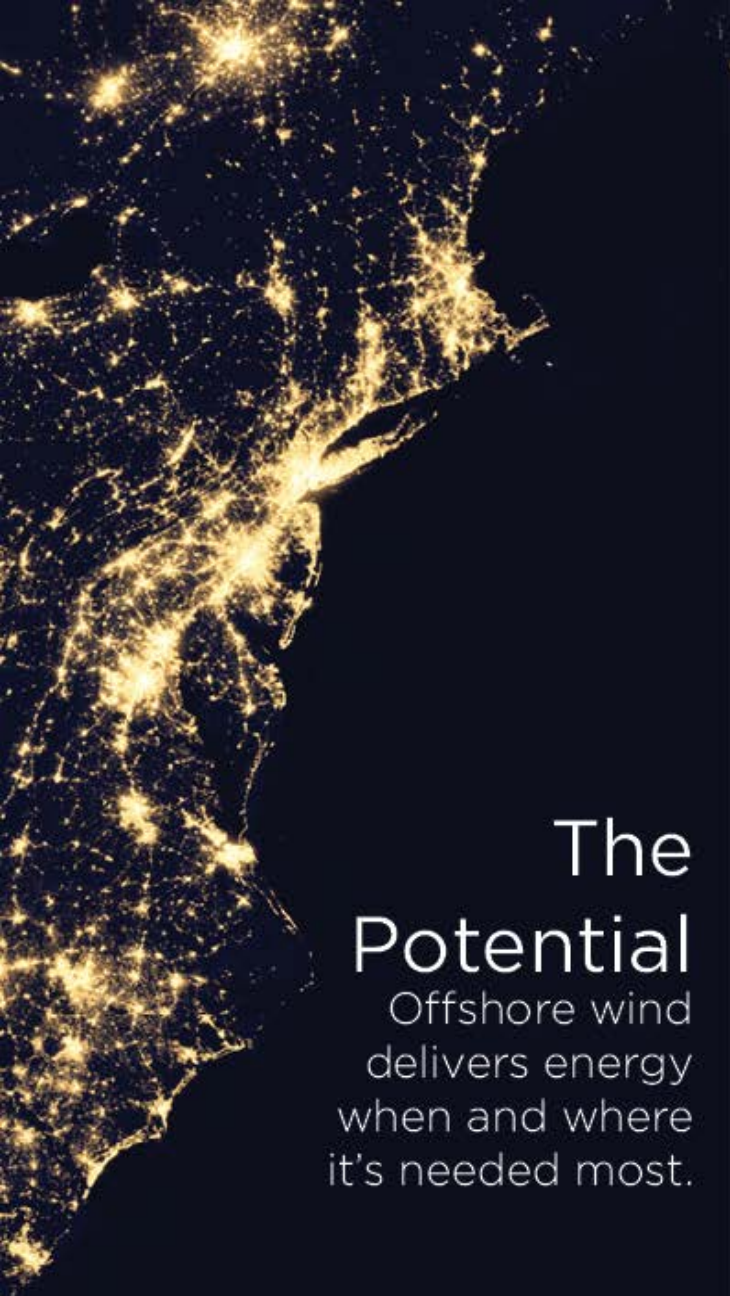


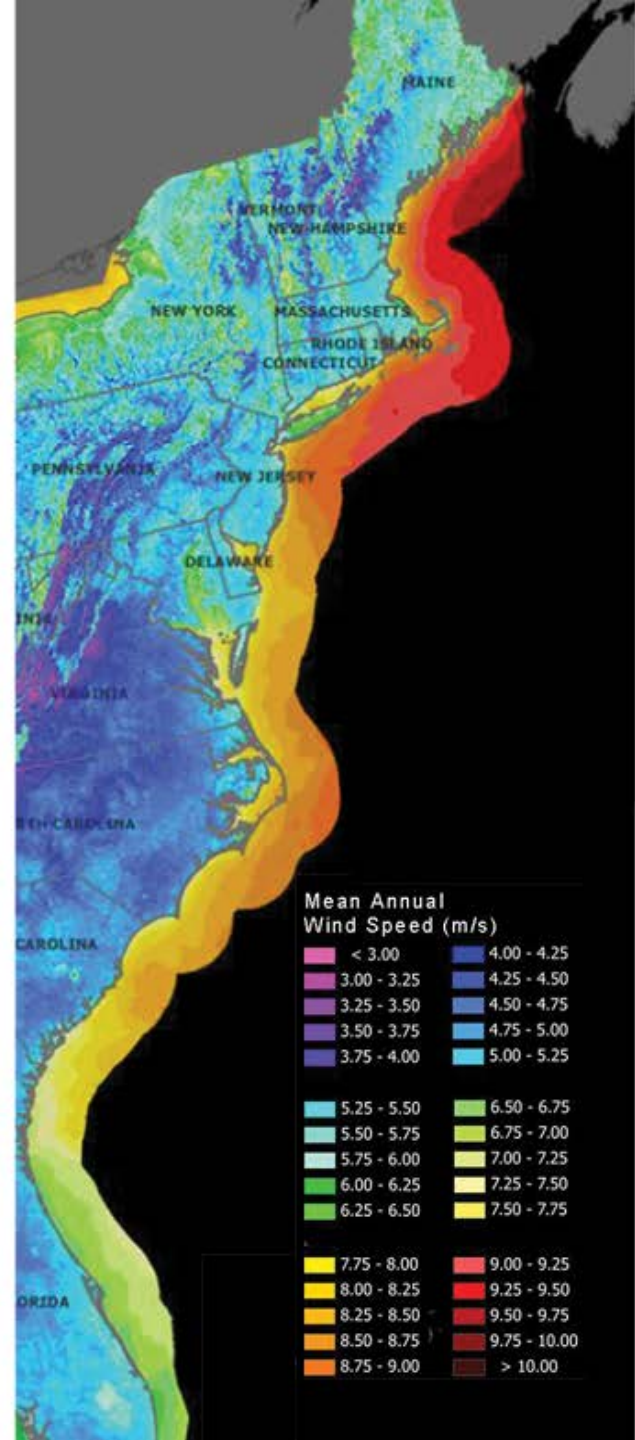


# Offshore: A booming Global Industry

- ~ 14,000 MW installed
- ~ 85,000 jobs (coastal & inland)
- \$30B investment in 2016 (↑40%)
- Europe: Dramatic Cost Reductions
  - ✓ 50% cost reduction in last 5 years, 22% just last year
  - ✓ Now cost-competitive w/new nuclear & coal
  - ✓ Cost reductions much faster than industry projected
  - ✓ Clear, long term market + mature supply chain
- LIPA selected a 90MW offshore wind project, citing it as the most cost-effective option which competed with fossil fuels
- MA Deepwater Tesla proposal



The  
Potential  
Offshore wind  
delivers energy  
when and where  
it's needed most.



Mean Annual Wind Speed (m/s)

< 3.00	4.00 - 4.25
3.00 - 3.25	4.25 - 4.50
3.25 - 3.50	4.50 - 4.75
3.50 - 3.75	4.75 - 5.00
3.75 - 4.00	5.00 - 5.25
5.25 - 5.50	6.50 - 6.75
