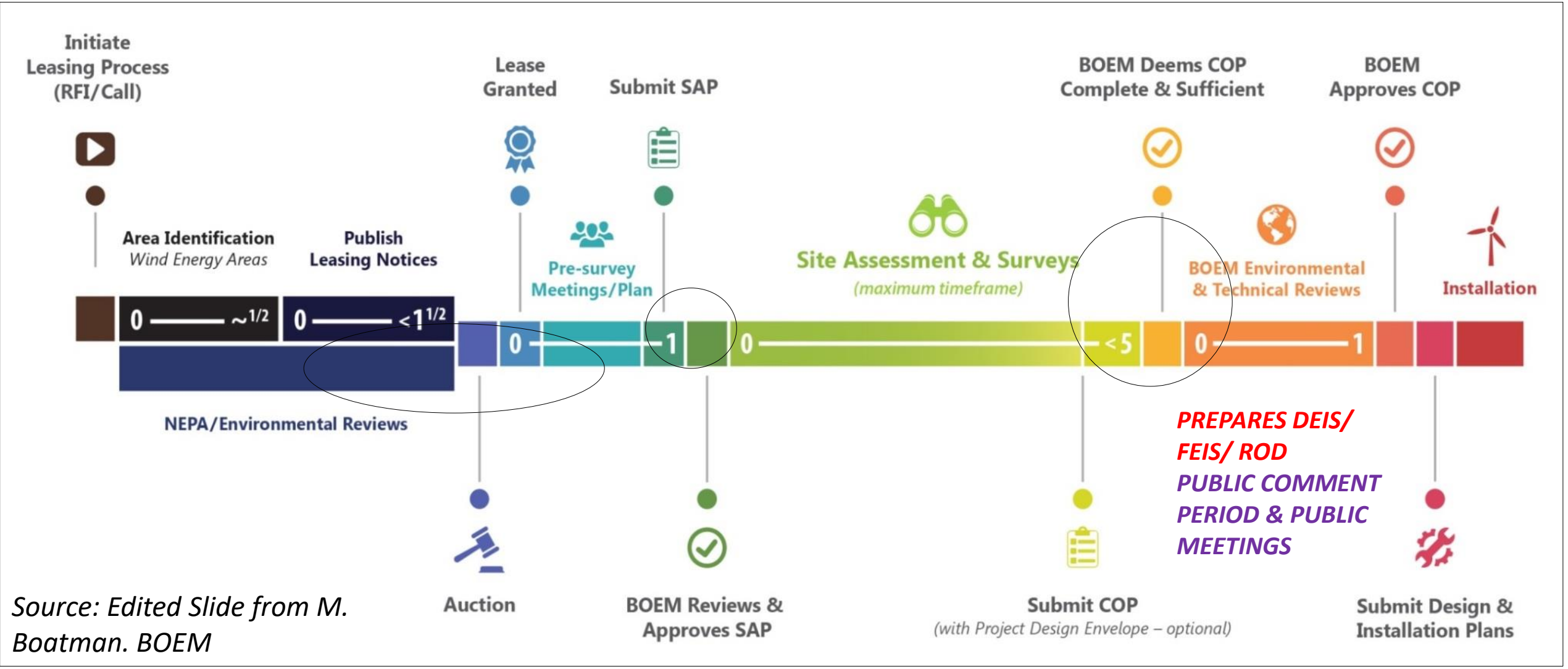
- 22,480 MW* committed by 2035
- 13,956 MW* committed by 2030
- 8 states
- $80 Billion in gross revenue possible
- Global forecasts predict 154 to 193 GW of Offshore Wind by 2030 and 500 GW by 2050
- Regulatory project pipeline for U.S. is calculated at 25,824 MW.

* increased by 2,500 MW from August market report after VA Gov. Northham's Executive Order in Sept 2019



Slide source courtesy of NREL. Walt Musial. Data from Fall 2019.

BOEM Lease Selection & Planning Process



Source: Edited Slide from M. Boatman. BOEM

Estimated Decision Timeline

Planning & Analysis	Leasing	Site Assessment	Construction & Operations
~ 2 YEARS	~ 1-2 YEARS	UP TO 5 YEARS	~ 2 YEARS (+25)
• Intergovernmental Task Force • Request for Information or Call for Information and Nominations • Area Identification • Environmental Reviews	• Publish Leasing Notices • Conduct Auction or Negotiate Lease Terms • Issue Lease(s)	• Site Characterization • Site Assessment Plan	• Construction and Operations Plan • Facility Design Report and Fabrication and Installation Report • Decommissioning • Environmental and Technical Reviews

Source: BOEM regulatory Guidelines: https://www.boem.gov/renewable-energy/regulatory-framework-and-guidelines

Estimated Construction & Operation > 30 years

Policy Elements =
Technology +
Science +
Stakeholders +
Economics +
Ratepayers

2 years of construction

25 years of operation

2 years of decommissioning

Slide adapted from Offshore Wind Energy Class. University of DE

Stakeholder Engagement

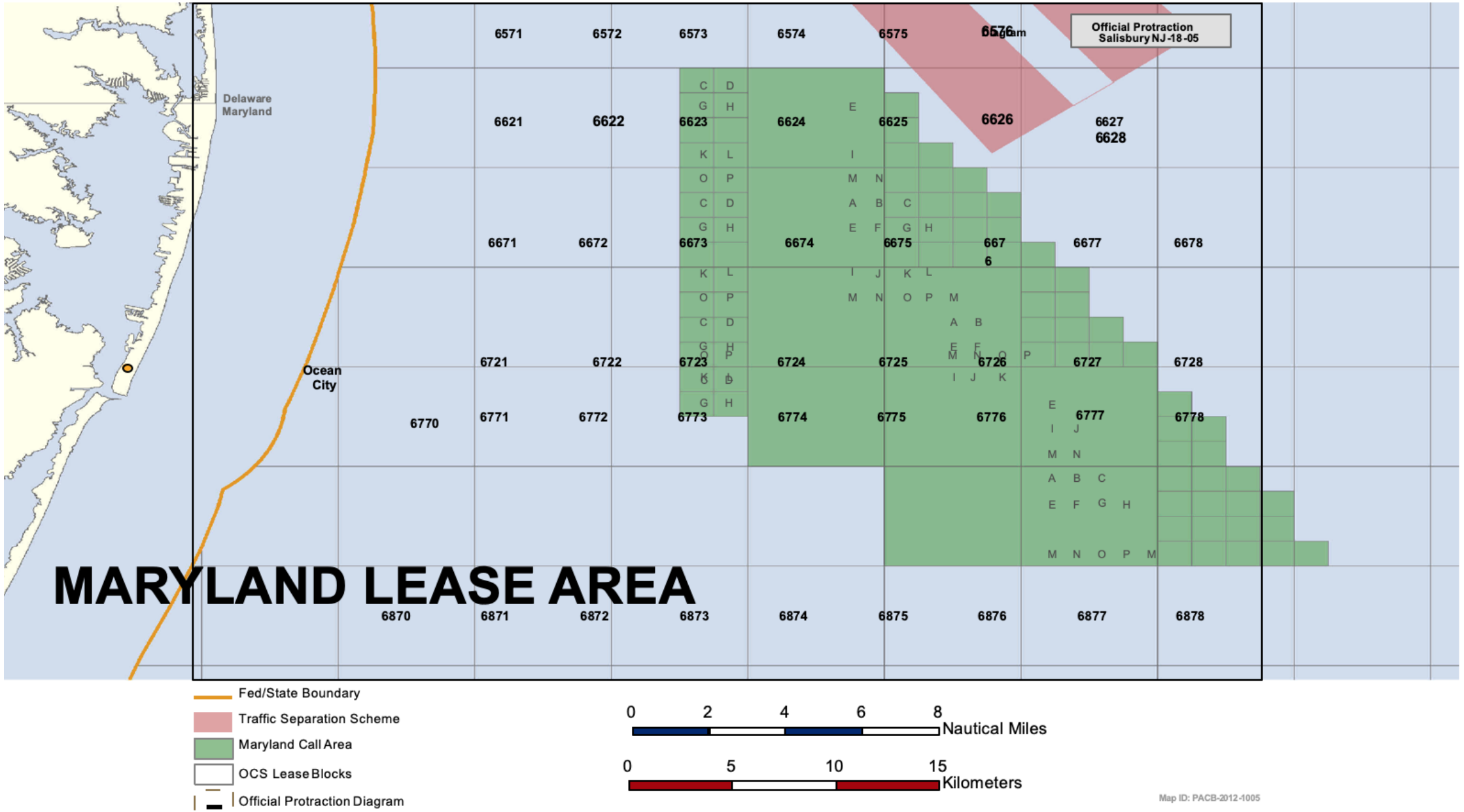
Maryland PSC Decision – May 2017 Approved two Offshore wind projects

- Maryland offshore wind target 1568 MW
- Procured by the state so far = 368 MW
- Supported by Offshore Renewable Energy Credits (ORECs) bought by utilities
- Delaware & Maryland Wind Energy Areas (leases)

Maryland PSC Decision --- May 2-17

US Wind - Maryland Wind Energy Area

- Off of Ocean City and as far north as Fenwick Island
- 248 MW **---** 30 - 8 MW or 20 -- 12 MW
  - Turbine size TBD
- Provides power to an estimated 76,000 homes
- Distance to shore has varied from 12 – 17 miles
- Toto Construction (Italian Developer) -- office in Baltimore
- Ratepayer Bill increase by 1.4% or $1.40/month.


