OFFSHORE WIND (from page 20)

For this reason, the Block Island Wind Farm (BIWF) needed roughly three-foot diameter piles driven down through the hollow legs, but the new turbines will require 36-foot diameter monopiles driven straight down through the sea floor.

I do not know the energy requirements for each because they depend on many design factors, but I can tell you that energy required for pile driving is dependent on 2 primary factors: **pile end resistance** and **pile side surface resistance**.

A 36-foot pile has a cross section that is 230 times as great as a 3-foot pile and a surface area per foot of length that is 10 times as great. This leads me to conclude that energy requirements are hundreds of times as great for driving these monopiles compared to the piles needed for the jacketed foundations used at BIWF.

Even with 4 piles per foundation the impact of underwater sound energy would be much less during installation of jacketed foundations, but this comparison was not included in the DEIS for SFWF.

With pile driving impacts likely to "harm finfish" for more than 6 nautical miles in all directions around pile driving activities (reported in the SFWF DEIS) the developers must be required to evaluate alternatives.

Those alternatives should include gravity foundations, jacketed foundations, helical foundations, floating platforms, etc. This should be part of the original design and should be documented in the EIS for each project so that there is a consideration of how these most severe impacts can be avoided during construction.

Bottom structure important to recreational fishing

While some habitat improvement is possible with the monopile foundations there has been no attempt by any of the OWE developers to modify design for habitat value nor has there been any interest in studying the potential for habitat improvement.

This leads me to conclude that as recreational anglers we currently have very low status for consideration by OWE developers and we need to push modifications for the purpose of habitat improvement while we make sure that OWE developers evaluate all potential negative impacts associated with their projects.

Long term effects of pile driving?

One project like the Block Island Wind Farm with pile driving for 5 turbines during a single season is much different than 20 projects with up to 1,000 turbines over decades of construction!

Will fish habituation be disrupted over so many seasons that they change forever?

It is certainly possible that fish chased out of this offshore area every summer for a decade may imprint a different behavior on subsequent generations, leading to significant long-term avoidance of the wind farm area. It did not occur in the case of the BIWF, but pile driving only occurred during one season for that project.

Essential Fish Habitat

Section 3.4 of the DEIS for SFWF, Biological Resources, identifies the area of Cox Ledge where SFWF is to be located as Essential Fish Habitat (EFH) for more than 25 marine species, many of which are very significant species for commercial or recreational fishing or both.

In consideration of this fact and the statement that this project will impact up to 354.8 acres of seafloor, the developer should detail, at a minimum, how the Proposed Action will include construction of new fish habitat that exceeds the 354.8 acres that will be impacted, where and how this new habitat will be constructed, and how this new habitat will be monitored to assure that it develops into a high quality "complex" habitat that will make some accommodation for impacts to 354.8 acres of EFH on Cox Ledge.

This "compensatory construction" of new habitat should be required for all OWE projects.

Considering that these OWE projects have such potential significant impacts to fish (as referenced above, injury to finfish greater than 2 grams in size out to a radius of 39,265 feet shown on p. 3-23 of the DEIS) and are located in an area of EFH with major concentration of existing fishing, turbine installation evaluations should include an analysis of alternatives that do not require the enormous energy necessary to drive monopiles into the seafloor.

Those alternatives that should be considered include gravity foundations, helical piles, floating platforms, jacketed foundations which require much lower energy levels for pile driving, or other alternatives that do not result in the level of impact that would result from large diameter monopile pounding.

Finally, I want to point out that the European Meta-analysis study by Methratta & Dardick (2019), often quoted as documenting a greater abundance of fish inside wind farm areas, according to the authors, was written only to "promote further research," Therefore, the authors used a greatly relaxed selection criterion of $p<0.05$ rather than $p<0.01$ which would normally be used for policy decisions. This basically says that a difference of fish abundance will be claimed based on a certainty that is 5 times less rigorous than would be necessary for decision making purposes.

For this reason, it is not clear that there is a significant difference in abundance near turbine bases in Europe or if the very minor increases observed are because commercial fishing is not possible near those bases.

If anyone is interested in links to the various documents referenced above to get more information feel free to contact me at hittinger@risaa.org