5.50 - 5.75	6.75 - 7.00
5.75 - 6.00	7.00 - 7.25
6.00 - 6.25	7.25 - 7.50
6.25 - 6.50	7.50 - 7.75
7.75 - 8.00	9.00 - 9.25
8.00 - 8.25	9.25 - 9.50
8.25 - 8.50	9.50 - 9.75
8.50 - 8.75	9.75 - 10.00
8.75 - 9.00	> 10.00



# Status of U.S. Atlantic Offshore Wind Power Development

- **America's first project came online in 2016!**
  - ✓ Block Island Wind Farm – 30 MW (RI)
- **Nearly 2 million acres of federal waters have been designated for offshore wind leasing:**
  - ✓ 8 Wind Energy Areas finalized (MA, RI, NY, NJ, DE, MD, VA, NC)
  - ✓ Additional areas in process (NY, NC, SC)
  - ✓ **7 companies now hold leases along coast with combined potential of >20 GW**
- **State Market Policy Commitments**
  - ✓ MA: 1,600 MW by 2027 (1<sup>st</sup> RFP due 6/17)
  - ✓ NY: 2,400 MW by 2030 (+90 MW project)
  - ✓ NJ: 1,100 MW (with 3,300 MW pledge)
  - ✓ MD: ~250 MW
  - ✓ RI: 150 MW







