



Predators & Prey Around Renewable Energy Developments

Sue O'Brien, Marine Scotland Science
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Presentation structure

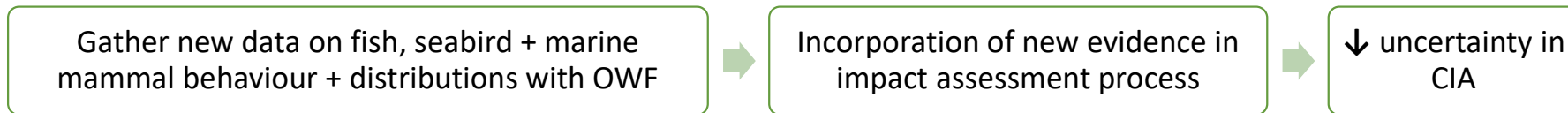
1. Overview
 2. Context
 3. Aim & Objectives
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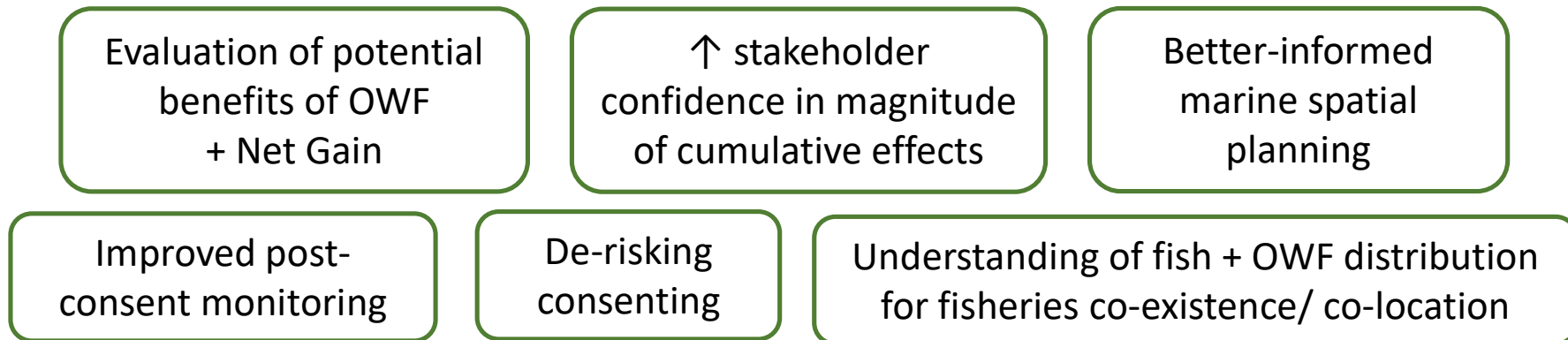
PrePARED Project Overview



Aim: to derisk consenting by reducing uncertainty in cumulative impact assessments



PrePARED Project Outcomes

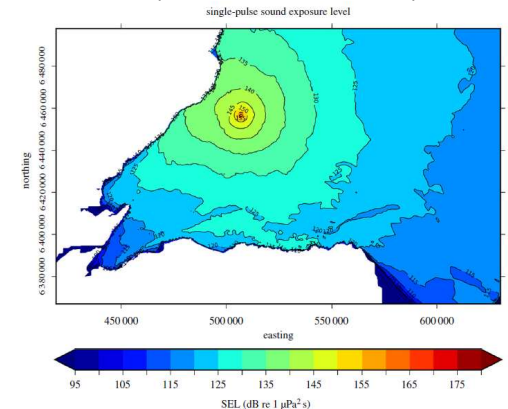


Context

- Urgent need to better understand key receptor response to OWF development
- Strategic studies have helped reduce uncertainty around impacts, e.g. ORJIP bird collision avoidance study and porpoise response to pile driving



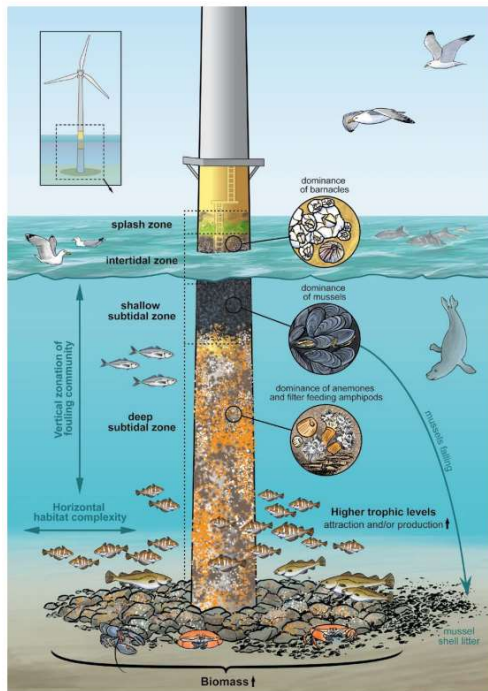
Bowgen & Cook 2018. Bird Collision Avoidance: Empirical evidence and impact assessments. JNCC Report No. 614



