LIFE14 PRE/UK/000002 Project

- Final Draft -

International Multi-Species Action Plan for the Conservation of Breeding Waders in Wet Grassland Habitats in Europe (2018 – 2028)

European Union (EU)

International Multi-Species Action Plan for the Conservation of Breeding Waders in Wet Grassland Habitats in Europe

LIFE14 PRE/UK/000002 Project

April 2018

Produced by

Naturschutzbund Deutschland (NABU)

Prepared in the framework of the

EuroSAP (LIFE14 PRE/UK/000002) LIFE preparatory project, coordinated by BirdLife International and co-financed by the European Commission Directorate General for the Environment, the African-Eurasian Migratory Waterbird Agreement (AEWA), the MAVA Foundation and each of the project partners.

Adopting Framework:
European Union (EU)

This Multi-Species Action Plan was prepared through EuroSAP, a LIFE Preparatory project, co-financed by the European Commission Directorate General for the Environment, the African-Eurasian Migratory Waterbird Agreement (AEWA), the MAVA Foundation and by each of the project partners, and coordinated by BirdLife International. http://www.birdlife.org/europe-and-central-asia/project/life-eu-rosap submitted 30-11-2015.

Compilers: Jutta Leyrer[1], Daniel Brown[2], Gerrit Gerritsen[3], Hermann Hötker[1] & Richard Ottvall[4]
[1]Michael-Otto-Institut im NABU, Goosstroot 1, 24861 Bergenhusen, Germany.
[2]RSPB, 2 Lochside View, Edinburgh, EH12 9DH, United Kingdom.
[3]Vogelbescherming Nederland, Boulevard 12, Zeist, 3707 BM, The Netherlands.
[4]SOF, Stenhusa Gård, Mörbylånga, SE-380 62, Sweden.

Contributors: Jouke Altenburg (Vogelbescherming Nederland), Sylvia Barova (European Commission DG ENV), Heinrich Belting (NLWKN Staatliche Vogelschutzwarte Niedersachsen (state-run bird observatory Lower Saxony), Germany), Manfred Bohlen (MELUND Schleswig-Holstein (Ministry of the Environment Schleswig-Holstein), Germany), Kate Bricket (Department for Environment, Food and Rural Affairs, UK), Daniel Brown (RSPB, UK), Dominic Cimiotti (NABU, Germany), Mary Colwell (writer, journalist and conservation activist, UK), Zoltán Czirák (Hungary), Helene de Jonge (Environmental Agency Friesland, Netherlands), Gerrit Gerritsen (Vogelbescherming, Netherlands), Hermann Hötker (NABU, Germany), Heike Jeromin (NABU, Germany), Knut Jeromin (KUNO e.V., Germany), Domingos Leitão (SPEA, Portugal), Jutta Leyrer (NABU, Germany), Jose Masero (Univeristy of Extremadura, Spain), Davy McCracken (Scotland's Rural College, UK), Hans Meltofte (Denmark), Jakub Milczarek (Poland), Alexander Mischenko (Russian Academy of Sciences, Russia), Gergő Gábor Nagy (Hungary), Szabolcs Nagy (Wetlands International, Netherlands), Richard Ottvall (SOF, Sweden), Hannes Pehlak (Estonian University of Life Sciences Tartu, Estonia), Jorma Pessa (Centre for Economic Development, Transport and the Environment, Finland), Gwenaël Quaintenne (LPO, France), Frédéric Robin (LPO, France), David Scallan (FACE, Belgium), András Schmidt (Hungary), Jennifer Smart (RSPB, UK), Luis Schmidt (NABU, Germany), Anna Stavena (BirdLife International, UK), David Stroud (JNCC, UK), Wolf Teunissen (Sovon, The Netherlands), Ole Thorup (AmphiConsult, Denmark), Bertrand Trolliet (ONCFS, France), Hannah Ward (RSPB, UK), Kerstin Wosnitza (Association of German Dairy Farmers, Germany), Václav Zámečník (CSO, Czech Republic).

Date of adoption: [May 2018].

Lifespan of Plan: 2018-2028. This Multi-Species Action Plan should be reviewed and updated every 10 years (first revision in 2028).

Milestones in the production of the Plan:
Species Status Report (Leyrer *et al* 2016): December 2016.
Species Action Planning Workshop in Tönning, Germany, 8-10 November 2017.
First Draft (version 1): April 2017, circulated to the Expert Group on the Birds and Habitats Directive (NADEG) and experts across the MSAP Range States.
Second Draft (version 1.2): August 2017, circulated to experts across the MSAP Range States.
Presentation and discussion at the 2017 Annual Conference of the International Wader Study group with two workshops on Eurasian Curlew and Northern Lapwing (100 participants of the International Wader Study Group, www.waderstudygroup.org).
Plenary talk: Leyrer Jutta - Multi-Species Action Plan for Breeding waders of wet grasslands in Europe
1. Workshop on “Improving knowledge on the biology of the Eurasian Curlew *Numenius Arquata*” Friday, September 15th 2017.
2. Workshop on the conservation of Northern Lapwings, September 15th 2017.

Final Draft: April 2018.

Recommended citation: Leyrer, J., Brown, D., Gerritsen, G., Hötker, H. and Ottvall, R. (compilers). (2018) International Multi-species Action Plan for the Conservation of Breeding Waders in Wet Grassland Habitats in Europe (2018-2028). Report of Action A13 under the framework of Project LIFE EuroSAP (LIFE14 PRE/UK/002). NABU, RSPB, VBN and SOF.

Picture on the front cover: Jan Sohler

Executive Summary

Multi-Species Action Plans (MSAPs) are designed to coordinate conservation action that seeks to protect groups of threatened species that occur across similar habitats. Europe's **wet grassland ecosystems** have undergone considerable decline in both extent and quality in recent decades. They still face numerous threats, many linked to modern agricultural practices such as drainage and early mowing dates. However, farming practices also play a crucial role in their conservation. They are sensitive ecosystems and require careful management in order to ensure the species, habitats and ecosystem processes found within them can thrive into the future.

There are eight species of migratory wading birds that are highly dependant on wet grassland ecosystems during the breeding period of their annual life cycle. These eight **"wet grassland breeding waders"** are the focus of this MSAP. The European population of all eight species has declined considerably in recent decades, and their fate is largely linked to the quality and extent of sympathetically-managed wet grassland habitats and the wider landscapes within which they are found.

In the past, ideal conditions for these species were intrinsically created and maintained via more traditional farming practices. However, the policies and incentives of **Pillar 1 of the Common Agricultural Policy (CAP)** have primarily focussed on increasing agricultural production. And whilst recipients of EU agricultural subsidies have had to adhere to basic environmental requirements as a condition of receiving financial support subsidies (such as 'Good Agricultural and Environmental Conditions' and the so-called 'greening' measures from 2013 onwards), there is little evidence that these environmental measures have resulted in improvements for biodiversity. In fact, the population declines of wet grassland breeding waders have been more pronounced within the EU compared to non-Member States.

Although Pillar 2 programmes of the CAP support and incentivise farming practices assumed to improve habitat for wet grassland breeding waders via **Rural Development Programmes (RDP)** and **Agri-Environment Schemes (AES)**, these measures have not been sufficient to reverse population declines at a national and European level. There are several reasons suggested for this and they may vary in different countries. However, some general factors include the fact that they are not being deployed at a sufficient geographical scale. In addition, in certain regions they do not adequately address issues associated with water table management and predation pressure.

The MSAP focuses on the following biogeographic populations: **Baltic Dunlin** (*Calidris alpina schinzii*), "European" **Black-tailed Godwit** (*Limosa limosa limosa*), **Common Redshank** (*Tringa totanus*), **Common Snipe** (*Gallinago gallinago*), **Eurasian Curlew** (*Numenius arquata*), **Eurasian Oystercatcher** (*Haematopus ostralegus*), **Northern Lapwing** (*Vanellus vanellus*) and **Ruff** (*Calidris* [*Philomachus*] *pugnax*).

Over 50% of the global populations of Baltic Dunlin, Black-tailed Godwit, Common Redshank, Eurasian Curlew, Eurasian Oystercatcher and Northern Lapwing occur in Europe during the breeding season. Four of the eight species are listed on the IUCN Red Lists as globally Near Threatened (NT): Black-tailed Godwit, Eurasian Curlew, Eurasian Oystercatcher, and Norther Lapwing. Two species are listed on the European Red List as Endangered (EN): Black-tailed Godwit and Ruff, and as Vulnerable (VU): Common Redshank, Eurasian Curlew, Eurasian Oystercatcher, and Norther Lapwing. AEWA International Single Species Action Plans and International Working Groups are currently in place for Black-tailed Godwit and Eurasian Curlew.

Population declines are being primarily driven by low reproductive success and factors responsible for this include:

- the loss, degradation and fragmentation of breeding habitats
- nest and chick loss due to agricultural activities
- high levels of nest and chick predation.

Conservation of all eight species will be dependent upon maintaining or where necessary improving the habitat and management conditions at a coherent network of large-scale wet grassland areas in the EU. It will also require better collaborative working between different stakeholder groups.

Content

1 – BASIC DATA

Introduction

Multi-Species Action Plans (MSAPs) are designed to coordinate conservation action that seeks to protect groups of threatened species that occur across similar habitats. They can also complement the so-called 'ecosystem approach' to conservation.

Bird species can be important 'indicator species' - their populations can be relatively easily monitored and as such certain countries use their population trends to help assess the condition of ecosystems, habitats and wider biodiversity. The breeding ecology of wet grassland breeding waders is well understood, as they have been studied by numerous field naturalists in many countries. Additionally, a large number of research projects have been undertaken, and whilst knowledge gaps do exist and are addressed in this MSAP, the conservation community has a good understanding of the factors responsible for population declines.

This MSAP lists conservation actions for these wet grassland breeding wader populations. It also provides detailed information for the various stakeholder groups that are responsible for implementing these conservation actions (e.g. policy makers, nature reserve managers, etc).

For many people, birds are their most familiar 'link' to the natural world. Watching them, studying them and even just by knowing they are nearby can provide a lot of enjoyment - birdwatching is a very popular activity in many European countries. These eight species are also familiar and popular with numerous farmers, and many farmers take great care to avoid nests during agricultural operations. These species have influenced the very history and culture of European countries. Certain actions within this MSAP seek to build on the cultural significance of these special and cherished birds – so as to help build popular support for their conservation.

Geographic range and species covered by the MSAP

The **species and their biogeographic populations** covered are as follows: **Baltic Dunlin** (*Calidris alpina schinzii*), **"European" Black-tailed Godwit** (*Limosa limosa limosa*), **Common Redshank** (*Tringa totanus*), **Common Snipe** (*Gallinago gallinago*), **Eurasian Curlew** (*Numenius arquata*), **Eurasian Oystercatcher** (*Haematopus ostralegus*), **Northern Lapwing** (*Vanellus vanellus*), and **Ruff** (*Calidris* [*Philomachus*] *pugnax*) (see Figure 1).

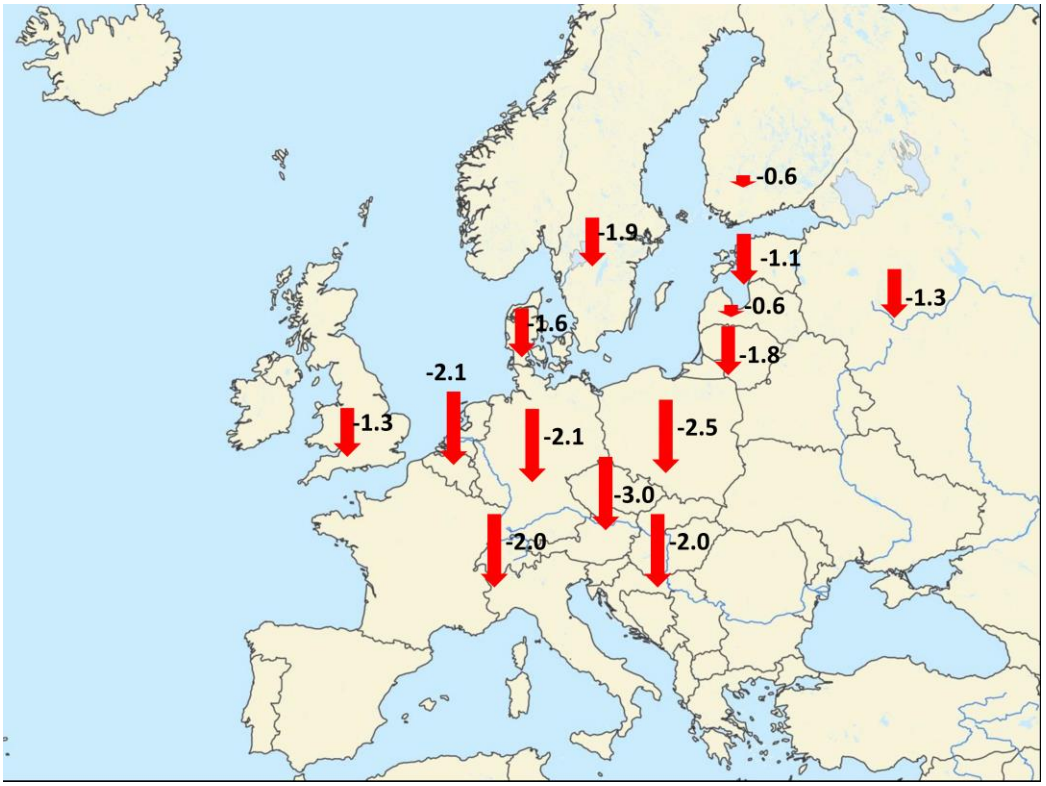


Figure 1. Map of Europe indicating the estimated annual rate of population change for the period 1990 – 2013 of eight wet grassland breeding wader species and populations: Baltic Dunlin, "European" Black-tailed Godwit, Common Redshank, Common Snipe, Eurasian Curlew, Eurasian Oystercatcher, Northern Lapwing and Ruff.

Species Action Plans (SAPs) and Management Plans are a widely-used conservation tool in wildlife conservation and species management throughout the world. They have the potential to provide considerable benefits for wildlife through the implementation of conservation action. In the past, four of the eight species had EU Management Plans (Tab. 1).

Table 1. Previous and existing plans for species that are the focus of this MSAP.

Species	Type of plan	Duration of plan	Framework
Black-tailed Godwit	EU Management Plan	2007-2009	EU Commission
	International Single Species Action Plan	From 2008	AEWA
Eurasian Curlew	EU Management Plan	2007-2009	EU Commission
	International Single Species Action Plan	From 2015	AEWA
Common Redshank	EU Management Plan	2009-2011	EU Commission
Northern Lapwing	EU Management Plan	2009-2011	EU Commission

Background and rationale for the scope of the MSAP

The **political scope** of this MSAP is the EU Member States. The wader populations being targeted are migratory and spend different periods of the year in different regions in Europe and Africa. The MSAP focuses on threats and conservation actions required during the **breeding season only.** For clarity, it does not address threats the populations face during the non-breeding season (i.e. during migration and at stop-over and staging sites).

All eight species have undergone substantial population declines across Europe in recent decades[8,42,59,60,63,83,96,99,119,123] as a result of **low reproductive success,** caused by a combination of 'indirect threats' (the **loss, degradation and fragmentation** of their breeding habitats) alongside direct threats (**nest and chick loss to farming operations** and **increased predation pressure)**[49,67,69,83,98,99,104,129,132]. This MSAP focuses on improving habitat and management conditions for the target populations within wet grassland habitats only.

Many of these species breed in other habitats - saltmarsh, arable crops, amenity grassland, bogs, heaths, dunes, fens, mires and even roofs on buildings – where they may face other threats[29,54,127,126]. However, since a high proportion of the population of each species breeds within wet grassland habitats, it is these habitats that are the focus of this MSAP.

All eight populations are migratory and spend the non-breeding season in other regions of Europe and Africa[28,46,125] where they use different habitats (e.g. intertidal mudflats) and face other threats[25,26,45,65,92,119,125].

Addressing these threats is outwith the scope of this MSAP. However, it is important to stress that 'non-breeding threats' may be having a large, detrimental impact on certain populations. Threats during the non-breeding season include **land use change** and **climate change,** which can lead to the **loss, fragmentation and degradation of stopover, staging and wintering sites.** For some of the species in certain geographical areas it also includes **harvesting** and **illegal hunting.**

All of these threats can result in **elevated adult mortality rates** - which is a highly-influential demographic parameter for these long-lived species. The other main threats on non-breeding grounds are food shortages[3,2,26,34,118,128] and/or human disturbance (e.g. via hunting and leisure activities[66,79,116,131]).

A key recommendation that has emerged during the consultation and development of this MSAP has been the urgent need for a **complementary MSAP that addresses threats and identifies conservation actions for these species during the non-breeding season**. This would ensure that a comprehensive conservation strategy is in place.

Conservation and legal status

Table 2. International and European conservation status

Instrument	Relevant section	Species and Notes
IUCN Red List www.iucnredlist.org (last accessed 15th March 2017)	Near Threatened (NT)	Black-tailed Godwit Eurasian Curlew Eurasian Oystercatcher Northern Lapwing
Pan-European Status BirdLife (2017)[16]	Species of European Conservation Concern SPEC1 (breeding)	Eurasian Oystercatcher Northern Lapwing
	Species of European Conservation Concern concentrated in Europe SPEC2 (breeding)	Common Redshank
European Red List BirdLife (2015)[15]	Endangered (EN)	Black-tailed Godwit Ruff
	Vulnerable (VU)	Common Redshank Eurasian Curlew Eurasian Oystercatcher Northern Lapwing

Table 3. International and European protection policy and legislation

Instrument	Relevant section	Species and Notes
Bonn Convention/CMS	Appendix II	Black-tailed Godwit Common Redshank Common Snipe Dunlin *Calidris alpina* with all spp. Eurasian Curlew Northern Lapwing Ruff
Bern Convention http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104	Appendix II	Dunlin *Calidris* alpina with all ssp.
	Appendix III	all other species
EU Birds Directive	Annex I	Baltic Dunlin Ruff
	Annex II PartA	Common Snipe
	Annex II PartB	Northern Lapwing Eurasian Curlew Black-tailed Godwit Common Redshank Eurasian Oystercatcher

Other EU policy areas will have a direct effect on all eight MSAP wader species as they specifically target the quality of their breeding habitats. These include but are not restricted to**: Rural Development Programmes, Common Agricultural Policy, Habitats Directive, Water Framework Directive** etc.

Table 4. Other relevant international policy and legislation

Instrument	Relevant section	Species and subspecies
Convention on the Conservation of Migratory Species of Wild Animals www.cms.int/en/document/international-single-species-action-plans-birds	AEWA International Single Species Action Plans.	Black-tailed Godwit *Limosa l. limosa* & *Limosa l. islandica* [65] Eurasian Curlew *Numenius arquata, N.a. orientalis* & *N.a. suschkini*[25]
Convention on Biological Diversity		national Biodiversity Strategies and Action Plans

An AEWA International Working Group - a group of government representatives and species experts designed to oversee the implementation of **AEWA International Single Species Action Plans exists for Black-tailed Godwit and Eurasian Curlew**. The ISSAP for Black-tailed Godwits is due for revision in 2018.

2 – FRAMEWORK FOR ACTION

Table 5. Summary Table of Goals, Objectives and Actions

Goal	• **support the recovery of wet grassland breeding wader populations by maintaining or where necessary improving the habitat and management conditions at a coherent network of large-scale wet grassland areas in the EU** • **to support public awareness campaigns and education by promoting wide-ranging stakeholder partnerships**				
High Level Actions	• **to halt further population declines so that, at a minimum, current population levels are maintained** (see Annex 7), **to achieve sustainable breeding success** (within local populations) and **to restore (parts) of their distribution range**				
5 Objectives	**Ensure sufficient and adequate habitats**	**Increase productivity**	**Raise awareness**	**Fill key knowledge gaps**	**Establish structures for MSAP implementation**
32 Actions	Identify Important Breeding Sites	Minimise Losses to Agriculture	Awareness Raising Campaigns	Learning From Past Experience	Role of NADEG
	Protect Important Breeding Sites	Communicate Role of Agriculture	Environmental Education	Research: Conservation Management	International Coordinator
	Manage Important Breeding Sites	Predation Management	Influencing Consumer Demand	Research: Climate Change	International Working Group
	Monitor Important Breeding Sites	Biosecurity and Predators	Influencing Stakeholders	Research: Pollution	Communication Strategy & Task Force
	Optimise Nature Reserves	Communicate Role of Predation	Forming Partnerships	Cultural Heritage	National Working Groups
	Farmland & Agri-Environment	Update Predation Guidance		Ecosystem Services	National Action Plans
	Other Rural Policies			Improving the CAP	Local Partnerships

Key to the colour of actions

Actions in red: these are actions that have been identified as needing to start immediately i.e. to have started by 2019
Actions in amber: actions with other timescales attached to them – see framework for action for specific details

Goal

- **to support the recovery of wet grassland breeding wader populations by maintaining or where necessary improving the habitat and management conditions at a coherent network of large-scale wet grassland areas across the EU**. In order to ensure sufficient high-quality breeding habitats, support adequate habitat management activities within respective sites of the Natura 2000 network;
- **to support public awareness campaigns and education by promoting wide-ranging stakeholder partnerships** to influence consumer choice and increase demand for agricultural products produced on wet grassland habitats that are being managed in a 'bird-friendly' way.