Official Protraction
Salisbury NJ-18-05
Delaware
Maryland
Ocean
City
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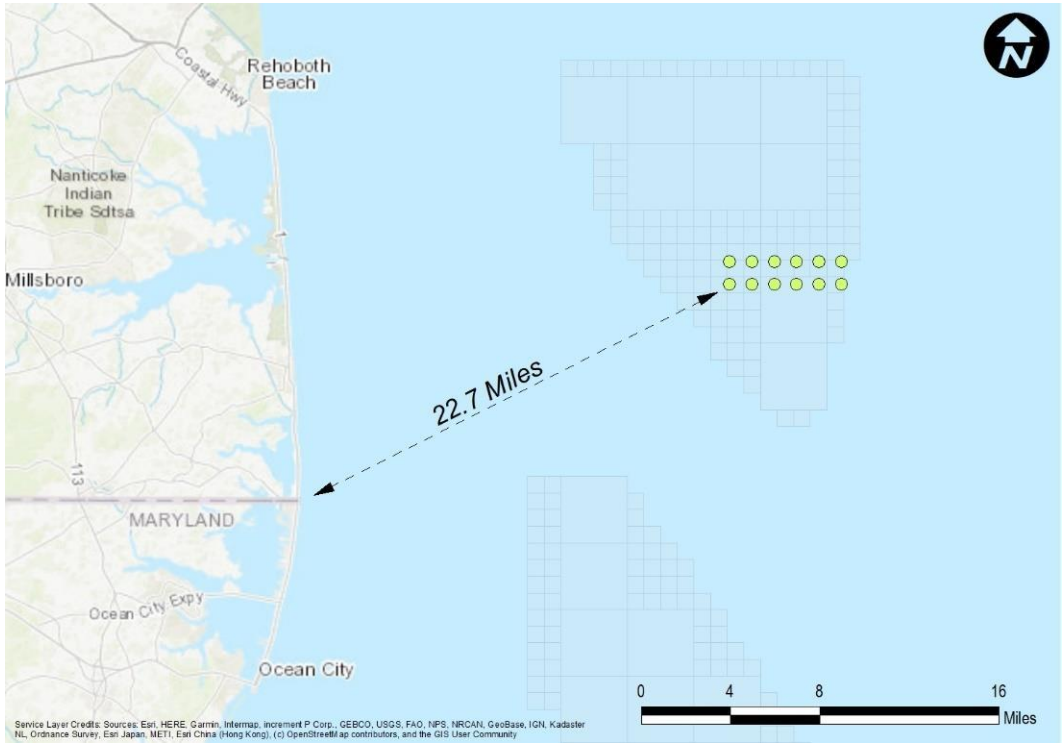
MARYLAND LEASE AREA
Fed/State Boundary
Traffic Separation Scheme
Maryland Call Area
OCS Lease Blocks
Official Protraction Diagram
0 2 4 6 8
Nautical Miles
0 5 10 15
Kilometers
Map ID: PACB-2012-1005

