Bird Sensitivity Mapping
for wind energy developments in Ireland

BirdWatchIreland
protecting birds and biodiversity
Overview

4pm (GMT)

- The journey to date
- Development of the mapping tool
- Mobilisation of mapping tool – delivery of training
- Successes so far
- Next steps
BirdWatch Ireland
Membership supported, science-based

- > 15,000 members and 28 branches

- Funded by membership subscriptions, donations, grants and sponsorship.

- Active in research and monitoring, practical conservation work, education, policy and advocacy.
In favour of wind energy

Supporting Ireland’s renewable energy targets – Policy & legislative framework

- Climate change – threat to global biodiversity and human well-being.

- Ireland has obligations under the European Union’s Birds and Habitats Directives. The Birds and Habitats Directives form the cornerstones of Europe’s legislation on nature conservation.

- “wildlife sensitivity maps will also help to avoid potential conflicts with the provisions of article 5 of the Birds Directive and 12 & 13 of the Habitats Directive as regards the need to protect species of EU importance throughout their entire natural range within the EU.”

European Court of Justice Case "The Birds Case" (C-418/04):
Ireland found guilty of failing to properly transpose and implement obligations of Birds (2009/147/EC) and Habitats (92/43/EEC) Directives into Irish legislation

Key issue: Lack of coherent strategy for protection of "priority, migratory and dispersed" bird species in the wider countryside (i.e. outside of protected areas)

In favour of wind energy
Ensuring compliance and strengthening protection

ACTION PLAN FOR
Lowland Farmland Birds
IN IRELAND 2011-2020

ACTION PLAN FOR
Upland Birds
IN IRELAND 2011-2020

ACTION PLAN FOR
Marine and Sea Cliff Birds
IN IRELAND 2011-2020

ACTION PLAN FOR
Woodland and Scrub Birds
IN IRELAND 2011-2020
10 Group Action Plans (GAPS) for Irish Birds developed by BirdWatch Ireland (Stakeholder consultation) – provide framework to help address ECJ Judgement

• Stakeholder input and support key to implementing actions: progress on cross-departmental and sectorial cooperation vitally important.

• Key cross-cutting priority across 10 GAPs = Develop ecologically sound land-use planning strategies using spatial tools e.g. Bird Sensitivity Mapping

→ Identify the most vulnerable areas to Wind Energy Developments
What is Sensitivity Mapping?

- A means to achieving our renewable energy targets without adversely impacting on our obligations under the European Union’s Nature Directives

- Measured spatial indication of where protected species are likely to be perturbed by change

- Does not create no-go areas

- Not indicative of species presence/absence

- Uses existing data

- Stakeholder involvement
Potential impacts of wind energy on birds

• Collision

• Displacement disturbance

• Habitat loss/habitat change

• Barrier effects
<table>
<thead>
<tr>
<th>Country / Region</th>
<th>Species/areas mapped</th>
<th>Scoring criteria</th>
<th>Resolution</th>
<th>Sensitivity categories</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland</td>
<td>18 species of conservation concern</td>
<td>Literature and expert review</td>
<td>1 km square</td>
<td>High, Medium, Low/Unknown</td>
<td>Bright et al. (2008)</td>
</tr>
<tr>
<td>England</td>
<td>12 species of conservation concern</td>
<td>Literature and expert review</td>
<td>1 km square</td>
<td>High, Medium, Low/Unknown</td>
<td>Bright et al. (2009)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Group species approach</td>
<td>Species richness</td>
<td>1 km square</td>
<td>Highest, High, Average, Low</td>
<td>Aarts &amp; Bruinzeel (2009)</td>
</tr>
<tr>
<td>South Africa</td>
<td>105 species</td>
<td>Literature and expert review</td>
<td>7.8 x 8 km “square”</td>
<td>High, Medium, Low</td>
<td>Retief et al. (2010)</td>
</tr>
<tr>
<td>USA</td>
<td>IBAs, migratory corridors, Critical Habitat locations, Range strongholds</td>
<td>Literature and expert review</td>
<td>50 km square</td>
<td>Critical importance, High importance, Potential risk</td>
<td>American Bird Conservancy</td>
</tr>
<tr>
<td>Rift Valley/Red Sea flyway</td>
<td>37 migratory soaring birds</td>
<td>Literature and expert review</td>
<td>50 km square</td>
<td>High, Medium, Low/Unknown</td>
<td>Strix et al. (in prep)</td>
</tr>
<tr>
<td>Greece</td>
<td>SPAs, IBAs, Ramsar Wetlands, Pelican flyways, Raptor nests, seabird colonies</td>
<td></td>
<td>Wind energy exclusion zones</td>
<td>Dimalexis et al. (2010)</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>26 species of seabirds</td>
<td>Literature and expert review</td>
<td>c. 120 km square</td>
<td>Major concern, Less concern, Concern</td>
<td>Garthe &amp; Huppop (2004)</td>
</tr>
<tr>
<td>Denmark</td>
<td>38 migrants (seabirds, raptors, passerines etc.)</td>
<td>Literature review</td>
<td>case study of 1 wind farm</td>
<td>High, Medium and Low priority species</td>
<td>Desholm (2009)</td>
</tr>
<tr>
<td>Slovenia</td>
<td>35 species, congregatory areas and reserves</td>
<td>Literature and expert review</td>
<td>1 km square</td>
<td>High, Medium, Low/Unknown</td>
<td>Bordjan et al. (2012)</td>
</tr>
<tr>
<td>Flanders (Belgium)</td>
<td>Group species approach</td>
<td></td>
<td>500m square</td>
<td>High, Medium, Possible, Low</td>
<td>Everaert (2011)</td>
</tr>
</tbody>
</table>
Sensitivity Mapping examples

