



Wind-wildlife Interactions in the Offshore Realm: A review of the current state of scientific knowledge

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A Team Effort

Undertaken by AWEA OWWG Wildlife Issues Committee

Primary Technical Contributors

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Benthos and Plankton: Marcia Bowen (Normandeau)

Mammals and Turtles: Mary Jo Barkaszi (CSA), Alison Bates (U. of Delaware)

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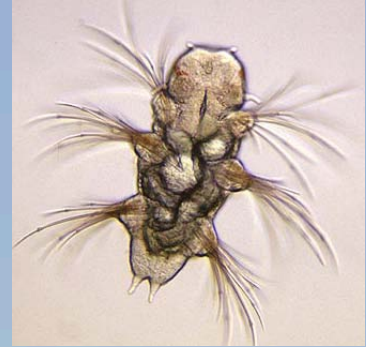
Objectives

- Review the current state of scientific knowledge of the interactions between offshore wind installations and wildlife
- Distill findings into concise, understandable format, accessible to wide audience of offshore wind stakeholders
- Cite and document sources for scientific transparency, independent verifiability

Scope

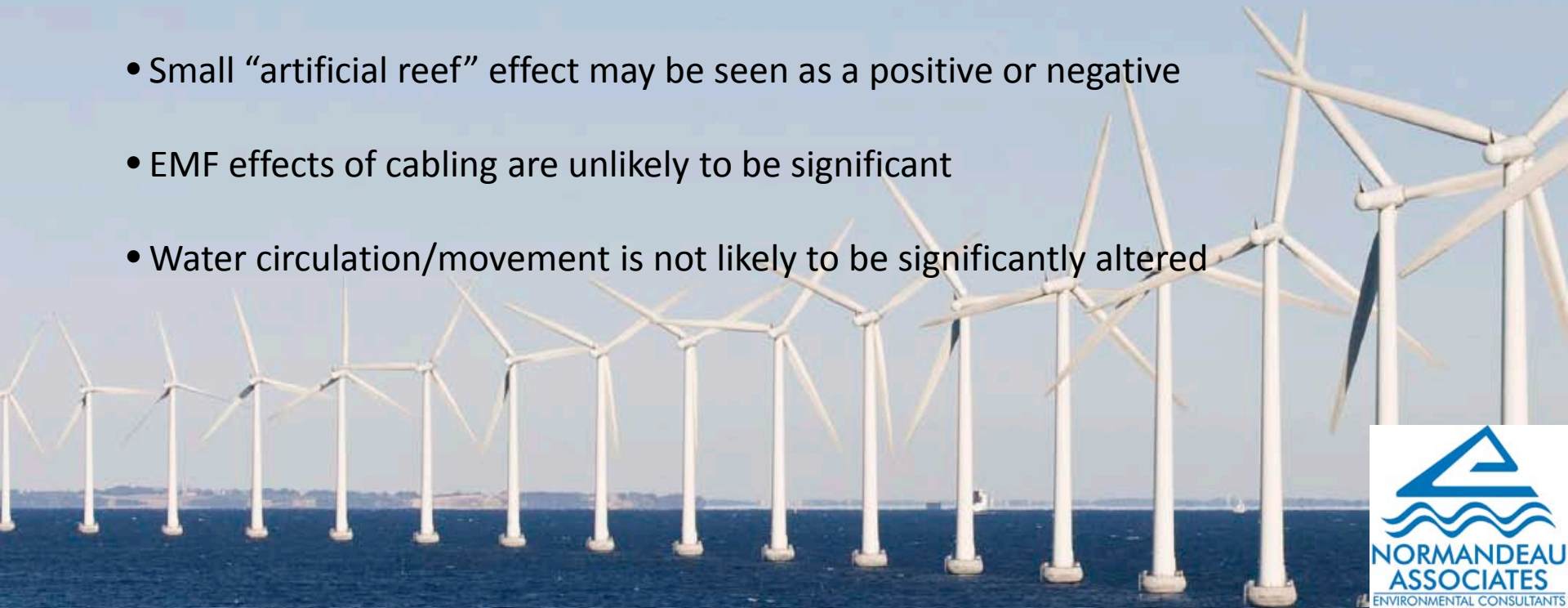
- **Taxonomic:** All living things
- **Geographic:** Review global info, discuss impact for US
- **Habitat:** Turbine towers with wet bases
- **Content:**
 - Scientific technical literature
 - emphasis on peer-reviewed sources
 - also other “gray” literature deemed to be reliable
 - emphasis on data, evidence

Findings Summary



Benthic (sea floor) and Planktonic (water column) communities

- Direct loss of benthic habitat is small, unlikely to be significant (<0.1 ha/turbine)
- No significant impacts to planktonic communities are likely
- Small “artificial reef” effect may be seen as a positive or negative
- EMF effects of cabling are unlikely to be significant
- Water circulation/movement is not likely to be significantly altered