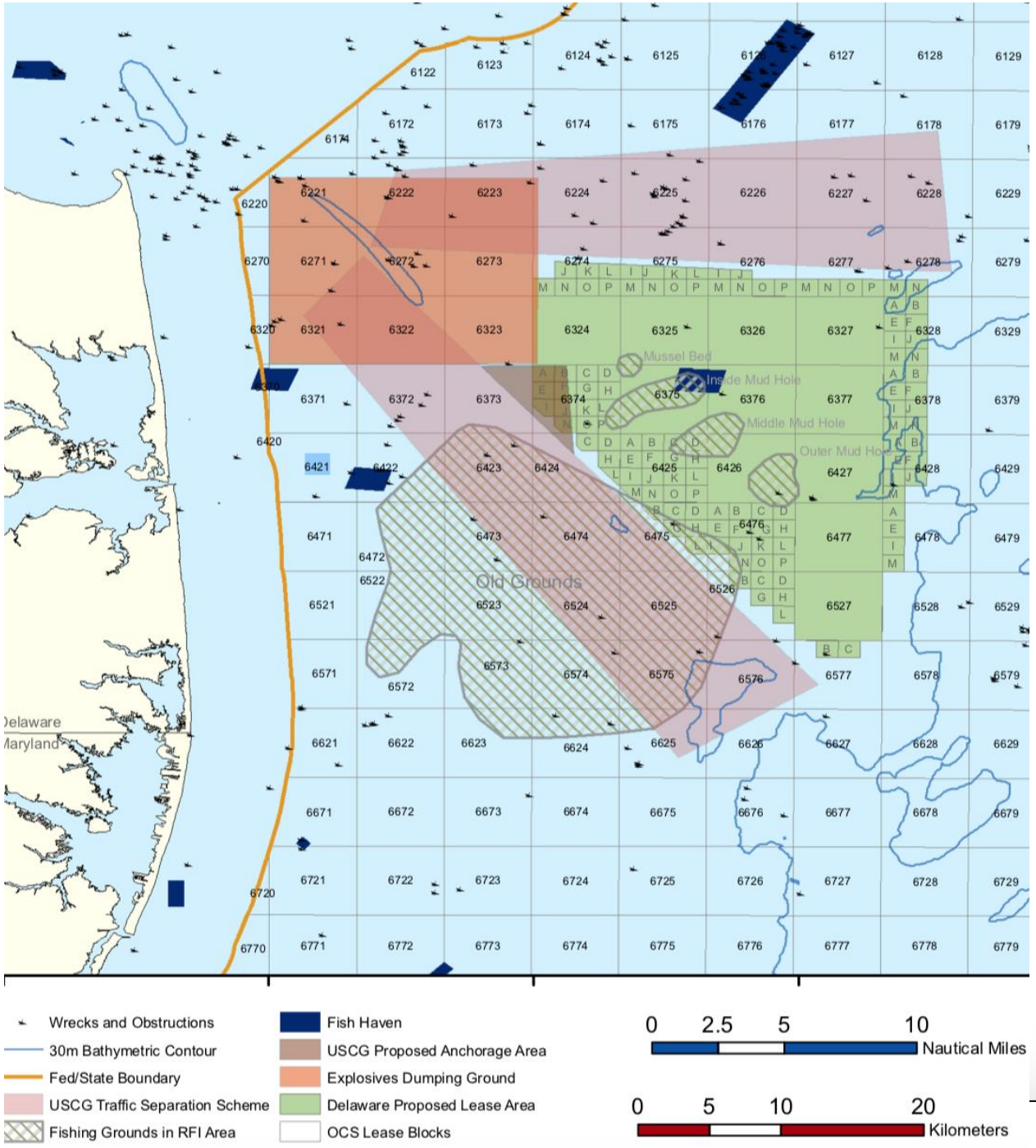
Maryland PSC Decision – May 2017

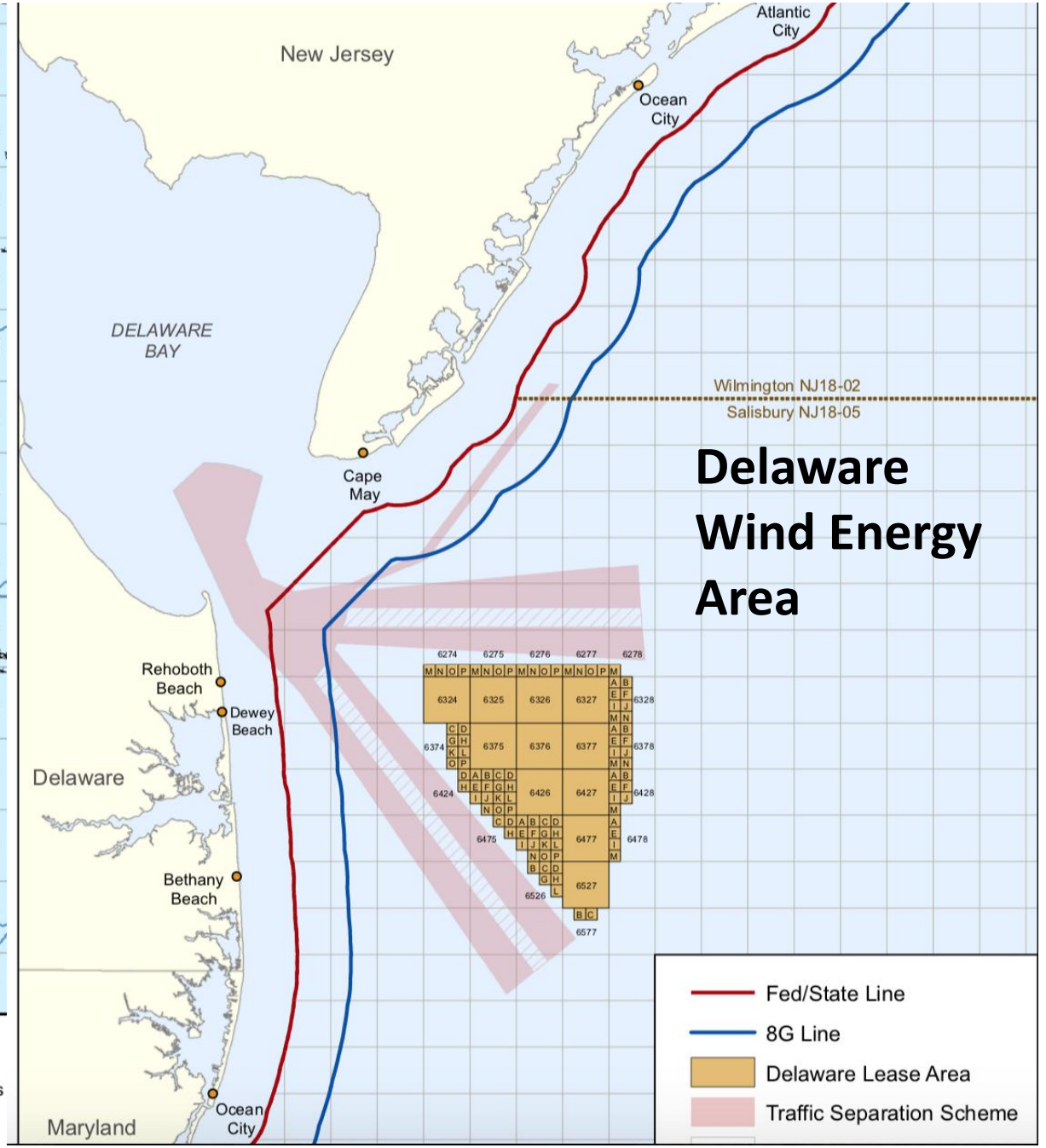
Delaware Wind Energy Area

- Danish Developer Ørsted (Skipjack project)
- Closest point to the coast estimated at 19m
- 120 MW = Ten -- 12 MW turbines
- Powers 35,000 homes
- Installation & commercial operation projected by 2023
- 20 year contract @ 2023 Price is $171.30/MWh rising 1%/year to $206.95 in 2042



Source: Skipjack Offshore Energy. Direct Testimony of Gordon W. Perkins. 4/17/20





Delaware Wind Energy Area

https://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/State_Activities/DEProposedLeaseArea_RFCI.pdf

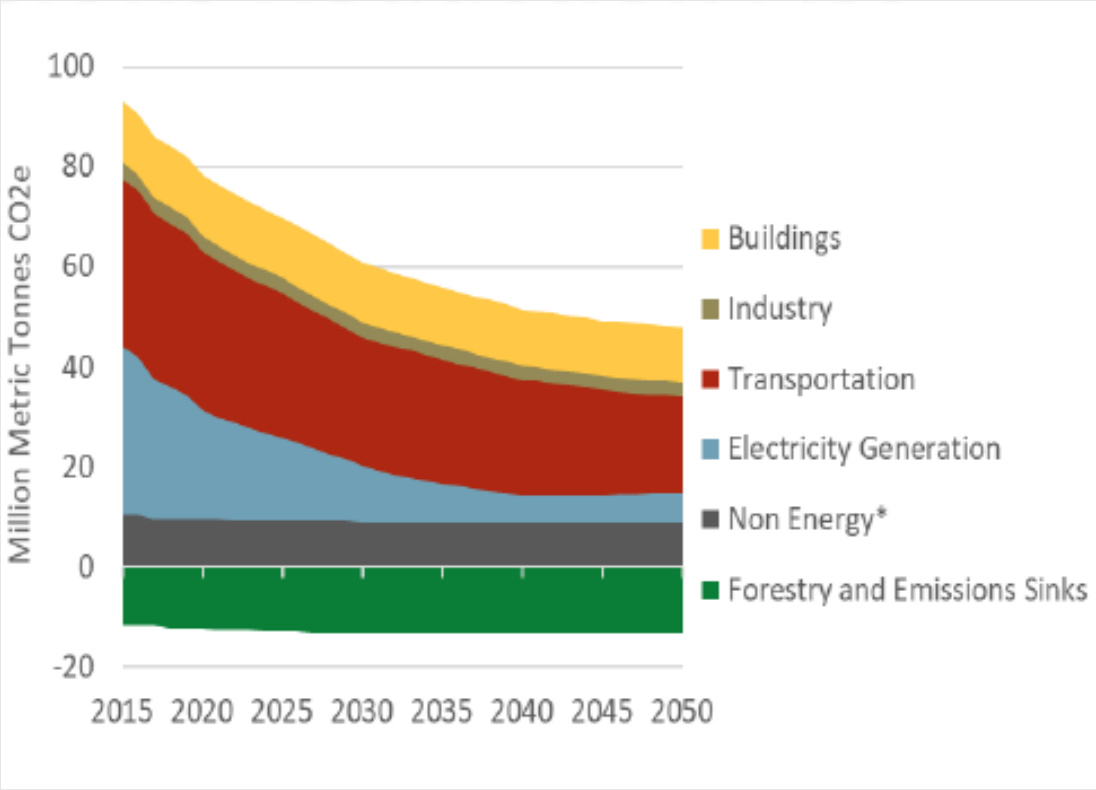
STATUS OF THE TWO PROJECTS

- **Skipjack --- Developer, Ørsted**
  - Submitted construction and operation plan (COP) to BOEM
  - Selected 12 MW turbine (approved by MD-PSC)
  - Committed $13.2 million for first piece of overall infrastructure investment
  - Seeking alternative land-based cable connection
    - Negotiated MOU with DNREC for Fenwick Island State Park substation(cancelled in summer 2020)

- **US Wind (Marwin)** --- Developer, Toto Construction
  - Submitted SAP for MET tower (cancelled) – now using a FLiDAR
  - Turbine not selected
  - COP not submitted

what does 368MW mean in terms of avoided CO_2?

- **74.8% is emissions from Power Plants:** (15,837,769 metric tons of CO2)
- 368 MW of offshore wind = **offsets 1,060,421 million metric tons of CO_2**
- Equivalent to 246,211 passenger vehicles driven for one year or 15,087 tanker trucks worth of gasoline
- 2400 MW of offshore wind could produce ALL the electricity to run Delaware continuously.



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How can The Mid-Atlantic reap some of the potential benefits?