Scotland¹

Greece²

England³

The Netherlands⁴

Previous work in Ireland

Piloting Sensitivity Mapping for Irish birds
• Pilot approach for Whooper Swan
• Funded by Irish Environmental Network, 2010

Scoping best practice and methodology required for a breeding wader Sensitivity Map
• Scoping methodology for mapping breeding waders
• Funded by the Heritage Council, 2012

Bird Sensitivity Map for Ireland (Phase 1)
• Methodology determined, three draft layers produced, High Level Stakeholder Group established
• Funded by Sustainable Energy Authority of Ireland, 2012

...........................................

Full Republic of Ireland Sensitivity Map (Phase 2+3)
• Various funders and collaborators
• Scoping for All-Ireland map
Species selection

- Terrestrial species
  - No
  - Remove
  - Yes

- Is the species of conservation concern
  - No
  - Remove
  - Yes

- Will inclusion add value to the map
  - No
  - Remove
  - Yes

- Is there sufficient data
  - No
  - Remove
  - Yes

- Retain for final assessment
Species Sensitivity Index

- Conservation status
- Proportion of biogeographic population
- Availability of preferred habitat
- Habitat preference
- Sensitivity to displacement
- Range
- Site fidelity
- Annual adult survival rate
- Flight manoeuvrability
- Soaring
- Aerial foraging
- Ranging behaviour
- Flocking
- Nocturnal flight activity
- Aerial display
## Calculating the Sensitivity Index

<table>
<thead>
<tr>
<th>Score</th>
<th>Annex I of the Birds Directive</th>
<th>EU SPEC</th>
<th>BoCCI</th>
<th>Proportion of flyway &amp; BiE2 - (euro breeding/wintering) popn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 4</td>
<td>Yes</td>
<td>SPEC 1</td>
<td>Red</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>Score 3</td>
<td>SPEC 2</td>
<td></td>
<td></td>
<td>26-50%</td>
</tr>
<tr>
<td>Score 2</td>
<td>SPEC 3</td>
<td>Amber</td>
<td></td>
<td>11-25%</td>
</tr>
<tr>
<td>Score 1</td>
<td>SPEC 3</td>
<td></td>
<td></td>
<td>1-10%</td>
</tr>
<tr>
<td>Score 0</td>
<td>No</td>
<td>SPEC 4</td>
<td>Green</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

### Flight Vulnerability

<table>
<thead>
<tr>
<th>Species</th>
<th>Adult annual survival rate</th>
<th>Flight Manoeuvrability</th>
<th>Soaring</th>
<th>Predatory / aerial forager</th>
<th>Ranging Behaviour</th>
<th>Flocking</th>
<th>Nocturnal flight activity</th>
<th>Aerial Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 4</td>
<td>&gt;0.85-1.00</td>
<td>Very Low</td>
<td>Always</td>
<td>Very wide range</td>
<td></td>
<td></td>
<td>Act at night</td>
<td></td>
</tr>
<tr>
<td>Score 3</td>
<td>&gt;0.70-0.85</td>
<td>Low</td>
<td>Usually</td>
<td>Highly</td>
<td>Long, daily commuter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score 2</td>
<td>&gt;0.60-0.70</td>
<td>Medium</td>
<td>Regularly</td>
<td>Wide</td>
<td>Always</td>
<td>Crepuscular</td>
<td>Frequent</td>
<td></td>
</tr>
<tr>
<td>Score 1</td>
<td>&gt;0.50-0.60</td>
<td>High</td>
<td>Sometimes</td>
<td>Partially</td>
<td>Local movements</td>
<td>Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score 0</td>
<td></td>
<td>Very High</td>
<td>Never</td>
<td>Never</td>
<td>Sedentary</td>
<td>Never</td>
<td>Diurnal</td>
<td>Never</td>
</tr>
</tbody>
</table>