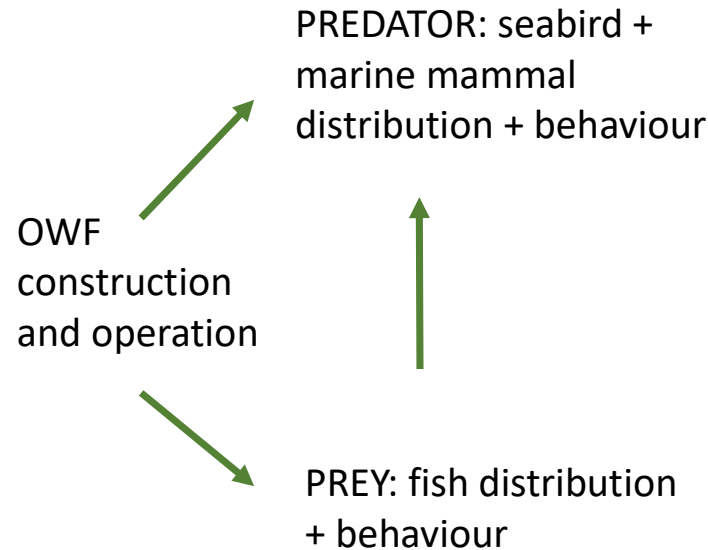
Graham *et al.* 2019 Harbour porpoise responses to pile-driving diminish over time. *R Soc Open Sci* 6, 190335



Role of prey in understanding receptor response to OWF



Degraer et al. 2020. *Oceanography* 33:48–57



- Understand how OW activities influence prey distribution and behaviour
- Understand how seabirds + marine mammals distribute themselves in relation to their prey
- Will lead to substantially reduced uncertainty in our understanding of OW impacts on protected populations

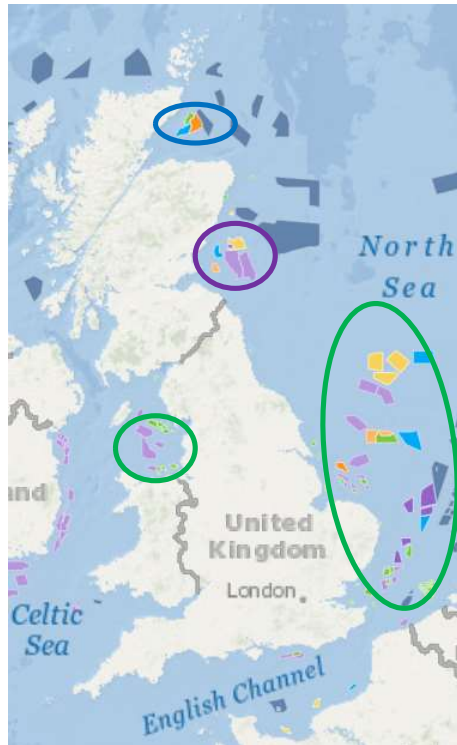
Project Aim & Objectives



- **Aim:** to derisk consenting by reducing uncertainty in cumulative impact assessments
- **Objectives:**
 - How do fish (prey) behaviour, distribution and communities change in response to OWF development?
 - How do predators (seabirds and marine mammals) respond to changes in prey and OWF development?
 - How does this change with multiple OWF close together?
 - Incorporate into cumulative impact assessments



PrePARED Project Structure



- **Workstream A:** Predators + prey in relation to OWF in the Forth & Tay
- **Workstream B:** Predators + prey in relation to OWF in the Moray Firth
- **Workstream C:** Relevance/ application of findings elsewhere in UK
- **Workstream D:** Dissemination for improved impact assessments and OW policy

[Global Offshore Renewable Map | 4C Offshore](#)



Methods: Predators + prey + OWF in the Forth & Tay



WP1: PREY

- Fish surveys in + around OWF
- Changes in fish communities and distribution with OWF construction + operation

Marine Scotland Science,
UKCEH, BioSS



SEABIRDS

- Survey: GPS tracking seabirds, digital aerial survey (NnGOWL, Seagreen and Berwick Bank)



WP2: SEABIRDS + PREY + OWF

- Displacement rates: ↓ uncertainty ↑ power
- Spatial distribution in relation to OWF + prey
- Movement modelling linking prey and seabirds

Methods: Workstream B: Predators + prey + OWF in the Moray Firth



WP3: PREY

- Fish surveys in + around OWF
- How do turbine structures affect fish abundance, movement and diversity?

