Identifying problems and testing solutions

James Pearce-Higgins
Director of Science
British Trust for Ornithology
A tale of loss

Over the past 20 years, the UK has lost half its breeding curlew

In Ireland, only 500 pairs may remain
A tale of loss
78% range contraction in Ireland, 17% in Britain
and in winter?
A group prone to extinction?

Eurasian curlew

Whimbrel

Long-billed curlew

Far Eastern curlew

Bristle-thighed curlew

Little curlew

Slender-billed curlew

Eskimo curlew
Breeding Abundance Change 1988–91 to 2008–11

Increasing

Stable

Declining

© BTO
Environmental correlates of breeding abundance and population change of Eurasian Curlew *Numenius arquata* in Britain

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**ABSTRACT**

**Capsule:** Across Britain, breeding Eurasian Curlew *Numenius arquata* are less numerous and have shown greater population declines in areas with more arable farming, woodland cover and higher generalist predator abundance.

**Aims:** We present the first national-scale analysis of the potential drivers of Curlew population change in Britain, which is needed to guide conservation action for this globally near-threatened, declining species.

**Methods:** Breeding Bird Survey data and environmental predictors were used to model variation in Curlew abundance in 1995–99 and 2007–11, and population change between these periods.

**Results:** Arable farming and woodland cover were negatively associated with Curlew abundance and population declines. Curlew abundance was positively associated with extent of protected area coverage and gamebird numbers. Abundance and population change were positively associated with cooler temperatures and higher summer rainfall, but negatively associated with numbers of generalist predators.

**Conclusions:** We found support for the negative effects of intensive agriculture, forestry, increases in generalist predator populations and climate warming on Curlew abundance and population change. Effective site protection and measures to reduce generalist predator abundance may be important conservation measures, together with improving breeding habitat quality in the wider countryside.
Reasons for decline: **habitat change**

- Grazing
- Grassland improvement
- Agricultural intensification
- Bog drainage & peat extraction
- Vegetation change
Reasons for decline: **habitat change**

- **Afforestation**
  - displacement
  - edge effects
  - predator sources

*Douglas et al. 2014 J Applied Ecology*
<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect on curlew abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arable farming</td>
<td>−</td>
</tr>
<tr>
<td>Afforestation</td>
<td>−</td>
</tr>
<tr>
<td>Semi-natural grassland</td>
<td>+</td>
</tr>
</tbody>
</table>

**Table:**

**Variable:**
- Arable farming
- Afforestation
- Semi-natural grassland

**Effect on curlew abundance:**
- (−) Negative
- (+) Positive

**Diagram:**

*Graphs showing the relationship between arable land cover, woodland land cover, and semi-natural grassland land cover with curlew abundance.*

*Legend:*
- **black line:** 2002–06
- **grey line:** 2007–11
<table>
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</tr>
</thead>
<tbody>
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<td>−</td>
</tr>
<tr>
<td>Afforestation</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Semi-natural grassland</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Reasons for decline: predation pressure
Reasons for decline: predation pressure

- Gamebird management
  - predator control

Fletcher et al. 2010 J Applied Ecology
Reasons for decline: predation pressure

- Gamebird management
  - predator control

<table>
<thead>
<tr>
<th>Variable</th>
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<tbody>
<tr>
<td>Crow &amp; fox abundance</td>
<td>−</td>
</tr>
<tr>
<td>Gamebird abundance</td>
<td>+</td>
</tr>
<tr>
<td>Strip burning</td>
<td>−</td>
</tr>
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</table>

![Graphs showing the relationship between crow abundance and probability of fox occurrence.](image)
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<tbody>
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<tr>
<td>Strip burning</td>
<td>-</td>
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![Graphs showing the relationship between strip burning and bird abundance](image)
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<td>Crow &amp; fox abundance</td>
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<td>− −</td>
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<td>+</td>
<td></td>
</tr>
<tr>
<td>Strip burning</td>
<td>−</td>
<td></td>
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</table>
Reasons for decline: **climate change**

Projected decline of >60% due to a warmer & drier climate

*Renwick et al. 2012 Diversity & Distributions*
<table>
<thead>
<tr>
<th>Variable</th>
<th>Effect on curlew abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>−</td>
</tr>
<tr>
<td>Elevation</td>
<td>−</td>
</tr>
<tr>
<td>Peat</td>
<td>−</td>
</tr>
</tbody>
</table>

![Graphs showing the effect of different variables on curlew abundance](image-url)
<table>
<thead>
<tr>
<th>Variable</th>
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<th>Population change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>−</td>
<td>− (rain +)</td>
</tr>
<tr>
<td>Elevation</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Peat</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>
Reasons for decline: wind farms

Reasons for decline: wind farms

Dobson et al. (2014) BTO report
Where have our curlew gone?

- Habitat change
- Climate change
- Predation pressure
Testing solutions

1. Evaluating the effectiveness of conservation measures for European grassland-breeding waders

Running title: Conservation of grassland-breeding waders

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Franks et al. (2018) Ecol & Evol
Testing solutions: agriculture

Franks et al. (2018) Ecol & Evol
Testing solutions: agriculture

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Testing solutions: agriculture

Franks et al. (2018) Ecol & Evol
Testing solutions: agriculture

Franks et al. (2018) Ecol & Evol
Testing solutions: predation

Franks et al. (2018) Ecol & Evol
Testing solutions: predation

Rabbit 
*Oryctolagus cuniculus*

Average abundance in 1995–1999 and 2011–2015 (counts/1-km square)
- > 10
- 5 – 10
- 2 – 5
- 1 – 2
- 0 – 1

- > 100%
- 25% to 100%
- 0% to 25%
- -20% to 0%
- -50% to -20%
- < -50%
- not significant

Red Fox 
*Vulpes vulpes*

Average abundance in 1995–1999 and 2011–2015 (counts/1-km square)
- > 0.5
- 0.2 – 0.5
- 0.1 – 0.2
- 0.05 – 0.1
- 0 – 0.05

- > 100%
- 25% to 100%
- 0% to 25%
- -20% to 0%
- -50% to -20%
- < -50%
- not significant

Conclusions

- Rapid declines caused by
  - Land-use change
  - Predation pressure
  - Climate change
Conclusions

• We know what works for waders (?less so for curlew):
  • Agri-environment schemes
  • Appropriate grazing levels
  • Manage water levels
  • Reduce losses through agricultural activity
  • Reduce predation
  • Nest protection
  • Predator control
• Spatial planning for wind farms
Conclusions

Moving forward
• Work locally
  • Identify specific limitations
• Test which solutions work where
• Identify the scale of intervention required for success.
Acknowledgements

Samantha Franks (BTO) led the analysis of curlew data and review of interventions.

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