- Reduce greenhouse gas (GHG) emissions & other pollutants
- Reduce water consumption
- Realize economic development commitments
- Reduce electricity transmission congestion in Delmarva Peninsula

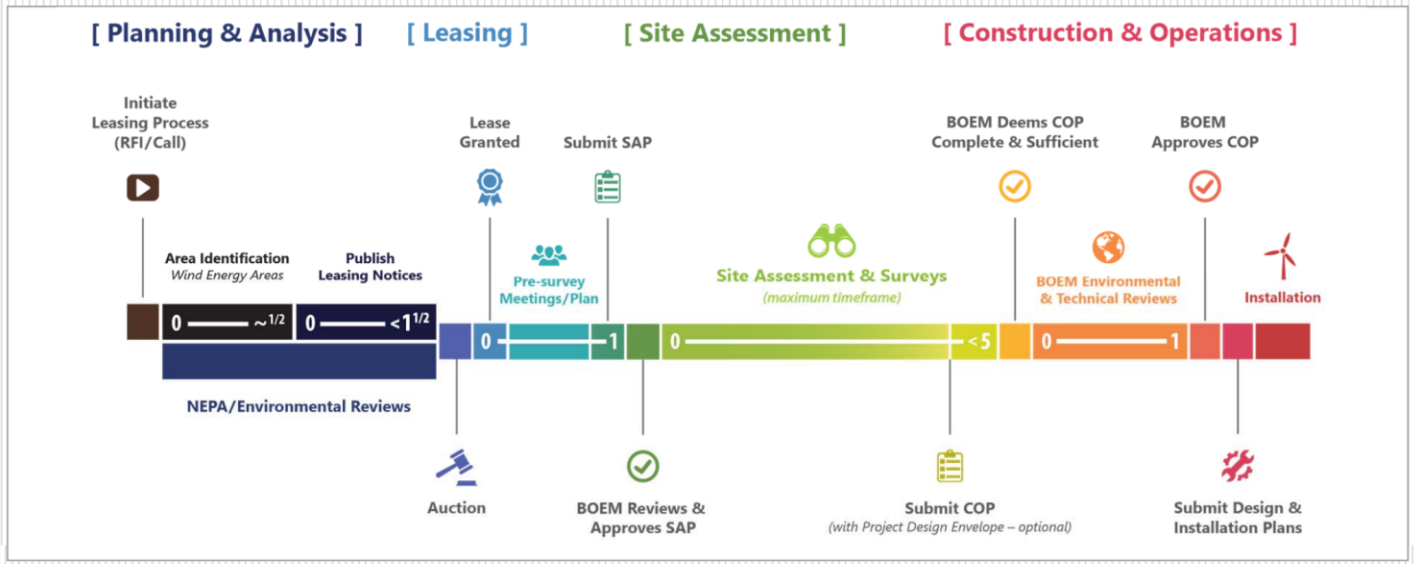
How can the Mid-Atlantic address the potential challenges?

- Understanding better the public & political perceptions of clean energy options
- Participating in public engagement opportunities & local social media
- Building the knowledge base quickly and with transparency
  - Commercial fishing areas
  - Navigation and shipping lanes
  - Protected and/or endangered species and habitat areas

Offshore wind & birds in Maryland and Delaware

GARRY GEORGE, CLEAN ENERGY DIRECTOR

Renewable Energy Process: From Call to Operation

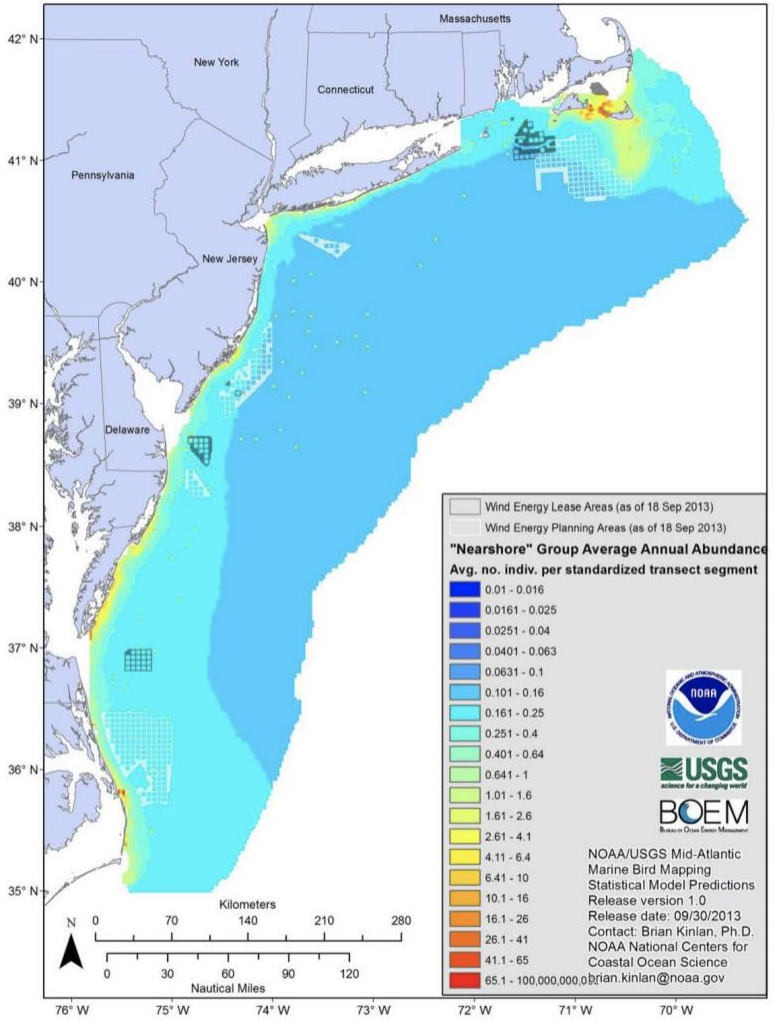


OCS EIS/EA
BOEM 2012-003

Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New Jersey, Delaware, Maryland, and Virginia

Final Environmental Assessment

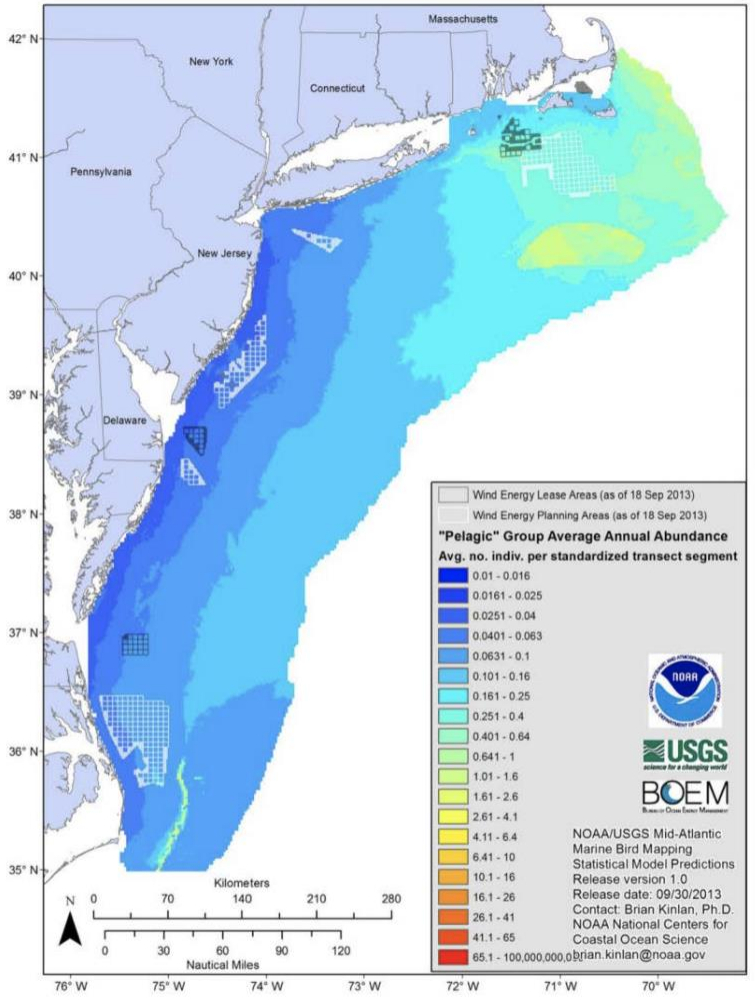
Figure 3.7-1 Predicted Average Annual Distribution of Near-shore Bird Species



Note: "Near-shore Birds" include Black Scoter, Common Eider, Common Loon, Common Tern, Double-crested Cormorant, Long-tailed Duck, Razorbill, Roseate Tern, Red-throated Loon, Surf Scoter, and White-winged Scoter

Source: VOWTAP – EA (BOEM, 2015)