High level objective

- **to halt further population declines so that, at a minimum, current population levels are maintained** (see Annex 7), **to achieve sustainable breeding success** (within local populations) and **to restore (parts) of their distribution range** by strengthening and expanding the Natura 2000 network during the coming ten years. Most importantly, structures need to be established to coordinate the implementation of the MSAP at the level of the EU.

Results and actions

Action priority	Action timescale
Essential	**Immediate** - to commence within the next year
High	**Short** - to commence within the next 3 years
Medium	**Medium** - to commence within the next 5 years
Low	**Long** - to commence within the next 10 years
	Ongoing - currently implemented and should continue
	Completed - completed during preparation of the Action Plan

Table 6. Framework for action

Objective 1: Ensure sufficient and adequate habitats.				
Result	**Action and scope**	**Priority**	**Timescale**	**Responsibility**
1.1. Important wet grassland breeding sites for all 8 species are identified and are receiving appropriate protection. They are actively managed, and monitoring programmes are in place.	Action 1.1.1 – **Identify Important Breeding Sites** Important breeding sites may be important on the basis that they host (1) international important numbers, (2) nationally important numbers, (3) regionally important numbers, or because (4) they are important from the perspective of maintaining the species' European breeding range. For each important breeding site, estimate the status of each species (e.g. population size, population trend) to help inform future management and research priorities. Consideration should also be given to sites that until recently would have qualified as important breeding sites - and have the potential to be restored.	Essential	Immediate	**National Governments** with support from **National Conservation NGOs** **International Conservation NGOs**
	Action 1.1.2 – **Protect Important Breeding Sites** Ensure that: • all breeding sites of international importance for the 8 species are protected under the EU Birds Directive. For each species' biogeographic population, population thresholds for internationally important sites are those containing >1% of the biogeographic population. • all breeding sites of national importance are protected under national or federal legislation. This should give consideration both to sites that host large populations as well as sites that may be of importance for the purposes of maintenance of breeding range; • respond to potential negative impacts from proposed developments at important breeding sites using Ramsar's Avoid-Minimise-Compensate planning framework. Inappropriate land use change is likely to include the conversion of wet grasslands into arable or ley grasslands, afforestation, infrastructure and urban development, wind farms, solar farms etc. Where appropriate, consider using other legal provisions such as the Habitats Directive and/	Essential	Immediate	**European Commission** **National Governments** with support from **National Conservation NGOs** **International Conservation NGOs**

Table 6. Framework for action

Objective 1: Ensure sufficient and adequate habitats.				
Result	**Action and scope**	**Priority**	**Timescale**	**Responsibility**
	or Water Framework Directive to further protect important breeding sites from inappropriate development.			
	Action 1.1.3 – **Manage Important Breeding Sites** Develop and implement fully-costed management plans for each important breeding site. These plans should identify and address local management issues and they should involve local stakeholders. They should set biological objectives in regards to population size, population trend and reproductive rates. The plans should be reviewed at regular intervals. They should take into consideration the emerging results of monitoring and research - and adapt accordingly.	Essential	Immediate	**Regional/ Local Government** **Government Conservation Agencies** **National Conservation NGOs** **Nature Reserve Managers** **Individual landowners & farmers** **Relevant Community Groups** (e.g. Community Council, Local Tourism Interests, Local NGOs)
	Action 1.1.4 – **Monitor Important Breeding Sites** Adapt existing or devise and implement new monitoring schemes at important breeding sites. These should seek to produce population trends and data on reproductive rates. The data should be reported to the International Coordinator and National Working Groups (see actions under objective 5) at regular intervals.	High	Immediate	**Regional/ Local Government** **Government Conservation Agencies** **National Conservation NGOs** **Nature Reserve Managers** With potential support from **Local Birdwatchers**
1.2. Management on nature reserves is providing optimal conditions for wet grassland breeding waders.	Action 1.2.1 – **Optimise Nature Reserves** Optimise conservation management at existing nature reserves. Extend or establish new nature reserves where species' requirements cannot be delivered through voluntary schemes (such as agri-environment schemes) or where it is the most cost effective option.	Essential	Immediate	**Nature Reserve Managers** **Regional/ Local Government** **Government Conservation Agencies** **National Conservation NGOs**
1.3. Management on private farmland is providing optimal	Action 1.3.1 – **Farmland and Agri-Environment**	Essential	Immediate	**Regional/ Local Government**

Table 6. Framework for action

Objective 1: Ensure sufficient and adequate habitats.				
Result	**Action and scope**	**Priority**	**Timescale**	**Responsibility**
conditions for wet grassland breeding waders, supported by agri-environment schemes.	Develop packages of well-designed, targeted agri-environment options that address the threats acting upon local populations. Options will likely be addressing issues relating to (a) water level management, (b) mitigating predation pressure, (c) measures that maintain or improve suitable breeding and feeding habitat and (d) measures to reduce nest loss to agricultural operations. Overall, national/ regional schemes must seek to ensure (1) breeding habitats are maintained in good condition (2) breeding success is equal to, or above, the levels of productivity associated with stable or increasing populations and (3) these options are deployed over a sufficient proportion of land to result in stable or preferably increasing populations. See also action 2.1.1. & 2.2.1.			**Government Conservation Agencies** **National Conservation NGOs** **National Farming Organisations**
1.4. Individuals and organisations responsible for the implementation of other rural policies are made aware of the importance of important breeding sites and support conservation activity where there is overlap.	Action 1.4.1 - **Other Rural Policies** Work with the national authorities to (1) ensure that they are aware of this MSAP and National Action Plans and (2) ensure they are made aware of the location of important breeding sites. Led by National Working Groups, an assessment of other rural policies should be undertaken in the context of whether they have the potential to benefit or negatively impact upon wet grassland breeding waders. Some examples include national or regional policies relating to forestry, renewables, the water environment, tourism and wider agricultural support schemes.	High	Short	**National Government** **Government Conservation Agencies** **Other Key Government Agencies** **National Conservation NGOs** **National Farming Organisations**

Objective 2: Increase productivity.				
Result	**Action and scope**	**Priority**	**Timescale**	**Responsibility**
2.1. The impact of farming operations on breeding success is minimised. The impact that farming operations can have on nests and chicks is being communicated sensitively.	2.1.1 – **Minimise Losses to Agriculture** Conservation measures should be deployed that seek to minimise the number of nests and chicks that are lost to agricultural operations and to livestock trampling. In many cases these measures will be linked to agri-environment options such as delayed mowing (see action 1.3.1 – **Farmland and Agri-Environment)** but in some situations other measures may be more appropriate (e.g. local volunteers marking nests – see the German case study in Annex 5 as a good example of this approach).	Essential	Immediate	**National Conservation NGOs** **National Farming Organisations** **Individual landowners & farmers** With potential support from **Local Birdwatchers**
	2.1.2 – **Communicate Role of Agriculture** National Action Plans and Local Partnerships (see objective 5) should plan regular communications with the farming community regarding the impact operations can have on breeding success. This requires sensitive communication, since (1) farmland provides important habitat for wet grassland breeding waders (2) farming practices can be crucial in maintaining habitat conditions and (3) some farmers and agricultural contractors already take great care to avoid or move nests during operations. The focus should therefore be on providing support and/or educating younger or less experienced contractors on the issues, how to avoid nests, etc.	High	Ongoing	**National Government** **Government Conservation Agencies** **National Conservation NGOs** **National Farming Organisations** **Individual landowners & farmers**
2.2. Important breeding sites are being managed to reduce predation pressure to sustainable levels, and stakeholders and the wider public understand why this is occurring.	Action 2.2.1 - **Predation Management** When it has been established that high levels of predation is limiting populations at important breeding sites, then predation management will need to become part of the conservation work for that site. Guidance on this topic is provided in Annex 4. Predation management will often require close cooperation, and a coordinated approach with other local interest groups, such as hunters and farmers, will in most cases be essential (see the Swedish case study in annex 5 as an example of this approach).	Essential	Immediate	**Government Conservation Agencies** **Local NGO staff** **Nature Reserve Managers** **Individual landowners & farmers** **Local hunters**
	Action 2.2.2 – **Biosecurity and Predators**	High	Immediate	**National Government**

Objective 2: Increase productivity.				
Result	**Action and scope**	**Priority**	**Timescale**	**Responsibility**
	Assess whether adequate provisions are in place to minimise the risk of non-native predators being introduced into important breeding sites. This should also include native predators that are outwith their natural range (e.g. when the arrive onto islands). Have contingency plans in place that are regularly reviewed, in order to act swiftly if introductions do occur. Work to remove introduced species from important breeding sites where they occur.			**Regional/ local Government** **Government Conservation Agencies** **National Conservation NGOs**
	Action 2.2.3 – **Communicate Role of Predation** Promote a better understanding amongst stakeholders and the general public as to why predation management is being carried out – including reference to the fact it is being carried out as part of a package of conservation measures for wet grassland breeding waders.	High	Ongoing	**National Government** **Regional/ local Government** **Government Conservation Agencies** **National Conservation NGOs** **National Hunting Organisations**
2.2. Guidance on best-practice in managing predation risk is kept relevant and up-to-date.	Action 2.2.1 - **Update Predation Guidance** Regularly review Annex 4 and update it whenever new case studies or research is published (see action **4.2.1. – Research: Conservation Management**). Ensure any updated guidance is disseminated widely i.e. International Working Group > National Working Groups > Local Partnerships (see objective 5 for details on these structures that are to be set up).	High	Ongoing	**IWG Coordinator** **Government Conservation Agencies** **National Conservation NGOs** **International Conservation NGOs** **Academic Institutions**

Objective 3: Raise awareness				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
3.1. The unfavourable conservation status of wet grassland breeding waders and the causes behind their decline are better understood by the public, stakeholders and decision-makers.	Action 3.1.1 - **Awareness Raising Campaigns** Develop national and international campaigns to raise awareness about the conservation status of wet grassland breeding waders, the threats they face, and the conservation work being undertaken to conserve them. Such awareness-raising campaigns should also focus on the wider conservation value of wet grassland habitats, alongside the ecosystem services they can provide (e.g. flood alleviation, carbon storage). The campaigns should also seek to promote the cultural value of the birds, and emphasise the need to form collaborative partnerships between conservationists, farmers and the wider land management community.	High	Short	**National Conservation NGOs** **International Conservation NGOs** With support from **National Government** **National Farming Organisations** **Culture & Heritage Organisations**
	Action 3.1.2 - **Environmental Education** Broaden public support for wet grassland breeding waders by running education programmes for schools. This may activities such as (1) developing and distributing educational materials to schools, (2) hosting field days for school children where they can meet farmers and conservationists, and learn about how food production and conservation can go 'hand in hand'.	High	Medium	Partnerships between **Conservation NGOs** **Local Education Authorities** **Individual landowners/ farmers** **Individual Schools** etc
	Action 3.1.3 - **Influencing Consumer Demand** Develop a workstream seeking to better understand how to influence and increase consumer demand for products produced on land being sensitively-managed for breeding waders. This may include trials, new labelling, marketing strategies, etc (see the Dutch case study in Annex 5 as a good example of this approach).	Medium	Medium	**Food Industry Representatives** **National/ Regional Farming Organisations** **National Government** **National NGOs**

Objective 3: Raise awareness				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
3.2 There is political support and sufficient funding for implementation of National Action Plans.	Action 3.2.1 - **Influencing Stakeholders** Inform decision-makers and stakeholders about the legal obligations to protect meadow birds, to avoid potential conflict with other stakeholders, as well as the economic and multiple benefits to society linked to conservation of their habitats e.g. as climate change impact mitigation, flood protection, etc (refer to actions 4.4.1 - **Ecosystem Services &** 4.3.1 - **Cultural Heritage).** Inspire decision-makers by showcasing successful conservation projects and the actions required to achieve them e.g. successful deployment of AE schemes, nature compensation/mitigation in response to developments, the rewetting of wet grasslands for the dual purposes of wader conservation and flood alleviation, etc.	High	Short	**National Conservation NGOs** **Nature Conservation Agencies** **Academic Institutions** **Government Conservation Agencies** **Developers**
3.3. There is a wide range of support for the conservation of breeding waders at all levels of civic society.	Action 3.2.3 - **Forming Partnerships** Continue to develop broad partnerships with farmers, the wider food industry and other relevant stakeholders (e.g. hunters and local communities) in order to work together to implement the relevant actions within this MSAP. These partnerships will need to formed at (1) the European level e.g. in relation to some of the overarching MSAP actions (2) at national level e.g. to implement National Action Plans and (3) at regional/ local level, to implement conservation measures at important breeding sites, to develop marketing schemes, organise educational activities, etc.	High	Short	**All relevant stakeholders.**

Objective 4: Fill key knowledge gaps				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
4.1. Lessons learnt from previous conservation projects are fully utilised. They are communicated widely and implemented.	Action 4.1.1 - **Learning From Past Experience** Commission a European-wide review of previous and current wet grassland breeding wader conservation projects in order to identify what combination of factors contributed to their success or failure. Publish the results so that case studies and key recommendations can be made widely available - and incorporated into future conservation management at other sites, as appropriate. This action will expand on the example case studies provided in Annex 5.	High	Short	**European Commission**
4.2. Research is prioritised towards addressing the key issues affecting waders at their important breeding sites. Key recommendations are disseminated.	Action 4.2.1 – **Research: Conservation Management** Provide funding for and undertake research to further our understanding of the use of important breeding sites by the eight species so as to inform future conservation management. The habitat requirements and breeding ecology for the 8 species are relatively well understood – a focus for future research should therefore be (1) sustainable solutions to reduce predation pressure and (2) the scale of conservation delivery required to produce stable populations (e.g. addressing questions such as what proportion of land needs to be managed under agri-environment schemes, the effectiveness of existing agri-environment options, what scale and intensity of predation management is required, etc).	Essential	Immediate	**European Commission** **National Governments** **Conservation NGOs** **Academic Institutions**
4.3. The impact of climate change and pollution on wet grassland waders populations is better understood.	Action 4.3.1 - **Research: Climate Change** Undertake a project that assesses the likely impact of climate change on wet grassland breeding waders and wet grassland ecosystems. Develop potential mitigation measures.	High	Short	**European Commission** **National Governments** **Conservation NGOs** **Academic Institutions**
	Action 4.3.2 – **Research: Pollution**	High	Short	**European Commission** **National Governments**

Objective 4: Fill key knowledge gaps				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
	Undertake a project that thoroughly analyses the impact and severity of various forms of pollution (e.g. heavy metals, neonicotinoids, glyphosate, etc.) potentially acting on wet grassland breeding waders and develop conservation measures in response to any findings.			**Conservation NGOs** **Academic Institutions**
4.4. The historic and cultural significance of wet grassland breeding waders is better understood & communicated to further their conservation.	Action 4.4.1 - **Cultural Heritage** Seek to better capture information on the cultural importance of wet grassland breeding waders when speaking to local stakeholders e.g. their role in local traditions, their name and meaning in local dialects, their place in historical events and myths, etc. Use these stories in the complementary actions concerning communications, awareness raising and educational activities.	Medium	Short	**Conservation NGOs** **Academic and educational institutions** **Local heritage and cultural NGOs**
4.5. The wider ecosystem services of wet grassland habitats are better understood and communicated to further the conservation of wet grassland breeding waders.	Action 4.5.1 - **Ecosystem Services** Collate existing information on the wider environmental benefits that can arise as a result of the conservation of wet grassland breeding waders. This is likely to focus primarily on the role well-managed wet grassland ecosystems can play in carbon sequestration/ storage and flood attenuation or alleviation. It may also include the wider social benefits that arise e.g. from tourism and for local communities (see the Dutch case study in Annex 5 as a good example of this approach). Communicate these wider ecosystem services and social benefits in future communications regarding wet grassland breeding waders, and if any significant knowledge gaps exist, identify these as priorities for research in the future.	Medium	Short	**European Commission** **National Governments** **Conservation NGOs** **Academic Institutions**
4.6. Pillar 1 and Pillar 2 of the Common Agricultural Policy (CAP) provide a greater range	Action 4.6.1 - **Improving the CAP** Commission a review of the current CAP (both Pillars 1 and 2) in order to assess which elements benefit wet grassland breeding waders, which are neutral, and which elements are currently detri-	Essential	Short	**European Commission** **National Governments** **International Conservation NGOs**

Objective 4: Fill key knowledge gaps				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
of mechanisms to deliver towards the conservation of wet grassland breeding waders.	mental. Produce recommendations to help inform future CAP reform discussions so that any unintended but negative consequences are removed or mitigated - whilst new, positive measures are incorporated.			

Objective 5: Establish structures for MSAP implementation				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
5.1. The implementation of the MSAP is being coordinated at international level.	Action 5.1.1 - **Role of NADEG** Use the biannual meeting of the Expert Group on Birds and Habitats Directives (NADEG) to discuss and inform on the progress MSAP implementation.	High	Short	**European Commission** **National Governments**
	Action 5.1.2 - **International Coordinator** Appoint a lead organisation and an international coordinator to coordinate the implementation of the MSAP. Their role will be fully defined in due course, but would include the formation and coordination of an International Working Group (see below).	Low	Immediate	**European Commission** **International Conservation NGOs**
	Action 5.1.3 – **International Working Group** Establish an MSAP International Working Group to oversee implementation of the MSAP. Build on the experience and lessons of AEWA International Working Groups. The MSAP IWG is likely to include a combination of government contacts, experts from academic or NGOs institutions, and international observer organisations (e.g. BirdLife, FACE, Wetlands International, etc). Establish terms of reference with the AEWA International Working Groups for Black-tailed Godwit and Eurasian Curlew - to ensure the three IWGs are synergistic and avoid duplication of effort.	Low	Immediate	**European Commission** **International Conservation NGOs and other observer organisations** **Farming Representative Organisations** **National Experts**
	Action 5.1.4 - **Communication Strategy & Task Force** Develop a communications strategy to promote the MSAP implementation. This will tie in with action 3.1.1 - **Awareness Raising Campaigns** but two priorities would be to (1) ensure that wet grassland breeding waders and the multiple biodiversity benefits related to their conservation remain high on the political and economic agenda of the EC and national governments and (2) create a communications task force as a sub-group of the IWG. Such a task	High	Short	**International Conservation NGOs** **National Conservation NGOs** **Farming Representative Organisations**

Objective 5: Establish structures for MSAP implementation				
Result	**Action and scope**	**Priority**	**Timescale**	**Organisations responsible**
	force would coordinate and promote national and international campaigns.			
5.2. The implementation of the MSAP is being coordinated and communicated at national level.	Action 5.2.1 - **National Working Groups** Establish national/regional structures for coordination and advocacy to support the implementation of national action plans	Essential	Immediate	**National Governments** **National NGOs** **National Farming Organisations** **National Hunting Organisations**
	Action 5.2.2 - **National Action Plans** Produce National Action Plans with clear priorities and cost estimates for the maintenance and restoration of a national network of important breeding sites. National Action Plans should also determine national population targets. They should ensure that national actions are aligned with all relevant actions of the MSAP for that member state.	High	Immediate	**National Governments** **National NGOs** **National Farming Organisations** **National Hunting Organisations**
5.3. Local partnerships have been formed at important breeding sites.	Action 5.4.1 – **Local Partnerships** Facilitate the establishment of local partnerships at each important breeding site to deliver local conservation priorities. The roles will vary per site, but some common functions might include having a named contact to act as a liaison point between the local partnership and National Working Groups.	High	Immediate	**Regional/ Local Government** **Local Farming Representatives** **Local NGO staff** **Relevant Community Groups (e.g. Community Council, Local Tourism Interests)**

Annex 1. PROBLEM ANALYSIS

This chapter discusses threats acting upon the wader populations and assesses their impact. These were analysed by species experts and stakeholders during the MSAP consultation workshop. The process followed the BirdLife International framework of threat assessment (http://datazone.birdlife.org/species/spcthreat).

For each threat, several options have been assigned: timing, scope and severity. The assignment has been done by experts during the MSAP Planning workshop.

Timing options:	
Ongoing	**3**
Likely to be ongoing	**2**
Future (long term)	**1**

Scope options:	
Whole population (>90%)	**3**
Majority of population (50-90%)	**2**
Minority of population (10-50%)	**1**
Negligible proportion of pop. (<10%)	**0**

Severity options:	
Very rapid declines (>30% over 10 years or 3 generations)	**3**
Rapid declines (10–30% over 10 years or 3 generations)	**2**
Relatively slow but significant declines (1–10% over 10 years or 3 generations)	**1**
Fluctuations or negligible declines	**0**

The 'impact' of any threat on a population is then based upon an assessment of the threat's timing, scope and severity, with scores ranging from 0 to 3 (see box above).

