Shifting the paradigm for offshore wind energy and wildlife impacts:
a questions based approach for assessing impacts of offshore wind projects to birds

DAVID TIDHAR, DR EMILY NELSON, DR FIONA CARYL, DR NANCY McLEAN, DR CHRIS PENDLEBURY, CHRISTINE SUTTER

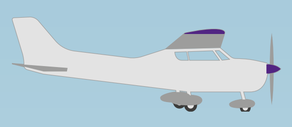
Introduction

As the US offshore wind industry celebrates the construction of the first utility-scale project, it is an opportune moment to shift the paradigm for how wind-energy and wildlife projects are designed. Focusing effort on mortality monitoring to calculate mortality rates for birds or bats is not appropriate for offshore projects. Rather, investment in increasing our understanding of 1) effective risk assessment methods, 2) the drivers of mortality and avoidance for key receptors, and 3) effective avoidance, minimization and mitigation tools and methods are advocated. Designing effective studies utilizing appropriate statistical methods to address key questions will reduce uncertainties of the effects of offshore wind projects (OWP) and facilitate the provision of fit-for-purpose results. Incorporating lessons learned from global studies and de-emphasizing mortality monitoring will reduce costs and uncertainties, while increasing the potential to avoid and minimize impacts.

Aerial Surveys

Hi-definition digital photography can be targeted towards periods of year of greatest interest, e.g. breeding season, migration etc...

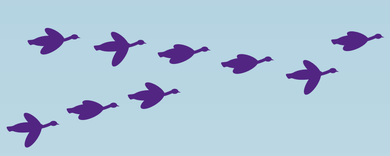
- Wider area distribution & abundance
- Wider area flight direction
- Puts site into wider-area context



Migration Surveys

Coastal and boat-based observations

- Identifies key migration routes
- Flight height info for non-seabirds
- Informs the need, if applicable, for radar studies



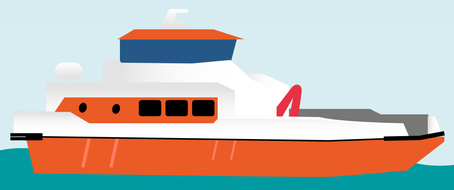
Seabird Tracking Surveys

GPS logger devices on key species

- Foraging locations
- Foraging distances
- Activity budgets

Boat-Based Surveys

- Monthly species' distribution & abundance
- Flight height data
- Flight direction information
- Behavioral information



Concerns for OWP

Construction

- Disturbance/displacement leading to habitat loss
- Reduced breeding success through increased energy expenditure associated with avoidance / disturbance (?)

Operations

- Collision risk and potential for population level impacts
- Disturbance/displacement leading to direct habitat loss
- Barrier effects to movement leading to increased energy expenditure during commuting and foraging (?)
- Reduced breeding success through increased energy expenditure associated with avoidance / disturbance (?)

What are the key questions?

What are the key receptors?

- Species which may congregate/concentrate
- Species breeding, foraging or flying through the OWP
- Pelagic seabirds, coastal waterbirds and migratory terrestrial birds

How should the proposed project cost-effectively assess effects?

Careful study design utilizing appropriate statistical design and power analysis

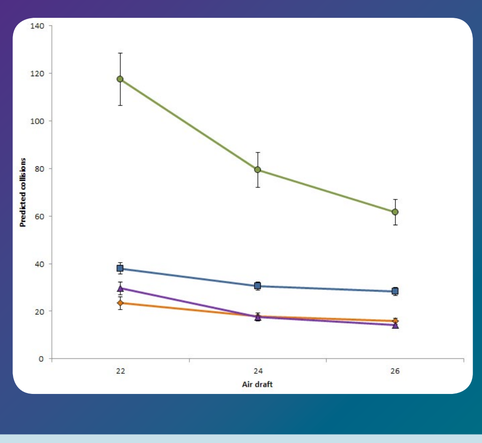
What are the expected effects?