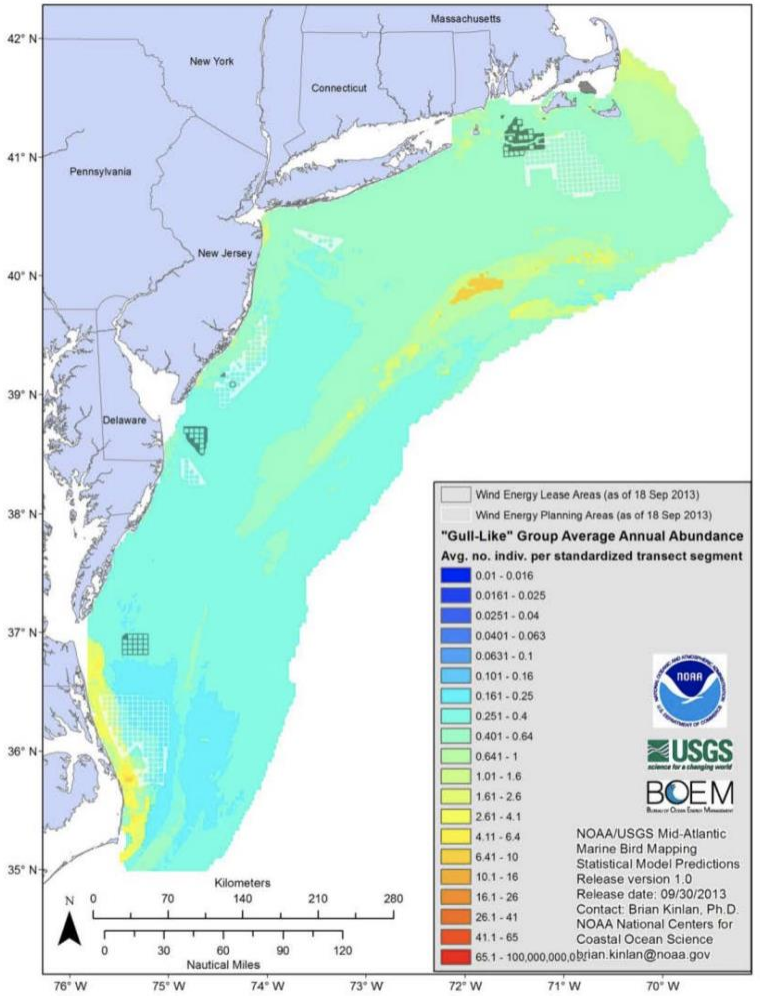
Figure 3.7-2 Predicted Average Annual Distribution of Pelagic Bird Species



Note: "Pelagic Birds" include Cory's Shearwater, Dovekie, Greater Shearwater, Northern Fulmar, Pomarine Jaeger, Red Phalarope, Sooty Shearwater, and Wilson's Storm Petrel.

Source: VOWTAP – EA (BOEM, 2015)

Figure 3.7-3 Predicted Average Annual Distribution of Gulls and Gannets



Note: "Gulls and Gannets" include Black-legged Kittiwake, Bonaparte's Gull, Great Black-backed Gull, Herring Gull, Laughing Gull, Northern Gannet, and Ring-billed Gull.

Source: VOWTAP – EA (BOEM, 2015)

Roseate Tern

- US Wind Site Assessment, April 7, 2016
  - Currently, there are no roseate tern breeding colonies in Maryland or Delaware (formerly Assateague Island, MD in 1930's)
  - Although the precise route of migration is not firmly established, it is possible that roseate terns will fly over the Project Area during spring and fall migration.

Piping Plover

- April 7, 2016 Site Assessment for US Wind
  - Nest on beaches in Delaware and Maryland
  - Some birds migrate to Bahamas and West Indies
  - Although the precise route of migration is not firmly established, it is possible that these birds will fly over the Project Area during migration.

Red Knot

- US Wind Site Assessment, April 7, 2016
- Delaware Bay is the most important spring migration stopover in the eastern U.S. because it is the final stop at which the birds can refuel in preparation for their nonstop leg to the Arctic (Harrington, 2001; NatureServe, 2015; USDOI, FWS, 2010b).
- Although the precise migration route has not been firmly established (Niles et al., 2010), it is possible that these birds will fly over the Project Area during spring and fall migrations.

Bermuda Petrel

- Although there is no evidence that the Bermuda petrel is present in the mid-Atlantic OCS, the Cahow may potentially be present in the southern offshore waters of the Virginia WEA

Migratory birds

US Wind Site Assessment, April 7, 2016

- Birds traveling along the Atlantic coastal flyway may pass over the Project Area on the oceanic route from Labrador and Nova Scotia to the Lesser Antilles and South America (Rappole, 1995).
- It has been estimated that hundreds of millions of birds are killed each year in collisions with communication towers, windows, electric transmission lines, and other structures (see Klem, 1989 and 1990; Dunn, 1993; Shire et al., 2000).
- It is possible that some birds (i.e., gulls, terns, shorebird, petrels, shearwaters, sea ducks, and alcids) may collide with the MET tower and be injured or killed. However, due to the single structure and its distance from shore, migratory birds (including pelagic birds) colliding with the anticipated MET tower is possible but would be a rare event.

