

# The Impact of Underwater Sound on Marine Mammals

## What sounds will be made?

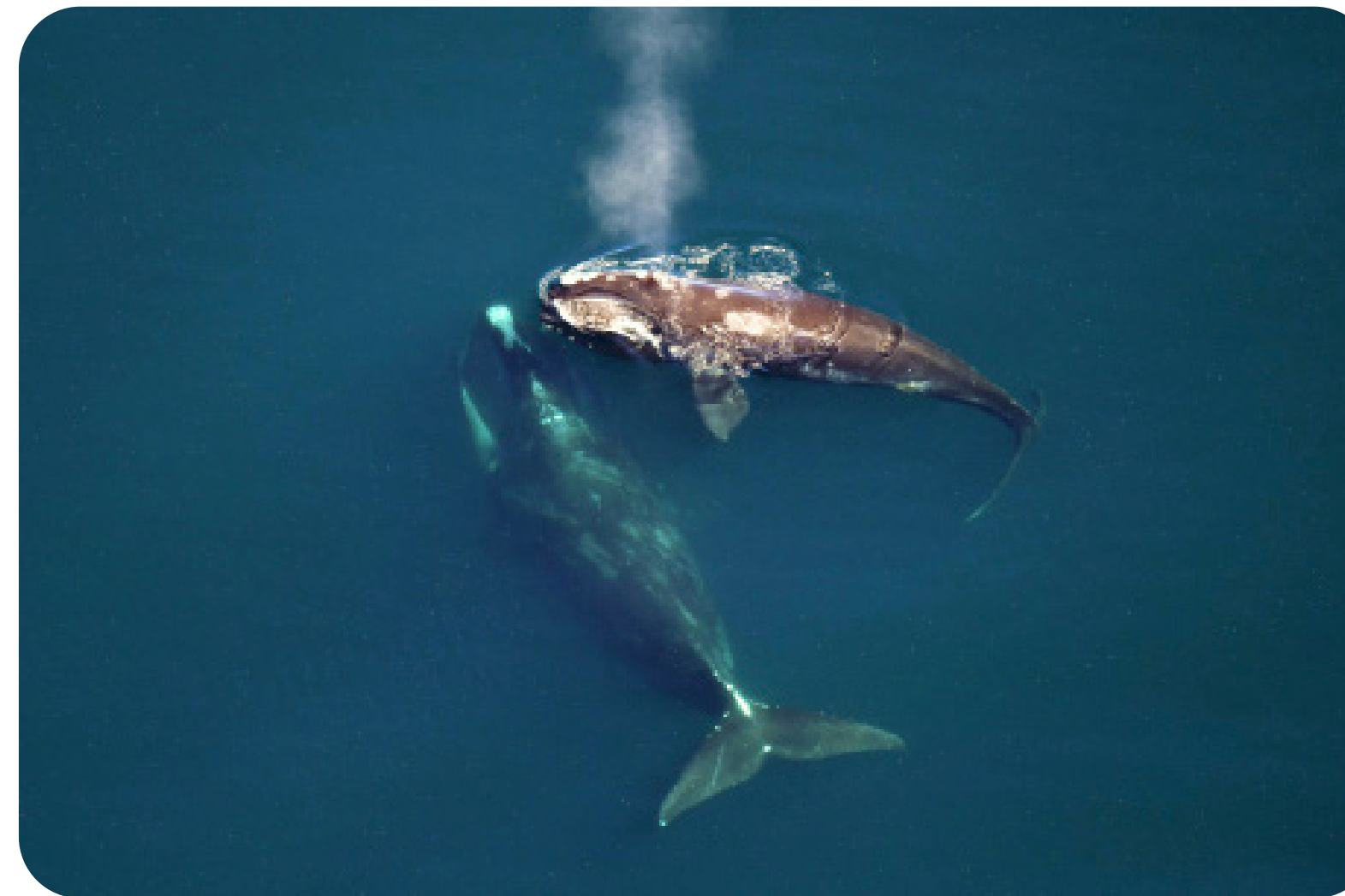
Pile driving is the primary source of acoustic concern associated with the proposed project. Not all project-related sounds are expected to be harmful. Some sounds will only be present during certain stages over the life of an offshore wind energy facility.



Studies in European waters show that harbor porpoises may leave an area and feed less when pile driving begins but generally return within weeks after pile driving activities end.

