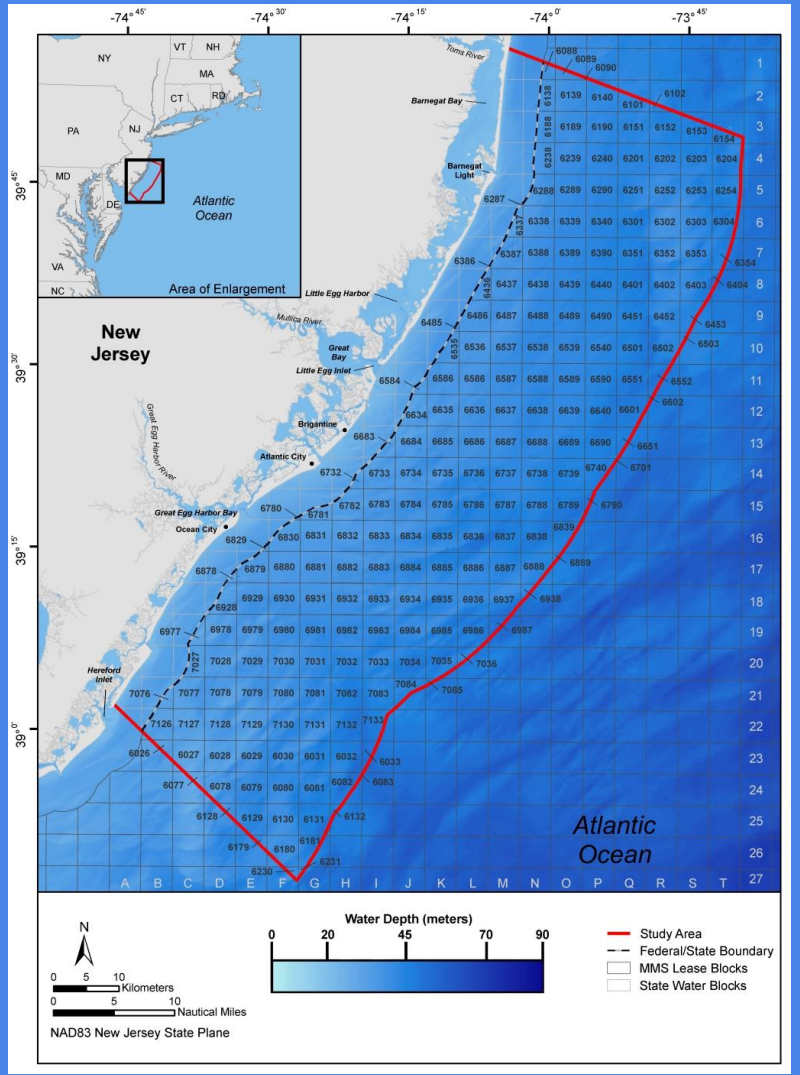
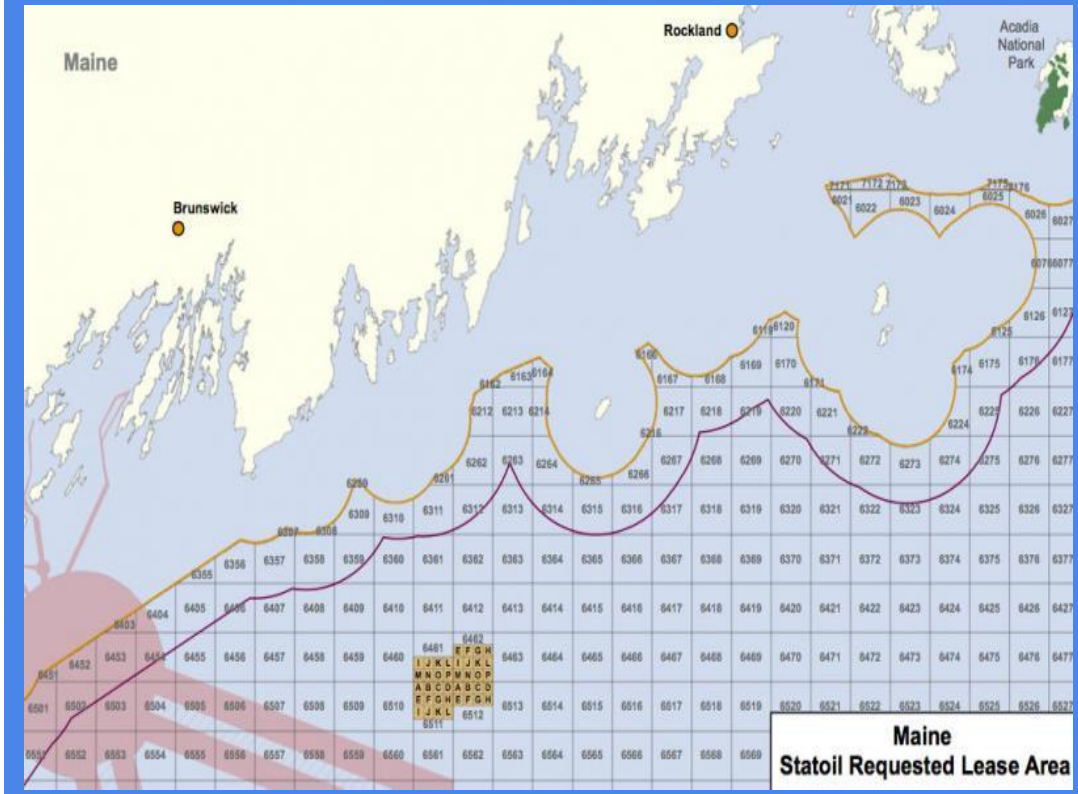
Renewable Energy off the East Coast and its Effects