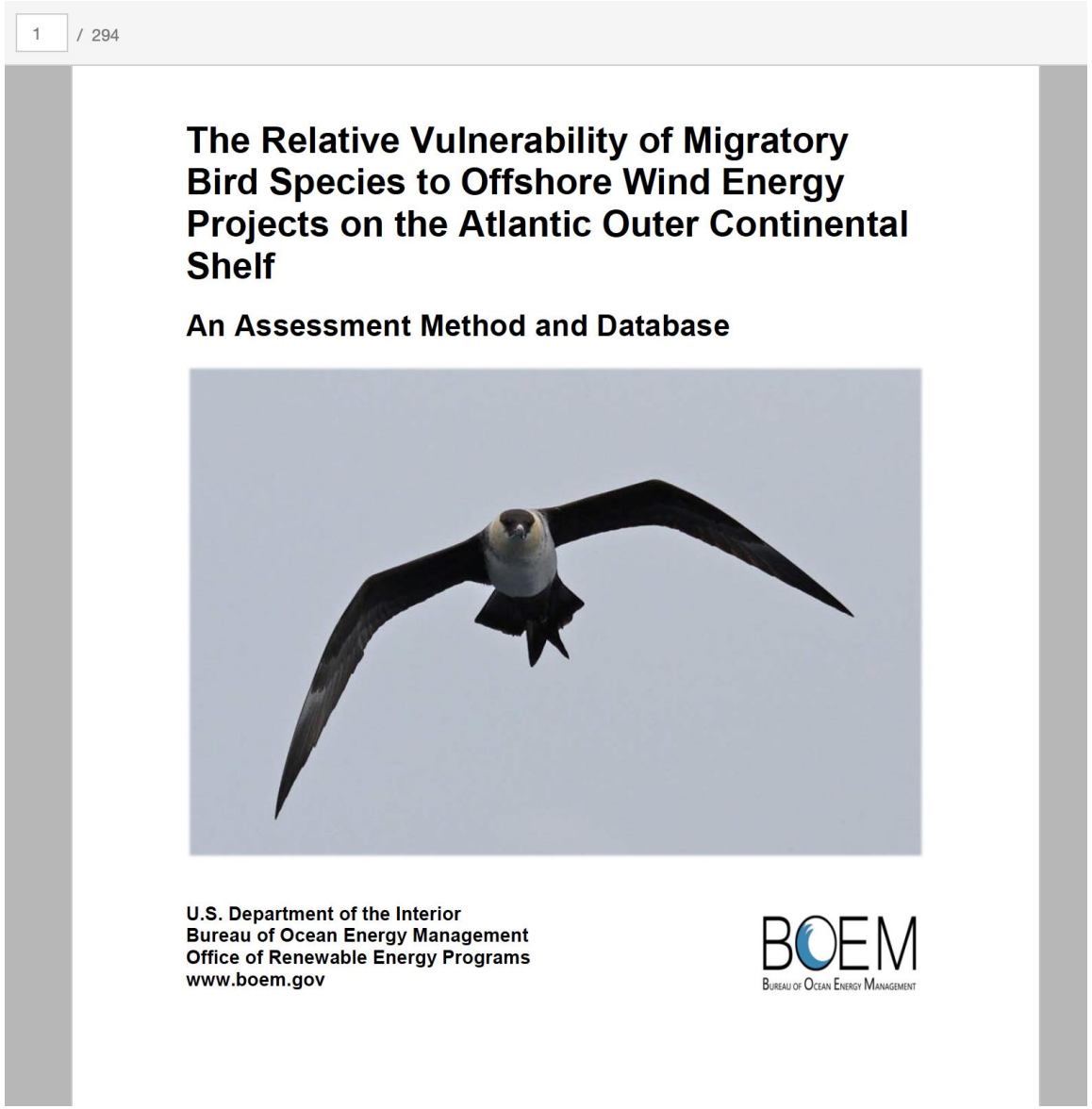
Important Bird Areas

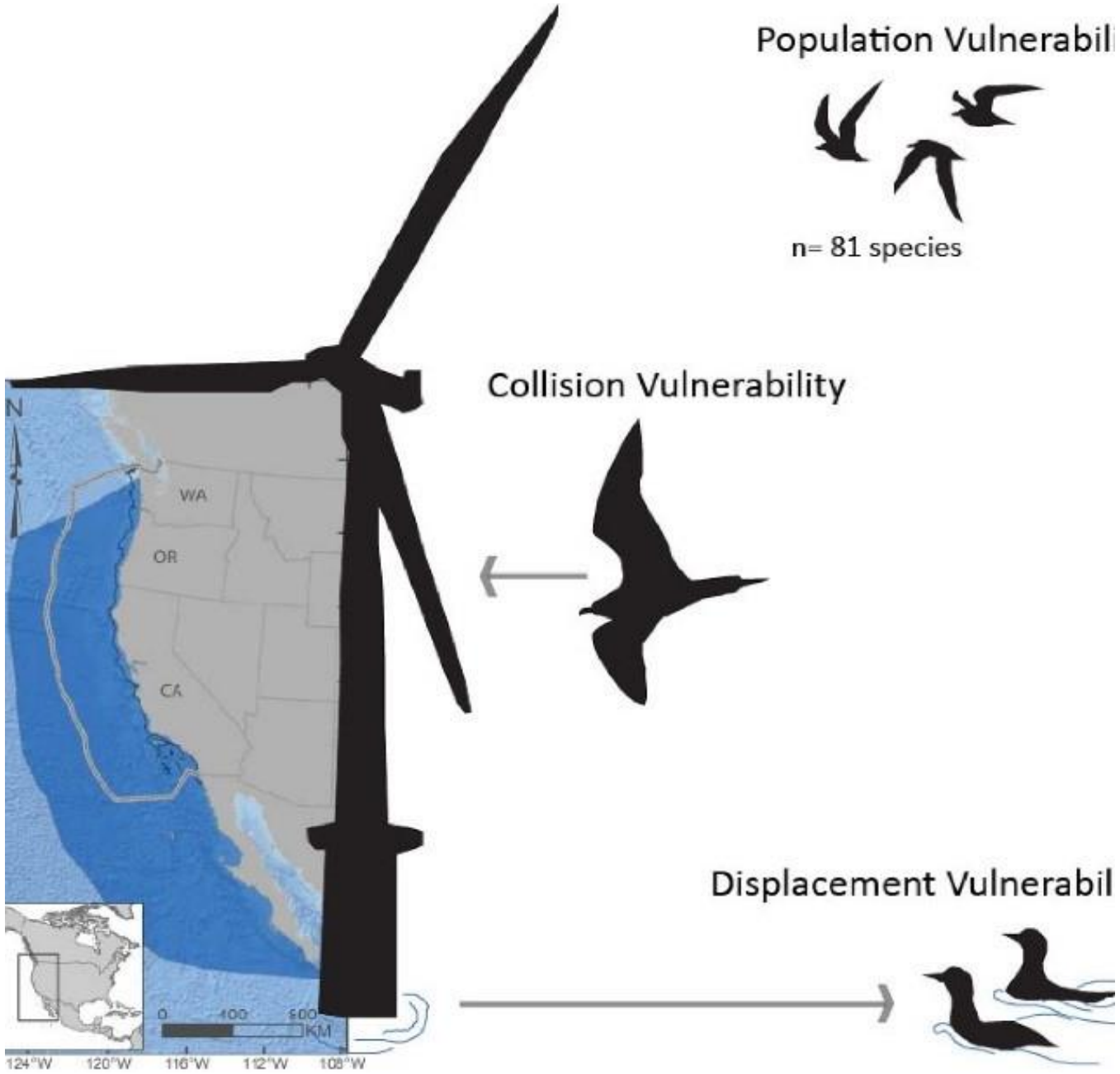
US Wind Site Assessment, April 7, 2016

Delaware Coastal Zone	DE
Maryland Coastal Bays	MD
Assateague Island	MD
Barrier Island/Lagoon System	VA
Delmarva Bayside Marshes	VA

State of the Science on birds

- Siting - where to put turbines
- Construction - BMPs
- Operation
  - Research and technology gaps:
    - Monitoring
    - Adaptive Management
    - Cumulative Impacts