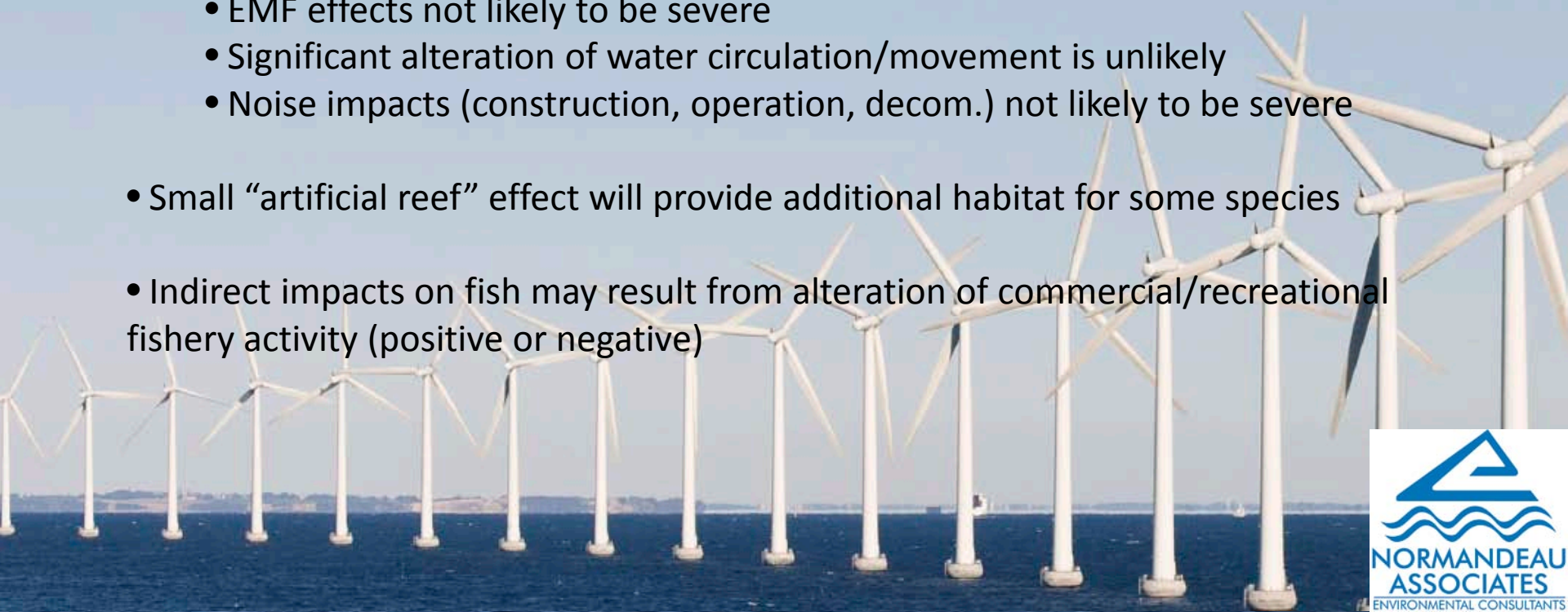


Findings Summary



Fish

- Adverse impacts on fish and their habitats are not likely to be significant
 - Direct habitat loss is minimal and localized
 - Direct mortality not likely
 - EMF effects not likely to be severe
 - Significant alteration of water circulation/movement is unlikely
 - Noise impacts (construction, operation, decom.) not likely to be severe
- Small “artificial reef” effect will provide additional habitat for some species
- Indirect impacts on fish may result from alteration of commercial/recreational fishery activity (positive or negative)