## NWF's Campaign for Atlantic Offshore Wind Power

- ✓ Connect national, regional, state, & local offshore wind advocates
- ✓ Demonstrate support from diverse voices to Governors/state leaders, federal Administration, & Congress
- ✓ Advocacy to ensure wildlife protections during offshore wind siting, construction & operations
- ✓ Rapid response & social media communications/outreach strategy



# Environmental concerns across a range of species and habitats

## ► Species concerns

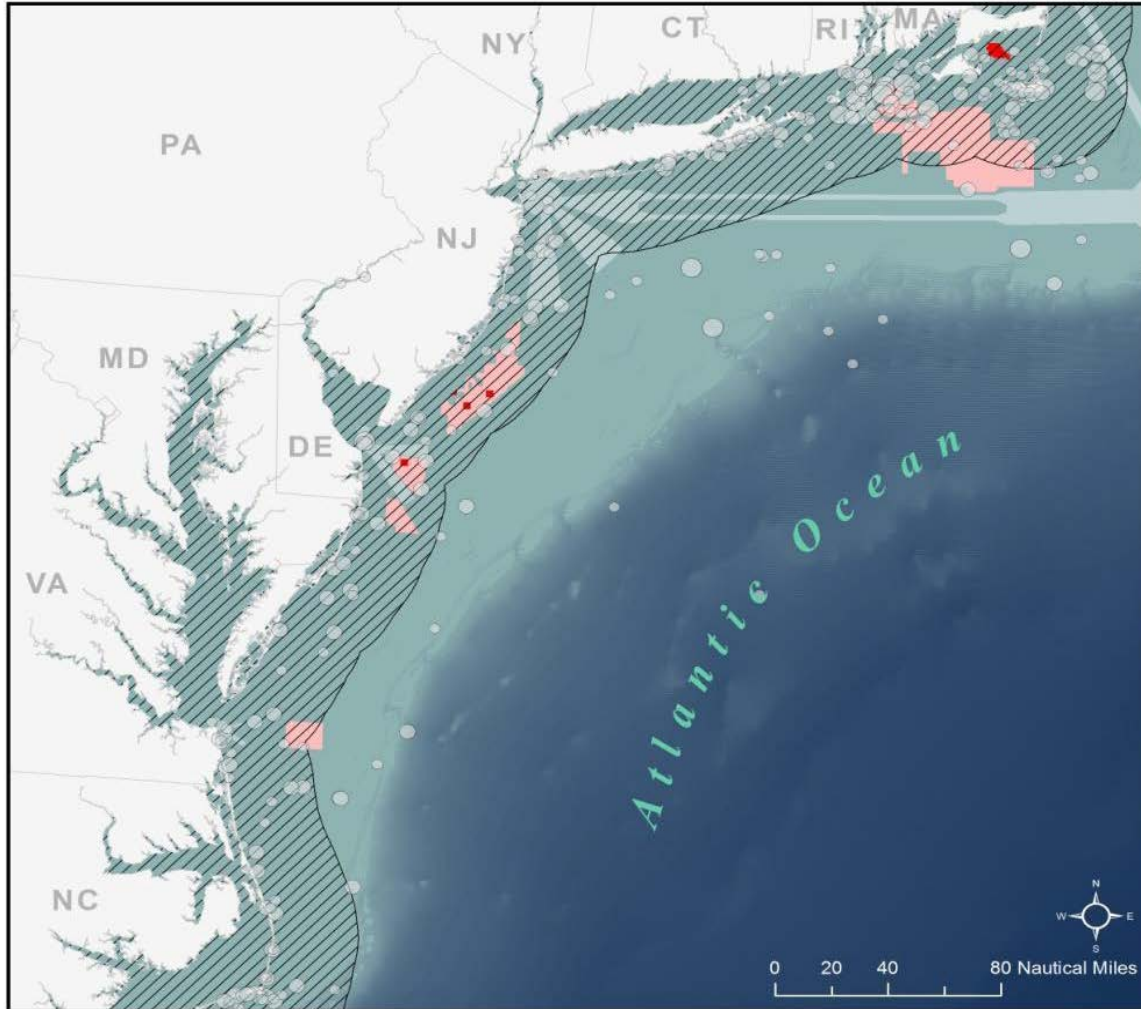
- Vessel collisions
- Noise from pile driving
- Short and potential long-term displacement from important habitat
- Cumulative impacts

## ► Habitat concerns

- Benthic habitat loss and/or modification
- Changes in turbulence and structure of the water column (prey base?)