MARINE MAMMALS

- Survey: Passive acoustic monitoring



University of Exeter, University of Aberdeen, SMRU Consulting, Sea Mammal Research Unit, University of Aarhus



WP4: M. MAMMALS + PREY + OWF

- Spatial distribution of MM in relation to OWF + prey
- 'reef effects' and MM foraging
- MM response to pile driving and vessel disturbance + prey + OWF
- Nutritional value of prey



Workstream C: Relevance + Application of PrePARED Project Results Throughout the UK



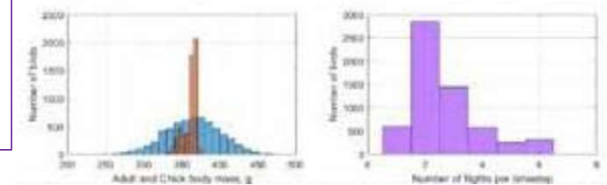
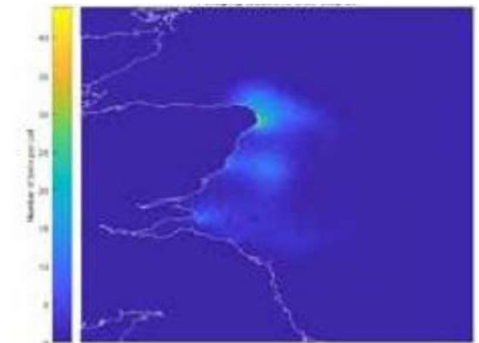
Workstream A: Predators + prey in relation to OWF in the Forth & Tay

Workstream B: Predators + prey in relation to OWF in the Moray Firth

WP5: Generalities in fish + marine mammal response to OWF development

WP6: Assessment of minimum data requirements and survey design for predator-prey studies in other UK marine areas

WP7: Development and application of impact assessment tools for cumulative impact assessment



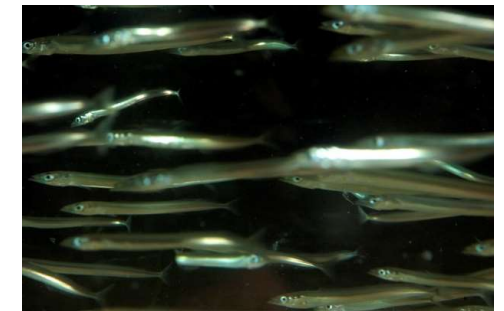
SeabORD impact assessment tool



PrePARED Project Outputs



1. Understanding of changes in fish communities, distribution + biomass with construction and operation of multiple OWF in an area, and how this changes prey availability
2. Evaluation of reef effect - fish aggregation/↑ fish biomass
3. Energy density + nutritional content of key prey species
4. Evaluation of possible net benefits of OWF from increased prey availability

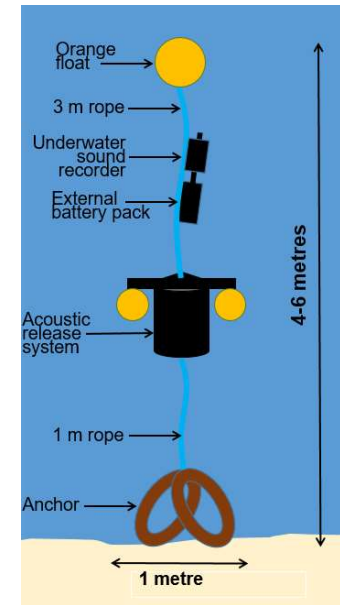


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PrePARED Project Outputs



5. Improved understanding of the roles of prey, habitat and OWF on driving seabird and marine mammal distributions
6. Use of prey data to ↓ uncertainty in seabird densities + tools using densities (sCRM and displacement matrix)
7. How are harbour porpoise behavioural responses to construction moderated by resulting changes in prey fields?
8. Improved understanding of cumulative effects of OWF by observing predator response to OWF construction in the vicinity of operational OWF



PrePARED Project Outputs



9. Integration of PrePARED project findings into impact assessment tools (iPCoD, DEPONS and SeabORD)
10. Testing/validation of models - \uparrow biological realism and \downarrow uncertainty in impact assessment tools
11. Cumulative Effects Framework: incorporate PrePARED findings in to CEF to improve CIA



Project Outcomes



1. Increased stakeholder confidence in magnitude of cumulative effects

- Dissemination of new knowledge from PrePARED project to ↓ uncertainty and ↑ biological realism in cumulative impact assessments
- Improved stakeholder confidence in CIA

2. De-risking consenting

- Provide applicants with clearer guidance on how to assess cumulative impacts and evidence to support this
- ↓ uncertainty in decision-making and ↓ risk of delays in the planning and licensing process



Project Outcomes



3. Evaluation of both negative and positive effects of OWF

- Assessment of how changes to the prey base in OWF might benefit key receptors
- Improved understanding of opportunities for net gain

4. Improved post-consent monitoring

- Identification of key variables driving receptor response to OWF
- Recommendations for targeted cost-effective relevant post consent monitoring



Project Outcomes



5. Better-informed marine spatial planning

- Provision of evidence to inform mapping of constraints and opportunities for future OWF development (e.g. POSEIDON)

6. Understanding of OWF + fisheries co-existence/ co- location opportunities

- Knowledge of how commercial fish species use OWF
- Understanding of opportunities for fishing industry



Acknowledgements



- OWEC and Crown Estate Scotland for funding PrePARED
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Contact:

Sue O'Brien

PrePARED Project Lead, PrePARED@gov.scot