## What natural and man-made sounds are in the project area?

- Commercial and recreational boats
- Scientific surveys
- Fishing and navigational sonars
- Animal vocalizations
- Wave action, storms



*The population of North Atlantic right whales has been shown to be declining, and they are a species of interest in the mid-Atlantic region.*

## What are the possible impacts to marine mammals and sea turtles from pile driving?

### Hearing Impacts

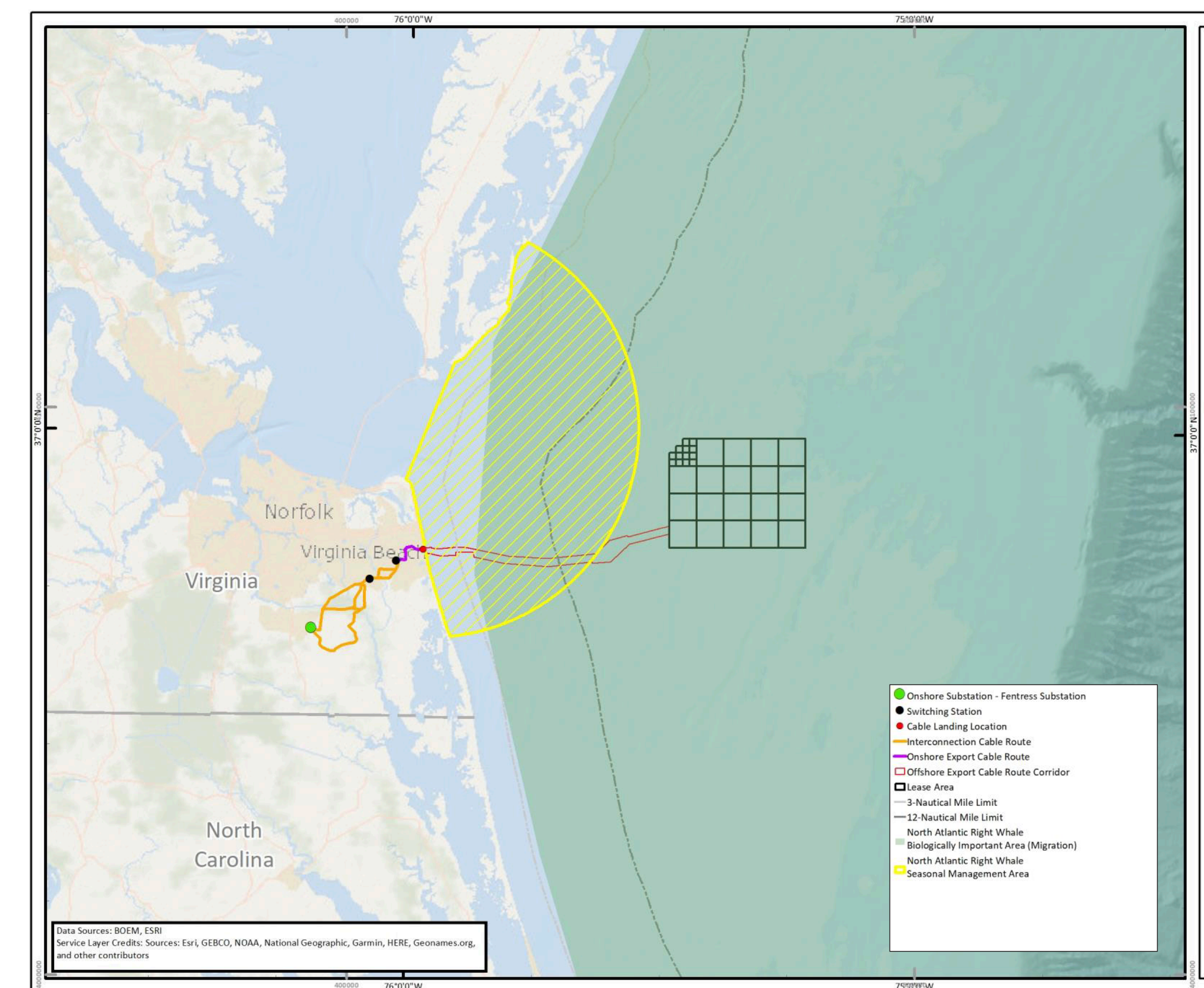
- Temporary hearing loss
- Permanent hearing loss

### Behavioral Impacts

- Avoidance of the area
- Impacts to hearing ability (temporary or permanent)
- Changes to feeding success, resting, migratory behavior
- Disrupted communication
- Stress

## What information informed the analysis?

- Technical information on sound sources
- Underwater sound models
- Animal movement models to assess realistic exposure
- The seasonal occurrence of protected species in the lease area
- Information on animal responses to sound
- National Oceanic and Atmospheric Administration guidance on assessing the effects of sound on marine mammals



North Atlantic Right Whale Seasonal Management Area and Biological Important Area