Wind Study Area of focus of where potential wind turbines may be in New Jersey and Maine.





Non-Monetary Impacts

- The farm is planned to be about 3 miles offshore
- As a result, the wind farm may impact the aesthetics of the shore
- Dangers to many marine animals, including birds and several endangered mammals.
- Fin, Humpback, and North Atlantic right whales

Species Along the East Coast

Species:

- **North Atlantic Right Whale***
- **Fin Whale***
- **Humpback Whale***
- Leatherback Turtle
- Loggerhead Turtle
- Minke Whale
- Bottlenose Dolphin
- Short- Beaked
- Common Dolphin
- Harbor Seal
- Harbor Porpoise
- Atlantic Puffin*
- **Great Blue Heron**

Right Whale & Dolphin Sounds

Right Whale Sounds

- Up-call
- Moan Call
- Scream Call
- Gunshot Sound

http://www.listenforwhales.org/page.aspx?pid=432

Dolphin Sounds

- Whistles & Clicks

http://animals.nationalgeographic.com/animals/mammals/bottlenose-dolphin/?rptregcta=reg_free_np&rptregcampaign=20131016_rw_membership_r1p_us_se_w#

http://animals.nationalgeographic.com/animals/mammals/harbor-porpoise/?source=A-to-Z

North Atlantic Right Whale

- Right whales are found in Cape Cod, the Great South Channel, Bay of Fundy, and Roseway Basin. They are recently most abundant in the Bay of Fundy.

- In 2011-2012, the Massachusetts Clean Energy Center Survey Project conducted research on right whales south of Martha's Vineyard and Nantucket for future alternative energy planning

Wind Turbine Effects on Right Whales and other Marine Wildlife

- Construction & Machines
- (some) Habitat Removal & Disturbance
- Noise & Vibrations on animal communication

Impacts on the Right Whale

- Only an estimated 400 whales remain
- Migration path takes them up and down the Eastern coast
- They are not frequently spotted of the New Jersey coast, but interfering with a migration route could prove costly
- Right Whales rarely come within 3 miles of the shore, however.