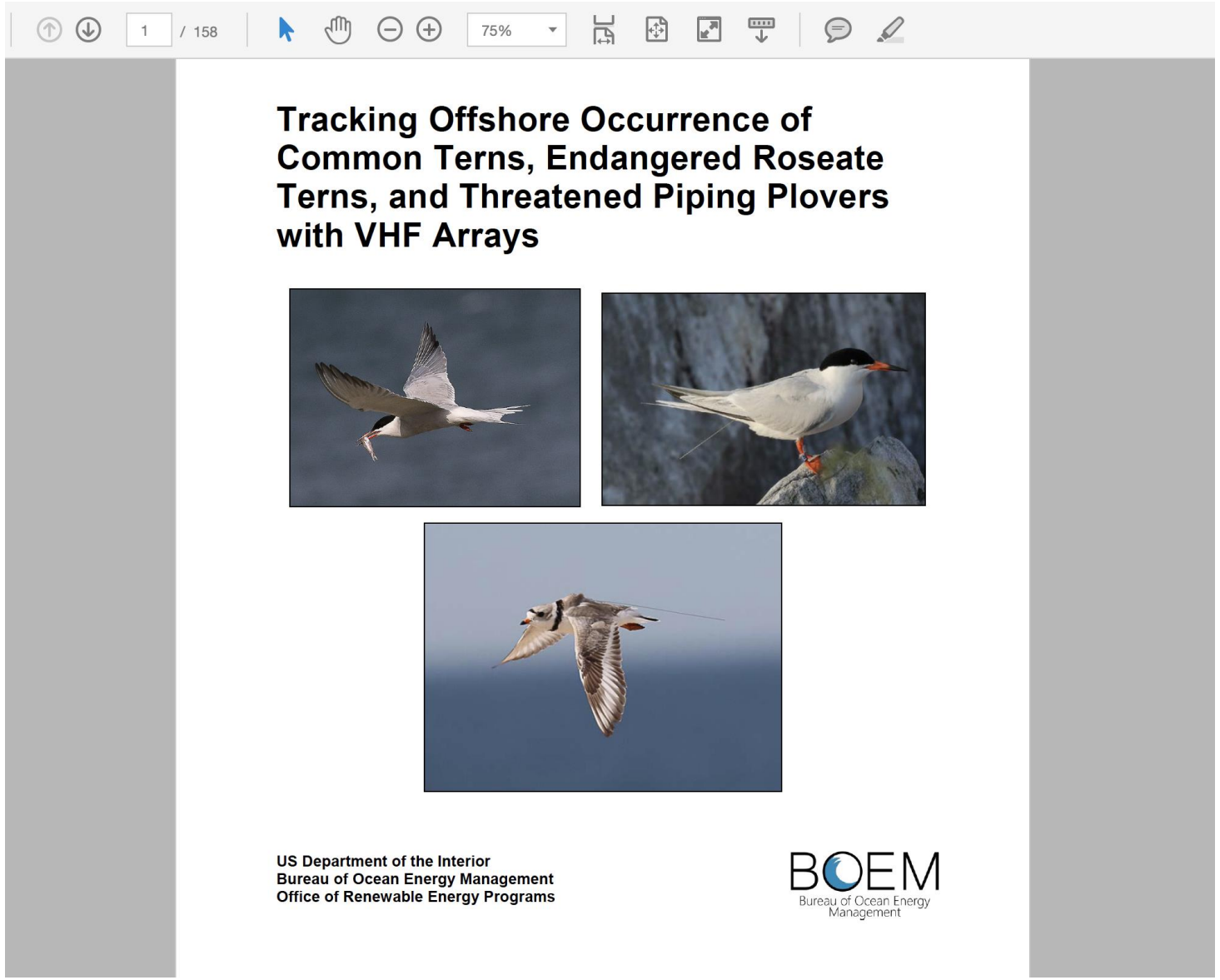


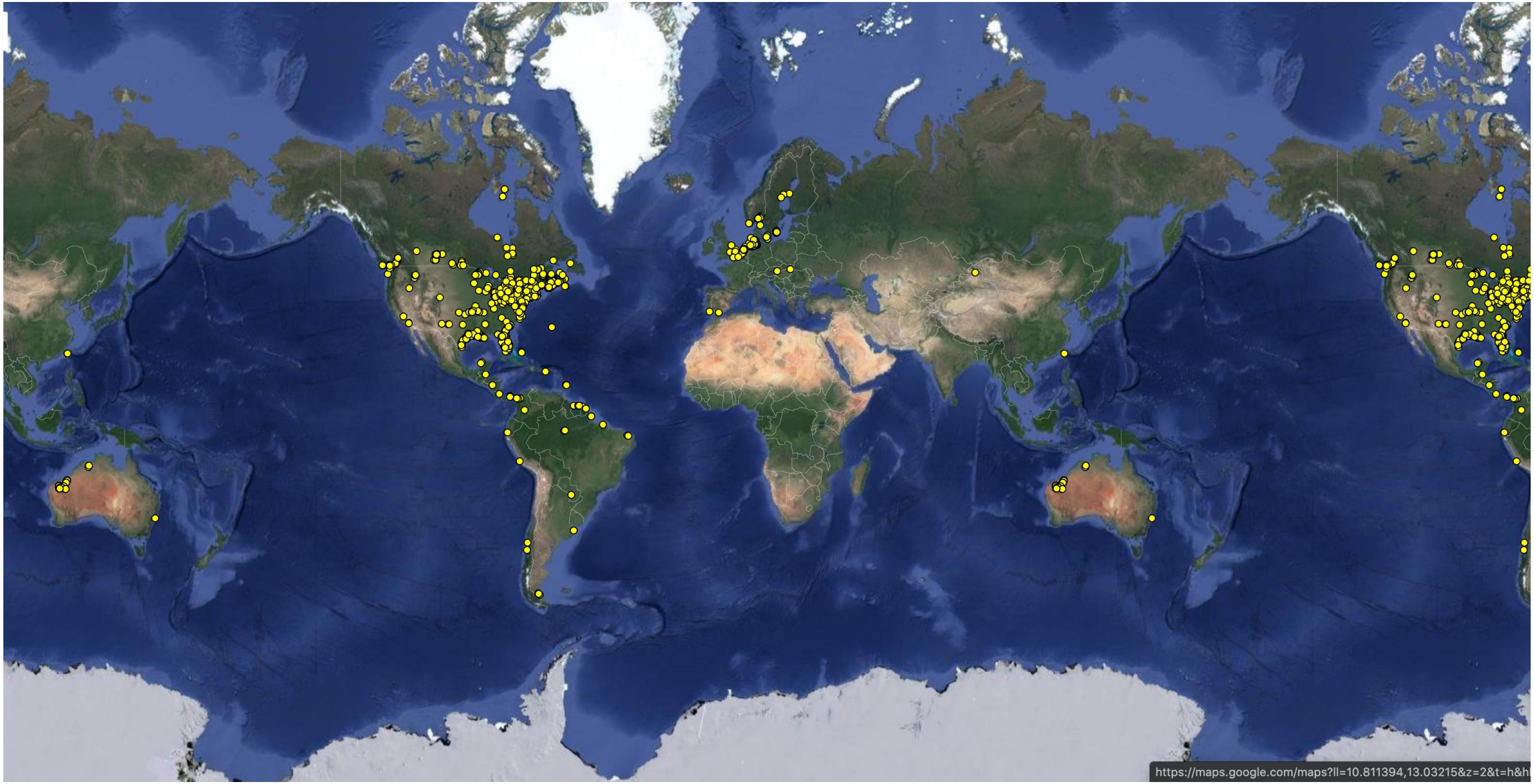


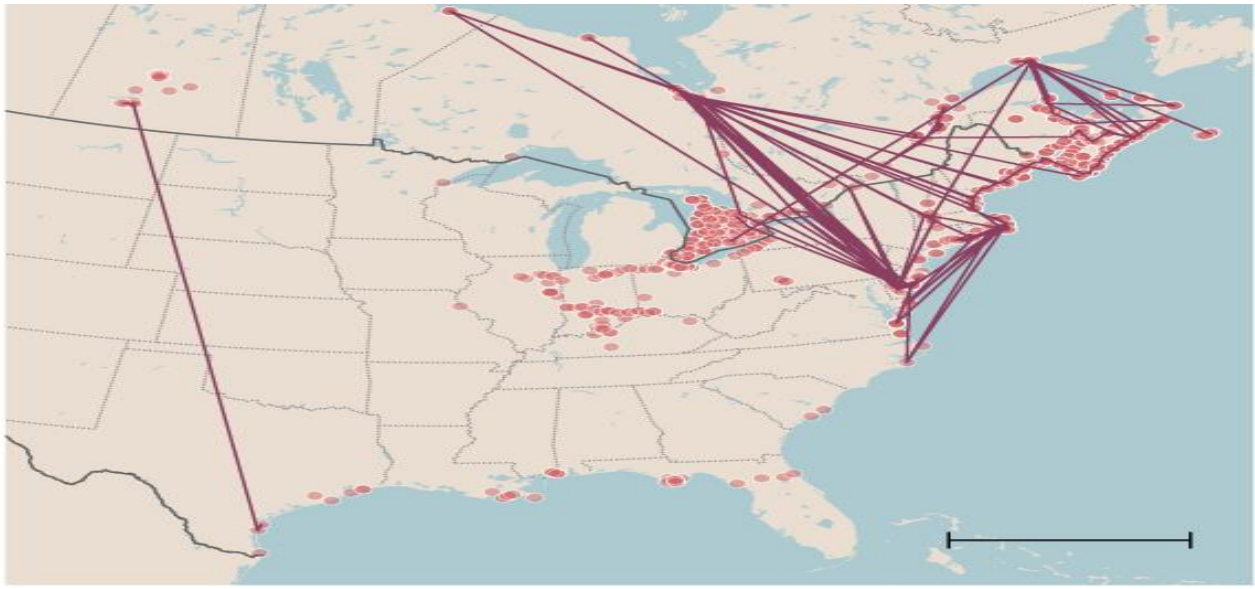
- Population Vulnerability
- **Collision Vulnerability**
  - Pelicans.
  - Terns
  - Gulls
  - Skuas
  - Cormorants
  - Albatrosses
  - Petrels
  - Shearwater
  - Gannetts
- **Displacement Vulnerability**
  - Storm-petrels
  - Murrelets
  - Puffins
  - Loons
  - Terns