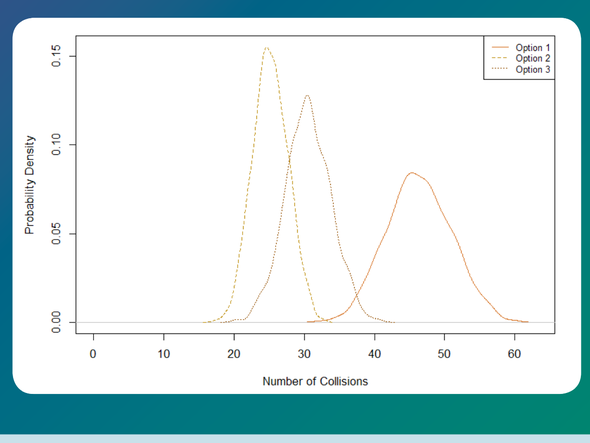
Assess temporal use, spatial use & hotspots, species composition and abundance
Quantify and characterize displacement risk

Before After Control Impact currently recommended by BOEM	VS	Before After Gradient
Surveys conducted before and after construction in both control and impact areas		All areas within a given radius of site monitored baseline and after construction
Temporal replication is vital to provide reliable conclusions as bird density, distribution and spatial use varies annually/seasonally – resulting in increased timescales and costs		Measures changes in the distribution and abundance of birds with respect to distance from the development
Spatial replication and randomized selection for controls required to provide reliable conclusions - resulting in increased timescales and costs		Impacts are assumed to decline with increasing distance from OWP
Independence of controls is vital but difficult to achieve – e.g. a colony of seabirds may range over both control and impact areas – decreasing capacity to detect effects		Study design does not need to be uniform (e.g. for near shore sites) and may extend >5km
Sufficient replication of independent controls gets harder to achieve as development increases		Transparent spatial scale; provides clear statistical evidence; easy to interpret results

Quantify avoidance and collision rates - Collision Risk Modeling

Collision Risk at three different rotor diameters





Quantify effects to populations – Population Biological Removal & Population Viability Analysis
Qualify impacts – e.g. Cumulative Impact Assessment

What can the proposed OWP do to avoid and minimize effects?

Design, siting, receptor constraints

What should be included in an effective adaptive management strategy?

Not arbitrary thresholds

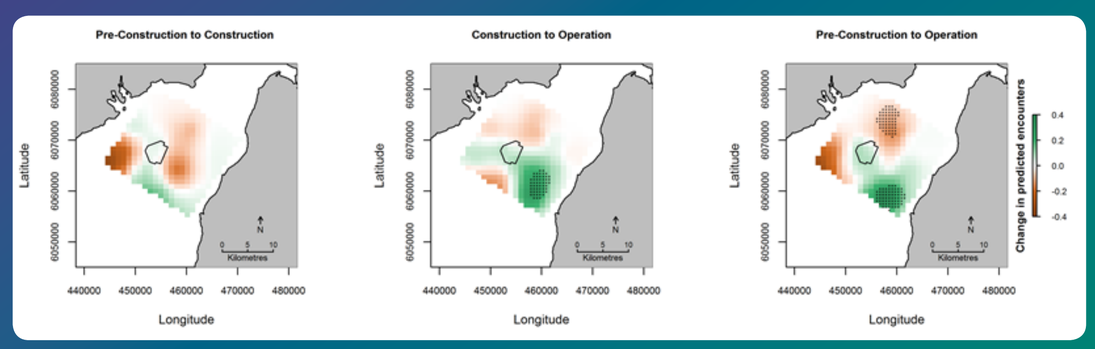
How should the project monitor the effects?

Formulated between industry, regulators and researchers

To assess whether predictive assessments of the extent and magnitude of effects are validated through observed patterns during operations

Inform the adaptive management strategy

Increase the knowledge base for offshore wind




For more information contact:
Chris Pendlebury
Director of Planning & Environment
chrisp@naturalpower.com


For more information contact:
David Tidhar
Senior Environmental Consultant
davidt@naturalpower.com


For more information contact:
Christine Sutter
Head of Environment
christines@naturalpower.com

naturalpower.com
sayhello@naturalpower.com

natural power