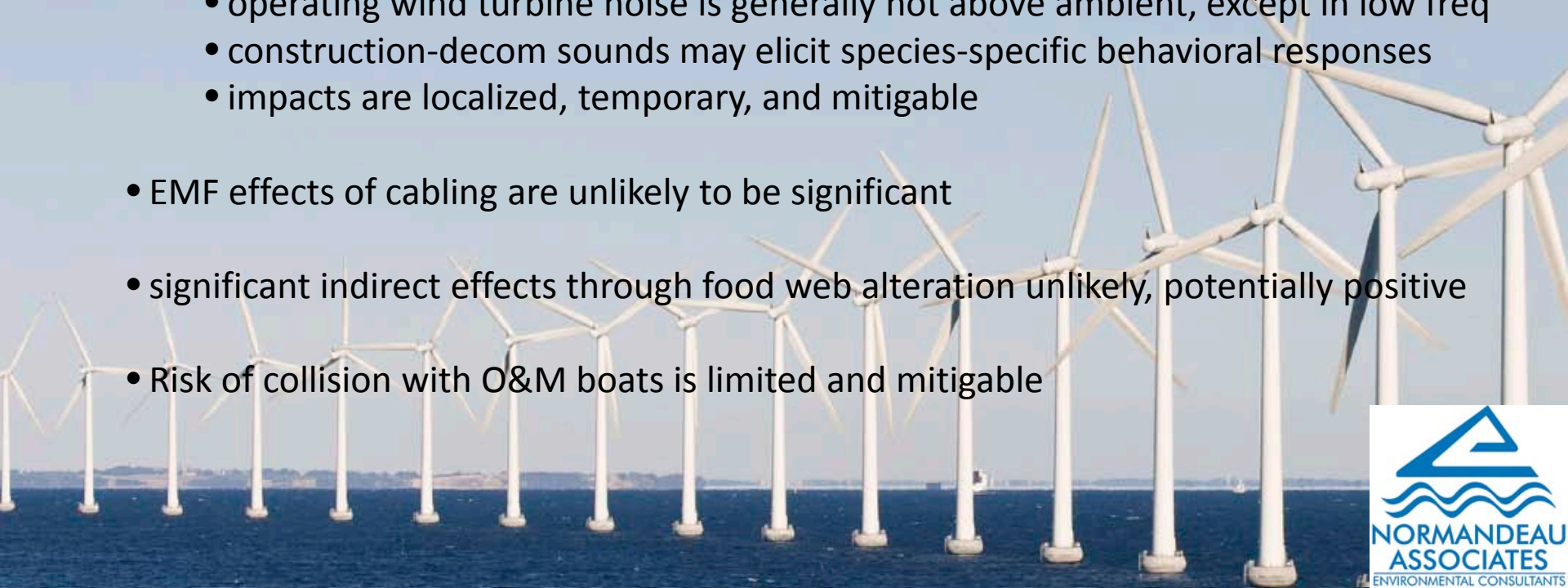


Findings Summary

Marine Mammals and Sea Turtles



- Some adverse impacts from pile driving/decom noise are possible
 - potential direct damage from pile driving noise limited to within a few 100 m
 - operating wind turbine noise is generally not above ambient, except in low freq
 - construction-decom sounds may elicit species-specific behavioral responses
 - impacts are localized, temporary, and mitigable
- EMF effects of cabling are unlikely to be significant
- significant indirect effects through food web alteration unlikely, potentially positive
- Risk of collision with O&M boats is limited and mitigable