The overall impact of the threat is calculated by adding the individual scores for timing, scope and severity as follows:

- **high impact** score 8-9
- **medium impact** score 6-7
- **low impact** score 3-5
- **no/negligible impact** score 0-2

The threat types used were based on BirdLife's guide on assessing threats. We classified eight threats shown in Tables 2 and 3.Two threat classes have been identified as high impact threats: **habitat loss & degradation on the breeding grounds** and **predation of nests and chicks.**

Habitat loss and degradation have been caused by several factors but the predominant factor has been the intensification of farming practices. Conventional grassland management is focussed on the sowing and harvesting of high-yielding, fast-growing grass species. This management requires relatively **low water tables**, facilitated by field drainage systems, and large quantities of fertiliser. This allows for several harvests of grass per year and has resulted in advances in the date of the first cut of grass. Consequently, operations that can destroy nests and chicks (e.g. rolling, mowing) now overlap with the nesting and chick-rearing period.

Table 7. Overall impact of the major threats assessed by experts and stakeholders.

Threat	Impact
Habitat loss & degradation on the breeding grounds	**High**
Hunting	**Unknown**
Pollution	**Unknown**
Human disturbance	**Low**
Predation of nests and chicks	**High**
Climate change	**Unknown**
Renewable energy production: wind and solar farms only	**Low**

Table 8. Scoring table for threats acting upon the eight wader populations covered in the action plan.

Threats	overall impact		Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
Habitat loss & degradation on the breeding grounds	High	Scope	3	3	2	2	2	2	2	3
		Severity	3	3	3	3	3	3	3	3
		Timing	3	3	3	3	3	3	3	3
		Impact score	9	9	8	8	8	8	8	9
		Impact	High	High	High	High	High	High	High	High
Hunting	Unknown	Scope	0	2	2	3	2	1	2	1
		Severity	0	?	?	?	?	?	0	?
		Timing	0	2	3	3	2	3	3	3
		Impact score	0	4	5	6	4	4	5	4
		Impact	Past	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Pollution	Unknown	Scope	?	?	?	?	?	?	?	?
		Severity	?	?	?	?	?	?	?	?
		Timing	3	3	3	3	3	3	3	3
		Impact score	3	3	3	3	3	3	3	3
		Impact	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Human disturbance	Low	Scope	0	1	1	0	1	1	1	1
		Severity	0	0	0	0	1	0	0	0
		Timing	1	1	1	1	3	1	1	1
		Impact score	1	2	2	1	5	2	2	2
		Impact	Negligible	Negligible	Negligible	Negligible	Low	Negligible	Negligible	Negligible
Predation of nests and chicks	High	Scope	2	2	2	2	2	2	2	2
		Severity	1	3	2	?	3	3	3	1
		Timing	3	3	3	3	3	3	3	3
		Impact score	6	8	7	5	8	8	8	6
		Impact	Medium	High	Medium	Unknown	High	High	High	Medium
Climate change	Unknown	Scope	3	3	3	3	3	3	3	3
		Severity	?	?	?	?	?	?	?	?
		Timing	3	3	3	3	3	3	3	3
		Impact score	6	6	6	6	6	6	6	6
		Impact	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Renewable energy production: windfarm and solar farms only	Low	Scope	0	0	0	0	1	0	0	0
		Severity	0	1	1	1	1	1	1	0
		Timing	3	3	3	3	3	3	3	3
		Impact score	3	4	4	4	5	4	4	3
		Impact	Low	Low	Low	Low	Low	Low	Low	Low

Habitat loss and degradation on the breeding grounds

The **main demographic** factor influenced during the breeding season is **reproductive output**. Population developments of all eight populations are currently suffering low reproductive output, foremost caused by habitat loss and degradation. The main driver is agricultural intensification[1,5,6,8,9,12,24,31,33,36,38,39,37,49,50,59,68,69,71,73,72,85,97,96,99,103,104,110,129,133].

Stress	Through
(a) changes in habitat structure / landscape simplification **(b)** urbanisation and infrastructure	· drainage · conversion of grassland · application of fertilizers · farm abandonment · afforestation · increase in ley-grass · autumn-sown crops
reduced food availability	· inappropriate management of water-table and vegetation · fertilizers and pesticides · deep ploughing · mowing frequency · changing spring weather · manure-injection
increased clutch and chick mortality leading reduced reproductive success	· inappropriate mowing and grazing regimes · increasing predation rates, also by 'new' species
inbreeding[17,88]	· As a result of habitat fragmentation, suitable patches of habitat are far between in many wader populations. Smaller and isolated patches results not only in population declines but also in reduced connectivity and reduced movement of individuals between patches (***i***). Increased isolation might lead to increased mating between relatives, inbreeding and genetic problems. Inbreeding has been shown to negatively affect reproductive output in Baltic Dunlins in Sweden (***ii***). The loss of genetic diversity is expected to increase the extinction risk of small populations.

Hunting

The scope of this MSAP focuses on threats and conservation implementation during the **breeding season only**, so for clarity, it does not assess the impact of harvesting on non-breeding grounds. Egg collecting is prohibited for all eight populations in all Member States, and harvesting of adult or immature birds does not happen during the breeding season.

Hunting activities outside the breeding area and season might significantly affect the population in the breeding season in various ways (e.g. lower body condition upon arrival in the breeding grounds due to disturbance through hunting activities in the nonbreeding-grounds, higher adult mortality through hunting). However, there is so far hardly data to assess the overall impact of hunting e.g. via carry-over effects on the breeding populations, consequently, the impact of this threat has been scored 'unknown'. A complementary MSAP for the non-breeding season is required.

Pollution

Pollution from lead poisoning (as a result from hunting with lead shot) has been described as a potential problem affecting Common Snipe[7,81] but long-term monitoring of heavy metal contamination along the Wadden Sea coast have shown generally decreasing values in Eurasian Oystercatcher eggs[30]. So far, no knowledge exists on potential short- and long-term effects resulting from pesticides applied in agriculture. There is growing evidence though that some groups of pesticides, including neonicotinoid insecticides, have contributed to the strong decline in insect abundance[52,53] and since invertebrates form a key food source for adults and chicks, this is likely to be having some form of indirect impact.

Human disturbance

Human disturbance at breeding sites can occur through recreation and traffic, and has been shown to have an impact The Netherlands[56,93-95,130] (note that human disturbance resulting from harvesting/ hunting and agricultural practices are considered within the respective sections on those threats). It is likely that the degree of disturbance varies considerably between countries and in different landscapes.

Climate change

Climate change could well have an effect on the eight species[10]. Although it is extremely challenging to address this issue just yet[97,27], there are many hints that can give an outline of what will happen in the future. Already, in songbirds a seasonal mismatch of arrival in the breeding grounds has been observed[22,21,20,114]. There is also a study on the arrival timing of European Black-tailed Godwits in the Netherlands, that has been strongly influence by a late cold spell[107]. Regular drought events in spring, coupled with heavy rains later in the breeding season influence chick survival and breeding success in general. And both, earlier spring warming plus the increase in the application of fertilizers has already led to an advancement in agricultural schedules, posing a major threat to the survival of clutches and chicks[50,68,69,106]. Agri-environment schemes need to address issues arising from climate change[73]. Coastal breeding wet grassland breeding waders will be at risk to more extreme spring- and storm-flooding events and sea-level rise[127]. And earlier snow melting might have serious effects on the water table with earlier spring snowmelt floods of rivers in Europe[18]. Yet, climate change might not only have negative effects[23]

Renewable energy production

Most significantly, the conversion of wet grasslands to maize fields for biogas plants has been extreme. In The Netherlands about 20% of grassland has been lost to biogas production in the last decade. Renewable energy production in areas where the MSAP wet grassland breeding wader species breed consists mainly of wind farms, solar farms and biogas plants. Collision risks with wind farms might not be at a significant level, but mind that monitoring projects on collision risks of birds and bats are ongoing[91]. There is evidence that breeding wet grassland waders are displaced by windfarms[62,90], and land-use, and hence habitat degradation and loss through the building of wind and solar farms might well pose a threat.

Predation

The demographic factors mainly influenced by predation are both reproductive success and adult survival. **Predation has the highest impact during the breeding season**[100,121]. The main factor is increasing populations of mammalian predators mainly driven by changes in landscape structures[4,6,11,19,39,40,44,68,75-78,86,87,100-102,105,121,122,124]

Stress	through

(a) increasing populations of mammalian predators
(b) range expansions of ground predators to e.g. islands
(c) increasing non-native / invasive species populations
	· increase in food availability for predators
	  · reduced water tables
	  · warmer winters
	  · game bird release
	  · voles
	· changes in landscape structures
	  · reduced water tables
	  · simplified landscapes
	  · reduction in open landscapes
	  · rural development
	  · land abandonment
	  · afforestation
	· reduced predator control
	  · vaccination against rabies
	  · lack of public support
	  · lack of funding
	· successful conservation measures
	  · e,g, peregrine falcon, buzzards, marsh harrier, grey heron

Annex 2. BIOLOGICAL BACKGROUND AND JUSTIFICATION OF CONSERVATION OBJECTIVES

The world of wet grassland breeding waders 'in a nutshell'

Wet grassland habitats within agricultural landscapes

Over 50% of the global populations of Baltic Dunlin, Black-tailed Godwit, Common Redshank, Eurasian Curlew, Eurasian Oystercatcher, and Northern Lapwing occur in Europe during the breeding season[14] (indeed, Baltic Dunlin is almost entirely confined to the EU during this period).

Numerous peer-reviewed, scientific publications have demonstrated that **agricultural intensification** and **increased predation pressure** have a negative impact on breeding populations[4,31,33,39,43,44,69,73,72,75,76,78,86,87,99,100,121,124,132]. Recent analyses have shown that modern agriculture is a major anthropogenic threat to biodiversity, comparable in impact with global climate change. Many species of 'farmland birds' in general - including the eight MSAP species - have severely declined across Europe, and these declines have been correlated with agricultural intensity[32]. Furthermore, declines have been more pronounced within the EU compared to non-Member States[32], due to unintended consequences arising from policies and incentives of the **Common Agricultural Policy (CAP)** which have focussed primarily on increasing agricultural production. Whilst the CAP requires farm businesses to adhere to basic environmental requirements as a condition of receiving subsidies ('Good Agricultural and Environmental Conditions'), and the 2013 CAP reform saw the introduction of further environmental requirements (so-called 'greening'), there is little evidence to date that these measures have resulted in improvements for biodiversity[89]. CAP incentives for farmers to improve habitats for breeding waders is available in many Member States via the "Pillar 2" that provides funds through **Rural Development Programmes (RDP)** and, in particular, **Agri-environment Schemes (AES)**.

Whilst there is evidence that AES can successfully stabilise breeding wader populations at a local level, they have been unable to **reverse population declines at the various national and European levels.** Factors include AES not adequately addressing issues associated with water table management, a lack of resource resulting in AES measures being deployed at an insufficient geographical scale, and poor geographical targeting of AES[12,24,74,71,70,113,129].

Other agricultural policy changes can have unintended but adverse impacts on breeding habitats, for example the 2015 decision to abandon milk quotas. Extensive grazing of wet grassland habitats by low-density herds of dairy cattle is an effective method of maintaining the habitat requirements of breeding waders; but with the abandonment of the milk quota, such farming systems may no longer be economically viable. Should land abandonment or intensification proceed, then it will result in further loss, degradation and fragmentation of breeding habitats.

Moreover, recent research has demonstrated that in the past 30 years, flying insect abundance has fallen more than 75%[53]. Invertebrates form the main prey of wader chicks. Alarmingly, this has been documented in protected areas which are intended to counteract loss of biodiversity in the wider environment[53].

Consequently, there is an **urgent need to scale up conservation delivery.** The EU needs policies that adequately **support and incentivise the farming practices that benefit waders and the wet grassland habitats they depend upon to successfully breed in.**

This support must be geographically targeted and implemented on a much greater geographical scale than is currently the case, in order to ensure a sufficient area of sympathetically-managed wet grassland habitat is available to stabilise current population declines.

The **revision of the Common Agricultural Policy (CAP)** presents an opportunity to consider the various mechanisms that are available in order to achieve this.

As alluded to above, the eight wader populations are **heavily reliant on farming practices** across much of their European breeding range (a notable exception is breeding areas in the sub-Arctic zone). Farming practices maintain access to grassland and wetland habitats that they select for nesting and feeding in; grazing and mowing ensures that the vegetation does not become inaccessible to the birds (i.e. by becoming too tall, dense, or slowly turning into scrub).

The flipside is that the **grazing of wet grassland habitats**, *when* undertaken by high densities of livestock and during the period that waders are incubating their eggs or raising their chicks, has the potential to disturb nesting birds or result in the trampling of eggs. Otherwise, waders will happily nest alongside lower densities of grazing livestock. So - the number and timing of livestock grazing is critical[109,108].

Similarly, the **timing of field operations** associated with hay and silage production (e.g. particularly rolling and mowing) is of critical importance. It is imperative that such operations occur only after eggs have hatched and chicks have fledged (i.e. the point at which chicks can fly and therefore fly away from machinery) or that operations are carefully planned in a way that ensures nest destruction is avoided or minimised. Otherwise, high levels of nest destruction and chick mortality can occur.

Within their breeding territories, they require at least some ground with a **high water table** so that shallow pools, damp soils and muddy areas are available. Such areas provide invertebrate-rich feeding areas for adults and their chicks[36,38,37]. They also benefit from areas of **herb-rich vegetation** to provide invertebrate prey resources[69].

As ground-nesting species that typically lay 3-4 eggs, they are particularly vulnerable to mammalian and avian predators, and as such they require relatively **open landscapes** (i.e. landscapes that possess few woodlands[13], trees, buildings and pylons nearby, since these structures may provide cover for mammalian predators and nest sites and perch posts for avian predators).

It is important to also consider the role of agriculturally **improved grasslands** in the breeding ecology of waders. On improved grasslands that consist primarily of agricultural grasses and receive high levels of fertiliser spreading, invertebrate biodiversity is far lower when compared to semi-natural grasslands and wetlands. However, such fields can create good foraging opportunities, as improved grasslands may contain high densities of certain invertebrate prey that are important food for adult waders (e.g. leatherjackets)[69,129]. It can therefore be beneficial to have fields of more improved/ productive grassland in close proximity to wet grassland. However, it is critical to ensure that the area and proportion of improved, well-drained grassland within a landscape does not increase to the point at which it dominates the landscape, as this will lead to population declines[120].

In summary, the maintenance of suitable breeding habitat is often reliant on the continuation of certain beneficial farming practices. These beneficial farming systems are often described as 'low-intensity', but in reality the farm management practices associated with high wader numbers will vary across different parts of Europe and can therefore be difficult to define. It is therefore often necessary to understand beneficial farming practices in a local context. This requires close cooperation with local farmers.

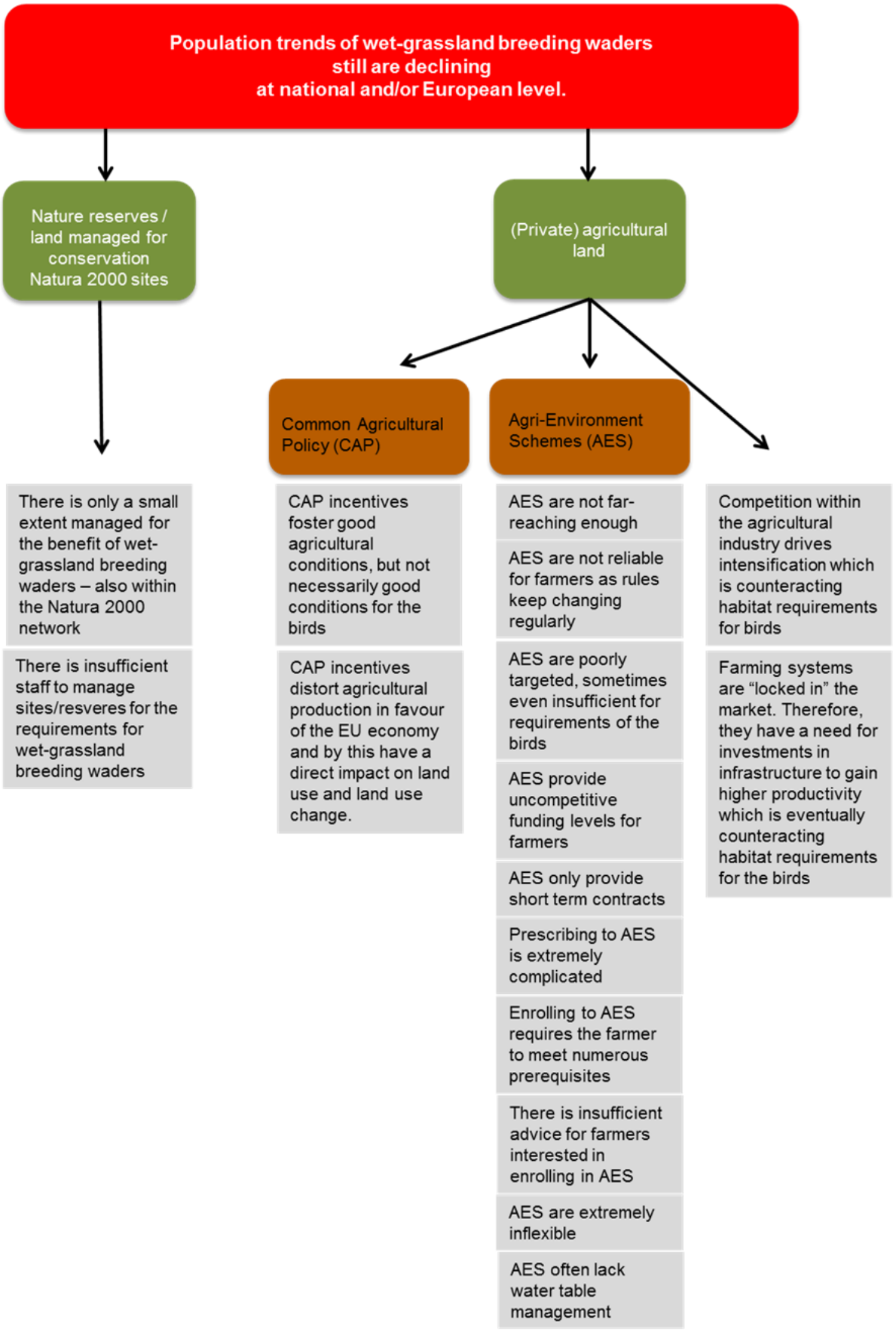
Supporting the farm businesses that deliver these beneficial management practices (and are likely to be providing a wider range of ecosystem services such as flood alleviation and carbon storage) requires sufficient financial support/ compensation and good quality advice. The scale of support and incentives needs to be greatly increased in order to stabilise wader population declines. This primarily requires changes to the CAP that allow for a greater proportion of funding within RDPs, as well as consideration to how Pillar 1 policies could help deliver for wader conservation.

Away from farmland, even on some nature reserves and on land designated for nature conservation (e.g. Natura 2000 sites) important wader populations have declined. The result is that nature reserves and protected sites are not yet playing the full role they could in delivering conservation for waders at local, national and European population levels. Key reasons for this are: (a) **insufficient number and extent of protected sites that include important breeding populations of waders as qualifying features within the existing Special Protection Areas (SPA) network** (partially because only 2 of the 8 MSAP species are listed on Annex 1 of the Birds Directive) however protected sites for the other 6 species can be made under Article 4.2, and (b) very often, **sufficient staff resource is lacking to manage these areas appropriately** for waders.

What is urgently needed is a **large and coherent network of wet grassland landscapes** that are being sympathetically-managed for waders. This approach is required in order to provide suitable breeding habitat and management conditions on the necessary scale. Waders are not confined to nature reserves - large proportions of certain national populations occur on private farmland – so this coherent network must encompass nature reserves, designated sites and private farmland. To deliver the latter will require a considerable restructuring of the CAP, since twenty years of AES has been shown to be insufficient[41,71]. Another mechanism that deserves further exploration is the possibility of a market-led approach, whereby a premium is added to the price of farm produce that is produced on farmland meeting the breeding requirements for waders.

Wet grassland breeding waders - ‘problem tree’

This problem tree has been identified during the expert workshop and represents a graphical summary of the previous chapter.



Wet grassland breeding waders' dreamland – an interplay of nature reserves and sympathetically managed surrounding farmland

There is an urgent need to scale-up conservation efforts in order to protect wet grassland breeding waders[111]. A very promising approach is to create and manage large and coherent network of wet grassland landscapes where nature reserves (Natura 2000 sites) are surrounded by sympathetic-managed farmland (through agri-environment initiatives).

Nature reserves (blue areas) are the best option for optimizing conservation management for wet grassland breeding waders.

Sympathetic management of farmland around and between reserves through agri-environment initiatives (green areas) can play an important role in delivering conservation at a landscape scale.

This could create a diverse array of wildlife, including prey for avian and mammal predators, and landscapes where these predators will be less reliant on waders during the breeding season. This may lead to lower nest and chick predation rates, which in turn could allow wader numbers and nest densities to increase to a point where nest defence reduces predation rates even more and over larger areas and populations become sustainable.

The graphic represents a hypothetical landscape with breeding lapwing as an example of the MSAP species, voles as prey for predators and fox, marsh harrier, stoat and kestrel as examples of avian and mammal predators.

The way to wet grassland breeding waders' dreamland

Protecting wet grassland breeding wader populations on a national and a European scale is a major task. It requires sophisticated management measures being delivered across a **large and coherent network** of wet grassland landscapes that support important breeding populations.

