Developing methods for cumulative impact assessments in relation to marine renewables and seabirds

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- Climate change
- Ecology & ecosystems
- Biogeochemistry
- Emerging contaminants & ecotoxicology
- Biotechnology & bioresources
- Renewable energy & the environment
1. Knowledge gap and partner organisation
2. The internship
3. Benefits
4. And now…?
Knowledge Gap

• Increasing number of marine renewable projects (wind, wave and tidal)

• Individual projects can effect/impact seabirds
  – Collision risk (tidal and offshore wind)
  – Habitat loss (direct or indirect)
  – Barrier effects

• Cumulative effects/impacts of multiple projects unknown and difficult to assess
Cumulative impacts?

Cumulative effects/impacts are...

1. “Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project” (Hyder, 1999)

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1. “Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project” (Hyder, 1999)

2. “The additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together” (Scottish Natural Heritage, 2009)
Cumulative impacts?

EC Directive (85/337/EEC) on EIA...

1. “the characteristics of development must be considered having regard, in particular, …the cumulation with other developments”
Cumulative impacts?

EC Directive (85/337/EEC) on EIA…

1. “the characteristics of development must be considered having regard, in particular, …the cumulation with other developments”

2. “a description of the likely significant effects of the development on the environment, which should cover the cumulative effects of the development…”
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• Guidance improving but not there yet
Knowledge Gap

Developing Guidance on Ornithological Cumulative Impact Assessment for Offshore Wind Farm Developers

Sue King, Ilya Maclean, Tim Norman and Andrew Prior

June 2009

This report has been commissioned by COWRIE Ltd
Knowledge Gap
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• Aim: Develop and improve methods for cumulative impact assessment
Partner organisation

• Royal Society for the Protection of Birds
• Europe’s largest wildlife conservation organisation
• Range of projects on effects of renewable energy on birds (majority onshore wind)
• Frequently comment on renewable energy development applications
• Dr Ellie Owen, Dr Aly McCluskie & Dr Rowena Langston
• Based at the Inverness office
The internship

- What CIA projects already underway?
  - Contacts and colleagues
  - Marine Alliance for Science and Technology Scotland (MASTS)

- Reviewed available Environmental Statements

- Manageable and with impact

- Focus on uncertainty in CIA

- 2 tasks/deliverables
  - Report on uncertainty in CIA
  - Case study to demonstrate methods suggested in the report for collision risk modelling
The internship

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Task 1: Write internal report

Uncertainty in the assessment of cumulative impacts

- Uncertainty = incomplete information
- Uncertainty often has negative connotation
- Uncertain results can be considered unreliable
- Uncertainty can delay progress of developments
- Problem for…
  1. Regulators – environmental impacts
  2. Developers – financing
Task 1: Write internal report

• “The first step to quantifying risk is to identify the sources of uncertainty” (Harwood and Stokes, 2003)

• Objective: to provide a guidance document that highlights possible sources of uncertainty in CIA

• Intended for RSPB staff
  – Help focus efforts when reviewing developments
  – Respond constructively to developers
  – Methods to describe and reduce uncertainty

Task 1: Translating science

Task 1: Types of uncertainty

- Level 1: Random, Systematic
- Level 2: Knowledge, Decision Making, Linguistic
- Level 3: Habitat Loss, Collision, Barrier Effects, Disturbance
- Level 4: Process, Data and Parameters, Model Structure, Model Output
Task 1: Recommendations

- Linguistic uncertainty
  - Consistent language
  - Follow available guidelines and case study examples

- Decision-making uncertainty
  - Clear presentation of results
  - Summary table
  - Present risk rather than uncertainty if more tangible

- Knowledge uncertainty
  - Qualitative methods: IPCC system of 7 descriptors
  - Quantitative methods
## ENVIRONMENTAL/CUMULATIVE IMPACT ASSESSMENT CHECKLIST

### LINGUISTIC UNCERTAINTY
- ☐ Contains a glossary of terms
- ☐ Consistent use of terms throughout the document
- ☐ Mentions and discusses uncertainty within the document

### DECISION-MAKING UNCERTAINTY
- ☐ Is the document a reasonable length, well-written and easy to navigate? The document does not need to be verbose and results should not be hidden in long prose.
- ☐ Key results presented in a summary table
- ☐ Would any of the results be more accessible if presented with an estimate of risk rather than with a measure of uncertainty?
- ☐ Do the results seem oversimplified? Is there complexity and uncertainty which has been ignored?

### KNOWLEDGE UNCERTAINTY
- ☐ Data sources clearly referenced if values/estimates taken from the literature.
- ☐ General methods statement detailing how uncertainties have been considered in the assessment.
- ☐ Clear methods statement which details how the cumulative impacts and associated uncertainties are estimated.
- ☐ Results presented with either a quantitative (confidence interval/standard deviation/variance/error/etc.) or qualitative (certain/probable/unlikely/etc.) measure of uncertainty.
- ☐ Are the methods and results from different projects compatible?
The benefits for RSPB

• Report on uncertainty in CIA including checklist for staff dealing with CIAs
  – Already being used
  – Wouldn’t have been produced internally

• Additional expertise available to RSPB on CIA

• Build stronger links with ERI, a research institute near an RSPB reserve in the Flow Country (Forsinard)

• Additional benefit: Use of ERI telemetry equipment
The benefits for myself, ERI & UHI

- Stronger links with RSPB and better understanding of the organisation
- Submitted a NERC KE application with RSPB as a project partner
- Discussing possibilities of joint PhD students
- Potential for 2 manuscripts to be submitted for peer-review
- Direct impact of my work – impact a criteria of REF
And now...am I more employable?

• Contract at ERI has been extended
  – in part due to me actively seeking funding i.e. this intern

• Submitted a NERC KE application with RSPB
  – Links made during internship
  – “Developing an avian collision risk model to incorporate variability and uncertainty ”

• RSPB keen to work with me further which strengthens my position and academic reputation