Institution: University of East Anglia

Unit of Assessment: 5 – Biological Sciences

Title of case study:

Avian conservation in the EU: developing species action plans and agri-environment initiatives for migratory birds

1. Summary of the impact

Conservation of migratory bird species is an inherently international endeavour, because the fate of these species depends upon the actions of nations throughout their migratory ranges.

Research into migratory wading bird populations by Jennifer Gill and colleagues at UEA has had the following impacts:

- directly influenced the development of International Species Action Plans published by the European Union and the Convention on Migratory Species;
- determined appropriate actions for individual nations, including site protection, habitat restoration and management and a moratorium on hunting;
- developed techniques for wet grassland restoration and management (to benefit ground-nesting birds) that are being implemented as agri-environment initiatives throughout lowland England.

2. Underpinning research

Many migratory bird populations are declining severely, and identifying the causes of these declines is complex because of the huge spatial scales over which the birds travel and the many environmental changes they may experience across their migratory ranges. A prime example is the black-tailed godwit, a species categorised by Birdlife International as 'Vulnerable' in Europe, as a consequence of sharp population declines. However, while the population breeding in mainland Europe has approximately halved in recent decades, the population in Iceland is increasing. Similar drivers are likely to underlie the widespread population declines in many ground-nesting bird species across Europe, but identifying appropriate conservation actions can be complex when populations are declining so rapidly. The contrast between increasing and declining populations of godwits therefore provided an opportunity to explore the causes and consequences of population changes in a sentinel species of high conservation concern.

Since 1995, Gill and colleagues have developed a research programme focussed on identifying key processes that influence population-level responses to environmental changes in godwits and this work has been presented in a series of high-level publications [1-4]. This has involved a series of PhD and post-doctoral studies in the UK, Iceland, Portugal and Ireland and the development, by Gill, of a network of >2000 citizen science volunteers across Europe, whose observations of marked individuals allow individual migration routes to be mapped precisely. Their research has shown:

1. that migratory connectivity and variation in habitat quality results in some individuals experiencing both higher survival and higher breeding success [1-3].
2. that changes in population size can alter the proportion of individuals experiencing better conditions, in summer and winter [1, 3].
3. the locations and time periods in which godwit populations from Europe and Iceland overlap, particularly in areas subject to hunting pressures [4].
4. the strong influence of agricultural development on the breeding ecology of this and similar species [5].

In 2007, Gill organised an international workshop to synthesise research from across Europe on this species, which provided recommendations for the EU and African-Eurasian Waterbird Agreement (AEWA) International Species Action Plans [4].

As part of Gill's contribution to the implementation of these Action Plans, she has focussed recent collaborations with conservation NGOs on developing appropriate agri-environment initiatives for

the restoration and maintenance of habitats for breeding waders. This has involved a series of three PhD studies with the RSPB as CASE partner, exploring differing techniques of managing lowland grasslands for the conservation of migratory waders, and the consequent publication of a Practitioners' Guide to the effective restoration of wet grassland from arable cropping to encourage breeding birds.

3. References to the research

Publications

(UEA authors in bold)

1. **Gill, J.A.,** Norris, K., Potts, P.M., Gunnarsson, T.G., Atkinson, P.W. & **Sutherland, W.J.** (2001) The buffer effect and large-scale population regulation in migratory birds. *Nature* **412**: 436-438. (194 Citations)
   doi: 10.1038/35086568
2. Gunnarsson, T.G., **Gill, J.A**., Sigurbjörnsson, Þ. & **Sutherland W.J.** (2004) Pair bonds: Arrival synchrony in migratory birds. *Nature* **431**: 646-646. (33 Citations)
   doi: 10.1038/431646a
3. **Gunnarsson, T.G., Gill, J.A,** Newton, J., Potts, P.M. & **Sutherland, W.J.** (2005) Seasonal matching of habitat quality and fitness in migratory birds. *Proceedings of the Royal Society of London B* **272**: 2319-2323. (88 Citations)
   doi: 10.1098/rspb.2005.3214
4. **Gill, J.A.,** Langston, R.H.W., **Alves, J.A.,** Atkinson, P.W., Bocher, P., Vieira, N.C., Crockford, N.J., Gélinaud, G., Groen, N., Gunnarsson, T.G., **Hayhow, B.**, Hooijmeijer, J., Kentie, R., Kleijn, D., Lourenço, P.M., Masero, J.A., Meunier, F., Potts, P.M., Roodbergen, M., Schekkerman, H., Schröder, J., Wymenga, E. & Piersma, T. (2008) Contrasting trends in two Black-tailed Godwit populations: a review of causes and recommendations. *Wader Study Group Bulletin* **114**: 43-50. (22 Citations)
   http://irs.ub.rug.nl/dbi/519ded5ae827e
5. **Eglington, S.M., Gill, J.A**., Bolton, M., Smart, M.A., **Sutherland, W.J. & Watkinson, A.R.** (2008) Restoration of wet features for breeding waders on lowland grassland. *Journal of Applied Ecology* **45**: 305-314. (34 Citations)
   doi: 10.1111/j.1365-2664.2007.01405.x