The most promising approach involves the combination and interaction of (1) **nature reserves,** with optimal management conditions in place for waders and (2) **private farmland**, located around and between nature reserves, where famers are delivering sympathetic management for waders with the support of agri-environment schemes (AES).

In the future, other issues affecting the species could be addressed through identifying synergies with other components of the **Common Agricultural Policy (CAP);** for example, wider financial support schemes that encourage the continuation of wildlife-friendly farming practices in economically fragile areas susceptible to land abandonment.

To really benefit waders **agri-environment schemes** need to include water level management. A good example of how water tables are being managed together with farmers is in a polder area of The Netherlands (see Annex 5: Best practice examples).

They also need to include measures to address the currently high levels of nest and chick predation. This may include lethal control of predators but also encompasses a variety of non-lethal means that are the subject of much current research; measures such as anti-predator fencing, manipulating the landscape to make it less 'predator-friendly' and managing landscapes so important breeding sites do not become ecologically isolated and become 'honeypots' for predators (these issues are discussed in Annex 4). A good example of forming partnerships to manage predation for conservation outputs can be found in Öland, Sweden (see Annex 5).

Many important breeding sites are on islands. Here, the number of mammalian predator species is far lower than on mainland sites – or absent altogether. Such conditions can give rise to some of the highest densities of breeding waders. It is imperative that the predator-free status of these island sites is maintained.

Lastly, AES require measures that create and maintain good habitat conditions as well as directly protecting nests and chicks from agricultural activities (see the case study from Schleswig-Holstein in Annex 5).

Underpinning all of these case studies, are productive partnerships of nature conservation NGOs, farmers, local government, and local communities.

Agri-environment schemes also need to be geographically targeted, and, for farmers, both reliable, financially attractive, easy-to-understand and apply for. This can be a challenge. An example from Scotland highlights the importance of collaborations between various governmental and non-governmental partners to ensure that AES funding is targeted (Annex 5. Best practice examples), while an example from Schleswig-Holstein explains how non-governmental organisations produce and implement management plans for Natura2000 sites and promote and support the implementation of AES (Annex 5. Best practice examples).

To provide incentives for farmers to produce 'bird friendly' products, **partnerships amongst various stakeholders** are needed. An example from The Netherlands introduces a project that created and launched biodiversity-labelled dairy products produced in a bird-friendly way (Annex 5. Best practice examples). **Environmental education** and recognizing the **cultural heritage** of wet grassland breeding waders will help to strengthen people's awareness so consumers are better informed.

Of continuing importance will be **nature reserves** at **Natura2000 sites** being managed for the benefit of wet grassland breeding waders. Management conditions for these species is complex, and different species have subtly-differing habitat and management requirements (Annex 3. Species' Management Requirements). Nature reserves provide the opportunity to deliver highly-target management, but many reserves also need increased capacity and resources to deliver.

They are legally protected by the **EU Birds and Habitat Directives** from inappropriate development. Providing that there is an **adequate number and extent Natura 2000 sites**, and providing that there is **enough funding and sufficient staff resource to manage a reserve**, nature reserves still provide the

most reliable option for optimizing conservation management for wet grassland breeding waders, and certain nature reserves still host the most stable populations.

There are many more **success partnerships** from across Europe, but we need a much larger network of similar projects to help **halt population declines** and **support the recovery of wet grassland ecosystems and the special wildlife they support.**

Annex 3. SPECIES' MANAGEMENT REQUIREMENTS

		positive effect	no positive effect	none / contradictory effect	no data

habitat feature	biological function	Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
water table[e.g.115,112] wet meadows with a high water table and wet features in the meadow that dry out only late in the season	· attracts adult breeders by providing food for chicks later in the season · reduces vegetation growth and prolongs breeding time window available · wet soils stay cold in spring, important for good timing of insect abundance in the chick-period · lengthens breeding period time window.	open water until late May / early June (in areas with later season even later)			water table -10 - +15cm[57,134] water-logged or moist soil until mid-June[48,84]	positively associated with vegetation associated with wet features	also breed in coastal salt-marshes and on roof tops	also breed on arable field and urban fallow	open water until late May / early June (in areas with later season even later)
raise water table in breeding season[61]	mineral soil								
	organic soil								
open shallow ponds[61]	mineral soil								
	organic soil								
flood irrigation in winter[61]	mineral soil								
	organic soil								

habitat feature	biological function	Baltic Dunlin	Black-tailed God-wit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oyster-catcher	Northern Lapwing	Ruff
surface structure well developed structures with pools and gullies which gradually dry out from late May and June onwards providing a diversity in moisture under various weather conditions artificial depressions, ponds and footdrains can be filled up using solar driven water pumps	· increasing availability of invertebrate prey for adults and chicks · complex habitat structure reduces predation probability		earth-worms are easy to catch in wet soils form main prey for adults to · recover from migration · produce eggs		water depth less than 15cm due to short legs				

habitat feature	biological function	Baltic Dunlin	Black-tailed God-wit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oyster-catcher	Northern Lapwing	Ruff
vegetation at nest	· to avoid predation species either prefer low or high vegetation for open view and cover, respectively	prefers vegetation height of 5-15cm in an open landscape	prefers meadows used for haymaking with a long sward to be less visible for predators	are tolerant but prefer vegetation height of 5-15cm in an open landscape	very cryptic, nests usually hidden in grass, sedges, dwarf shrubs[23]	Cryptic nests in a variety of vegetation types and habitats, but often in relatively tall vegetation typically found in heather moorland, silage fields, rough and wet pastures	Sparse, short vegetation associated with well-grazed or disturbed ground	open ground, vegetation sparse with heights <10cm, better <5cm; good conditions can be achieved by autumn mowing, winter grazing, or soil disturbance on arable fields	Prefers vegetation height of 10-15 cm at time of egg-laying

habitat feature	biological function	Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
chick rearing habitat wet features such as wet mud, foot drains, shallow ponds, ditches with flat, shallow slopes for prey availability small-scale patchiness of open wet features and high vegetation (up to ~50cm) to cover from predators	• there is a specific demand to compromise between good camouflage and food availability • broods require adequately available insect prey for chicks as well as appropriate prey for adults in the near vicinity of the nest location • too dense vegetation can reduce chick survival	chicks are reared in open vegetation of 2-10cm height	chicks catch mostly insect prey from the vegetation	chicks are reared in open vegetation of 2-20cm height		Takes chicks to wet features such as bogs, flushes, species-rich wetlands, etc	Unlike other waders oystercatchers feed their chicks, predominately on worms	adult lapwings avoid fields with (too) high vegetation chicks catch insect prey at the interface of wet mud, water and vegetation	chicks are reared in open vegetation of 10-20cm height

habitat feature	biological function	Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
agricultural practice / **type of meadow I** low productive meadows provide slow growing vegetation necessary for a sufficiently long breeding season low vegetation and a high degree of openness required for anti-predator measures diverse structures of different vegetation heights and wet features are important for chick rearing late mowing and low density stock grazing important for successful breeding fertilization only moderately and outside the breeding season	• needs to offer diverse structures to compromise between good cover against predators and food for both adults and chicks	confined to wet meadows with an open and slow growing vegetation fertilization destroys breeding habitat	prefer low productive wet meadows on peat and clay soils accepts moderate fertilization, but only outside the breeding season and not in spring	prefers open meadows with slow growing vegetation accepts moderate fertilization	needs structurally diverse and patchy vegetation (small-scale mosaic of low/high and open/dense)[47,51,55,57,58,82]	Needs structurally diversity – needs longer vegetation to nest in, adults feed on improved pastures, and take chicks to wet habitats		make use of both low and high productive wet meadows, yet high productivity meadows become unattractive when vegetation becomes too high and dense in the course of the season	confined to wet meadows with an open and slow growing vegetation fertilization destroys breeding habitat

habitat feature		Baltic Dunlin	Black-tailed God-wit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oyster-catcher	Northern Lapwing	Ruff
agricultural practice / type of meadow II									
stop fertilization[61]	mineral soil								
	organic soil								
reduce fertilization61	mineral soil								
	organic soil								
keep fertilization as is[61]	mineral soil								
	organic soil								
reduce livestock density[61]	mineral soil								
	organic soil								
keep livestock density as is[61]	mineral soil								
	organic soil								
grazing period starts late[61]	mineral soil								
	organic soil								
grazing period starts early[61]	mineral soil								
	organic soil								
late[1] mowing[61]	mineral soil								
	organic soil								
early mowing[61]	mineral soil								
	organic soil								

[1] for Baltic Dunlin and Ruff, late mowing is mowing in late July/August; it provides favourable vegetation structures for chick rearing

habitat feature	biological function	Baltic Dunlin	Black-tailed God-wit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oyster-catcher	Northern Lapwing	Ruff
salt (marshes) (coastal) saltmarshes provide important breeding habitat for Baltic Dunlin, Common Redshank and Eurasian Oystercatcher salinity influences invertebrate and vegetation communities which is beneficial to some but detrimental to other wet meadow species especially islands with missing ground predator (mammals) populations can provide safe refuge for ground nesting birds flooding due to spring and storm tides poses a major threat to breeding success		breeds in salt, brackish as well as freshwater meadows	is mainly found in freshwater wet meadows	breeds in (coastal) saltmarshes, brackish and freshwater meadows eggs can survive temporary flooding	saltmarshes are of very low and local importance	Breeds in saltmarshes but other habitats are more important	mainly breeds in coastal saltmarshes suffers more and more from flooding	mainly found in freshwater habitats	avoids breeding in meadows where salinity of wet features is >5ppm has poorly developed salt glands

habitat feature	biological function	Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
anti-predation strategies by the birds require supporting habitat features to either camouflage or attracting other, more aggressive and/or colony breeding species with an effective and aggressive anti-predator strategy most MSAP species avoid woodland and habitats with shrubs and hedges as habitats for potential predators	· strongly aggressive species such as e.g. Northern Lapwings fight predation on eggs and chicks by attacking and stressing areal and mammalian predators · co-nesting with more aggressive species is beneficial for other, more timid and cryptic species[35]	reproduces much better near strongly aggressive species such as breeding Northern Lapwing	when breeding in high densities with other species, such as Northern Lapwing, Common Redshank, Eurasian Oystercatcher, pursuing and attacking predators is more effective	nests are often found close to Northern Lapwings and do much better then[13,76,77]	profit from anti-predator behaviour of more aggressive species such as Northern Lapwing[35]	mostly breeds in solitary territorial pairs. Occassionally, small colonies are formed.	Pair members defend nesting and feeding territories	prefers to breed in colonies when habitat suitable to be more effective in chasing away predators reproductive success better in larger colonies, in arable fields though, lower densities attract less predators	reproduces much better near strongly aggressive species such as breeding Northern Lapwing

habitat feature	biological function	Baltic Dunlin	Black-tailed Godwit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oystercatcher	Northern Lapwing	Ruff
managing ground (mammalian) predators larger suitable sites attract more breeding birds and reduce risk of predation for single individual/clutch habitat fragmentation reduces suitable breeding habitat and provides suitable habitat for predators, edge habitats incur a higher risk of predation[126] to control predator populations make habitat unattractive for predators manage (edge) vegetation structure to alter impact of predators[75-77] using electric fencing has proven to increase hatching success[64,80,117], but predators might be able to find ways around after some years using all legal possibilities to control predator populations	· increasing reproduction rate as wet grassland ground nesting species are very vulnerable to predation of eggs and chicks · potential breeders might defer from breeding in a habitat when predation risk is too high								

habitat feature	biological function	Baltic Dunlin	Black-tailed God-wit	Common Redshank	Common Snipe	Eurasian Curlew	Eurasian Oyster-catcher	Northern Lapwing	Ruff
managing avian predators larger suitable sites attract more breeding birds and reduce risk of predation for single individual/clutch habitat fragmentation reduces suitable breeding habitat and provides suitable habitat for predators to control predator populations make habitat unattractive for predators (e.g. no trees and tall shrubs) avoid conservation measures for birds (e.g. Peregrine nest boxes) near habitats managed for wet grassland breeding waders	· avian predators pose a threat to both chicks and adults · potential breeders might defer from breeding in a habitat when predation risk is too high								

Annex 4. PREDATION MANAGEMENT GUIDELINES

Predation management

High rates of predation of eggs and chicks has been identified as one of the major threats affecting wader populations[4,44,60,61,78,100,121].

Changes in landscape structures due to the intensification in farming as well as an increase in year-round food availability for predators provides excellent conditions for predator populations to thrive. In addition, predator control has been reduced, diseases like rabies and mange have been eradicated, and successful conservation programmes for previously vulnerable raptor populations (e.g. peregrine falcons, red kites) - have all contributed to an increase in predator populations. In addition, some non-native predators have been introduced (e.g. racoons, mink, racoon dogs), and are increasing in number and range.

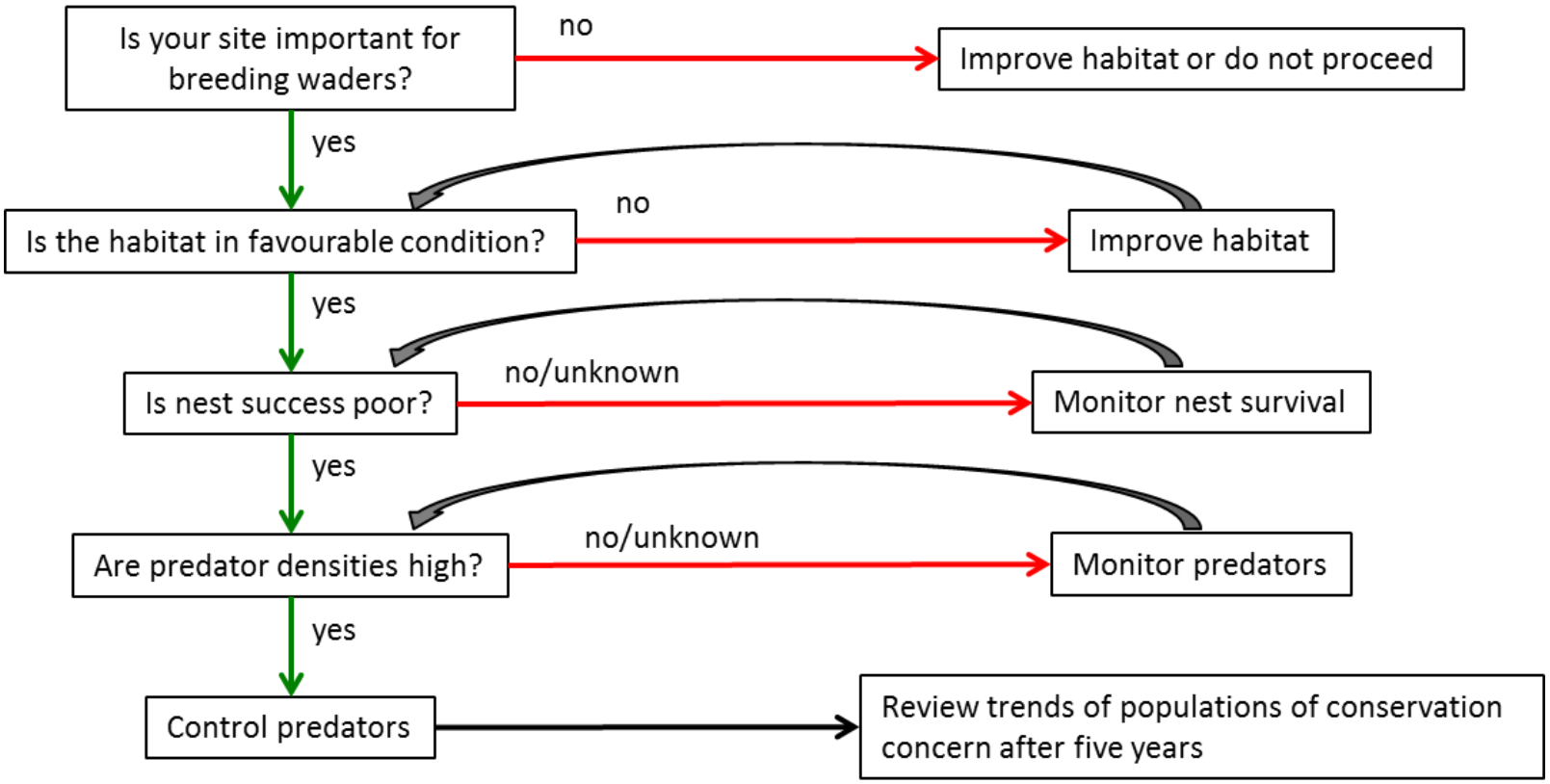
Managing predation in wet grassland landscapes is challenging, complex and multi-layered[4,111]. There is an ethical, but also an ecological concern to ensure that, if predation management is needed, the reasons are justifiable. Article 9 of the Birds Directive applies to predator control and provides general guidelines for avian predators. Following these rules is also suitable when dealing with non-avian predators to take reasonable precautions[52]:

- There must be good evidence that the level of predation is high enough to have a serious, negative effect on the conservation of the species being preyed on.
- There must be no alternative non-lethal solutions available to resolve the predation problem.
- There must be a reasonable prospect that the method of predator control will achieve the conservation objective.
- There should be no adverse effect on the conservation status of both targeted and non-targeted species.

Management to reduce predation for populations of conservation concern should first focus on **habitat improvement**. Bringing habitat conditions into a favourable state will not only reduce predation risk but birds will at the same time also benefit from better foraging conditions and hence better breeding conditions in general. As a second step, **non-lethal methods** such as e.g. fencing nests or fields might be considered to improve hatching and fledging conditions. If necessary though, site managers should be prepared to apply lethal predator control methods. Most importantly, **monitoring programmes** on both predator and bird populations of concern should be in place to react flexibly to changes in predator-prey relationships at the managed site. Awareness campaigns and education are necessary to gain acceptance and understanding within the public.

Decision tree for evaluating predator control for wet grassland breeding waders

This graph has been modified according to Bolton et al. 2007[19]



Annex 5. BEST PRACTICE EXAMPLES

Implementing agri-environmental schemes for meadow birds

Local Alliances in Schleswig-Holstein, Germany - regional networks advice and support farmers enrolling in agri-environment schemes

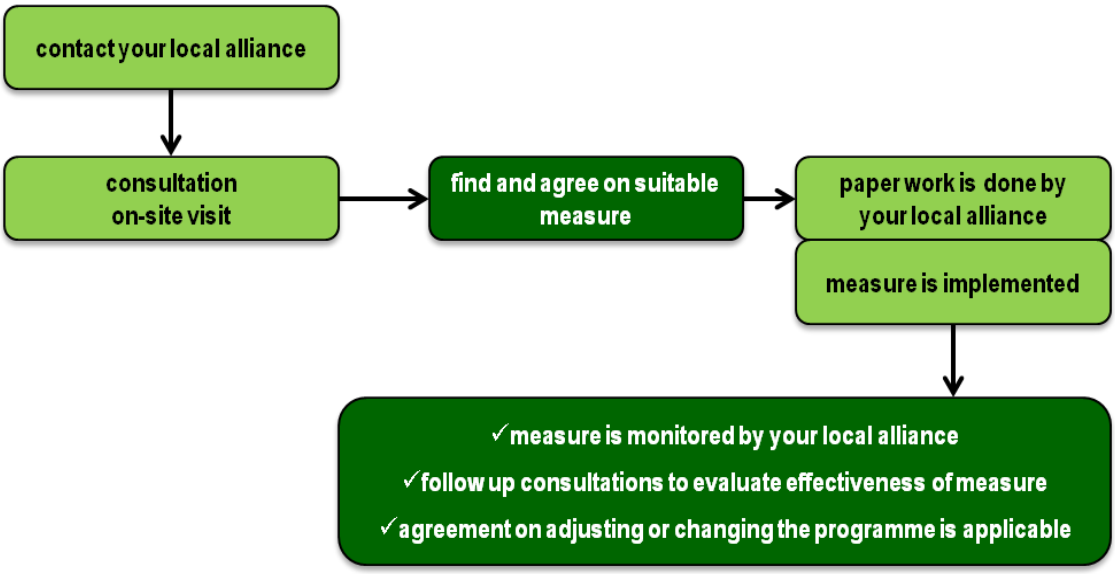
The federal state of Schleswig-Holstein hosts significant numbers of wet grassland breeding waders populations and hence, has a responsibility for managing their breeding habitats accordingly. To meet these obligations, the federal state government has supported so-called *local alliances* (https://schleswig-holstein.lpv.de/lokale-aktionen.html) to produce and implement management plans and to promote and support the implementation of agri-environment schemes, not only but also in Natura 2000 sites.

One such local alliance is *Kulturlandschaft nachhaltig organisieren - Kuno e.V.* (https://kuno.jimdo.com/). Kuno e.V. is active in the Eider-Treene-Sorge-Niederung in the centre of Schleswig-Holstein.

The *Eider-Treene-Sorge Niederung* holds approx. 500 km² of lowland wet grassland area of which approx. 150 km² is protected under the Natura 2000 network. The lowlands are characterized by semi-natural (agriculturally cultivated) wet grassland, and bog and fen habitats, with a high importance for breeding wet grassland waders. For about 64 km² of the Natura 2000 area (coloured areas in map) Kuno e.V. has produced management plans.