Impacts on Other Marine Mammals

- Right Whales are not the only endangered mammals off the New Jersey coast.
- Humpback and Fin Whales both come closer to the New Jersey shoreline than Right Whales.
- In addition, bottlenose dolphins spend a great deal of time just offshore.
- The building of wind farms could interfere with their habitat

Table 5-3. Summary of sightings data (combined aerial and shipboard survey data) by species/group. The means and ranges of group size, water depth, distance from shore, and SST are also summarized.

Common Name	Sightings (# of schools)			Group Size (# of animals)		Water Depth (m)		Distance from Shore (km)		SST* (°C)	
	On-effort	Off-effort	Total	Mean	Range	Mean	Range	Mean	Range	Mean	Range
North Atlantic right whale *Eubalaena glacialis*	2	2	4**	1.5	1-2	22.5	17-26	23.7	19.9-31.9	10.0	5.5-12.2
Humpback whale *Megaptera novaeangliae*	10	7	17	1.2	1-2	20.5	12-29	18.4	4.8-33.2	10.1	4.7-19.5
Minke whale *Balaenoptera acutorostrata*	2	2	4	1	1	18	11-24	13.1	6.7-18.5	8.3	5.4-11.5
Fin whale *Balaenoptera physalus*	27	10	37	1.5	1-4	21.5	12-29	20.0	3.1-33.9	9.6	4.2-19.7
Bottlenose dolphin *Tursiops truncatus*	257	62	319	15.3	1-112	16.6	1-34	11.3	0.4-37.7	16.3	4.8-20.3
Short-beaked common dolphin *Delphinus delphis*	23	9	32	12.8	1-65	23.2	10-31	23.5	3.0-37.5	7.1	4.7-12.4
Harbor porpoise *Phocoena phocoena*	42	9	51	1.7	1-4	21.5	12-30	19.5	1.5-36.6	5.8	4.5-18.7
Harbor seal *Phoca vitulina*	1	0	1	1	1	18	18	9.9	9.9	11.4	11.4
Unidentified cetacean	0	1	1	2	2	28	28	23.0	23.0	5.2	5.2

Birds and Bats

- The Gulf of Maine is home to many different bird species and bats as well. Half a million songbirds move through this location on their way south every year.
- Research was conducted by multiple organizations to determine the impact of wind turbines off the coast of Maine to these species.

Wind Turbine Effect on Birds and Bats

The conclusion of the studies done off of the Gulf of Maine were:

- The vortex from rotating wind turbines may cause birds and bats to have flight trouble due to unstable air
- The structures themselves are a hazard for birds and bats to run into
- Bad weather can cause the birds to fly lower and decreased visibility may cause them to hit the turbines

The Outcome:

- It is believed that the mortality will be lower than deaths caused by other structures
- The American Bird Conservancy is afraid that with more planned turbines, the mortality may rise

Possible Solutions

1. Moving wind turbines further offshore
2. Consider wildlife ranges and if they might move around in the future
3. Put turbines in places that have less species abundance

Actors Involved

Energy Companies

- Fishermen's Energy
- Atlantic Wind Connection
- NY/NJ Port Authority

Decision Makers

- NJ State Government
- Local Governments
- NJ State Energy Regulators
- Bureau of Ocean Energy Management (BOEM)
- The people

Costs of Offshore Energy

- The planned wind farm is 25 Megawatts
- It costs approximately $4 million per Megawatt
- Low-end estimate would be $100 million, probably much higher
- Also, offshore energy is more expensive, costing 22.5 cents per kilowatt hour, while onshore wind costs 8.66
- Plant costs 2.66 times as much as a similar wind farm on shore

Recent Activity

- NJ state regulators turned down Fisherman's Energy project.
- Scientists have called this a huge error on the part of state officials.
- Nationally there is no offshore wind power project.
- NJ has the opportunity to lead the way in offshore renewable energy but has fumbled the opportunity... again