### Habitat Vulnerability

<table>
<thead>
<tr>
<th>Species</th>
<th>Range in Ireland</th>
<th>Site fidelity</th>
<th>Availability of preferred habitat</th>
<th>Habitat Preference</th>
<th>Sensitivity to displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score 4</td>
<td>Very limited range</td>
<td>High</td>
<td>Low</td>
<td>Open</td>
<td>High</td>
</tr>
<tr>
<td>Score 3</td>
<td>Limited range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score 2</td>
<td>Localised</td>
<td>Med</td>
<td>Med</td>
<td>Semi-open</td>
<td>Medium</td>
</tr>
<tr>
<td>Score 1</td>
<td>Widely distributed</td>
<td>Med</td>
<td>Med</td>
<td>Semi-open</td>
<td>Medium</td>
</tr>
<tr>
<td>Score 0</td>
<td>Very widely distributed</td>
<td>Low</td>
<td>High</td>
<td>Closed</td>
<td>Low</td>
</tr>
</tbody>
</table>
Calculating the Sensitivity Index

Species Sensitivity Score (SSS) =

\[
\text{Max. Conservation Score} \times \frac{\text{Average [Flight Vulnerability Scores]}}{2} + \frac{\text{Average [Habitat Vulnerability Scores]}}{2}
\]

- Characteristics often overlap (i.e. collinear)
- Avoid inflation / stretching of range
<table>
<thead>
<tr>
<th>Species List</th>
<th>Top 30 Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Golden Eagle</strong></td>
<td>Whooper Swan</td>
</tr>
<tr>
<td>Common Scoter</td>
<td>Chough</td>
</tr>
<tr>
<td>Red-throated Diver</td>
<td>Hen Harrier</td>
</tr>
<tr>
<td>Twite</td>
<td>Curlew (Breeding)</td>
</tr>
<tr>
<td>Dunlin (Breeding)</td>
<td>Red Kite</td>
</tr>
<tr>
<td>Golden Plover (Breeding)</td>
<td>Merlin</td>
</tr>
<tr>
<td>Sandwich Tern</td>
<td>Barn Owl</td>
</tr>
<tr>
<td>Bewick's Swan</td>
<td>Light-bellied Brent Goose</td>
</tr>
<tr>
<td>Common Tern</td>
<td>Black-headed Gull</td>
</tr>
<tr>
<td><strong>White-tailed Eagle</strong></td>
<td>Peregrine Falcon</td>
</tr>
<tr>
<td>Barnacle Goose</td>
<td>Common Gull</td>
</tr>
<tr>
<td>Greenland White-fronted Goose</td>
<td>Greylag Goose</td>
</tr>
<tr>
<td>Lapwing (Breeding)</td>
<td>Red Grouse</td>
</tr>
<tr>
<td>Redshank (Breeding)</td>
<td>Lesser Black-backed Gull</td>
</tr>
<tr>
<td>Corncrake</td>
<td>Grey Partridge</td>
</tr>
</tbody>
</table>
7 factors - more subjective in nature:

**Flight Vulnerability**
1. Flight manoeuvrability
2. Soaring/flying at turbine height
3. Ranging behaviour
4. Aerial display

**Habitat Vulnerability**
1. Site fidelity
2. Availability of preferred habitat
3. Sensitivity to disturbance/displacement
External consultation