# Working collaboratively to meet these challenges: Developing NARW mitigation measures

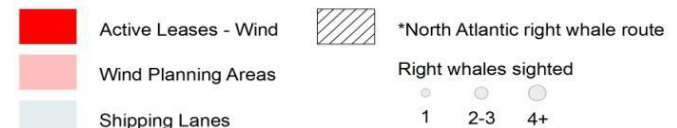


The NARW's limited range directly overlaps with a number of WEAs:

Northeast seasonal foraging

Mid-Atlantic migration

Southeast calving habitat



\*The North Atlantic right whale route for the mid-Atlantic was created by measuring the distance of whale sightings to shore during the time of migration through the region (Nov-Apr). An area covering one standard deviation from the mean distance was created to encompass 95% of whale sightings.

Data sources: Right Whale Consortium Database, 1762-2010  
Projection: NAD 83 UTM 19 N

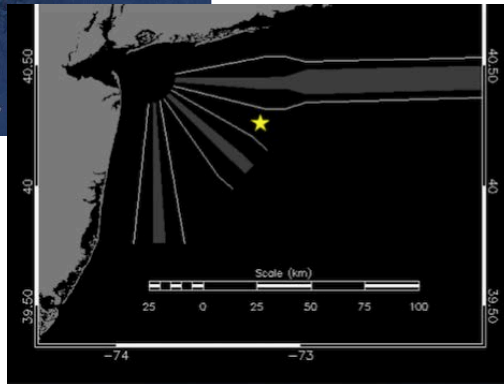
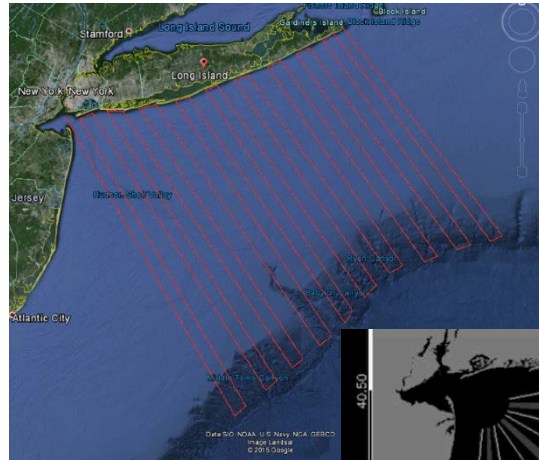


# Working collaboratively to meet these challenges: Developing NARW mitigation measures

- ▶ **Goal:** develop mitigation measures to **protect** the North Atlantic right whale while **facilitating** activities related to offshore wind energy development
- ▶ **Strategies:**
  - Most effective mitigation for NARWs is to separate development activity from animals
  - Special attention to moms and calves
- ▶ **Scope:**
  - First phase of development: site characterization and assessment (e.g. some mid-Atl, RI/MA WEAs)
  - Second phase of development: construction (e.g. Block Island)



# Important considerations and solutions



daily analyst review:

Date	Sei whale	Fin whale	Right whale	Humpback whale
<a href="#">03/06/2017</a>				
<a href="#">03/05/2017</a>				
<a href="#">03/04/2017</a>				
<a href="#">03/03/2017</a>				
<a href="#">03/02/2017</a>				
<a href="#">03/01/2017</a>				
<a href="#">02/28/2017</a>				
<a href="#">02/27/2017</a>				
<a href="#">02/26/2017</a>				
<a href="#">02/25/2017</a>				
<a href="#">02/24/2017</a>				
<a href="#">02/23/2017</a>				

- ▶ **Data gaps in species distribution**
  - ▶ Consideration & integration of multiple data sources (e.g. BOEM/MA CEC data, potential for NY)
  - ▶ Recommendations on environmental baselines (e.g. Nowacek et al. 2016)
  - ▶ Data & BMPs needed for other species, particularly resident populations
- ▶ **Little data on the impacts of OW on marine species**
  - ▶ Precautionary operating conditions based on best available science
  - ▶ Adaptive management, with monitoring & data sharing
  - ▶ New technologies to reduce noise/impacts at the source