Funding 2004-2013:

- 2013-2015 Defra *Reducing the impacts of predation on breeding waders using landscape-scale habitat management*. PI: Dr J Smart (RSPB), co-I: Dr J Gill (UEA) £226,737
- 2010-2013 NERC Standard Grant *Ecological and behavioural constraints on range expansion in migratory birds.* PI: Dr J Gill (UEA) £453,633
- 2010-2013 NERC/RSPB Case studentship *Climatic impacts and conservation management for breeding Lapwing*. PI: Dr J Gill (UEA), co-I: Dr J Smart (RSPB), Dr J Pearce-Higgins (BTO) CASE partner contribution: £6000
- 2009-2012 NERC/RSPB Case studentship *Intra-guild relationships among predators of breeding waders*. PI: Dr J Gill (UEA), co-I: Dr J Smart (RSPB) Case partner contribution: £6000
- 2008-2009 UKPopNet Scoping study *Ecosystem service delivery by real-world conservation approaches: a scoping study for a lowland wetland research platform*. PIs: Dr J Gill (UEA), Dr R Bradbury (RSPB) £15,000
- 2005-2008 NERC Standard Grant *Seasonal connectivity in settlement decisions of migratory birds.* PI: Prof. W Sutherland (UEA), co-I: Dr J Gill (UEA) £206,844
- 2004-2007 NERC/RSPB Case studentship *Managing grassland water levels for breeding waders in Broadland*. PI: Prof A Watkinson (UEA), co-I: Dr J Gill, Prof W Sutherland (UEA), Dr M Bolton (RSPB) Case partner contribution: £21,000

- 2003-2006 NERC Fellowship *Climate change, sea level rise and migratory bird populations.* Fellow: Dr J. Gill (UEA) £134,819

4. Details of the impact

Gill has developed very strong relationships with conservation NGOs such as the RSPB and Birdlife International over many years, which has resulted in Gill's research being specifically designed to address issues of relevance to species conservation management (corroborating sources A – C).

The actions required to implement effective conservation of migratory species require international co-operation and contributing to Action Plans is one of the most effective means of encouraging and implementing the international-scale species conservation required by EU legislation. Research by Gill and colleagues at UEA has:

1. Identified appropriate actions for individual nations, including site protection, habitat restoration and management and a moratorium on hunting. In particular, to address the issue of godwit hunting in France, Gill and colleagues quantified the extent of overlap (in France) of godwits from the increasing Icelandic population and declining European population, in order to assess which populations are exposed to this hunting pressure. As a result of this, and following negotiations and discussions at the workshop organised by Gill (research reference 4), a 5-year moratorium on hunting was introduced in France in 2008 (corroborating source A), and extended for a further 5 years in 2013.

2. Directly informed the development and adoption of EU and African-Eurasian Waterbird Agreement (AEWA) Action Plans for Black-tailed Godwits (corroborating sources A and B), with the milestones shown below:
   - Workshop: 1st October 2007 in La Rochelle, France
   - First draft: December 2007, presented to the AEWA Technical Committee
   - Second draft: May 2008, presented to the Range States
   - Final version: August 2008, adopted by the 4th session of the Meeting of the Parties to AEWA in September 2008.

   The workshop and subsequent published Action Plans identified and prioritised a range of conservation actions to be undertaken by member states, and a working group was established to guide the implementation of the AEWA plan (see below).