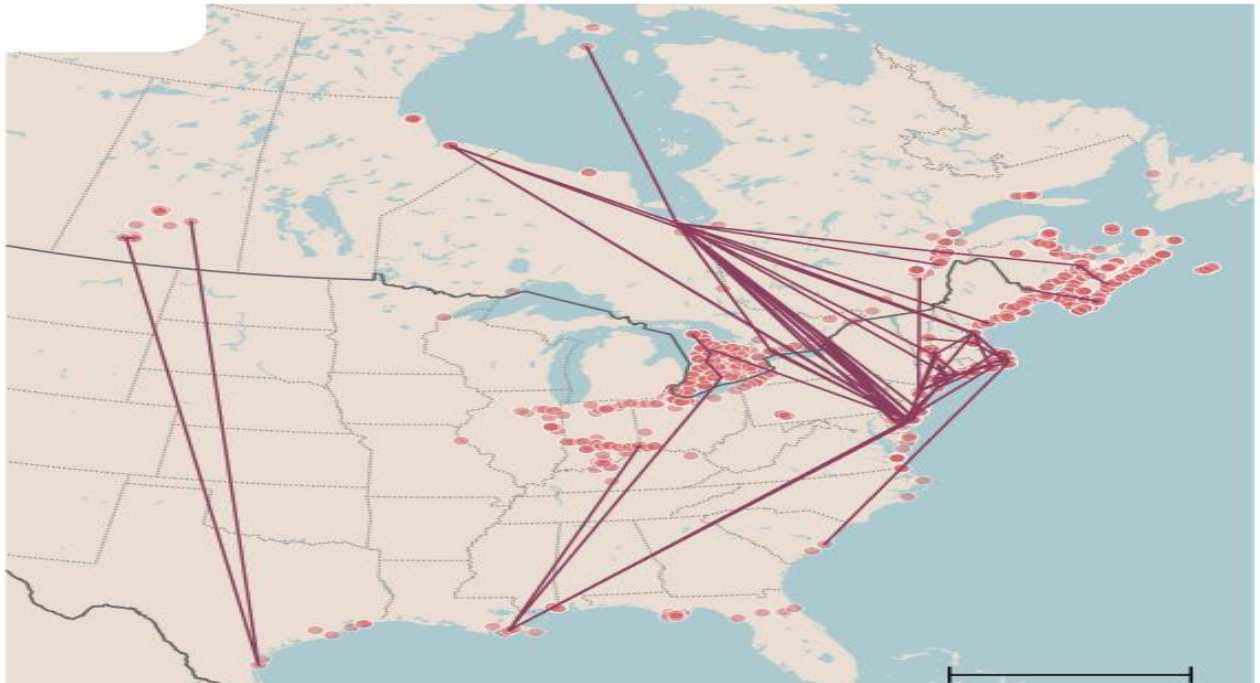
Tracking

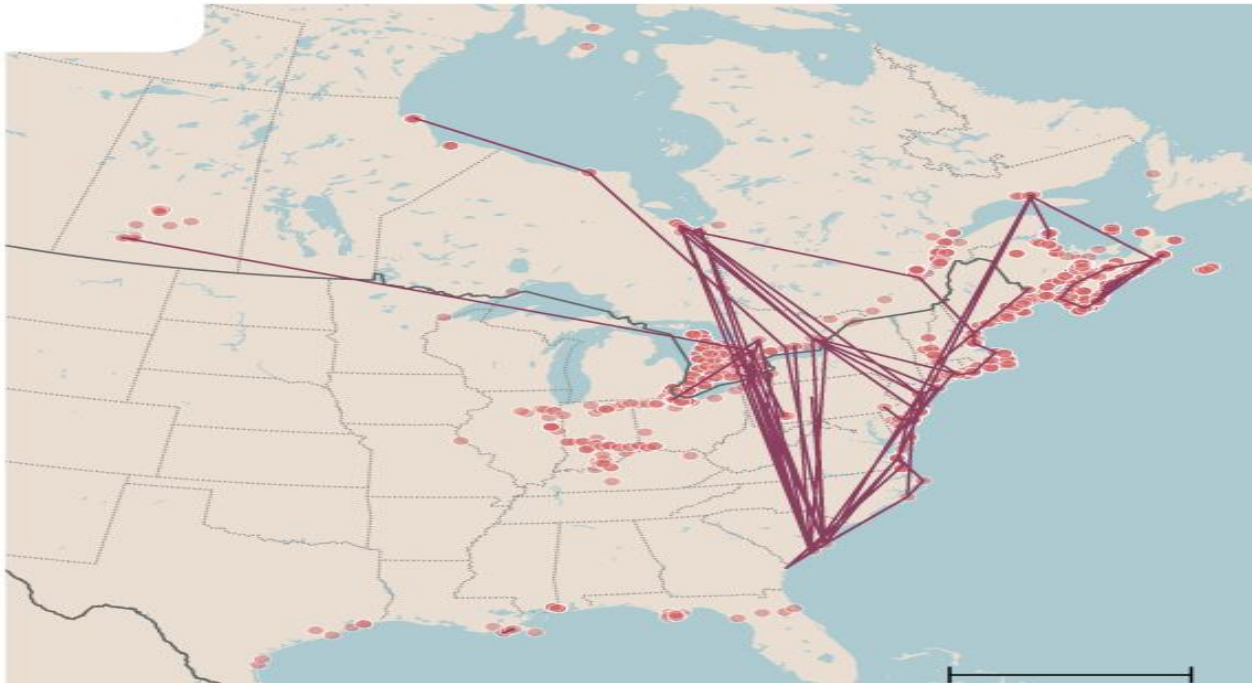
- Common tern (a surrogate for Roseate Tern)
- Roseate Tern
- Piping Plover
- Red Knot




https://maps.google.com/maps?ll=10.811394,13.03215&z=2&t=h&hl







A boreal songbird's 20,000 km migration across North America and the Atlantic Ocean

DeLuca, WV, Woodworth, BK, Mackenzie, SA, Newman, AEM, Cooke, H, Phillips, LM, Freeman, N, Sutton, AO, Tauzer, L, McIntyre, C, Stenhouse, I, Weidensaul, S, Taylor, PD & Norris, DR. 2019. A boreal songbird's 20,000 km migration across North America and the Atlantic Ocean. *Ecology*.

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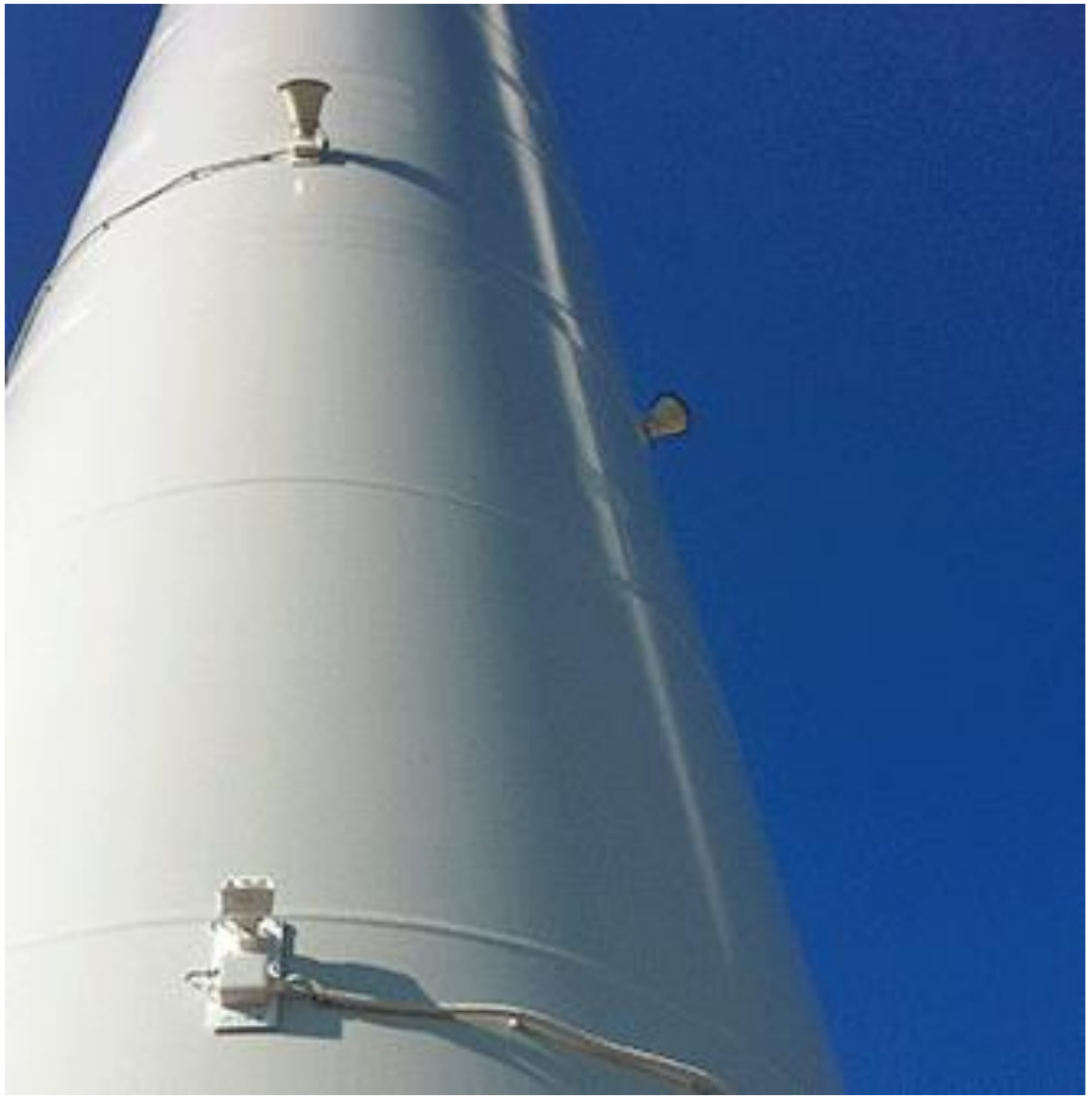
Detection technology

- Detect and avoid by curtailing turbines until bird passes through
- Detect bird strikes with sound detectors on the turbine
- Provides count of mortality with data including time and weather status
- Audubon has been advocating for funding and Department of Energy and others currently funding $ 8 million plus



Is Offshore Wind Good For Birds?

Next Steps

- By joining you're on our e-mail list, stay updated and engaged!
- Join your local chapter – www.audubon.org
- Learn more about campaigns at Audubon
- www.audubon.org/conservation/campaigns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• Questions

DISCLAIMERS

Audubon's support for offshore wind in general is not support for every project. The two projects with leases off of Maryland and Delaware, or any project, will prepare environmental documents and considerations which we will review to determine support.

Audubon's partner in this webinar is the Center for Research in Wind at the University of Delaware that fosters interdisciplinary and collaborative scientific research; engages decision makers, industry and civil society and acts as an "honest broker" among them; and enhances the education of the present generation of students with the goal of facilitating the transition to power generation using carbon-free geophysical flows, particularly wind power.