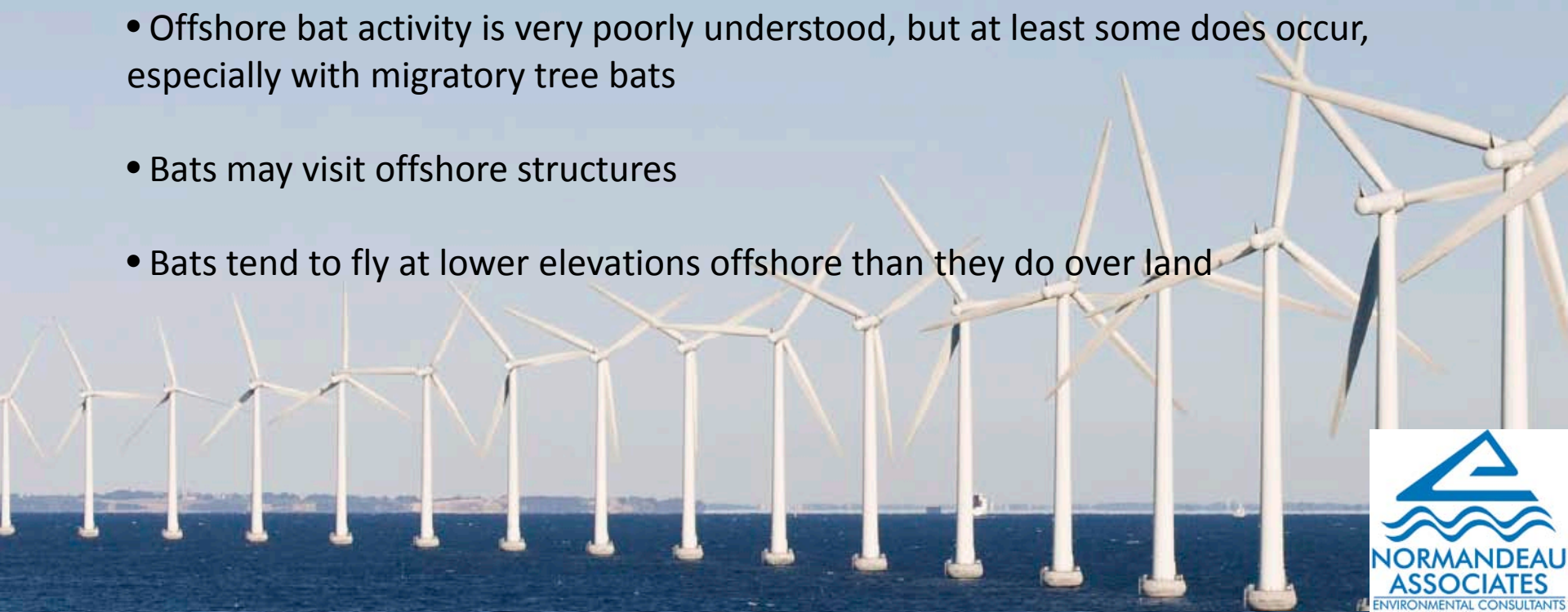


Findings Summary

Bats



- Bats are primarily terrestrial animals, hence density and wind power impacts likely much lower offshore than on land
- Offshore bat activity is very poorly understood, but at least some does occur, especially with migratory tree bats
- Bats may visit offshore structures
- Bats tend to fly at lower elevations offshore than they do over land

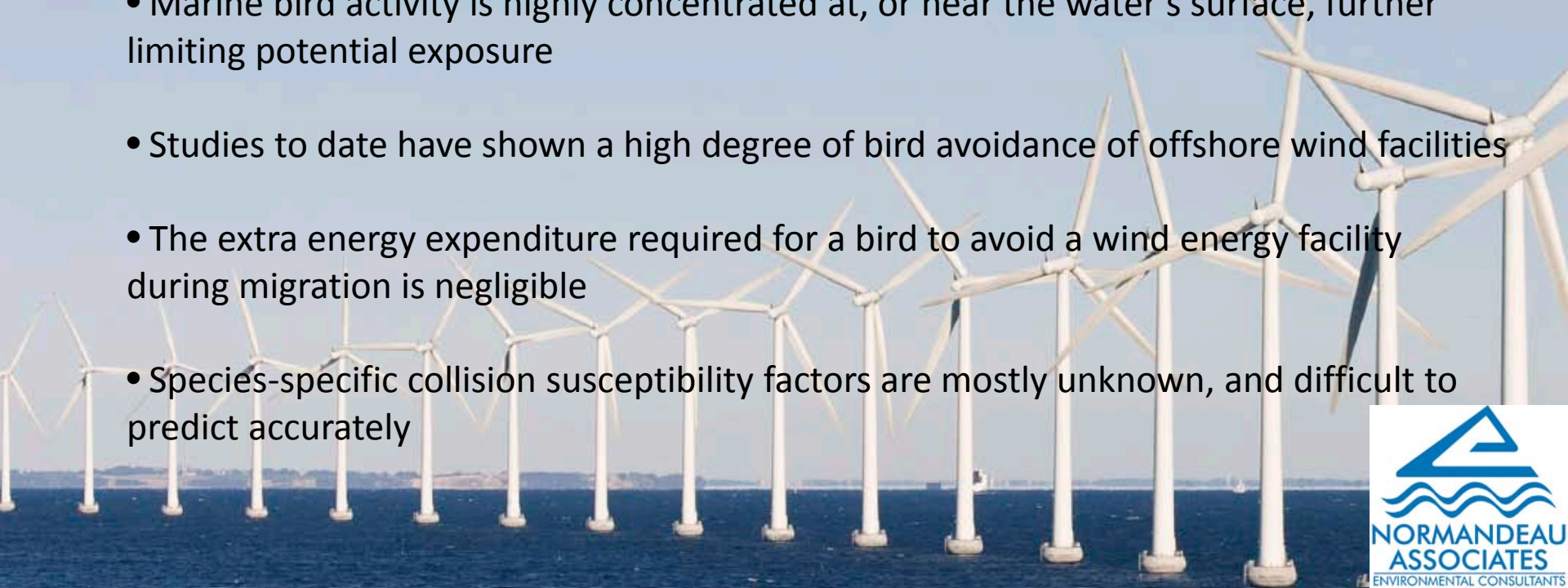


Findings Summary

Birds



- Bird density and diversity are generally much lower in offshore environments than on land, suggesting low exposure, particularly far from shore
- Marine bird activity is highly concentrated at, or near the water's surface, further limiting potential exposure
- Studies to date have shown a high degree of bird avoidance of offshore wind facilities
- The extra energy expenditure required for a bird to avoid a wind energy facility during migration is negligible
- Species-specific collision susceptibility factors are mostly unknown, and difficult to predict accurately



Findings Summary

Overall

- No “red flag” risk issues were identified, potential impacts of limited spatial extent, severity, and biological significance
- State of the knowledge is very poor. Much less baseline data than on land