The other key field of Kuno e.V.'s activity is to promote agri-environment schemes and support their implementation. Farmers interested in enrolling into the various programmes can contact Kuno e.V. to get advice and support. The working procedure is simple and straightforward:

In Schleswig-Holstein, for meadows and pastures the majority of schemes on offer require farmers to commit themselves for five years, a few schemes run 2 years, some 30 years or permanent. Permanent schemes e.g. include the restoration or construction of ditches and footdrains to improve the water table on single fields, or the acquisition of land for to be entirely managed for conservation by a federal state-owned trust. Most five-year key agri-environment



schemes supporting wet grassland breeding waders aim for low productive meadows and pastures by i.a. demanding high water tables, restricting fertilization, limiting stocking rate and delaying mowing until 20 June. A special scheme adapted to the local conditions allows farmers to scale restrictions due to their agricultural practice. The scheme works with three levels: green, yellow and red with stricter restrictions from green to red. For example, a farmer has both fields that are cultivated intensively and low reproductive fields, then intensively cultivated fields can be enrolled as 'green fields' while low productive fields can become 'red fields'. Monetary compensation is scaled according to the level of restrictions, and a farmer has to enroll 90% of his total area and 10% into the red category to be eligible for this scheme.

Contract periods very often are evaluated with contradictory outcomes: some farmers prefer long-term contracts, but for others even five year-contracts are not flexible enough. It is mostly 'new' farmers that have not had prior experiences with enrolling into agri-environment schemes. In the Eider-Treene-Sorge Niederung, these farmers can gain experience by enrolling in seasonal contracts. The scheme is called 'joint protection of meadowbirds' and will be introduced in Annex 4.

The work of Kuno e.V. - and others - is financed by the European Commission and the federal government of Schleswig-Holstein within the framework of the national Rural Development Plans. Hence, consultation on agri-environment schemes for those interested in enrolling into a scheme. Eligible are farmers cultivating both their own and on leased land.

NGO activities in conventional farmland

Cooperation between dairy co-operatives and conservation - an example from BirdLife in The Netherlands

by Gerrit Gerritsen, Vogelbescherming Nederland

After World War II the Dutch government started a huge project to improve the production of the cows of Dutch dairy farmers. Large scale national and EU-grants accelerated the process. Now 70 years later the national milk-production is that big that we just use 20% for national consumption. The other 80% is exported, mainly as cheese or (baby)milk powder.

This enormous economic success proved to have a lot of disadvantages for environment, landscape, biodiversity, number of farmers and animal-welfare. In just a few decades we lost almost all or Ruff, Skylarks and a great part of the population our national bird the Black-tailed Godwit. So silent spring is now also reality in The Netherlands, a former key-country for a superb meadow-bird-community. Drainage, early mowing and transforming bio-diverse grasslands into monocultures were the main factors.

In part of the country it is possible for farmers to join agri-environment schemes. These schemes help to slow down the decline of meadow birds in general and wet grassland breeding waders in particular but have to be improved concerning the time period of agreements and the quality of management. Also bureaucracy should be minimized and budgets should be (much) higher. Additionally, protecting Black-tailed Godwits just by public money, i.e. agri-environment schemes (AE-schemes) is an uncertain policy.

So in 2012 we started to talk with the dairy-industry to convince them that biodiversity should be a part of their sustainability programs. This debate is ongoing but we see some results. In 2014 we were able to launch a new cheese from an organic and biodiverse farm. On this farm 33% of the grasslands are just mown after June 15th when all chicks of Black-tailed Godwits (BTG) are able to fly. So on this farm the BTG-management is paid by AE-schemes and by the profits of the cheese. The farmer Henk Pelleboer also organizes BTG-safaris and thousands of people visits his farm yearly. There is a lot of interest for this cheese but we have just 60 selling-points in our country. So the next step should be the supermarket chains.

In 2016 we were successful to launch milk, yoghurt and cottage-cheese in cooperation with the dairy co-operation Noorderlandmelk. The brand "Weideweelde" is sold in most Jumbo-supermarkets, the second biggest supermarket in The Netherlands. The Weideweelde-milk comes from 12 non-organic, conventional farms in the north of the country. All farms have to write a nature-management-plan, helped by a coach paid by the dairy industry. At the start they manage at least 10% of their farm in a bird-friendly way and after three years it has to be 20%.

In 2017 we also signed an agreement with organic farmers with the brands "Zuiver-Zuivel" and "Weerribben-Zuivel".

We are sure more products will be developed and we see a growing interest in the dairy industry in the marketing power of biodiversity. All mentioned products are supported by our Birdlife-logo and we pay of lot of attention for the products in our printed magazine(s) and social media.

A flexible nest and wader family protection scheme in conventional farming practice - an example from Schleswig-Holstein, Germany

'Joint protection of meadowbirds' - a species protection programme for wet grassland breeding waders in the Eider-Treene-Sorge Niederung

Aim

Protecting nests and broods of wet grassland breeding waders in cooperation with farmers. If needed, rare ground-nesting species such as Short-eared Owl, Montagu's Harrier or Corncrake can be included into the programme.

How does it work?

- Early nests from end of March onwards can be impacted by agricultural practices such as rolling and fertilizing. Very often, the nest can be saved by excluding the nesting area from processing. Nests are usually marked by volunteers (see below).
- When there are nests of broods on a given field during the mowing period then mowing can be delayed until the family has left the field. Alternatively, fields are mown partially and nesting or chick rearing sites are excluded. Yet, a minimum 'left-over' area of 0.25 ha is required to avoid attracting predators. Farmers are paid per ha area not mown and 'left-over', respectively.
- Nests on pastures with live stock should be protected by fencing the nests, preferably with electric fences. Another possibility is to delay stocking the pastures until the brood has hatched. The minimal area fenced off should be 20x20 m.

Duration of contract

Farmers who enrol into the joint meadowbird protection programme only do so for the season. They can take up agricultural practice as usual as soon as the brood has left the specific field. Arrangement between farmers and volunteer nature wardens are based on oral agreements only.

Volunteer nature wardens

In many areas, volunteer nature wardens, mostly local persons such as hunters or farmers themselves, are put into place to run the programme. Wardens are chosen because of the knowledge of the local area and their contact to the farmers. During their weekly checks, all nests found on pastures and meadows are registered and the respective farmers is contacted to ask whether he is willing to join the programme. If the answer is positive, arrangements are agreed on. As soon as the warden observes that a brood has left a given field, the farmer will be contacted and can then proceed to cultivate the field as usual.

Financing

This programme is run as a species protection programme and financed by the ministry for the environment by the federal state government of Schleswig-Holstein.

Significance of the programme

Because the agreements within the programme are flexible and straightforward and very short-term, it is highly attractive for farmers to enrol. In 2014, 416 nests and broods in an area of 293ha involving 92 farmers could be protected. Monitoring the breeding success of these nests have shown that this programme contributes to achieve a sustainable breeding success. Although being of different background, for many farmers, this programme provides a first contact with agri-environment schemes and helps lowering the threshold for longer-term engagements in meadow bird protection schemes.

The Clyde Valley Wader Initiative, UK

"*I never hear the loud, solitary whistle of the curlew in a summer noon... without feeling an elevation of soul*" – Robert Burns, Scotland's national bard, 1978.

This upland region of southern Scotland is a land of beef and sheep farms, forestry plantations and more recently, wind farms. Across the region there is a variety of agricultural and semi-natural habitats, including pastures, leys, wetlands, heather moorland and blanket bog. This 'mosaic' of habitats provides a home for curlew, lapwing, oystercatcher and snipe across much of the project area, whilst redshanks are found at a few sites with higher water tables. Some dunlin are also found, mostly on larger areas of intact or restored bog.

Partnership approach

Over 70 farms have been involved in the project since it was set up in 2008. Many are in agri-environment schemes and have taken up management options specifically aimed at protecting wader nests and chicks, and the habitats they need during the breeding season. Staff and volunteers from the RSPB undertake surveys to build a picture of where the most important areas are for waders, and whether the population is decreasing, stable or increasing at different sites.

Staff and volunteers from RSPB, the Scottish Agricultural College and the local Scottish Government agricultural department are working together to ensure agri-environment funding is targeted to the farming areas known to support waders in high numbers. The main management options that farms and estates are undertaking include:

- ✓ During the nesting period, less livestock are put out onto fields that attract nesting birds in high numbers. This reduces the number of eggs that get accidentally trampled by cattle and sheep.
- ✓ The creation and maintenance of shallow pools within grasslands. These 'wader scrapes' create wet, muddy feeding areas for adult waders and their chicks.
- ✓ The cutting and grazing of fields to ensure there is a variety of vegetation heights for the different species' nesting requirements.
- ✓ Minimising the creation of any new woodland or hedgerows at key sites for waders. This reduces the likelihood of the main predators of wader nests and chicks, such as foxes and crows, to be attracted to the area to breed. In addition, some farms and estates undertake legal predator control as part of their wider land management practices.

Local community involvement

Local volunteer birdwatchers carry out most of the breeding wader surveys. This provides a chance for them to use their ornithological skills to help conserve threatened species, meet local farmers and gain a better understanding of farming practices. Donald McGarrie has been volunteering with the project for several years, and said: "Early starts are sometimes a challenge, but this is more that made up for by the special feel that only comes from being outside in remote areas in the early morning.

I enjoy working as part of a team and surveying in areas of the country that I would never visit otherwise. There is always something of interest to see and hear.

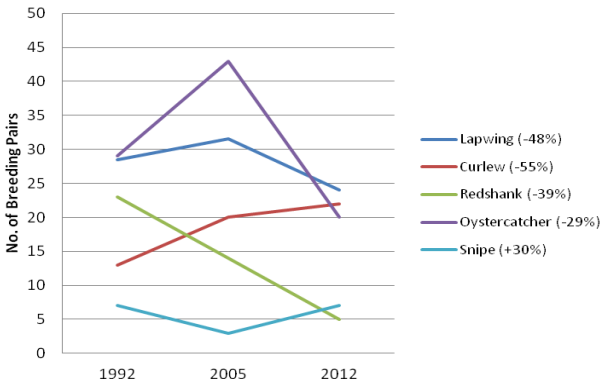
I feel that making a contribution to conservation is important, however small that may be. Being responsible for only a small part of the jigsaw puzzle means it is difficult to draw any definite conclusions from the individual surveys, however, my experience over the years tells me that there are noticeable changes in the environment and in people's attitudes towards it."

Farmer's perspective

Doug Telfer's 320 ha sheep farm is in the project. RSPB volunteers surveying his farm have picked up an impressive 62 pairs of breeding curlew, lapwing, snipe, redshank and oystercatcher across the farm. Doug attributes these high numbers to various factors. These include providing wet areas scattered across the farm (when draining he takes care to always leave some wetter areas), taking care to avoid nests during farming operations, as well as the fox and crow control by the local gamekeeper.

Doug says: "I remember years ago when my son was leaving for London, we were packing his bags into the car as a whaup (local name for curlew) flew over singing and I said "enjoy that – cause you won't be

hearing it for a while!". It's a real joy having so many whaups, pewits (local name for lapwing) and other birds at Glendouran. Glendouran is 40 miles from Edinburgh and 40 miles from Glasgow – but three miles from the moon! We're that high up and so winters can be harsh - so when the whaups return ever year, as they have done in recent weeks, it's great be-cause you know spring is just round the corner." Read more at http://www.rspb.org.uk/community/ourwork/b/scotland/archive/2017/04/27/saving-the-curlew-in-scotland.aspx#fWv5yur44gchTRjw.99



The surveys track population trends at a network of monitored farms within the project area. Above are the figures for a cluster of 3 farms that are subject to long-term monitoring. Curlew have increased as agricultural activity has declined and efforts are being made to increase grazing on certain fields. The figures in brackets relate to the national population trend at the time of graph production and are intended for comparison purposes.

Cultural heritage

Up until recently, these birds were previously very common across much of Scotland – the prevailing wet climate and historic land management practices created ideal conditions for them. As such, they were well recognised by those working and living in the countryside, and several poets, writers and artists found inspiration from them. Of the curlew, Scotland's national poet Rabbie Burns, himself a keen naturalist, wrote "*I never hear the loud, solitary whistle of the curlew in a summer noon... without feeling an elevation of soul*".

What's in a name?

In local dialects, names for these birds offer a different perspective of how our ancestors viewed these birds, with many names linking the birds to their habitats or the sound of their songs or calls. Wonderful examples include whaup, whitterick and tilliwhillie (curlew); peesie, teuchit (lapwing); heather-bleater, moss-bluter or air-goat (snipe); watery-pleeps (redshank); mussel-pecker, sea-pie or trillichan (oyster-catcher); and pickerel, ebb-sleeper or sea-mouse (dunlin).

Further information

For further information on this project daniel.brown@rspb.org.uk or visit

Website: https://www.rspb.org.uk/our-work/conservation/conservation-projects/details/311967-clyde-valley-wader-initiative

Natuurmonumenten and farmers in the Dutch Eempolder

by Gerrit Gerritsen, Vogelbescherming Nederland
and Jan Roodhart, manager Eemland-reserve

In The Netherlands just 2% of the 1 million ha of grassland is nature reserve for breeding waders. Most of these reserves were the result of a "fight for decades" between farmers and conservationists as part of land consolidation processes. When this process was finished, the reserve-manager still depended on the same farmers for grazing and mowing the fields after the breeding season. You can imagine that this cooperation is a challenge. So we have several good examples of bad cooperation. But also some fine examples.

The reserve "Eemland" was formed during the 1980s and is situated in an open polder landscape of 7000 hectares. The total surface is 500 hectares with a coherent core area of 330 ha. Until 2001 farmers' management resulted in nutrient-rich meadows with low biodiversity and just a few pairs of Black-tailed Godwits were left. From 2001 a new period started when Natuurmonumenten (a Dutch nature conservation NGO) became the owner and manager of the reserve. The water table was adjusted to the needs of the breeding waders and the openness of the landscape was restored. Several shallow waters (*plasdrassen* in Dutch) were created for waders to roost, sleep, preen and feed and the banks of ditches were lowered to 30 cm over a length of 158 km. Weirs and solar-pumps were installed to realize high water levels. Local hunters were successfully asked to reduce predation by Red Foxes.

All meadows were leased to almost 40 local farmers on a yearly base. Yearly leasing to so many farmers have some advantages for the reserve-manager:

- selecting the good farmers is possible to create optimal management;
- creating variety in vegetation due to the personal approach of each farmer.

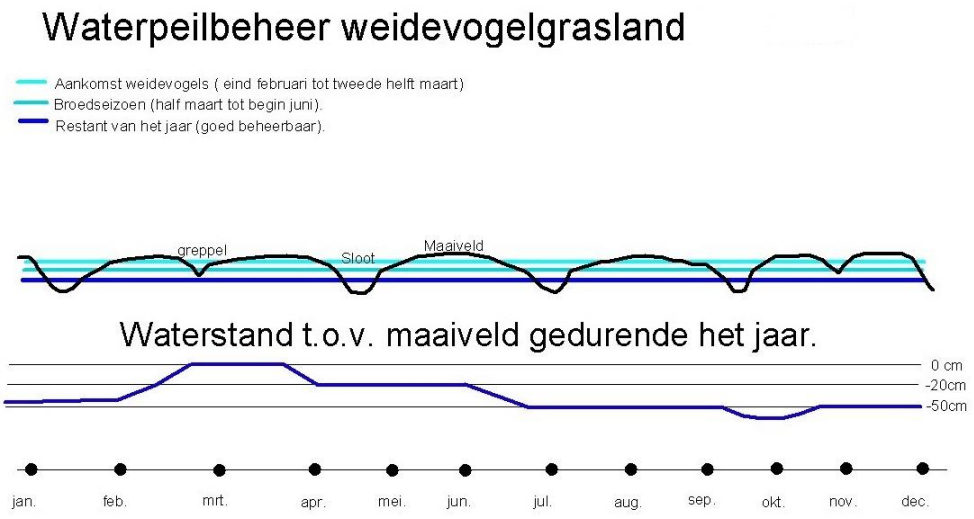


Figure: Water levels during the year in the Eemland reserve: During the arrival time (end february to second half of march, the water table is at surface level. During the breeding season, the water table is lowered to 20 cm below surface while during the rest of the year, the water table is lowered to 50cm below surface to guarantee good working conditions for agricultural machinery.

The grasslands are managed in the following way:

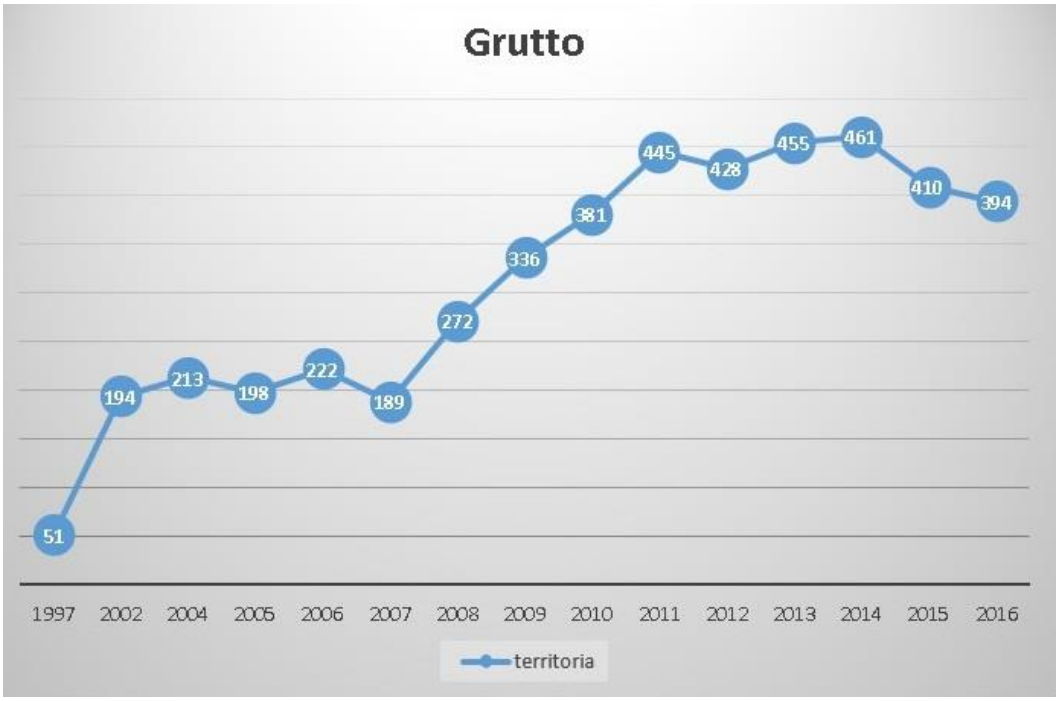
- 60% of the grasslands are mowed not earlier than 22nd June, in a late breeding-season mowing is further delayed;
- 40% of the grasslands are grazed with cattle in a low density (1.5 AUM[2]/ha) from 15th May until 15th June. After 15th June a higher grazing density is allowed, autumn grazing is important to realize a short sward, for that reason sheep-grazing is allowed in December;
- circa 50% of all grasslands are yearly fertilized with manure, all farmers use manure from their own farm to prevent spreading animal-diseases;
- in the breeding season water levels are 20 cm below surface and further lowered to 50 cm during June for mowing.

An important condition for leasing reserve-grasslands is that the farmers implement a certain amount of wader-friendly management on their own farmland. This is judged by the board of the cooperation of reserve- and farmland managers.

SOVON (Dutch NGO for field ornithology) maps all territories yearly and also the number of alarming Black-tailed Godwits are counted, to monitor the breeding success. After improving the management the population of Black-tailed-Godwit increased from 115 pairs in 2002 to 434 pairs in 2017. The amount of alarming Black-tailed Godwits was 78% on average in the period 2009-2017, indicating sufficient breeding-success.

Figure 2: Number of territories of Black-tailed Godwits in the nature-reserve Eempolders (330 ha) in the period 1997-2016, in 2017 there were 434 pairs

The main keys to this success are the good cooperation between the reserve-manager (former local farmer) and his 40 (former) colleagues and the consistent and high- quality management.



[2]animal unit equivalent

Predator removal on Öland, Sweden: a co-operation between hunters, conservationists and a county government

by Richard Ottvall, SOF BirdLife Sweden

The island of Öland in the Baltic Sea holds important areas of coastal grazed pastures where grassland waders breed in good numbers. A major part of the Swedish breeding population of Baltic Dunlin and Black-tailed Godwit occurs on the island. This agricultural landscape is also a UNESCO World Heritage Site with a mixture of arable land, villages and alvar plains. It is mainly a limestone plateau where remains of human settlements have been traced back to prehistoric times.

It is a living agrarian landscape where farmers are crucial for preserving cultural and biodiversity values. The county government makes efforts together with farmers and NGOs as SOF-BirdLife Sweden to restore wetlands on the grazed pastures and thereby increase the amount of water available for breeding waders. Apart from a general lack of water on the island due to previous drainage actions, predation on eggs and chicks is a threat to waders. The predator community has increased in numbers due to reduced hunting efforts and increased amount of food resources. Therefore, the local hunters have initiated a voluntarily-based project aiming to decrease the numbers of general predators in an area of about 200 km^2. Conservationists and the county government are involved where breeding success and population trends of waders are monitored in parallel to the predator control. The hunting season has been extended in early spring for some of the predators. More than 100 hunters from the island have participated in mandatory courses within the project before they can take part in the extended hunting. To gain social acceptance of the action information has been delivered through organisations, seminars open to public and the local media. The hunters have removed about 1 000 avian and 400 mammal predators annually. The main predators are Red Fox, Badger, Pine Marten, Hooded Crow and Raven.