3. Developed techniques for wet grassland restoration and management to benefit breeding wading birds. To improve the design of these agri-environment initiatives, Gill also developed collaborative research with the RSPB, identifying techniques to restore and manage wet grasslands for breeding waders. These techniques have greatly improved water management and retention on grasslands, and are highly successful at attracting breeding waders and providing key resources during chick development. They have been adopted as UK agri-environment schemes and implemented on ~3000 ha of lowland grassland in England (corroborating source C).

Gill is also a member of the AEWA Working Group guiding international implementation of the AEWA Plan. Agricultural development has been a major driver of godwit population trends, and key recommendations are improved design and targeting of agri-environment initiatives, increased protection and management of key breeding and wintering areas and a temporary ban on hunting in France (the only European country in which godwits are not protected from hunting).

In order to identify key conservation actions for implementation through the Species Action Plans, Gill organised a workshop in 2007 in La Rochelle, France, for scientists, conservationists, hunters and policy-makers, including representatives from NGOs, universities and institutes in the UK, Iceland, the Netherlands, France, Spain and Portugal. The workshop and subsequent publications (research reference 4; corroborating source B) were specifically designed to synthesise research findings and identify recommendations to feed directly into the development and implementation of the Action Plans. A key focus was on the impacts of hunting on the species, and subsequent negotiations using the outputs of the research that were reported in the workshop resulted in a moratorium on the hunting of godwits in France. This hunting moratorium ended in 2013, but a further five year hunting ban was agreed in September 2013. The research team are involved in

ongoing assessments of the influence of the moratorium on godwit populations, and thus the case for continued restriction of hunting activities.

The AEWA Action Plan specifically called for efforts to restore breeding habitats and ensure adequate protection of migration and wintering sites. In 2011, the Plan was adopted and an International Working Group was established to guide and co-ordinate the implementation of the Plan. The Working Group consists of two National Representatives from each country (one from government and one national expert), and two members of Gill's research group (Dr J Gill (PI): UK and Dr J Alves (post-doc): Portugal) are active members of the Working Group as expert National Representatives. This Working Group is a key mechanism through which our research is used to directly inform policy development and implementation, as our work forms the basis of our recommendations on the prioritisation of actions and the countries in which actions should be concentrated.

Gill was recently asked by the RSPB to run a similar workshop addressing the causes of population change in all 37 species of godwits and curlews (the *Numeniini*) throughout the world. As many of these populations are declining severely, and one curlew species is likely to soon be declared extinct, there is an urgent need to identify and implement appropriate actions. This workshop took place in Germany in September 2013, and the conservation recommendations identified at this workshop will be published later this year.

5. Sources to corroborate the impact

A. European Commission (2007) **Management Plan for Black-tailed Godwit, 2007-2009**
European Communities Technical Report 019-2007, Luxembourg.
(held on file at UEA)

This International Species Management Plan summarises available scientific information for the species and provides recommended conservation actions for all EU member states in which the species occurs. Our research underpinned much of the contents of the document and is cited throughout.

B. Jensen, F.P., Béchet, A. & Wymenga, E. (Compilers) 2008 **International Single Species Action Plan for the Conservation of Black-tailed Godwit *Limosa l. limosa & L. l. islandica***.
AEWA Technical Series No. 37. Bonn, Germany.
(held on file at UEA)

This International Species Management Plan summarises available scientific information for the species and provides recommended conservation actions for the 66 countries that must be implemented by the contracting parties to African-Eurasian Waterbird Agreement of the Ramsar Convention, and the 119 range states covered by the agreement. The workshop that Gill organized and the research that was presented and discussed at that workshop formed the first milestone of this plan:

C. Eglington, S.M., Gill, J.A., Smart, M & Bolton, M. (2009) **Reversion of arable land to wet grassland for breeding waders**
Conservation Land Management **7**: 5-9.
(held on file at UEA)

This document provides technical guidance for practitioners on the application of the techniques for restoration and improvement of wet grasslands to encourage breeding wader populations that have been assessed in our research, including equipment recommendations and associated costs. More specific technical guidance about machinery requirements is also provided on: http://www.rspb.org.uk/Images/technicalguidance_tcm9-258711.pdf)