**Report of the Workshop on**

**Wildlife and Offshore Wind Energy Development**

**Woodbury, NY**

**November 13 – 14, 2018**

**I. Summary**

A workshop was hosted by the New York State Energy Research and Development Authority (NYSERDA) to review what we know and what we need to know about the impacts of wind farms on animals and their habitat. It was attended by about 180 persons. There were presentations about:

* Wind farm construction
* The ecology of the wind energy areas in the northeast
* Marine mammals
* Sea turtles
* Fish
* Birds and bats
* Research coordination.

The workshop was primarily for the exchange of information. There were no decisions or recommendations coming out of the workshop, but there was great interest in trying to develop a region-wide process to coordinate research about the impacts of wind farms and to standardize and share data.

This report does not try to summarize the content of the workshop. Rather is highlights a few of the points that were made that might be of interest to fishermen.

**II. Wind Farm Construction**

There are a number of wind farms expected to be built during the next few years in the mid-Atlantic Bight. Two experimental turbines will probably go on line near Virginia in 2020. Vineyard Wind in Massachusetts expects to be operational by 2021. The South Fork wind farm off Rhode Island is expected by 2022. And there are multiple other areas that have been leased and which may see wind farms in the next decade. According to the U.S. Department of Energy, more than 25 offshore wind projects with a generating capacity of 24 gigawatts are now being planned, mainly off the U.S. Northeast and mid-Atlantic coasts.

**III. Ecology**

The physical characteristics of the mid-Atlantic Bight have been changing since at least the 1970’s, according to Kevin Friedland of the Northeast Fisheries Science Center. For example, “spring” is coming earlier and the water is getting saltier. For many species, habitat is actually increasing, although habitat suitable for lobsters has somewhat decreased south of Cape Cod. The diversity of species present in the fall is greater than it was in 1970. Diversity in the spring is still about the same as it used to be.

Mary Boatman (Bureau of Ocean Energy Management, or “BOEM”) reported on monitoring conducted at the Rhode Island Wind Farm. Sampling was done before, during and after construction. Analysis of benthic surveys has shown “relatively small impact”. Some scouring of the bottom has been noted, but Dr. Boatman reported that it is not severe. There were some sediment plumes generated during construction, but they were less than anticipated. About one mile of cable can be laid in a day.

**IV. Marine Mammals**

Marine mammals include large whales, dolphins, porpoises and seals. All are sensitive to noise in the environment. The pile driving used to install the supports for the turbines is expected to have the greatest impact on marine mammals, but rotating turbine blades will also generate some sound that will be transmitted through the water. To encourage marine mammals and other mobile animals to leave an area before the really loud pile-driving sounds are made, pile driving can begin with a “soft start”. This is done by starting the pile driving softly then slowly ramping up the sound. Seals off the United Kingdom were seen to leave an area when pile driving started, then to return when it stopped.

The sound of pile driving can be substantially reduced in the water by surrounding the operation with a curtain of air bubbles. The curtain can absorb up to 90% of the sound. This is expensive technology, but it has been used successfully in Europe and is being considered for construction here in the United States.

**V. Sea turtles**

In the Massachusetts Wind Energy Area, there are four species of sea turtle that can be found in the area: leatherbacks, green, loggerhead and Kemp’s ridley turtles. Of these, the leatherback and Kemp’s ridley species are listed as endangered under the Endangered Species Act, while the populations of green and loggerhead turtles in the northwest Atlantic are considered threatened. It is unclear how turtles will be affected by a wind farm, although they may be susceptible to sounds generated (especially during construction) or by being hit by vessels in the area. It is possible that sea turtles will be attracted to the turbine towers, which act like reefs by accumulating mussels, tunicates and sea weeds.

**VI. Fish**

The second morning was focused on fish biology and how wind farms might affect fish. Several points were made that might affect the future debate about fisheries impacts:

* Arthur Popper, one of the world’s foremost experts on fish hearing, stated that he thought the guidelines used by the National Marine Fisheries Service for noise levels that fish can tolerate are too low. He has recommended using higher thresholds (in other words, allowing fish to be exposed to louder sounds before the government requires any mitigation).
* A study has been done to see how lobsters and little skates are affected by the electromagnetic field (EMF) generated by undersea cables. Lobsters and skates were placed in a large cage on the ocean bottom of Long Island Sound, right over a buried cable carrying electricity from Connecticut to Long Island. Both species could detect the EMF, but it was not a barrier for them—they crossed right over the cable. The author of the study said that we still do not fully understand EMF reception in fish or lobster, and therefore do not fully understand the impacts, but other persons at the workshop said that they thought that EMF would not be an issue for commercially valuable species.
* Turbine towers act as a hard surface to which marine organisms can attach. One large turbine in the United Kingdom was home to almost 13,000 lbs of attached marine biomass, including mussels, sea weeds, predatory mollusks, edible crabs, sea stars, etc. So the turbine foundations might serve as biological hot spots.
* One often sees a lot of small fish near a turbine tower, which may attract predators, including fish and birds. In the UK, the effect of turbines as fish aggregators tends to peter out within about 20 m (65 ft).

A study was done before, during and after construction of the Block Island wind farm to see how fish and invertebrates were affected. The study consisted of a trawl survey using a protocol similar to the Northeast Area Monitoring and Assessment Program (NEAMAP) and a ventless trap survey using standard techniques. Both the trawl and the trap survey were conducted using fishing vessels. The study is not yet complete, but preliminary findings include:

* Fish and invertebrate species and abundance changed over time in the wind farm area and in the two reference areas that were away from the wind farm site. However, the changes were not greater at the wind farm than at the reference sites.
* Construction did not appear to have a negative impact on lobster abundance. Although some species of fish appeared to move away from the area when pile driving was occurring, lobsters did not move away.
* Black sea bass were attracted to the turbine foundation area.
* Construction did not appear to change the composition of fish species in the area.
* Invasive species have not yet been seen in the Block Island wind farm, but this does not mean that they will not arrive in the future.

**VII. Birds and Bats**

There are three main concerns about the impacts of wind farms on bird and bat populations. One is death caused by being hit by a turbine blade. Another is that the birds could be displaced from their usual habitat because of construction or operation of turbines, and a third is that wind farms would cause birds and bats to fly farther during migrations if they avoid flying through the farms. One study of birds around turbines followed 1500 birds through a wind farm. Of these, 299 came within striking distance of the blades. Of the 299, 6 were actually hit by the blade.

The endangered piping plover may migrate through the Massachusetts Wind Energy Area. They usually depart at sundown in late July or early August.

**VIII. Research Coordination**

Invited speakers from Europe recommended that the United States start now to form some sort of organization to prioritize and coordinate research on the impacts of wind farms on the environment and the species that live near the farms. They said that after 15 years of wind farm development in Europe, there are still questions about the impacts. By a coordinated research program through which researchers use agreed data collection methods and pool their results, the United States might be able to answer some to those questions better than the Europeans. Time is of the essence, though, as research needs to start before construction begins in order to know what the area is like before the wind farm is created.

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