While it is difficult to evaluate the precise conservation effects of the hunting efforts as a fox disease erupted and spread on the island by the time the project started in 2007 it is clear that the breeding success of waders has increased in the area of predator removal. The population size of Black-tailed Godwit has increased with several years of good reproduction. The Baltic Dunlin has recently disappeared from almost all localities of southern Sweden but on Öland the population size has settled at a fairly stable level.

To this date, there is no possibility in Sweden to finance predator removal within agri-environment schemes, and most work is carried out voluntarily. This also holds true for the monitoring programme. The project itself is to some degree financed by the county government. The fact that the project is still going on after ten years shows that the grassland waders have an important value for the local community on Öland.

Annex 6. EUROPEAN BREEDING POPULATION SIZE AND TRENDS BY COUNTRY FOR ALL EIGHT SPECIES

For more explanation see below last table.

Table A 6.1. Breeding population size and trend by country/territory for Dunlin

source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Belarus	0	<1	2003-2012	medium	-	100	2001-2004	good	-	100	1980-2004	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Denmark	135	<1	2011	good	-	20-33	2000-2011	good	-	50-100	1980-2011	good	C. a. schinzii, Baltic/SW Europe & NW Africa
DK: Faroe Is	10-15	<1	2014	medium	?				?				C. a. schinzii, Iceland & Greenland/NW and West Africa
DK: Greenland	7,000-15,000	2	2000-2012	medium	?				?				C. a. arctica, NE Greenland/West Africa
Estonia	180-230	<1	2008-2012	good	-	20-50	2001-2012	good	-	50-70	1980-2012	good	C. a. schinzii, Baltic/SW Europe & NW Africa
Finland	5,000-10,000	1	2006-2010	medium	?				-	40-50	1980-2012	medium	C. a. alpina, NE Europe & NW Siberia/W Europe & NW Africa
Finland	55-60	<1	2010-2012	good	0	0	2001-2012	good	-	42	1980-2012	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Germany	7-16	<1	2005-2009	good	-	64-87	1998-2008	good	-	51-100	1985-2009	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Iceland	270,000	56	2000	poor	?				?				C. a. schinzii, Iceland & Greenland/NW and West Africa
Rep. Ireland	150	<1	2008	medium	-	27	1996-2008	poor	-	58-79	1972-2008	poor	C. a. schinzii, Britain & Ireland/SW Europe & NW Africa
Latvia	0-1	<1	2012	medium	?				-	90-100	1980-2012	good	C. a. schinzii, Baltic/SW Europe & NW Africa
Lithuania	5-10	<1	2008-2012	medium	-	60-80	2001-2012	medium	-	60-80	1980-2012	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Norway	25,000-35,000	6	2013	poor	?				?				C. a. alpina, NE Europe & NW Siberia/W Europe & NW Africa
NO: Svalbard	200-300	<1	2001-2013	poor	?				?				C. a. alpina, NE Europe & NW Siberia/W Europe & NW Africa
Poland	0-1	<1	2008-2012	good	-	95-100	2000-2012	good	-	100	1980-2012	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Russia	100,000-200,000	29	1995-2010	poor	-	5-30	2001-2012	poor	-	5-30	1980-2012	poor	C. a. alpina, NE Europe & NW Siberia/W Europe & NW Africa
Russia	10-25	<1	2001-2012	good	-	60-90	2000-2011	good	-	70-95	1980-2012	medium	C. a. schinzii, Baltic/SW Europe & NW Africa
Sweden	10,000-20,000	3	2008-2012	medium	0	0	2001-2012	medium	+	10-30	1980-2012	medium	C. a. alpina, NE Europe & NW Siberia/W Europe & NW Africa
Sweden	80-120	<1	2008-2012	good	-	35-65	2001-2012	good	-	50-80	1980-2012	good	C. a. schinzii, Baltic/SW Europe & NW Africa
United Kingdom	8,600-10,600	2	2005-2007	good	+	56	1998-2010	medium	0	0	1982-2006	medium	C. a. schinzii, Britain & Ireland/SW Europe & NW Africa
EU27	**24,200-41,300**	**6**			**Stable**								
Europe	**426,000-562,000**	**100**			**Unknown**								

Table A 6.2. Breeding population size and trend by country/territory for Black-tailed Godwit

source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Austria	90-140	<1	2008-2012	good	-	10-20	2001-2012	good	F	0	1980-2012	good	L. l. limosa, Western Europe/NW & West Africa
Belarus	6,000-8,500	6	2000-2012	medium	F	0-42	2000-2012	medium	F	0-42	1980-2012	medium	
Belgium	900-1,100	1	2008-2012	good	0	0	2000-2012	medium	+	80-175	1973-2012	medium	L. l. limosa, Western Europe/NW & West Africa
Czech Rep.	10-20	<1	2001-2003	good	?				-	66	1985-2003	good	L. l. limosa, Western Europe/NW & West Africa
Denmark	541-556	<1	2011	good	-	7	1999-2011	medium	+	25-50	1980-2011	medium	L. l. limosa, Western Europe/NW & West Africa
DK: Faroe Is	1-3	<1	2014	medium	?				?				
Estonia	400-700	<1	2008-2012	medium	-	20-50	2001-2012	medium	0	0-10	1980-2012	medium	L. l. limosa, Eastern Europe/Central & Eastern Africa
Finland	110-130	<1	2006-2008	good	+	85	2001-2008	good	+	445	1980-2008	good	L. l. limosa, Western Europe/NW & West Africa
France	110-180	<1	2009-2012	good	0	0	2003-2013	medium	+	100-160	1981-2011	good	L. l. limosa, Western Europe/NW & West Africa
Germany	3,900-4,400	3	2005-2009	good	-	31-100	1998-2009	medium	-	51-100	1985-2009	medium	L. l. limosa, Western Europe/NW & West Africa
Hungary	120-600	<1	2008-2012	medium	-	40-60	2000-2012	medium	-	50-88	1980-2012	poor	L. l. limosa, Eastern Europe/Central & Eastern Africa
Iceland	25,000	20	2000	poor	+	10-29	2000-	poor	+	30-50	1980-2006	poor	
Italy	15	<1	2008	good	+	200-650	1998-2009	good	+		1977-2009	good	L. l. limosa, Western Europe/NW & West Africa
Latvia	70-100	<1	2000-2004	medium	?				-	0-30	1980-2004	poor	L. l. limosa, Eastern Europe/Central & Eastern Africa
Lithuania	250-350	<1	2008-2012	medium	-	10-20	2001-2012	medium	0	0	1980-2012	medium	L. l. limosa, Eastern Europe/Central & Eastern Africa
Netherlands	35,219-59,766	37	2008-2011	medium	-	25-33	2003-2012	good	-	48-57	1984-2010	good	L. l. limosa, Western Europe/NW & West Africa
Norway	29-62	<1	2010	medium	-	0-25	2000-2013	good	?				
Poland	1,500-2,000	1	2008-2012	medium	-	65-70	2000-2012	medium	-	75	1980-2012	medium	L. l. limosa, Eastern Europe/Central & Eastern Africa
Romania	40-80	<1	2008-2013	medium	+	0-19	2000-2012	poor	+	0-19	1980-2012	poor	L. l. limosa, Eastern Europe/Central & Eastern Africa
Russia	15,000-30,000	17	2004-2010	medium	-	0-10	2000-2012	medium	-	0-10	1990-2012	medium	
Serbia	15-30	<1	2008-2012	medium	F	0	2000-2012	medium	F	0	1980-2012	medium	
Slovakia	0	<1	2012		-	50-100	2000-2012	medium	-	90-100	1980-2012	medium	L. l. limosa, Western Europe/NW & West Africa
Spain	0-10	<1	2000-2007	good	0	0	1998-2007	good	0	0	1980-2007	medium	L. l. limosa, Western Europe/NW & West Africa
Sweden	70-100	<1	2008-2012	good	-	45-75	2001-2012	good	-	70-90	1980-2012	good	L. l. limosa, Western Europe/NW & West Africa
Ukraine	13,000-15,000	11	2000	medium	F	30-80	1998-2010	medium	F	30-90	1980-2010	medium	
United Kingdom	54-57	<1	2006-2010	good	+	59	1996-2008	good	0	1	1981-2008	good	L. l. limosa, Western Europe/NW & West Africa
United Kingdom	7-9	<1	2006-2010	good	+	57	1996-2008	good	+	2540	1981-2008	good	L. l. islandica, Iceland/Western Europe
EU27	**43,400-70,300**	**45**			**Decreasing**								
Europe	**102,000-149,000**	**100**			**Decreasing**								

Table A 6.3. Breeding population size and trend by country/territory for Common Redshank

source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Albania	30-100	<1	2002-2012	medium	0	0	2002-2012	medium	-	10-20	1980-2012	poor	
Armenia	400-800	<1	2002-2012	medium	?				?				
Austria	190-260	<1	2008-2012	good	F	0	2001-2012	good	+	80-100	1980-2012	good	
Azerbaijan	500-5,000	<1	1996-2000	medium	?				?				
Belarus	40,000-70,000	13	2000-2012	medium	0	0	2000-2012	medium	0	0	1980-2012	medium	
Belgium	300-350	<1	2008-2012	medium	-	17-29	2000-2012	medium	+	43-84	1973-2012	medium	
Bosnia & HG	10-30	<1	2010-2014	poor	?				?				
Bulgaria	20-45	<1	2005-2012	medium	-	5-10	2000-2012	poor	-	10-15	1980-2012	poor	
Croatia	3-5	<1	2010	good	-	30-50	2004-2012	good	?				
Czech Rep.	25-40	<1	2001-2003	good	?				-	33-38	1985-2003	medium	
Denmark	9,000	2	2011	medium	-	20-33	1999-2011	good	-	50-100	1980-2011	good	
DK: Faroe Is	15	<1	2014	medium	?				?				
Estonia	3,000-6,000	1	2008-2012	medium	-	20-50	2001-2012	medium	-	20-50	1980-2012	medium	
Finland	4,500-6,000	1	2006-2010	medium	-	23-44	2001-2012	good	-	33-49	1980-2012	good	
France	1,500-1,800	<1	2010-2011	good	+	25-30	1996-2010	good	+	150-200	1983-2011	poor	
Georgia	Present	<1			?				?				
Germany	11,000-17,500	3	2005-2009	good	0	0	1998-2008	good	0	0	1985-2009	medium	
Greece	400-800	<1	2008-2012	poor	0	0	2001-2012	poor	0	0	1980-2012	poor	
Hungary	400-1,000	<1	2000-2012	medium	F	53	2000-2012	medium	?				
Iceland	140,000	35	2000	poor	+	0-10	2000-2009	poor	0	0	1980-2000	poor	
Rep. Ireland	500	<1	2008	medium	-	88	1991-2008	poor	-	88-89	1972-2008	poor	
Italy	1,100-1,200	<1	2004	medium	?				+	60-185	1983-2004	medium	
Kosovo	2-5	<1	2009-2014	good	?				?				
Latvia	204-520	<1	2000-2004	good	?				-	0-79	1994-2004	medium	
Lithuania	400-600	<1	2008-2012	medium	-	30-50	2001-2012	medium	-	30-50	1980-2012	medium	
FYRO Macedonia	0-10	<1	2001-2012	poor	?				?				
Montenegro	30-80	<1	2002-2012	good	0	0	2002-2012	good	?				
Netherlands	15,534-21,845	5	2008-2011	medium	-	20-28	2003-2012	good	-	5-24	1984-2010	good	
Norway	25,000-35,000	7	2013	poor	?				-	25-50	1980-2012	medium	
Poland	1,000-1,500	<1	2008-2012	medium	-	21-91	2000-2012	good	-	40-50	1980-2012	medium	
Portugal	1-50	<1	2008-2012	medium	?				?				
Romania	800-2,000	<1	2008-2012	medium	?				?				
Russia	25,000-70,000	11	2005-2010	medium	?				-	5-30	1980-2012	medium	
Serbia	150-210	<1	2008-2012	medium	-	1-9	2000-2012	medium	-	10-29	1980-2012	medium	
Slovakia	20-50	<1	2012	medium	-	10-30	2000-2012	medium	-	30-50	1980-2012	medium	
Slovenia	10-20	<1	2008-2012	medium	+	10-20	2001-2012	medium	?				
Spain	2,800-5,600	1	2007	good	F	0	1998-2009	medium	-		1980-2009	poor	
Sweden	16,000-28,000	6	2008-2012	medium	+	3-61	2001-2012	good	+	10-50	1980-2012	medium	
Turkey	1,000-10,000	1	2013	poor	-	20-29	2000-2012	poor	-	0-19	1990-2013	poor	
Ukraine	14,000-23,000	5	2000	medium	F	20-40	1998-2010	medium	F	20-70	1980-2010	medium	
United Kingdom	25,000	6	2009	good	-	35	1998-2010	good	-	73	1980-2010	medium	
EU27	**93,700-130,000**	**27**			**Decreasing**								
Europe	**340,000-484,000**	**100**			**Decreasing**								

Table A 6.4. Breeding population size and trend by country/territory for Common Snipe
source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Austria	60-90	<1	2008-2012	good	-	30-50	2001-2012	good	-	50-80	1980-2012	medium	
Belarus	70,000-90,000	2	2000-2012	medium	F	0-30	2000-2012	medium	F	0-30	1980-2012	medium	
Belgium	15-20	<1	2008-2012	good	-	35-52	2000-2012	medium	-	83-90	1973-2012	medium	
Bosnia & HG	20-50	<1	2010-2014	poor	?				?				
Croatia	11-17	<1	2010	poor	?				?				
Czech Rep.	500-800	<1	2012	medium	F	0	2000-2012	good	-	90-99	1982-2012	good	
Denmark	1,300	<1	2011	medium	-	33-50	1999-2011	good	-	33-50	1980-2011	good	
DK: Faroe Is	1,500-3,000	<1	2014	medium	?				?				
Estonia	40,000-60,000	1	2008-2012	medium	0	0-10	2001-2012	medium	0	0-10	1980-2012	medium	
Finland	92,000-180,000	4	2006-2012	good	-	22-46	2001-2012	good	-	9-33	1983-2012	good	
France	30-100	<1	2008-2012	medium	-	40-68	2000-2012	medium	-	75-85	1985-2013	medium	
Germany	5,500-8,500	<1	2005-2009	good	-	31-100	1998-2009	medium	-	51-100	1985-2009	medium	
Hungary	300-600	<1	2005-2012	medium	F	0	2000-2012	medium	F	0	1980-2012	poor	
Iceland	180,000	5	2000	poor	?				?				
Rep. Ireland	4,275	<1	2008	medium	-	50	1991-2008	medium	-	78	1972-2008	medium	
Latvia	38,329-72,808	1	2012	medium	0	0-30	2001-2012	medium	+	42-1017	1994-2010	poor	
Liechtenstein	0	<1	2009-2014	good	?				-	100	1980-2014	good	
Lithuania	10,000-20,000	<1	2008-2012	medium	0	0	2001-2012	medium	-	10-20	1980-2012	medium	
Netherlands	862-1,383	<1	2008-2011	medium	-	21-36	2002-2011	good	-	59-66	1989-2011	good	
Norway	30,000-70,000	1	2000-2013	poor	F	0	2006-2013	good	F	0	1980-2013	good	
Poland	33,000-71,000	1	2008-2012	good	+	17-121	2000-2012	good	+	120-180	1980-2012	medium	
Portugal	3-10	<1	2008-2012	good	-	50-70	2006-2012	good	-	90-98	1984-2012	medium	
PT: Azores	370-450	<1	2005-2012	medium	?				?				
Romania	30-50	<1	2008-2013	medium	?				0	0	1980-2012	poor	
Russia	2,000,000-4,000,000	77	2008-2012	medium	0	0	2001-2012	medium	-	5-30	1980-2012	poor	
Serbia	3-6	<1	2008-2012	medium	F	0	2000-2012	medium	F	0	1980-2012	medium	
Slovakia	30-100	<1	2012	medium	-	10-20	2000-2012	medium	-	40-60	1980-2012	medium	
Slovenia	10-20	<1	2004-2012	medium	F	0-100	2001-2012	medium	F	0-100	1980-2012	medium	
Spain	69-118	<1	2009	good	0	0	2001-2012	medium	-		1980-2012	medium	
Sweden	72,000-197,000	4	2008-2012	medium	-	8-26	2001-2012	good	-	31-52	1980-2012	good	
Switzerland	0-1	<1	2008-2012	medium	0	0	2001-2012	medium	-	11-100	1990-2012	medium	
Turkey	0-5	<1	2013	poor	-	0-89	2000-2012	good	0	0	1990-2013	poor	
Ukraine	13,000-15,000	<1	2000	medium	F	10-30	1998-2010	medium	F	20-60	1980-2010	medium	
United Kingdom	80,000	2	2009	medium	+	12	1998-2010	good	-	16	1970-2009	good	
EU27	**379,000-699,000**	**14**			**Decreasing**								
Europe	**2,670,000-5,060,000**	**100**			**Decreasing**								

Table A 6.5. Breeding population size and trend by country/territory for Eurasian Curlew
source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Austria	140-160	<1	2011-2012	good	+	10-20	2001-2012	good	+	70-200	1980-2012	good	N. a. arquata, Europe/Europe, North & West Africa
Belarus	950-1,200	<1	2000-2012	medium	F	0-26	2000-2012	medium	F	0-26	1980-2012	medium	
Belgium	500-600	<1	2008-2012	medium	0	0	2000-2012	medium	0	0	1973-2012	medium	N. a. arquata, Europe/Europe, North & West Africa
Czech Rep.	1-3	<1	2001-2003	good	?				-	80	1985-2003	good	N. a. arquata, Europe/Europe, North & West Africa
Denmark	330	<1	2011	medium	-	17	1999-2011	good	+	100-1000	1980-2011	good	N. a. arquata, Europe/Europe, North & West Africa
DK: Faroe Is	0-3	<1	1990	medium	?				?				
Estonia	2,000-4,000	1	2008-2012	medium	-	20-50	2001-2012	medium	-	50-70	1980-2012	medium	N. a. arquata, Europe/Europe, North & West Africa
Finland	76,000-88,000	33	2006-2012	good	0	0	2001-2012	good	-	1-22	1983-2012	good	N. a. arquata, Europe/Europe, North & West Africa
France	1,300-1,600	1	2010-2011	good	-	20-25	1996-2010	good	0	0	1983-2011	good	N. a. arquata, Europe/Europe, North & West Africa
Germany	3,700-5,000	2	2005-2009	good	0	0	1998-2009	medium	-	21-50	1985-2009	medium	N. a. arquata, Europe/Europe, North & West Africa
Hungary	20-60	<1	2008-2012	good	?				?				N. a. arquata, Europe/Europe, North & West Africa
Rep. Ireland	98	<1	2008-2013	medium	-	98	1991-2013	poor	-	98	1972-2013	poor	N. a. arquata, Europe/Europe, North & West Africa
Latvia	134-288	<1	2000-2004	medium	?				0	0	1980-2004	medium	N. a. arquata, Europe/Europe, North & West Africa
Lithuania	50-100	<1	2008-2012	medium	-	60-80	2001-2012	medium	-	60-80	1980-2012	medium	N. a. arquata, Europe/Europe, North & West Africa
Netherlands	4,643-5,949	2	2008-2011	medium	-	12-27	2002-2011	good	-	18-43	1984-2011	good	N. a. arquata, Europe/Europe, North & West Africa
Norway	2,500-5,000	1	2013	poor	-	50	1996-2013	good	-	50	1980-2013	medium	
Poland	250-350	<1	2008-2013	medium	-	50-60	2000-2013	medium	-	10-40	1980-2013	medium	N. a. arquata, Europe/Europe, North & West Africa
Romania	0-10	<1	2008-2013	medium	?				?				N. a. arquata, Europe/Europe, North & West Africa
Russia	45,000-100,000	27	2004-2010	medium	?				-	5-30	1980-2012	medium	
Serbia	0	<1	2008-2012	medium	?				?				
Slovakia	0	<1	2012		-	80-100	2000-2012	medium	-	80-100	1980-2012	poor	N. a. arquata, Europe/Europe, North & West Africa
Slovenia	12-15	<1	2007-2012	medium	0	0	2001-2012	medium	0	0	1980-2012	medium	N. a. arquata, Europe/Europe, North & West Africa
Spain	3	<1	2007-2008	good	0	0	1998-2009	good	0	0	1980-2009	good	N. a. arquata, Europe/Europe, North & West Africa
Sweden	6,800-11,000	4	2008-2012	medium	-	5-31	2001-2012	good	-	1-40	1980-2012	good	N. a. arquata, Europe/Europe, North & West Africa
Switzerland	0-1	<1	2006-2012	good	-	99-100	2001-2012	medium	-	99-100	1980-2012	medium	
Ukraine	50-100	<1	2000	medium	F	25-35	1998-2010	medium	F	25-50	1980-2010	medium	
United Kingdom	68,000	28	2009	good	-	38	1998-2010	good	-	59	1980-2010	good	N. a. arquata, Europe/Europe, North & West Africa
EU27	**164,000-186,000**	**70**			**Decreasing**								
Europe	**212,000-292,000**	**100**			**Decreasing**								

