

Flight Responses and Potential Impacts of Offshore Wind Turbines to Daily Commute of Sea ducks, specifically the Long-Tailed Duck (*Clangula hyemalis*)

- Information scarce about daily commute impacts.
- Population-level impacts caused by energy expenditure to avoid turbines on commute or migration are referred to as “barrier effects.”
- Based on literature review, barrier effects are the most probable way that the proposed project could impact Long-Tailed Ducks in Nantucket.
- Habitat/substrate alteration irrelevant because proposed turbine is not within feeding grounds nor is it actually offshore. Substantial collision mortality unlikely because there is only one proposed turbine.
- Literature review suggests that barrier effects rarely have population-level effects on birds (not specific to long-tailed duck) unless large wind farms create long diversion between nesting and foraging grounds or multiple large wind farms have cumulative effects on commuting/migrating distances (Desholm and Kahlert 2005, Langston and Pullan 2003).
- In diurnal flight, sea ducks often avoid wind farms by diverting flight to go around entire farm. More individuals fly into farms in nocturnal flight and will fly between turbine rows when possible (Langston and Pullan 2006). A very small percentage of birds fly near enough to turbines to pose collision risk (Desholm and Kahlert 2005).
- Avoidance responses (not specific to sea ducks) occur between 100 and 3000 meters of wind farm (Drewitt and Langston 2006).
- When wind farms were constructed in Long-Tailed Duck staging areas, numbers of birds decreased significantly within wind farms after construction. However, many ducks were observed flying through the wind farms (Pettersson 2005, Guarnaccia and Kerlinger 2008)).
- Long-tailed ducks disturbed from staging for several hours by turbine maintenance boats (Pettersson 2005).

- Little information is available about habituation of sea birds to barrier effects (Langston and Pullan 2003). Unclear if long-tailed ducks would avoid wind turbines initially and eventually revert to previous commuting routes.
- In a lake offshore windfarm, Dirksen et al (1998) reported that Pochard and Tufted Duck habituated to presence of wind turbines even when they created a barrier to daily movements (in Kerlinger and Guarnaccia 2008).
- Most available information available pertains to large, multi-row offshore windfarms. Because the proposed project consists of only one turbine, it is unclear whether the long-tailed duck behaviors reported in previous studies are relevant.
- In 1997-1998, 15.5-18.6 long-tailed ducks per km² were observed in Nantucket Sound using aerial transect surveys. They were often found over waters of 20-meter depths (White et al 2009).

Literature Cited

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