| Site fidelity: This factor was included to account for disturbance displacement associated with species with high levels of site fidelity. Species that exhibit site fidelity are likely to incur greater negative impacts as a result of habitat damage compared to species that are less tied to specific sites. |
|---|---|---|---|---|
| Golden Eagle | Aquila chrysaetos | High | No Change |
| Red-throated Diver | Gavia stellata | High | No Change |
| Sandwich Tern | Sterna sandvicensis | High | No Change |
| Breeding Curlew | Numenius arquata | High | No Change |
| Breeding Dunlin | Calidris alpina | High | No Change |
| Breeding Golden Plover | Pluvialis apricaria | High | No Change |
| Common Tern | Sterna hirundo | High | No Change |
| Bewick's Swan | Cygnus columbianus bewickii | High | No Change |
| Barnacle Goose | Branta leucopsis | High | No Change |
| White-tailed Eagle | Haliaeetus albicilla | High | No Change |
| Greenland White-fronted Goose | Anser albirostris flavirostris | High | No Change |
| Breeding Lapwing | Vanellus vanellus | High | No Change |
| Whooper Swan | Cygnus cygnus | High | No Change |
| Breeding Redshank | Tringa totanus | High | No Change |
| Greylag Goose | Anser anser | High | No Change |
| Chough | Pyrrhocorax pyrrhocorax | High | No Change |
| Hen Harrier | Circus cyaneus | High | No Change |
Zones of sensitivity

- Internal + external consultation and consensus
- Individual radius distance for each

Raptors: Random offset
Sensitivity Mapping

Overlaid with 1km grid

Raptors
Online Mapping Tool

1km square resolution
http://maps.biodiversityireland.ie/#/Map

Graduated colour scheme used according to Species Sensitivity and Species Richness
Sensitivity Mapping

**Greylag Goose** *Anser anser*

- **Conservation Status in Ireland**: Amber listed
- **BirdWatch Ireland Species Sensitivity Score**: 19.0
- **Vulnerability attributes/assessment**: Sensitive to habitat loss
- **References/metadata**: Irish Wetland Bird Survey (I-WeBS)
- **Status in Europe**: Secure

**Typical Lifespan**: 8 years

**Diet**: Roots of rushes and sedges, though increasingly cereal stubble, potatoes and grassland

**Habitat**: Reedbeds and marshes of estuaries and lakes, low-lying wetlands and grasslands

For further information click below

- [Greylag Goose Species Guidance (300KB pdf)](link)
- [Guidance Document - Bird Sensitivity Mapping for Wind Energy Developments (3MB pdf)](link)
• Detailed guidance document
  Requirement for mapping
  – Existing research
  – Detailed methodology
  – Species-level guidance

Bird Sensitivity to Wind Energy Developments

All Birds (sensitivity score): 56.40

Barnacle Goose: 18.7
Barnacle Goose Bird Clip: Click here
Whooper Swan: 19.8
Whooper Swan Bird Clip: Click here
Corncockle: 17.9
Corncockle Bird Clip: Click here
Mobilisation of the tool

- 27 / 31 Local Authorities + DECLG
- 10 workshops
- 100 participants
- All 26 counties
Local Authority GIS

Offaly Local Authority

Tipperary Local Authority

Wexford Local Authority

REST Service Endpoint – on request
Wider Awareness Raising

MEDIA COVERAGE

• Wings Magazine
• Energy Ireland: Renewables

National Media (TV & Print)

• RTÉ *EcoEye* Irish TV Programme—February 2015 - see https://youtu.be/svzDvqoYEWU

• Irish Times articles (27/02/2015) (11/05/2015)

Official Launch of Tool - March 2015
Wider Awareness Raising

CONFERENCES & SUBMISSIONS


– *Planning for Energy Infrastructure* – October 2014

– *Green Paper - Priority 3 'Planning and Implementing Essential Energy Infrastructure'* – October 2014


Publications – “*Spatial Planning for Wildlife*” –

Book Chapter (in prep). Authors: Jenny Bright (Bright Ecology) & Caoimhe Muldoon (BirdWatch Ireland)
Next steps – Map for Offshore Renewables in Ireland

**Example** - Mapping Seabirds Sensitivity to Offshore Windfarms in English territorial waters

![Map of Seabird Sensitivity](image)

Acknowledgements

Thank you

Sinéad Cummins
Species Policy Officer
Policy, Communications & People Engagement Team

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www.birdwatchireland.ie

Picture credits
Chough (Shay Connolly), Curlew (Shay Connolly), Yellowhammer (Andrew Kelly), Grey Heron (Oran O’Sullivan), Redshank (Brian Caffrey), Sparrowhawk (Andrew Kelly), Great Black-backed Gull, Ringed Plover (Alan Lauder), Yellowhammer (Billy Clarke), Greenland White-fronted Goose (John Carey), Puffin (Shay Connolly), Red-throated Diver (Ken Kinsella), Lapwing (Anthony McGeehan), birdwatchers (John Lombard), Red Kite (John Carey), Kestrel (Shay Connolly), wind turbine (Dick Coombes), Puffin over sea pool (Shay Connolly)