Table A 6.6. Breeding population size and trend by country/territory for Eurasian Oystercatcher
source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Albania	5-10	<1	2002-2012	medium	-	20-30	2002-2012	medium	-	30-50	1980-2012	poor	
Belarus	300	<1	2001-2012	medium	+	0-30	2001-2012	medium	+	33	1980-2012	medium	
Belgium	1,500-2,000	1	2008-2012	medium	0	0	2000-2012	medium	+	436-669	1973-2012	medium	
Bulgaria	30-67	<1	2005-2012	medium	?				?				
Denmark	7,000	2	2011	medium	-	20-33	1999-2011	good	-	20-33	1980-2011	good	
DK: Faroe Is	10,000	3	2014	medium	?				?				
Estonia	2,500-3,500	1	2008-2012	poor	-	20-50	2001-2012	poor	0	0-10	1980-2012	poor	
Finland	3,400-4,900	1	2006-2012	good	+	1-22	2001-2012	good	+	7-35	1980-2012	good	
France	1,100-1,300	<1	2010-2011	good	+	10-25	1996-2010	poor	+	40-60	1983-2011	poor	
Germany	25,000-33,000	9	2005-2009	good	0	0	1998-2009	medium	0	0	1985-2009	medium	
Greece	60-100	<1	2008-2012	medium	0	0	2001-2012	medium	-	5-30	1980-2012	poor	
Iceland	10,000-20,000	4	1990	poor	?				?				
Rep. Ireland	2,316-3,087	1	2008-2011	medium	?				?				
Italy	260-330	<1	2009-2013	medium	+	85-120	2002-2013	medium	+	550-730	1983-2013	medium	
Latvia	72-125	<1	2000-2004	good	?				+	4-150	1980-2004	medium	
Lithuania	10-30	<1	2008-2012	medium	-	50-75	2001-2012	medium	+	900-2900	1980-2012	medium	
Montenegro	2-5	<1	2002-2012	medium	-		2002-2012	medium	?				
Netherlands	65,000-87,000	24	2009	good	-	32-37	2002-2011	medium	-	67-72	1984-2011	medium	
Norway	30,000-40,000	11	2013	poor	?				?				
Poland	15-25	<1	2008-2012	good	0	0	1997-2012	medium	+	200-210	1980-2012	medium	
Romania	50-150	<1	2008-2013	medium	+	0-19	2000-2012	poor	+	0-19	1980-2012	poor	
Russia	6,500-15,500	3	2000-2008	medium	-	5-30	2000-2012	medium	-	5-30	1980-2012	medium	
Spain	49-51	<1	2005-2007	good	0	0	1998-2009	good	0	0	1980-2009	medium	
Sweden	8,000-14,000	3	2008-2012	good	-	5-15	2001-2012	good	-	15-35	1980-2012	good	
Turkey	300-500	<1	2013	medium	-	20-29	2000-2012	poor	0	0-19	1990-2013	medium	
Ukraine	650-880	<1	2000	medium	F	10-20	1998-2010	medium	F	10-20	1980-2012	medium	
United Kingdom	110,000	35	2009	medium	-	8	1998-2010	good	+	340	1970-2009	good	
EU27	**226,000-267,000**	**77**			**Decreasing**								
Europe	**284,000-354,000**	**100**			**Decreasing**								

Table A 6.7. Breeding population size and trend by country/territory for Northern Lapwing
source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (pairs)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Albania	10-30	<1	2002-2012	medium	-	10-20	2002-2012	medium	-	10-30	1980-2012	poor	
Armenia	100-400	<1	2002-2012	medium	?				?				
Austria	3,500-5,000	<1	2001-2012	medium	0	0	2001-2012	medium	?				Europe, W Asia/Europe, N Africa & SW Asia
Azerbaijan	500-5,000	<1	1996-2000	poor	?				?				
Belarus	100,000-160,000	6	2012-2013	medium	F	10-60	2000-2012	medium	F	10-60	1980-2012	medium	
Belgium	15,000-20,000	1	2008-2012	medium	-	1-25	2000-2012	medium	0	0	1973-2012	medium	Europe, W Asia/Europe, N Africa & SW Asia
Bosnia & HG	500-700	<1	2010-2014	poor	-	5-10	2001-2012	poor	-	5-10	1980-2013	poor	
Bulgaria	800-1,500	<1	2005-2012	medium	-	10-15	2000-2012	medium	-	10-20	1980-2012	medium	Europe, W Asia/Europe, N Africa & SW Asia
Croatia	1,000-5,000	<1	2013	poor	?				?				
Czech Rep.	7,000-10,000	<1	2012	medium	F	0	2000-2012	good	-	165-238	1982-2012	good	Europe, W Asia/Europe, N Africa & SW Asia
Denmark	20,000	1	2011	medium	-	33-50	1999-2011	good	-	50-100	1980-2011	good	Europe, W Asia/Europe, N Africa & SW Asia
DK: Faroe Is	2-5	<1	2014	medium	-		2001-2014	poor	-		1980-2014	poor	
Estonia	40,000-60,000	2	2008-2012	medium	+	50-70	2001-2012	medium	+	20-50	1980-2012	medium	Europe, W Asia/Europe, N Africa & SW Asia
Finland	92,000-120,000	5	2006-2012	good	+	15-72	2001-2012	good	+	24-74	1983-2012	good	Europe, W Asia/Europe, N Africa & SW Asia
France	12,000-18,000	1	2010-2011	medium	-	5-30	1996-2010	poor	-	20	1983-2011	poor	Europe, W Asia/Europe, N Africa & SW Asia
Georgia	Present	<1			?				?				
Germany	63,000-100,000	4	2005-2009	good	-	48-62	1998-2009	good	-	65-85	1990-2009	good	Europe, W Asia/Europe, N Africa & SW Asia
Greece	50-100	<1	2008-2012	medium	0	0	2001-2012	medium	0	0	1980-2012	medium	Europe, W Asia/Europe, N Africa & SW Asia
Hungary	29,000-38,000	2	2000-2012	medium	0	0	1999-2012	medium	-	42-62	1990-2012	poor	Europe, W Asia/Europe, N Africa & SW Asia
Rep. Ireland	2,000	<1	2008	poor	-	88	1991-2008	medium	-	88	1972-2008	medium	Europe, W Asia/Europe, N Africa & SW Asia
Italy	4,800-6,050	<1	2003-2011	medium	?				+		1980-2012	poor	Europe, W Asia/Europe, N Africa & SW Asia
Kosovo	200-300	<1	2009-2014	medium	?				?				
Latvia	126,472-286,669	9	2012	good	0	0-50	2001-2012	good	+	1-67	1995-2012	good	Europe, W Asia/Europe, N Africa & SW Asia
Liechtenstein	0	<1	2009-2014	good	-	100	2001-2003	good	-	100	1980-2003	good	
Lithuania	12,000-15,000	1	2008-2012	medium	-	20-30	2001-2012	medium	-	20-30	1980-2012	medium	Europe, W Asia/Europe, N Africa & SW Asia
Luxembourg	10-20	<1	2008-2012	good	-	35-45	2000-2012	good	-	1000-1500	1980-2012	good	Europe, W Asia/Europe, N Africa & SW Asia
FYRO Macedonia	50-150	<1	2001-2012	poor	0	0	2001-2012	poor	?				
Moldova	350-500	<1	2000-2010	medium	F	0	2000-2010	medium	F	0	1980-2010	medium	
Netherlands	131,655-229,856	9	2008-2011	medium	-	34-41	2003-2012	good	-	33-46	1984-2010	good	Europe, W Asia/Europe, N Africa & SW Asia
Norway	7,500-10,000	<1	1996-2012	poor	-	50-75	2007-2012	good	-	80-85	1996-2012	medium	
Poland	90,000-120,000	5	2008-2012	good	-	35-40	2000-2012	good	?				Europe, W Asia/Europe, N Africa & SW Asia
Portugal	10-100	<1	2008-2012	medium	?				?				Europe, W Asia/Europe, N Africa & SW Asia
Romania	65,000-130,000	5	2010-2013	medium	F	0-20	2001-2013	medium	?				Europe, W Asia/Europe, N Africa & SW Asia
Russia	500,000-850,000	32	2005-2008	medium	-	5-30	2000-2012	medium	-	5-30	1980-2012	medium	
Serbia	2,050-2,700	<1	2008-2012	medium	0	0	2000-2012	medium	-	1-9	1980-2012	medium	
Slovakia	2,000-4,000	<1	2000-2012	poor	-	10-30	2000-2012	poor	-	30-50	1980-2012	poor	Europe, W Asia/Europe, N Africa & SW Asia
Slovenia	700-1,000	<1	2002-2012	medium	?				-	20-30	1980-2012	poor	Europe, W Asia/Europe, N Africa & SW Asia
Spain	1,500-1,600	<1	1998-2002	good	0	0	1998-2002	good	-		1980-2009	medium	Europe, W Asia/Europe, N Africa & SW Asia
Sweden	48,000-77,000	3	2008-2012	medium	-	8-32	2001-2012	good	0	0	1980-2012	good	Europe, W Asia/Europe, N Africa & SW Asia
Switzerland	90-130	<1	2008-2012	good	-	18-72	2001-2012	medium	-	80-90	1980-2012	medium	
Turkey	10,000-20,000	1	2013	medium	-	30-49	2000-2012	poor	-	0-19	1990-2013	medium	
Ukraine	65,000-124,000	4	2000	medium	-	30-70	1998-2010	medium	-	35-80	1980-2010	medium	
United Kingdom	140,000	7	2009	medium	-	24	1998-2010	good	-	61	1980-2010	good	Europe, W Asia/Europe, N Africa & SW Asia
EU27	**906,000-1,410,000**	**56**			**Decreasing**								
Europe	**1,590,000-2,580,000**	**100**			**Decreasing**								

Table A 6.8. Breeding population size and trend by country/territory for Ruff
source: BirdLife International (2015) European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities

Country (or territory)[2]	Population estimate				Short-term population trend[4]				Long-term population trend[4]				Subspecific population (where relevant)
	Size (calling/lekking males)[3]	Europe (%)	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	Direction[5]	Magnitude (%)[6]	Year(s)	Quality	
Belarus	2,000-2,400	<1	2000-2012	medium	F	20	2000-2012	medium	F	20	1980-2012	medium	
Czech Rep.	0	<1	2001-2003	good	?				?				
Denmark	18-35	<1	2010	good	-	50-100	2000-2011	good	-	50-100	1980-2011	good	
Estonia	10-30	<1	2008-2012	medium	-	20-50	2001-2012	medium	-	50-70	1980-2012	medium	
Finland	6,000-13,500	1	2000-2012	medium	-	0-100	2001-2012	medium	-	79-99	1983-2012	good	
France	0-10	<1	2008-2012	good	-	75-100	2002-2012	good	-	80-100	1981-2012	good	
Germany	24-26	<1	2005-2009	good	-	92-99	1998-2009	good	-	51-100	1985-2009	medium	
Latvia	0-5	<1	2012	medium	?				-	90-100	1994-2012	poor	
Lithuania	200-300	<1	2008-2012	medium	+	20-30	2001-2012	medium	0	0	1980-2012	medium	
Netherlands	9-45	<1	2008-2011	medium	-	53-89	2008-2012	good	-	99	1984-2011	good	
Norway	1,030-1,710	<1	2009	medium	-	85-95	2002-2009	medium	-	65-90	1980-2012	medium	
Poland	0-2	<1	2008-2012	medium	-	99-100	1996-2012	medium	-	95-100	1980-2012	medium	
Russia	240,000-1,600,000	94	2000-2006	medium	F	0	2001-2012	medium	-	5-30	1980-2012	medium	
Sweden	16,000-35,000	4	2008-2012	medium	-	25-75	2001-2012	medium	-	25-75	1980-2012	medium	
Ukraine	100-150	<1	2000	medium	-	20-50	1998-2010	medium	-	25-50	1980-2012	medium	
United Kingdom	0-11	<1	2006-2010	good	-	67	1996-2008	good	-	86	1980-2008	good	
EU27	**22,300-49,000**	**5**			**Decreasing**								
Europe	**265,000-1,650,000**	**100**			**Decreasing**								

Explanations:

- [2] The designation of geographical entities and the presentation of the material do not imply the expression of any opinion whatsoever on the part of IUCN or BirdLife International concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.
- [3] In the few cases where population size estimates were reported in units other than those specified, they were converted to the correct units using standard correction factors.
- [4] The robustness of regional trends to the effects of any missing or incomplete data was tested using plausible scenarios, based on other sources of information, including any other reported information, recent national Red Lists, scientific literature, other publications and consultation with relevant experts.
- [5] Trend directions are reported as: increasing (+); decreasing (-); stable (0); fluctuating (F); or unknown (?).
- [6] Trend magnitudes are rounded to the nearest integer.
- Short-term trend = last 10 years (or 3 generations), but the period is not necessarily the same for all countries.
- Quality: **good** = reliable quantitative data; **medium** = incomplete data derived from sampling or interpolation; **poor** = estimates derive from circumstantial evidence (no data)

Annex 7. LIST OF ACRONYMS AND ABBREVIATIONS

AES – Agri-Environment Schemes

BTO – British Trust for Ornithology

CAP – Common Agricultural Policy

CMS - Convention on Migratory Species

DOF - Dansk Ornitologisk Forening (BirdLife Denmark)

EU – European Union

FACE – The European Federation of Associations for Hunting and Conservation

IUCN – International Union for Conservation of Nature

LPO – Ligue pour la Protection des Oiseaux (BirdLife France)

NGO - Non-governmental Organisation

NABU - Nature and Biodiversity Conservation Union (BirdLife Germany)

ONCFS - Office national de la Chasse et de la Faune Sauvage

RDP - Rural Development Funds

RSPB - Royal Society for the Protection of Birds (BirdLife United Kingdom)

SEO - Sociedad Española de Ornitología (BirdLife Spain)

SPA - Special Protection Area

SPEA - Sociedade Portuguesa para o Estudo das Aves (BirdLife Portugal)

Annex 8. REFERENCES

1 Atkinson, P, R Fuller, J Vickery, G Conway, J Tallowin, R Smith, K Haysom, T Ings, E Asteraki & V Brown (2005) Influence of agricultural management, sward structure and food resources on grassland field use by birds in lowland England. *Journal of Applied Ecology* **42**, 932-942.

2 Atkinson, PW, NA Clark, MC Bell, PJ Dare, JA Clark & PL Ireland (2003) Changes in commercially fished shellfish stocks and shorebird populations in the Wash, England. *Biological Conservation* **114**, 127-141.

3 Atkinson, PW, NA Clark, JA Clark, MC Bell, PJ Dare & PL Ireland (2000) The effects of changes in shellfish stocks and winter weather on shorebird populations: results of a 30-year study on the Wash, England. *BTO research report*.

4 Ausden, M, M Bolton, N Butcher, DG Hoccom, J Smart & G Williams (2009) Predation of breeding waders on lowland wet grassland—Is it a problem? *British Wildlife* **21**, 29.

5 Ausden, M, WJ Sutherland & R James (2001) The effects of flooding lowland wet grassland on soil macroinvertebrate prey of breeding wading birds. *Journal of Applied Ecology* **38**, 320-338.

6 Baines, D (1990) The roles of predation, food and agricultural practice in determining the breeding success of the lapwing (*Vanellus vanellus*) on upland grasslands. *The Journal of Animal Ecology*, 915-929.

7 Beck, N & P Granval (1997) Lead shot ingestion by the common snipe (*Gallinago gallinago*) and the jack snipe (*Lymnocryptes minimus*) in northwestern France. *Gibier Faune Sauvage (France)*.

8 Beintema, A (1983) in *Shorebirds and large waterbirds conservation. Proceedings of two workshops held at St. Aidens College* eds P R Evans, H Hafner, & P L'Hermite pp. 26-33.

9 Beintema, A & G Muskens (1987) Nesting success of birds breeding in Dutch agricultural grasslands. *Journal of Applied Ecology* **24**, 743-758.

10 Beintema, A & G Visser (1989) The effect of weather on time budgets and development of chicks of meadow birds. *Ardea* **77**, 181-192.

11 Bellebaum, J & C Bock (2009) Influence of ground predators and water levels on Lapwing *Vanellus vanellus* breeding success in two continental wetlands. *Journal of Ornithology* **150**, 221-230.

12 Berendse, F, D Chamberlain, D Kleijn & H Schekkerman (2004) Declining biodiversity in agricultural landscapes and the effectiveness of agri-environment schemes. *Ambio: A journal of the Human environment* **33**, 499-502.

13 Bertholdt, NP, JA Gill, RA Laidlaw & J Smart (2017) Landscape effects on nest site selection and nest success of Northern Lapwing Vanellus vanellus in lowland wet grasslands. *Bird Study* **64**, 30-36.

14 BirdLife International (2004) *Birds in Europe: Population estimates, trends and conservation status*. BirdLife International pp.

15 BirdLife International (2015) *European Red List of Birds*. Page Office for Official Publications of the European Union, Luxembourg.

16 BirdLife International (2017) *European birds of conservation concern: populations, trends and national responsibilities*. Page BirdLife International, Cambridge, UK.

17 Blomqvist, D, A Pauliny, M Larsson & L-Å Flodin (2010) Trapped in the extinction vortex? Strong genetic effects in a declining vertebrate population. *BMC Evolutionary Biology* **10**, 33.

18 Blöschl, G, J Hall, J Parajka, RA Perdigão, B Merz, B Arheimer, GT Aronica, A Bilibashi, O Bonacci & M Borga (2017) Changing climate shifts timing of European floods. *Science* **357**, 588-590.

19 Bolton, M, G Tyler, K Smith & R Bamford (2007) The impact of predator control on lapwing *Vanellus vanellus* breeding success on wet grassland nature reserves. *Journal of Applied Ecology* **44**, 534-544.

20 Both, C, AV Artemyev, B Blaauw, RJ Cowie, AJ Dekhuijzen, T Eeva, A Enemar, L Gustafsson, EV Ivankina & A Järvinen (2004) Large–scale geographical variation confirms that climate change causes birds to lay earlier. *Proceedings of the Royal Society of London B: Biological Sciences* **271**, 1657-1662.

21 Both, C, CAM van Turnhout, RG Bijlsma, H Siepel, AJ van Strien & RPB Foppen (2010) Avian population consequences of climate change are most severe for long-distance migrants in seasonal habitats. *Proceedings of the Royal Society London B* **277**, 1259-1266.

22 Both, C & ME Visser (2001) Adjustment to climate change is constrained by arrival date in a long-distance migrant bird. *Nature* **411**, 296-298.

23 Brandsma, OH, R Kentie & T Piersma (2017) Why Did Lapwings Vanellus vanellus in Managed Habitat Advance Egg Laying During a Period without Warming Early Springs? *Ardea* **105**, 19-26.

24 Breeuwer, A, F Berendse, F Willems, R Foppen, W Teunissen, H Schekkerman & P Goedhart (2009) Do meadow birds profit from agri-environment schemes in Dutch agricultural landscapes? *Biological Conservation* **142**, 2949-2953.

25 Brown, DJ (in prep) *International Single Species Action Plan for the Conservation of the Eurasian Curlew Numenius arquata arquata, N. a. orientalis and N. a. suschkini.* . Page, Bonn, Germany.

26 Camphuysen, C, B Ens, D Heg, J Hulscher, J Van der Meer & C Smit (1996) Oystercatcher *Haematopus ostralegus* winter mortality in The Netherlands: the effect of severe weather and food supply. *Ardea*.

27 Crick, HQP (2004) The impact of climate change on birds. *Ibis* **146**, 48-56.

28 Delany, S, D Scott, T Dodman & D Stroud (2009) *An atlas of wader populations in Africa and Western Eurasia*. Wetlands International pp.

29 Dijksen, L (1980) Enige gegevens over broedseizoen en broedsukses bij Scholeksters (*Haemotopus ostralegus*) in de duinen. *Watervogels* **5**, 3-7.

30 Dittmann, T, P Becker, J Bakker, A Bignert, E Nyberg, M Pereira, U Pijanowska, R Shore, E Stienen, G Toft & H Marencic (2011) *The EcoQO on mercury and organohalogens in coastal bird eggs: report on the pilot study 2008 – 2010*. Page (INBO.R.2011.43). Research Institute for Nature and Forest, Brussel.

31 Donald, P, R Green & M Heath (2001) Agricultural intensification and the collapse of Europe's farmland bird populations. *Proceedings of the Royal Society of London B: Biological Sciences* **268**, 25-29.

32 Donald, PF, G Pisano, MD Rayment & DJ Pain (2002) The Common Agricultural Policy, EU enlargement and the conservation of Europe's farmland birds. *Agriculture, Ecosystems & Environment* **89**, 167-182.

33 Donald, PF, FJ Sanderson, IJ Burfield & FP Van Bommel (2006) Further evidence of continent-wide impacts of agricultural intensification on European farmland birds, 1990–2000. *Agriculture, Ecosystems & Environment* **116**, 189-196.

34 Duriez, O, BJ Ens, R Choquet, R Pradel & M Klaassen (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. *Oikos* **121**, 862-873.

35 Dyrcz, A, J Witkowski & J Okulewicz (1981) Nesting of 'timid'waders in the vicinity of 'bold'ones as an antipredator adaptation. *Ibis* **123**, 542-545.

36 Eglington, S (2008) *Managing water levels on wet grasslands for breeding waders: the use of shallow wet features*, University of East Anglia.

37 Eglington, SM, M Bolton, MA Smart, WJ Sutherland, AR Watkinson & JA Gill (2010) Managing water levels on wet grasslands to improve foraging conditions for breeding northern lapwing *Vanellus vanellus*. *Journal of Applied Ecology* **47**, 451-458.

38 Eglington, SM, JA Gill, M Bolton, MA Smart, WJ Sutherland & AR Watkinson (2008) Restoration of wet features for breeding waders on lowland grassland. *Journal of Applied Ecology* **45**, 305-314.

39 Eglington, SM, JA Gill, MA Smart, WJ Sutherland, AR Watkinson & M Bolton (2009) Habitat management and patterns of predation of Northern Lapwings on wet grasslands: the influence of linear habitat structures at different spatial scales. *Biological Conservation* **142**, 314-324.

40 Evans, K (2004) The potential for interactions between predation and habitat change to cause population declines of farmland birds. *Ibis* **146**, 1-13.

41 Franks, SE, M Roodbergen, W Teunissen, A Cotton & JW Pearce-Higgins (2016).

42 Fuller, R, R Gregory, D Gibbons, J Marchant, J Wilson, S Baillie & N Carter (1995) Population declines and range contractions among lowland farmland birds in Britain. *Conservation Biology* **9**, 1425-1441.

43 Galbraith, H (1988) Effects of agriculture on the breeding ecology of lapwings *Vanellus vanellus*. *Journal of Applied Ecology*, 487-503.

44 Gibbons, D, A Amar, G Anderson, M Bolton, RB Bradbury, MA Eaton, A Evans, MC Grant, R Gregory, G Hilton, G Hirons, J Hughes, I Johnstone, P Newberry, W Peach, N Ratcliffe, K Smith, R Summers, P Walton & J Wilson (2007) *The predation of wild birds in the UK: A review of its conservation impact and management*. Page RSPB, Sandy.

45 Gill, JA, RH Langston, JA Alves, PW Atkinson, P Bocher, NC Vieira, NJ Crockford, G Gélinaud, N Groen & TG Gunnarsson (2007) Contrasting trends in two Black-tailed Godwit populations: a review of causes and recommendations. *Wader Study Group Bulletin* **114**, 43.

46 Glutz von Blotzheim, UH (1986) *Handbuch der Vögel Mitteleuropas, Bd. 7: Charadriiformes (2.Teil)*. 2. Aufl. AULA-Verlag pp.

47 Görn, S, F Schulze & K Fischer (2015) Effects of fen management on bird communities in north-eastern Germany. *Journal of Ornithology* **156**, 287-296.

48 Green, R (1988) Effects of environmental factors on the timing and success of breeding of common snipe *Gallinago gallinago* (Aves: Scolopacidae). *Journal of Applied Ecology*, 79-93.

49 Groen, NM & L Hemerik (2002) Reproductive success and survival of Black-tailed Godwits *Limosa limosa* in a declining local population in the Netherlands. *Ardea* **90**, 239-248.

50 Groen, NM, R Kentie, Pd Goeij, B Verheijen, JC Hooijmeijer & T Piersma (2012) A modern landscape ecology of Black-tailed Godwits: habitat selection in southwest Friesland, The Netherlands. *Ardea* **100**, 19-28.

51 Gunnarsson, TG, JA Gill, GF Appleton, H Gíslason, A Gardarsson, AR Watkinson & WJ Sutherland (2006) Large-scale habitat associations of birds in lowland Iceland: implications for conservation. *Biological Conservation* **128**, 265-275.

52 Hallmann, CA, RP Foppen, CA van Turnhout, H de Kroon & E Jongejans (2014) Declines in insectivorous birds are associated with high neonicotinoid concentrations. *Nature* **511**, 341-343.

53 Hallmann, CA, M Sorg, E Jongejans, H Siepel, N Hofland, H Schwan, W Stenmans, A Müller, H Sumser, T Hörren, D Goulson & H de Kroon (2017) More than 75 percent decline over 27 years in total flying insect biomass in protected areas. *PLOS ONE* **12**, e0185809.

54 Heg, D (1999) *Life-history decisions in oysteratchers* PhD thesis, University of Groningen.

55 Herold, B (2012) *Neues Leben in alten Mooren – Brutvögel wiedervernässter Flusstalmoore*. Haupt pp.

56 Holm, TE & K Laursen (2009) Experimental disturbance by walkers affects behaviour and territory density of nesting Black-tailed Godwit *Limosa limosa*. *Ibis* **151**, 77-87.

57 Holsten, B (2003) *Der Einfluss extensiver Beweidung auf ausgewählte Tiergruppen im oberen Eidertal*, Christian-Albrechts Universität Kiel.

58 Hoodless, AN & D Baines. (Year) in *Sixth European Woodcock and Snipe Workshop - Proceedings of an International Symposium of the Wetlands International Woodcock and Snipe Specialist Group, 25-27 November 2003.* ed Y Ferrand 95-101 International Wader Studies 13. Wetlands International, Wageningen.

59 Hötker, H (1991) Waders breeding on wet grasslands. *Wader Study Group Bull-etin* **61**, 1-107.

60 Hötker, H, H Jeromin & J Melter (2007) Entwicklung der Brutbestände der Wiesen-Limikolen in Deutschland– Ergebnisse eines neuen Ansatzes im Monitoring mittelhäufiger Brutvogelarten. *Vogelwelt* **128**, 49-65.

61 Hötker, H, H Jeromin & K-M Thomsen (2007) *Aktionsplan für Wiesenvögel und Feuchtwiesen - Endbericht*. Page Michael-Otto-Institut im NABU, Bergenhusen.

62 Hötker, H, K-M Thomsen & H Köster (2006) Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats. *Facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen* **65**.

63 International Wader Study Group (2001) The Kollumerpomp Statement. *Wader Study Group Bulletin* **96**, 14-16.

64 Jackson, DB (2001) Experimental removal of introduced hedgehogs improves wader nest success in the Western Isles, Scotland. *Journal of Applied Ecology* **38**, 802-812.

65 Jensen, FP, A Béchet & E Wymenga (2008) *International Single Species Action Plan for the Conservation of Black-tailed Godwit Limosa l. limosa & L. l. islandica.* . Page, Bonn, Germany.

66 Jiguet, F, L Godet & V Devictor (2012) Hunting and the fate of French breeding waterbirds. *Bird study* **59**, 474-482.

67 Kentie, R (2015) *Spatial demography of black-tailed godwits: Metapopulation dynamics in a fragmented agricultural landscape* PhD Thesis thesis, University of Groningen.

68 Kentie, R, C Both, JC Hooijmeijer & T Piersma (2015) Management of modern agricultural landscapes increases nest predation rates in Black‐tailed Godwits *Limosa limosa*. *Ibis* **157**, 614-625.

69 Kentie, R, JC Hooijmeijer, KB Trimbos, NM Groen & T Piersma (2013) Intensified agricultural use of grasslands reduces growth and survival of precocial shorebird chicks. *Journal of Applied Ecology* **50**, 243-251.

70 Kleijn, D, R Baquero, Y Clough, M Diaz, Jd Esteban, F Fernández, D Gabriel, F Herzog, A Holzschuh & R Jöhl (2006) Mixed biodiversity benefits of agri‐environment schemes in five European countries. *Ecology letters* **9**, 243-254.

71 Kleijn, D, F Berendse, R Smit & N Gilissen (2001) Agri-environment schemes do not effectively protect biodiversity in Dutch agricultural landscapes. *Nature* **413**, 723-725.

72 Kleijn, D, F Berendse, R Smit, N Gilissen, J Smit, B Brak & R Groeneveld (2004) Ecological effectiveness of agri‐environment schemes in different agricultural landscapes in The Netherlands. *Conservation Biology* **18**, 775-786.

73 Kleijn, D, H Schekkerman, WJ Dimmers, RJ Van Kats, D Melman & WA Teunissen (2010) Adverse effects of agricultural intensification and climate change on breeding habitat quality of Black-tailed Godwits *Limosa l. limosa* in the Netherlands. *Ibis* **152**, 475-486.

74 Kleijn, D & WJ Sutherland (2003) How effective are European agri‐environment schemes in conserving and promoting biodiversity? *Journal of applied ecology* **40**, 947-969.

75 Laidlaw, R, J Smart, M Smart & J Gill (2013) Managing a food web: impacts on small mammals of managing grasslands for breeding waders. *Animal Conservation* **16**, 207-215.

76 Laidlaw, RA, J Smart, MA Smart & JA Gill (2015) The influence of landscape features on nest predation rates of grassland-breeding waders. *Ibis* **157**, 700-712.

77 Laidlaw, RA, J Smart, MA Smart & JA Gill (2017) Scenarios of habitat management options to reduce predator impacts on nesting waders. *Journal of Applied Ecology* **54**, 1219-1229.

78 Langgemach, T & J Bellebaum (2005) Prädation und der Schutz bodenbrütender Vogelarten in Deutschland. *Vogelwelt* **126**, 259-298.

79 Madsen, J & AD Fox (1995) Impacts of hunting disturbance on waterbirds - a review. *Wildlife Biology* **1**, 193-207.

80 Malpas, LR, RJ Kennerley, GJ Hirons, RD Sheldon, M Ausden, JC Gilbert & J Smart (2013) The use of predator-exclusion fencing as a management tool improves the breeding success of waders on lowland wet grassland. *Journal for Nature Conservation* **21**, 37-47.

81 Mateo, R (2009) Lead poisoning in wild birds in Europe and the regulations adopted by different countries. *Ingestion of lead from spent ammunition: implications for wildlife and humans* **2009**, 71-98.

82 Mongin, E. (Year) in *Sixth European Woodcock and Snipe Workshop – Proceedings of an International Symposium of the Wetlands International Woodcock and Snipe Specialist Group, 25–27 November 2003.* ed Y Ferrand 82-88 International Wader Studies 13. Wetlands International, Wageningen.

83 Newton, I (2004) The recent declines of farmland bird populations in Britain: an appraisal of causal factors and conservation actions. *Ibis* **146**, 579-600.

84 Obracay, K (2016) Bestand und Verbreitung der Bekassine *Gallinago gallinago* in Niedersachsen. Ergebnisse der landesweiten Brutbestandserfassung 2013. *Vogelkundlicher Berichte aus Niedersachsen* **45**, 3-35.

85 Onrust, J & T Piersma (2017) The hungry worm feeds the bird. *Ardea* **105**.

86 Pakanen, V-M, A Luukkonen & K Koivula (2011) Nest predation and trampling as management risks in grazed coastal meadows. *Biodiversity and Conservation* **20**, 2057-2073.

87 Pakanen, V-M, N Rönkä, RL Thomson & K Koivula (2014) Informed renesting decisions: the effect of nest predation risk. *Oecologia* **174**, 1159-1167.

88 Pakanen, VM, K Koivula, LÅ Flodin, A Grissot, R Hagstedt, M Larsson, A Pauliny, N Rönkä & D Blomqvist (2017) Between‐patch natal dispersal declines with increasing natal patch size and distance to other patches in the endangered Southern Dunlin Calidris alpina schinzii. *Ibis* **159**, 611-622.

89 Pe'er, G, L Dicks, P Visconti, R Arlettaz, A Báldi, T Benton, S Collins, M Dieterich, R Gregory & F Hartig (2014) EU agricultural reform fails on biodiversity. *Science* **344**, 1090-1092.

90 Pearce‐Higgins, JW, L Stephen, RH Langston, IP Bainbridge & R Bullman (2009) The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology* **46**, 1323-1331.

91 Peron, G, JE Hines, JD Nichols, WL Kendall, KA Peters & DS Mizrahi (2013) Estimation of bird and bat mortality at wind‐power farms with superpopulation models. *Journal of Applied Ecology* **50**, 902-911.

92 Prater, A (1975) The wintering population of the black-tailed godwit. *Bird Study* **22**, 169-176.

93 Reijnen, R & R Foppen (2006) in *The ecology of transportation: managing mobility for the environment* Springer pp. 255-274.

94 Reijnen, R, R Foppen & H Meeuwsen (1996) The effects of traffic on the density of breeding birds in Dutch agricultural grasslands. *Biological Conservation* **75**, 255-260.

95 Reijnen, R, R Foppen & G Veenbaas (1997) Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. *Biodiversity & Conservation* **6**, 567-581.

96 Roodbergen, M & H Hötker (2014) in *Annual Conference of the International Wader Study Group 2014* Haapsalu, Estonia.

97 Roodbergen, M & C Klok (2008) Timing of breeding and reproductive output in two Black-tailed Godwit *Limosa limosa* populations in The Netherlands. *Ardea* **96**, 219-232.

98 Roodbergen, M, C Klok & A van der Hout (2008) Transfer of heavy metals in the food chain earthworm Black-tailed godwit (*Limosa limosa*): comparison of a polluted and a reference site in The Netherlands. *Science of the total environment* **406**, 407-412.

99 Roodbergen, M, B van der Werf & H Hötker (2012) Revealing the contributions of reproduction and survival to the Europe-wide decline in meadow birds: review and meta-analysis. *Journal of Ornithology* **153**, 53-74.

100 Roos, S, J Smart, J Wilson & D Gibbons (in review) A review of predation as a limiting factor for UK bird populations in mesopredator-rich-landscapes: the UK as a case study. *Biological Reviews*, in review.

101 Salek, M & P Smilauer (2002) Predation on Northern Lapwing *Vanellus vanellus* nests: the effect of population density and spatial distribution of nests. *Ardea* **90**, 51-60.

102 Schekkerman, H (2008) *Precocial problems - Shorebird chick performance in relation to weather, farming, and predation* PhD Thesis thesis, University of Groningen.

103 Schekkerman, H & AJ Beintema (2007) Abundance of invertebrates and foraging success of Black-tailed Godwit *Limosa limosa* chicks in relation to agricultural grassland management. *Ardea* **95**, 39-54.

104 Schekkerman, H, W Teunissen & E Oosterveld (2008) The effect of 'mosaic management'on the demography of black-tailed godwit *Limosa limosa* on farmland. *Journal of Applied Ecology* **45**, 1067-1075.

105 Schekkerman, H, W Teunissen & E Oosterveld (2009) Mortality of Black-tailed Godwit *Limosa limosa* and Northern Lapwing *Vanellus vanellus* chicks in wet grasslands: influence of predation and agriculture. *Journal of Ornithology* **150**, 133-145.

106 Schroeder, J, T Piersma, NM Groen, JC Hooijmeijer, R Kentie, PM Lourenço, H Schekkerman & C Both (2012) Reproductive timing and investment in relation to spring warming and advancing agricultural schedules. *Journal of Ornithology* **153**, 327-336.

107 Senner, NR, MA Verhoeven, JM Abad‐Gómez, JS Gutierrez, JC Hooijmeijer, R Kentie, JA Masero, TL Tibbitts & T Piersma (2015) When Siberia came to the Netherlands: the response of continental black‐tailed godwits to a rare spring weather event. *Journal of Animal Ecology* **84**, 1164-1176.

108 Sharps, E, A Garbutt, JG Hiddink, J Smart & MW Skov (2016) Light grazing of saltmarshes increases the availability of nest sites for Common Redshank *Tringa totanus*, but reduces their quality. *Agriculture, ecosystems & environment* **221**, 71-78.

109 Sharps, E, J Smart, MW Skov, A Garbutt & JG Hiddink (2015) Light grazing of saltmarshes is a direct and indirect cause of nest failure in Common Redshank *Tringa totanus*. *Ibis* **157**, 239-249.

110 Shrubb, M (1990) Effects of agricultural change on nesting lapwings *Vanellus vanellus* in England and Wales. *Bird Study* **37**, 115-127.

111 Smart, J (2016) A question of scale – from nature reserves to landscape-scale conservation. *Wader Study* **123**, 81-83.

112 Smart, J, A Amar, M O'Brien, P Grice & K Smith (2008) Changing land management of lowland wet grasslands of the UK: impacts on snipe abundance and habitat quality. *Animal Conservation* **11**, 339-351.

113 Smart, J, M Bolton, F Hunter, H Quayle, G Thomas & RD Gregory (2013) Managing uplands for biodiversity: Do agri‐environment schemes deliver benefits for breeding lapwing Vanellus vanellus? *Journal of Applied Ecology* **50**, 794-804.

114 Smart, J & J Gill (2003) Climate change and the potential impact on breeding waders in the UK. *Wader Study Group Bulletin* **100**, 80-85.

115 Smart, J, JA Gill, WJ Sutherland & AR Watkinson (2006) Grassland‐breeding waders: identifying key habitat requirements for management. *Journal of Applied Ecology* **43**, 454-463.

116 Smit, CJ & GJ Visser (1993) Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta. *Wader Study Group Bulletin, numéro special* **68**, 6-19.

117 Smith, RK, AS Pullin, GB Stewart & WJ Sutherland (2011) Is nest predator exclusion an effective strategy for enhancing bird populations? *Biological conservation* **144**, 1-10.

118 Stillman, RA, AD West, JD Goss‐Custard, RW Caldow, S Mcgrorty, SELV Durell, MG Yates, PW Atkinson, NA Clark & MC Bell (2003) An individual behaviour‐based model can predict shorebird mortality using routinely collected shellfishery data. *Journal of Applied Ecology* **40**, 1090-1101.

119 Stroud, D, NC Davidson, R West, DA Scott, L Haanstra, O Thorup, B Ganter & S Delany (2004) *Status of migratory wader populations in Afrcia and Western Eurasia in the 1990s*. International Wader Study Group pp.

120 Taylor, IR & MC Grant (2004) Long-term trends in the abundance of breeding lapwing *Vanellus vanellus* in relation to land-use change on upland farmland in southern Scotland. *Bird Study* **51**, 133-142.

121 Teunissen, W, H Schekkerman & F Willems (2006) Predation on meadowbirds in the Netherlands–results of a four-year study. *Ökologie und Schutz von Wiesenvögeln in Mitteleuropa*, 137-143.

122 Teunissen, W, H Schekkerman, F Willems & F Majoor (2008) Identifying predators of eggs and chicks of Lapwing *Vanellus vanellus* and Black-tailed Godwit *Limosa limosa* in the Netherlands and the importance of predation on wader reproductive output. *Ibis* **150**, 74-85.

123 Thorup, O (2006) *Breeding waders in Europe 2000*. Vol. 14 International Wader Study Group pp.

124 Valkama, J, D Currie & E Korpimäki (1999) Differences in the intensity of nest predation in the curlew *Numenius arquata*: a consequence of land use and predator densities? *Ecoscience* **6**, 497-504.

125 van de Kam, J (2004) *Shorebirds: an illustrated behavioural ecology*. KNNV pp.

126 van de Pol, M, PW Atkinson, J Blew, O Crowe, S Delany, O Duriez, BJ Ens, B Hälterlein, H Hötker & K Laursen (2014) A global assessment of the conservation status of the nominate subspecies of Eurasian Oystercatcher *Haematopus ostralegus ostralegus*. *International Wader Studies* **20**, 47-61.

127 Van De Pol, M, BJ Ens, D Heg, L Brouwer, J Krol, M Maier, KM Exo, K Oosterbeek, T Lok & CM Eising (2010) Do changes in the frequency, magnitude and timing of extreme climatic events threaten the population viability of coastal birds? *Journal of Applied Ecology* **47**, 720-730.

128 Verhulst, S, K Oosterbeek, A Rutten & B Ens (2004) Shellfish fishery severely reduces condition and survival of oystercatchers despite creation of large marine protected areas. *Ecology and Society* **9**.

129 Vickery, J, J Tallowin, R Feber, E Asteraki, P Atkinson, R Fuller & V Brown (2001) The management of lowland neutral grasslands in Britain: effects of agricultural practices on birds and their food resources. *Journal of Applied Ecology* **38**, 647-664.

130 Waterman, E, I Tulp, R Reijnen, K Krijgsveld & C Braak (2002) Disturbance of meadow birds by railway noise in The Netherlands. *Geluid* **1**, 2-3.

131 West, AD, JD Goss-Custard, RA Stillman, RW Caldow, SEIV dit Durell & S McGrorty (2002) Predicting the impacts of disturbance on shorebird mortality using a behaviour-based model. *Biological Conservation* **106**, 319-328.

132 Wilson, AM, M Ausden & TP Milsom (2004) Changes in breeding wader populations on lowland wet grasslands in England and Wales: causes and potential solutions. *Ibis* **146**, 32-40.

133 Wretenberg, J, Å Lindström, S Svensson, T Thierfelder & T Pärt (2006) Population trends of farmland birds in Sweden and England: similar trends but different patterns of agricultural intensification. *Journal of Applied Ecology* **43**, 1110-1120.

134 Żmihorski, M, T Pärt, T Gustafson & Å Berg (2016) Effects of water level and grassland management on alpha and beta diversity of birds in restored wetlands. *Journal of Applied Ecology* **53**, 587-595.